RF MEASUREMENT REPORT

FCC ID:	Q9DASIN0305
Applicant:	Hewlett Packard Enterprise
Product:	HPE Aruba User Experience Sensor
Model No.:	ASIN0305
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:	2023-06-15
Test Date:	2023-07-15 ~ 2023-09-04

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
2306RSU027-U12	V01	Initial Report	2023-09-22	Invalid
2306RSU027-U12	V02	Add 1-18GHz test plot of RSE	2023-10-30	Invalid
2306RSU027-U12	V03	Add Spot-check Error description	2023-12-15	Valid

Note 1: The product is a variation on the existing ASIN0306 (FCC ID: Q9DASIN0306).

The differences are shown in the table below.

Parts of Product	Modification
PCB	Remove LTE/GPS module and its antenna & Remove the super-capacitor
Others	No Change

The applicant remeasured a set of antenna gain data that slightly different than before.

Frequency Band (MHz)	LTE Version (ASIN0306)		Non-LTE Version (ASIN0305)	
	Uncorrelated	Correlated	Uncorrelated	Correlated
2G/5G				
2450	2.1	5.0	2.2	5.0
5150	3.5	6.5	4.3	7.1
5500	3.5	6.3	4.8	7.8
5850	3.5	6.0	4.4	7.3
5895	3.6	6.2	4.5	7.5
2G/6G				
2450	2.0	4.8	1.3	4.2
5925	2.7	5.5	2.5	5.3
6500	3.1	6.0	3.7	6.7
7000	3.2	6.1	2.7	5.6
ZigBee / BLE				
2450	2.3		2.3	

Note 2: Spot-check tests were done on these items (Radiated Spurious Emission & Radiated Restricted Band Edge) based on worst-case results reported in the original FCC ID filing.

Other test data refer to original test report no. 2306RSU027-U2.

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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	HPE Aruba User Experience Sensor
Model No.	ASIN0305
Serial No.	CNQJLPL01P
Software Version	OPENTHREAD/2060039bb; Zephyr
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	BLE only
ZigBee Specification	802.15.4
Power Type	AC/DC Adapter
Operating Temperature	0 ~ 40 °C
Operating Environment	Indoor Use
Accessories	
AC/DC Adapter	Model No.: WB-12G12R Input: 100-240V, 50/60Hz, 0.3A Max Output: 12.0V⎓1.0A 12.0W
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 ~ 2475MHz
Channel Number	15
Type of Modulation	O-QPSK
Antenna Type	PIFA Antenna
Antenna Gain	2.30dBi

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

2. Test Configuration

2.1. Test Mode

Mode 1: Transmit by 802.15.4

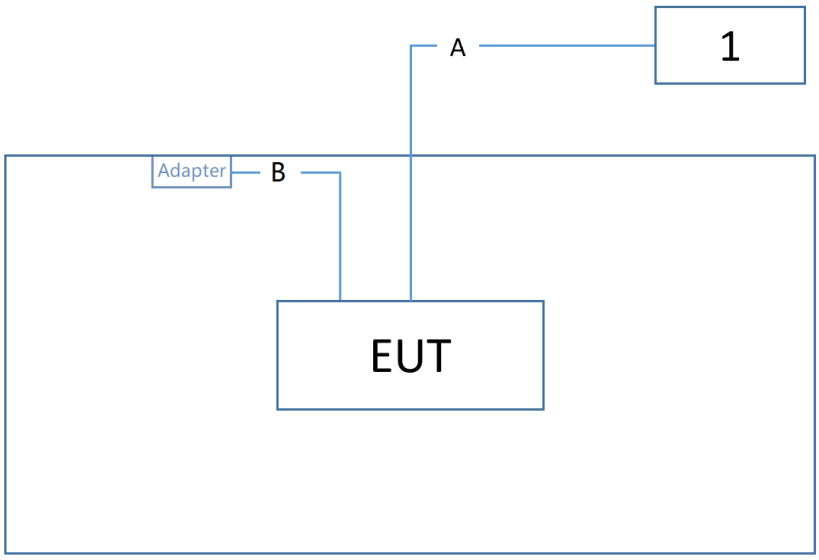
Radio Working Mode

Work Groups	Wi-Fi Radio 0	Wi-Fi Radio 1	IOT
1	2.4G	6G	BLE or ZigBee
2	5G	2.4G	BLE or ZigBee
3	5G	6G	BLE or ZigBee

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 – Radiated Emission testing & AC Conducted Emissions



Cable Type		Cable Description	
A	Ethernet Cable	Non shielded, > 10m	
B	Power Cable	Non shielded, 1.6m	
Product		**Manufacturer**	**Model No.**
1	Notebook	Dell	Latitude 5491

2.3. Test Software

The test utility software used during testing was “IPOP”, and commands were provided by 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	2023-08-22	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-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2024-05-15	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2024-05-23	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2024-05-07	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2024-04-20	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2024-05-23	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2024-05-31	WZ-SR2
Four-Line V-Network	R&S	ENV432	MRTSUE06615	1 year	2023-10-08	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2023-10-27	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2024-05-31	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2024-05-23	WZ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2024-05-23	WZ-SR5

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable
Controller_MF 7802	1.02	RE Antenna & Turntable
BenchVue Power Meter	2018.1	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 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.

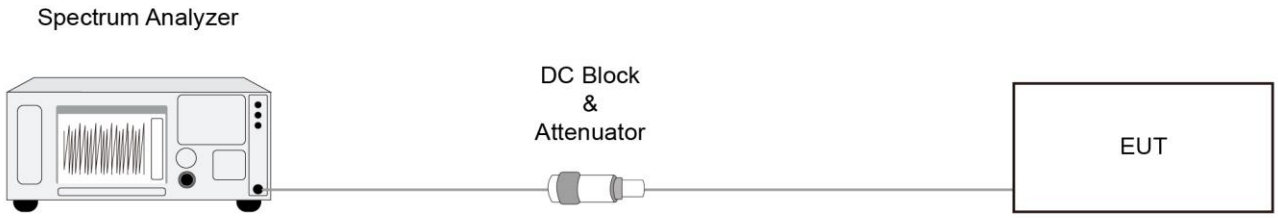
6.2.2. Test Procedure

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

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

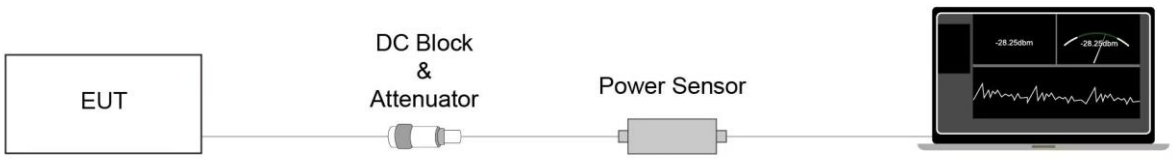
Method PKPM1 (Peak Power Measurement of Signals with DTS BW ≤ 50MHz)

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.

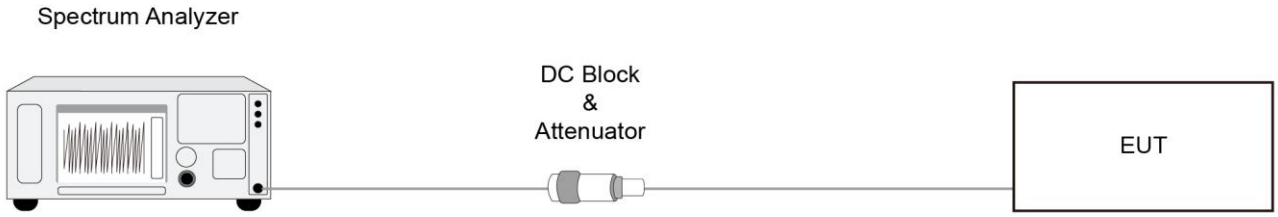
6.4.2. Test Procedure

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

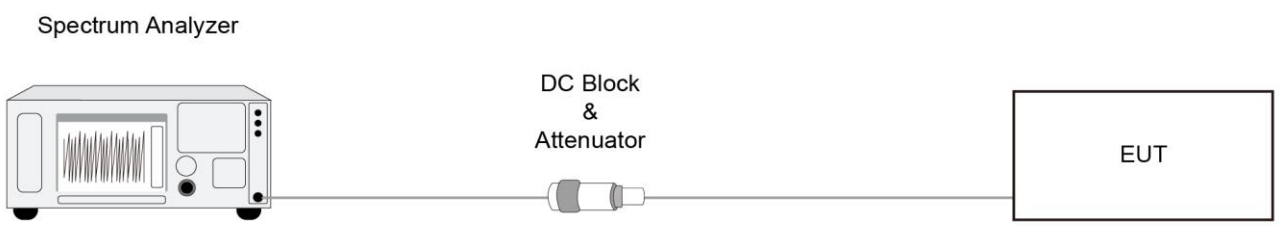
Reference level measurement

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 [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

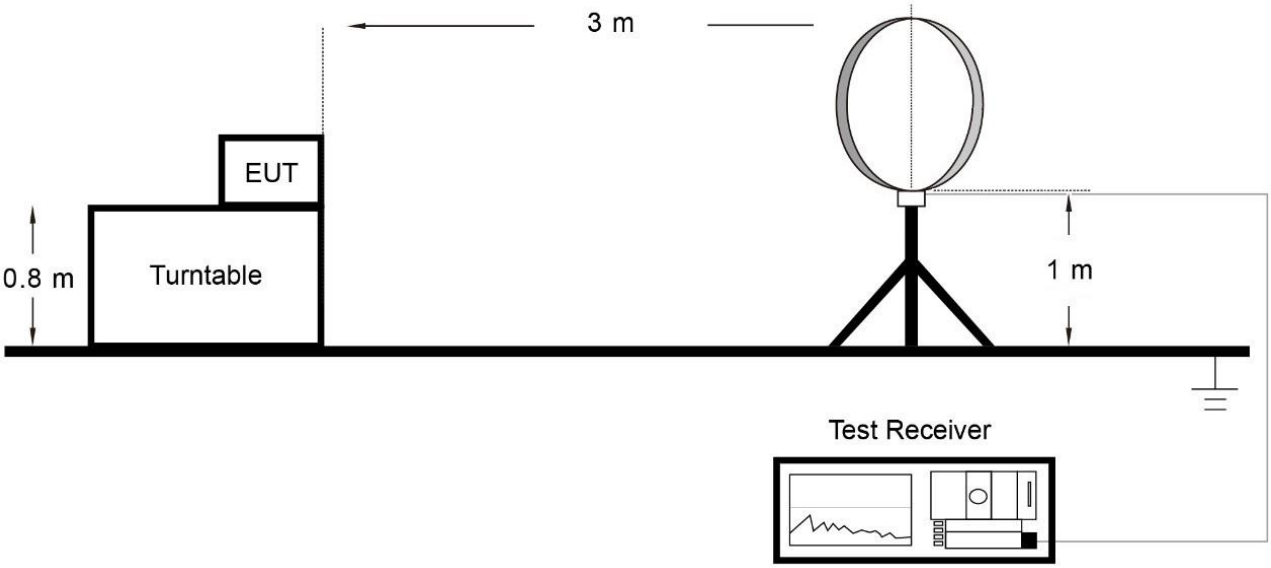
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

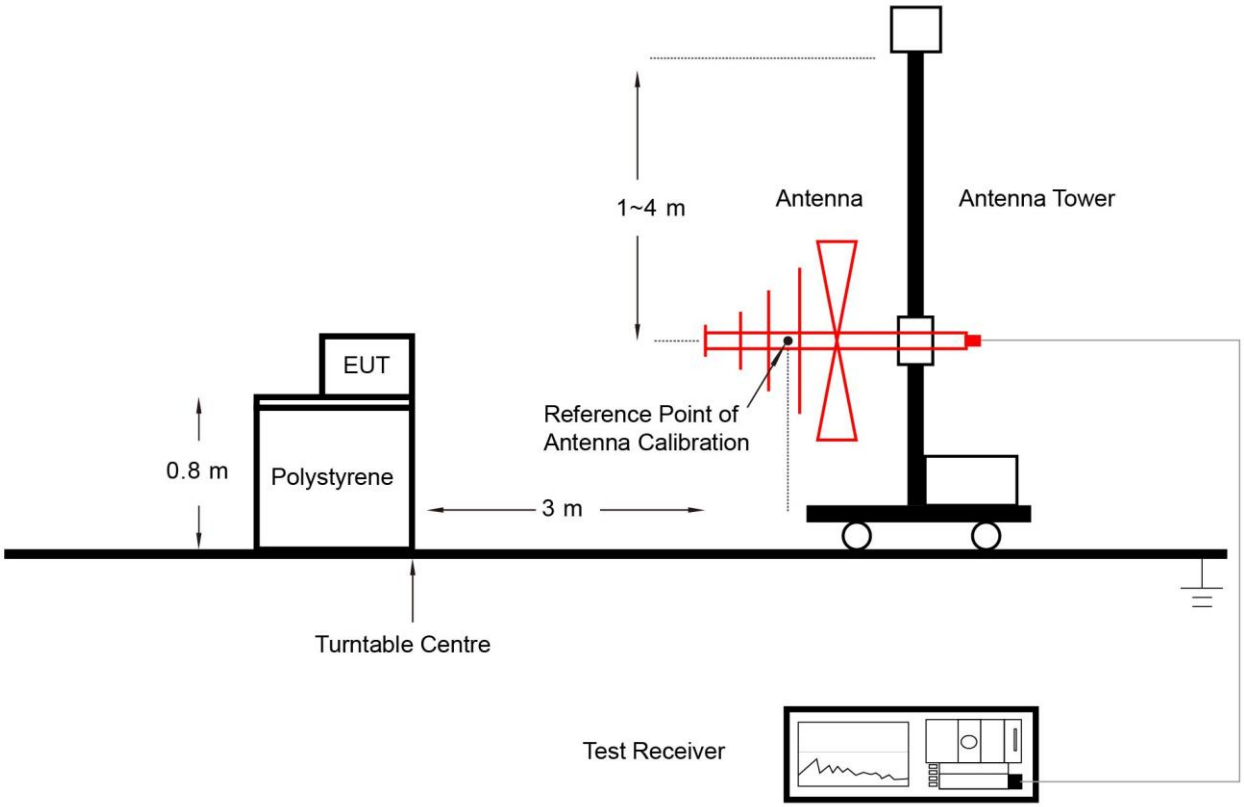
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.4. Test Setup

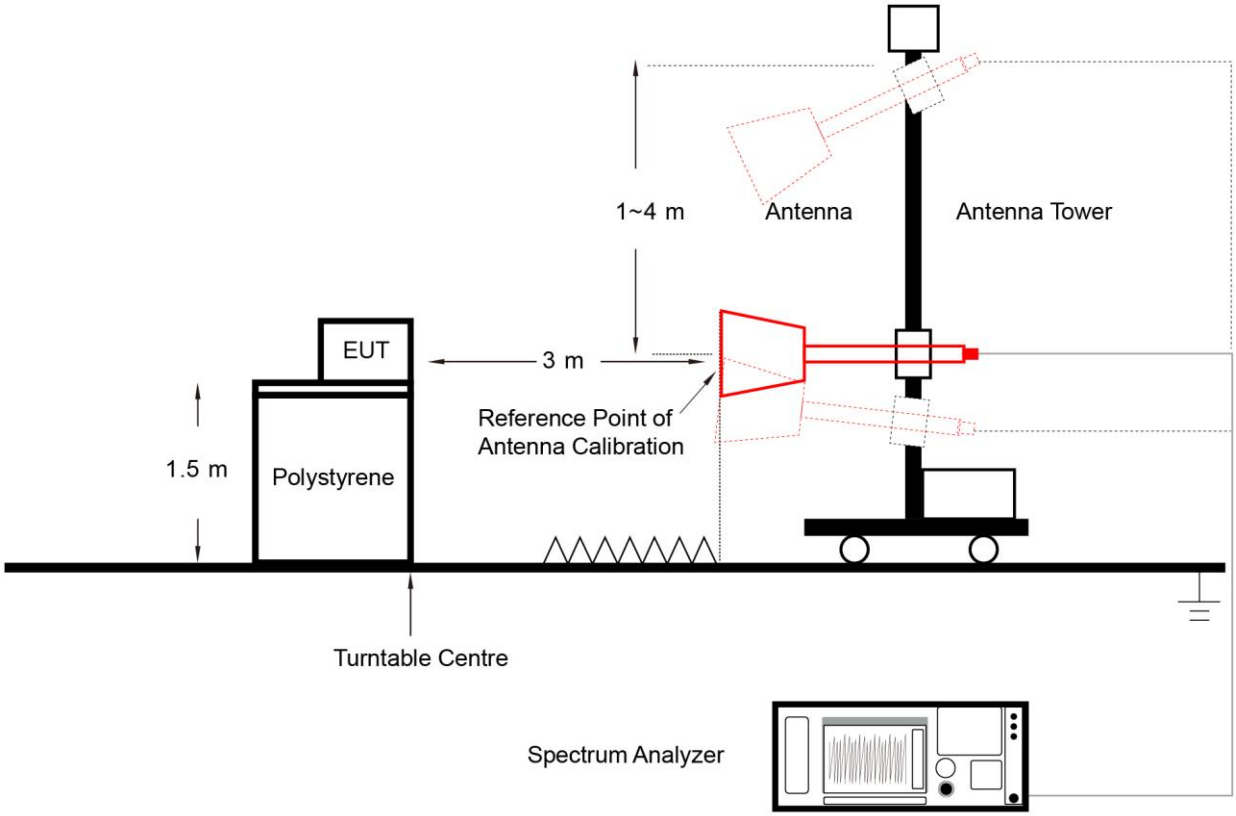
Below 30MHz Test Setup:



