RF MEASUREMENT REPORT

FCC ID:	Q9DAPIN0654
Applicant:	Hewlett Packard Enterprise
Product:	ACCESS POINT
Model No.:	APIN0654
Trademark:	Hewlett Packard Enterprise , HPE aruba networking
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Result:	Complies
Received Date:	2023-07-19
Test Date:	2023-08-25 ~ 2023-08-28

Reviewed By: Jame Yuan

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
2307RSU045-U2	V01	Initial Report	2023-09-27	Invalid
2307RSU045-U2	V02	Add spot-check error	2023-11-29	Invalid
2307RSU045-U2	V03	Add 1-18GHz test plot	2023-12-02	Valid

Note 1: The product is a variation on the existing APIN0655 that had FCC approval (FCC ID: Q9DAPIN0655). The differences are shown in the table below.

Parts of Product	Modification
Enclosure	Wi-Fi Antenna location from internal to external
Others	PCB board has no change, including BLE/ZigBee antenna

The applicant remeasured BLE/ZigBee antenna gain that is slightly different than before.

Frequency Range (MHz)	Original BLE/ZigBee Antenna Gain (dBi)	Current BLE/ZigBee Antenna Gain (dBi)
2400 ~ 2500	3.60	3.80

Note 2: Spot-check tests were done for “Output Power” & “Radiated Restricted Band Edge” & “Radiated Spurious Emission” items, others refer to the original report no is 2109TW0003-U2.

CONTENTS

1. General Information

1.1. Applicant

Hewlett Packard Enterprise

6280 America Center Drive, San Jose CA 95002, United States

1.2. Manufacturer

Hewlett Packard Enterprise

6280 America Center Drive, San Jose CA 95002, United States

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: 3261				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	ACCESS POINT
Model No.	APIN0654
Serial No.	CNQNLZ303M
Software Version	nf52840_modulate.hex
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	v5.0 single mode, BLE only
Zigbee Specification	802.15.4
Working Voltage	AC/DC Adapter or PoE Injector input
Operating Temperature	0 ~ 50 °C
Operating Environment	Indoor Use
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

Zigbee Specification	802.15.4
Frequency Range	2405 ~ 2480MHz
Channel Number	16
Type of Modulation	O-QPSK
Antenna Type	PIFA Antenna
Antenna Gain	3.80dBi

1.6. Working Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405 MHz	12	2410 MHz	13	2415 MHz
14	2420 MHz	15	2425 MHz	16	2430 MHz
17	2435 MHz	18	2440 MHz	19	2445 MHz
20	2450 MHz	21	2455 MHz	22	2460 MHz
23	2465 MHz	24	2470 MHz	25	2475 MHz
26	2480 MHz	--	--	--	--

1.7. Description of Operating Paths

Filter	Specification	Remark
Wi-Fi		
Filter 1#	Band Pass Filter (2412-2472)	Allowing any transmission on all channels
Filter 2#	Band Pass Filter (2402-2447)	Allowing any transmission on 20MHz channels 1 thru 6
Filter 3#	Band Pass Filter (2452-2472)	Allowing any transmission on 20MHz channel 11
Bluetooth / ZigBee		
Filter 4#	Band Pass Filter (2402-2480)	Allowing any transmission on all channels
Filter 5#	Band Pass Filter (2402-2430)	Allowing transmission on BLE channels 37 (2402MHz) and 38 (2426MHz) and Zigbee channel 11 (2405MHz)
Filter 6#	Band Pass Filter (2478-2482)	Allowing transmission on BLE channel 39 (2480MHz) and Zigbee channel 26(2480MHz)
Note: ZigBee and BLE can't work simultaneously.		

Working Mode

Wi-Fi	Bluetooth	Remark
Filter 1#	Filter 4#	Filter 1# or Filter 4# work alone
Filter 2#	Filter 6#	Transmission simultaneously
Filter 3#	Filter 5#	Transmission simultaneously
Note: Filter groups on the 2.4GHz Wi-Fi and BLE/Zigbee outputs to prevent reverse IMD when both 2.4GHz Wi-Fi and BLE/Zigbee are transmitting simultaneously		

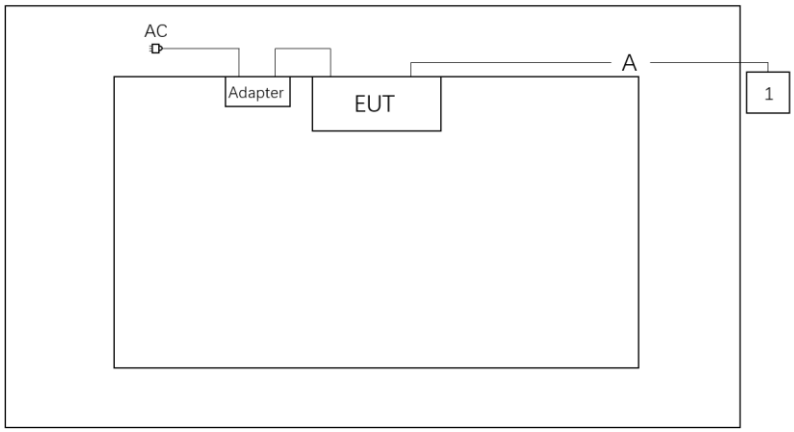
2. Test Configuration

2.1. Test Mode

Mode 1: Transmit by 802.15.4

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.



Cable Type		Cable Spec.	Length
A	Ethernet Cable	Non-Shielding, Cat 5e	>10.0m
Product		Manufacturer	Model No.
1	Notebook	Dell	Latitude 5491

2.3. Test Software

The test utility software used during testing was “telnet.exe” and command was provided by the manufacturer.

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	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2024-08-09	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2024-05-07	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2024-06-09	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2024-04-20	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2024-05-31	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
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2024-05-31	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2024-05-23	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11076	1 year	2024-06-08	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11077	1 year	2024-06-08	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.

Radiated Emission Measurement
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~40GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.91dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.5dB

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 tests, 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.

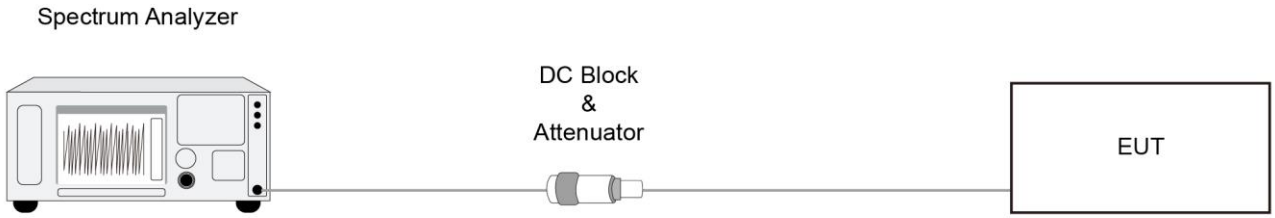
6.2.2. Test Procedure

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

Test data refer to original report no. 2109TW0003-U2 Clause 7.2.5.

