FCC Test Report

Report No.:	RF170609C18-1
FCC ID:	QXO-AP3915I
Test Model:	AP3915i
Series Model:	AP7632i (refer to item 3.1 for more details)
Received Date:	Jun. 09, 2017
Test Date:	Jul. 03 ~ Jul. 17, 2017
Issued Date:	Jul. 28, 2017
Applicant:	Extreme Networks, Inc.
Address:	6480 VIA DEL ORO SAN JOSE CA 95119 USA
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
RF170609C18-1	Original release.	Jul. 28, 2017

1 Certificate of Conformity

Product:	Wireless 802.11 a/ac+b/g/n Indoor Access Point
Brand:	Extreme Networks
Test Model:	AP3915i
Series Model:	AP7632i (refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	Extreme Networks, Inc.
Test Date:	Jul. 03 ~ Jul. 17, 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 : Celine Chou , **Date:** Jul. 28, 2017

Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Jul. 28, 2017

Ken Liu / Senior Manager

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 -3.85dB at 0.48700MHz.
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 -1.0dB at 37.87MHz.
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 IPEX not a standard connector.

*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	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless 802.11 a/ac+b/g/n Indoor Access Point
Brand	Extreme Networks
Test Model	AP3915i
Series Model	AP7632i
Model Difference	Refer to note for more details
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter 54Vdc from 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), 802.11n (HT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11n (HT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180~5240MHz: 440.898mW 5745~5825MHz: 366.653mW Beamforming Mode: 5180~5240MHz: 220.464mW 5745~5825MHz: 180.168mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

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 (VHT40)	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, Beamforming mode is the worst case for final tests after pretesting.

2. All models are listed as below. Model: AP3915i was chosen for final test.

Brand	Model	Difference
Extreme Networks	AP3915i	All models are electrically identical, only the cover printing is different.
	AP7632i	

3. The EUT consumes power from the following adapter and POE. (Support unit only)

Adapter	
Brand	Powertron Electronics Corp.
Model	PA1024-120IB200
Input Power	100-240Vac, 50-60Hz, 0.6A.
Output Power	12Vdc, 2A, 24W Max
Power Line	1.5m power cable with one core attached on adapter

POE	
Brand	EnGenius
Model	EPA5006GP
Input Power	100-240Vac, 50-60Hz, 0.8A
Output Power	54Vdc, 0.6A Pin 4, 5: 54Vdc Pin 7, 8: Return

4. The EUT uses following antennas.

Antenna Type	PIFA	Antenna Connector	IPEX
Gain (dBi)	Frequency (MHz)		
	2400-2500		5150-5850
1	4.1		-
2	4.3		-
3 (BT LE / Zigbee)	4.1		-
4	-		5.3
5	-		5.3

5. Power Setting as below.

CDD Mode						
	802.11a	802.11n (HT20)		802.11n (HT40)		802.11ac (VHT80)
CH 36	20.5	21	CH 38	18	CH 42	17.5
CH 40	23	23	CH 46	22	CH 155	21
CH 48	23	23	CH 151	23		
CH 149	23	23	CH 159	23		
CH 157	22	22				
CH 165	22	22				

Beamforming Mode					
	802.11n (HT20)		802.11n (HT40)		802.11ac (VHT80)
CH 36	21	CH 38	18	CH 42	17.5
CH 40	23	CH 46	22	CH 155	21
CH 48	23	CH 151	23		
CH 149	23	CH 159	23		
CH 157	22				
CH 165	22				

6. 2.4GHz & 5GHz & BT LE or 2.4GHz & 5GHz & Zigbee technology can transmit at same time. BT LE and Zigbee cannot transmit simultaneously.
7. Spurious emission of the simultaneous operation (2.4GHz & 5GHz & BT LE or 2.4GHz & 5GHz & Zigbee) 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), 802.11n (HT40):

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), 802.11n (HT40):

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	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from POE

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

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

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)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	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
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		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)
A, B	802.11a	5180-5240	36 to 48	36	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	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	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B	802.11a	5180-5240	36 to 48	36	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	6.0

Transmit Power 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)
CDD Mode						
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	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
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3
Beamforming Mode						
A	802.11n (HT20)	5180-5240	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
A	802.11n (HT20)	5745-5825	149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Peak Power Spectral Density, Bandwidth and Frequency Stability 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)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	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
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

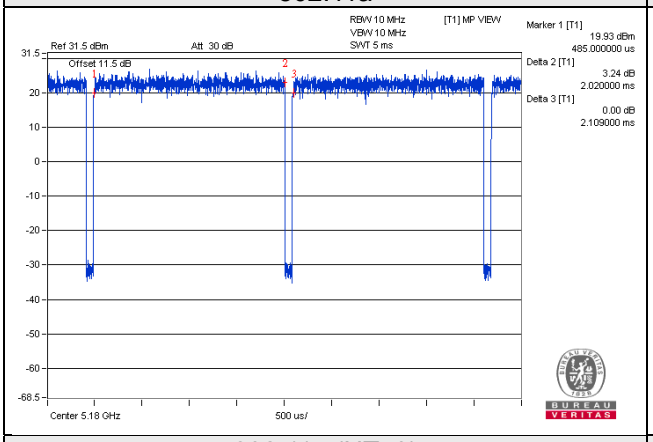
Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	25 deg. C, 66% RH	120Vac, 60Hz	Jones Chang
RE<1G	25 deg. C, 66% RH	120Vac, 60Hz	Jones Chang
PLC	25 deg. C, 75% RH	120Vac, 60Hz 54Vdc	Jones Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Edward Lin

3.3 Duty Cycle of Test Signal

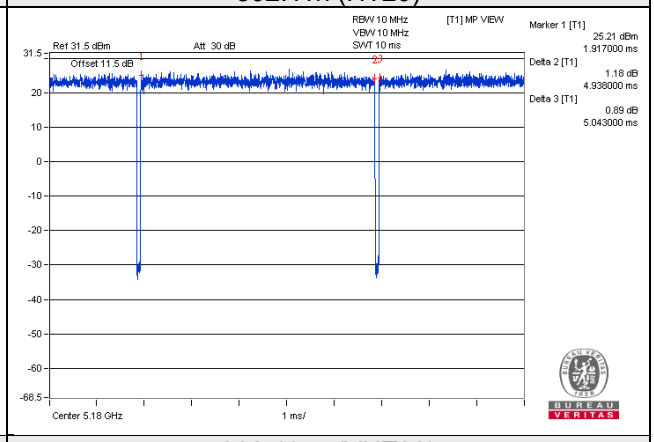
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.020/2.109 = 0.958, Duty factor = 10 * log(1/0.958) = 0.19
802.11n (HT20): Duty cycle = 4.938/5.043 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11n (HT40): Duty cycle = 2.390/2.497 = 0.957, Duty factor = 10 * log(1/0.957) = 0.19
802.11ac (VHT80): Duty cycle = 1.129/1.216 = 0.928, Duty factor = 10 * log(1/0.928) = 0.32

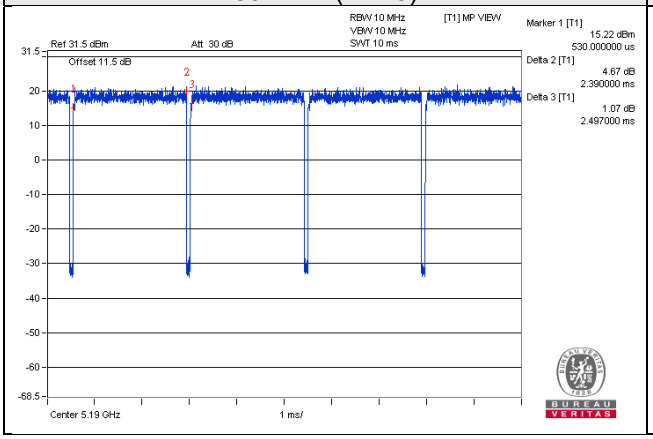
802.11a



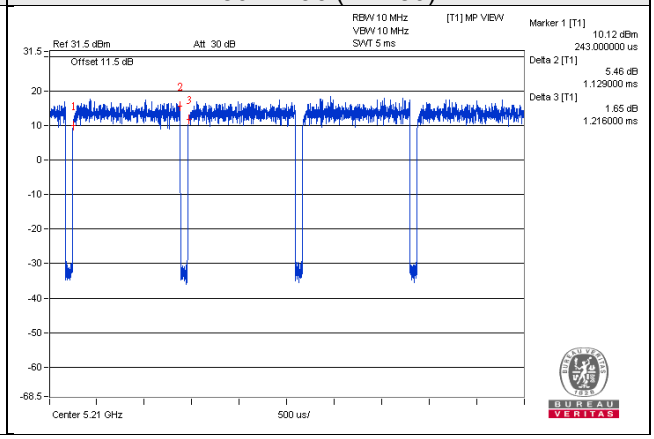
802.11n (HT20)



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	E5410	1HC2XM1	FCC DoC Approved	-
B.	Adapter	Powertron Electronics Corp.	PA1024-120IB200	NA	NA	Provided by manufacturer
C.	POE	EnGenius	EPA5006GAT	NA	NA	Provided by manufacturer

Note:

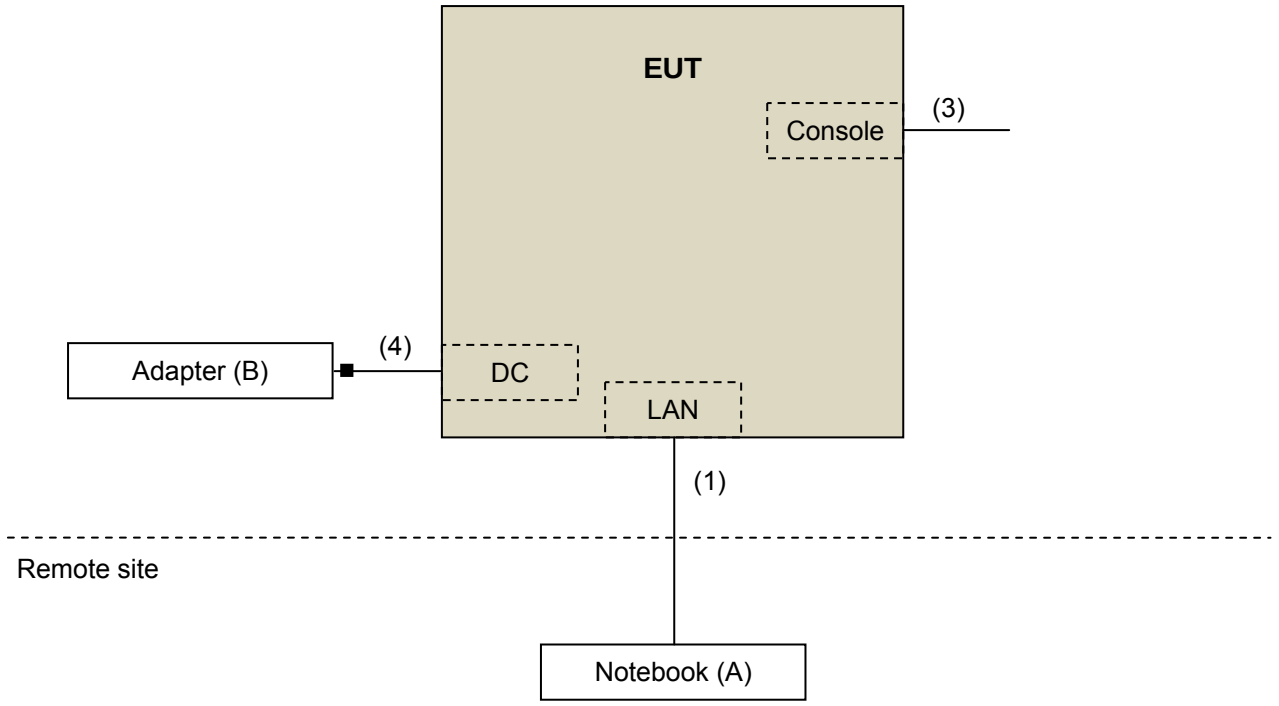
1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	3	N	0	-
2.	RJ45, Cat5e	1	1.8	N	0	-
3.	Console cable	1	1	N	0	Provided by manufacturer
4.	Power cable	1	1.5	N	1	Provided by manufacturer

