FCC Test Report

Report No.:	RF180608C05-1
FCC ID:	A8J-ECM955AP
Test Model:	ECM955AP
Received Date:	Jun. 08, 2018
Test Date:	Jun. 14 ~ Jun. 22, 2018
Issued Date:	Jul. 03, 2018
Applicant:	EnGenius Technologies
Address:	1580 Scenic Avenue, Costa Mesa, CA92626
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.)
FCC Registration / Designation Number:	788550 / TW0003

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180608C05-1	Original release.	Jul. 03, 2018

1 Certificate of Conformity

Product:	AC1300 Wave2 Dual Band Outdoor Cloud management Base Station
Brand:	EnGenius
Test Model:	ECM955AP
Sample Status:	Engineering sample
Applicant:	EnGenius Technologies
Test Date:	Jun. 14 ~ Jun. 22, 2018
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 RF characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Jul. 03, 2018

Suntee Liu / Specialist

Approved by :  , **Date:** Jul. 03, 2018

Bruce Chen / 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 -6.02dB at 0.46792MHz.
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 -1.4dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB 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	Antenna connector is N type. (The device is professionally installed)

*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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	200MHz ~1000MHz	3.87 dB
	1GHz ~ 18GHz	2.29 dB
Radiated Emissions above 1 GHz	18GHz ~ 40GHz	2.29 dB
	30MHz ~ 200MHz	3.86 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1300 Wave2 Dual Band Outdoor Cloud management Base Station
Brand	EnGenius
Test Model	ECM955AP
Sample Status	Engineering sample
Power Supply Rating	54Vdc (POE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180~5240MHz: 295.170mW 5745~5825MHz: 551.524mW Beamforming Mode: 5180~5240MHz: 147.251mW 5745~5825MHz: 275.781mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	POE, Antenna: Scanning radio*1/GPS*1/2.4GHz*2/5GHz*2 (GPS: 1m non-shielded cable)
Cable Supplied	1.75m non-shielded ground cable without core

Note:

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

Modulation Mode	TX Function	Beamforming
802.11a	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT80)	2TX	Support

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
* For 802.11n and 802.11ac, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT uses following POE.

Brand	EnGenius
Model	EPA5012GR
Input Power	100-240Vac, 1.5A, 50-60Hz
Output Power	54Vdc, 1.11A PIN 3,4,5,6: 54V PIN 1,2,7,8: RETURN
Power Line	0.55m non-shielded AC cable without core

3. The EUT uses following antenna.

Radio	Frequency	Antenna Type	Antenna Connector	Gain (dBi)
1	2.4GHz	Omni	N type	5
2	5GHz	Omni	N type	7
3	2.4GHz	Dipole	RSMA	4.5
(RX only)	5GHz	Dipole	RSMA	6

4. The EUT will be installed at outdoor area, the highest antenna gains from the horizon above 30 degrees are as below, for more detail information please refer to antenna specification and user manual.

Antenna gain (dBi)	Antenna install degree
-3.887	
The elevation gain from the pattern XZ and YZ should be 0-60 degree and 300-360 degree gain is -3.887 dBi.	

5. Radio 1 & Radio 2 technologies can transmit at same time.
6. Spurious emission of the simultaneous operation (Radio 1 & Radio 2) has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	Radio 2
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5	
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5	
	802.11ac (VHT80)		42	42	OFDM	29.3	
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	
	802.11n (HT20)		144 to 165	149, 157, 165	OFDM	6.5	
	802.11n (HT40)		142 to 159	151, 159	OFDM	13.5	
	802.11ac (VHT80)		138 to 155	155	OFDM	29.3	

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
-	802.11a	5180-5240	36 to 48	165	OFDM	6.0	Radio 2
	802.11a	5745-5825	149 to 165		OFDM	6.5	

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	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
-	802.11a	5180-5240	36 to 48	165	OFDM	6.0	Radio 2
	802.11a	5745-5825	149 to 165		OFDM	6.5	

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	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	Radio 2
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5	
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5	
	802.11ac (VHT80)		42	42	OFDM	29.3	
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	
	802.11n (HT20)		144 to 165	149, 157, 165	OFDM	6.5	
	802.11n (HT40)		142 to 159	151, 159	OFDM	13.5	
	802.11ac (VHT80)		138 to 155	155	OFDM	29.3	

Test Condition:

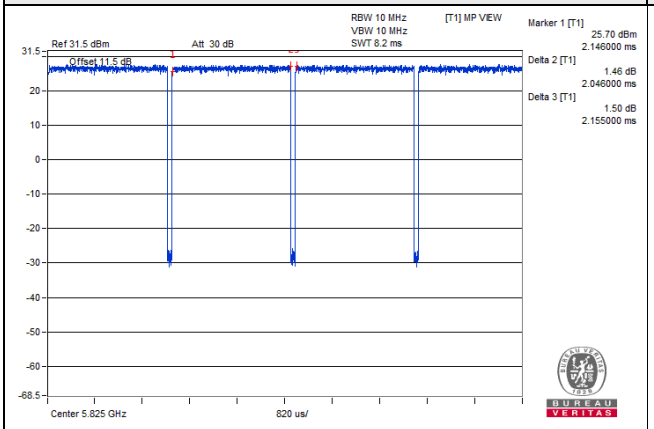
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	24 deg. C, 69% RH 23 deg. C, 66% RH	120Vac, 60Hz	Willy Cheng Adair Peng
RE<1G	24 deg. C, 69% RH	120Vac, 60Hz	Willy Cheng
PLC	24 deg. C, 64% RH	120Vac, 60Hz	Willy Cheng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

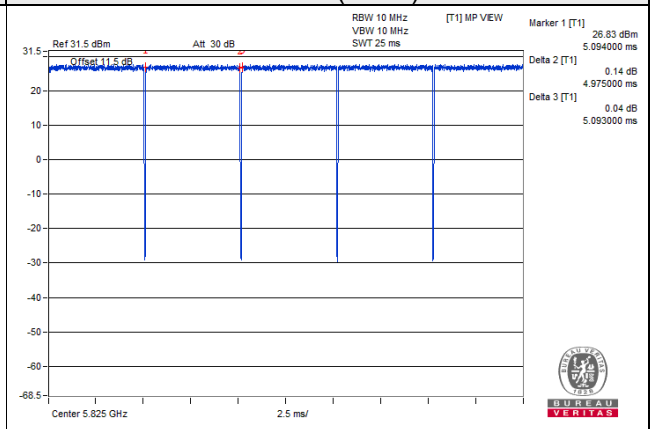
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.046/2.155 = 0.949, Duty factor = 10 * log(1/0.949) = 0.23
802.11n (HT20): Duty cycle = 4.975/5.093 = 0.977, Duty factor = 10 * log(1/0.977) = 0.10
802.11n (HT40): Duty cycle = 2.415/2.513 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17
802.11ac (VHT80): Duty cycle = 1.132/1.234 = 0.917, Duty factor = 10 * log(1/0.917) = 0.37

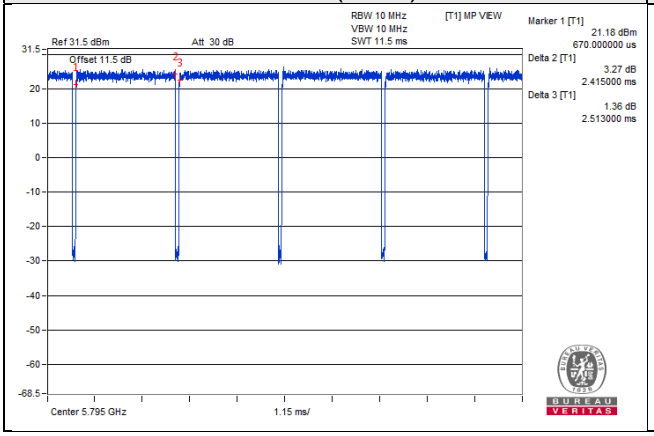
802.11a



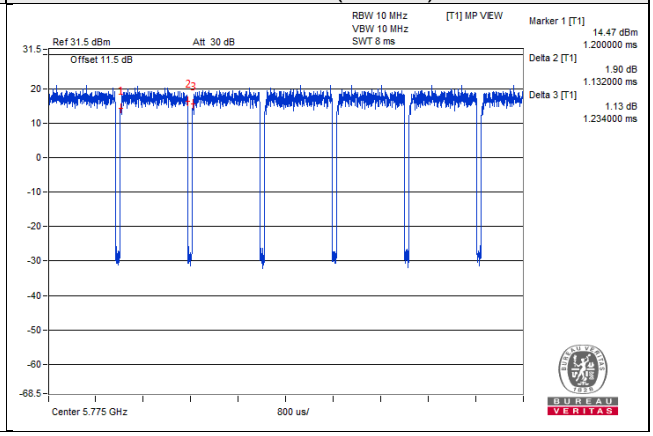
802.11n (HT20)



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.

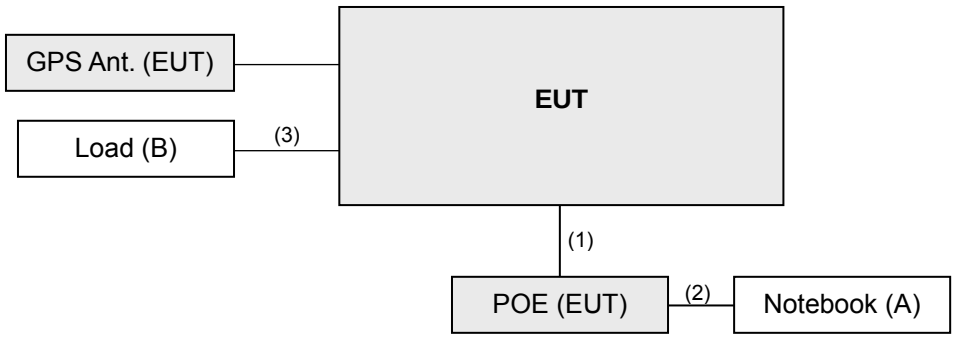
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	5	N	0	-
2.	RJ45, Cat5e	1	1.5	N	0	-
3.	RJ45, Cat5e	1	2	N	0	-

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)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

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.

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2 (dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8 (dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*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.</td></tr>
</table>

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).

