FCC Test Report

Report No.:	RF180109C12-1
FCC ID:	PD5-LM-WESA0440A
Test Model:	LM-WESA0440A
Received Date:	Jan. 09, 2018
Test Date:	Feb. 01 ~ Feb. 13, 2018
Issued Date:	Feb. 21, 2018
Applicant:	Delta Networks, Inc.
Address:	No. 252, Shang Ying Rd., Kuei San District, Taoyuan City 33341, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration/ Designation Number:	788550 / TW0003

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180109C12-1	Original release.	Feb. 21, 2018

1 Certificate of Conformity

Product: 802.11 b/g/n/ac WIFI AP

Test Model: LM-WESA0440A

Sample Status: Engineering sample

Applicant: Delta Networks, Inc.

Test Date: Feb. 01 ~ Feb. 13, 2018

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 RF characteristics under the Conditions specified in this report.

Prepared by : _____ , **Date:** Feb. 21, 2018
Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Feb. 21, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.13dB at 0.69685MHz.
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 -0.1dB 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 I-PEX 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	3.59 dB
	200MHz ~1000MHz	3.60 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	802.11 b/g/n/ac WIFI AP
Test Model	LM-WESA0440A
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter 42.5Vdc-57Vdc 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 600Mbps 802.11ac: up to 1300Mbps
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), 802.11ac (VHT80+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), 802.11ac (VHT80+VHT80)
Output Power	CDD Mode: 5180 ~ 5240MHz: 953.064mW 5745 ~ 5825MHz: 896.641mW Beamforming Mode: 5180 ~ 5240MHz: 324.433mW 5745 ~ 5825MHz: 316.911mW
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 4 completed transmitters and 4 receivers.

Band	Modulation Mode	Beamforming Mode	TX Function
2.4GHz	802.11b	Not Support	4TX
	802.11g	Not Support	4TX
	802.11n (HT20)	Support (CDD / Nss=1 / Nss=2)	4TX
	802.11n (HT40)	Support (CDD / Nss=1 / Nss=2)	4TX
5GHz	802.11a	Not Support	4TX
	802.11n (HT20)	Support (CDD / Nss=1 / Nss=2)	4TX
	802.11n (HT40)	Support (CDD / Nss=1 / Nss=2)	4TX
	802.11ac (VHT80)	Support (CDD / Nss=1 / Nss=2)	4TX
	802.11ac (VHT80+VHT80)	Support (CDD / Nss=1)	2TX+2TX

* For 802.11a/b/g, the EUT doesn't support Beamforming mode.
* The modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz and 802.11ac mode for V20MHz / V40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
* For 5GHz band 802.11n and 802.11ac, after pre-tested two modes (with beamforming mode Nss=1 / 2 and CDD mode) found CDD mode was the worst, therefore chosen for final test for radiated emission and power line conducted emission test and presented in the test report.

2. The EUT uses following antennas.

Antenna Type	PCB PIFA							
Antenna Connector	I-PEX							
Antenna Gain (dBi)								
	2400	2450	2500	5150	5320	5550	5700	5850
Ant. 1	3.22	3.62	3.56	3.17	3.32	3.47	3.39	3.77
Ant. 2	3.45	3.48	3.32	3.01	3.18	3.31	3.52	3.70
Ant. 3	3.15	3.38	3.08	2.97	2.91	3.36	3.55	3.68
Ant. 4	3.01	3.23	3.15	2.86	3.10	3.39	3.34	3.71

3. The EUT uses following adapter & PoE.

Adapter (Support unit)	
Brand	DELTA
Model	ADP-30HW B
Input Power	100-240Vac~50/60Hz 0.8A
Output Power	12.0Vdc / 2.5A
Power Line	1.45m DC cable without core attached on adapter

PoE (Support unit)	
Brand	ZyXEL
Model	PoE12-HP
Input Power	100-240Vac~,50/60Hz, 1.5A max
Output Power	42.5Vdc-57Vdc, 42.1 Watt max

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), 802.11ac (VHT80+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), 802.11ac (VHT80+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 **X-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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
A	802.11ac (VHT80)		42	42	OFDM	BPSK	117.0
A	802.11ac (VHT80+ VHT80)		42	42	OFDM	BPSK	117.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
A	802.11ac (VHT80)		155	155	OFDM	BPSK	117.0
A	802.11ac (VHT80+ VHT80)		155	155	OFDM	BPSK	117.0

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)
A, B	802.11a	5180-5240	36 to 48	149	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		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)
A, B	802.11a	5180-5320	36 to 64	149	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		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)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
A	802.11ac (VHT80)		42	42	OFDM	BPSK	117.0
A	802.11ac (VHT80+ VHT80)		42	42	OFDM	BPSK	117.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
A	802.11ac (VHT80)		155	155	OFDM	BPSK	117.0
A	802.11ac (VHT80+ VHT80)		155	155	OFDM	BPSK	117.0

Test Condition:

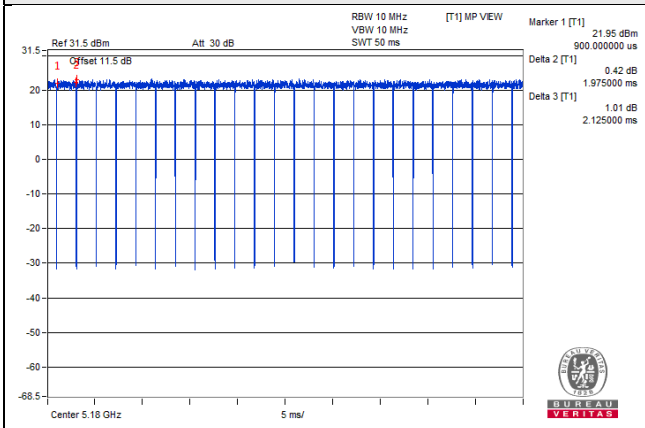
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	29deg. C, 60%RH	120Vac, 60Hz	Alan Wu
RE<1G	23deg. C, 66%RH	120Vac, 60Hz	Alan Wu
PLC	26deg. C, 63%RH	120Vac, 60Hz	Alan Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Hsu

3.3 Duty Cycle of Test Signal

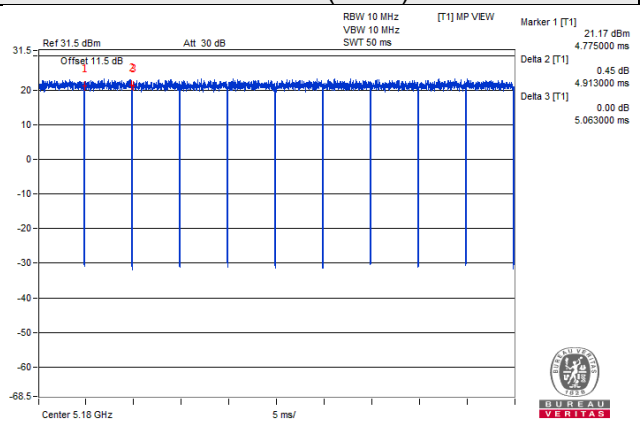
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 1.975/2.125 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32
802.11n (HT20): Duty cycle = 4.913/5.063 = 0.970, Duty factor = 10 * log(1/0.970) = 0.13
802.11n (HT40): Duty cycle = 2.325/2.437 = 0.954, Duty factor = 10 * log(1/0.954) = 0.20
802.11ac (VHT80): Duty cycle = 1.063/1.225 = 0.868, Duty factor = 10 * log(1/0.868) = 0.62
802.11ac (VHT80+VHT80): Duty cycle = 1.063/1.225 = 0.868, Duty factor = 10 * log(1/0.868) = 0.62

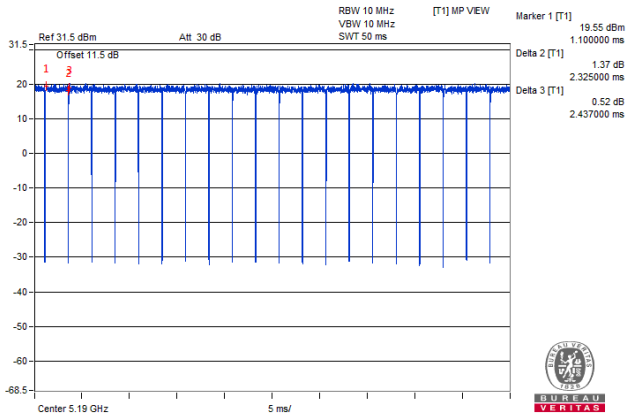
802.11a



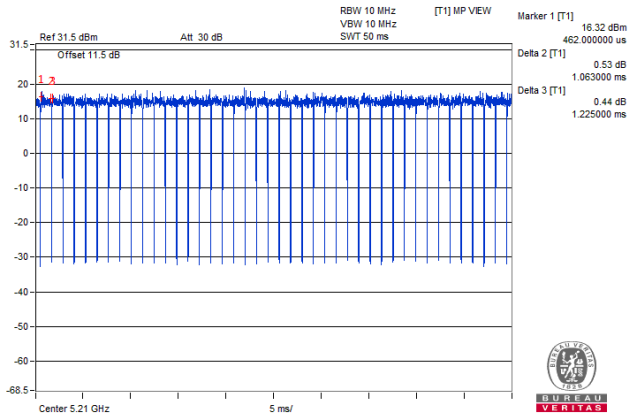
802.11n (HT20)



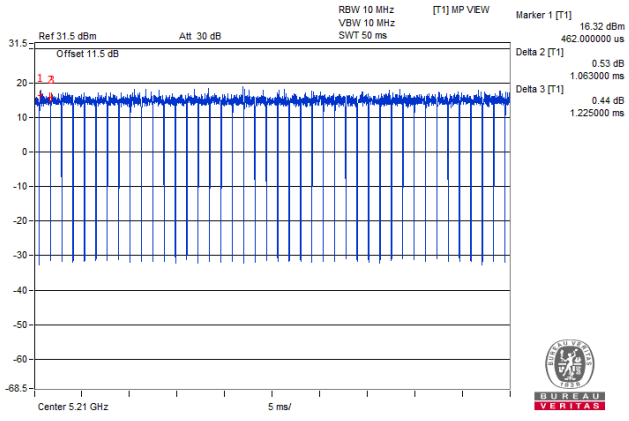
802.11n (HT40)



802.11ac (VHT80)



802.11ac (VHT80+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	N/A	N/A	N/A	N/A	-

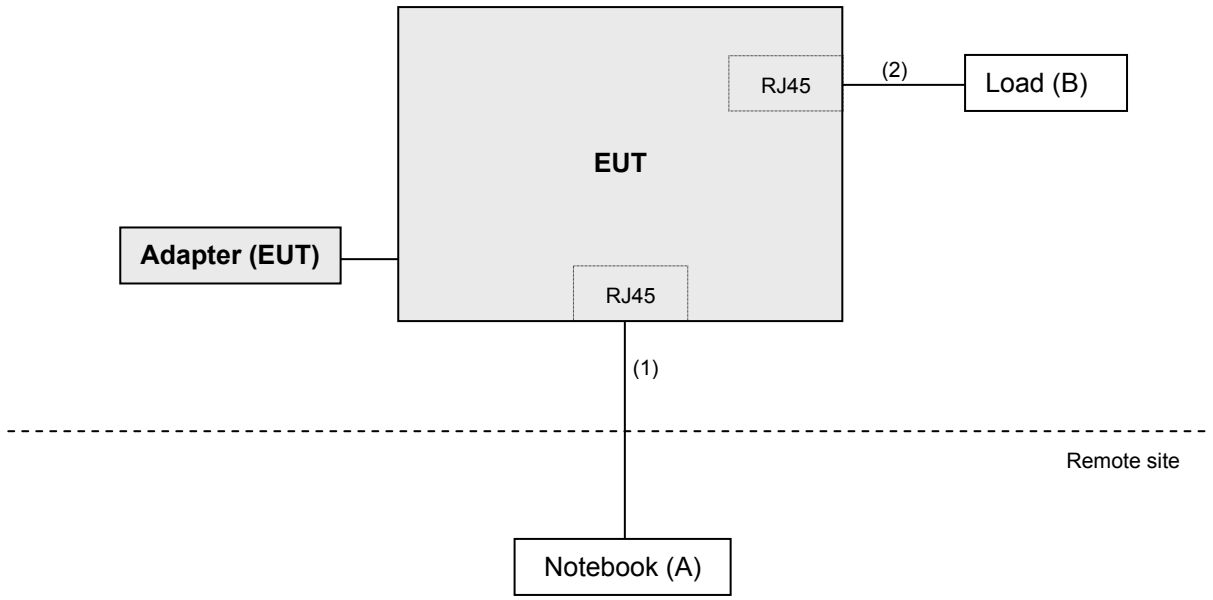
Note:

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.

