



RF MEASUREMENT REPORT

FCC ID: XMR202211KG100S

Applicant: Quectel Wireless Solutions Co., Ltd

Product: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)

Model No.: KG100S

Brand Name: Quectel

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15 Subpart C (Section 15.247)

Result: Complies

Received Date: 2022-11-18

Test Date: 2022-11-28 ~ 2023-02-14

Reviewed By:

Sunny Sun

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2211RSU051-U1	V01	Initial Report	2023-03-25	Valid

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1. General Information

1.1. Applicant

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai,
China 200233

1.2. Manufacturer

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai,
China 200233

1.3. Testing Facility

☒	Test Site – MRT Suzhou Laboratory Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian’edang Rd., Wuzhong Economic Development Zone, Suzhou, China Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China Laboratory Accreditations A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001 VCCI: ☐ R-20025 ☐ G-20034 ☐ C-20020 ☐ T-20020 ☐ R-20141 ☐ G-20134 ☐ C-20103 ☐ T-20104
☐	Test Site – MRT Shenzhen Laboratory Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China Laboratory Accreditations A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
☐	Test Site – MRT Taiwan Laboratory Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) Laboratory Accreditations TAF: L3261-190725 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)
Model No.	KG100S
Serial No.	D1N22JJ0E000291 (KG100SABMD) D1N22JI06000143 (KG100SAAMD)
Bluetooth Specification	BT 5.1 (LE only)
LoRa Specification	902 ~ 928 MHz
Working Voltage	3.0 ~ 3.6 V, nominal 3.3 V
Note: 1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer. 2. The model differences of serial numbers are different for the duplexer, this report assessed two serial numbers.	

1.5. Radio Specification under Test

Bluetooth Frequency	2402 ~ 2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	125kbps, 500kbps, 1Mbps, 2Mbps
Antenna Type	Dipole
Antenna Gain	3.40 dBi

1.6. Working Frequencies

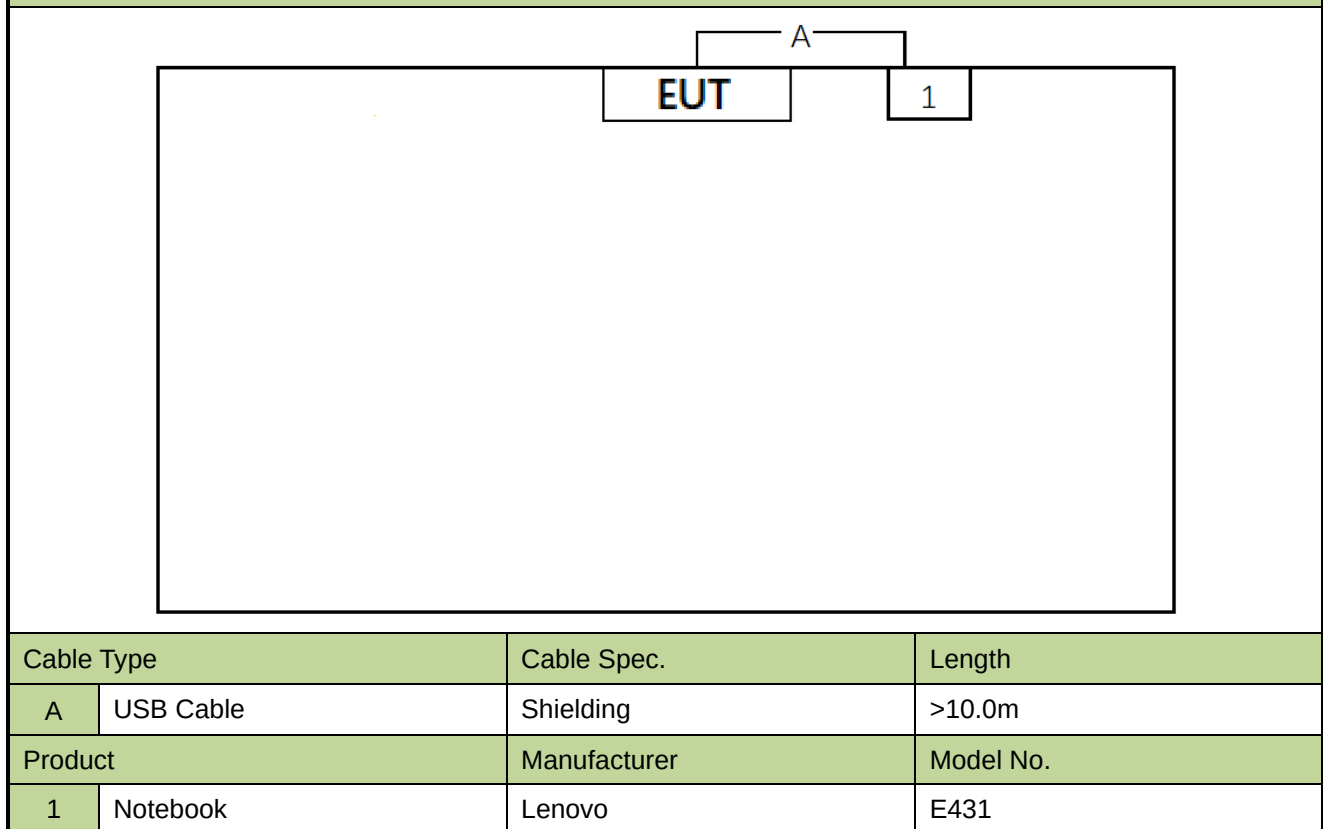
Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	--	--	--	--

2. Test Configuration

2.1. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram – Radiated Emission testing & AC Conducted Emissions



2.2. Test Software

The test utility software used during testing was “QCOM”, and the version was 1.6.

2.3. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.247
- KDB 558074 D01v05r02
- ANSI C63.10-2013

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022-12-29	WZ-AC1
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2023-05-08	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2022-12-29	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2023-01-13	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2023-06-04	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2023-06-06	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2023-10-27	WZ-SR2
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2023-06-04	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2023-06-06	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2023-06-04	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11087	1 year	2023-06-09	WZ-SR5

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
BenchVue Power Meter	2018.1	Power
Controller_MF 7802	2.03C	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2.
(Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.59dB Coplanar: 9kHz~30MHz: 2.60dB Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~25GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~25GHz: 4.91dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.30dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.50dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.30dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.20%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.247(a)(2)	6dB Bandwidth	Conducted	Pass
15.247(b)(3)	Output Power		Pass
15.247(e)	Power Spectral Density		Pass
15.247(d)	Band Edge / Out-of-Band Emissions		Pass
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Notes:

1. The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

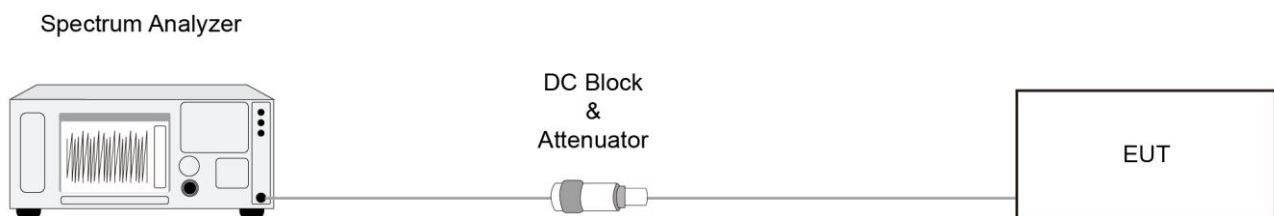
6.2.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. Output Power Measurement

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.9.1.3

ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

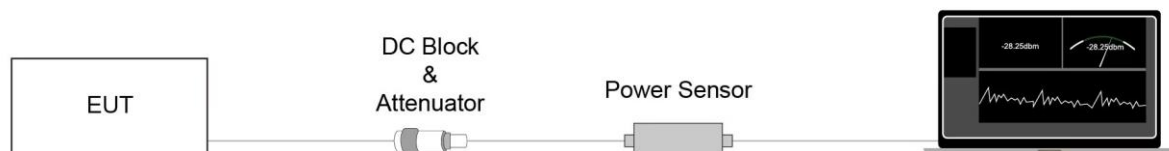
Method PKPM1 (Peak Power Measurement of Signals with DTS BW $\leq$ 50MHz)

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

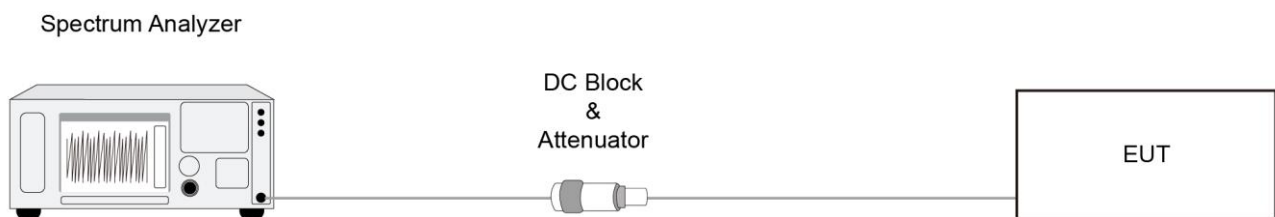
6.4.2. Test Procedure

ANSI C63.10-2013 Section 11.10.2

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Conducted Band Edge and Out-of-Band Emissions Measurement

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Settling

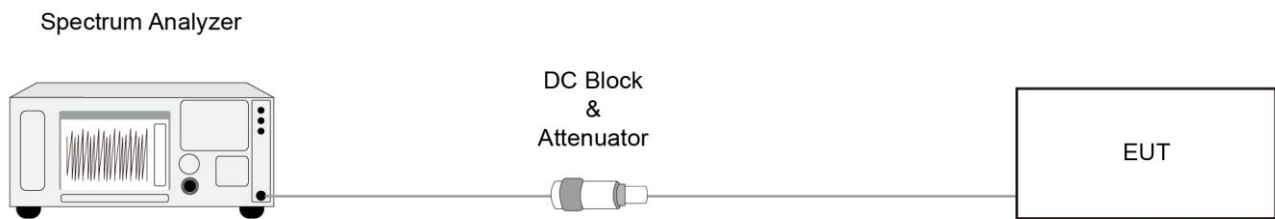
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Radiated Spurious Emission Measurement

6.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.6.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.11 & 11.12

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 - 2013 - Section 6.6 (Standard test method above 1GHz)

6.6.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

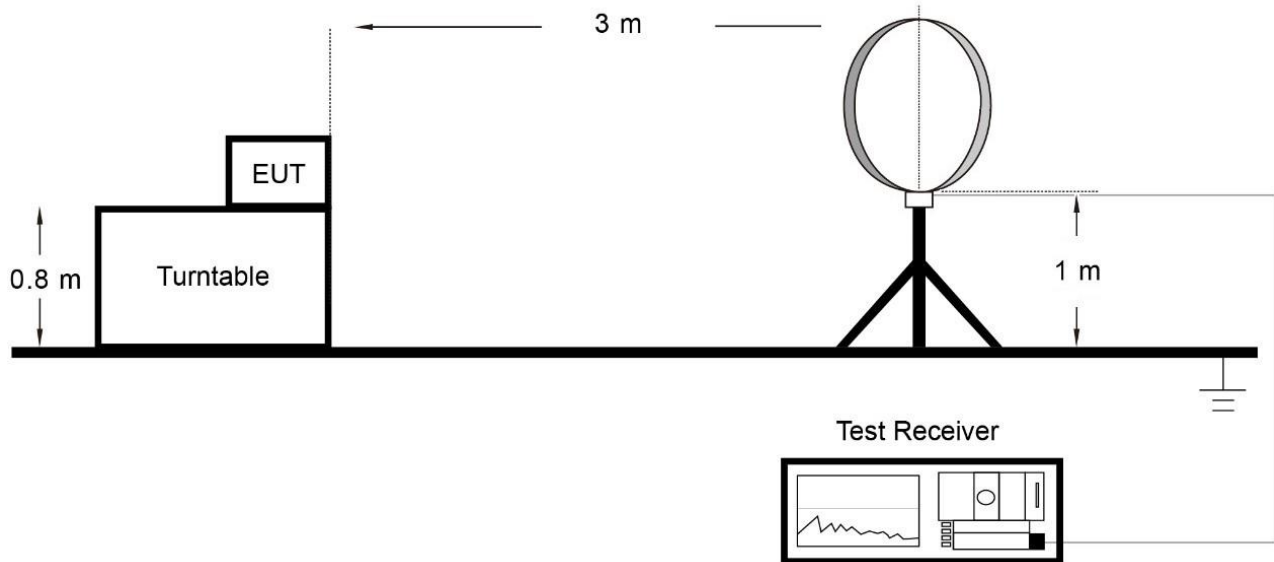
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

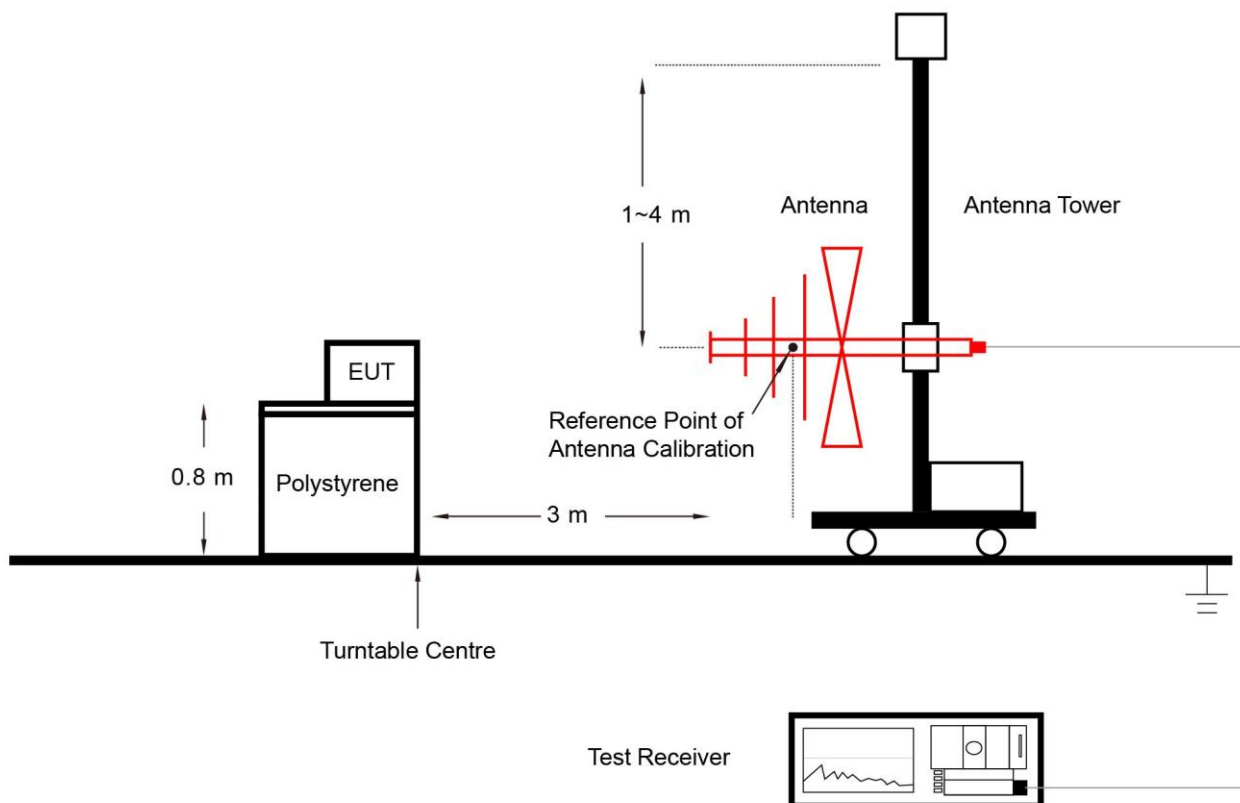
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.4. Test Setup