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM-8000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 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 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

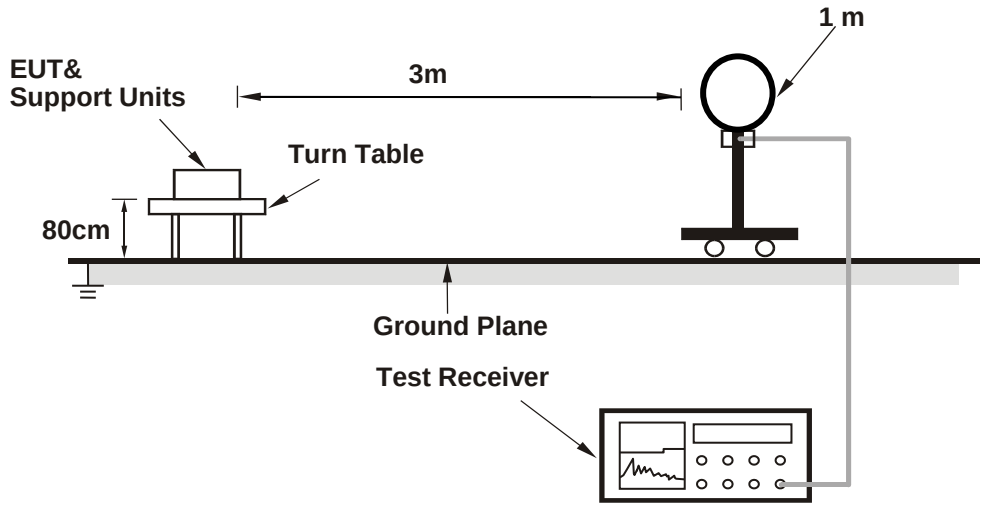
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

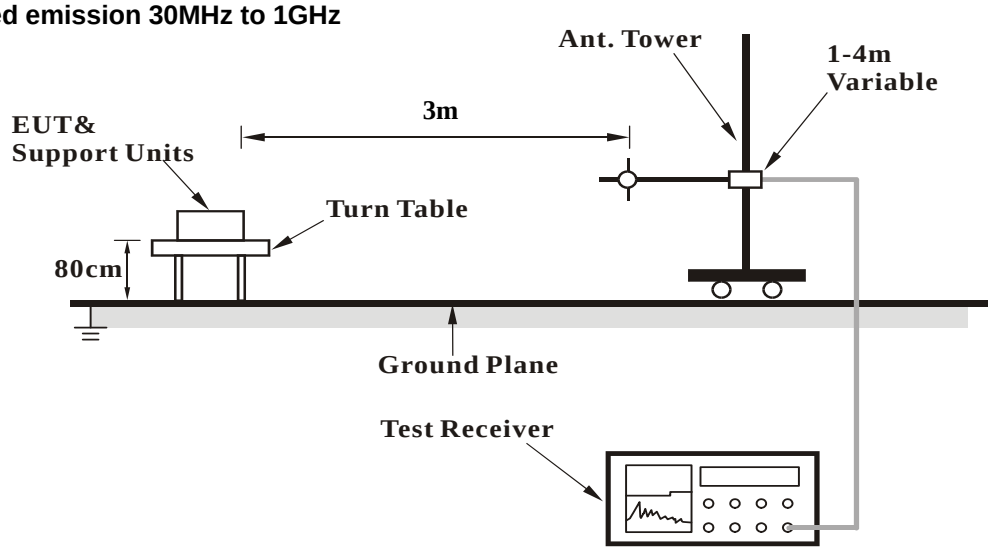
No deviation.

4.1.5 Test Setup

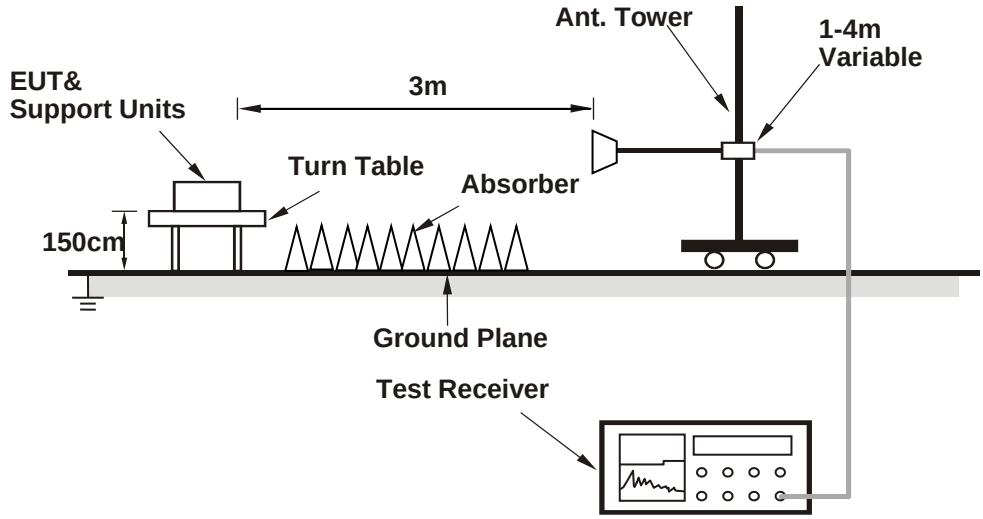
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.3 PK	74.0	-18.7	1.83 H	264	51.4	3.9
2	5150.00	42.4 AV	54.0	-11.6	1.83 H	264	38.5	3.9
3	*5180.00	98.7 PK			1.78 H	238	59.1	39.6
4	*5180.00	87.8 AV			1.78 H	238	48.2	39.6
5	#10360.00	57.4 PK	74.0	-16.6	2.63 H	289	41.6	15.8
6	#10360.00	43.7 AV	54.0	-10.3	2.63 H	289	27.9	15.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.1 PK	74.0	-4.9	2.03 V	356	65.2	3.9
2	5150.00	52.5 AV	54.0	-1.5	2.03 V	356	48.6	3.9
3	*5180.00	118.9 PK			2.00 V	354	79.3	39.6
4	*5180.00	108.6 AV			2.00 V	354	69.0	39.6
5	#10360.00	57.5 PK	74.0	-16.5	1.63 V	231	41.7	15.8
6	#10360.00	44.3 AV	54.0	-9.7	1.63 V	231	28.5	15.8

Remarks:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	100.9 PK			1.42 H	230	61.3	39.6
2	*5200.00	90.4 AV			1.42 H	230	50.8	39.6
3	#10400.00	57.3 PK	74.0	-16.7	2.82 H	236	41.4	15.9
4	#10400.00	44.1 AV	54.0	-9.9	2.82 H	236	28.2	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	121.6 PK			1.99 V	354	82.0	39.6
2	*5200.00	110.9 AV			1.99 V	354	71.3	39.6
3	#10400.00	57.5 PK	74.0	-16.5	1.82 V	163	41.6	15.9
4	#10400.00	44.1 AV	54.0	-9.9	1.82 V	163	28.2	15.9

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	100.5 PK			1.43 H	234	61.1	39.4
2	*5240.00	89.7 AV			1.43 H	234	50.3	39.4
3	5350.00	55.5 PK	74.0	-18.5	1.44 H	236	51.5	4.0
4	5350.00	42.8 AV	54.0	-11.2	1.44 H	236	38.8	4.0
5	#10480.00	58.6 PK	74.0	-15.4	2.96 H	233	41.9	16.7
6	#10480.00	44.7 AV	54.0	-9.3	2.96 H	233	28.0	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.3 PK			1.94 V	351	81.9	39.4
2	*5240.00	110.7 AV			1.94 V	351	71.3	39.4
3	5350.00	57.3 PK	74.0	-16.7	1.95 V	352	53.3	4.0
4	5350.00	45.8 AV	54.0	-8.2	1.95 V	352	41.8	4.0
5	#10480.00	58.2 PK	74.0	-15.8	1.85 V	166	41.5	16.7
6	#10480.00	44.8 AV	54.0	-9.2	1.85 V	166	28.1	16.7

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5609.60	56.1 PK	68.2	-12.1	2.83 H	144	51.6	4.5
2	*5745.00	104.6 PK			2.83 H	144	64.5	40.1
3	*5745.00	93.8 AV			2.83 H	144	53.7	40.1
4	#5935.20	56.8 PK	68.2	-11.4	2.83 H	144	51.7	5.1
5	11490.00	60.1 PK	74.0	-13.9	1.61 H	357	42.5	17.6
6	11490.00	46.9 AV	54.0	-7.1	1.61 H	357	29.3	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.40	56.9 PK	68.2	-11.3	2.06 V	352	52.3	4.6
2	*5745.00	124.9 PK			2.06 V	352	84.8	40.1
3	*5745.00	114.2 AV			2.06 V	352	74.1	40.1
4	#5982.40	57.3 PK	68.2	-10.9	2.06 V	352	52.0	5.3
5	11490.00	60.5 PK	74.0	-13.5	2.15 V	217	42.9	17.6
6	11490.00	47.3 AV	54.0	-6.7	2.15 V	217	29.7	17.6

Remarks:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5627.20	56.7 PK	68.2	-11.5	2.81 H	139	52.2	4.5
2	*5785.00	105.3 PK			2.81 H	139	65.0	40.3
3	*5785.00	94.5 AV			2.81 H	139	54.2	40.3
4	#5952.80	57.6 PK	68.2	-10.6	2.81 H	139	52.4	5.2
5	11570.00	60.6 PK	74.0	-13.4	1.70 H	350	42.7	17.9
6	11570.00	47.3 AV	54.0	-6.7	1.70 H	350	29.4	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.20	56.1 PK	68.2	-12.1	2.06 V	351	51.6	4.5
2	*5785.00	124.5 PK			2.06 V	351	84.2	40.3
3	*5785.00	114.1 AV			2.06 V	351	73.8	40.3
4	#5933.60	57.9 PK	68.2	-10.3	2.06 V	351	52.7	5.2
5	11570.00	60.9 PK	74.0	-13.1	2.25 V	222	43.0	17.9
6	11570.00	47.4 AV	54.0	-6.6	2.25 V	222	29.5	17.9

Remarks:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5611.20	55.7 PK	68.2	-12.5	2.83 H	224	51.2	4.5
2	*5825.00	106.5 PK			2.83 H	224	66.0	40.5
3	*5825.00	95.8 AV			2.83 H	224	55.3	40.5
4	#5936.00	57.1 PK	68.2	-11.1	2.83 H	224	52.0	5.1
5	11650.00	60.6 PK	74.0	-13.4	1.69 H	354	43.1	17.5
6	11650.00	46.9 AV	54.0	-7.1	1.69 H	354	29.4	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	56.2 PK	68.2	-12.0	2.10 V	349	51.6	4.6
2	*5825.00	125.2 PK			2.10 V	349	84.7	40.5
3	*5825.00	114.4 AV			2.10 V	349	73.9	40.5
4	#5925.60	59.2 PK	68.2	-9.0	2.10 V	349	54.0	5.2
5	11650.00	60.6 PK	74.0	-13.4	2.21 V	220	43.1	17.5
6	11650.00	47.0 AV	54.0	-7.0	2.21 V	220	29.5	17.5