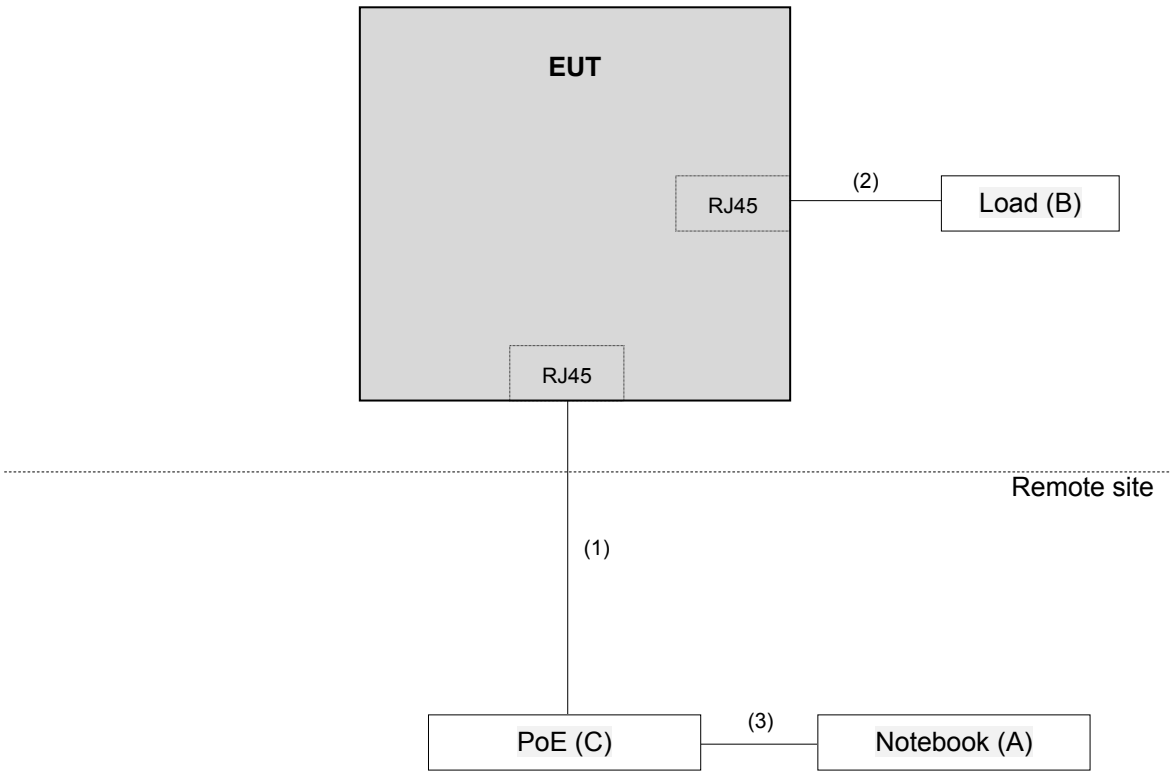
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	10	N	0	-
2.	RJ45 cable	4	1.5	N	0	-
3.	RJ45 cable	1	1.8	N	0	-

3.4.1 Configuration of System under Test

Test Mode A



Test Mode B



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 Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

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

Applicable To			Limit	
KDB 789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3m	
			PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	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	ESCI	100424	Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 18, 2017	Aug. 17, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01960	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2017	Aug. 07, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-4.

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:

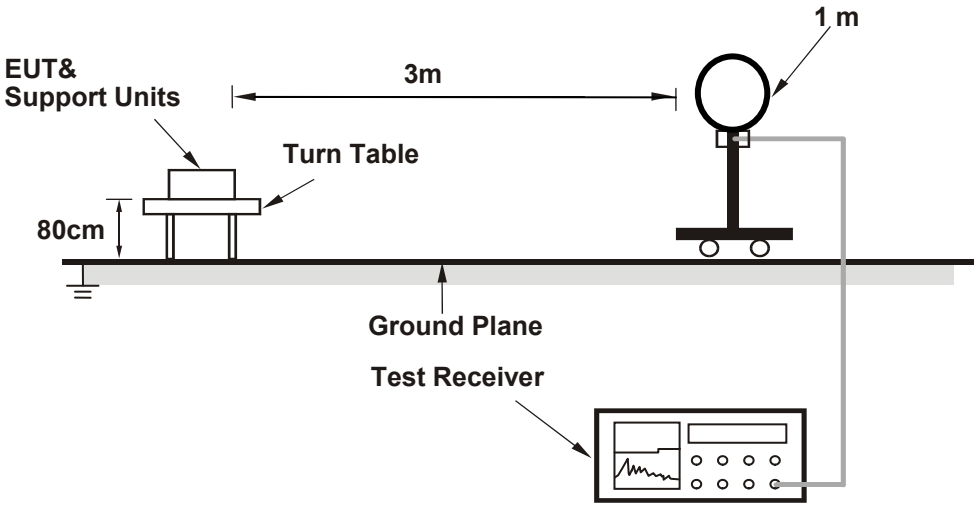
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

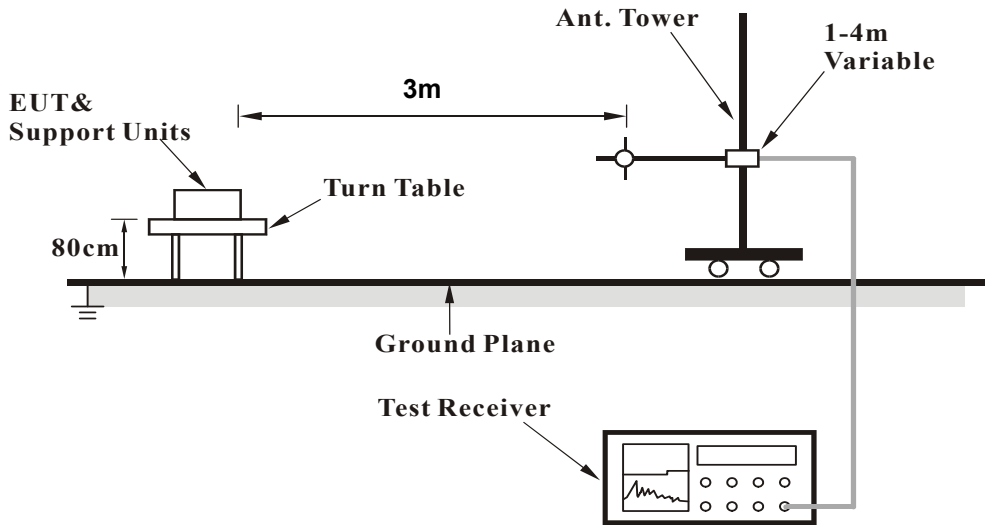
No deviation.

4.1.5 Test Setup

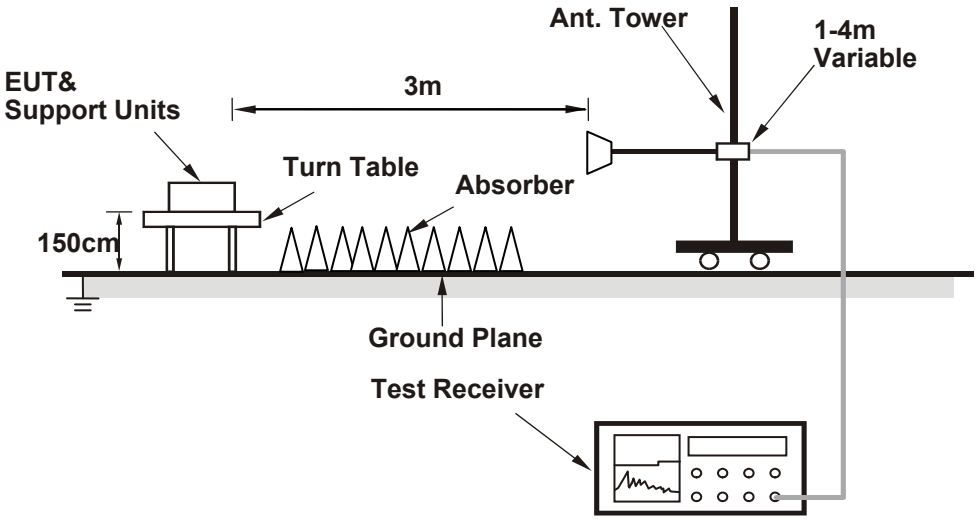
For Radiated emission below 30MHz



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	5150.00	68.0 PK	74.0	-6.0	1.90 H	37	65.4	2.6
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.90 H**	**37**	**51.3**	**2.6**
3	*5180.00	118.6 PK			2.81 H	54	77.7	40.9
4	*5180.00	108.3 AV			2.81 H	54	67.4	40.9
5	#10360.00	59.8 PK	74.0	-14.2	1.85 H	267	45.0	14.8
6	#10360.00	46.4 AV	54.0	-7.6	1.85 H	267	31.6	14.8
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	66.9 PK	74.0	-7.1	3.23 V	219	64.3	2.6
2	5150.00	53.0 AV	54.0	-1.0	3.23 V	219	50.4	2.6
3	*5180.00	116.4 PK			3.76 V	150	75.5	40.9
4	*5180.00	105.4 AV			3.76 V	150	64.5	40.9
5	#10360.00	59.0 PK	74.0	-15.0	2.49 V	102	44.2	14.8
6	#10360.00	45.9 AV	54.0	-8.1	2.49 V	102	31.1	14.8

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	*5200.00	120.5 PK			3.00 H	68	79.6	40.9
2	*5200.00	110.1 AV			3.00 H	68	69.2	40.9
3	#10400.00	59.5 PK	74.0	-14.5	1.92 H	248	44.6	14.9
4	#10400.00	46.2 AV	54.0	-7.8	1.92 H	248	31.3	14.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	118.7 PK			3.92 V	156	77.8	40.9
2	*5200.00	108.0 AV			3.92 V	156	67.1	40.9
3	#10400.00	59.5 PK	74.0	-14.5	2.63 V	125	44.6	14.9
4	#10400.00	45.9 AV	54.0	-8.1	2.63 V	125	31.0	14.9

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 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	121.1 PK			2.92 H	81	80.4	40.7
2	*5240.00	110.4 AV			2.92 H	81	69.7	40.7
3	5350.00	56.5 PK	74.0	-17.5	2.02 H	45	53.7	2.8
4	5350.00	43.4 AV	54.0	-10.6	2.02 H	45	40.6	2.8
5	#10480.00	59.4 PK	74.0	-14.6	1.95 H	281	44.7	14.7
6	#10480.00	46.2 AV	54.0	-7.8	1.95 H	281	31.5	14.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	117.8 PK			3.48 V	145	77.1	40.7
2	*5240.00	107.3 AV			3.48 V	145	66.6	40.7
3	5350.00	56.2 PK	74.0	-17.8	3.42 V	141	53.4	2.8
4	5350.00	43.0 AV	54.0	-11.0	3.42 V	141	40.2	2.8
5	#10480.00	59.0 PK	74.0	-15.0	1.55 V	56	44.3	14.7
6	#10480.00	45.6 AV	54.0	-8.4	1.55 V	56	30.9	14.7

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)
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	#5649.60	56.7 PK	68.2	-11.5	1.84 H	25	53.3	3.4
2	*5745.00	120.4 PK			1.84 H	25	78.2	42.2
3	*5745.00	110.4 AV			1.84 H	25	68.2	42.2
4	#5964.00	60.4 PK	68.2	-7.8	1.84 H	25	55.7	4.7
5	11490.00	59.6 PK	74.0	-14.4	2.50 H	138	43.4	16.2
6	11490.00	47.5 AV	54.0	-6.5	2.50 H	138	31.3	16.2
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	57.3 PK	68.2	-10.9	2.60 V	329	53.7	3.6
2	*5745.00	116.2 PK			2.60 V	329	74.0	42.2
3	*5745.00	105.9 AV			2.60 V	329	63.7	42.2
4	#5964.00	58.9 PK	68.2	-9.3	2.60 V	329	54.2	4.7
5	11490.00	59.6 PK	74.0	-14.4	2.86 V	321	43.4	16.2
6	11490.00	46.5 AV	54.0	-7.5	2.86 V	321	30.3	16.2

