

TEST REPORT

Report Number: 23031222HKG-003

Application for Original Grant of 47 CFR Part 15 Certification

New Family of RSS-247 Issue 2 Equipment

This report contains the data of Bluetooth 4.0 BLE portion only.

FCC ID: 2A7PS-LOMIBLOOM

IC: 28807-LOMIBLOOM

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TEST REPORT

GENERAL INFORMATION

Applicant Name:	OPEN MIND DEVELOPMENTS CORPORATION
Applicant Address:	604-460 DOYLE AVE., UNIT 604, KELOWNA, BC V1Y 0C2, Canada.
FCC Specification Standard:	FCC Part 15, October 1, 2021 Edition
FCC ID:	2A7PS-LOMIBLOOM
FCC Model:	80201-LOMI-BLOOM-WH
Additional Model:	80202-LOMI-BLOOM-SAGE, 80203-LOMI-BLOOM-BLK, 80204-LOMI-BLOOM-D, 80205-LOMI-BLOOM-E, 80206-LOMI-BLOOM-F, 80207-LOMI-BLOOM-G, 80208-LOMI-BLOOM-H, 80209-LOMI-BLOOM-I
IC Specification Standard:	RSS-247 Issue 2, February 2017 RSS-Gen Issue 5 Amendment 2, February 2021
IC:	28807-LOMIBLOOM
HVIN:	80201
PMN:	80201-LOMI-BLOOM-WH, 80202-LOMI-BLOOM-SAGE, 80203-LOMI-BLOOM-BLK, 80204-LOMI-BLOOM-D, 80205-LOMI-BLOOM-E, 80206-LOMI-BLOOM-F, 80207-LOMI-BLOOM-G, 80208-LOMI-BLOOM-H, 80209-LOMI-BLOOM-I
Type of EUT:	Spread Spectrum Transmitter
Description of EUT:	Kitchen Composter/Bloom
Sample Receipt Date:	March 30, 2023
Date of Test:	April 04, 2023 to April 08, 2023
Report Date:	June 15, 2023
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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Conclusion:

Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 / RSS-247 Issue 2 Certification.

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1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	RSS-247/ RSS-Gen# Section	Results	Details See Section
Antenna Requirement	15.203	7.1.2#	Pass	2.1
Max. Conducted Output Power (Peak)	15.247(b)(3)&(4)	5.4(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	5.2(1)	Pass	4.2
Max. Power Density (average)	15.247(e)	5.2(2)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	5.5	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	5.5	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	N/A	4.7

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2021 Edition
RSS-247 Issue 2, February 2017
RSS-Gen Issue 5 Amendment 1, March 2019

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2.0 GENERAL DESCRIPTION

2.1 Product Description

The Equipment Under Test (EUT) is a composite device which consists of 2.4GHz Wi-Fi, Bluetooth 3.0 and BLE functions.

For IC, the PMN: 80201-LOMI-BLOOM-WH,80202-LOMI-BLOOM-SAGE,80203-LOMI-BLOOM-BLK, 80204-LOMI-BLOOM-D,80205-LOMI-BLOOM-E,80206-LOMI-BLOOM-F,80207-LOMI-BLOOM-G, 80208-LOMI-BLOOM-H,80209-LOMI-BLOOM-I are the same as the IC HVIN: 80201 in hardware aspect. The difference in PMN and color serves as marketing strategy.

For FCC, the Model: 80201-LOMI-BLOOM-WH,80202-LOMI-BLOOM-SAGE,80203-LOMI-BLOOM-BLK, 80204-LOMI-BLOOM-D,80205-LOMI-BLOOM-E,80206-LOMI-BLOOM-F,80207-LOMI-BLOOM-G, 80208-LOMI-BLOOM-H,80209-LOMI-BLOOM-I are the same as the IC HVIN: 80201 in hardware aspect. The difference in model number and color serves as marketing strategy.

The tested model is IC HVIN: 80201.

For Bluetooth BLE mode, it occupies a frequency range from 2402MHz to 2480MHz (40 channels with channel spacing of 2MHz). It transmits via GFSK modulation.

The EUT is powered by 120VAC.

The antenna(s) used in the EUT is integral, and the test sample is a prototype.
Peak Antenna Gain = 2.3 dBi

The circuit description is saved with filename: descri.pdf.

This report covers the test result of Bluetooth BLE portion only.

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2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v05r02 (02-April-2019) All other measurements were made in accordance with the procedures in 47 CFR Part 2 and RSS-Gen Issue 5 Amendment 2, February 2021.

2.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Shenzhen UnionTrust Quality and Technology Co., Ltd. at 16/F., Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109. This test facility and site measurement data have been fully placed on file with the FCC and Industry Canada No.: 21600, CABID "HKAP01", "CN0023".

2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (Bluetooth BLE portion).

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3.0 SYSTEM TEST CONFIGURATION

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by 120VAC.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209 / RSS-247 2.5. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 / RSS-247 Section 5.5 Limits.

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3.1 Justification – Cont'd

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period (Teff) was referred to Exhibit 4.6. With the resolution bandwidth 3MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

Different data rates have been tested. Worst case is reported only.

All relevant operation modes have been tested, and the worst-case data is included in this report.

For simultaneous transmission, both wifi and Bluetooth portions are also switched on when taking radiated emission for determining worst-case spurious emission.

3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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3.3 Details of EUT and Description of Accessories

None.

3.4 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044. For these excepted or not mentioned standards, Cl 4.2.2 of ILAC-G8:09/2019 decision rules will be reference and guard band will be equal to our measurement uncertainty with 95% confidence level ($k=2$). In case, the measured value is within guard band region, undetermined decision will be used. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are $\pm 5.3\text{dB}$ and $\pm 0.99\text{dB}$ respectively. The value of the Measurement uncertainty for conducted emission test is $\pm 4.2\text{dB}$.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

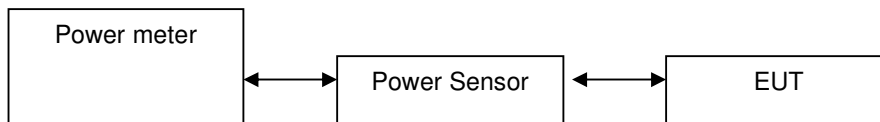
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4.0 TEST RESULTS

4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

RF Conduct Measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



The antenna port of the EUT was connected to the input of a spectrum analyzer.

- ☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals. The measurement procedure 8.3.2.3 was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

Peak Antenna Gain = 2.3dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2402	8.85	7.67
Middle Channel:	2440	8.23	6.65
High Channel:	2480	7.74	5.94

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

Max. conducted (peak) output level = 8.85 dBm

Limits:

☒ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___ W (___ dBm) for antennas with gains more than 6dBi

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4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Frequency (MHz)		6dB Bandwidth (MHz)
Low Channel:	2402	0.6384
Middle Channel:	2440	0.6366
High Channel:	2480	0.6376

Limits: 6dB bandwidth shall be at least 500kHz

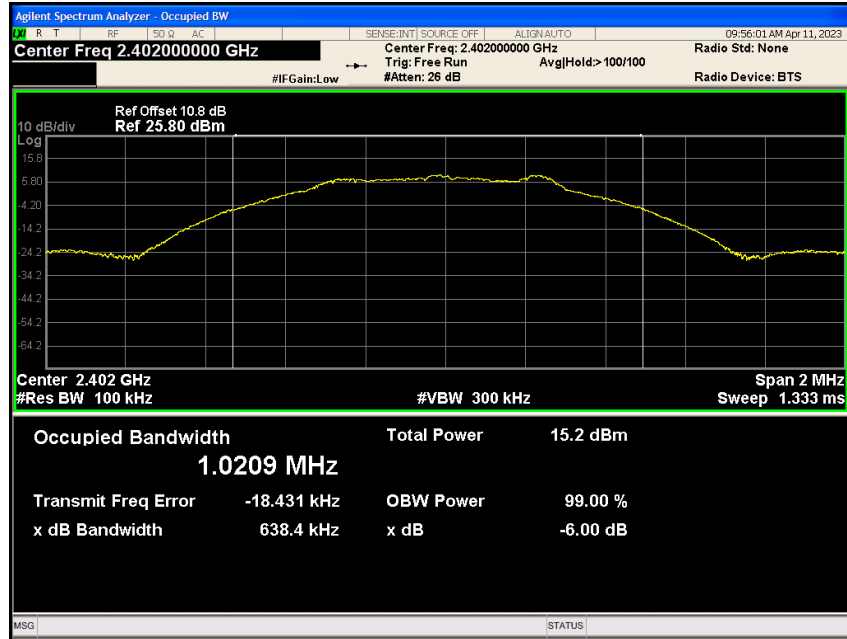
The plots of 6dB RF bandwidth are saved as below.

Tested by: Rain Wang

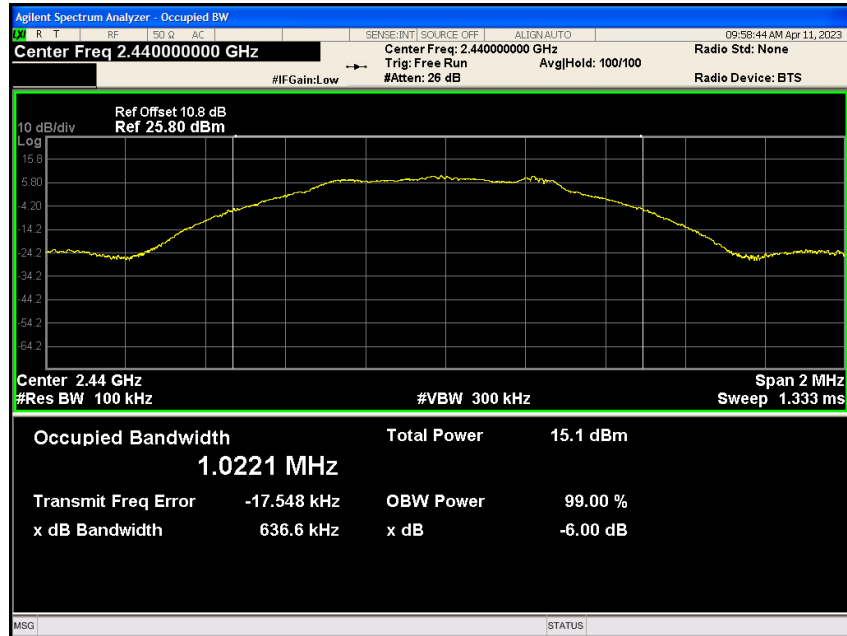
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PLOTS OF 6dB RF BANDWIDTH

Lowest Channel



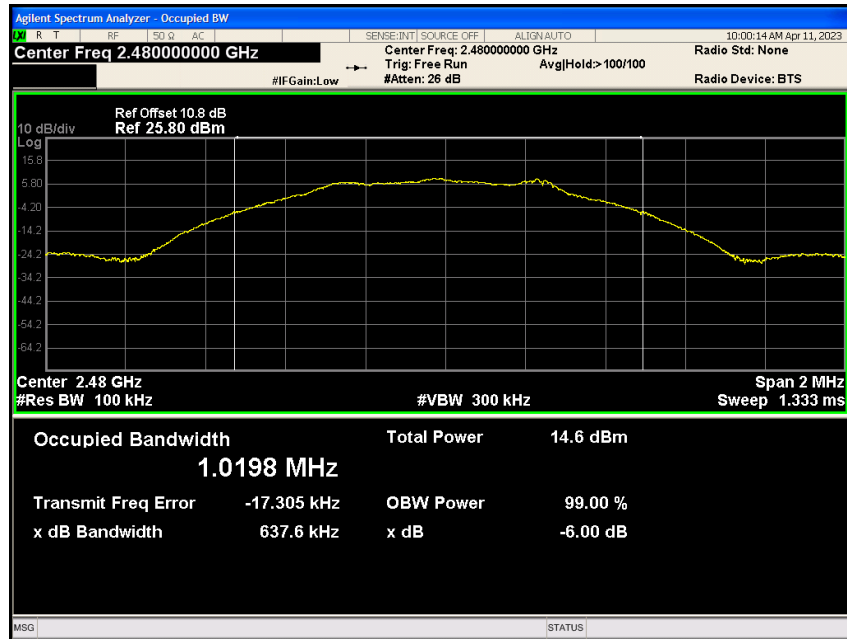
Middle Channel



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PLOTS OF 6dB RF BANDWIDTH

Highest Channel



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4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

Frequency (MHz)		PSD in 3kHz (dBm)
Low Channel:	2402	-6.691
Middle Channel:	2440	-6.719
High Channel:	2480	-7.143