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 [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

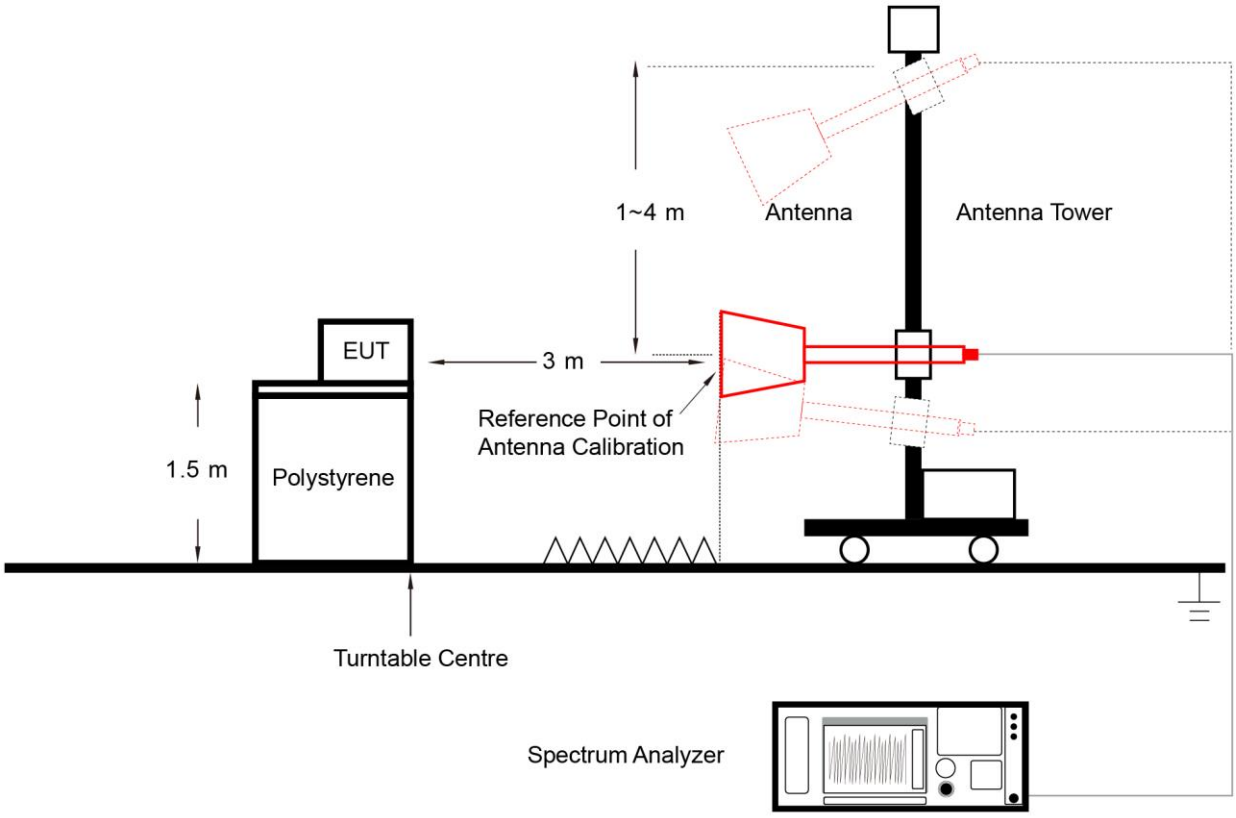
ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

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

6.7.4. Test Setup



6.7.5. Test Result

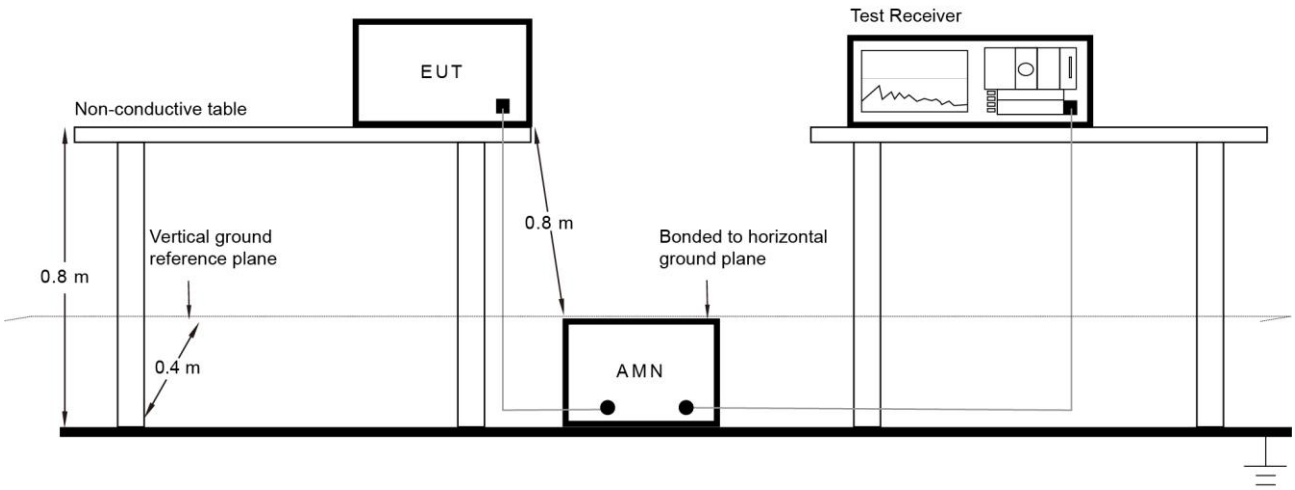
Refer to Appendix A.7.

6.8. AC Conducted Emissions Measurement

6.8.1. Test Limit

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

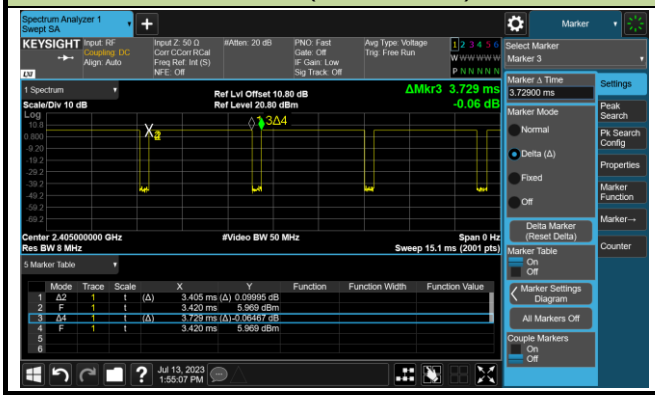
Refer to Appendix A.8.

Appendix A – Test Result

A.1 Duty Cycle Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-07-13		

Test Mode	Duty Cycle
802.15.4	91.31%

Duty Cycle (T = Transmission Duration)	
802.15.4 (T = 3.405ms)	
	

A.2 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-07-13 ~ 2023-09-04		

Test Mode	Modulation Mode	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.15.4	O-QPSK	11	2405	1.117	≥ 0.5	Pass
802.15.4	O-QPSK	18	2440	1.116	≥ 0.5	Pass
802.15.4	O-QPSK	25	2475	1.132	≥ 0.5	Pass

802.15.4 6dB Bandwidth

Channel 11 (2405MHz)

Channel 18 (2440MHz)

Channel 25 (2475MHz)

A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-07-13 ~ 2023-09-04		

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	6.13	≤ 30.00	Pass
802.15.4	O-QPSK	18	2440	6.75	≤ 30.00	Pass
802.15.4	O-QPSK	25	2475	6.80	≤ 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	5.95	≤ 30.00	Pass
802.15.4	O-QPSK	18	2440	6.63	≤ 30.00	Pass
802.15.4	O-QPSK	25	2475	6.64	≤ 30.00	Pass

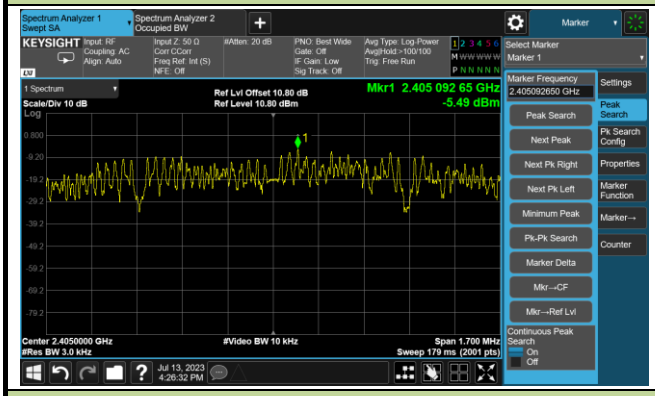
A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-07-13 ~ 2023-09-04		

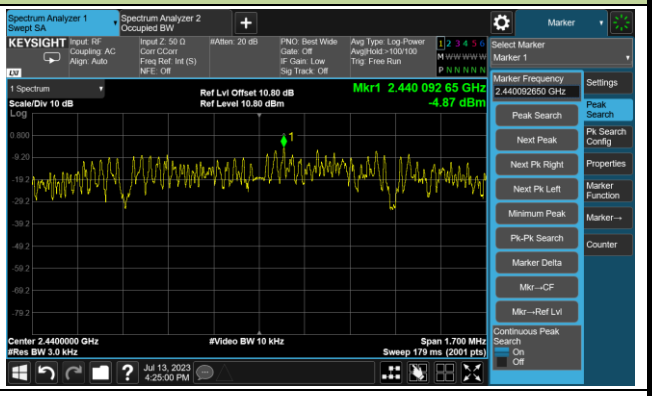
Test Mode	Modulation Mode	Channel No.	Frequency (MHz)	PK PSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
802.15.4	O-QPSK	11	2405	-5.49	≤ 8.00	Pass
802.15.4	O-QPSK	18	2440	-4.87	≤ 8.00	Pass
802.15.4	O-QPSK	25	2475	-5.02	≤ 8.00	Pass

802.15.4 Power Density

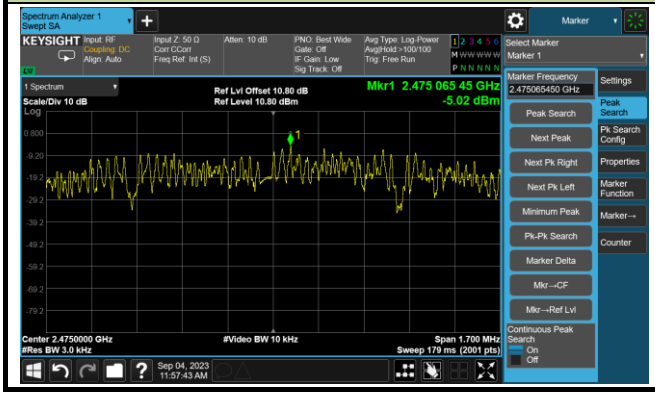
Channel 11 (2405MHz)



Channel 18 (2440MHz)



Channel 25 (2475MHz)



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

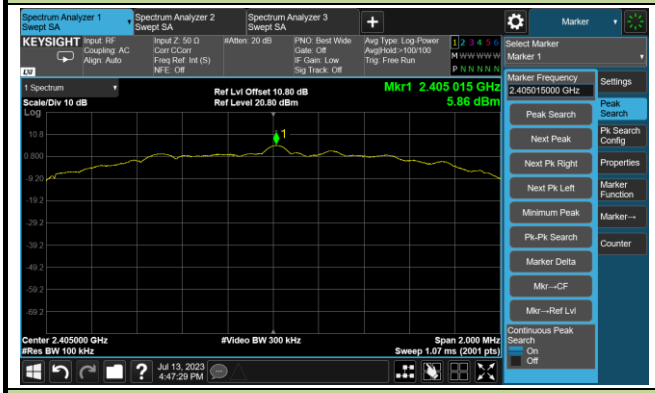
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-07-13 ~ 2023-09-04		

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit (dBc)	Result
802.15.4	O-QPSK	11	2405	> 20	Pass
802.15.4	O-QPSK	18	2440	> 20	Pass
802.15.4	O-QPSK	25	2475	> 20	Pass

802.15.4 Out-of-Band Emissions

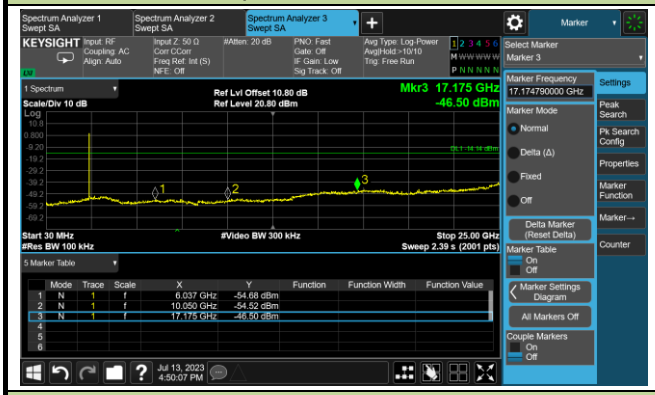
Channel 11 (2405MHz)

100kHz PSD Reference Level



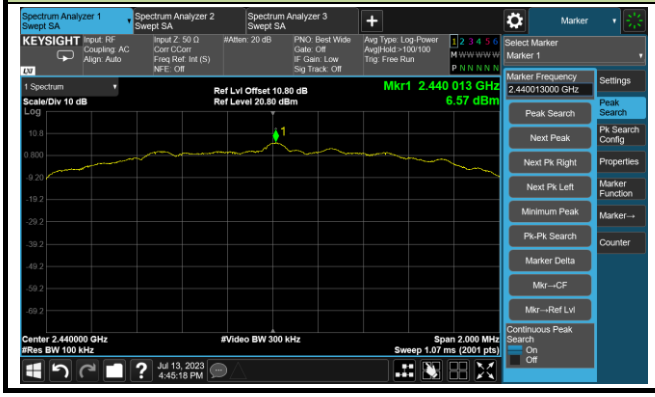
Low Band Edge

Spurious Emission

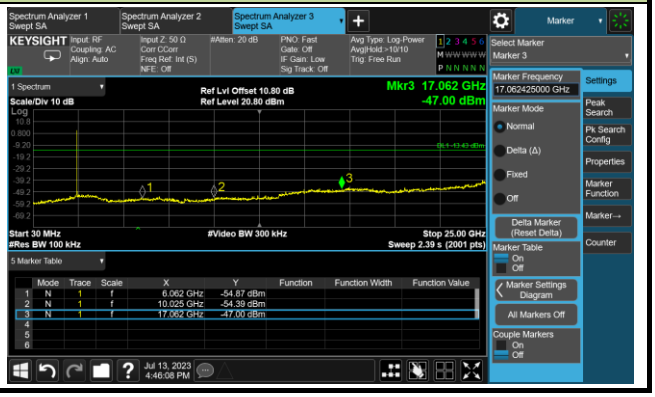


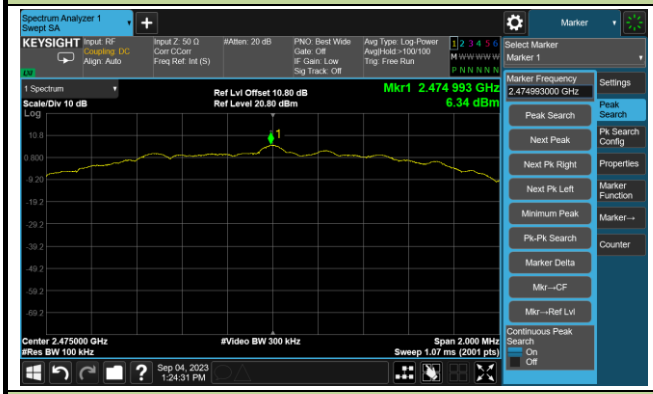
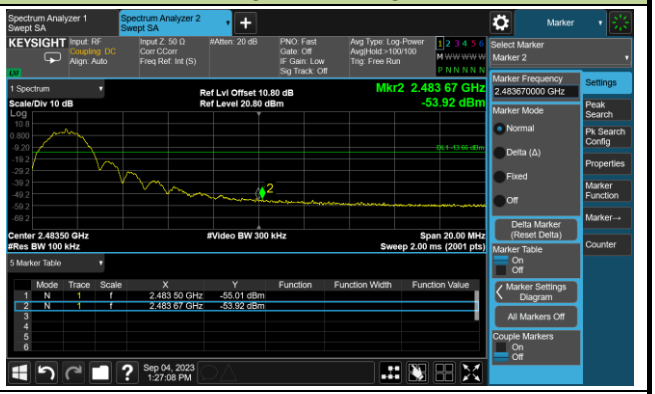
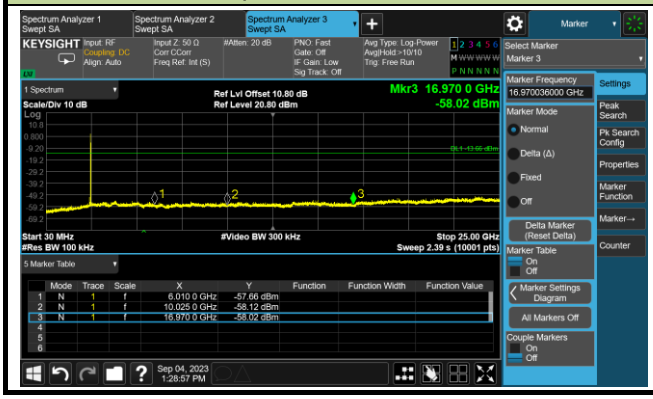
Channel 18 (2440MHz)

100kHz PSD Reference Level



Spurious Emission



Channel 25 (2475MHz)	
100kHz PSD Reference Level	High Band Edge
	
Spurious Emission	
	

A.6 Radiated Spurious Emission Test Result

Test Site	WZ-AC2	Test Engineer	Dick Shen
Test Date	2023-07-25		
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.		

