FCC Test Report

Report No.:	RF170419C34-1
FCC ID:	W23-JWX5556
Test Model:	JWX6055, JWX6056
Received Date:	Apr. 19, 2017
Test Date:	Jun. 09, 2017 ~ Jul. 03, 2017
Issued Date:	Jul. 17, 2017
Applicant:	jjPlus CORP.
Address:	13F.-3, No.120, Qiaohe Rd., Zhonghe Dist., New Taipei City 23584, Taiwan (R.O.C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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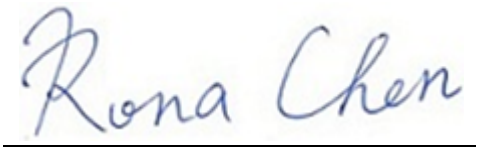
Release Control Record

Issue No.	Description	Date Issued
RF170419C34-1	Original Release	Jul. 17, 2017

1 Certificate of Conformity

Product:	802.11ac/abgn 2T2R Half Mini-PCI-Express Module
Brand:	jjPlus
Test Model:	JWX6055, JWX6056
Sample Status:	Identical Prototype
Applicant:	jjPlus CORP.
Test Date:	Jun. 09, 2017 ~ Jul. 03, 2017
Standards:	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 EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Jul. 17, 2017

Rona Chen / Specialist

Approved by :  , **Date:** Jul. 17, 2017

David Huang / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -17.43 dB at 2.91000 MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.42 dB at 5150 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	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	802.11ac/abgn 2T2R Half Mini-PCI-Express Module
Brand	jjPlus
Test Model	JWX6055, JWX6056
Status of EUT	Identical Prototype
Power Supply Rating	3.3 Vdc (Host equipment)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to MCS7 802.11ac: up to V9
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80)
Output Power	167.314 mW for 5180 ~ 5240 MHz 167.593 mW for 5745 ~ 5825 MHz
Antenna Type	Dipole antenna with 2 dBi gain (5180 ~ 5240 MHz) Dipole antenna with 2 dBi gain (5745 ~ 5825 MHz)
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

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

Modulation Mode	Tx Function
802.11a	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT80)	2TX

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

2. All models are listed as below.

Brand	Model	Difference
jjPlus	JWX6055	The difference between two model names is temperature operating range only. Other specification is the same.
	JWX6056	

   * JWX6056 was chosen for the final test and only its test result was recorded in this report.

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

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20):

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

For 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5775

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	-
B	√	-	-	√	

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the antenna positioned of X and Z plane. The worst case was found when positioned on **Z-plane**.

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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
B		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
		802.11ac (VHT80)	42	42	OFDM	BPSK	MCS0
A	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
B		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	MCS0
		802.11ac (VHT80)	155	155	OFDM	BPSK	MCS0

Radiated Emission Test (Below 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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36	OFDM	BPSK	6.0
B	5745-5825	802.11a	149 to 165	149	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

☒ 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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36	OFDM	BPSK	6.0

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ 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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
B		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
		802.11ac (VHT80)	42	42	OFDM	BPSK	MCS0
A	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
B		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	MCS0
		802.11ac (VHT80)	155	155	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Toby Tian
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Toby Tian
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
APCM	25 deg. C, 65 % RH	3.3 Vdc	Anson Lin

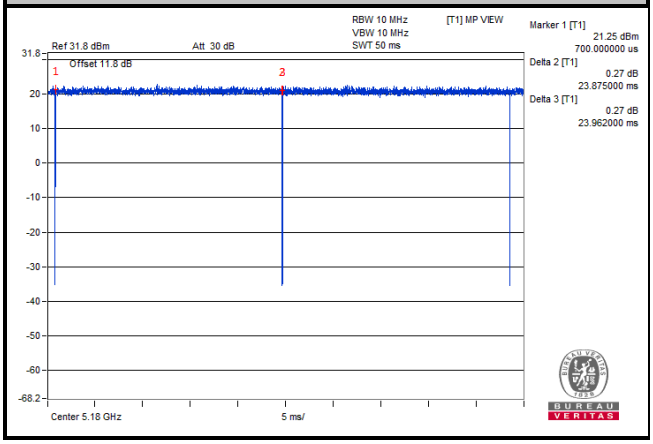
3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

Mode A

802.11a: Duty cycle of test signal is > 98 %, duty factor is not required.

802.11a



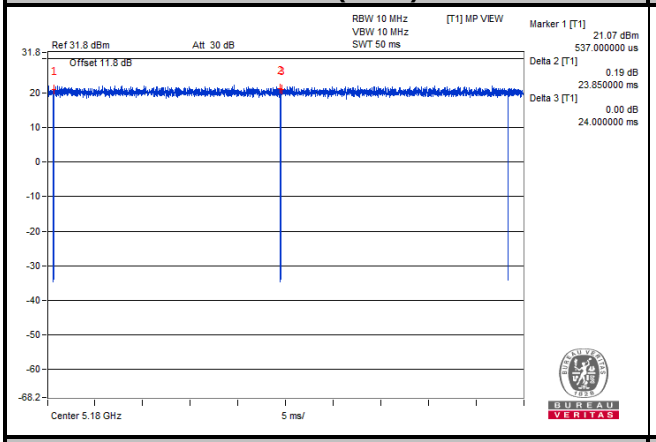
Mode B

802.11n (HT20): Duty cycle of test signal is > 98 %, duty factor is not required.

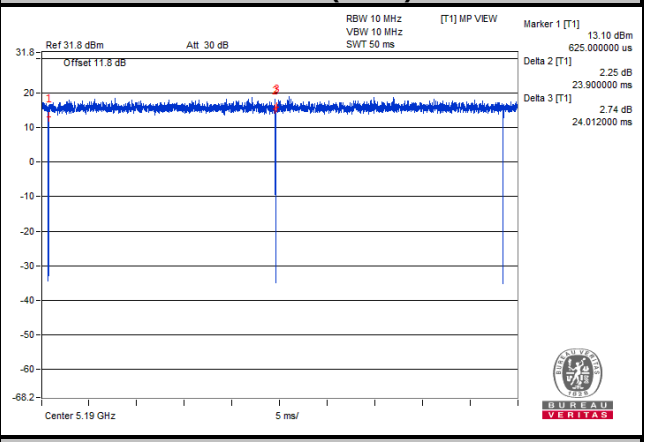
802.11n (HT40): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11ac (VHT80): Duty cycle of test signal is > 98 %, duty factor is not required.

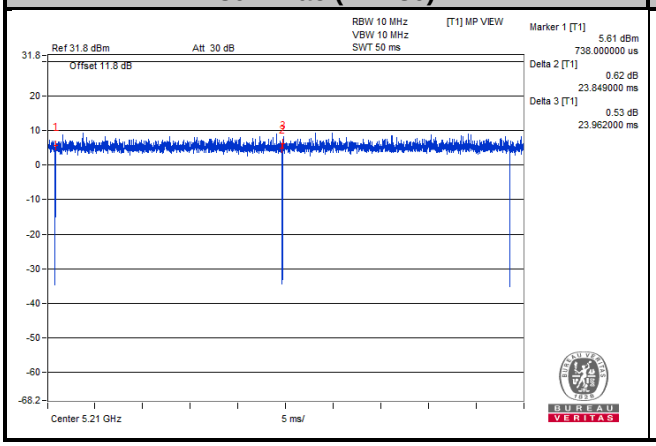
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



3.4 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.

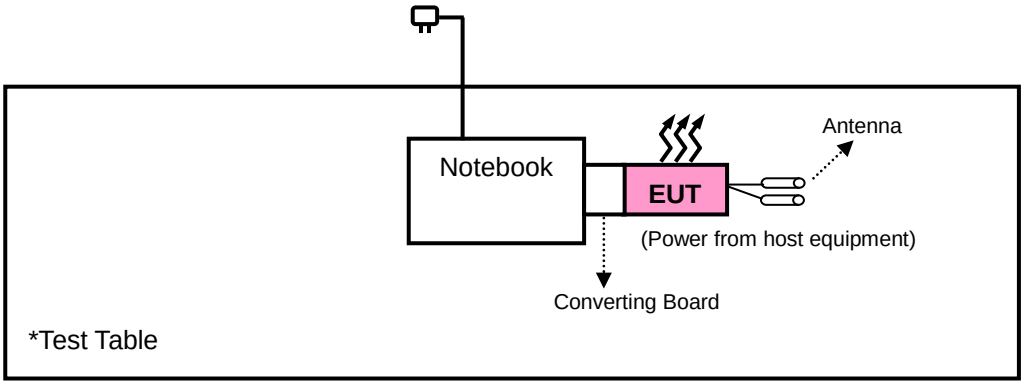
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	DELL	E5420	33MJMQ1	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.4.1 Configuration of System under Test



3.5 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:

FCC Part 15, Subpart E (15.407)
789033 D02 General UNII Test Procedures New Rules v01r04
644545 D01 Guidance for IEEE 802 11ac v01r02
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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 20 dB 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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Limits of Unwanted Emission Out of the Restricted Bands

Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v01r03		Field Strength at 3 m	
		PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	**Applicable To**	**EIRP Limit**	**Equivalent Field Strength at 3 m**
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	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
	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:

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

4.1.3 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 02, 2016	Sep. 01, 2017
DC Power Supply Topward	33010D	807748	Oct. 25, 2016	Oct. 24, 2018
Digital Multimeter Fluke	87-III	70360742	Jul. 01, 2016	Jun. 30, 2017
			Jun. 30, 2017	May 31, 2018

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.4 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

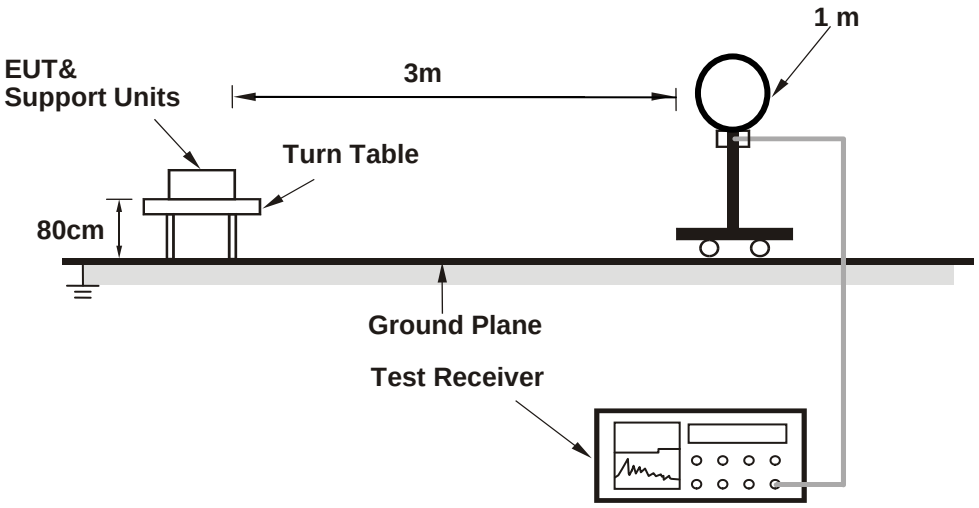
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

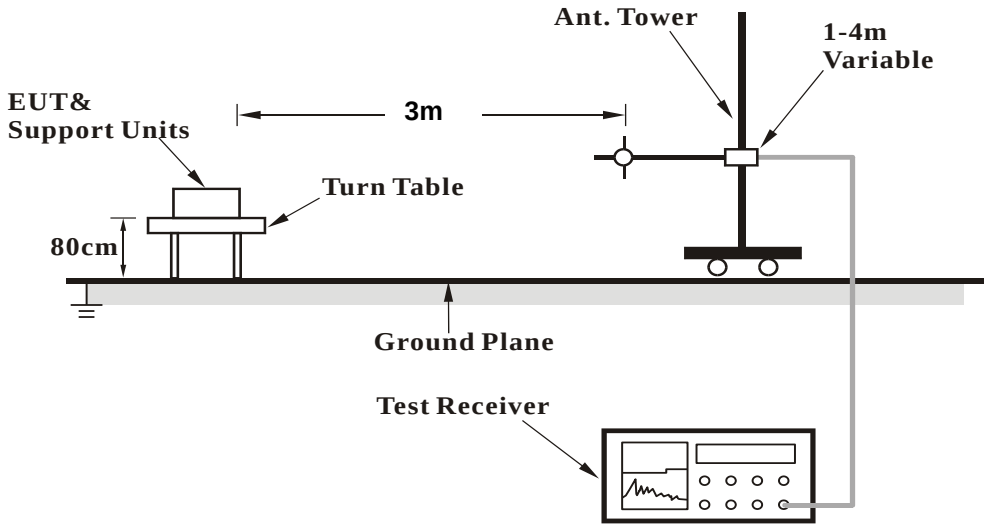
No deviation.

