RF MEASUREMENT REPORT

FCC ID:	LNQ-WF810G
Applicant:	Actiontec Electronics Inc.
Product:	Wi-Fi 6E Mesh Extender
Model No.:	GE6E220C, WF-810G
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Result:	Complies
Received Date:	2023-02-09
Test Date:	2023-02-23 ~ 2023-04-14

Reviewed By: Kevin Guo

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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
2301RSU042-U2	V01	Initial Report	2023-05-19	Invalid
2301RSU042-U2	V02	Updated the product information	2023-06-26	Valid

CONTENTS

Description Page

1. General Information 5

1.1. Applicant 5

1.2. Manufacturer 5

1.3. Testing Facility 5

1.4. Product Information 6

1.5. Radio Specification under Test 6

1.6. Working Frequencies 7

2. Test Configuration 8

2.1. Test Mode 8

2.2. Test System Connection Diagram 8

2.3. Test Software 8

2.4. Applied Standards 8

2.5. Test Environment Condition 9

3. Antenna Requirements 10

4. Measuring Instrument 11

5. Decision Rules and Measurement Uncertainty 12

5.1. Decision Rules 12

5.2. Measurement Uncertainty 12

6. Test Result 13

6.1. Summary 13

6.2. 6dB Bandwidth Measurement 14

6.2.1. Test Limit 14

6.2.2. Test Procedure 14

6.2.3. Test Setting 14

6.2.4. Test Setup 14

6.2.5. Test Result 14

6.3. Output Power Measurement 15

6.3.1. Test Limit 15

6.3.2. Test Procedure 15

6.3.3. Test Setting 15

6.3.4. Test Setup 15

6.3.5. Test Result 15

6.4. Power Spectral Density Measurement 16

6.4.1. Test Limit 16

6.4.2. Test Procedure 16

6.4.3. Test Setting 16

6.4.4. Test Setup 16
6.4.5. Test Result 16
6.5. Conducted Band Edge and Out-of-Band Emissions Measurement 17
6.5.1. Test Limit 17
6.5.2. Test Procedure 17
6.5.3. Test Settitng 17
6.5.4. Test Setup 18
6.5.5. Test Result 18
6.6. Radiated Spurious Emission Measurement 19
6.6.1. Test Limit 19
6.6.2. Test Procedure 19
6.6.3. Test Setting 19
6.6.4. Test Setup 21
6.6.5. Test Result 22
6.7. Radiated Restricted Band Edge Measurement 23
6.7.1. Test Limit 23
6.7.2. Test Procedure 24
6.7.3. Test Setting 24
6.7.4. Test Setup 25
6.7.5. Test Result 25
6.8. AC Conducted Emissions Measurement 26
6.8.1. Test Limit 26
6.8.2. Test Setup 26
6.8.3. Test Result 26
Appendix A - Test Result 27
A.1 Duty Cycle Test Result 27
A.2 6dB Bandwidth Test Result 28
A.3 Output Power Test Result 29
A.4 Power Spectral Density Test Result 30
A.5 Conducted Band Edge and Out-of-Band Emissions Test Result 31
A.6 Radiated Spurious Emission Test Result 33
A.7 Radiated Restricted Band Edge Test Result 36
A.8 AC Conducted Emissions Test Result 44
Appendix B - Test Setup Photograph 46
Appendix C - EUT Photograph 47

1. General Information

1.1. Applicant

Actiontec Electronics Inc.

3301 Olcott St. Santa Clara, CA 95054

1.2. Manufacturer

Actiontec Electronics Inc.

3301 Olcott St. Santa Clara, CA 95054

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	Wi-Fi 6E Mesh Extender
Model No.	GE6E220C, WF-810G
Serial No.	1HG230200055
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	V5.0 (Single mode, LE only)
Antenna Information	Refer to Section 1.5
Accessories	
Adapter #1	Model No.: ADT-38FKJ-PCU00F Input: 100-240V, 50/60Hz, Max. 1.0A Output: 5.0V⎓3.0A or 12.0V⎓3.0A
Adapter #2	Model No.: ADS036G-W 120300 Input: 100-240V, 50/60Hz, Max. 1.0A Output: 5.0V⎓3.0A, 9.0V⎓3.0A, 12.0V⎓3.0A

Note:

1. There is not any hardware or software differences between GE6E220C and WF-810G, only for different brand.
2. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
3. Adapter #1 was selected in this report.

1.5. Radio Specification under Test

Bluetooth Frequency	2402 ~ 2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	1Mbps
Antenna Type	PCB Antenna
Antenna Gain	1.66 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

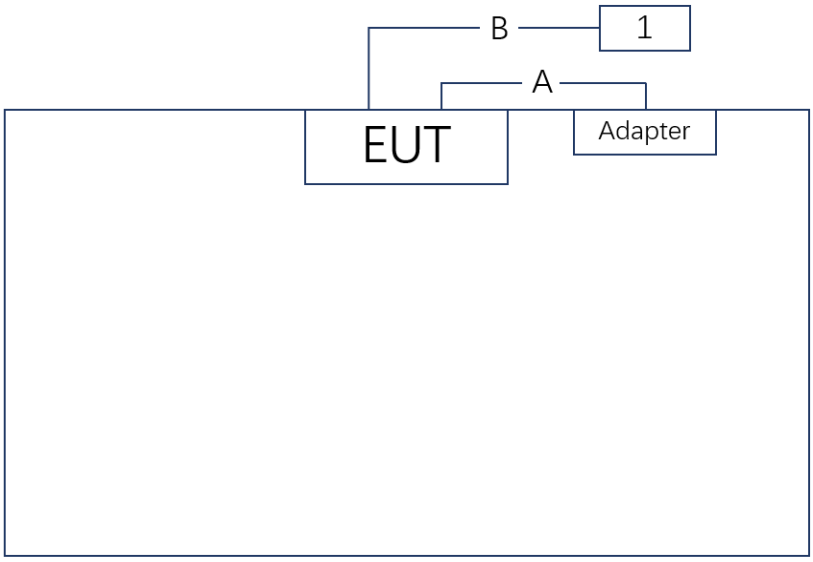
2.1. Test Mode

Mode 1: Transmit by BLE-1Mbps

2.2. 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



No.	Cable Type	Cable Spec.	Length
A	Power Cable	Non-Shielding	1.2m
B	Ethernet Cable	Non-Shielding	>5m
No.	Product	Manufacturer	Model No.
1	Notebook	Lenovo	E495

2.3. Test Software

The test utility software used during testing was “QRCT”, and the version was 3.0.268.0.

2.4. 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

2.5. 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."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

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	ESR3	MRTSUE06185	1 year	2023-12-28	SIP-AC2
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2024-02-26	SIP-AC2
Thermohygrometer	testo	608-H1	MRTSUE06623	1 year	2023-11-27	SIP-AC2
Thermohygrometer	testo	608-H1	MRTSUE06624	1 year	2023-11-27	SIP-AC2
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06647	1 year	2023-07-13	SIP-AC2
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2023-12-22	SIP-AC2
Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2023-06-01	SIP-AC3
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06599	1 year	2023-10-13	SIP-AC3
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2023-06-08	SIP-AC3
Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2023-07-30	SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06619	1 year	2023-11-01	SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06622	1 year	2023-11-27	SIP-AC3
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2024-01-12	SIP-AC3
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2023-12-22	SIP-AC3
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2023-06-01	SIP-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2023-06-01	SIP-SR2
Thermohygrometer	testo	608-H1	MRTSUE06621	1 year	2023-11-27	SIP-SR2
Shielding Room	MIX-BEP	SIP-SR2	MRTSUE06949	5 years	2024-10-23	SIP-SR2
Signal Analyzer	Keysight	N9010B	MRTSUE06558	1 year	2023-06-01	SIP-TR1
Thermohygrometer	testo	608-H1	MRTSUE11022	1 year	2023-11-01	SIP-TR1
USB Power Sensor	Agilent	U2021XA	MRTSUE06030	1 year	2023-10-08	SIP-TR1

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802BS	1.02	RE Antenna & Turntable
Agilent Power Panel	V R03.09.00	Power

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
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Coaxial: 9kHz~30MHz: 2.59dB Coplanar: 9kHz~30MHz: 2.60dB Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~40GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.91dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.3dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.5dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.3dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.2%

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.

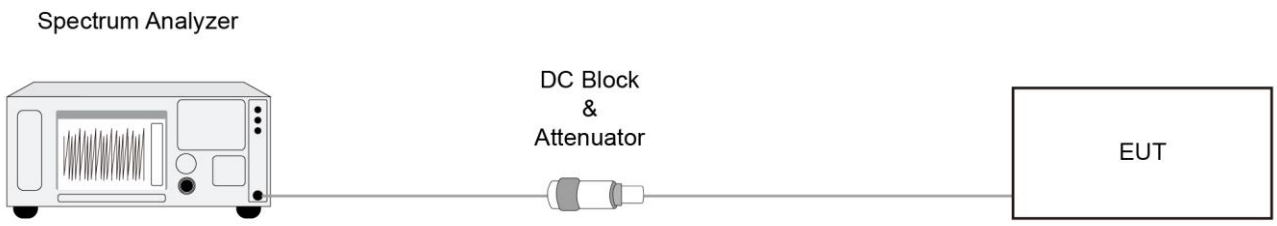
6.2.2. Test Procedure

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 ≥ 3 × 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

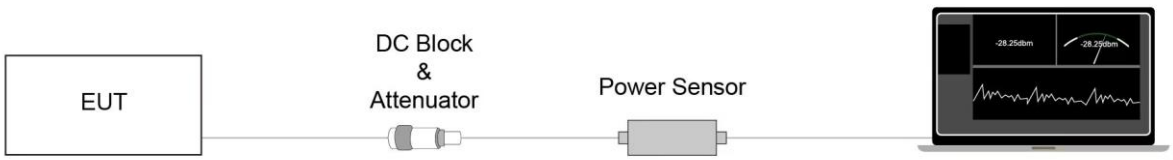
Method PKPM1 (Peak Power Measurement of Signals with DTS BW ≤ 50MHz)

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.