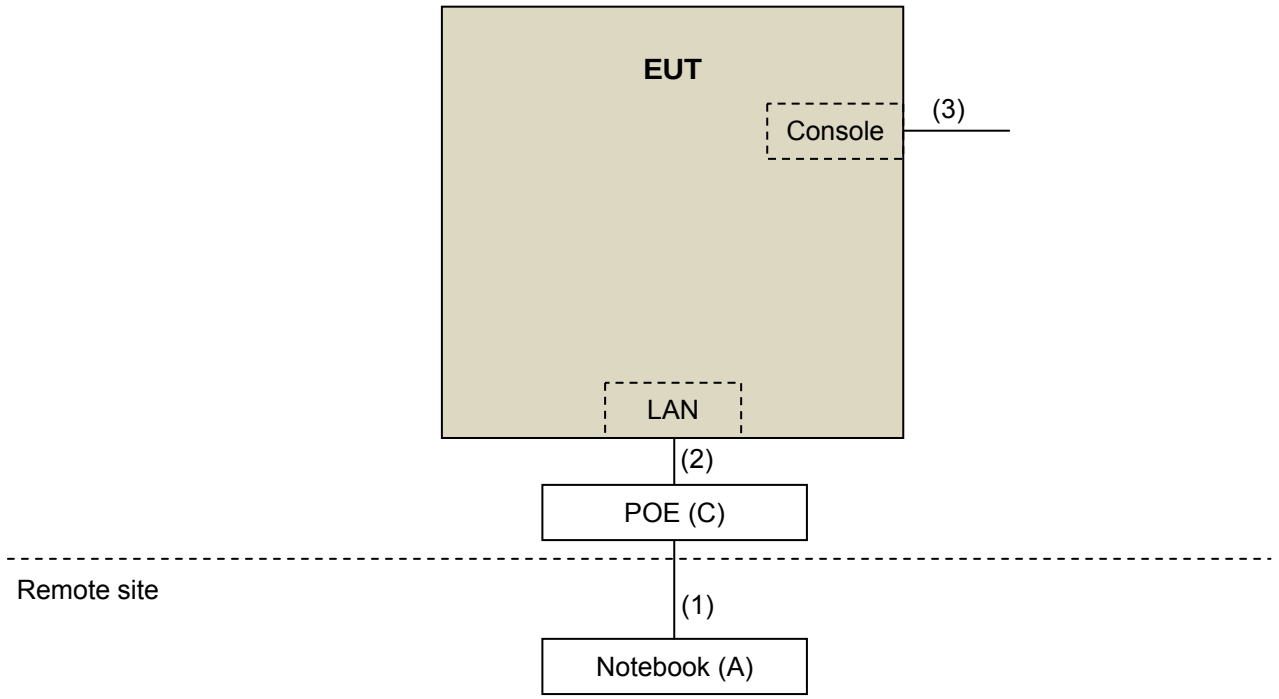
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

Test Mode A



Test Mode B



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 v01r04
KDB 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.

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 v01r04</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 02, 2017	May 01, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 16, 2016	Nov. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 28, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	9120D	209	Dec. 27, 2016	Dec. 26, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8447D	2944A10738	Aug. 22, 2016	Aug. 21, 2017
Preamplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2016	Aug. 21, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2016	Aug. 21, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	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
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2017	Jun. 07, 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 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. Both X and Y axes 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:

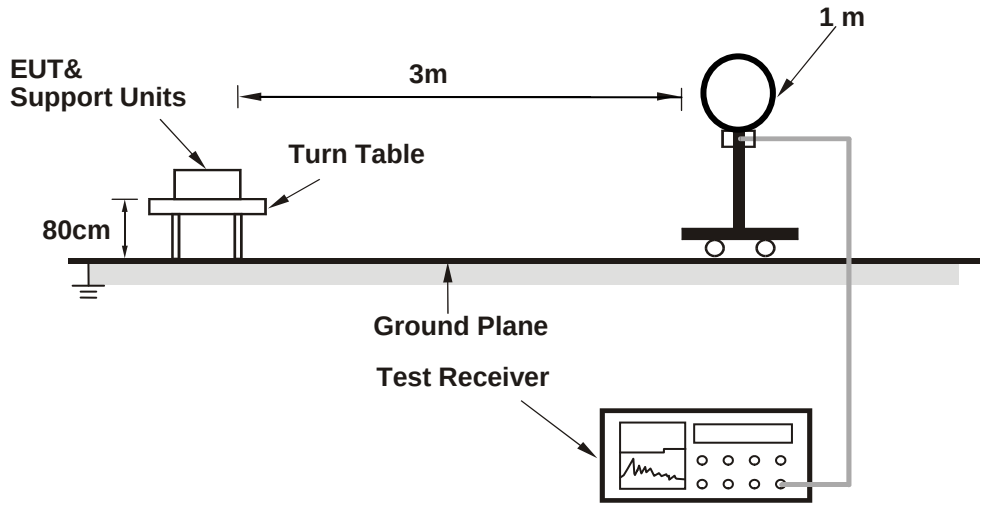
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

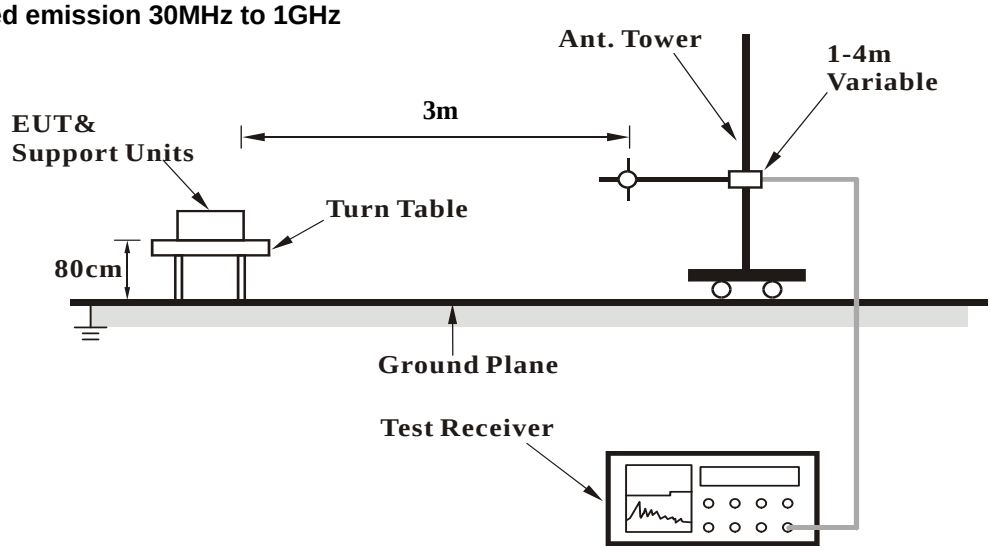
No deviation.

4.1.5 Test Setup

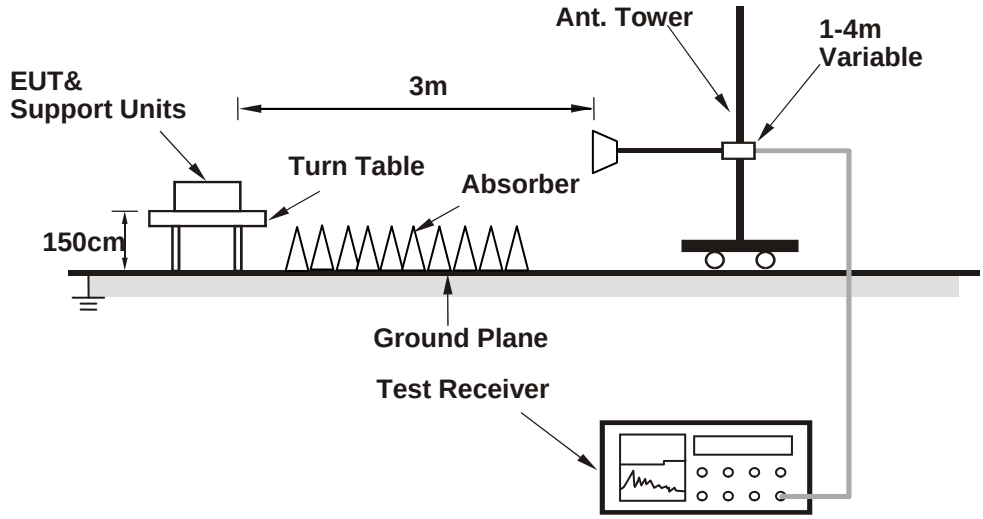
For Radiated emission below 30MHz



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	67.4 PK	74.0	-6.6	2.52 H	291	66.6	0.8
2	5150.00	52.7 AV	54.0	-1.3	2.52 H	291	51.9	0.8
3	*5180.00	117.6 PK			2.63 H	291	78.9	38.7
4	*5180.00	106.9 AV			2.63 H	291	68.2	38.7
5	#10360.00	57.8 PK	74.0	-16.2	2.01 H	96	45.1	12.7
6	#10360.00	44.8 AV	54.0	-9.2	2.01 H	96	32.1	12.7
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	5150.00	61.2 PK	74.0	-12.8	2.72 V	13	60.4	0.8
2	5150.00	48.1 AV	54.0	-5.9	2.72 V	13	47.3	0.8
3	*5180.00	112.7 PK			3.34 V	0	74.0	38.7
4	*5180.00	102.0 AV			3.34 V	0	63.3	38.7
5	#10360.00	58.7 PK	74.0	-15.3	2.14 V	118	46.0	12.7
6	#10360.00	45.2 AV	54.0	-8.8	2.14 V	118	32.5	12.7

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 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	5150.00	62.1 PK	74.0	-11.9	2.65 H	290	61.3	0.8
2	5150.00	48.1 AV	54.0	-5.9	2.65 H	290	47.3	0.8
3	*5200.00	120.1 PK			2.46 H	289	81.4	38.7
4	*5200.00	110.0 AV			2.46 H	289	71.3	38.7
5	#10400.00	59.0 PK	74.0	-15.0	1.98 H	123	46.3	12.7
6	#10400.00	47.1 AV	54.0	-6.9	1.98 H	123	34.4	12.7
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	5150.00	60.7 PK	74.0	-13.3	3.56 V	344	59.9	0.8
2	5150.00	45.3 AV	54.0	-8.7	3.56 V	344	44.5	0.8
3	*5200.00	114.5 PK			3.15 V	344	75.8	38.7
4	*5200.00	104.5 AV			3.15 V	344	65.8	38.7
5	#10400.00	58.4 PK	74.0	-15.6	2.26 V	131	45.7	12.7
6	#10400.00	46.2 AV	54.0	-7.8	2.26 V	131	33.5	12.7

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 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	121.3 PK			2.52 H	298	82.5	38.8
2	*5240.00	110.6 AV			2.52 H	298	71.8	38.8
3	5350.00	57.2 PK	74.0	-16.8	2.58 H	293	56.1	1.1
4	5350.00	46.2 AV	54.0	-7.8	2.58 H	293	45.1	1.1
5	#10480.00	59.7 PK	74.0	-14.3	2.03 H	133	46.2	13.5
6	#10480.00	47.7 AV	54.0	-6.3	2.03 H	133	34.2	13.5
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	*5240.00	117.4 PK			3.61 V	342	78.6	38.8
2	*5240.00	107.1 AV			3.61 V	342	68.3	38.8
3	5350.00	55.9 PK	74.0	-18.1	2.77 V	299	54.8	1.1
4	5350.00	44.3 AV	54.0	-9.7	2.77 V	299	43.2	1.1
5	#10480.00	59.0 PK	74.0	-15.0	1.98 V	151	45.5	13.5
6	#10480.00	46.9 AV	54.0	-7.1	1.98 V	151	33.4	13.5

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.