4.1.6 Test Set Up

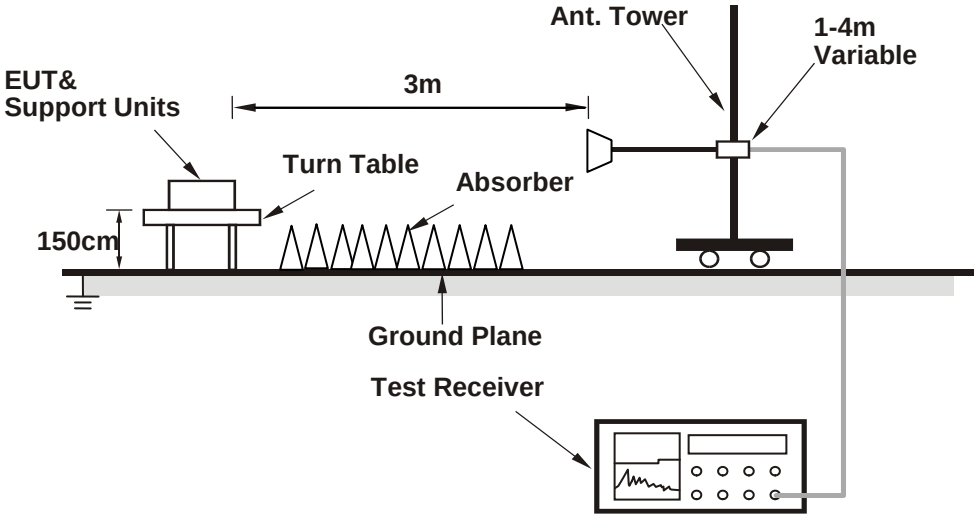
<Radiated emission below 30MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.7 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.8 Test Results

