FCC Test Report

Report No.: RF181026C02-1

FCC ID: PY318300419

Test Model: RBS50v2

Received Date: Aug. 08, 2018

Test Date: Sep. 05 ~ Oct. 27, 2018

Issued Date: Oct. 30, 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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The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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Release Control Record

Issue No.	Description	Date Issued
RF181026C02-1	Original release.	Oct. 30, 2018

1 Certificate of Conformity

Product: Orbi Satellite

Brand: NETGEAR

Test Model: RBS50v2

Sample Status: Engineering sample

Applicant: NETGEAR, INC.

Test Date: Sep. 05 ~ Oct. 27, 2018

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

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

Prepared by : Pettie Chen , **Date:** Oct. 30, 2018
Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 30, 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 -14.05dB at 0.15391MHz.
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 -0.3dB at 5150.00MHz.
15.407(a) (1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a) (1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Orbi Satellite
Brand	NETGEAR
Test Model	RBS50v2
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 600.0Mbps 802.11ac: up to 1733.0Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	CDD Mode: 5180 ~ 5240MHz: 868.576mW 5745 ~ 5825MHz: 904.968mW Beamforming_NSS1 Mode: 5180 ~ 5240MHz: 851.849mW 5745 ~ 5825MHz: 599.265mW Beamforming_NSS 2 Mode: 5745 ~ 5825MHz: 877.724mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. The model is listed as below.

Brand	Model	Product Name	FCC ID	RF Module	Difference
NETGEAR	RBS50v2	Orbi Satellite	PY318300419	Module 1	software firmware: RBS50_V2.2.5.4 Master and Client mode for 5.50-5.70GHz band
				Module 2	

Note:
All of the RF specifications (include antenna type and location) are identical except the differences stated.
RF Module 1 support WLAN 2.4GHz band, 5.18 ~ 5.24GHz and 5.26 ~ 5.32GHz band functionally.
RF Module 2 WLAN 5.50 ~ 5.70GHz and 5.745 ~ 5.825GHz band functionally.

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Band	Modulation Mode	Beamforming Mode	TX Function
5GHz U-NII-1Band	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
5GHz U-NII-3 Band	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 5GHz band 802.11n and 802.11ac, CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

3. The following antenna was provided to the EUT.

Ant. Type	Dipole					
Connecter Type	I-PEX (WLAN)					
Directional Antenna Gain (dBi)						
Item	2.4G	5G Band 1	5G Band 2	5G Band 3	5G Band 4	
					Nss1	Nss2
-	2.61	4.18	4.18	7.43	7.43	4.86

4. The EUT uses following adapters.

Adapter 1	
Brand	NETGEAR
Model	2ABL030F1 NJ
PN	332-10948-01
Input Power	100-240Vac, 50/60Hz 1.0A
Output Power	12Vdc, 2.5A
Power Line	1.8m power cable without core attached on adapter

Adapter 2	
Brand	NETGEAR
Model	AD2067F10
PN	332-10944-01
Input Power	100-240Vac, 50/60Hz 1.0A
Output Power	12Vdc, 2.5A
Power Line	1.85m power cable without core attached on adapter

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

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 (40MHz):

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	√	√	√	√	EUT power from adapter 1
B	-	√	√	-	EUT 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 was positioned on the Z-plane during testing.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	13.0
A	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	27.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	13.0
A	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	27.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	130.0

Radiated Emission Test (Below 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5180-5240	36 to 48	149	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	13.0
A	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	27.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	13.0
A	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	27.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	130.0

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	21 deg. C, 66% RH	120Vac, 60Hz	Rey Chen
RE<1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
PLC	25 deg. C, 67% RH	120Vac, 60Hz	Jones Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

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.

5GHz U-NII-1Band:

CDD Mode

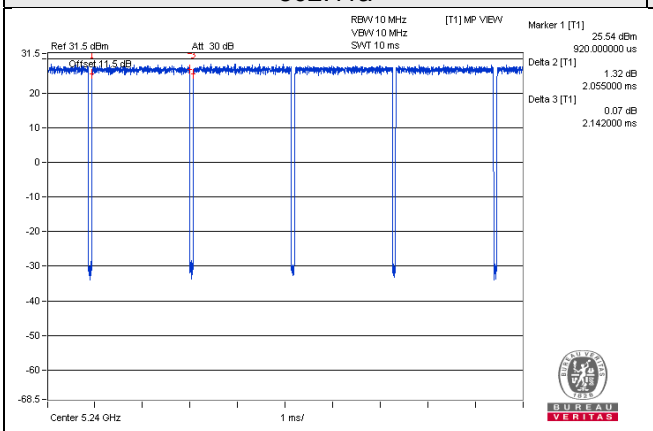
802.11a: Duty cycle = 2.055/2.142 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18

802.11ac (VHT20): Duty cycle = 4.980/5.073 =0.982

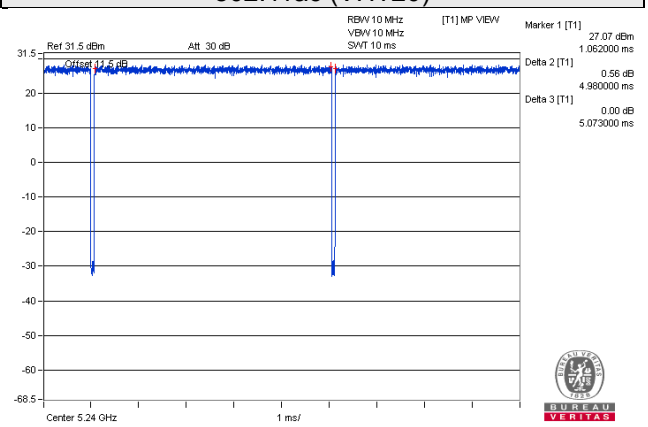
802.11ac (VHT40): Duty cycle = 2.415/2.505 =0.964, Duty factor = 10 * log(1/0.964) = 0.16

802.11ac (VHT80): Duty cycle = 1.125/1.227 =0.917, Duty factor = 10 * log(1/0.917) = 0.38

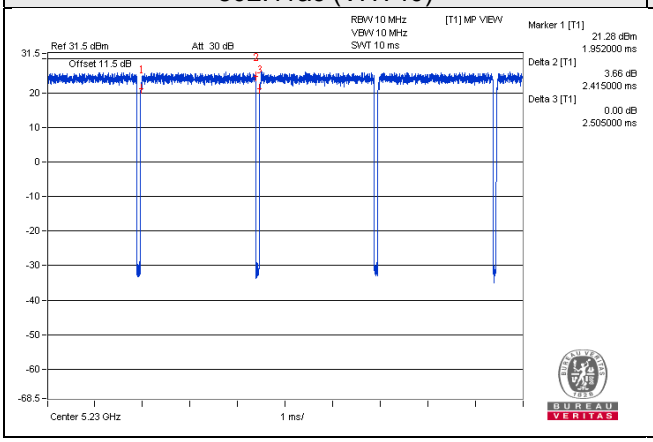
802.11a



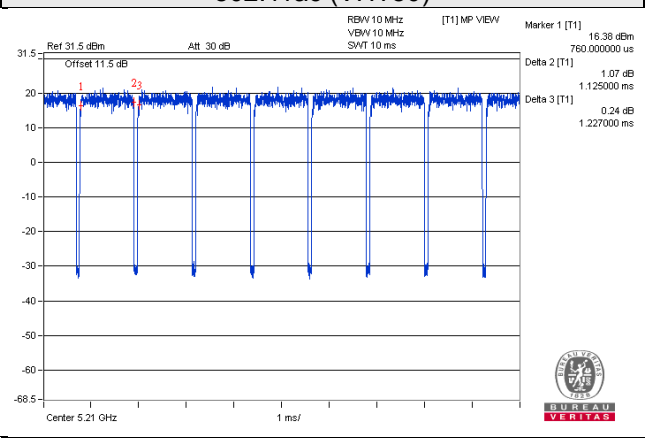
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



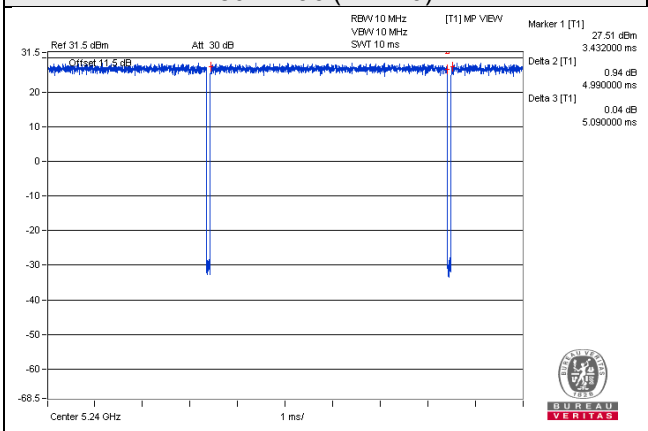
Beamforming_NSS1 Mode

802.11ac (VHT20): Duty cycle = 4.990/5.090 =0.9803

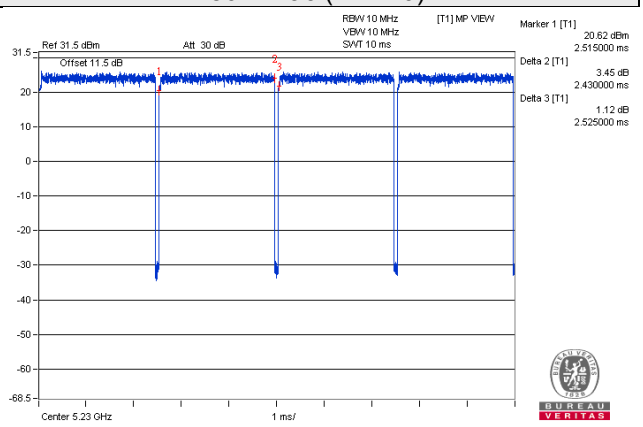
802.11ac (VHT40): Duty cycle = 2.430/2.525 =0.962, Duty factor = 10 * log(1/0.962) = 0.17

802.11ac (VHT80): Duty cycle = 1.140/1.245 =0.916, Duty factor = 10 * log(1/0.916) = 0.38

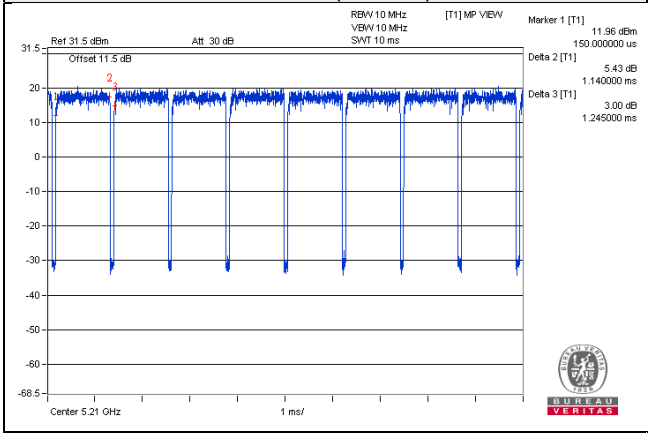
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



5GHz U-NII-3 Band:

CDD Mode

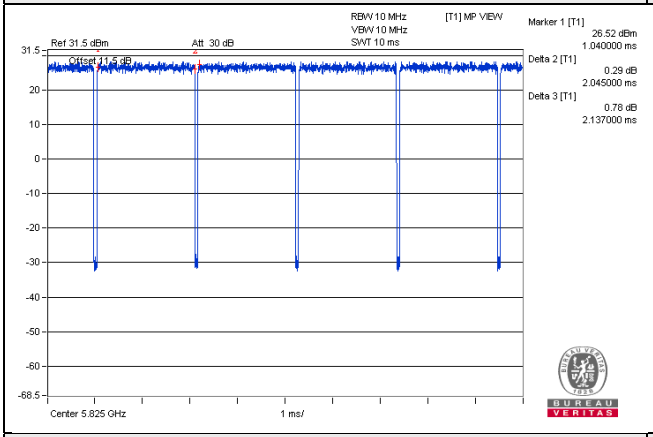
802.11a: Duty cycle = 2.045/2.137 = 0.957, Duty factor = 10 * log(1/0.957) = 0.19

802.11ac (VHT20): Duty cycle = 4.970/5.070 =0.9802

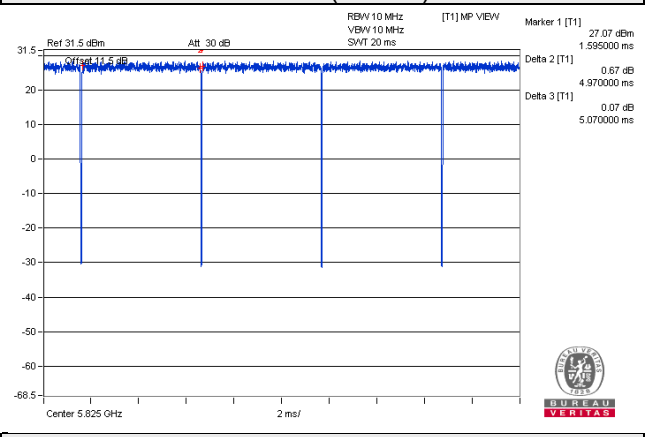
802.11ac (VHT40): Duty cycle = 2.418/2.493 =0.970, Duty factor = 10 * log(1/0.970) = 0.13

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

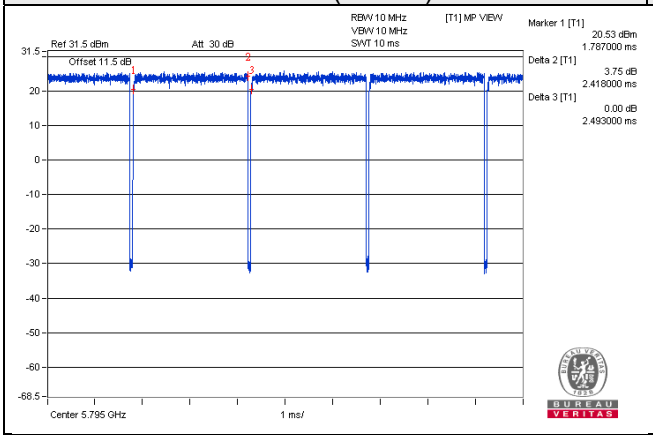
802.11a



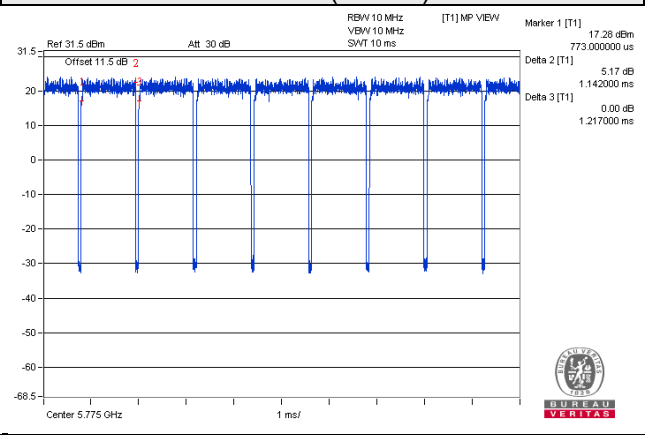
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