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	#5634.40	57.0 PK	68.2	-11.2	2.04 H	24	53.5	3.5
2	*5785.00	120.3 PK			2.04 H	24	77.9	42.4
3	*5785.00	110.3 AV			2.04 H	24	67.9	42.4
4	#5959.20	58.9 PK	68.2	-9.3	2.04 H	24	54.2	4.7
5	11570.00	58.9 PK	74.0	-15.1	2.55 H	149	42.9	16.0
6	11570.00	47.1 AV	54.0	-6.9	2.55 H	149	31.1	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	#5606.40	56.8 PK	68.2	-11.4	3.24 V	247	53.3	3.5
2	*5785.00	118.3 PK			3.24 V	247	75.9	42.4
3	*5785.00	107.6 AV			3.24 V	247	65.2	42.4
4	#5934.40	58.7 PK	68.2	-9.5	3.24 V	247	54.2	4.5
5	11570.00	60.3 PK	74.0	-13.7	2.33 V	156	44.3	16.0
6	11570.00	46.9 AV	54.0	-7.1	2.33 V	156	30.9	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 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	#5605.60	57.4 PK	68.2	-10.8	1.82 H	27	53.8	3.6
2	*5825.00	121.3 PK			1.82 H	27	78.5	42.8
3	*5825.00	111.2 AV			1.82 H	27	68.4	42.8
4	#5934.40	58.3 PK	68.2	-9.9	1.82 H	27	53.8	4.5
5	11650.00	59.0 PK	74.0	-15.0	2.46 H	116	43.6	15.4
6	11650.00	46.8 AV	54.0	-7.2	2.46 H	116	31.4	15.4
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	#5608.00	57.6 PK	68.2	-10.6	3.23 V	228	54.1	3.5
2	*5825.00	117.5 PK			3.23 V	228	74.7	42.8
3	*5825.00	107.5 AV			3.23 V	228	64.7	42.8
4	#5997.60	58.4 PK	68.2	-9.8	3.23 V	228	53.7	4.7
5	11650.00	58.8 PK	74.0	-15.2	2.66 V	321	43.4	15.4
6	11650.00	46.5 AV	54.0	-7.5	2.66 V	321	31.1	15.4

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)
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	68.1 PK	74.0	-5.9	3.02 H	69	65.5	2.6
2	5150.00	53.5 AV	54.0	-0.5	3.02 H	69	50.9	2.6
3	*5180.00	117.9 PK			3.10 H	12	77.0	40.9
4	*5180.00	107.2 AV			3.10 H	12	66.3	40.9
5	#10360.00	59.2 PK	74.0	-14.8	2.15 H	221	44.4	14.8
6	#10360.00	45.7 AV	54.0	-8.3	2.15 H	221	30.9	14.8
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	62.4 PK	74.0	-11.6	2.82 V	261	59.8	2.6
2	5150.00	48.2 AV	54.0	-5.8	2.82 V	261	45.6	2.6
3	*5180.00	115.5 PK			2.82 V	254	74.6	40.9
4	*5180.00	105.3 AV			2.82 V	254	64.4	40.9
5	#10360.00	59.0 PK	74.0	-15.0	3.31 V	12	44.2	14.8
6	#10360.00	45.6 AV	54.0	-8.4	3.31 V	12	30.8	14.8

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	*5200.00	120.4 PK			3.03 H	18	79.5	40.9
2	*5200.00	109.7 AV			3.03 H	18	68.8	40.9
3	#10400.00	59.7 PK	74.0	-14.3	2.24 H	239	44.8	14.9
4	#10400.00	46.1 AV	54.0	-7.9	2.24 H	239	31.2	14.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	117.0 PK			3.00 V	255	76.1	40.9
2	*5200.00	106.9 AV			3.00 V	255	66.0	40.9
3	#10400.00	59.5 PK	74.0	-14.5	3.36 V	225	44.6	14.9
4	#10400.00	45.9 AV	54.0	-8.1	3.36 V	225	31.0	14.9

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 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	119.8 PK			3.17 H	69	79.1	40.7
2	*5240.00	109.3 AV			3.17 H	69	68.6	40.7
3	5350.00	55.9 PK	74.0	-18.1	2.84 H	55	53.1	2.8
4	5350.00	43.1 AV	54.0	-10.9	2.84 H	55	40.3	2.8
5	#10480.00	59.4 PK	74.0	-14.6	2.09 H	244	44.7	14.7
6	#10480.00	46.1 AV	54.0	-7.9	2.09 H	244	31.4	14.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	117.0 PK			3.00 V	256	76.3	40.7
2	*5240.00	106.7 AV			3.00 V	256	66.0	40.7
3	5350.00	55.8 PK	74.0	-18.2	3.26 V	222	53.0	2.8
4	5350.00	43.0 AV	54.0	-11.0	3.26 V	222	40.2	2.8
5	#10480.00	59.0 PK	74.0	-15.0	3.62 V	32	44.3	14.7
6	#10480.00	45.9 AV	54.0	-8.1	3.62 V	32	31.2	14.7

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)
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	57.2 PK	68.2	-11.0	3.04 H	315	53.7	3.5
2	*5745.00	120.1 PK			3.04 H	315	77.9	42.2
3	*5745.00	110.0 AV			3.04 H	315	67.8	42.2
4	#5936.80	58.7 PK	68.2	-9.5	3.04 H	315	54.2	4.5
5	11490.00	59.5 PK	74.0	-14.5	2.84 H	89	43.3	16.2
6	11490.00	46.6 AV	54.0	-7.4	2.84 H	89	30.4	16.2
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	#5603.20	57.3 PK	68.2	-10.9	3.08 V	245	53.7	3.6
2	*5745.00	117.8 PK			3.08 V	245	75.6	42.2
3	*5745.00	107.2 AV			3.08 V	245	65.0	42.2
4	#5952.80	58.4 PK	68.2	-9.8	3.08 V	245	53.8	4.6
5	11490.00	59.4 PK	74.0	-14.6	1.52 V	12	43.2	16.2
6	11490.00	46.4 AV	54.0	-7.6	1.52 V	12	30.2	16.2

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	#5644.00	57.2 PK	68.2	-11.0	3.24 H	313	53.8	3.4
2	*5785.00	121.5 PK			3.24 H	313	79.1	42.4
3	*5785.00	111.1 AV			3.24 H	313	68.7	42.4
4	#5972.00	58.2 PK	68.2	-10.0	3.24 H	313	53.6	4.6
5	11570.00	59.5 PK	74.0	-14.5	2.88 H	96	43.5	16.0
6	11570.00	46.8 AV	54.0	-7.2	2.88 H	96	30.8	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	#5612.00	58.1 PK	68.2	-10.1	3.20 V	246	54.6	3.5
2	*5785.00	117.0 PK			3.20 V	246	74.6	42.4
3	*5785.00	106.5 AV			3.20 V	246	64.1	42.4
4	#5932.80	58.1 PK	68.2	-10.1	3.20 V	246	53.6	4.5
5	11570.00	60.0 PK	74.0	-14.0	2.62 V	99	44.0	16.0
6	11570.00	46.5 AV	54.0	-7.5	2.62 V	99	30.5	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.

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	#5632.00	57.6 PK	68.2	-10.6	2.80 H	37	54.1	3.5
2	*5825.00	120.7 PK			2.80 H	37	77.9	42.8
3	*5825.00	109.9 AV			2.80 H	37	67.1	42.8
4	#5936.00	58.5 PK	68.2	-9.7	2.80 H	37	54.0	4.5
5	11650.00	58.6 PK	74.0	-15.4	2.60 H	100	43.2	15.4
6	11650.00	46.0 AV	54.0	-8.0	2.60 H	100	30.6	15.4
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	#5616.80	56.7 PK	68.2	-11.5	2.88 V	142	53.2	3.5
2	*5825.00	117.2 PK			2.88 V	142	74.4	42.8
3	*5825.00	106.4 AV			2.88 V	142	63.6	42.8
4	#5978.40	58.0 PK	68.2	-10.2	2.88 V	142	53.4	4.6
5	11650.00	58.4 PK	74.0	-15.6	3.25 V	116	43.0	15.4
6	11650.00	46.6 AV	54.0	-7.4	3.25 V	116	31.2	15.4

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)
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	71.9 PK	74.0	-2.1	3.00 H	20	69.3	2.6
2	5150.00	53.8 AV	54.0	-0.2	3.00 H	20	51.2	2.6
3	*5190.00	115.3 PK			2.99 H	83	74.4	40.9
4	*5190.00	104.9 AV			2.99 H	83	64.0	40.9
5	#10380.00	59.0 PK	74.0	-15.0	2.61 H	188	44.2	14.8
6	#10380.00	45.8 AV	54.0	-8.2	2.61 H	188	31.0	14.8
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	67.5 PK	74.0	-6.5	3.08 V	196	64.9	2.6
2	5150.00	50.4 AV	54.0	-3.6	3.08 V	196	47.8	2.6
3	*5190.00	112.2 PK			3.10 V	260	71.3	40.9
4	*5190.00	101.8 AV			3.10 V	260	60.9	40.9
5	#10380.00	58.8 PK	74.0	-15.2	1.36 V	321	44.0	14.8
6	#10380.00	45.6 AV	54.0	-8.4	1.36 V	321	30.8	14.8

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 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	68.8 PK	74.0	-5.2	2.99 H	52	66.2	2.6
2	5150.00	53.8 AV	54.0	-0.2	2.99 H	52	51.2	2.6
3	*5230.00	117.0 PK			3.05 H	79	76.3	40.7
4	*5230.00	106.5 AV			3.05 H	79	65.8	40.7
5	5350.00	56.2 PK	74.0	-17.8	3.24 H	340	53.4	2.8
6	5350.00	43.9 AV	54.0	-10.1	3.24 H	340	41.1	2.8
7	#10460.00	59.3 PK	74.0	-14.7	2.66 H	170	44.5	14.8
8	#10460.00	46.1 AV	54.0	-7.9	2.66 H	170	31.3	14.8
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	67.3 PK	74.0	-6.7	2.96 V	249	64.7	2.6
2	5150.00	51.6 AV	54.0	-2.4	2.96 V	249	49.0	2.6
3	*5230.00	114.6 PK			3.10 V	241	73.9	40.7
4	*5230.00	104.6 AV			3.10 V	241	63.9	40.7
5	5350.00	62.8 PK	74.0	-11.2	2.97 V	243	60.0	2.8
6	5350.00	49.6 AV	54.0	-4.4	2.97 V	243	46.8	2.8
7	#10460.00	59.2 PK	74.0	-14.8	3.21 V	125	44.4	14.8
8	#10460.00	46.0 AV	54.0	-8.0	3.21 V	125	31.2	14.8

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 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	#5646.40	60.6 PK	68.2	-7.6	3.00 H	316	57.2	3.4
2	*5755.00	117.8 PK			3.00 H	316	75.5	42.3
3	*5755.00	107.1 AV			3.00 H	316	64.8	42.3
4	#5959.20	58.7 PK	68.2	-9.5	3.00 H	316	54.0	4.7
5	11510.00	59.1 PK	74.0	-14.9	3.66 H	214	43.1	16.0
6	11510.00	46.5 AV	54.0	-7.5	3.66 H	214	30.5	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	#5645.60	62.4 PK	68.2	-5.8	3.10 V	259	59.0	3.4
2	*5755.00	115.4 PK			3.10 V	259	73.1	42.3
3	*5755.00	104.7 AV			3.10 V	259	62.4	42.3
4	#5981.60	58.1 PK	68.2	-10.1	3.10 V	259	53.5	4.6
5	11510.00	59.0 PK	74.0	-15.0	1.11 V	302	43.0	16.0
6	11510.00	46.9 AV	54.0	-7.1	1.11 V	302	30.9	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 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	#5635.20	57.8 PK	68.2	-10.4	3.25 H	314	54.3	3.5
2	*5795.00	119.2 PK			3.25 H	314	76.7	42.5
3	*5795.00	108.9 AV			3.25 H	314	66.4	42.5
4	#5935.20	59.6 PK	68.2	-8.6	3.25 H	314	55.1	4.5
5	11590.00	59.1 PK	74.0	-14.9	3.50 H	221	43.3	15.8
6	11590.00	46.5 AV	54.0	-7.5	3.50 H	221	30.7	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	#5610.40	57.4 PK	68.2	-10.8	3.10 V	11	53.9	3.5
2	*5795.00	115.6 PK			3.10 V	11	73.1	42.5
3	*5795.00	104.5 AV			3.10 V	11	62.0	42.5
4	#5928.80	60.0 PK	68.2	-8.2	3.10 V	11	55.5	4.5
5	11590.00	59.9 PK	74.0	-14.1	2.35 V	156	44.1	15.8
6	11590.00	46.8 AV	54.0	-7.2	2.35 V	156	31.0	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.

