FCC Test Report

Report No.:	RF170906C12D-1
FCC ID:	PY317400402
Test Model:	RBR20
Series Model:	RBS20 (Refer to item 3.1 for more details)
Received Date:	Aug. 25, 2017
Test Date:	Aug. 25, 2017 ~ Jan. 25, 2018
Issued Date:	Jan. 26, 2018
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.)
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF170906C12D-1	Original release.	Jan. 26, 2018

1 Certificate of Conformity

Product:	Orbi Router, Orbi Satellite (Refer to item 3.1 for more details)
Brand:	NETGEAR
Test Model:	RBR20
Series Model:	RBS20 (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	NETGEAR, INC.
Test Date:	Aug. 25, 2017 ~ Jan. 25, 2018
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Celine Chou , **Date:** Jan. 26, 2018

Celine Chou / Specialist

Approved by : Bruce Chen , **Date:** Jan. 26, 2018

Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.44dB at 0.39219MHz.
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 5148.00MHz, 5150.00MHz and 5635.20MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

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	Orbi Router, Orbi Satellite (Refer to note for more details)
Brand	NETGEAR
Test Model	RBR20
Series Model	RBS20
Model Difference	Refer to note for more details
Sample Status	Engineering sample
Power Supply Rating	12Vdc from 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 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz: 210.769mW 5745 ~ 5825MHz: 615.033mW Beamforming Mode: 5180 ~ 5240MHz: 210.769mW 5745 ~ 5825MHz: 615.033mW
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 2 completed transmitters and 2 receivers.

Modulation Mode	Beamforming Mode	TX Function
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

* 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. All models are electrically identical except software firmware. Model: RBR20 is the representative for final test.

Brand	Model	Function	Band	RF Module	Difference
NETGEAR	RBR20	Router	2.4G/UNII-3	Module 1	Master mode only
			UNII-1	Module 2	
	RBS20	Satellite	2.4G/UNII-3	Module 1	Master mode and Client mode for 2.4GHz Client mode for UNII-3
			UNII-1	Module 2	Master mode only for U-NII-1

The following RF Modules are for the EUT.

RF Module	Band	Antenna No.
Module 1	2.4G	1/2
	UNII-3	1/2
Module 2	UNII-1	3/4

3. The following filters are provided to this EUT.

RF Module Brand / Model	Filter	Position	Filter Model Name	Remark
Module 1	1st	TFL1 ,TFL2	Filter 1	passive filter (pin to pin & Same design)
	2nd	TFL1 ,TFL2	Filter 2	passive filter (pin to pin & Same design)
Module 2	1st	BFL2, BFL3	Filter 3	passive filter (pin to pin & Same design)
	2nd	BFL2, BFL3	Filter 4	passive filter (pin to pin & Same design)

4. The EUT uses following antennas.

Ant. Type	Dipole		
Connecter Type	I-PEX		
Directional Antenna Gain (dBi)			
Item	2.4G	5G Band 1	5G Band 4
-	5.71	5.01	4.65

5. The EUT consumes power from the following adapters.

Adapter 1	
Brand	NETGEAR
Model	ML18-F120150-A1
P/N	332-11014-01
Input Power	100-120Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1.5A
Power Line	1.8m power cable without core attached on adapter

Adapter 2	
Brand	NETGEAR
Model	MU18A2120150-A1
P/N	332-11015-01
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1.5A
Power Line	1.8m power cable without core attached on adapter

Adapter 3	
Brand	NETGEAR
Model	2ABB018F 1 NJ
P/N	332-11008-01
Input Power	100-120Vac, 50/60Hz, 0.6A
Output Power	12Vdc, 1.5A
Power Line	1.8m power cable without core attached on adapter

Adapter 4	
Brand	NETGEAR
Model	2ABB018F NA
P/N	332-11009-01
Input Power	100-240Vac, 50/60Hz, 0.6A
Output Power	12Vdc, 1.5A
Power Line	1.85m power cable without core attached on adapter

* Adapter 1 and 2 are electrically identical, different model names are for marketing purpose. Therefore adapter 1 was chosen for final test and presented in the test report.

* Adapter 3 and 4 are electrically identical, different model names are for marketing purpose. Therefore adapter 3 was chosen for final test and presented in the test report.

6. Spurious emission of the simultaneous operation mode as below and the test data please refer to report no.: RF170906C12D-2.

No	Mode
1	WLAN 2.4GHz + WLAN 5GHz B1 + WLAN 5GHz B4

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 3

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)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Radiated Emission Test (Below 1GHz):

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

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

Power Line Conducted Emission Test:

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

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

Peak Power Spectral Density, Bandwidth and Frequency Stability Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Transmit Power Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3
Beamforming Mode						
A	802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
A	802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

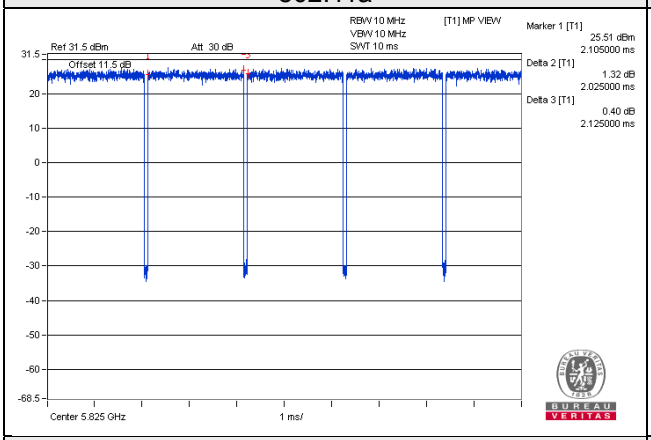
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
RE<1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
PLC	25 deg. C, 68% RH	120Vac, 60Hz	Jones Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Cedric Wu

3.3 Duty Cycle of Test Signal

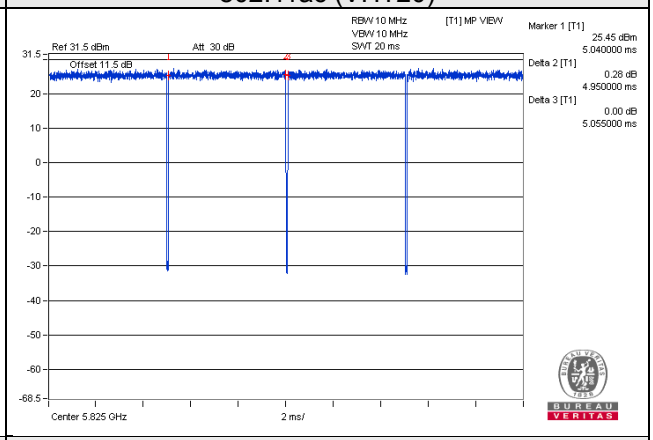
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.025/2.125 = 0.953, Duty factor = 10 * log(1/0.953) = 0.21
802.11ac (VHT20): Duty cycle = 4.950/5.055 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11ac (VHT40): Duty cycle = 2.405/2.500 = 0.962, Duty factor = 10 * log(1/0.962) = 0.17
802.11ac (VHT80): Duty cycle = 1.132/1.214 = 0.932, Duty factor = 10 * log(1/0.932) = 0.30

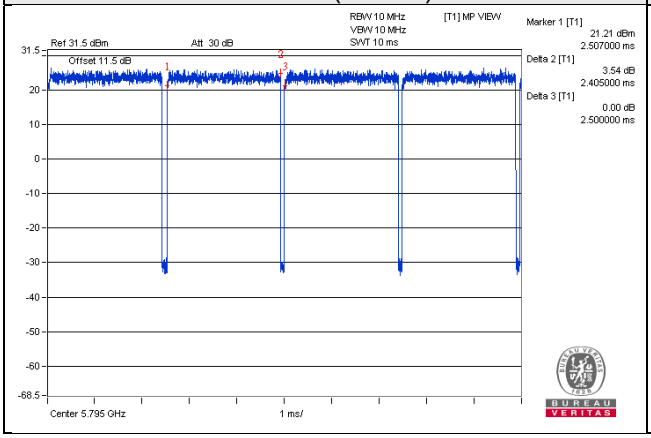
802.11a



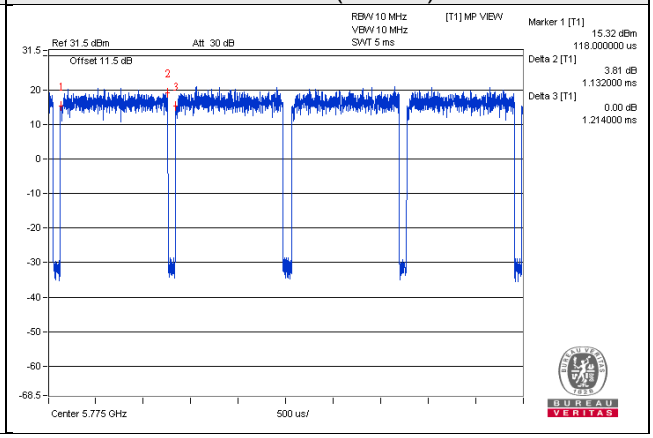
802.11ac (VHT20)



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.

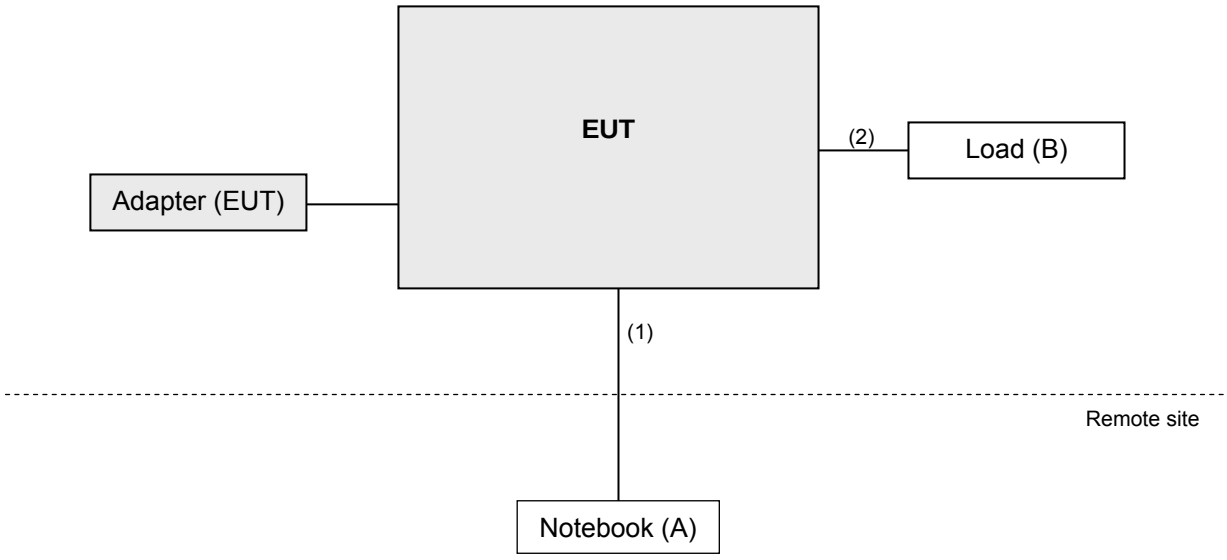
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	3	N	0	-
2.	RJ45, Cat5e	1	1.8	N	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