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 11.9.2.3.2

ANSI C63.10 - 2013 - Section 11.9.1.3

6.3.3. Test Setting

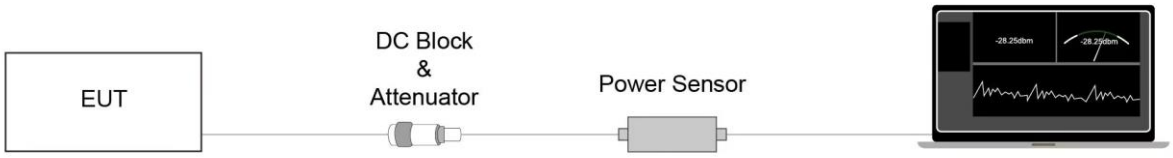
Method PKPM1 (Peak Power Measurement of Signals with DTS BW ≤ 50MHz)

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

Test data refer to original report no. 2109TW0003-U2 Clause 7.3.5, spot check data refer to Appendix A.1.

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.

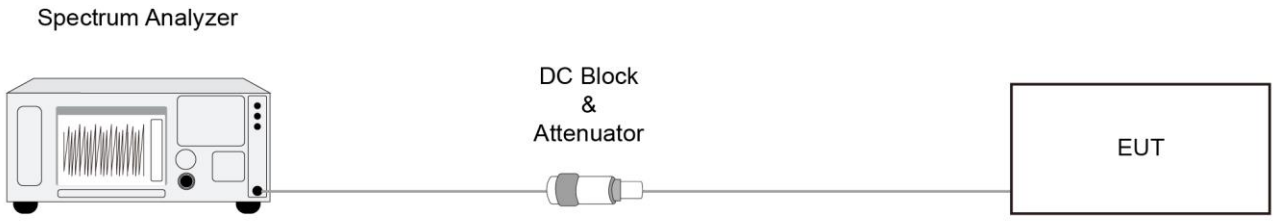
6.4.2. Test Procedure

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

Test data refer to original report no. 2109TW0003-U2 Clause 7.4.5.

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

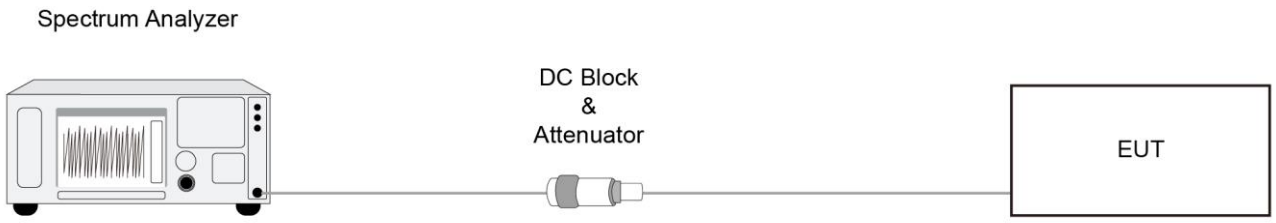
Reference level measurement

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

Test data refer to original report no. 2109TW0003-U2 Clause 7.5.5.

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 [μV/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