Remarks:

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

802.11n (HT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.5 PK	74.0	-18.5	2.63 H	189	51.6	3.9
2	5150.00	42.4 AV	54.0	-11.6	2.63 H	189	38.5	3.9
3	*5180.00	98.5 PK			3.20 H	210	58.9	39.6
4	*5180.00	87.7 AV			3.20 H	210	48.1	39.6
5	#10360.00	57.4 PK	74.0	-16.6	2.18 H	103	41.6	15.8
6	#10360.00	43.6 AV	54.0	-10.4	2.18 H	103	27.8	15.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.6 PK	74.0	-5.4	2.03 V	342	64.7	3.9
2	5150.00	52.4 AV	54.0	-1.6	2.03 V	342	48.5	3.9
3	*5180.00	119.5 PK			2.01 V	353	79.9	39.6
4	*5180.00	108.6 AV			2.01 V	353	69.0	39.6
5	#10360.00	57.3 PK	74.0	-16.7	1.83 V	231	41.5	15.8
6	#10360.00	44.0 AV	54.0	-10.0	1.83 V	231	28.2	15.8

Remarks:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	101.8 PK			1.42 H	230	62.2	39.6
2	*5200.00	90.8 AV			1.42 H	230	51.2	39.6
3	#10400.00	57.9 PK	74.0	-16.1	2.05 H	168	42.0	15.9
4	#10400.00	44.0 AV	54.0	-10.0	2.05 H	168	28.1	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	121.6 PK			2.06 V	353	82.0	39.6
2	*5200.00	110.8 AV			2.06 V	353	71.2	39.6
3	#10400.00	58.0 PK	74.0	-16.0	1.66 V	203	42.1	15.9
4	#10400.00	44.3 AV	54.0	-9.7	1.66 V	203	28.4	15.9

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	101.0 PK			1.42 H	234	61.6	39.4
2	*5240.00	90.2 AV			1.42 H	234	50.8	39.4
3	5350.00	55.5 PK	74.0	-18.5	1.55 H	196	51.5	4.0
4	5350.00	42.6 AV	54.0	-11.4	1.55 H	196	38.6	4.0
5	#10480.00	58.2 PK	74.0	-15.8	2.21 H	136	41.5	16.7
6	#10480.00	44.8 AV	54.0	-9.2	2.21 H	136	28.1	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.9 PK			2.06 V	354	82.5	39.4
2	*5240.00	110.9 AV			2.06 V	354	71.5	39.4
3	5350.00	57.3 PK	74.0	-16.7	1.96 V	352	53.3	4.0
4	5350.00	45.8 AV	54.0	-8.2	1.96 V	352	41.8	4.0
5	#10480.00	58.9 PK	74.0	-15.1	1.72 V	254	42.2	16.7
6	#10480.00	44.9 AV	54.0	-9.1	1.72 V	254	28.2	16.7

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5616.80	55.8 PK	68.2	-12.4	2.56 H	201	51.3	4.5
2	*5745.00	106.0 PK			2.56 H	201	65.9	40.1
3	*5745.00	94.9 AV			2.56 H	201	54.8	40.1
4	#5973.60	57.0 PK	68.2	-11.2	2.56 H	201	51.7	5.3
5	11490.00	60.4 PK	74.0	-13.6	1.88 H	348	42.8	17.6
6	11490.00	47.0 AV	54.0	-7.0	1.88 H	348	29.4	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	57.0 PK	68.2	-11.2	2.14 V	359	52.4	4.6
2	*5745.00	124.6 PK			2.14 V	359	84.5	40.1
3	*5745.00	113.7 AV			2.14 V	359	73.6	40.1
4	#5936.80	57.5 PK	68.2	-10.7	2.14 V	359	52.4	5.1
5	11490.00	60.6 PK	74.0	-13.4	2.11 V	220	43.0	17.6
6	11490.00	47.5 AV	54.0	-6.5	2.11 V	220	29.9	17.6

Remarks:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5611.20	56.4 PK	68.2	-11.8	3.04 H	197	51.9	4.5
2	*5785.00	105.5 PK			3.04 H	197	65.2	40.3
3	*5785.00	94.5 AV			3.04 H	197	54.2	40.3
4	#5938.40	56.8 PK	68.2	-11.4	3.04 H	197	51.7	5.1
5	11570.00	60.7 PK	74.0	-13.3	1.71 H	359	42.8	17.9
6	11570.00	47.0 AV	54.0	-7.0	1.71 H	359	29.1	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.00	56.5 PK	68.2	-11.7	2.03 V	354	52.0	4.5
2	*5785.00	124.1 PK			2.03 V	354	83.8	40.3
3	*5785.00	113.5 AV			2.03 V	354	73.2	40.3
4	#5926.40	58.2 PK	68.2	-10.0	2.03 V	354	53.0	5.2
5	11570.00	60.9 PK	74.0	-13.1	2.09 V	210	43.0	17.9
6	11570.00	47.3 AV	54.0	-6.7	2.09 V	210	29.4	17.9

Remarks:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5621.60	55.5 PK	68.2	-12.7	3.04 H	197	51.0	4.5
2	*5825.00	104.7 PK			3.00 H	199	64.2	40.5
3	*5825.00	94.1 AV			3.00 H	199	53.6	40.5
4	#5972.00	57.3 PK	68.2	-10.9	3.04 H	197	52.0	5.3
5	11650.00	59.6 PK	74.0	-14.4	1.79 H	343	42.1	17.5
6	11650.00	46.2 AV	54.0	-7.8	1.79 H	343	28.7	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.00	56.1 PK	68.2	-12.1	2.01 V	349	51.6	4.5
2	*5825.00	124.7 PK			2.01 V	349	84.2	40.5
3	*5825.00	113.8 AV			2.01 V	349	73.3	40.5
4	#5925.60	59.0 PK	68.2	-9.2	2.01 V	349	53.8	5.2
5	11650.00	59.8 PK	74.0	-14.2	2.22 V	210	42.3	17.5
6	11650.00	46.6 AV	54.0	-7.4	2.22 V	210	29.1	17.5

Remarks:

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

802.11n (HT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.7 PK	74.0	-18.3	1.51 H	246	51.8	3.9
2	5150.00	42.5 AV	54.0	-11.5	1.51 H	246	38.6	3.9
3	*5190.00	93.2 PK			1.43 H	234	53.6	39.6
4	*5190.00	82.9 AV			1.43 H	234	43.3	39.6
5	#10380.00	57.3 PK	74.0	-16.7	2.56 H	158	41.4	15.9
6	#10380.00	44.1 AV	54.0	-9.9	2.56 H	158	28.2	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.1 PK	74.0	-7.9	2.03 V	354	62.2	3.9
2	**5150.00**	**52.6 AV**	**54.0**	**-1.4**	**2.03 V**	**354**	**48.7**	**3.9**
3	*5190.00	114.5 PK			2.01 V	354	74.9	39.6
4	*5190.00	104.1 AV			2.01 V	354	64.5	39.6
5	#10380.00	57.7 PK	74.0	-16.3	2.21 V	237	41.8	15.9
6	#10380.00	44.2 AV	54.0	-9.8	2.21 V	237	28.3	15.9

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	97.9 PK			1.44 H	232	58.5	39.4
2	*5230.00	87.5 AV			1.44 H	232	48.1	39.4
3	5350.00	56.0 PK	74.0	-18.0	1.68 H	209	52.0	4.0
4	5350.00	42.8 AV	54.0	-11.2	1.68 H	209	38.8	4.0
5	#10460.00	57.8 PK	74.0	-16.2	1.96 H	267	41.4	16.4
6	#10460.00	44.5 AV	54.0	-9.5	1.96 H	267	28.1	16.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	118.4 PK			1.98 V	355	79.0	39.4
2	*5230.00	107.9 AV			1.98 V	355	68.5	39.4
3	5350.00	57.1 PK	74.0	-16.9	2.03 V	344	53.1	4.0
4	5350.00	45.3 AV	54.0	-8.7	2.03 V	344	41.3	4.0
5	#10460.00	57.9 PK	74.0	-16.1	1.83 V	226	41.5	16.4
6	#10460.00	44.3 AV	54.0	-9.7	1.83 V	226	27.9	16.4

Remarks:

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

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.80	56.9 PK	68.2	-11.3	3.40 H	133	52.4	4.5
2	#5650.00	55.5 PK	68.2	-12.7	3.33 H	141	50.9	4.6
3	*5755.00	103.8 PK			3.40 H	133	63.7	40.1
4	*5755.00	93.8 AV			3.40 H	133	53.7	40.1
5	#5944.80	59.7 PK	68.2	-8.5	3.40 H	133	54.5	5.2
6	11510.00	59.5 PK	74.0	-14.5	1.81 H	333	41.9	17.6
7	11510.00	46.3 AV	54.0	-7.7	1.81 H	333	28.7	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	65.2 PK	68.2	-3.0	2.00 V	248	60.6	4.6
2	#5650.00	66.6 PK	68.2	-1.6	2.17 V	348	62.0	4.6
3	*5755.00	119.0 PK			2.00 V	348	78.9	40.1
4	*5755.00	109.0 AV			2.00 V	348	68.9	40.1
5	#5928.80	60.6 PK	68.2	-7.6	2.00 V	348	55.4	5.2
6	11510.00	59.8 PK	74.0	-14.2	2.22 V	229	42.2	17.6
7	11510.00	46.7 AV	54.0	-7.3	2.22 V	229	29.1	17.6

Remarks:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.20	57.5 PK	68.2	-10.7	3.40 H	130	52.9	4.6
2	*5795.00	104.3 PK			3.40 H	130	64.0	40.3
3	*5795.00	93.8 AV			3.40 H	130	53.5	40.3
4	#5925.00	57.7 PK	68.2	-10.5	3.21 H	149	52.5	5.2
5	#5954.40	58.9 PK	68.2	-9.3	3.40 H	130	53.7	5.2
6	11590.00	59.7 PK	74.0	-14.3	1.69 H	315	41.8	17.9
7	11590.00	46.7 AV	54.0	-7.3	1.69 H	315	28.8	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.80	58.0 PK	68.2	-10.2	2.06 V	184	53.4	4.6
2	*5795.00	120.4 PK			2.06 V	184	80.1	40.3
3	*5795.00	110.0 AV			2.06 V	184	69.7	40.3
4	#5925.00	66.7 PK	68.2	-1.5	2.08 V	185	61.5	5.2
5	#5930.40	66.7 PK	68.2	-1.5	2.06 V	184	61.5	5.2
6	11590.00	60.0 PK	74.0	-14.0	2.29 V	211	42.1	17.9
7	11590.00	46.9 AV	54.0	-7.1	2.29 V	211	29.0	17.9

