FCC Test Report

Report No.:	RF160920C16-1
FCC ID:	WBV-AP122
Test Model:	AP122
Received Date:	Sep. 21, 2016
Test Date:	Oct. 06 ~ Oct. 26, 2016
Issued Date:	Nov. 07, 2016
Applicant:	Aerohive Networks Inc.
Address:	1011 McCarthy Blvd, Milpitas, CA 95035, 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
RF160920C16-1	Original release.	Nov. 07, 2016

1 Certificate of Conformity

Product:	Access Point
Brand:	Aerohive
Test Model:	AP122
Sample Status:	Engineering sample
Applicant:	Aerohive Networks Inc.
Test Date:	Oct. 06 ~ Oct. 26, 2016
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : _____ , **Date:** Nov. 07, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Nov. 07, 2016

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 -2.47dB at 0.40800MHz.
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 5150.00MHz.
15.407(a) (1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a) (1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	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)(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	2.44 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	Access Point
Brand	Aerohive
Test Model	AP122
Status of EUT	Engineering sample
Power Supply Rating	53Vdc (POE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps 802.11ac: up to 866.5Mbps
Operating Frequency	5180 ~ 5240MHz & 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	CDD Mode 5180 ~ 5240MHz: 180.532mW 5745 ~ 5825MHz: 144.882mW Beamforming Mode 5180 ~ 5240MHz: 180.532mW 5745 ~ 5825MHz: 143.569mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Data Cable Supplied	NA

Note:

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

Modulation Mode	Beamforming Mode	TX/RX Function
802.11a	Not Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11n (HT20)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11n (HT40)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT20)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT40)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT80)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)

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

* CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

2. The EUT uses the following POE. . (Support unit only)

PoE	
Brand	CERIO
Model	POE-S53VG
Input Power	100-240Vac~50-60Hz
Output Power	53Vdc / 0.57A

3. Spurious emission of the simultaneous operation (WLAN 2.4GHz and WLAN 5GHz and BT) has been evaluated and no non-compliance was found.

4. There are 2 WiFi Radio modules for the EUT.

Radio	Support Function
Radio 1	a. RSDB off: 2.4GHz: 2Tx/2Rx b. RSDB on: 2.4GHz: 1Tx/1Rx+ 5GHz:1Rx
Radio 2	5GHz: 2Tx/2Rx

5. The following antenna was provided to the EUT.

Antenna No.	Chain No.	Antenna Net Gain (dBi)	Frequency range	Antenna Type	Connecter Type
ANT0_2.4G (White)	chain0	3.26	2.4~2.4835GHz	PIFA	i-pex(MHF)
ANT1_2.4G RSDB_Ant0_5G (Black)	chain1	3.8 (2.4G) 4.61 (5G)	2.4~2.4835GHz 5.15~5.85GHz	PIFA	i-pex(MHF)
ANT0_5G (Yellow)	chain0	5.44	5.15~5.85GHz	PIFA	i-pex(MHF)
ANT1_5G (Red)	chain1	4.91	5.15~5.85GHz	Dipole	i-pex(MHF)
BT (Blue)	-	3.96	2.4~2.4835GHz	PIFA	i-pex(MHF)

6. The power settings are list as below.

	802.11a	802.11n (HT20)		802.11n (HT40)		802.11ac (VHT80)
CH 36	66	66	CH 38	54	CH 42	50
CH 40	76	76	CH 46	70	CH 155	68
CH 48	82	82	CH 151	78		
CH 149	82	82	CH 159	78		
CH 157	80	80				
CH 165	78	80				

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

3.2 Description of Test Modes

FOR 5180 ~ 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

FOR 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 **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 on Lying & Wall Mount. The worst case was found when positioned on Wall Mount.

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	58.5

Radiated Emission Test (Below 1GHz):

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

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320 5745-5825	36 to 64 149 to 165	36	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320 5745-5825	36 to 64 149 to 165	36	OFDM	BPSK	6.0

Antenna Port Conducted Measurement:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
CDD Mode							
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	58.5
Beamforming Mode							
-	802.11n (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
-	802.11n (HT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	58.5

Test Condition:

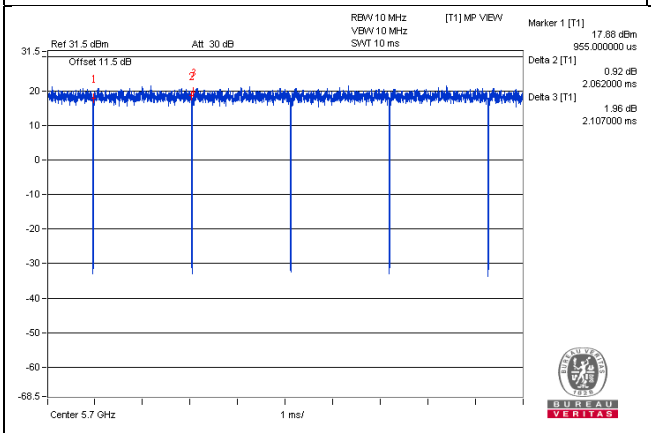
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	20 deg. C, 69% RH	120Vac, 60Hz	Byau Chen
PLC	20 deg. C, 69% RH	120Vac, 60Hz	Byau Chen
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Nick Hsu

3.3 Duty Cycle of Test Signal

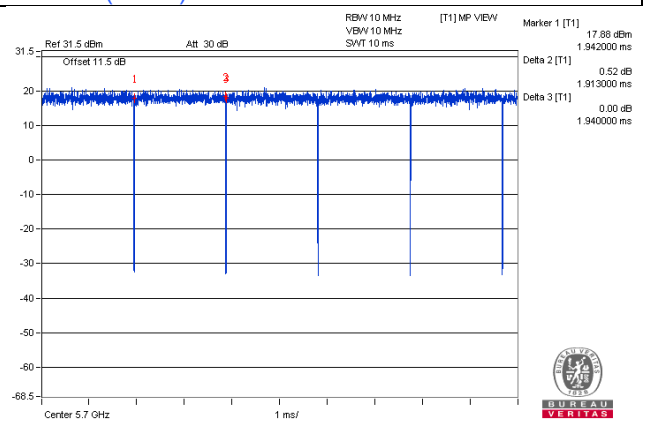
Duty cycle of test signal is > 98%, duty factor is not required
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.062/2.107 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11n (HT20): Duty cycle = 1.913/1.940 = 0.986
802.11n (HT40): Duty cycle = 0.941/0.971 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14
802.11ac (VHT80): Duty cycle = 0.459/0.489 = 0.939, Duty factor = 10 * log(1/0.939) = 0.27

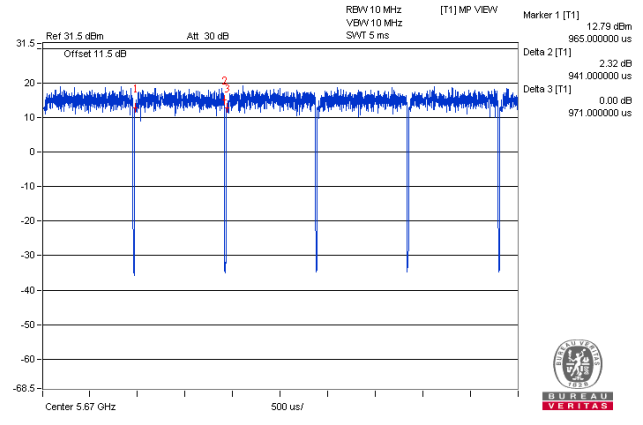
802.11a



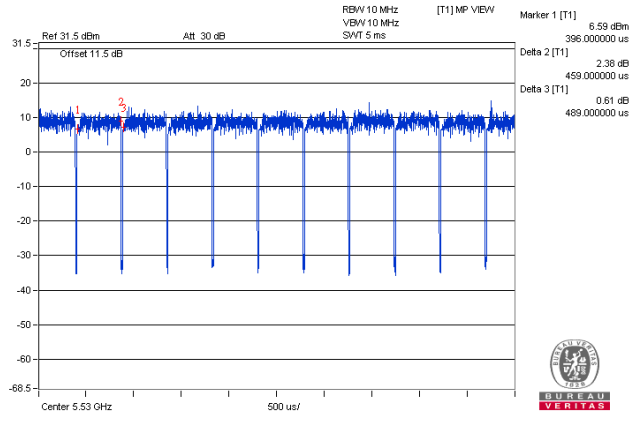
802.11n (HT20)



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.

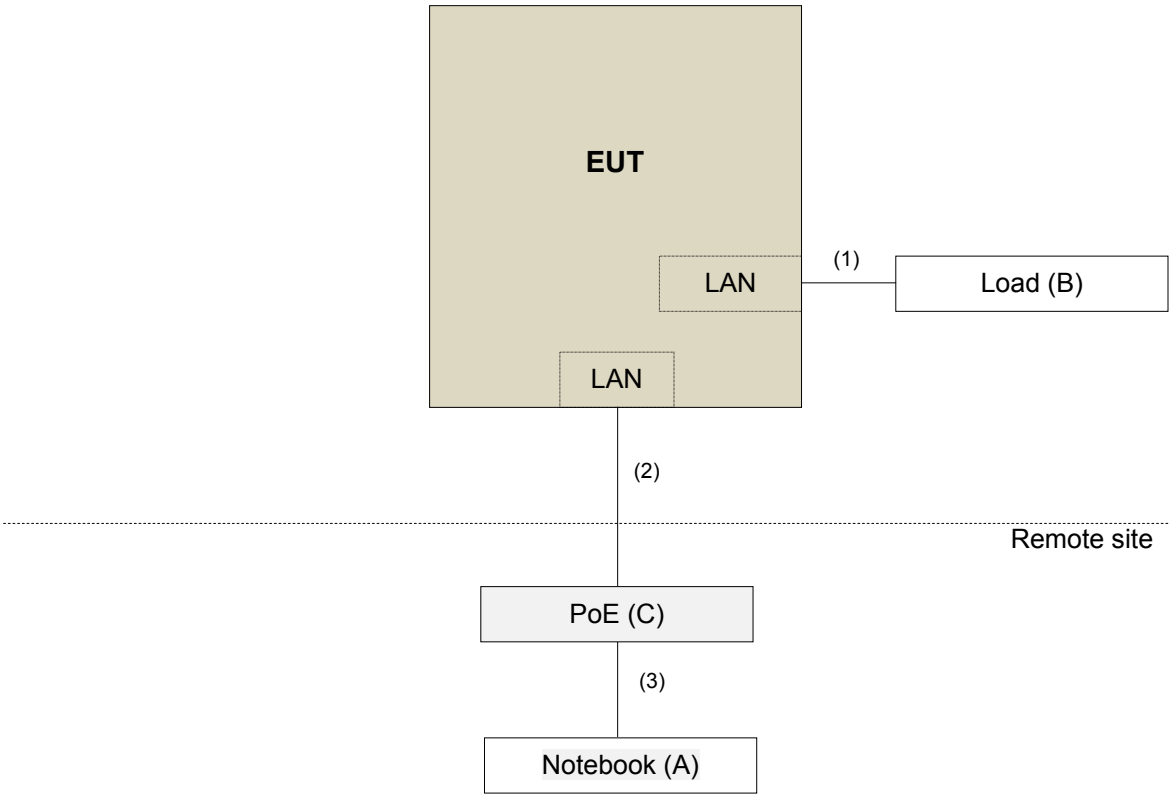
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	PoE	CERIO	POE-S53VG	NA	NA	Provided by client