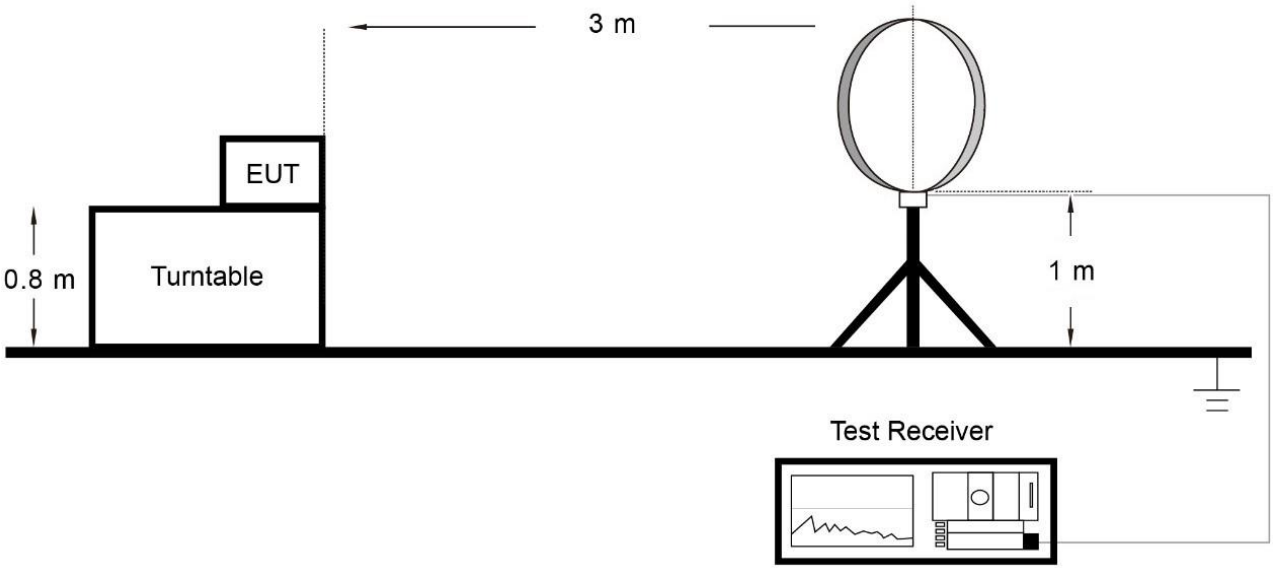
Average Measurements above 1GHz

1. Average Measurement Level = Peak Measurement Level - 20 * Log(Duty Cycle) = -20

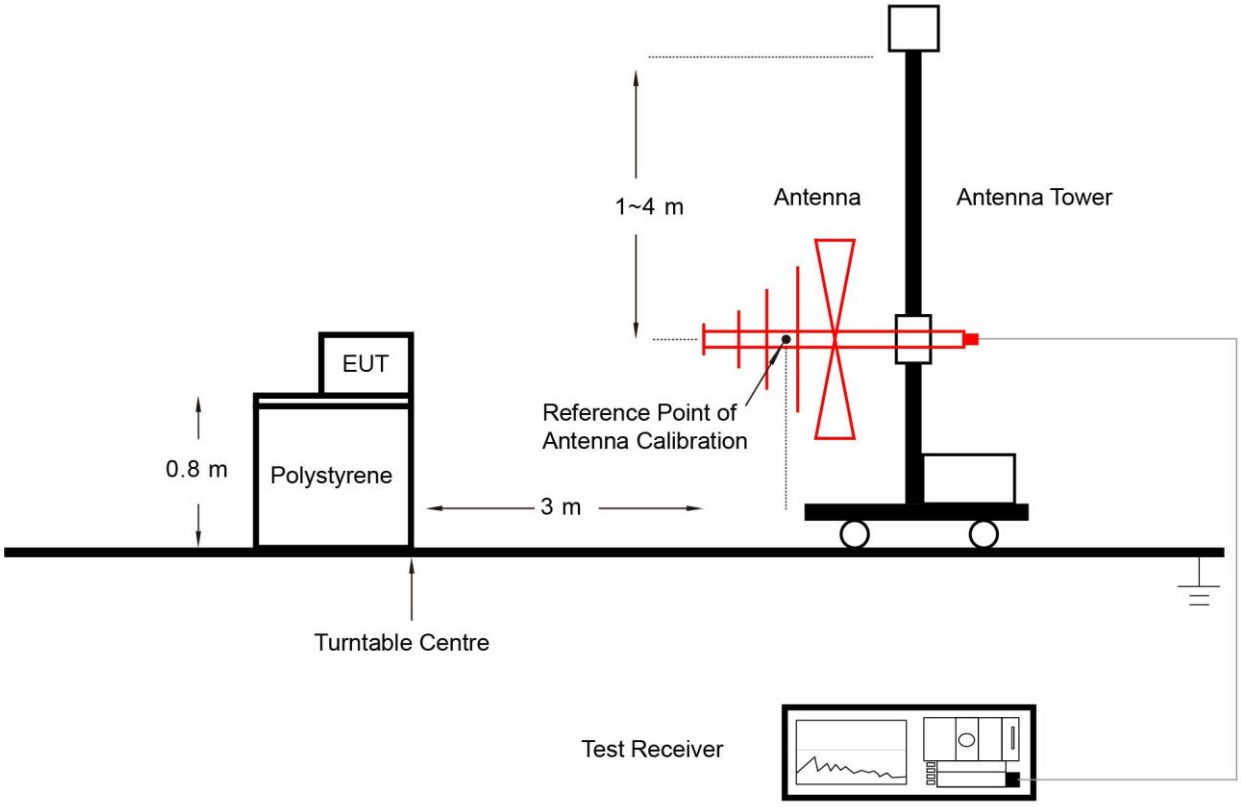
2. Duty Cycle = 10%

6.6.4. Test Setup

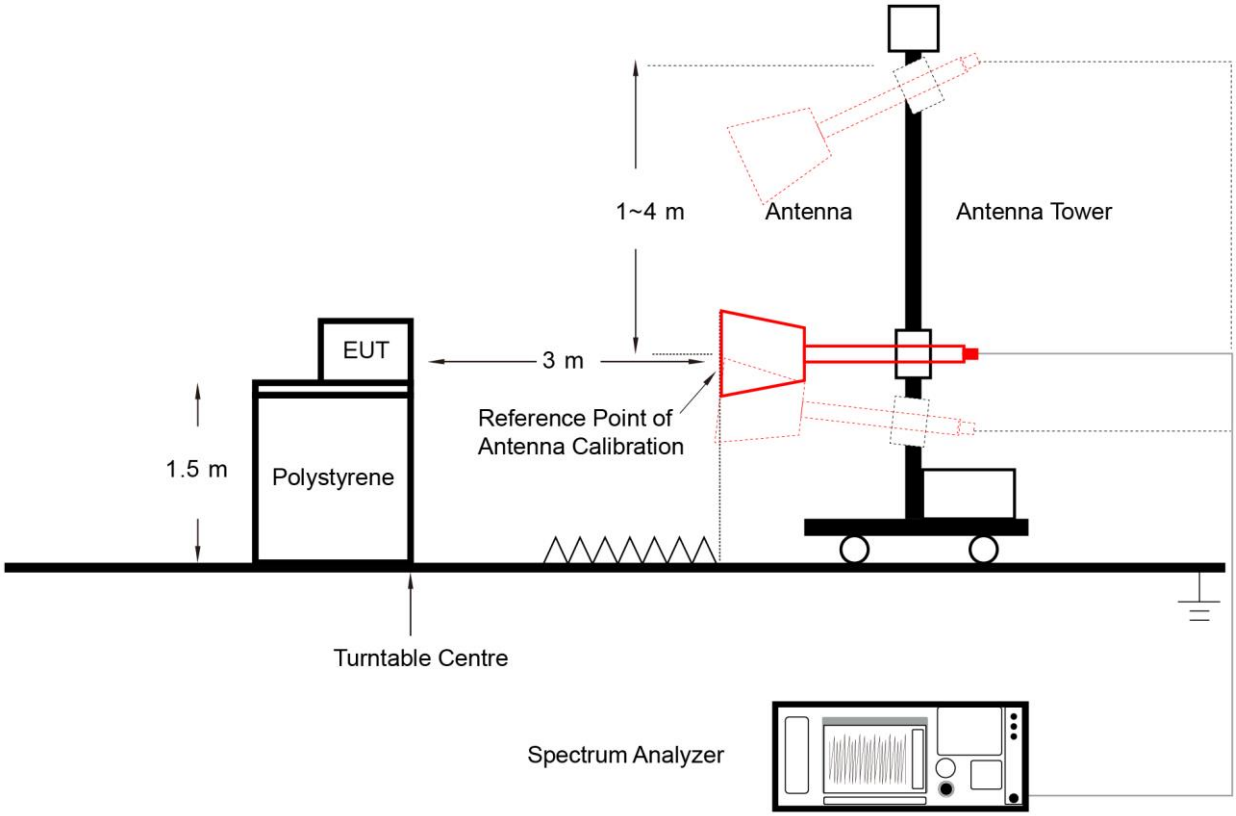
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Test data refer to original report no. 2109TW0003-U2 Clause 7.6.5, spot check data refer to Appendix A.2.

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 [μV/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