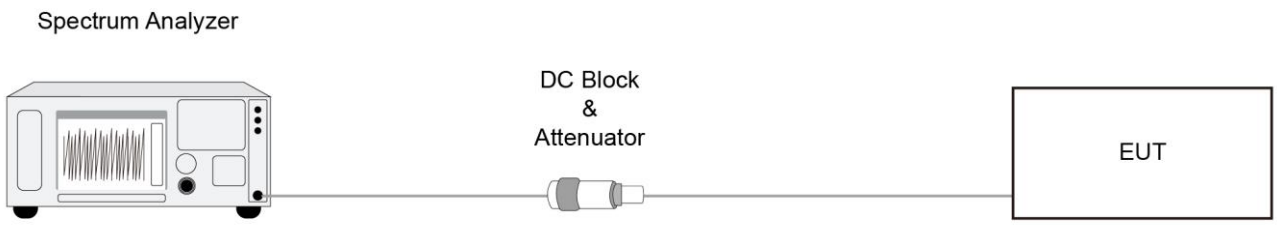
6.4.2. Test Procedure

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 Settitng

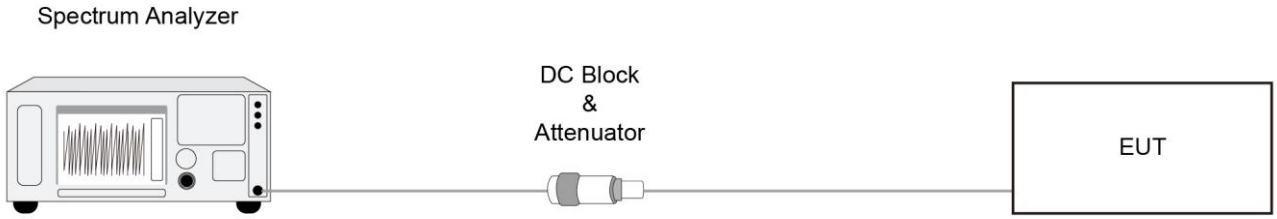
Reference level measurement

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 ≥ 3 x 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 ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