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	1	1.8	N	0	-
2.	RJ45	1	10	N	0	-
3.	RJ45	1	1.8	N	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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 v01r03
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

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v01r03			Field Strength at 3m	
			PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8 (dBμV/m) *3 PK:122.2 (dBμV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2016	Apr. 18, 2017
MIMO Power measurement Test set (4X4) KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jun. 21, 2016	Jun. 20, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02 (309222+248780)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03 (274092)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
			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

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 Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedure

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:

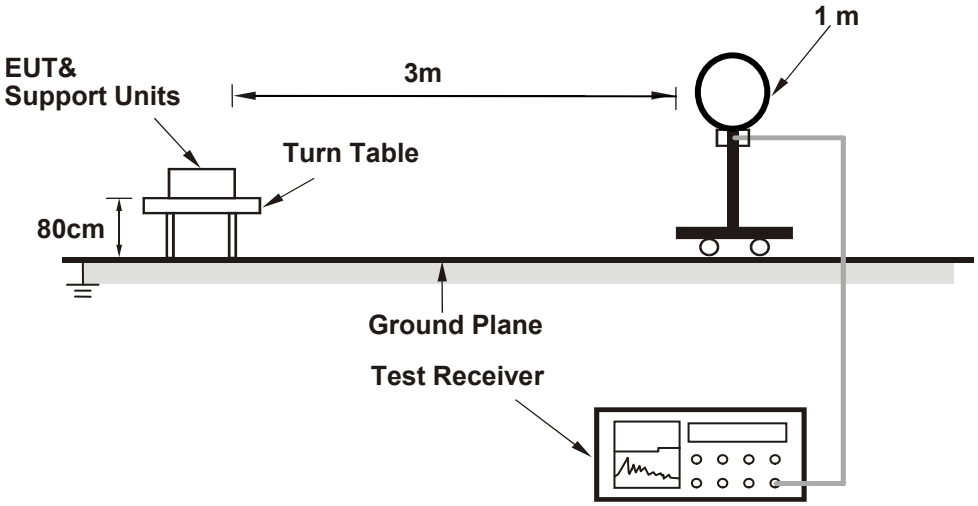
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

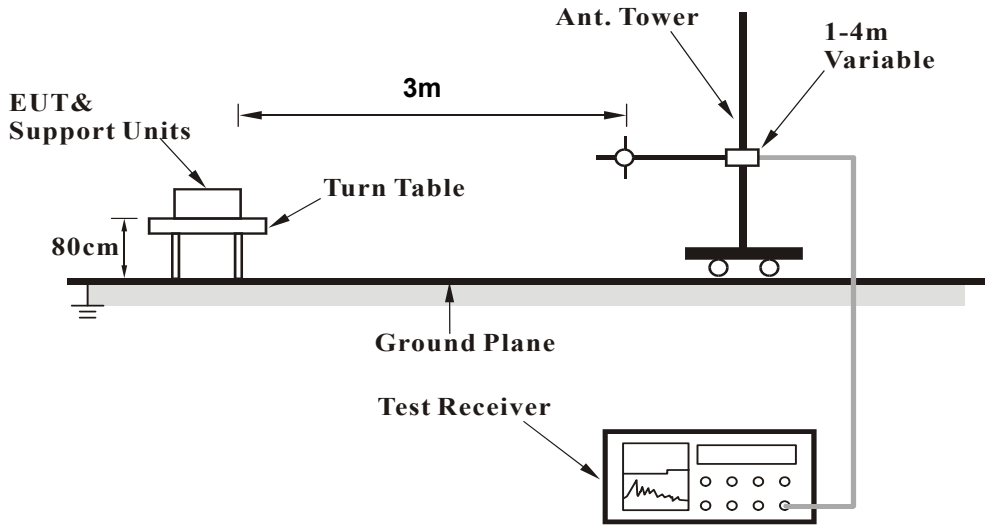
No deviation.

4.1.5 Test Setup

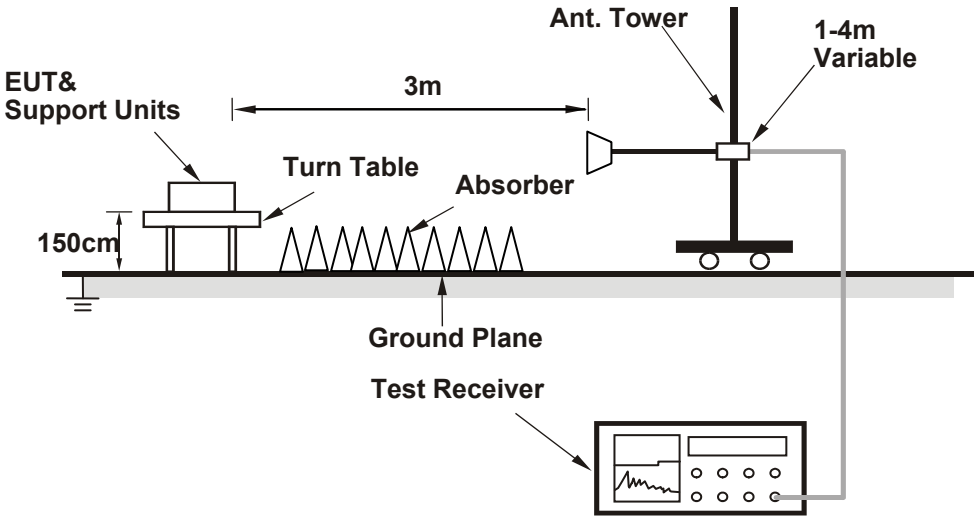
For Radiated emission below 30MHz



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".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

ABOVE 1GHz WORST-CASE 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	4749.00	62.9 PK	74.0	-11.1	1.73 H	88	59.3	3.6
2	4749.00	49.5 AV	54.0	-4.5	1.73 H	88	45.9	3.6
3	5150.00	71.0 PK	74.0	-3.0	1.76 H	71	66.4	4.6
4	**5150.00**	**53.0 AV**	**54.0**	**-1.0**	**1.76 H**	**71**	**48.4**	**4.6**
5	*5180.00	112.1 PK			1.80 H	81	69.3	42.8
6	*5180.00	102.5 AV			1.80 H	81	59.7	42.8
7	5400.00	61.6 PK	74.0	-12.4	1.90 H	82	56.8	4.8
8	5400.00	49.4 AV	54.0	-4.6	1.90 H	82	44.6	4.8
9	#10360.00	59.5 PK	74.0	-14.5	1.06 H	243	43.7	15.8
10	#10360.00	48.5 AV	54.0	-5.5	1.06 H	243	32.7	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	4749.00	60.8 PK	74.0	-13.2	3.76 V	13	57.2	3.6
2	4749.00	47.3 AV	54.0	-6.7	3.76 V	13	43.7	3.6
3	5150.00	66.0 PK	74.0	-8.0	3.86 V	16	61.4	4.6
4	5150.00	50.6 AV	54.0	-3.4	3.86 V	16	46.0	4.6
5	*5180.00	109.4 PK			3.97 V	21	66.6	42.8
6	*5180.00	99.6 AV			3.97 V	21	56.8	42.8
7	5400.00	61.1 PK	74.0	-12.9	4.00 V	31	56.3	4.8
8	5400.00	48.2 AV	54.0	-5.8	4.00 V	31	43.4	4.8
9	#10360.00	59.1 PK	74.0	-14.9	1.57 V	205	43.3	15.8
10	#10360.00	47.6 AV	54.0	-6.4	1.57 V	205	31.8	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)
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	4764.00	61.6 PK	74.0	-12.4	1.89 H	83	57.9	3.7
2	4764.00	48.8 AV	54.0	-5.2	1.89 H	83	45.1	3.7
3	5150.00	68.0 PK	74.0	-6.0	1.84 H	77	63.4	4.6
4	5150.00	52.6 AV	54.0	-1.4	1.84 H	77	48.0	4.6
5	*5200.00	115.7 PK			1.92 H	72	72.9	42.8
6	*5200.00	105.7 AV			1.92 H	72	62.9	42.8
7	5421.00	62.4 PK	74.0	-11.6	1.92 H	87	57.6	4.8
8	5421.00	49.2 AV	54.0	-4.8	1.92 H	87	44.4	4.8
9	#10400.00	59.8 PK	74.0	-14.2	1.00 H	265	43.8	16.0
10	#10400.00	48.6 AV	54.0	-5.4	1.00 H	265	32.6	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	4764.00	60.4 PK	74.0	-13.6	3.92 V	31	56.7	3.7
2	4764.00	47.2 AV	54.0	-6.8	3.92 V	31	43.5	3.7
3	5150.00	66.0 PK	74.0	-8.0	3.98 V	5	61.4	4.6
4	5150.00	51.3 AV	54.0	-2.7	3.98 V	5	46.7	4.6
5	*5200.00	112.5 PK			3.65 V	17	69.7	42.8
6	*5200.00	102.5 AV			3.65 V	17	59.7	42.8
7	5421.00	59.4 PK	74.0	-14.6	3.71 V	21	54.6	4.8
8	5421.00	47.6 AV	54.0	-6.4	3.71 V	21	42.8	4.8
9	#10400.00	59.2 PK	74.0	-14.8	1.63 V	210	43.2	16.0
10	#10400.00	48.2 AV	54.0	-5.8	1.63 V	210	32.2	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)
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	4800.00	61.2 PK	74.0	-12.8	1.81 H	89	57.5	3.7
2	4800.00	48.7 AV	54.0	-5.3	1.81 H	89	45.0	3.7
3	*5240.00	115.1 PK			1.94 H	84	72.2	42.9
4	*5240.00	105.0 AV			1.94 H	84	62.1	42.9
5	5460.00	61.1 PK	74.0	-12.9	1.76 H	84	56.3	4.8
6	5460.00	48.3 AV	54.0	-5.7	1.76 H	84	43.5	4.8
7	#10480.00	59.2 PK	74.0	-14.8	1.03 H	258	43.2	16.0
8	#10480.00	48.0 AV	54.0	-6.0	1.03 H	258	32.0	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	4800.00	58.4 PK	74.0	-15.6	3.88 V	30	54.7	3.7
2	4800.00	46.7 AV	54.0	-7.3	3.88 V	30	43.0	3.7
3	*5240.00	113.9 PK			3.81 V	21	71.0	42.9
4	*5240.00	103.8 AV			3.81 V	21	60.9	42.9
5	5460.00	60.8 PK	74.0	-13.2	3.67 V	23	56.0	4.8
6	5460.00	47.1 AV	54.0	-6.9	3.67 V	23	42.3	4.8
7	#10480.00	59.0 PK	74.0	-15.0	1.54 V	222	43.0	16.0
8	#10480.00	47.9 AV	54.0	-6.1	1.54 V	222	31.9	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)
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	60.4 PK	68.2	-7.8	1.75 H	89	55.3	5.1
2	*5745.00	113.9 PK			1.75 H	89	70.3	43.6
3	*5745.00	103.9 AV			1.75 H	89	60.3	43.6
4	#5948.80	60.1 PK	68.2	-8.1	1.75 H	89	54.8	5.3
5	11490.00	61.2 PK	74.0	-12.8	1.09 H	255	45.1	16.1
6	11490.00	48.0 AV	54.0	-6.0	1.09 H	255	31.9	16.1
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	59.9 PK	68.2	-8.3	3.80 V	21	54.8	5.1
2	*5745.00	111.6 PK			3.80 V	21	68.0	43.6
3	*5745.00	101.8 AV			3.80 V	21	58.2	43.6
4	#5968.80	60.5 PK	68.2	-7.7	3.80 V	21	55.2	5.3
5	11490.00	61.5 PK	74.0	-12.5	1.66 V	193	45.4	16.1
6	11490.00	48.4 AV	54.0	-5.6	1.66 V	193	32.3	16.1