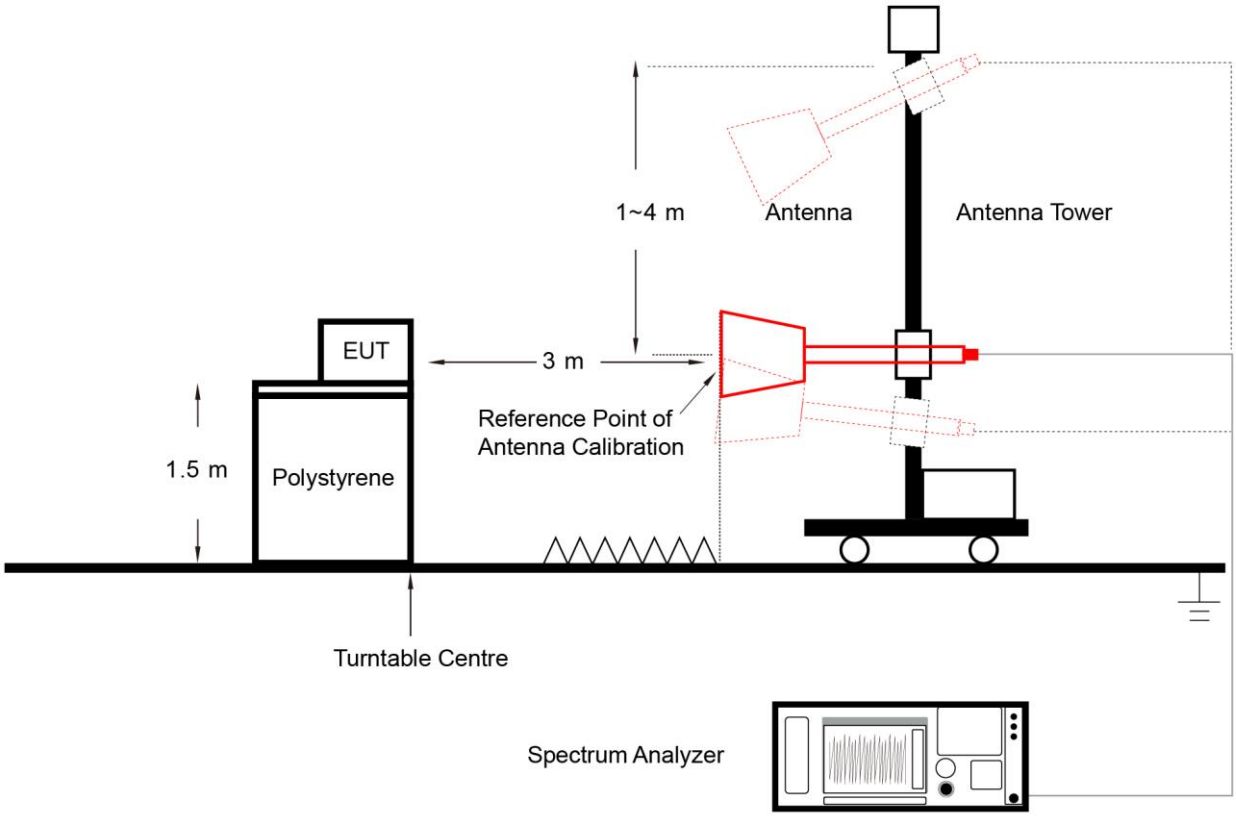
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz

1. Average Measurement Level = Peak Measurement Level - 20 * Log(Duty Cycle) = -20

2. Duty Cycle = 10%

6.7.4. Test Setup



6.7.5. Test Result

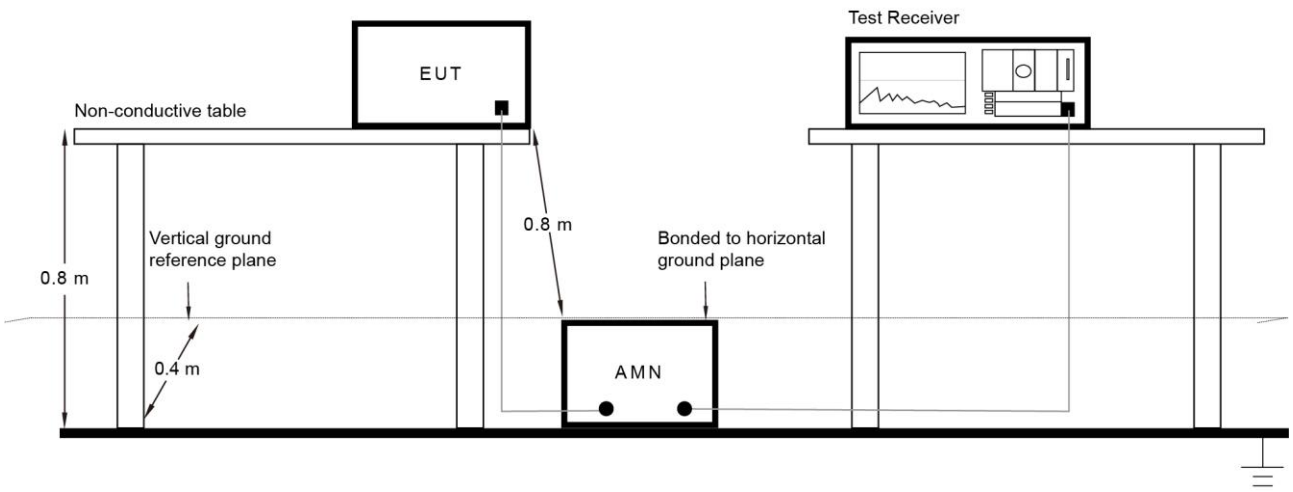
Test data refer to original report no. 2109TW0003-U2 Clause 7.7.5, spot check data refer to Appendix A.3.

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

Test data refer to original report no. 2109TW0003-U2 Clause 7.8.3.

Appendix A - Test Result

A.1 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-08-28	Filter Configuration	Filter 4#

Test Result of Peak Output Power

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	26	2480	7.22	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	26	2480	6.91	≤ 30.00	Pass

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-08-28	Filter Configuration	Filter 5#

Test Result of Peak Output Power

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	11	2405	6.20	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	11	2405	5.69	≤ 30.00	Pass

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-08-28	Filter Configuration	Filter 6#

Test Result of Peak Output Power

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Peak Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	26	2480	4.75	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Modulation Mode	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
802.15.4	O-QPSK	26	2480	4.17	≤ 30.00	Pass

Spot-check Error (From KDB 484596 D01 Referencing Test Data v02r01)

Worst Case Spot-check Error	Limit	Result
0.28%	25%	Pass

Note: Spot-check Error = |spot check data – reference data| / |reference data|

For example, |7.22 - 7.24| / 7.24 *100 = 0.28%

A.2 Radiated Spurious Emission Test Result

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2023-08-25	Filter Configuration	Filter 4#
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
18	4187.500	36.8	1.2	38.0	74.0	-36.0	Peak	Horizontal
	5037.500	36.8	3.7	40.5	74.0	-33.5	Peak	Horizontal
	7324.000	44.2	8.2	52.4	74.0	-21.6	Peak	Horizontal
	7324.000	36.0	8.2	44.2	54.0	-9.8	Average	Horizontal
	3898.500	36.9	0.6	37.5	74.0	-36.5	Peak	Vertical
	4808.000	36.5	3.0	39.5	74.0	-34.5	Peak	Vertical
	7324.000	43.6	8.2	51.8	74.0	-22.2	Peak	Vertical
	7324.000	34.3	8.2	42.5	54.0	-11.5	Average	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	2023-08-25	Filter Configuration	Filter 5#
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.		