Above 1 GHz Data：

Mode A

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5052	40.59	40.43	54	-13.41	31.24	6.17	37.25	200	217	Average
5052	59.68	59.52	74	-14.32	31.24	6.17	37.25	200	217	Peak
5180	89.91	89.68			31.35	6.22	37.34	200	217	Average
5180	99.16	98.93			31.35	6.22	37.34	200	217	Peak
*10360	52.17	56.07	68.2	-16.03	39.19	9.05	52.14	101	174	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5150	**52.58**	**52.38**	**54**	**-1.42**	**31.32**	**6.2**	**37.32**	**228**	**288**	**Average**
5150	66.14	65.94	74	-7.86	31.32	6.2	37.32	228	288	Peak
5180	103.53	103.3			31.35	6.22	37.34	228	288	Average
5180	112.04	111.81			31.35	6.22	37.34	228	288	Peak
*10360	52.94	56.84	68.2	-15.26	39.19	9.05	52.14	105	99	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 44	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5030	38.4	38.26	54	-15.6	31.23	6.15	37.24	200	217	Average
5030	59.23	59.09	74	-14.77	31.23	6.15	37.24	200	217	Peak
5220	91.02	90.77			31.37	6.24	37.36	200	217	Average
5220	99.6	99.35			31.37	6.24	37.36	200	217	Peak
5434	38.59	37.85	54	-15.41	31.55	6.32	37.13	200	217	Average
5434	60.22	59.48	74	-13.78	31.55	6.32	37.13	200	217	Peak
*10440	52.48	56.58	68.2	-15.72	39.29	9.09	52.48	101	157	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5146	42.59	42.39	54	-11.41	31.32	6.2	37.32	226	287	Average
5146	60.22	60.02	74	-13.78	31.32	6.2	37.32	226	287	Peak
5220	104.47	104.22			31.37	6.24	37.36	226	287	Average
5220	112.53	112.28			31.37	6.24	37.36	226	287	Peak
5390	41.68	41.04	54	-12.32	31.51	6.31	37.18	226	287	Average
5390	60.78	60.14	74	-13.22	31.51	6.31	37.18	226	287	Peak
*10440	52.77	56.87	68.2	-15.43	39.29	9.09	52.48	107	87	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 48	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5054	38.39	38.23	54	-15.61	31.24	6.17	37.25	200	217	Average
5054	59.85	59.69	74	-14.15	31.24	6.17	37.25	200	217	Peak
5240	91.47	91.15			31.39	6.25	37.32	200	217	Average
5240	99.88	99.56			31.39	6.25	37.32	200	217	Peak
5402	38.47	37.81	54	-15.53	31.52	6.32	37.18	200	217	Average
5402	60.23	59.57	74	-13.77	31.52	6.32	37.18	200	217	Peak
*10480	52.57	56.82	68.2	-15.63	39.37	9.09	52.71	101	180	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5108	41.82	41.62	54	-12.18	31.29	6.19	37.28	225	278	Average
5108	60.31	60.11	74	-13.69	31.29	6.19	37.28	225	278	Peak
5240	104.81	104.49			31.39	6.25	37.32	225	278	Average
5240	112.73	112.41			31.39	6.25	37.32	225	278	Peak
5430	41.65	40.91	54	-12.35	31.55	6.32	37.13	225	278	Average
5430	60.56	59.82	74	-13.44	31.55	6.32	37.13	225	278	Peak
*10480	52.92	57.17	68.2	-15.28	39.37	9.09	52.71	106	101	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 149	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	89.87	88.6			31.99	6.75	37.47	128	225	Average
5745	99.17	97.9			31.99	6.75	37.47	128	225	Peak
11490	45.91	48.8	54	-8.09	39.91	10.03	52.83	110	122	Average
11490	56.62	59.51	74	-17.38	39.91	10.03	52.83	110	122	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	103.95	102.68			31.99	6.75	37.47	209	292	Average
5745	112.34	111.07			31.99	6.75	37.47	209	292	Peak
11490	45.03	47.92	54	-8.97	39.91	10.03	52.83	100	196	Average
11490	56.61	59.5	74	-17.39	39.91	10.03	52.83	100	196	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5647.375	47.91	46.75	68.2	-20.29	31.82	6.62	37.28	128	225	Peak
5654.025	47.19	46.06	71.19	-24	31.85	6.62	37.34	128	225	Peak
5921.925	47.29	45.49	70.47	-23.18	32.29	7.01	37.5	128	225	Peak
5929.05	47.62	45.82	68.2	-20.58	32.29	7.01	37.5	128	225	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5645	50.13	48.97	68.2	-18.07	31.82	6.62	37.28	209	292	Peak
5655.45	49.39	48.26	72.25	-22.86	31.85	6.62	37.34	209	292	Peak
5921.925	49.09	47.29	70.47	-21.38	32.29	7.01	37.5	209	292	Peak
5929.05	49.02	47.22	68.2	-19.18	32.29	7.01	37.5	209	292	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 157	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	90.72	89.4			32.04	6.82	37.54	130	225	Average
5785	99.85	98.53			32.04	6.82	37.54	130	225	Peak
11570	44.27	47.73	54	-9.73	39.78	10.09	53.33	105	116	Average
11570	55.47	58.93	74	-18.53	39.78	10.09	53.33	105	116	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	103.41	102.09			32.04	6.82	37.54	210	292	Average
5785	112.84	111.52			32.04	6.82	37.54	210	292	Peak
11570	43.35	46.81	54	-10.65	39.78	10.09	53.33	100	117	Average
11570	54.84	58.3	74	-19.16	39.78	10.09	53.33	100	117	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5631.7	48.27	47.2	68.2	-19.93	31.79	6.56	37.28	130	225	Peak
5654.5	47.23	46.1	71.54	-24.31	31.85	6.62	37.34	130	225	Peak
5920.975	47.53	45.76	71.17	-23.64	32.26	7.01	37.5	130	225	Peak
5929.525	47.75	45.95	68.2	-20.45	32.29	7.01	37.5	130	225	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5622.675	54.98	53.85	68.2	-13.22	31.79	6.56	37.22	210	292	Peak
5655.45	48.51	47.38	72.25	-23.74	31.85	6.62	37.34	210	292	Peak
5922.875	48.74	46.94	69.77	-21.03	32.29	7.01	37.5	210	292	Peak
5927.15	49.34	47.54	68.2	-18.86	32.29	7.01	37.5	210	292	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 165	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	89.92	88.45			32.12	6.88	37.53	135	225	Average
5825	99.79	98.32			32.12	6.88	37.53	135	225	Peak
11650	44.3	47.85	54	-9.7	39.65	10.15	53.35	100	155	Average
11650	55.87	59.42	74	-18.13	39.65	10.15	53.35	100	155	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	103.59	102.12			32.12	6.88	37.53	207	290	Average
5825	112.58	111.11			32.12	6.88	37.53	207	290	Peak
11650	43.69	47.24	54	-10.31	39.65	10.15	53.35	100	162	Average
11650	55.68	59.23	74	-18.32	39.65	10.15	53.35	100	162	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5646.425	48.92	47.76	68.2	-19.28	31.82	6.62	37.28	135	225	Peak
5653.075	47.22	46.03	70.49	-23.27	31.85	6.62	37.28	135	225	Peak
5921.45	48.5	46.73	70.82	-22.32	32.26	7.01	37.5	135	225	Peak
5933.325	48.53	46.73	68.2	-19.67	32.29	7.01	37.5	135	225	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5646.9	52.01	50.85	68.2	-16.19	31.82	6.62	37.28	207	290	Peak
5653.55	51.95	50.76	70.84	-18.89	31.85	6.62	37.28	207	290	Peak
5918.125	52.1	50.33	73.27	-21.17	32.26	7.01	37.5	207	290	Peak
5930	51.8	50	68.2	-16.4	32.29	7.01	37.5	207	290	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 36	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5126	39.27	39.06	54	-14.73	31.31	6.2	37.3	178	25	Average
5126	59.3	59.09	74	-14.7	31.31	6.2	37.3	178	25	Peak
5180	89.41	89.18			31.35	6.22	37.34	178	25	Average
5180	98.49	98.26			31.35	6.22	37.34	178	25	Peak
5404	38.9	38.24	54	-15.1	31.52	6.32	37.18	178	25	Average
5404	59.73	59.07	74	-14.27	31.52	6.32	37.18	178	25	Peak
*10360	54.71	58.61	68.2	-13.49	39.19	9.05	52.14	100	198	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5150	51.21	51.01	54	-2.79	31.32	6.2	37.32	225	280	Average
5150	64.58	64.38	74	-9.42	31.32	6.2	37.32	225	280	Peak
5180	98.16	97.93			31.35	6.22	37.34	225	280	Average
5180	111.85	111.62			31.35	6.22	37.34	225	280	Peak
5386	41.69	41.05	54	-12.31	31.51	6.31	37.18	225	280	Average
5386	60.39	59.75	74	-13.61	31.51	6.31	37.18	225	280	Peak
*10360	55.87	59.77	68.2	-12.33	39.19	9.05	52.14	100	57	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 44	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5028	38.39	38.25	54	-15.61	31.23	6.15	37.24	166	24	Average
5028	59.96	59.82	74	-14.04	31.23	6.15	37.24	166	24	Peak
5220	91	90.75			31.37	6.24	37.36	166	24	Average
5220	99.94	99.69			31.37	6.24	37.36	166	24	Peak
5442	38.84	38.08	54	-15.16	31.55	6.34	37.13	166	24	Average
5442	60.13	59.37	74	-13.87	31.55	6.34	37.13	166	24	Peak
*10440	55.14	59.24	68.2	-13.06	39.29	9.09	52.48	100	177	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5066	43.63	43.46	54	-10.37	31.25	6.17	37.25	221	281	Average
5066	61.74	61.57	74	-12.26	31.25	6.17	37.25	221	281	Peak
5220	105.02	104.77			31.37	6.24	37.36	221	281	Average
5220	113.19	112.94			31.37	6.24	37.36	221	281	Peak
5458	43.41	42.59	54	-10.59	31.56	6.34	37.08	221	281	Average
5458	60.59	59.77	74	-13.41	31.56	6.34	37.08	221	281	Peak
*10440	55.52	59.62	68.2	-12.68	39.29	9.09	52.48	100	87	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 48	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5098	38.53	38.34	54	-15.47	31.28	6.19	37.28	148	26	Average
5098	59.25	59.06	74	-14.75	31.28	6.19	37.28	148	26	Peak
5240	90.52	90.2			31.39	6.25	37.32	148	26	Average
5240	98.98	98.66			31.39	6.25	37.32	148	26	Peak
5460	38.77	37.95	54	-15.23	31.56	6.34	37.08	148	26	Average
5460	60.28	59.46	74	-13.72	31.56	6.34	37.08	148	26	Peak
*10480	54.19	58.44	68.2	-14.01	39.37	9.09	52.71	100	208	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5146	43.67	43.47	54	-10.33	31.32	6.2	37.32	223	280	Average
5146	60.21	60.01	74	-13.79	31.32	6.2	37.32	223	280	Peak
5240	105.27	104.95			31.39	6.25	37.32	223	280	Average
5240	112.45	112.13			31.39	6.25	37.32	223	280	Peak
5440	43.53	42.77	54	-10.47	31.55	6.34	37.13	223	280	Average
5440	60.4	59.64	74	-13.6	31.55	6.34	37.13	223	280	Peak
*10480	55.82	60.07	68.2	-12.38	39.37	9.09	52.71	100	210	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 149	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	93.72	92.45			31.99	6.75	37.47	116	197	Average
5745	103.18	101.91			31.99	6.75	37.47	116	197	Peak
11490	44.03	46.92	54	-9.97	39.91	10.03	52.83	176	89	Average
11490	56.51	59.4	74	-17.49	39.91	10.03	52.83	176	89	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	102.65	101.38			31.99	6.75	37.47	205	285	Average
5745	111.98	110.71			31.99	6.75	37.47	205	285	Peak
11490	44.27	47.16	54	-9.73	39.91	10.03	52.83	129	26	Average
11490	57.53	60.42	74	-16.47	39.91	10.03	52.83	129	26	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5562.35	51.3	50.25	68.2	-16.9	31.68	6.49	37.12	116	197	Peak
5656.4	50.26	49.13	72.95	-22.69	31.85	6.62	37.34	116	197	Peak
5920.975	50.85	49.08	71.17	-20.32	32.26	7.01	37.5	116	197	Peak
5974.175	51.6	49.66	68.2	-16.6	32.37	7.08	37.51	116	197	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5555.7	54.04	53.06	68.2	-14.16	31.68	6.42	37.12	205	285	Peak
5655.45	53.5	52.37	72.25	-18.75	31.85	6.62	37.34	205	285	Peak
5919.075	52.01	50.24	72.57	-20.56	32.26	7.01	37.5	205	285	Peak
5983.675	52.76	50.82	68.2	-15.44	32.37	7.08	37.51	205	285	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 157	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	93.78	92.46			32.04	6.82	37.54	118	199	Average
5785	103.26	101.94			32.04	6.82	37.54	118	199	Peak
11570	43.55	47.01	54	-10.45	39.78	10.09	53.33	182	98	Average
11570	55.98	59.44	74	-18.02	39.78	10.09	53.33	182	98	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	103.09	101.77			32.04	6.82	37.54	206	287	Average
5785	112.25	110.93			32.04	6.82	37.54	206	287	Peak
11570	43.59	47.05	54	-10.41	39.78	10.09	53.33	120	34	Average
11570	55.98	59.44	74	-18.02	39.78	10.09	53.33	120	34	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5580.875	50.84	49.8	68.2	-17.36	31.71	6.49	37.16	118	199	Peak
5658.775	50.62	49.49	74.72	-24.1	31.85	6.62	37.34	118	199	Peak
5921.45	50.87	49.1	70.82	-19.95	32.26	7.01	37.5	118	199	Peak
5979.875	51.64	49.7	68.2	-16.56	32.37	7.08	37.51	118	199	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5599.4	53.91	52.81	68.2	-14.29	31.77	6.49	37.16	206	287	Peak
5656.4	53.39	52.26	72.95	-19.56	31.85	6.62	37.34	206	287	Peak
5920.025	52.48	50.71	71.87	-19.39	32.26	7.01	37.5	206	287	Peak
5990.8	52.75	50.72	68.2	-15.45	32.4	7.14	37.51	206	287	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 165	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	93.39	54.39			32.12	6.88	0	118	200	Average
5825	103.02	64.02			32.12	6.88	0	118	200	Peak
11650	43.45	47	54	-10.55	39.65	10.15	53.35	184	81	Average
11650	54.97	58.52	74	-19.03	39.65	10.15	53.35	184	81	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	103.04	101.57			32.12	6.88	37.53	205	282	Average
5825	112.18	110.71			32.12	6.88	37.53	205	282	Peak
11650	43.81	47.36	54	-10.19	39.65	10.15	53.35	132	33	Average
11650	55.13	58.68	74	-18.87	39.65	10.15	53.35	132	33	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5597.975	50.11	11.88	68.2	-18.09	31.74	6.49	0	118	200	Peak
5655.45	50.6	12.13	72.25	-21.65	31.85	6.62	0	118	200	Peak
5923.825	50.18	10.88	69.07	-18.89	32.29	7.01	0	118	200	Peak
5986.05	51.83	12.32	68.2	-16.37	32.37	7.14	0	118	200	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5560.45	53.41	15.24	68.2	-14.79	31.68	6.49	0	205	282	Peak
5652.6	54.14	15.67	70.13	-15.99	31.85	6.62	0	205	282	Peak
5920.025	51.87	12.6	71.87	-20	32.26	7.01	0	205	282	Peak
6007.425	52.69	13.1	68.2	-15.51	32.45	7.14	0	205	282	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5032	42.33	42.19	54	-11.67	31.23	6.15	37.24	148	26	Average
5032	58.71	58.57	74	-15.29	31.23	6.15	37.24	148	26	Peak
5190	82.62	82.39			31.35	6.22	37.34	148	26	Average
5190	91.52	91.29			31.35	6.22	37.34	148	26	Peak
5446	38.7	37.93	54	-15.3	31.56	6.34	37.13	148	26	Average
5446	59.47	58.7	74	-14.53	31.56	6.34	37.13	148	26	Peak
*10380	55.72	59.71	68.2	-12.48	39.21	9.05	52.25	100	195	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5144	52.08	51.88	54	-1.92	31.32	6.2	37.32	217	279	Average
5144	64.49	64.29	74	-9.51	31.32	6.2	37.32	217	279	Peak
5190	98.39	98.16			31.35	6.22	37.34	217	279	Average
5190	106.99	106.76			31.35	6.22	37.34	217	279	Peak
5362	41.36	40.74	54	-12.64	31.49	6.31	37.18	217	279	Average
5362	60.44	59.82	74	-13.56	31.49	6.31	37.18	217	279	Peak
*10380	55.08	59.07	68.2	-13.12	39.21	9.05	52.25	100	177	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5190 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 46	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5062	38.42	38.25	54	-15.58	31.25	6.17	37.25	148	24	Average
5062	59.26	59.09	74	-14.74	31.25	6.17	37.25	148	24	Peak
5230	86.54	86.23			31.39	6.24	37.32	148	24	Average
5230	94.01	93.7			31.39	6.24	37.32	148	24	Peak
5452	38.88	38.06	54	-15.12	31.56	6.34	37.08	148	24	Average
5452	60.46	59.64	74	-13.54	31.56	6.34	37.08	148	24	Peak
*10460	53.32	57.51	68.2	-14.88	39.32	9.09	52.6	100	181	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5132	42.72	42.51	54	-11.28	31.31	6.2	37.3	220	280	Average
5132	60.45	60.24	74	-13.55	31.31	6.2	37.3	220	280	Peak
5230	102.3	101.99			31.39	6.24	37.32	220	280	Average
5230	110.29	109.98			31.39	6.24	37.32	220	280	Peak
5432	42.26	41.52	54	-11.74	31.55	6.32	37.13	220	280	Average
5432	60.5	59.76	74	-13.5	31.55	6.32	37.13	220	280	Peak
*10460	54.16	58.35	68.2	-14.04	39.32	9.09	52.6	100	208	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5230 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 151	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	91.1	89.74			32.04	6.82	37.5	115	198	Average
5775	100.66	99.3			32.04	6.82	37.5	115	198	Peak
11510	43.75	46.89	54	-10.25	39.9	10.03	53.07	183	91	Average
11510	56.4	59.54	74	-17.6	39.9	10.03	53.07	183	91	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	100.37	99.01			32.04	6.82	37.5	206	285	Average
5775	109.69	108.33			32.04	6.82	37.5	206	285	Peak
11510	43.96	47.1	54	-10.04	39.9	10.03	53.07	115	21	Average
11510	55.64	58.78	74	-18.36	39.9	10.03	53.07	115	21	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5592.275	50.57	49.5	68.2	-17.63	31.74	6.49	37.16	115	198	Peak
5653.55	53.02	51.83	70.84	-17.82	31.85	6.62	37.28	115	198	Peak
5917.65	50.48	48.71	73.62	-23.14	32.26	7.01	37.5	115	198	Peak
6006.95	52.44	50.36	68.2	-15.76	32.45	7.14	37.51	115	198	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5576.6	52.79	51.71	68.2	-15.41	31.71	6.49	37.12	206	285	Peak
5653.075	51.61	50.42	70.49	-18.88	31.85	6.62	37.28	206	285	Peak
5921.925	51.28	49.48	70.47	-19.19	32.29	7.01	37.5	206	285	Peak
5970.85	51.98	50.07	68.2	-16.22	32.34	7.08	37.51	206	285	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5755 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 159	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5795	90.92	89.57			32.07	6.82	37.54	117	201	Average
5795	100.57	99.22			32.07	6.82	37.54	117	201	Peak
11590	43.47	46.97	54	-10.53	39.74	10.09	53.33	180	97	Average
11590	55.66	59.16	74	-18.34	39.74	10.09	53.33	180	97	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5795	100.39	99.04			32.07	6.82	37.54	205	288	Average
5795	109.74	108.39			32.07	6.82	37.54	205	288	Peak
11590	43.82	47.32	54	-10.18	39.74	10.09	53.33	113	17	Average
11590	55.36	58.86	74	-18.64	39.74	10.09	53.33	113	17	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5582.775	51.35	50.28	68.2	-16.85	31.74	6.49	37.16	117	201	Peak
5653.55	50.9	49.71	70.84	-19.94	31.85	6.62	37.28	117	201	Peak
5920.975	51.48	49.71	71.17	-19.69	32.26	7.01	37.5	117	201	Peak
6004.575	52.03	50	68.2	-16.17	32.4	7.14	37.51	117	201	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5603.675	53.13	52.02	68.2	-15.07	31.77	6.56	37.22	205	288	Peak
5654.975	51.36	50.23	71.9	-20.54	31.85	6.62	37.34	205	288	Peak
5920.025	51.52	49.75	71.87	-20.35	32.26	7.01	37.5	205	288	Peak
6005.05	53.12	51.09	68.2	-15.08	32.4	7.14	37.51	205	288	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5795 MHz: Fundamental Frequency
3. *: Out of Restricted Band