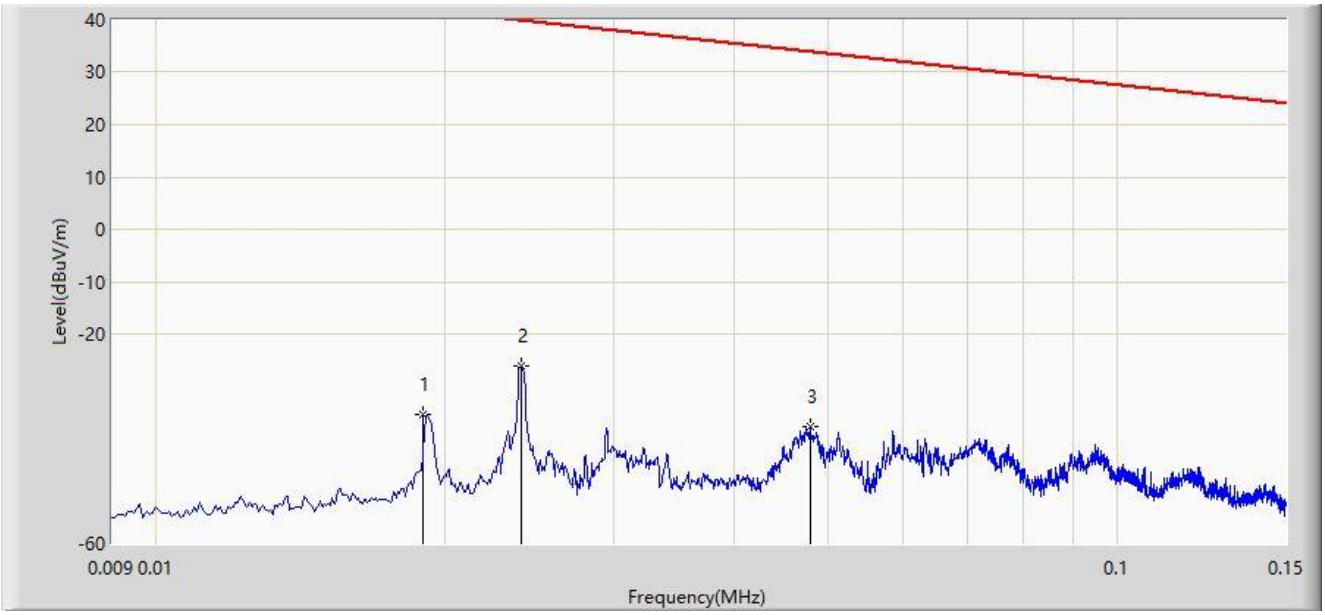
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
11	4000.5	40.6	-0.1	40.5	74.0	-33.5	Peak	Horizontal
	4893.0	35.4	3.0	38.4	74.0	-35.6	Peak	Horizontal
	11531.5	32.1	17.3	49.4	74.0	-24.6	Peak	Horizontal
	4000.5	39.7	-0.1	39.6	74.0	-34.4	Peak	Vertical
	4689.0	33.9	3.8	37.7	74.0	-36.3	Peak	Vertical
	11795.0	31.9	17.6	49.5	74.0	-24.5	Peak	Vertical
18	4000.5	39.6	-0.1	39.5	74.0	-34.5	Peak	Horizontal
	4672.0	34.7	3.7	38.4	74.0	-35.6	Peak	Horizontal
	11013.0	32.1	16.4	48.5	74.0	-25.5	Peak	Horizontal
	4000.5	40.0	-0.1	39.9	74.0	-34.1	Peak	Vertical
	4697.5	34.3	3.8	38.1	74.0	-35.9	Peak	Vertical
	11157.5	31.9	16.7	48.6	74.0	-25.4	Peak	Vertical
25	8310.0	34.0	8.7	42.7	74.0	-31.3	Peak	Horizontal
	10741.0	35.1	14.1	49.2	74.0	-24.8	Peak	Horizontal
	12118.0	35.0	12.5	47.5	74.0	-26.5	Peak	Horizontal
	8361.0	36.0	8.8	44.8	74.0	-29.2	Peak	Vertical
	11336.0	35.6	13.4	49.0	74.0	-25.0	Peak	Vertical
	12194.5	36.7	12.3	49.0	74.0	-25.0	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)

The Result of Radiated Emission 9kHz ~ 30MHz:

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coaxial
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.019	-35.484	24.402	-77.497	42.013	-59.886	PK
2	*	0.024	-26.114	34.362	-66.099	39.985	-60.476	PK
3		0.048	-37.742	24.593	-71.710	33.968	-62.335	PK

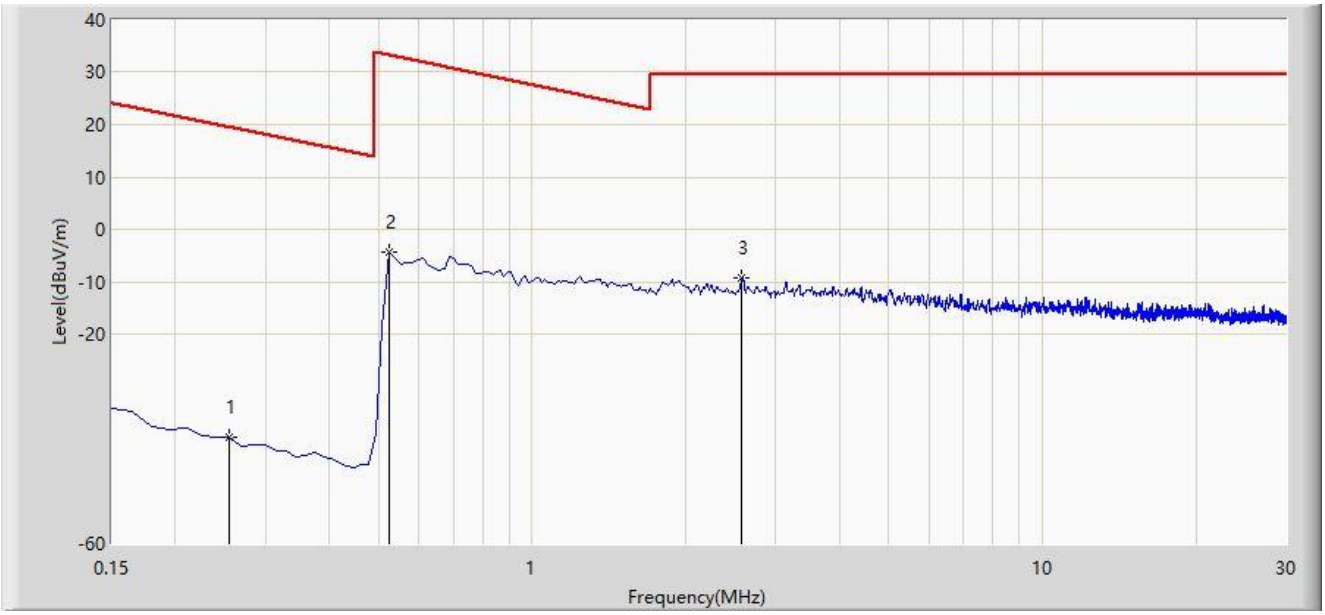
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coaxial
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		0.254	-39.577	23.020	-59.082	19.504	-62.597	PK
2	*	0.523	-4.322	18.075	-37.557	33.235	-22.397	PK
3		2.568	-9.371	12.979	-38.871	29.500	-22.350	PK

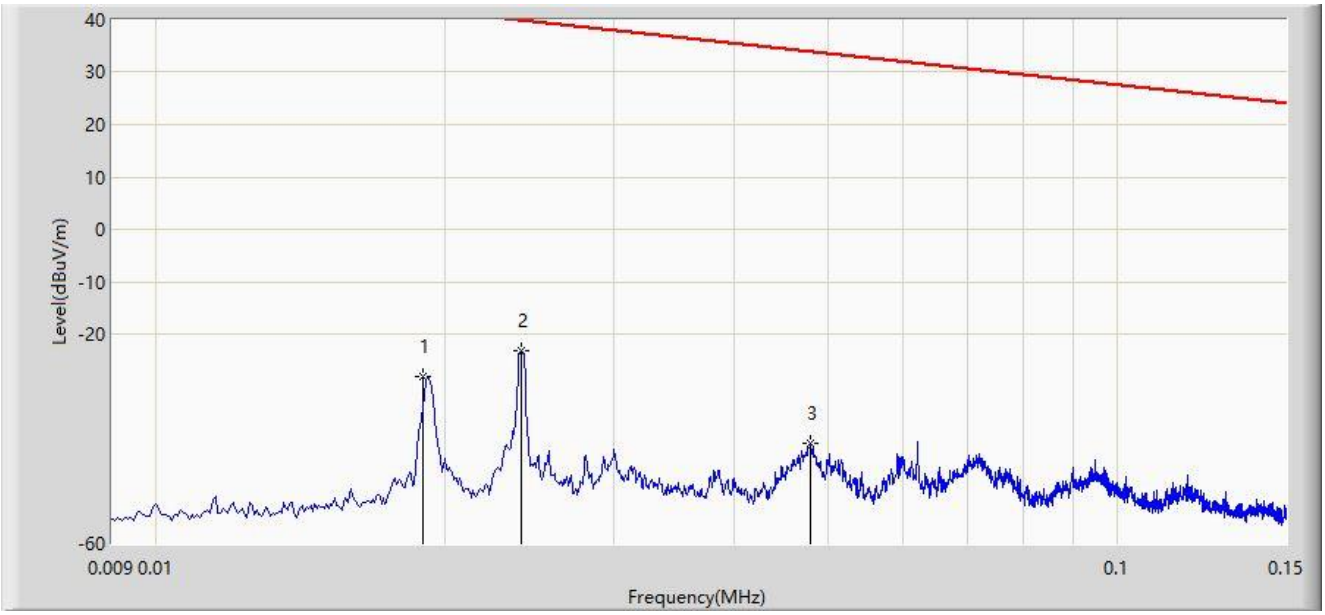
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coplanar
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.019	-28.078	31.808	-70.091	42.013	-59.886	PK
2	*	0.024	-23.244	37.232	-63.229	39.985	-60.476	PK
3		0.048	-40.848	21.487	-74.816	33.968	-62.335	PK

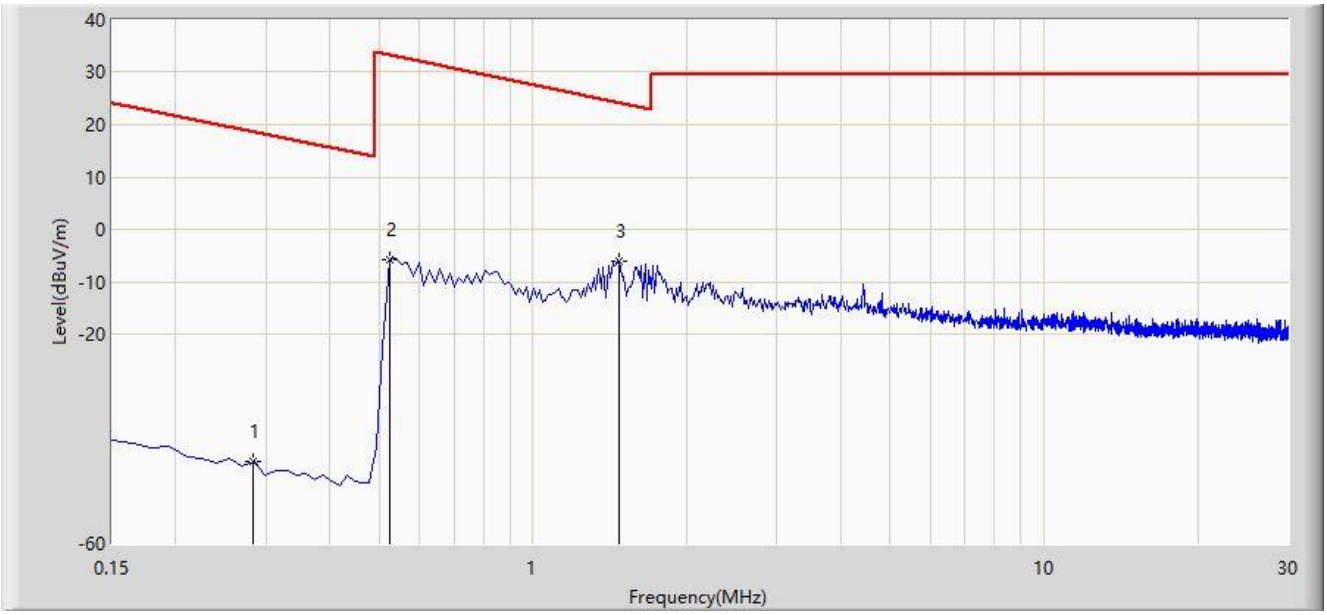
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coplanar
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		0.284	-44.378	18.204	-62.913	18.535	-62.582	PK
2		0.523	-5.686	16.711	-38.921	33.235	-22.397	PK
3	*	1.478	-5.952	16.392	-30.189	24.237	-22.344	PK

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

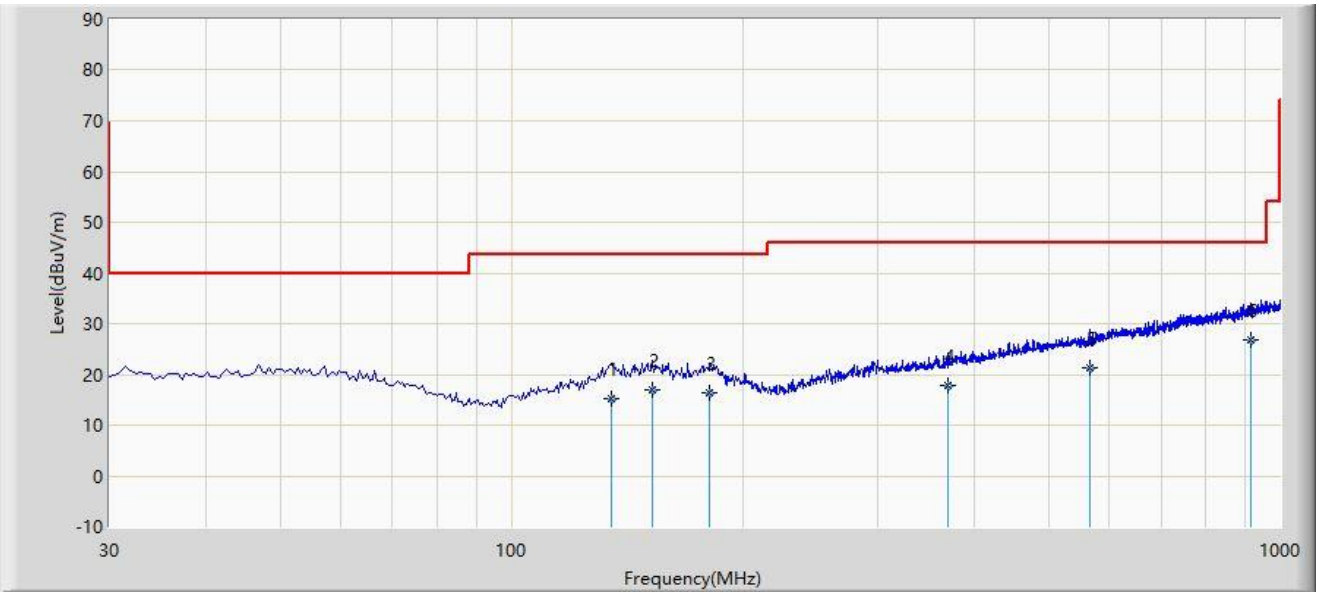
Note 2: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