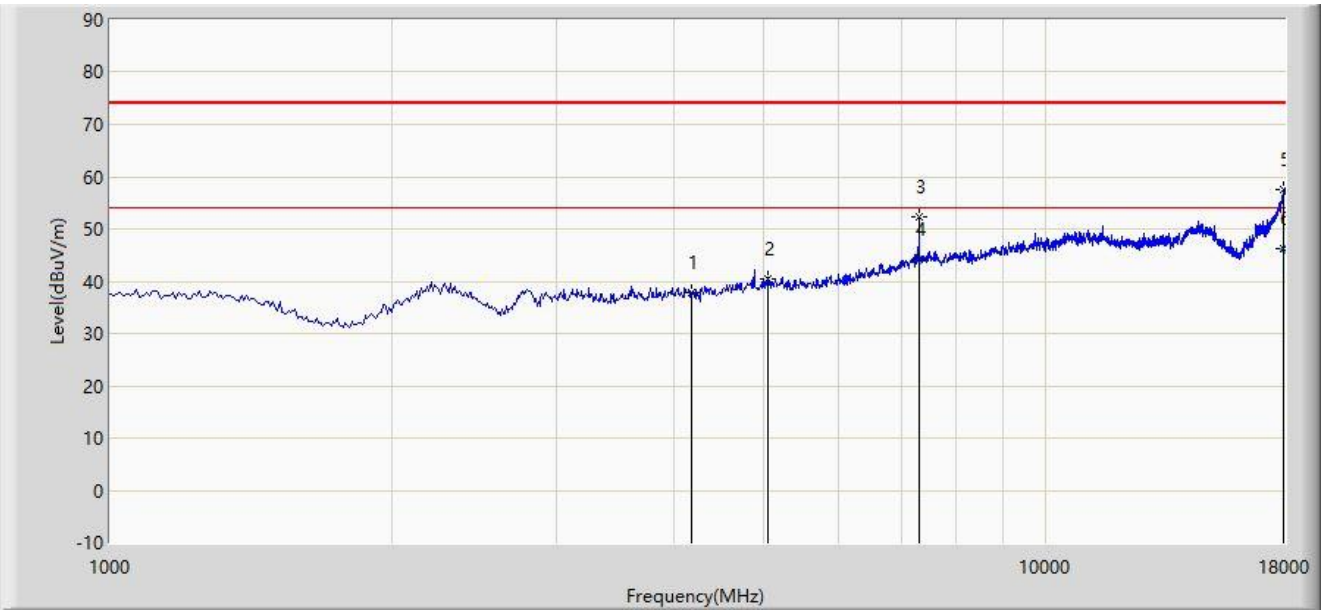
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
11	3949.500	36.0	0.8	36.8	74.0	-37.2	Peak	Horizontal
	4833.500	35.1	3.1	38.2	74.0	-35.8	Peak	Horizontal
	7451.500	35.8	8.6	44.4	74.0	-29.6	Peak	Horizontal
	3941.000	36.5	0.8	37.3	74.0	-36.7	Peak	Vertical
	5088.500	35.2	3.8	39.0	74.0	-35.0	Peak	Vertical
	7553.500	35.9	8.5	44.4	74.0	-29.6	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	2023-08-25	Filter Configuration	Filter 6#
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
26	4230.000	35.8	1.2	37.0	74.0	-37.0	Peak	Horizontal
	5046.000	34.9	3.7	38.6	74.0	-35.4	Peak	Horizontal
	7681.000	36.0	8.0	44.0	74.0	-30.0	Peak	Horizontal
	4230.000	36.1	1.2	37.3	74.0	-36.7	Peak	Vertical
	5012.000	35.5	3.5	39.0	74.0	-35.0	Peak	Vertical
	7664.000	35.9	8.0	43.9	74.0	-30.1	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 of 1GHz ~ 18GHz:

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_Part15.209_RSE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2440MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		4187.500	37.965	36.751	-36.035	74.000	1.215	PK
2		5037.500	40.460	36.765	-33.540	74.000	3.695	PK
3		7324.000	52.367	44.177	-21.633	74.000	8.190	PK
4		7324.000	44.194	36.004	-9.806	54.000	8.190	AV
5		17957.500	57.648	35.177	-16.352	74.000	22.472	PK
6	*	17957.500	46.145	23.674	-7.855	54.000	22.472	AV

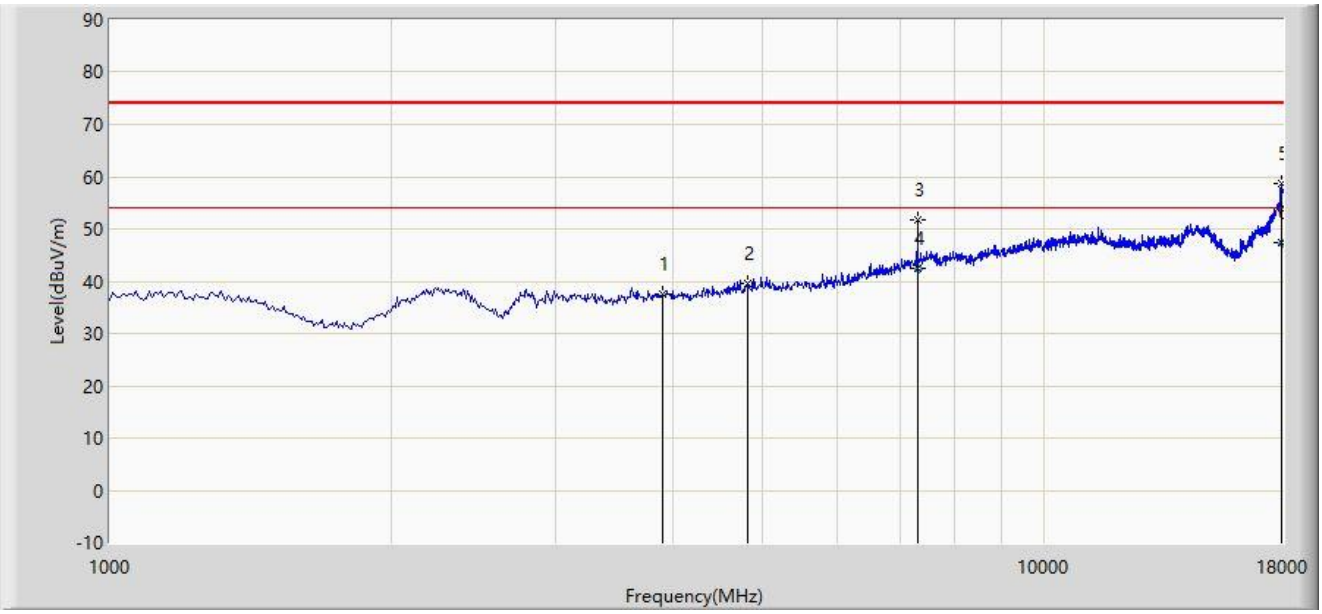
Note 1: " * ", means this data is the worst emission level.