802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5064	41.53	41.36	54	-12.47	31.25	6.17	37.25	156	24	Average
5064	60.5	60.33	74	-13.5	31.25	6.17	37.25	156	24	Peak
5210	79.83	79.58			31.37	6.24	37.36	156	24	Average
5210	88.57	88.32			31.37	6.24	37.36	156	24	Peak
5450	39.81	38.99	54	-14.19	31.56	6.34	37.08	156	24	Average
5450	59.92	59.1	74	-14.08	31.56	6.34	37.08	156	24	Peak
*10420	55.94	59.94	68.2	-12.26	39.27	9.09	52.36	100	186	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5142	52.44	52.22	54	-1.56	31.32	6.2	37.3	220	279	Average
5142	63.23	63.01	74	-10.77	31.32	6.2	37.3	220	279	Peak
5210	91.65	91.4			31.37	6.24	37.36	220	279	Average
5210	101.83	101.58			31.37	6.24	37.36	220	279	Peak
5424	39.71	39.04	54	-14.29	31.53	6.32	37.18	220	279	Average
5424	60.84	60.17	74	-13.16	31.53	6.32	37.18	220	279	Peak
*10420	55.34	59.34	68.2	-12.86	39.27	9.09	52.36	100	254	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5210 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 155	**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**	Toby Tian

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	97.82	96.46			32.04	6.82	37.5	115	201	Average
5775	97.44	96.08			32.04	6.82	37.5	115	201	Peak
11550	43.55	46.89	54	-10.45	39.81	10.09	53.24	177	87	Average
11550	55.49	58.83	74	-18.51	39.81	10.09	53.24	177	87	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	97.48	96.12			32.04	6.82	37.5	206	282	Average
5775	106.95	105.59			32.04	6.82	37.5	206	282	Peak
11550	43.75	47.09	54	-10.25	39.81	10.09	53.24	128	27	Average
11550	56.04	59.38	74	-17.96	39.81	10.09	53.24	128	27	Peak

<Ouf of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5577.075	50.55	49.47	68.2	-17.65	31.71	6.49	37.12	115	201	Peak
5654.975	51.13	50	71.9	-20.77	31.85	6.62	37.34	115	201	Peak
5917.65	51.53	49.76	73.62	-22.09	32.26	7.01	37.5	115	201	Peak
5989.85	51.84	49.81	68.2	-16.36	32.4	7.14	37.51	115	201	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5644.05	56.78	55.62	68.2	-11.42	31.82	6.62	37.28	206	282	Peak
5654.975	60.86	59.73	71.9	-11.04	31.85	6.62	37.34	206	282	Peak
5917.65	53.42	51.65	73.62	-20.2	32.26	7.01	37.5	206	282	Peak
5997.45	52.32	50.29	68.2	-15.88	32.4	7.14	37.51	206	282	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5775 MHz: Fundamental Frequency
3. *: Out of Restricted Band

9 kHz ~ 30 MHz DATA:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz WORST-CASE DATA:

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
166.77	40.06	58.65	43.5	-3.44	12.05	1.13	31.77	123	23	Peak
230.79	39.98	59.75	46	-6.02	10.66	1.42	31.85	130	204	Peak
298.69	39.54	56.82	46	-6.46	12.91	1.63	31.82	116	145	Peak
624.61	25.94	35.9	46	-20.06	19.9	2.3	32.16	131	192	Peak
666.32	36.12	45.18	46	-9.88	20.41	2.39	31.86	125	102	Peak
700.27	42.76	51.28	46	-3.24	20.82	2.45	31.79	129	148	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
32.91	33.98	52	40	-6.02	12.47	0.6	31.09	109	300	Peak
99.84	39.76	61.62	43.5	-3.74	9.06	1.04	31.96	103	234	Peak
166.77	38.61	57.2	43.5	-4.89	12.05	1.13	31.77	124	62	Peak
298.69	29.55	46.83	46	-16.45	12.91	1.63	31.82	131	250	Peak
556.71	27.33	38.56	46	-18.67	18.61	2.19	32.03	117	194	Peak
697.36	39.67	48.24	46	-6.33	20.78	2.45	31.8	115	202	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 149	**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**	Toby Tian

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
144.46	36.3	54.26	43.5	-7.2	12.51	1.16	31.63	122	295	Peak
166.77	39.97	58.56	43.5	-3.53	12.05	1.13	31.77	111	22	Peak
229.82	39.01	58.83	46	-6.99	10.62	1.42	31.86	136	73	Peak
298.69	39.59	56.87	46	-6.41	12.91	1.63	31.82	119	18	Peak
663.41	37.39	46.54	46	-8.61	20.37	2.38	31.9	138	268	Peak
700.27	42.41	50.93	46	-3.59	20.82	2.45	31.79	139	249	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
99.84	39.5	61.36	43.5	-4	9.06	1.04	31.96	127	240	Peak
166.77	38.77	57.36	43.5	-4.73	12.05	1.13	31.77	104	239	Peak
222.06	35.99	56.05	46	-10.01	10.3	1.38	31.74	118	297	Peak
299.66	29.59	46.86	46	-16.41	12.94	1.63	31.84	130	136	Peak
499.48	24.74	36.97	46	-21.26	17.31	2.09	31.63	138	37	Peak
663.41	32.87	42.02	46	-13.13	20.37	2.38	31.9	113	19	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 21, 2016	Nov. 20, 2017
RF signal cable Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

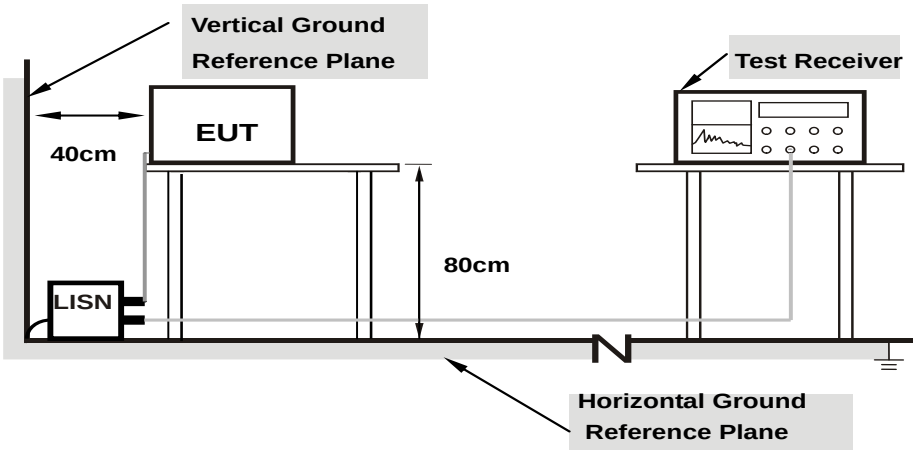
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

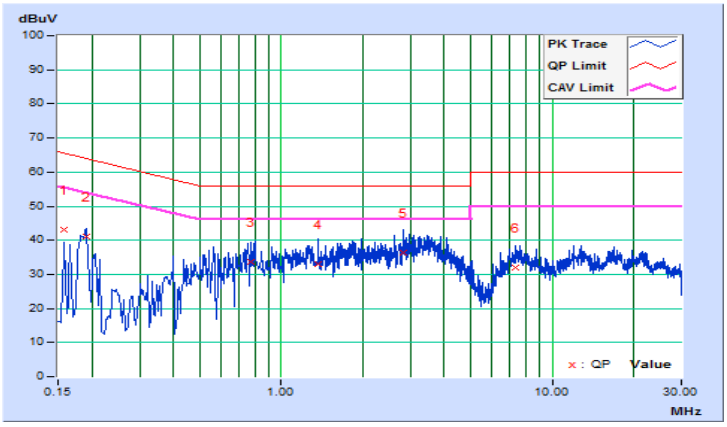
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/6/21

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.35	32.62	8.48	42.97	18.83	65.57	55.57	-22.60	-36.74
2	0.19000	10.36	30.79	16.91	41.15	27.27	64.04	54.04	-22.89	-26.77
3	0.77400	10.40	23.19	9.69	33.59	20.09	56.00	46.00	-22.41	-25.91
4	1.36600	10.42	22.51	12.59	32.93	23.01	56.00	46.00	-23.07	-22.99
5	2.83800	10.51	25.83	17.68	36.34	28.19	56.00	46.00	-19.66	-17.81
6	7.29400	10.71	21.31	14.81	32.02	25.52	60.00	50.00	-27.98	-24.48