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

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

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 v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2016	Oct. 23, 2017
			Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 18, 2017	Aug. 17, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 28, 2016	Dec. 27, 2017
			Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 15, 2016	Dec. 14, 2017
			Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
			Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent	8449B	3008A01960	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent	8447D	2944A10631	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2017	Aug. 07, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 07, 2017	Jun. 06, 2018

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

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

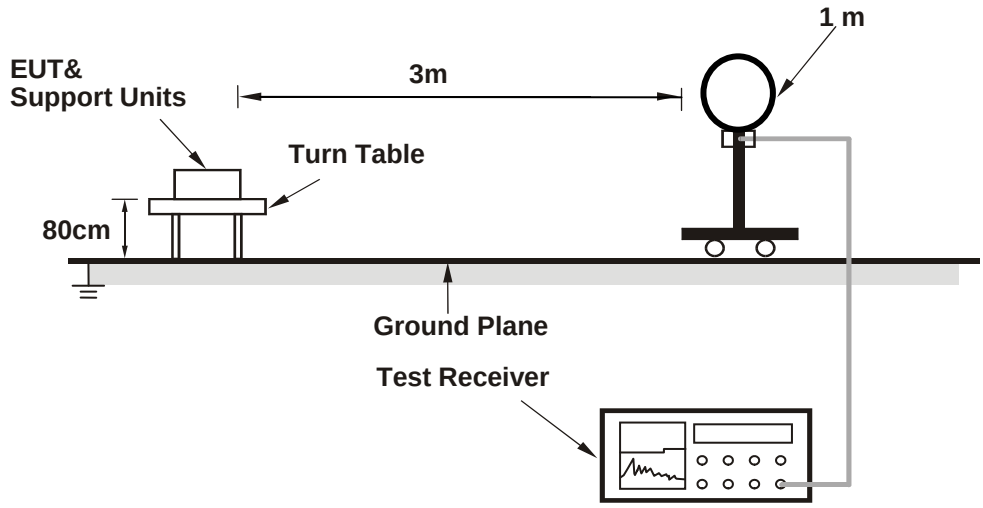
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

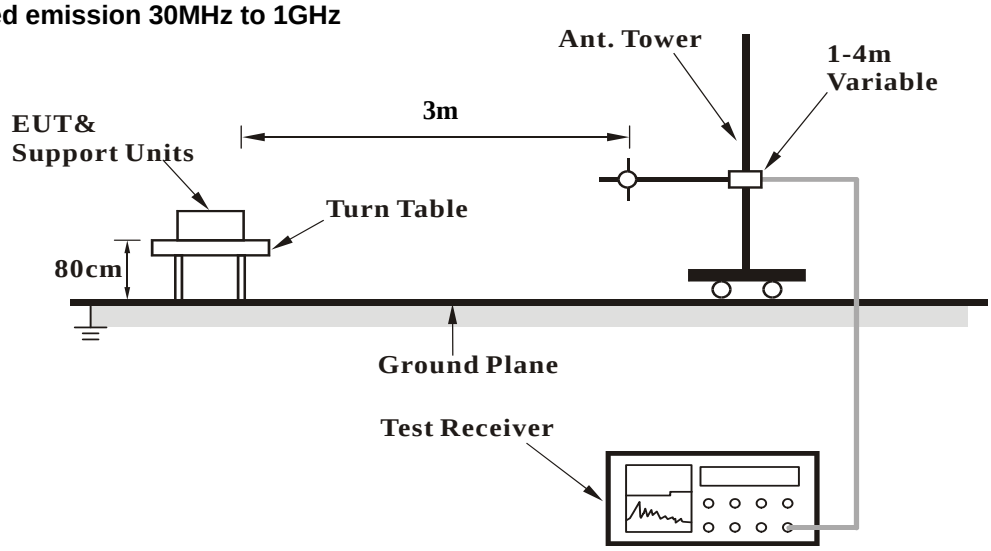
No deviation.

4.1.5 Test Setup

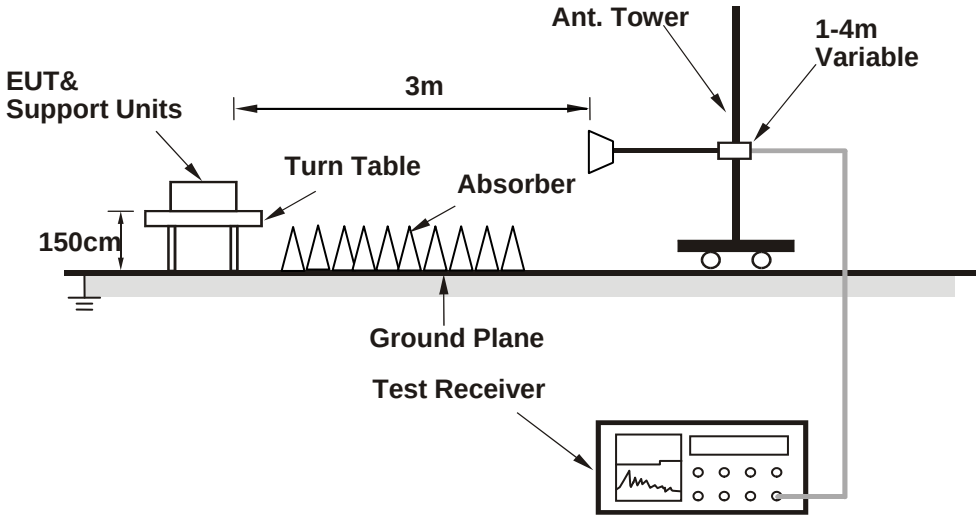
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5148.00	60.3 PK	74.0	-13.7	3.70 H	315	52.9	7.4
2	5148.00	47.0 AV	54.0	-7.0	3.70 H	315	39.6	7.4
3	*5180.00	109.0 PK			3.70 H	315	67.7	41.3
4	*5180.00	97.7 AV			3.70 H	315	56.4	41.3
5	#10360.00	61.8 PK	74.0	-12.2	2.98 H	205	41.8	20.0
6	#10360.00	48.8 AV	54.0	-5.2	2.98 H	205	28.8	20.0
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	5148.00	69.6 PK	74.0	-4.4	2.39 V	198	62.2	7.4
2	**5148.00**	**53.9 AV**	**54.0**	**-0.1**	**2.39 V**	**198**	**46.5**	**7.4**
3	*5180.00	120.7 PK			2.39 V	198	79.4	41.3
4	*5180.00	109.2 AV			2.39 V	198	67.9	41.3
5	#10360.00	62.2 PK	74.0	-11.8	2.55 V	118	42.2	20.0
6	#10360.00	49.3 AV	54.0	-4.7	2.55 V	118	29.3	20.0

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 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	108.6 PK			3.42 H	318	67.3	41.3
2	*5200.00	98.3 AV			3.42 H	318	57.0	41.3
3	#10400.00	62.1 PK	74.0	-11.9	3.02 H	214	41.9	20.2
4	#10400.00	49.1 AV	54.0	-4.9	3.02 H	214	28.9	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	*5200.00	121.1 PK			2.44 V	196	79.8	41.3
2	*5200.00	109.4 AV			2.44 V	196	68.1	41.3
3	#10400.00	62.7 PK	74.0	-11.3	2.68 V	122	42.5	20.2
4	#10400.00	49.7 AV	54.0	-4.3	2.68 V	122	29.5	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 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	109.3 PK			3.38 H	316	67.8	41.5
2	*5240.00	99.1 AV			3.38 H	316	57.6	41.5
3	5350.00	59.8 PK	74.0	-14.2	3.38 H	316	51.8	8.0
4	5350.00	46.9 AV	54.0	-7.1	3.38 H	316	38.9	8.0
5	#10480.00	62.1 PK	74.0	-11.9	2.87 H	231	41.8	20.3
6	#10480.00	49.0 AV	54.0	-5.0	2.87 H	231	28.7	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	*5240.00	120.8 PK			2.39 V	199	79.3	41.5
2	*5240.00	110.0 AV			2.39 V	199	68.5	41.5
3	5350.00	60.2 PK	74.0	-13.8	2.39 V	199	52.2	8.0
4	5350.00	47.5 AV	54.0	-6.5	2.39 V	199	39.5	8.0
5	#10480.00	62.3 PK	74.0	-11.7	2.60 V	109	42.0	20.3
6	#10480.00	49.5 AV	54.0	-4.5	2.60 V	109	29.2	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 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	#5608.80	61.0 PK	68.2	-7.2	2.01 H	143	52.5	8.5
2	*5745.00	112.8 PK			2.01 H	143	70.1	42.7
3	*5745.00	102.9 AV			2.01 H	143	60.2	42.7
4	#5944.80	60.8 PK	68.2	-7.4	2.01 H	143	51.4	9.4
5	11490.00	61.9 PK	74.0	-12.1	1.35 H	288	40.1	21.8
6	11490.00	49.7 AV	54.0	-4.3	1.35 H	288	27.9	21.8
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	#5617.60	61.5 PK	68.2	-6.7	2.47 V	79	53.0	8.5
2	*5745.00	123.2 PK			2.47 V	79	80.5	42.7
3	*5745.00	112.7 AV			2.47 V	79	70.0	42.7
4	#5971.20	62.7 PK	68.2	-5.5	2.47 V	79	53.1	9.6
5	11490.00	62.7 PK	74.0	-11.3	1.58 V	46	40.9	21.8
6	11490.00	50.2 AV	54.0	-3.8	1.58 V	46	28.4	21.8

Remarks:

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

CHANNEL	TX Channel 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	#5616.00	61.9 PK	68.2	-6.3	2.09 H	142	53.4	8.5
2	*5785.00	113.9 PK			2.09 H	142	71.2	42.7
3	*5785.00	103.2 AV			2.09 H	142	60.5	42.7
4	#5940.80	62.3 PK	68.2	-5.9	2.09 H	142	52.9	9.4
5	11570.00	62.1 PK	74.0	-11.9	1.31 H	295	40.3	21.8
6	11570.00	49.9 AV	54.0	-4.1	1.31 H	295	28.1	21.8
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	#5604.00	62.0 PK	68.2	-6.2	2.48 V	83	53.5	8.5
2	*5785.00	123.8 PK			2.48 V	83	81.1	42.7
3	*5785.00	112.8 AV			2.48 V	83	70.1	42.7
4	#5975.20	62.2 PK	68.2	-6.0	2.48 V	83	52.6	9.6
5	11570.00	63.7 PK	74.0	-10.3	1.88 V	40	41.9	21.8
6	11570.00	50.6 AV	54.0	-3.4	1.88 V	40	28.8	21.8