4. Detector = Peak

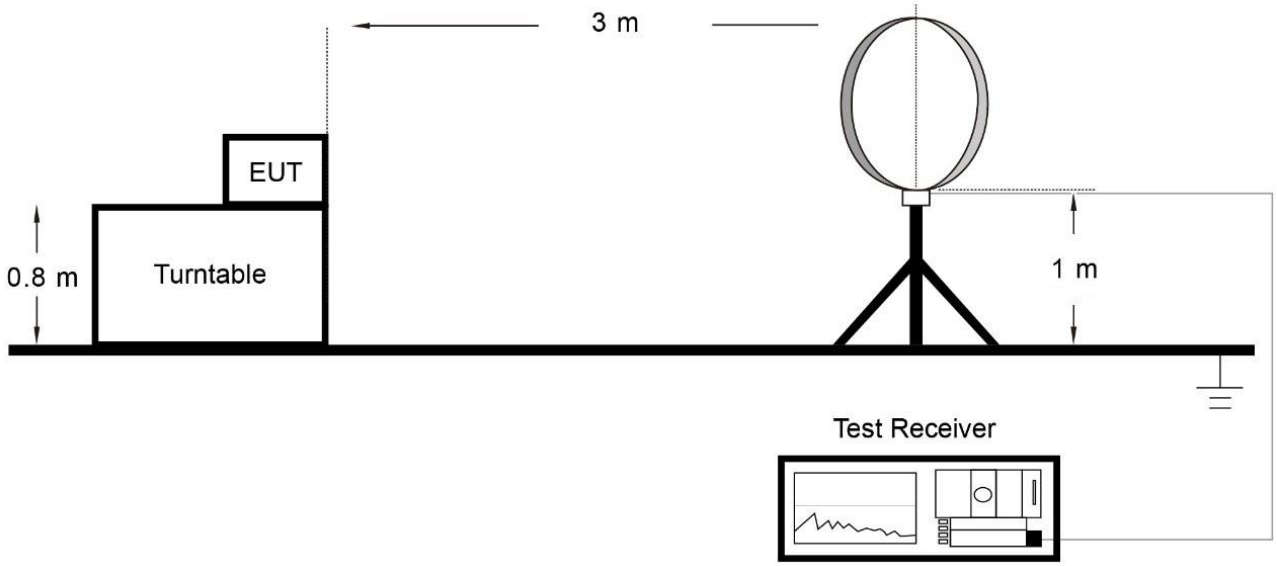
5. Sweep time = auto

6. Trace mode = max hold

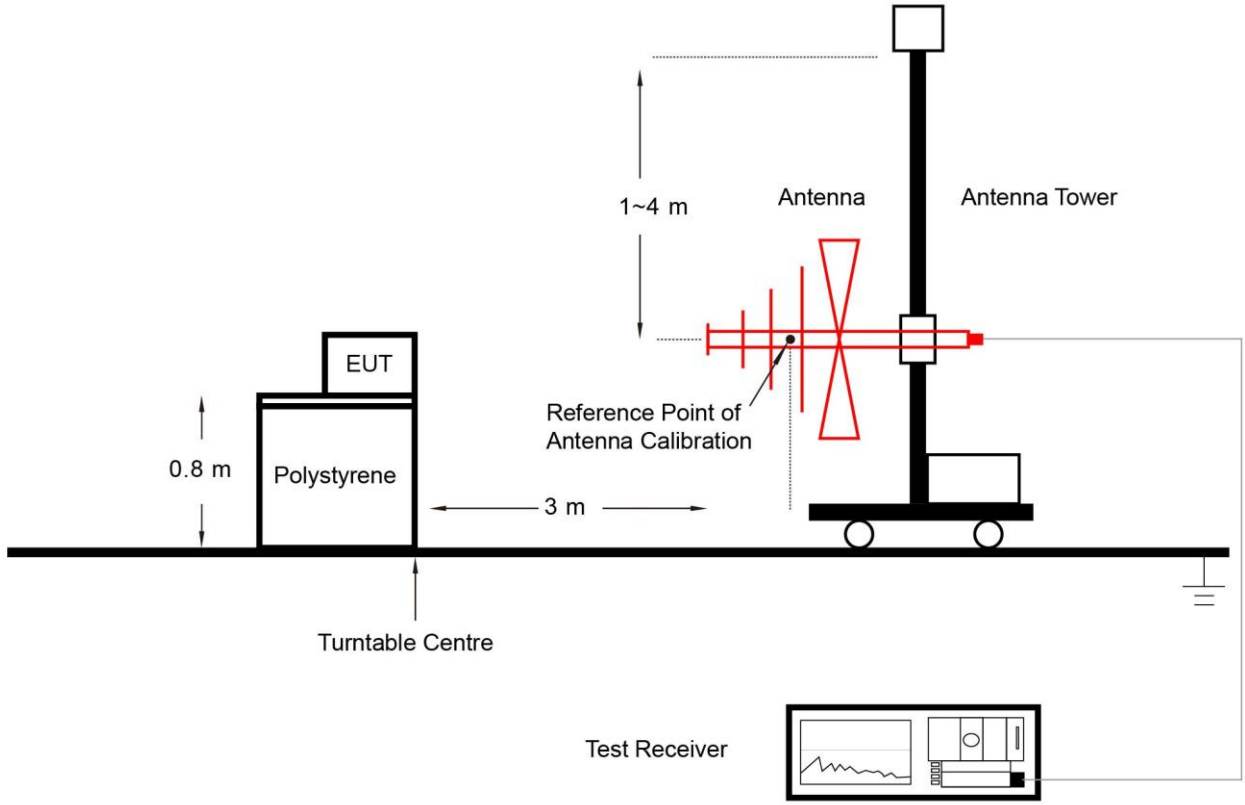
7. Trace was allowed to stabilize

6.6.4. Test Setup

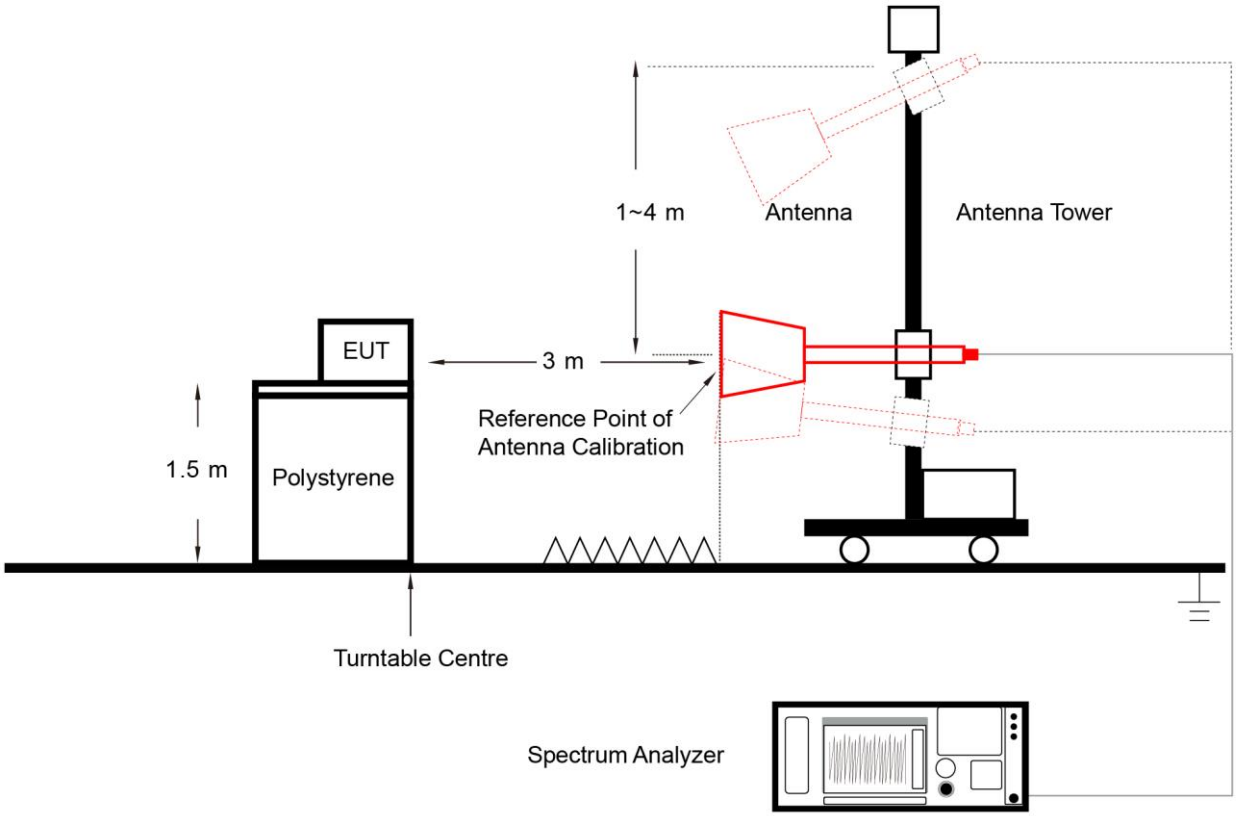
Below 30MHz Test Setup:



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

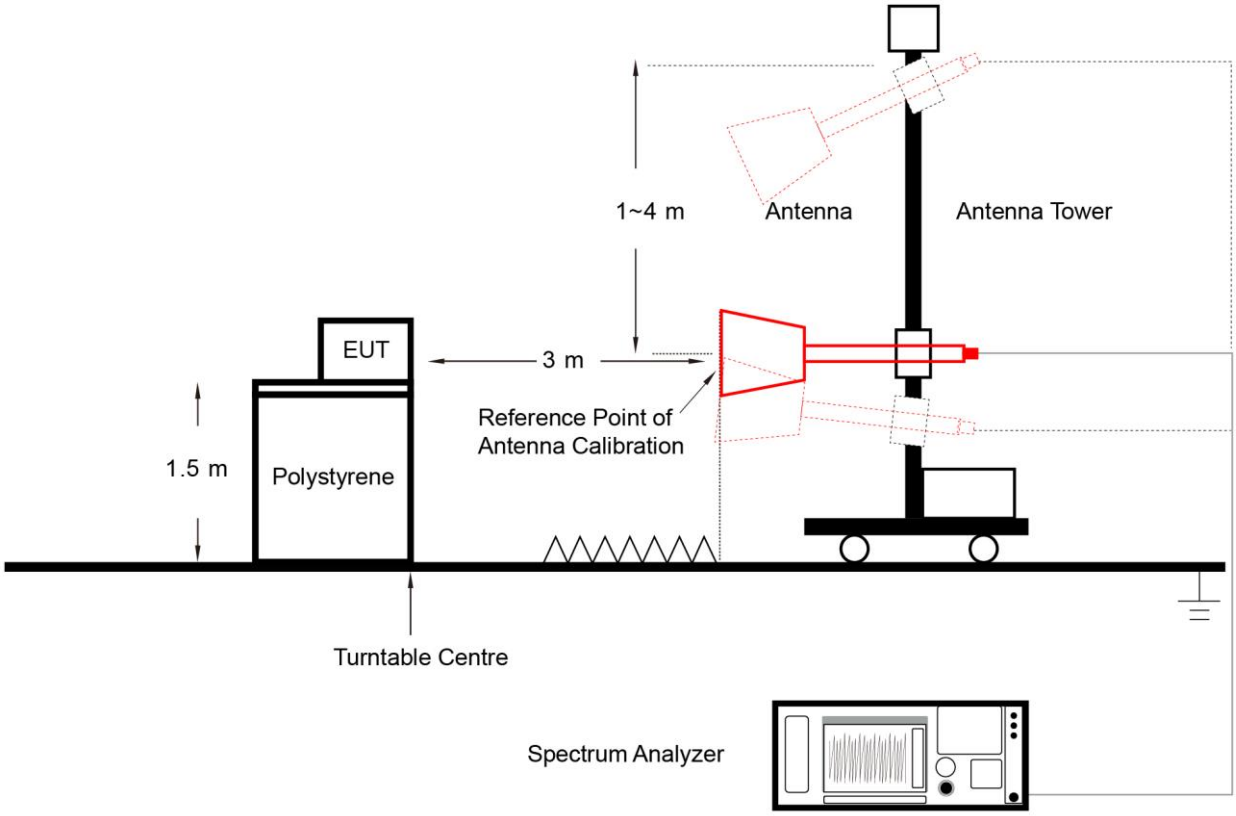
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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 ≥ 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

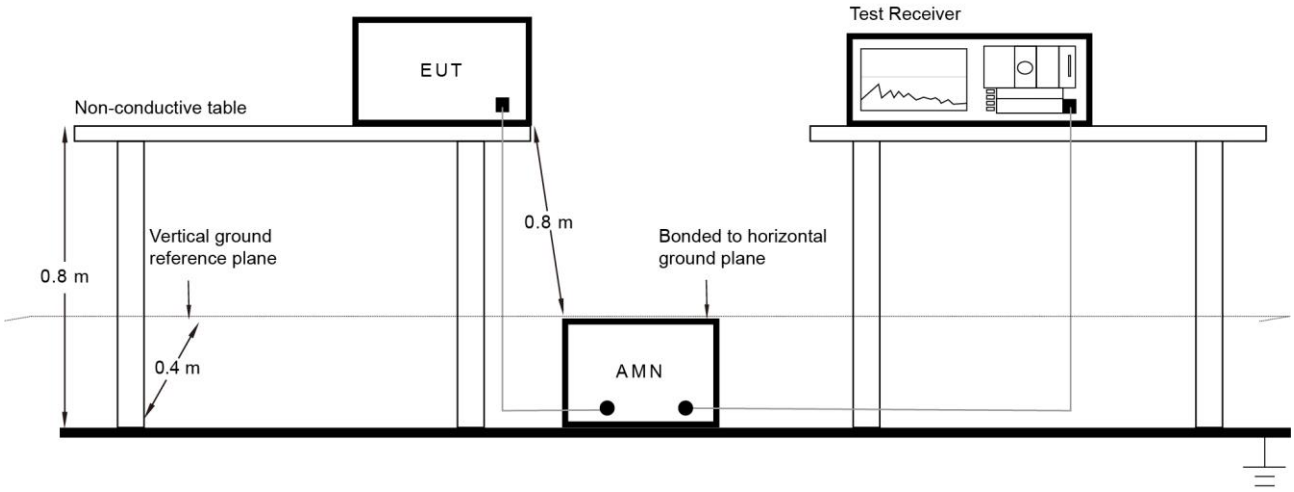
Refer to Appendix A.7.

6.8. AC Conducted Emissions Measurement

6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
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

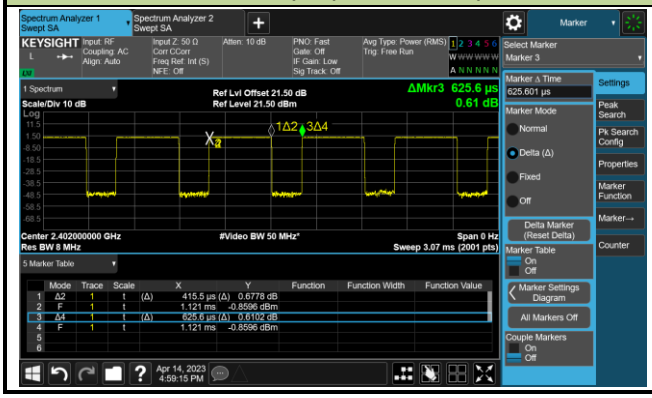
Refer to Appendix A.8.

