

## FCC Test Report (Co-Located)

**Report No.:** RF200511E13A-1

**FCC ID:** 2AHBN-AP12

**Test Model:** AP12

**Received Date:** May 11, 2020

**Test Date:** Jul. 09 ~ Aug. 18, 2020

**Issued Date:** Aug. 28, 2020

**Applicant:** Juniper Networks, Inc.

**Address:** 1133 Innovation Way Sunnyvale, CA 94089 USA

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, TAIWAN

**FCC Registration /** 788550 / TW0003  
**Designation Number:**



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

## Table of Contents

<b>Release Control Record .....</b>	<b>3</b>
<b>1 Certificate of Conformity .....</b>	<b>4</b>
<b>2 Summary of Test Results .....</b>	<b>5</b>
2.1 Measurement Uncertainty .....	5
2.2 Modification Record .....	5
<b>3 General Information .....</b>	<b>6</b>
3.1 General Description of EUT .....	6
3.2 Description of Test Modes .....	9
3.2.1 Test Mode Applicability and Tested Channel Detail .....	11
3.3 Description of Support Units .....	12
3.3.1 Configuration of System under Test .....	12
3.4 General Description of Applied Standards .....	12
<b>4 Test Types and Results .....</b>	<b>13</b>
4.1 Radiated Emission and Bandedge Measurement .....	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	13
4.1.2 Test Instruments .....	14
4.1.3 Test Procedures .....	15
4.1.4 Deviation from Test Standard .....	15
4.1.5 Test Setup .....	16
4.1.6 EUT Operating Conditions .....	17
4.1.7 Test Results .....	18
<b>5 Pictures of Test Arrangements .....</b>	<b>22</b>
<b>Appendix – Information of the Testing Laboratories .....</b>	<b>23</b>

### Release Control Record

Issue No.	Description	Date Issued
RF200511E13A-1	Original Release	Aug. 28, 2020

## 1 Certificate of Conformity

**Product:** 802.11ax Wallplate AP

**Brand:** Mist

**Test Model:** AP12

**Sample Status:** Engineering Sample

**Applicant:** Juniper Networks, Inc.

**Test Date:** Jul. 09 ~ Aug. 18, 2020

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)

47 CFR FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Lena Wang , Date: Aug. 28, 2020  
Lena Wang / Specialist

Approved by : Dylan Chiou , Date: Aug. 28, 2020  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

Applied Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407)		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -1.24dB at 5460 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	802.11ax Wallplate AP				
Brand	Mist				
Test Model	AP12				
Sample Status	Engineering sample				
Power Supply rating	55 Vdc (POE)				
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA			
	BT LE	GFSK			
Transfer Rate	WLAN	802.11b: 11.0/ 5.5/ 2.0/ 1.0 Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 300.0 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 2402.0 Mbps			
	BT LE	1 Mbps & 2 Mbps			
Operating Frequency	WLAN	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5260 ~ 5320 MHz, 5500 ~ 5700 MHz			
	BT LE	2402 ~ 2480 MHz			
Number of Channel	WLAN	2412 ~ 2462MHz: 11 for 802.11b, 802.11g, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), 802.11ac (VHT40), 11ax (HE40)  5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80)  5500 ~ 5700 MHz: 11 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 5 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 2 for 802.11ac (VHT80), 802.11ax (HE80)			
	BT LE	40			
Output Power	WLAN		TX Function	CCD Mode	Beamforming Mode
		5260 ~ 5320 MHz:	2TX	230.73 mW	131.391 mW
			1TX	87.7 mW	--
		5500 ~ 5700 MHz:	2TX	235.544 mW	131.242 mW
			1TX	86.099 mW	--
Antenna Type	Refer to Note as below				
Antenna Connector	Refer to Note as below				
Accessory Device	Refer to Note as below				
Cable Supplied	Refer to Note as below				

**Note:**

1. This report is for FCC Class II Permissive Change application. The difference compared with original report is for adding DFS bands <5.26~5.32GHz, 5.5~5.70GHz> by software enabling.
2. There are three radios for the EUT.