Remarks:

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

CHANNEL	TX Channel 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	#5616.00	61.6 PK	68.2	-6.6	2.13 H	141	53.1	8.5
2	*5825.00	113.1 PK			2.13 H	141	70.2	42.9
3	*5825.00	102.9 AV			2.13 H	141	60.0	42.9
4	#5969.60	63.0 PK	68.2	-5.2	2.13 H	141	53.4	9.6
5	11650.00	61.8 PK	74.0	-12.2	1.40 H	281	40.4	21.4
6	11650.00	49.4 AV	54.0	-4.6	1.40 H	281	28.0	21.4
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	#5604.00	62.5 PK	68.2	-5.7	2.40 V	82	54.0	8.5
2	*5825.00	123.5 PK			2.40 V	82	80.6	42.9
3	*5825.00	112.8 AV			2.40 V	82	69.9	42.9
4	#5961.60	62.8 PK	68.2	-5.4	2.40 V	82	53.2	9.6
5	11650.00	63.4 PK	74.0	-10.6	1.95 V	44	42.0	21.4
6	11650.00	50.1 AV	54.0	-3.9	1.95 V	44	28.7	21.4

Remarks:

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

802.11ac (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	5147.00	60.2 PK	74.0	-13.8	3.40 H	323	52.8	7.4
2	5147.00	47.2 AV	54.0	-6.8	3.40 H	323	39.8	7.4
3	*5180.00	107.3 PK			3.40 H	323	66.0	41.3
4	*5180.00	96.7 AV			3.40 H	323	55.4	41.3
5	#10360.00	61.7 PK	74.0	-12.3	2.88 H	191	41.7	20.0
6	#10360.00	49.0 AV	54.0	-5.0	2.88 H	191	29.0	20.0
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	5147.00	70.2 PK	74.0	-3.8	2.22 V	200	62.8	7.4
2	5147.00	53.5 AV	54.0	-0.5	2.22 V	200	46.1	7.4
3	*5180.00	119.9 PK			2.22 V	200	78.6	41.3
4	*5180.00	108.4 AV			2.22 V	200	67.1	41.3
5	#10360.00	62.4 PK	74.0	-11.6	1.88 V	41	42.4	20.0
6	#10360.00	49.4 AV	54.0	-4.6	1.88 V	41	29.4	20.0

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 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	108.0 PK			3.58 H	320	66.7	41.3
2	*5200.00	97.8 AV			3.58 H	320	56.5	41.3
3	#10400.00	62.5 PK	74.0	-11.5	3.00 H	189	42.3	20.2
4	#10400.00	49.3 AV	54.0	-4.7	3.00 H	189	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	*5200.00	120.2 PK			2.01 V	197	78.9	41.3
2	*5200.00	108.6 AV			2.01 V	197	67.3	41.3
3	#10400.00	62.9 PK	74.0	-11.1	1.79 V	53	42.7	20.2
4	#10400.00	49.8 AV	54.0	-4.2	1.79 V	53	29.6	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 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	110.3 PK			3.57 H	317	68.8	41.5
2	*5240.00	98.9 AV			3.57 H	317	57.4	41.5
3	5350.00	59.9 PK	74.0	-14.1	3.57 H	317	51.9	8.0
4	5350.00	47.2 AV	54.0	-6.8	3.57 H	317	39.2	8.0
5	#10480.00	62.0 PK	74.0	-12.0	3.03 H	193	41.7	20.3
6	#10480.00	49.1 AV	54.0	-4.9	3.03 H	193	28.8	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	*5240.00	121.1 PK			2.02 V	197	79.6	41.5
2	*5240.00	110.1 AV			2.02 V	197	68.6	41.5
3	5350.00	60.4 PK	74.0	-13.6	2.02 V	197	52.4	8.0
4	5350.00	47.8 AV	54.0	-6.2	2.02 V	197	39.8	8.0
5	#10480.00	62.5 PK	74.0	-11.5	1.81 V	60	42.2	20.3
6	#10480.00	49.6 AV	54.0	-4.4	1.81 V	60	29.3	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 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	#5622.40	61.6 PK	68.2	-6.6	1.15 H	110	53.1	8.5
2	*5745.00	113.3 PK			1.15 H	110	70.6	42.7
3	*5745.00	103.2 AV			1.15 H	110	60.5	42.7
4	#5958.40	62.0 PK	68.2	-6.2	1.15 H	110	52.4	9.6
5	11490.00	62.9 PK	74.0	-11.1	1.25 H	311	41.1	21.8
6	11490.00	50.0 AV	54.0	-4.0	1.25 H	311	28.2	21.8
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	#5646.40	61.8 PK	68.2	-6.4	2.40 V	83	53.2	8.6
2	*5745.00	123.4 PK			2.40 V	83	80.7	42.7
3	*5745.00	112.7 AV			2.40 V	83	70.0	42.7
4	#5983.20	62.1 PK	68.2	-6.1	2.40 V	83	52.5	9.6
5	11490.00	63.6 PK	74.0	-10.4	1.77 V	61	41.8	21.8
6	11490.00	50.4 AV	54.0	-3.6	1.77 V	61	28.6	21.8

Remarks:

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

CHANNEL	TX Channel 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	#5628.00	62.0 PK	68.2	-6.2	1.14 H	109	53.5	8.5
2	*5785.00	114.5 PK			1.14 H	109	71.8	42.7
3	*5785.00	103.6 AV			1.14 H	109	60.9	42.7
4	#5951.20	61.8 PK	68.2	-6.4	1.14 H	109	52.4	9.4
5	11570.00	62.7 PK	74.0	-11.3	1.21 H	308	40.9	21.8
6	11570.00	49.9 AV	54.0	-4.1	1.21 H	308	28.1	21.8
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	#5648.80	62.1 PK	68.2	-6.1	2.39 V	84	53.5	8.6
2	*5785.00	124.4 PK			2.39 V	84	81.7	42.7
3	*5785.00	113.3 AV			2.39 V	84	70.6	42.7
4	#5932.00	62.8 PK	68.2	-5.4	2.38 V	84	53.4	9.4
5	11570.00	63.6 PK	74.0	-10.4	1.85 V	31	41.8	21.8
6	11570.00	50.7 AV	54.0	-3.3	1.85 V	31	28.9	21.8

Remarks:

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

CHANNEL	TX Channel 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	61.3 PK	68.2	-6.9	1.02 H	112	52.8	8.5
2	*5825.00	113.3 PK			1.02 H	112	70.4	42.9
3	*5825.00	103.4 AV			1.02 H	112	60.5	42.9
4	#5964.00	61.4 PK	68.2	-6.8	1.02 H	112	51.8	9.6
5	11650.00	62.4 PK	74.0	-11.6	1.13 H	320	41.0	21.4
6	11650.00	49.6 AV	54.0	-4.4	1.13 H	320	28.2	21.4
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	#5605.60	62.2 PK	68.2	-6.0	2.38 V	88	53.7	8.5
2	*5825.00	124.2 PK			2.38 V	88	81.3	42.9
3	*5825.00	113.9 AV			2.38 V	88	71.0	42.9
4	#5964.80	62.9 PK	68.2	-5.3	2.38 V	88	53.3	9.6
5	11650.00	63.6 PK	74.0	-10.4	2.00 V	33	42.2	21.4
6	11650.00	50.7 AV	54.0	-3.3	2.00 V	33	29.3	21.4

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.

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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	61.1 PK	74.0	-12.9	3.61 H	311	53.7	7.4
2	5150.00	48.4 AV	54.0	-5.6	3.61 H	311	41.0	7.4
3	*5190.00	100.8 PK			3.61 H	311	59.5	41.3
4	*5190.00	90.3 AV			3.61 H	311	49.0	41.3
5	#10380.00	61.8 PK	74.0	-12.2	3.12 H	185	41.8	20.0
6	#10380.00	48.7 AV	54.0	-5.3	3.12 H	185	28.7	20.0
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	70.9 PK	74.0	-3.1	2.26 V	198	63.5	7.4
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.26 V**	**198**	**46.5**	**7.4**
3	*5190.00	110.9 PK			2.26 V	198	69.6	41.3
4	*5190.00	100.5 AV			2.26 V	198	59.2	41.3
5	#10380.00	62.2 PK	74.0	-11.8	1.67 V	134	42.2	20.0
6	#10380.00	49.1 AV	54.0	-4.9	1.67 V	134	29.1	20.0

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	58.6 PK	74.0	-15.4	3.71 H	318	51.2	7.4
2	5150.00	46.1 AV	54.0	-7.9	3.71 H	318	38.7	7.4
3	*5230.00	106.3 PK			3.71 H	318	64.9	41.4
4	*5230.00	96.0 AV			3.71 H	318	54.6	41.4
5	#10460.00	62.2 PK	74.0	-11.8	3.03 H	180	42.0	20.2
6	#10460.00	49.0 AV	54.0	-5.0	3.03 H	180	28.8	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	5150.00	61.8 PK	74.0	-12.2	2.39 V	198	54.4	7.4
2	5150.00	48.0 AV	54.0	-6.0	2.39 V	198	40.6	7.4
3	*5230.00	117.8 PK			2.39 V	198	76.4	41.4
4	*5230.00	107.3 AV			2.39 V	198	65.9	41.4
5	#10460.00	62.6 PK	74.0	-11.4	1.70 V	140	42.4	20.2
6	#10460.00	49.7 AV	54.0	-4.3	1.70 V	140	29.5	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 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	#5616.00	61.2 PK	68.2	-7.0	1.29 H	113	52.7	8.5
2	*5755.00	110.0 PK			1.29 H	113	67.3	42.7
3	*5755.00	100.5 AV			1.29 H	113	57.8	42.7
4	#5960.80	61.5 PK	68.2	-6.7	1.29 H	113	51.9	9.6
5	11510.00	61.9 PK	74.0	-12.1	1.18 H	307	40.2	21.7
6	11510.00	50.0 AV	54.0	-4.0	1.18 H	307	28.3	21.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.40	64.3 PK	68.2	-3.9	2.47 V	91	55.7	8.6
2	*5755.00	121.1 PK			2.47 V	91	78.4	42.7
3	*5755.00	110.3 AV			2.47 V	91	67.6	42.7
4	#5963.20	62.5 PK	68.2	-5.7	2.47 V	91	52.9	9.6
5	11510.00	62.2 PK	74.0	-11.8	1.85 V	115	40.5	21.7
6	11510.00	50.3 AV	54.0	-3.7	1.85 V	115	28.6	21.7

Remarks:

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

CHANNEL	TX Channel 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	#5614.40	62.0 PK	68.2	-6.2	1.39 H	105	53.5	8.5
2	*5795.00	110.1 PK			1.39 H	105	67.4	42.7
3	*5795.00	100.5 AV			1.39 H	105	57.8	42.7
4	#5957.60	61.9 PK	68.2	-6.3	1.39 H	105	52.3	9.6
5	11590.00	62.0 PK	74.0	-12.0	1.23 H	319	40.3	21.7
6	11590.00	49.8 AV	54.0	-4.2	1.23 H	319	28.1	21.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5607.20	63.5 PK	68.2	-4.7	2.34 V	80	55.0	8.5
2	*5795.00	120.7 PK			2.34 V	80	78.0	42.7
3	*5795.00	110.8 AV			2.34 V	80	68.1	42.7
4	#5936.80	62.9 PK	68.2	-5.3	2.34 V	80	53.5	9.4
5	11590.00	62.5 PK	74.0	-11.5	1.96 V	107	40.8	21.7
6	11590.00	50.4 AV	54.0	-3.6	1.96 V	107	28.7	21.7

Remarks:

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

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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	64.6 PK	74.0	-9.4	3.53 H	316	57.2	7.4
2	5150.00	50.1 AV	54.0	-3.9	3.53 H	316	42.7	7.4
3	*5210.00	97.0 PK			3.53 H	316	55.6	41.4
4	*5210.00	86.7 AV			3.53 H	316	45.3	41.4
5	5350.00	59.4 PK	74.0	-14.6	3.53 H	316	51.4	8.0
6	5350.00	46.8 AV	54.0	-7.2	3.53 H	316	38.8	8.0
7	#10420.00	61.7 PK	74.0	-12.3	3.01 H	177	41.7	20.0
8	#10420.00	48.5 AV	54.0	-5.5	3.01 H	177	28.5	20.0
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	67.8 PK	74.0	-6.2	2.14 V	198	60.4	7.4
2	5150.00	53.7 AV	54.0	-0.3	2.14 V	198	46.3	7.4
3	*5210.00	108.0 PK			2.14 V	198	66.6	41.4
4	*5210.00	97.3 AV			2.14 V	198	55.9	41.4
5	5350.00	61.2 PK	74.0	-12.8	2.14 V	198	53.2	8.0
6	5350.00	48.5 AV	54.0	-5.5	2.14 V	198	40.5	8.0
7	#10420.00	61.9 PK	74.0	-12.1	1.77 V	50	41.9	20.0
8	#10420.00	48.7 AV	54.0	-5.3	1.77 V	50	28.7	20.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5618.40	61.4 PK	68.2	-6.8	2.04 H	119	52.9	8.5
2	*5775.00	105.4 PK			2.04 H	119	62.7	42.7
3	*5775.00	95.8 AV			2.04 H	119	53.1	42.7
4	#5956.00	61.8 PK	68.2	-6.4	2.04 H	119	52.2	9.6
5	11550.00	62.0 PK	74.0	-12.0	1.35 H	330	40.2	21.8
6	11550.00	49.9 AV	54.0	-4.1	1.35 H	330	28.1	21.8
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	**#5635.20**	**68.1 PK**	**68.2**	**-0.1**	**2.40 V**	**91**	**59.6**	**8.5**
2	*5775.00	116.3 PK			2.40 V	91	73.6	42.7
3	*5775.00	106.0 AV			2.40 V	91	63.3	42.7
4	#5942.40	63.0 PK	68.2	-5.2	2.40 V	91	53.6	9.4
5	11550.00	63.1 PK	74.0	-10.9	1.99 V	112	41.3	21.8
6	11550.00	50.2 AV	54.0	-3.8	1.99 V	112	28.4	21.8

Remarks:

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

Below 1GHz Worst-Case Data: 802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	72.59	22.3 QP	40.0	-17.7	1.00 H	176	38.4	-16.1
2	136.62	30.0 QP	43.5	-13.5	1.00 H	64	44.5	-14.5
3	223.94	28.5 QP	46.0	-17.5	1.49 H	152	44.6	-16.1
4	664.41	37.5 QP	46.0	-8.5	1.49 H	12	42.1	-4.6
5	751.73	39.1 QP	46.0	-6.9	1.00 H	350	41.7	-2.6
6	938.01	37.3 QP	46.0	-8.7	1.00 H	87	36.6	0.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	68.71	27.6 QP	40.0	-12.4	1.00 V	291	42.9	-15.3
2	136.62	28.9 QP	43.5	-14.6	1.00 V	172	43.4	-14.5
3	352.01	25.0 QP	46.0	-21.0	1.50 V	200	36.3	-11.3
4	687.70	38.0 QP	46.0	-8.0	1.00 V	99	42.4	-4.4
5	794.42	38.6 QP	46.0	-7.4	1.50 V	7	40.3	-1.7
6	938.01	35.4 QP	46.0	-10.6	1.00 V	359	34.7	0.7

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.24	22.4 QP	40.0	-17.6	1.50 H	140	36.5	-14.1
2	130.80	23.5 QP	43.5	-20.0	1.50 H	105	38.5	-15.0
3	225.88	27.8 QP	46.0	-18.2	1.01 H	299	43.9	-16.1
4	676.05	40.9 QP	46.0	-5.1	1.01 H	158	45.4	-4.5
5	831.29	38.1 QP	46.0	-7.9	1.01 H	49	39.4	-1.3
6	903.08	36.6 QP	46.0	-9.4	1.50 H	200	36.7	-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	51.24	32.6 QP	40.0	-7.4	1.00 V	307	46.7	-14.1
2	130.80	20.4 QP	43.5	-23.1	1.00 V	222	35.4	-15.0
3	449.03	23.0 QP	46.0	-23.0	1.00 V	272	32.2	-9.2
4	670.23	39.1 QP	46.0	-6.9	1.00 V	140	43.7	-4.6
5	786.66	39.2 QP	46.0	-6.8	1.50 V	169	41.1	-1.9
6	949.65	37.0 QP	46.0	-9.0	1.00 V	126	36.0	1.0

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

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
			Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
			Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 Test 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.

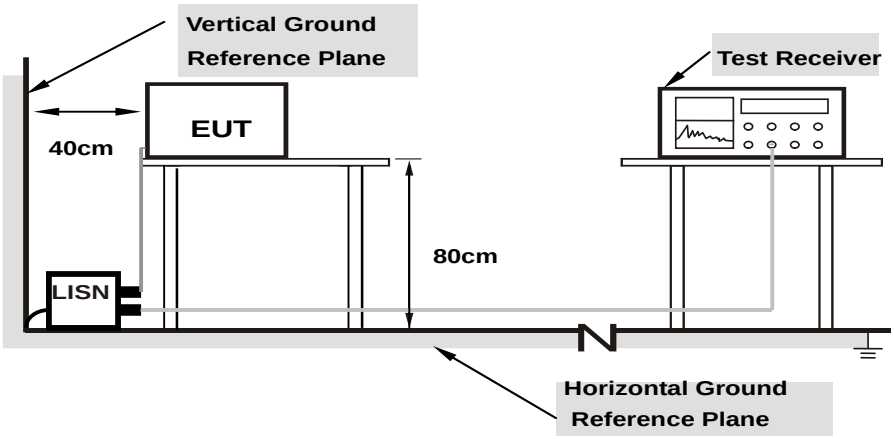
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

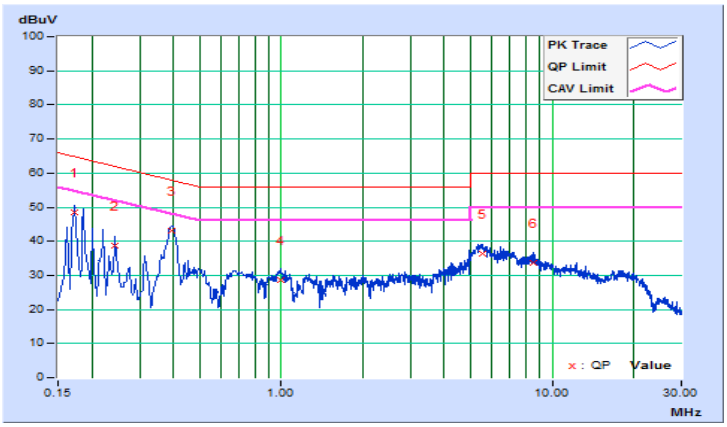
Worst-case data: 802.11a

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	0.17328	10.16	38.43	22.23	48.59	32.39	64.80	54.80	-16.21	-22.41
2	0.24384	10.17	28.39	14.50	38.56	24.67	61.96	51.96	-23.40	-27.29
3	**0.39219**	**10.20**	**33.03**	**27.38**	**43.23**	**37.58**	**58.02**	**48.02**	**-14.79**	**-10.44**
4	0.99065	10.17	18.35	14.58	28.52	24.75	56.00	46.00	-27.48	-21.25
5	5.54971	10.42	25.99	20.78	36.41	31.20	60.00	50.00	-23.59	-18.80
6	8.52131	10.57	22.98	18.03	33.55	28.60	60.00	50.00	-26.45	-21.40

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.

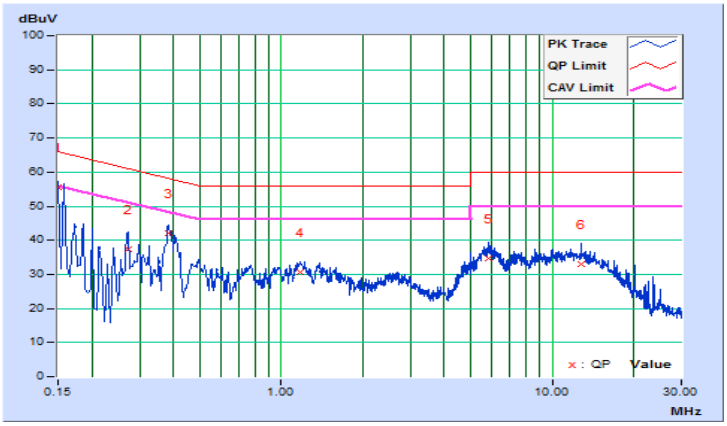


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.15000	10.14	45.38	30.20	55.52	40.34	66.00	56.00	-10.48	-15.66
2	0.27120	10.18	27.26	14.60	37.44	24.78	61.08	51.08	-23.64	-26.30
3	0.38300	10.19	31.90	25.76	42.09	35.95	58.21	48.21	-16.12	-12.26
4	1.17365	10.21	20.57	16.45	30.78	26.66	56.00	46.00	-25.22	-19.34
5	5.84296	10.41	24.41	19.32	34.82	29.73	60.00	50.00	-25.18	-20.27
6	12.79885	10.70	22.38	17.74	33.08	28.44	60.00	50.00	-26.92	-21.56

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.