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)
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	#5643.20	60.9 PK	68.2	-7.3	1.64 H	83	55.8	5.1
2	*5785.00	114.5 PK			1.64 H	83	70.9	43.6
3	*5785.00	104.1 AV			1.64 H	83	60.5	43.6
4	#5962.40	60.7 PK	68.2	-7.5	1.64 H	83	55.4	5.3
5	11570.00	61.0 PK	74.0	-13.0	1.21 H	253	44.9	16.1
6	11570.00	48.2 AV	54.0	-5.8	1.21 H	253	32.1	16.1
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	#5605.60	60.6 PK	68.2	-7.6	3.93 V	21	55.6	5.0
2	*5785.00	112.2 PK			3.93 V	21	68.6	43.6
3	*5785.00	102.1 AV			3.93 V	21	58.5	43.6
4	#5947.20	61.3 PK	68.2	-6.9	3.93 V	21	56.0	5.3
5	11570.00	61.3 PK	74.0	-12.7	1.63 V	193	45.2	16.1
6	11570.00	48.3 AV	54.0	-5.7	1.63 V	193	32.2	16.1

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)
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	#5625.60	60.1 PK	68.2	-8.1	1.75 H	88	55.0	5.1
2	*5825.00	113.4 PK			1.75 H	88	69.8	43.6
3	*5825.00	103.4 AV			1.75 H	88	59.8	43.6
4	#5970.40	60.2 PK	68.2	-8.0	1.75 H	88	54.9	5.3
5	11650.00	61.5 PK	74.0	-12.5	1.17 H	249	45.2	16.3
6	11650.00	48.3 AV	54.0	-5.7	1.17 H	249	32.0	16.3
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	59.8 PK	68.2	-8.4	3.85 V	20	54.8	5.0
2	*5825.00	111.6 PK			3.85 V	20	68.0	43.6
3	*5825.00	101.6 AV			3.85 V	20	58.0	43.6
4	#5948.80	60.9 PK	68.2	-7.3	3.85 V	20	55.6	5.3
5	11650.00	61.5 PK	74.0	-12.5	1.57 V	200	45.2	16.3
6	11650.00	48.6 AV	54.0	-5.4	1.57 V	200	32.3	16.3

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)
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	4746.00	59.2 PK	74.0	-14.8	1.87 H	81	55.6	3.6
2	4746.00	47.8 AV	54.0	-6.2	1.87 H	81	44.2	3.6
3	5150.00	69.6 PK	74.0	-4.4	1.96 H	68	65.0	4.6
4	5150.00	52.9 AV	54.0	-1.1	1.96 H	68	48.3	4.6
5	*5180.00	113.3 PK			1.97 H	77	70.5	42.8
6	*5180.00	103.0 AV			1.97 H	77	60.2	42.8
7	5399.00	60.0 PK	74.0	-14.0	1.89 H	81	55.2	4.8
8	5399.00	48.6 AV	54.0	-5.4	1.89 H	81	43.8	4.8
9	#10360.00	59.9 PK	74.0	-14.1	1.00 H	268	44.1	15.8
10	#10360.00	48.3 AV	54.0	-5.7	1.00 H	268	32.5	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	4746.00	58.4 PK	74.0	-15.6	3.91 V	8	54.8	3.6
2	4746.00	47.0 AV	54.0	-7.0	3.91 V	8	43.4	3.6
3	5150.00	68.3 PK	74.0	-5.7	4.00 V	26	63.7	4.6
4	5150.00	51.1 AV	54.0	-2.9	4.00 V	26	46.5	4.6
5	*5180.00	111.0 PK			3.79 V	30	68.2	42.8
6	*5180.00	101.4 AV			3.79 V	30	58.6	42.8
7	5399.00	59.5 PK	74.0	-14.5	3.83 V	16	54.7	4.8
8	5399.00	48.2 AV	54.0	-5.8	3.83 V	16	43.4	4.8
9	#10360.00	59.5 PK	74.0	-14.5	1.59 V	183	43.7	15.8
10	#10360.00	48.1 AV	54.0	-5.9	1.59 V	183	32.3	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)
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	4760.00	60.6 PK	74.0	-13.4	1.86 H	83	56.9	3.7
2	4760.00	48.1 AV	54.0	-5.9	1.86 H	83	44.4	3.7
3	5150.00	69.7 PK	74.0	-4.3	1.97 H	77	65.1	4.6
4	5150.00	52.6 AV	54.0	-1.4	1.97 H	77	48.0	4.6
5	*5200.00	116.8 PK			1.97 H	78	74.0	42.8
6	*5200.00	105.7 AV			1.97 H	78	62.9	42.8
7	5424.00	60.6 PK	74.0	-13.4	1.79 H	68	55.8	4.8
8	5424.00	48.6 AV	54.0	-5.4	1.79 H	68	43.8	4.8
9	#10400.00	59.9 PK	74.0	-14.1	1.05 H	253	43.9	16.0
10	#10400.00	48.7 AV	54.0	-5.3	1.05 H	253	32.7	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	4760.00	59.6 PK	74.0	-14.4	4.00 V	3	55.9	3.7
2	4760.00	47.5 AV	54.0	-6.5	4.00 V	3	43.8	3.7
3	5150.00	66.9 PK	74.0	-7.1	3.75 V	19	62.3	4.6
4	5150.00	51.0 AV	54.0	-3.0	3.75 V	19	46.4	4.6
5	*5200.00	114.1 PK			3.81 V	20	71.3	42.8
6	*5200.00	102.8 AV			3.81 V	20	60.0	42.8
7	5424.00	59.1 PK	74.0	-14.9	3.69 V	23	54.3	4.8
8	5424.00	47.8 AV	54.0	-6.2	3.69 V	23	43.0	4.8
9	#10400.00	59.3 PK	74.0	-14.7	1.62 V	193	43.3	16.0
10	#10400.00	48.0 AV	54.0	-6.0	1.62 V	193	32.0	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)
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	4801.00	61.8 PK	74.0	-12.2	1.99 H	81	58.1	3.7
2	4801.00	49.2 AV	54.0	-4.8	1.99 H	81	45.5	3.7
3	*5240.00	116.9 PK			1.86 H	81	74.0	42.9
4	*5240.00	106.0 AV			1.86 H	81	63.1	42.9
5	5460.00	61.4 PK	74.0	-12.6	1.81 H	86	56.6	4.8
6	5460.00	48.8 AV	54.0	-5.2	1.81 H	86	44.0	4.8
7	#10480.00	59.8 PK	74.0	-14.2	1.00 H	261	43.8	16.0
8	#10480.00	48.5 AV	54.0	-5.5	1.00 H	261	32.5	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	4801.00	60.0 PK	74.0	-14.0	3.72 V	14	56.3	3.7
2	4801.00	47.9 AV	54.0	-6.1	3.72 V	14	44.2	3.7
3	*5240.00	114.7 PK			3.89 V	23	71.8	42.9
4	*5240.00	105.2 AV			3.89 V	23	62.3	42.9
5	5460.00	59.8 PK	74.0	-14.2	3.76 V	38	55.0	4.8
6	5460.00	47.1 AV	54.0	-6.9	3.76 V	38	42.3	4.8
7	#10480.00	59.4 PK	74.0	-14.6	1.62 V	213	43.4	16.0
8	#10480.00	48.1 AV	54.0	-5.9	1.62 V	213	32.1	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)
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	#5637.60	59.8 PK	68.2	-8.4	1.76 H	90	54.7	5.1
2	*5745.00	113.8 PK			1.76 H	90	70.2	43.6
3	*5745.00	103.2 AV			1.76 H	90	59.6	43.6
4	#5964.80	60.9 PK	68.2	-7.3	1.76 H	90	55.6	5.3
5	11490.00	61.3 PK	74.0	-12.7	1.00 H	187	45.2	16.1
6	11490.00	48.1 AV	54.0	-5.9	1.00 H	187	32.0	16.1
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	#5607.20	60.3 PK	68.2	-7.9	3.82 V	22	55.3	5.0
2	*5745.00	111.8 PK			3.82 V	22	68.2	43.6
3	*5745.00	101.2 AV			3.82 V	22	57.6	43.6
4	#5975.20	60.8 PK	68.2	-7.4	3.82 V	22	55.4	5.4
5	11490.00	61.6 PK	74.0	-12.4	1.55 V	200	45.5	16.1
6	11490.00	48.7 AV	54.0	-5.3	1.55 V	200	32.6	16.1

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)
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	#5622.40	60.7 PK	68.2	-7.5	1.79 H	83	55.6	5.1
2	*5785.00	113.8 PK			1.79 H	83	70.2	43.6
3	*5785.00	103.8 AV			1.79 H	83	60.2	43.6
4	#5987.20	60.2 PK	68.2	-8.0	1.79 H	83	54.9	5.3
5	11570.00	61.4 PK	74.0	-12.6	1.00 H	263	45.3	16.1
6	11570.00	48.1 AV	54.0	-5.9	1.00 H	263	32.0	16.1
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	#5612.80	60.6 PK	68.2	-7.6	3.91 V	13	55.6	5.0
2	*5785.00	112.0 PK			3.91 V	13	68.4	43.6
3	*5785.00	101.7 AV			3.91 V	13	58.1	43.6
4	#5972.00	60.1 PK	68.2	-8.1	3.91 V	13	54.7	5.4
5	11570.00	61.6 PK	74.0	-12.4	1.57 V	188	45.5	16.1
6	11570.00	48.5 AV	54.0	-5.5	1.57 V	188	32.4	16.1