The Result of Radiated Emission below 1GHz:

Site: WZ-AC1	Test Date: 2023-08-11
Limit: FCC_Part15.209_RSE(3m)	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



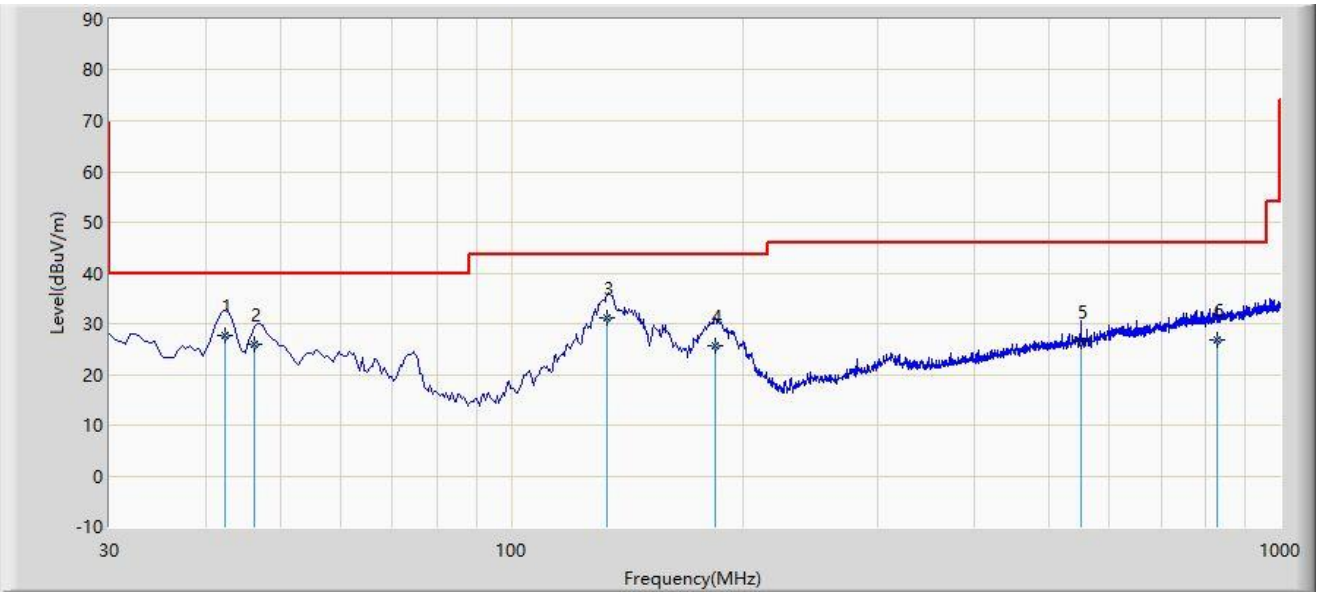
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		134.760	15.121	-2.150	-28.379	43.500	17.271	QP
2		152.220	16.974	-1.230	-26.526	43.500	18.203	QP
3		181.230	16.338	-0.390	-27.162	43.500	16.728	QP
4		369.230	17.711	-2.450	-28.289	46.000	20.162	QP
5		565.230	21.371	-2.890	-24.629	46.000	24.261	QP
6	*	914.250	26.695	-2.870	-19.305	46.000	29.565	QP

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: 2023-08-11
Limit: FCC_Part15.209_RSE(3m)	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		42.390	27.617	9.350	-12.383	40.000	18.267	QP
2		46.230	26.063	7.560	-13.937	40.000	18.503	QP
3	*	133.260	31.272	14.120	-12.228	43.500	17.153	QP
4		184.360	25.568	9.250	-17.932	43.500	16.317	QP
5		550.120	26.466	2.360	-19.534	46.000	24.106	QP
6		829.350	26.688	-2.120	-19.312	46.000	28.808	QP

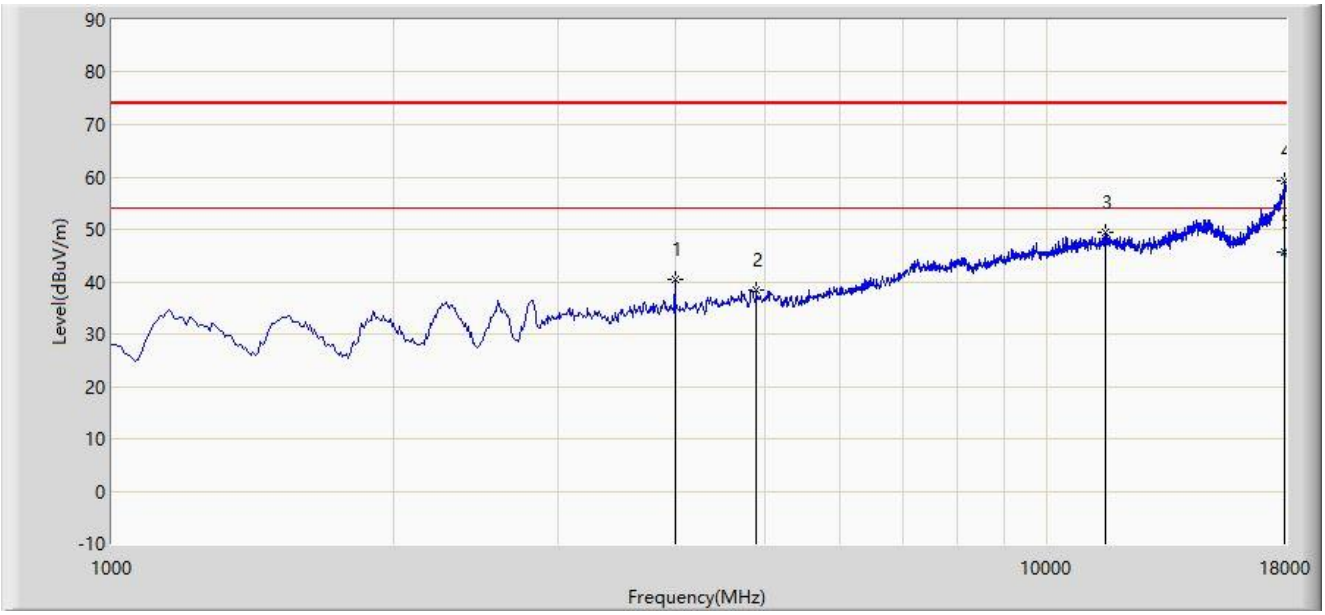
Note 1: " * ", means this data is the worst emission level.

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

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

The Result of Radiated Emission 1G ~ 18GHz:

Site: WZ-AC2	Test Date: 2023-07-25
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9120D_1457_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		4000.500	40.464	40.614	-33.536	74.000	-0.149	PK
2		4893.000	38.415	35.430	-35.585	74.000	2.985	PK
3		11531.500	49.300	32.051	-24.700	74.000	17.250	PK
4		17966.000	59.213	31.360	-14.787	74.000	27.852	PK
5	*	17966.000	45.743	17.890	-8.257	54.000	27.852	AV

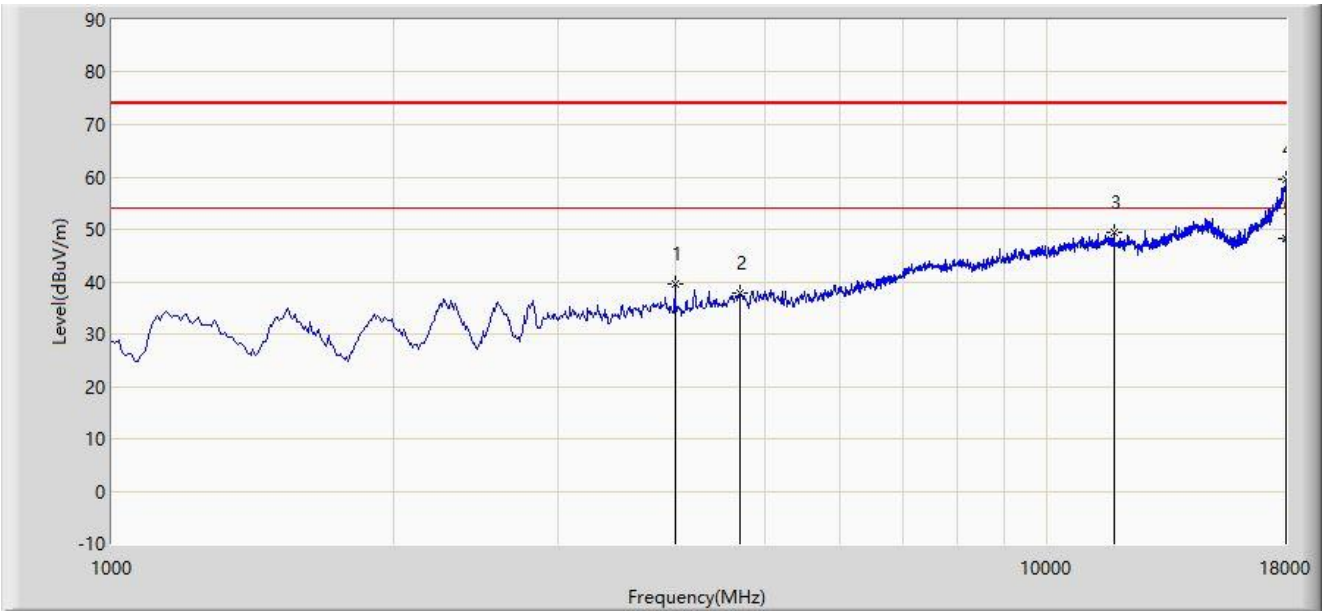
Note 1: " * ", means this data is the worst emission level.

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-AC2	Test Date: 2023-07-25
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9120D_1457_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		4000.500	39.593	39.743	-34.407	74.000	-0.149	PK
2		4689.000	37.688	33.899	-36.312	74.000	3.789	PK
3		11795.000	49.559	31.928	-24.441	74.000	17.631	PK
4		17991.500	59.430	31.172	-14.570	74.000	28.258	PK
5	*	17991.500	48.378	20.120	-5.622	54.000	28.258	AV

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

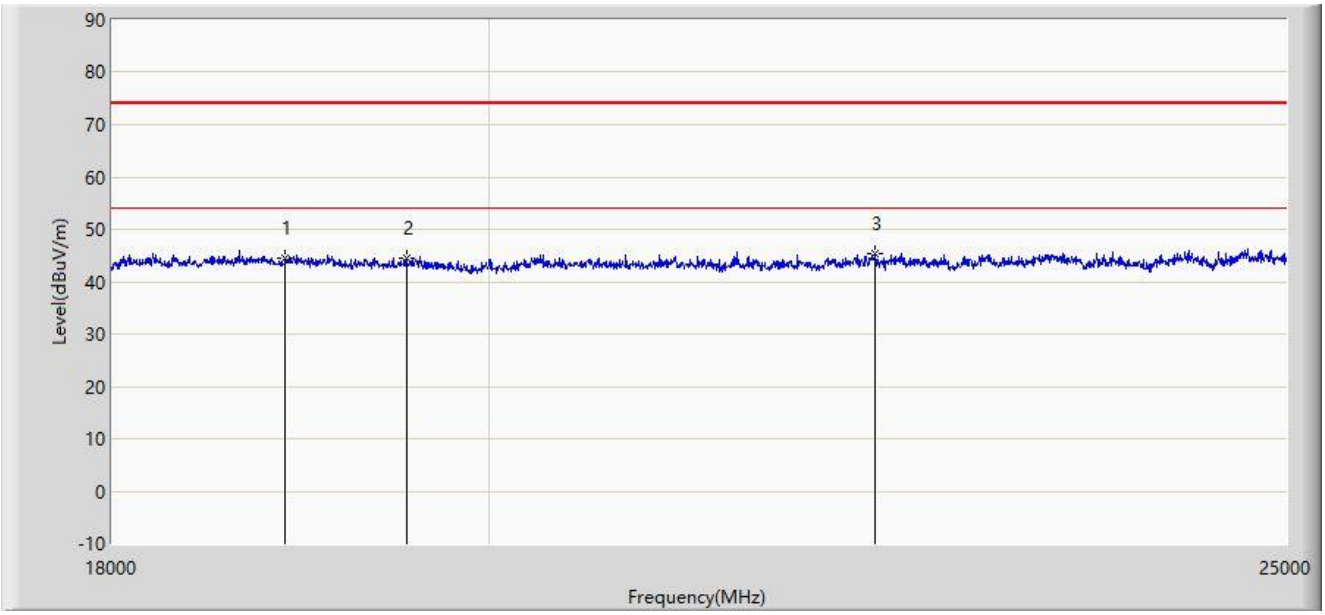
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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.

The Result of Radiated Emission 18G ~ 25GHz:

Site: WZ-AC2	Test Date: 2023-08-13
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9170_993_18-40GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		18896.000	44.529	55.063	-29.471	74.000	-10.533	PK
2		19547.000	44.527	54.930	-29.473	74.000	-10.403	PK
3	*	22287.500	45.411	53.171	-28.589	74.000	-7.761	PK

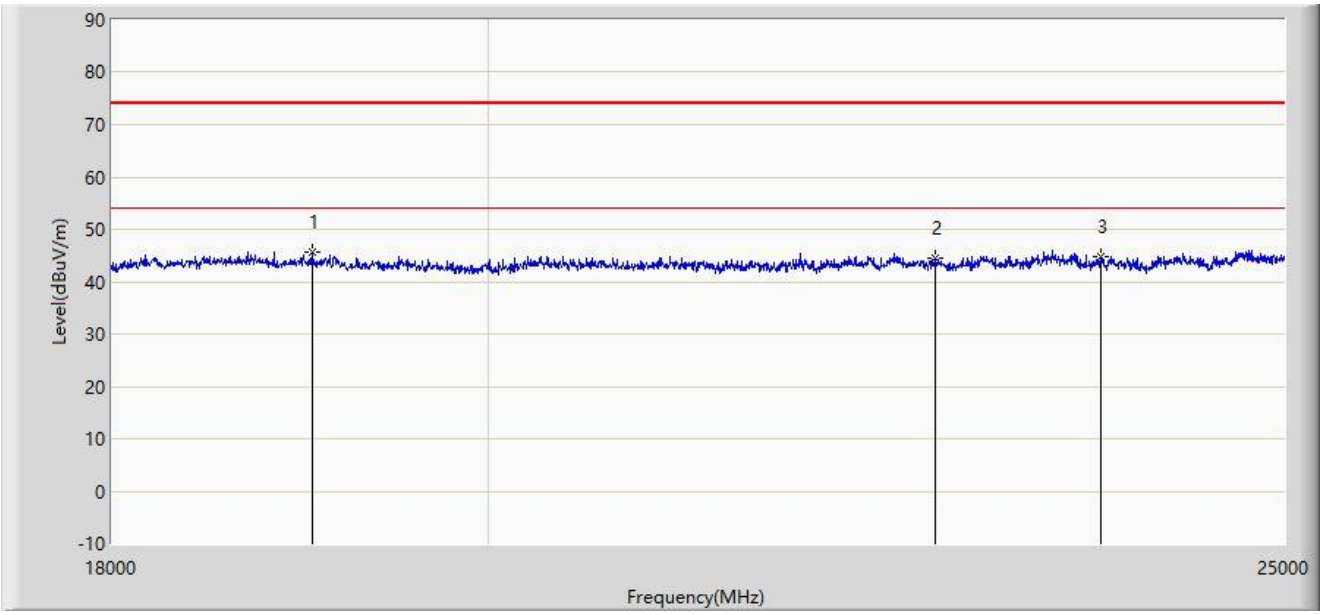
Note 1: " * ", means this data is the worst emission level.

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

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

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

Site: WZ-AC2	Test Date: 2023-08-13
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9170_993_18-40GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	19039.500	45.776	55.972	-28.224	74.000	-10.196	PK
2		22676.000	44.614	52.632	-29.386	74.000	-8.018	PK
3		23747.000	44.843	52.461	-29.157	74.000	-7.618	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) - Pre_Amplifier Gain (dB).