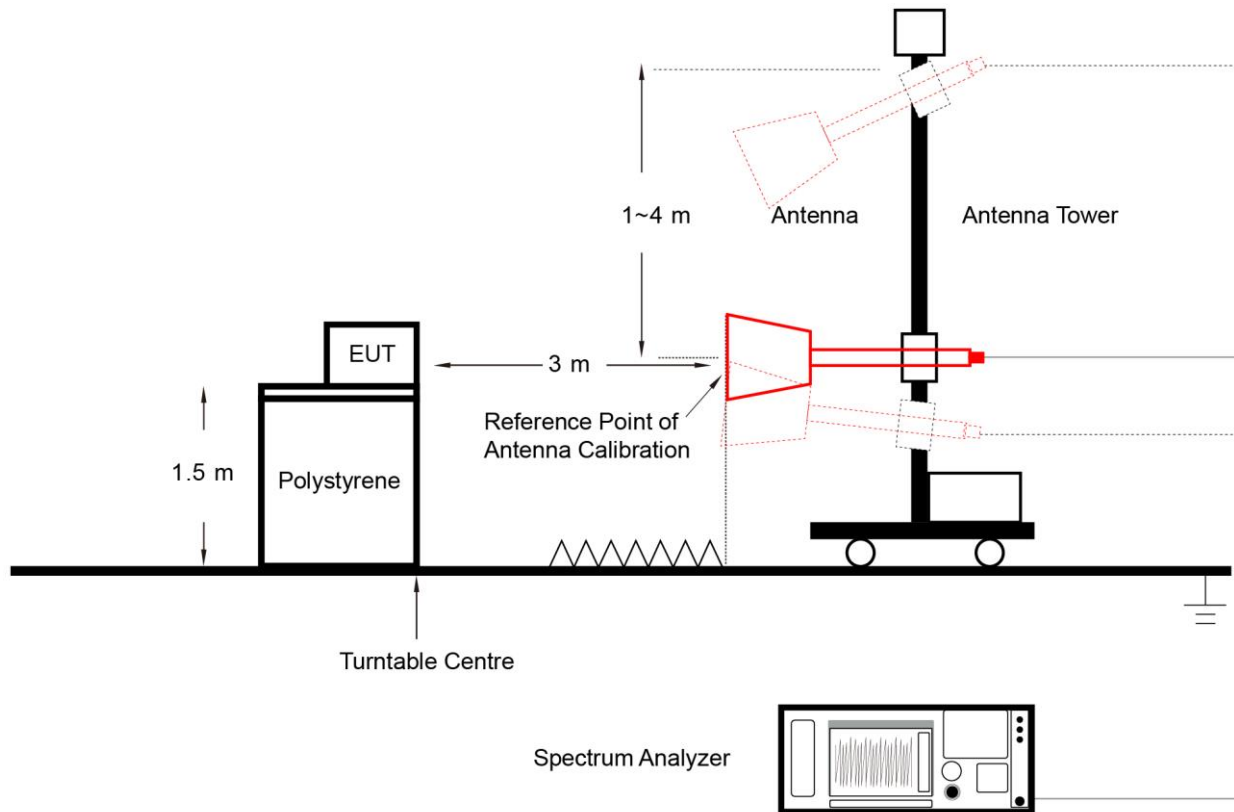
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.6.

6.7. Radiated Restricted Band Edge Measurement

6.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure

ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

6.7.3. Test Setting

Peak Field Strength Measurements

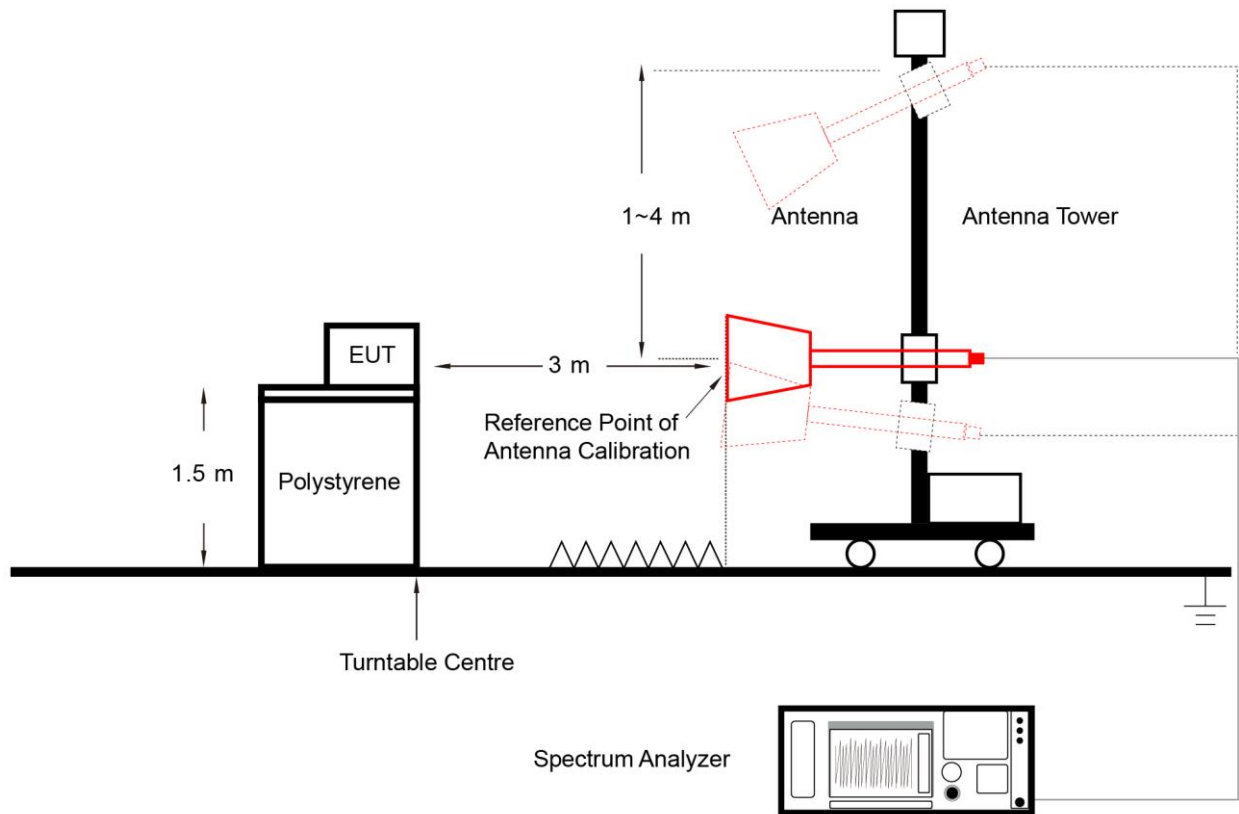
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak

6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.7.4. Test Setup



6.7.5. Test Result

Refer to Appendix A.7.

6.8. AC Conducted Emissions Measurement

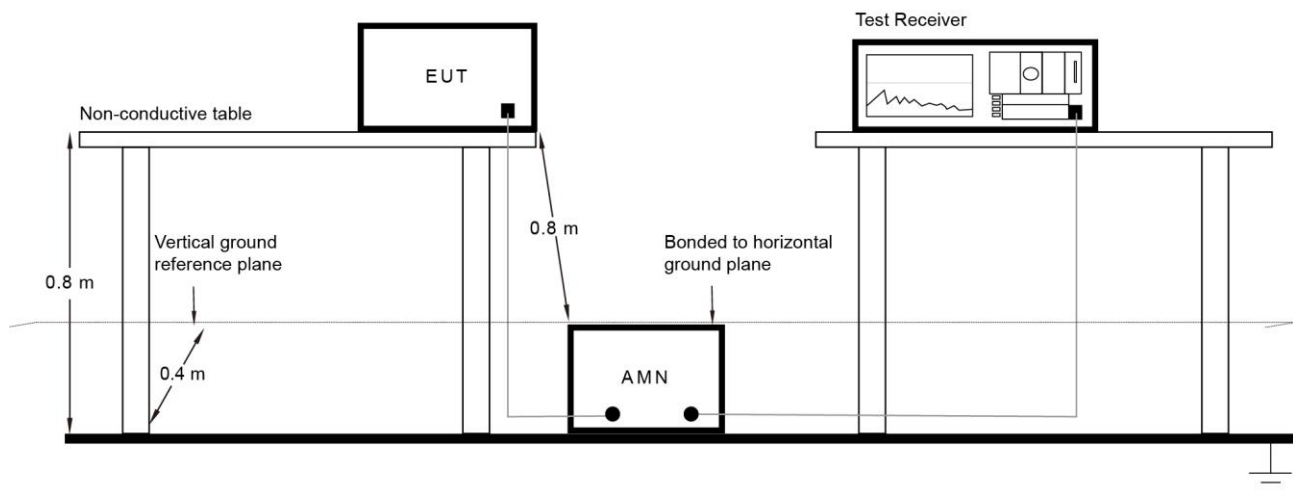
6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.8.2. Test Setup



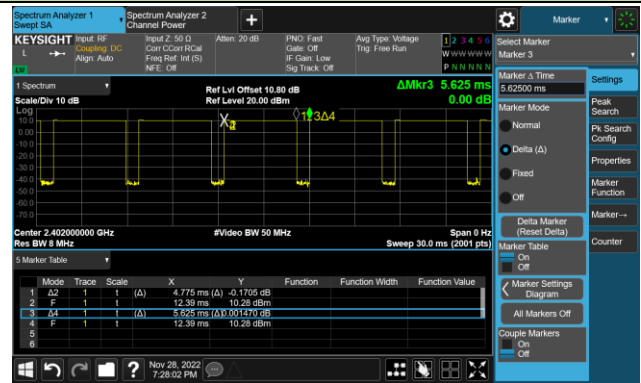
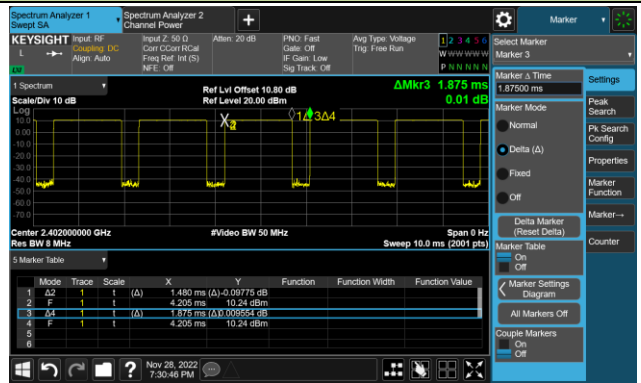
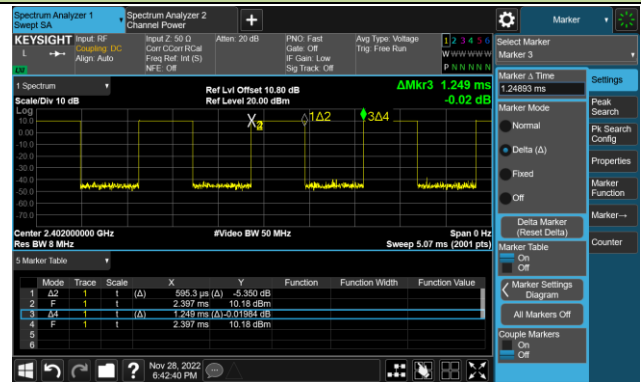
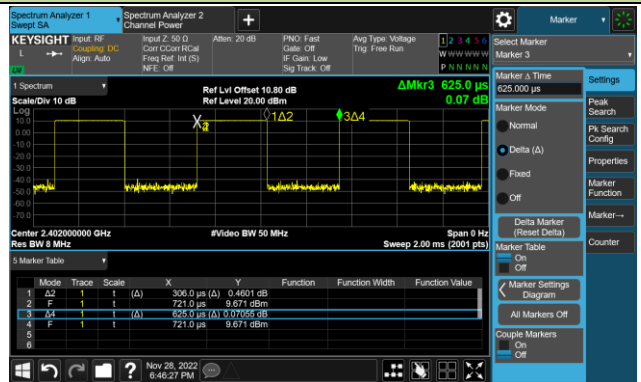
6.8.3. Test Result

Refer to Appendix A.8.