Remarks:

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

802.11ac (VHT80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.3 PK	74.0	-18.7	1.45 H	241	51.4	3.9
2	5150.00	42.4 AV	54.0	-11.6	1.45 H	241	38.5	3.9
3	*5210.00	90.1 PK			1.43 H	233	50.6	39.5
4	*5210.00	79.4 AV			1.43 H	233	39.9	39.5
5	5350.00	55.8 PK	74.0	-18.2	1.88 H	231	51.8	4.0
6	5350.00	42.4 AV	54.0	-11.6	1.88 H	231	38.4	4.0
7	#10420.00	57.8 PK	74.0	-16.2	2.64 H	196	41.8	16.0
8	#10420.00	44.6 AV	54.0	-9.4	2.64 H	196	28.6	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.5 PK	74.0	-8.5	2.02 V	355	61.6	3.9
2	5150.00	52.3 AV	54.0	-1.7	2.02 V	355	48.4	3.9
3	*5210.00	110.5 PK			2.02 V	352	71.0	39.5
4	*5210.00	100.0 AV			2.02 V	352	60.5	39.5
5	5350.00	58.9 PK	74.0	-15.1	1.96 V	336	54.9	4.0
6	5350.00	45.8 AV	54.0	-8.2	1.96 V	336	41.8	4.0
7	#10420.00	57.1 PK	74.0	-16.9	1.86 V	254	41.1	16.0
8	#10420.00	44.6 AV	54.0	-9.4	1.86 V	254	28.6	16.0

Remarks:

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

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5649.60	57.5 PK	68.2	-10.7	3.37 H	131	52.9	4.6
2	#5650.00	56.0 PK	68.2	-12.2	2.91 H	140	51.4	4.6
3	*5775.00	96.5 PK			3.37 H	131	56.3	40.2
4	*5775.00	86.5 AV			3.37 H	131	46.3	40.2
5	#5925.00	56.7 PK	68.2	-11.5	3.21 H	139	51.5	5.2
6	#5944.80	59.2 PK	68.2	-9.0	3.37 H	131	54.0	5.2
7	11550.00	59.8 PK	74.0	-14.2	1.76 H	321	42.0	17.8
8	11550.00	46.8 AV	54.0	-7.2	1.76 H	321	29.0	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5649.60	62.3 PK	68.2	-5.9	2.05 V	185	57.7	4.6
2	#5650.00	66.4 PK	68.2	-1.8	2.27 V	186	61.8	4.6
3	*5775.00	113.5 PK			2.05 V	185	73.3	40.2
4	*5775.00	102.8 AV			2.05 V	185	62.6	40.2
5	#5925.00	66.7 PK	68.2	-1.5	2.19 V	189	61.5	5.2
6	#5928.80	64.6 PK	68.2	-3.6	2.05 V	185	59.4	5.2
7	11550.00	60.6 PK	74.0	-13.4	2.31 V	228	42.8	17.8
8	11550.00	47.2 AV	54.0	-6.8	2.31 V	228	29.4	17.8

Remarks:

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

Below 1GHz worst-case data: 802.11a

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.12	29.6 QP	40.0	-10.4	2.00 H	183	39.1	-9.5
2	97.95	33.0 QP	43.5	-10.5	2.00 H	165	46.7	-13.7
3	125.17	28.3 QP	43.5	-15.2	1.49 H	319	39.2	-10.9
4	206.83	31.8 QP	43.5	-11.7	1.00 H	106	43.3	-11.5
5	296.27	28.4 QP	46.0	-17.6	1.00 H	143	35.6	-7.2
6	346.82	26.1 QP	46.0	-19.9	1.00 H	76	32.5	-6.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	36.1 QP	40.0	-3.9	1.00 V	345	45.4	-9.3
2	64.90	36.8 QP	40.0	-3.2	1.00 V	1	47.1	-10.3
3	90.17	32.4 QP	43.5	-11.1	1.49 V	143	47.1	-14.7
4	160.17	27.2 QP	43.5	-16.3	1.00 V	191	35.9	-8.7
5	199.05	27.1 QP	43.5	-16.4	1.00 V	242	38.6	-11.5
6	339.04	25.4 QP	46.0	-20.6	1.49 V	112	31.7	-6.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. 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 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 06, 2018	Mar. 05, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.4	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.

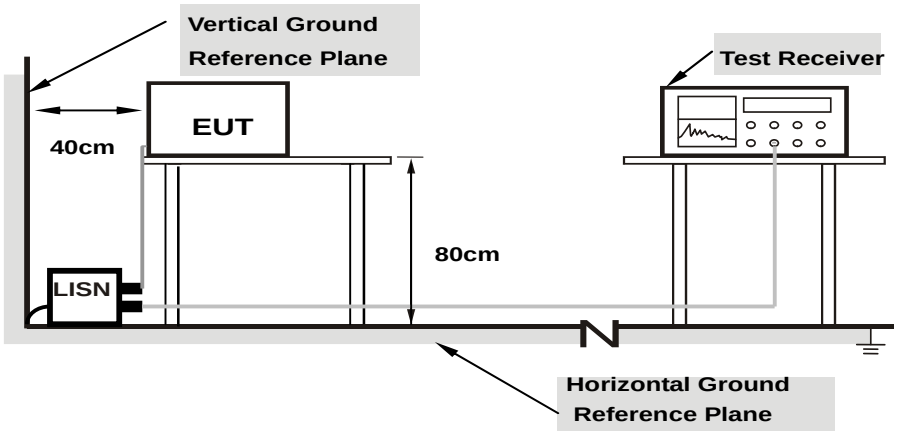
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

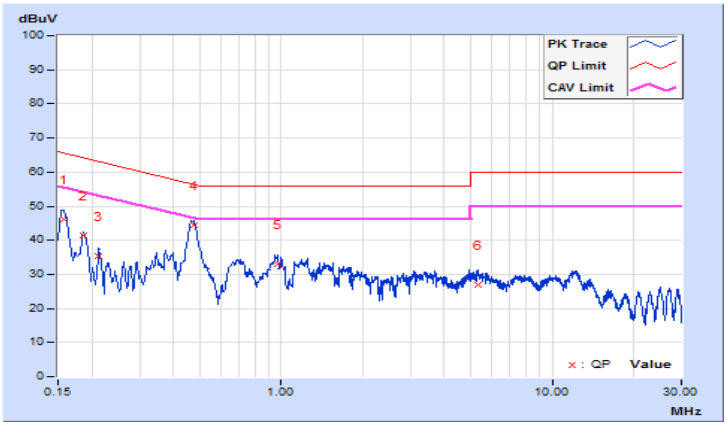
Worst-case data: 802.11a

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15719	10.10	36.10	22.99	46.20	33.09	65.61	55.61	-19.41	-22.52
2	0.18519	10.10	31.39	19.95	41.49	30.05	64.25	54.25	-22.76	-24.20
3	0.21256	10.10	25.37	14.37	35.47	24.47	63.10	53.10	-27.63	-28.63
4	0.47412	10.12	34.49	28.59	44.61	38.71	56.44	46.44	-11.83	-7.73
5	0.97084	10.14	22.94	19.05	33.08	29.19	56.00	46.00	-22.92	-16.81
6	5.35421	10.36	16.74	10.40	27.10	20.76	60.00	50.00	-32.90	-29.24

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.

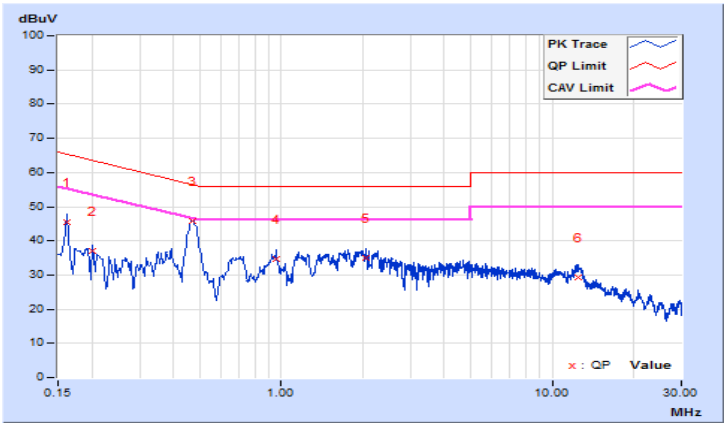


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16181	10.10	35.46	21.79	45.56	31.89	65.37	55.37	-19.81	-23.48
2	0.20084	10.10	26.91	16.19	37.01	26.29	63.58	53.58	-26.57	-27.29
3	**0.46792**	**10.12**	**35.52**	**30.41**	**45.64**	**40.53**	**56.55**	**46.55**	**-10.91**	**-6.02**
4	0.95937	10.13	24.44	21.21	34.57	31.34	56.00	46.00	-21.43	-14.66
5	2.05026	10.18	24.88	20.23	35.06	30.41	56.00	46.00	-20.94	-15.59
6	12.51342	10.63	18.68	13.87	29.31	24.50	60.00	50.00	-30.69	-25.50

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 Measurement

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

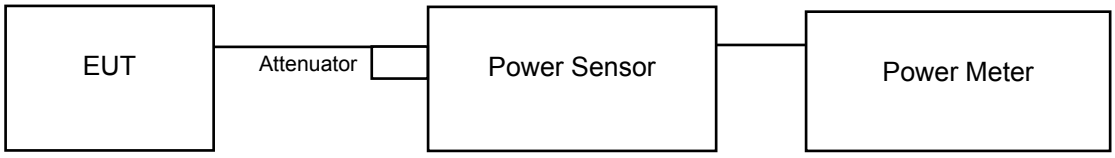
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

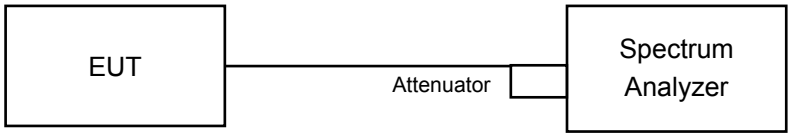
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

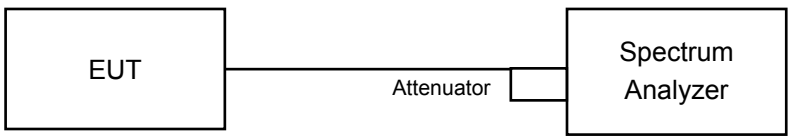
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 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.