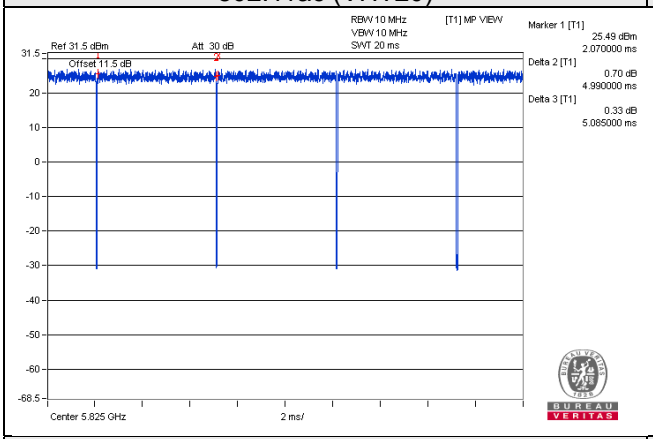
Beamforming_NSS1 Mode

802.11ac (VHT20): Duty cycle = 4.990/5.085 =0.981

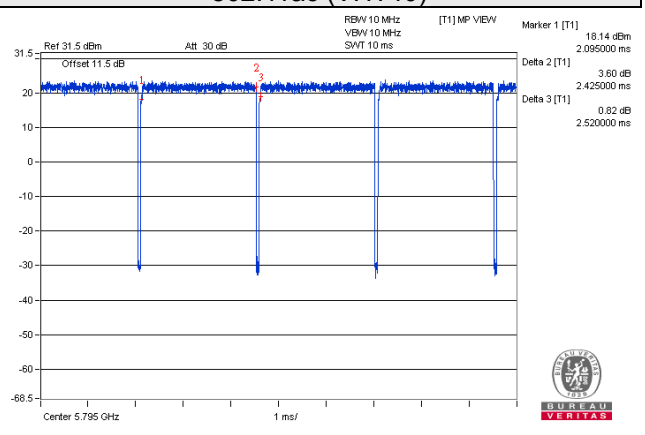
802.11ac (VHT40): Duty cycle = 2.425/2.520 =0.962, Duty factor = 10 * log(1/0.962) = 0.17

802.11ac (VHT80): Duty cycle = 1.129/1.217 =0.928, Duty factor = 10 * log(1/0.928) = 0.33

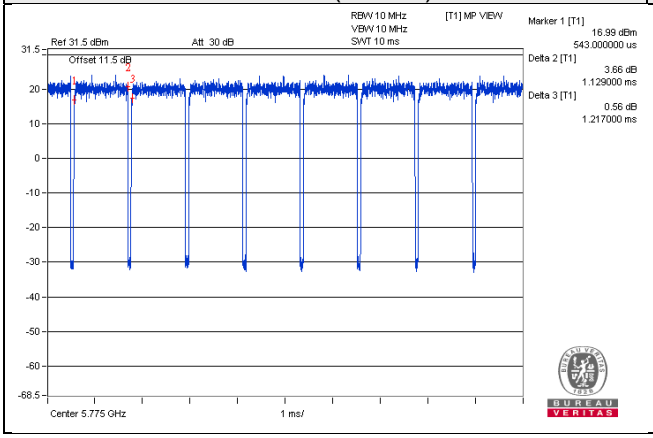
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



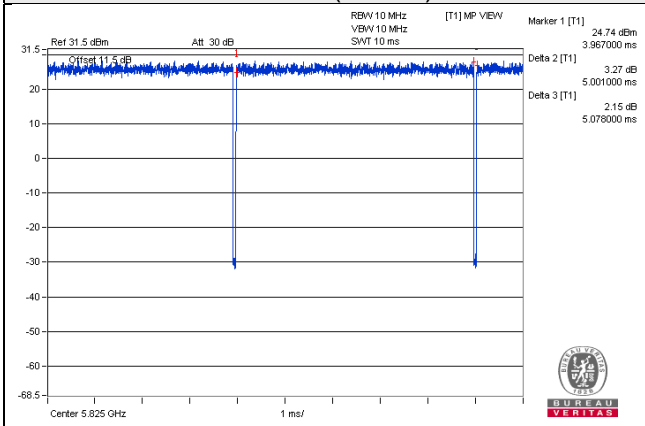
Beamforming_NSS2 Mode

802.11ac (VHT20): Duty cycle = 5.001/5.078 =0.985

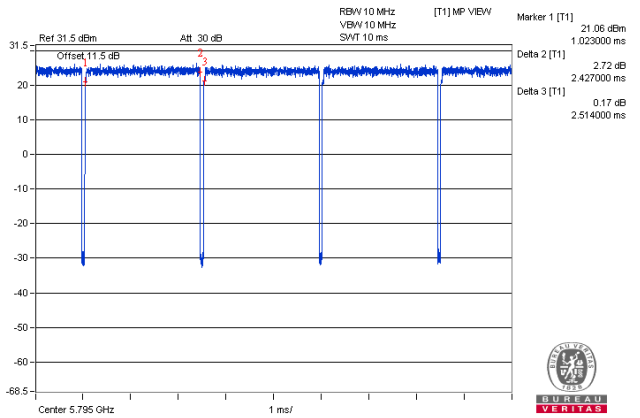
802.11ac (VHT40): Duty cycle = 2.427/2.514 =0.965, Duty factor = 10 * log(1/0.965) = 0.15

802.11ac (VHT80): Duty cycle = 1.137/1.209 =0.940, Duty factor = 10 * log(1/0.940) = 0.27

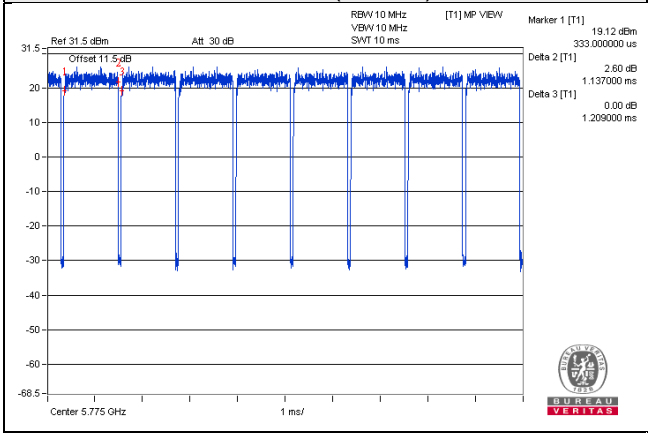
802.11ac (VHT20)



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.

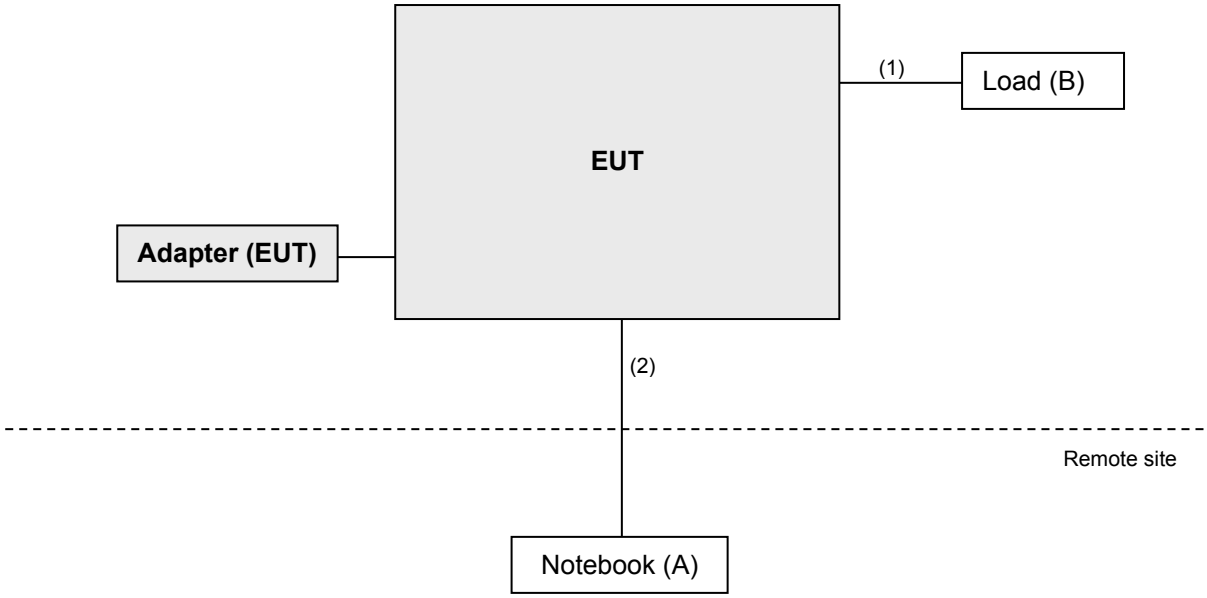
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	N/A	N/A	N/A	N/A	-

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

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

Note:

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2018	Aug. 07, 2019
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jul. 02, 2018	Jul. 01, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2018	Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2018	Aug. 07, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	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
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 17, 2018	Jul. 16, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019

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

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

c. Parallel, perpendicular, and ground-parallel orientations 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 detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

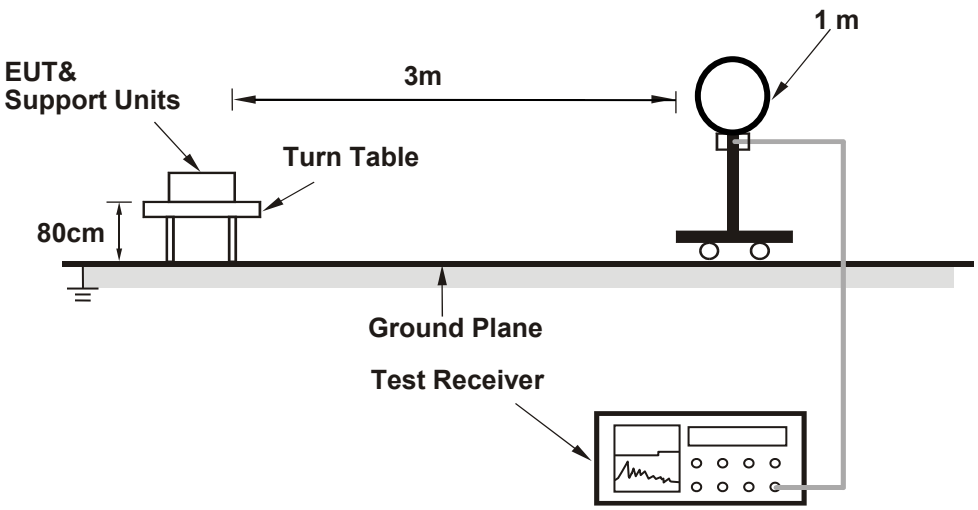
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

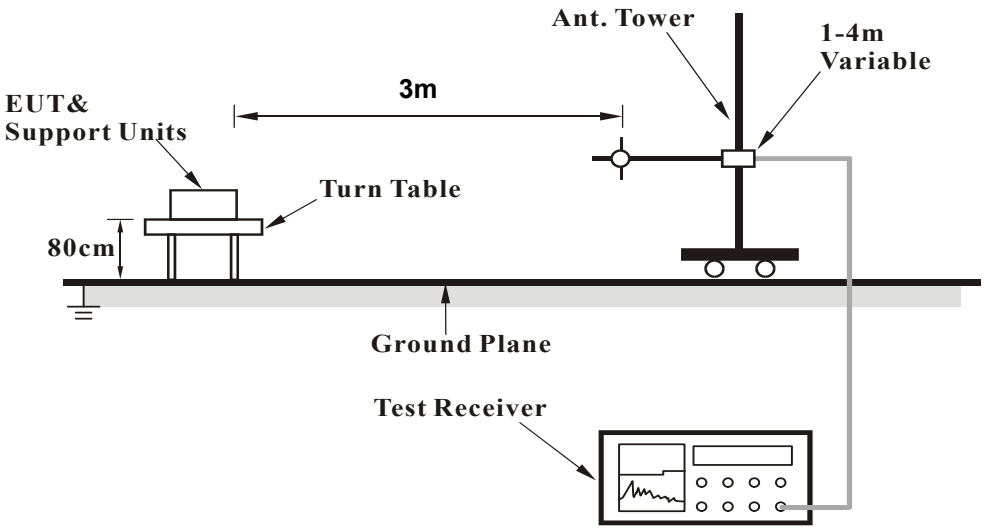
No deviation.

4.1.5 Test Setup

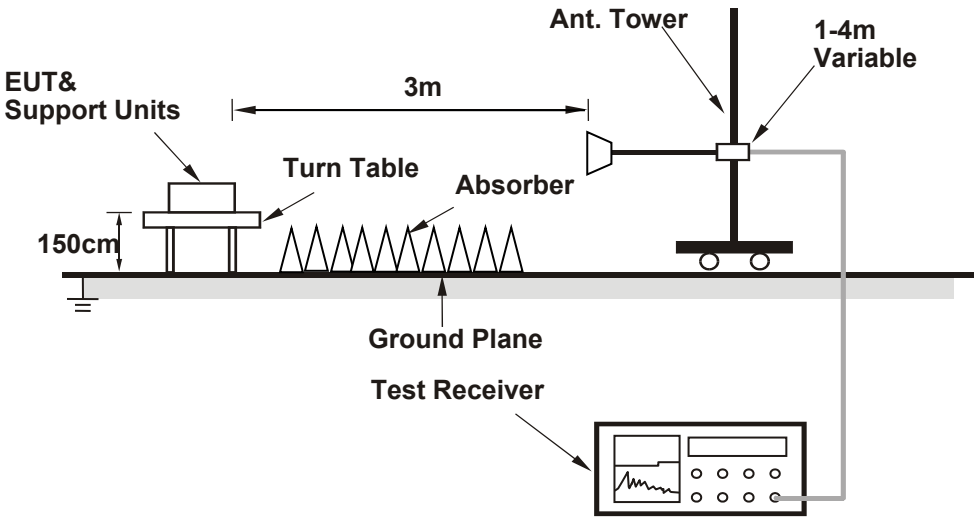
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz Worst-Case Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.8 PK	74.0	-11.2	1.38 H	200	60.2	2.6
2	5150.00	48.5 AV	54.0	-5.5	1.38 H	200	45.9	2.6
3	*5180.00	106.5 PK			1.38 H	200	104.0	2.5
4	*5180.00	96.0 AV			1.38 H	200	93.5	2.5
5	#10360.00	61.2 PK	68.2	-7.0	2.05 H	146	49.3	11.9
6	15540.00	56.1 PK	74.0	-17.9	1.39 H	162	43.7	12.4
7	15540.00	43.0 AV	54.0	-11.0	1.39 H	162	30.6	12.4
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	5150.00	68.2 PK	74.0	-5.8	2.13 V	190	65.6	2.6
2	5150.00	53.3 AV	54.0	-0.7	2.13 V	190	50.7	2.6
3	*5180.00	115.0 PK			2.13 V	190	112.5	2.5
4	*5180.00	104.9 AV			2.13 V	190	102.4	2.5
5	#10360.00	61.3 PK	68.2	-6.9	1.40 V	200	49.4	11.9
6	15540.00	57.3 PK	74.0	-16.7	1.99 V	172	44.9	12.4
7	15540.00	44.1 AV	54.0	-9.9	1.99 V	172	31.7	12.4

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 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	110.9 PK			1.34 H	211	108.5	2.4
2	*5200.00	100.6 AV			1.34 H	211	98.2	2.4
3	#10400.00	61.4 PK	68.2	-6.8	2.00 H	152	49.2	12.2
4	15600.00	56.0 PK	74.0	-18.0	1.45 H	174	43.1	12.9
5	15600.00	42.9 AV	54.0	-11.1	1.45 H	174	30.0	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	118.7 PK			2.16 V	195	116.3	2.4
2	*5200.00	108.9 AV			2.16 V	195	106.5	2.4
3	#10400.00	61.3 PK	68.2	-6.9	1.41 V	189	49.1	12.2
4	15600.00	57.9 PK	74.0	-16.1	1.94 V	160	45.0	12.9
5	15600.00	44.2 AV	54.0	-9.8	1.94 V	160	31.3	12.9

REMARKS:

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

CHANNEL	TX Channel 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	109.9 PK			1.37 H	186	107.7	2.2
2	*5240.00	99.7 AV			1.37 H	186	97.5	2.2
3	5350.00	61.2 PK	74.0	-12.8	1.37 H	186	58.9	2.3
4	5350.00	48.0 AV	54.0	-6.0	1.37 H	186	45.7	2.3
5	#10480.00	60.1 PK	68.2	-8.1	2.10 H	160	47.7	12.4
6	15720.00	56.8 PK	74.0	-17.2	1.35 H	150	44.8	12.0
7	15720.00	43.7 AV	54.0	-10.3	1.35 H	150	31.7	12.0
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	*5240.00	119.8 PK			2.18 V	204	117.6	2.2
2	*5240.00	109.2 AV			2.18 V	204	107.0	2.2
3	5350.00	60.7 PK	74.0	-13.3	2.18 V	204	58.4	2.3
4	5350.00	47.3 AV	54.0	-6.7	2.18 V	204	45.0	2.3
5	#10480.00	60.7 PK	68.2	-7.5	1.43 V	187	48.3	12.4
6	15720.00	57.5 PK	74.0	-16.5	1.98 V	183	45.5	12.0
7	15720.00	44.1 AV	54.0	-9.9	1.98 V	183	32.1	12.0