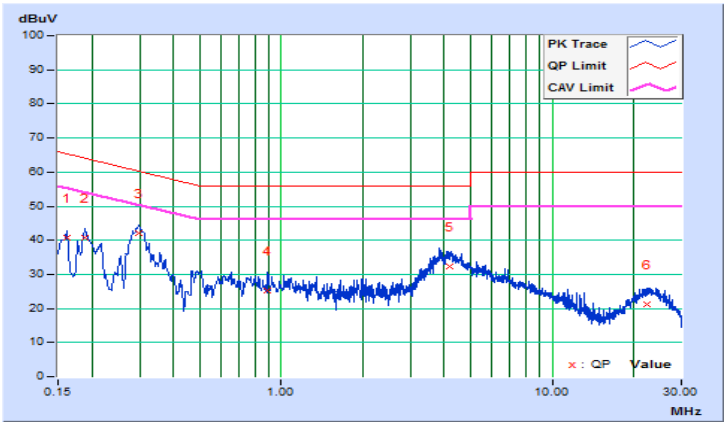


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16139	10.16	30.55	21.40	40.71	31.56	65.39	55.39	-24.68	-23.83
2	0.18910	10.16	30.43	21.88	40.59	32.04	64.08	54.08	-23.49	-22.04
3	0.29858	10.18	31.96	23.43	42.14	33.61	60.28	50.28	-18.14	-16.67
4	0.89290	10.18	15.15	10.50	25.33	20.68	56.00	46.00	-30.67	-25.32
5	4.16948	10.35	22.14	16.64	32.49	26.99	56.00	46.00	-23.51	-19.01
6	22.30797	11.30	9.96	5.33	21.26	16.63	60.00	50.00	-38.74	-33.37

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.

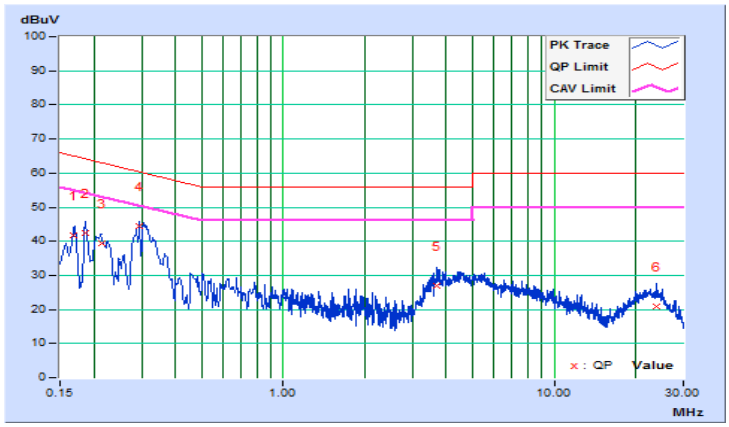


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16878	10.15	31.50	20.38	41.65	30.53	65.02	55.02	-23.37	-24.49
2	0.18519	10.16	32.17	23.64	42.33	33.80	64.25	54.25	-21.92	-20.45
3	0.21282	10.17	29.14	20.94	39.31	31.11	63.09	53.09	-23.78	-21.98
4	0.29467	10.18	34.33	24.81	44.51	34.99	60.39	50.39	-15.88	-15.40
5	3.70419	10.33	16.65	8.56	26.98	18.89	56.00	46.00	-29.02	-27.11
6	23.95408	11.07	9.76	5.10	20.83	16.17	60.00	50.00	-39.17	-33.83

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

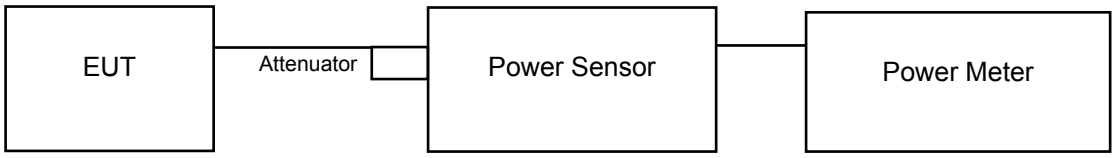
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

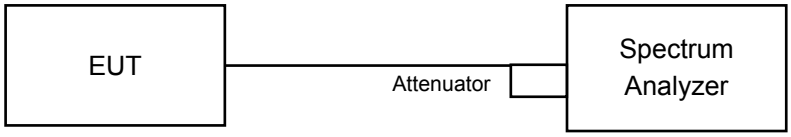
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

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



802.11ac (VHT80)



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.

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	20.04	20.34	209.068	23.20	30.00	Pass
40	5200	20.07	20.35	210.018	23.22	30.00	Pass
48	5240	20.02	20.23	205.901	23.14	30.00	Pass
149	5745	24.75	24.90	607.568	27.84	30.00	Pass
157	5785	24.23	24.14	524.268	27.20	30.00	Pass
165	5825	24.62	24.70	584.855	27.67	30.00	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	20.05	20.23	206.597	23.15	30.00	Pass
40	5200	20.03	20.24	206.375	23.15	30.00	Pass
48	5240	20.07	20.38	**210.769**	23.24	30.00	Pass
149	5745	24.75	24.95	611.146	27.86	30.00	Pass
157	5785	24.52	25.21	**615.033**	27.89	30.00	Pass
165	5825	24.68	24.71	589.566	27.71	30.00	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	14.39	14.78	57.540	17.60	30.00	Pass
46	5230	20.04	20.33	208.820	23.20	30.00	Pass
151	5755	24.31	24.43	547.106	27.38	30.00	Pass
159	5795	24.44	25.03	596.391	27.76	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.25	13.83	45.290	16.56	30.00	Pass
155	5775	22.15	21.98	321.82	25.08	30.00	Pass

Beamforming Mode

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	20.05	20.23	206.597	23.15	30.00	Pass
40	5200	20.03	20.24	206.375	23.15	30.00	Pass
48	5240	20.07	20.38	**210.769**	23.24	30.00	Pass
149	5745	24.75	24.95	611.146	27.86	30.00	Pass
157	5785	24.52	25.21	**615.033**	27.89	30.00	Pass
165	5825	24.68	24.71	589.566	27.71	30.00	Pass

Note:
1. U-NII-1 band directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
2. U-NII-3 band directional gain = 4.65dBi < 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				
38	5190	14.39	14.78	57.540	17.60	30.00	Pass
46	5230	20.04	20.33	208.820	23.20	30.00	Pass
151	5755	24.31	24.43	547.106	27.38	30.00	Pass
159	5795	24.44	25.03	596.391	27.76	30.00	Pass

Note:
1. U-NII-1 band directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
2. U-NII-3 band directional gain = 4.65dBi < 6dBi, so the limit no need to be reduced.

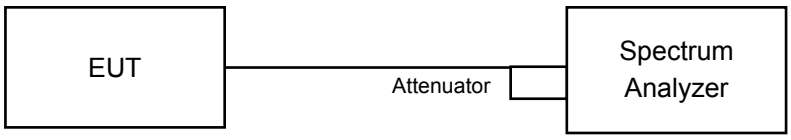
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.25	13.83	45.290	16.56	30.00	Pass
155	5775	22.15	21.98	321.82	25.08	30.00	Pass

Note:
1. U-NII-1 band directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
2. U-NII-3 band directional gain = 4.65dBi < 6dBi, so the limit no need to be reduced.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.84	19.56
40	5200	18.36	18.84
48	5240	19.32	17.16
149	5745	27.96	19.68
157	5785	23.52	20.04
165	5825	25.08	23.88

802.11ac (VHT20)

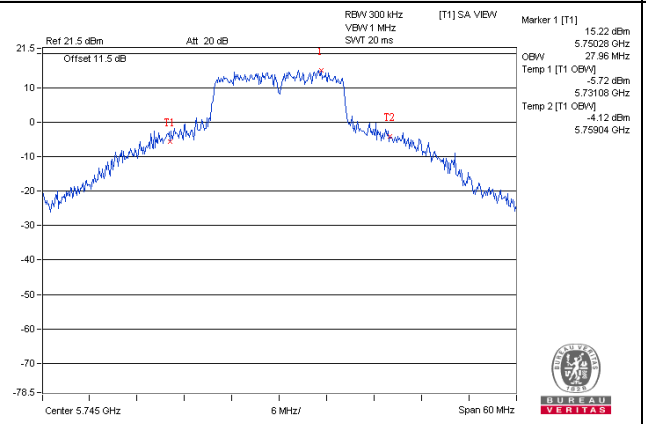
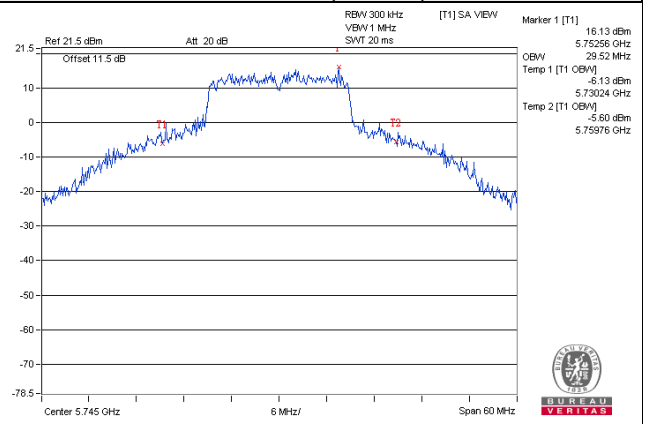
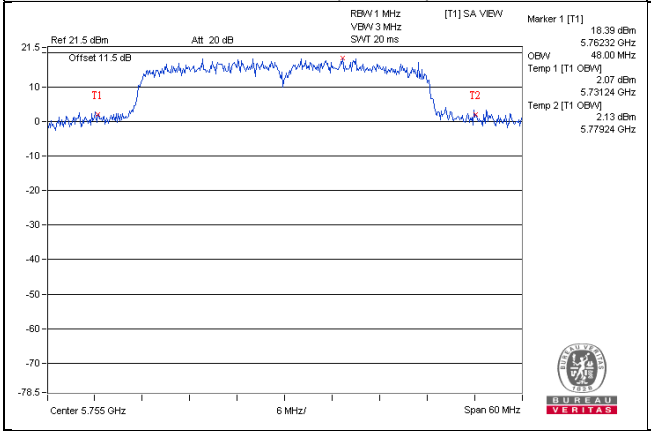
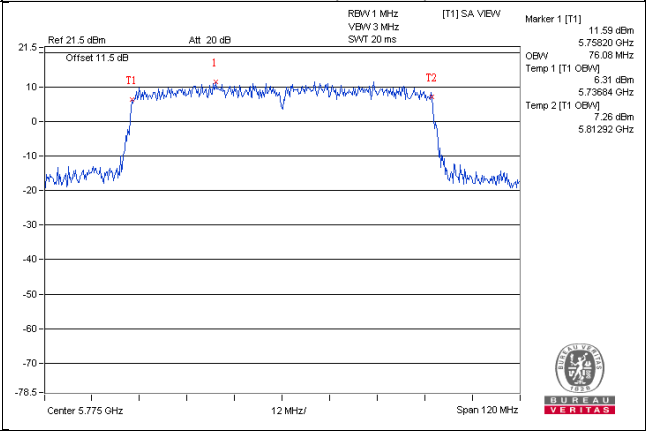
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.60	19.20
40	5200	18.60	18.84
48	5240	19.08	18.24
149	5745	29.52	19.92
157	5785	25.80	19.80
165	5825	26.64	24.12