Appendix A - Test Result

A.1 Duty Cycle Test Result

Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-28		

Test Mode	Duty Cycle
BLE-125kbps	84.89%
BLE-500kbps	78.93%
BLE-1Mbps	47.66%
BLE-2Mbps	48.96%
Duty Cycle (T = Transmission Duration)	
BLE-125kbps (T = 4.775ms)	BLE-500kbps (T = 1.480ms)
	
BLE-1Mbps (T = 595.3μs)	BLE-2Mbps (T = 306.0μs)
	

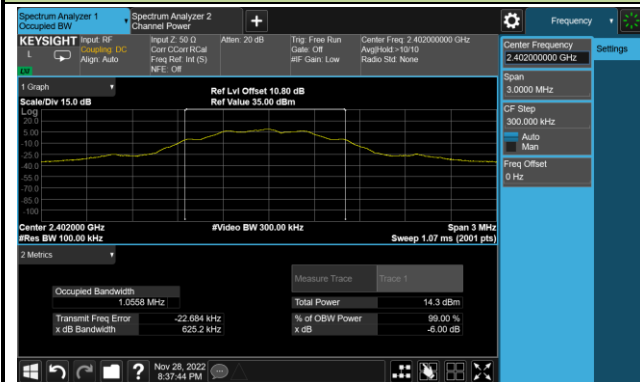
A.2 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-28		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
BLE	125kbps	00	2402	0.625	≥ 0.5
BLE	125kbps	19	2440	0.627	≥ 0.5
BLE	125kbps	39	2480	0.625	≥ 0.5
BLE	500kbps	00	2402	0.640	≥ 0.5
BLE	500kbps	19	2440	0.640	≥ 0.5
BLE	500kbps	39	2480	0.639	≥ 0.5
BLE	1Mbps	00	2402	0.676	≥ 0.5
BLE	1Mbps	19	2440	0.673	≥ 0.5
BLE	1Mbps	39	2480	0.673	≥ 0.5
BLE	2Mbps	00	2402	1.137	≥ 0.5
BLE	2Mbps	19	2440	1.136	≥ 0.5
BLE	2Mbps	39	2480	1.134	≥ 0.5

BLE-125kbps 6dB Bandwidth

Channel 00 (2402MHz)



Channel 19 (2440MHz)

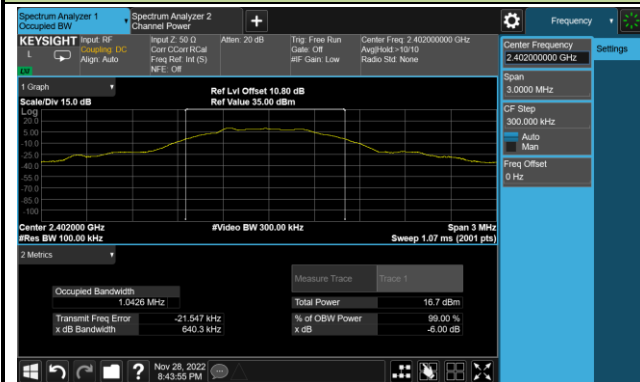


Channel 39 (2480MHz)



BLE-500kbps 6dB Bandwidth

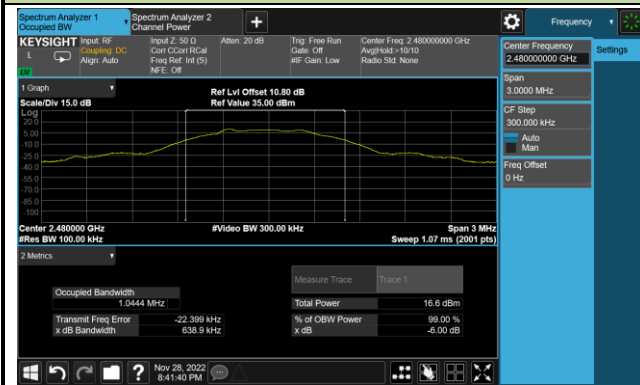
Channel 00 (2402MHz)



Channel 19 (2440MHz)

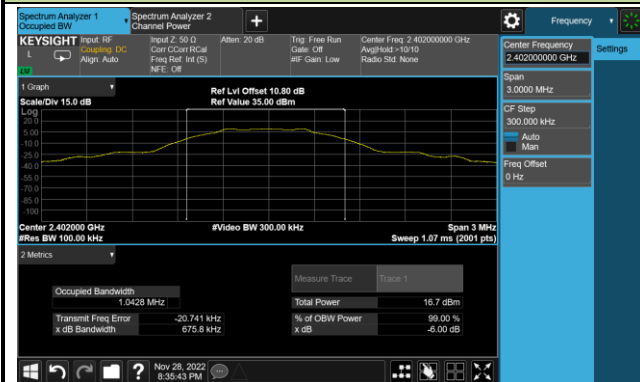


Channel 39 (2480MHz)

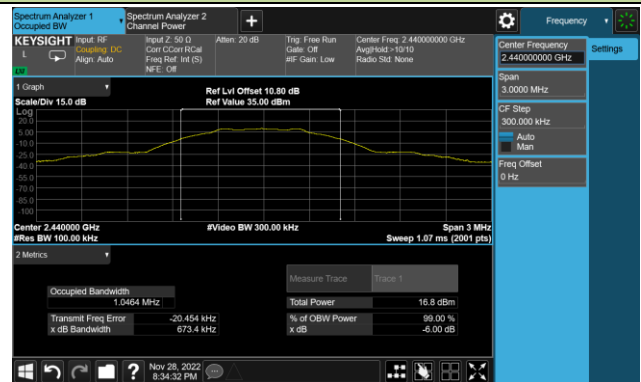


BLE-1Mbps 6dB Bandwidth

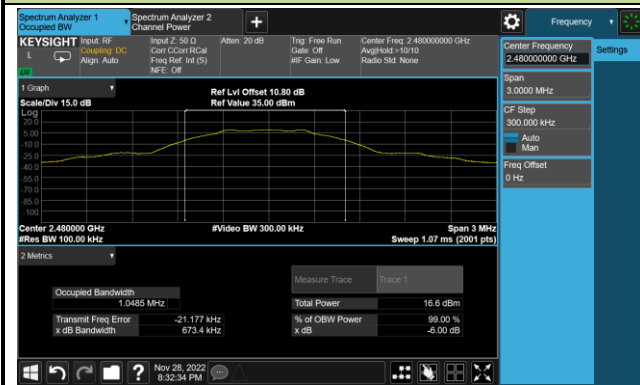
Channel 00 (2402MHz)



Channel 19 (2440MHz)

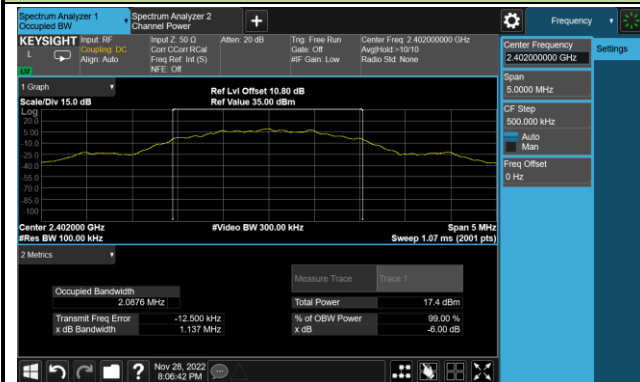


Channel 39 (2480MHz)

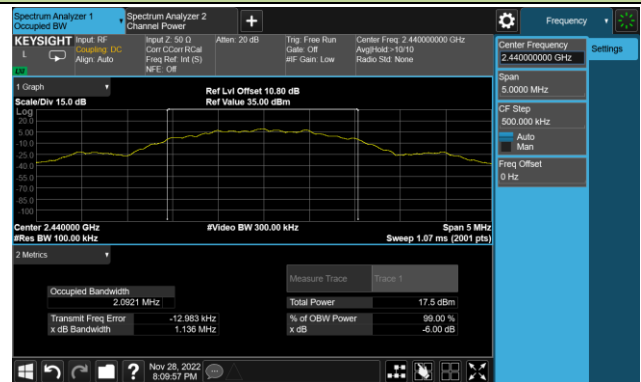


BLE-2Mbps 6dB Bandwidth

Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-28	Duplexer Type No.	KG100SABMD

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Peak Output Power						
BLE	125kbps	00	2402	10.52	≤ 30.00	Pass
BLE	125kbps	19	2440	10.41	≤ 30.00	Pass
BLE	125kbps	39	2480	10.41	≤ 30.00	Pass
BLE	500kbps	00	2402	10.38	≤ 30.00	Pass
BLE	500kbps	19	2440	10.28	≤ 30.00	Pass
BLE	500kbps	39	2480	10.28	≤ 30.00	Pass
BLE	1Mbps	00	2402	10.37	≤ 30.00	Pass
BLE	1Mbps	19	2440	10.28	≤ 30.00	Pass
BLE	1Mbps	39	2480	10.30	≤ 30.00	Pass
BLE	2Mbps	00	2402	10.27	≤ 30.00	Pass
BLE	2Mbps	19	2440	10.23	≤ 30.00	Pass
BLE	2Mbps	39	2480	10.21	≤ 30.00	Pass
Average Output Power (Reporting Only)						
BLE	125kbps	00	2402	10.29	≤ 30.00	Pass
BLE	125kbps	19	2440	10.19	≤ 30.00	Pass
BLE	125kbps	39	2480	10.18	≤ 30.00	Pass
BLE	500kbps	00	2402	10.27	≤ 30.00	Pass
BLE	500kbps	19	2440	10.17	≤ 30.00	Pass
BLE	500kbps	39	2480	10.17	≤ 30.00	Pass
BLE	1Mbps	00	2402	10.19	≤ 30.00	Pass
BLE	1Mbps	19	2440	10.09	≤ 30.00	Pass
BLE	1Mbps	39	2480	10.11	≤ 30.00	Pass
BLE	2Mbps	00	2402	10.22	≤ 30.00	Pass
BLE	2Mbps	19	2440	10.16	≤ 30.00	Pass
BLE	2Mbps	39	2480	10.15	≤ 30.00	Pass

Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-28	Duplexer Type No.	KG100SAAMD

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Peak Output Power						
BLE	125kbps	00	2402	10.31	≤ 30.00	Pass
BLE	125kbps	19	2440	10.15	≤ 30.00	Pass
BLE	125kbps	39	2480	10.26	≤ 30.00	Pass
BLE	500kbps	00	2402	10.22	≤ 30.00	Pass
BLE	500kbps	19	2440	10.24	≤ 30.00	Pass
BLE	500kbps	39	2480	10.01	≤ 30.00	Pass
BLE	1Mbps	00	2402	10.25	≤ 30.00	Pass
BLE	1Mbps	19	2440	10.20	≤ 30.00	Pass
BLE	1Mbps	39	2480	10.14	≤ 30.00	Pass
BLE	2Mbps	00	2402	10.21	≤ 30.00	Pass
BLE	2Mbps	19	2440	10.15	≤ 30.00	Pass
BLE	2Mbps	39	2480	10.06	≤ 30.00	Pass
Average Output Power (Reporting Only)						
BLE	125kbps	00	2402	9.56	≤ 30.00	Pass
BLE	125kbps	19	2440	10.02	≤ 30.00	Pass
BLE	125kbps	39	2480	10.01	≤ 30.00	Pass
BLE	500kbps	00	2402	10.12	≤ 30.00	Pass
BLE	500kbps	19	2440	10.05	≤ 30.00	Pass
BLE	500kbps	39	2480	9.91	≤ 30.00	Pass
BLE	1Mbps	00	2402	9.65	≤ 30.00	Pass
BLE	1Mbps	19	2440	9.76	≤ 30.00	Pass
BLE	1Mbps	39	2480	9.67	≤ 30.00	Pass
BLE	2Mbps	00	2402	10.02	≤ 30.00	Pass
BLE	2Mbps	19	2440	10.08	≤ 30.00	Pass
BLE	2Mbps	39	2480	9.89	≤ 30.00	Pass

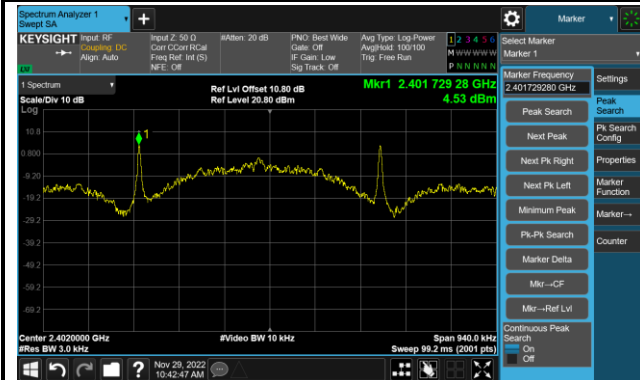
A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-29	Duplexer Type No.	KG100SABMD

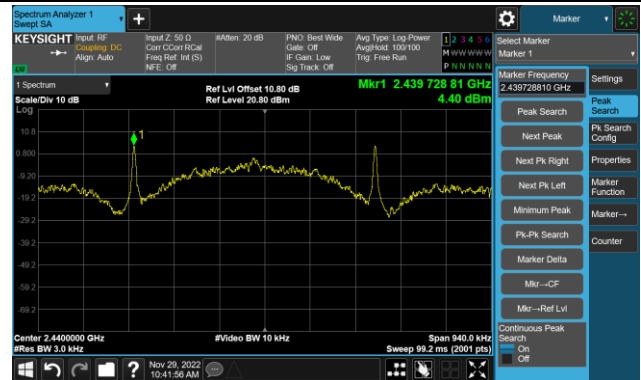
Test Mode	Data Rate	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	125kbps	00	2402	4.53	≤ 8.00	Pass
BLE	125kbps	19	2440	4.40	≤ 8.00	Pass
BLE	125kbps	39	2480	4.34	≤ 8.00	Pass
BLE	500kbps	00	2402	3.98	≤ 8.00	Pass
BLE	500kbps	19	2440	3.84	≤ 8.00	Pass
BLE	500kbps	39	2480	3.77	≤ 8.00	Pass
BLE	1Mbps	00	2402	-4.55	≤ 8.00	Pass
BLE	1Mbps	19	2440	-4.66	≤ 8.00	Pass
BLE	1Mbps	39	2480	-4.70	≤ 8.00	Pass
BLE	2Mbps	00	2402	-6.93	≤ 8.00	Pass
BLE	2Mbps	19	2440	-7.01	≤ 8.00	Pass
BLE	2Mbps	39	2480	-7.08	≤ 8.00	Pass

BLE-125kbps PSD

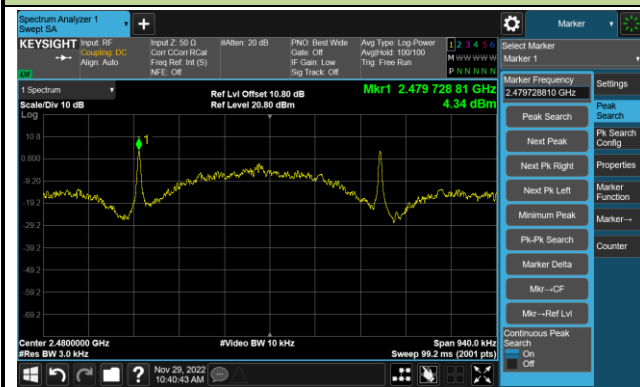
Channel 00 (2402MHz)