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 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	#5628.80	63.4 PK	68.2	-4.8	1.00 H	316	50.8	12.6
2	*5745.00	117.4 PK			1.38 H	202	114.5	2.9
3	*5745.00	106.7 AV			1.38 H	202	103.8	2.9
4	#5963.20	64.3 PK	68.2	-3.9	1.00 H	316	50.5	13.8
5	11490.00	61.6 PK	74.0	-12.4	2.10 H	130	49.3	12.3
6	11490.00	50.3 AV	54.0	-3.7	2.10 H	130	38.0	12.3
7	#17235.00	55.6 PK	68.2	-12.6	1.43 H	177	40.3	15.3
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	#5616.80	62.8 PK	68.2	-5.4	1.00 V	158	50.2	12.6
2	*5745.00	123.6 PK			2.07 V	194	120.7	2.9
3	*5745.00	113.1 AV			2.07 V	194	110.2	2.9
4	#5932.80	62.9 PK	68.2	-5.3	1.00 V	158	49.3	13.6
5	11490.00	62.9 PK	74.0	-11.1	1.39 V	206	50.6	12.3
6	11490.00	51.1 AV	54.0	-2.9	1.39 V	206	38.8	12.3
7	#17235.00	57.1 PK	68.2	-11.1	2.02 V	173	41.8	15.3

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	#5624.00	63.9 PK	68.2	-4.3	1.00 H	313	51.3	12.6
2	*5785.00	117.8 PK			1.38 H	214	114.7	3.1
3	*5785.00	107.3 AV			1.38 H	214	104.2	3.1
4	#5997.60	64.3 PK	68.2	-3.9	1.00 H	313	50.6	13.7
5	11570.00	61.7 PK	74.0	-12.3	1.99 H	140	49.3	12.4
6	11570.00	49.7 AV	54.0	-4.3	1.99 H	140	37.3	12.4
7	#17355.00	56.0 PK	68.2	-12.2	1.40 H	159	40.0	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5630.40	63.6 PK	68.2	-4.6	1.84 V	157	51.0	12.6
2	*5785.00	124.6 PK			2.13 V	204	121.5	3.1
3	*5785.00	114.3 AV			2.13 V	204	111.2	3.1
4	#5995.20	64.3 PK	68.2	-3.9	1.84 V	157	50.6	13.7
5	11570.00	62.6 PK	74.0	-11.4	1.44 V	186	50.2	12.4
6	11570.00	50.2 AV	54.0	-3.8	1.44 V	186	37.8	12.4
7	#17355.00	56.3 PK	68.2	-11.9	2.05 V	163	40.3	16.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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	#5652.80	64.0 PK	70.3	-6.3	1.00 H	316	51.6	12.4
2	*5825.00	117.7 PK			1.44 H	191	114.5	3.2
3	*5825.00	106.7 AV			1.44 H	191	103.5	3.2
4	#5949.60	64.2 PK	68.2	-4.0	1.00 H	316	50.5	13.7
5	11650.00	61.3 PK	74.0	-12.7	2.11 H	130	48.9	12.4
6	11650.00	49.4 AV	54.0	-4.6	2.11 H	130	37.0	12.4
7	#17475.00	56.0 PK	68.2	-12.2	1.39 H	164	38.6	17.4
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	#5644.80	63.6 PK	68.2	-4.6	1.84 V	270	51.1	12.5
2	*5825.00	123.4 PK			2.12 V	185	120.2	3.2
3	*5825.00	113.3 AV			2.12 V	185	110.1	3.2
4	#5927.20	63.6 PK	68.2	-4.6	1.84 V	270	50.0	13.6
5	11650.00	61.3 PK	74.0	-12.7	1.43 V	198	48.9	12.4
6	11650.00	49.6 AV	54.0	-4.4	1.43 V	198	37.2	12.4
7	#17475.00	57.0 PK	68.2	-11.2	2.05 V	175	39.6	17.4

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	5150.00	63.1 PK	74.0	-10.9	1.42 H	200	60.5	2.6
2	5150.00	49.7 AV	54.0	-4.3	1.42 H	200	47.1	2.6
3	*5180.00	109.7 PK			1.42 H	200	107.2	2.5
4	*5180.00	99.2 AV			1.42 H	200	96.7	2.5
5	#10360.00	61.3 PK	68.2	-6.9	2.05 H	131	49.4	11.9
6	15540.00	55.8 PK	74.0	-18.2	1.34 H	150	43.4	12.4
7	15540.00	43.1 AV	54.0	-10.9	1.34 H	150	30.7	12.4
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	5150.00	70.3 PK	74.0	-3.7	2.09 V	201	67.7	2.6
2	**5150.00**	**53.7 AV**	**54.0**	**-0.3**	**2.09 V**	**201**	**51.1**	**2.6**
3	*5180.00	117.5 PK			2.09 V	201	115.0	2.5
4	*5180.00	106.2 AV			2.09 V	201	103.7	2.5
5	#10360.00	61.6 PK	68.2	-6.6	1.46 V	210	49.7	11.9
6	15540.00	57.0 PK	74.0	-17.0	1.95 V	169	44.6	12.4
7	15540.00	43.9 AV	54.0	-10.1	1.95 V	169	31.5	12.4

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 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	110.0 PK			1.33 H	213	107.6	2.4
2	*5200.00	100.1 AV			1.33 H	213	97.7	2.4
3	#10400.00	60.8 PK	68.2	-7.4	2.00 H	142	48.6	12.2
4	15600.00	56.3 PK	74.0	-17.7	1.35 H	175	43.4	12.9
5	15600.00	43.9 AV	54.0	-10.1	1.35 H	175	31.0	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	119.1 PK			2.13 V	185	116.7	2.4
2	*5200.00	108.9 AV			2.13 V	185	106.5	2.4
3	#10400.00	60.3 PK	68.2	-7.9	1.42 V	188	48.1	12.2
4	15600.00	57.9 PK	74.0	-16.1	1.97 V	172	45.0	12.9
5	15600.00	44.6 AV	54.0	-9.4	1.97 V	172	31.7	12.9

REMARKS:

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

CHANNEL	TX Channel 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	111.1 PK			1.32 H	201	108.9	2.2
2	*5240.00	101.3 AV			1.32 H	201	99.1	2.2
3	5350.00	60.0 PK	74.0	-14.0	1.32 H	201	57.7	2.3
4	5350.00	47.8 AV	54.0	-6.2	1.32 H	201	45.5	2.3
5	#10480.00	61.1 PK	68.2	-7.1	2.00 H	152	48.7	12.4
6	15720.00	55.2 PK	74.0	-18.8	1.42 H	148	43.2	12.0
7	15720.00	42.6 AV	54.0	-11.4	1.42 H	148	30.6	12.0
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	*5240.00	120.2 PK			2.18 V	193	118.0	2.2
2	*5240.00	109.0 AV			2.18 V	193	106.8	2.2
3	5350.00	60.3 PK	74.0	-13.7	2.18 V	193	58.0	2.3
4	5350.00	47.5 AV	54.0	-6.5	2.18 V	193	45.2	2.3
5	#10480.00	61.8 PK	68.2	-6.4	1.42 V	205	49.4	12.4
6	15720.00	57.1 PK	74.0	-16.9	2.03 V	167	45.1	12.0
7	15720.00	44.2 AV	54.0	-9.8	2.03 V	167	32.2	12.0

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 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	#5625.60	64.2 PK	68.2	-4.0	1.00 H	315	51.6	12.6
2	*5745.00	115.1 PK			1.30 H	219	112.2	2.9
3	*5745.00	104.9 AV			1.30 H	219	102.0	2.9
4	#5929.60	64.2 PK	68.2	-4.0	1.00 H	315	50.6	13.6
5	11490.00	61.1 PK	74.0	-12.9	1.96 H	147	48.8	12.3
6	11490.00	50.1 AV	54.0	-3.9	1.96 H	147	37.8	12.3
7	#17235.00	56.1 PK	68.2	-12.1	1.32 H	162	40.8	15.3
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	#5600.00	63.1 PK	68.2	-5.1	1.39 V	146	50.5	12.6
2	*5745.00	124.2 PK			2.19 V	194	121.3	2.9
3	*5745.00	114.0 AV			2.19 V	194	111.1	2.9
4	#5964.00	64.1 PK	68.2	-4.1	1.39 V	146	50.3	13.8
5	11490.00	62.0 PK	74.0	-12.0	1.37 V	190	49.7	12.3
6	11490.00	50.5 AV	54.0	-3.5	1.37 V	190	38.2	12.3
7	#17235.00	56.8 PK	68.2	-11.4	1.95 V	162	41.5	15.3

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	#5635.20	63.5 PK	68.2	-4.7	1.08 H	315	50.9	12.6
2	*5785.00	116.2 PK			1.36 H	223	113.1	3.1
3	*5785.00	105.9 AV			1.36 H	223	102.8	3.1
4	#5965.60	64.0 PK	68.2	-4.2	1.08 H	315	50.2	13.8
5	11570.00	61.2 PK	74.0	-12.8	1.98 H	152	48.8	12.4
6	11570.00	49.7 AV	54.0	-4.3	1.98 H	152	37.3	12.4
7	#17355.00	56.7 PK	68.2	-11.5	1.36 H	190	40.7	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.00	63.4 PK	68.2	-4.8	1.25 V	147	50.8	12.6
2	*5785.00	124.0 PK			2.12 V	189	120.9	3.1
3	*5785.00	113.4 AV			2.12 V	189	110.3	3.1
4	#5938.40	63.9 PK	68.2	-4.3	1.25 V	147	50.3	13.6
5	11570.00	61.0 PK	74.0	-13.0	1.39 V	194	48.6	12.4
6	11570.00	49.4 AV	54.0	-4.6	1.39 V	194	37.0	12.4
7	#17355.00	57.1 PK	68.2	-11.1	2.03 V	184	41.1	16.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.80	62.9 PK	68.2	-5.3	1.02 H	315	50.3	12.6
2	*5825.00	117.3 PK			1.32 H	217	114.1	3.2
3	*5825.00	106.2 AV			1.32 H	217	103.0	3.2
4	#5973.60	64.0 PK	68.2	-4.2	1.02 H	315	50.3	13.7
5	11650.00	60.9 PK	74.0	-13.1	2.04 H	145	48.5	12.4
6	11650.00	49.0 AV	54.0	-5.0	2.04 H	145	36.6	12.4
7	#17475.00	56.1 PK	68.2	-12.1	1.40 H	160	38.7	17.4
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	#5611.20	64.0 PK	68.2	-4.2	1.24 V	148	51.4	12.6
2	*5825.00	124.2 PK			2.18 V	204	121.0	3.2
3	*5825.00	114.4 AV			2.18 V	204	111.2	3.2
4	#5928.00	64.8 PK	68.2	-3.4	1.24 V	148	51.2	13.6
5	11650.00	60.9 PK	74.0	-13.1	1.44 V	209	48.5	12.4
6	11650.00	49.6 AV	54.0	-4.4	1.44 V	209	37.2	12.4
7	#17475.00	57.3 PK	68.2	-10.9	2.04 V	177	39.9	17.4

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	63.1 PK	74.0	-10.9	1.38 H	225	60.5	2.6
2	5150.00	48.6 AV	54.0	-5.4	1.38 H	225	46.0	2.6
3	*5190.00	102.6 PK			1.38 H	225	100.1	2.5
4	*5190.00	92.9 AV			1.38 H	225	90.4	2.5
5	#10380.00	61.9 PK	68.2	-6.3	2.05 H	152	49.9	12.0
6	15570.00	56.4 PK	74.0	-17.6	1.33 H	170	43.8	12.6
7	15570.00	43.2 AV	54.0	-10.8	1.33 H	170	30.6	12.6
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	68.2 PK	74.0	-5.8	2.15 V	193	65.6	2.6
2	5150.00	53.4 AV	54.0	-0.6	2.15 V	193	50.8	2.6
3	*5190.00	110.2 PK			2.15 V	193	107.7	2.5
4	*5190.00	100.8 AV			2.15 V	193	98.3	2.5
5	#10380.00	63.5 PK	68.2	-4.7	1.38 V	208	51.5	12.0
6	15570.00	57.5 PK	74.0	-16.5	2.02 V	167	44.9	12.6
7	15570.00	44.0 AV	54.0	-10.0	2.02 V	167	31.4	12.6

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	*5230.00	105.0 PK			1.33 H	211	102.8	2.2
2	*5230.00	95.8 AV			1.33 H	211	93.6	2.2
3	5350.00	61.9 PK	74.0	-12.1	1.33 H	211	59.6	2.3
4	5350.00	48.1 AV	54.0	-5.9	1.33 H	211	45.8	2.3
5	#10460.00	61.2 PK	68.2	-7.0	2.00 H	137	48.8	12.4
6	15690.00	56.3 PK	74.0	-17.7	1.38 H	167	44.1	12.2
7	15690.00	43.1 AV	54.0	-10.9	1.38 H	167	30.9	12.2
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	*5230.00	114.6 PK			2.10 V	199	112.4	2.2
2	*5230.00	105.4 AV			2.10 V	199	103.2	2.2
3	5350.00	65.3 PK	74.0	-8.7	2.11 V	177	63.0	2.3
4	5350.00	53.6 AV	54.0	-0.4	2.11 V	177	51.3	2.3
5	#10460.00	61.9 PK	68.2	-6.3	1.41 V	216	49.5	12.4
6	15690.00	57.4 PK	74.0	-16.6	1.94 V	170	45.2	12.2
7	15690.00	43.9 AV	54.0	-10.1	1.94 V	170	31.7	12.2

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	#5633.60	64.0 PK	68.2	-4.2	1.00 H	306	51.4	12.6
2	*5755.00	113.8 PK			1.27 H	197	110.8	3.0
3	*5755.00	104.4 AV			1.27 H	197	101.4	3.0
4	#5982.40	63.9 PK	68.2	-4.3	1.00 H	306	50.2	13.7
5	11510.00	61.4 PK	74.0	-12.6	1.98 H	157	49.1	12.3
6	11510.00	50.5 AV	54.0	-3.5	1.98 H	157	38.2	12.3
7	#17265.00	56.6 PK	68.2	-11.6	1.37 H	160	41.2	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.00	65.3 PK	68.2	-2.9	1.17 V	230	52.7	12.6
2	*5755.00	121.5 PK			2.08 V	181	118.5	3.0
3	*5755.00	111.8 AV			2.08 V	181	108.8	3.0
4	#5950.40	63.8 PK	68.2	-4.4	1.17 V	230	50.1	13.7
5	11510.00	61.3 PK	74.0	-12.7	1.39 V	186	49.0	12.3
6	11510.00	50.0 AV	54.0	-4.0	1.39 V	186	37.7	12.3
7	#17265.00	56.9 PK	68.2	-11.3	2.02 V	158	41.5	15.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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	#5618.40	63.7 PK	68.2	-4.5	1.00 H	315	51.1	12.6
2	*5795.00	114.6 PK			1.37 H	220	111.6	3.0
3	*5795.00	104.6 AV			1.37 H	220	101.6	3.0
4	#5934.40	64.8 PK	68.2	-3.4	1.00 H	315	51.2	13.6
5	11590.00	60.3 PK	74.0	-13.7	2.00 H	152	47.9	12.4
6	11590.00	48.7 AV	54.0	-5.3	2.00 H	152	36.3	12.4
7	#17385.00	56.0 PK	68.2	-12.2	1.38 H	179	39.8	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.80	63.1 PK	68.2	-5.1	1.38 V	91	50.5	12.6
2	*5795.00	122.3 PK			2.16 V	204	119.3	3.0
3	*5795.00	111.6 AV			2.16 V	204	108.6	3.0
4	#5926.40	64.0 PK	68.2	-4.2	1.38 V	91	50.4	13.6
5	11590.00	61.4 PK	74.0	-12.6	1.41 V	197	49.0	12.4
6	11590.00	50.0 AV	54.0	-4.0	1.41 V	197	37.6	12.4
7	#17385.00	56.9 PK	68.2	-11.3	1.99 V	170	40.7	16.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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	62.1 PK	74.0	-11.9	1.33 H	225	59.5	2.6
2	5150.00	48.1 AV	54.0	-5.9	1.33 H	225	45.5	2.6
3	*5210.00	97.6 PK			1.33 H	225	95.2	2.4
4	*5210.00	87.5 AV			1.33 H	225	85.1	2.4
5	5350.00	59.1 PK	74.0	-14.9	1.33 H	225	56.8	2.3
6	5350.00	46.5 AV	54.0	-7.5	1.33 H	225	44.2	2.3
7	#10420.00	60.9 PK	68.2	-7.3	2.06 H	136	48.7	12.2
8	15630.00	56.2 PK	74.0	-17.8	1.39 H	162	43.5	12.7
9	15630.00	43.2 AV	54.0	-10.8	1.39 H	162	30.5	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.1 PK	74.0	-7.9	2.12 V	190	63.5	2.6
2	5150.00	53.4 AV	54.0	-0.6	2.12 V	190	50.8	2.6
3	*5210.00	106.9 PK			2.12 V	190	104.5	2.4
4	*5210.00	97.3 AV			2.12 V	190	94.9	2.4
5	5350.00	59.2 PK	74.0	-14.8	2.12 V	190	56.9	2.3
6	5350.00	46.6 AV	54.0	-7.4	2.12 V	190	44.3	2.3
7	#10420.00	62.2 PK	68.2	-6.0	1.44 V	214	50.0	12.2
8	15630.00	56.9 PK	74.0	-17.1	1.97 V	171	44.2	12.7
9	15630.00	44.0 AV	54.0	-10.0	1.97 V	171	31.3	12.7