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

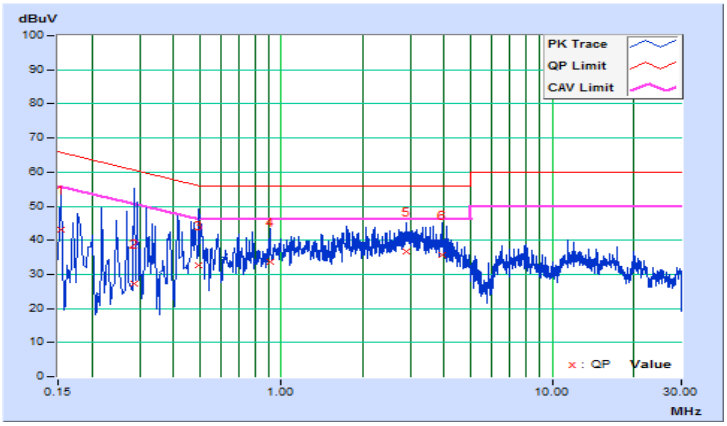


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/6/21

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.11	33.06	8.25	43.17	18.36	65.78	55.78	-22.61	-37.42
2	0.28600	10.15	17.27	1.93	27.42	12.08	60.64	50.64	-33.22	-38.56
3	0.49800	10.16	22.42	10.69	32.58	20.85	56.03	46.03	-23.45	-25.18
4	0.90600	10.17	23.41	11.46	33.58	21.63	56.00	46.00	-22.42	-24.37
5	**2.91000**	**10.28**	**26.36**	**18.29**	**36.64**	**28.57**	**56.00**	**46.00**	**-19.36**	**-17.43**
6	3.91000	10.34	25.24	17.71	35.58	28.05	56.00	46.00	-20.42	-17.95

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 Transmit Power Measurment

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125 mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A	-		250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	-		250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

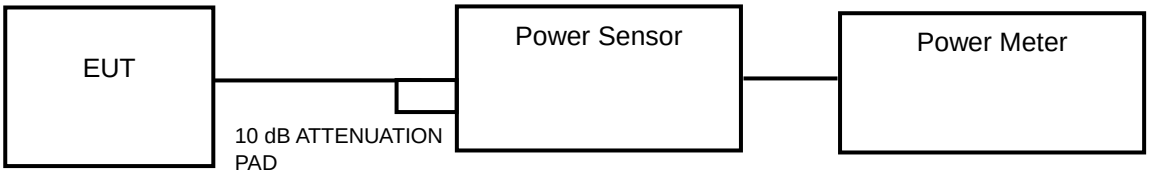
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20 MHz channel widths with $N_{ANT} \geq 5$.

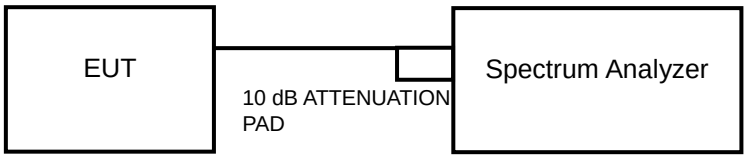
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

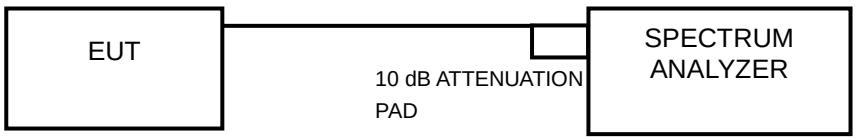
<Power Output Measurement>



or



<26 dB Bandwidth / Occupied Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<802.11a, 802.11n (HT20), 802.11n (HT40)>

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

<802.11ac (VHT80)>

Method SA-1 is used to perform output power measurement, trigger and gating function of spectrum analyzer is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

26 dB Bandwidth

1) Set RBW = approximately 1 % of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Occupied Bandwidth

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Power Output:

Mode A

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	126.183	21.01	24	Pass
44	5220	129.122	21.11	24	Pass
48	5240	127.35	21.05	24	Pass
149	5745	127.057	21.04	30	Pass
157	5785	136.773	21.36	30	Pass
165	5825	130.617	21.16	30	Pass

Mode B

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Cunducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	19.51	18.92	167.314	22.24	24	Pass
44	5220	19.44	18.89	165.348	22.18	24	Pass
48	5240	19.26	19.07	165.057	22.18	24	Pass
149	5745	19.55	18.48	160.626	22.06	30	Pass
157	5785	19.73	18.67	167.593	22.24	30	Pass
165	5825	19.65	18.32	160.177	22.05	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Cunducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.48	15.34	69.516	18.42	24	Pass
46	5230	18.34	18.44	138.057	21.40	24	Pass
151	5755	18.57	17.94	134.175	21.28	30	Pass
159	5795	18.97	17.84	139.7	21.45	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Cunducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	10.18	10.11	20.68	13.16	24	Pass
155	5775	18.51	18.14	136.121	21.34	30	Pass

26 dB Bandwidth:

Mode A

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	45.00
44	5220	45.54
48	5240	45.68

Mode B

802.11n (HT20)

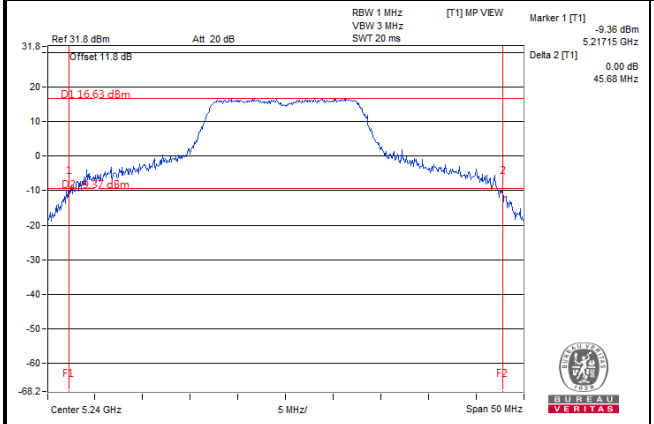
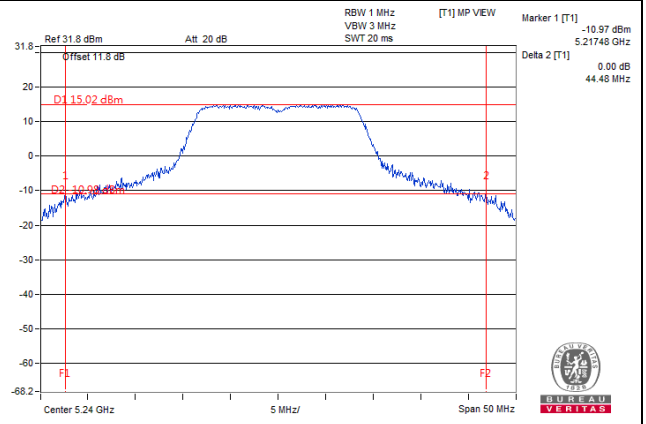
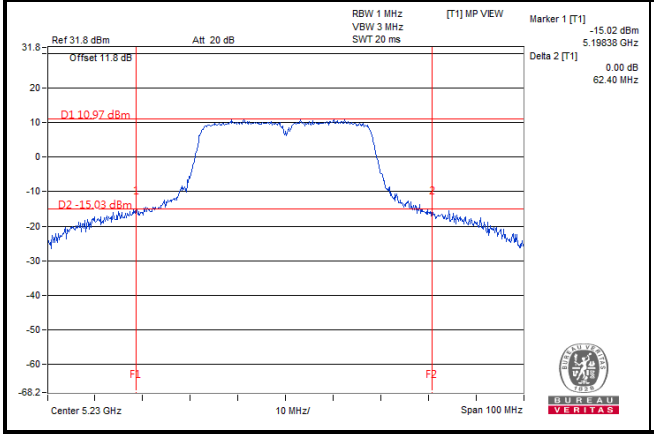
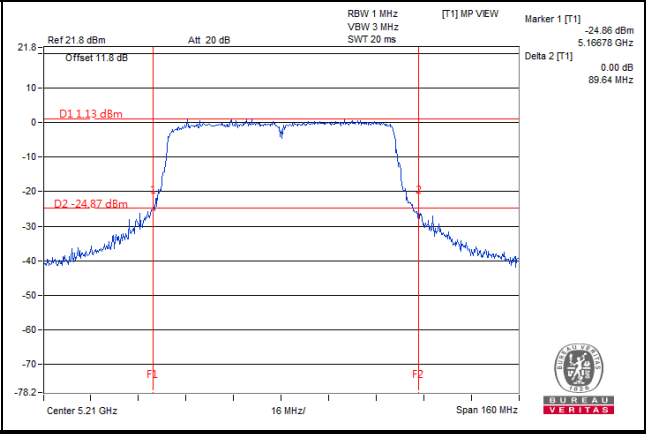
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	44.44	41.90
44	5220	43.48	40.49
48	5240	44.48	39.23

802.11n (HT40)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	60.58	53.46
46	5230	62.40	58.32

802.11ac (VHT80)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	89.33	89.64

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

Occupied Bandwidth

Mode A

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
36	5180	19.80	Pass
44	5220	20.67	Pass
48	5240	19.66	Pass
149	5745	20.43	Pass
157	5785	20.80	Pass
165	5825	19.60	Pass

Mode B

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	18.79	18.36	Pass
44	5220	18.65	18.46	Pass
48	5240	18.70	18.26	Pass
149	5745	18.60	18.31	Pass
157	5785	18.75	18.30	Pass
165	5825	18.50	18.25	Pass

802.11n (HT40)

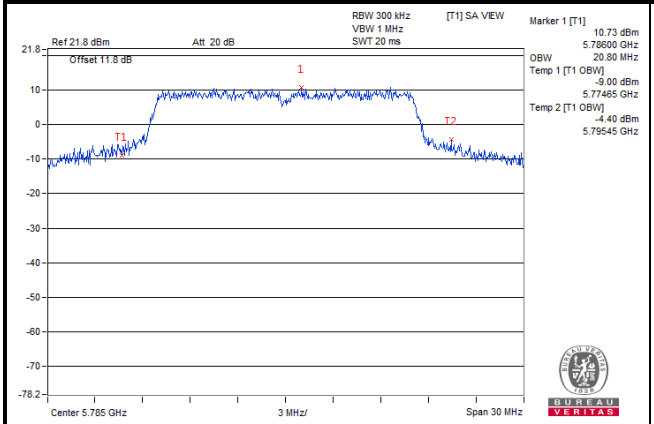
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	37.82	37.30	Pass
46	5230	37.82	37.30	Pass
151	5755	37.50	37.17	Pass
159	5795	37.66	37.16	Pass

802.11ac (VHT80)

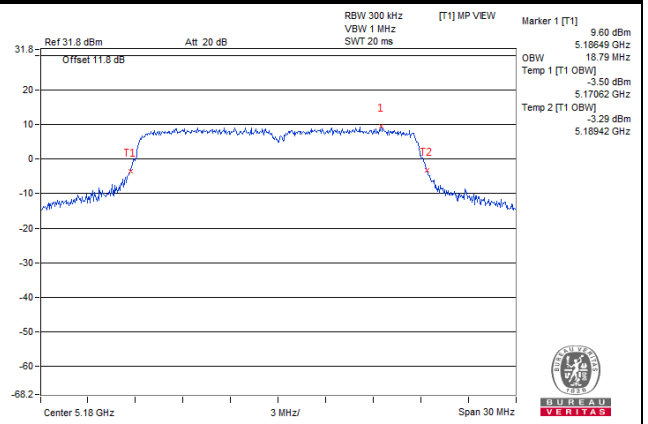
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	75.96	75.80	Pass
155	5775	76.60	76.60	Pass