Radio	Brand	Model	Function
Radio 1(WL0)	WLAN 2.4G	TX/RX	Radio 1(WL0)
Radio 2(WL1) Scanning	WLAN 2.4G & 5G	TX/RX	Radio 2(WL1) Scanning
Radio 3(WL2)	WLAN 5G	TX/RX	Radio 3(WL2)
Radio 4	BT5.0	TX/RX	Radio 4

3. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function	Beamforming
<b>Radio 1</b>		
802.11b	2TX	Not Support
802.11g	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT40)	2TX	Support
802.11ax (HE20)	2TX	Support
802.11ax (HE40)	2TX	Support
<b>Radio 2</b>		
802.11b	1TX	Not Support
802.11g	1TX	Not Support
802.11n (HT20)	1TX	Not Support
802.11n (HT40)	1TX	Not Support
802.11ac (VHT20)	1TX	Not Support
802.11ac (VHT40)	1TX	Not Support
802.11ax (HE20)	1TX	Not Support
802.11ax (HE40)	1TX	Not Support
802.11a	1TX	Not Support
802.11n (HT20)	1TX	Not Support
802.11n (HT40)	1TX	Not Support
802.11ac (VHT20)	1TX	Not Support
802.11ac (VHT40)	1TX	Not Support
802.11ac (VHT80)	1TX	Not Support
802.11ax (HE20)	1TX	Not Support
802.11ax (HE40)	1TX	Not Support
802.11ax (HE80)	1TX	Not Support
<b>Radio 3</b>		
802.11a	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT40)	2TX	Support
802.11ac (VHT80)	2TX	Support
802.11ax (HE20)	2TX	Support
802.11ax (HE40)	2TX	Support
802.11ax (HE80)	2TX	Support

Modulation Mode	TX Function	Beamforming
Radio 4		
BT5.0	1TX	Not Support

\*The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 ,802.11ac mode for VHT20 / VHT40 / VHT80 and 802.11ax HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

\*The worst case of Radio 3 is beamforming on mode for the final tests.

\*The worst configuration is as below.

Mode	Chain
Radio 1 / 2TX	Chain 0 + 1
Radio 2 / 1TX	Chain 0
Radio 3 / 2TX	Chain 0 + 1
Radio 4 / 1TX	Chain 0

\*After estimating, 2TX is the worst case for the final tests.

4. The EUT contains following accessory devices. (Support unit only)

Product	Brand	Model	Description
POE	Microsemi	PD-9001GR/AC	I/P: 100-240 Vac, 50/60 Hz, 0.67 A O/P: 55 Vdc, 0.6 A

5. The following antennas were provided to the EUT.

Antenna Type	PIFA	
Antenna Connector	IPEX	
Gain (dBi)	Frequency	
	2.4~2.4835GHz	5.15~5.85GHz
Int. WIFI Ant. 1	2.7	5.5
Int. WIFI Ant. 2	2.9	5.7
Scanning Radio Ant.	2.1	5

\*Int. WIFI Ant. 1~2 (2.4G) were for Radio 1 and Int. WIFI Ant. 1~2 (5G) were for Radio 3.

\*Scanning Radio Ant. was for Radio 2

Antenna Type	PCB
Gain (dBi)	Frequency
	2.402~2.480GHz
BT Ant.	-0.6

6. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

7. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.