REMARKS:

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

CHANNEL	TX Channel 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	#5645.60	65.5 PK	68.2	-2.7	1.00 H	305	53.1	12.4
2	*5775.00	112.8 PK			1.31 H	213	109.8	3.0
3	*5775.00	102.9 AV			1.31 H	213	99.9	3.0
4	#5929.60	64.5 PK	68.2	-3.7	1.00 H	305	50.9	13.6
5	11550.00	63.0 PK	74.0	-11.0	2.00 H	132	50.6	12.4
6	11550.00	49.7 AV	54.0	-4.3	2.00 H	132	37.3	12.4
7	#17325.00	56.6 PK	68.2	-11.6	1.38 H	176	40.9	15.7
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	#5632.00	66.7 PK	68.2	-1.5	1.00 V	159	54.1	12.6
2	*5775.00	117.0 PK			2.16 V	185	114.0	3.0
3	*5775.00	106.7 AV			2.16 V	185	103.7	3.0
4	#5932.80	66.1 PK	68.2	-2.1	1.00 V	159	52.5	13.6
5	11550.00	62.3 PK	74.0	-11.7	1.38 V	194	49.9	12.4
6	11550.00	49.4 AV	54.0	-4.6	1.38 V	194	37.0	12.4
7	#17325.00	57.4 PK	68.2	-10.8	1.99 V	176	41.7	15.7

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.

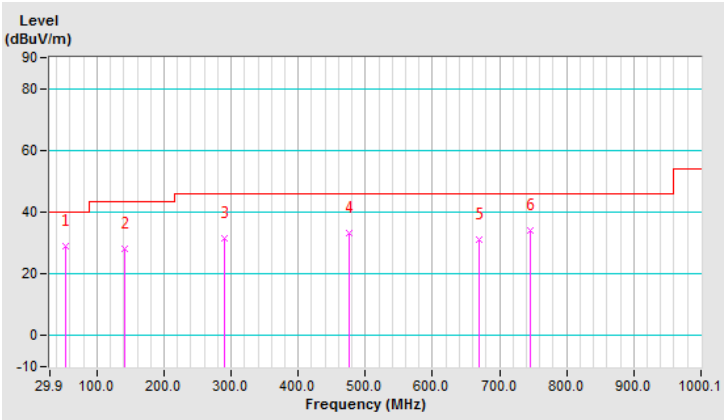
Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	53.18	28.9 QP	40.0	-11.1	1.01 H	102	37.6	-8.7
2	140.50	28.0 QP	43.5	-15.5	1.01 H	89	37.2	-9.2
3	289.91	31.4 QP	46.0	-14.6	1.01 H	121	39.5	-8.1
4	476.19	33.1 QP	46.0	-12.9	1.50 H	7	38.3	-5.2
5	670.23	31.2 QP	46.0	-14.8	1.01 H	297	32.3	-1.1
6	745.91	34.0 QP	46.0	-12.0	1.50 H	8	33.0	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

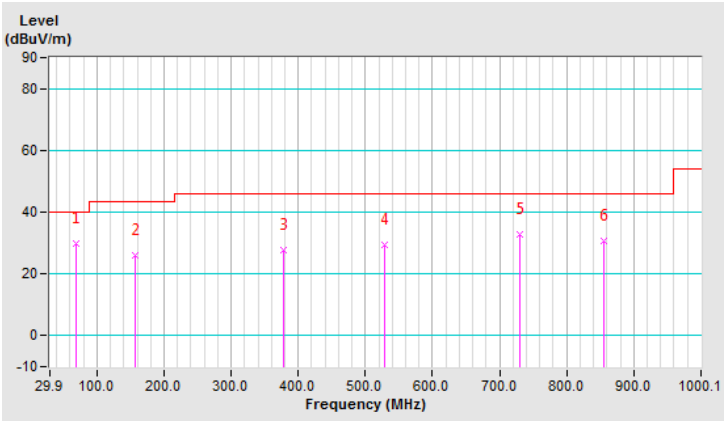


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz	TEST MODE	A

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	30.0 QP	40.0	-10.0	1.50 V	294	40.1	-10.1
2	157.97	26.2 QP	43.5	-17.3	1.00 V	6	34.7	-8.5
3	377.23	27.8 QP	46.0	-18.2	1.00 V	290	34.5	-6.7
4	528.58	29.6 QP	46.0	-16.4	1.00 V	35	34.0	-4.4
5	730.38	32.6 QP	46.0	-13.4	1.00 V	6	32.1	0.5
6	854.57	30.8 QP	46.0	-15.2	1.50 V	13	28.0	2.8

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

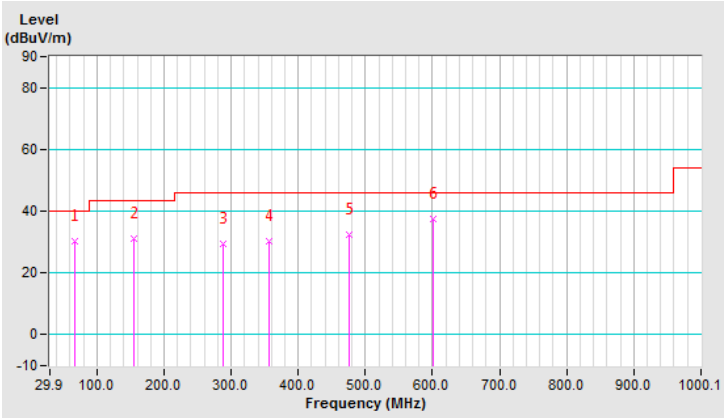


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz	TEST MODE	B

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	66.77	30.3 QP	40.0	-9.7	1.00 H	118	40.2	-9.9
2	156.03	31.2 QP	43.5	-12.3	1.50 H	306	39.7	-8.5
3	287.97	29.6 QP	46.0	-16.4	1.00 H	258	37.8	-8.2
4	355.89	30.1 QP	46.0	-15.9	1.00 H	142	37.3	-7.2
5	476.19	32.2 QP	46.0	-13.8	1.50 H	209	37.4	-5.2
6	600.38	37.3 QP	46.0	-8.7	1.50 H	164	39.6	-2.3

REMARKS:

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

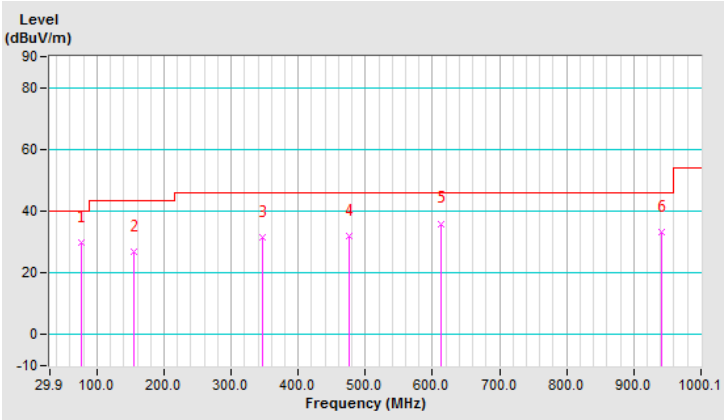


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz	TEST MODE	B

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	76.47	29.7 QP	40.0	-10.3	1.01 V	13	41.3	-11.6
2	156.03	26.9 QP	43.5	-16.6	1.50 V	66	35.4	-8.5
3	346.19	31.6 QP	46.0	-14.4	1.50 V	186	39.0	-7.4
4	476.19	32.0 QP	46.0	-14.0	1.50 V	34	37.2	-5.2
5	612.02	36.0 QP	46.0	-10.0	1.50 V	183	37.9	-1.9
6	941.89	33.2 QP	46.0	-12.8	1.01 V	62	28.9	4.3

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Feb. 08, 2018	Feb. 07, 2019
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 05, 2018	Feb. 04, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2018	Aug. 12, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	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 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedure

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

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

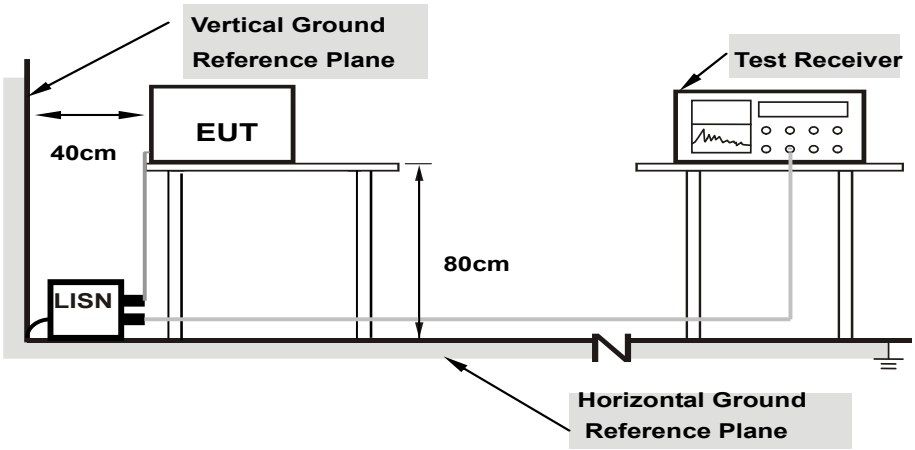
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

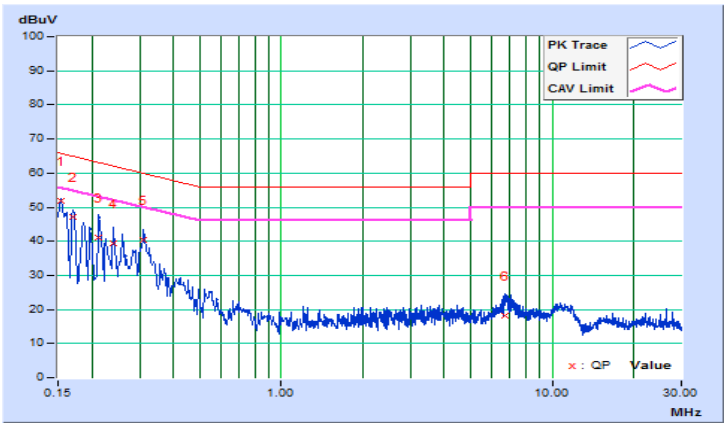
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value		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	**0.15391**	**9.73**	**42.01**	**24.88**	**51.74**	**34.61**	**65.79**	**55.79**	**-14.05**	**-21.18**
2	0.16967	9.73	37.37	20.08	47.10	29.81	64.98	54.98	-17.88	-25.17
3	0.21256	9.72	31.51	15.33	41.23	25.05	63.10	53.10	-21.87	-28.05
4	0.23993	9.73	29.63	14.97	39.36	24.70	62.10	52.10	-22.74	-27.40
5	0.31021	9.74	30.73	22.70	40.47	32.44	59.96	49.96	-19.49	-17.52
6	6.66406	9.83	8.49	0.47	18.32	10.30	60.00	50.00	-41.68	-39.70

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.

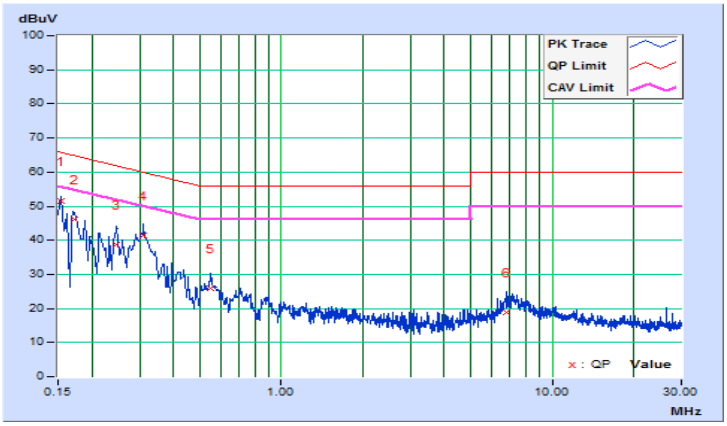


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.15391	9.72	41.74	24.31	51.46	34.03	65.79	55.79	-14.33	-21.76
2	0.17346	9.72	36.52	19.82	46.24	29.54	64.79	54.79	-18.55	-25.25
3	0.24775	9.73	28.90	15.89	38.63	25.62	61.83	51.83	-23.20	-26.21
4	0.31031	9.74	31.79	24.42	41.53	34.16	59.96	49.96	-18.43	-15.80
5	0.54882	9.74	16.34	10.16	26.08	19.90	56.00	46.00	-29.92	-26.10
6	6.78527	9.86	8.84	0.65	18.70	10.51	60.00	50.00	-41.30	-39.49

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.

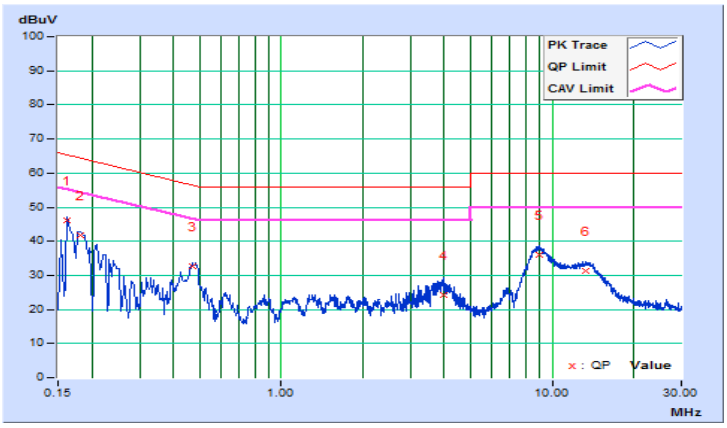


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16181	9.73	36.38	20.44	46.11	30.17	65.37	55.37	-19.26	-25.20
2	0.18075	9.72	31.91	16.71	41.63	26.43	64.45	54.45	-22.82	-28.02
3	0.47039	9.74	22.98	13.84	32.72	23.58	56.51	46.51	-23.79	-22.93
4	3.98962	9.79	14.51	3.68	24.30	13.47	56.00	46.00	-31.70	-32.53
5	8.94359	9.86	26.27	20.08	36.13	29.94	60.00	50.00	-23.87	-20.06
6	13.29151	9.91	21.39	14.59	31.30	24.50	60.00	50.00	-28.70	-25.50

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.