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	67.7 PK	74.0	-6.3	2.86 H	316	65.1	2.6
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.86 H**	**316**	**51.3**	**2.6**
3	*5210.00	110.1 PK			3.12 H	67	69.3	40.8
4	*5210.00	99.8 AV			3.12 H	67	59.0	40.8
5	5350.00	62.8 PK	74.0	-11.2	3.10 H	54	60.0	2.8
6	5350.00	49.6 AV	54.0	-4.4	3.10 H	54	46.8	2.8
7	#10420.00	57.3 PK	74.0	-16.7	2.18 H	147	42.5	14.8
8	#10420.00	45.3 AV	54.0	-8.7	2.18 H	147	30.5	14.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.0 PK	74.0	-6.0	2.88 V	259	65.4	2.6
2	5150.00	52.5 AV	54.0	-1.5	2.88 V	259	49.9	2.6
3	*5210.00	106.6 PK			2.94 V	260	65.8	40.8
4	*5210.00	97.8 AV			2.94 V	260	57.0	40.8
5	5350.00	62.4 PK	74.0	-11.6	2.97 V	246	59.6	2.8
6	5350.00	48.1 AV	54.0	-5.9	2.97 V	246	45.3	2.8
7	#10420.00	59.1 PK	74.0	-14.9	2.33 V	66	44.3	14.8
8	#10420.00	45.1 AV	54.0	-8.9	2.33 V	66	30.3	14.8

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 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	#5646.40	67.8 PK	68.2	-0.4	3.16 H	315	64.4	3.4
2	*5775.00	111.5 PK			3.16 H	315	69.1	42.4
3	*5775.00	101.7 AV			3.16 H	315	59.3	42.4
4	#5927.20	67.9 PK	68.2	-0.3	3.16 H	315	63.4	4.5
5	11550.00	58.8 PK	74.0	-15.2	3.47 H	201	42.8	16.0
6	11550.00	46.2 AV	54.0	-7.8	3.47 H	201	30.2	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	#5643.20	65.6 PK	68.2	-2.6	2.93 V	330	62.2	3.4
2	*5775.00	107.4 PK			2.93 V	330	65.0	42.4
3	*5775.00	98.3 AV			2.93 V	330	55.9	42.4
4	#5924.80	64.9 PK	68.3	-3.4	2.93 V	330	60.5	4.4
5	11550.00	59.5 PK	74.0	-14.5	1.56 V	69	43.5	16.0
6	11550.00	46.3 AV	54.0	-7.7	1.56 V	69	30.3	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.

802.11ac (VHT80+VHT80)

CHANNEL	TX Channel 42+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	5150.00	63.0 PK	74.0	-11.0	1.69 H	161	60.4	2.6
2	5150.00	50.3 AV	54.0	-3.7	1.69 H	161	47.7	2.6
3	*5210.00	105.1 PK			1.01 H	148	64.3	40.8
4	*5210.00	95.2 AV			1.01 H	148	54.4	40.8
5	5350.00	59.8 PK	74.0	-14.2	1.49 H	233	57.0	2.8
6	5350.00	46.9 AV	54.0	-7.1	1.49 H	233	44.1	2.8
7	#5639.20	58.6 PK	68.2	-9.6	3.03 H	293	55.2	3.4
8	*5775.00	105.6 PK			3.03 H	293	63.2	42.4
9	*5775.00	96.3 AV			3.03 H	293	53.9	42.4
10	#5996.80	58.4 PK	68.2	-9.8	3.03 H	293	53.7	4.7
11	#10420.00	57.4 PK	74.0	-16.6	1.43 H	66	42.6	14.8
12	#10420.00	44.0 AV	54.0	-10.0	1.43 H	66	29.2	14.8
13	11550.00	58.5 PK	74.0	-15.5	2.36 H	98	42.5	16.0
14	11550.00	45.7 AV	54.0	-8.3	2.36 H	98	29.7	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	5150.00	57.2 PK	74.0	-16.8	3.27 V	286	54.6	2.6
2	5150.00	45.2 AV	54.0	-8.8	3.27 V	286	42.6	2.6
3	*5210.00	102.4 PK			3.49 V	356	61.6	40.8
4	*5210.00	92.3 AV			3.49 V	356	51.5	40.8
5	5350.00	56.7 PK	74.0	-17.3	3.13 V	300	53.9	2.8
6	5350.00	43.1 AV	54.0	-10.9	3.13 V	300	40.3	2.8
7	#5604.00	56.8 PK	68.2	-11.4	3.03 V	293	53.2	3.6
8	*5775.00	103.4 PK			3.48 V	325	61.0	42.4
9	*5775.00	93.6 AV			3.48 V	325	51.2	42.4
10	#5964.00	59.1 PK	68.2	-9.1	3.03 V	293	54.4	4.7
11	#10420.00	57.3 PK	74.0	-16.7	2.52 V	96	42.5	14.8
12	#10420.00	43.9 AV	54.0	-10.1	2.52 V	96	29.1	14.8
13	11550.00	58.0 PK	74.0	-16.0	3.51 V	105	42.0	16.0
14	11550.00	44.9 AV	54.0	-9.1	3.51 V	105	28.9	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.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 149	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	26.8 QP	40.0	-13.2	1.99 H	97	41.2	-14.4
2	237.94	31.1 QP	46.0	-14.9	1.00 H	289	46.4	-15.3
3	282.66	38.9 QP	46.0	-7.1	1.49 H	7	52.0	-13.1
4	451.81	35.0 QP	46.0	-11.0	1.99 H	319	45.1	-10.1
5	479.03	36.7 QP	46.0	-9.3	1.99 H	17	46.4	-9.7
6	624.85	28.7 QP	46.0	-17.3	1.49 H	207	35.5	-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	57.12	27.4 QP	40.0	-12.6	1.00 V	41	41.8	-14.4
2	125.17	23.0 QP	43.5	-20.5	1.00 V	50	38.9	-15.9
3	235.99	34.0 QP	46.0	-12.0	1.00 V	270	49.6	-15.6
4	374.04	27.2 QP	46.0	-18.8	2.00 V	304	38.8	-11.6
5	455.70	31.9 QP	46.0	-14.1	1.51 V	269	42.0	-10.1
6	624.85	29.9 QP	46.0	-16.1	1.00 V	343	36.7	-6.8

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

CHANNEL	TX Channel 149	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	57.12	22.1 QP	40.0	-17.9	1.50 H	139	36.5	-14.4
2	162.11	25.0 QP	43.5	-18.5	1.00 H	246	38.9	-13.9
3	282.66	38.9 QP	46.0	-7.1	1.00 H	10	52.0	-13.1
4	374.04	30.3 QP	46.0	-15.7	1.50 H	295	41.9	-11.6
5	471.25	30.1 QP	46.0	-15.9	2.00 H	5	39.9	-9.8
6	624.85	26.6 QP	46.0	-19.4	1.00 H	59	33.4	-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	39.62	25.5 QP	40.0	-14.5	1.51 V	68	40.5	-15.0
2	101.84	24.2 QP	43.5	-19.3	1.51 V	124	42.5	-18.3
3	284.60	30.5 QP	46.0	-15.5	1.51 V	136	43.5	-13.0
4	374.04	28.6 QP	46.0	-17.4	1.51 V	300	40.2	-11.6
5	455.70	32.1 QP	46.0	-13.9	1.51 V	265	42.2	-10.1
6	624.85	30.0 QP	46.0	-16.0	1.00 V	323	36.8	-6.8

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
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.

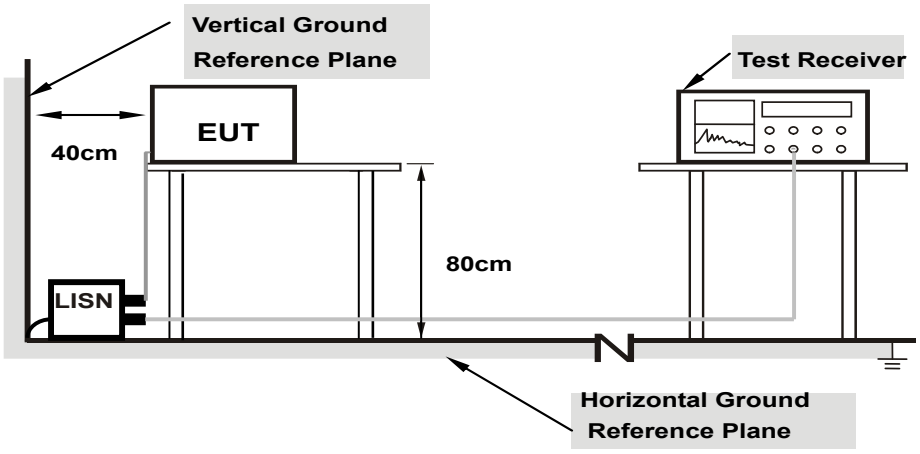
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

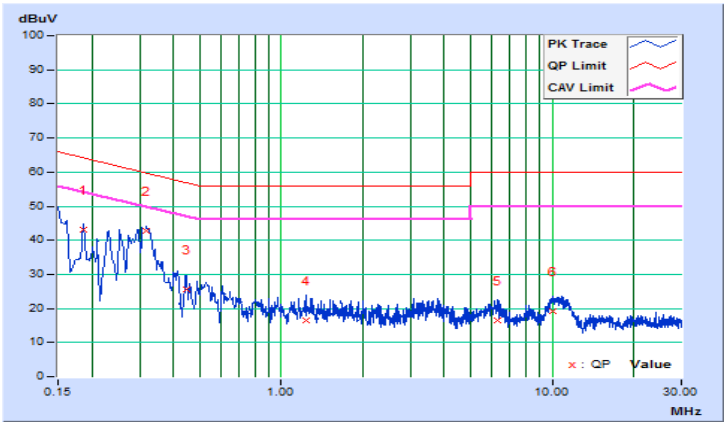
4.2.7 Test Results

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

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	0.18600	10.10	33.08	18.47	43.18	28.57	64.21	54.21	-21.03	-25.64
2	0.31698	10.11	32.78	25.66	42.89	35.77	59.79	49.79	-16.90	-14.02
3	0.44527	10.12	15.49	6.86	25.61	16.98	56.96	46.96	-31.35	-29.98
4	1.23000	10.15	6.46	1.86	16.61	12.01	56.00	46.00	-39.39	-33.99
5	6.28200	10.41	6.24	0.09	16.65	10.50	60.00	50.00	-43.35	-39.50
6	10.01000	10.62	8.49	3.78	19.11	14.40	60.00	50.00	-40.89	-35.60

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.

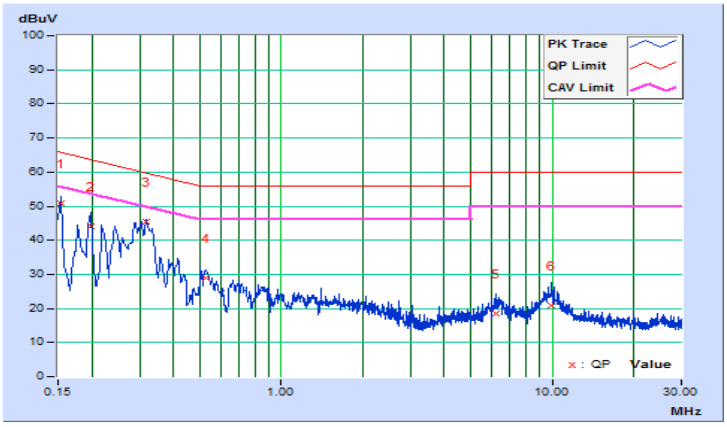


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.15400	10.10	40.65	26.41	50.75	36.51	65.78	55.78	-15.03	-19.27
2	0.19800	10.10	33.91	21.88	44.01	31.98	63.69	53.69	-19.68	-21.71
3	0.31781	10.11	35.22	28.00	45.33	38.11	59.76	49.76	-14.43	-11.65
4	0.52567	10.12	18.84	13.16	28.96	23.28	56.00	46.00	-27.04	-22.72
5	6.21000	10.36	8.28	1.57	18.64	11.93	60.00	50.00	-41.36	-38.07
6	9.95800	10.52	10.47	5.87	20.99	16.39	60.00	50.00	-39.01	-33.61

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.