802.11ac (VHT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.84	36.84
151	5755	48.00	38.04
159	5795	43.56	37.80

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.08	76.08
155	5775	76.08	75.84

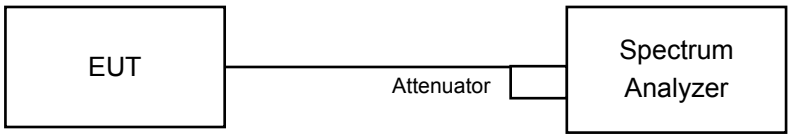
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Using method SA-2

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

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

c. Set Channel power measure = 1MHz

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

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

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

For U-NII-3 band:

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

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

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

d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz)

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

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.89	5.91	0.21	9.12	17.00	Pass
40	5200	6.19	6.06	0.21	9.34	17.00	Pass
48	5240	5.11	5.23	0.21	8.39	17.00	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.01dBi < 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 w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.50	5.55	0.09	8.63	17.00	Pass
40	5200	5.54	5.42	0.09	8.58	17.00	Pass
48	5240	4.64	4.86	0.09	7.85	17.00	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

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	-2.29	-2.09	0.17	0.99	17.00	Pass
46	5230	2.99	3.05	0.17	6.20	17.00	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

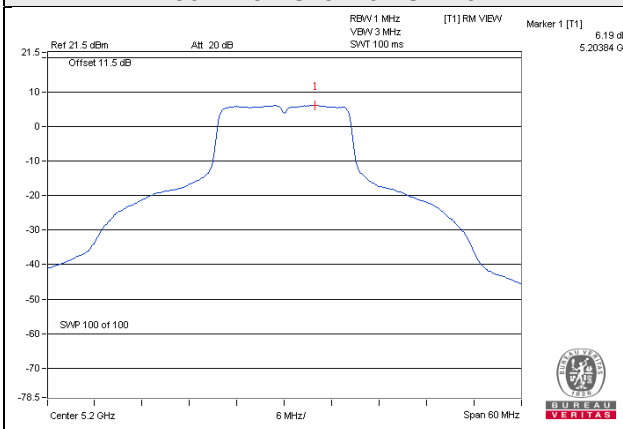
802.11ac (VHT80)

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	-5.44	-6.14	0.30	-2.46	17.00	Pass

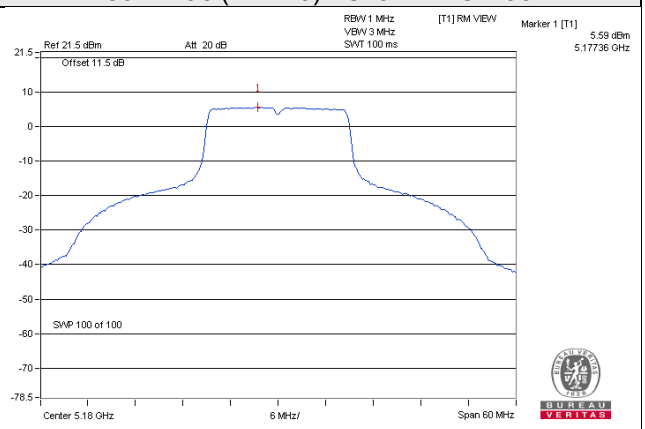
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.01dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

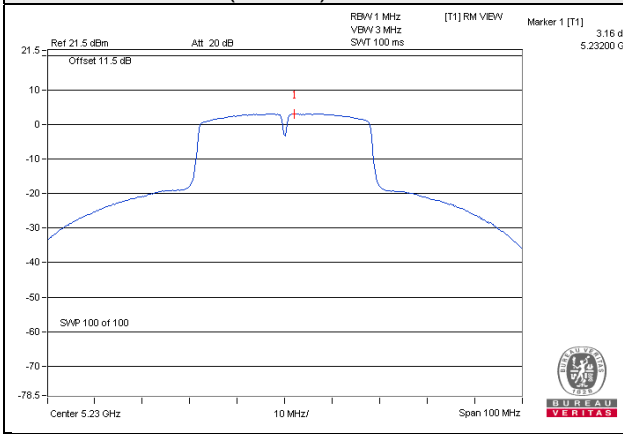
802.11a / Chain 0 / CH 40



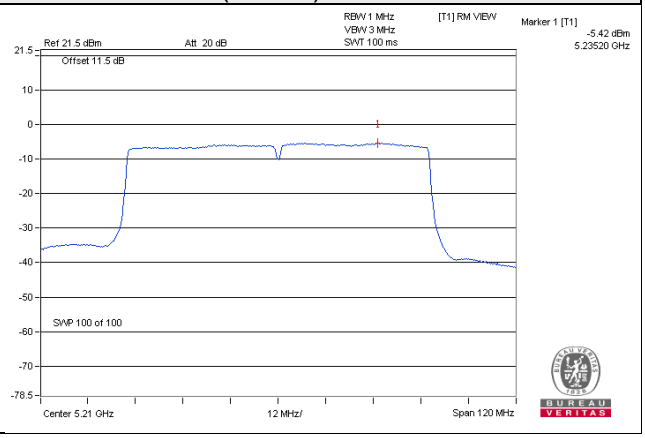
802.11ac (VHT20) / Chain 1 / CH 36



802.11ac (VHT40) / Chain 1 / CH 46



802.11ac (VHT80) / Chain 0 / CH 42



For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.68	4.90	3.01	0.21	8.12	30.00	Pass
	157	5785	2.18	4.40	3.01	0.21	7.62	30.00	Pass
	165	5825	2.33	4.55	3.01	0.21	7.77	30.00	Pass
1	149	5745	2.65	4.87	3.01	0.21	8.09	30.00	Pass
	157	5785	2.70	4.92	3.01	0.21	8.14	30.00	Pass
	165	5825	3.13	5.35	3.01	0.21	8.57	30.00	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 = 4.65dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.45	4.67	3.01	0.09	7.77	30.00	Pass
	157	5785	2.16	4.38	3.01	0.09	7.48	30.00	Pass
	165	5825	2.00	4.22	3.01	0.09	7.32	30.00	Pass
1	149	5745	2.17	4.39	3.01	0.09	7.49	30.00	Pass
	157	5785	2.60	4.82	3.01	0.09	7.92	30.00	Pass
	165	5825	2.84	5.06	3.01	0.09	8.16	30.00	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 = 4.65dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

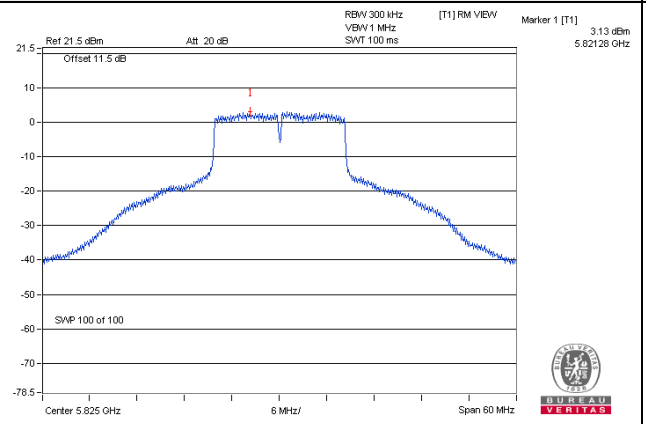
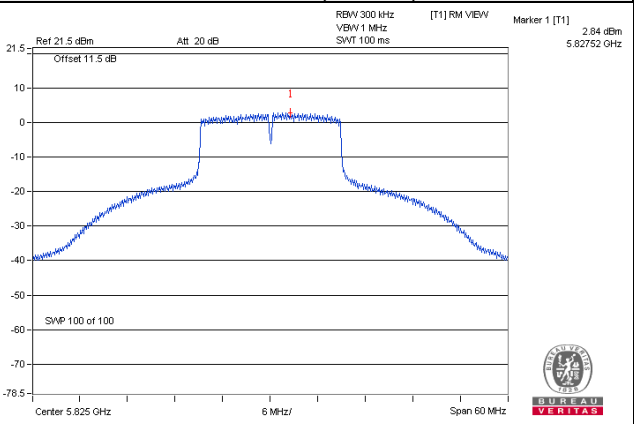
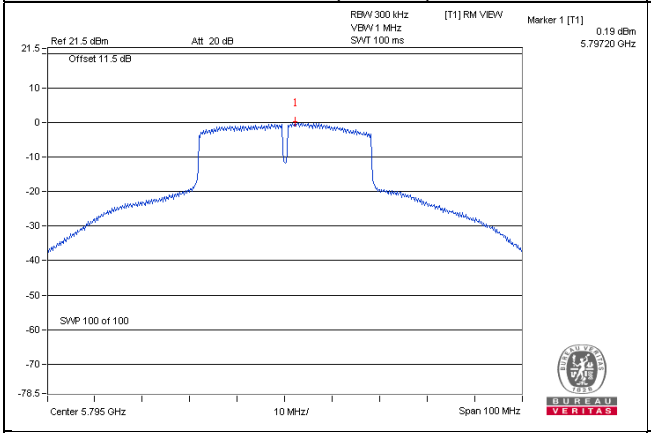
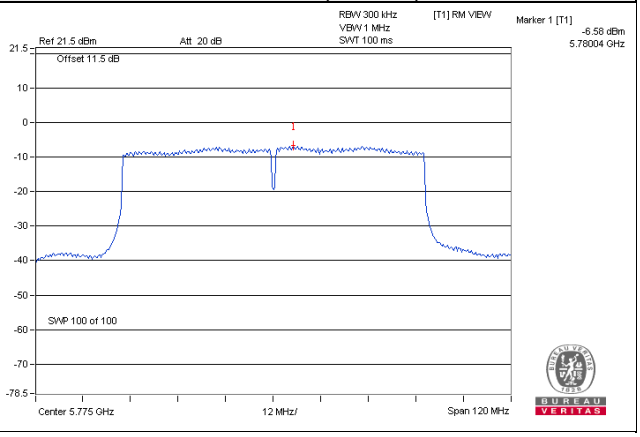
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-0.05	2.17	3.01	0.17	5.35	30.00	Pass
	159	5795	-0.14	2.08	3.01	0.17	5.26	30.00	Pass
1	151	5755	-0.03	2.19	3.01	0.17	5.37	30.00	Pass
	159	5795	0.19	2.41	3.01	0.17	5.59	30.00	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 = 4.65dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-6.90	-4.68	3.01	0.30	-1.37	30.00	Pass
1	155	5775	-6.58	-4.36	3.01	0.30	-1.05	30.00	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 = 4.65dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