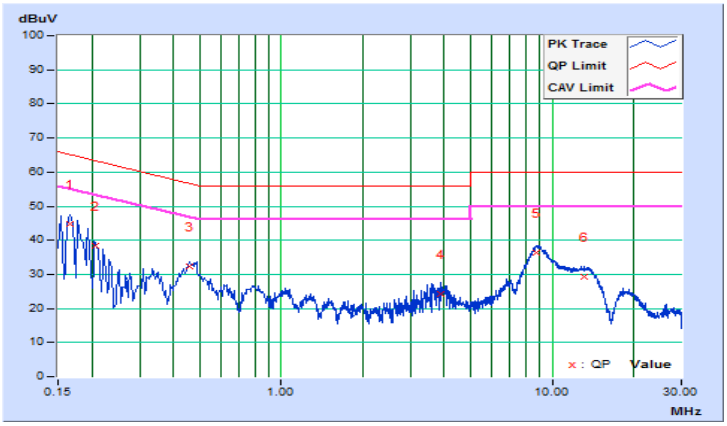


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16569	9.72	35.06	18.41	44.78	28.13	65.17	55.17	-20.39	-27.04
2	0.20511	9.73	28.55	14.65	38.28	24.38	63.40	53.40	-25.12	-29.02
3	0.45937	9.75	22.43	17.98	32.18	27.73	56.70	46.70	-24.52	-18.97
4	3.88014	9.81	14.45	4.02	24.26	13.83	56.00	46.00	-31.74	-32.17
5	8.71693	9.89	26.35	20.09	36.24	29.98	60.00	50.00	-23.76	-20.02
6	13.21722	9.97	19.43	12.75	29.40	22.72	60.00	50.00	-30.60	-27.28

REMARKS:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

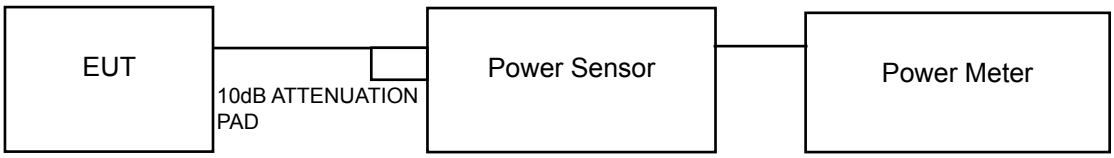
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz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

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

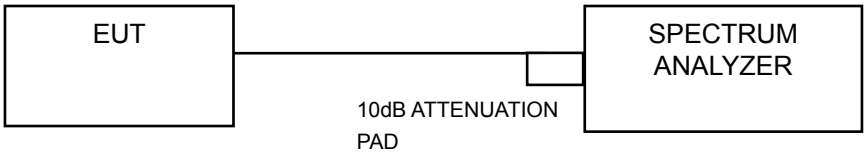
4.3.2 Test Setup

For Power Output Measurement

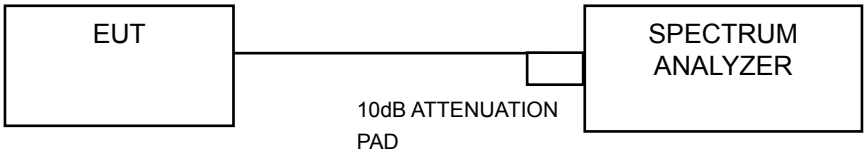
For 802.11a, 802.11n (HT20), 802.11n (HT40)



For 802.11ac (VHT80)



For 26dB and Occupied Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11ac (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.

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:
For U-NII-1 Band:

CDD Mode

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.45	22.70	362.001	25.59	30	Pass
40	5200	26.11	26.63	**868.576**	29.39	30	Pass
48	5240	25.21	25.41	679.430	28.32	30	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.45	22.69	361.572	25.58	30	Pass
40	5200	26.12	26.46	851.849	29.30	30	Pass
48	5240	25.14	25.45	677.340	28.31	30	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.73	21.08	246.537	23.92	30	Pass
46	5230	24.44	24.74	575.823	27.60	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	20.67	20.93	240.561	23.81	30	Pass

Beamforming_NSS1 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.45	22.69	361.572	25.58	30	Pass
40	5200	26.12	26.46	**851.849**	29.30	30	Pass
48	5240	25.14	25.45	677.340	28.31	30	Pass

Note: Directional gain = 4.18dBi < 6dBi, so the power limit is not reduced.

802.11ac (VHT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.73	21.08	246.537	23.92	30	Pass
46	5230	24.44	24.74	575.823	27.60	30	Pass

Note: Directional gain = 4.18dBi < 6dBi, so the power limit is not reduced.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	20.67	20.93	240.561	23.81	30	Pass

Note: Directional gain = 4.18dBi < 6dBi, so the power limit is not reduced.

For U-NII-3 Band:

CDD Mode

802.11a

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.58	23.26	23.70	23.63	**904.968**	29.57	30	Pass
157	5785	23.21	23.32	23.30	23.23	848.368	29.29	30	Pass
165	5825	23.37	23.34	23.37	23.18	858.284	29.34	30	Pass

802.11ac (VHT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.37	23.11	23.45	23.33	858.501	29.34	30	Pass
157	5785	23.43	23.25	23.43	23.16	858.949	29.34	30	Pass
165	5825	23.60	23.18	23.48	23.06	862.203	29.36	30	Pass

802.11ac (VHT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.19	23.35	23.49	23.22	857.972	29.33	30	Pass
159	5795	23.39	23.39	23.46	23.30	872.162	29.41	30	Pass

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	23.48	23.28	23.42	23.20	864.374	29.37	30	Pass

Beamforming_NSS1 Mode

802.11ac (VHT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	21.47	21.59	22.22	21.63	596.764	27.76	28.57	Pass
157	5785	21.70	21.69	21.87	21.76	**599.265**	27.78	28.57	Pass
165	5825	21.62	21.55	21.81	21.55	582.694	27.65	28.57	Pass

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

802.11ac (VHT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	21.59	21.60	21.88	21.66	589.481	27.70	28.57	Pass
159	5795	21.61	21.63	21.96	21.50	588.713	27.70	28.57	Pass

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

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	21.70	21.57	21.98	21.49	590.150	27.71	28.57	Pass

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

Beamforming_NSS2 Mode

802.11ac (VHT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.43	23.06	23.45	23.35	860.176	29.35	30	Pass
157	5785	23.38	23.18	23.38	23.16	850.526	29.30	30	Pass
165	5825	23.65	23.12	23.46	23.05	860.512	29.35	30	Pass

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

802.11ac (VHT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.26	23.28	23.52	23.24	860.418	29.35	30	Pass
159	5795	23.43	23.40	23.50	23.32	**877.724**	29.43	30	Pass

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

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	23.53	23.35	23.47	23.24	874.890	29.42	30	Pass

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

26dB Bandwidth:

CDD Mode

802.11a

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

802.11ac (VHT20)

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

802.11ac (VHT40)

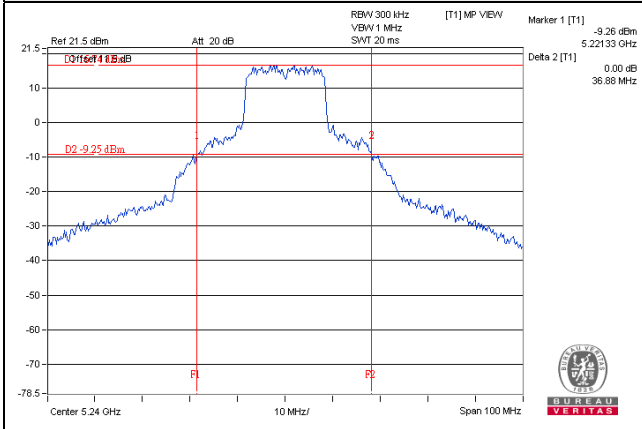
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	40.80	41.01	Pass
46	5230	75.00	84.72	Pass

802.11ac (VHT80)

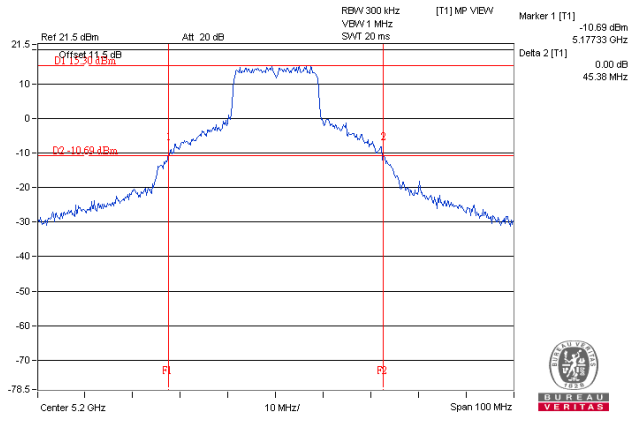
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	83.81	83.79	Pass

Spectrum Plot of Worst Value

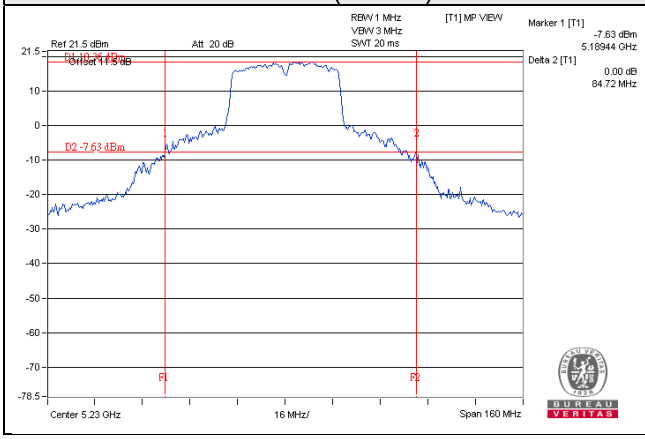
802.11a



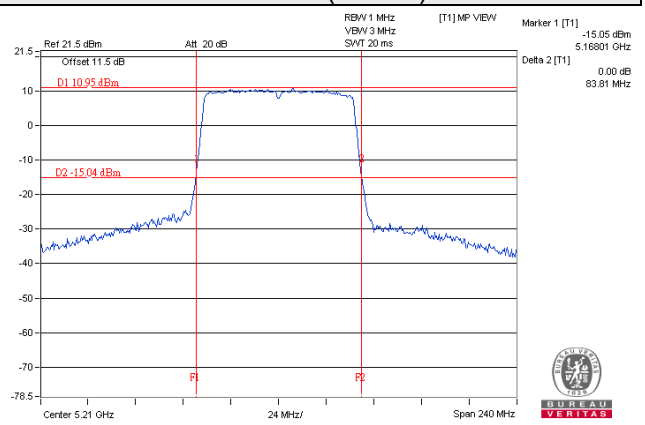
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS1 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	20.85	20.73	Pass
40	5200	42.77	41.69	Pass
48	5240	33.34	33.07	Pass

802.11ac (VHT40)

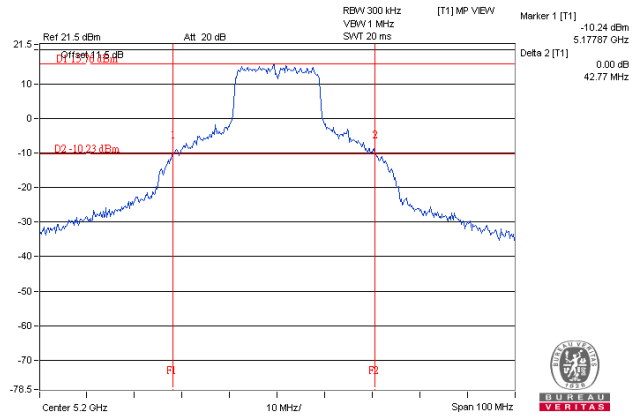
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	41.05	40.71	Pass
46	5230	71.78	68.02	Pass

802.11ac (VHT80)

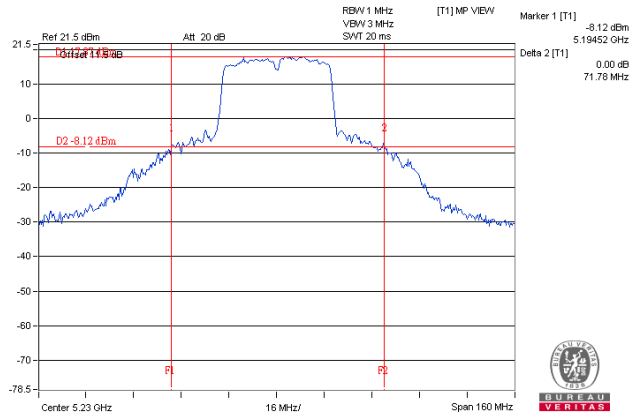
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	84.34	84.17	Pass

Spectrum Plot of Worst Value

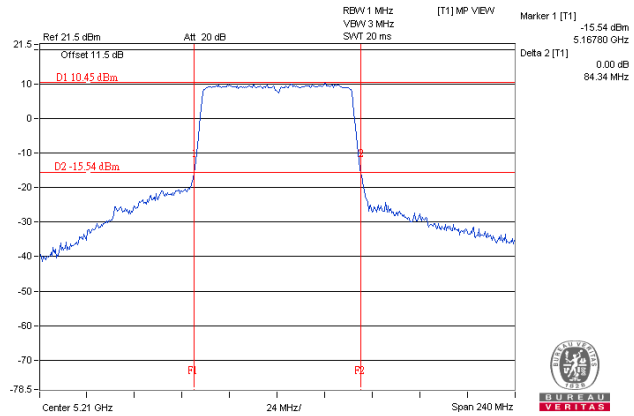
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Occupied Bandwidth:
For U-NII-1 Band:

CDD Mode

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

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

802.11ac (VHT40)

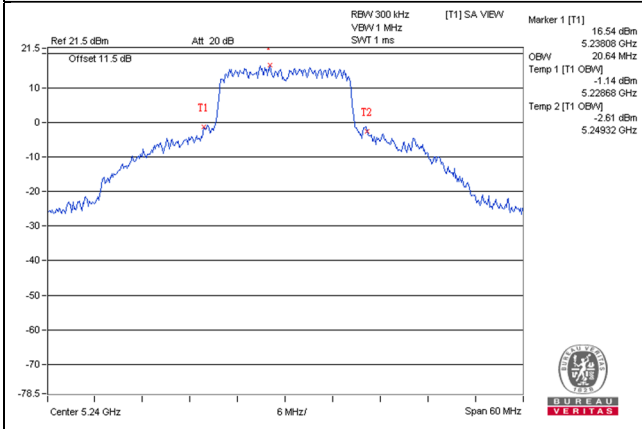
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.24
46	5230	36.60	37.32

802.11ac (VHT80)

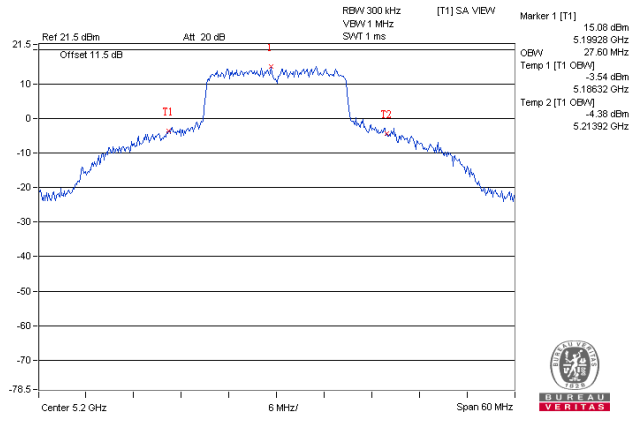
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.88	76.16