Channel 19 (2440MHz)

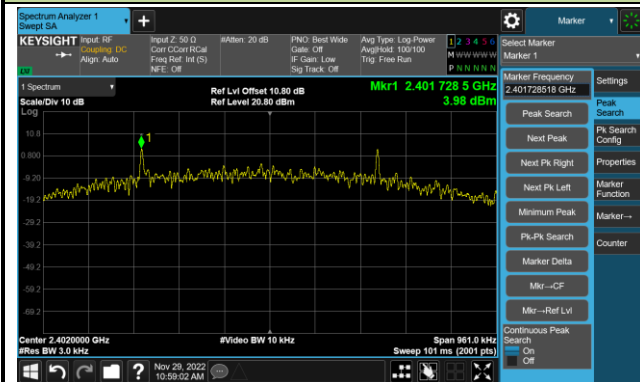


Channel 39 (2480MHz)



BLE-500kbps PSD

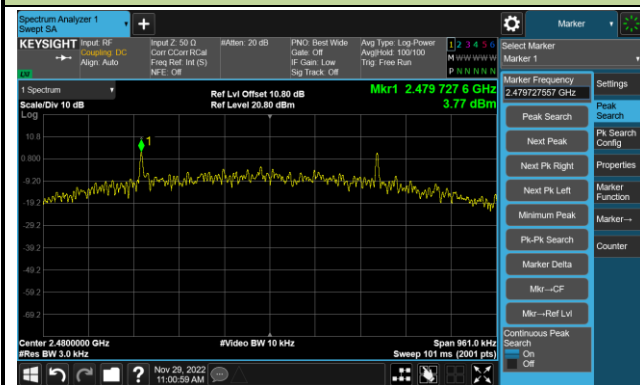
Channel 00 (2402MHz)



Channel 19 (2440MHz)

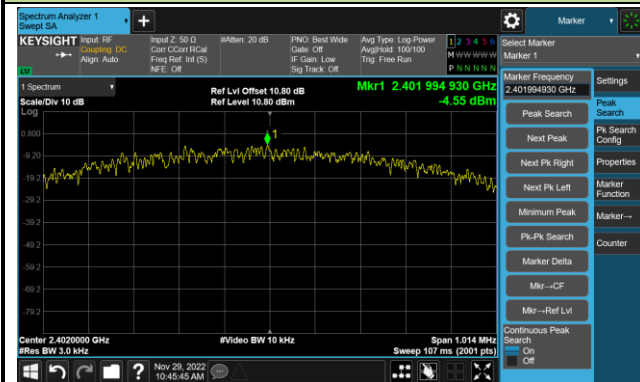


Channel 39 (2480MHz)

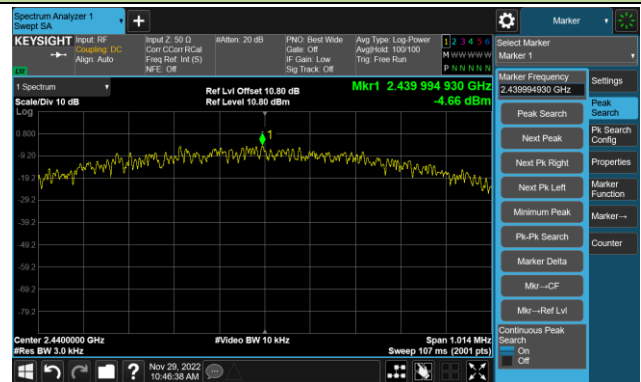


BLE-1Mbps PSD

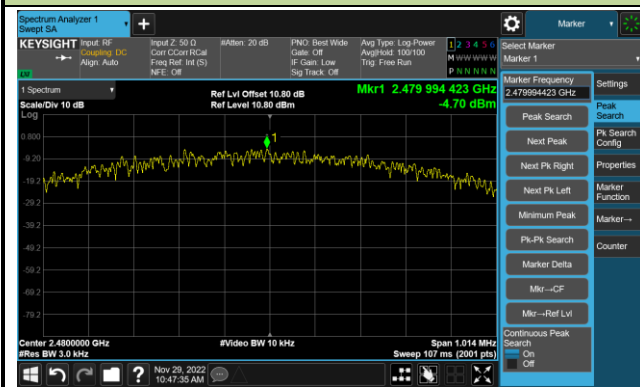
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



BLE-2Mbps PSD

Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



A.5 Conducted Band Edge and Out-of-Band Emissions Test Result

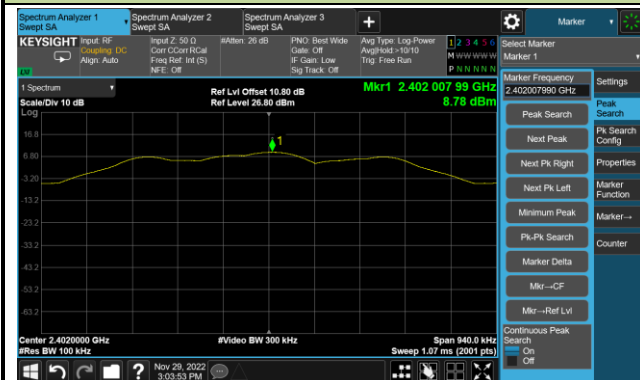
Test Site	WZ-SR5	Test Engineer	Luis Yang
Test Date	2022-11-29	Duplexer Type No.	KG100SABMD

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Limit (dBc)	Result
BLE	125kbps	00	2402	20	Pass
BLE	125kbps	19	2440	20	Pass
BLE	125kbps	39	2480	20	Pass
BLE	500kbps	00	2402	20	Pass
BLE	500kbps	19	2440	20	Pass
BLE	500kbps	39	2480	20	Pass
BLE	1Mbps	00	2402	20	Pass
BLE	1Mbps	19	2440	20	Pass
BLE	1Mbps	39	2480	20	Pass
BLE	2Mbps	00	2402	20	Pass
BLE	2Mbps	19	2440	20	Pass
BLE	2Mbps	39	2480	20	Pass

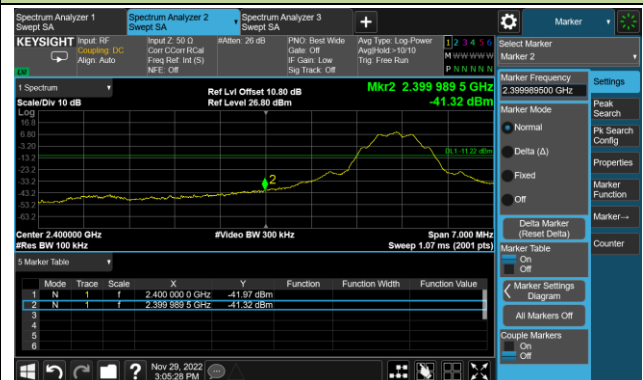
BLE-125kbps Out-of-Band Emissions

Channel 00 (2402MHz)

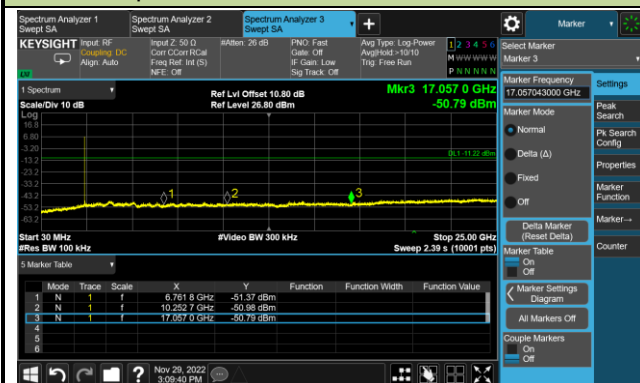
100kHz PSD Reference Level



Low Band Edge

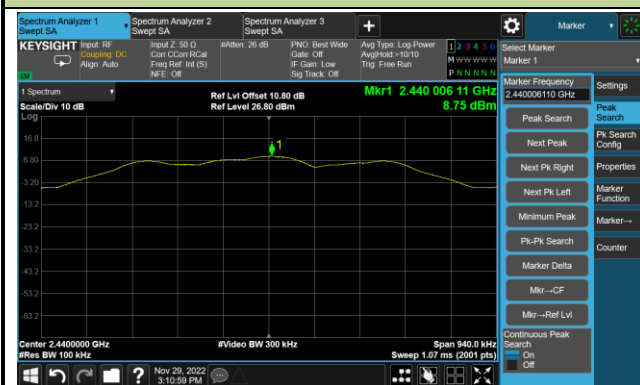


Spurious Emission 30MHz ~ 25GHz

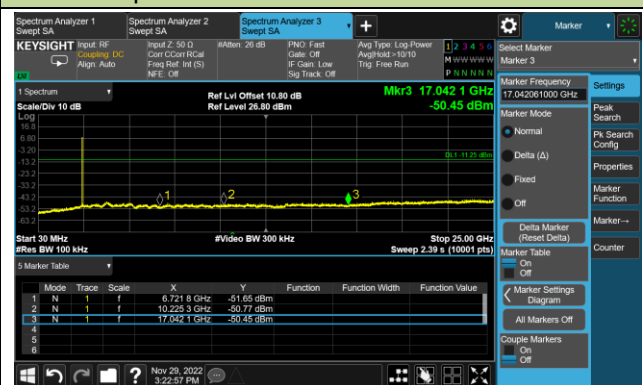


Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz





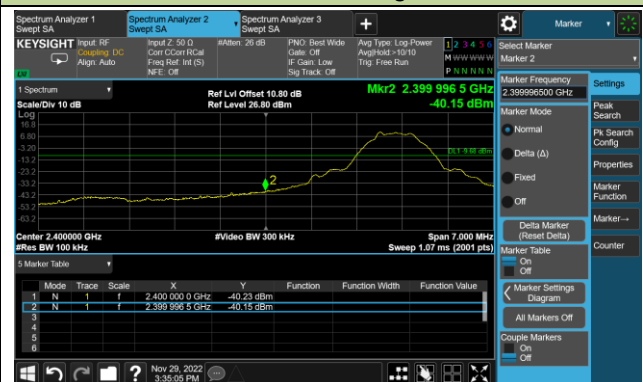
BLE-500kbps Out-of-Band Emissions

Channel 00 (2402MHz)

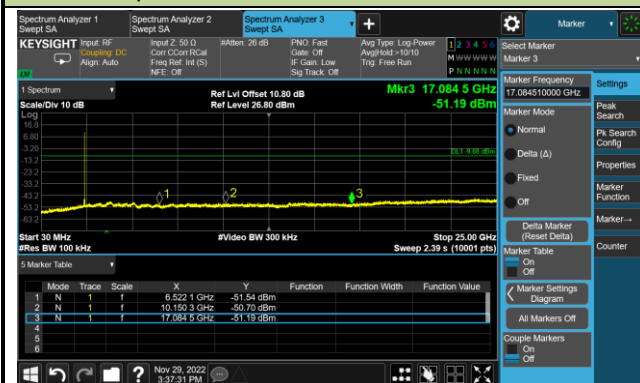
100kHz PSD Reference Level



Low Band Edge



Spurious Emission 30MHz ~ 25GHz

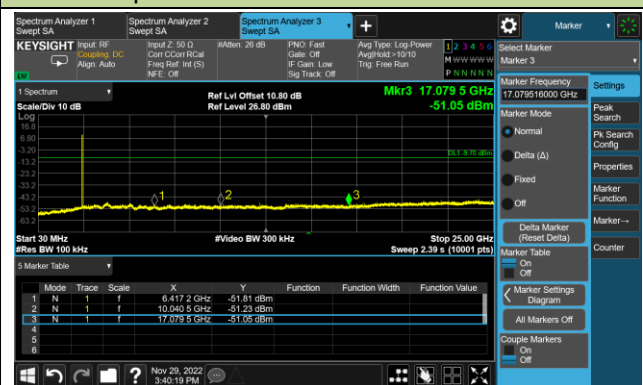


Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz

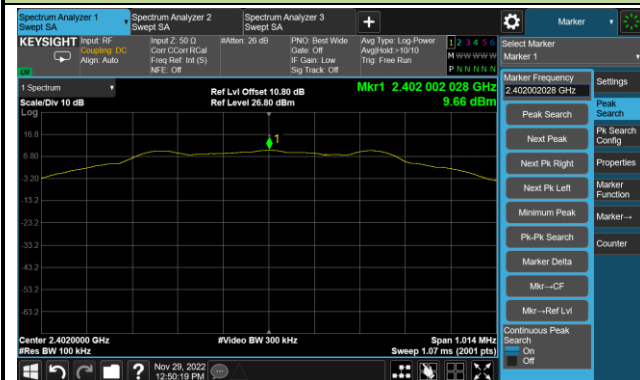




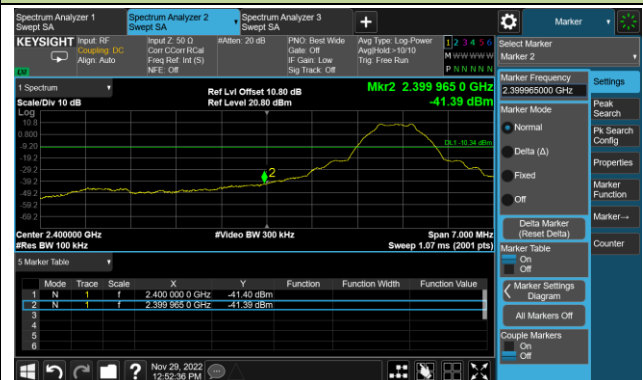
BLE-1Mbps Out-of-Band Emissions

Channel 00 (2402MHz)

