FCC Test Report

Report No.:	RF170301C16-1
FCC ID:	PY317100372
Test Model:	EX8000
Received Date:	Mar. 01, 2017
Test Date:	Mar. 10 ~ Apr. 06, 2017
Issued Date:	Apr. 13, 2017
Applicant:	NETGEAR, INC.
Address:	350 East Plumeria Drive San Jose, CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF170301C16-1	Original release.	Apr. 13, 2017

1 Certificate of Conformity

Product:	Nighthawk X6S AC3000 Tri-Band WiFi Range Extender
Brand:	NETGEAR
Test Model:	EX8000
Sample Status:	Engineering sample
Applicant:	NETGEAR, INC.
Test Date:	Mar. 10 ~ Apr. 06, 2017
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by :  , **Date:** Apr. 13, 2017

Suntee Liu / Specialist

Approved by :  , **Date:** Apr. 13, 2017

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -13.94dB at 0.35764MHz.
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.
---	Occupied Bandwidth Measurement	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit.
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	3.63 dB
	200MHz ~1000MHz	3.64 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	Nighthawk X6S AC3000 Tri-Band WiFi Range Extender
Brand	NETGEAR
Test Model	EX8000
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
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 1733.3Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180~5240MHz: 835.541mW 5745~5825MHz: 900.957mW Beamforming Mode_NSS1: 5180~5240MHz: 834.992mW 5745~5825MHz: 593.833mW Beamforming Mode_NSS2: 5745~5825MHz: 900.957mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
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	2TX
	802.11g	Not Support	2TX
	802.11n (HT20)	Support (CDD / NSS1)	2TX
	802.11n (HT40)	Support (CDD / NSS1)	2TX
5G Band 1	802.11a	Not Support	2TX
	802.11n (HT20)	Support (CDD / NSS=1)	2TX
	802.11n (HT40)	Support (CDD / NSS=1)	2TX
	802.11ac (VHT20)	Support (CDD / NSS=1)	2TX
	802.11ac (VHT40)	Support (CDD / NSS=1)	2TX
	802.11ac (VHT80)	Support (CDD / NSS=1)	2TX
5G Band 4	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 (VHT20)	Support (CDD / NSS=1 / NSS=2)	4TX
	802.11ac (VHT40)	Support (CDD / NSS=1 / NSS=2)	4TX
	802.11ac (VHT80)	Support (CDD / NSS=1 / NSS=2)	4TX

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n and 802.11ac, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT uses following antennas.

Ant. Type	Dipole			
Connecter Type	I-PEX (WLAN)			
Directional Antenna Gain (dBi)				
Item	2.4G	5G Band 1	5G Band 4	
			NSS1	NSS2
-	2.61	4.18	7.43	4.86

3. The following filters are provided to this EUT.

RF Module	Filter	Filter No.	Position	Gasket	Remark
Module 1	1st	Filter 1	TFL1 ,TFL2	With TFL1, TFL2 gasket	passive filter (pin to pin & Same design)
	2nd	Filter 2	TFL1 ,TFL2	Without TFL1, TFL2 gasket	passive filter (pin to pin & Same design)
Module 2	1st	Filter 3	BHPF1 ,BHPF2 BHPF3 ,BHPF4	With BHPF1, BHPF2, BHPF3, BHPF4 gasket	passive filter (pin to pin & Same design)
	2nd	Filter 4	BHPF1 ,BHPF2 BHPF3 ,BHPF4	Without BHPF1, BHPF2, BHPF3, BHPF4 gasket	passive filter (pin to pin & Same design)

Note: The 1st Filter is the worst case for final test.
RF Module 1 (2TX) supports WLAN 2.4GHz band & U-NII-1 band functionally.
RF Module 2 (4TX) supports WLAN U-NII-3 band functionally.

4. The following options are provided to this EUT.

Option 1	Original Heat sink without gasket
Option 2	New Heat sink with gasket

* Option 1 was worse case for final test.

5. The EUT uses following adapters.

Adapter 1 (US)	
Brand	NETGEAR
Model	2ABN042F NA (PN:332-10761-01)
Input Power	100-240Vac, 50/60Hz, 1.3A
Output Power	12Vdc, 3.5A
Power Line	1.85m DC cable without core attached on adapter

Adapter 2 (US)	
Brand	NETGEAR
Model	AD2080F20 (PN:332-10876-01)
Input Power	100-240Vac, 50/60Hz, 1.0A
Output Power	12Vdc, 3.5A
Power Line	1.8m DC cable without core attached on adapter

6. 2.4GHz & 5GHz band 4 technologies can transmit at same time.
   5GHz band 1 & 5GHz band 4 technologies can transmit at same time.
7. Spurious emission of the simultaneous operation (2.4GHz & 5GHz band 4 / 5GHz band 1 & 5GHz band 4) has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 2

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 Z-plane.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	2TX
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	13.0	2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	27.0	2TX
	802.11ac (VHT80)		42	42	OFDM	58.5	2TX
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	4TX
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	13.0	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	27.0	4TX
	802.11ac (VHT80)		155	155	OFDM	130.0	4TX

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
A, B	802.11a	5180-5240	36 to 48	149	OFDM	6.0	2TX
		5745-5825	149 to 165		OFDM	6.0	4TX

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
A, B	802.11a	5180-5240	36 to 48	149	OFDM	6.0	2TX
		5745-5825	149 to 165		OFDM	6.0	4TX

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	2TX
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	13.0	2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	27.0	2TX
	802.11ac (VHT80)		42	42	OFDM	58.5	2TX
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	4TX
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	13.0	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	27.0	4TX
	802.11ac (VHT80)		155	155	OFDM	130.0	4TX

Test Condition:

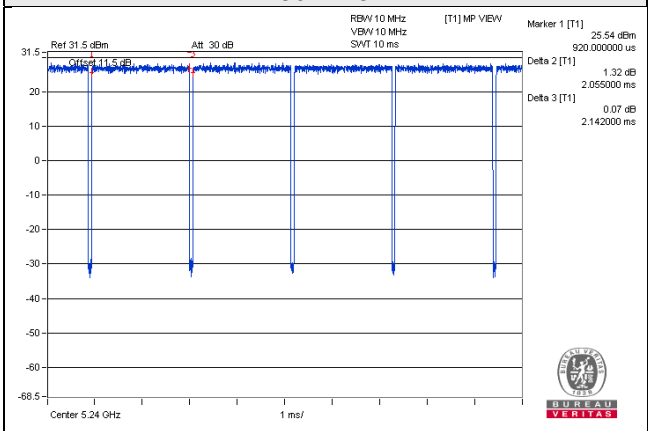
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65% RH 25 deg. C, 69% RH 25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang Tank Wu Chris Lin
RE<1G	25 deg. C, 65% RH 23 deg. C, 64% RH	120Vac, 60Hz	Matthew Yang
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Bond Tseng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Frank Liu Leo Tsai

3.3 Duty Cycle of Test Signal

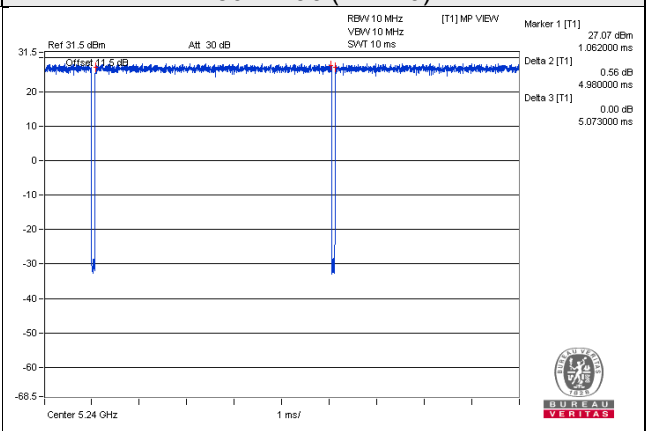
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor shall be considered.

U-NII-1 band:
802.11a: Duty cycle = 2.055/2.142 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11ac (VHT20): Duty cycle = 4.980/5.073 = 0.982
802.11ac (VHT40): Duty cycle = 2.415/2.505 = 0.964, Duty factor = 10 * log(1/0.964) = 0.16
802.11ac (VHT80): Duty cycle = 1.125/1.227 = 0.917, Duty factor = 10 * log(1/0.917) = 0.38

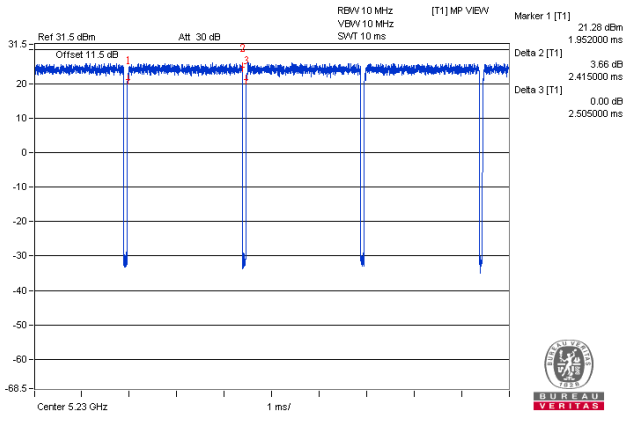
802.11a



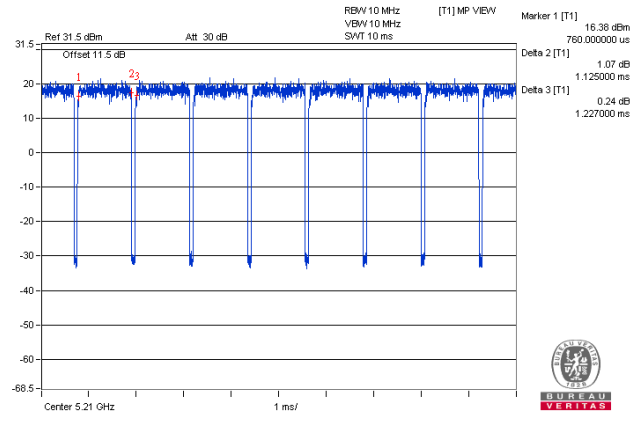
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



U-NII-3 band:

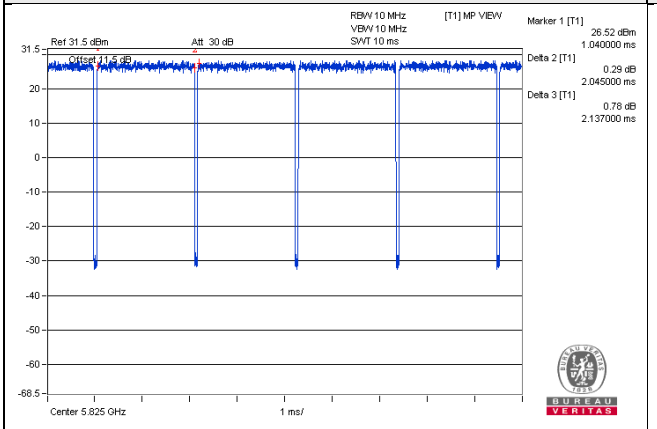
802.11a: Duty cycle = 2.045/2.137 = 0.957, Duty factor = 10 * log(1/0.957) = 0.19

802.11ac (VHT20): Duty cycle = 4.970/5.070 = 0.980

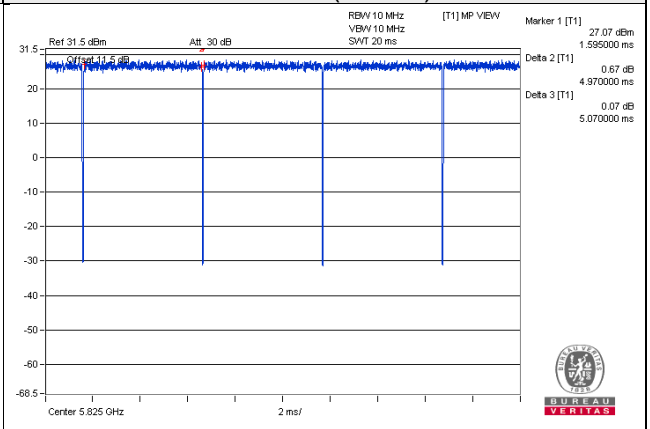
802.11ac (VHT40): Duty cycle = 2.418/2.493 = 0.970, Duty factor = 10 * log(1/0.970) = 0.13