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	#5606.40	56.6 PK	68.2	-11.6	2.53 H	318	54.9	1.7
2	*5745.00	118.2 PK			2.53 H	318	78.3	39.9
3	*5745.00	108.4 AV			2.53 H	318	68.5	39.9
4	#5971.20	58.5 PK	68.2	-9.7	2.53 H	318	55.8	2.7
5	11490.00	62.8 PK	74.0	-11.2	2.77 H	41	48.3	14.5
6	11490.00	50.8 AV	54.0	-3.2	2.77 H	41	36.3	14.5
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	#5621.60	56.1 PK	68.2	-12.1	2.95 V	0	54.4	1.7
2	*5745.00	114.2 PK			2.95 V	0	74.3	39.9
3	*5745.00	104.2 AV			2.95 V	0	64.3	39.9
4	#5970.40	57.8 PK	68.2	-10.4	2.95 V	0	55.1	2.7
5	11490.00	60.8 PK	74.0	-13.2	1.97 V	264	46.3	14.5
6	11490.00	48.4 AV	54.0	-5.6	1.97 V	264	33.9	14.5

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.

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	#5640.80	57.6 PK	68.2	-10.6	2.49 H	250	55.9	1.7
2	*5785.00	117.3 PK			2.49 H	250	77.2	40.1
3	*5785.00	107.1 AV			2.49 H	250	67.0	40.1
4	#5964.00	59.0 PK	68.2	-9.2	2.49 H	250	56.3	2.7
5	11570.00	66.6 PK	74.0	-7.4	1.81 H	141	52.3	14.3
6	11570.00	52.4 AV	54.0	-1.6	1.81 H	141	38.1	14.3
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	#5628.00	56.2 PK	68.2	-12.0	3.01 V	0	54.5	1.7
2	*5785.00	114.8 PK			3.01 V	0	74.7	40.1
3	*5785.00	104.6 AV			3.01 V	0	64.5	40.1
4	#5965.60	58.4 PK	68.2	-9.8	3.01 V	0	55.7	2.7
5	11570.00	61.4 PK	74.0	-12.6	2.15 V	244	47.1	14.3
6	11570.00	49.8 AV	54.0	-4.2	2.15 V	244	35.5	14.3

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
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	#5615.20	56.4 PK	68.2	-11.8	2.50 H	305	54.7	1.7
2	*5825.00	117.3 PK			2.50 H	305	77.1	40.2
3	*5825.00	107.0 AV			2.50 H	305	66.8	40.2
4	#5932.80	58.0 PK	68.2	-10.2	2.50 H	305	55.4	2.6
5	11650.00	64.4 PK	74.0	-9.6	1.69 H	139	50.0	14.4
6	11650.00	52.7 AV	54.0	-1.3	1.69 H	139	38.3	14.4
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	#5601.60	56.4 PK	68.2	-11.8	2.97 V	0	54.8	1.6
2	*5825.00	114.6 PK			2.97 V	0	74.4	40.2
3	*5825.00	104.6 AV			2.97 V	0	64.4	40.2
4	#5968.00	58.4 PK	68.2	-9.8	2.97 V	0	55.7	2.7
5	11650.00	61.5 PK	74.0	-12.5	2.34 V	229	47.1	14.4
6	11650.00	49.5 AV	54.0	-4.5	2.34 V	229	35.1	14.4

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.

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	66.8 PK	74.0	-7.2	2.75 H	328	66.0	0.8
2	5150.00	52.8 AV	54.0	-1.2	2.75 H	328	52.0	0.8
3	*5180.00	119.5 PK			2.66 H	293	80.8	38.7
4	*5180.00	108.4 AV			2.66 H	293	69.7	38.7
5	#10360.00	59.0 PK	74.0	-15.0	2.11 H	100	46.3	12.7
6	#10360.00	46.0 AV	54.0	-8.0	2.11 H	100	33.3	12.7
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	5150.00	65.6 PK	74.0	-8.4	3.74 V	0	64.8	0.8
2	5150.00	50.5 AV	54.0	-3.5	3.74 V	0	49.7	0.8
3	*5180.00	115.2 PK			3.52 V	358	76.5	38.7
4	*5180.00	104.7 AV			3.52 V	358	66.0	38.7
5	#10360.00	57.4 PK	74.0	-16.6	2.24 V	115	44.7	12.7
6	#10360.00	44.5 AV	54.0	-9.5	2.24 V	115	31.8	12.7

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 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	5150.00	63.9 PK	74.0	-10.1	2.76 H	322	63.1	0.8
2	5150.00	49.5 AV	54.0	-4.5	2.76 H	322	48.7	0.8
3	*5200.00	121.7 PK			2.40 H	295	83.0	38.7
4	*5200.00	110.5 AV			2.40 H	295	71.8	38.7
5	#10400.00	59.2 PK	74.0	-14.8	2.00 H	155	46.5	12.7
6	#10400.00	47.9 AV	54.0	-6.1	2.00 H	155	35.2	12.7
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	5150.00	60.6 PK	74.0	-13.4	2.77 V	349	59.8	0.8
2	5150.00	45.3 AV	54.0	-8.7	2.77 V	349	44.5	0.8
3	*5200.00	117.2 PK			3.47 V	338	78.5	38.7
4	*5200.00	105.8 AV			3.47 V	338	67.1	38.7
5	#10400.00	58.1 PK	74.0	-15.9	2.22 V	277	45.4	12.7
6	#10400.00	45.3 AV	54.0	-8.7	2.22 V	277	32.6	12.7

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 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	122.2 PK			2.55 H	294	83.4	38.8
2	*5240.00	111.3 AV			2.55 H	294	72.5	38.8
3	5350.00	57.2 PK	74.0	-16.8	2.58 H	299	56.1	1.1
4	5350.00	47.9 AV	54.0	-6.1	2.58 H	299	46.8	1.1
5	#10480.00	60.8 PK	74.0	-13.2	2.12 H	144	47.3	13.5
6	#10480.00	48.7 AV	54.0	-5.3	2.12 H	144	35.2	13.5
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	*5240.00	116.5 PK			3.63 V	40	77.7	38.8
2	*5240.00	106.1 AV			3.63 V	40	67.3	38.8
3	5350.00	57.2 PK	74.0	-16.8	3.22 V	345	56.1	1.1
4	5350.00	45.4 AV	54.0	-8.6	3.22 V	345	44.3	1.1
5	#10480.00	60.3 PK	74.0	-13.7	2.08 V	172	46.8	13.5
6	#10480.00	46.5 AV	54.0	-7.5	2.08 V	172	33.0	13.5

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.

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	#5630.40	55.8 PK	68.2	-12.4	2.36 H	311	54.1	1.7
2	*5745.00	118.7 PK			2.36 H	311	78.8	39.9
3	*5745.00	109.1 AV			2.36 H	311	69.2	39.9
4	#5952.80	57.0 PK	68.2	-11.2	2.36 H	311	54.4	2.6
5	11490.00	64.3 PK	74.0	-9.7	1.99 H	136	49.8	14.5
6	11490.00	52.1 AV	54.0	-1.9	1.99 H	136	37.6	14.5
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	#5622.40	55.9 PK	68.2	-12.3	2.85 V	348	54.2	1.7
2	*5745.00	117.0 PK			2.89 V	352	77.1	39.9
3	*5745.00	106.9 AV			2.89 V	352	67.0	39.9
4	#5968.00	57.1 PK	68.2	-11.1	2.85 V	348	54.4	2.7
5	11490.00	61.1 PK	74.0	-12.9	1.83 V	344	46.6	14.5
6	11490.00	48.3 AV	54.0	-5.7	1.83 V	344	33.8	14.5

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.

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	#5646.40	56.7 PK	68.2	-11.5	2.36 H	314	55.0	1.7
2	*5785.00	117.0 PK			2.36 H	314	76.9	40.1
3	*5785.00	107.0 AV			2.36 H	314	66.9	40.1
4	#5948.00	60.3 PK	68.2	-7.9	2.36 H	314	57.7	2.6
5	11570.00	65.3 PK	74.0	-8.7	1.95 H	138	51.0	14.3
6	11570.00	52.3 AV	54.0	-1.7	1.95 H	138	38.0	14.3
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	#5609.60	55.8 PK	68.2	-12.4	2.88 V	345	54.1	1.7
2	*5785.00	115.8 PK			2.85 V	348	75.7	40.1
3	*5785.00	105.2 AV			2.85 V	348	65.1	40.1
4	#5960.00	57.7 PK	68.2	-10.5	2.88 V	345	55.1	2.6
5	11570.00	61.7 PK	74.0	-12.3	1.89 V	273	47.4	14.3
6	11570.00	49.6 AV	54.0	-4.4	1.89 V	273	35.3	14.3

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
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	#5637.60	56.4 PK	68.2	-11.8	2.43 H	305	54.7	1.7
2	*5825.00	119.1 PK			2.43 H	305	78.9	40.2
3	*5825.00	108.1 AV			2.43 H	305	67.9	40.2
4	#5938.40	57.8 PK	68.2	-10.4	2.43 H	305	55.2	2.6
5	11650.00	64.3 PK	74.0	-9.7	1.66 H	141	49.9	14.4
6	11650.00	52.3 AV	54.0	-1.7	1.66 H	141	37.9	14.4
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	#5609.60	55.9 PK	68.2	-12.3	2.83 V	338	54.2	1.7
2	*5825.00	115.4 PK			2.83 V	338	75.2	40.2
3	*5825.00	104.5 AV			2.83 V	338	64.3	40.2
4	#5964.00	61.3 PK	68.2	-6.9	2.83 V	338	58.6	2.7
5	11650.00	62.2 PK	74.0	-11.8	1.77 V	288	47.8	14.4
6	11650.00	50.2 AV	54.0	-3.8	1.77 V	288	35.8	14.4

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.