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

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

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_Part15.209_RSE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2440MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		3898.500	37.480	36.920	-36.520	74.000	0.559	PK
2		4808.000	39.509	36.475	-34.491	74.000	3.035	PK
3		7324.000	51.818	43.628	-22.182	74.000	8.190	PK
4		7324.000	42.443	34.253	-11.557	54.000	8.190	AV
5		17940.500	58.636	36.296	-15.364	74.000	22.340	PK
6	*	17940.500	47.291	24.951	-6.709	54.000	22.340	AV

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

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

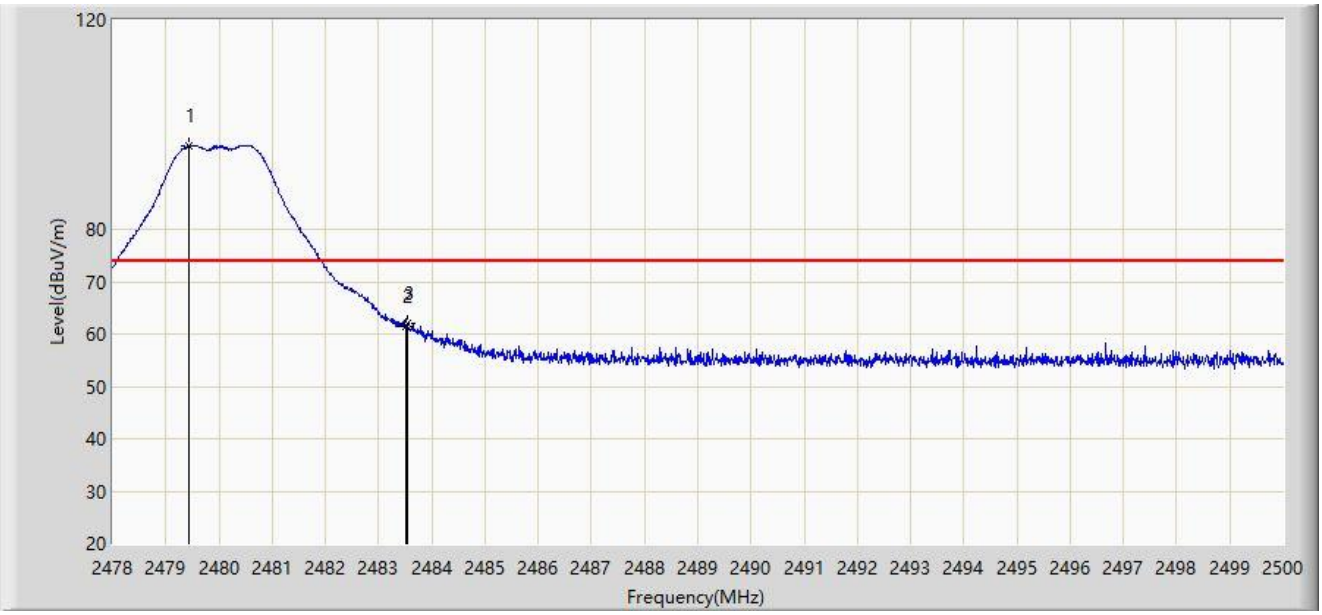
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 4: Average measurement was not performed when peak measure level was lower than the average limit.

A.3 Radiated Restricted Band Edge Test Result

Filter Configuration 4#

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.441	95.954	64.731	N/A	N/A	N/A	31.223	PK
		2479.441	75.954	64.731	N/A	-20.00	N/A	31.223	AV
2		2483.500	61.334	30.108	-12.666	N/A	74.000	31.226	PK
		2483.500	41.334	30.108	-12.666	-20.00	54.000	31.226	AV
3	*	2483.533	61.997	30.771	-12.003	N/A	74.000	31.226	PK
		2483.533	41.997	30.771	-12.003	-20.00	54.000	31.226	AV

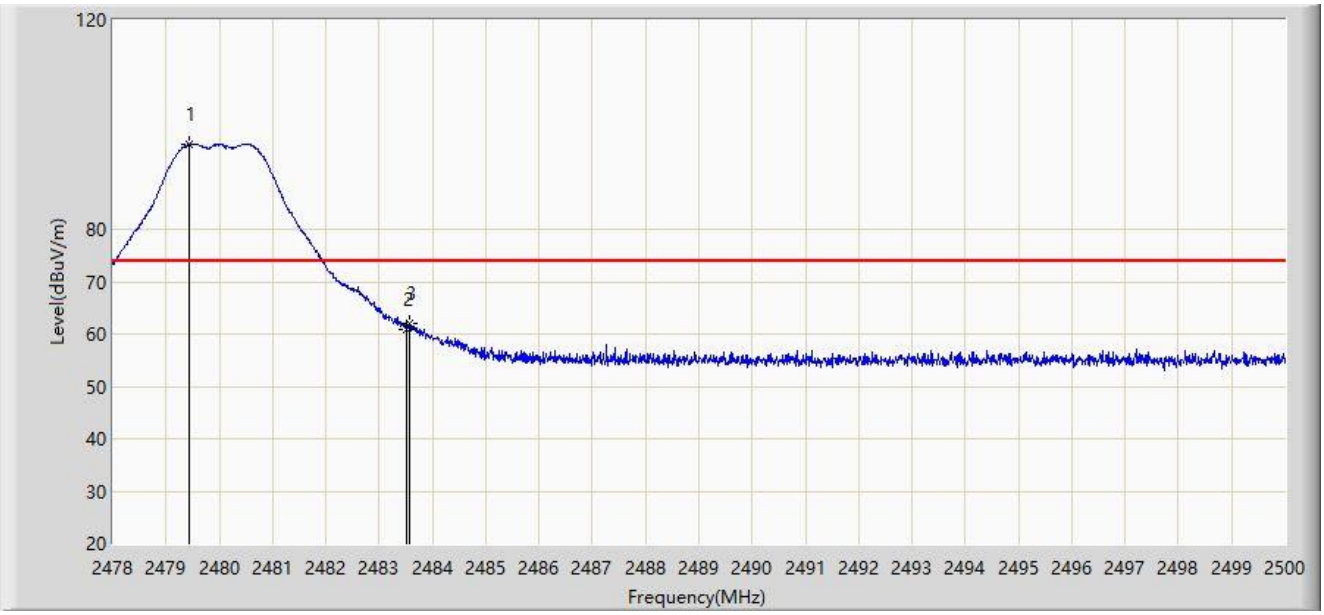
Note 1: " * ", means this data is the worst emission level.