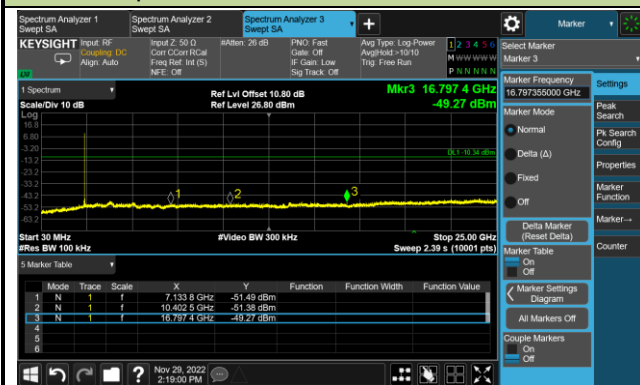
100kHz PSD Reference Level



Low Band Edge

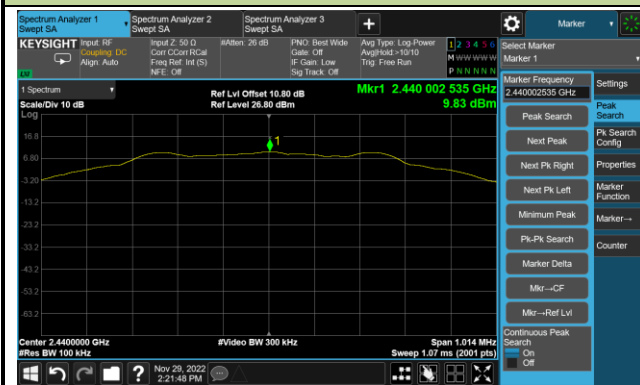


Spurious Emission 30MHz ~ 25GHz

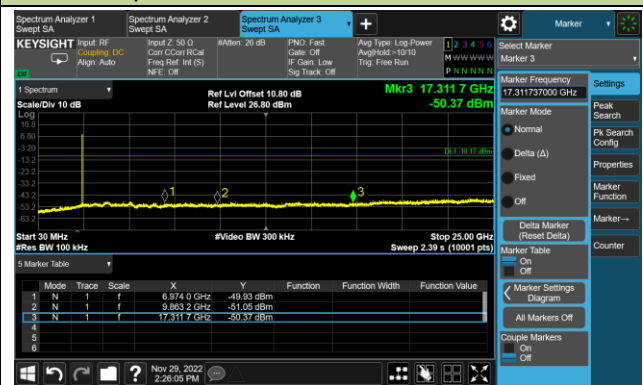


Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz

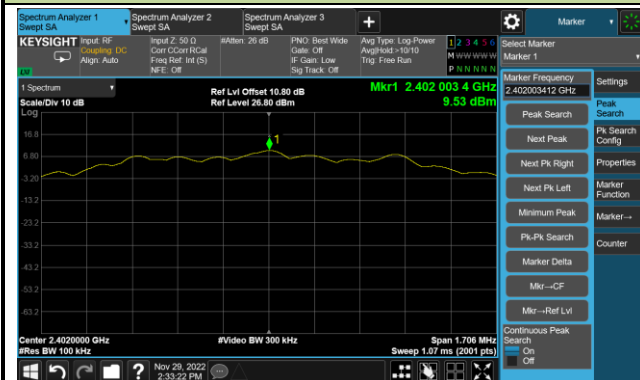




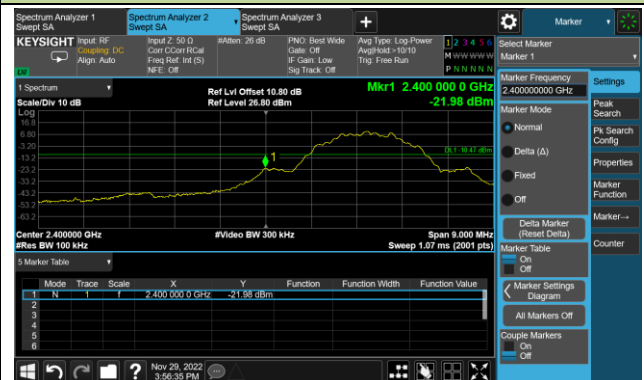
BLE-2Mbps Out-of-Band Emissions

Channel 00 (2402MHz)

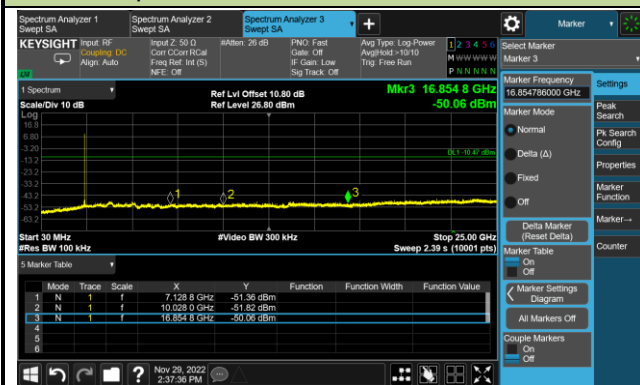
100kHz PSD Reference Level



Low Band Edge

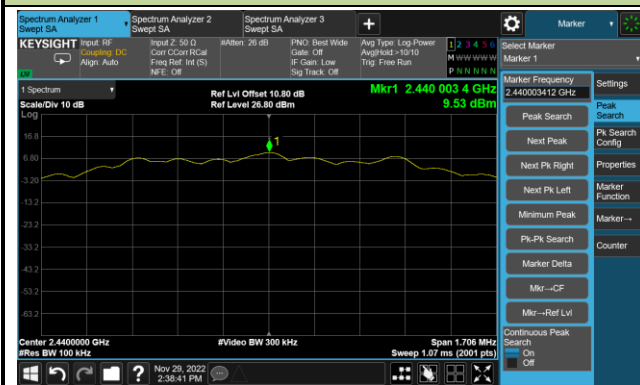


Spurious Emission 30MHz ~ 25GHz

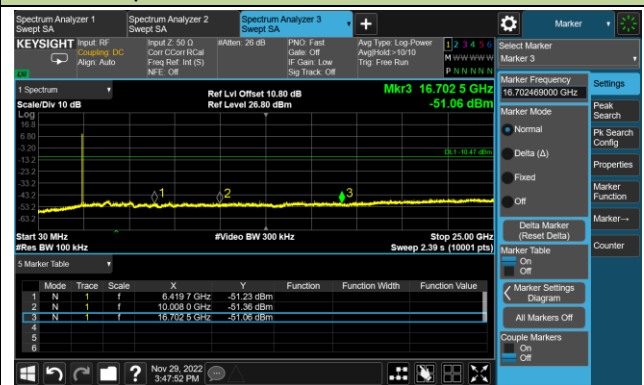


Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz





A.6 Radiated Spurious Emission Test Result

KG100SABMD:

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-125kbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	43.7	2.8	46.5	74.0	-27.5	Peak	Horizontal
	10851.5	36.5	13.5	50.0	74.0	-24.0	Peak	Horizontal
	11846.0	36.6	12.2	48.8	74.0	-25.2	Peak	Horizontal
	4799.5	40.8	2.9	43.7	74.0	-30.3	Peak	Vertical
	11013.0	35.9	13.4	49.3	74.0	-24.7	Peak	Vertical
	12169.0	35.6	12.2	47.8	74.0	-26.2	Peak	Vertical
19	4876.0	42.7	2.8	45.5	74.0	-28.5	Peak	Horizontal
	7324.0	40.4	7.9	48.3	74.0	-25.7	Peak	Horizontal
	11404.0	36.6	13.0	49.6	74.0	-24.4	Peak	Horizontal
	4876.0	41.8	2.8	44.6	74.0	-29.4	Peak	Vertical
	7324.0	44.5	7.9	52.4	74.0	-21.6	Peak	Vertical
	7324.0	39.3	7.9	47.2	54.0	-6.8	Average	Vertical
	11072.5	36.4	13.3	49.7	74.0	-24.3	Peak	Vertical
39	7443.0	39.1	8.2	47.3	74.0	-26.7	Peak	Horizontal
	11081.0	35.7	13.2	48.9	74.0	-25.1	Peak	Horizontal
	11599.5	36.6	12.8	49.4	74.0	-24.6	Peak	Horizontal
	7443.0	40.3	8.2	48.5	74.0	-25.5	Peak	Vertical
	10851.5	35.8	13.5	49.3	74.0	-24.7	Peak	Vertical
	11888.5	35.9	12.1	48.0	74.0	-26.0	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-500kbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	44.0	2.8	46.8	74.0	-27.2	Peak	Horizontal
	10834.5	35.6	13.4	49.0	74.0	-25.0	Peak	Horizontal
	11472.0	36.0	13.0	49.0	74.0	-25.0	Peak	Horizontal
	4808.0	40.8	2.8	43.6	74.0	-30.4	Peak	Vertical
	10987.5	35.9	13.6	49.5	74.0	-24.5	Peak	Vertical
	11361.5	34.6	12.8	47.4	74.0	-26.6	Peak	Vertical
19	4876.0	42.1	2.8	44.9	74.0	-29.1	Peak	Horizontal
	7324.0	39.9	7.9	47.8	74.0	-26.2	Peak	Horizontal
	11089.5	35.9	13.3	49.2	74.0	-24.8	Peak	Horizontal
	4876.0	40.6	2.8	43.4	74.0	-30.6	Peak	Vertical
	7324.0	44.8	7.9	52.7	74.0	-21.3	Peak	Vertical
	7324.0	40.2	7.9	48.1	54.0	-5.9	Average	Vertical
	11421.0	36.1	12.9	49.0	74.0	-25.0	Peak	Vertical
39	7443.0	39.2	8.2	47.4	74.0	-26.6	Peak	Horizontal
	11064.0	36.2	13.3	49.5	74.0	-24.5	Peak	Horizontal
	11557.0	35.8	12.8	48.6	74.0	-25.4	Peak	Horizontal
	7443.0	40.0	8.2	48.2	74.0	-25.8	Peak	Vertical
	10843.0	35.9	13.5	49.4	74.0	-24.6	Peak	Vertical
	11489.0	35.6	13.2	48.8	74.0	-25.2	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-1Mbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	9151.5	37.1	11.1	48.2	74.0	-25.8	Peak	Horizontal
	10826.0	37.2	13.3	50.5	74.0	-23.5	Peak	Horizontal
	11956.5	37.1	12.2	49.3	74.0	-24.7	Peak	Horizontal
	9381.0	38.7	12.0	50.7	74.0	-23.3	Peak	Vertical
	10826.0	36.9	13.3	50.2	74.0	-23.8	Peak	Vertical
	11871.5	37.0	12.2	49.2	74.0	-24.8	Peak	Vertical
19	4884.5	43.9	2.9	46.8	74.0	-27.2	Peak	Horizontal
	7315.5	41.0	7.9	48.9	74.0	-25.1	Peak	Horizontal
	11064.0	37.4	13.3	50.7	74.0	-23.3	Peak	Horizontal
	4876.0	43.3	2.8	46.1	74.0	-27.9	Peak	Vertical
	7315.5	45.6	7.9	53.5	74.0	-20.5	Peak	Vertical
	7313.5	40.3	7.9	48.2	54.0	-5.8	Average	Vertical
	11489.0	36.7	13.2	49.9	74.0	-24.1	Peak	Vertical
39	7443.0	39.8	8.2	48.0	74.0	-26.0	Peak	Horizontal
	11021.5	36.4	13.4	49.8	74.0	-24.2	Peak	Horizontal
	11650.5	36.2	12.4	48.6	74.0	-25.4	Peak	Horizontal
	4961.0	40.0	3.1	43.1	74.0	-30.9	Peak	Vertical
	7443.0	40.7	8.2	48.9	74.0	-25.1	Peak	Vertical
	11353.0	37.0	12.8	49.8	74.0	-24.2	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-2Mbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

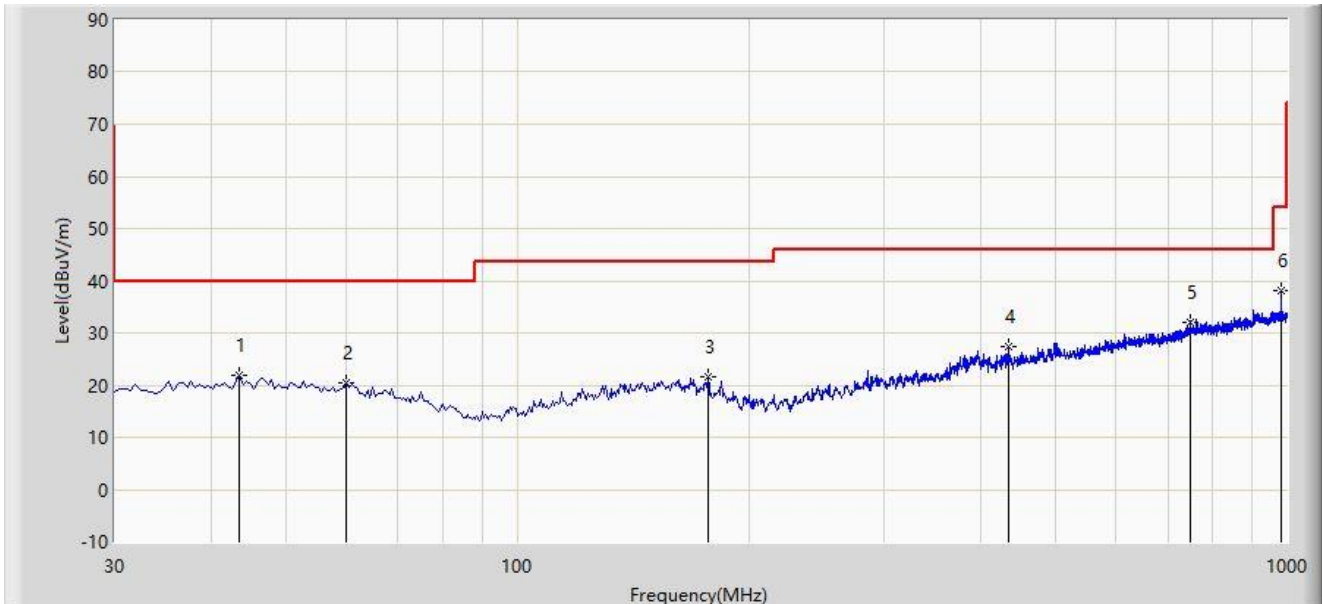
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	43.5	2.8	46.3	74.0	-27.7	Peak	Horizontal
	10885.5	36.3	13.4	49.7	74.0	-24.3	Peak	Horizontal
	11769.5	36.7	12.3	49.0	74.0	-25.0	Peak	Horizontal
	4799.5	41.2	2.9	44.1	74.0	-29.9	Peak	Vertical
	9406.5	37.0	11.9	48.9	74.0	-25.1	Peak	Vertical
	11480.5	36.5	13.0	49.5	74.0	-24.5	Peak	Vertical
19	4884.5	42.3	2.9	45.2	74.0	-28.8	Peak	Horizontal
	7324.0	39.6	7.9	47.5	74.0	-26.5	Peak	Horizontal
	11548.5	36.2	13.0	49.2	74.0	-24.8	Peak	Horizontal
	7315.5	42.6	7.9	50.5	74.0	-23.5	Peak	Vertical
	11081.0	36.8	13.2	50.0	74.0	-24.0	Peak	Vertical
	11599.5	37.0	12.8	49.8	74.0	-24.2	Peak	Vertical
39	7434.5	39.2	8.1	47.3	74.0	-26.7	Peak	Horizontal
	10843.0	36.4	13.5	49.9	74.0	-24.1	Peak	Horizontal
	11820.5	37.4	12.0	49.4	74.0	-24.6	Peak	Horizontal
	7443.0	38.3	8.2	46.5	74.0	-27.5	Peak	Vertical
	8403.5	37.1	8.6	45.7	74.0	-28.3	Peak	Vertical
	11081.0	36.7	13.2	49.9	74.0	-24.1	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Result of Radiated Emission below 1GHz:

Site: WZ-AC1	Test Date: 2022-02-14
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Note: Transmit by BLE 125kbps at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		43.580	21.909	3.537	-18.091	40.000	18.372	PK
2		60.070	20.402	2.955	-19.598	40.000	17.447	PK
3		176.955	21.699	4.690	-21.801	43.500	17.009	PK
4		434.490	27.331	5.438	-18.669	46.000	21.893	PK
5	*	749.255	32.141	3.981	-13.859	46.000	28.160	PK
6		982.540	38.170	8.041	-15.830	54.000	30.129	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

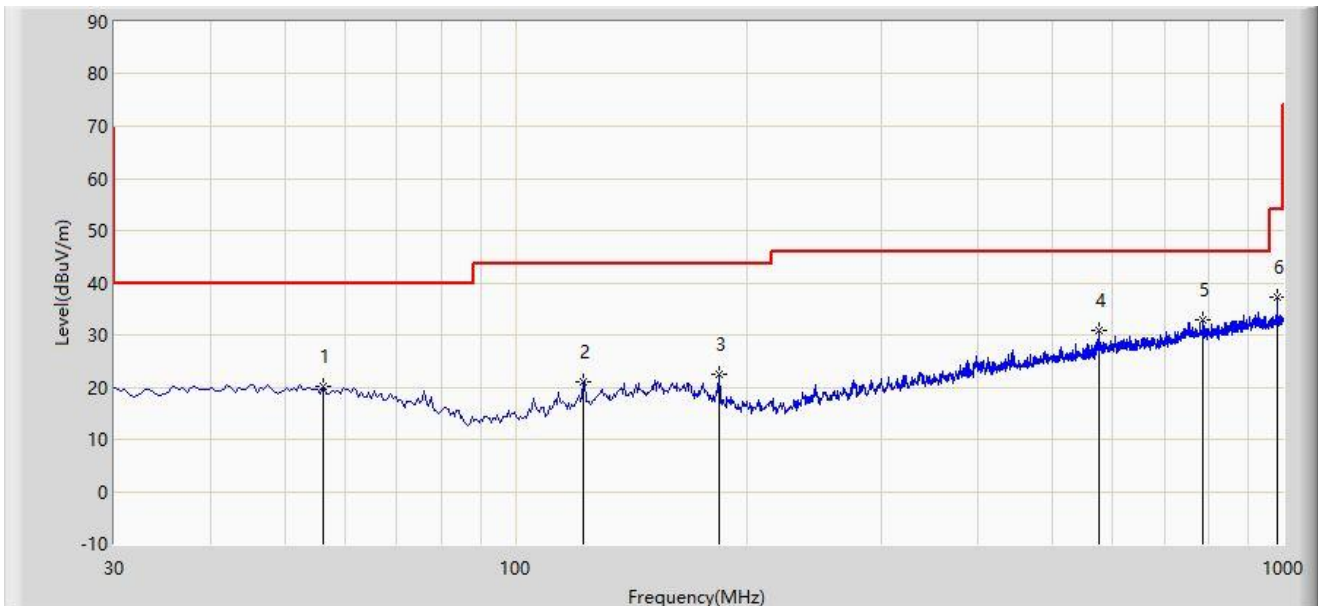
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

Site: WZ-AC1	Test Date: 2022-02-14
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Note: Transmit by BLE 125kbps at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		56.190	20.028	2.226	-19.972	40.000	17.802	PK
2		122.635	21.091	5.068	-22.409	43.500	16.023	PK
3		184.230	22.358	6.276	-21.142	43.500	16.082	PK
4		575.140	30.892	6.084	-15.108	46.000	24.808	PK
5	*	785.630	32.890	4.667	-13.110	46.000	28.223	PK
6		982.540	37.255	7.126	-16.745	54.000	30.129	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

KG100SAAMD:

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-125kbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	50.4	2.8	53.2	74.0	-20.8	Peak	Horizontal
	4808.0	46.7	2.8	49.5	54.0	-4.5	Average	Horizontal
	11421.0	36.8	12.9	49.7	74.0	-24.3	Peak	Horizontal
	12118.0	36.1	12.2	48.3	74.0	-25.7	Peak	Horizontal
	4808.0	40.4	2.8	43.2	74.0	-30.8	Peak	Vertical
	10911.0	35.5	13.4	48.9	74.0	-25.1	Peak	Vertical
	11591.0	35.6	12.7	48.3	74.0	-25.7	Peak	Vertical
19	4876.0	46.7	2.8	49.5	74.0	-24.5	Peak	Horizontal
	10715.5	35.6	13.4	49.0	74.0	-25.0	Peak	Horizontal
	11531.5	36.7	12.8	49.5	74.0	-24.5	Peak	Horizontal
	7324.0	39.7	7.9	47.6	74.0	-26.4	Peak	Vertical
	10851.5	36.3	13.5	49.8	74.0	-24.2	Peak	Vertical
	11489.0	36.4	13.2	49.6	74.0	-24.4	Peak	Vertical
39	4961.0	42.1	3.1	45.2	74.0	-28.8	Peak	Horizontal
	10758.0	35.7	13.3	49.0	74.0	-25.0	Peak	Horizontal
	11446.5	35.3	13.0	48.3	74.0	-25.7	Peak	Horizontal
	4961.0	38.6	3.1	41.7	74.0	-32.3	Peak	Vertical
	10953.5	35.3	13.5	48.8	74.0	-25.2	Peak	Vertical
	11625.0	36.1	12.5	48.6	74.0	-25.4	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-500kbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	49.8	2.8	52.6	74.0	-21.4	Peak	Horizontal
	4808.0	46.7	2.8	49.5	54.0	-4.5	Average	Horizontal
	10962.0	36.5	13.5	50.0	74.0	-24.0	Peak	Horizontal
	11540.0	35.7	12.9	48.6	74.0	-25.4	Peak	Horizontal
	4808.0	39.7	2.8	42.5	74.0	-31.5	Peak	Vertical
	10911.0	36.1	13.4	49.5	74.0	-24.5	Peak	Vertical
	12058.5	35.3	12.3	47.6	74.0	-26.4	Peak	Vertical
19	4884.5	46.3	2.9	49.2	74.0	-24.8	Peak	Horizontal
	11072.5	35.8	13.3	49.1	74.0	-24.9	Peak	Horizontal
	11693.0	36.1	12.2	48.3	74.0	-25.7	Peak	Horizontal
	4876.0	38.5	2.8	41.3	74.0	-32.7	Peak	Vertical
	11540.0	35.4	12.9	48.3	74.0	-25.7	Peak	Vertical
	12458.0	35.4	11.9	47.3	74.0	-26.7	Peak	Vertical
39	4961.0	42.3	3.1	45.4	74.0	-28.6	Peak	Horizontal
	10834.5	36.0	13.4	49.4	74.0	-24.6	Peak	Horizontal
	11786.5	36.3	12.0	48.3	74.0	-25.7	Peak	Horizontal
	7604.5	37.3	7.9	45.2	74.0	-28.8	Peak	Vertical
	10936.5	34.6	13.6	48.2	74.0	-25.8	Peak	Vertical
	12194.5	34.7	12.0	46.7	74.0	-27.3	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-1Mbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4808.0	51.3	2.8	54.1	74.0	-19.9	Peak	Horizontal
	4808.0	47.3	2.8	50.1	54.0	-3.9	Average	Horizontal
	10936.5	36.7	13.6	50.3	74.0	-23.7	Peak	Horizontal
	12449.5	36.5	11.9	48.4	74.0	-25.6	Peak	Horizontal
	4808.0	40.2	2.8	43.0	74.0	-31.0	Peak	Vertical
	11514.5	37.2	13.0	50.2	74.0	-23.8	Peak	Vertical
	13325.0	35.9	13.5	49.4	74.0	-24.6	Peak	Vertical
19	4876.0	47.0	2.8	49.8	74.0	-24.2	Peak	Horizontal
	10809.0	36.4	13.3	49.7	74.0	-24.3	Peak	Horizontal
	11786.5	34.9	12.0	46.9	74.0	-27.1	Peak	Horizontal
	4884.5	39.2	2.9	42.1	74.0	-31.9	Peak	Vertical
	10970.5	35.4	13.4	48.8	74.0	-25.2	Peak	Vertical
	11608.0	36.8	12.7	49.5	74.0	-24.5	Peak	Vertical
39	4961.0	42.9	3.1	46.0	74.0	-28.0	Peak	Horizontal
	10741.0	36.3	13.6	49.9	74.0	-24.1	Peak	Horizontal
	12381.5	36.8	11.8	48.6	74.0	-25.4	Peak	Horizontal
	7485.5	36.7	8.3	45.0	74.0	-29.0	Peak	Vertical
	11038.5	35.3	13.6	48.9	74.0	-25.1	Peak	Vertical
	11591.0	36.1	12.7	48.8	74.0	-25.2	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-12-16	Test Mode:	BLE-2Mbps
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

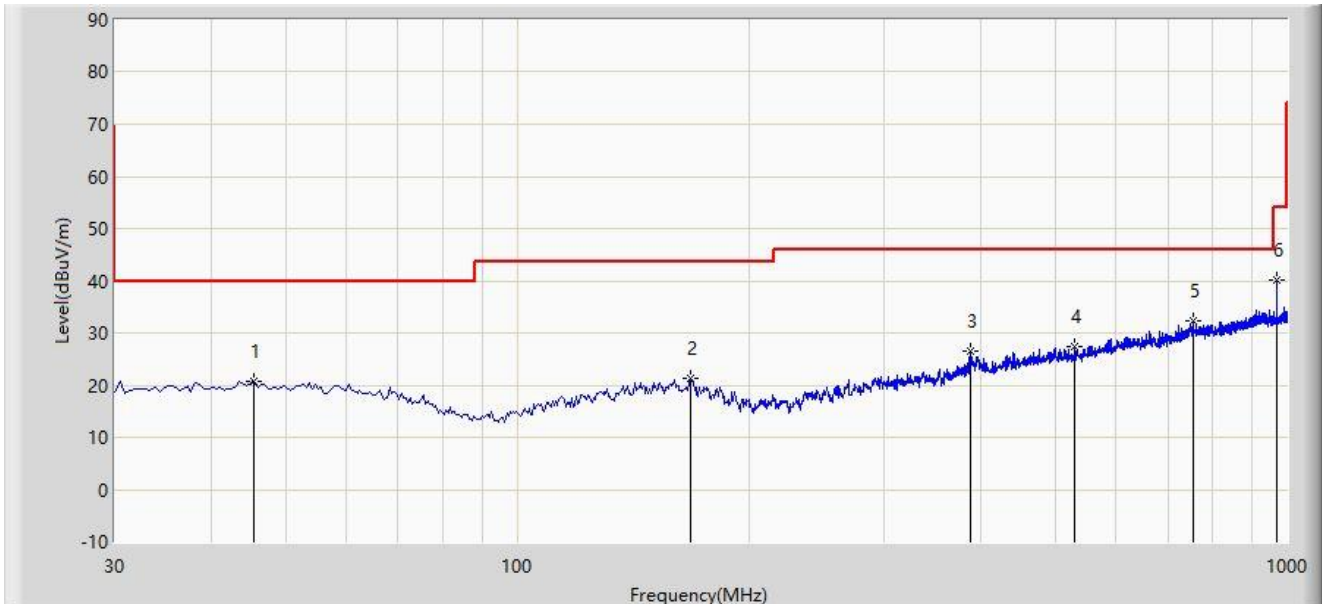
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	4799.5	50.2	2.9	53.1	74.0	-20.9	Peak	Horizontal
	4799.5	44.0	2.9	46.9	54.0	-7.1	Average	Horizontal
	11608.0	35.8	12.7	48.5	74.0	-25.5	Peak	Horizontal
	12160.5	36.3	12.2	48.5	74.0	-25.5	Peak	Horizontal
	4799.5	39.6	2.9	42.5	74.0	-31.5	Peak	Vertical
	10877.0	36.0	13.4	49.4	74.0	-24.6	Peak	Vertical
	12118.0	35.9	12.2	48.1	74.0	-25.9	Peak	Vertical
19	4876.0	46.3	2.8	49.1	74.0	-24.9	Peak	Horizontal
	11081.0	35.9	13.2	49.1	74.0	-24.9	Peak	Horizontal
	12143.5	36.7	12.1	48.8	74.0	-25.2	Peak	Horizontal
	7324.0	38.3	7.9	46.2	74.0	-27.8	Peak	Vertical
	10877.0	35.5	13.4	48.9	74.0	-25.1	Peak	Vertical
	11497.5	35.3	13.3	48.6	74.0	-25.4	Peak	Vertical
39	4961.0	40.8	3.1	43.9	74.0	-30.1	Peak	Horizontal
	11030.0	35.6	13.4	49.0	74.0	-25.0	Peak	Horizontal
	12041.5	35.4	12.2	47.6	74.0	-26.4	Peak	Horizontal
	7485.5	36.1	8.3	44.4	74.0	-29.6	Peak	Vertical
	10936.5	36.0	13.6	49.6	74.0	-24.4	Peak	Vertical
	12177.5	35.0	12.1	47.1	74.0	-26.9	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Result of Radiated Emission below 1GHz:

Site: WZ-AC1	Test Date: 2022-02-14
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Note: Transmit by BLE 125kbps at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		45.520	20.640	2.269	-19.360	40.000	18.371	PK
2		167.740	21.392	3.463	-22.108	43.500	17.929	PK
3		387.445	26.512	5.990	-19.488	46.000	20.522	PK
4		529.065	27.438	3.739	-18.562	46.000	23.699	PK
5	*	756.045	32.259	4.005	-13.741	46.000	28.254	PK
6		969.930	40.206	10.275	-13.794	54.000	29.931	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