Cable Loss: 0.5dB

Limit: 8dBm

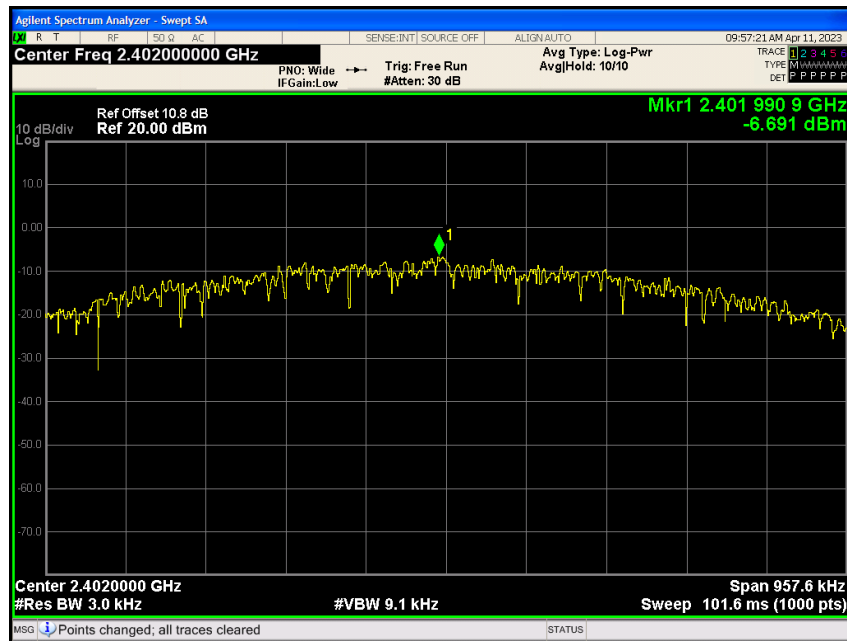
The plots of power spectral density are as below.

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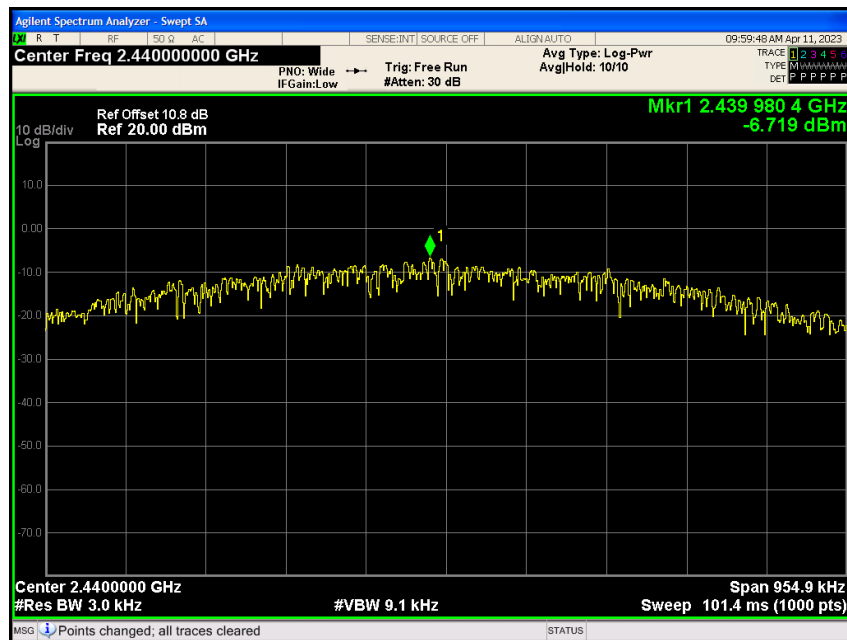
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PLOTS OF POWER SPECTRAL DENSITY

Lowest Channel



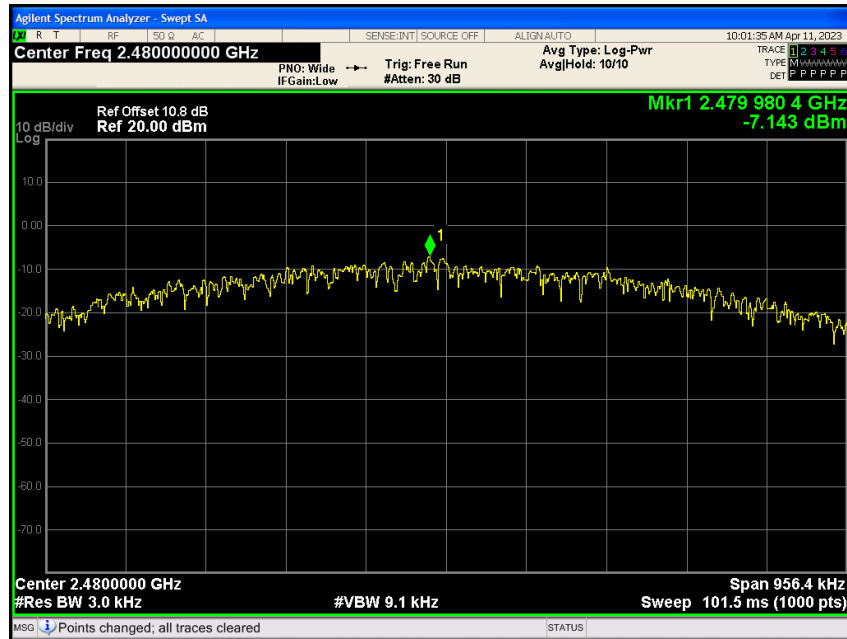
Middle Channel



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PLOTS OF POWER SPECTRAL DENSITY

Highest Channel



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4.4 Out of Band Conducted Emissions

For Bluetooth BLE, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for Bluetooth BLE.

The measurement procedures under sections 11 of KDB558074 D01 v05r02 (02-April-2019) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

Limits:

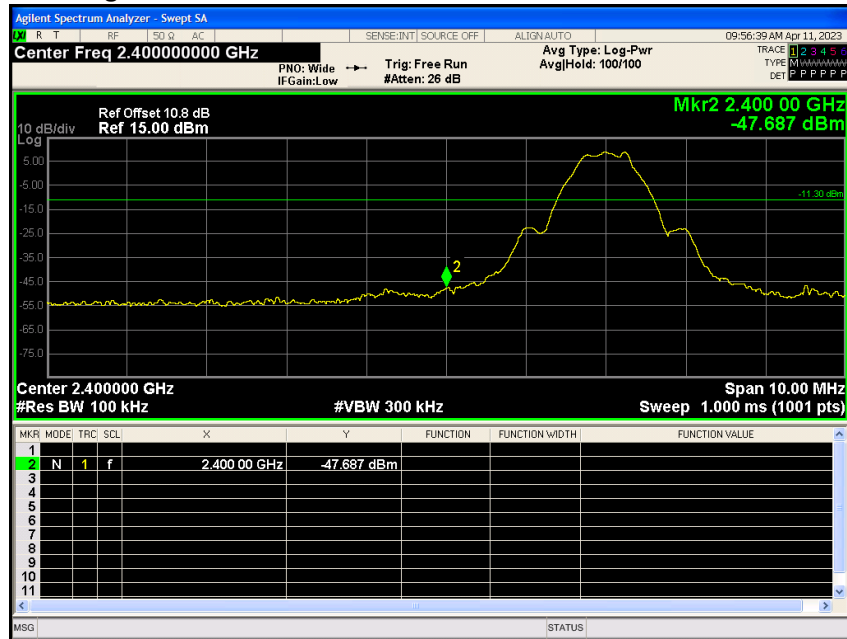
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the maximum measured in-band peak PSD level for Bluetooth BLE.