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

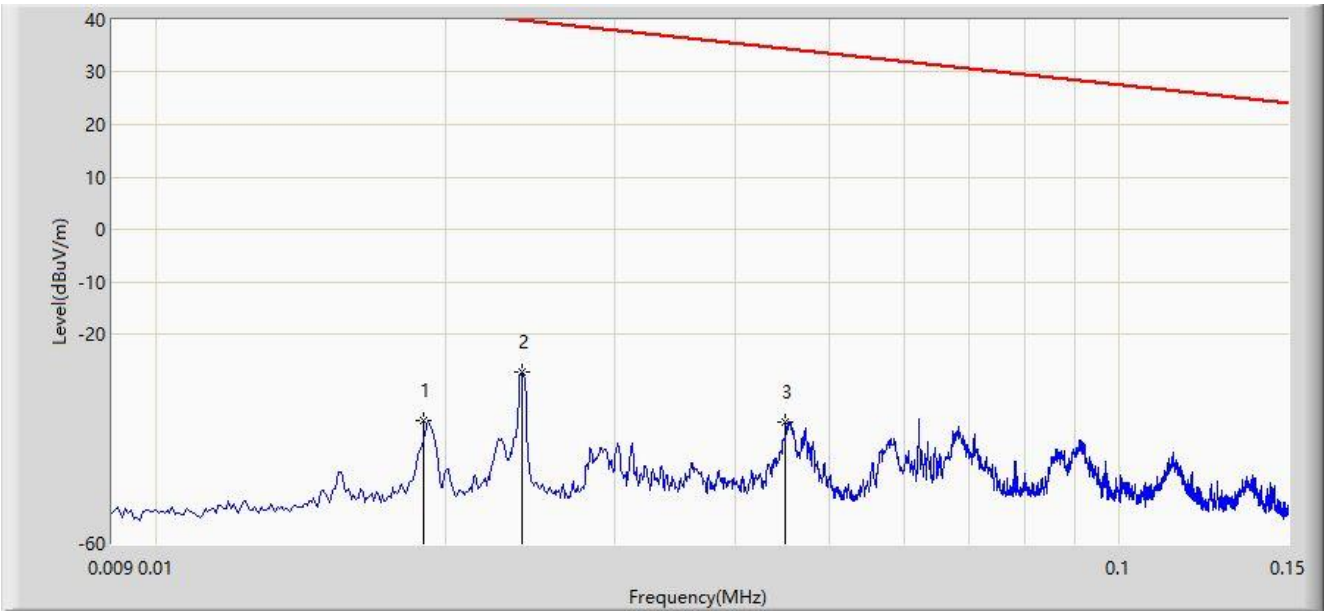
Spot Check Test Data

Test Site	WZ-AC1	Test Engineer	Ajin Fan
Test Date	2023-08-12		
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
25	8369.5	34.4	8.9	43.3	74.0	-30.7	Peak	Horizontal
	11412.5	35.1	13.5	48.6	74.0	-25.4	Peak	Horizontal
	12050.0	34.1	12.5	46.6	74.0	-27.4	Peak	Horizontal
	8216.5	35.9	8.8	44.7	74.0	-29.3	Peak	Vertical
	11098.0	35.7	13.9	49.6	74.0	-24.4	Peak	Vertical
	12058.5	33.4	12.5	45.9	74.0	-28.1	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 9kHz ~ 30MHz:

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coaxial
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.019	-36.624	23.262	-78.637	42.013	-59.886	PK
2	*	0.024	-27.348	33.128	-67.333	39.985	-60.476	PK
3		0.045	-36.776	25.529	-71.304	34.528	-62.305	PK

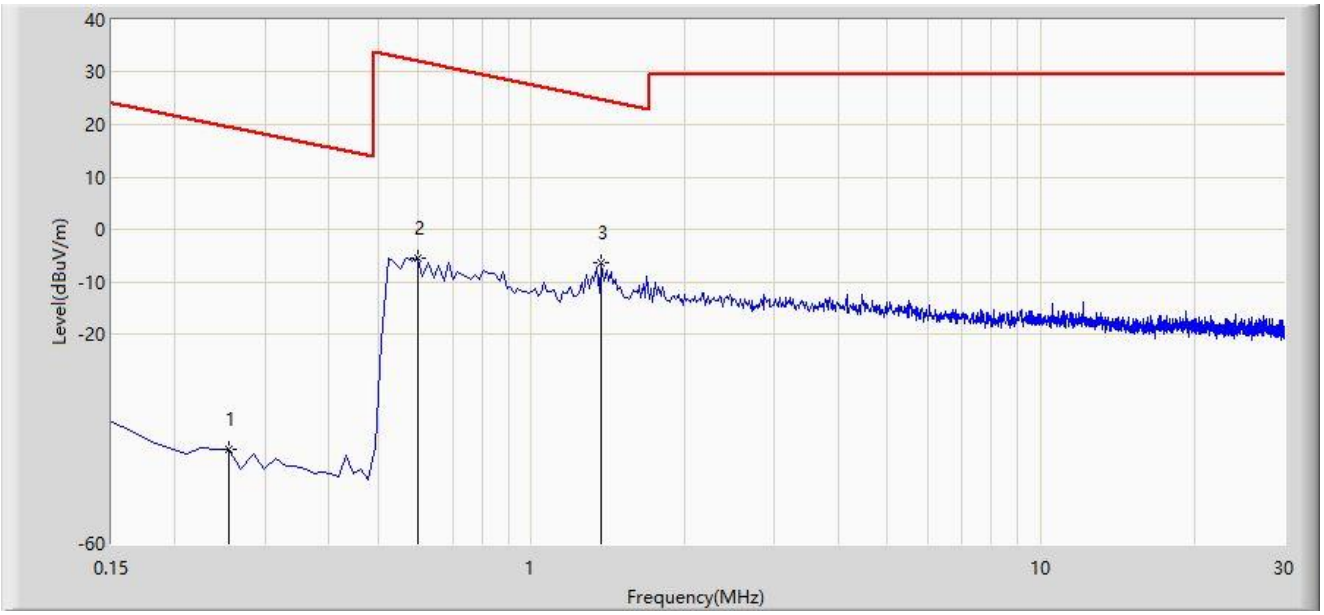
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coaxial
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.254	-41.946	20.651	-61.451	19.504	-62.597	PK
2		0.598	-5.571	16.789	-37.646	32.075	-22.360	PK
3	*	1.374	-6.512	15.821	-31.381	24.869	-22.333	PK

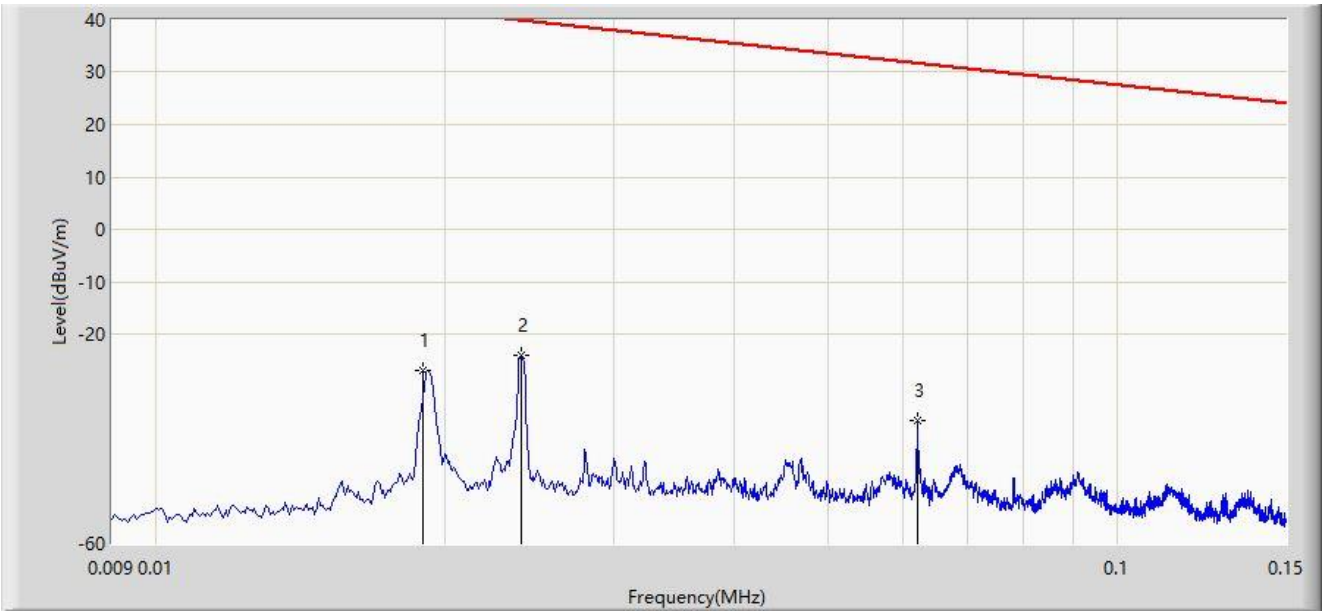
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coplanar
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.019	-26.921	32.965	-68.934	42.013	-59.886	PK
2	*	0.024	-24.077	36.399	-64.062	39.985	-60.476	PK
3		0.062	-36.554	25.921	-68.300	31.746	-62.475	PK

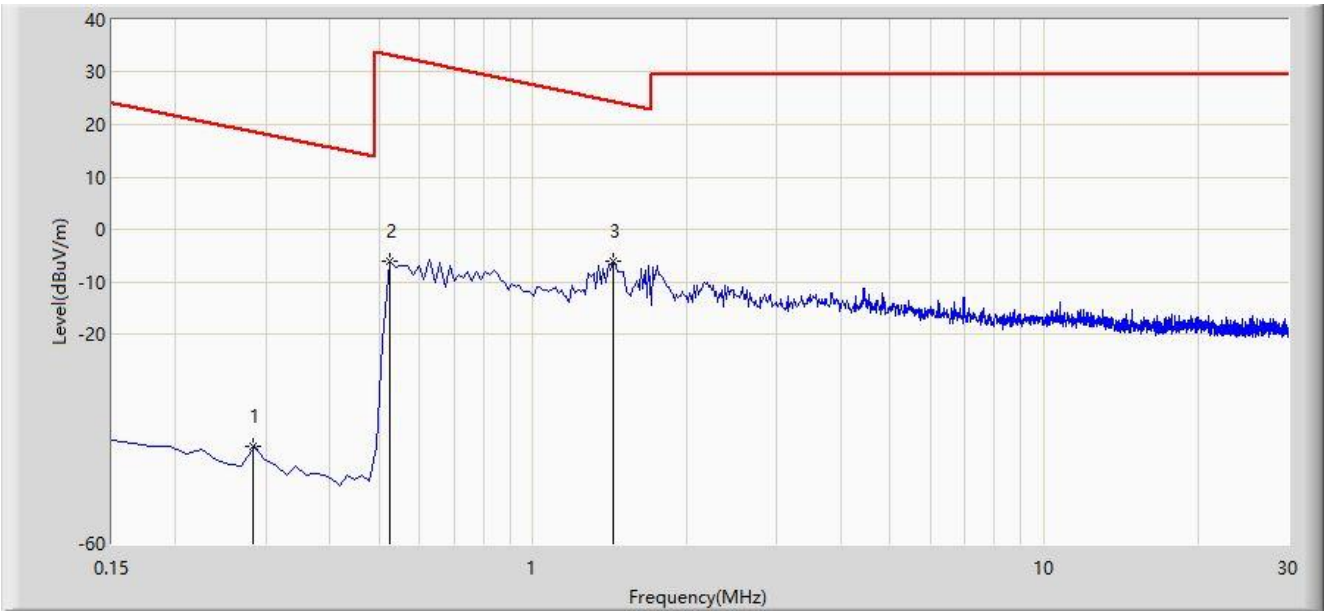
Note 1: " * ", means this data is the worst emission level.

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

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

Site: WZ-AC1	Test Date: 2023-07-26
Limit: FCC_Part15.209_RSE	Engineer: Carl Jiang
Probe: FMZB1519_0.009-30MHz	Polarity: Coplanar
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		0.284	-41.430	21.152	-59.965	18.535	-62.582	PK
2		0.523	-6.124	16.273	-39.359	33.235	-22.397	PK
3	*	1.434	-6.082	16.257	-30.581	24.499	-22.339	PK

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

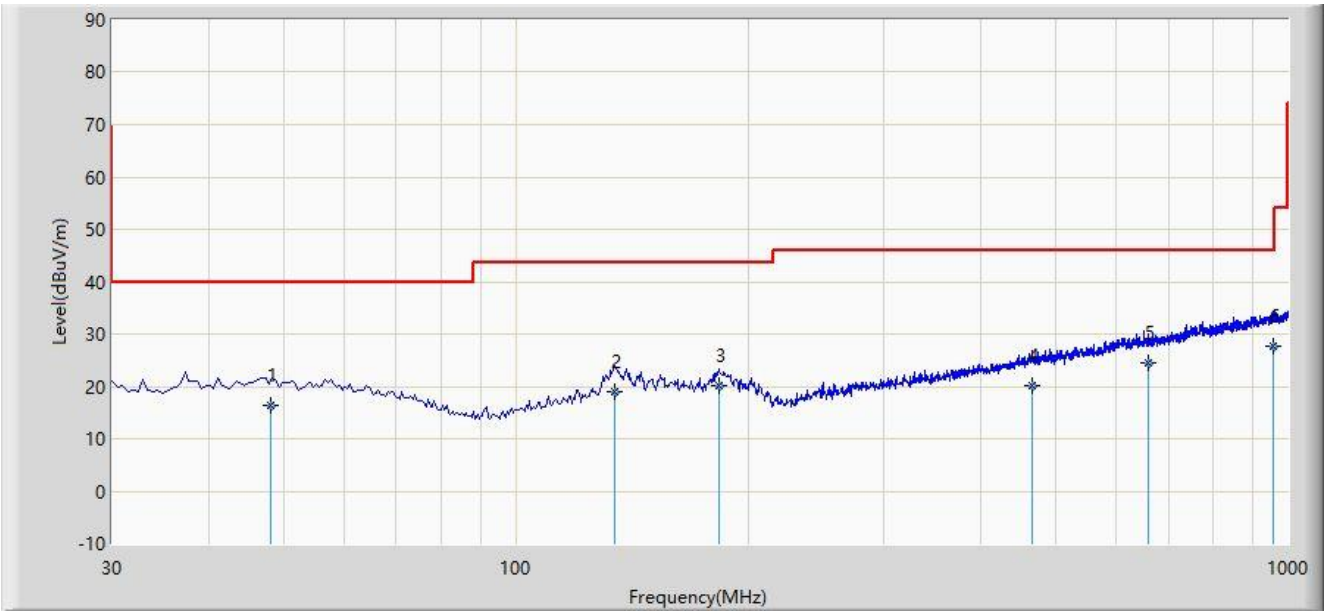
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + 40log(d1/d2) (dB), d1 = 3m, d2 = 300m (9kHz-490kHz) or 30m (490kHz-30MHz).