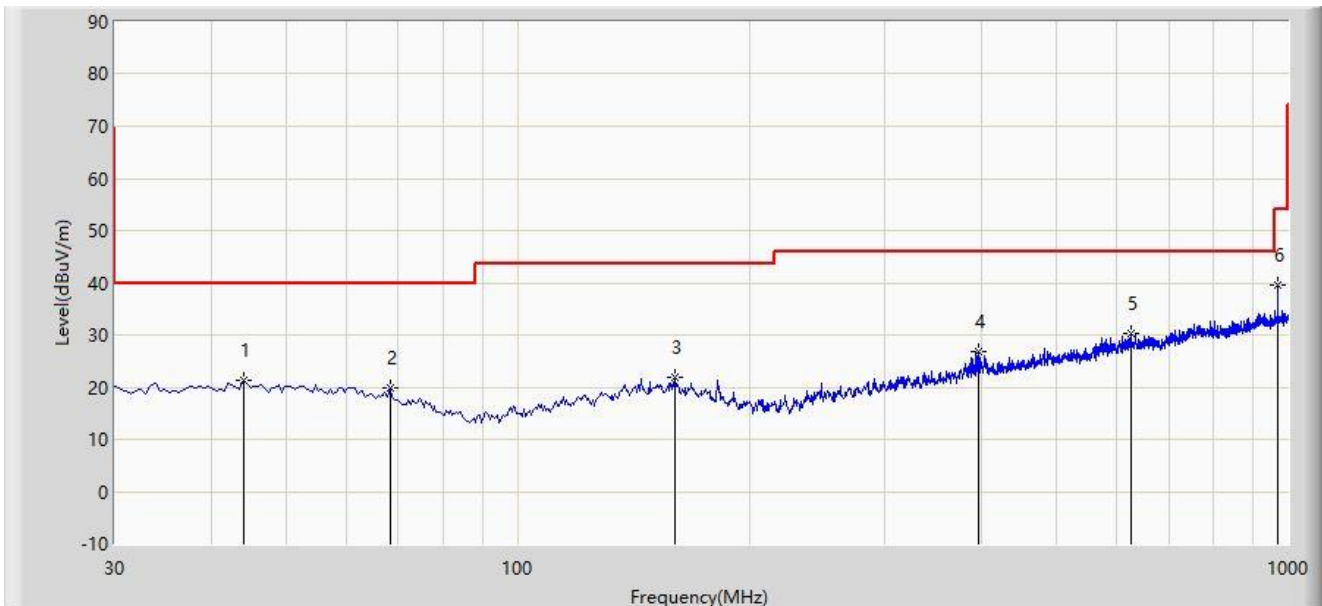
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

Site: WZ-AC1	Test Date: 2022-02-14
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Note: Transmit by BLE 125kbps at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		44.065	21.447	3.072	-18.553	40.000	18.375	PK
2		68.315	19.844	3.395	-20.156	40.000	16.448	PK
3		159.980	21.821	3.665	-21.679	43.500	18.156	PK
4		396.660	26.677	5.948	-19.323	46.000	20.729	PK
5		626.065	30.252	4.288	-15.748	46.000	25.964	PK
6	*	969.930	39.578	9.647	-14.422	54.000	29.931	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

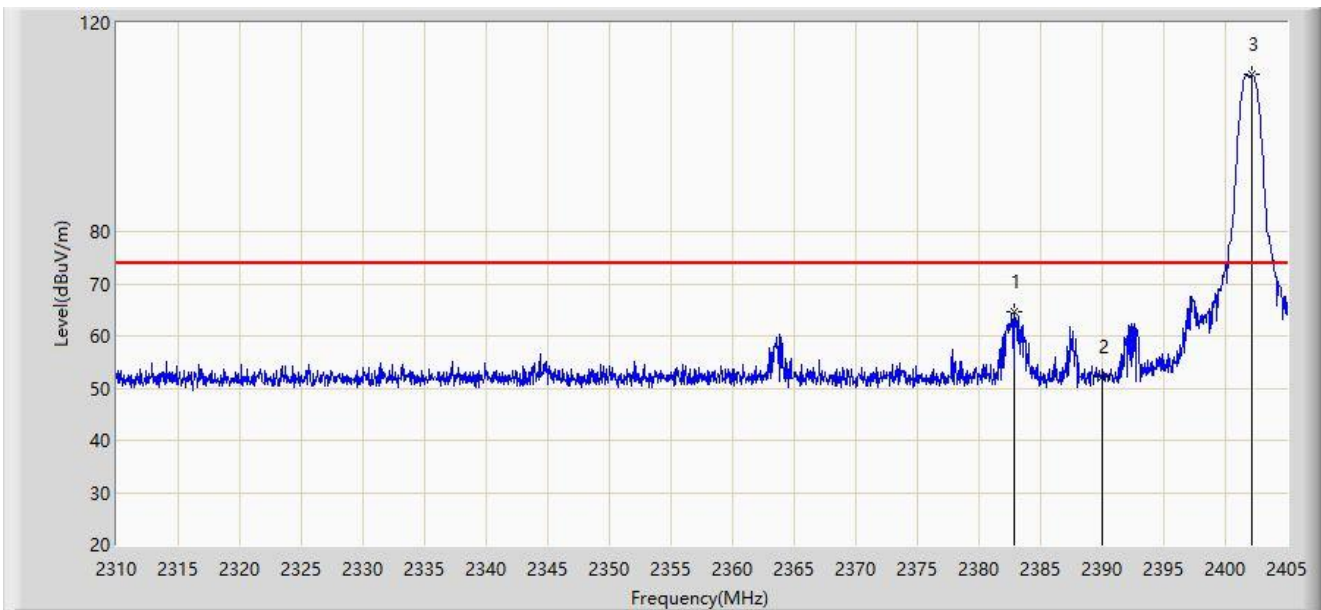
Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value.

Therefore, the data is not presented in the report.

A.7 Radiated Restricted Band Edge Test Result

KG100SABMD:

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2402MHz	



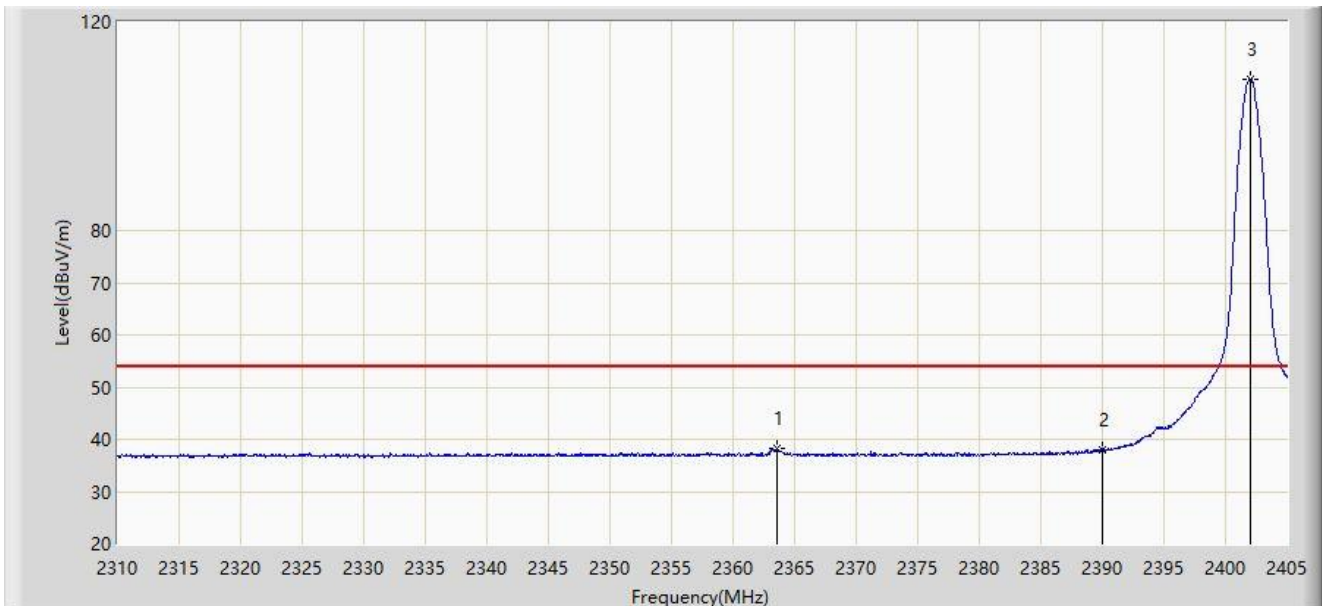
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2382.913	64.647	33.647	-9.353	74.000	31.000	PK
2		2390.000	52.120	21.128	-21.880	74.000	30.992	PK
3		2402.103	110.097	79.108	N/A	N/A	30.989	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2402MHz	



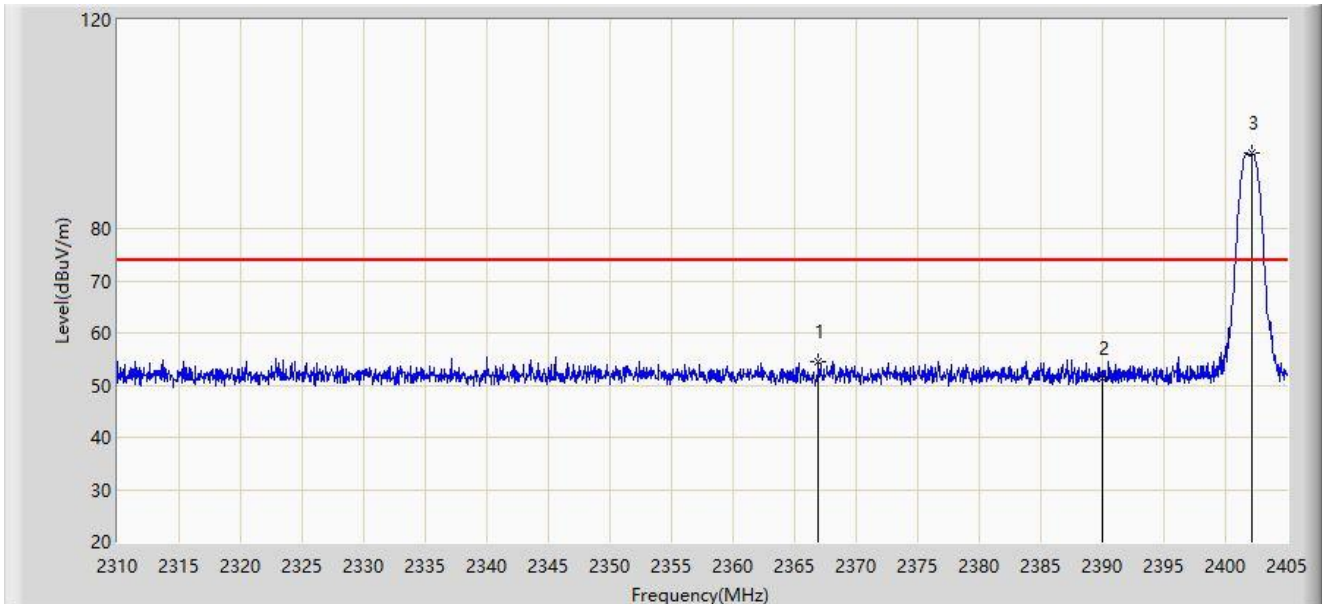
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2363.580	38.126	7.038	-15.874	54.000	31.088	AV
2		2390.000	37.918	6.926	-16.082	54.000	30.992	AV
3		2402.055	109.024	78.035	N/A	N/A	30.989	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2402MHz	



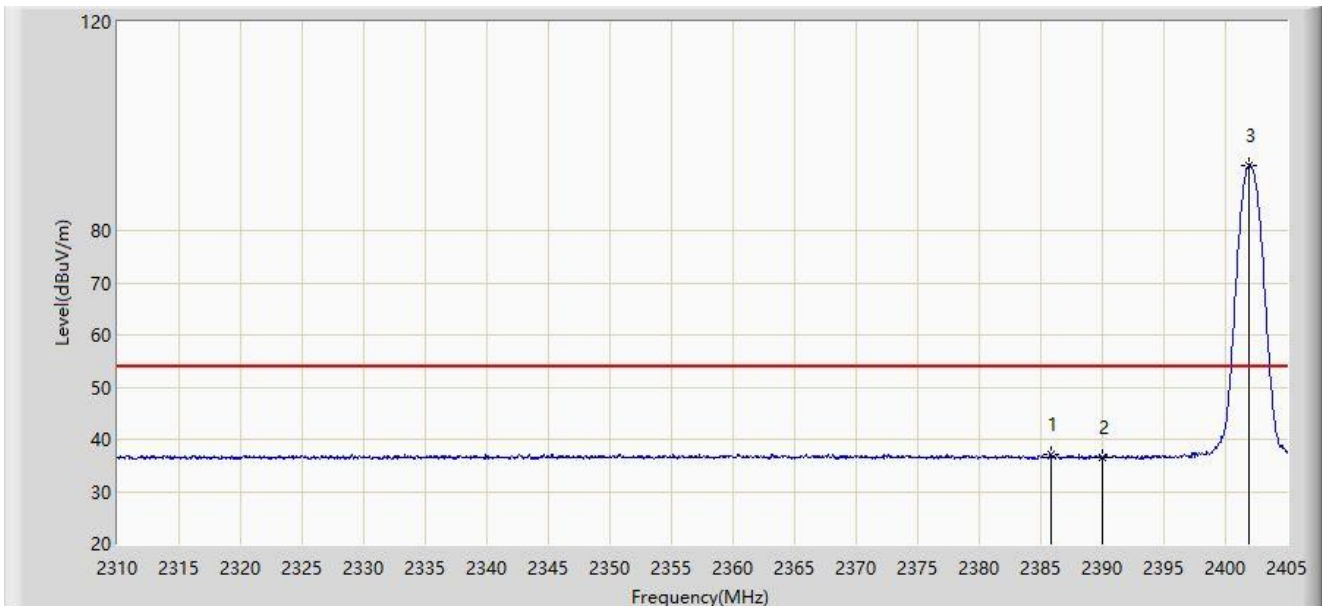
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2366.952	54.475	23.399	-19.525	74.000	31.076	PK
2		2390.000	51.428	20.436	-22.572	74.000	30.992	PK
3		2402.150	94.412	63.424	N/A	N/A	30.988	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2402MHz	