Tested by: Rain Wang

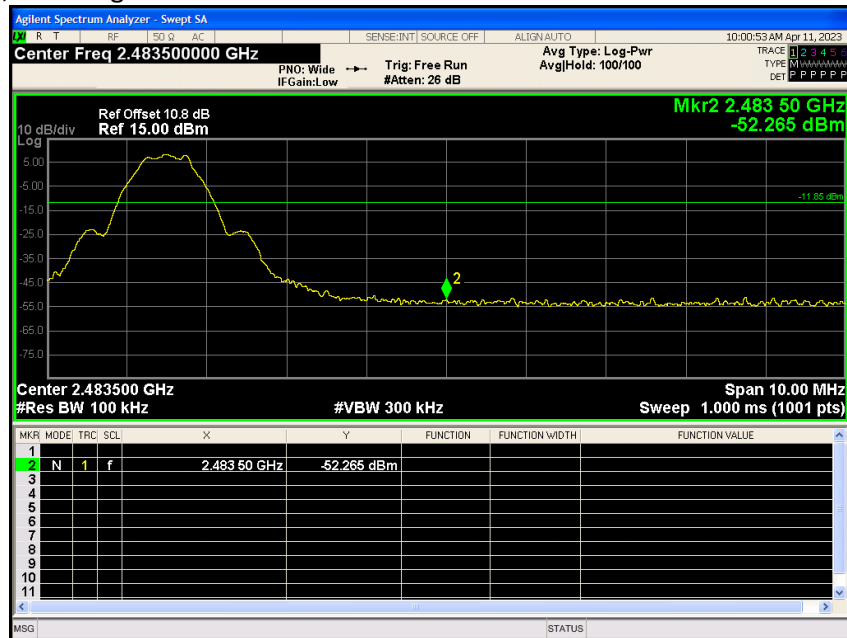
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PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

Lowest Channel, Bandedge



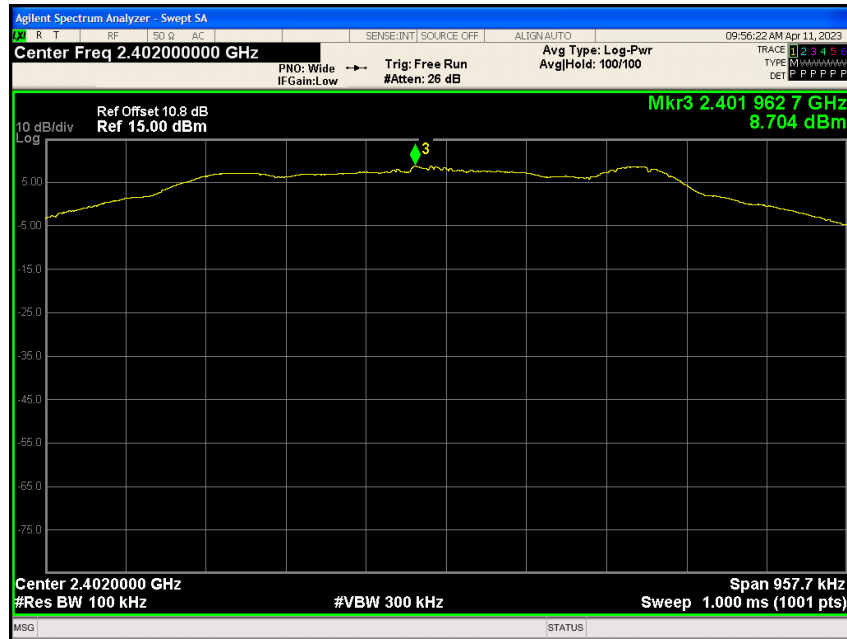
Highest Channel, Bandedge



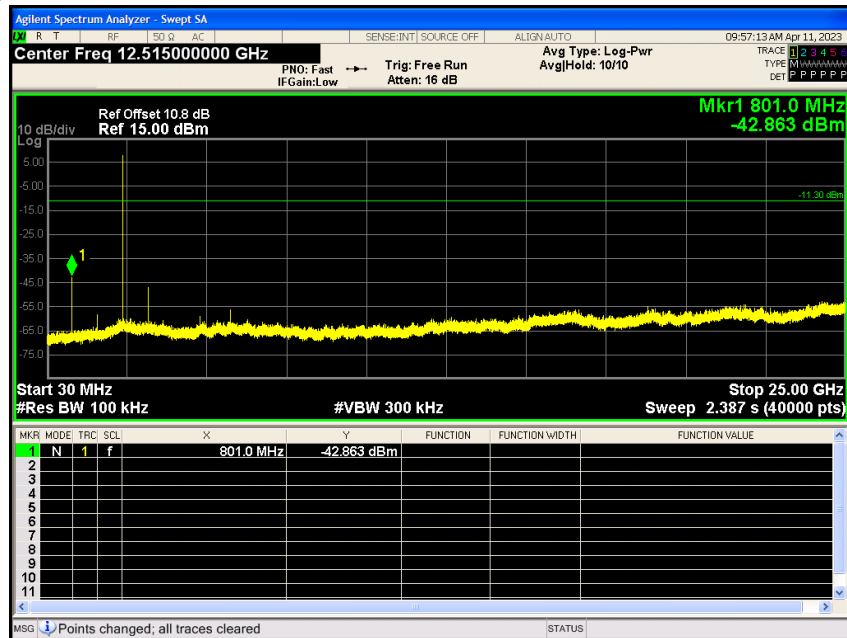
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PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