Appendix A - Test Result

A.1 Duty Cycle Test Result

Test Site	SIP-TR1	Test Engineer	Nandy Zhang
Test Date	2023-04-14		

Test Mode	Duty Cycle
BLE-1Mbps	66.42%
Duty Cycle (T = Transmission Duration)	
BLE-1Mbps (T = 415.5us)	



A.2 6dB Bandwidth Test Result

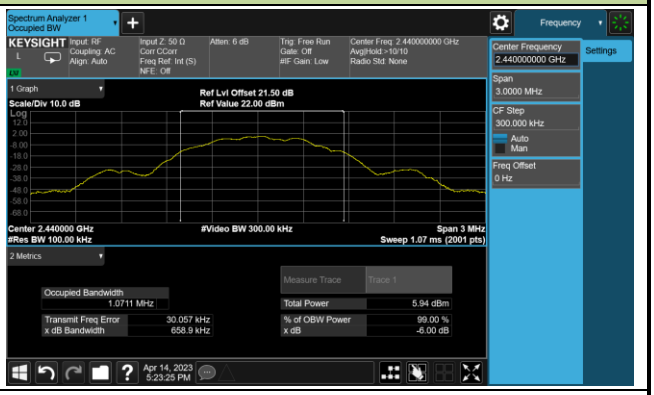
Test Site	SIP-TR1	Test Engineer	Nandy Zhang
Test Date	2023-04-14		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
BLE	1Mbps	00	2402	0.6642	≥ 0.5
BLE	1Mbps	19	2440	0.6589	≥ 0.5
BLE	1Mbps	39	2480	0.6567	≥ 0.5

BLE-1Mbps 6dB Bandwidth

Channel 00 (2402MHz)

Channel 19 (2440MHz)



Channel 39 (2480MHz)

A.3 Output Power Test Result

Test Site	SIP-TR1	Test Engineer	Nandy Zhang
Test Date	2023-04-14		

Test Result of Peak Output Power

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	1.10	≤ 30.00	Pass
BLE	1Mbps	19	2440	1.12	≤ 30.00	Pass
BLE	1Mbps	39	2480	1.22	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	-0.94	≤ 30.00	Pass
BLE	1Mbps	19	2440	-0.83	≤ 30.00	Pass
BLE	1Mbps	39	2480	-0.79	≤ 30.00	Pass

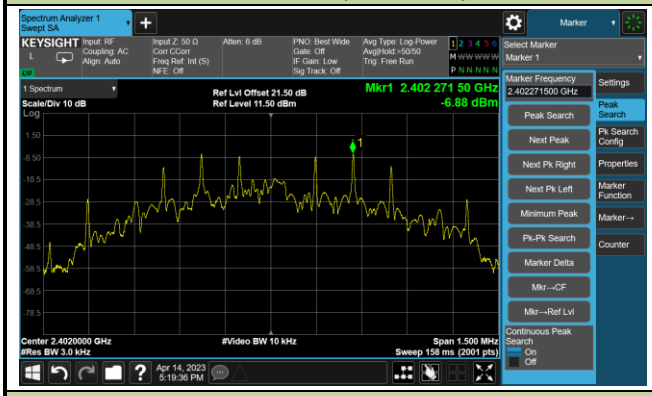
A.4 Power Spectral Density Test Result

Test Site	SIP-TR1	Test Engineer	Nandy Zhang
Test Date	2023-04-14		

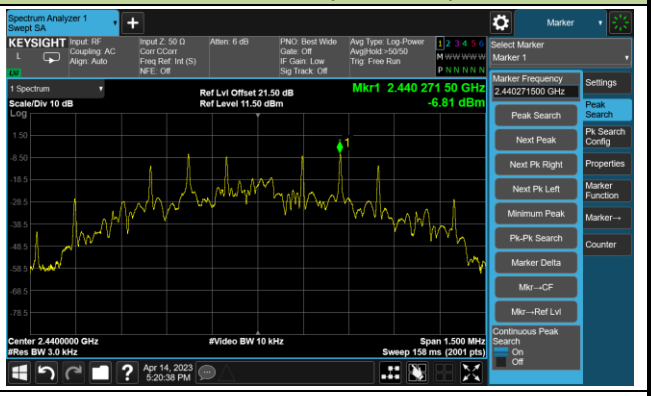
Test Mode	Data Rate	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1Mbps	00	2402	-6.88	≤ 8.00	Pass
BLE	1Mbps	19	2440	-6.81	≤ 8.00	Pass
BLE	1Mbps	39	2480	-6.75	≤ 8.00	Pass

BLE-1Mbps PSD

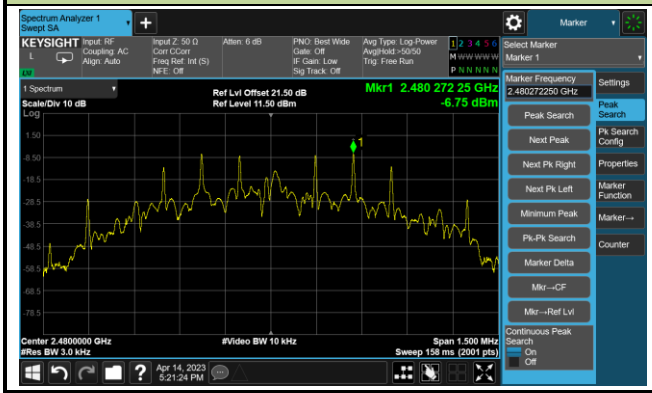
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



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

Test Site	SIP-TR1	Test Engineer	Nandy Zhang
Test Date	2023-04-14		

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

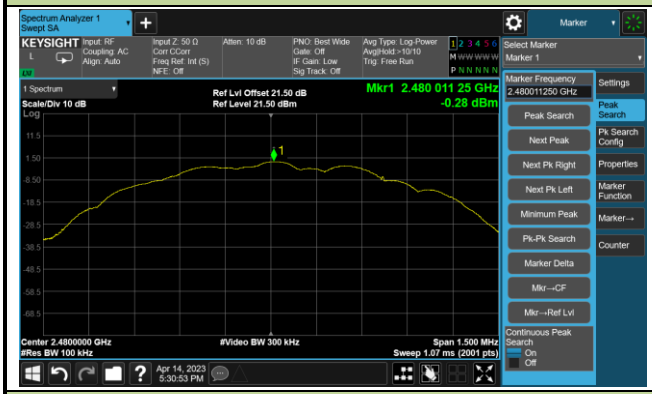
BLE-1Mbps Out-of-Band Emissions

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
Channel 39 (2480MHz)	
100kHz PSD Reference Level	High Band Edge
	
Spurious Emission 30MHz ~ 25GHz	

A.6 Radiated Spurious Emission Test Result

Test Site	SIP-AC3	Test Engineer	Wayne Wang
Test Date	2023-02-23	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.		

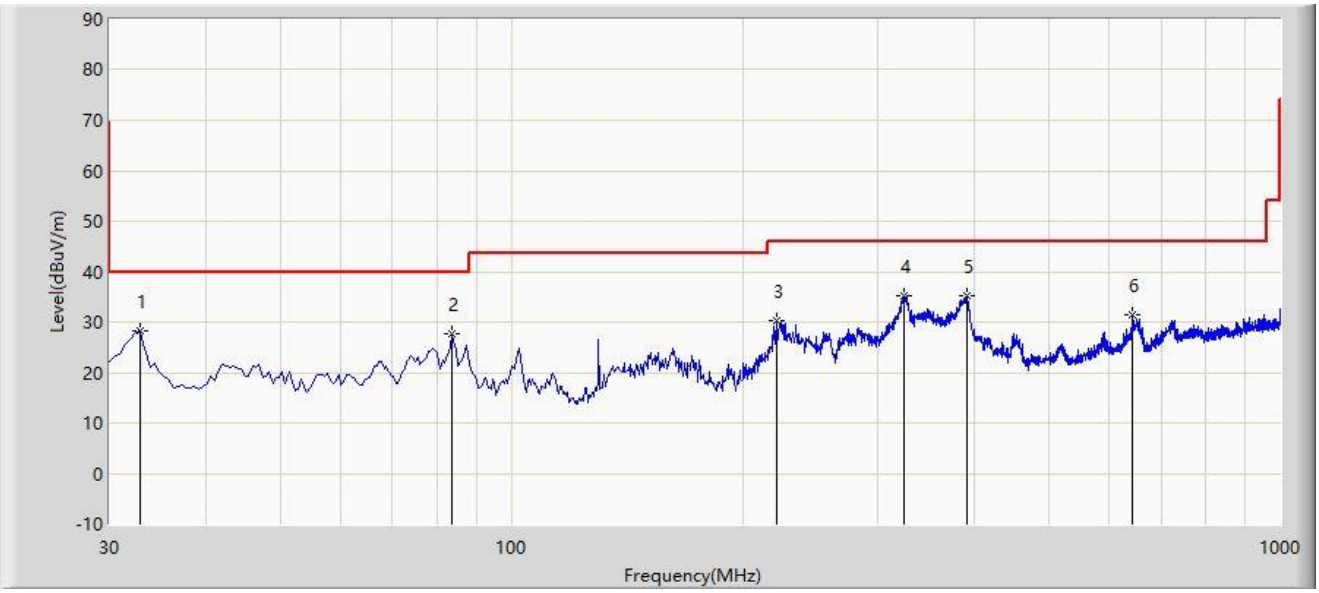
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	8242.0	49.6	-3.1	46.5	74.0	-27.5	Peak	Horizontal
	10885.5	50.2	-3.1	47.1	74.0	-26.9	Peak	Horizontal
	11650.5	50.7	-3.4	47.3	74.0	-26.7	Peak	Horizontal
	9075.0	50.2	-2.9	47.3	74.0	-26.7	Peak	Vertical
	11200.0	50.2	-2.6	47.6	74.0	-26.4	Peak	Vertical
	12305.0	50.7	-2.8	47.9	74.0	-26.1	Peak	Vertical
19	8335.5	50.0	-3.0	47.0	74.0	-27.0	Peak	Horizontal
	11021.5	50.5	-3.2	47.3	74.0	-26.7	Peak	Horizontal
	12407.0	50.1	-2.5	47.6	74.0	-26.4	Peak	Horizontal
	8140.0	50.7	-2.9	47.8	74.0	-26.2	Peak	Vertical
	10996.0	49.8	-2.9	46.9	74.0	-27.1	Peak	Vertical
	12271.0	50.7	-3.6	47.1	74.0	-26.9	Peak	Vertical
39	8395.0	50.7	-3.2	47.5	74.0	-26.5	Peak	Horizontal
	11106.5	50.0	-3.1	46.9	74.0	-27.1	Peak	Horizontal
	12483.5	49.8	-2.5	47.3	74.0	-26.7	Peak	Horizontal
	8131.5	50.9	-3.0	47.9	74.0	-26.1	Peak	Vertical
	11089.5	49.8	-2.9	46.9	74.0	-27.1	Peak	Vertical
	12390.0	49.3	-2.5	46.8	74.0	-27.2	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)