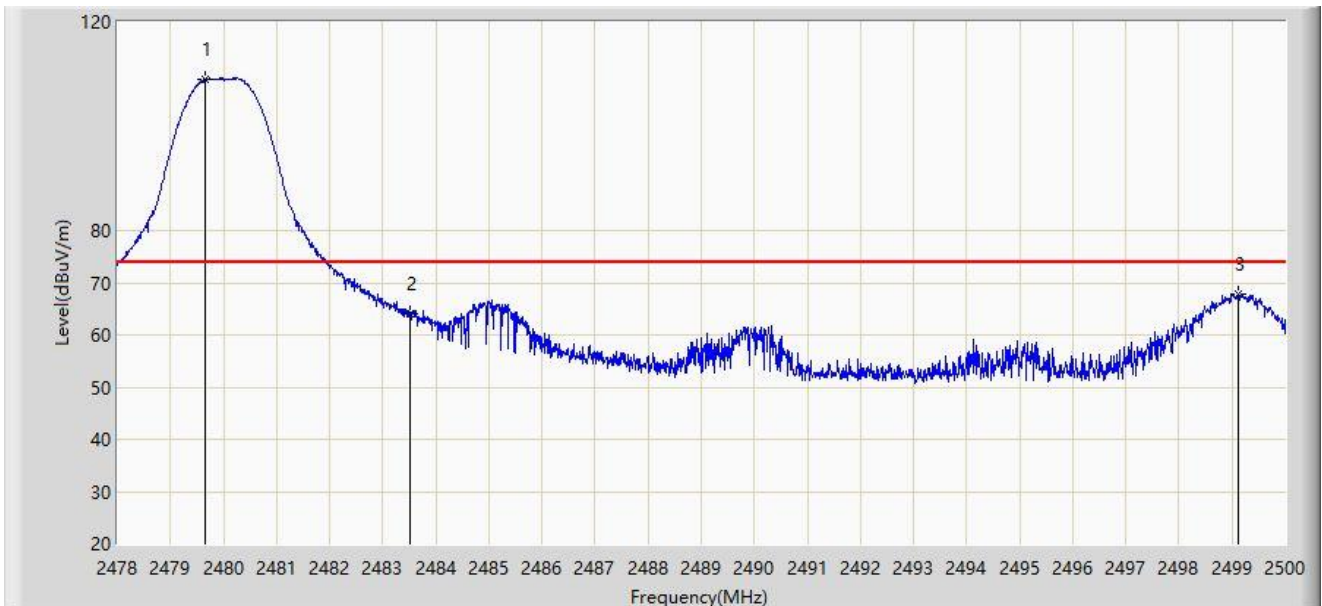
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2385.810	37.102	6.108	-16.898	54.000	30.994	AV
2		2390.000	36.609	5.617	-17.391	54.000	30.992	AV
3		2401.913	92.569	61.580	N/A	N/A	30.989	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2480MHz	



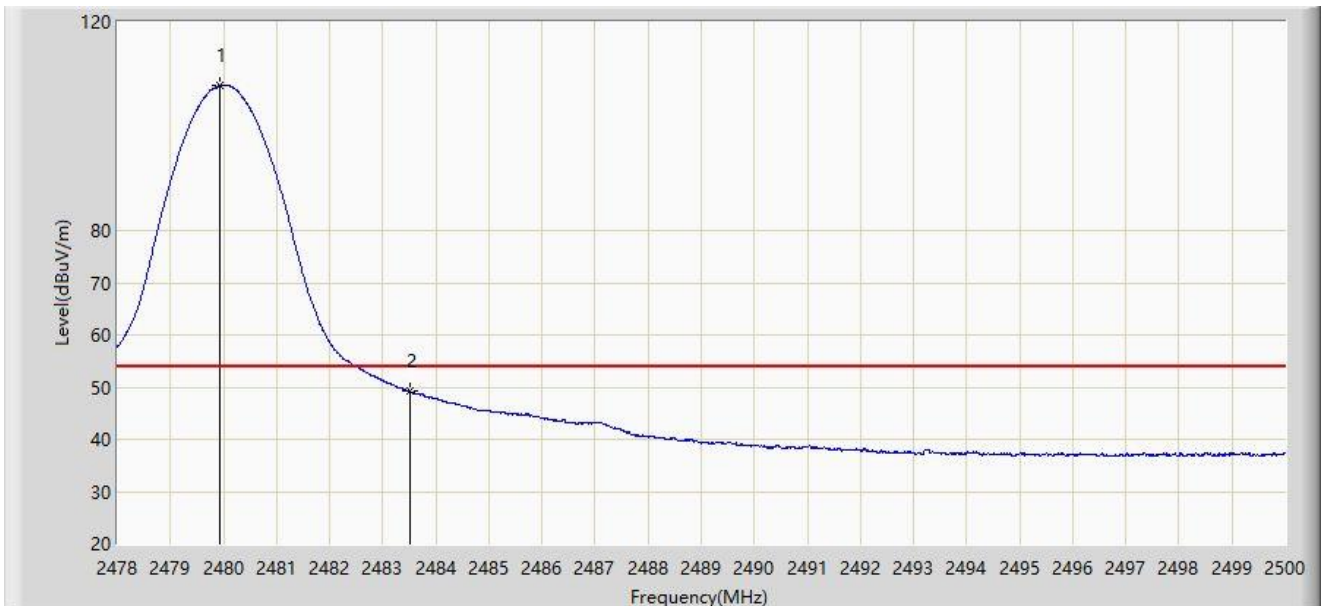
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.661	109.008	78.110	N/A	N/A	30.898	PK
2		2483.500	64.200	33.309	-9.800	74.000	30.892	PK
3	*	2499.131	67.706	36.810	-6.294	74.000	30.897	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2480MHz	



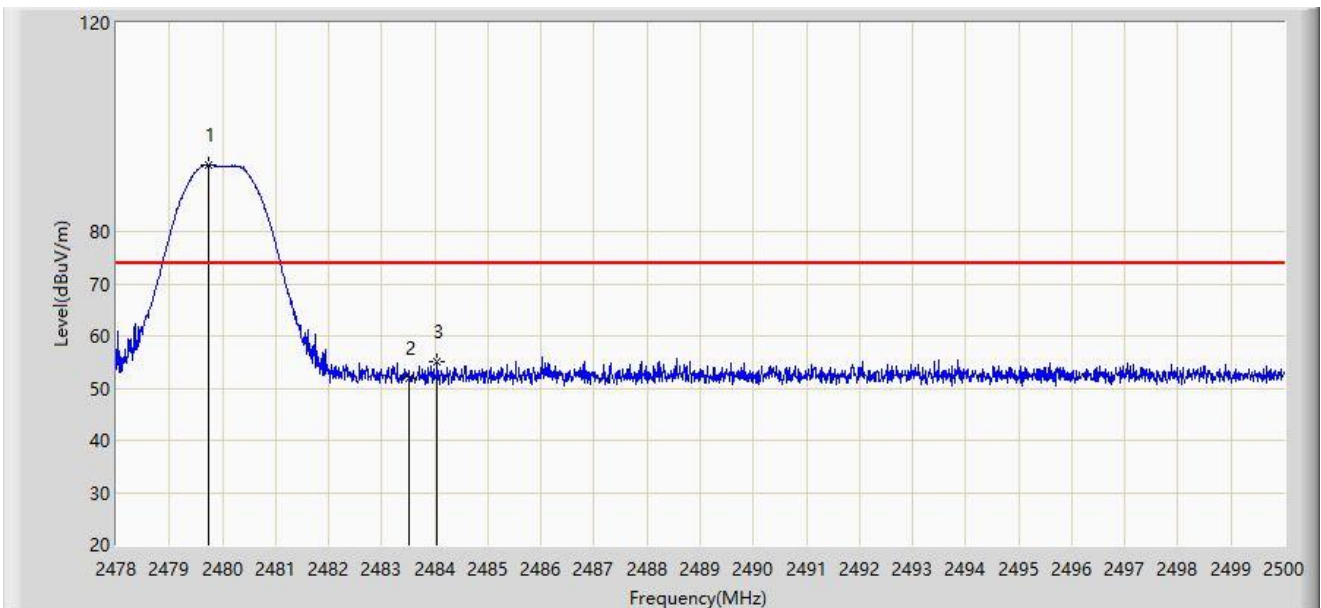
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.925	107.760	76.863	N/A	N/A	30.897	AV
2	*	2483.500	49.278	18.387	-4.722	54.000	30.892	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2480MHz	



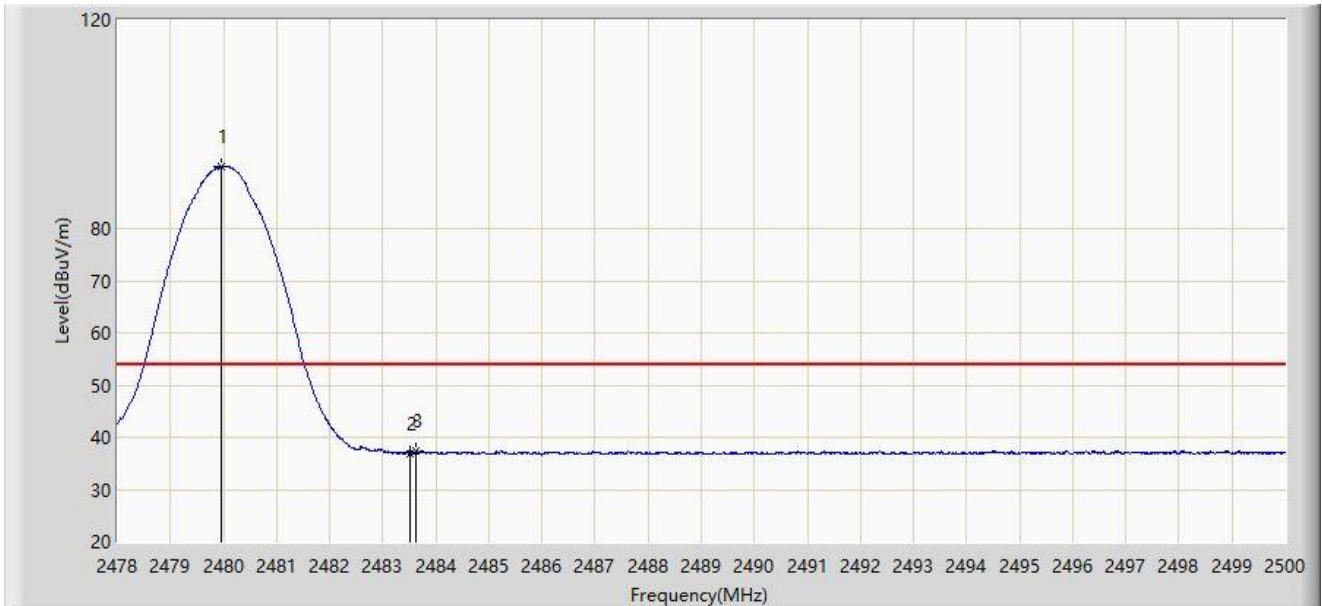
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.749	92.841	61.943	N/A	N/A	30.897	PK
2		2483.500	51.755	20.864	-22.245	74.000	30.892	PK
3	*	2484.050	55.079	24.188	-18.921	74.000	30.891	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 125kbps at 2480MHz	



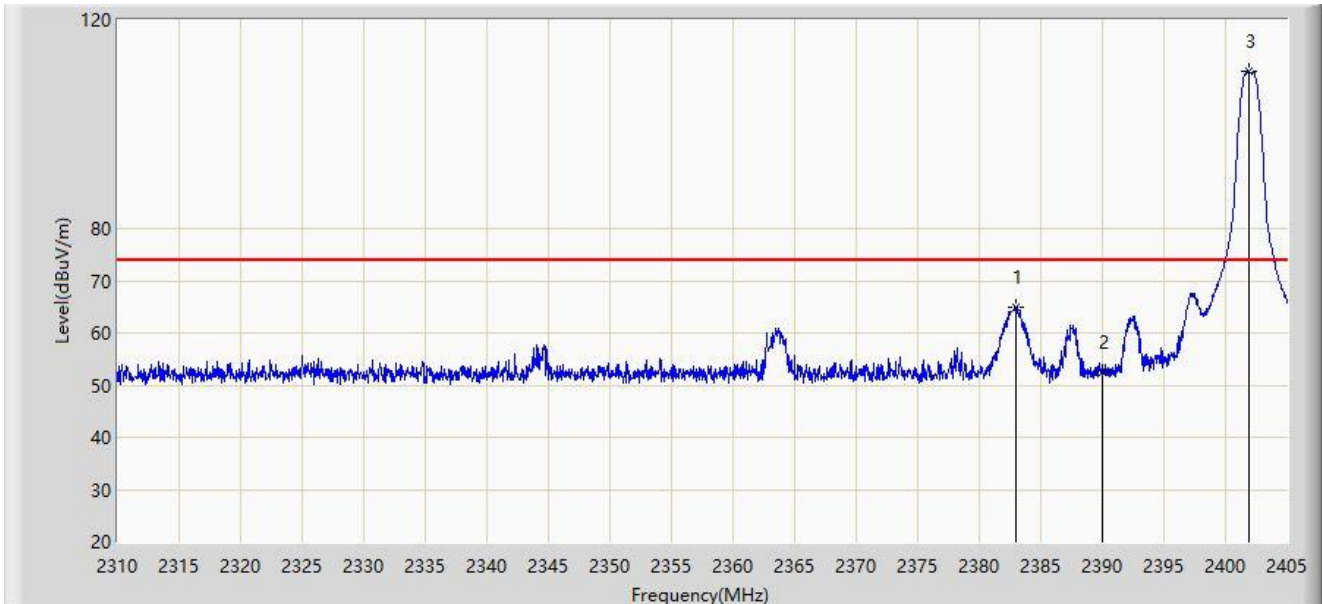
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.969	91.910	61.013	N/A	N/A	30.897	AV
2		2483.500	36.894	6.003	-17.106	54.000	30.892	AV
3	*	2483.632	37.388	6.497	-16.612	54.000	30.892	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2022-12-16
Limit: FCC_2.4G_RE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit by BLE 500kbps at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2382.960	64.905	33.905	-9.095	74.000	31.000	PK
2		2390.000	52.552	21.560	-21.448	74.000	30.992	PK
3		2401.960	110.279	79.290	N/A	N/A	30.989	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).