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	66.2 PK	74.0	-7.8	2.51 H	301	65.4	0.8
2	5150.00	52.4 AV	54.0	-1.6	2.51 H	301	51.6	0.8
3	*5190.00	112.8 PK			2.61 H	292	74.1	38.7
4	*5190.00	103.3 AV			2.61 H	292	64.6	38.7
5	#10380.00	58.1 PK	74.0	-15.9	1.99 H	120	45.3	12.8
6	#10380.00	45.1 AV	54.0	-8.9	1.99 H	120	32.3	12.8
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	61.4 PK	74.0	-12.6	3.55 V	341	60.6	0.8
2	5150.00	50.1 AV	54.0	-3.9	3.55 V	341	49.3	0.8
3	*5190.00	107.0 PK			3.47 V	355	68.3	38.7
4	*5190.00	97.6 AV			3.47 V	355	58.9	38.7
5	#10380.00	57.4 PK	74.0	-16.6	2.05 V	105	44.6	12.8
6	#10380.00	43.9 AV	54.0	-10.1	2.05 V	105	31.1	12.8

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 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	5150.00	62.9 PK	74.0	-11.1	2.63 H	295	62.1	0.8
2	5150.00	52.3 AV	54.0	-1.7	2.63 H	295	51.5	0.8
3	*5230.00	117.1 PK			2.60 H	296	78.3	38.8
4	*5230.00	108.1 AV			2.60 H	296	69.3	38.8
5	#10460.00	59.5 PK	74.0	-14.5	1.93 H	138	46.2	13.3
6	#10460.00	47.0 AV	54.0	-7.0	1.93 H	138	33.7	13.3
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	59.5 PK	74.0	-14.5	2.66 V	342	58.7	0.8
2	5150.00	45.9 AV	54.0	-8.1	2.66 V	342	45.1	0.8
3	*5230.00	112.1 PK			3.11 V	358	73.3	38.8
4	*5230.00	102.6 AV			3.11 V	358	63.8	38.8
5	#10460.00	59.8 PK	74.0	-14.2	2.11 V	158	46.5	13.3
6	#10460.00	47.2 AV	54.0	-6.8	2.11 V	158	33.9	13.3

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
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	#5648.80	56.9 PK	68.2	-11.3	2.24 H	311	55.2	1.7
2	*5755.00	116.3 PK			2.24 H	311	76.4	39.9
3	*5755.00	106.3 AV			2.24 H	311	66.4	39.9
4	#5939.20	57.5 PK	68.2	-10.7	2.24 H	311	54.9	2.6
5	11510.00	62.8 PK	74.0	-11.2	2.01 H	136	48.3	14.5
6	11510.00	50.3 AV	54.0	-3.7	2.01 H	136	35.8	14.5
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	#5636.80	56.1 PK	68.2	-12.1	2.89 V	346	54.4	1.7
2	*5755.00	113.4 PK			2.89 V	346	73.5	39.9
3	*5755.00	103.8 AV			2.89 V	346	63.9	39.9
4	#5936.80	57.4 PK	68.2	-10.8	2.89 V	346	54.8	2.6
5	11510.00	61.8 PK	74.0	-12.2	1.96 V	271	47.3	14.5
6	11510.00	49.5 AV	54.0	-4.5	1.96 V	271	35.0	14.5

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.

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	#5640.80	56.3 PK	68.2	-11.9	2.40 H	318	54.6	1.7
2	*5795.00	115.7 PK			2.32 H	307	75.6	40.1
3	*5795.00	106.6 AV			2.32 H	307	66.5	40.1
4	#5976.00	58.6 PK	68.2	-9.6	2.40 H	318	55.8	2.8
5	11590.00	62.8 PK	74.0	-11.2	1.70 H	140	48.5	14.3
6	11590.00	49.9 AV	54.0	-4.1	1.70 H	140	35.6	14.3
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	#5624.00	55.6 PK	68.2	-12.6	2.85 V	339	53.9	1.7
2	*5795.00	112.8 PK			2.85 V	339	72.7	40.1
3	*5795.00	103.8 AV			2.85 V	339	63.7	40.1
4	#5987.20	57.9 PK	68.2	-10.3	2.85 V	339	55.1	2.8
5	11590.00	61.0 PK	74.0	-13.0	1.96 V	343	46.7	14.3
6	11590.00	48.8 AV	54.0	-5.2	1.96 V	343	34.5	14.3

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
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	63.8 PK	74.0	-10.2	2.63 H	298	63.0	0.8
2	5150.00	52.4 AV	54.0	-1.6	2.63 H	298	51.6	0.8
3	*5210.00	109.1 PK			2.86 H	290	70.4	38.7
4	*5210.00	99.2 AV			2.86 H	290	60.5	38.7
5	5350.00	58.8 PK	74.0	-15.2	2.44 H	293	57.7	1.1
6	5350.00	46.7 AV	54.0	-7.3	2.44 H	293	45.6	1.1
7	#10420.00	58.4 PK	74.0	-15.6	2.08 H	171	45.5	12.9
8	#10420.00	45.3 AV	54.0	-8.7	2.08 H	171	32.4	12.9
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	61.6 PK	74.0	-12.4	3.55 V	340	60.8	0.8
2	5150.00	39.3 AV	54.0	-14.7	3.55 V	340	38.5	0.8
3	*5210.00	104.3 PK			3.49 V	336	65.6	38.7
4	*5210.00	94.4 AV			3.49 V	336	55.7	38.7
5	5350.00	56.3 PK	74.0	-17.7	3.05 V	322	55.2	1.1
6	5350.00	44.9 AV	54.0	-9.1	3.05 V	322	43.8	1.1
7	#10420.00	57.2 PK	74.0	-16.8	1.88 V	179	44.3	12.9
8	#10420.00	44.2 AV	54.0	-9.8	1.88 V	179	31.3	12.9

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 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	#5643.20	59.7 PK	68.2	-8.5	2.55 H	328	58.0	1.7
2	#5650.00	66.5 PK	68.2	-1.7	2.85 H	293	64.8	1.7
3	*5775.00	110.9 PK			2.62 H	312	70.9	40.0
4	*5775.00	101.1 AV			2.62 H	312	61.1	40.0
5	#5925.00	64.5 PK	68.2	-3.7	2.02 H	301	61.9	2.6
6	#5937.60	61.0 PK	68.2	-7.2	2.55 H	328	58.4	2.6
7	11550.00	61.0 PK	74.0	-13.0	1.70 H	133	46.5	14.5
8	11550.00	48.8 AV	54.0	-5.2	1.70 H	133	34.3	14.5
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	#5636.00	57.6 PK	68.2	-10.6	3.01 V	0	55.9	1.7
2	#5650.00	60.8 PK	68.2	-7.4	3.01 V	40	59.1	1.7
3	*5775.00	107.2 PK			3.01 V	0	67.2	40.0
4	*5775.00	97.8 AV			3.01 V	0	57.8	40.0
5	#5925.00	61.6 PK	68.2	-6.6	3.00 V	1	59.0	2.6
6	#5933.60	59.4 PK	68.2	-8.8	3.01 V	0	56.8	2.6
7	11550.00	60.0 PK	74.0	-14.0	1.99 V	265	45.5	14.5
8	11550.00	47.0 AV	54.0	-7.0	1.99 V	265	32.5	14.5

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.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	A		

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	31.8 QP	40.0	-8.2	2.00 H	67	46.4	-14.6
2	115.45	36.6 QP	43.5	-6.9	1.51 H	75	53.3	-16.7
3	166.00	35.3 QP	43.5	-8.2	1.51 H	82	49.2	-13.9
4	282.66	34.0 QP	46.0	-12.0	1.51 H	13	46.4	-12.4
5	379.87	34.6 QP	46.0	-11.4	1.51 H	318	45.0	-10.4
6	556.80	34.5 QP	46.0	-11.5	1.51 H	193	41.3	-6.8
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	43.53	37.4 QP	40.0	-2.6	1.00 V	291	52.1	-14.7
2	111.56	35.1 QP	43.5	-8.4	1.01 V	14	52.2	-17.1
3	156.28	35.1 QP	43.5	-8.4	1.01 V	97	48.8	-13.7
4	282.66	31.6 QP	46.0	-14.4	1.49 V	158	44.0	-12.4
5	385.70	37.5 QP	46.0	-8.5	1.49 V	141	47.9	-10.4
6	558.75	32.6 QP	46.0	-13.4	1.01 V	357	39.3	-6.7

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

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	37.68	28.9 QP	40.0	-11.1	1.51 H	13	44.3	-15.4
2	86.28	31.4 QP	40.0	-8.6	2.00 H	61	51.0	-19.6
3	125.17	30.9 QP	43.5	-12.6	1.51 H	225	46.7	-15.8
4	154.33	28.0 QP	43.5	-15.5	2.00 H	107	41.7	-13.7
5	543.19	28.7 QP	46.0	-17.3	1.51 H	189	35.8	-7.1
6	747.34	32.0 QP	46.0	-14.0	2.00 H	22	34.3	-2.3
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	**37.87**	**39.0 QP**	**40.0**	**-1.0**	**1.00 V**	**72**	**54.3**	**-15.3**
2	47.40	38.2 QP	40.0	-1.8	1.01 V	331	52.7	-14.5
3	64.90	37.1 QP	40.0	-2.9	1.01 V	8	52.6	-15.5
4	183.50	24.5 QP	43.5	-19.0	1.01 V	66	39.8	-15.3
5	333.21	27.8 QP	46.0	-18.2	1.01 V	5	38.9	-11.1
6	745.40	30.8 QP	46.0	-15.2	1.01 V	220	33.1	-2.3

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. 21, 2016	Nov. 20, 2017
RF signal cable (with 10dB PAD) 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.

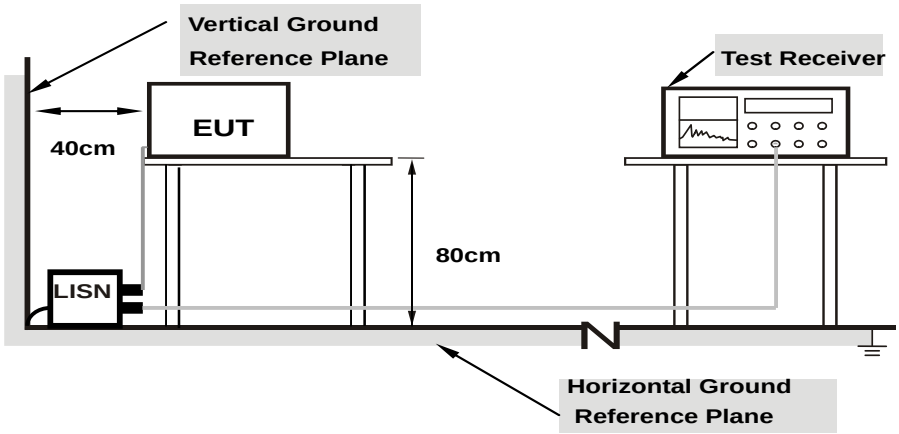
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

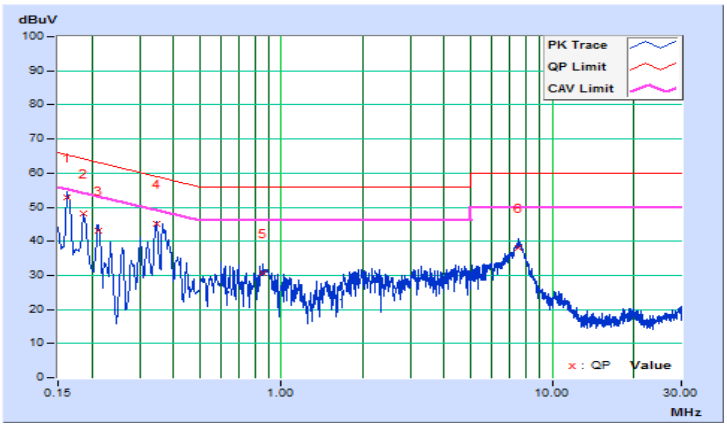
Worst-case data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16200	10.41	42.61	27.96	53.02	38.37	65.36	55.36	-12.34	-16.99
2	0.18617	10.42	37.72	24.07	48.14	34.49	64.21	54.21	-16.07	-19.72
3	0.21015	10.43	32.72	19.77	43.15	30.20	63.20	53.20	-20.05	-23.00
4	0.34577	10.49	34.51	31.59	45.00	42.08	59.06	49.06	-14.06	-6.98
5	0.85800	10.47	20.12	12.58	30.59	23.05	56.00	46.00	-25.41	-22.95
6	7.48200	10.80	27.21	20.82	38.01	31.62	60.00	50.00	-21.99	-18.38

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.