For 802.11ac (VHT80)

1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2) Set sweep trigger to “free run”.
3) Set RBW = 1 MHz.
4) Set VBW ≥ 3 MHz.
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (number of points in sweep) * T
7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
8) Detector = RMS.
9) Trace mode = max hold.
10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
11) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB 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%.

4.3.5 Deviation from Test 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:

For U-NII-1 Band

CDD Mode

802.11a

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	19.96	19.07	179.807	22.55	29	-3.887	18.663	21	Pass
40	5200	21.94	21.37	293.403	24.67	29	-3.887	20.783	21	Pass
48	5240	21.75	21.63	**295.170**	24.70	29	-3.887	20.813	21	Pass

Note:
1. Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain = (0 dB (i.e., no array gain) for NANT ≤ 4)

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	19.98	19.03	179.524	22.54	29	-3.887	18.653	21	Pass
40	5200	21.83	21.25	285.757	24.56	29	-3.887	20.673	21	Pass
48	5240	21.73	21.63	294.482	24.69	29	-3.887	20.803	21	Pass

Note:
1. Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain = (0 dB (i.e., no array gain) for NANT ≤ 4)

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	18.03	17.31	117.360	20.70	29	-3.887	16.813	21	Pass
46	5230	21.67	21.25	280.245	24.48	29	-3.887	20.593	21	Pass

Note:
1. Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain = (0 dB (i.e., no array gain) for NANT ≤ 4)

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	17.64	16.97	107.850	20.33	29	-3.887	16.443	21	Pass

Note:
1. Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain = (0 dB (i.e., no array gain) for NANT ≤ 4)

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	16.97	16.02	89.768	19.53	25.99	-0.877	18.65	21	Pass
40	5200	18.82	18.24	142.889	21.55	25.99	-0.877	20.67	21	Pass
48	5240	18.72	18.62	**147.251**	21.68	25.99	-0.877	20.80	21	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain (3.01dBi) = (0 dB (i.e., no array gain) for NANT ≤ 4)

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	15.02	14.30	58.684	17.69	25.99	-0.877	16.81	21	Pass
46	5230	18.66	18.24	140.132	21.47	25.99	-0.877	20.59	21	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain (3.01dBi) = (0 dB (i.e., no array gain) for NANT ≤ 4)

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	14.63	13.96	53.929	17.32	25.99	-0.877	16.44	21	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
2. Gain = -3.887dBi (above 30 degrees from the horizon)
3. EIRP = conducted power +(-3.887dBi) + array gain (3.01dBi) = (0 dB (i.e., no array gain) for NANT ≤ 4)

For U-NII-3 Band

CDD Mode

802.11a

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	24.43	24.33	548.351	27.39	29	Pass
157	5785	24.41	24.23	540.908	27.33	29	Pass
165	5825	24.50	24.24	547.299	27.38	29	Pass

Note: Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	24.35	24.46	**551.524**	27.42	29	Pass
157	5785	24.26	24.48	547.229	27.38	29	Pass
165	5825	24.37	24.43	550.859	27.41	29	Pass

Note: Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	23.36	23.41	436.050	26.40	29	Pass
159	5795	23.42	23.29	433.090	26.37	29	Pass

Note: Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	19.42	19.34	173.399	22.39	29	Pass

Note: Gain = 7dBi > 6dBi, so the limit shall be reduced to 30-(7-6) = 29dBm.

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	21.34	21.45	**275.781**	24.41	25.99	Pass
157	5785	21.25	21.47	273.633	24.37	25.99	Pass
165	5825	21.36	21.42	275.449	24.40	25.99	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	20.35	20.40	218.041	23.39	25.99	Pass
159	5795	20.41	20.28	216.561	23.36	25.99	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	16.41	16.33	86.706	19.38	25.99	Pass

Note:
1. Directional Gain = 7 + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.55	19.26
40	5200	20.92	20.00
48	5240	21.00	20.04

802.11n (HT20)

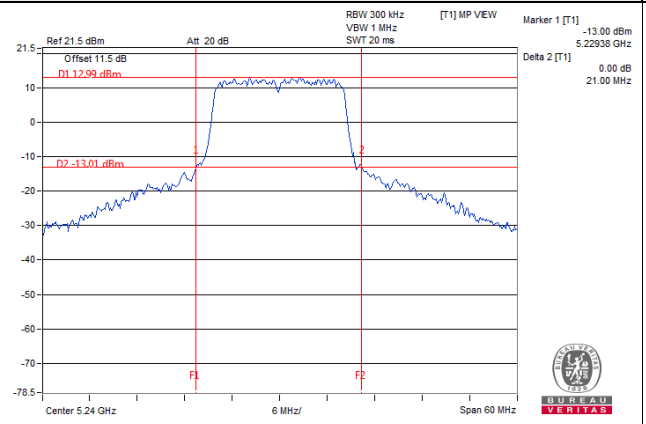
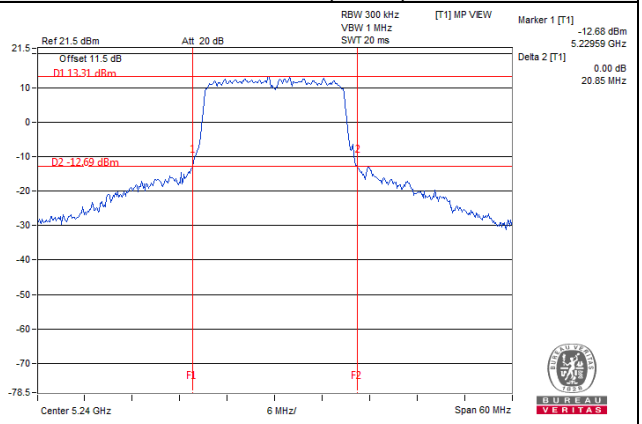
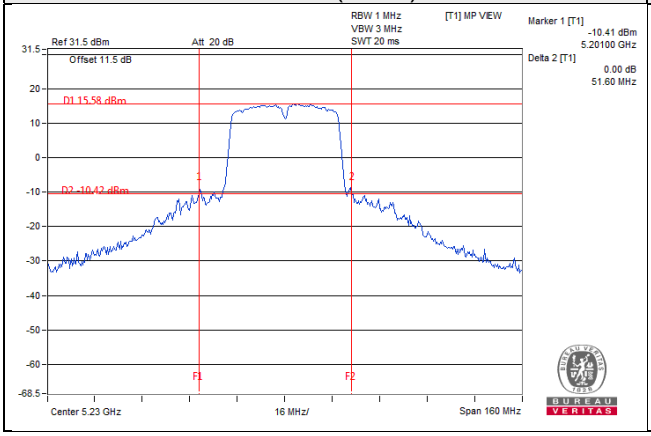
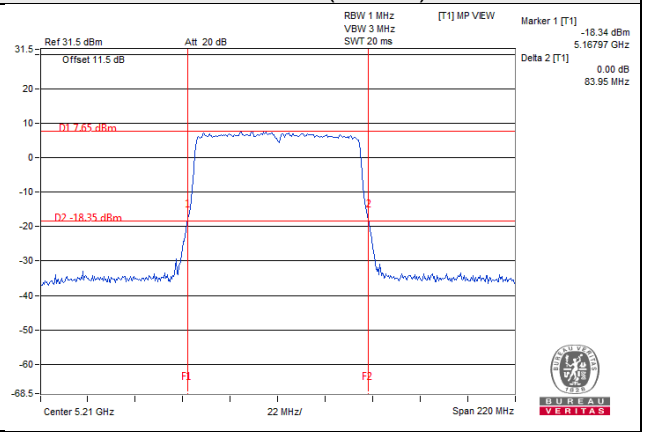
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.38	20.35
40	5200	20.78	20.47
48	5240	20.85	20.80

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	40.67	40.81
46	5230	51.60	41.49

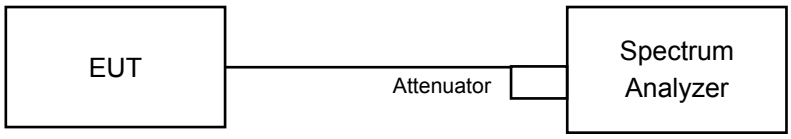
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	83.82	83.95

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

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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.

4.4.4 Test Result

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.56	16.44
40	5200	16.56	16.44
48	5240	16.56	16.44
149	5745	28.78	17.28
157	5785	22.44	18.00
165	5825	26.76	19.92

802.11n (HT20)