Spectrum Plot of Worst Value

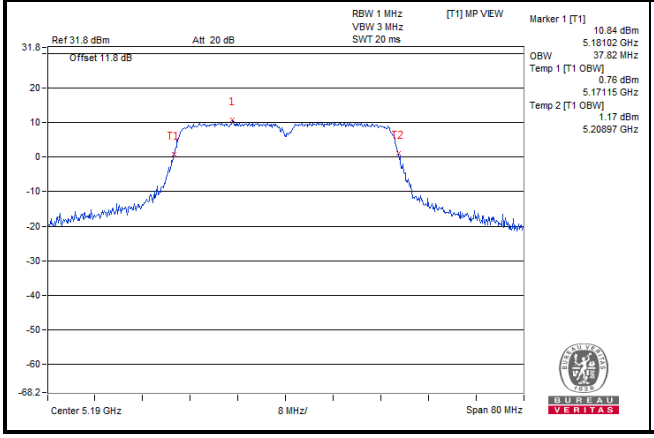
802.11a



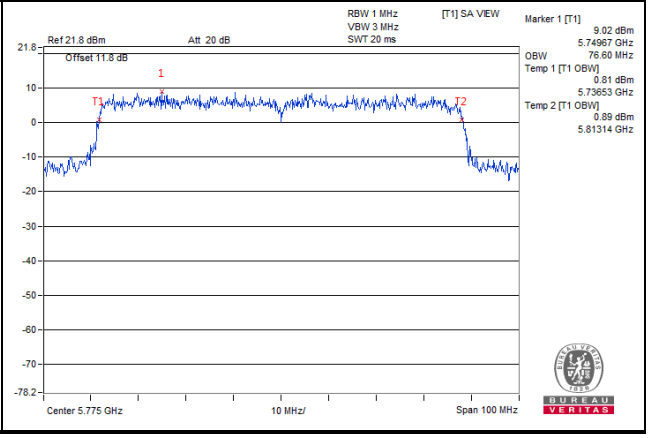
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

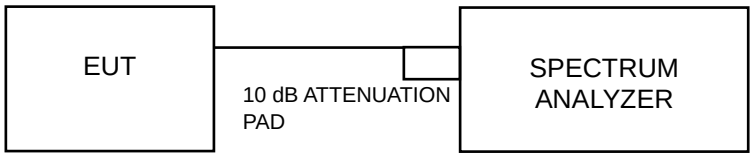


4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17 dBm/MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11 dBm/MHz
U-NII-2A	-		11 dBm/MHz
U-NII-2C	-		11 dBm/MHz
U-NII-3	√		30 dBm/500 kHz

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedures

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
4. Sweep time = auto, trigger set to “free run”.
5. Trace average at least 100 traces in power averaging mode.
6. Record the max value

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.7 Test Results

For U-NII-1 Band

Mode A

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
36	5180	7.00	11	Pass
44	5220	7.47	11	Pass
48	5240	7.36	11	Pass

Mode B

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	5.95	5.23	8.60	11	Pass
44	5220	5.72	5.63	8.66	11	Pass
48	5240	5.84	5.47	8.66	11	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
38	5190	1.11	1.03	4.04	11	Pass
46	5230	1.34	1.57	4.44	11	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

802.11ac (VHT80):

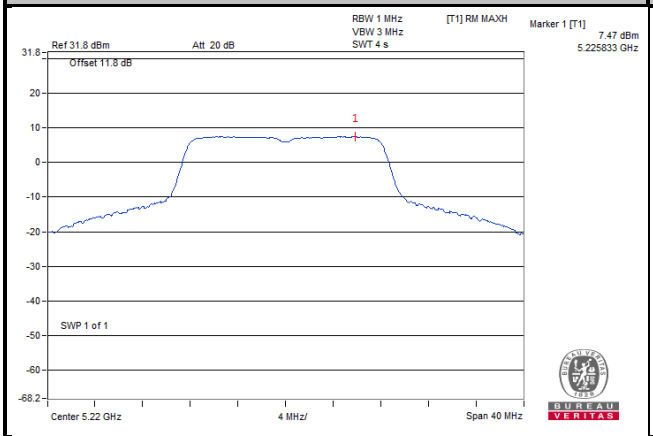
Channel	Frequency (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
42	5210	-10.45	-10.52	-7.59	11	Pass

Note:

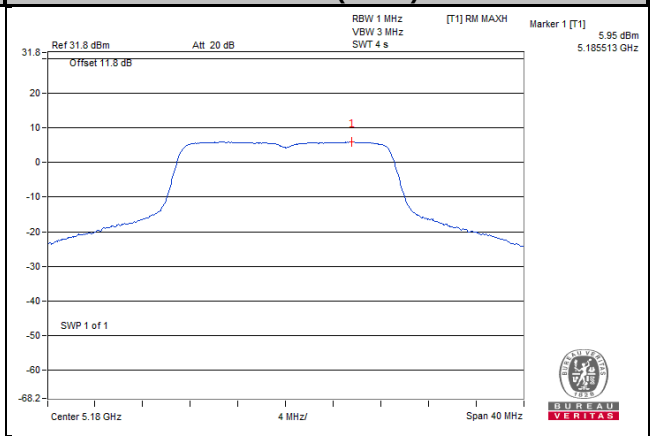
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

Spectrum Plot of Worst Value

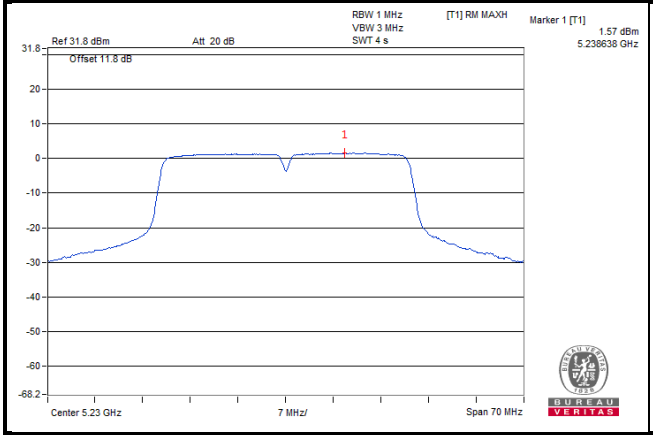
802.11a



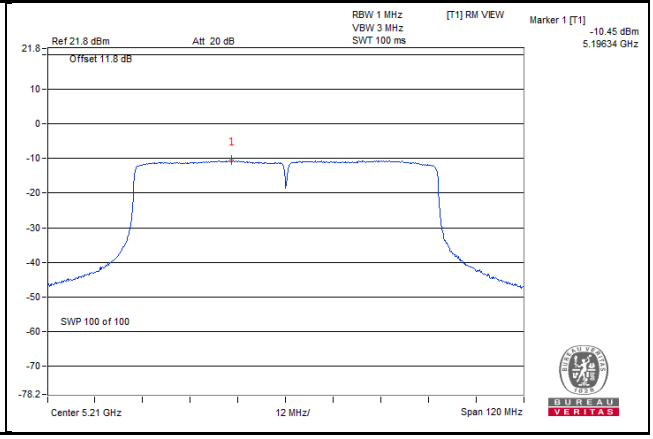
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



For U-NII-3 Band

Mode A

802.11a

Channel	Freq. (MHz)	PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	4.61	30	Pass
157	5785	4.79	30	Pass
165	5825	4.91	30	Pass

Mode B

802.11n (HT20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	149	5745	3.10	3.01	6.11	30	Pass
	157	5785	3.01	3.01	6.02	30	Pass
	165	5825	3.10	3.01	6.11	30	Pass
1	149	5745	2.79	3.01	5.80	30	Pass
	157	5785	3.07	3.01	6.08	30	Pass
	165	5825	3.20	3.01	6.21	30	Pass

Note: Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

802.11n (HT40)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	151	5755	-0.88	3.01	2.13	30	Pass
	159	5795	-0.24	3.01	2.77	30	Pass
1	151	5755	-0.91	3.01	2.10	30	Pass
	159	5795	-0.41	3.01	2.60	30	Pass

Note: Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

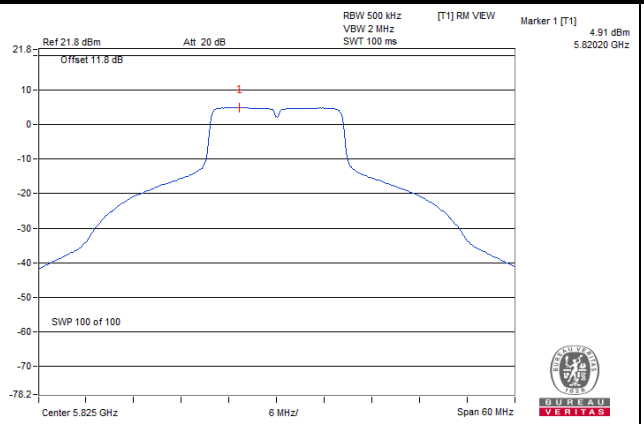
802.11ac (VHT80)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	155	5775	-2.90	3.01	0.11	30	Pass
1	155	5775	-3.14	3.01	-0.13	30	Pass

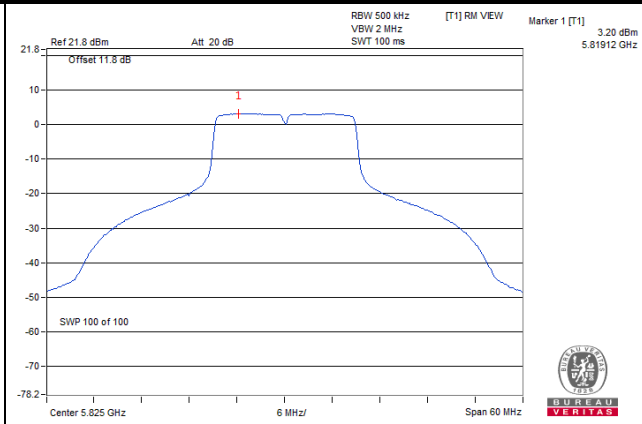
Note: Directional gain = 2 dBi + 10log(2) = 5.01 dBi > 6 dBi, so the limit no need to reduced.