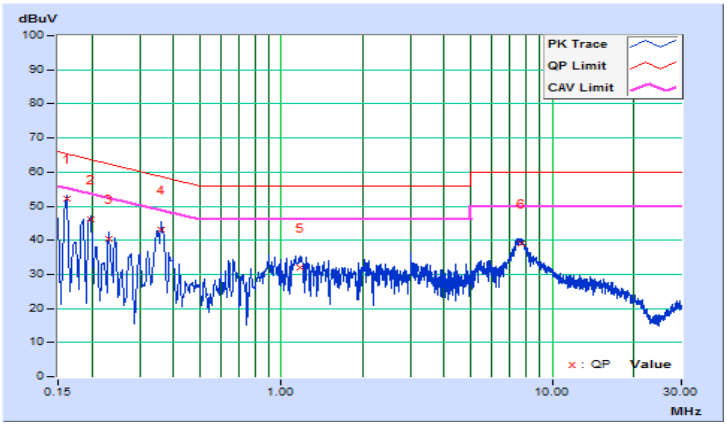


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16190	10.17	41.91	24.72	52.08	34.89	65.37	55.37	-13.29	-20.48
2	0.19780	10.20	36.07	21.39	46.27	31.59	63.70	53.70	-17.43	-22.11
3	0.23000	10.20	30.25	14.87	40.45	25.07	62.45	52.45	-22.00	-27.38
4	0.36161	10.22	32.87	25.92	43.09	36.14	58.69	48.69	-15.60	-12.55
5	1.18200	10.25	21.89	13.40	32.14	23.65	56.00	46.00	-23.86	-22.35
6	7.71800	10.56	28.59	22.00	39.15	32.56	60.00	50.00	-20.85	-17.44

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.

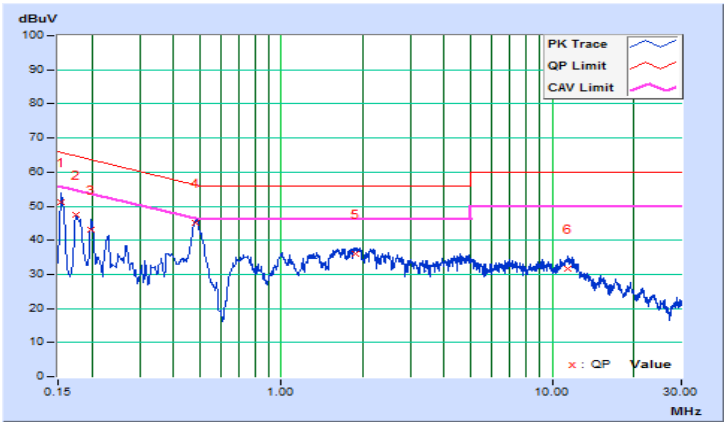


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.41	40.70	26.63	51.11	37.04	65.78	55.78	-14.67	-18.74
2	0.17430	10.42	37.08	23.47	47.50	33.89	64.75	54.75	-17.25	-20.86
3	0.19832	10.43	32.82	19.29	43.25	29.72	63.68	53.68	-20.43	-23.96
4	0.48063	10.50	34.66	29.39	45.16	39.89	56.33	46.33	-11.17	-6.44
5	1.88200	10.51	25.35	21.56	35.86	32.07	56.00	46.00	-20.14	-13.93
6	11.41800	10.97	20.71	15.31	31.68	26.28	60.00	50.00	-28.32	-23.72

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.

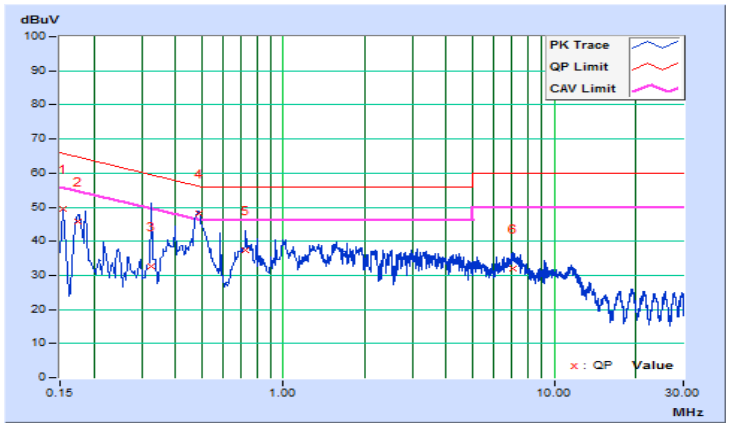


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.16	39.44	26.42	49.60	36.58	65.78	55.78	-16.18	-19.20
2	0.17522	10.18	35.64	23.44	45.82	33.62	64.71	54.71	-18.89	-21.09
3	0.32600	10.22	22.58	16.18	32.80	26.40	59.55	49.55	-26.75	-23.15
4	**0.48700**	**10.23**	**37.86**	**32.14**	**48.09**	**42.37**	**56.22**	**46.22**	**-8.13**	**-3.85**
5	0.72600	10.24	27.19	22.55	37.43	32.79	56.00	46.00	-18.57	-13.21
6	7.04200	10.53	21.34	15.27	31.87	25.80	60.00	50.00	-28.13	-24.20

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 ≦ 125mW(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	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

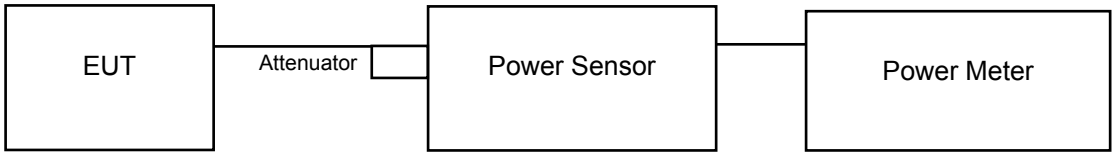
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

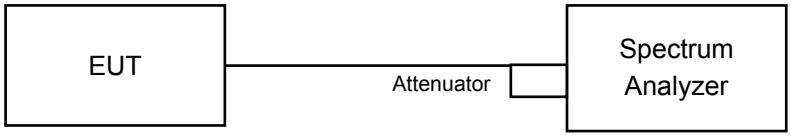
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

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



802.11ac (VHT80)



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)

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

b. Set sweep trigger to “free run”.

c. Set RBW = 1 MHz.

d. Set VBW ≥ 3 MHz.

e. Number of points in sweep ≥ 2 Span / RBW.

f. Sweep time ≤ (number of points in sweep) * T

g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.

h. Detector = RMS.

i. Trace mode = max hold.

j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

k. 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.

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:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.53	20.72	231.012	23.64	30.00	Pass
40	5200	23.10	23.13	409.763	26.13	30.00	Pass
48	5240	23.15	23.62	436.682	26.40	30.00	Pass
149	5745	22.17	23.05	**366.653**	25.64	30.00	Pass
157	5785	21.26	21.41	272.017	24.35	30.00	Pass
165	5825	21.15	21.03	257.082	24.10	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.02	21.52	268.380	24.29	30.00	Pass
40	5200	23.02	23.31	414.736	26.18	30.00	Pass
48	5240	23.16	23.69	**440.898**	26.44	30.00	Pass
149	5745	22.05	23.01	360.311	25.57	30.00	Pass
157	5785	21.44	21.45	278.953	24.46	30.00	Pass
165	5825	21.32	20.99	261.122	24.17	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	18.38	18.45	138.849	21.43	30.00	Pass
46	5230	22.43	22.54	354.458	25.50	30.00	Pass
151	5755	22.33	22.71	357.640	25.53	30.00	Pass
159	5795	22.24	22.37	340.078	25.32	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	17.95	17.92	124.317	20.95	30.00	Pass
155	5775	20.17	20.63	219.603	23.42	30.00	Pass

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	18.01	18.51	134.199	21.28	27.69	Pass
40	5200	20.01	20.30	207.383	23.17	27.69	Pass
48	5240	20.15	20.68	**220.464**	23.43	27.69	Pass
149	5745	19.04	20.00	**180.168**	22.56	27.69	Pass
157	5785	18.43	18.44	139.486	21.45	27.69	Pass
165	5825	18.31	17.98	130.570	21.16	27.69	Pass

Note: Directional gain = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power limit shall be reduced to 30-(8.31-6) = 27.69dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.37	15.44	69.430	18.42	27.69	Pass
46	5230	19.42	19.53	177.241	22.49	27.69	Pass
151	5755	19.32	19.70	178.832	22.52	27.69	Pass
159	5795	19.23	19.36	170.051	22.31	27.69	Pass

Note: Directional gain = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power limit shall be reduced to 30-(8.31-6) = 27.69dBm.

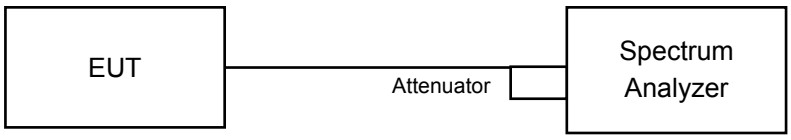
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.94	14.91	62.163	17.94	27.69	Pass
155	5775	17.16	17.62	109.810	20.41	27.69	Pass

Note: Directional gain = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power limit shall be reduced to 30-(8.31-6) = 27.69dBm.

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

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.44
40	5200	16.44	16.44
48	5240	16.44	16.56
149	5745	16.61	16.52
157	5785	16.44	16.44
165	5825	16.44	16.44

802.11n (HT20)

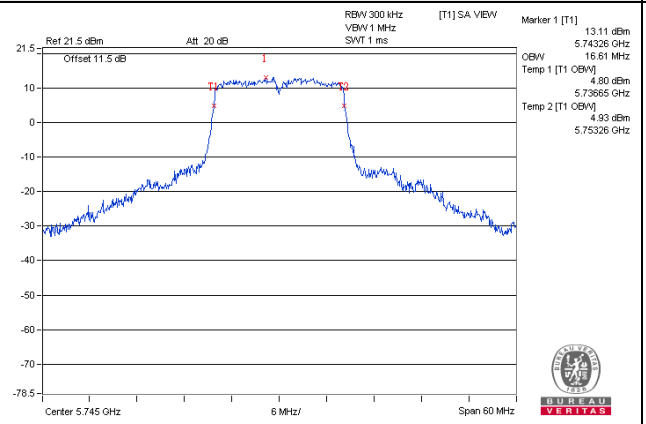
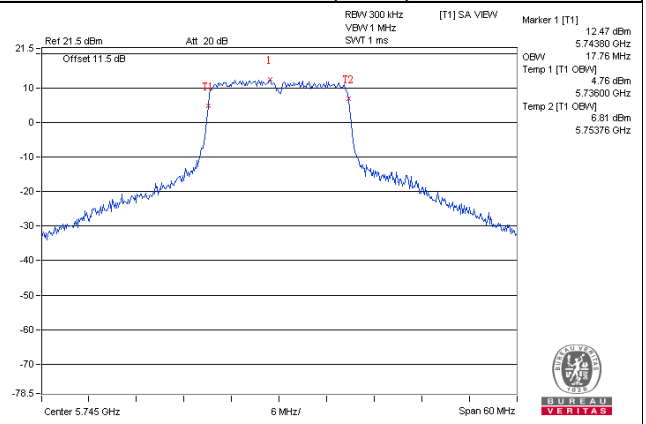
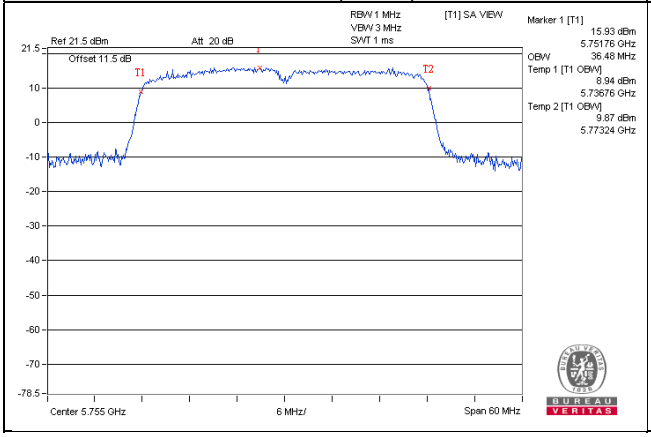
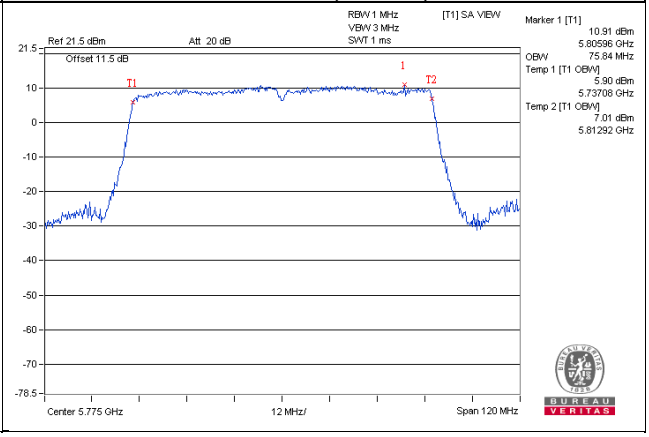
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.64	17.64
48	5240	17.64	17.64
149	5745	17.76	17.76
157	5785	17.64	17.64
165	5825	17.52	17.64