802.11ac (VHT80): Duty cycle = 1.142/1.217 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28

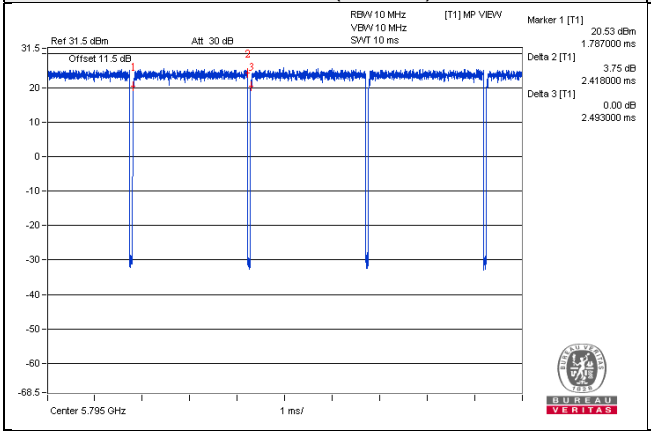
802.11a



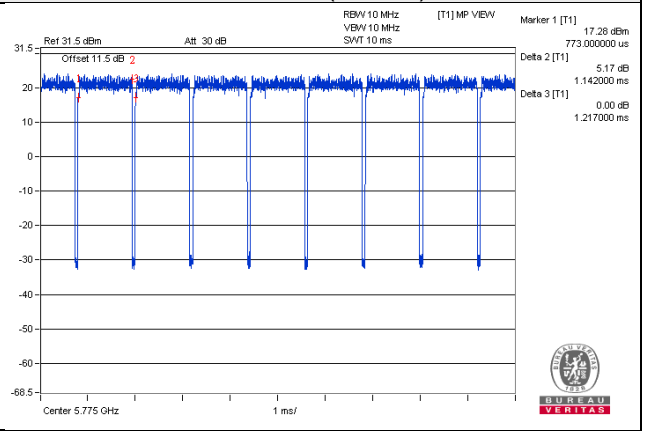
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

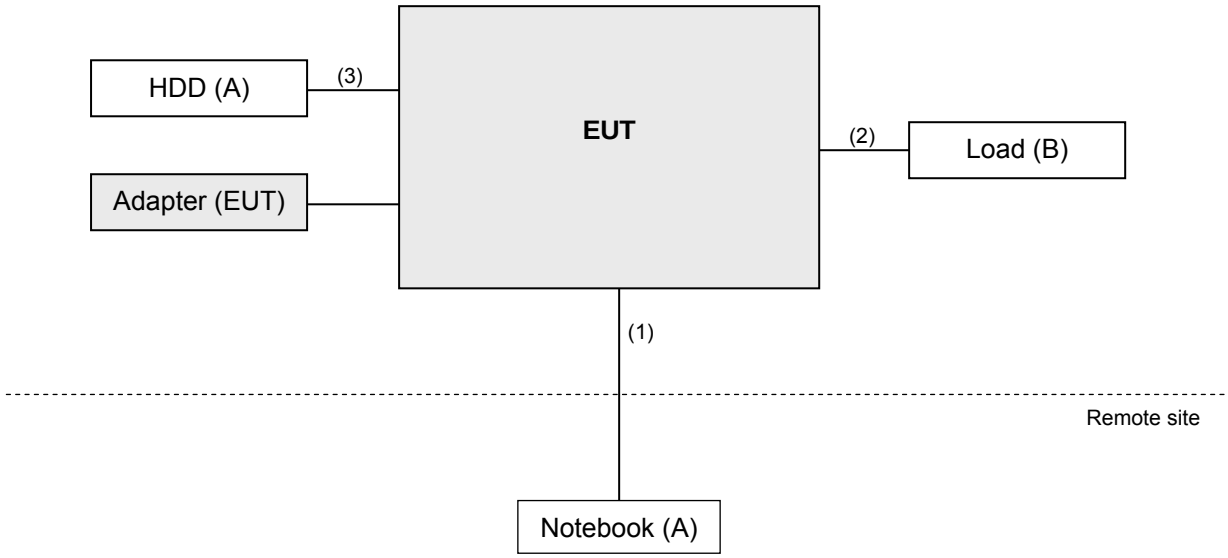
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	HDD	Toshiba	DTB305	X4RKCMV0T3ZB	FCC DoC Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45	1	10	N	0	-
2.	RJ45	3	1.8	N	0	-
3.	USB	1	0.5	Y	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v01r04
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r04</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2016	Oct. 23, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 16, 2016	Aug. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-151	Dec. 16, 2016	Dec. 15, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 15, 2016	Dec. 14, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 09, 2016	Aug. 08, 2017
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	EM26400	815221	Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2016	Jun. 07, 2017

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 788550.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

c. Both X and Y axes of the antenna are set to make the measurement.

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

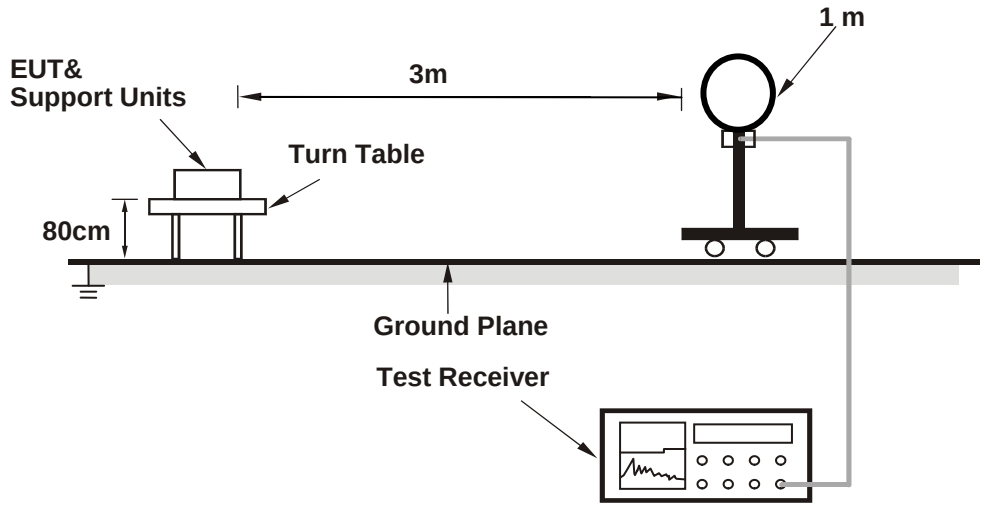
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

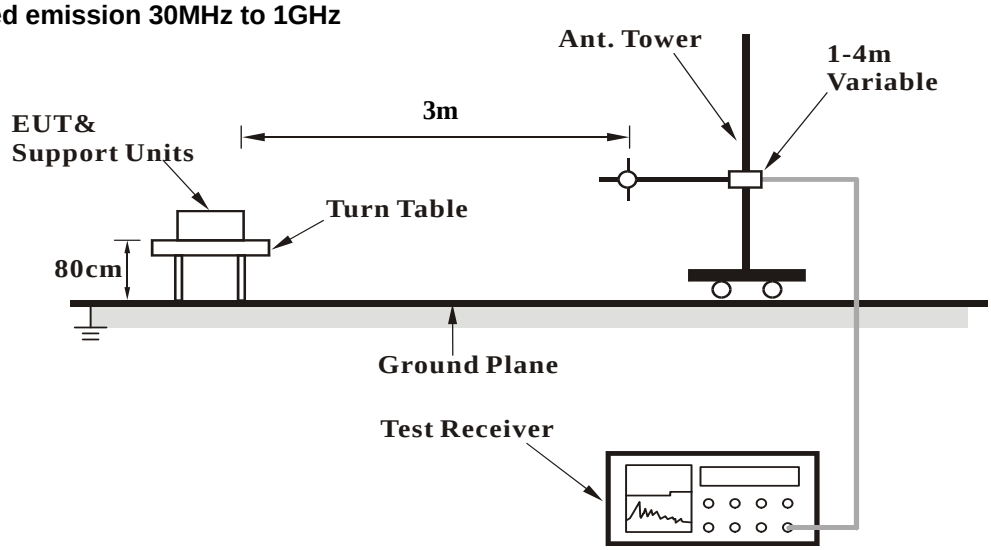
No deviation.

4.1.5 Test Setup

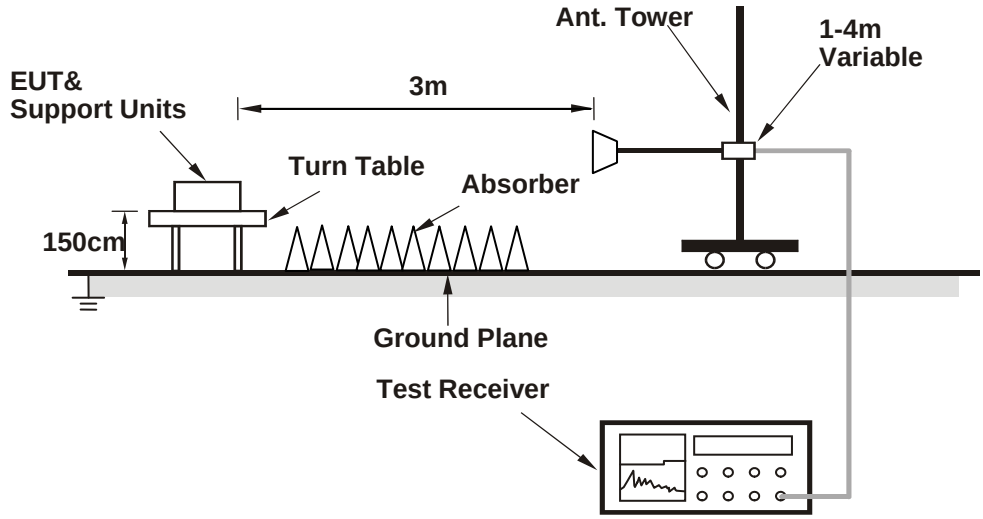
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.9 PK	74.0	-8.1	1.00 H	205	59.8	6.1
2	5150.00	50.1 AV	54.0	-3.9	1.00 H	205	44.0	6.1
3	*5180.00	112.9 PK			1.00 H	205	72.7	40.2
4	*5180.00	103.0 AV			1.00 H	205	62.8	40.2
5	#10360.00	59.7 PK	74.0	-14.3	1.05 H	235	41.8	17.9
6	#10360.00	47.2 AV	54.0	-6.8	1.05 H	235	29.3	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.0 PK	74.0	-4.0	1.23 V	163	63.9	6.1
2	5150.00	53.7 AV	54.0	-0.3	1.23 V	163	47.6	6.1
3	*5180.00	117.4 PK			1.26 V	163	77.2	40.2
4	*5180.00	106.9 AV			1.26 V	163	66.7	40.2
5	#10360.00	61.5 PK	74.0	-12.5	1.49 V	127	43.6	17.9
6	#10360.00	49.1 AV	54.0	-4.9	1.49 V	127	31.2	17.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.7 PK	74.0	-12.3	1.04 H	206	55.6	6.1
2	5150.00	46.8 AV	54.0	-7.2	1.04 H	206	40.7	6.1
3	*5200.00	115.1 PK			1.04 H	206	74.9	40.2
4	*5200.00	105.2 AV			1.04 H	206	65.0	40.2
5	#10400.00	61.0 PK	74.0	-13.0	1.12 H	233	42.8	18.2
6	#10400.00	47.9 AV	54.0	-6.1	1.12 H	233	29.7	18.2
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	5150.00	70.6 PK	74.0	-3.4	1.54 V	138	64.5	6.1
2	5150.00	53.0 AV	54.0	-1.0	1.54 V	138	46.9	6.1
3	*5200.00	120.6 PK			1.54 V	138	80.4	40.2
4	*5200.00	111.1 AV			1.54 V	138	70.9	40.2
5	#10400.00	63.9 PK	74.0	-10.1	1.66 V	145	45.7	18.2
6	#10400.00	49.8 AV	54.0	-4.2	1.66 V	145	31.6	18.2

