

FCC Test Report (Co-Located)

Report No.: RF200511E13-3

FCC ID: 2AHBN-AP12

Test Model: AP12

Received Date: May 11, 2020

Test Date: Jul. 04 ~ Aug. 04, 2020

Issued Date: Aug. 04, 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 /
Designation Number:** 788550 / TW0003



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. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
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
4 Test Types and Results	13
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
5 Pictures of Test Arrangements	22
Appendix – Information of the Testing Laboratories	23

Release Control Record

Issue No.	Description	Date Issued
RF200511E13-3	Original Release	Aug. 04, 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. 04 ~ Aug. 04, 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.

Lena Wang
Prepared by : _____, **Date:** _____
Lena Wang / Specialist
Aug. 04, 2020

Dylan Chiou
Approved by : _____, **Date:** _____
Dylan Chiou / Senior Project Engineer
Aug. 04, 2020

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 -1.78dB at 2390 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			
	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 400 Mbps 802.11ac: up to 866.7 Mbps			
	BT LE	1 Mbps & 2 Mbps			
Operating Frequency	WLAN	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5180 ~ 5240MHz, 5745 ~ 5825MHz			
	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) 5180 ~ 5240 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) 5745 ~ 5825 MHz: 5 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)			
	BT LE	40			
Output Power	WLAN		TX Function	CCD Mode	Beamforming Mode
		2412 ~ 2462 MHz	2TX	465.307 mW	190.343 mW
			1TX	399.945 mW	--
		5180 ~ 5240 MHz	2TX	514.081 mW	514.081 mW
			1TX	64.121 mW	--
		5745 ~ 5825 MHz	2TX	713.781 mW	516.296 mW
1TX	92.257 mW		--		
BT LE	2.193 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. 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

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

Modulation Mode	TX Function	Beamforming
Radio 1		
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
Radio 2		
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
Radio 3		
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
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.

3. 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

4. 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

5. 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.

6. 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		

5180~5240MHz:

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

Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80) , 802.11ax (HE80):

Channel	Frequency
155	5775MHz

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 (HE40) + 802.11a + BT LE	2412 ~ 2462	1 to 11	6 + 40 + 149 + 0	OFDM
		5180 ~ 5240	38 to 46		OFDMA
		5745 ~ 5825	149 to 165		OFDM
		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 (HE40) + 802.11a + BT LE	2412 ~ 2462	1 to 11	6 + 40 + 149 + 0	OFDM
		5180 ~ 5240	38 to 46		OFDMA
		5745 ~ 5825	149 to 165		OFDM
		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	Charles Hsiao

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

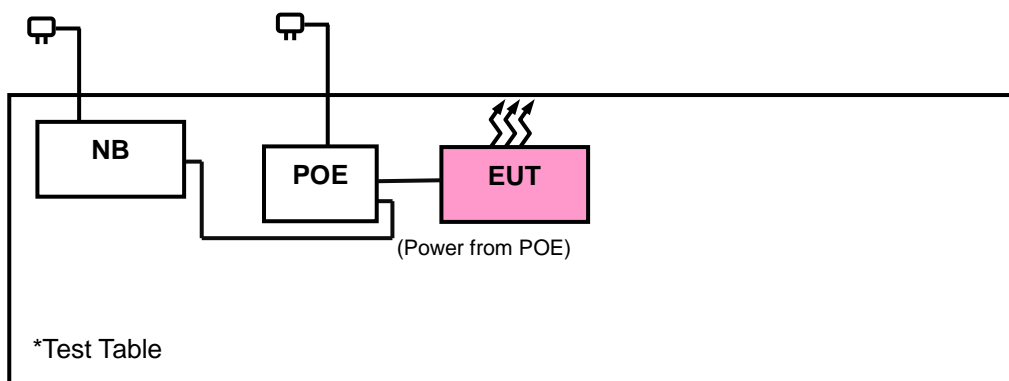
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	Notebook	DELL	E6420	D3T96R1	FCC DoC Approved

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 Cable	1	1	N	0	Cat5e
2.	RJ45 Cable	1	1	N	0	Cat5e

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partners to transfer data.

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

All test items have been performed as a reference to the above KDB test guidance.