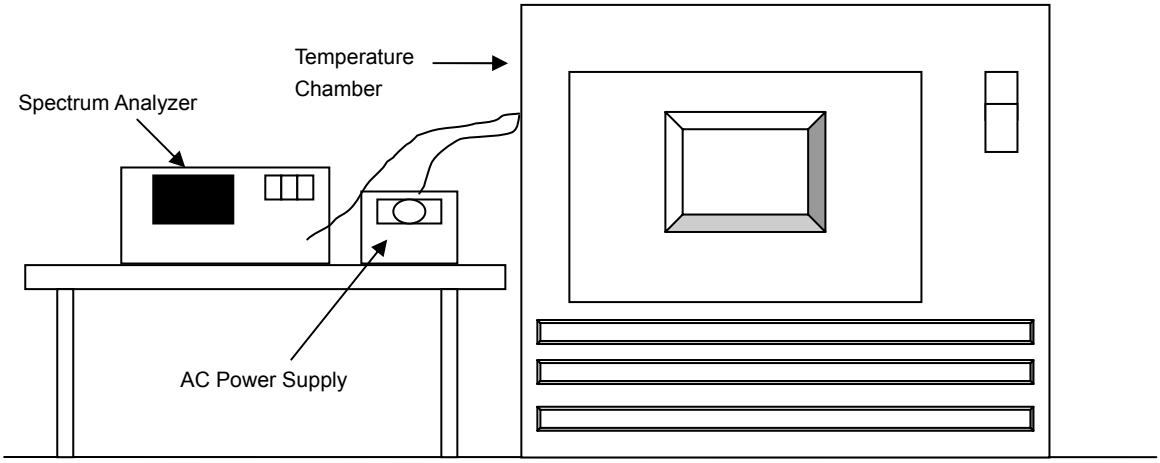
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

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	5180.0235	0.00045	5180.0259	0.00050	5180.0259	0.00050	5180.0232	0.00045
40	120	5179.9912	-0.00017	5179.9897	-0.00020	5179.992	-0.00015	5179.991	-0.00017
30	120	5180.0162	0.00031	5180.0143	0.00028	5180.0165	0.00032	5180.0158	0.00031
20	120	5180.0173	0.00033	5180.0167	0.00032	5180.0149	0.00029	5180.0133	0.00026
10	120	5180.0097	0.00019	5180.01	0.00019	5180.0091	0.00018	5180.0107	0.00021
0	120	5179.9926	-0.00014	5179.9927	-0.00014	5179.9923	-0.00015	5179.9933	-0.00013
-10	120	5179.9866	-0.00026	5179.987	-0.00025	5179.9847	-0.00030	5179.986	-0.00027
-20	120	5180.0072	0.00014	5180.0034	0.00007	5180.0042	0.00008	5180.005	0.00010
-30	120	5180.0074	0.00014	5180.0069	0.00013	5180.0081	0.00016	5180.0092	0.00018

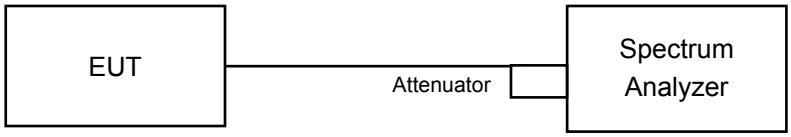
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.017	0.00033	5180.0167	0.00032	5180.0146	0.00028	5180.0141	0.00027
	120	5180.0173	0.00033	5180.0167	0.00032	5180.0149	0.00029	5180.0133	0.00026
	102	5180.0182	0.00035	5180.0171	0.00033	5180.0155	0.00030	5180.0143	0.00028

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.38	16.41	0.5	Pass
157	5785	16.36	16.38	0.5	Pass
165	5825	16.42	16.37	0.5	Pass

802.11ac (VHT20)

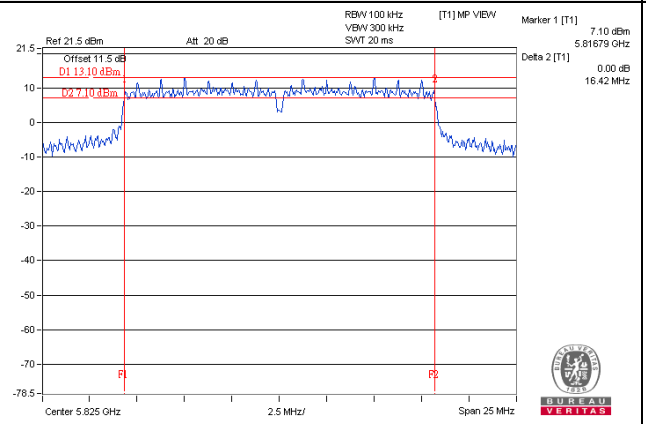
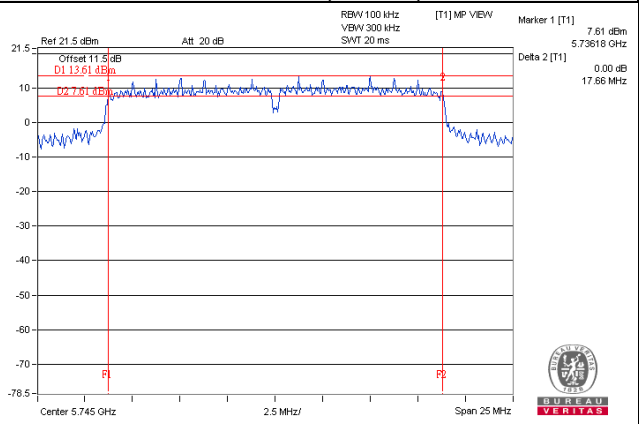
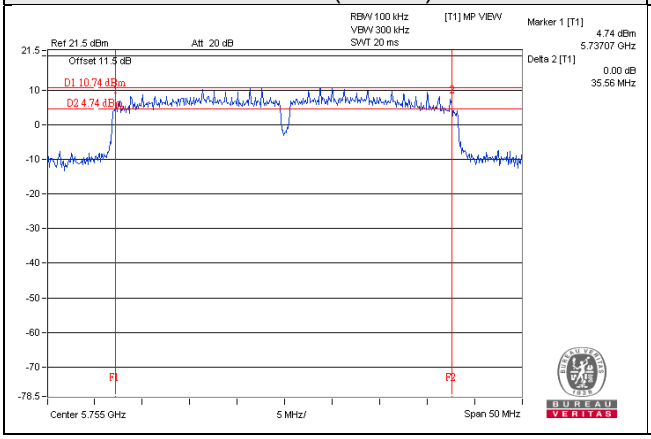
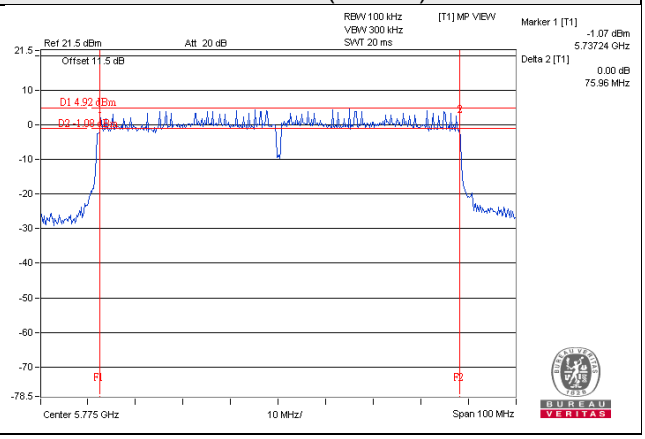
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.66	17.66	0.5	Pass
157	5785	17.61	17.63	0.5	Pass
165	5825	17.65	17.35	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.18	35.56	0.5	Pass
159	5795	35.16	35.49	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.94	75.96	0.5	Pass

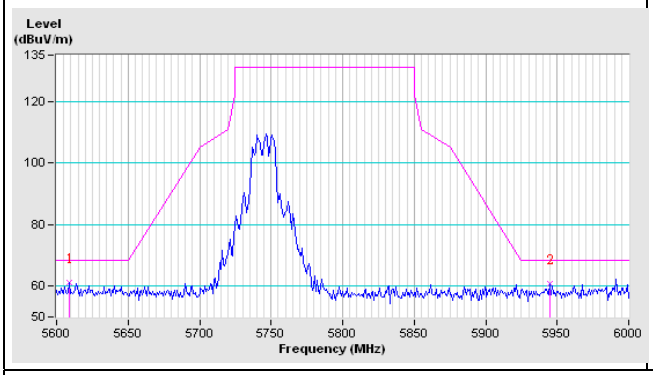
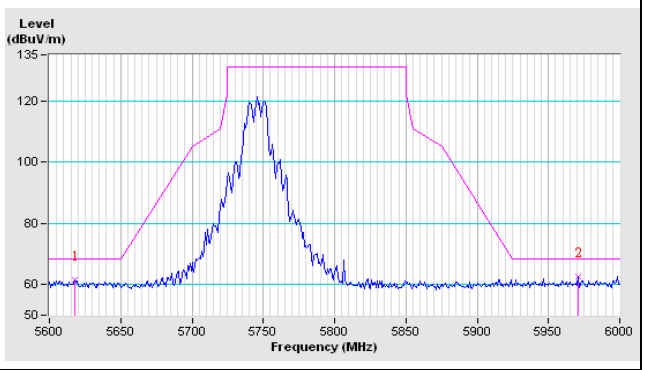
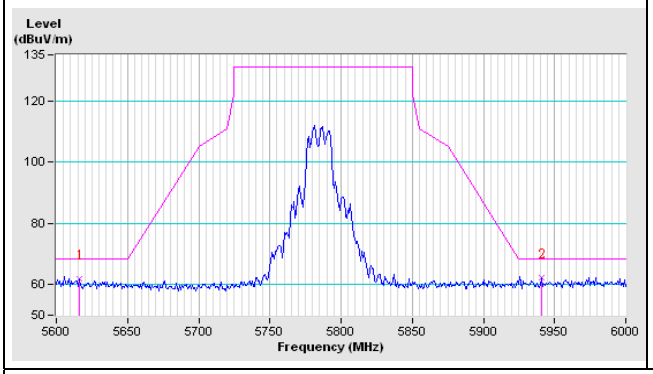
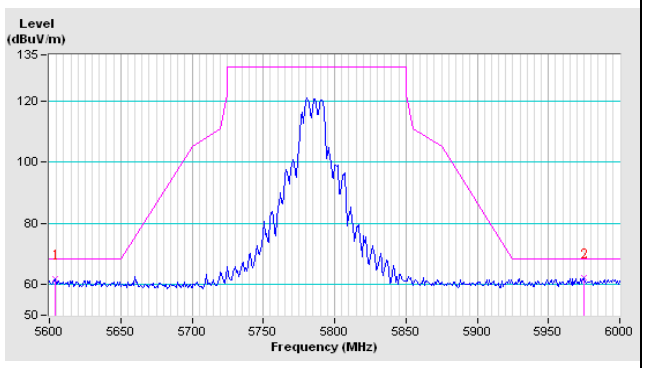
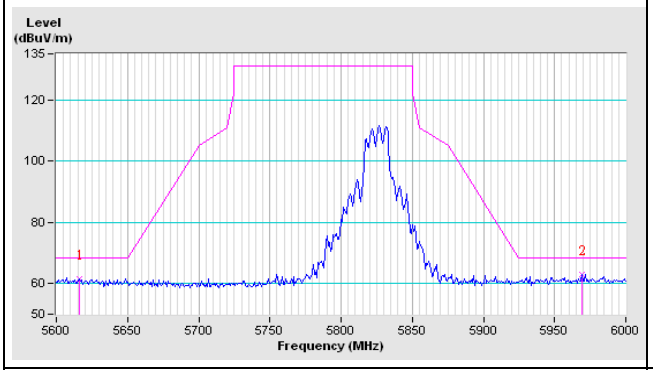
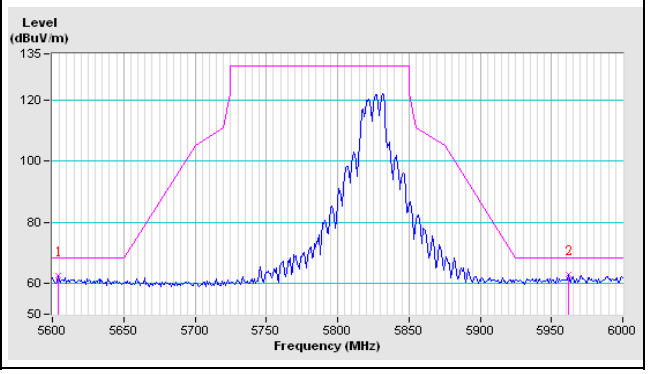
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