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

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

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.441	96.255	65.032	N/A	N/A	N/A	31.223	PK
		2479.441	76.255	65.032	N/A	-20.00	N/A	31.223	AV
2		2483.500	60.830	29.604	-13.170	N/A	74.000	31.226	PK
		2483.500	40.830	29.604	-13.170	-20.00	54.000	31.226	AV
3	*	2483.566	62.048	30.822	-11.952	N/A	74.000	31.226	PK
		2483.566	42.048	30.822	-11.952	-20.00	54.000	31.226	AV

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

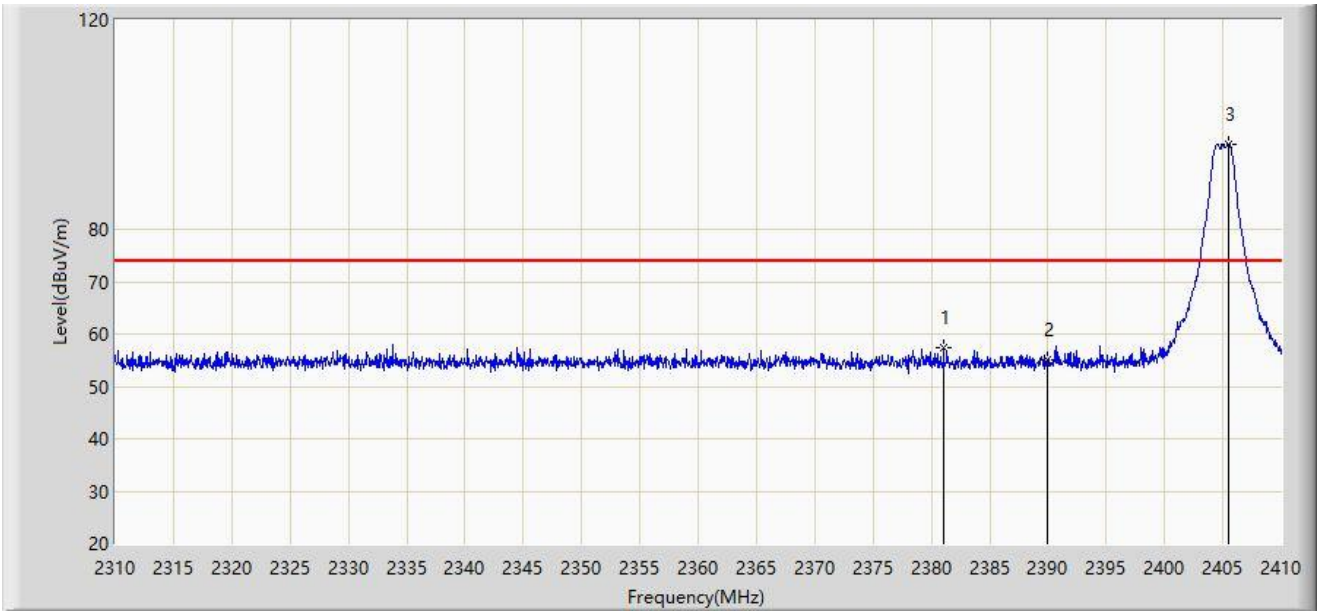
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Filter Configuration 5#

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2381.050	57.268	25.997	-16.732	N/A	74.000	31.270	PK
		2381.050	37.268	25.997	-16.732	-20.00	54.000	31.270	AV
2		2390.000	54.980	23.726	-19.020	N/A	74.000	31.254	PK
		2390.000	34.980	23.726	-19.020	-20.00	54.000	31.254	AV
3		2405.500	96.245	64.989	N/A	N/A	N/A	31.256	PK
		2405.500	76.245	64.989	N/A	-20.00	N/A	31.256	AV

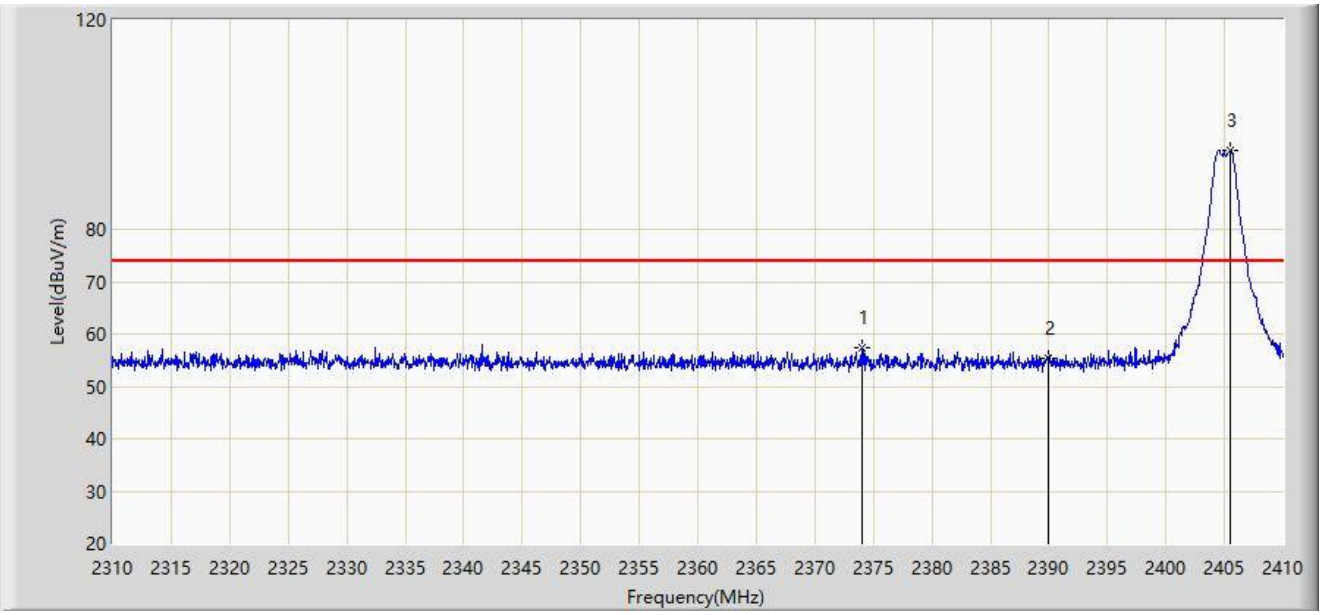
Note 1: " * ", means this data is the worst emission level.