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.8 PK			1.01 H	204	73.4	40.4
2	*5240.00	103.7 AV			1.01 H	204	63.3	40.4
3	5350.00	58.2 PK	74.0	-15.8	1.01 H	204	51.7	6.5
4	5350.00	45.4 AV	54.0	-8.6	1.01 H	204	38.9	6.5
5	#10480.00	60.7 PK	74.0	-13.3	1.08 H	248	42.3	18.4
6	#10480.00	47.9 AV	54.0	-6.1	1.08 H	248	29.5	18.4
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	*5240.00	120.7 PK			1.55 V	139	80.3	40.4
2	*5240.00	110.7 AV			1.55 V	139	70.3	40.4
3	5350.00	58.2 PK	74.0	-15.8	1.55 V	139	51.7	6.5
4	5350.00	45.8 AV	54.0	-8.2	1.55 V	139	39.3	6.5
5	#10480.00	63.5 PK	74.0	-10.5	1.67 V	143	45.1	18.4
6	#10480.00	50.1 AV	54.0	-3.9	1.67 V	143	31.7	18.4

Remarks:

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

CHANNEL	TX Channel 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	#5600.80	59.0 PK	68.2	-9.2	1.92 H	213	52.1	6.9
2	*5745.00	118.1 PK			1.92 H	213	76.5	41.6
3	*5745.00	107.5 AV			1.92 H	213	65.9	41.6
4	#5959.20	59.9 PK	68.2	-8.3	1.92 H	213	52.0	7.9
5	11490.00	60.5 PK	74.0	-13.5	1.32 H	65	40.2	20.3
6	11490.00	48.9 AV	54.0	-5.1	1.32 H	65	28.6	20.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5603.20	66.0 PK	68.2	-2.2	1.33 V	273	59.1	6.9
2	*5745.00	124.4 PK			1.33 V	273	82.8	41.6
3	*5745.00	114.2 AV			1.33 V	273	72.6	41.6
4	#5928.00	65.3 PK	68.2	-2.9	1.33 V	273	57.5	7.8
5	11490.00	64.6 PK	74.0	-9.4	1.72 V	193	44.3	20.3
6	11490.00	51.5 AV	54.0	-2.5	1.72 V	193	31.2	20.3

Remarks:

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

CHANNEL	TX Channel 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	#5630.40	59.7 PK	68.2	-8.5	1.96 H	213	52.7	7.0
2	*5785.00	117.6 PK			1.96 H	213	76.0	41.6
3	*5785.00	107.2 AV			1.96 H	213	65.6	41.6
4	#5947.20	60.8 PK	68.2	-7.4	1.96 H	213	53.0	7.8
5	11570.00	60.6 PK	74.0	-13.4	1.33 H	25	40.5	20.1
6	11570.00	48.7 AV	54.0	-5.3	1.33 H	25	28.6	20.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	59.3 PK	68.2	-8.9	1.10 V	204	52.2	7.1
2	*5785.00	124.7 PK			1.10 V	204	83.1	41.6
3	*5785.00	114.7 AV			1.10 V	204	73.1	41.6
4	#5937.60	60.2 PK	68.2	-8.0	1.10 V	204	52.4	7.8
5	11570.00	61.3 PK	74.0	-12.7	1.47 V	87	41.2	20.1
6	11570.00	50.0 AV	54.0	-4.0	1.47 V	87	29.9	20.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.00	58.9 PK	68.2	-9.3	2.00 H	216	51.9	7.0
2	*5825.00	118.3 PK			2.00 H	216	76.5	41.8
3	*5825.00	107.5 AV			2.00 H	216	65.7	41.8
4	#5926.40	60.1 PK	68.2	-8.1	2.00 H	216	52.3	7.8
5	11650.00	60.5 PK	74.0	-13.5	1.30 H	54	40.7	19.8
6	11650.00	48.0 AV	54.0	-6.0	1.30 H	54	28.2	19.8
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	#5620.00	58.9 PK	68.2	-9.3	1.62 V	178	52.0	6.9
2	*5825.00	125.8 PK			1.62 V	178	84.0	41.8
3	*5825.00	114.8 AV			1.62 V	178	73.0	41.8
4	#5935.20	59.5 PK	68.2	-8.7	1.62 V	178	51.7	7.8
5	11650.00	61.4 PK	74.0	-12.6	1.47 V	87	41.6	19.8
6	11650.00	49.2 AV	54.0	-4.8	1.47 V	87	29.4	19.8

Remarks:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.6 PK	74.0	-7.4	1.00 H	204	60.5	6.1
2	5150.00	51.2 AV	54.0	-2.8	1.00 H	204	45.1	6.1
3	*5180.00	112.8 PK			1.00 H	204	72.6	40.2
4	*5180.00	102.7 AV			1.00 H	204	62.5	40.2
5	#10360.00	57.9 PK	74.0	-16.1	1.47 H	85	40.0	17.9
6	#10360.00	46.6 AV	54.0	-7.4	1.47 H	85	28.7	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.1 PK	74.0	-3.9	1.52 V	152	64.0	6.1
2	5150.00	53.8 AV	54.0	-0.2	1.52 V	152	47.7	6.1
3	*5180.00	117.7 PK			1.52 V	152	77.5	40.2
4	*5180.00	106.2 AV			1.52 V	152	66.0	40.2
5	#10360.00	61.1 PK	74.0	-12.9	1.61 V	149	43.2	17.9
6	#10360.00	48.9 AV	54.0	-5.1	1.61 V	149	31.0	17.9

Remarks:

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

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	115.9 PK			1.03 H	205	75.7	40.2
2	*5200.00	105.2 AV			1.03 H	205	65.0	40.2
3	5350.00	59.1 PK	74.0	-14.9	1.03 H	205	52.6	6.5
4	5350.00	46.2 AV	54.0	-7.8	1.03 H	205	39.7	6.5
5	#10400.00	58.8 PK	74.0	-15.2	1.47 H	85	40.6	18.2
6	#10400.00	47.6 AV	54.0	-6.4	1.47 H	85	29.4	18.2
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	5150.00	69.5 PK	74.0	-4.5	2.18 V	149	63.4	6.1
2	5150.00	53.7 AV	54.0	-0.3	2.18 V	149	47.6	6.1
3	*5200.00	120.1 PK			2.18 V	149	79.9	40.2
4	*5200.00	109.5 AV			2.18 V	149	69.3	40.2
5	#10400.00	63.0 PK	74.0	-11.0	1.59 V	162	44.8	18.2
6	#10400.00	49.7 AV	54.0	-4.3	1.59 V	162	31.5	18.2

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.9 PK			1.95 H	205	75.5	40.4
2	*5240.00	104.7 AV			1.95 H	205	64.3	40.4
3	5350.00	58.4 PK	74.0	-15.6	1.95 H	205	51.9	6.5
4	5350.00	46.2 AV	54.0	-7.8	1.95 H	205	39.7	6.5
5	#10480.00	59.9 PK	74.0	-14.1	1.07 H	48	41.5	18.4
6	#10480.00	47.5 AV	54.0	-6.5	1.07 H	48	29.1	18.4
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	*5240.00	121.0 PK			1.00 V	9	80.6	40.4
2	*5240.00	111.2 AV			1.00 V	9	70.8	40.4
3	5350.00	59.1 PK	74.0	-14.9	1.00 V	9	52.6	6.5
4	5350.00	47.4 AV	54.0	-6.6	1.00 V	9	40.9	6.5
5	#10480.00	59.9 PK	74.0	-14.1	1.58 V	63	41.5	18.4
6	#10480.00	48.5 AV	54.0	-5.5	1.58 V	63	30.1	18.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5606.40	58.9 PK	68.2	-9.3	1.99 H	215	52.0	6.9
2	*5745.00	117.9 PK			1.99 H	215	76.3	41.6
3	*5745.00	106.8 AV			1.99 H	215	65.2	41.6
4	#5964.00	59.6 PK	68.2	-8.6	1.99 H	215	51.7	7.9
5	11490.00	61.2 PK	74.0	-12.8	1.36 H	60	40.9	20.3
6	11490.00	48.7 AV	54.0	-5.3	1.36 H	60	28.4	20.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.40	59.0 PK	68.2	-9.2	1.05 V	205	51.9	7.1
2	*5745.00	123.5 PK			1.05 V	205	81.9	41.6
3	*5745.00	113.4 AV			1.05 V	205	71.8	41.6
4	#5944.80	60.1 PK	68.2	-8.1	1.05 V	205	52.3	7.8
5	11490.00	61.8 PK	74.0	-12.2	1.47 V	87	41.5	20.3
6	11490.00	49.7 AV	54.0	-4.3	1.47 V	87	29.4	20.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5627.20	58.8 PK	68.2	-9.4	2.03 H	214	51.8	7.0
2	*5785.00	118.4 PK			2.03 H	214	76.8	41.6
3	*5785.00	107.5 AV			2.03 H	214	65.9	41.6
4	#5968.80	59.4 PK	68.2	-8.8	2.03 H	214	51.5	7.9
5	11570.00	61.3 PK	74.0	-12.7	1.37 H	52	41.2	20.1
6	11570.00	48.8 AV	54.0	-5.2	1.37 H	52	28.7	20.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	59.4 PK	68.2	-8.8	1.13 V	208	52.3	7.1
2	*5785.00	124.6 PK			1.13 V	208	83.0	41.6
3	*5785.00	114.4 AV			1.13 V	208	72.8	41.6
4	#5937.60	59.8 PK	68.2	-8.4	1.13 V	208	52.0	7.8
5	11570.00	61.6 PK	74.0	-12.4	1.47 V	87	41.5	20.1
6	11570.00	49.5 AV	54.0	-4.5	1.47 V	87	29.4	20.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.00	59.1 PK	68.2	-9.1	1.92 H	216	52.1	7.0
2	*5825.00	117.9 PK			1.92 H	216	76.1	41.8
3	*5825.00	107.0 AV			1.92 H	216	65.2	41.8
4	#5949.60	58.9 PK	68.2	-9.3	1.92 H	216	51.1	7.8
5	11650.00	61.2 PK	74.0	-12.8	1.40 H	46	41.4	19.8
6	11650.00	48.1 AV	54.0	-5.9	1.40 H	46	28.3	19.8
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	#5616.00	58.9 PK	68.2	-9.3	1.18 V	194	52.0	6.9
2	*5825.00	124.8 PK			1.18 V	194	83.0	41.8
3	*5825.00	113.9 AV			1.18 V	194	72.1	41.8
4	#5994.40	59.7 PK	68.2	-8.5	1.18 V	194	51.8	7.9
5	11650.00	61.5 PK	74.0	-12.5	1.35 V	87	41.7	19.8
6	11650.00	49.4 AV	54.0	-4.6	1.35 V	87	29.6	19.8

Remarks:

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

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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	62.6 PK	74.0	-11.4	1.04 H	207	56.5	6.1
2	5150.00	50.4 AV	54.0	-3.6	1.04 H	207	44.3	6.1
3	*5190.00	108.0 PK			1.04 H	207	67.8	40.2
4	*5190.00	97.7 AV			1.04 H	207	57.5	40.2
5	#10380.00	58.9 PK	74.0	-15.1	1.07 H	48	40.9	18.0
6	#10380.00	46.6 AV	54.0	-7.4	1.07 H	48	28.6	18.0
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	70.0 PK	74.0	-4.0	1.28 V	147	63.9	6.1
2	5150.00	53.6 AV	54.0	-0.4	1.28 V	147	47.5	6.1
3	*5190.00	111.4 PK			1.28 V	147	71.2	40.2
4	*5190.00	101.5 AV			1.28 V	147	61.3	40.2
5	#10380.00	61.6 PK	74.0	-12.4	1.59 V	157	43.6	18.0
6	#10380.00	48.7 AV	54.0	-5.3	1.59 V	157	30.7	18.0

Remarks:

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

CHANNEL	TX Channel 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	58.2 PK	74.0	-15.8	2.08 H	205	52.1	6.1
2	5150.00	46.2 AV	54.0	-7.8	2.08 H	205	40.1	6.1
3	*5230.00	110.9 PK			2.08 H	205	70.5	40.4
4	*5230.00	101.3 AV			2.08 H	205	60.9	40.4
5	5350.00	57.4 PK	74.0	-16.6	2.08 H	205	50.9	6.5
6	5350.00	44.1 AV	54.0	-9.9	2.08 H	205	37.6	6.5
7	#10460.00	58.7 PK	74.0	-15.3	1.32 H	65	40.5	18.2
8	#10460.00	47.3 AV	54.0	-6.7	1.32 H	65	29.1	18.2
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	5150.00	65.3 PK	74.0	-8.7	1.32 V	165	59.2	6.1
2	5150.00	50.5 AV	54.0	-3.5	1.32 V	165	44.4	6.1
3	*5230.00	116.0 PK			1.32 V	165	75.6	40.4
4	*5230.00	106.4 AV			1.32 V	165	66.0	40.4
5	5350.00	58.4 PK	74.0	-15.6	1.32 V	165	51.9	6.5
6	5350.00	46.7 AV	54.0	-7.3	1.32 V	165	40.2	6.5
7	#10460.00	61.9 PK	74.0	-12.1	1.61 V	177	43.7	18.2
8	#10460.00	48.4 AV	54.0	-5.6	1.61 V	177	30.2	18.2

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	59.4 PK	68.2	-8.8	1.94 H	215	52.3	7.1
2	*5755.00	115.7 PK	74.0	41.7	1.94 H	215	74.1	41.6
3	*5755.00	106.0 AV	54.0	52.0	1.94 H	215	64.4	41.6
4	#5971.20	61.0 PK	68.2	-7.2	1.94 H	215	53.1	7.9
5	11510.00	62.4 PK	74.0	-11.6	1.41 H	44	42.2	20.2
6	11510.00	49.3 AV	54.0	-4.7	1.41 H	44	29.1	20.2
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	#5648.80	60.2 PK	68.2	-8.0	1.39 V	274	53.1	7.1
2	*5755.00	122.1 PK			1.39 V	274	80.5	41.6
3	*5755.00	112.3 AV			1.39 V	274	70.7	41.6
4	#5949.60	59.1 PK	68.2	-9.1	1.39 V	274	51.3	7.8
5	11510.00	64.8 PK	74.0	-9.2	1.81 V	233	44.6	20.2
6	11510.00	51.4 AV	54.0	-2.6	1.81 V	233	31.2	20.2

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.80	58.5 PK	68.2	-9.7	1.91 H	216	51.5	7.0
2	*5795.00	115.5 PK			1.91 H	216	73.8	41.7
3	*5795.00	105.9 AV			1.91 H	216	64.2	41.7
4	#5942.40	60.0 PK	68.2	-8.2	1.91 H	216	52.2	7.8
5	11590.00	62.0 PK	74.0	-12.0	1.39 H	48	41.9	20.1
6	11590.00	49.3 AV	54.0	-4.7	1.39 H	48	29.2	20.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	59.8 PK	68.2	-8.4	1.00 V	205	52.7	7.1
2	*5795.00	123.6 PK			1.00 V	205	81.9	41.7
3	*5795.00	112.8 AV			1.00 V	205	71.1	41.7
4	#5993.60	59.8 PK	68.2	-8.4	1.00 V	205	51.9	7.9
5	11590.00	61.4 PK	74.0	-12.6	1.07 V	84	41.3	20.1
6	11590.00	49.8 AV	54.0	-4.2	1.07 V	84	29.7	20.1

Remarks:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	2.04 H	204	57.1	6.1
2	5150.00	51.2 AV	54.0	-2.8	2.04 H	204	45.1	6.1
3	*5210.00	102.5 PK			2.04 H	204	62.2	40.3
4	*5210.00	93.3 AV			2.04 H	204	53.0	40.3
5	5350.00	58.1 PK	74.0	-15.9	2.04 H	204	51.6	6.5
6	5350.00	46.3 AV	54.0	-7.7	2.04 H	204	39.8	6.5
7	#10420.00	58.3 PK	74.0	-15.7	1.02 H	47	40.2	18.1
8	#10420.00	47.6 AV	54.0	-6.4	1.02 H	47	29.5	18.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.4 PK	74.0	-5.6	1.28 V	177	62.3	6.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.28 V**	**177**	**47.8**	**6.1**
3	*5210.00	107.4 PK			1.28 V	177	67.1	40.3
4	*5210.00	97.4 AV			1.28 V	177	57.1	40.3
5	5350.00	59.9 PK	74.0	-14.1	1.28 V	177	53.4	6.5
6	5350.00	47.4 AV	54.0	-6.6	1.28 V	177	40.9	6.5
7	#10420.00	61.7 PK	74.0	-12.3	1.59 V	161	43.6	18.1
8	#10420.00	48.3 AV	54.0	-5.7	1.59 V	161	30.2	18.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5618.40	60.5 PK	68.2	-7.7	1.76 H	220	53.6	6.9
2	*5775.00	112.8 PK			1.76 H	220	71.2	41.6
3	*5775.00	102.1 AV			1.76 H	220	60.5	41.6
4	#5947.20	59.1 PK	68.2	-9.1	1.76 H	220	51.3	7.8
5	11550.00	62.6 PK	74.0	-11.4	1.29 H	37	42.4	20.2
6	11550.00	49.7 AV	54.0	-4.3	1.29 H	37	29.5	20.2
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	#5640.80	67.4 PK	68.2	-0.8	1.34 V	278	60.3	7.1
2	*5775.00	119.3 PK			1.34 V	278	77.7	41.6
3	*5775.00	108.7 AV			1.34 V	278	67.1	41.6
4	#5930.40	62.5 PK	68.2	-5.7	1.34 V	278	54.7	7.8
5	11550.00	64.4 PK	74.0	-9.6	1.79 V	237	44.2	20.2
6	11550.00	51.3 AV	54.0	-2.7	1.79 V	237	31.1	20.2

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 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	124.98	35.5 QP	43.5	-8.0	1.50 H	345	51.2	-15.7
2	249.17	38.8 QP	46.0	-7.2	1.00 H	262	53.0	-14.2
3	299.62	33.3 QP	46.0	-12.7	1.00 H	249	45.6	-12.3
4	476.19	40.2 QP	46.0	-5.8	2.00 H	12	49.2	-9.0
5	604.26	36.4 QP	46.0	-9.6	1.24 H	13	42.4	-6.0
6	938.01	38.0 QP	46.0	-8.0	2.00 H	138	38.2	-0.2
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	30.00	35.5 QP	40.0	-4.5	1.00 V	97	51.2	-15.7
2	124.98	40.6 QP	43.5	-2.9	1.00 V	169	56.3	-15.7
3	249.17	36.4 QP	46.0	-9.6	2.00 V	192	50.6	-14.2
4	478.13	37.2 QP	46.0	-8.8	1.00 V	112	46.2	-9.0
5	730.38	33.1 QP	46.0	-12.9	1.50 V	105	36.7	-3.6
6	936.07	38.3 QP	46.0	-7.7	1.24 V	357	38.6	-0.3

Remarks:

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

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	134.68	33.1 QP	43.5	-10.4	2.00 H	301	47.8	-14.7
2	249.17	39.1 QP	46.0	-6.9	1.24 H	99	53.3	-14.2
3	476.19	41.4 QP	46.0	-4.6	1.50 H	246	50.4	-9.0
4	606.20	35.7 QP	46.0	-10.3	1.50 H	7	41.6	-5.9
5	742.03	36.9 QP	46.0	-9.1	1.00 H	52	40.0	-3.1
6	939.95	34.6 QP	46.0	-11.4	1.24 H	13	34.7	-0.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	35.8 QP	40.0	-4.2	1.00 V	211	51.5	-15.7
2	124.98	36.1 QP	43.5	-7.4	1.00 V	17	51.8	-15.7
3	249.17	37.1 QP	46.0	-8.9	1.50 V	173	51.3	-14.2
4	478.13	35.5 QP	46.0	-10.5	1.50 V	251	44.5	-9.0
5	784.72	33.7 QP	46.0	-12.3	2.00 V	231	36.1	-2.4
6	939.95	35.0 QP	46.0	-11.0	1.24 V	260	35.1	-0.1

Remarks:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

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

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

4.2.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

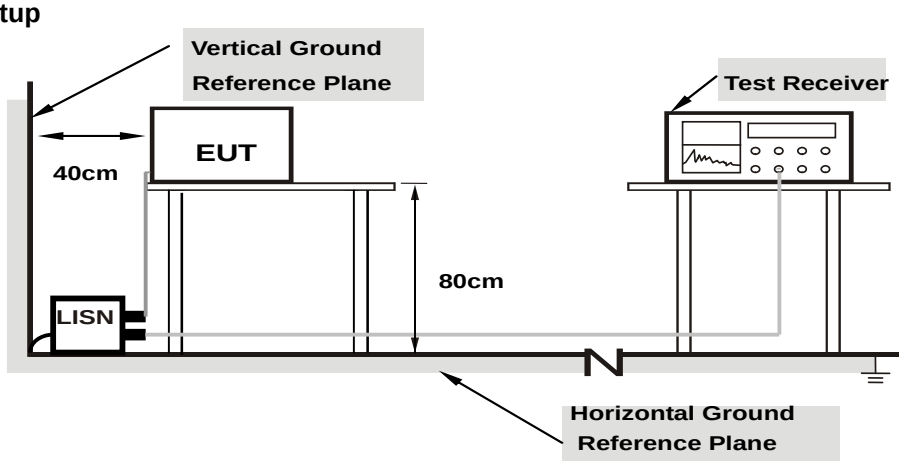
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

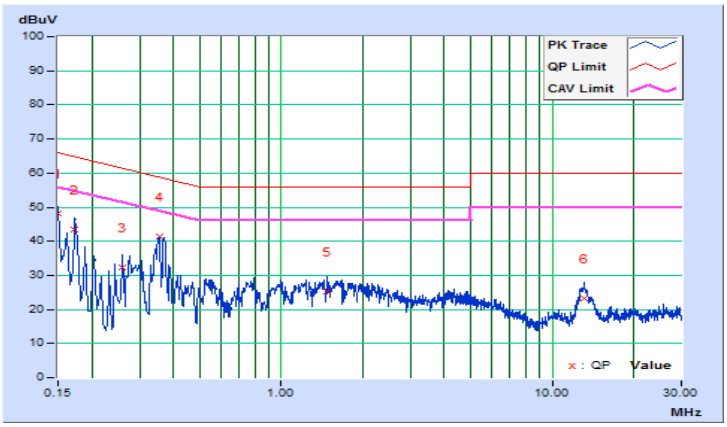
Worst-case data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.40	37.75	21.43	48.15	31.83	66.00	56.00	-17.85	-24.17
2	0.17346	10.42	32.87	16.92	43.29	27.34	64.79	54.79	-21.50	-27.45
3	0.25948	10.45	21.88	12.24	32.33	22.69	61.45	51.45	-29.12	-28.76
4	0.35723	10.49	30.96	23.20	41.45	33.69	58.79	48.79	-17.34	-15.10
5	1.47940	10.49	14.76	5.72	25.25	16.21	56.00	46.00	-30.75	-29.79
6	13.09601	11.06	12.14	7.64	23.20	18.70	60.00	50.00	-36.80	-31.30

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.

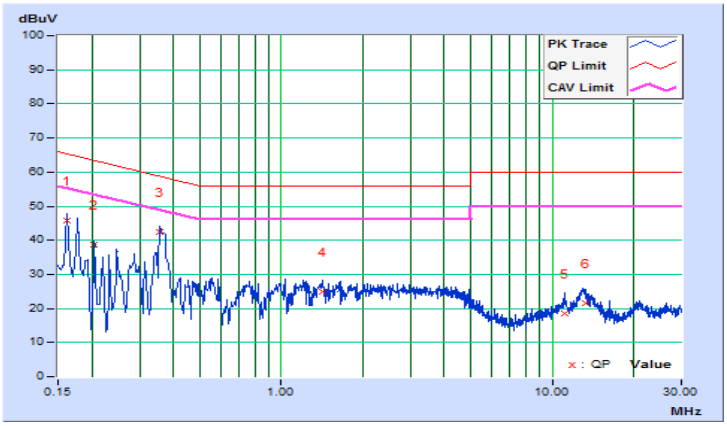


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.16173	10.17	35.72	20.78	45.89	30.95	65.37	55.37	-19.48	-24.42
2	0.20474	10.20	28.36	12.21	38.56	22.41	63.42	53.42	-24.86	-31.01
3	**0.35764**	**10.22**	**32.13**	**24.62**	**42.35**	**34.84**	**58.78**	**48.78**	**-16.43**	**-13.94**
4	1.42075	10.27	14.55	7.24	24.82	17.51	56.00	46.00	-31.18	-28.49
5	11.11755	10.68	7.98	3.70	18.66	14.38	60.00	50.00	-41.34	-35.62
6	13.30324	10.77	10.76	5.91	21.53	16.68	60.00	50.00	-38.47	-33.32

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.