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

The Result of Radiated Emission below 1GHz:

Site: WZ-AC1	Test Date: 2023-08-11
Limit: FCC_Part15.209_RSE(3m)	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



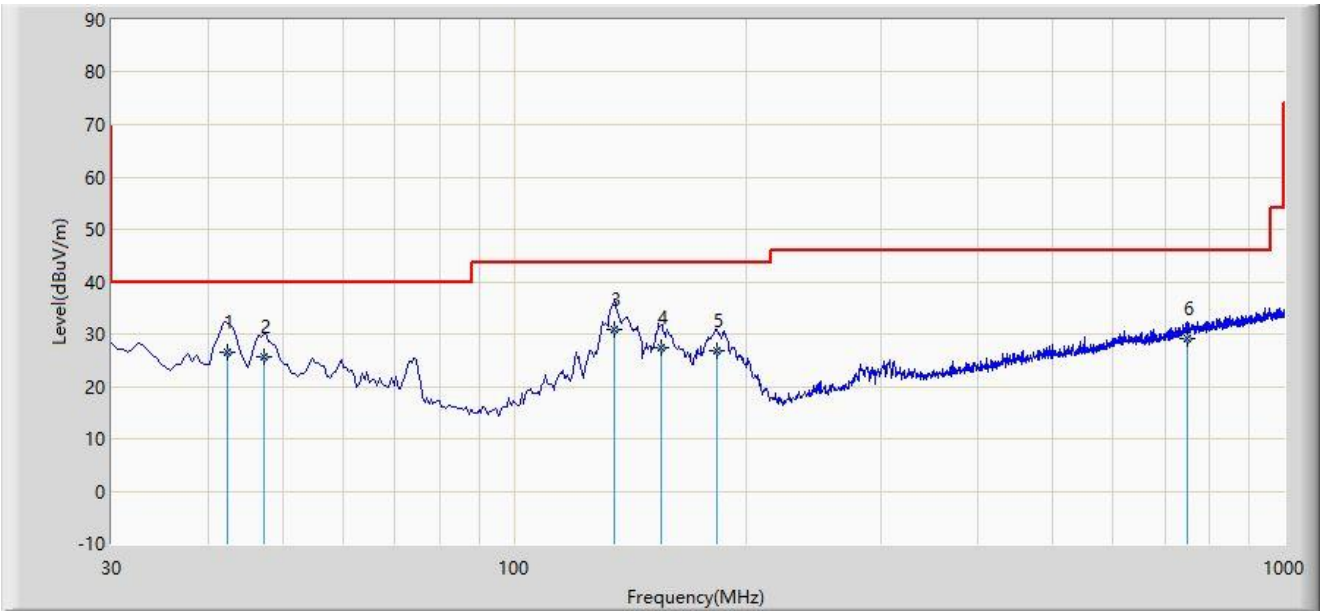
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		48.230	16.458	-2.100	-23.542	40.000	18.559	QP
2		134.260	18.918	1.690	-24.582	43.500	17.228	QP
3		183.240	20.055	3.590	-23.445	43.500	16.464	QP
4		466.390	20.131	-2.590	-25.869	46.000	22.720	QP
5		660.120	24.543	-1.590	-21.457	46.000	26.133	QP
6	*	955.830	27.692	-2.410	-18.308	46.000	30.103	QP

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: 2023-08-11
Limit: FCC_Part15.209_RSE(3m)	Engineer: Ajin Fan
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		42.360	26.524	8.260	-13.476	40.000	18.264	QP
2		47.260	25.771	7.240	-14.229	40.000	18.531	QP
3	*	135.020	30.983	13.690	-12.517	43.500	17.293	QP
4		155.240	27.521	9.250	-15.979	43.500	18.272	QP
5		183.060	26.697	10.210	-16.803	43.500	16.488	QP
6		750.000	29.202	1.140	-16.798	46.000	28.062	QP

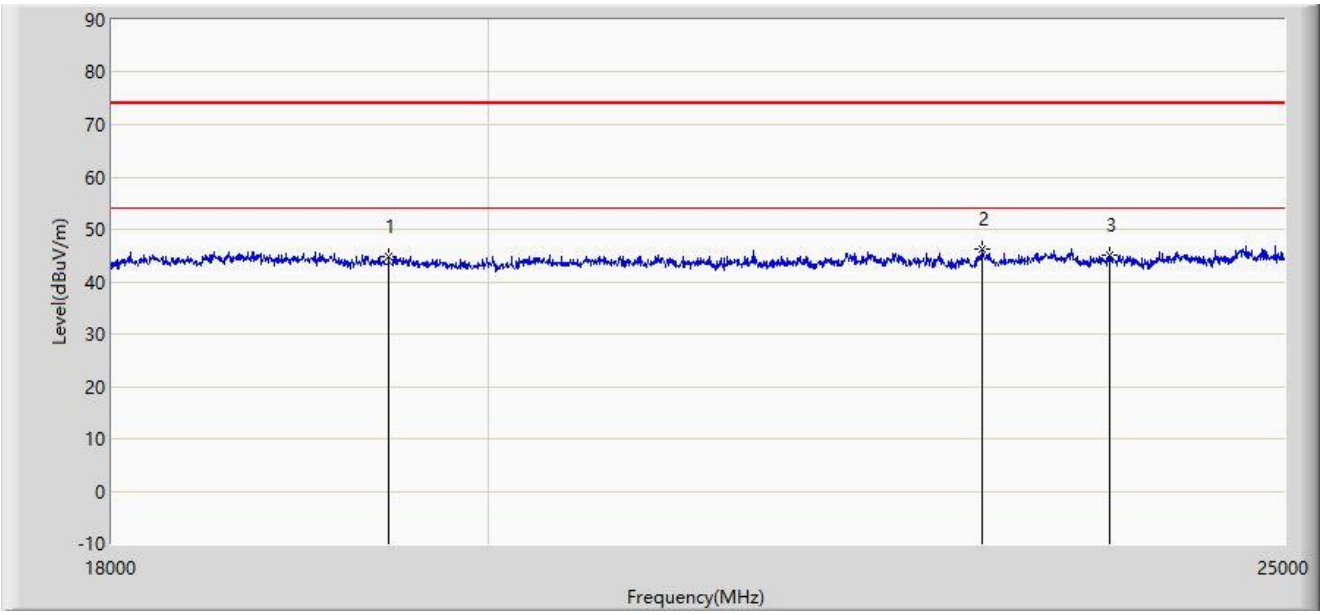
Note 1: " * ", means this data is the worst emission level.

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

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

The Result of Radiated Emission 18G ~ 25GHz:

Site: WZ-AC2	Test Date: 2023-08-13
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9170_993_18-40GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		19452.500	44.843	55.096	-29.157	74.000	-10.253	PK
2	*	22973.500	46.232	53.558	-27.768	74.000	-7.326	PK
3		23803.000	45.215	52.375	-28.785	74.000	-7.160	PK

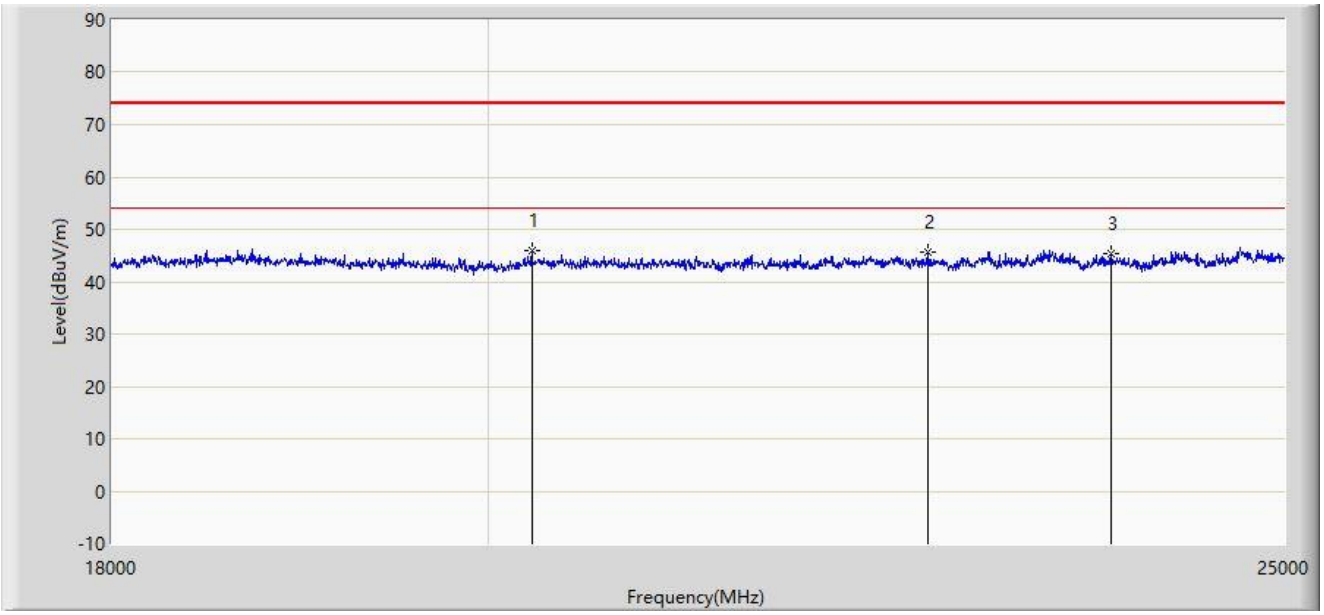
Note 1: " * ", means this data is the worst emission level.

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

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

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

Site: WZ-AC2	Test Date: 2023-08-13
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: BBHA9170_993_18-40GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	20250.500	45.905	55.840	-28.095	74.000	-9.935	PK
2		22623.500	45.707	53.941	-28.293	74.000	-8.235	PK
3		23820.500	45.282	52.255	-28.718	74.000	-6.973	PK

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

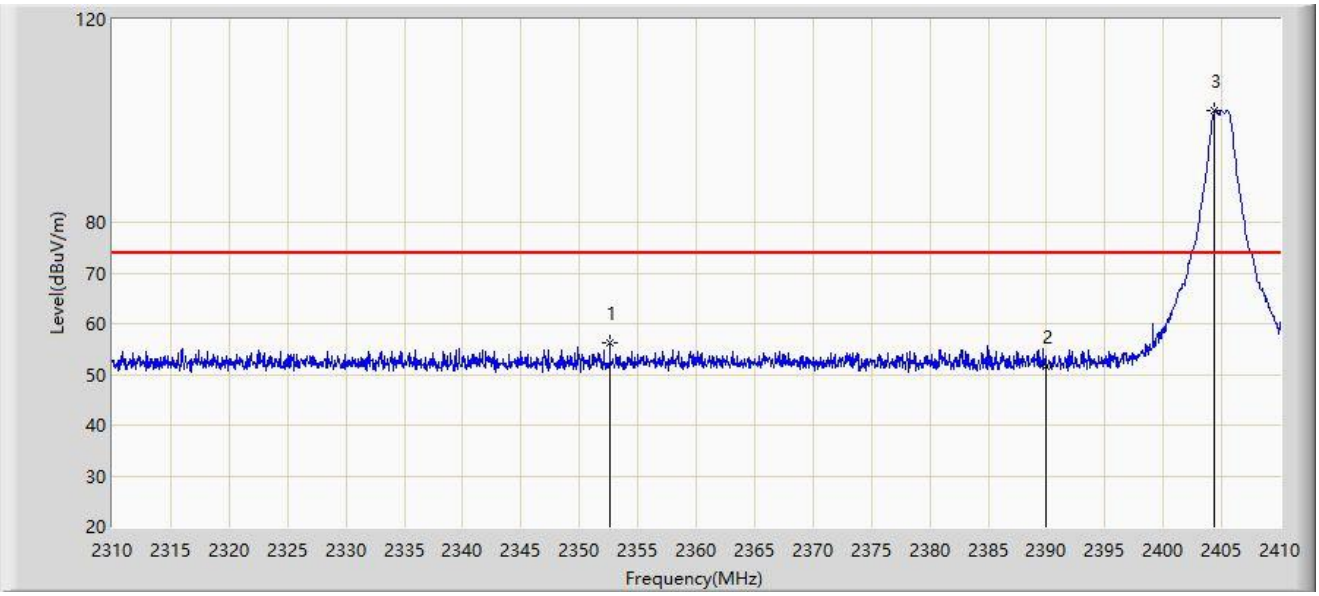
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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

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

A.7 Radiated Restricted Band Edge Test Result

Site: WZ-AC2	Test Date: 2023-07-25
Limit: FCC_2.4G_RE(3m)	Engineer: Edith Yu
Probe: BBHA9120D_1457_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



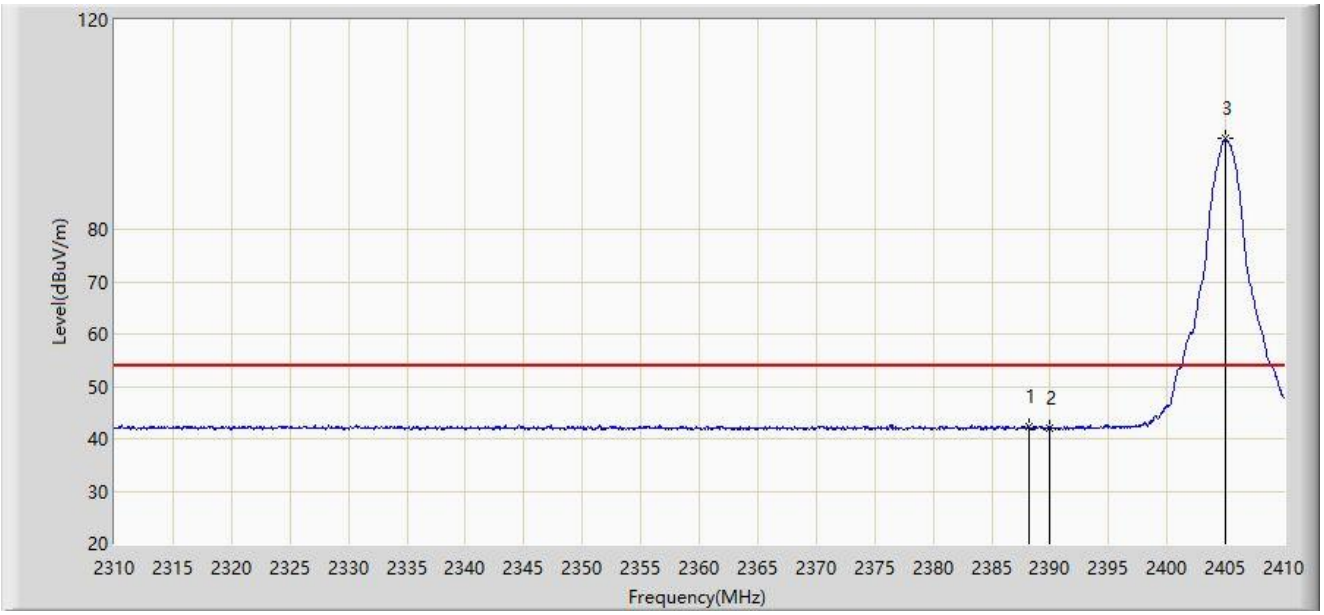
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2352.600	56.144	24.444	-17.856	74.000	31.700	Peak
2		2390.000	51.520	19.905	-22.480	74.000	31.615	Peak
3		2404.400	101.993	70.450	N/A	N/A	31.542	Peak

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



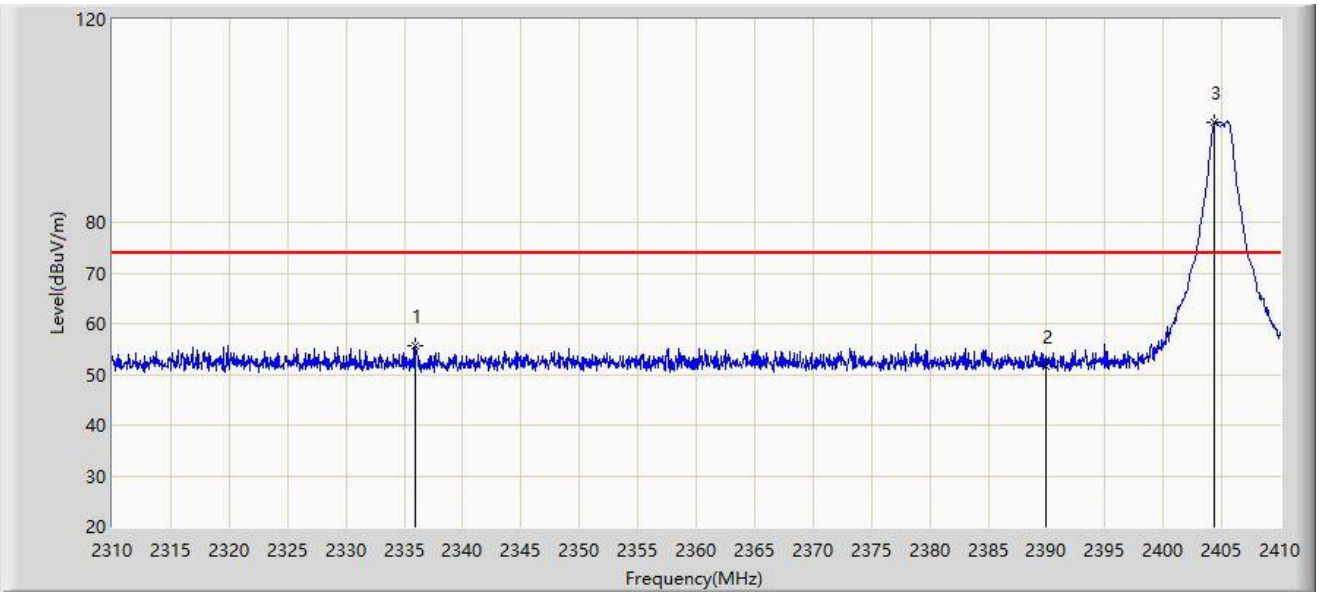
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2388.150	42.343	11.088	-11.657	54.000	31.256	AV
2		2390.000	42.049	10.795	-11.951	54.000	31.254	AV
3		2404.950	97.268	66.011	N/A	N/A	31.256	AV

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).