### 3.2 Description of Test Modes

#### BT LE:

40 channels are provided provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

#### For 2.4GHz

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

#### 5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
58	5290

#### 5500~5700MHz:

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE $\geq$ 1G	RE<1G	
-	√	√	Radio 1 + Radio 2 + Radio 3 + Radio 4

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**

**NOTE:** "-" means no effect.

#### **Radiated Emission Test (Above 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b + 802.11ax (HE20) + 802.11ax (HE40) + BT LE	2412 ~ 2462	1 to 11	6 + 52 + 110 + 0	OFDM
		5260 ~ 5320	52 to 64		OFDMA
		5500 ~ 5700	102 to 134		OFDMA
		BT LE	0, 19, 39		GFSK

#### **Radiated Emission Test (Below 1GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b + 802.11ax (HE20) + 802.11ax (HE40) + BT LE	2412 ~ 2462	1 to 11	6 + 52 + 110 + 0	OFDM
		5260 ~ 5320	52 to 64		OFDMA
		5500 ~ 5700	102 to 134		OFDMA
		BT LE	0, 19, 39		GFSK

#### **Test Condition:**

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE $\geq$ 1G	23 deg. C, 67% RH	120 Vac, 60 Hz	Charles Hsiao
RE<1G	23 deg. C, 67% RH	120 Vac, 60 Hz	Karl Lee



## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 15.407(b)(4)(i)	PK: -27 (dBm/MHz) <sup>*1</sup> PK: 10 (dBm/MHz) <sup>*2</sup> PK: 15.6 (dBm/MHz) <sup>*3</sup> PK: 27 (dBm/MHz) <sup>*4</sup>	PK: 68.2(dBμV/m) <sup>*1</sup> PK: 105.2 (dBμV/m) <sup>*2</sup> PK: 110.8(dBμV/m) <sup>*3</sup> PK: 122.2 (dBμV/m) <sup>*4</sup>
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
<sup>*1</sup> beyond 75 MHz or more above of the band edge.		<sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
<sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		<sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 26, 2019	Aug. 25, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 12, 2019	Nov. 11, 2020
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 24, 2019	Nov. 23, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Loop Antenna	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Sep. 03, 2020
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Sep. 03, 2020
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HsinTien Chamber 1.

#### 4.1.3 Test Procedures

##### For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

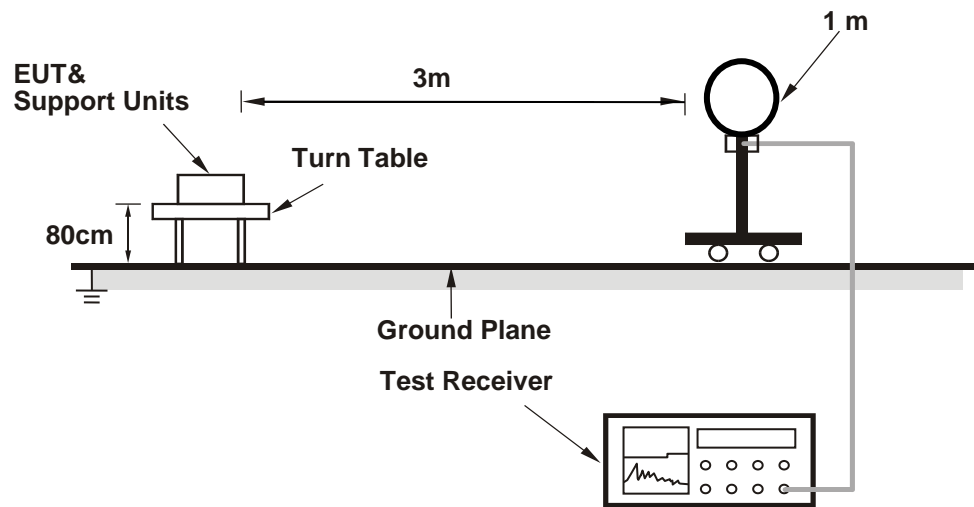
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