Spectrum Plot of Worst Value

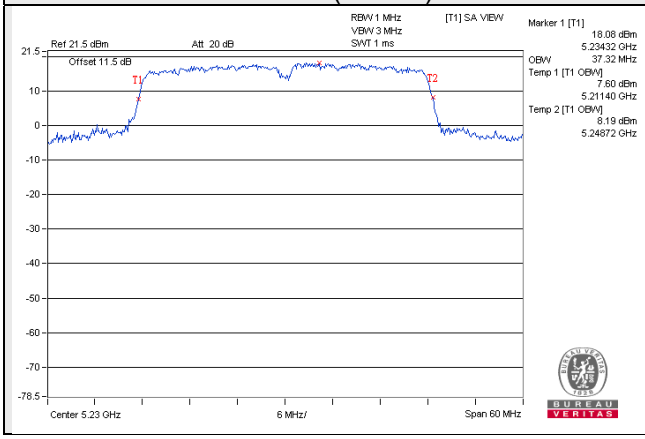
802.11a



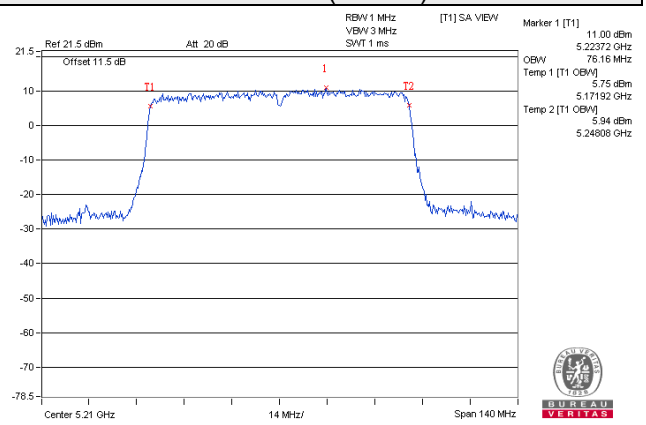
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS1 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	23.52	21.00
48	5240	18.00	18.00

802.11ac (VHT40)

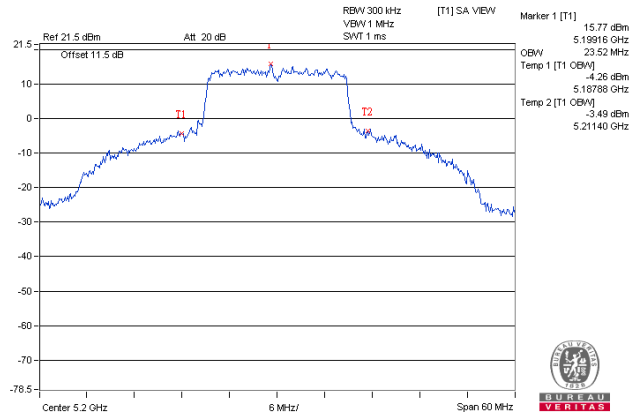
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.00
46	5230	36.48	36.48

802.11ac (VHT80)

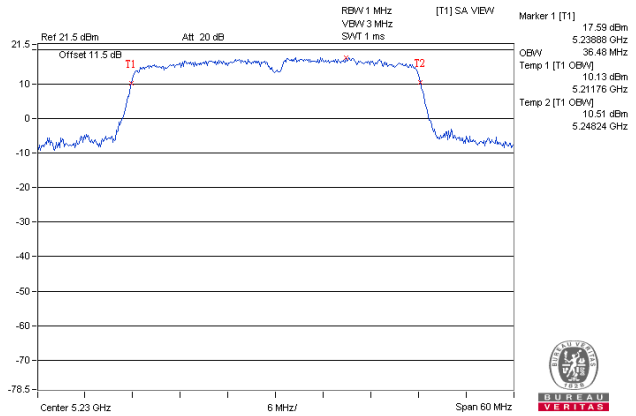
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.88	75.88

Spectrum Plot of Worst Value

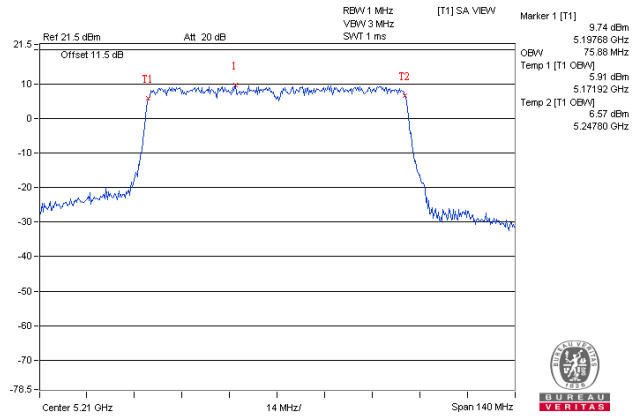
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



5GHz U-NII-3 Band:

CDD Mode

802.11a

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	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)

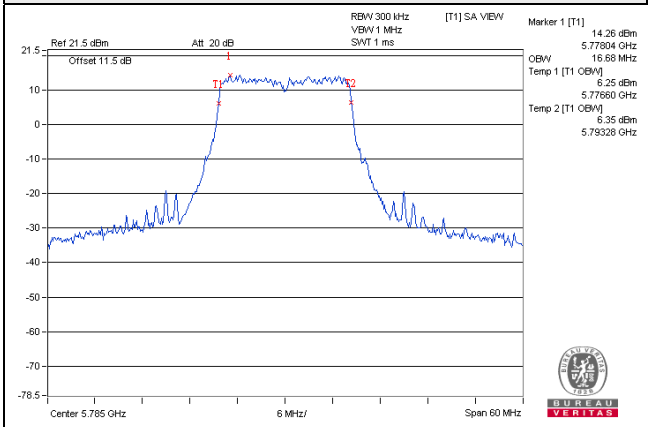
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.24	36.00	36.12	36.24
159	5795	36.24	36.00	36.12	36.00

802.11ac (VHT80)

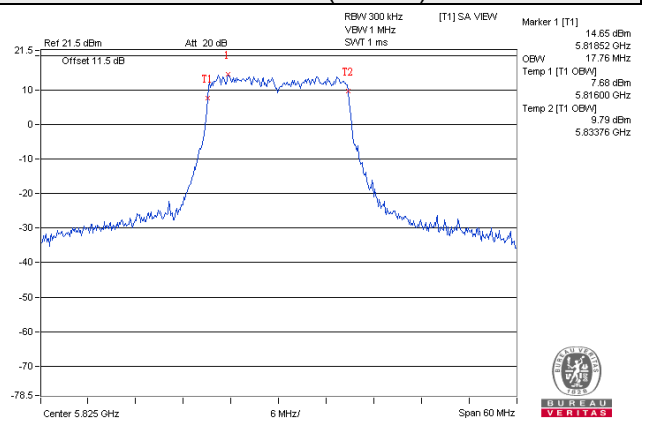
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.88	75.60	75.88	76.16

Spectrum Plot of Worst Value

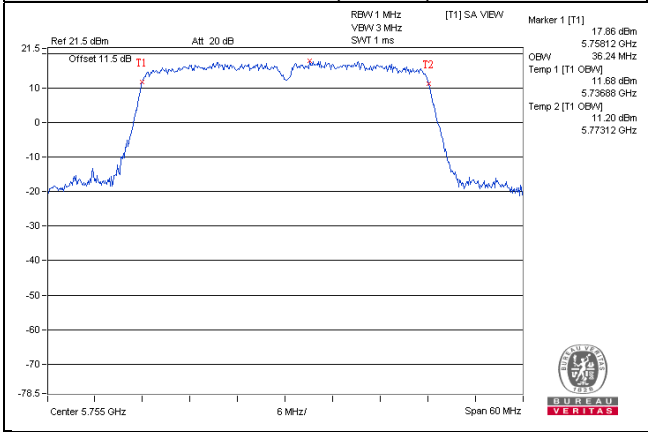
802.11a



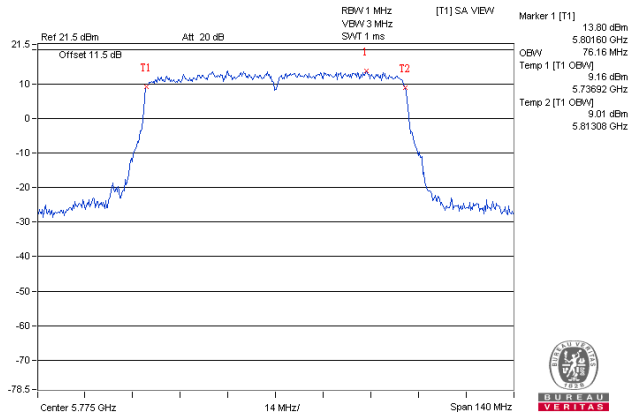
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS1 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.65	17.65	17.65	17.65
157	5785	17.64	17.64	17.64	17.64
165	5825	17.64	17.64	17.64	17.64

802.11ac (VHT40)

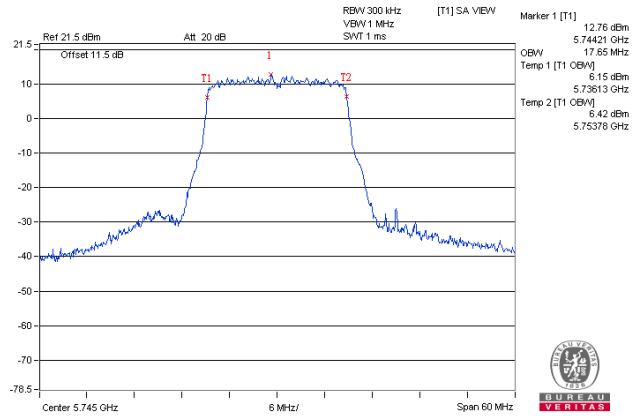
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.12	36.00	36.12	36.00
159	5795	36.12	36.00	36.12	36.00

802.11ac (VHT80)

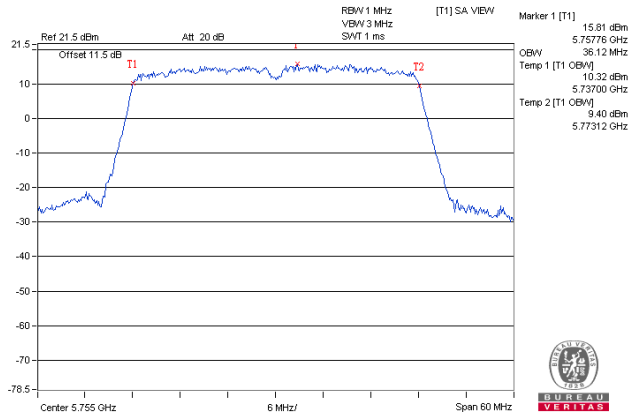
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.88	75.60	75.88	75.60

Spectrum Plot of Worst Value

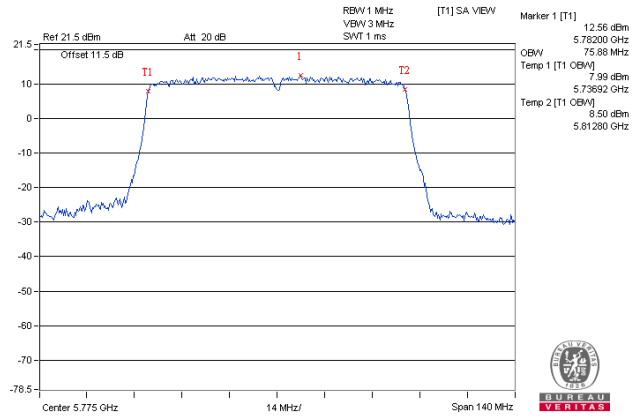
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS2 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.65	17.65	17.65	17.65
157	5785	17.64	17.64	17.64	17.64
165	5825	17.64	17.64	17.64	17.64

802.11ac (VHT40)

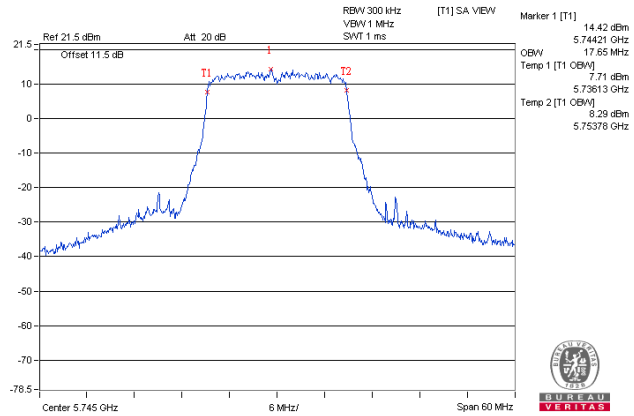
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.24	36.00	36.12	36.12
159	5795	36.12	36.00	36.12	36.12

802.11ac (VHT80)

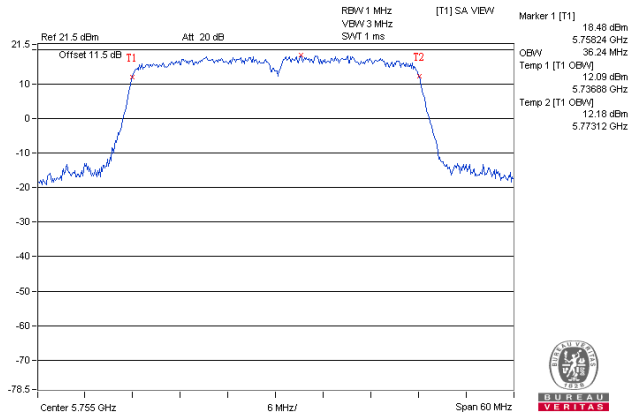
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.88	75.88	76.44	76.16

Spectrum Plot of Worst Value

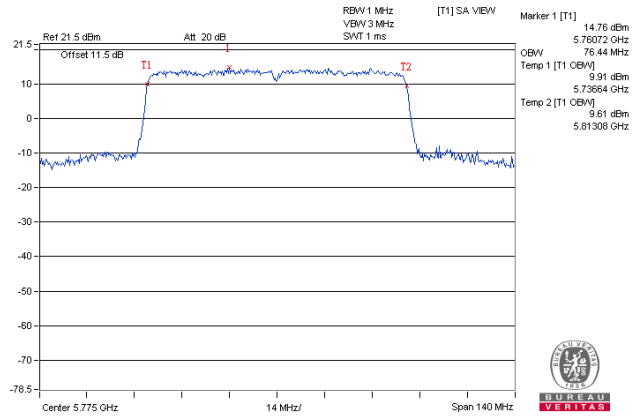
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

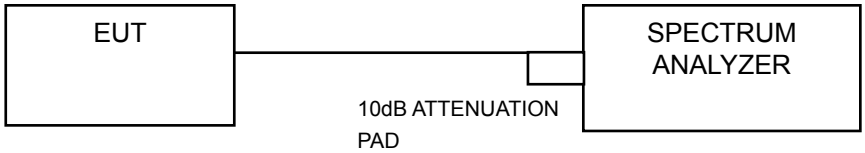


4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

For U-NII-1 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 1 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 = 30 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
3) Sweep time = auto, trigger set to “free run”.
4) Trace average at least 100 traces in power averaging mode.
5) Record the max value and add 10 log (1/duty cycle)
6) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

CDD Mode

802.11a

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	8.63	8.64	11.65	0.18	11.83	17.00	Pass
40	5200	11.03	11.12	14.09	0.18	14.27	17.00	Pass
48	5240	11.07	11.36	14.23	0.18	14.41	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 = 4.18dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	8.21	8.40	11.32	17.00	Pass
40	5200	10.78	10.64	13.72	17.00	Pass
48	5240	10.92	11.20	14.07	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 = 4.18dBi < 6dBi, so the limit no need to reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	3.78	3.83	6.81	0.16	6.97	17.00	Pass
46	5230	7.67	7.98	10.84	0.16	11.00	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 = 4.18dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

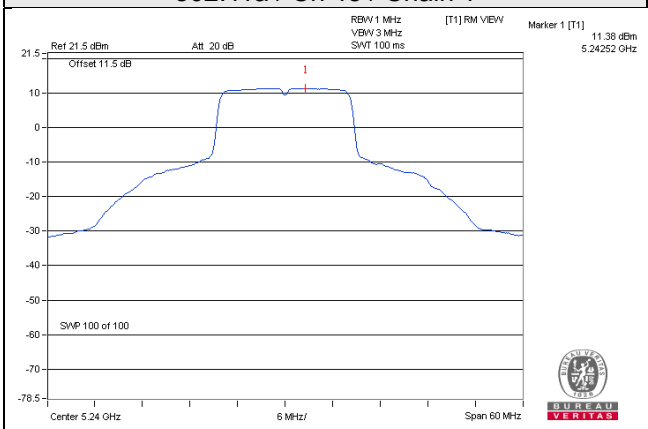
Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
42	5210	0.20	0.50	3.36	0.38	3.74	17.00	Pass

Note:

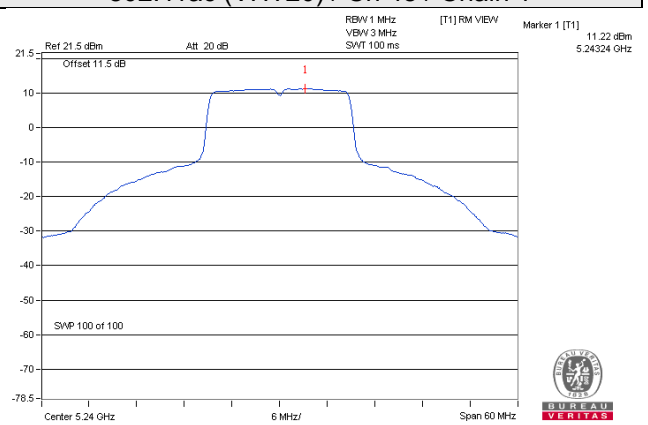
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 4.18dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

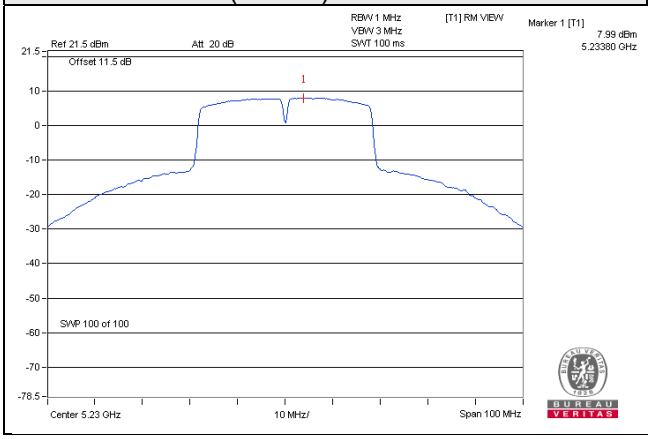
802.11a / Ch 48 / Chain 1



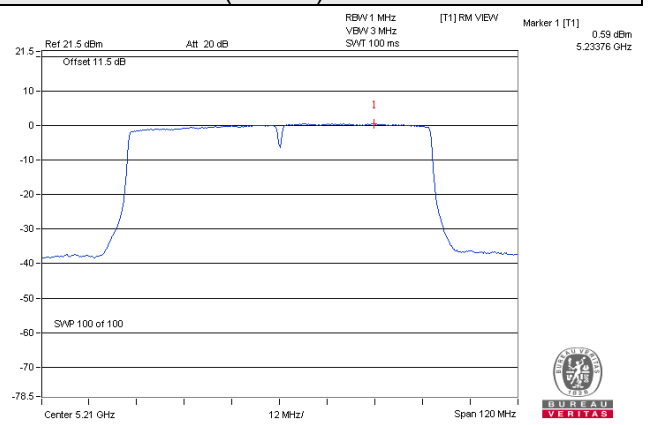
802.11ac (VHT20) / Ch 48 / Chain 1



802.11ac (VHT40) / Ch 46 / Chain 1



802.11ac (VHT80) / Ch 42 / Chain 1



Beamforming_NSS1 Mode

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	7.90	8.42	11.18	17.00	Pass
40	5200	10.69	11.58	14.17	17.00	Pass
48	5240	10.98	10.58	13.79	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 = 4.18dBi < 6dBi, so the limit no need to reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	3.30	3.69	6.51	0.17	6.68	17.00	Pass
46	5230	7.69	7.12	10.42	0.17	10.59	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 = 4.18dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

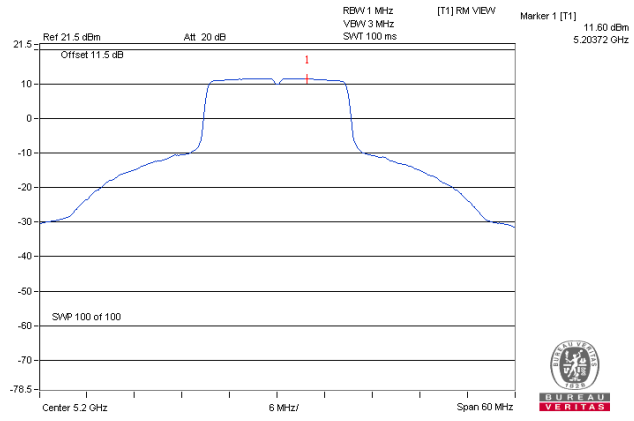
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
42	5210	-0.61	-0.11	2.66	0.38	3.04	17.00	Pass

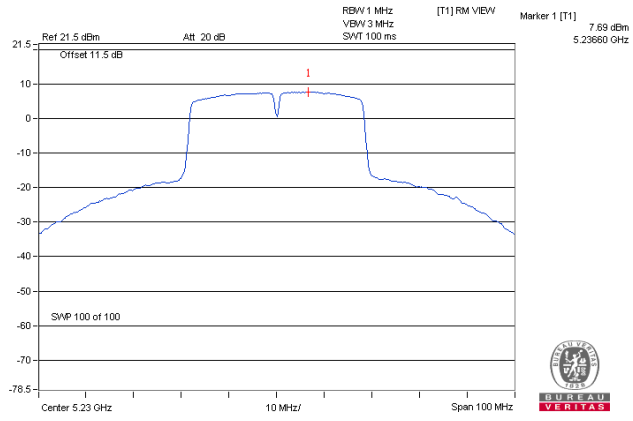
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 4.18dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

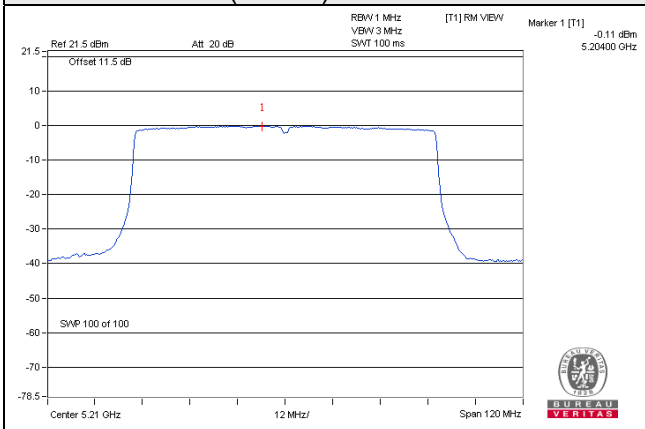
802.11ac (VHT20) / Ch 40 / Chain 1



802.11ac (VHT40) / Ch 46 / Chain 0



802.11ac (VHT80) / Ch 42 / Chain 1



For U-NII-3 Band

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	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	Channel	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	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-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)

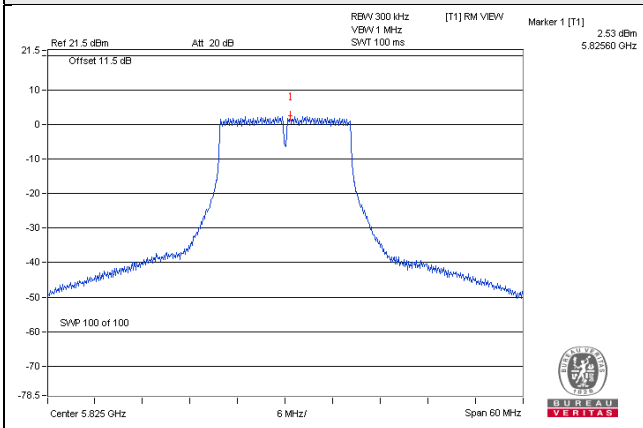
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-4.97	-2.75	6.02	0.28	3.55	28.57	Pass
1	155	5775	-4.74	-2.52	6.02	0.28	3.78	28.57	Pass
2	155	5775	-4.85	-2.63	6.02	0.28	3.67	28.57	Pass
3	155	5775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

Note:

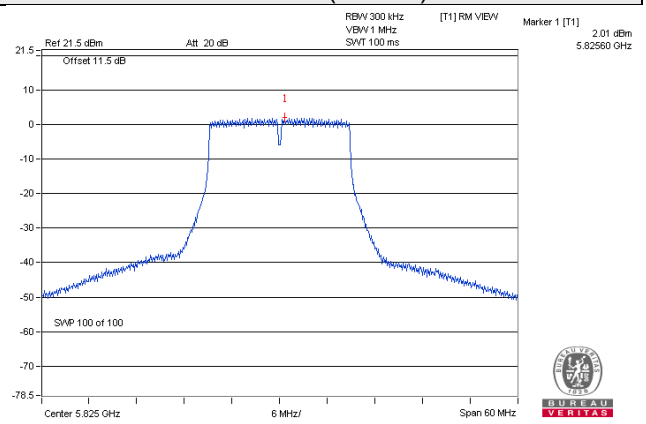
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6)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

Spectrum Plot of Worst Value

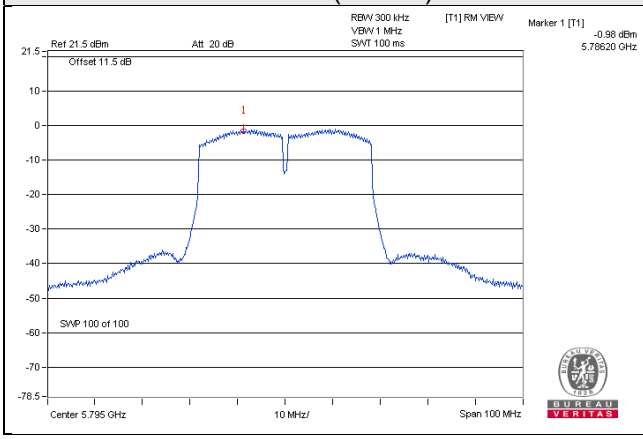
802.11a



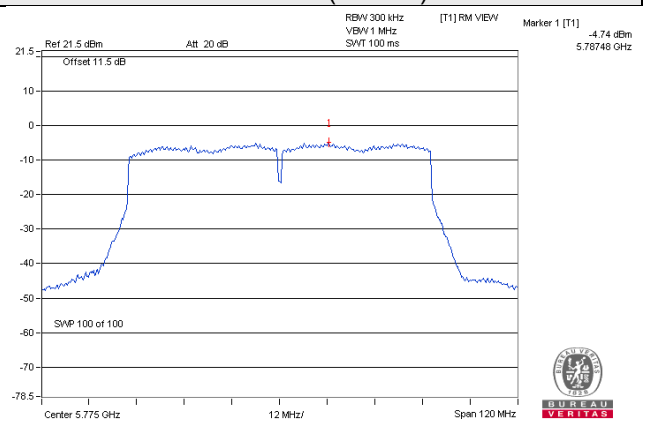
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS1 Mode

802.11ac (VHT20)

TX chain	Channel	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	-0.36	1.86	6.02	7.88	28.57	Pass
	157	5785	-0.29	1.93	6.02	7.95	28.57	Pass
	165	5825	-0.23	1.99	6.02	8.01	28.57	Pass
1	149	5745	-0.57	1.65	6.02	7.67	28.57	Pass
	157	5785	-0.31	1.91	6.02	7.93	28.57	Pass
	165	5825	-0.18	2.04	6.02	8.06	28.57	Pass
2	149	5745	-0.30	1.92	6.02	7.94	28.57	Pass
	157	5785	0.06	2.28	6.02	8.30	28.57	Pass
	165	5825	0.18	2.40	6.02	8.42	28.57	Pass
3	149	5745	-0.47	1.75	6.02	7.77	28.57	Pass
	157	5785	-0.24	1.98	6.02	8.00	28.57	Pass
	165	5825	0.07	2.29	6.02	8.31	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	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-3.37	-1.15	6.02	0.17	5.04	28.57	Pass
	159	5795	-3.37	-1.15	6.02	0.17	5.04	28.57	Pass
1	151	5755	-3.53	-1.31	6.02	0.17	4.88	28.57	Pass
	159	5795	-3.21	-0.99	6.02	0.17	5.20	28.57	Pass
2	151	5755	-3.49	-1.27	6.02	0.17	4.92	28.57	Pass
	159	5795	-3.33	-1.11	6.02	0.17	5.08	28.57	Pass
3	151	5755	-3.74	-1.52	6.02	0.17	4.67	28.57	Pass
	159	5795	-3.57	-1.35	6.02	0.17	4.84	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)

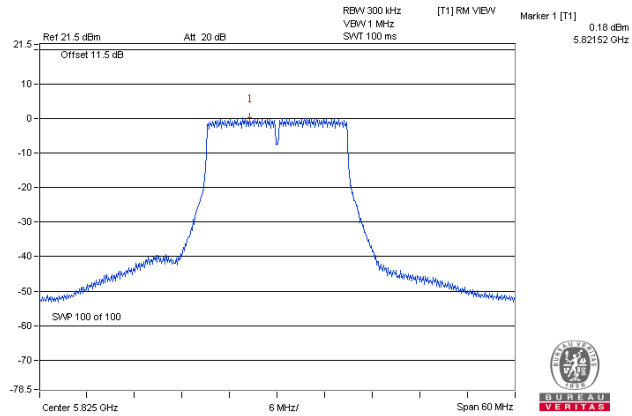
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-6.75	-4.53	6.02	0.33	1.82	28.57	Pass
1	155	5775	-6.87	-4.65	6.02	0.33	1.70	28.57	Pass
2	155	5775	-6.98	-4.76	6.02	0.33	1.59	28.57	Pass
3	155	5775	-7.14	-4.92	6.02	0.33	1.43	28.57	Pass

Note:

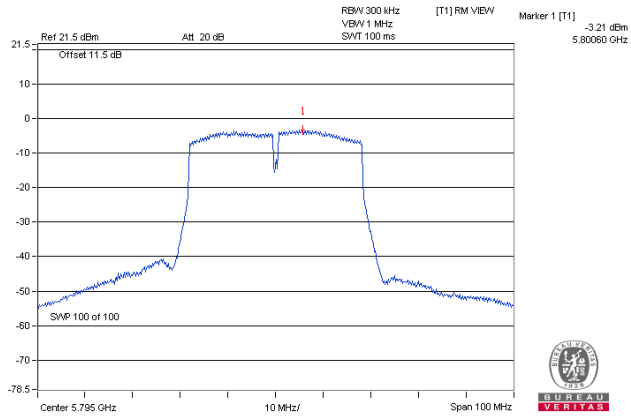
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 7.43dBi > 6dBi, so the limit shall be reduced to 30-(7.43-6)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

Spectrum Plot of Worst Value

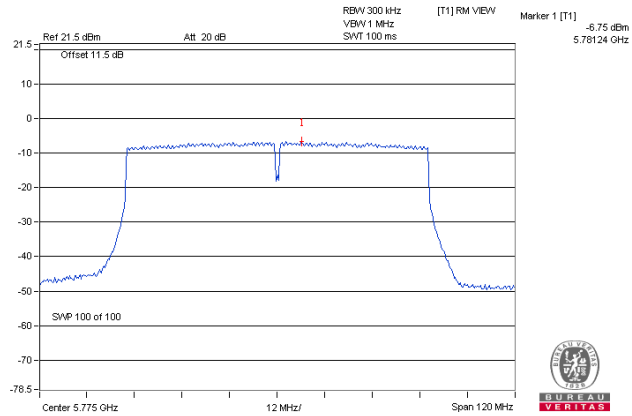
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS2 Mode

802.11ac (VHT20)

TX chain	Channel	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	1.09	3.31	6.02	9.33	30.00	Pass
	157	5785	1.20	3.42	6.02	9.44	30.00	Pass
	165	5825	1.27	3.49	6.02	9.51	30.00	Pass
1	149	5745	1.10	3.32	6.02	9.34	30.00	Pass
	157	5785	1.25	3.47	6.02	9.49	30.00	Pass
	165	5825	1.38	3.60	6.02	9.62	30.00	Pass
2	149	5745	1.06	3.28	6.02	9.30	30.00	Pass
	157	5785	1.33	3.55	6.02	9.57	30.00	Pass
	165	5825	1.54	3.76	6.02	9.78	30.00	Pass
3	149	5745	1.07	3.29	6.02	9.31	30.00	Pass
	157	5785	1.29	3.51	6.02	9.53	30.00	Pass
	165	5825	1.40	3.62	6.02	9.64	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 = 4.86dBi < 6dBi, so the power density limit is not reduced