Site: WZ-AC2	Test Date: 2023-07-25
Limit: FCC_2.4G_RE(3m)	Engineer: Edith Yu
Probe: BBHA9120D_1457_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



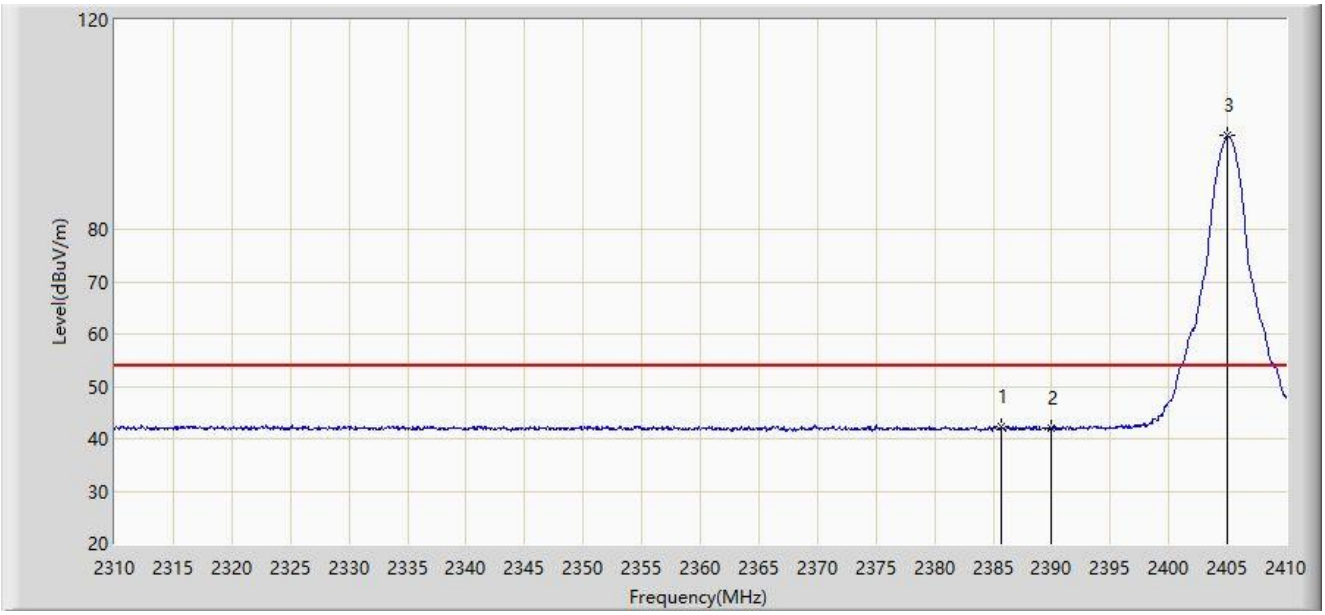
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2336.000	55.706	23.970	-18.294	74.000	31.736	Peak
2		2390.000	51.608	19.993	-22.392	74.000	31.615	Peak
3		2404.400	99.686	68.143	N/A	N/A	31.542	Peak

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



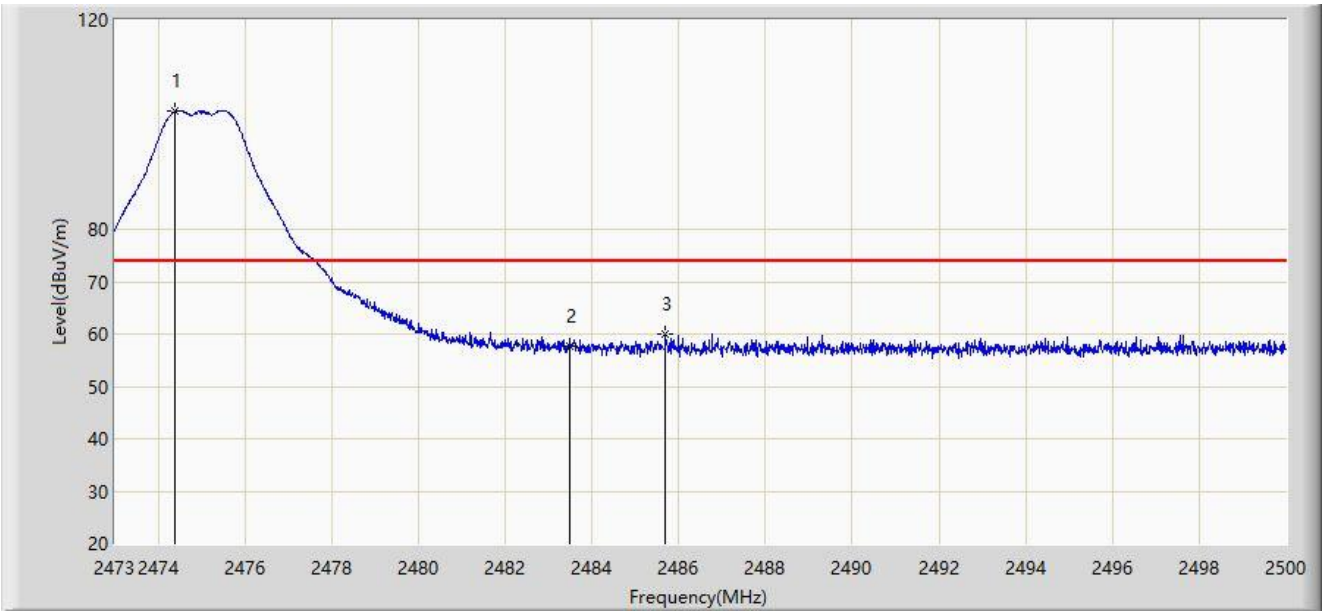
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2385.650	42.323	11.066	-11.677	54.000	31.258	AV
2		2390.000	41.944	10.690	-12.056	54.000	31.254	AV
3		2405.000	97.831	66.574	N/A	N/A	31.256	AV

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).

Site: WZ-AC1	Test Date: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



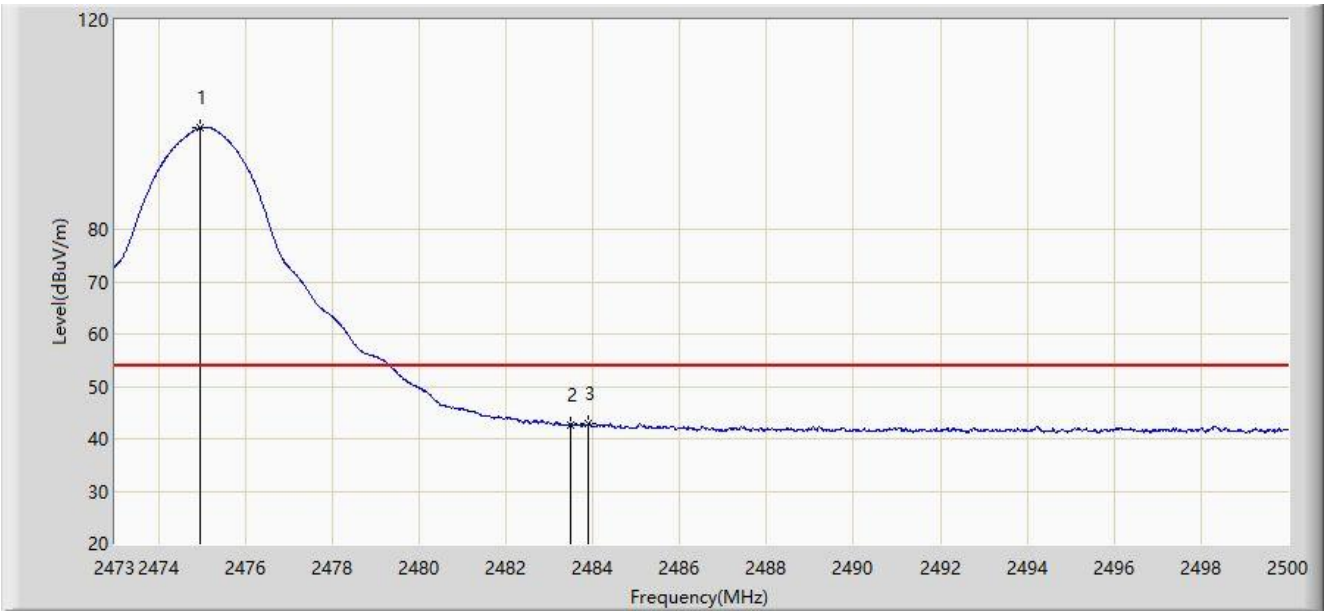
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.390	102.493	71.271	N/A	N/A	31.222	PK
2		2483.500	57.580	26.354	-16.420	74.000	31.226	PK
3	*	2485.704	60.019	28.791	-13.981	74.000	31.228	PK

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



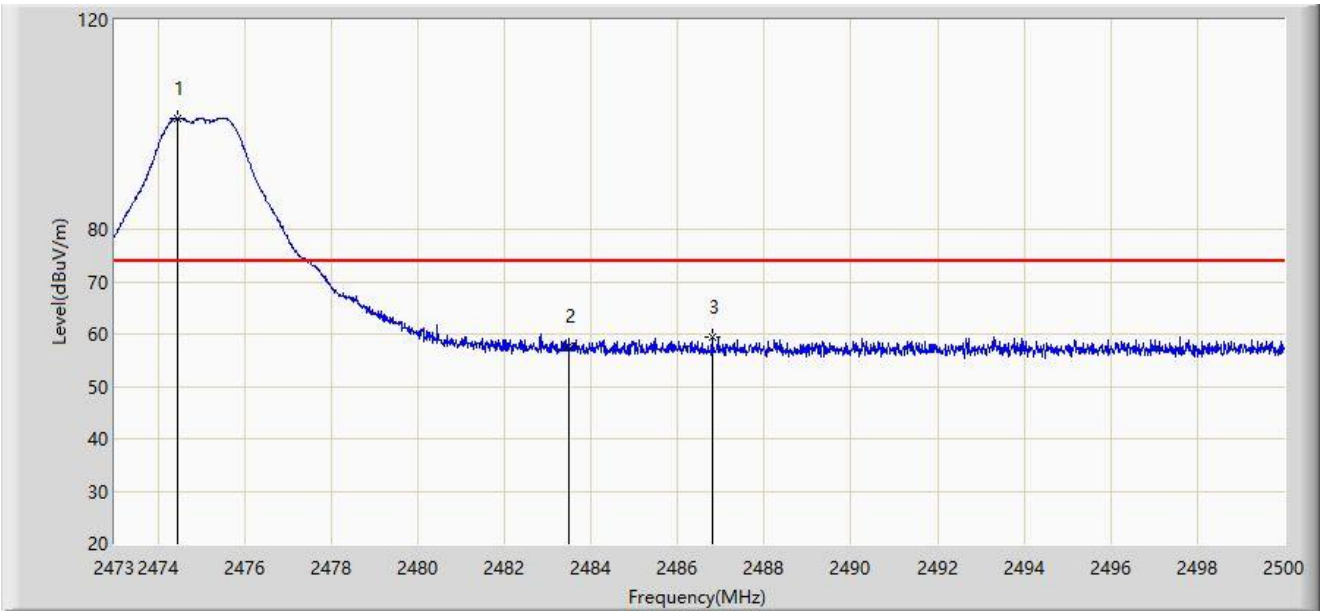
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.958	99.374	68.152	N/A	N/A	31.222	AV
2		2483.500	42.652	11.426	-11.348	54.000	31.226	AV
3	*	2483.908	42.837	11.610	-11.163	54.000	31.227	AV

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



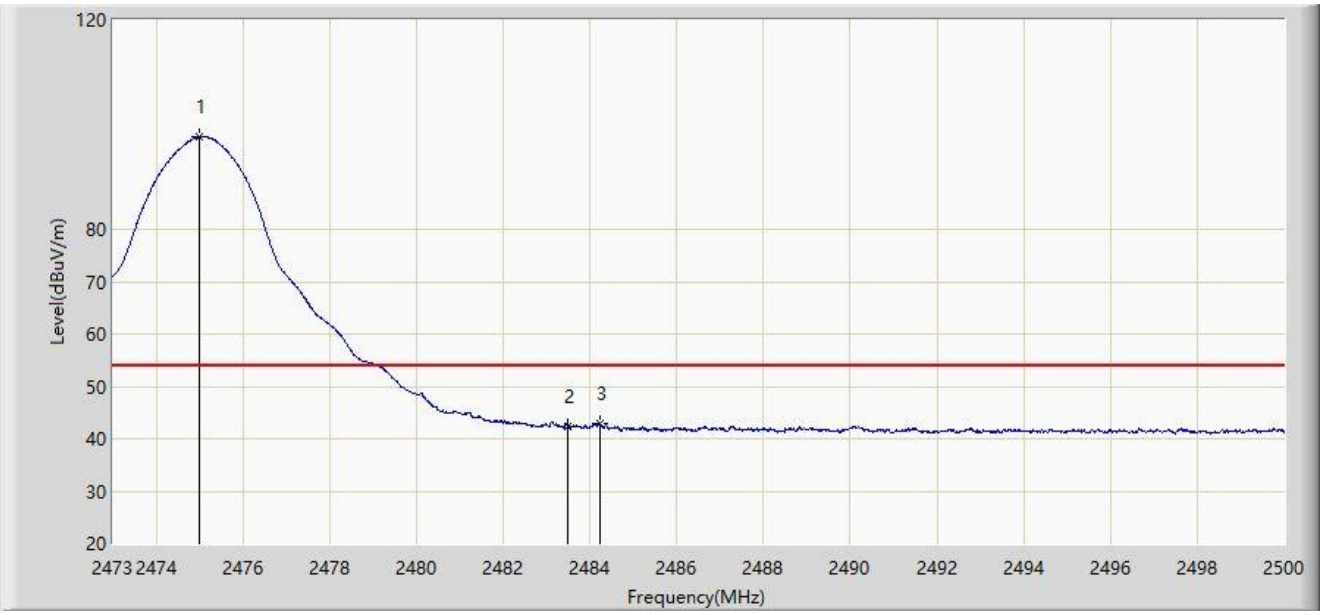
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.471	101.243	70.021	N/A	N/A	31.222	PK
2		2483.500	57.592	26.366	-16.408	74.000	31.226	PK
3	*	2486.797	59.359	28.130	-14.641	74.000	31.229	PK

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.985	97.676	66.454	N/A	N/A	31.222	AV
2		2483.500	42.446	11.220	-11.554	54.000	31.226	AV
3	*	2484.219	42.912	11.685	-11.088	54.000	31.227	AV

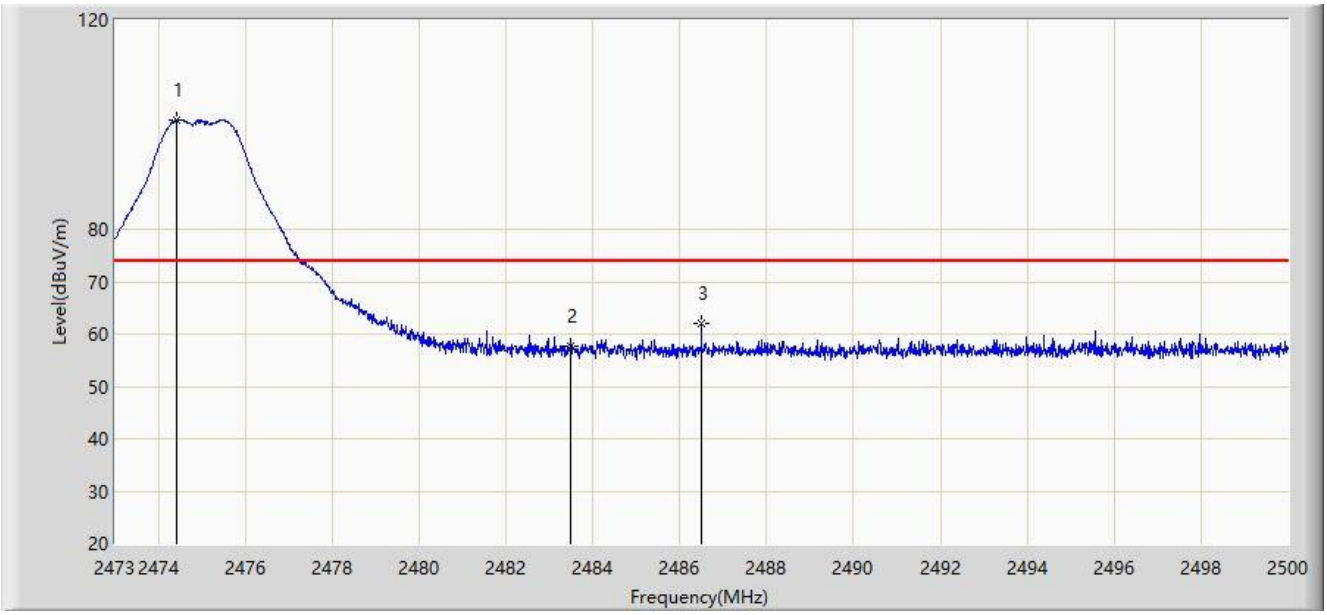
Note 1: " * ", means this data is the worst emission level.