The Result of Radiated Emission below 1GHz:

Site: SIP-AC2	Test Date: 2023-02-24
Limit: FCC_Part15.209_RSE(3m)	Engineer: Wayne Wang
Probe: VULB 9168_00999_25-2000MHz	Polarity: Horizontal
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		32.910	28.393	11.452	-11.607	40.000	16.940	PK
2		83.835	27.767	14.378	-12.233	40.000	13.389	PK
3		221.090	30.222	15.596	-15.778	46.000	14.625	PK
4	*	324.880	35.213	15.827	-10.787	46.000	19.386	PK
5		390.840	35.080	14.191	-10.920	46.000	20.889	PK
6		643.040	31.338	4.961	-14.662	46.000	26.377	PK

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

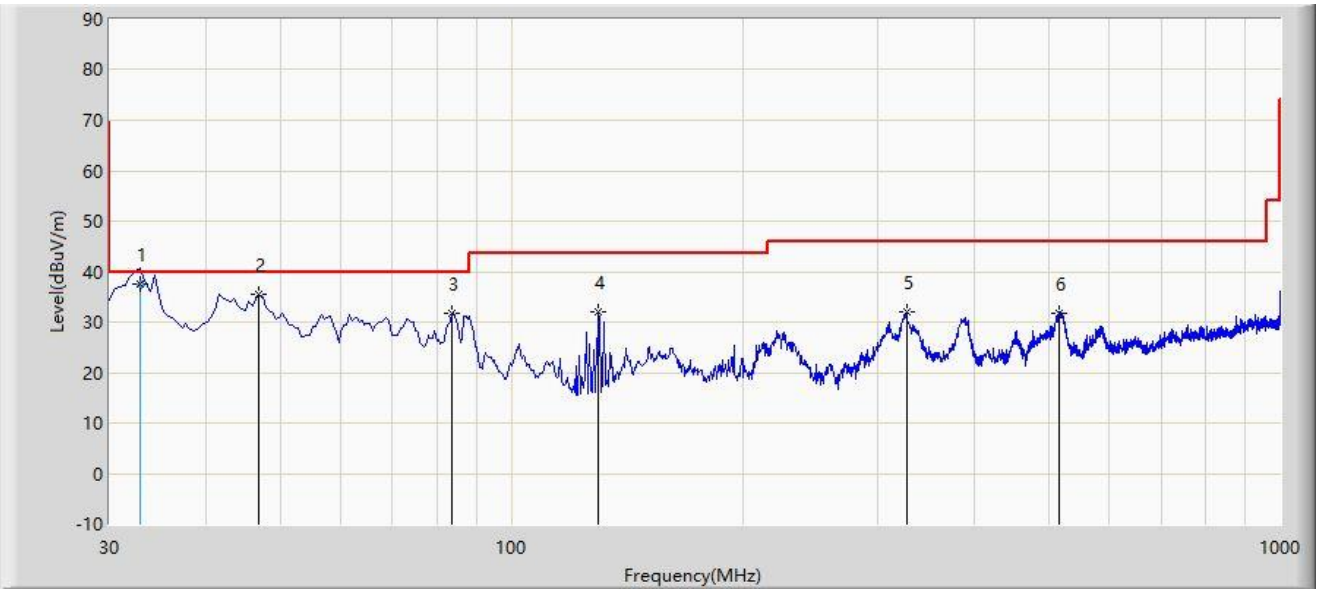
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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: SIP-AC2	Test Date: 2023-02-24
Limit: FCC_Part15.209_RSE(3m)	Engineer: Wayne Wang
Probe: VULB 9168_00999_25-2000MHz	Polarity: Vertical
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	32.910	37.571	20.630	-2.429	40.000	16.940	QP
2		46.975	35.605	17.269	-4.395	40.000	18.335	PK
3		83.835	31.835	18.446	-8.165	40.000	13.389	PK
4		129.910	32.044	15.574	-11.456	43.500	16.470	PK
5		326.335	32.072	12.651	-13.928	46.000	19.421	PK
6		516.940	31.835	7.814	-14.165	46.000	24.020	PK

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

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

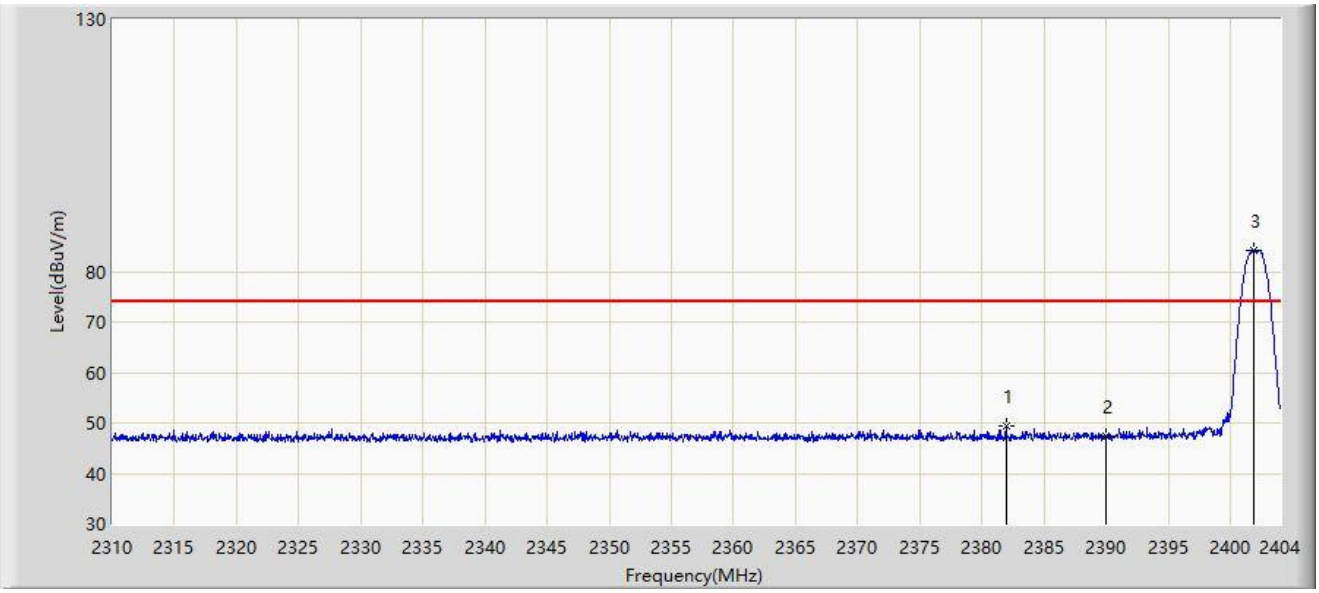
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

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

Site: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Horizontal
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