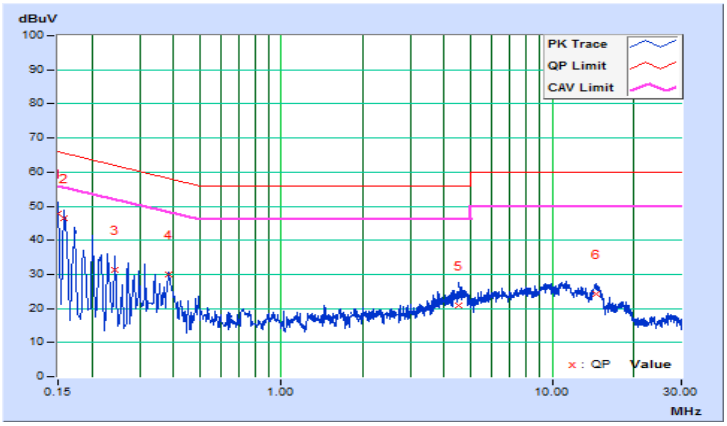


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15000	10.40	37.29	21.02	47.69	31.42	66.00	56.00	-18.31	-24.58
2	0.15782	10.41	36.05	18.15	46.46	28.56	65.58	55.58	-19.12	-27.02
3	0.24384	10.45	20.93	6.89	31.38	17.34	61.96	51.96	-30.58	-34.62
4	0.38460	10.50	19.60	11.67	30.10	22.17	58.18	48.18	-28.08	-26.01
5	4.54484	10.68	10.33	4.09	21.01	14.77	56.00	46.00	-34.99	-31.23
6	14.60136	11.13	13.23	8.54	24.36	19.67	60.00	50.00	-35.64	-30.33

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.

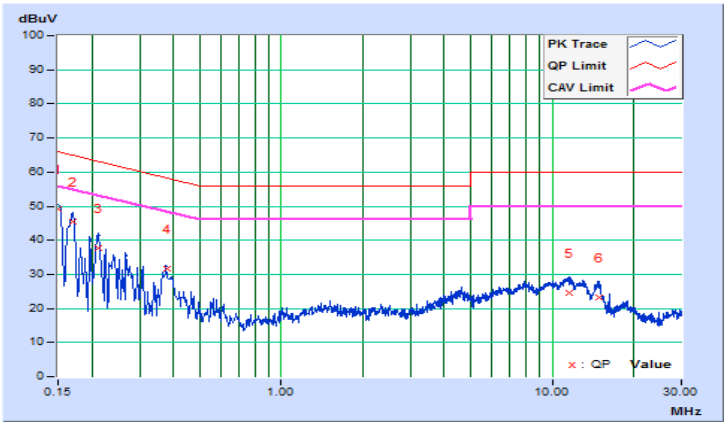


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15000	10.15	39.16	23.14	49.31	33.29	66.00	56.00	-16.69	-22.71
2	0.16967	10.17	35.20	17.97	45.37	28.14	64.98	54.98	-19.61	-26.84
3	0.21226	10.20	27.65	11.00	37.85	21.20	63.12	53.12	-25.27	-31.92
4	0.37700	10.23	21.53	12.54	31.76	22.77	58.35	48.35	-26.59	-25.58
5	11.56329	10.70	13.96	8.98	24.66	19.68	60.00	50.00	-35.34	-30.32
6	14.85160	10.83	12.49	7.70	23.32	18.53	60.00	50.00	-36.68	-31.47

REMARKS:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

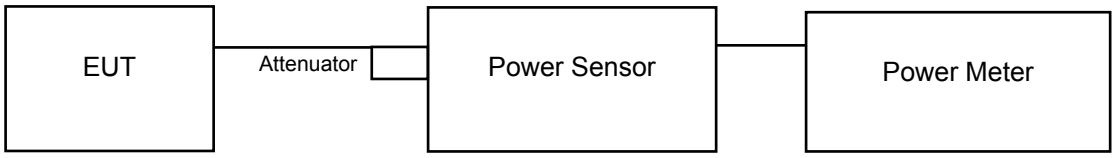
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

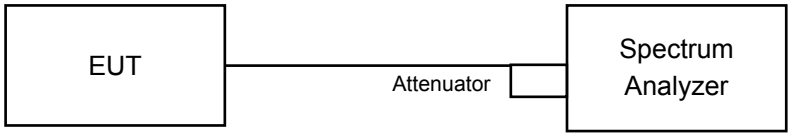
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

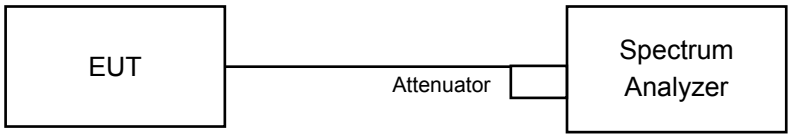
For Power Output
802.11a, 802.11ac (VHT20), 802.11ac (VHT40)



802.11ac (VHT80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (VHT80)
a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
b. Set sweep trigger to “free run”.
c. Set RBW = 1 MHz
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ 2 Span / RBW
f. Sweep time ≤ (number of points in sweep) * T
g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
h. Detector = RMS
i. Trace mode = max hold
j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

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%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.31	22.47	346.820	25.40	30	Pass
40	5200	26.01	26.40	**835.541**	29.22	30	Pass
48	5240	25.02	25.35	660.455	28.20	30	Pass

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.38	23.28	23.60	23.52	884.577	29.47	30	Pass
157	5785	23.29	23.45	23.41	23.46	875.713	29.42	30	Pass
165	5825	23.53	23.44	23.37	23.16	870.509	29.40	30	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.38	22.54	352.455	25.47	30	Pass
40	5200	26.09	26.32	834.992	29.22	30	Pass
48	5240	25.17	25.43	677.992	28.31	30	Pass

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.59	23.17	23.55	23.35	878.787	29.44	30	Pass
157	5785	23.58	23.38	23.46	23.29	880.929	29.45	30	Pass
165	5825	23.67	23.33	23.48	23.20	879.861	29.44	30	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.76	20.96	243.863	23.87	30	Pass
46	5230	24.55	24.66	577.517	27.62	30	Pass

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.37	23.50	23.76	23.33	894.104	29.51	30	Pass
159	5795	23.63	23.45	23.75	23.26	**900.957**	29.55	30	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	20.55	20.79	233.451	23.68	30	Pass

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	23.57	23.33	23.45	23.26	875.933	29.42	30	Pass

Beamforming Mode_NSS1

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.38	22.54	352.455	25.47	30	Pass
40	5200	26.09	26.32	**834.992**	29.22	30	Pass
48	5240	25.17	25.43	677.992	28.31	30	Pass

Note:
1. U-NII-1 Directional gain = 4.18dBi < 6dBi, so the limit no need to be reduced.

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	21.50	21.45	22.10	21.68	590.303	27.71	28.57	Pass
157	5785	21.66	21.62	21.87	21.71	**593.833**	27.74	28.57	Pass
165	5825	21.63	21.55	21.88	21.54	585.166	27.67	28.57	Pass

Note:
1. U-NII-3 Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.76	20.96	243.863	23.87	30	Pass
46	5230	24.55	24.66	577.517	27.62	30	Pass

Note:
1. U-NII-1 Directional gain = 4.18dBi < 6dBi, so the limit no need to be reduced.

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	21.60	21.62	21.78	21.81	592.121	27.72	28.57	Pass
159	5795	21.65	21.63	21.84	21.51	586.100	27.68	28.57	Pass

Note:
1. U-NII-3 Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	20.55	20.79	233.451	23.68	30	Pass

Note:
1. U-NII-1 Directional gain = 4.18dBi < 6dBi, so the limit no need to be reduced.

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	21.63	21.46	21.84	21.51	579.841	27.63	28.57	Pass

Note:
1. U-NII-3 Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.

Beamforming Mode_NSS2

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.59	23.17	23.55	23.35	878.788	29.44	30	Pass
157	5785	23.58	23.38	23.46	23.29	880.929	29.45	30	Pass
165	5825	23.67	23.33	23.48	23.20	879.860	29.44	30	Pass

Note: Directional gain = 4.86dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.37	23.50	23.76	23.33	894.104	29.51	30	Pass
159	5795	23.63	23.45	23.75	23.26	**900.957**	29.55	30	Pass

Note: Directional gain = 4.86dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	23.57	23.33	23.45	23.26	875.934	29.42	30	Pass

Note: Directional gain = 4.86dBi < 6dBi, so the limit no need to be reduced.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.04	20.18
40	5200	35.15	34.63
48	5240	35.22	36.88

802.11ac (VHT20)

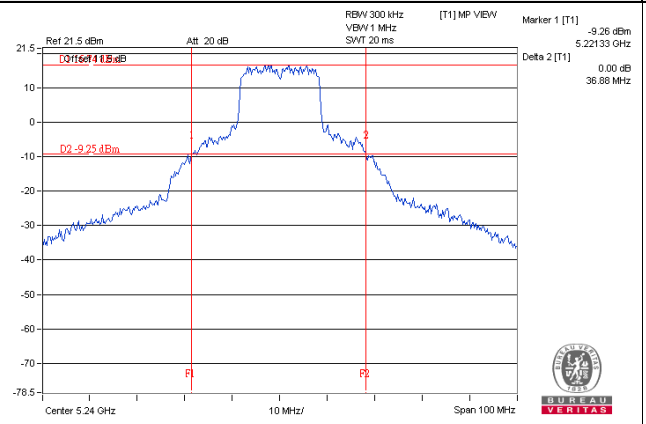
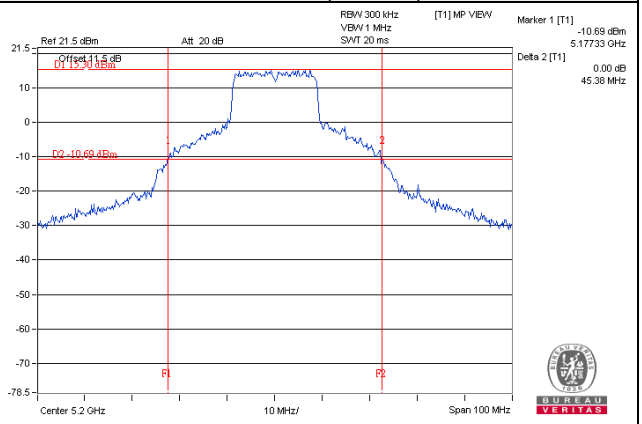
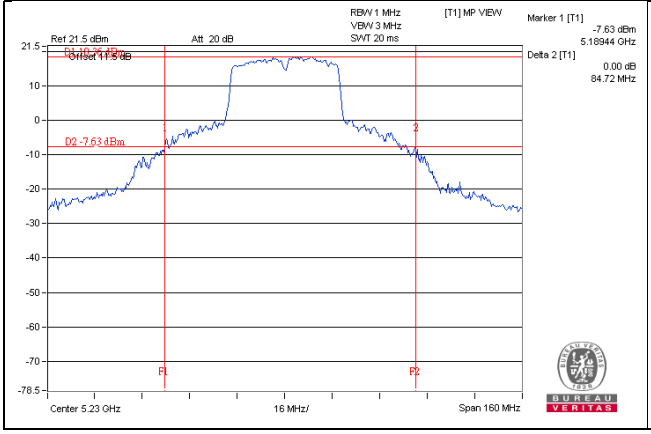
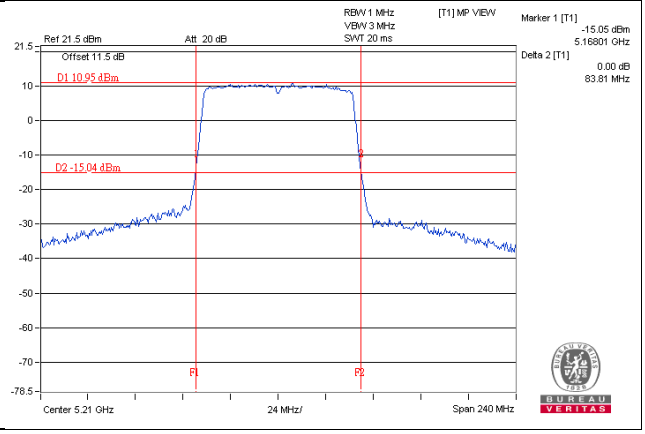
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.58	29.88
40	5200	34.19	45.38
48	5240	36.45	42.06