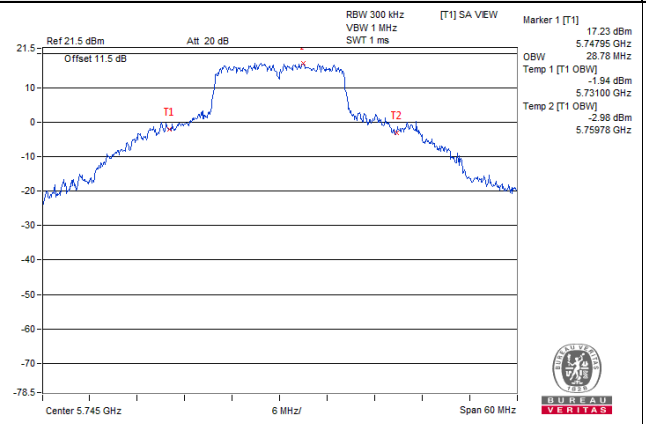
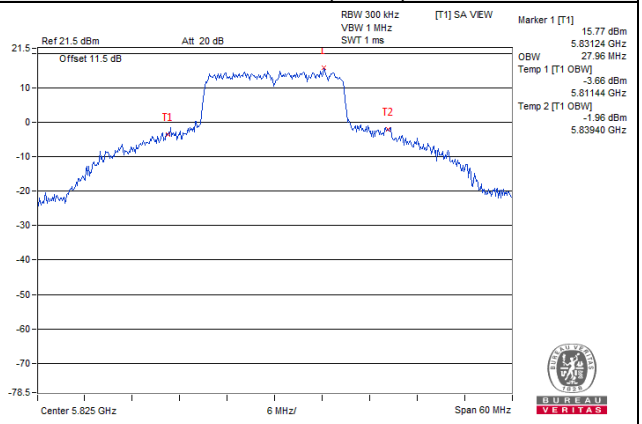
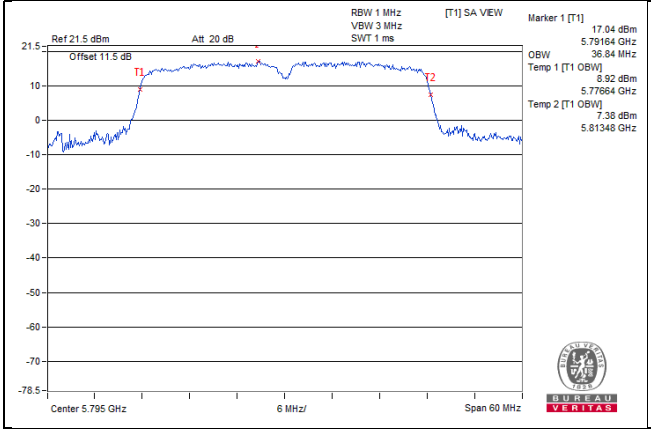
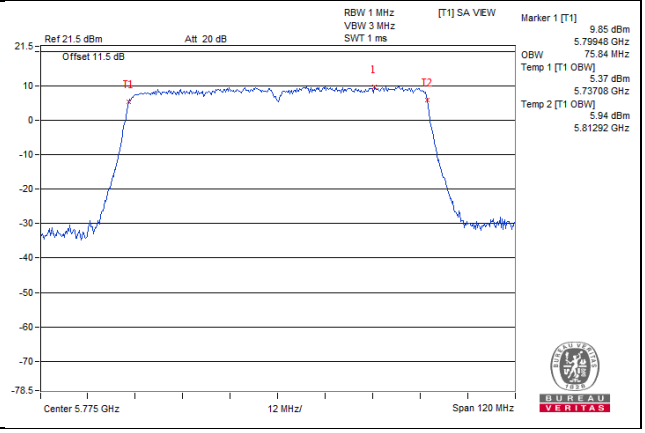
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.76	17.76
48	5240	17.64	17.64
149	5745	18.84	18.24
157	5785	22.92	18.60
165	5825	27.96	18.36

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.12
46	5230	36.24	36.24
151	5755	36.48	36.48
159	5795	36.84	36.72

802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.84
155	5775	75.84	75.84

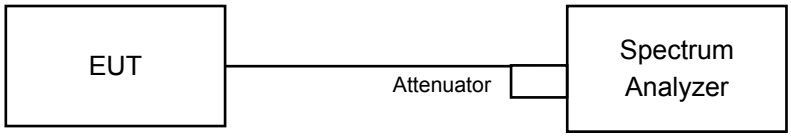
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1, U-NII-2A, U-NII-2C Band

Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
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.

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
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 and add 10 log (1/duty cycle).

For U-NII-3 Band

Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured 1) power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value.

Duty cycle of test signal is < 98%
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value and add 10 log (1/duty cycle).

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.38	5.30	0.23	8.58	12.99	Pass
40	5200	7.61	7.74	0.23	10.91	12.99	Pass
48	5240	8.48	7.94	0.23	11.45	12.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 17-(10.01-6) = 12.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	6.12	5.43	0.10	8.90	12.99	Pass
40	5200	8.21	7.84	0.10	11.14	12.99	Pass
48	5240	8.45	7.62	0.10	11.17	12.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 17-(10.01-6) = 12.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	1.44	0.76	0.17	4.30	12.99	Pass
46	5230	5.47	4.80	0.17	8.33	12.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 17-(10.01-6) = 12.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

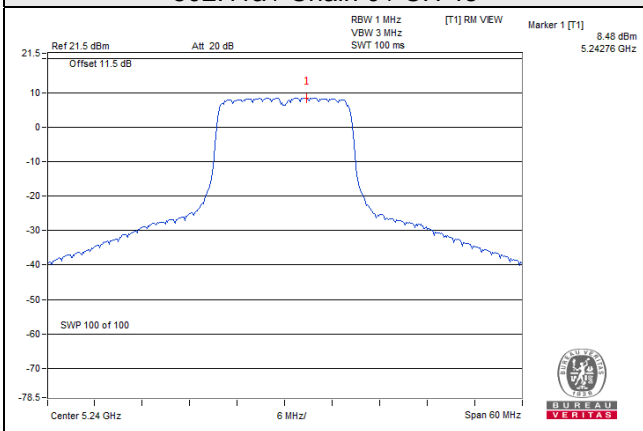
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-2.25	-3.20	0.37	0.69	12.99	Pass

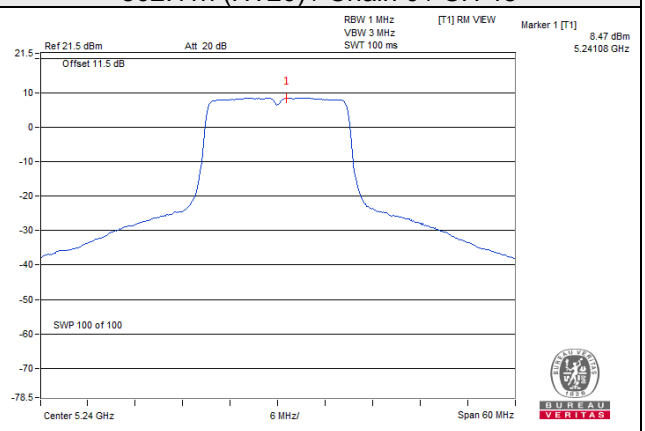
Note:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional Gain = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 17-(10.01-6) = 12.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

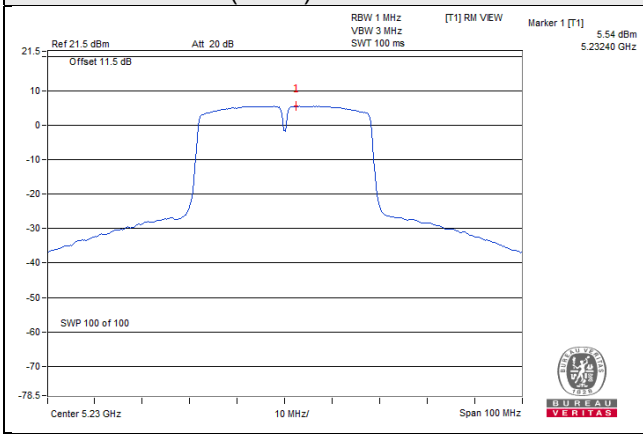
802.11a / Chain 0 / CH 48



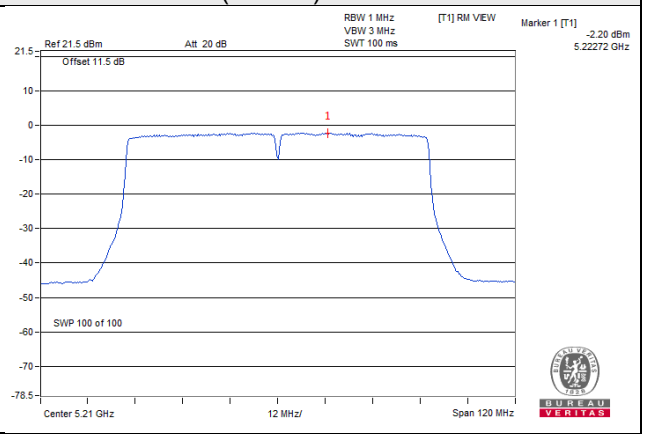
802.11n (HT20) / Chain 0 / CH 48



802.11n (HT40) / Chain 0 / CH 46



802.11ac (VHT80) / Chain 0 / CH 42



For U-NII-3 Band

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	4.63	6.85	3.01	0.23	10.09	25.99	Pass
	157	5785	2.99	5.21	3.01	0.23	8.45	25.99	Pass
	165	5825	3.24	5.46	3.01	0.23	8.70	25.99	Pass
1	149	5745	3.28	5.50	3.01	0.23	8.74	25.99	Pass
	157	5785	3.56	5.78	3.01	0.23	9.02	25.99	Pass
	165	5825	3.76	5.98	3.01	0.23	9.22	25.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.52	4.74	3.01	0.10	7.85	25.99	Pass
	157	5785	2.48	4.70	3.01	0.10	7.81	25.99	Pass
	165	5825	2.54	4.76	3.01	0.10	7.87	25.99	Pass
1	149	5745	3.27	5.49	3.01	0.10	8.60	25.99	Pass
	157	5785	3.54	5.76	3.01	0.10	8.87	25.99	Pass
	165	5825	3.63	5.85	3.01	0.10	8.96	25.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