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) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBµV/m) ^{*1} PK: 105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK: 122.2 (dBµV/m) ^{*4}
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
*1 beyond 75 MHz or more above of the band edge.		*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		*4 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:

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

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:

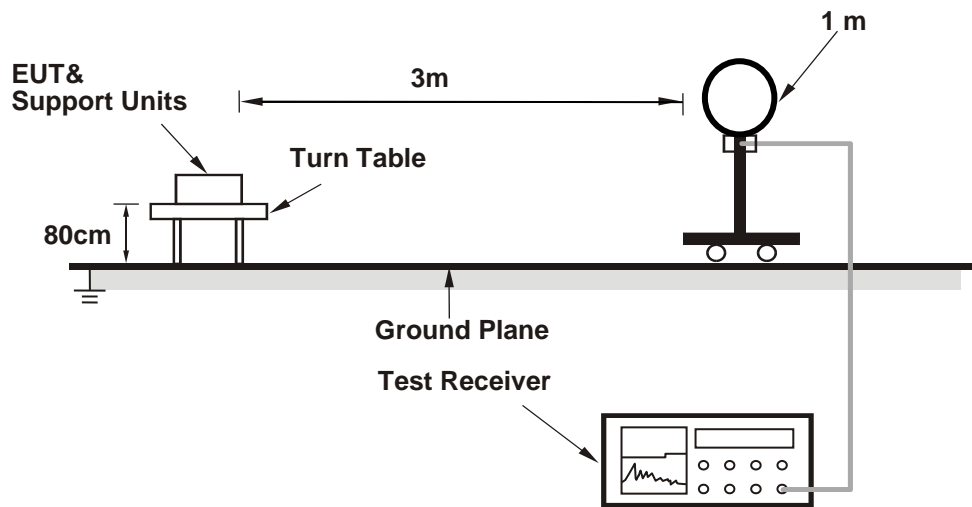
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

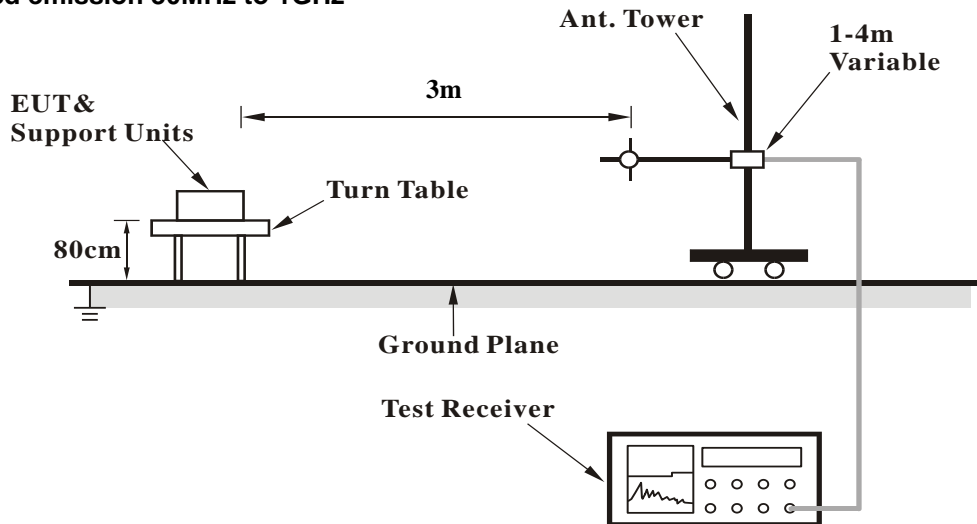
No deviation.