Lowest Channel, Plot A



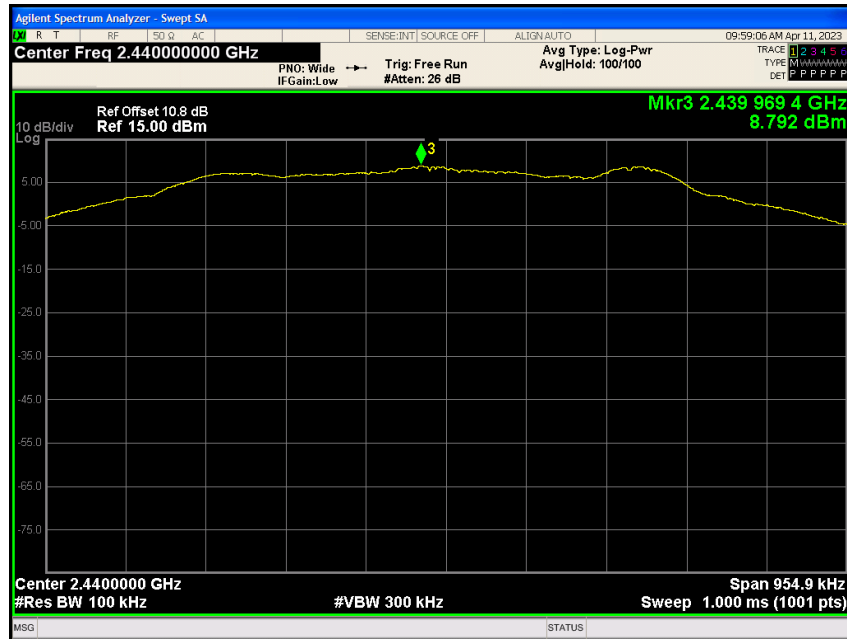
Lowest Channel, Plot B



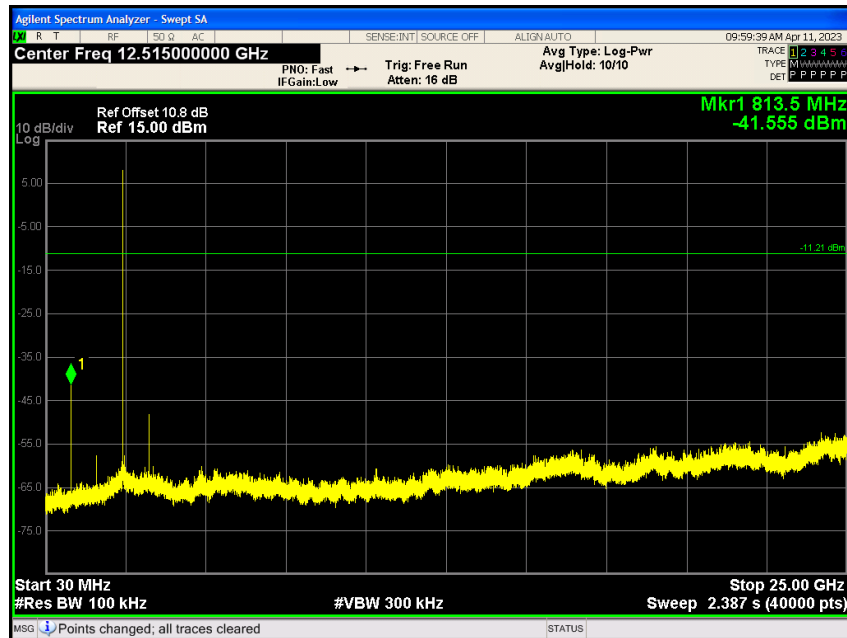
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PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

Middle Channel, Plot A



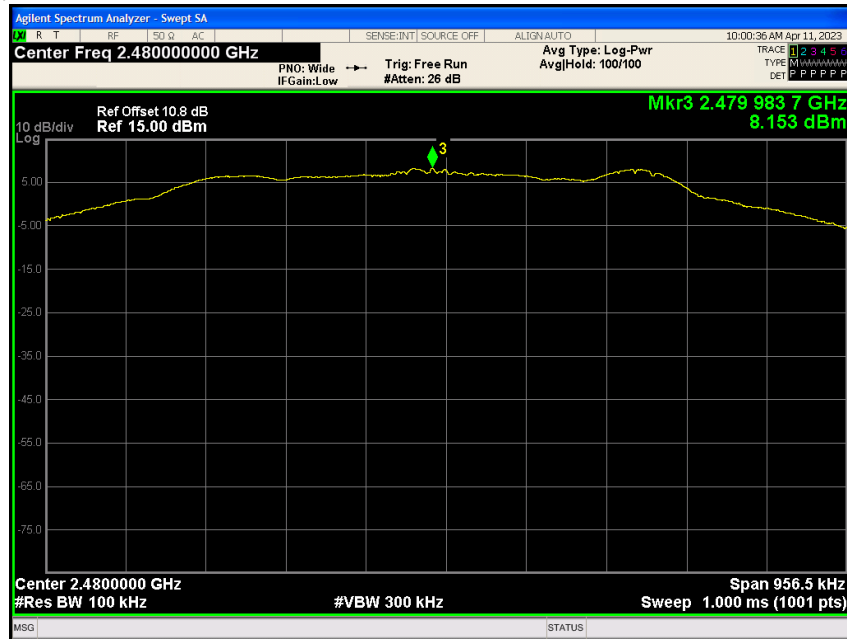
Middle Channel, Plot B



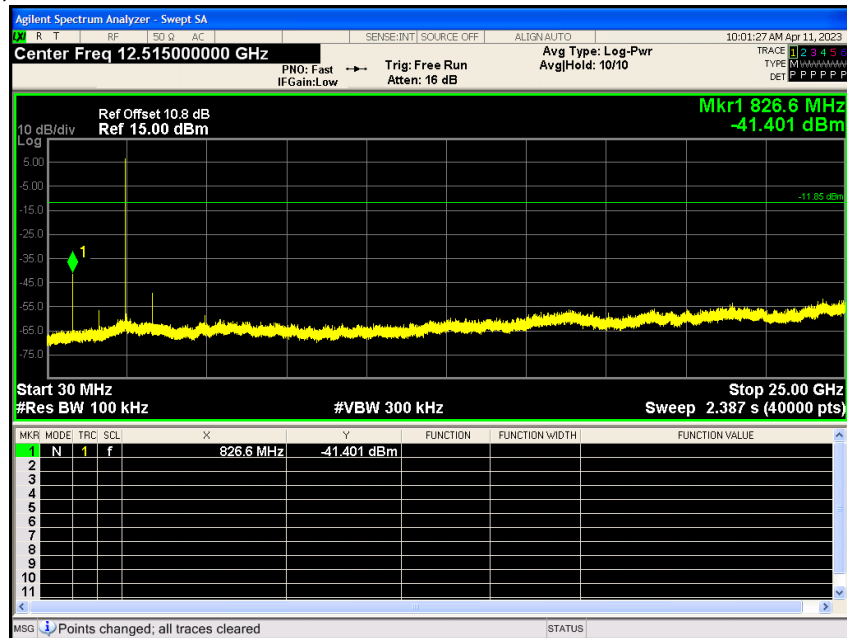
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PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