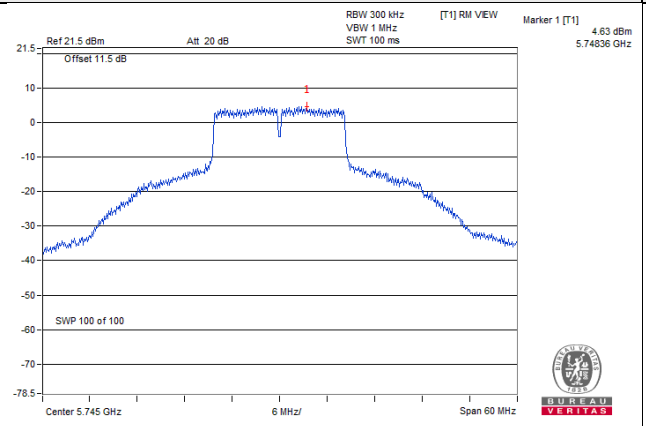
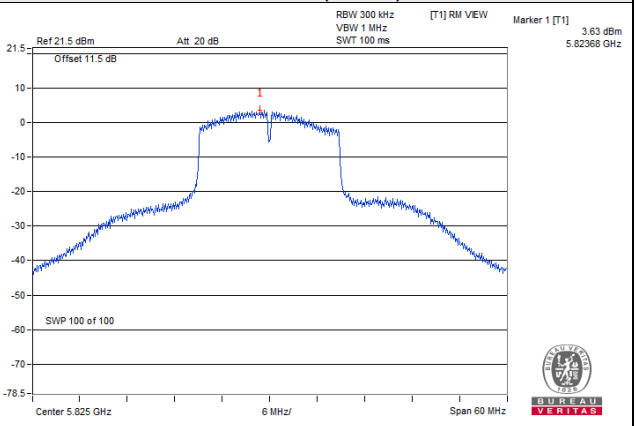
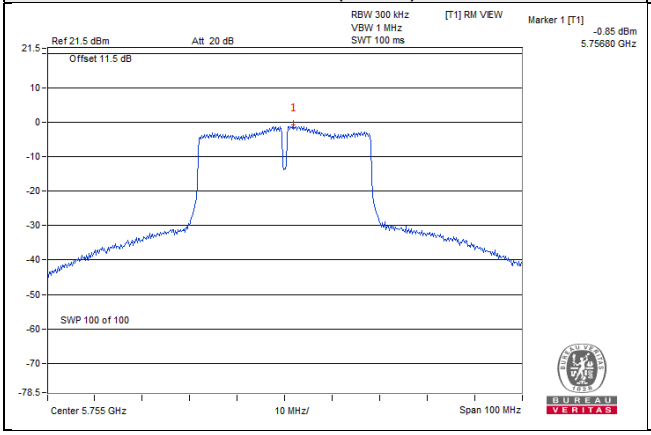
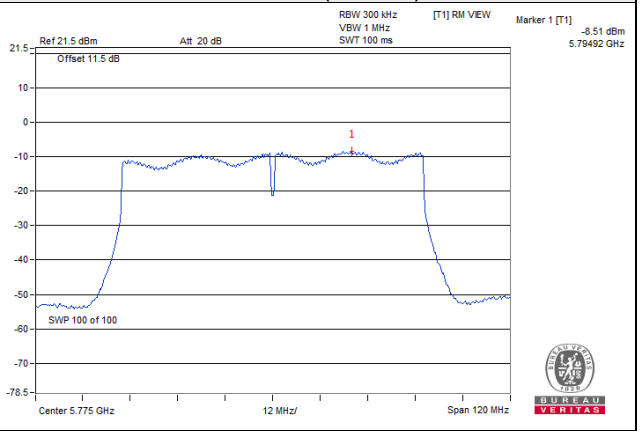
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.38	0.84	3.01	0.17	4.02	25.99	Pass
	159	5795	-1.41	0.81	3.01	0.17	3.99	25.99	Pass
1	151	5755	-0.85	1.37	3.01	0.17	4.55	25.99	Pass
	159	5795	-0.88	1.34	3.01	0.17	4.52	25.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.96	-6.74	3.01	0.37	-3.36	25.99	Pass
1	155	5775	-8.51	-6.29	3.01	0.37	-2.91	25.99	Pass

Note:
1. Method a) 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 = 7dBi + 10log(2) = 10.01dBi > 6dBi, so the limit shall be reduced to 30-(10.01-6) = 25.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

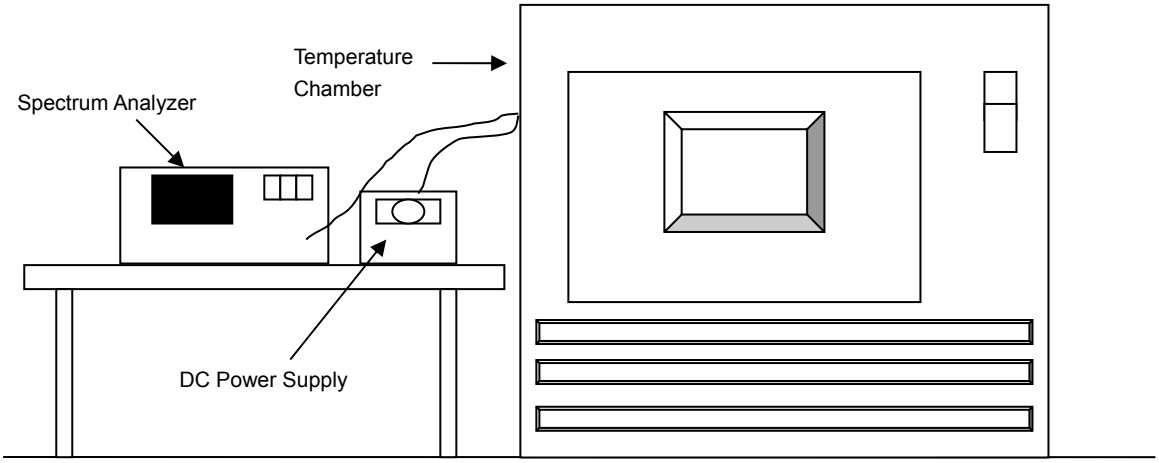
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 18, 2017	Aug. 17, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 30, 2017	Jun. 29, 2018
DC Power Supply Topward	6603D	700637	NA	NA

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
70	54	5180.0168	PASS	5180.0168	PASS	5180.016	PASS	5180.0162	PASS
60	54	5179.9844	PASS	5179.982	PASS	5179.984	PASS	5179.985	PASS
50	54	5180.012	PASS	5180.0118	PASS	5180.0113	PASS	5180.0149	PASS
40	54	5180.0046	PASS	5180.0046	PASS	5180.0015	PASS	5180.004	PASS
30	54	5179.9865	PASS	5179.9849	PASS	5179.9851	PASS	5179.9893	PASS
20	54	5179.9823	PASS	5179.9826	PASS	5179.9832	PASS	5179.985	PASS
10	54	5179.9992	PASS	5179.9968	PASS	5179.999	PASS	5179.9953	PASS
0	54	5180.0025	PASS	5180.0036	PASS	5180.002	PASS	5180.0011	PASS
-10	54	5179.9988	PASS	5179.9979	PASS	5179.9986	PASS	5179.9981	PASS
-20	54	5179.9925	PASS	5179.9913	PASS	5179.9913	PASS	5179.9884	PASS

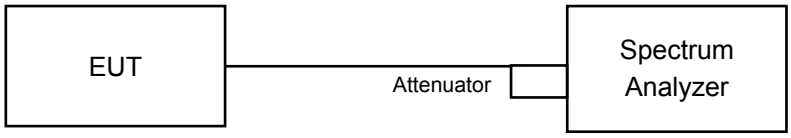
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	62.1	5179.9816	PASS	5179.9817	PASS	5179.9827	PASS	5179.9857	PASS
	54	5179.9823	PASS	5179.9826	PASS	5179.9832	PASS	5179.985	PASS
	45.9	5179.9821	PASS	5179.9827	PASS	5179.9832	PASS	5179.9842	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

a. Set resolution bandwidth (RBW) = 100kHz
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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.36	15.19	0.5	Pass
157	5785	16.39	15.12	0.5	Pass
165	5825	16.38	15.08	0.5	Pass

802.11n (HT20)

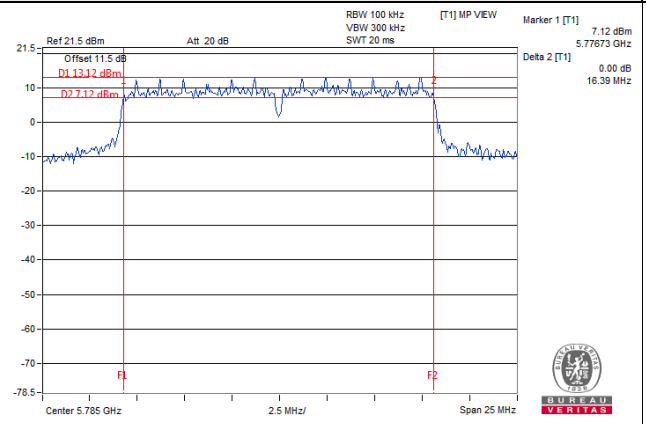
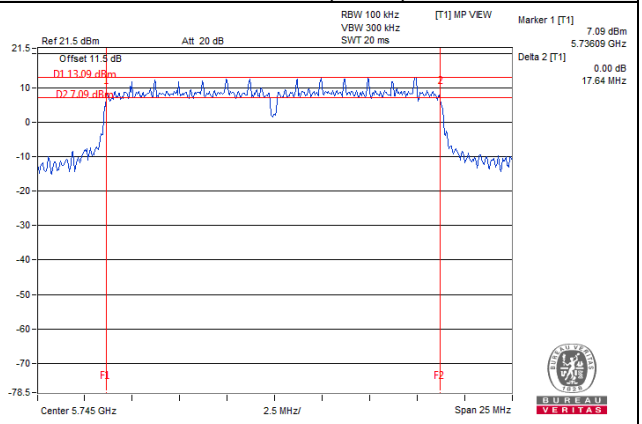
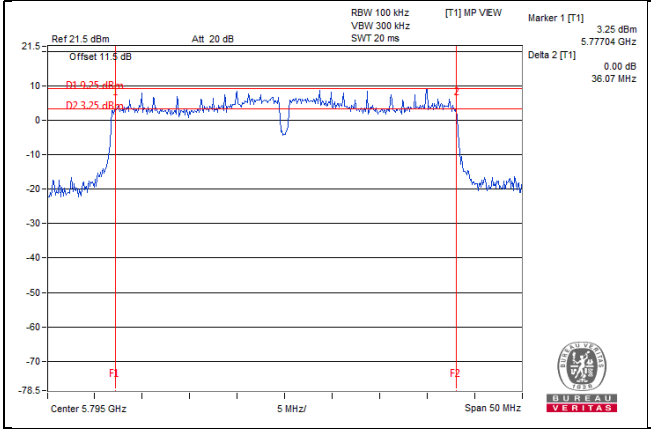
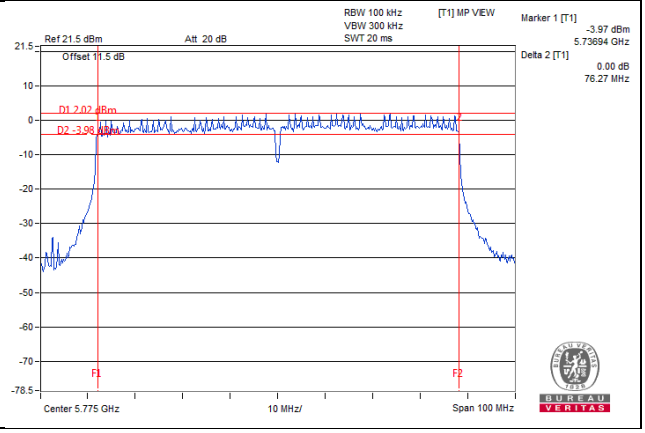
Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.64	15.72	0.5	Pass
157	5785	17.64	15.15	0.5	Pass
165	5825	17.63	15.06	0.5	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.33	35.18	0.5	Pass
159	5795	35.27	36.07	0.5	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.27	75.90	0.5	Pass