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)
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	#5627.20	60.2 PK	68.2	-8.0	1.82 H	86	55.1	5.1
2	*5825.00	113.6 PK			1.82 H	86	70.0	43.6
3	*5825.00	102.4 AV			1.82 H	86	58.8	43.6
4	#5964.00	61.2 PK	68.2	-7.0	1.82 H	86	55.9	5.3
5	11650.00	61.5 PK	74.0	-12.5	1.04 H	251	45.2	16.3
6	11650.00	48.4 AV	54.0	-5.6	1.04 H	251	32.1	16.3
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	#5620.00	59.7 PK	68.2	-8.5	3.83 V	13	54.6	5.1
2	*5825.00	111.3 PK			3.83 V	13	67.7	43.6
3	*5825.00	101.2 AV			3.83 V	13	57.6	43.6
4	#5976.80	60.4 PK	68.2	-7.8	3.83 V	13	55.0	5.4
5	11650.00	61.8 PK	74.0	-12.2	1.62 V	197	45.5	16.3
6	11650.00	48.8 AV	54.0	-5.2	1.62 V	197	32.5	16.3

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)
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	69.5 PK	74.0	-4.5	1.89 H	74	64.9	4.6
2	5150.00	52.8 AV	54.0	-1.2	1.89 H	74	48.2	4.6
3	*5190.00	108.0 PK			1.86 H	76	65.2	42.8
4	*5190.00	97.1 AV			1.86 H	76	54.3	42.8
5	#10380.00	59.5 PK	74.0	-14.5	1.07 H	247	43.5	16.0
6	#10380.00	48.2 AV	54.0	-5.8	1.07 H	247	32.2	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	66.3 PK	74.0	-7.7	4.00 V	18	61.7	4.6
2	5150.00	50.9 AV	54.0	-3.1	4.00 V	18	46.3	4.6
3	*5190.00	106.5 PK			3.86 V	6	63.7	42.8
4	*5190.00	95.2 AV			3.86 V	6	52.4	42.8
5	#10380.00	59.3 PK	74.0	-14.7	1.59 V	230	43.3	16.0
6	#10380.00	47.9 AV	54.0	-6.1	1.59 V	230	31.9	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)
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	67.9 PK	74.0	-6.1	1.95 H	83	63.3	4.6
2	5150.00	52.5 AV	54.0	-1.5	1.95 H	83	47.9	4.6
3	*5230.00	114.3 PK			1.91 H	78	71.5	42.8
4	*5230.00	102.4 AV			1.91 H	78	59.6	42.8
5	5350.00	61.0 PK	74.0	-13.0	1.86 H	86	56.3	4.7
6	5350.00	47.7 AV	54.0	-6.3	1.86 H	86	43.0	4.7
7	#10460.00	59.3 PK	74.0	-14.7	1.00 H	250	43.4	15.9
8	#10460.00	48.3 AV	54.0	-5.7	1.00 H	250	32.4	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	62.4 PK	74.0	-11.6	4.00 V	25	57.8	4.6
2	5150.00	50.2 AV	54.0	-3.8	4.00 V	25	45.6	4.6
3	*5230.00	109.0 PK			3.81 V	3	66.2	42.8
4	*5230.00	98.9 AV			3.81 V	3	56.1	42.8
5	5350.00	59.6 PK	74.0	-14.4	3.75 V	13	54.9	4.7
6	5350.00	46.4 AV	54.0	-7.6	3.75 V	13	41.7	4.7
7	#10460.00	59.1 PK	74.0	-14.9	1.67 V	211	43.2	15.9
8	#10460.00	48.0 AV	54.0	-6.0	1.67 V	211	32.1	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)
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	#5645.60	61.6 PK	68.2	-6.6	1.81 H	88	56.5	5.1
2	*5755.00	110.5 PK			1.81 H	88	66.9	43.6
3	*5755.00	99.9 AV			1.81 H	88	56.3	43.6
4	#5927.20	60.5 PK	68.2	-7.7	1.81 H	88	55.2	5.3
5	11510.00	60.7 PK	74.0	-13.3	1.00 H	251	44.8	15.9
6	11510.00	47.6 AV	54.0	-6.4	1.00 H	251	31.7	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	#5646.40	61.9 PK	68.2	-6.3	3.96 V	12	56.8	5.1
2	*5755.00	110.9 PK			3.96 V	12	67.3	43.6
3	*5755.00	100.2 AV			3.96 V	12	56.6	43.6
4	#5932.80	61.2 PK	68.2	-7.0	3.96 V	12	55.9	5.3
5	11510.00	61.2 PK	74.0	-12.8	1.53 V	258	45.3	15.9
6	11510.00	48.2 AV	54.0	-5.8	1.53 V	258	32.3	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)
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	#5609.60	61.5 PK	68.2	-6.7	1.73 H	86	56.5	5.0
2	*5795.00	110.1 PK			1.73 H	86	66.5	43.6
3	*5795.00	99.6 AV			1.73 H	86	56.0	43.6
4	#5928.00	62.6 PK	68.2	-5.6	1.73 H	86	57.3	5.3
5	11590.00	61.0 PK	74.0	-13.0	1.15 H	192	44.9	16.1
6	11590.00	48.1 AV	54.0	-5.9	1.15 H	192	32.0	16.1
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	#5631.20	60.9 PK	68.2	-7.3	3.88 V	17	55.8	5.1
2	*5795.00	108.3 PK			3.88 V	17	64.7	43.6
3	*5795.00	98.2 AV			3.88 V	17	54.6	43.6
4	#5928.00	63.1 PK	68.2	-5.1	3.88 V	17	57.8	5.3
5	11590.00	61.3 PK	74.0	-12.7	1.43 V	253	45.2	16.1
6	11590.00	48.3 AV	54.0	-5.7	1.43 V	253	32.2	16.1

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)
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	67.0 PK	74.0	-7.0	1.89 H	79	62.4	4.6
2	5150.00	52.7 AV	54.0	-1.3	1.89 H	79	48.1	4.6
3	*5210.00	101.6 PK			1.78 H	85	58.8	42.8
4	*5210.00	92.0 AV			1.78 H	85	49.2	42.8
5	5350.00	62.2 PK	74.0	-11.8	1.73 H	81	57.5	4.7
6	5350.00	47.7 AV	54.0	-6.3	1.73 H	81	43.0	4.7
7	#10420.00	59.3 PK	74.0	-14.7	1.00 H	252	43.3	16.0
8	#10420.00	47.9 AV	54.0	-6.1	1.00 H	252	31.9	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	63.0 PK	74.0	-11.0	3.79 V	16	58.4	4.6
2	5150.00	51.0 AV	54.0	-3.0	3.79 V	16	46.4	4.6
3	*5210.00	99.0 PK			3.92 V	25	56.2	42.8
4	*5210.00	89.6 AV			3.92 V	25	46.8	42.8
5	5350.00	60.7 PK	74.0	-13.3	3.85 V	30	56.0	4.7
6	5350.00	47.3 AV	54.0	-6.7	3.85 V	30	42.6	4.7
7	#10420.00	59.0 PK	74.0	-15.0	1.63 V	243	43.0	16.0
8	#10420.00	47.7 AV	54.0	-6.3	1.63 V	243	31.7	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)
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	#5640.80	66.7 PK	68.2	-1.5	1.85 H	84	61.6	5.1
2	#5650.00	68.5 PK	74.0	-5.5	1.87 H	81	63.4	5.1
3	#5650.00	52.8 AV	54.0	-1.2	1.87 H	81	47.7	5.1
4	*5775.00	106.0 PK			1.85 H	84	62.4	43.6
5	*5775.00	95.7 AV			1.85 H	84	52.1	43.6
6	#5924.80	63.1 PK	68.3	-5.2	1.85 H	84	57.8	5.3
7	11550.00	60.8 PK	74.0	-13.2	1.07 H	243	44.8	16.0
8	11550.00	47.9 AV	54.0	-6.1	1.07 H	243	31.9	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	#5643.20	64.8 PK	68.2	-3.4	3.79 V	13	59.7	5.1
2	#5650.00	66.5 PK	74.0	-7.5	3.95 V	8	61.4	5.1
3	#5650.00	52.5 AV	54.0	-1.5	3.95 V	8	47.4	5.1
4	*5775.00	103.7 PK			3.79 V	13	60.1	43.6
5	*5775.00	94.0 AV			3.79 V	13	50.4	43.6
6	#5940.00	61.2 PK	68.2	-7.0	3.79 V	13	55.9	5.3
7	11550.00	61.2 PK	74.0	-12.8	1.00 V	198	45.2	16.0
8	11550.00	48.1 AV	54.0	-5.9	1.00 V	198	32.1	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)
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		

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	49.40	30.8 QP	40.0	-9.2	1.99 H	305	44.4	-13.6
2	107.60	28.3 QP	43.5	-15.2	1.99 H	87	45.6	-17.3
3	140.58	33.8 QP	43.5	-9.7	1.99 H	279	47.9	-14.1
4	375.32	33.5 QP	46.0	-12.5	1.00 H	140	42.8	-9.3
5	499.48	34.1 QP	46.0	-11.9	1.49 H	165	40.6	-6.5
6	625.58	43.7 QP	46.0	-2.3	1.24 H	158	46.8	-3.1
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	35.28	34.0 QP	40.0	-6.0	1.00 V	201	49.4	-15.4
2	101.78	34.0 QP	43.5	-9.5	1.00 V	330	52.3	-18.3
3	192.96	30.9 QP	43.5	-12.6	1.00 V	139	46.6	-15.7
4	375.32	33.8 QP	46.0	-12.2	1.00 V	165	43.1	-9.3
5	625.58	38.0 QP	46.0	-8.0	1.00 V	160	41.1	-3.1
6	901.06	36.9 QP	46.0	-9.1	1.00 V	110	33.9	3.0

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)
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. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
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 Procedure

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.