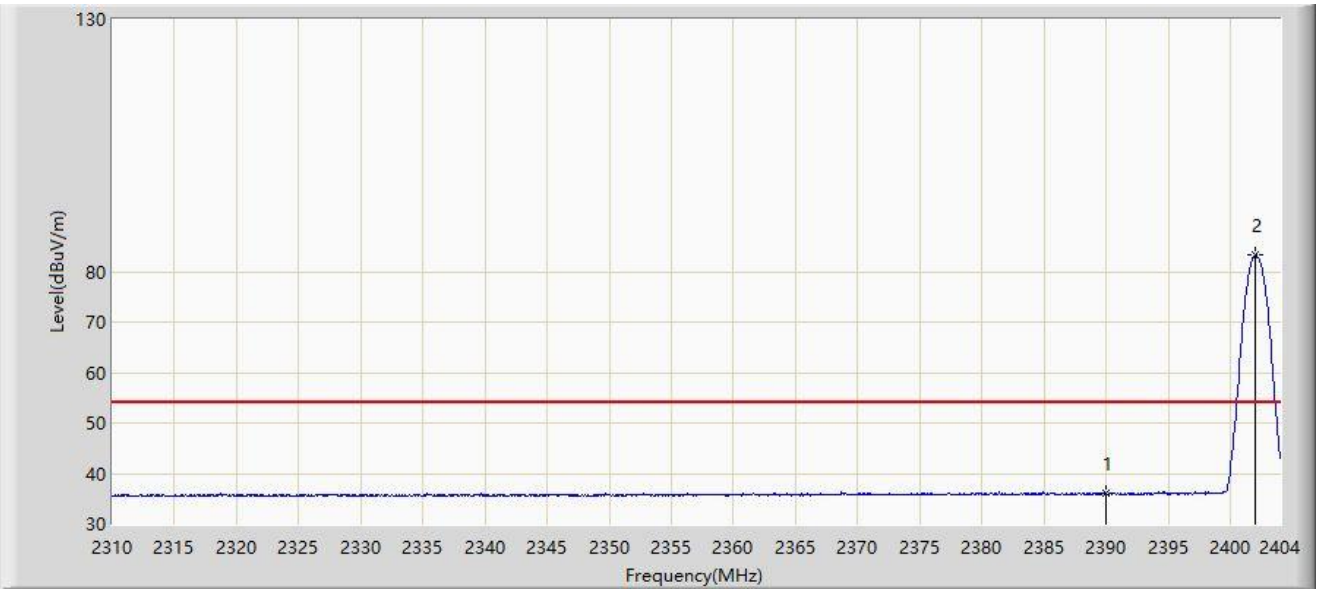
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2381.957	49.281	17.401	-24.719	74.000	31.880	PK
2		2390.000	47.358	15.429	-26.642	74.000	31.929	PK
3		2401.885	84.127	52.116	N/A	N/A	32.011	PK

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Horizontal
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



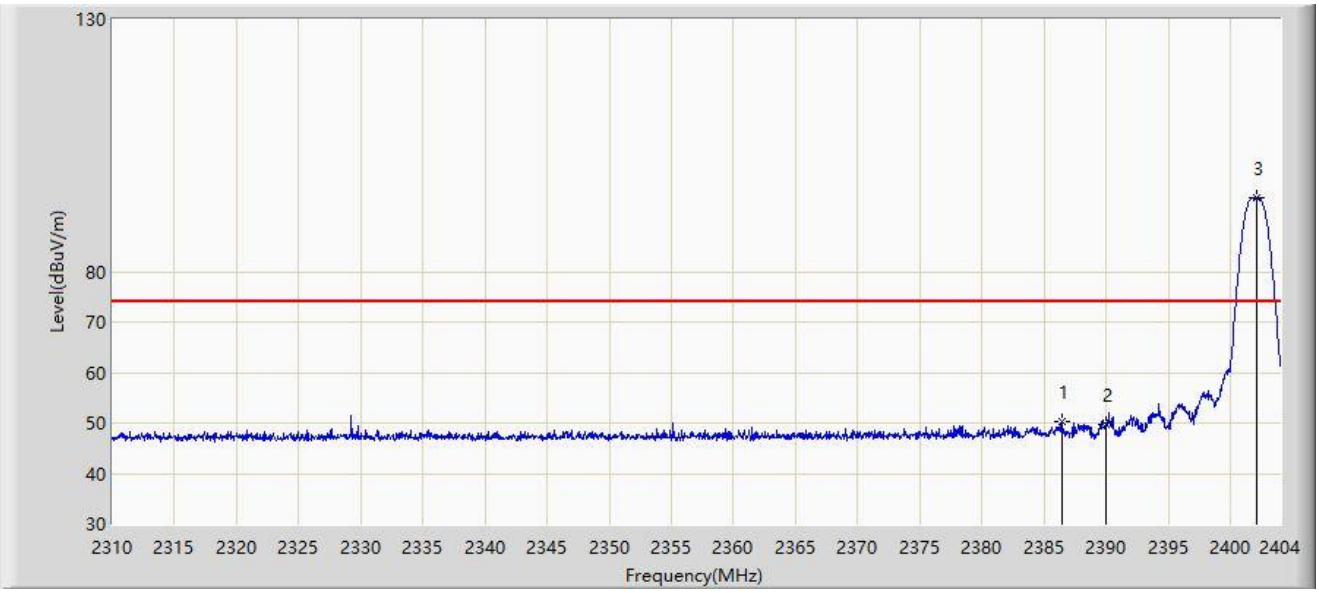
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2390.000	35.987	4.058	-18.013	54.000	31.929	AV
2		2402.026	83.348	51.336	N/A	N/A	32.012	AV

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Vertical
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



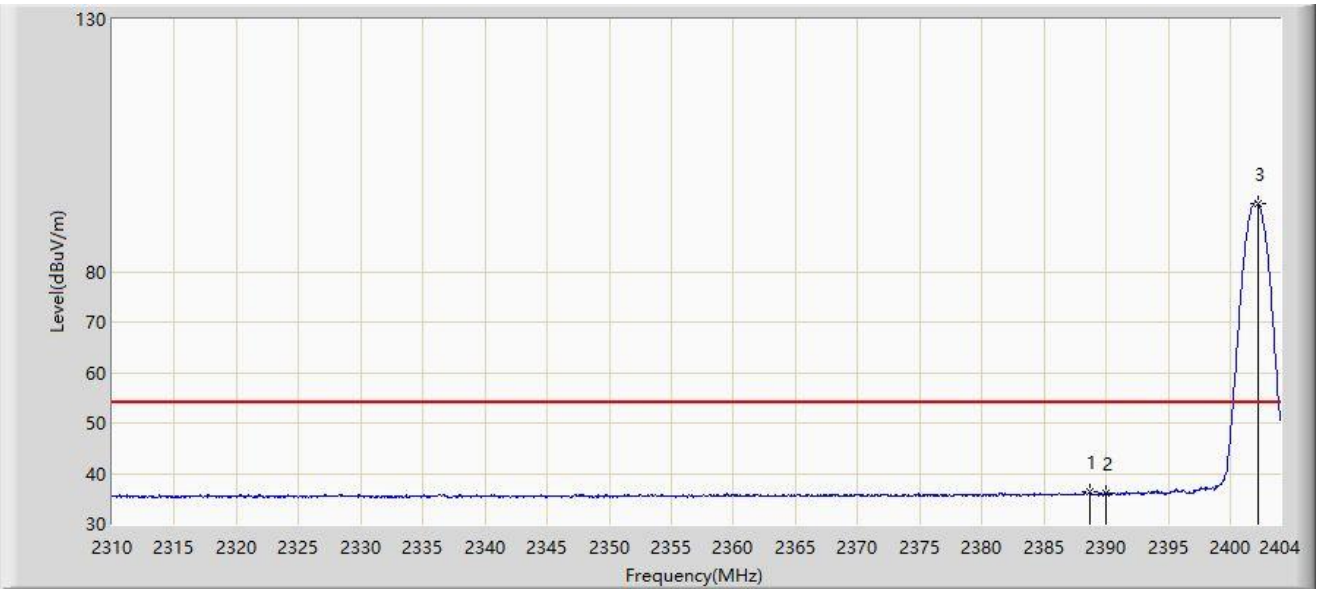
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2386.422	50.165	18.258	-23.835	74.000	31.907	PK
2		2390.000	49.768	17.839	-24.232	74.000	31.929	PK
3		2402.073	94.572	62.559	N/A	N/A	32.012	PK

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Vertical
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