Spectrum Plot of Worst Value

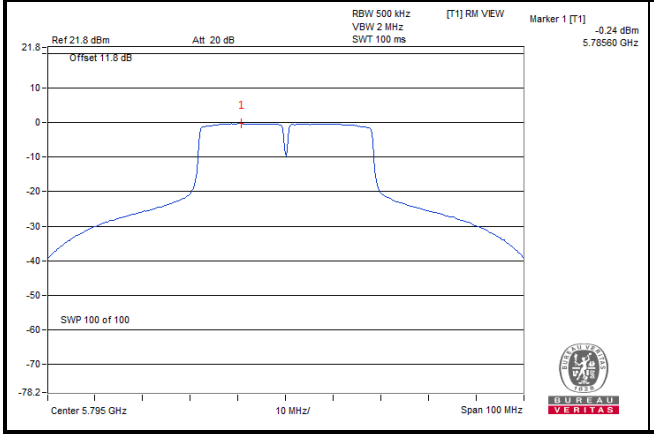
802.11a



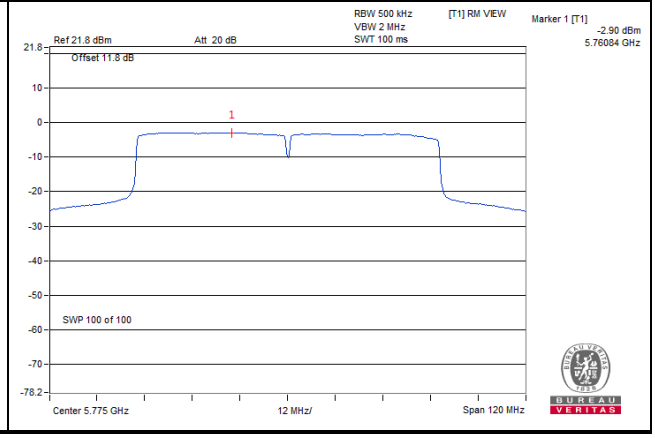
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

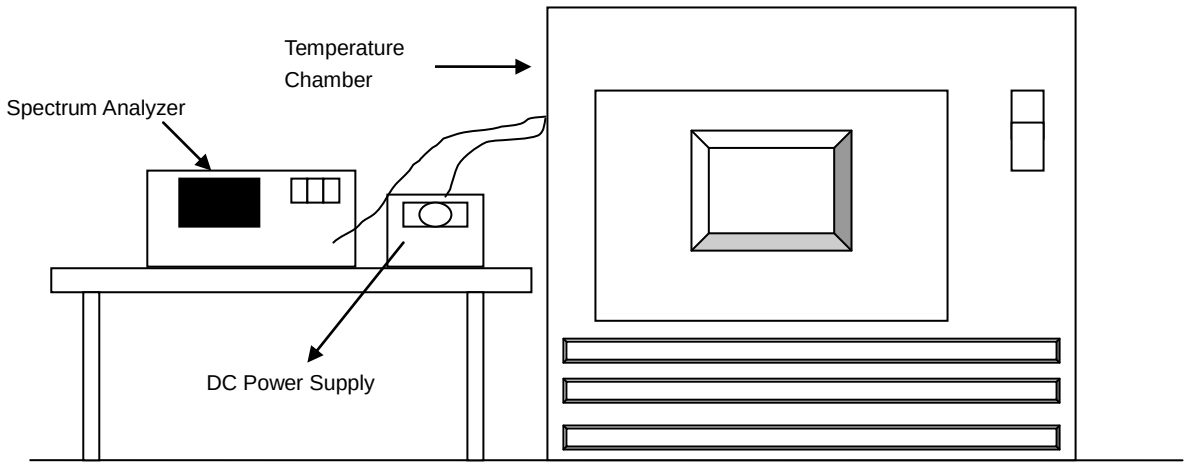


4.5 Frequency Stability

4.5.1 Limit of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.5.4 Test Procedure

a. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
b. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.
c. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5320 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	3.3	5179.989	-2.12000	5179.9844	-3.01000	5179.9847	-2.95000	5179.9863	-2.64000
40	3.3	5179.9807	-3.73000	5179.9788	-4.09000	5179.9826	-3.36000	5179.9823	-3.42000
30	3.3	5180.0211	4.07000	5180.0205	3.96000	5180.0188	3.63000	5180.0196	3.78000
20	3.3	5180.027	5.21000	5180.0254	4.90000	5180.0263	5.08000	5180.027	5.21000
10	3.3	5179.9801	-3.84000	5179.9764	-4.56000	5179.9769	-4.46000	5179.9794	-3.98000
0	3.3	5180.0188	3.63000	5180.0222	4.29000	5180.0224	4.32000	5180.0214	4.13000
-10	3.3	5180.0129	2.49000	5180.0112	2.16000	5180.0099	1.91000	5180.0133	2.57000
-20	3.3	5180.004	0.77000	5180.0069	1.33000	5180.0031	0.60000	5180.0073	1.41000
-30	3.3	5179.9922	-1.51000	5179.9883	-2.26000	5179.9894	-2.05000	5179.9906	-1.81000

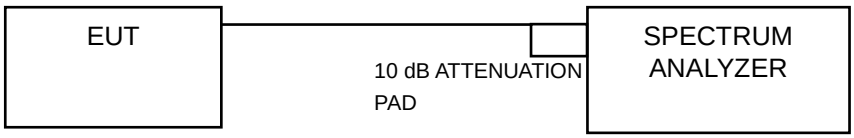
Frequency Stability Versus Temp.									
Operating Frequency: 5320 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	3.795	5180.0264	5.10000	5180.0249	4.81000	5180.0256	4.94000	5180.0263	5.08000
	3.3	5180.027	5.21000	5180.0254	4.90000	5180.0263	5.08000	5180.027	5.21000
	2.805	5180.0277	5.35000	5180.0263	5.08000	5180.027	5.21000	5180.0274	5.29000

4.6 6 dB Bandwidth Measurment

4.6.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100 kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

Mode A

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.44	0.5	Pass
157	5785	16.41	0.5	Pass
165	5825	16.45	0.5	Pass

Mode B

802.11n (HT20)

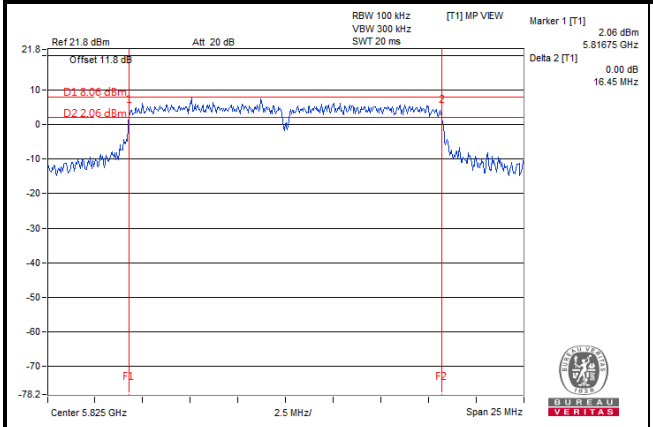
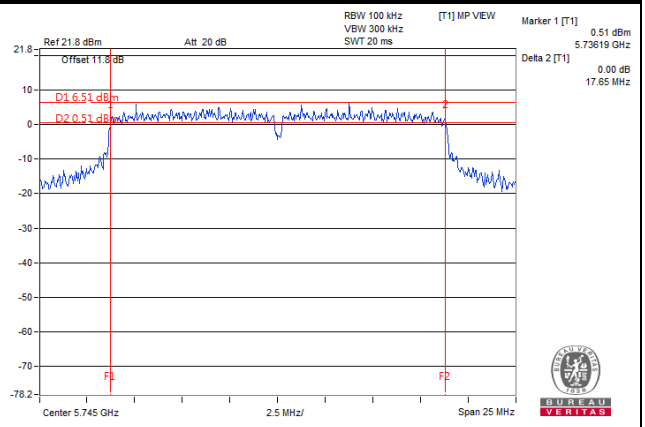
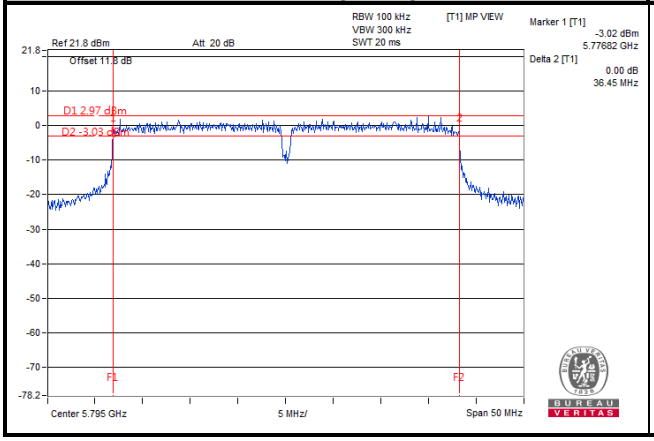
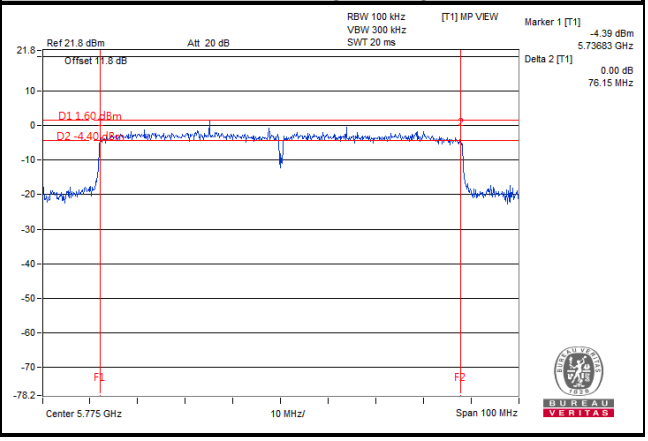
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.62	17.65	0.5	Pass
157	5785	17.61	17.61	0.5	Pass
165	5825	17.58	17.63	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.44	36.43	0.5	Pass
159	5795	36.39	36.45	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.15	75.85	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

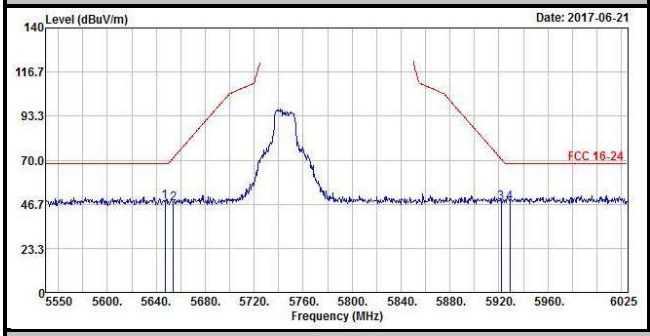
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emisison (OOBE) Measurement (For U-NII-3 band)