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.12
46	5230	36.12	36.12
151	5755	36.48	36.24
159	5795	36.36	36.09

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.84
155	5775	75.84	75.84

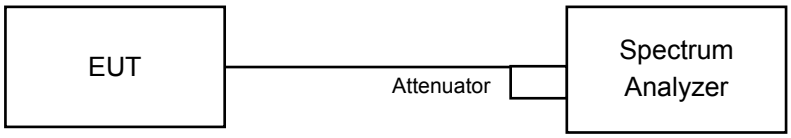
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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	11dBm/ MHz
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 band:

Using method SA-2

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS

c. Set Channel power measure = 1MHz

d. Sweep time = auto, trigger set to “free run”.

e. Trace average at least 100 traces in power averaging mode.

f. Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

Duty cycle of test signal is < 98%

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS

c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.

d. 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)

e. Sweep time = auto, trigger set to “free run”.

f. Trace average at least 100 traces in power averaging mode.

g. 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	6.38	6.41	0.19	9.59	14.69	Pass
40	5200	8.87	8.82	0.19	12.04	14.69	Pass
48	5240	9.05	9.08	0.19	12.26	14.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 17-(8.31-6) = 14.69dBm.
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	6.32	6.93	0.09	9.74	14.69	Pass
40	5200	8.42	8.87	0.09	11.75	14.69	Pass
48	5240	8.69	9.19	0.09	12.05	14.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 17-(8.31-6) = 14.69dBm.
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	1.18	1.16	0.19	4.37	14.69	Pass
46	5230	5.43	5.36	0.19	8.60	14.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 17-(8.31-6) = 14.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

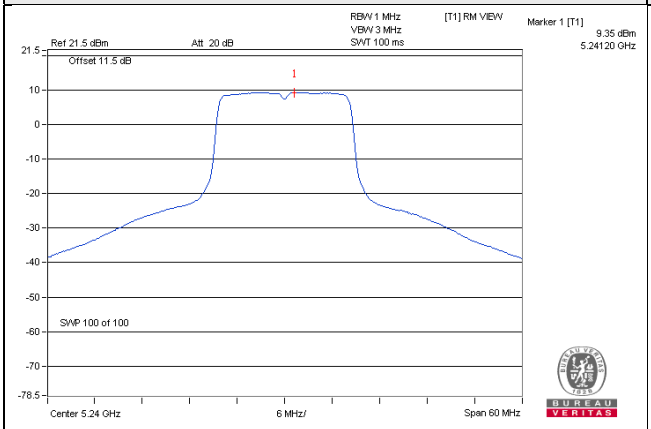
802.11ac (VHT80)

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	-3.08	-2.85	0.32	0.37	14.69	Pass

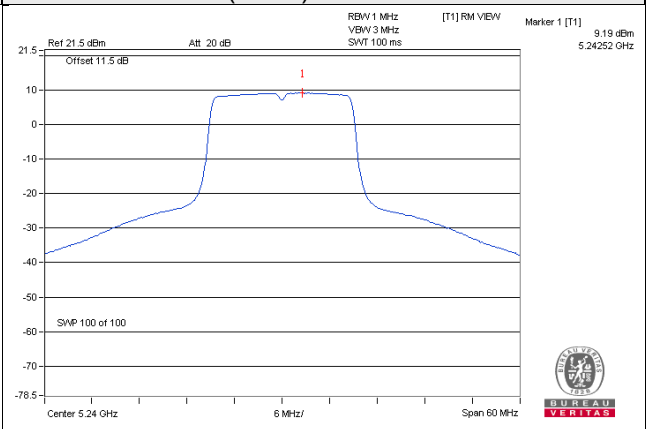
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 17-(8.31-6) = 14.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

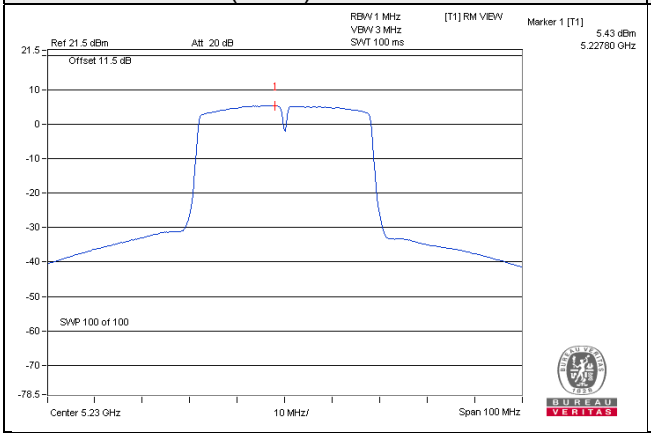
802.11a / Chain 1 / CH 48



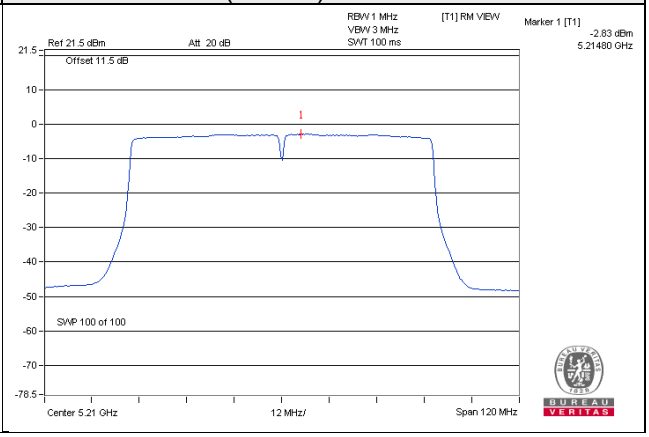
802.11n (HT20) / Chain 1 / CH 48



802.11n (HT40) / Chain 0 / CH 46



802.11ac (VHT80) / Chain 1 / CH 42



For U-NII-3 band:

802.11a

Ch.	Freq. (MHz)	PSD (dBm/300kHz)		PSD (dBm/500kHz)		Duty factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 0	Chain 1				
149	5745	0.46	1.02	2.68	3.24	0.19	6.16	27.69	Pass
157	5785	-0.24	-0.32	1.98	1.90	0.19	5.14	27.69	Pass
165	5825	-0.37	-0.68	1.85	1.54	0.19	4.89	27.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 30-(8.31-6) = 27.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Ch.	Freq. (MHz)	PSD (dBm/300kHz)		PSD (dBm/500kHz)		Duty factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 0	Chain 1				
149	5745	0.00	0.49	2.22	2.71	0.09	5.57	27.69	Pass
157	5785	-0.63	-0.82	1.59	1.40	0.09	4.60	27.69	Pass
165	5825	-0.49	-1.28	1.73	0.94	0.09	4.45	27.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 30-(8.31-6) = 27.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Ch.	Freq. (MHz)	PSD (dBm/300kHz)		PSD (dBm/500kHz)		Duty factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 0	Chain 1				
151	5755	-2.63	-2.06	-0.41	0.16	0.19	3.08	27.69	Pass
159	5795	-2.63	-2.42	-0.41	-0.20	0.19	2.90	27.69	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 = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 30-(8.31-6) = 27.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

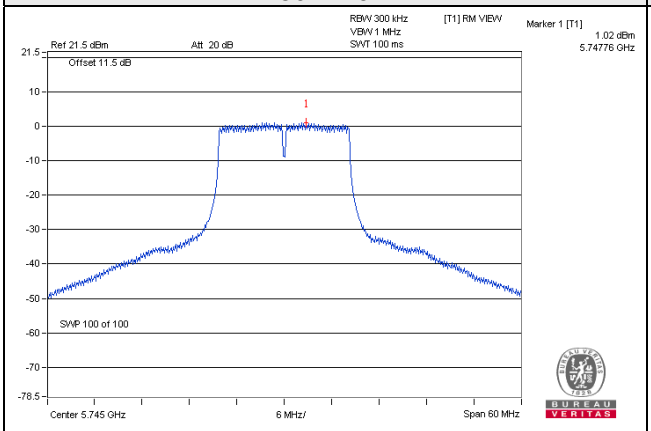
802.11ac (VHT80)

Ch.	Freq. (MHz)	PSD (dBm/300kHz)		PSD (dBm/500kHz)		Duty factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 0	Chain 1				
155	5775	-8.28	-8.02	-6.06	-5.80	0.32	-2.59	27.69	Pass

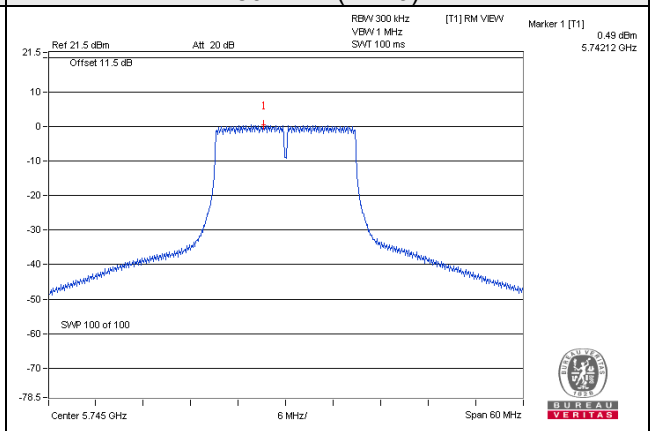
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.3dBi + 10log(2) = 8.31dBi > 6dBi, so the power density limit shall be reduced to 30-(8.31-6) = 27.69dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