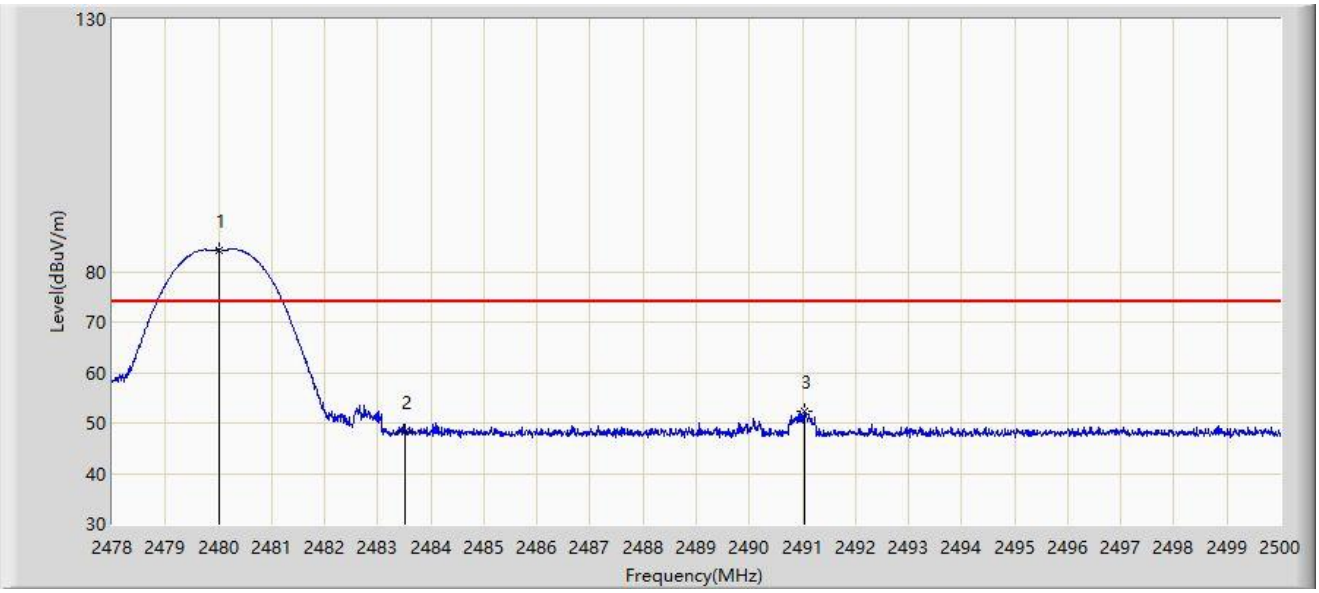
No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1	*	2388.631	36.434	4.513	-17.566	54.000	31.920	AV
2		2390.000	36.011	4.082	-17.989	54.000	31.929	AV
3		2402.214	93.598	61.584	N/A	N/A	32.014	AV

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Horizontal
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2480MHz	



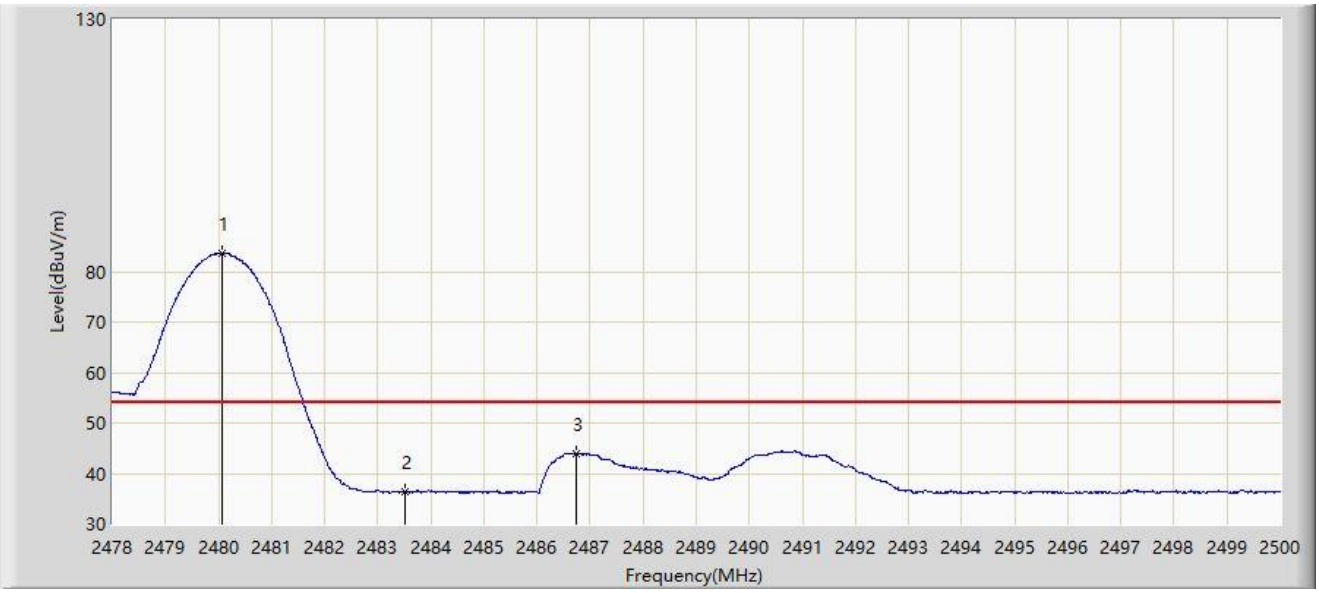
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2480.002	84.303	52.015	N/A	N/A	32.287	PK
2		2483.500	48.200	15.895	-25.800	74.000	32.305	PK
3	*	2491.035	52.208	19.865	-21.792	74.000	32.343	PK

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Horizontal
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2480MHz	



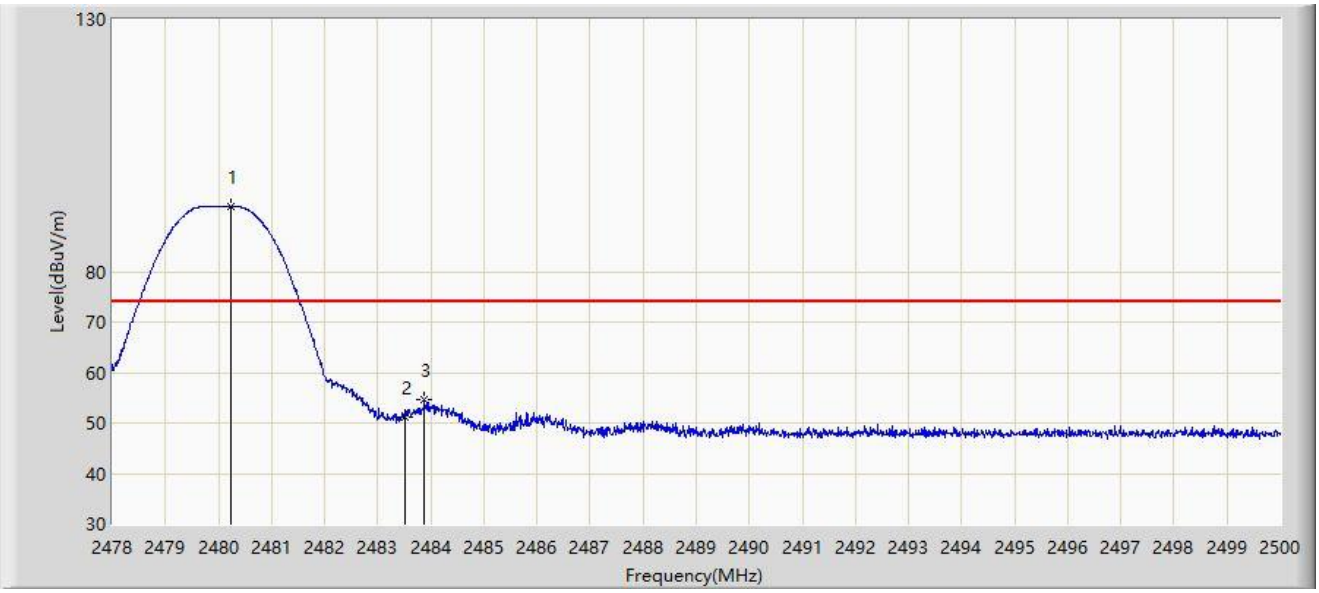
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2480.079	83.677	51.389	N/A	N/A	32.288	AV
2		2483.500	36.456	4.151	-17.544	54.000	32.305	AV
3	*	2486.745	43.959	11.638	-10.041	54.000	32.322	AV

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Vertical
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2480MHz	



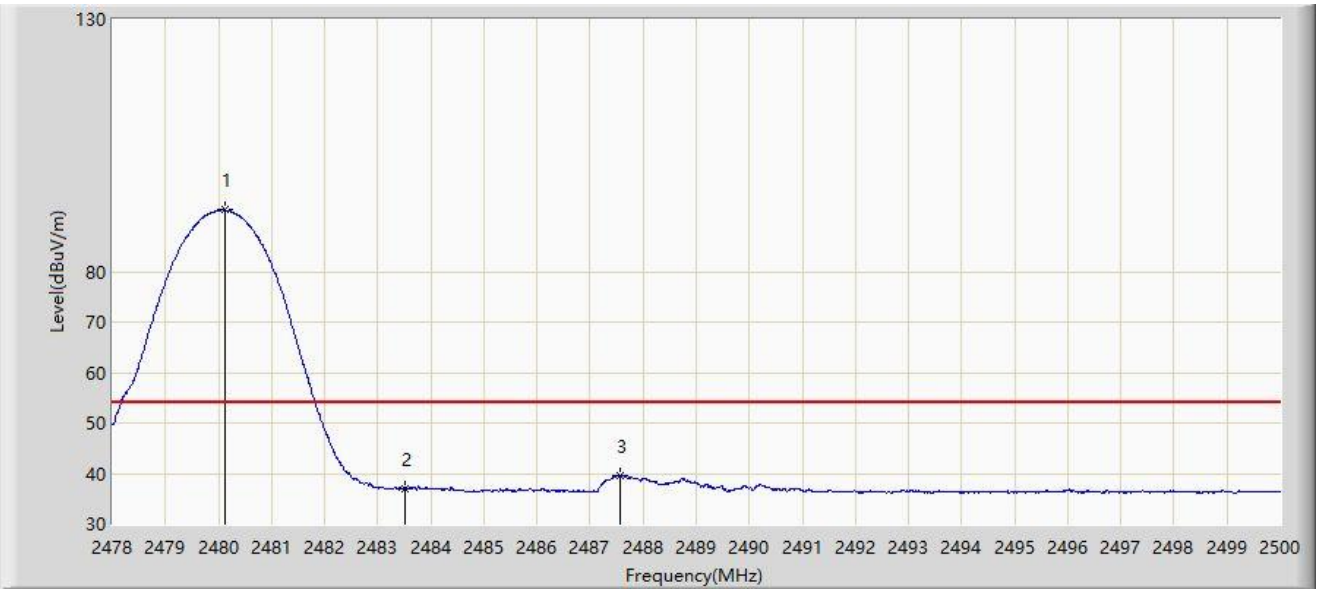
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2480.244	92.997	60.708	N/A	N/A	32.289	PK
2		2483.500	51.170	18.865	-22.830	74.000	32.305	PK
3	*	2483.885	54.672	22.365	-19.328	74.000	32.307	PK