802.11ac (VHT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	40.80	41.01
46	5230	75.00	84.72

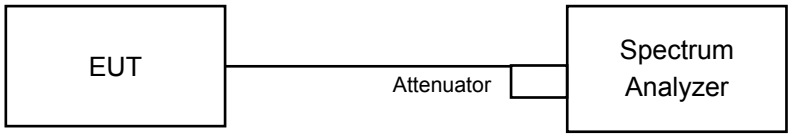
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	83.81	83.79

Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.56	16.56
40	5200	17.16	17.16
48	5240	17.76	20.64

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	16.52	16.60	16.52	16.43
157	5785	16.56	16.68	16.44	16.44
165	5825	16.44	16.68	16.44	16.44

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.76
40	5200	18.12	27.60
48	5240	18.48	21.60

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.64	17.64	17.64	17.64
157	5785	17.64	17.64	17.64	17.64
165	5825	17.64	17.76	17.64	17.64

802.11ac (VHT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.24
46	5230	36.60	37.32

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.24	36.00	36.12	36.24
159	5795	36.24	36.00	36.12	36.00

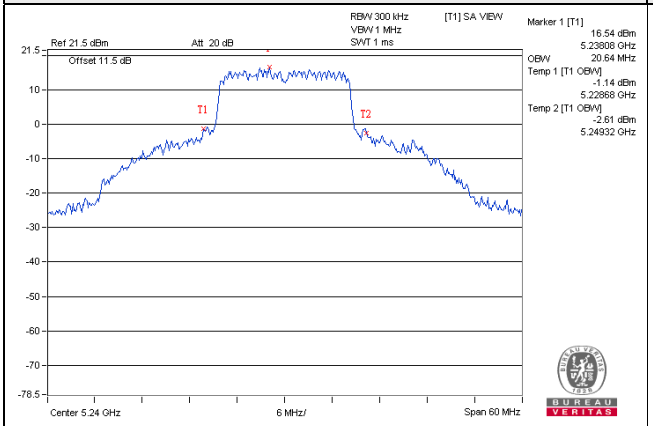
802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.88	76.16

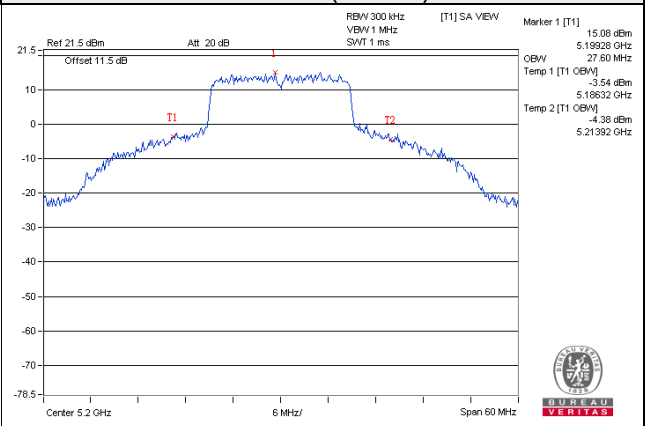
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.88	75.60	75.88	76.16

Spectrum Plot of Worst Value

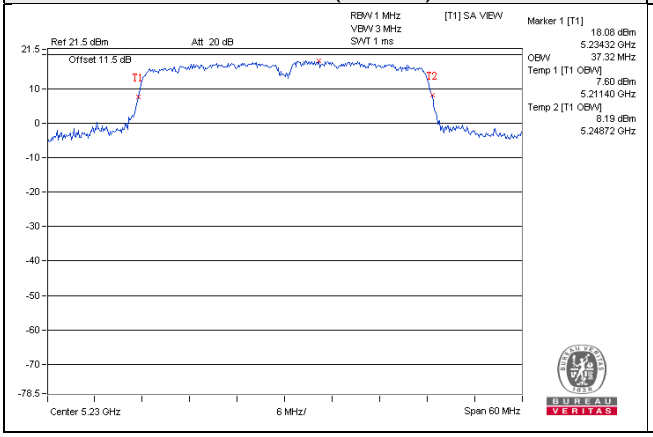
802.11a



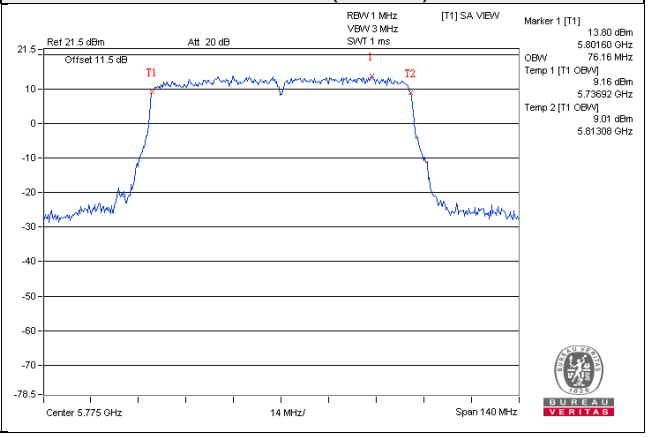
802.11ac (VHT20)



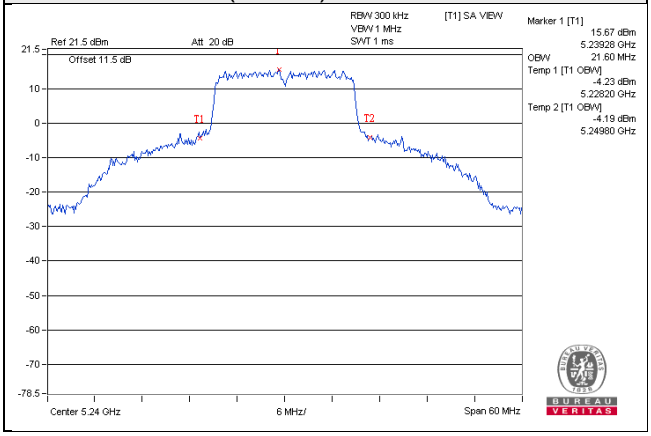
802.11ac (VHT40)



802.11ac (VHT80)



802.11ac (VHT20) / Chain 1 / CH 48

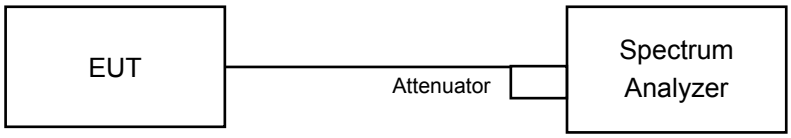


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

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

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

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	8.63	8.64	0.18	11.83	17	Pass
40	5200	11.03	11.12	0.18	14.27	17	Pass
48	5240	11.07	11.36	0.18	14.41	17	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 = 4.18dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	8.21	8.40	11.32	17	Pass
40	5200	10.78	10.64	13.72	17	Pass
48	5240	10.92	11.20	14.07	17	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 = 4.18dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT40)

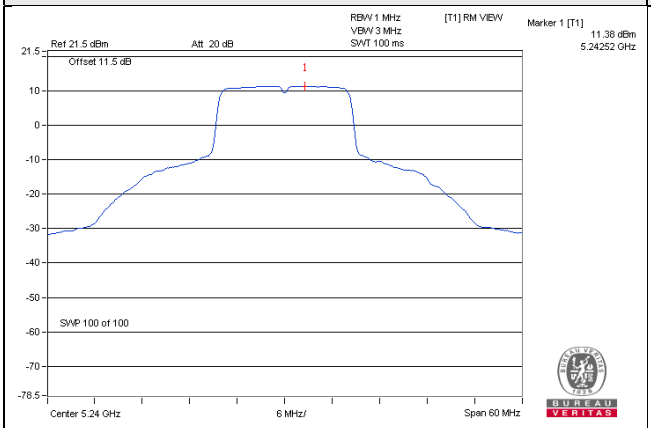
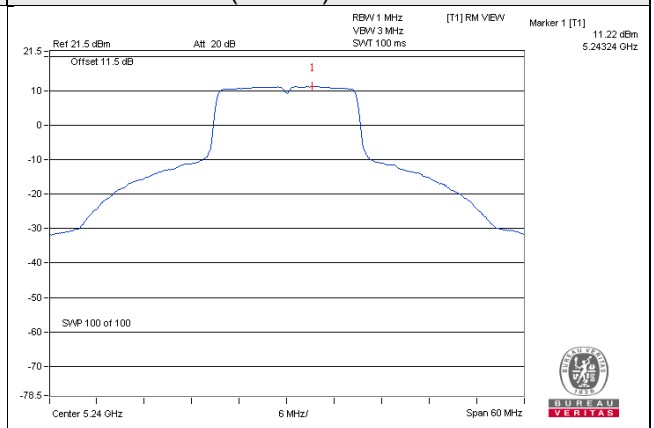
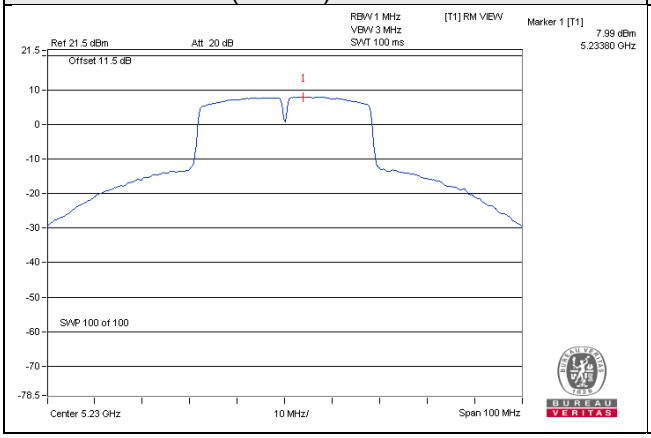
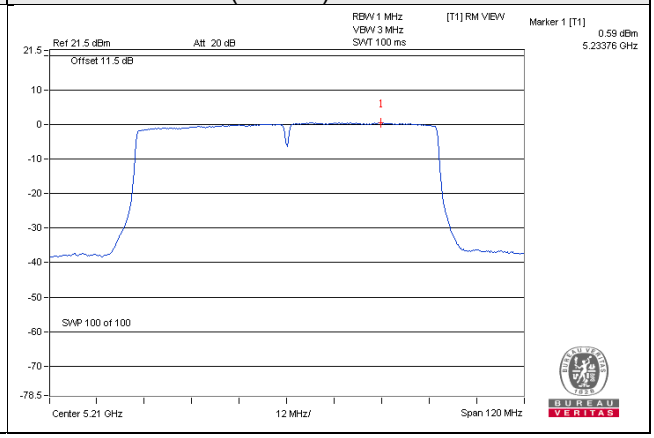
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	3.78	3.83	0.16	6.97	17	Pass
46	5230	7.67	7.98	0.16	11.00	17	Pass

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 = 4.18dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	0.20	0.50	0.38	3.74	17	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 = 4.18dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 1 / CH 48	802.11ac (VHT20) / Chain 1 / CH 48
	
802.11ac (VHT40)/ Chain 1 / CH 46	802.11ac (VHT80) / Chain 1 / CH 42
	

For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.13	4.35	6.02	0.19	10.56	28.57	Pass
	157	5785	2.13	4.35	6.02	0.19	10.56	28.57	Pass
	165	5825	2.53	4.75	6.02	0.19	10.96	28.57	Pass
1	149	5745	2.04	4.26	6.02	0.19	10.47	28.57	Pass
	157	5785	1.64	3.86	6.02	0.19	10.07	28.57	Pass
	165	5825	2.21	4.43	6.02	0.19	10.64	28.57	Pass
2	149	5745	2.07	4.29	6.02	0.19	10.50	28.57	Pass
	157	5785	1.67	3.89	6.02	0.19	10.10	28.57	Pass
	165	5825	2.18	4.40	6.02	0.19	10.61	28.57	Pass
3	149	5745	1.83	4.05	6.02	0.19	10.26	28.57	Pass
	157	5785	1.32	3.54	6.02	0.19	9.75	28.57	Pass
	165	5825	1.68	3.90	6.02	0.19	10.11	28.57	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 = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	1.58	3.80	6.02	9.82	28.57	Pass
	157	5785	1.53	3.75	6.02	9.77	28.57	Pass
	165	5825	2.01	4.23	6.02	10.25	28.57	Pass
1	149	5745	1.52	3.74	6.02	9.76	28.57	Pass
	157	5785	1.45	3.67	6.02	9.69	28.57	Pass
	165	5825	1.80	4.02	6.02	10.04	28.57	Pass
2	149	5745	1.74	3.96	6.02	9.98	28.57	Pass
	157	5785	1.42	3.64	6.02	9.66	28.57	Pass
	165	5825	1.66	3.88	6.02	9.90	28.57	Pass
3	149	5745	1.49	3.71	6.02	9.73	28.57	Pass
	157	5785	1.07	3.29	6.02	9.31	28.57	Pass
	165	5825	1.50	3.72	6.02	9.74	28.57	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 = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.