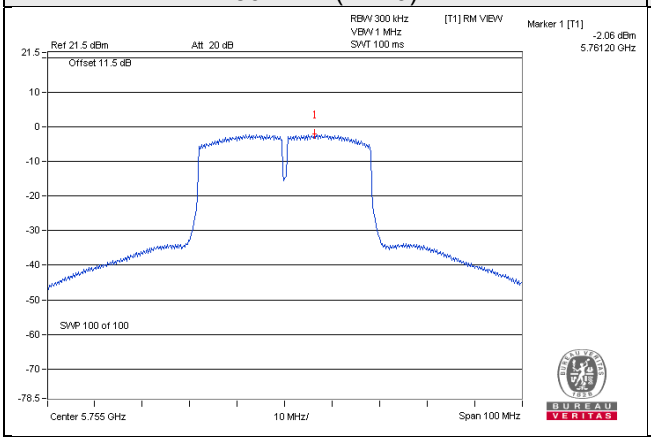
802.11a



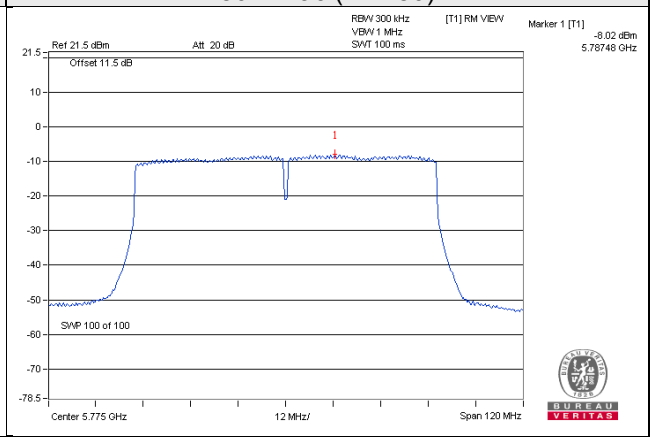
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

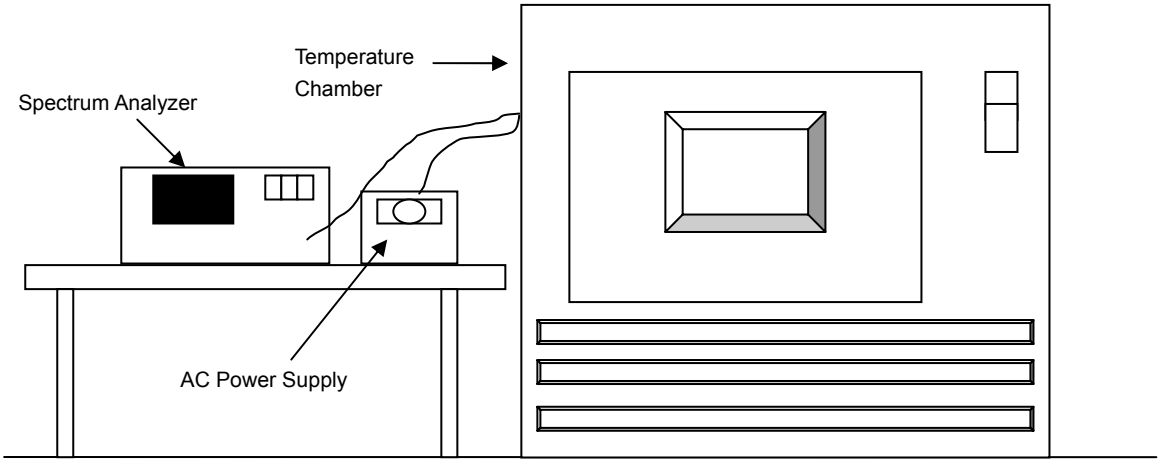


4.6 Frequency Stability

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

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC 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 (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5180.016	0.00031	5180.0173	0.00033	5180.0153	0.00030	5180.0149	0.00029
40	120	5180.0048	0.00009	5180.0014	0.00003	5180.004	0.00008	5180.0043	0.00008
30	120	5179.9992	-0.00002	5179.9945	-0.00011	5179.998	-0.00004	5179.9958	-0.00008
20	120	5179.9996	-0.00001	5180.0016	0.00003	5180.0005	0.00001	5180.0032	0.00006
10	120	5180.0049	0.00009	5180.0015	0.00003	5180.0006	0.00001	5180.0003	0.00001
0	120	5179.9855	-0.00028	5179.9879	-0.00023	5179.9898	-0.00020	5179.9888	-0.00022
-10	120	5179.9805	-0.00038	5179.9783	-0.00042	5179.9754	-0.00047	5179.9781	-0.00042
-20	120	5179.9758	-0.00047	5179.9753	-0.00048	5179.9779	-0.00043	5179.9753	-0.00048
-30	120	5180.0106	0.00020	5180.0103	0.00020	5180.0101	0.00019	5180.0083	0.00016

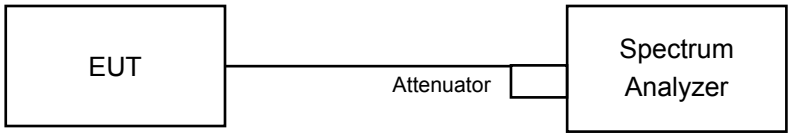
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180	0.00000	5180.0018	0.00003	5180.0008	0.00002	5180.0039	0.00008
	120	5179.9996	-0.00001	5180.0016	0.00003	5180.0005	0.00001	5180.0032	0.00006
	102	5180.0004	0.00001	5180.0021	0.00004	5180.0005	0.00001	5180.0039	0.00008

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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.40	16.40	0.5	Pass
157	5785	16.39	16.45	0.5	Pass
165	5825	16.37	16.43	0.5	Pass

802.11n (HT20)

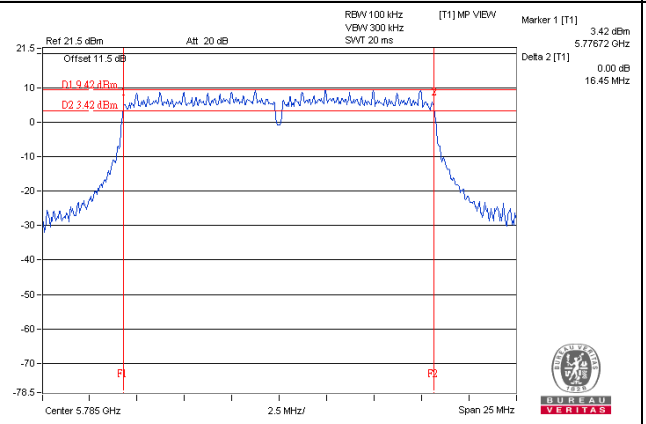
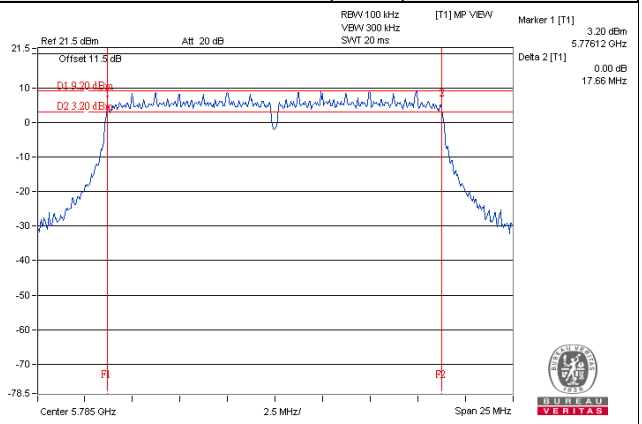
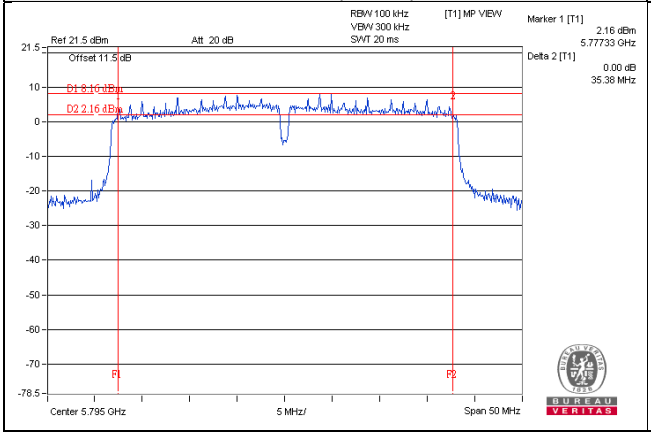
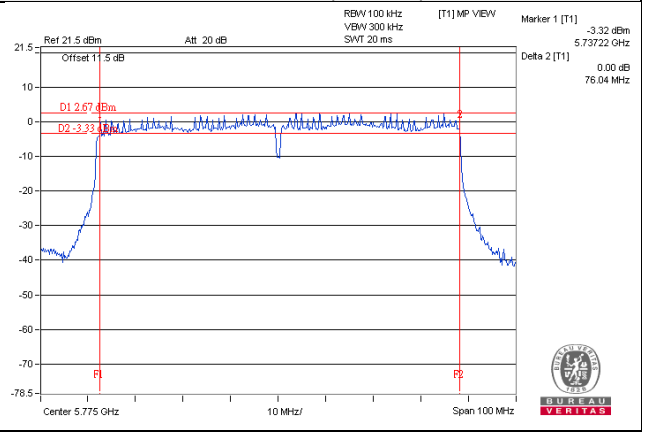
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.63	17.65	0.5	Pass
157	5785	17.63	17.66	0.5	Pass
165	5825	17.61	17.65	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.35	35.23	0.5	Pass
159	5795	35.38	35.15	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.04	76.00	0.5	Pass

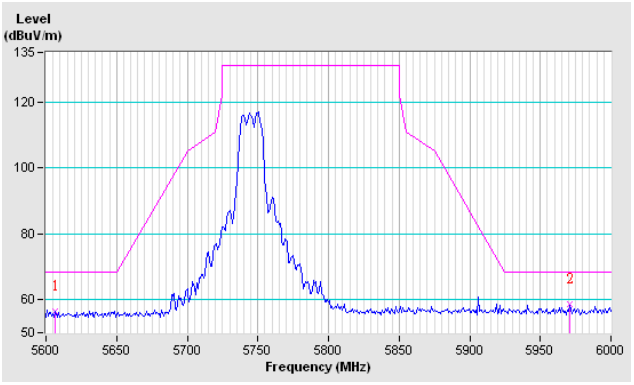
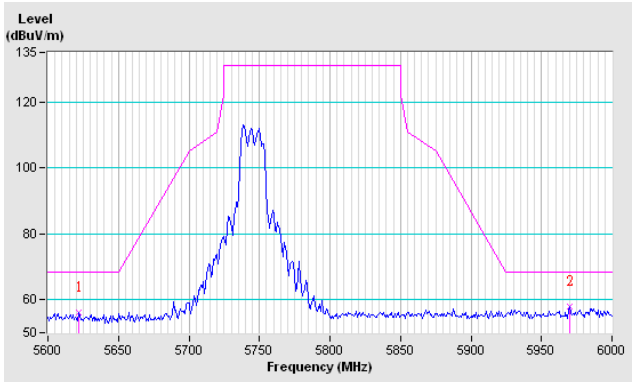
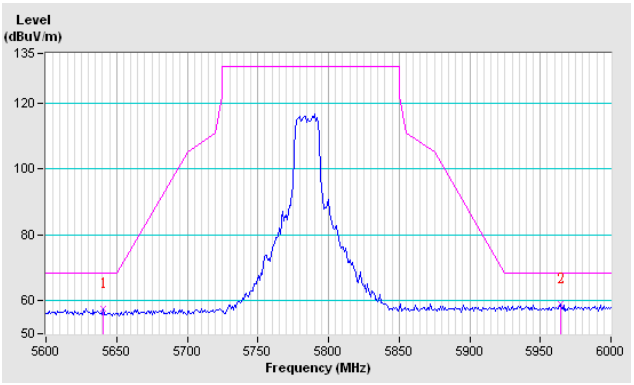
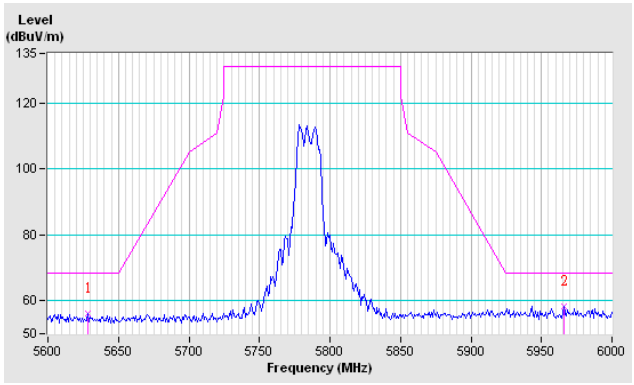
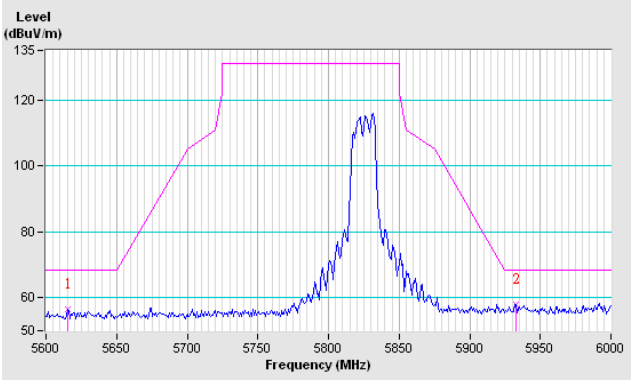
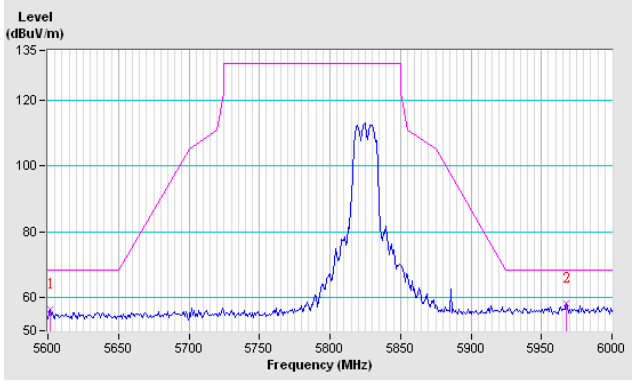
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