Highest Channel, Plot A



Highest Channel, Plot B



TEST REPORT

4.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

Where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dB μ V/m. This value in dB μ V/m is converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0.0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

2483.5 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.6.2 Radiated Emission Data

The data in tables 1-4 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 8.92 dB margin

Tested by: Andy Lin

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 2402MHz

Table 1

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2390.00	49.34	-8.30	41.04	74.00	-32.96	Peak	Horizontal
2	2390.00	35.91	-8.30	27.61	54.00	-26.39	Average	Horizontal
3	4804.00	37.88	-2.42	35.46	74.00	-38.54	Peak	Horizontal
4	4804.00	25.94	-2.42	23.52	54.00	-30.48	Average	Horizontal
5	7206.00	32.50	1.62	34.12	74.00	-39.88	Peak	Horizontal
6	7206.00	21.70	1.43	23.32	54.00	-30.68	Average	Horizontal
7	2390.00	48.75	-8.30	40.45	74.00	-33.55	Peak	Vertical
8	2390.00	37.01	-8.30	28.71	54.00	-25.29	Average	Vertical
9	4804.00	37.59	-2.42	35.17	74.00	-38.83	Peak	Vertical
10	4804.00	26.23	-2.42	23.81	54.00	-30.19	Average	Vertical
11	7206.00	31.20	1.62	32.82	74.00	-41.18	Peak	Vertical
12	7206.00	20.00	1.43	21.62	54.00	-32.38	Average	Vertical

- NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

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Mode: TX-Channel 2440MHz

Table 2

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4880.00	25.52	3.92	23.17	54.00	-30.83	Average	Horizontal
2	4880.00	36.71	3.92	34.36	74.00	-39.64	Peak	Horizontal
3	7320.00	24.35	4.84	26.04	54.00	-27.96	Average	Horizontal
4	7320.00	35.54	4.84	37.23	74.00	-36.77	Peak	Horizontal
5	4880.00	25.59	3.92	23.24	54.00	-30.76	Average	Vertical
6	4880.00	37.24	3.92	34.89	74.00	-39.11	Peak	Vertical
7	7320.00	18.76	4.84	20.45	54.00	-33.55	Average	Vertical
8	7320.00	29.93	4.84	31.62	74.00	-42.38	Peak	Vertical

- NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

TEST REPORT

Mode: TX-Channel 2480MHz

Table 3

No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	2483.50	59.23	3.96	51.31	74.00	-22.69	Peak	Horizontal
2	2483.50	53.00	3.96	45.08	54.00	-8.92	Average	Horizontal
3	4960.00	36.83	3.96	34.56	74.00	-39.44	Peak	Horizontal
4	4960.00	24.85	3.96	22.58	54.00	-31.42	Average	Horizontal
5	7440.00	37.95	4.95	39.72	74.00	-34.28	Peak	Horizontal
6	7440.00	25.16	4.95	26.93	54.00	-27.07	Average	Horizontal
7	2483.50	57.77	3.96	49.85	74.00	-24.15	Peak	Vertical
8	2483.50	50.53	3.96	42.61	54.00	-11.39	Average	Vertical
9	4960.00	35.77	3.96	33.50	74.00	-40.50	Peak	Vertical
10	4960.00	24.68	3.96	22.41	54.00	-31.59	Average	Vertical
11	7440.00	36.15	4.95	37.92	74.00	-36.08	Peak	Vertical
12	7440.00	25.00	4.95	26.77	54.00	-27.23	Average	Vertical

- NOTES:
1. Peak detector is used for the emission measurement. Average detector is used for the average data of emission measurement
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

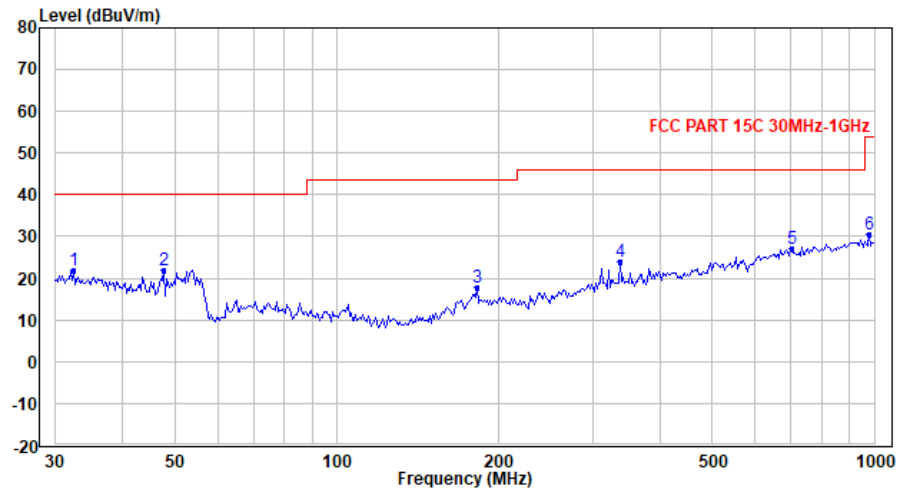
TEST REPORT

Mode: 2.4G Wi-Fi & Bluetooth simultaneously

Table 4-Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.411	27.13	-5.21	21.92	40.00	-18.08	QP
2	47.703	35.22	-13.31	21.91	40.00	-18.09	QP
3	182.578	27.76	-9.98	17.78	43.50	-25.72	QP
4	336.482	29.01	-5.19	23.82	46.00	-22.18	QP
5	703.731	25.48	1.76	27.24	46.00	-18.76	QP
6	979.139	25.71	4.95	30.66	54.00	-23.34	QP

- NOTES:
1. Quasi-Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.
 4. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

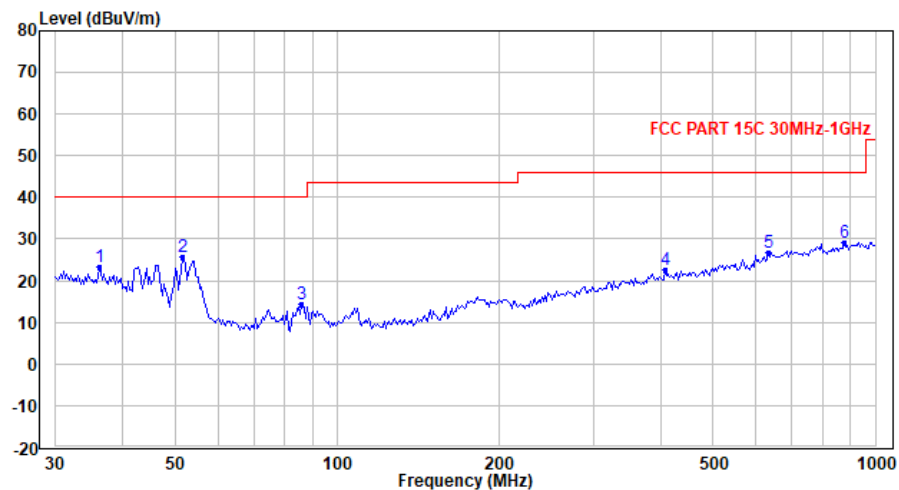


TEST REPORT

Table 5-Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.268	29.31	-5.85	23.46	40.00	-16.54	QP
2	51.536	40.91	-15.36	25.55	40.00	-14.45	QP
3	86.080	30.66	-16.33	14.33	40.00	-25.67	QP
4	406.782	26.49	-3.87	22.62	46.00	-23.38	QP
5	633.328	26.38	0.30	26.68	46.00	-19.32	QP
6	875.013	25.19	4.07	29.26	46.00	-16.74	QP