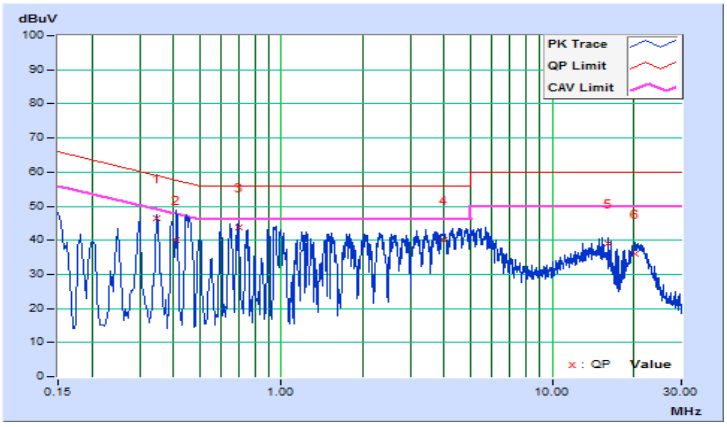


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.34600	10.11	36.49	31.89	46.60	42.00	59.06	49.06	-12.46	-7.06
2	0.41035	10.12	29.83	10.39	39.95	20.51	57.64	47.64	-17.69	-27.13
3	**0.69685**	**10.13**	**33.48**	**29.74**	**43.61**	**39.87**	**56.00**	**46.00**	**-12.39**	**-6.13**
4	3.95800	10.28	29.92	22.27	40.20	32.55	56.00	46.00	-15.80	-13.45
5	16.19400	10.99	28.23	26.40	39.22	37.39	60.00	50.00	-20.78	-12.61
6	20.29800	11.22	24.85	19.83	36.07	31.05	60.00	50.00	-23.93	-18.95

REMARKS:

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

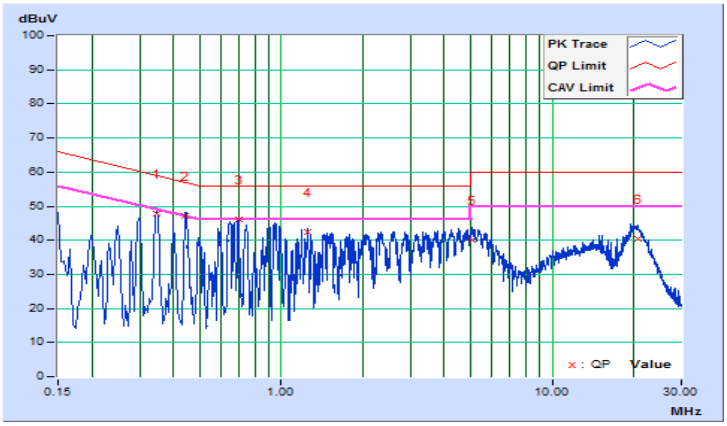


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.34577	10.11	37.73	32.76	47.84	42.87	59.06	49.06	-11.22	-6.19
2	0.44293	10.12	37.04	30.13	47.16	40.25	57.01	47.01	-9.85	-6.76
3	0.69502	10.12	36.08	29.61	46.20	39.73	56.00	46.00	-9.80	-6.27
4	1.24600	10.14	32.21	24.29	42.35	34.43	56.00	46.00	-13.65	-11.57
5	5.05000	10.31	29.87	22.84	40.18	33.15	60.00	50.00	-19.82	-16.85
6	20.67800	10.95	29.29	24.27	40.24	35.22	60.00	50.00	-19.76	-14.78

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

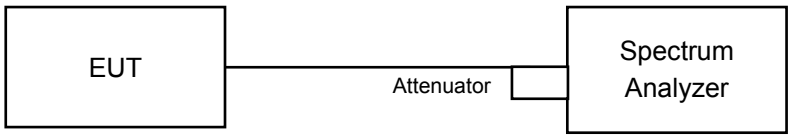
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

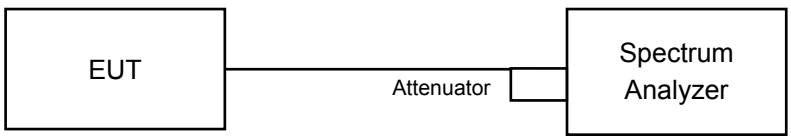
4.3.2 Test Setup

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

802.11ac (VHT80), 802.11ac (VHT80+VHT80)



For 26dB and Occupied Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11n (HT20), 802.11n (HT40)
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (VHT80), 802.11ac (VHT80+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.

For 26dB Bandwidth
a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. 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%.

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

4.3.5 Deviation 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

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.74	21.75	21.81	21.66	597.163	27.76	30	Pass
40	5200	23.83	23.74	23.82	23.68	952.475	29.79	30	Pass
48	5240	23.85	23.80	23.78	23.65	**953.064**	29.79	30	Pass
149	5745	22.58	24.11	23.42	23.75	895.689	29.52	30	Pass
157	5785	22.52	24.08	23.35	23.73	886.828	29.48	30	Pass
165	5825	22.57	24.13	23.38	23.79	**896.641**	29.53	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.70	21.68	21.74	21.62	589.632	27.71	30	Pass
40	5200	23.66	23.56	23.64	23.46	912.286	29.60	30	Pass
48	5240	23.68	23.61	23.60	23.47	914.379	29.61	30	Pass
149	5745	22.44	23.99	23.38	23.66	876.044	29.43	30	Pass
157	5785	22.36	23.96	23.37	23.70	872.766	29.41	30	Pass
165	5825	22.45	24.02	23.40	23.71	881.879	29.45	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	21.12	21.17	21.20	20.98	517.478	27.14	30	Pass
46	5230	23.22	23.14	23.42	23.03	836.652	29.23	30	Pass
151	5755	22.47	23.91	23.61	23.76	889.940	29.49	30	Pass
159	5795	22.49	23.96	23.56	23.80	893.174	29.51	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	19.60	19.58	19.77	19.63	368.658	25.67	30	Pass
155	5775	19.62	20.74	20.44	20.62	436.206	26.40	30	Pass

802.11ac (VHT80+VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	19.55	19.64	-	-	182.202	22.61	30	Pass
155	5775	-	-	19.44	19.00	167.335	22.24	30	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.20	17.18	17.24	17.12	209.210	23.21	26.98	Pass
40	5200	19.16	19.06	19.14	18.96	323.692	25.10	26.98	Pass
48	5240	19.18	19.11	19.10	18.97	**324.433**	25.11	26.98	Pass
149	5745	17.94	19.49	18.88	19.16	310.832	24.93	26.26	Pass
157	5785	17.86	19.46	18.87	19.20	309.668	24.91	26.26	Pass
165	5825	17.95	19.52	18.90	19.21	312.902	24.95	26.26	Pass

For U-NII-1: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 30-(9.02-6) = 26.98dBm.
For U-NII-3: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.62	16.67	16.70	16.48	183.609	22.64	26.98	Pass
46	5230	18.72	18.64	18.92	18.53	296.855	24.73	26.98	Pass
151	5755	17.97	19.41	19.11	19.26	315.761	24.99	26.26	Pass
159	5795	17.99	19.46	19.06	19.30	**316.911**	25.01	26.26	Pass

For U-NII-1: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 30-(9.02-6) = 26.98dBm.
For U-NII-3: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	15.10	15.08	15.27	15.13	130.805	21.17	26.98	Pass
155	5775	15.12	16.24	15.94	16.12	154.772	21.90	26.26	Pass

For U-NII-1: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 30-(9.02-6) = 26.98dBm.
For U-NII-3: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.

802.11ac (VHT80+VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	17.05	17.14	-	-	102.46	20.11	23.90	Pass
155	5775	-	-	16.94	16.50	94.099	19.74	29.29	Pass

For U-NII-1: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 6.10dBi > 6dBi, so the limit shall be reduced to 30-(6.10-6) = 23.90dBm.
For U-NII-3: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 6.71dBi > 6dBi, so the limit shall be reduced to 30-(6.71-6) = 29.29dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	20.12	19.99	19.57	19.74
40	5200	20.00	20.61	19.79	20.02
48	5240	20.34	20.78	19.96	19.87

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	21.01	20.61	20.74	20.74
40	5200	20.80	20.97	20.64	20.99
48	5240	21.29	21.29	20.64	20.64

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	40.83	40.53	40.60	40.64
46	5230	41.03	40.96	40.66	40.49

802.11ac (VHT80)

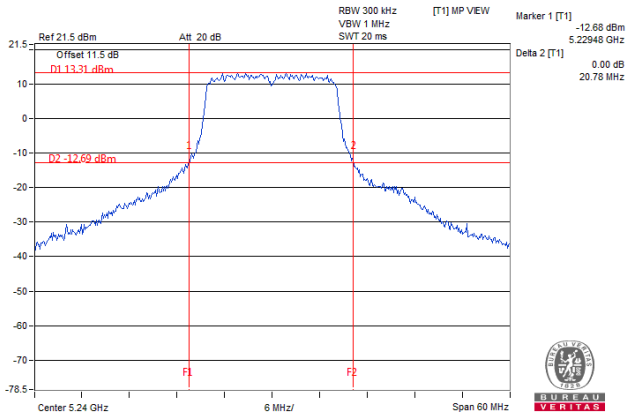
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	84.31	84.13	83.50	83.79

802.11ac (VHT80+VHT80)

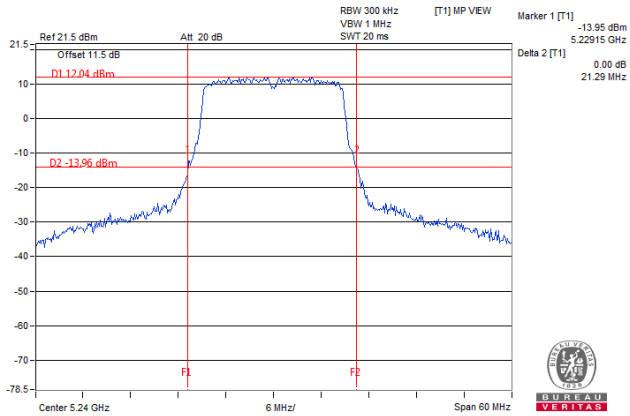
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	84.25	83.82

Spectrum Plot of Worst Value

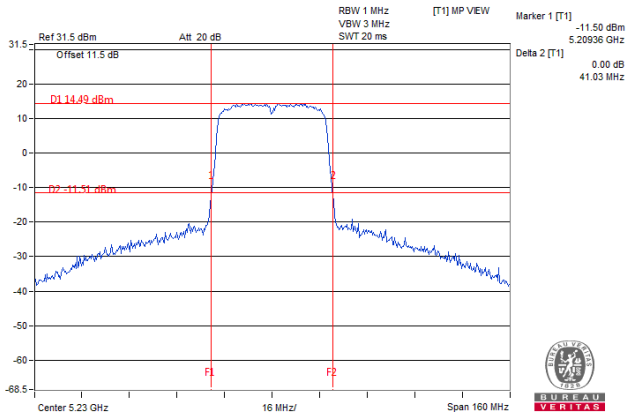
802.11a



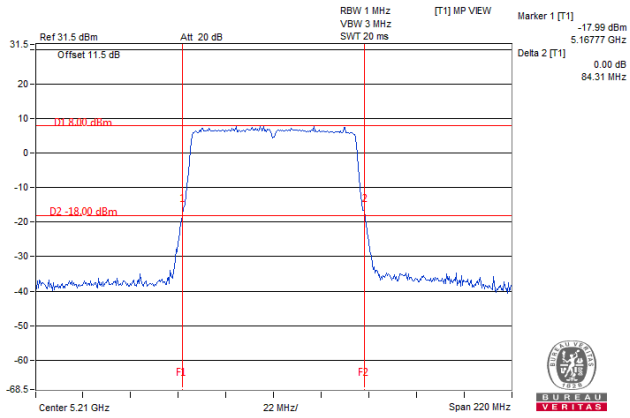
802.11n (HT20)



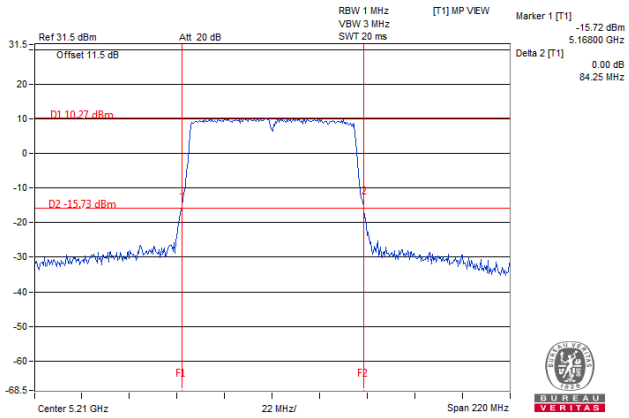
802.11n (HT40)



802.11ac (VHT80)



802.11ac (VHT80+VHT80)



Occupied Bandwidth:

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.44	16.56	16.44	16.56
40	5200	16.56	16.56	16.56	16.56
48	5240	16.56	16.56	16.56	16.56
149	5745	17.22	16.60	18.12	16.80
157	5785	17.52	16.80	20.28	16.92
165	5825	17.16	16.92	20.88	16.80

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.76	17.76	17.76	17.76
40	5200	17.76	17.64	17.76	17.76
48	5240	17.76	17.76	17.64	17.64
149	5745	18.00	17.76	18.48	17.76
157	5785	18.00	17.76	19.56	17.88
165	5825	18.00	17.76	19.32	17.88

802.11n (HT40)