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: SIP-AC3	Test Date: 2023-02-23
Limit: FCC_2.4_RE(3m)	Engineer: Wayne Wang
Probe: HF907_102861_1-18GHz	Polarity: Vertical
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2480.112	92.311	60.023	N/A	N/A	32.288	AV
2		2483.500	37.032	4.727	-16.968	54.000	32.305	AV
3	*	2487.570	39.489	7.163	-14.511	54.000	32.325	AV

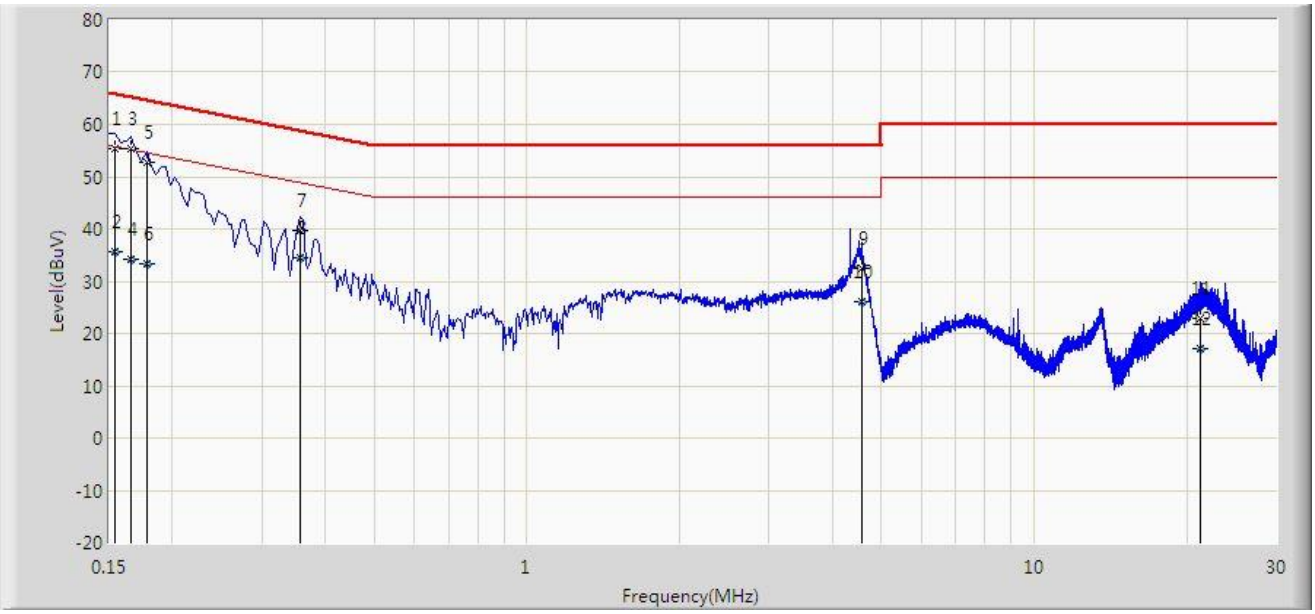
Note 1: " * ", means this data is the worst emission level.

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

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

A.8 AC Conducted Emissions Test Result

Site: SIP-SR2	Time: 2023/04/07 - 20:01
Temperature: 19.6°C	Humidity: 54.1%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Violet Tao
Probe: SIP-SR2-ENV216_101684_E	Polarity: Line
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



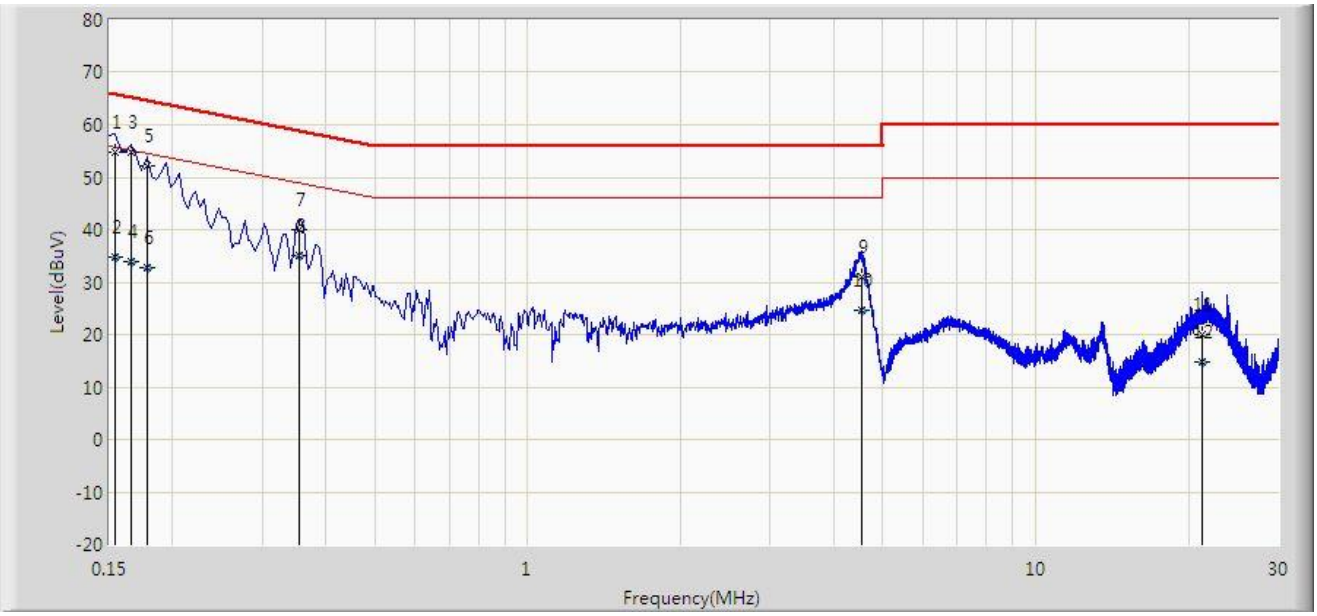
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.154	55.485	45.864	-10.297	65.781	9.621	QP
2		0.154	35.551	25.930	-20.231	55.781	9.621	AV
3	*	0.166	55.413	45.793	-9.745	65.158	9.620	QP
4		0.166	34.098	24.478	-21.060	55.158	9.620	AV
5		0.178	52.814	43.194	-11.765	64.578	9.620	QP
6		0.178	33.318	23.698	-21.261	54.578	9.620	AV
7		0.358	39.594	29.903	-19.181	58.775	9.690	QP
8		0.358	34.500	24.809	-14.275	48.775	9.690	AV
9		4.562	32.468	22.664	-23.532	56.000	9.804	QP
10		4.562	26.220	16.416	-19.780	46.000	9.804	AV
11		21.226	22.756	12.521	-37.244	60.000	10.235	QP
12		21.226	17.233	6.998	-32.767	50.000	10.235	AV

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

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

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: SIP-SR2	Time: 2023/04/07 - 20:08
Temperature: 19.6°C	Humidity: 54.1%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Violet Tao
Probe: SIP-SR2-ENV216_101684_E	Polarity: Neutral
EUT: Wi-Fi 6E Mesh Extender	Power: AC 120V/60Hz
Test Mode: Transmit by BLE 1M at 2402MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.154	54.693	45.062	-11.088	65.781	9.631	QP
2		0.154	34.906	25.275	-20.875	55.781	9.631	AV
3	*	0.166	54.858	45.228	-10.300	65.158	9.630	QP
4		0.166	33.968	24.338	-21.190	55.158	9.630	AV
5		0.178	52.109	42.480	-12.469	64.578	9.630	QP
6		0.178	32.751	23.121	-21.827	54.578	9.630	AV
7		0.354	40.022	30.325	-18.847	58.868	9.696	QP
8		0.354	35.042	25.346	-13.826	48.868	9.696	AV
9		4.546	31.156	21.357	-24.844	56.000	9.800	QP
10		4.546	24.771	14.972	-21.229	46.000	9.800	AV
11		21.298	20.102	9.892	-39.898	60.000	10.211	QP
12		21.298	14.649	4.438	-35.351	50.000	10.211	AV

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

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

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Appendix B - Test Setup Photograph

Refer to “2301RSU042-UT” file.

Appendix C - EUT Photograph

Refer to “2301RSU042-UE” file.

The End