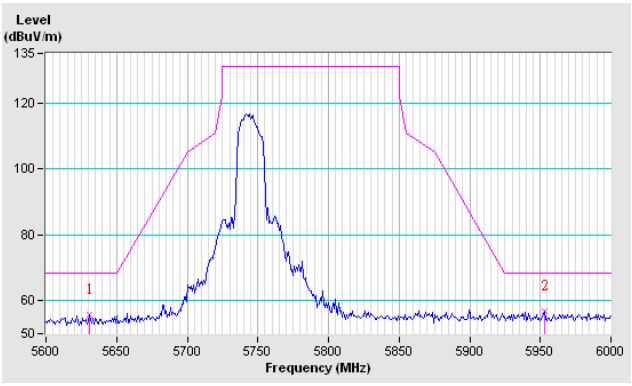
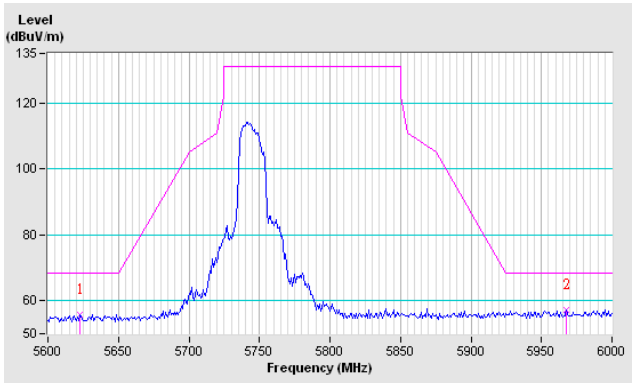
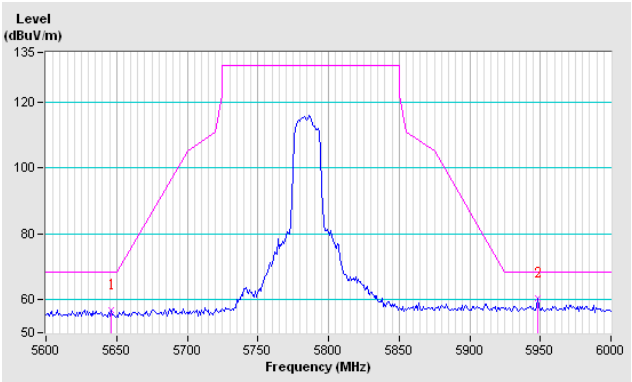
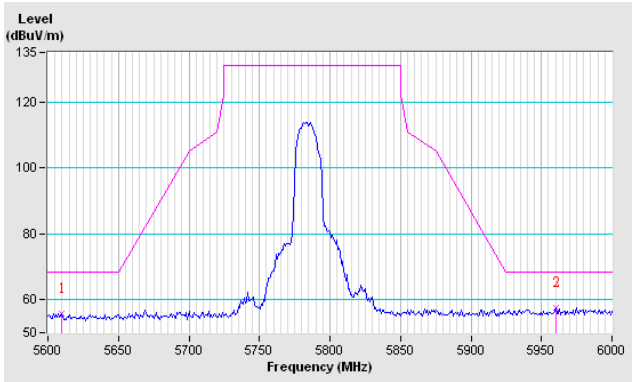
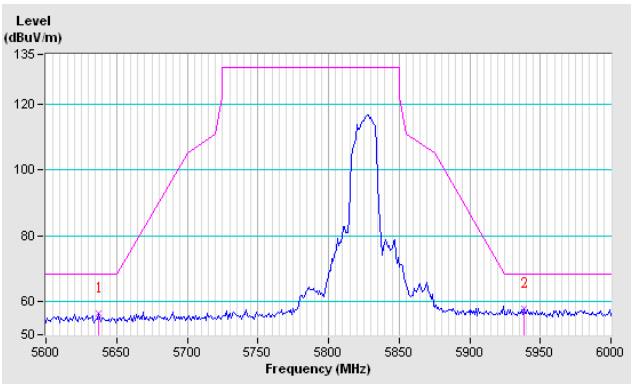
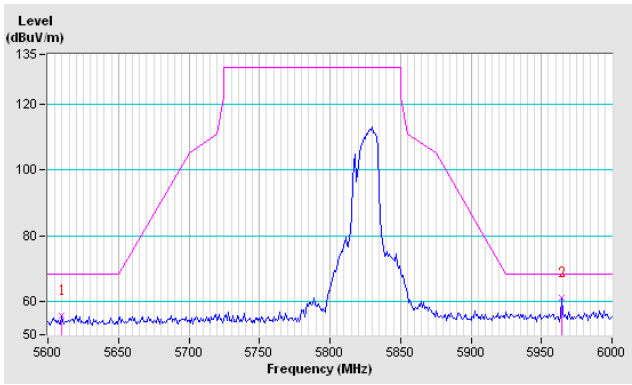
Please refer to the attached file (Test Setup Photo).

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

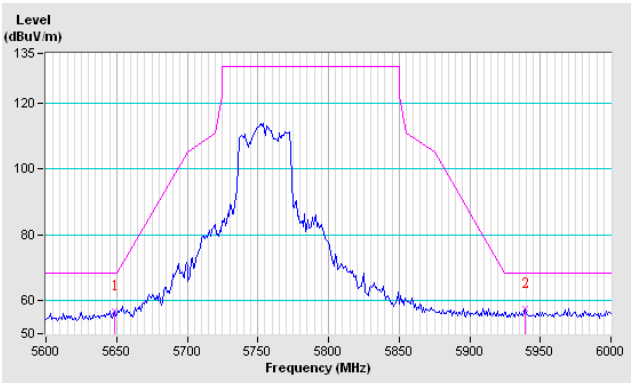
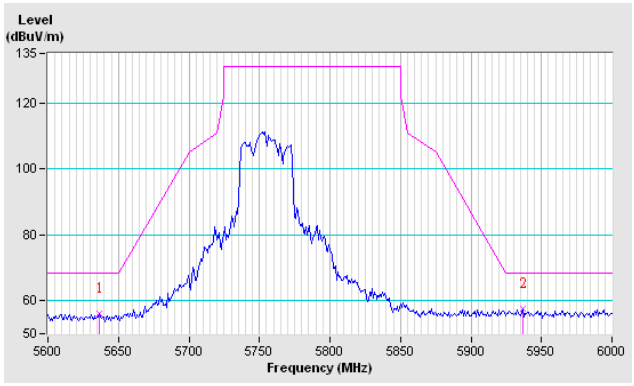
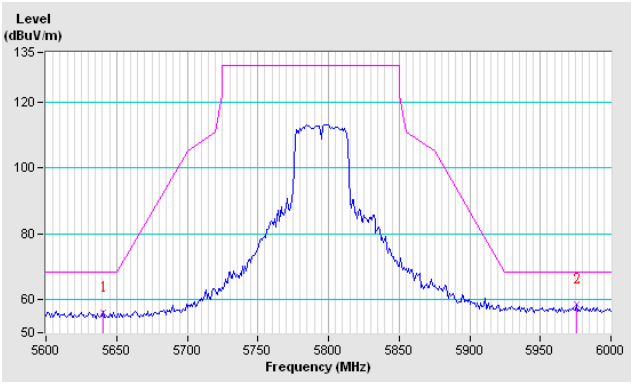
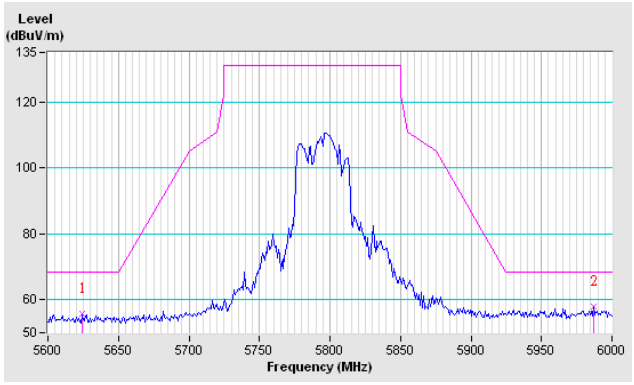
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

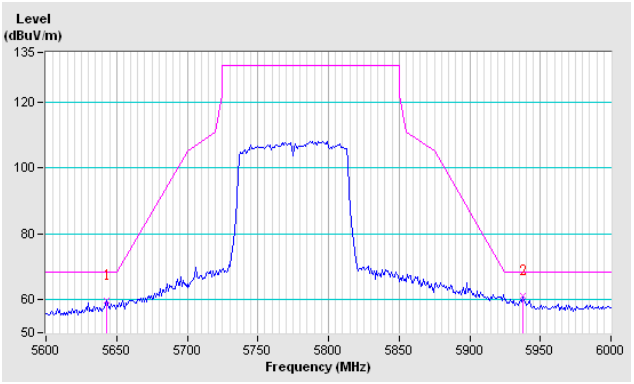
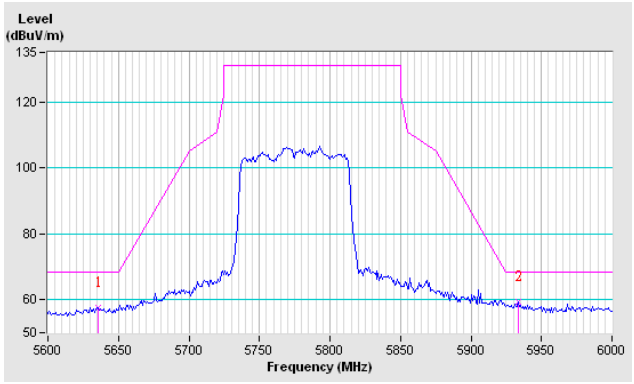
802.11n (HT20)

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 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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