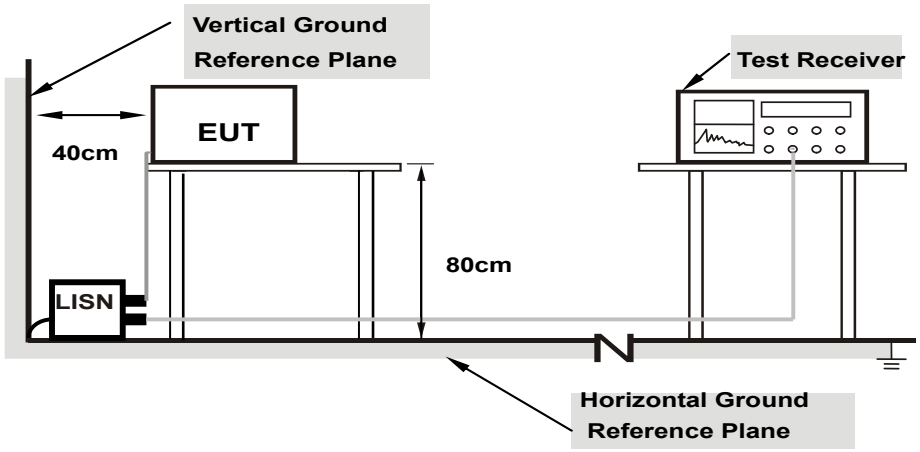
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

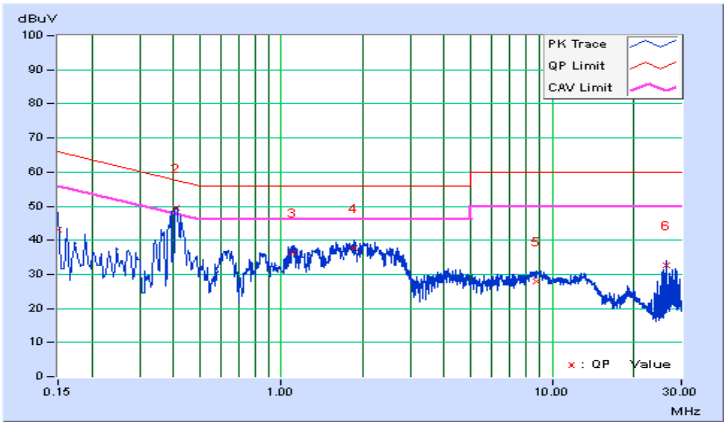
4.2.7 Test Results

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	0.15000	10.01	33.20	23.04	43.21	33.05	66.00	56.00	-22.79	-22.95
2	**0.40800**	**10.12**	**39.26**	**35.10**	**49.38**	**45.22**	**57.69**	**47.69**	**-8.31**	**-2.47**
3	1.09593	10.21	26.26	19.94	36.47	30.15	56.00	46.00	-19.53	-15.85
4	1.86258	10.26	27.56	18.99	37.82	29.25	56.00	46.00	-18.18	-16.75
5	8.77155	10.66	17.14	10.58	27.80	21.24	60.00	50.00	-32.20	-28.76
6	26.49167	11.77	20.94	20.41	32.71	32.18	60.00	50.00	-27.29	-17.82

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.

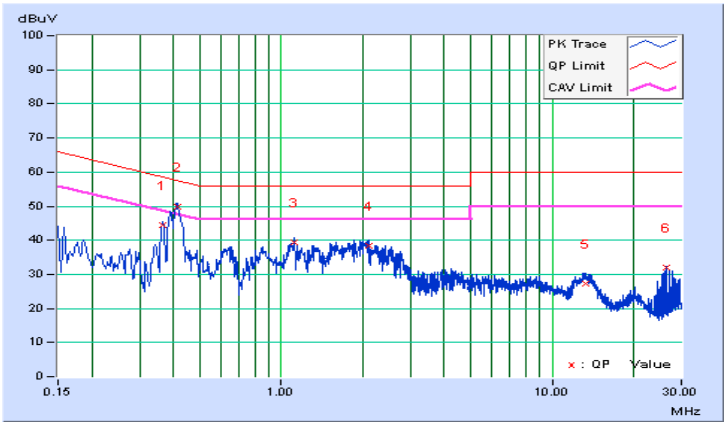


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.36505	10.11	34.48	32.69	44.59	42.80	58.61	48.61	-14.02	-5.81
2	0.41197	10.13	39.84	34.63	49.97	44.76	57.61	47.61	-7.64	-2.85
3	1.12359	10.22	29.09	20.88	39.31	31.10	56.00	46.00	-16.69	-14.90
4	2.09718	10.29	28.16	18.60	38.45	28.89	56.00	46.00	-17.55	-17.11
5	13.31497	11.01	16.42	10.74	27.43	21.75	60.00	50.00	-32.57	-28.25
6	26.49167	11.93	19.96	18.98	31.89	30.91	60.00	50.00	-28.11	-19.09

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)

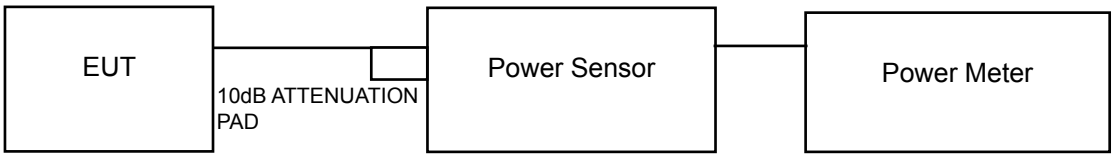
*B is the 26 dB emission bandwidth in megahertz

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 $N_{ANT} \geq 5$.

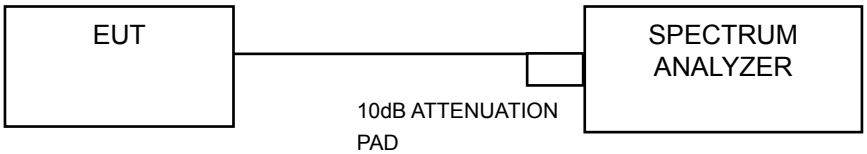
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

For Power Output Measurement



For 26dB 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

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 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:

CDD Mode

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	16.66	16.16	87.650	19.43	30	Pass
40	5200	18.40	18.63	142.129	21.53	30	Pass
48	5240	19.49	19.41	176.217	22.46	30	Pass
149	5745	18.80	18.39	**144.882**	21.61	30	Pass
157	5785	17.94	18.24	128.911	21.10	30	Pass
165	5825	17.35	17.34	108.525	20.36	30	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	16.44	16.02	84.049	19.25	30	Pass
40	5200	18.79	18.34	143.917	21.58	30	Pass
48	5240	19.60	19.51	**180.532**	22.57	30	Pass
149	5745	18.51	18.61	143.569	21.57	30	Pass
157	5785	18.15	17.92	127.257	21.05	30	Pass
165	5825	17.43	17.09	106.503	20.27	30	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	14.19	13.84	50.452	17.03	30	Pass
46	5230	18.38	17.91	130.667	21.16	30	Pass
151	5755	18.28	18.23	133.825	21.27	30	Pass
159	5795	17.82	17.38	115.236	20.62	30	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	12.55	12.54	35.936	15.56	30	Pass
155	5775	16.78	16.61	93.457	19.71	30	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	16.44	16.02	84.049	19.25	27.81	Pass
40	5200	18.79	18.34	143.917	21.58	27.81	Pass
48	5240	19.60	19.51	**180.532**	22.57	27.81	Pass
149	5745	18.51	18.61	**143.569**	21.57	27.81	Pass
157	5785	18.15	17.92	127.257	21.05	27.81	Pass
165	5825	17.43	17.09	106.503	20.27	27.81	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, so the power limit shall be reduced to 30-(8.19-6) = 27.81dBm.

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	14.19	13.84	50.452	17.03	27.81	Pass
46	5230	18.38	17.91	130.667	21.16	27.81	Pass
151	5755	18.28	18.23	133.825	21.27	27.81	Pass
159	5795	17.82	17.38	115.236	20.62	27.81	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, so the power limit shall be reduced to 30-(8.19-6) = 27.81dBm.

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	12.55	12.54	35.936	15.56	27.81	Pass
155	5775	16.78	16.61	93.457	19.71	27.81	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, so the power limit shall be reduced to 30-(8.19-6) = 27.81dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	25.06	21.75
40	5200	33.95	22.73
48	5240	38.95	36.77

802.11n (HT20)

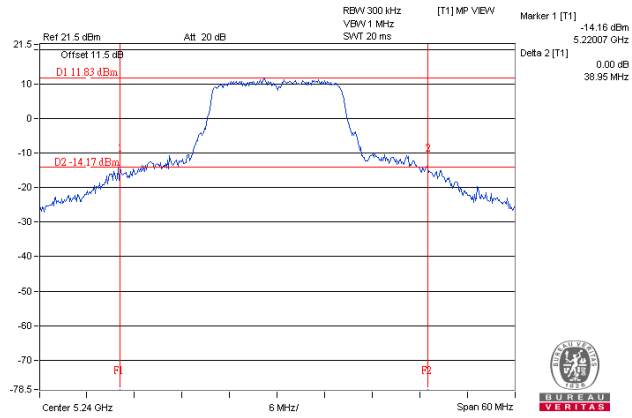
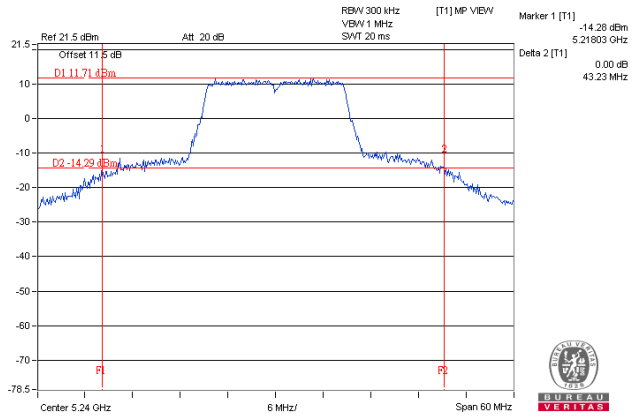
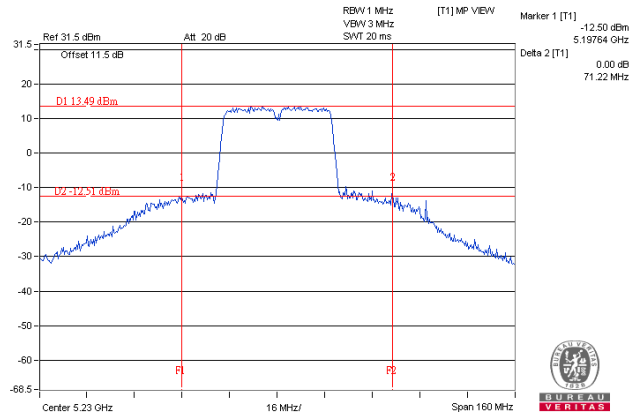
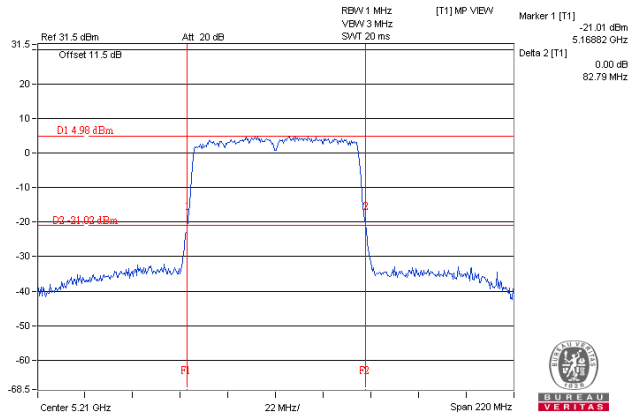
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	22.07	21.83
40	5200	31.24	21.87
48	5240	43.23	39.20

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.69	41.33
46	5230	71.22	41.71

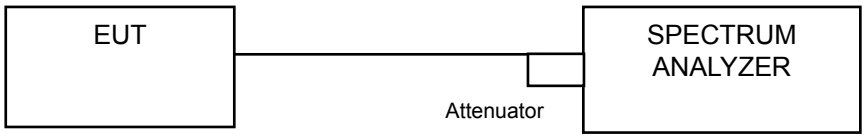
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	82.79	82.12

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 SAMPLE. 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 Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.52	17.04
40	5200	17.40	17.16
48	5240	18.00	18.24
149	5745	28.80	20.28
157	5785	20.40	18.84
165	5825	20.16	18.12