4.1.5 Test Setup

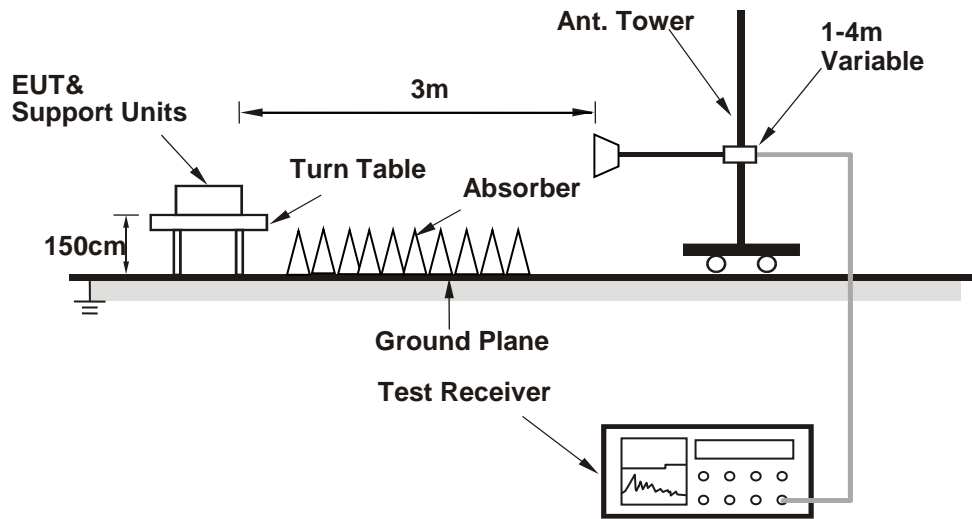
For Radiated emission below 30MHz



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 (HE40) + 802.11a + BT LE

EUT Test Condition		Measurement Detail	
Channel	Channel 6 + Channel 40 + Channel 149 + 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	41.21	36.71	4.5	54	-12.79	126	124	Average
2390	43.12	38.62	4.5	54	-10.88	126	115	Average
2390	51.21	46.71	4.5	74	-22.79	126	124	Peak
2390	52.12	47.62	4.5	74	-21.88	126	115	Peak
2402	98.24	93.72	4.52			126	235	Average
2402	99.1	94.58	4.52			126	235	Peak
2437	105.21	100.62	4.59			144	165	Average
2437	108.33	103.74	4.59			144	165	Peak
2483.5	43.12	38.46	4.66	54	-10.88	169	157	Average
2483.5	53.12	48.46	4.66	74	-20.88	169	157	Peak
4804	39.24	28.89	10.35	54	-14.76	126	201	Average
4804	46.21	35.86	10.35	74	-27.79	126	201	Peak
4874	52.12	41.91	10.21	54	-1.88	126	142	Average
4874	54.13	43.92	10.21	74	-19.87	126	142	Peak
5150	52.12	42.07	10.05	54	-1.88	166	132	Average
5150	64.52	54.47	10.05	74	-9.48	166	132	Peak
5200	100.65	90.49	10.16			146	197	Average
5200	107.12	96.96	10.16			146	197	Peak
5350	42.21	31.98	10.23	54	-11.79	142	195	Average
5350	51.57	41.34	10.23	74	-22.43	142	195	Peak
5745	111.25	100.37	10.88			146	168	Average
5745	119.12	108.24	10.88			146	168	Peak
*10400	52.12	35.94	16.18	68.2	-16.08	114	115	Peak
11490	45.21	28.74	16.47	54	-8.79	169	167	Average
11490	54.21	37.74	16.47	74	-19.79	169	167	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	40.24	35.74	4.5	54	-13.76	155	124	Average
2390	52.22	47.72	4.5	54	-1.78	163	124	Average
2390	58.65	54.15	4.5	74	-15.35	163	124	Peak
2390	50.12	45.62	4.5	74	-23.88	155	124	Peak
2402	94.12	89.6	4.52			156	124	Average
2402	95.12	90.6	4.52			156	124	Peak
2437	111.21	106.62	4.59			106	132	Average
2437	114.25	109.66	4.59			106	132	Peak
2483.5	51.2	46.54	4.66	54	-2.8	141	102	Average
2483.5	59.12	54.46	4.66	74	-14.88	141	102	Peak
4804	40.25	29.9	10.35	54	-13.75	156	135	Average
4804	46.25	35.9	10.35	74	-27.75	156	135	Peak
4874	50.24	40.03	10.21	54	-3.76	124	162	Average
4874	51.24	41.03	10.21	74	-22.76	124	162	Peak
5150	50.13	40.08	10.05	54	-3.87	126	175	Average
5150	63.12	53.07	10.05	74	-10.88	126	175	Peak
5200	100.21	90.05	10.16			168	102	Average
5200	106.21	96.05	10.16			168	102	Peak
5350	41.57	31.34	10.23	54	-12.43	103	122	Average
5350	52.12	41.89	10.23	74	-21.88	103	122	Peak
5745	108.21	97.33	10.88			122	165	Average
5745	114.32	103.44	10.88			122	165	Peak
*10400	51.21	35.03	16.18	68.2	-16.99	156	127	Peak
11490	45.21	28.74	16.47	54	-8.79	122	126	Average
11490	54.12	37.65	16.47	74	-19.88	122	126	Peak

Remarks:

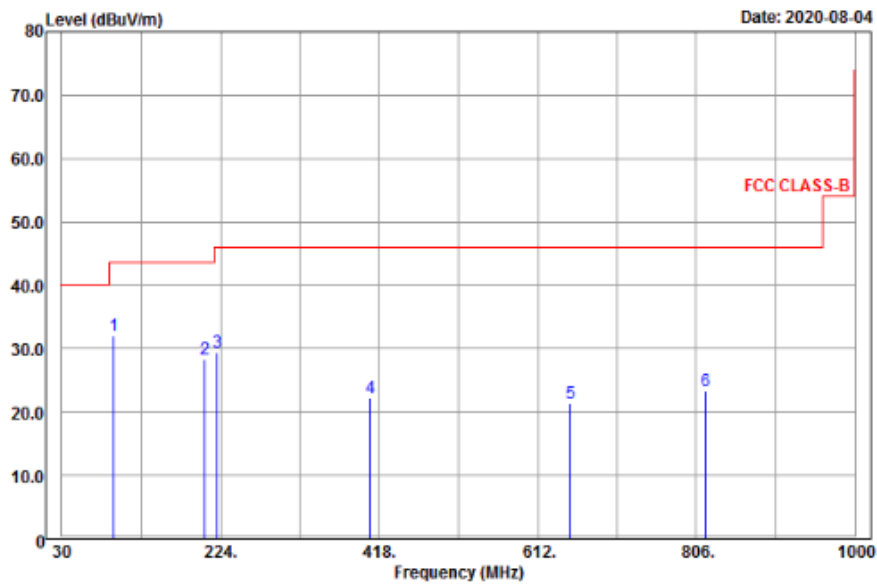
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz data

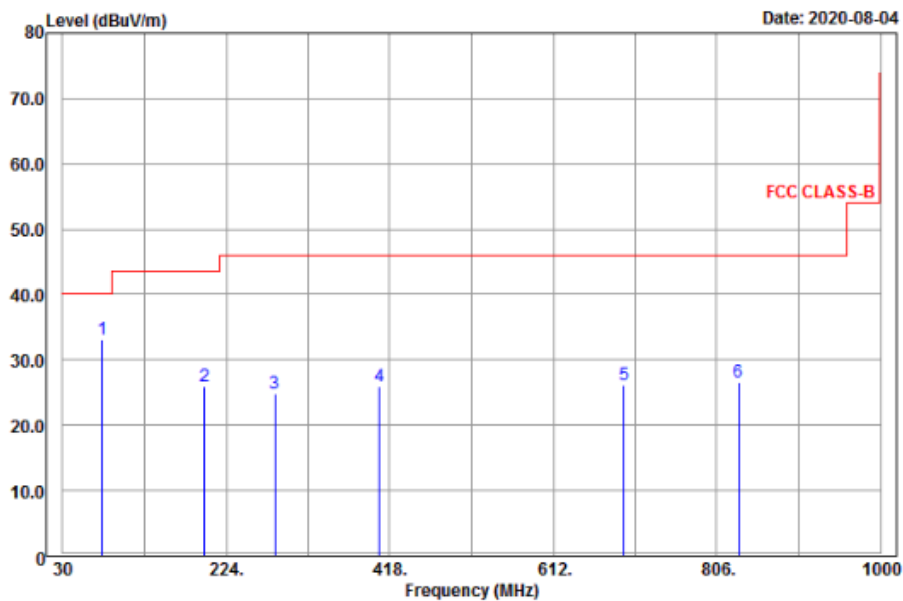
802.11b + 802.11ax (HE40) + 802.11a + BT LE

EUT Test Condition		Measurement Detail	
Channel	Channel 6 + Channel 40 + Channel 149 + 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
93.72	32.04	50.12	43.5	-11.46	-18.08	134	5	Peak
204.69	28.28	46.46	43.5	-15.22	-18.18	105	116	Peak
219.81	29.47	47.32	46	-16.53	-17.85	158	219	Peak
407.1	22.34	36.15	46	-23.66	-13.81	140	177	Peak
652.1	21.3	31.33	46	-24.7	-10.03	105	119	Peak
817.3	23.42	30.83	46	-22.58	-7.41	134	226	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
76.71	33.08	54.33	40	-6.92	-21.25	105	252	Peak
198.21	25.84	44.15	43.5	-17.66	-18.31	110	241	Peak
281.91	24.83	41.21	46	-21.17	-16.38	191	326	Peak
405.7	25.89	39.73	46	-20.11	-13.84	145	55	Peak
696.2	26.2	35.46	46	-19.8	-9.26	165	185	Peak
832	26.53	33.57	46	-19.47	-7.04	127	207	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 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

Web Site: www.bureauveritas-adt.com

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

--- END ---