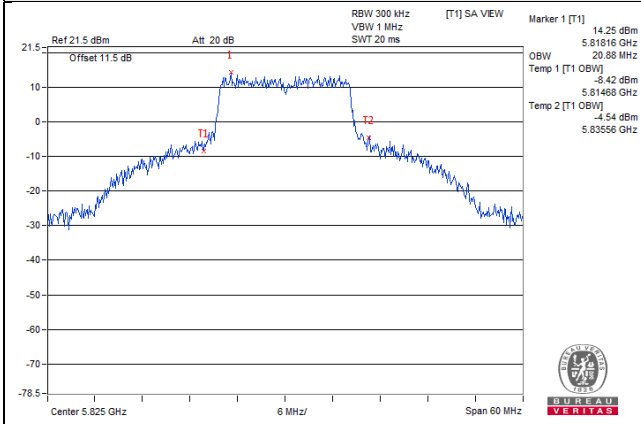
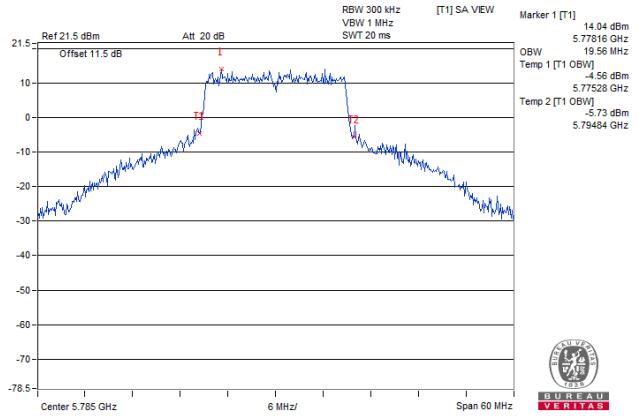
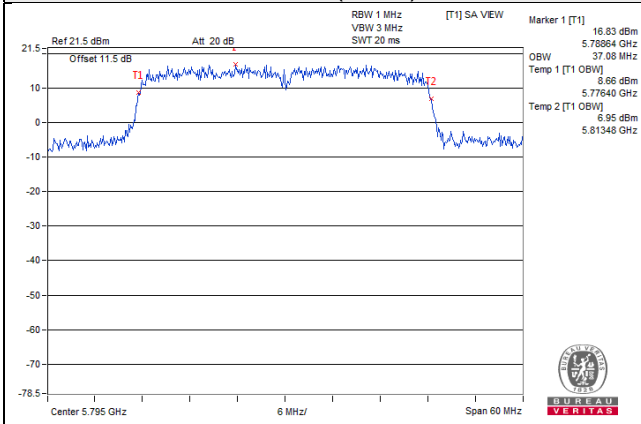
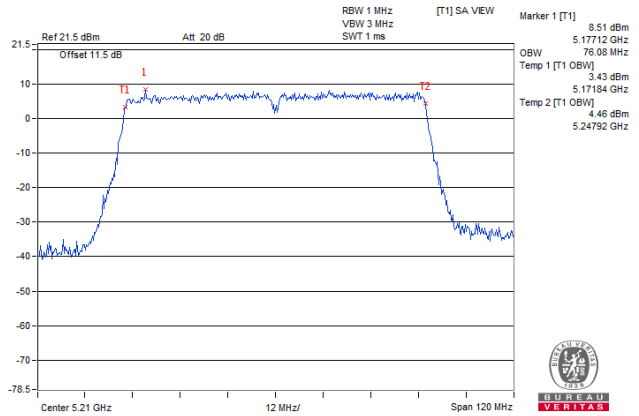
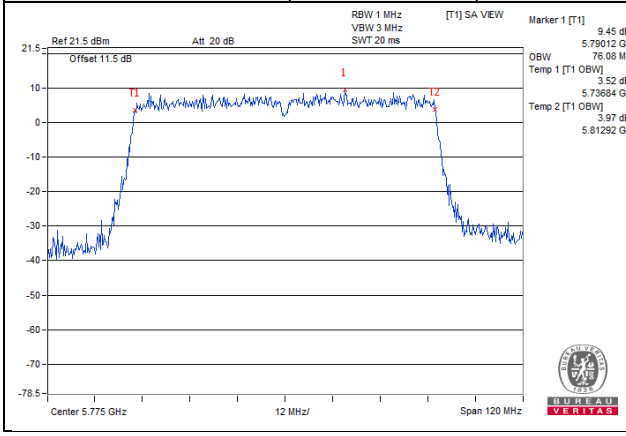
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.12	36.24	36.24	36.12
46	5230	36.24	36.24	36.12	36.12
151	5755	36.84	36.24	36.96	36.36
159	5795	36.84	36.12	37.08	36.60

802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.84	76.08	75.84	75.84
155	5775	75.84	75.84	75.84	75.84

802.11ac (VHT80+VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	76.08	76.08	-	-
155	5775	-	-	76.08	75.84

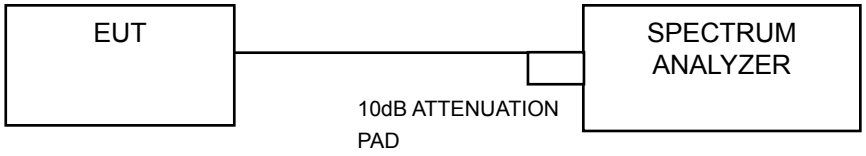
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ac (VHT80+VHT80)	
	

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

For U-NII-1 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 RBW, Detector = RMS
3) Sweep time = auto, trigger set to “free run”.
4) Trace average at least 100 traces in power averaging mode.
5) Record the max value and add 10 log (1/duty cycle)
6) 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)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.61	5.75	5.14	5.57	0.32	11.63	13.98	Pass
40	5200	7.04	7.94	7.44	7.80	0.32	13.91	13.98	Pass
48	5240	7.10	8.05	7.81	6.97	0.32	13.85	13.98	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 17-(9.02-6) = 13.98dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.10	5.32	4.66	5.10	0.13	10.97	13.98	Pass
40	5200	6.51	7.43	6.82	7.28	0.13	13.18	13.98	Pass
48	5240	7.11	7.61	7.37	7.71	0.13	13.61	13.98	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 17-(9.02-6) = 13.98dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	1.13	2.23	1.47	1.92	0.20	7.93	13.98	Pass
46	5230	3.77	4.49	3.96	4.52	0.20	10.42	13.98	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 17-(9.02-6) = 13.98dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

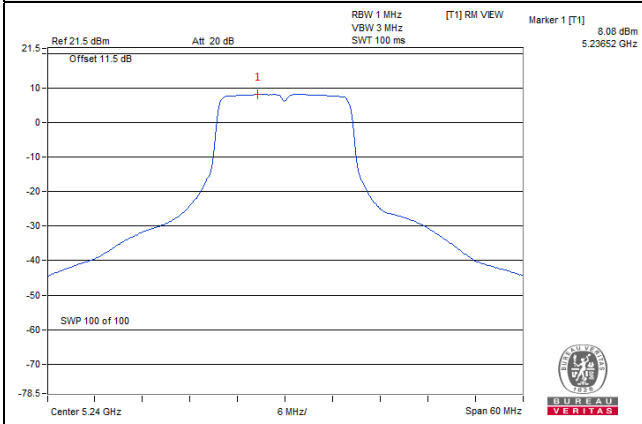
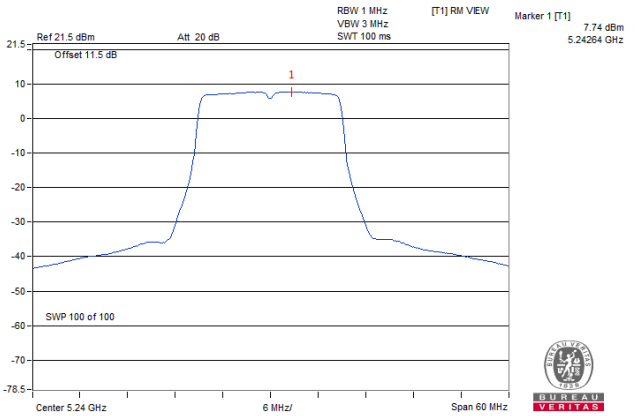
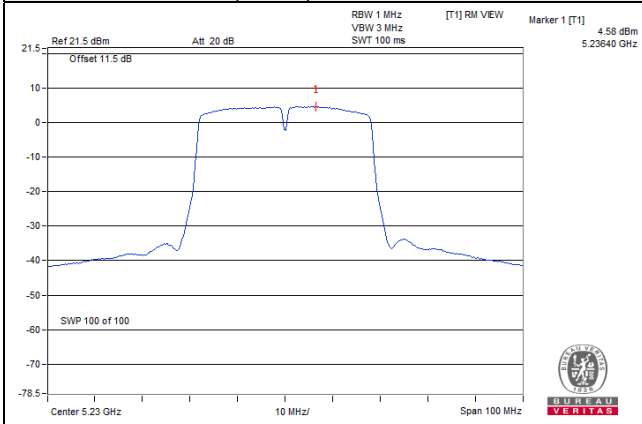
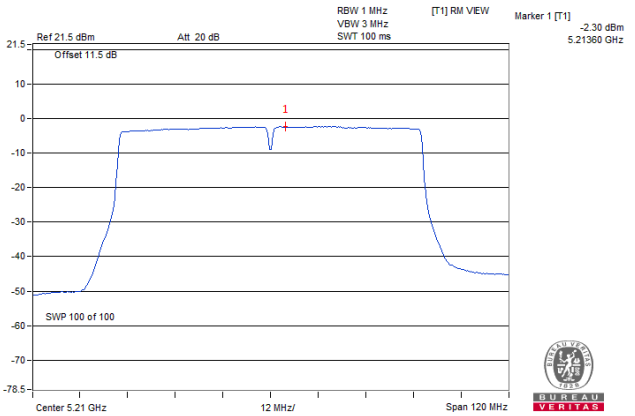
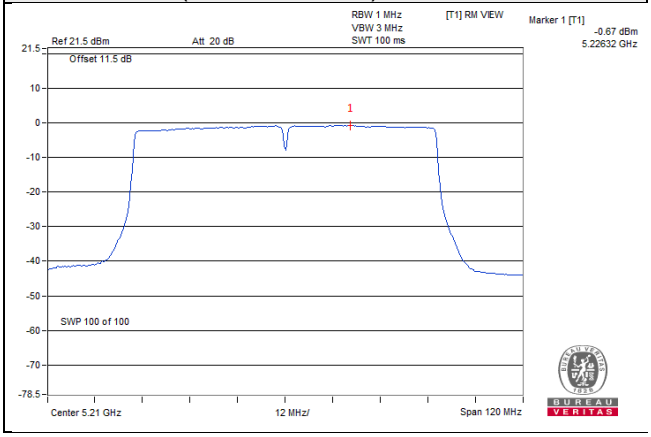
Chan.	Freq. (MHz)	PSD (dBm)				Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-3.41	-2.30	-3.02	-2.46	0.62	3.86	13.98	Pass

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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]= 9.02dBi > 6dBi, so the limit shall be reduced to 17-(9.02-6) = 13.98dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80+VHT80)

Chan.	Freq. (MHz)	PSD (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-1.17	-0.76	0.62	2.67	16.90	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 6.10dBi > 6dBi, so the limit shall be reduced to 17-(6.10-6) = 16.90dBm.
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 3
	
802.11n (HT40) / Ch 46 / Chain 3	802.11ac (VHT80) / Ch 42 / Chain 1
	
802.11ac (VHT80+VHT80) / Ch 42 / Chain 1	
	

For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	0.52	2.74	6.02	0.32	9.08	26.26	Pass
	157	5785	0.88	3.10	6.02	0.32	9.44	26.26	Pass
	165	5825	0.47	2.69	6.02	0.32	9.03	26.26	Pass
1	149	5745	-0.10	2.12	6.02	0.32	8.46	26.26	Pass
	157	5785	0.15	2.37	6.02	0.32	8.71	26.26	Pass
	165	5825	0.20	2.42	6.02	0.32	8.76	26.26	Pass
2	149	5745	1.47	3.69	6.02	0.32	10.03	26.26	Pass
	157	5785	1.54	3.76	6.02	0.32	10.10	26.26	Pass
	165	5825	1.32	3.54	6.02	0.32	9.88	26.26	Pass
3	149	5745	0.53	2.75	6.02	0.32	9.09	26.26	Pass
	157	5785	0.45	2.67	6.02	0.32	9.01	26.26	Pass
	165	5825	0.85	3.07	6.02	0.32	9.41	26.26	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.
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=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	0.13	2.35	6.02	0.13	8.50	26.26	Pass
	157	5785	0.25	2.47	6.02	0.13	8.62	26.26	Pass
	165	5825	-0.01	2.21	6.02	0.13	8.36	26.26	Pass
1	149	5745	-0.75	1.47	6.02	0.13	7.62	26.26	Pass
	157	5785	-0.42	1.80	6.02	0.13	7.95	26.26	Pass
	165	5825	-0.31	1.91	6.02	0.13	8.06	26.26	Pass
2	149	5745	1.30	3.52	6.02	0.13	9.67	26.26	Pass
	157	5785	1.32	3.54	6.02	0.13	9.69	26.26	Pass
	165	5825	1.04	3.26	6.02	0.13	9.41	26.26	Pass
3	149	5745	0.78	3.00	6.02	0.13	9.15	26.26	Pass
	157	5785	0.57	2.79	6.02	0.13	8.94	26.26	Pass
	165	5825	0.50	2.72	6.02	0.13	8.87	26.26	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-2.53	-0.31	6.02	0.20	5.91	26.26	Pass
	159	5795	-2.69	-0.47	6.02	0.20	5.75	26.26	Pass
1	151	5755	-3.66	-1.44	6.02	0.20	4.78	26.26	Pass
	159	5795	-3.42	-1.20	6.02	0.20	5.02	26.26	Pass
2	151	5755	-1.51	0.71	6.02	0.20	6.93	26.26	Pass
	159	5795	-1.64	0.58	6.02	0.20	6.80	26.26	Pass
3	151	5755	-2.58	-0.36	6.02	0.20	5.86	26.26	Pass
	159	5795	-2.65	-0.43	6.02	0.20	5.79	26.26	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