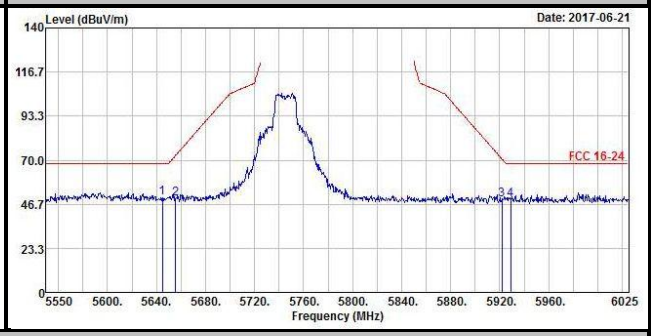
802.11a

Ch 149

Horizontal

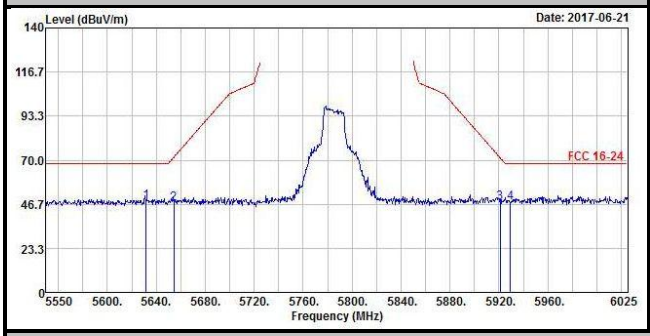


Vertical

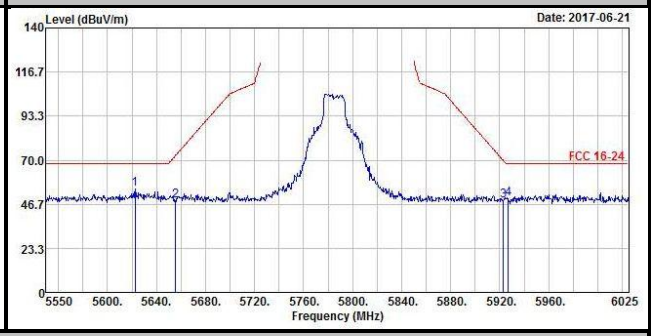


Ch 157

Horizontal

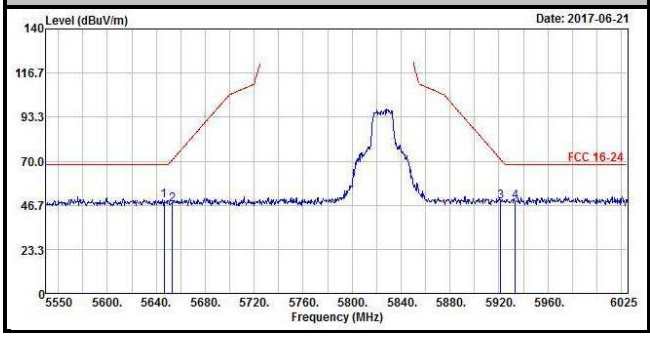


Vertical

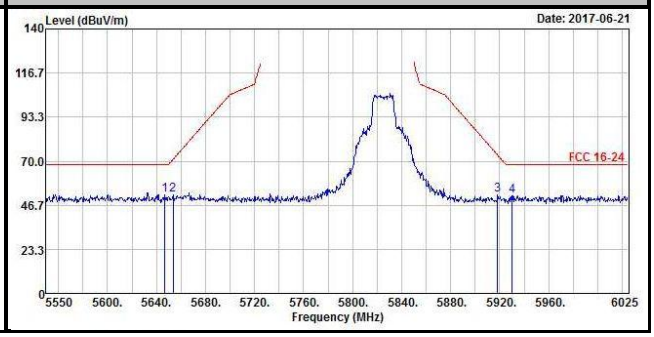


Ch 165

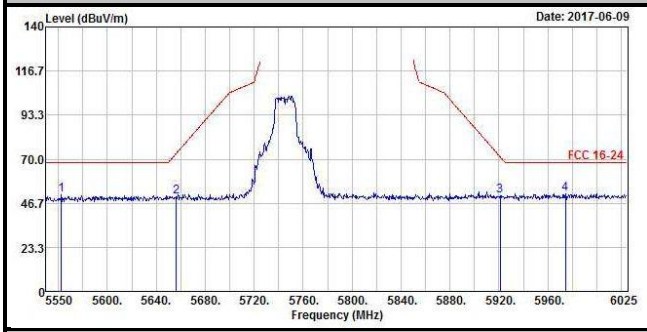
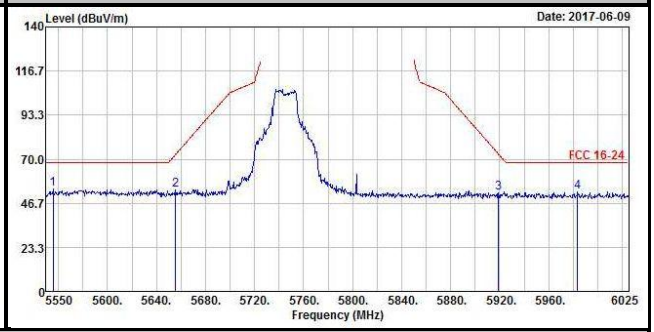
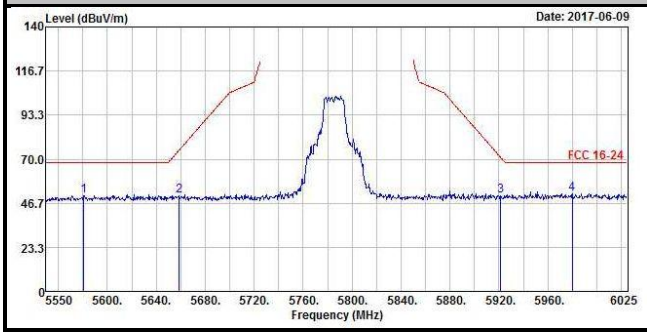
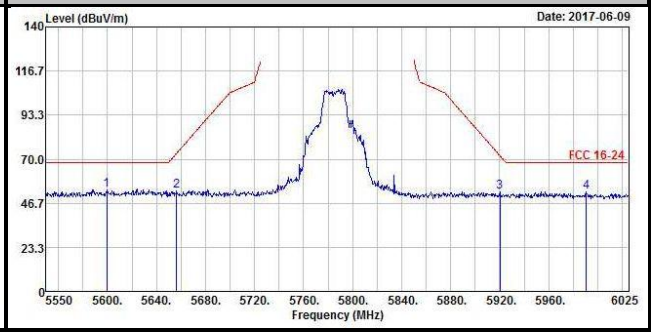
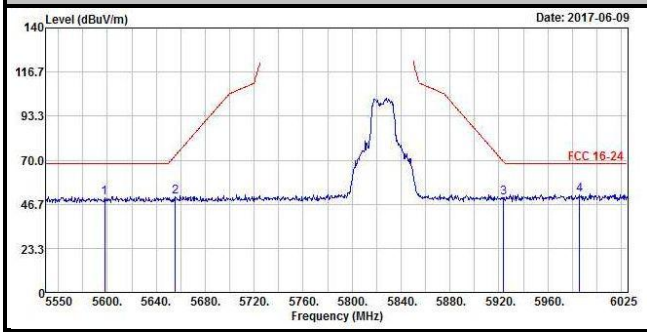
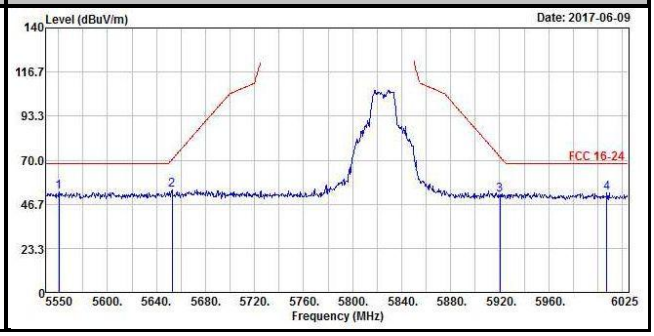
Horizontal



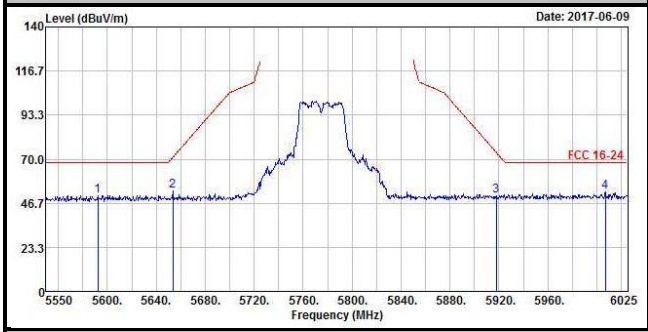
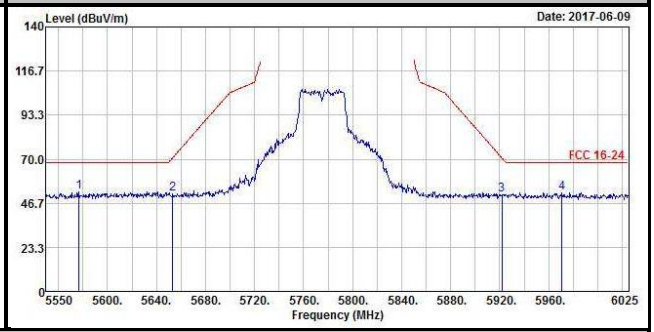
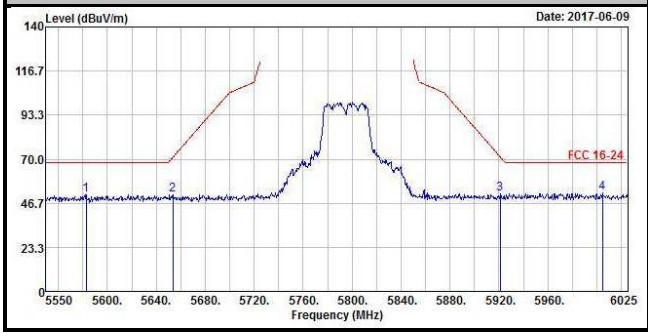
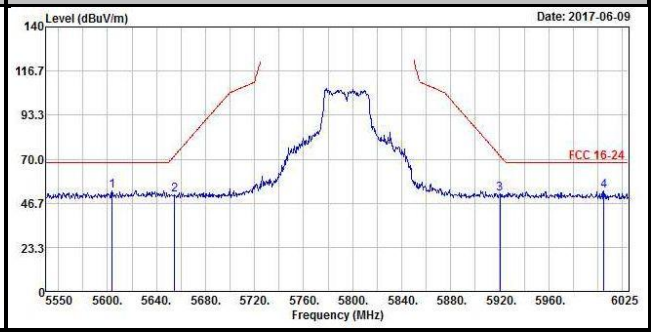
Vertical



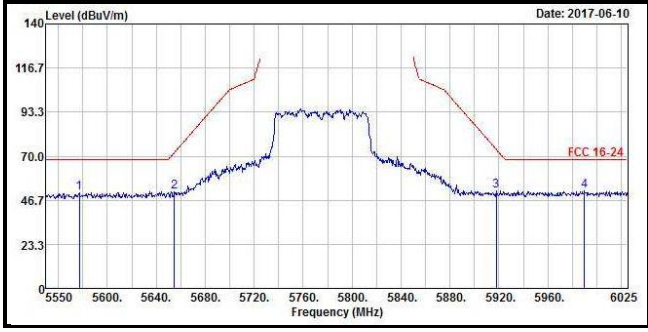
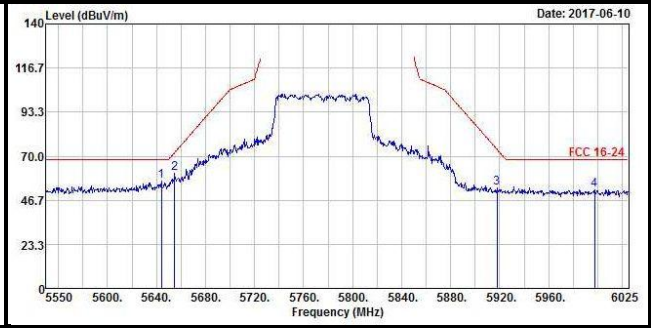
802.11n (HT20)

Ch 149	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
Ch 165	
Horizontal	Vertical
	

802.11n (HT40)

Ch 151	
Horizontal	Vertical
	
Ch 159	
Horizontal	Vertical
	

802.11ac (VHT80)

Ch 155	
Horizontal	Vertical
	

Appendix – Information on 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 accredited and approved according to ISO/IEC 17025.

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

Linko 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.

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