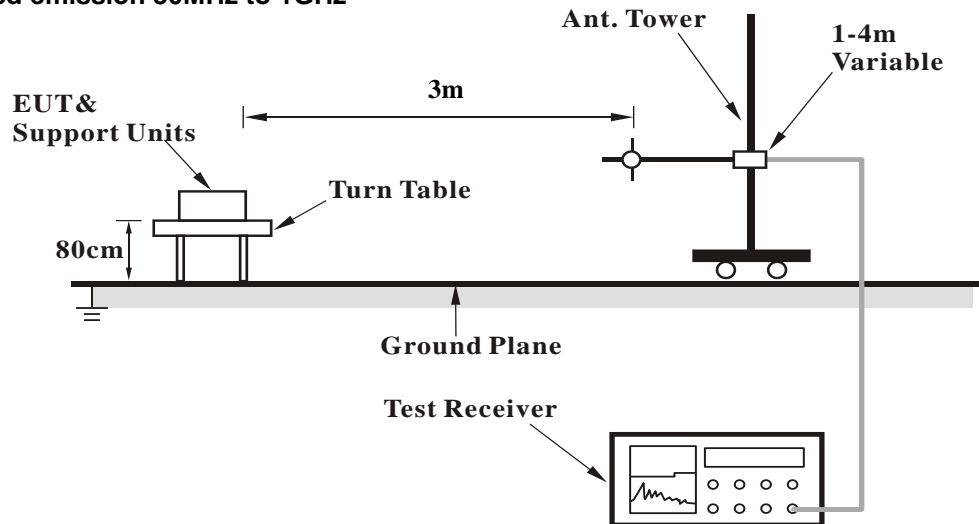
No deviation.

#### 4.1.5 Test Setup

##### For Radiated emission below 30MHz

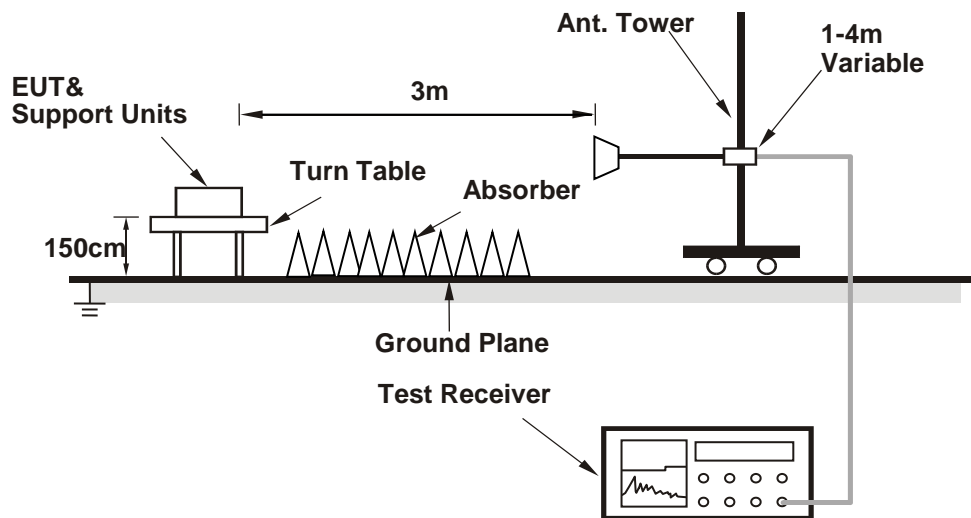


##### For Radiated emission 30MHz to 1GHz





#### For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

#### 4.1.7 Test Results

Above 1GHz Data:

802.11b + 802.11ax (HE20) + 802.11ax (HE40) + BT LE

EUT Test Condition		Measurement Detail	
Channel	Channel 6 + Channel 52 + Channel 111 + Channel 0	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.28	37.78	4.5	54	-11.72	157	124	Average
2390	51.89	47.39	4.5	74	-22.11	157	124	Peak
2402	99.86	95.34	4.52			106	112	Average
2402	100.71	96.19	4.52			106	112	Peak
2437	106.27	101.68	4.59			156	228	Average
2437	108.94	104.35	4.59			156	228	Peak
2483.5	44.43	39.77	4.66	54	-9.57	106	265	Average
2483.5	54.75	50.09	4.66	74	-19.25	106	265	Peak
4804	41.15	30.8	10.35	54	-12.85	172	115	Average
4804	47.06	36.71	10.35	74	-26.94	172	115	Peak
4874	52.64	42.43	10.21	54	-1.36	174	13	Average
4874	54.26	44.05	10.21	74	-19.74	174	13	Peak
5150	45.66	35.61	10.05	54	-8.34	254	326	Average
5150	56.27	46.22	10.05	74	-17.73	254	326	Peak
5260	99.56	89.44	10.12			248	311	Average
5260	106.38	96.26	10.12			248	311	Peak
5460	52.76	42.25	10.51	54	-1.24	168	299	Average
5460	62.04	51.53	10.51	74	-11.96	168	299	Peak
5470	65.43	54.9	10.53	68.2	-2.77	174	280	Peak
5550	107.61	96.93	10.68			186	314	Average
5550	115.02	104.34	10.68			186	314	Peak
5725	56.88	45.96	10.92	68.2	-11.32	194	278	Peak
10520	51.27	35.39	15.88	68.2	-16.93	169	204	Peak
11100	46.43	30.16	16.27	54	-7.57	154	84	Average
11100	55.28	39.01	16.27	74	-18.72	154	84	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.37	36.87	4.5	54	-12.63	165	283	Average
2390	51.68	47.18	4.5	74	-22.32	165	283	Peak
2402	94.86	90.34	4.52			177	315	Average
2402	95.68	91.16	4.52			177	315	Peak
2437	112.49	107.9	4.59			207	294	Average
2437	115.28	110.69	4.59			207	294	Peak
2483.5	51.37	46.71	4.66	54	-2.63	204	187	Average
2483.5	58.47	53.81	4.66	74	-15.53	204	187	Peak
4804	42.16	31.81	10.35	54	-11.84	119	205	Average
4804	47.15	36.8	10.35	74	-26.85	119	205	Peak
4874	50.33	40.12	10.21	54	-3.67	115	217	Average
4874	51.65	41.44	10.21	74	-22.35	115	217	Peak
5150	45.21	35.16	10.05	54	-8.79	126	17	Average
5150	56.24	46.19	10.05	74	-17.76	126	17	Peak
5260	100.82	90.7	10.12			135	18	Average
5260	108.69	98.57	10.12			135	18	Peak
5460	44.84	34.33	10.51	54	-9.16	207	11	Average
5460	55.46	44.95	10.51	74	-18.54	207	11	Peak
5470	54.2	43.67	10.53	68.2	-14	204	19	Peak
5550	101.58	90.9	10.68			199	7	Average
5550	108.63	97.95	10.68			199	7	Peak
5725	52.41	41.49	10.92	68.2	-15.79	206	9	Peak
10520	51.18	35.3	15.88	68.2	-17.02	160	86	Peak
11100	45.52	29.25	16.27	54	-8.48	111	49	Average
11100	54.78	38.51	16.27	74	-19.22	111	49	Peak

Remarks:

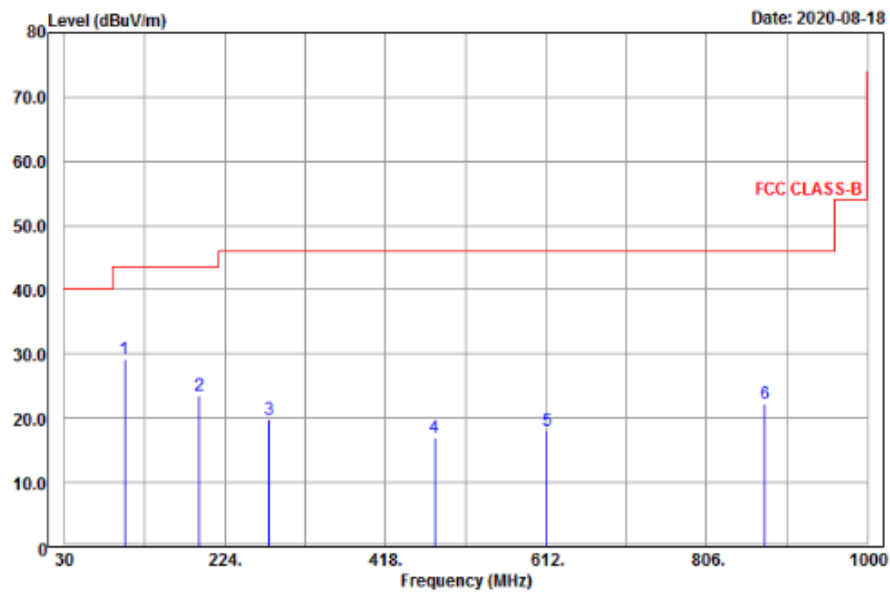
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.

Below 1GHz data

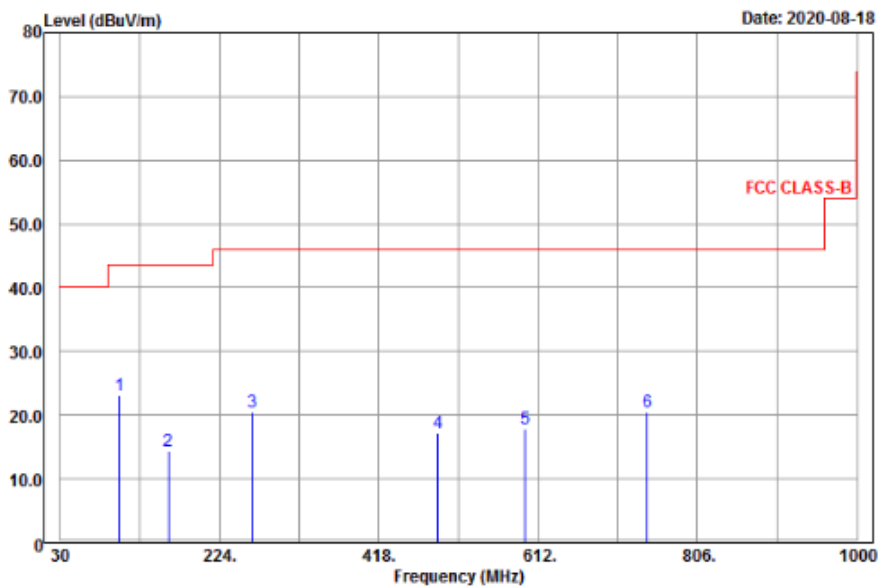
802.11b + 802.11ax (HE20) + 802.11ax (HE40) + BT LE

EUT Test Condition		Measurement Detail	
Channel	Channel 6 + Channel 52 + Channel 110 + Channel 0	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

### Horizontal



### Vertical



**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
102.9	29.22	46.37	-17.15	43.5	-14.28	135	175	Peak
192.81	23.49	42.01	-18.52	43.5	-20.01	166	137	Peak
277.32	19.88	36.33	-16.45	46	-26.12	190	112	Peak
477.8	16.92	29.66	-12.74	46	-29.08	104	135	Peak
613.6	18.14	28.56	-10.42	46	-27.86	177	245	Peak
876.1	22.32	28.58	-6.26	46	-23.68	102	139	Peak

**Antenna Polarity & Test Distance: Vertical at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
101.82	23.13	40.29	-17.16	43.5	-20.37	120	165	Peak
161.76	14.32	34.87	-20.55	43.5	-29.18	131	115	Peak
264.09	20.38	37	-16.62	46	-25.62	187	154	Peak
490.4	17.12	29.61	-12.49	46	-28.88	125	187	Peak
596.1	17.98	28.64	-10.66	46	-28.02	136	229	Peak
744.5	20.48	29.02	-8.54	46	-25.52	107	57	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---