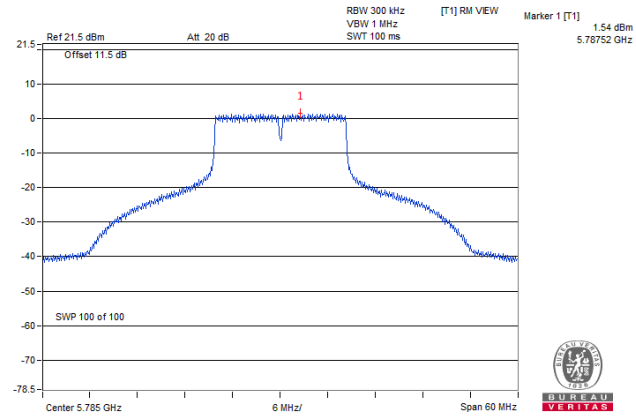
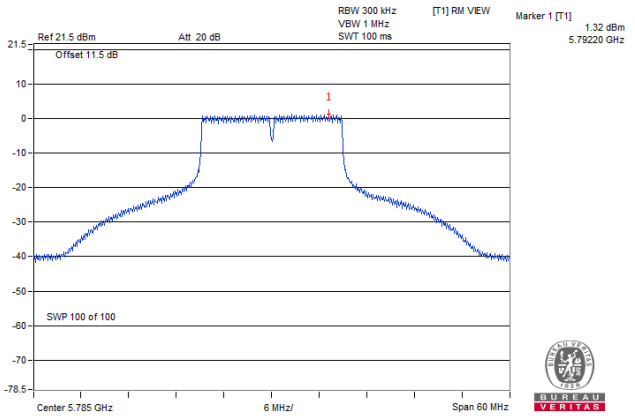
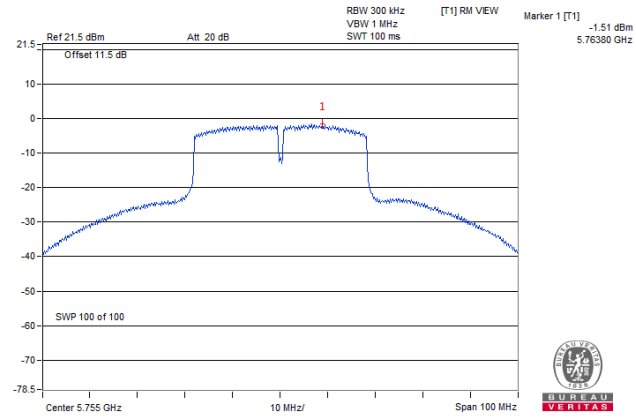
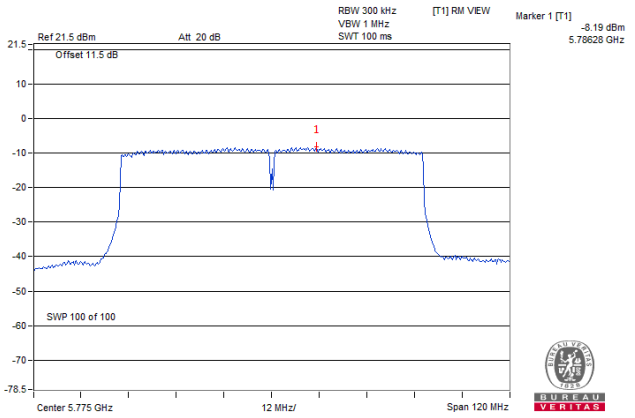
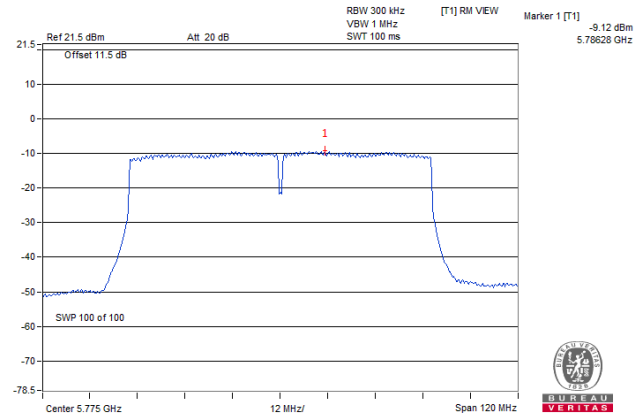
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-8.83	-6.61	6.02	0.62	0.03	26.26	Pass
1	155	5775	-9.61	-7.39	6.02	0.62	-0.75	26.26	Pass
2	155	5775	-8.19	-5.97	6.02	0.62	0.67	26.26	Pass
3	155	5775	-8.96	-6.74	6.02	0.62	-0.10	26.26	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 9.74dBi > 6dBi, so the limit shall be reduced to 30-(9.74-6) = 26.26dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80+VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
2	155	5775	-9.81	-7.59	3.01	0.62	-3.96	29.29	Pass
3	155	5775	-9.12	-6.90	3.01	0.62	-3.27	29.29	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 6.71dBi > 6dBi, so the limit shall be reduced to 30-(6.71-6) = 29.29dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

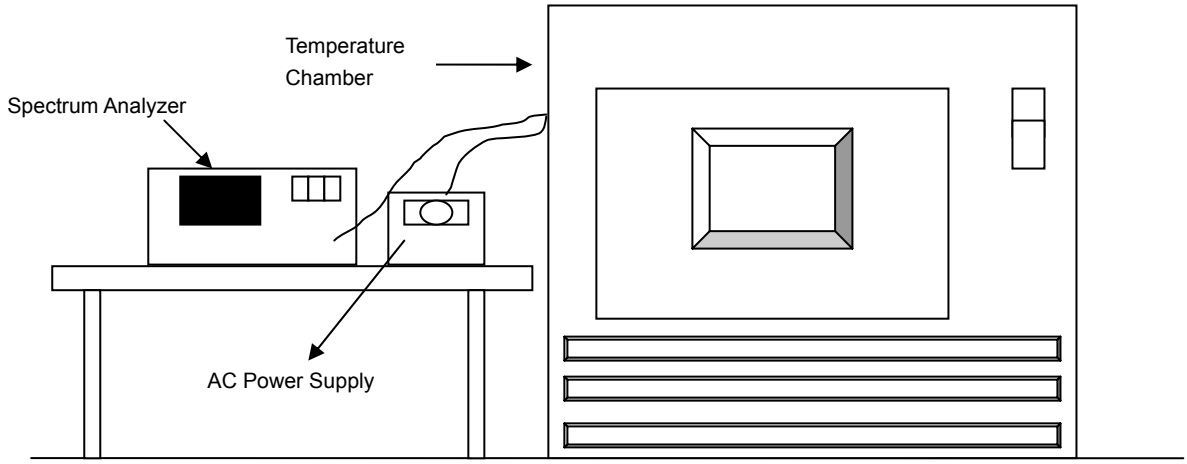
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ac (VHT80+VHT80)	
	

4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5180.0173	PASS	5180.0138	PASS	5180.0172	PASS	5180.0167	PASS
40	120	5179.9891	PASS	5179.9852	PASS	5179.9868	PASS	5179.9862	PASS
30	120	5179.9958	PASS	5179.9946	PASS	5179.9984	PASS	5179.9978	PASS
20	120	5179.9799	PASS	5179.9839	PASS	5179.9833	PASS	5179.9842	PASS
10	120	5180.0029	PASS	5180.0039	PASS	5180.0069	PASS	5180.0043	PASS
0	120	5179.9805	PASS	5179.9795	PASS	5179.9797	PASS	5179.9823	PASS
-10	120	5180.0060	PASS	5180.0043	PASS	5180.0064	PASS	5180.0046	PASS
-20	120	5179.9833	PASS	5179.9819	PASS	5179.9801	PASS	5179.9847	PASS
-30	120	5180.0007	PASS	5180.0002	PASS	5180.0023	PASS	5180.0028	PASS

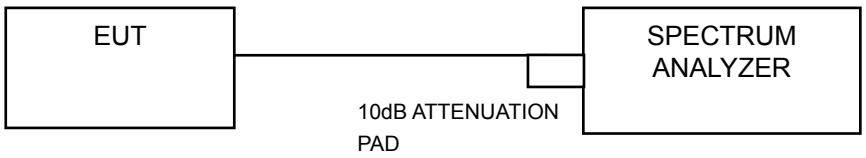
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5179.9796	PASS	5179.9835	PASS	5179.9838	PASS	5179.9850	PASS
	120	5179.9799	PASS	5179.9839	PASS	5179.9833	PASS	5179.9842	PASS
	102	5179.9802	PASS	5179.984	PASS	5179.9832	PASS	5179.9843	PASS

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

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. 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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.36	16.36	16.40	16.38	0.5	Pass
157	5785	16.38	16.37	16.39	16.38	0.5	Pass
165	5825	16.40	16.41	16.40	16.37	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.61	17.28	17.65	17.60	0.5	Pass
157	5785	17.60	17.62	17.63	17.56	0.5	Pass
165	5825	17.62	17.63	17.62	17.19	0.5	Pass

802.11n (HT40)

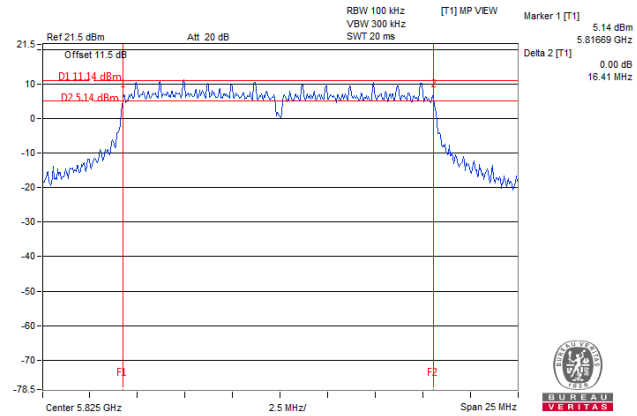
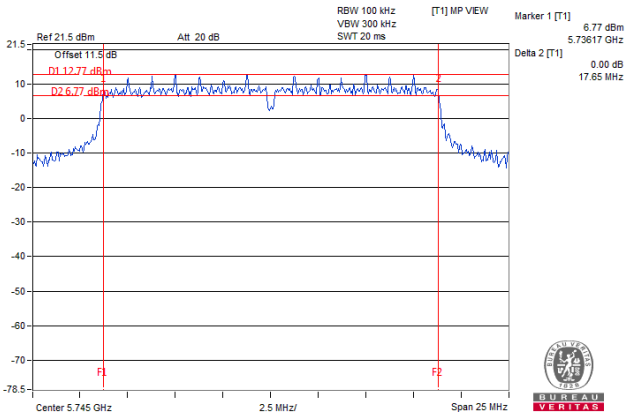
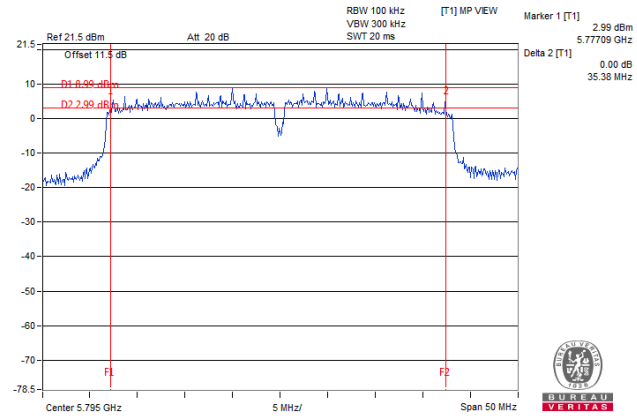
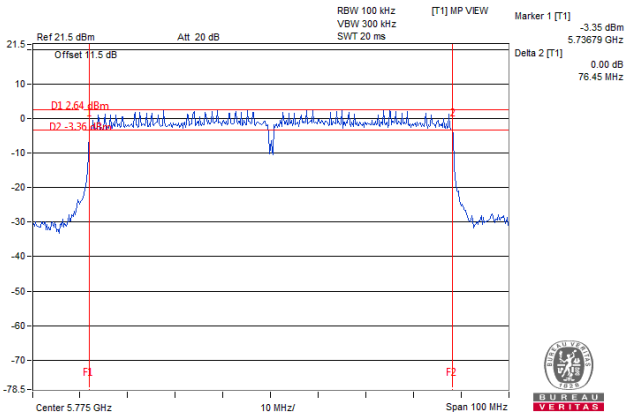
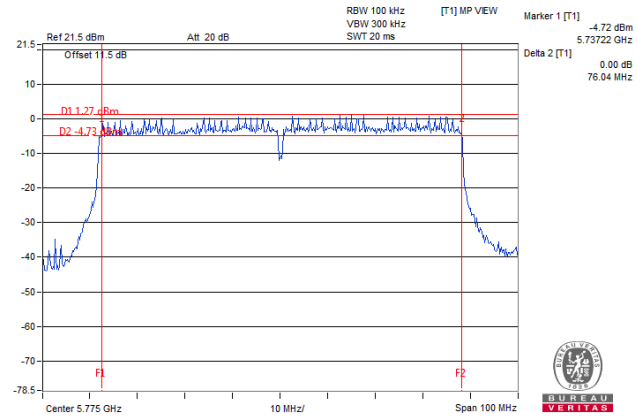
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.27	33.96	35.15	35.23	0.5	Pass
159	5795	35.38	33.96	35.21	35.18	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.43	76.10	76.45	76.11	0.5	Pass