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

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

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2374.000	57.269	25.972	-16.731	N/A	74.000	31.297	PK
		2374.000	37.269	25.972	-16.731	-20.00	54.000	31.297	AV
2		2390.000	55.273	24.019	-18.727	N/A	74.000	31.254	PK
		2390.000	35.273	24.019	-18.727	-20.00	54.000	31.254	AV
3		2405.450	95.020	63.764	N/A	N/A	N/A	31.257	PK
		2405.450	75.020	63.764	N/A	-20.00	N/A	31.257	AV

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

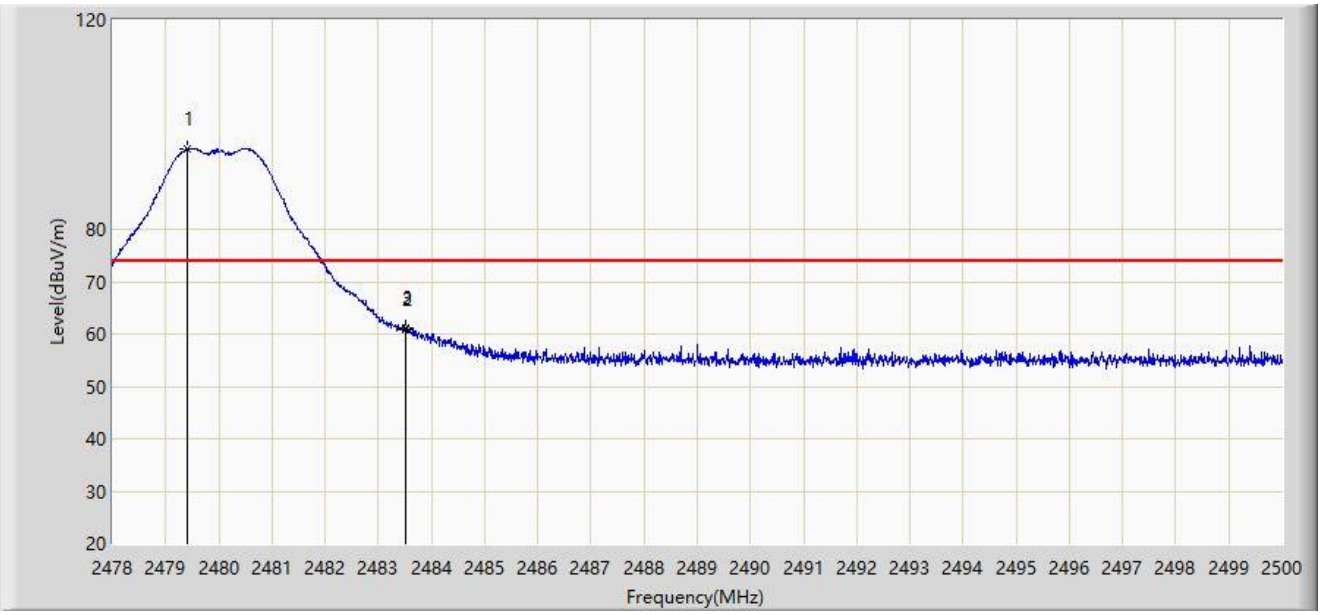
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Filter Configuration 6#

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2479.397	95.340	64.117	N/A	N/A	N/A	31.223	PK
		2479.397	75.340	64.117	N/A	-20.00	N/A	31.223	AV
2		2483.500	60.935	29.709	-13.065	N/A	74.000	31.226	PK
		2483.500	40.935	29.709	-13.065	-20.00	54.000	31.226	AV
3	*	2483.511	61.138	29.912	-12.862	N/A	74.000	31.226	PK
		2483.511	41.138	29.912	-12.862	-20.00	54.000	31.226	AV

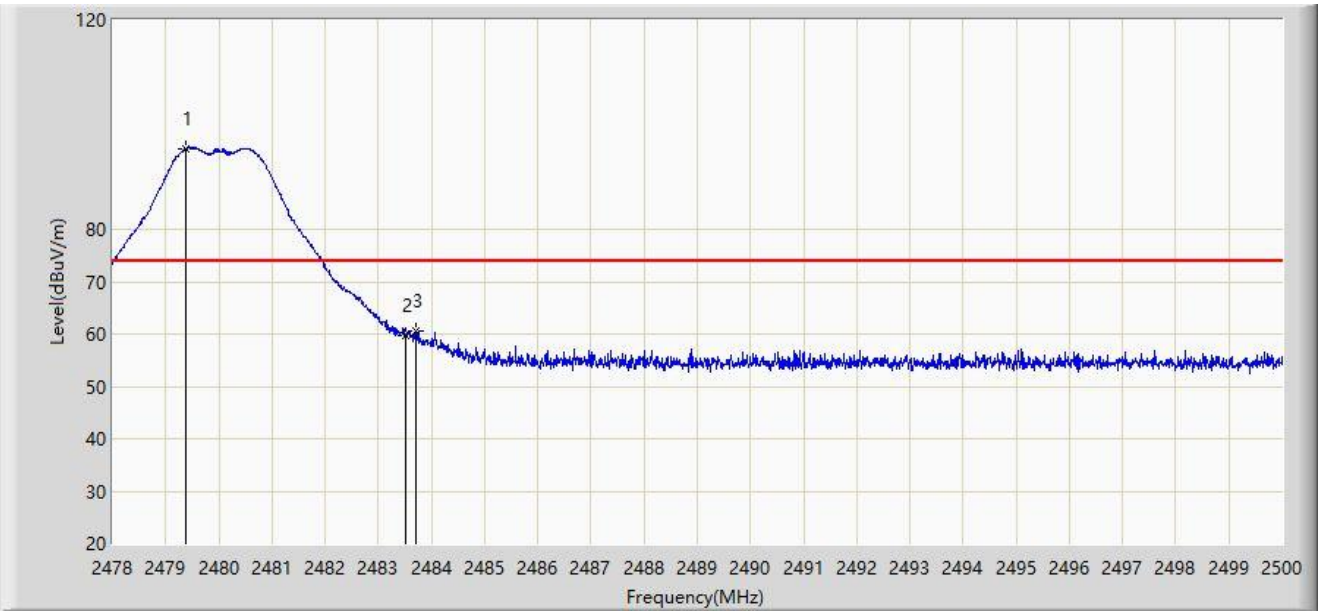
Note 1: " * ", means this data is the worst emission level.

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

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

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Site: WZ-AC1	Test Date: 2023-08-25
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Duty cycle Factor (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		2479.386	95.377	64.154	N/A	N/A	N/A	31.223	PK
		2479.386	75.377	64.154	N/A	-20.00	N/A	31.223	AV
2		2483.500	59.632	28.406	-14.368	N/A	74.000	31.226	PK
		2483.500	39.632	28.406	-14.368	-20.00	54.000	31.226	AV
3	*	2483.698	60.720	29.494	-13.280	N/A	74.000	31.226	PK
		2483.698	40.720	29.494	-13.280	-20.00	54.000	31.226	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).

Note 4. Average Measure Level = Peak Measure Level + Duty Cycle Factor, Duty cycle factor = -20dB.

Spot-check Error (From KDB 484596 D01 Referencing Test Data v02r01)

Worst Case Spot-check Error	Limit	Result
12.61%	25%	Pass

Note: Spot-check Error = |spot check data – reference data| / |reference data|

For example, |40.83 – 46.72| / 46.72 *100 = 12.61%

Appendix B - Test Setup Photograph

Refer to “2307RSU045-UT” file.

Appendix C - EUT Photograph

Refer to “2307RSU045-UE” file.

The End