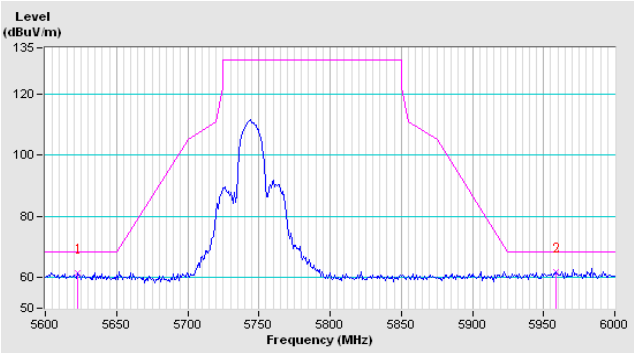
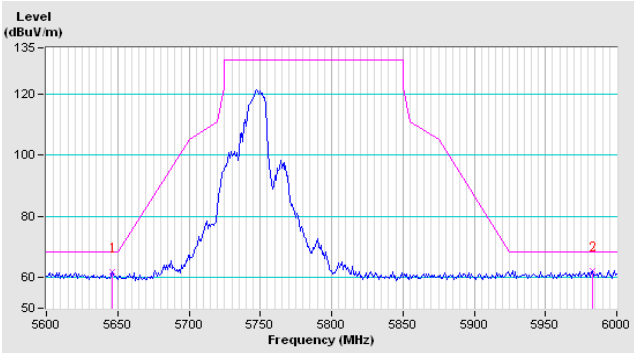
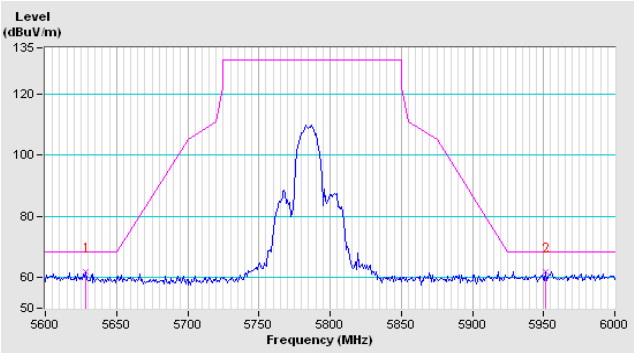
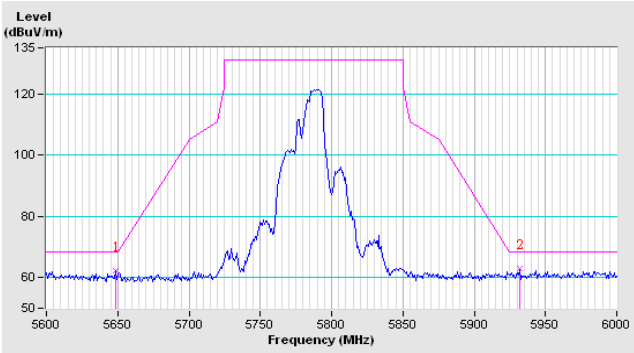
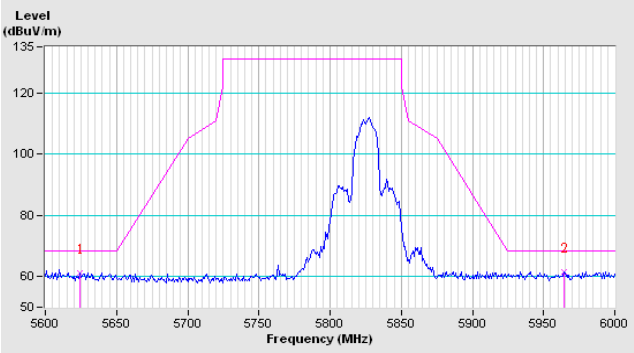
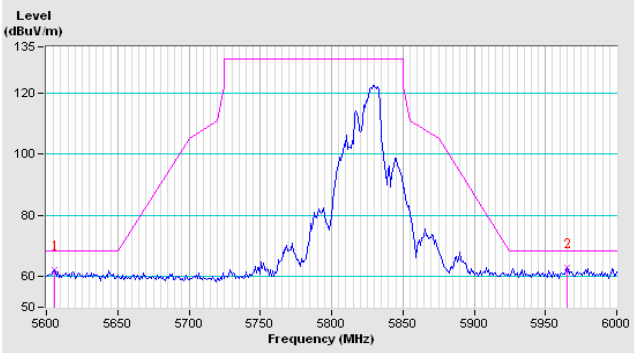
Please refer to the attached file (Test Setup Photo).

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

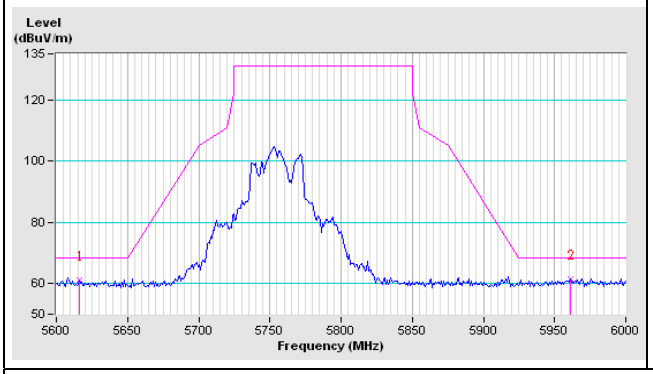
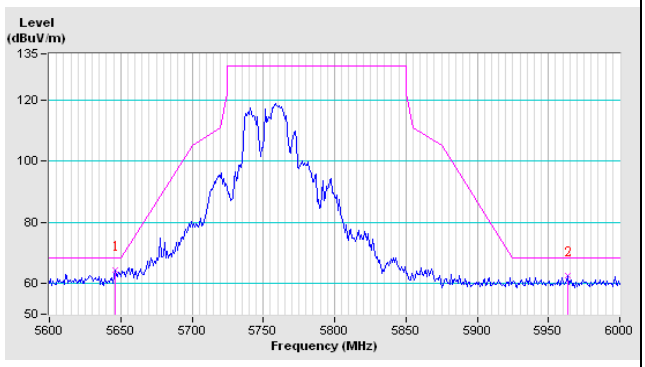
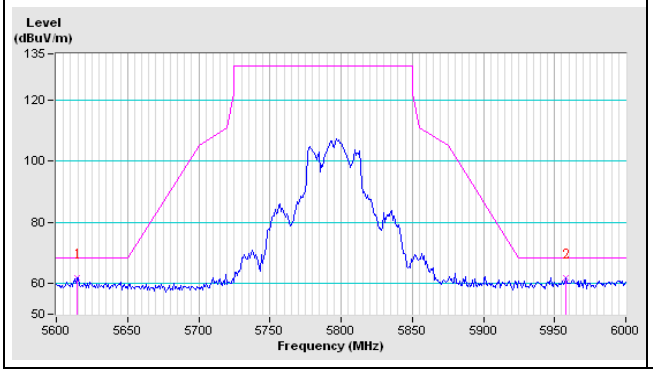
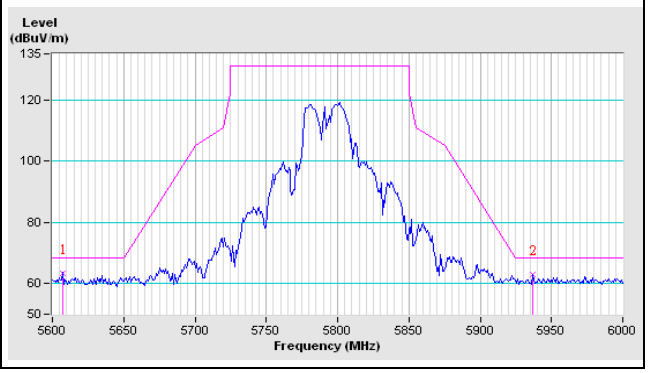
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

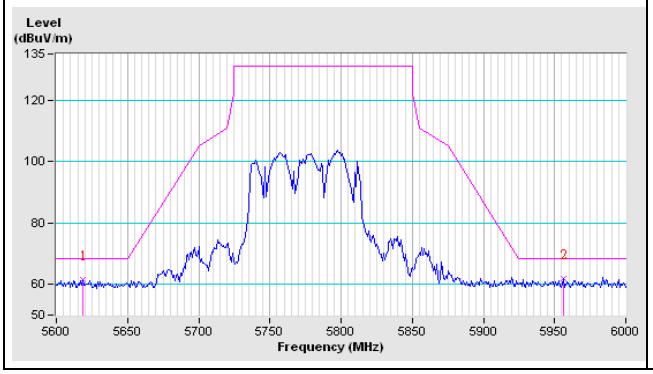
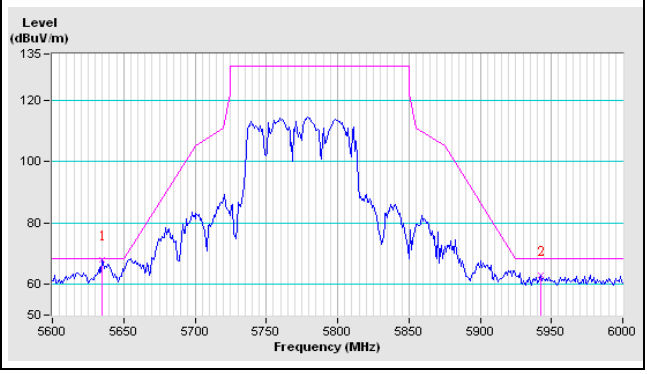
802.11ac (VHT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11ac (VHT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

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

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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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