802.11ac (VHT80+VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 2	Chain 3		
155	5775	76.04	76.02	0.5	Pass

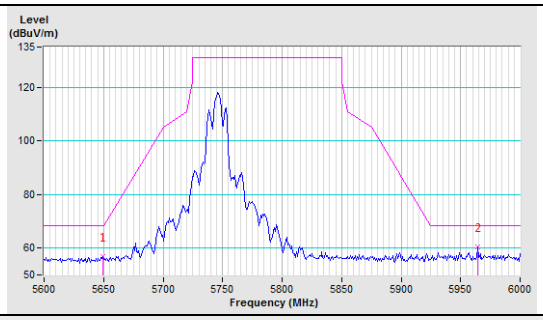
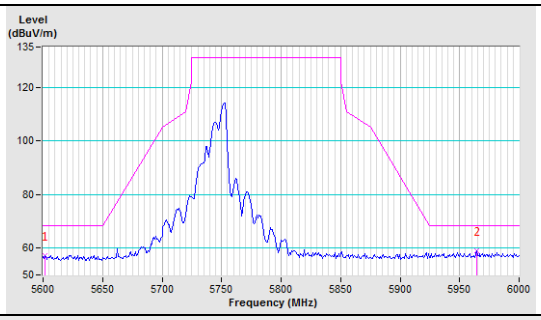
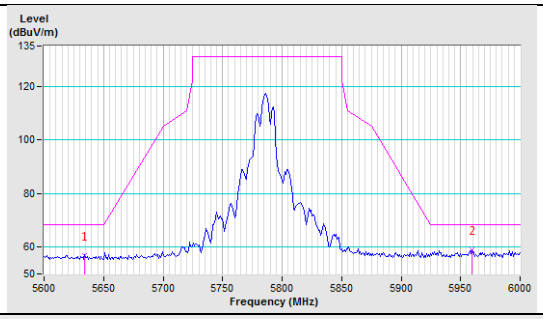
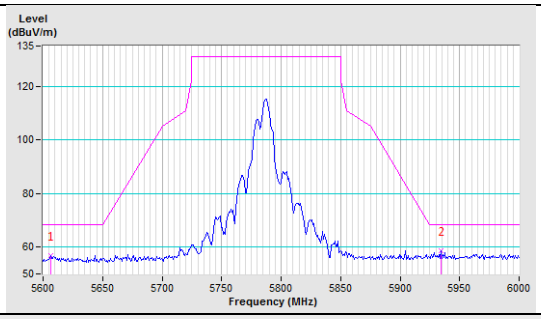
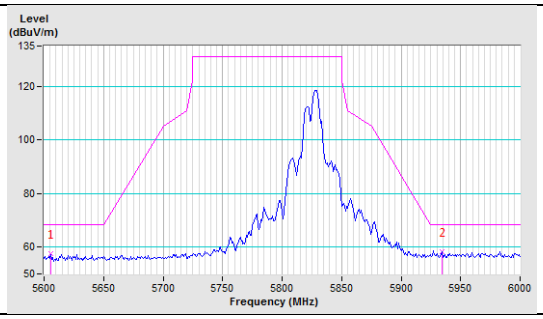
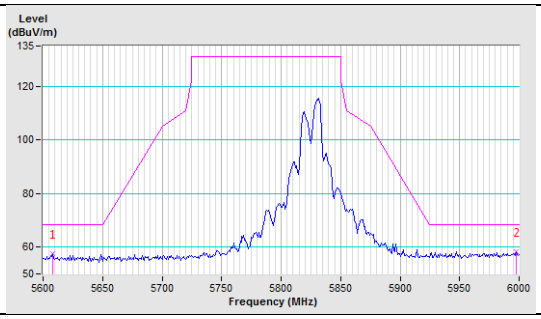
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ac (VHT80+VHT80)	
	

5 Pictures of Test Arrangements

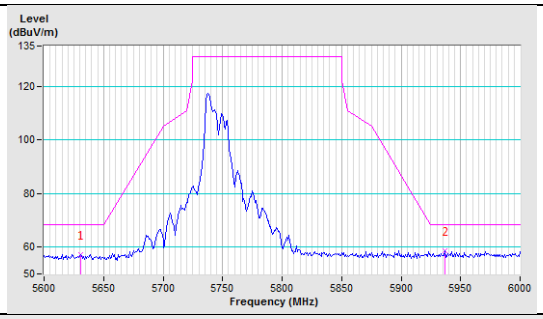
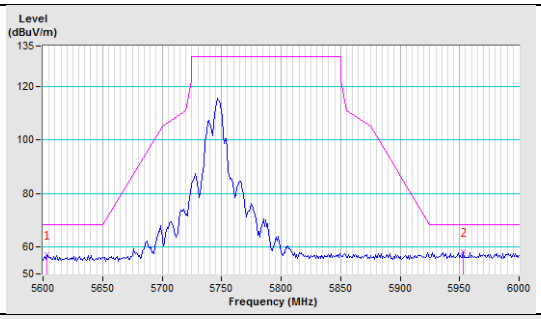
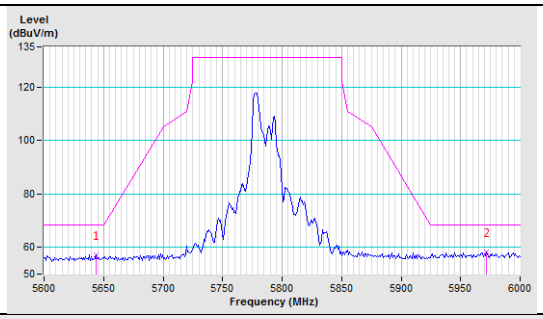
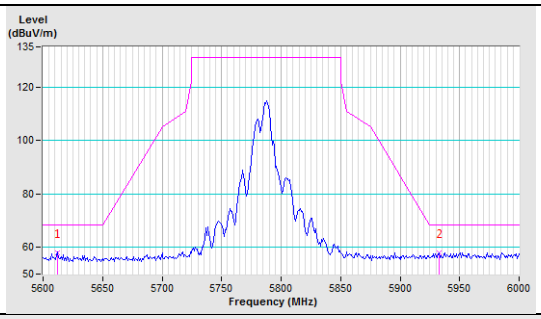
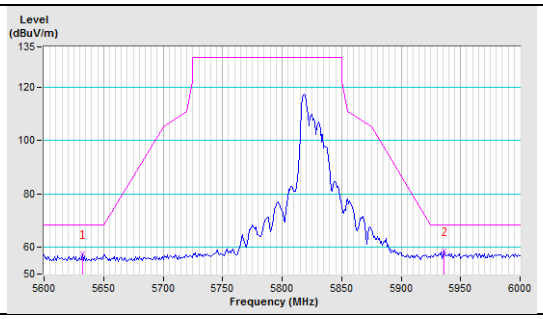
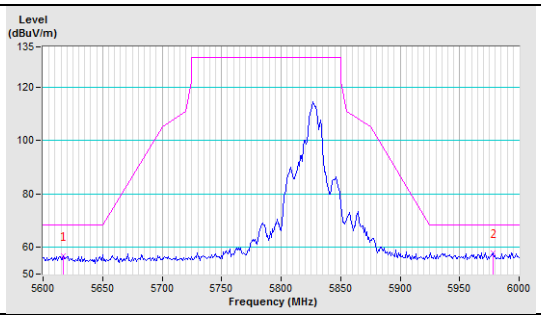
Please refer to the attached file (Test Setup Photo).

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

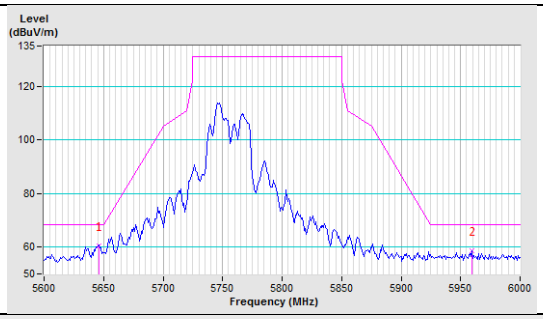
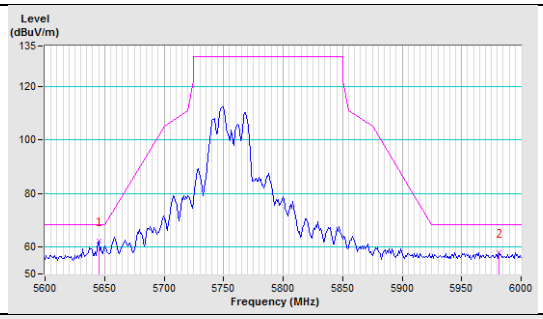
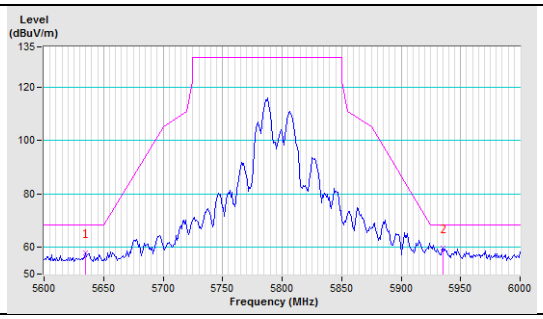
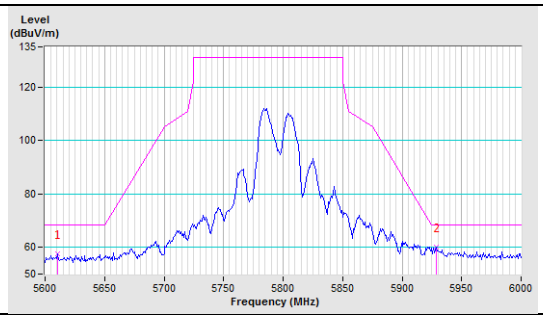
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

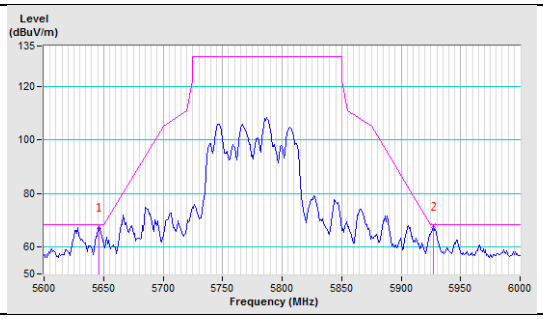
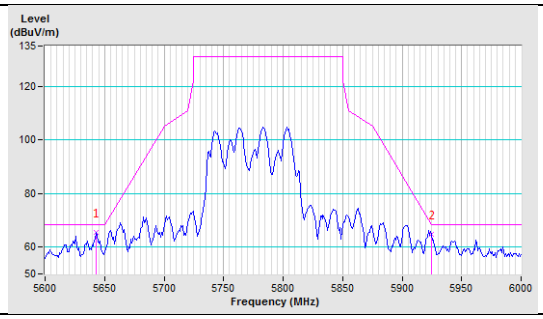
802.11n (HT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

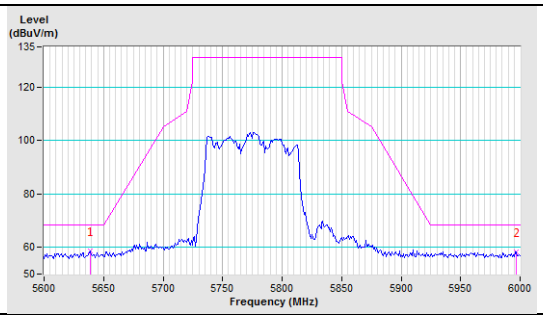
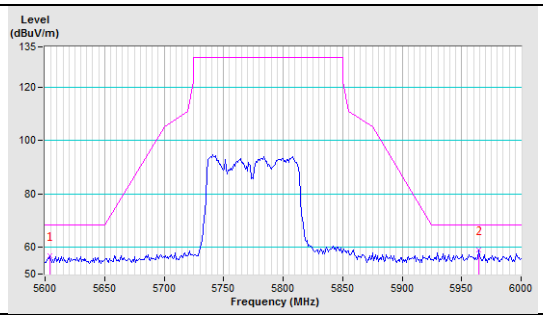
802.11n (HT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

802.11ac (VHT80+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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Fax: 886-2-26051924

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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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