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

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

Spot Check Test Data

Site: WZ-AC1	Test Date: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



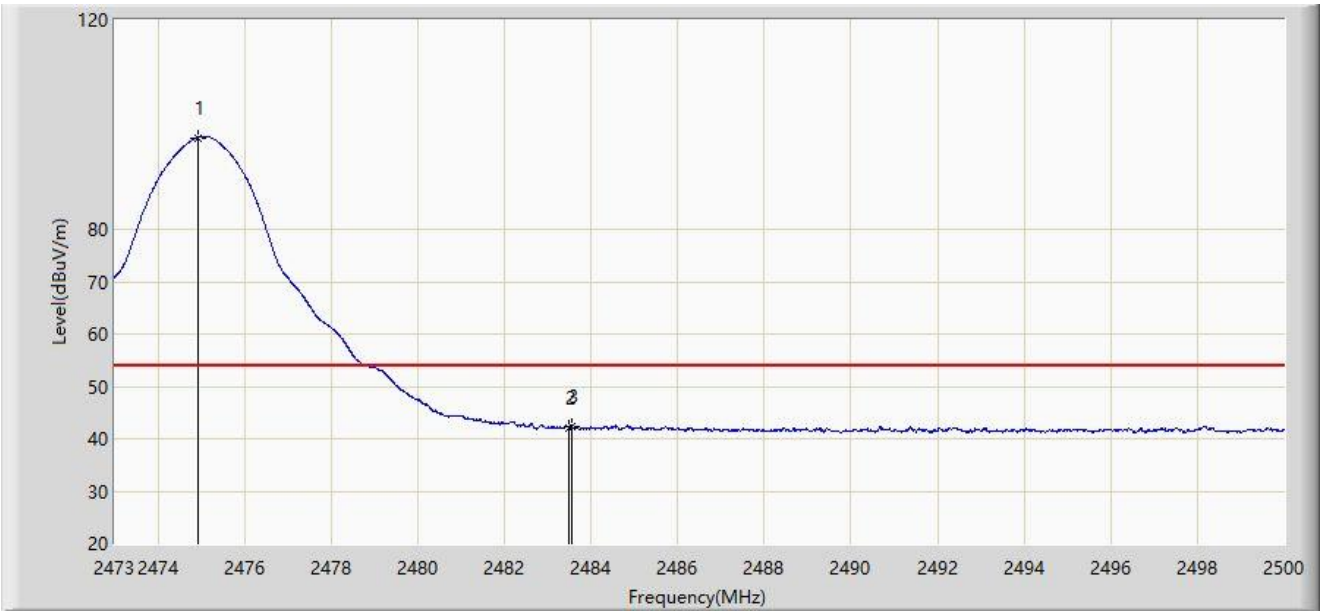
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.417	100.902	69.680	N/A	N/A	31.222	PK
2		2483.500	57.643	26.417	-16.357	74.000	31.226	PK
3	*	2486.500	61.885	30.657	-12.115	74.000	31.228	PK

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



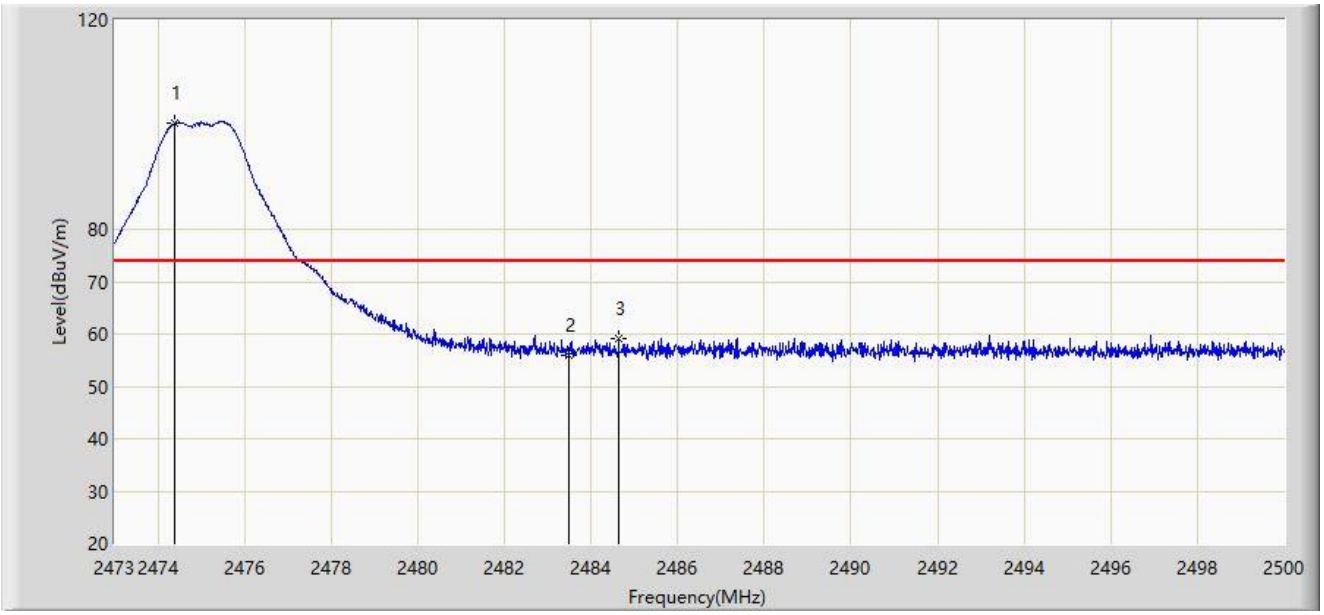
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.917	97.517	66.295	N/A	N/A	31.222	AV
2		2483.500	42.156	10.930	-11.844	54.000	31.226	AV
3	*	2483.543	42.361	11.135	-11.639	54.000	31.226	AV

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).

Site: WZ-AC1	Test Date: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



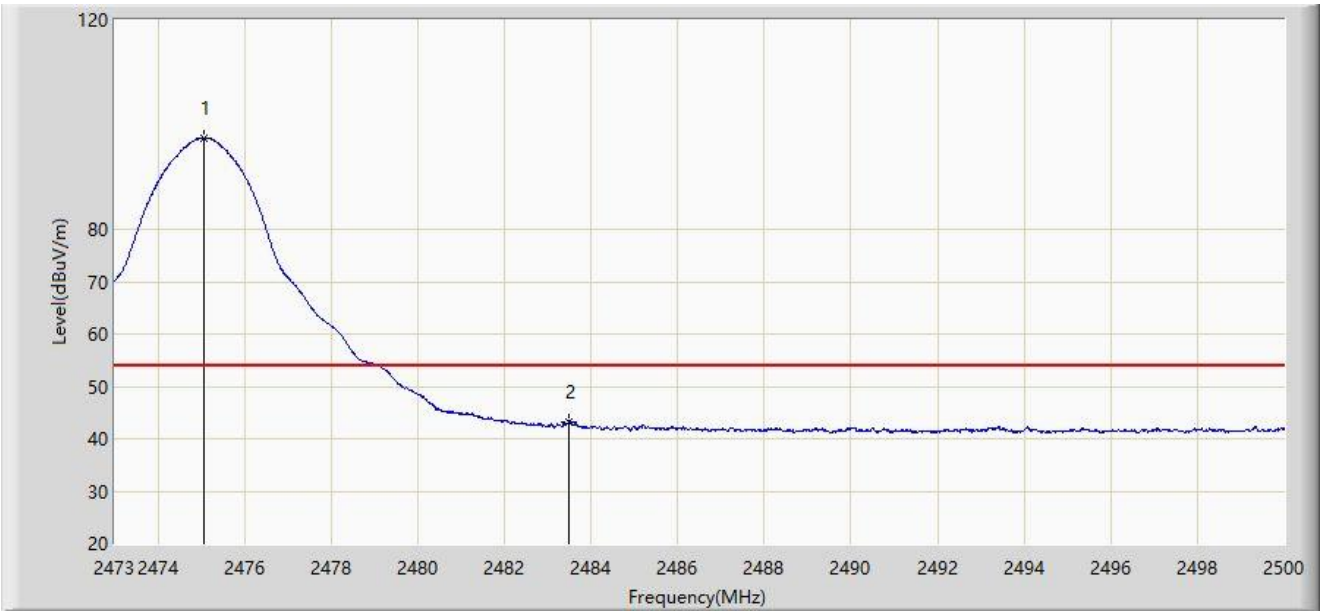
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2474.404	100.344	69.122	N/A	N/A	31.222	PK
2		2483.500	56.033	24.807	-17.967	74.000	31.226	PK
3	*	2484.637	59.240	28.013	-14.760	74.000	31.227	PK

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: 2023-09-03
Limit: FCC_2.4G_RE(3m)	Engineer: Carl Jiang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2475MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2475.052	97.497	66.275	N/A	N/A	31.222	AV
2	*	2483.500	43.311	12.085	-10.689	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).

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

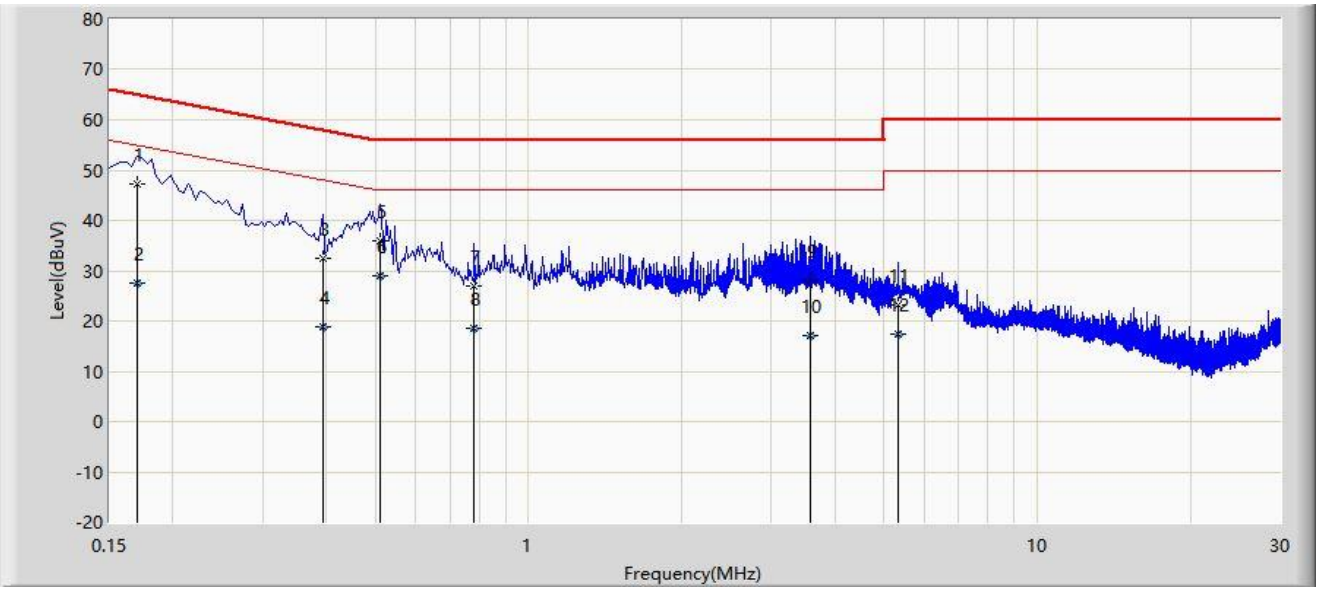
Worst Case Spot-check Error	Limit	Result
2.04%	25%	Pass

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

For example, |43.311 dBuV/m – 42.446 dBuV/m | / 42.446 dBuV/m *100 = 2.04%

A.8 AC Conducted Emissions Test Result

Site: WZ-SR2	Test Date: 2023-08-07
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Line
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



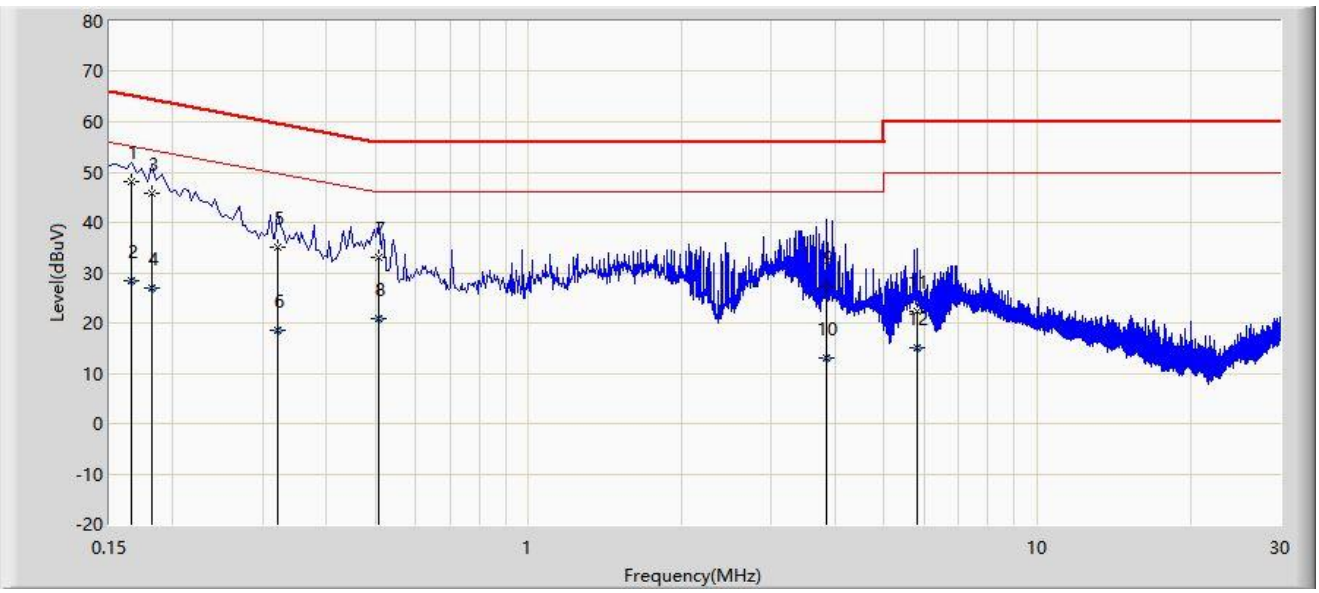
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.170	47.120	37.346	-17.840	64.960	9.775	QP
2		0.170	27.599	17.824	-27.362	54.960	9.775	AV
3		0.394	32.433	22.560	-25.546	57.979	9.873	QP
4		0.394	18.782	8.909	-29.197	47.979	9.873	AV
5		0.510	35.955	26.018	-20.045	56.000	9.937	QP
6	*	0.510	29.042	19.105	-16.958	46.000	9.937	AV
7		0.782	26.858	16.762	-29.142	56.000	10.097	QP
8		0.782	18.635	8.538	-27.365	46.000	10.097	AV
9		3.578	28.126	17.509	-27.874	56.000	10.617	QP
10		3.578	16.996	6.379	-29.004	46.000	10.617	AV
11		5.330	23.218	12.387	-36.782	60.000	10.830	QP
12		5.330	17.440	6.610	-32.560	50.000	10.830	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: WZ-SR2	Test Date: 2023-08-07
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Neutral
EUT: HPE Aruba User Experience Sensor	Power: AC 120V/60Hz
Test Mode: Transmit by Zigbee at 2405MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1	*	0.166	48.127	38.350	-17.031	65.158	9.778	QP
2		0.166	28.266	18.488	-26.892	55.158	9.778	AV
3		0.182	45.916	36.135	-18.478	64.394	9.781	QP
4		0.182	27.052	17.270	-27.342	54.394	9.781	AV
5		0.322	35.087	25.247	-24.568	59.655	9.840	QP
6		0.322	18.424	8.584	-31.231	49.655	9.840	AV
7		0.506	32.999	23.054	-23.001	56.000	9.945	QP
8		0.506	20.983	11.039	-25.017	46.000	9.945	AV
9		3.858	27.254	16.393	-28.746	56.000	10.862	QP
10		3.858	13.073	2.212	-32.927	46.000	10.862	AV
11		5.786	22.443	11.274	-37.557	60.000	11.168	QP
12		5.786	14.934	3.766	-35.066	50.000	11.168	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 “2306RSU027-UT” file.

Appendix C – EUT Photograph

Refer to “2306RSU027-UE” file.

The End