802.11ac (VHT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.48	0.74	6.02	0.13	6.89	28.57	Pass
	159	5795	-1.17	1.05	6.02	0.13	7.20	28.57	Pass
1	151	5755	-1.26	0.96	6.02	0.13	7.11	28.57	Pass
	159	5795	-0.98	1.24	6.02	0.13	7.39	28.57	Pass
2	151	5755	-1.23	0.99	6.02	0.13	7.14	28.57	Pass
	159	5795	-1.03	1.19	6.02	0.13	7.34	28.57	Pass
3	151	5755	-1.95	0.27	6.02	0.13	6.42	28.57	Pass
	159	5795	-1.57	0.65	6.02	0.13	6.80	28.57	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 = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

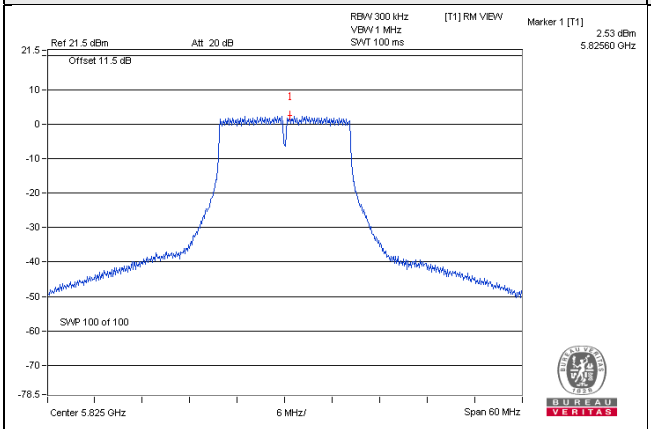
802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-4.97	-2.75	6.02	0.28	3.55	28.57	Pass
1	155	5775	-4.74	-2.52	6.02	0.28	3.78	28.57	Pass
2	155	5775	-4.85	-2.63	6.02	0.28	3.67	28.57	Pass
3	155	5775	-5.73	-3.51	6.02	0.28	2.79	28.57	Pass

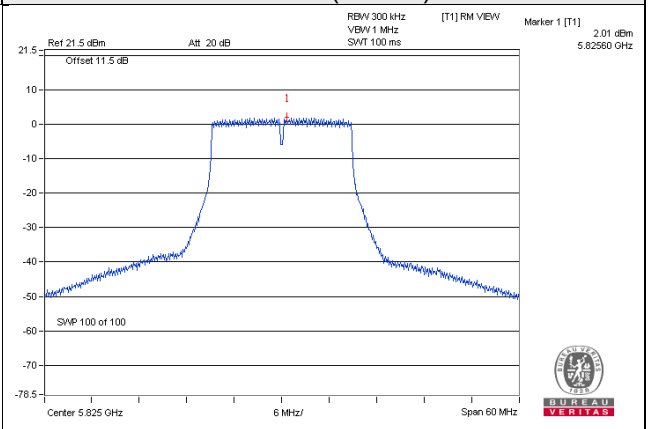
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6) = 28.57dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

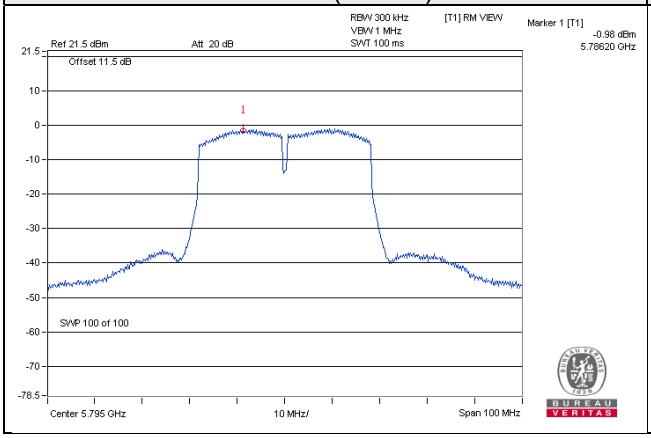
802.11a



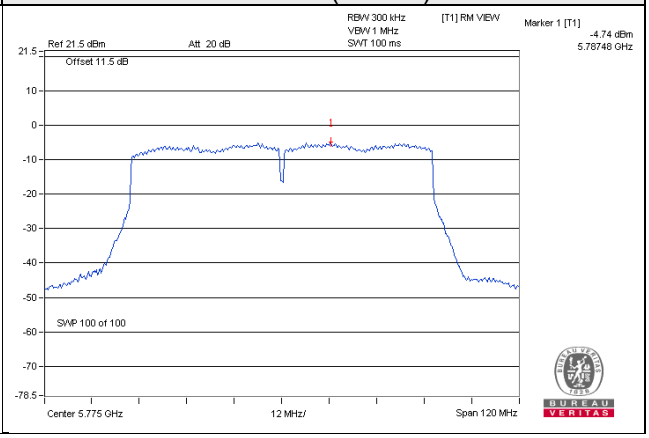
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

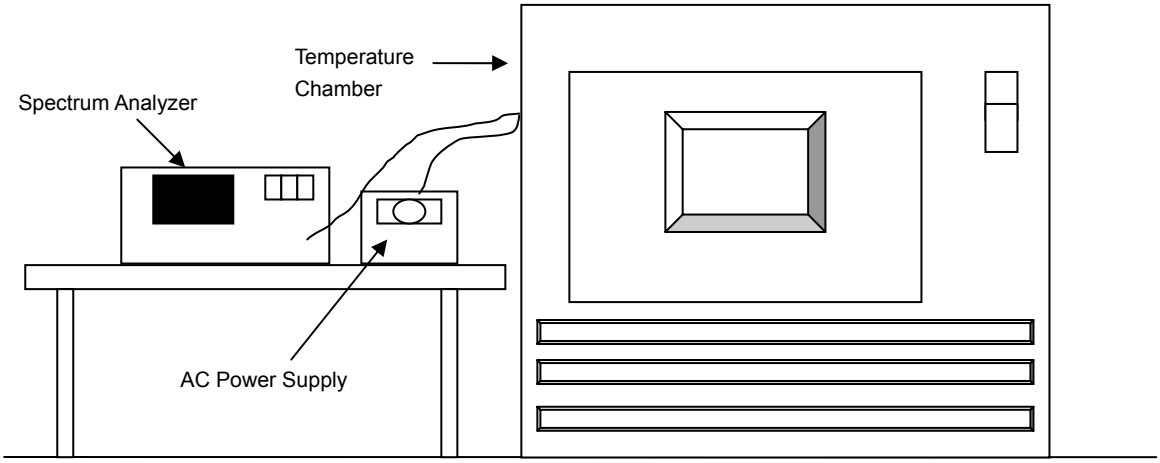


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5180.0238	0.00046	5180.0205	0.00040	5180.0212	0.00041	5180.0193	0.00037
40	120	5179.977	-0.00044	5179.9779	-0.00043	5179.9761	-0.00046	5179.9786	-0.00041
30	120	5179.9951	-0.00009	5179.9932	-0.00013	5179.992	-0.00015	5179.9968	-0.00006
20	120	5180.0224	0.00043	5180.0225	0.00043	5180.0239	0.00046	5180.0221	0.00043
10	120	5180.019	0.00037	5180.0191	0.00037	5180.0226	0.00044	5180.0192	0.00037
0	120	5179.975	-0.00048	5179.9776	-0.00043	5179.9778	-0.00043	5179.9785	-0.00042
-10	120	5179.9798	-0.00039	5179.9758	-0.00047	5179.9778	-0.00043	5179.977	-0.00044
-20	120	5179.9881	-0.00023	5179.9848	-0.00029	5179.9844	-0.00030	5179.9877	-0.00024
-30	120	5179.9838	-0.00031	5179.9835	-0.00032	5179.9831	-0.00033	5179.9816	-0.00036

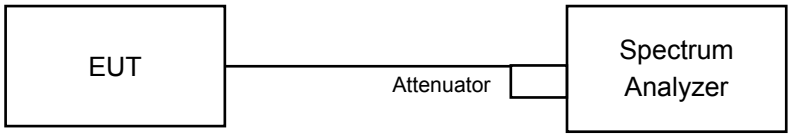
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0232	0.00045	5180.0226	0.00044	5180.0229	0.00044	5180.0227	0.00044
	120	5180.0224	0.00043	5180.0225	0.00043	5180.0239	0.00046	5180.0221	0.00043
	102	5180.0216	0.00042	5180.0228	0.00044	5180.0234	0.00045	5180.0217	0.00042

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

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

802.11ac (VHT20)

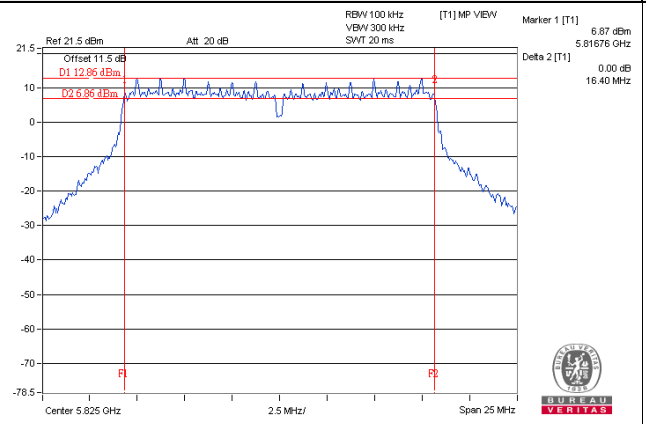
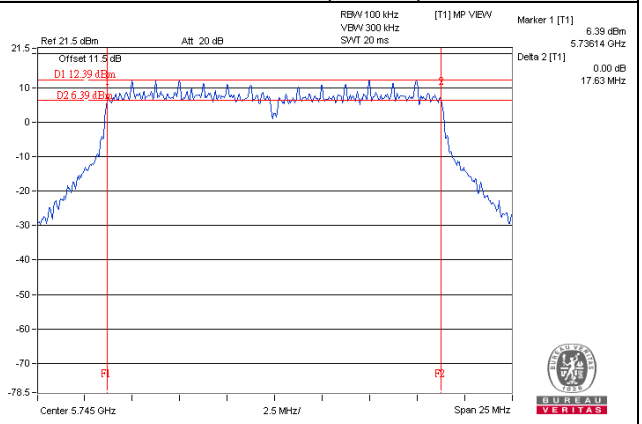
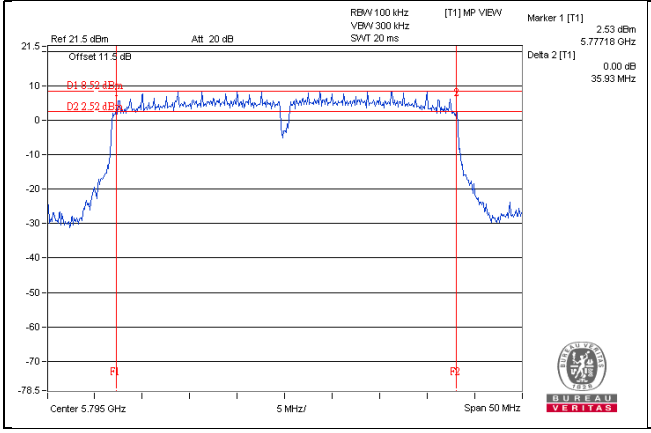
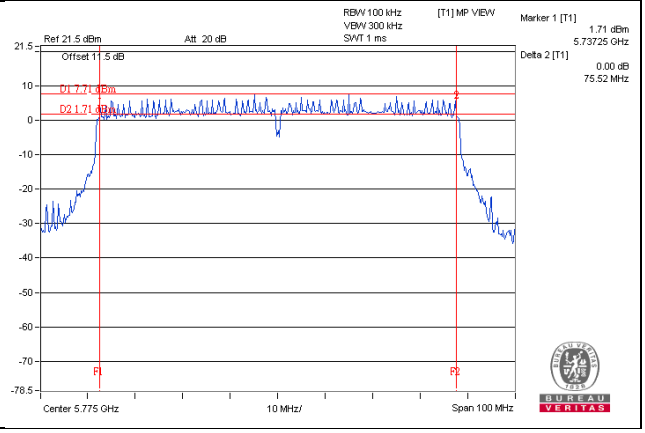
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.56	17.63	17.63	17.21	0.5	Pass
157	5785	17.56	17.63	17.61	17.18	0.5	Pass
165	5825	17.59	17.63	17.57	17.61	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.20	35.21	35.18	35.21	0.5	Pass
159	5795	35.20	35.16	35.21	35.93	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	75.52	74.20	75.44	75.47	0.5	Pass