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.12	18.12
40	5200	18.24	18.12
48	5240	18.96	18.84
149	5745	21.48	18.84
157	5785	22.92	19.32
165	5825	22.68	18.96

802.11n (HT40)

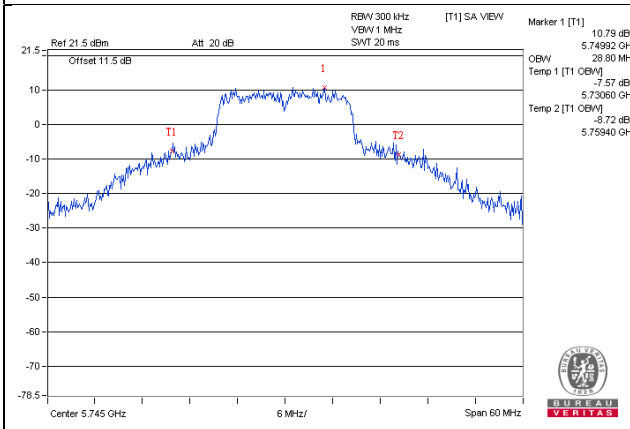
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.72	36.72
46	5230	36.72	36.72
151	5755	37.56	37.32
159	5795	38.16	37.20

802.11ac (VHT80)

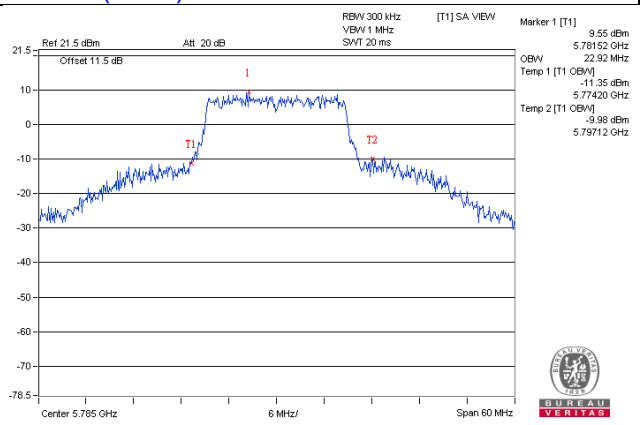
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.60	76.08
155	5775	76.08	75.84

SPECTRUM PLOT OF WORST VALUE

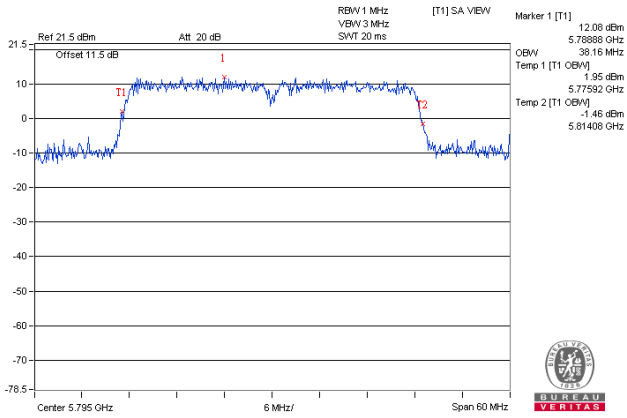
802.11a



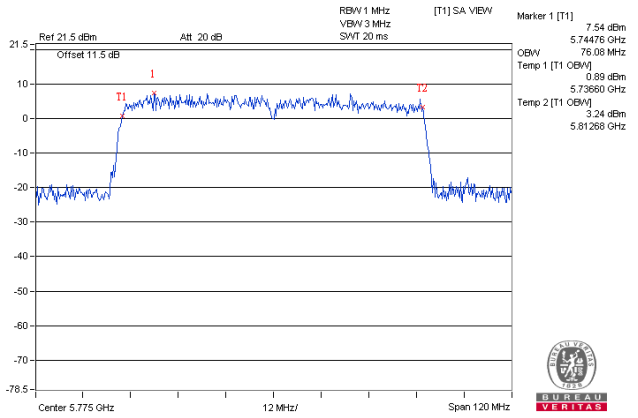
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

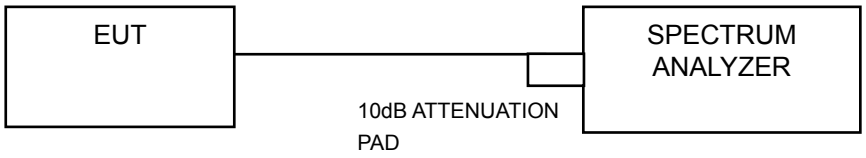


4.5 Peak Power Spectral Density Measurement

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 Procedure

For U-NII-1 band:
Using method SA-2 alternative
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 =20ms.
5) Perform a single sweep.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:
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/300kHz)
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 Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	3.50	2.63	0.09	6.19	14.81	Pass
40	5200	5.93	5.51	0.09	8.83	14.81	Pass
48	5240	6.50	7.10	0.09	9.91	14.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 17-(8.19-6) = 14.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	3.23	2.51	5.90	14.81	Pass
40	5200	5.68	5.10	8.41	14.81	Pass
48	5240	6.39	6.67	9.54	14.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 17-(8.19-6) = 14.81dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-2.09	-2.54	0.14	0.84	14.81	Pass
46	5230	2.29	1.53	0.14	5.07	14.81	Pass

NOTE:

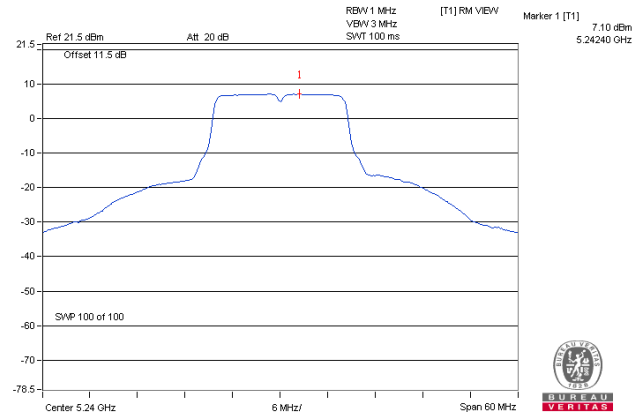
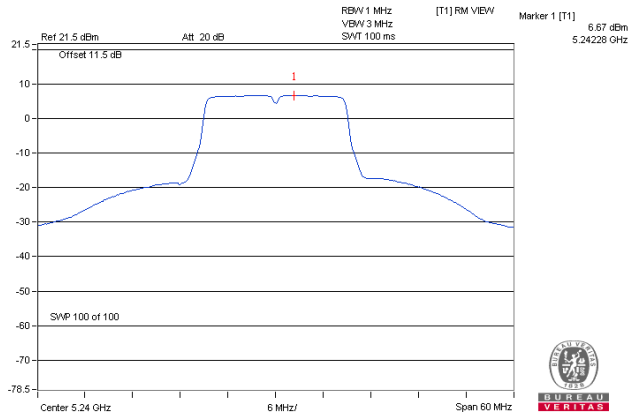
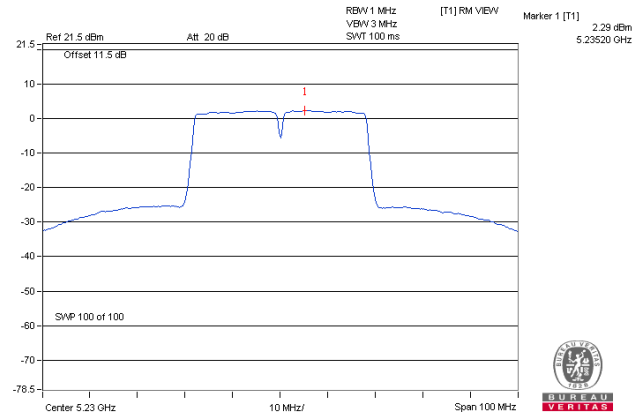
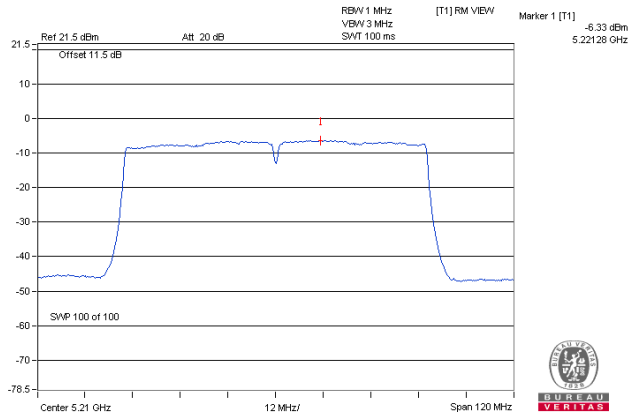
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 17-(8.19-6) = 14.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-6.33	-6.93	0.27	-3.34	14.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 17-(8.19-6) = 14.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE	
802.11a / CH 48 / Chain 1	802.11n (HT20) / CH 48 / Chain 1
	
802.11n (HT40) / CH 46 / Chain 0	802.11ac (VHT80) / CH 42 / Chain 0
	

For U-NII-3 Band

802.11a

TX chain	Chan.	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	-1.77	0.45	3.01	0.09	3.55	27.81	Pass
	157	5785	-2.98	-0.76	3.01	0.09	2.34	27.81	Pass
	165	5825	-3.36	-1.14	3.01	0.09	1.96	27.81	Pass
1	149	5745	-1.85	0.37	3.01	0.09	3.47	27.81	Pass
	157	5785	-2.61	-0.39	3.01	0.09	2.71	27.81	Pass
	165	5825	-3.33	-1.11	3.01	0.09	1.99	27.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, so the power density limit shall be reduced to 30-(8.19-6) = 27.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-2.85	-0.63	3.01	2.38	27.81	Pass
	157	5785	-3.14	-0.92	3.01	2.09	27.81	Pass
	165	5825	-3.70	-1.48	3.01	1.53	27.81	Pass
1	149	5745	-2.85	-0.63	3.01	2.38	27.81	Pass
	157	5785	-2.78	-0.56	3.01	2.45	27.81	Pass
	165	5825	-3.70	-1.48	3.01	1.53	27.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N$] = 8.19dBi > 6dBi, so the power density limit shall be reduced to 30-(8.19-6) = 27.81dBm.