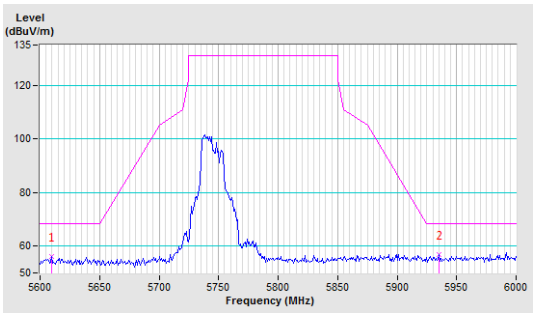
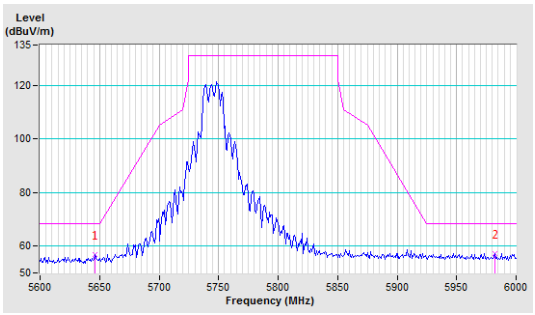
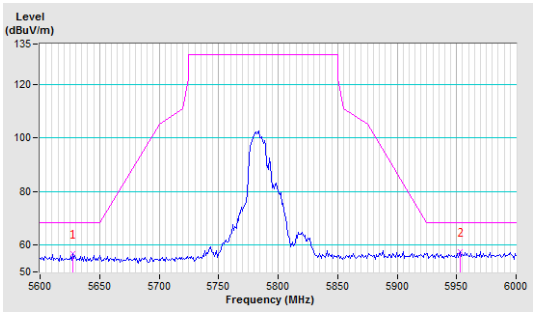
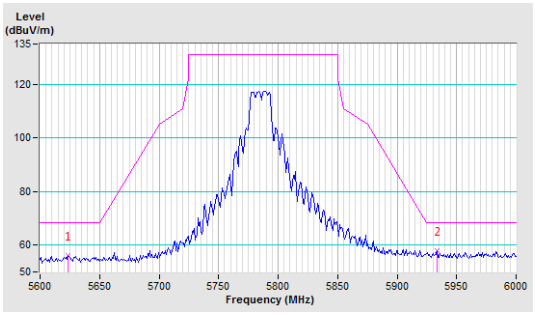
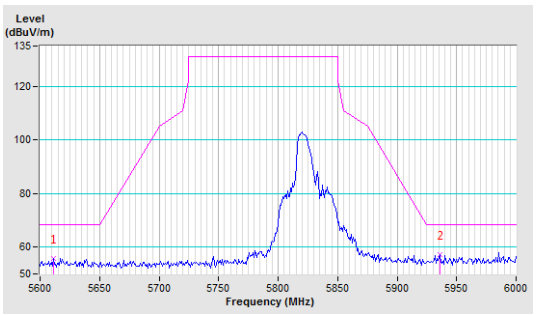
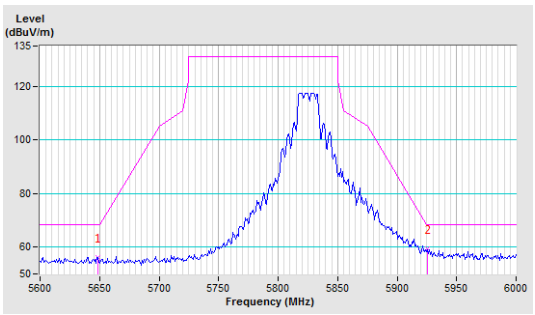
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

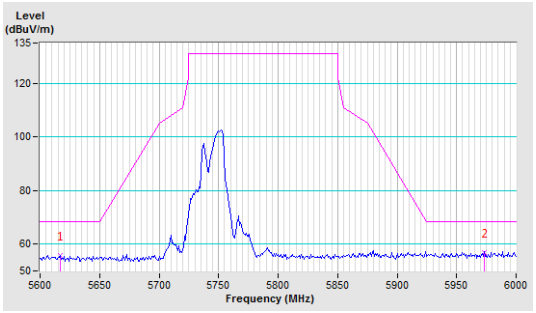
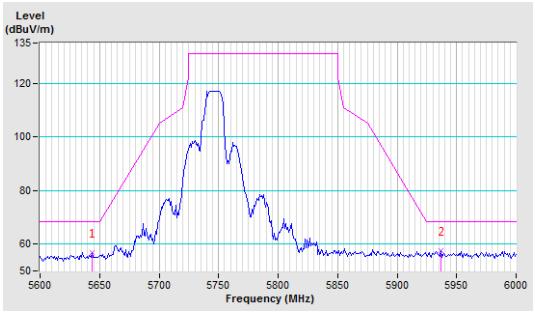
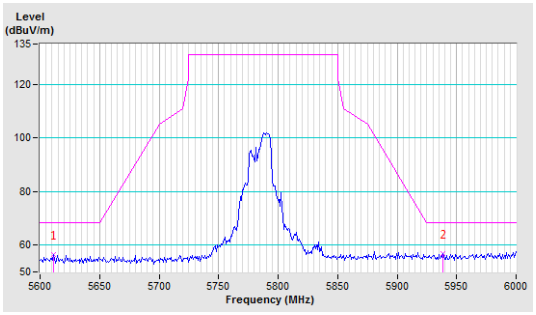
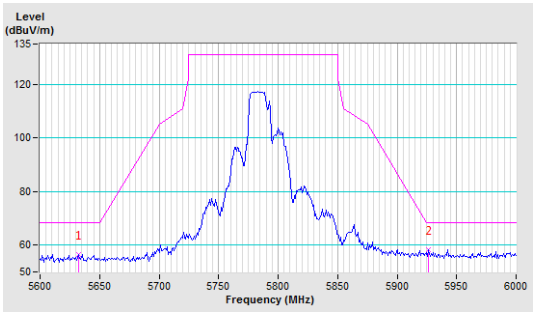
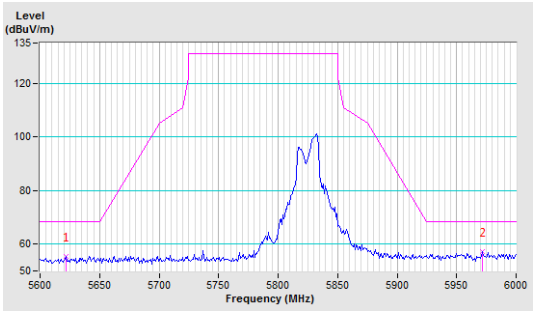
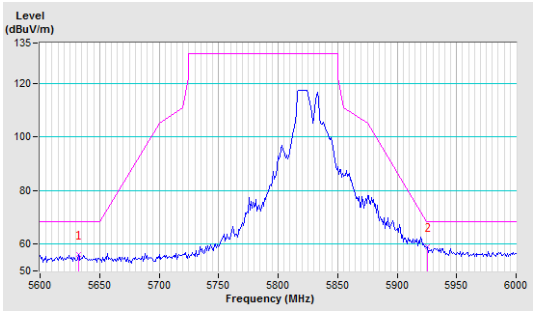
Please refer to the attached file (Test Setup Photo).

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

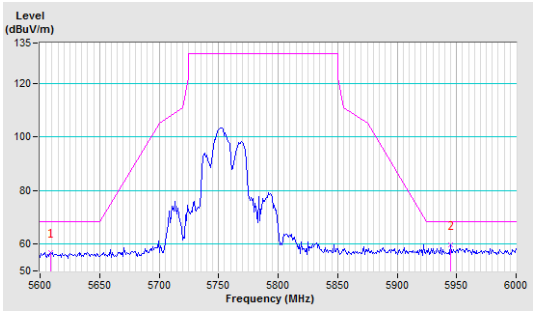
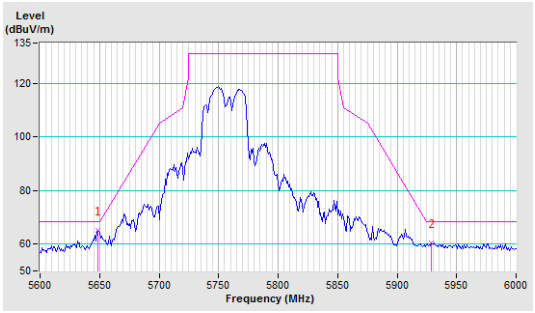
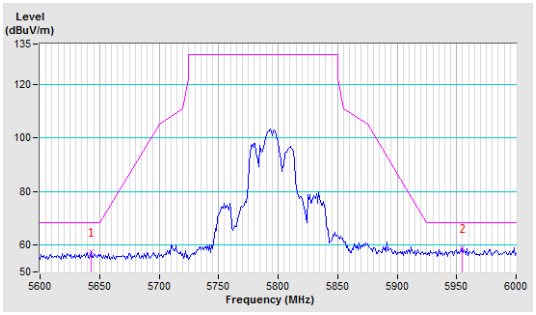
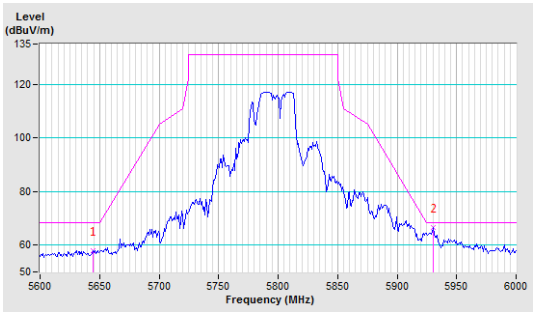
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

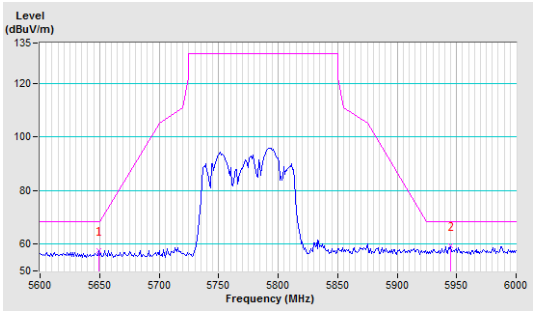
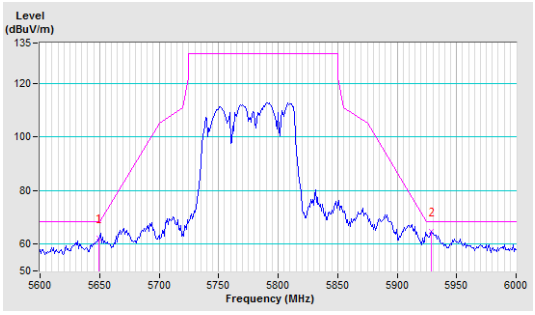
802.11n (HT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

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 Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---