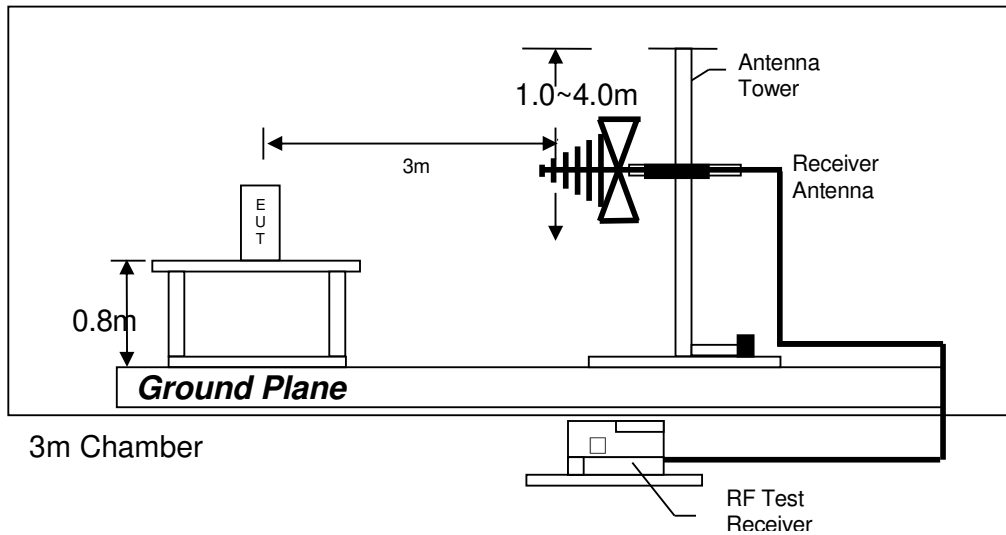
- NOTES:
1. Quasi-Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.
 4. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.



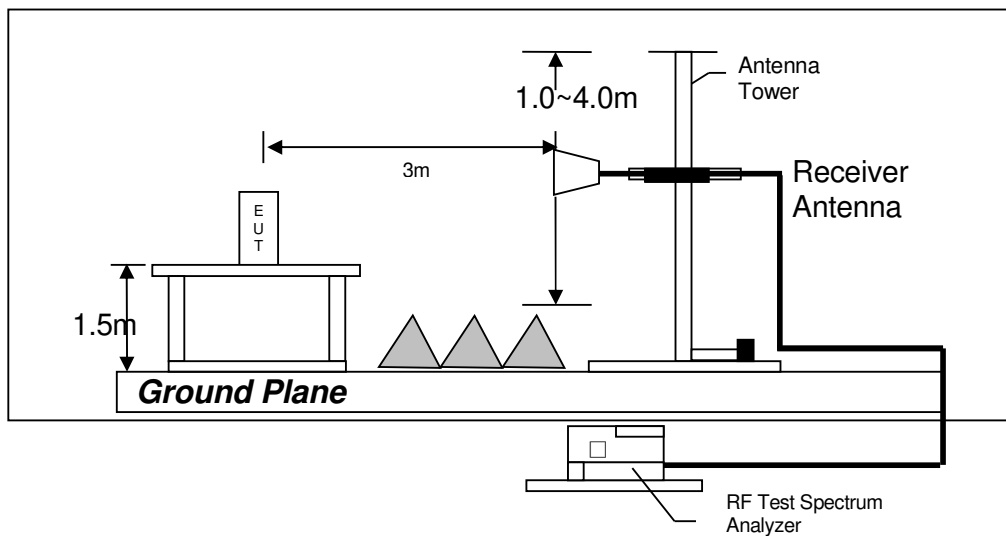
TEST REPORT

4.6.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

TEST REPORT

4.6.4 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

TEST REPORT

4.7 AC Power Line Conducted Emission

- ☐ Not applicable – EUT is only powered by battery for operation.
- ☒ EUT connects to AC power line. Emission Data is listed in following pages.
- ☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.446 MHz

The worst-case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.7.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 6.96 dB margin

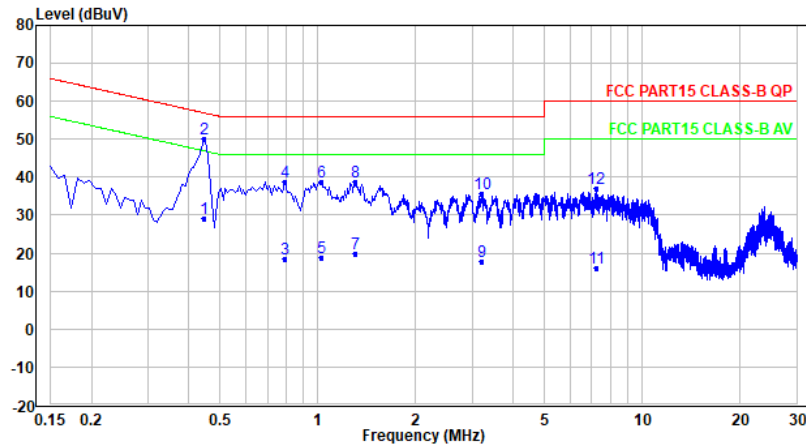
Tested by: Yana Zeng

TEST REPORT

AC POWER LINE CONDUCTED EMISSION

Worst Case: 2.4G Wi-Fi & Bluetooth simultaneously

Live:



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.446	18.95	10.04	28.99	46.95	-17.96	Average
2	0.446	39.95	10.04	49.99	56.95	-6.96	QP
3	0.790	8.60	10.05	18.65	46.00	-27.35	Average
4	0.790	28.60	10.05	38.65	56.00	-17.35	QP
5	1.030	8.65	10.06	18.71	46.00	-27.29	Average
6	1.030	28.65	10.06	38.71	56.00	-17.29	QP
7	1.310	9.65	10.09	19.74	46.00	-26.26	Average
8	1.310	28.65	10.09	38.74	56.00	-17.26	QP
9	3.213	7.51	10.21	17.72	46.00	-28.28	Average
10	3.213	25.51	10.21	35.72	56.00	-20.28	QP
11	7.205	5.65	10.44	16.09	50.00	-33.91	Average
12	7.205	26.65	10.44	37.09	60.00	-22.91	QP

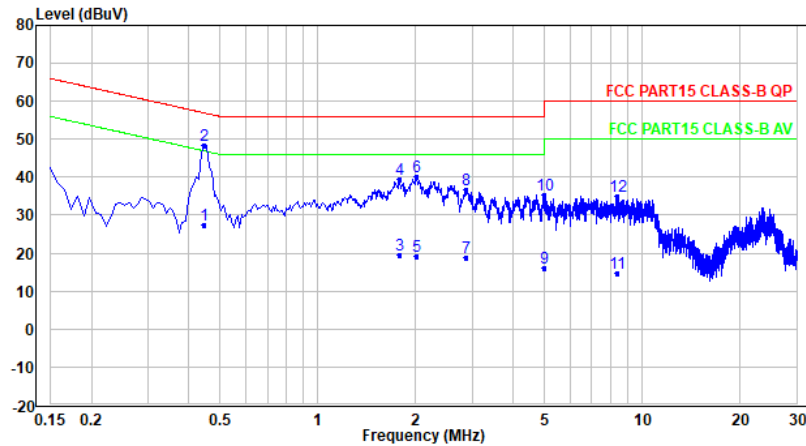
Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

TEST REPORT

Worst Case: 2.4G Wi-Fi & Bluetooth simultaneously

Neutral:



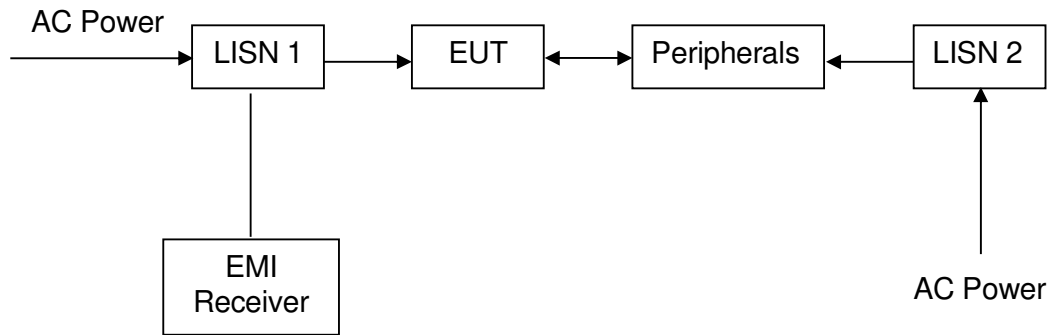
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.446	17.51	10.02	27.53	46.95	-19.42	Average
2	0.446	38.51	10.02	48.53	56.95	-8.42	QP
3	1.782	9.43	10.09	19.52	46.00	-26.48	Average
4	1.782	29.43	10.09	39.52	56.00	-16.48	QP
5	2.014	8.99	10.10	19.09	46.00	-26.91	Average
6	2.014	29.99	10.10	40.09	56.00	-15.91	QP
7	2.869	8.54	10.17	18.71	46.00	-27.29	Average
8	2.869	26.54	10.17	36.71	56.00	-19.29	QP
9	4.989	5.89	10.32	16.21	46.00	-29.79	Average
10	4.989	24.89	10.32	35.21	56.00	-20.79	QP
11	8.364	4.44	10.44	14.88	50.00	-35.12	Average
12	8.364	24.44	10.44	34.88	60.00	-25.12	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

TEST REPORT

4.7.3 Conducted Emission Test Setup



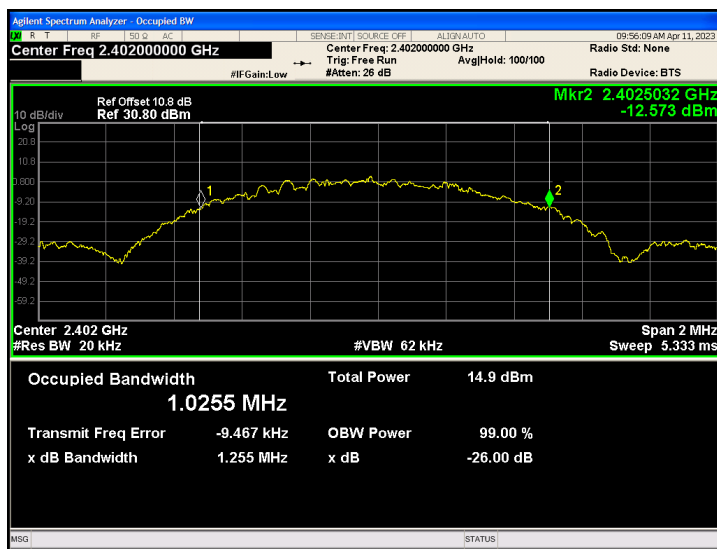
TEST REPORT

4.8 Occupied Bandwidth

Occupied Bandwidth Results:

Bluetooth (MHz)	Occupied Bandwidth (MHz)	
Low Channel:	2402	1.0255
Middle Channel:	2440	1.0215
High Channel:	2480	1.0229

The worst case is shown as below



Tested by: Rain Wang

TEST REPORT

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
3m SAC	ETS-LINDGREN	3m	N/A	Jan. 21, 2024
Receiver	R&S	ESIB26	100114	Nov. 02, 2023
Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 12, 2023
6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 12, 2023
Preamplifier	HP	8447F	2805A02960	Oct. 31, 2023
Double-Ridged Waveguide Horn Antenna	ETS-LINDGREN	3117-PA	00201541	Apr. 16, 2024
(Pre-amplifier)	ETS-LINDGREN	00118385	00201874	Oct. 31, 2023
Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A
Test Software	Audix	e3	Software Version: 9.160323	

2) Conducted Emissions Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
Receiver	R&S	ESR7	101181	Oct. 31, 2023
Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Oct. 31, 2023
LISN	R&S	ESH2-Z5	860014/024	Oct. 31, 2023
Test Software	Audix	e3	Software Version: 9.20151119i	

3) RF Test

Equipment	Manufacturer	Model No.	Serial Number	Cal. Due date
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Apr. 13, 2024
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 02, 2023

END OF TEST REPORT