802.11n (HT40)

TX chain	Chan.	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	-6.72	-4.50	3.01	0.14	-1.35	27.81	Pass
	159	5795	-6.73	-4.51	3.01	0.14	-1.36	27.81	Pass
1	151	5755	-5.85	-3.63	3.01	0.14	-0.48	27.81	Pass
	159	5795	-6.78	-4.56	3.01	0.14	-1.41	27.81	Pass

NOTE:

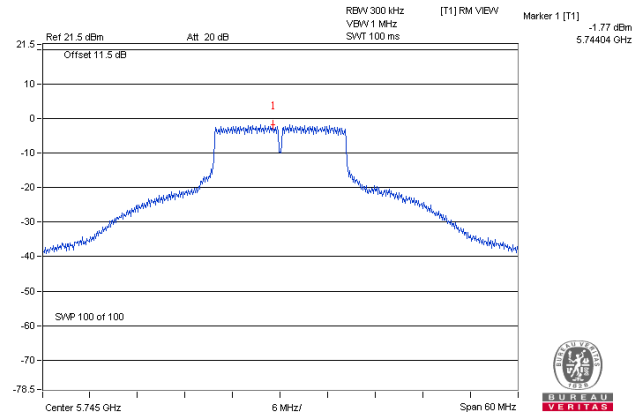
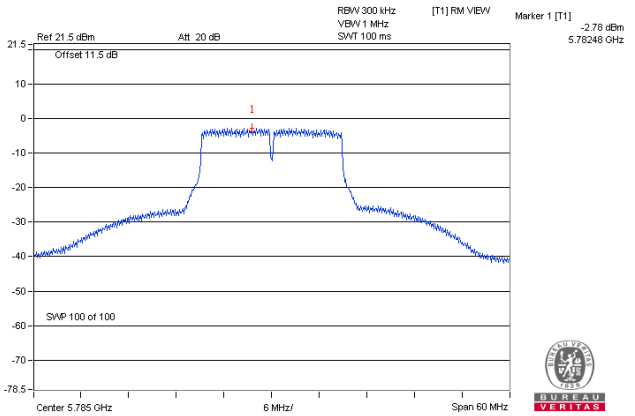
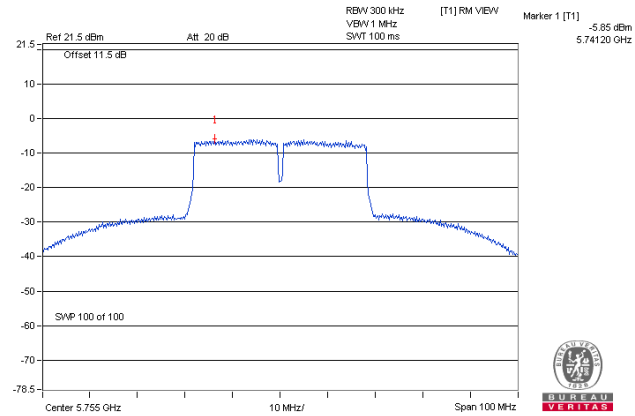
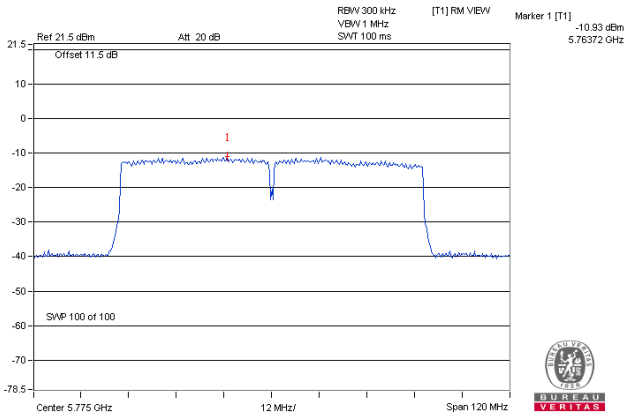
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, so the power density limit shall be reduced to 30-(8.19-6) = 27.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	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	-10.93	-8.71	3.01	0.27	-5.43	27.81	Pass
1	155	5775	-11.13	-8.91	3.01	0.27	-5.63	27.81	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, so the power density limit shall be reduced to 30-(8.19-6) = 27.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

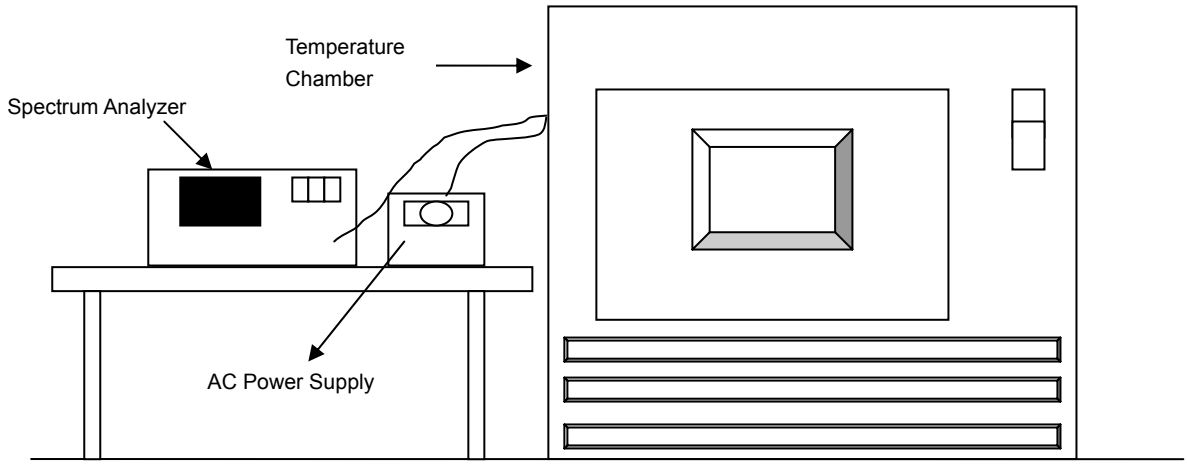
SPECTRUM PLOT OF WORST VALUE	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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

802.11a

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	5180.0144	0.00028	5180.0175	0.00034	5180.0184	0.00036	5180.0144	0.00028
40	120	5180.0244	0.00047	5180.0270	0.00052	5180.0240	0.00046	5180.0237	0.00046
30	120	5179.9729	-0.00052	5179.9729	-0.00052	5179.9751	-0.00048	5179.9735	-0.00051
20	120	5180.0053	0.00010	5180.0030	0.00006	5180.0052	0.00010	5180.0050	0.00010
10	120	5180.0155	0.00030	5180.0181	0.00035	5180.0181	0.00035	5180.0188	0.00036
0	120	5180.0229	0.00044	5180.0231	0.00045	5180.0241	0.00047	5180.0262	0.00051
-10	120	5180.0083	0.00016	5180.0092	0.00018	5180.0106	0.00020	5180.0103	0.00020
-20	120	5179.9874	-0.00024	5179.9851	-0.00029	5179.9855	-0.00028	5179.9852	-0.00029
-30	120	5180.0169	0.00033	5180.0175	0.00034	5180.0132	0.00025	5180.0167	0.00032

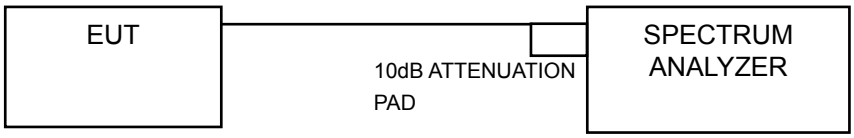
FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0043	0.00008	5180.0024	0.00005	5180.0050	0.00010	5180.0059	0.00011
	120	5180.0053	0.00010	5180.0030	0.00006	5180.0052	0.00010	5180.0050	0.00010
	102	5180.0050	0.00010	5180.0036	0.00007	5180.0055	0.00011	5180.0059	0.00011

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

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	16.13	16.38	0.5	Pass
157	5785	16.40	16.40	0.5	Pass
165	5825	16.40	16.41	0.5	Pass

802.11n (HT20)

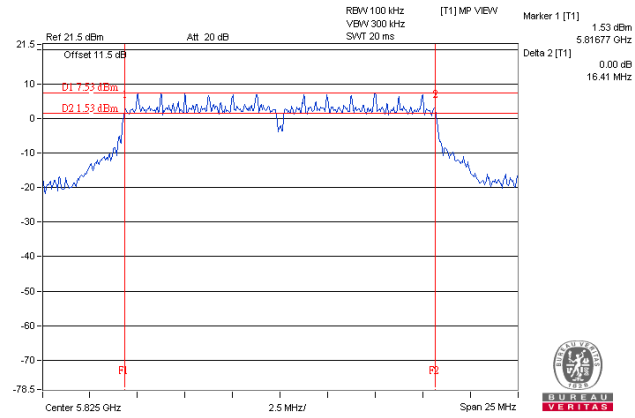
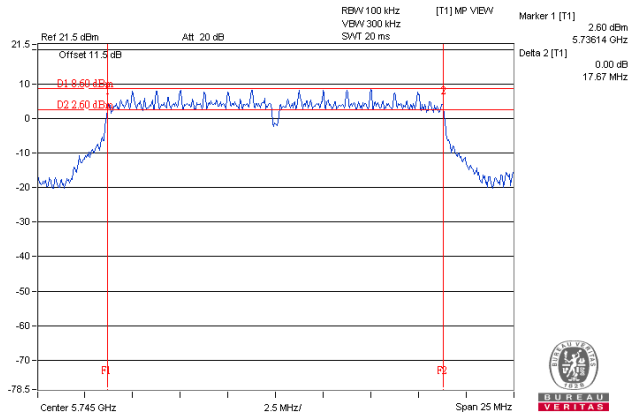
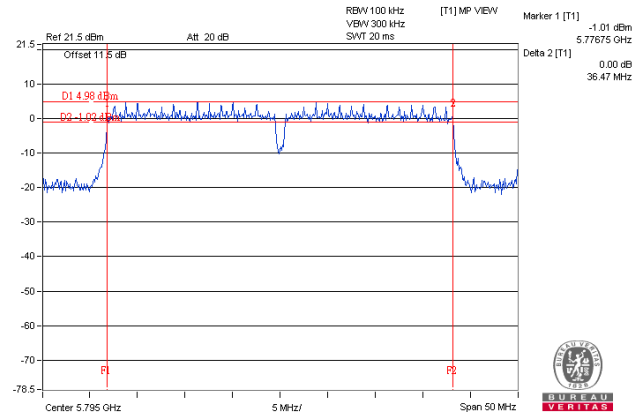
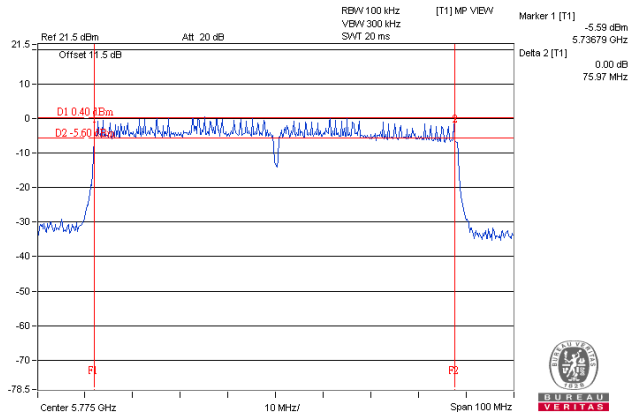
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.62	17.67	0.5	Pass
157	5785	17.62	17.66	0.5	Pass
165	5825	17.60	17.61	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.46	36.46	0.5	Pass
159	5795	36.45	36.47	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.83	75.97	0.5	Pass

SPECTRUM PLOT OF WORST VALUE	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