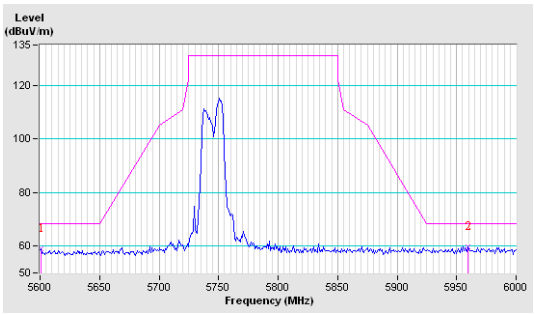
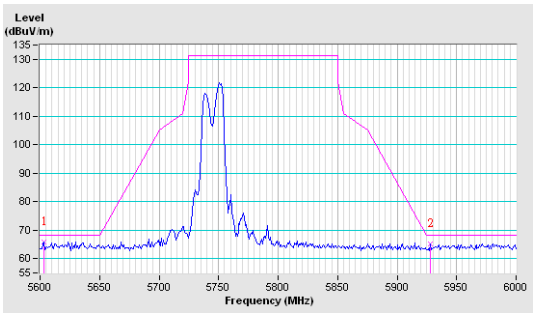
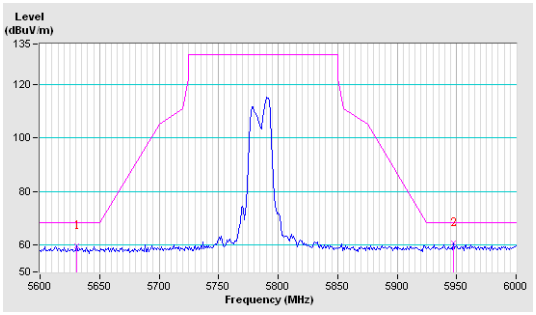
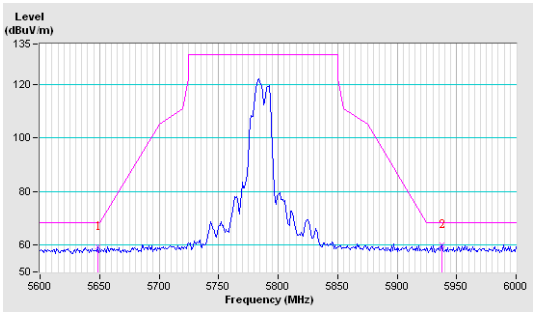
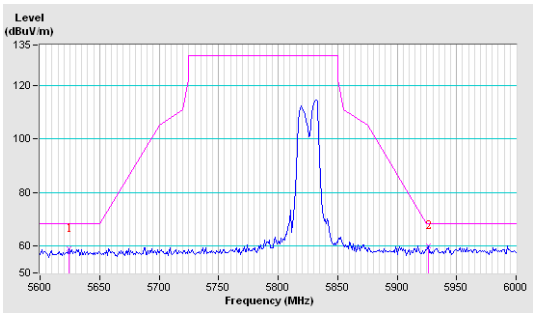
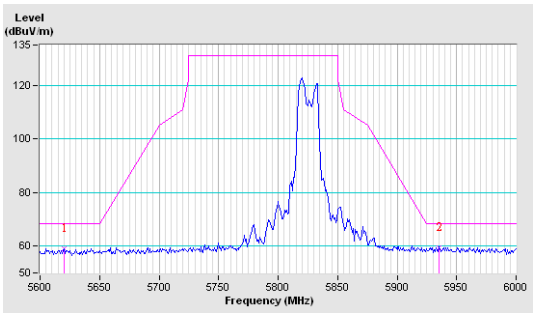
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

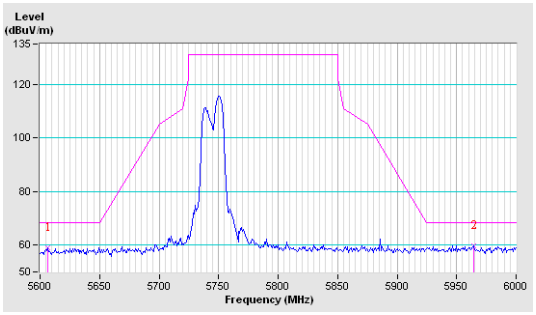
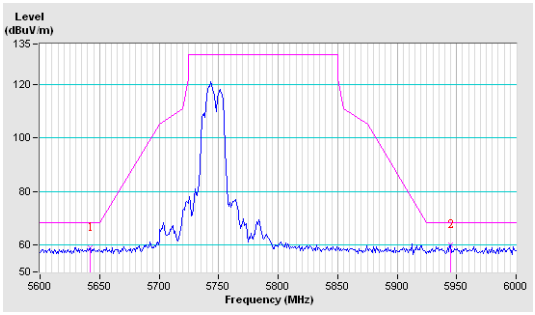
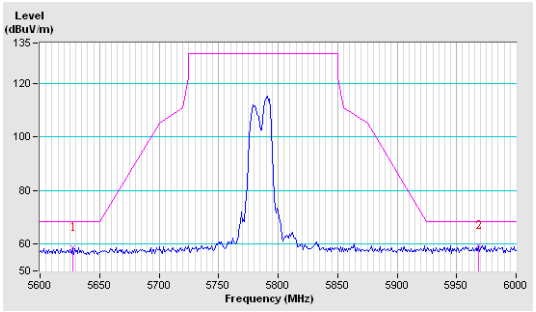
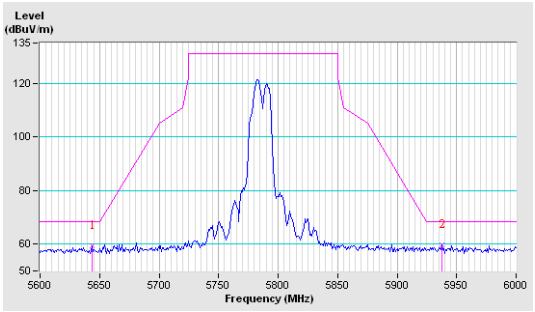
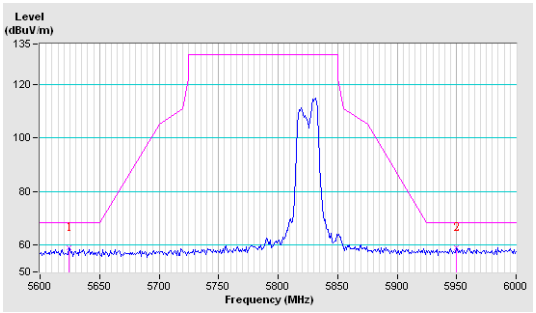
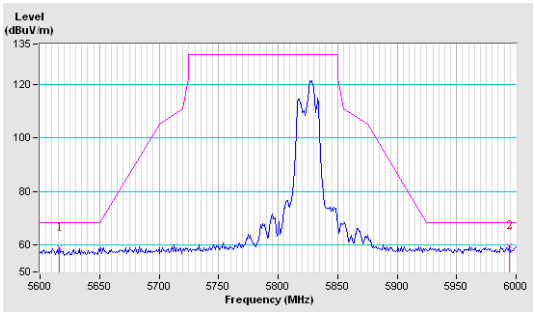
Please refer to the attached file (Test Setup Photo).

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

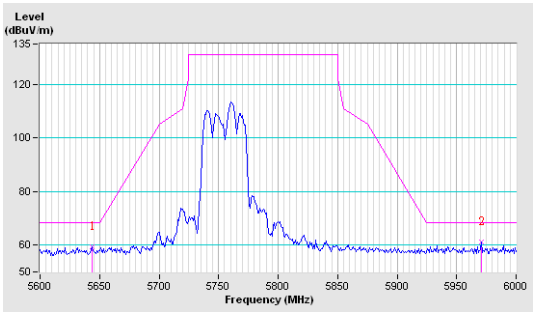
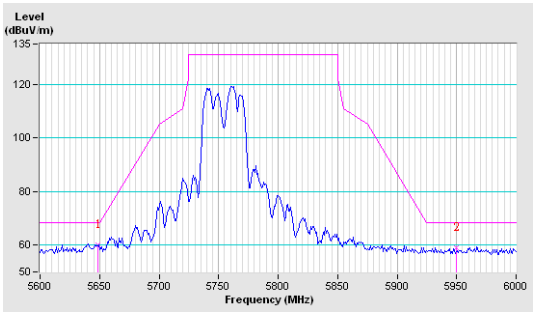
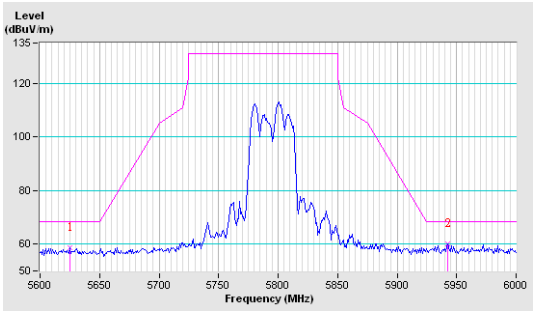
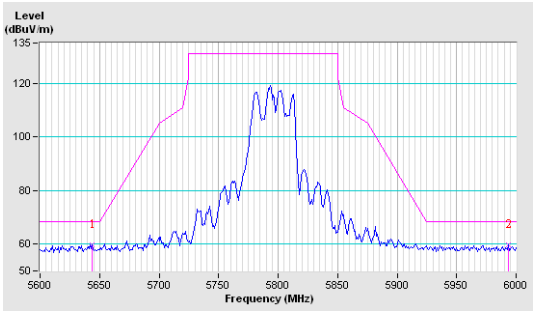
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

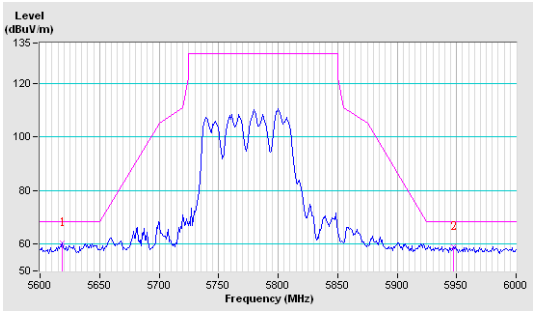
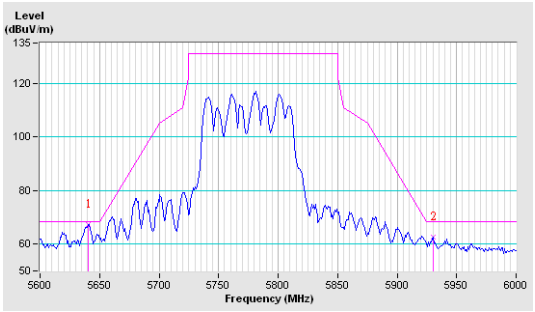
802.11n (HT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

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

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