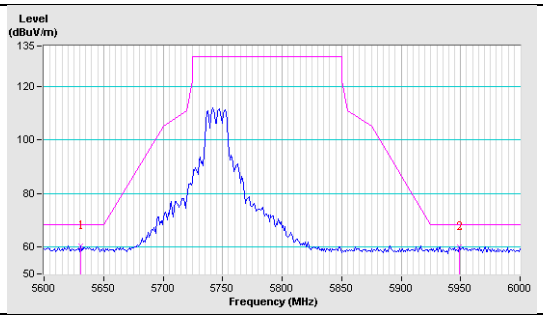
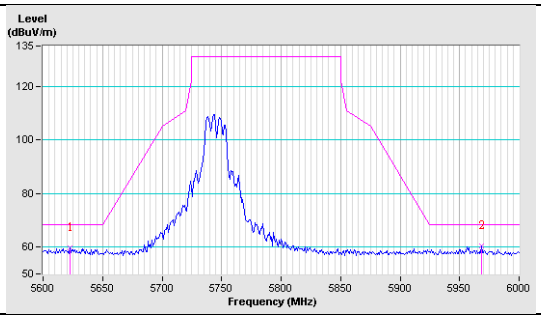
5 Pictures of Test Arrangements

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

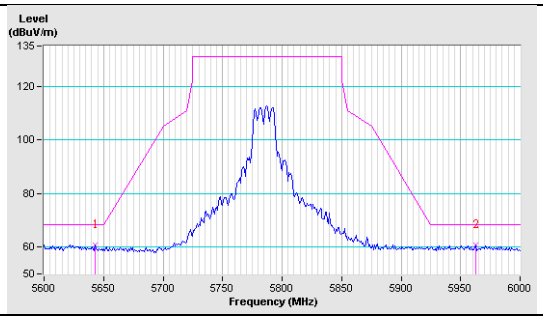
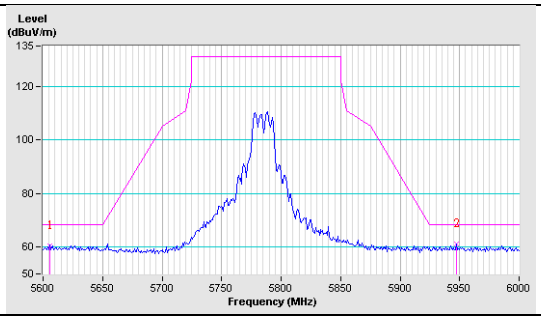
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

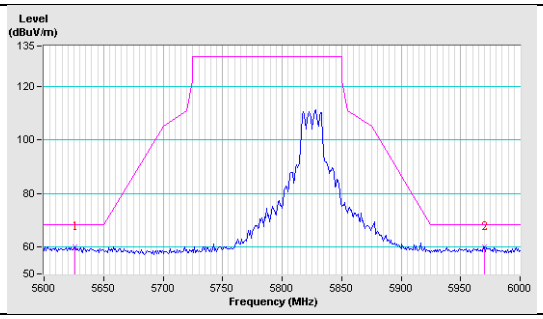
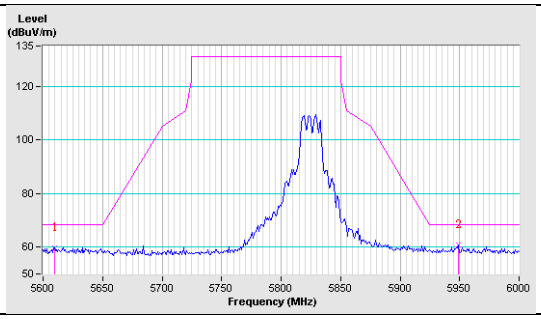
CH149

Horizontal	Vertical
	

CH157

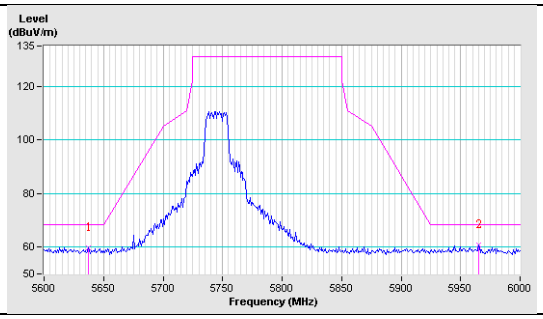
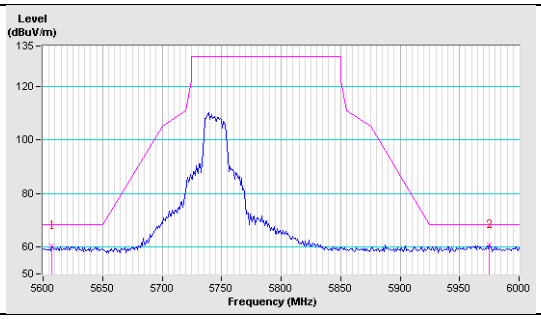
Horizontal	Vertical
	

CH165

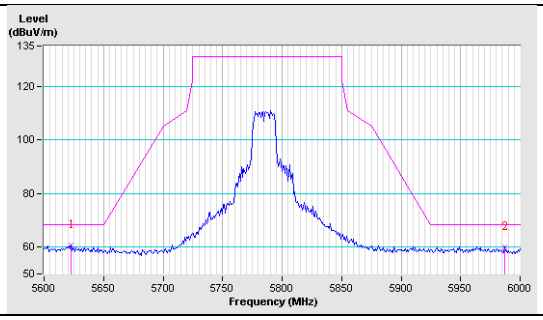
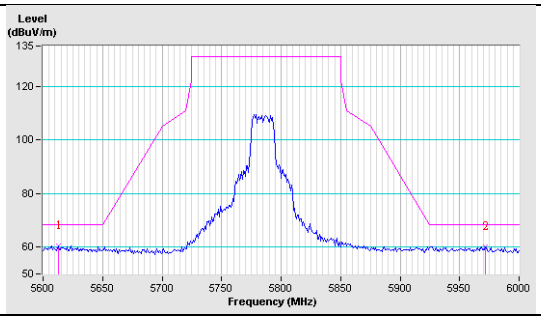
Horizontal	Vertical
	

802.11n (HT20)

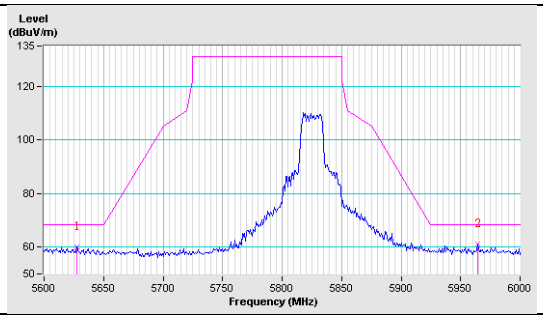
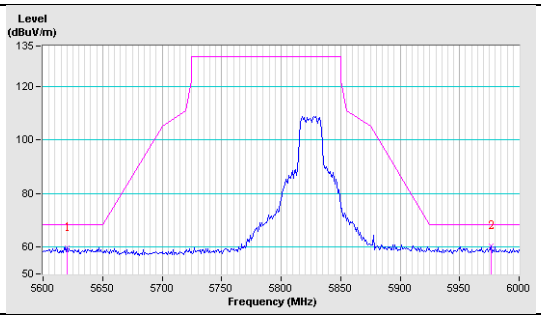
CH149

Horizontal	Vertical
	

CH157

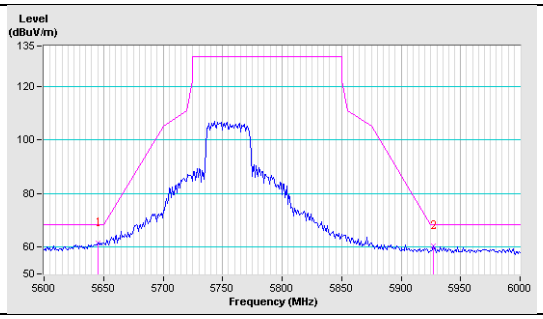
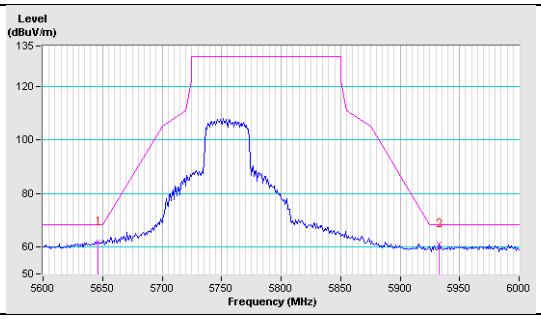
Horizontal	Vertical
	

CH165

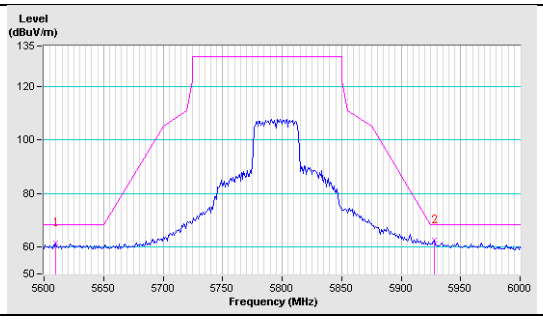
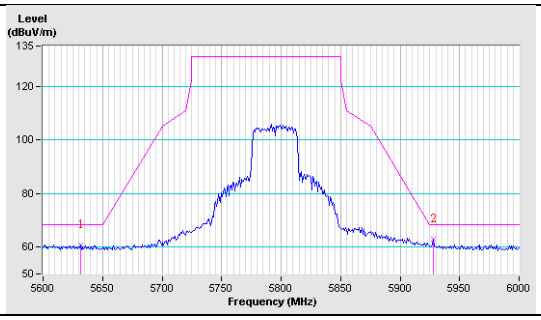
Horizontal	Vertical
	

802.11n (HT40)

CH151

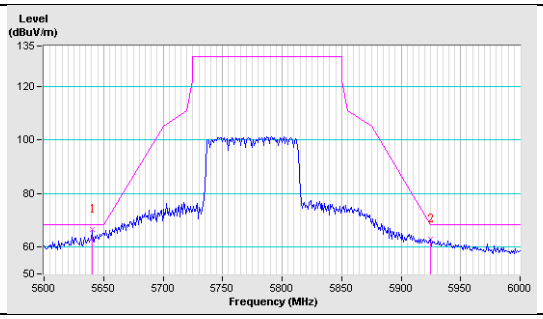
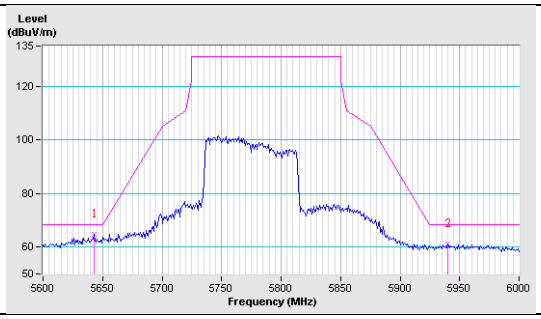
Horizontal	Vertical
	

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:

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

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