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-0.95	1.27	6.02	0.15	7.44	30.00	Pass
	159	5795	-0.86	1.36	6.02	0.15	7.53	30.00	Pass
1	151	5755	-0.91	1.31	6.02	0.15	7.48	30.00	Pass
	159	5795	-0.80	1.42	6.02	0.15	7.59	30.00	Pass
2	151	5755	-1.07	1.15	6.02	0.15	7.32	30.00	Pass
	159	5795	-0.85	1.37	6.02	0.15	7.54	30.00	Pass
3	151	5755	-1.47	0.75	6.02	0.15	6.92	30.00	Pass
	159	5795	-1.14	1.08	6.02	0.15	7.25	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 = 4.86dBi < 6dBi, so the power density limit is not reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

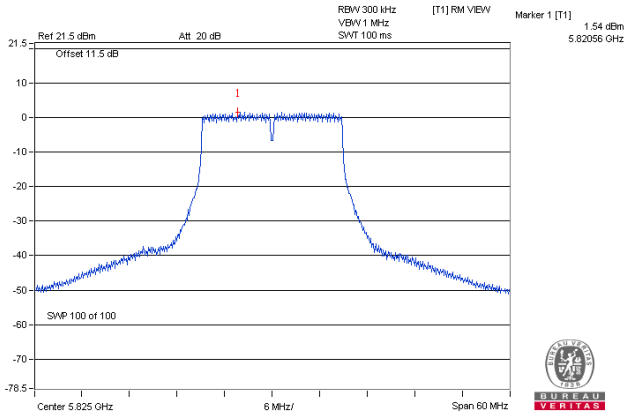
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-4.24	-2.02	6.02	0.27	4.27	30.00	Pass
1	155	5775	-4.27	-2.05	6.02	0.27	4.24	30.00	Pass
2	155	5775	-4.65	-2.43	6.02	0.27	3.86	30.00	Pass
3	155	5775	-4.80	-2.58	6.02	0.27	3.71	30.00	Pass

Note:

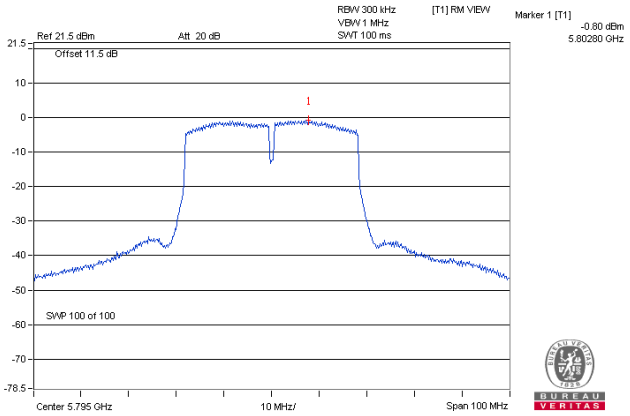
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 4.86dBi < 6dBi, so the power density limit is not reduced
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

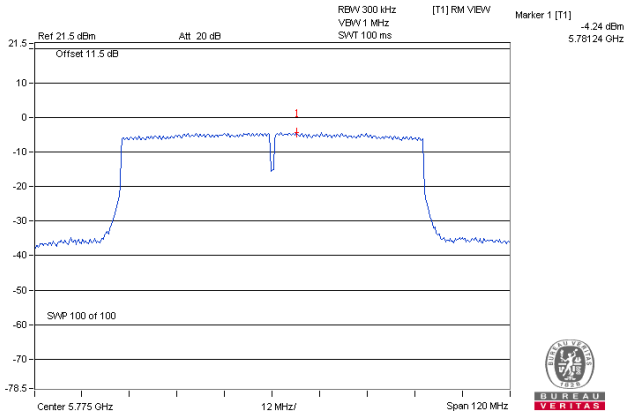
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

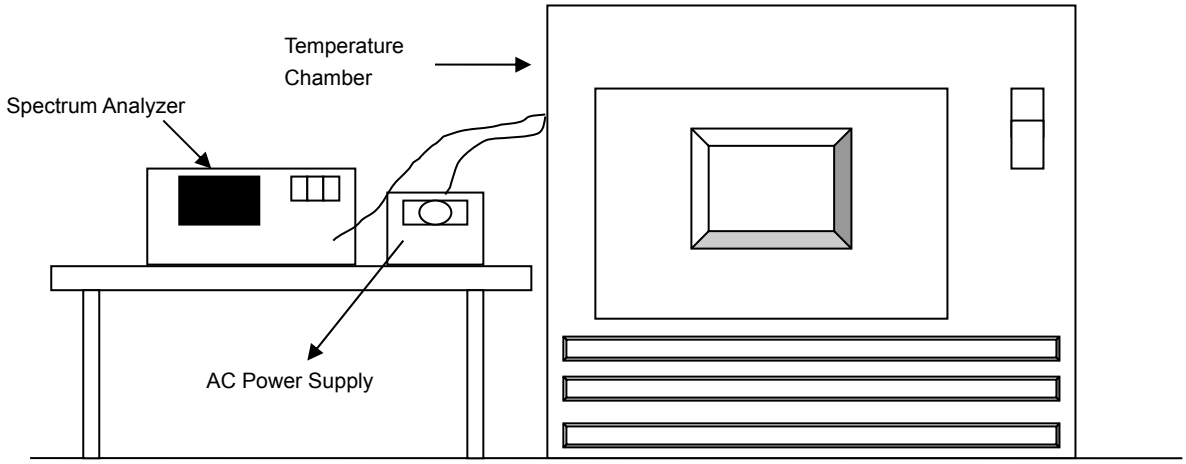


4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer R&S	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
AC Power Supply Extech	CFW-105	E000603	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.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5180.0162	0.00031	5180.0156	0.00030	5180.0154	0.00030	5180.0177	0.00034
40	120	5180.0145	0.00028	5180.0146	0.00028	5180.0145	0.00028	5180.0117	0.00023
30	120	5179.9803	-0.00038	5179.9833	-0.00032	5179.9839	-0.00031	5179.9834	-0.00032
20	120	5179.9775	-0.00043	5179.9803	-0.00038	5179.9774	-0.00044	5179.9795	-0.00040
10	120	5180.0063	0.00012	5180.0083	0.00016	5180.0058	0.00011	5180.0089	0.00017
0	120	5179.9776	-0.00043	5179.9766	-0.00045	5179.9787	-0.00041	5179.9774	-0.00044
-10	120	5179.9804	-0.00038	5179.9802	-0.00038	5179.9777	-0.00043	5179.9773	-0.00044
-20	120	5180.0219	0.00042	5180.0195	0.00038	5180.0168	0.00032	5180.0181	0.00035
-30	120	5180.0074	0.00014	5180.0047	0.00009	5180.0077	0.00015	5180.0048	0.00009

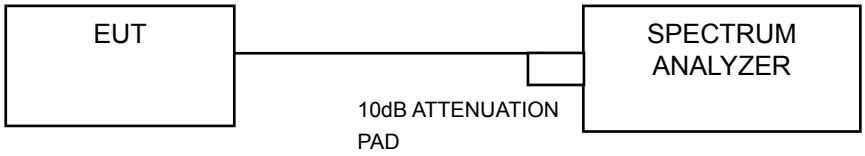
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5179.9778	-0.00043	5179.9803	-0.00038	5179.9776	-0.00043	5179.9787	-0.00041
	120	5179.9775	-0.00043	5179.9803	-0.00038	5179.9774	-0.00044	5179.9795	-0.00040
	102	5179.9782	-0.00042	5179.9813	-0.00036	5179.9772	-0.00044	5179.9800	-0.00039

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

CDD Mode

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)

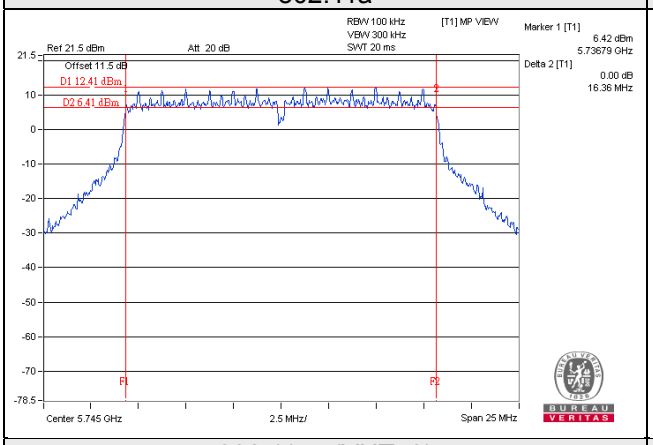
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.20	35.21	35.18	35.21	0.5	Pass
159	5795	35.20	35.16	35.21	35.93	0.5	Pass

802.11ac (VHT80)

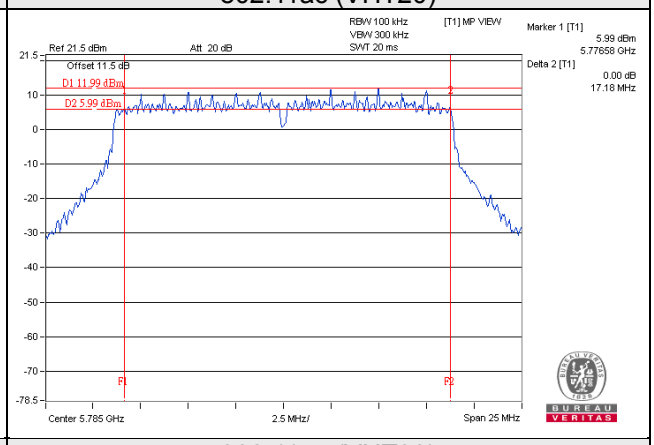
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.52	74.20	75.44	75.47	0.5	Pass

Spectrum Plot of Worst Value

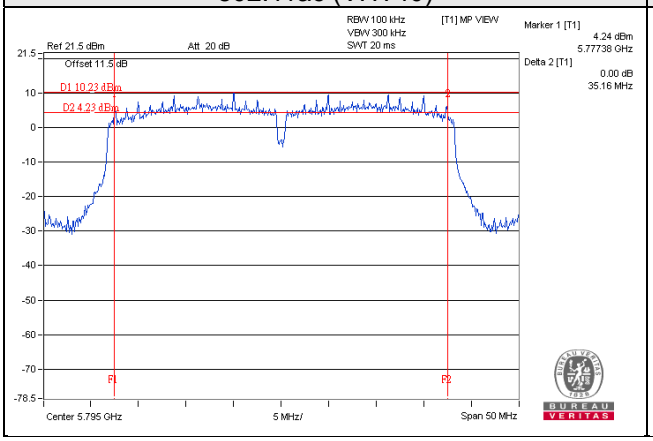
802.11a



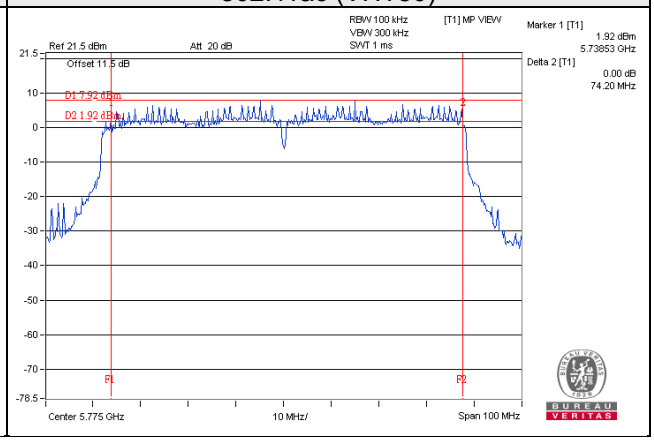
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS1 Mode

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	17.60	17.59	17.56	0.5	Pass
157	5785	17.57	17.58	17.60	17.62	0.5	Pass
165	5825	17.34	16.86	17.59	17.62	0.5	Pass

802.11ac (VHT40)

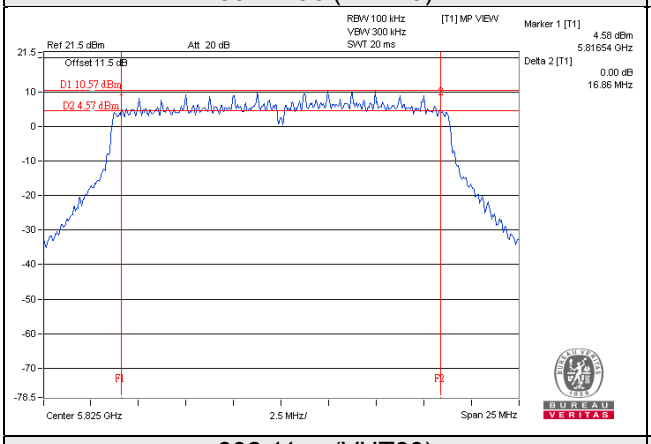
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.21	35.20	35.20	35.21	0.5	Pass
159	5795	35.46	35.19	35.23	35.23	0.5	Pass

802.11ac (VHT80)

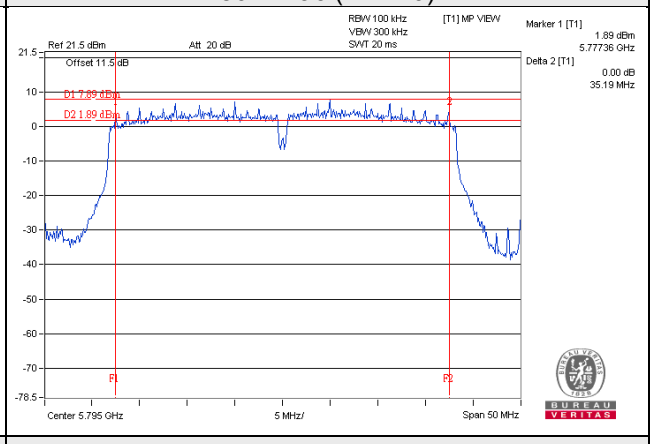
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.40	75.97	76.44	76.02	0.5	Pass

Spectrum Plot of Worst Value

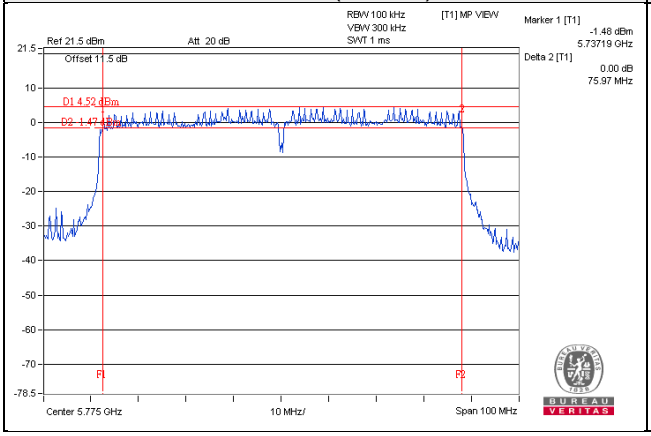
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming_NSS2 Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.21	17.59	17.60	17.56	0.5	Pass
157	5785	17.35	17.60	17.62	17.21	0.5	Pass
165	5825	17.36	17.22	17.61	17.21	0.5	Pass

802.11ac (VHT40)

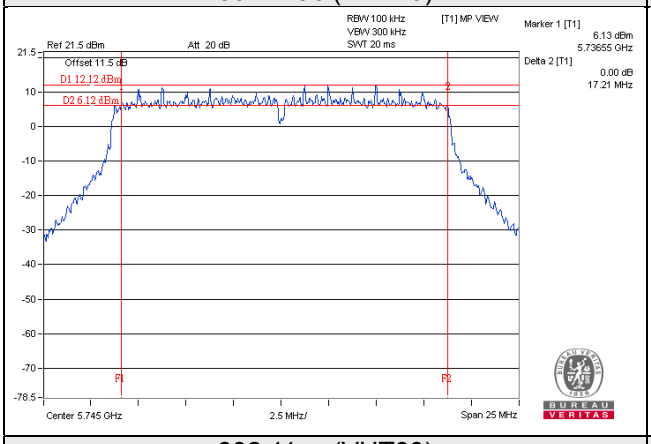
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.20	35.18	35.20	35.20	0.5	Pass
159	5795	35.22	35.15	35.20	35.20	0.5	Pass

802.11ac (VHT80)

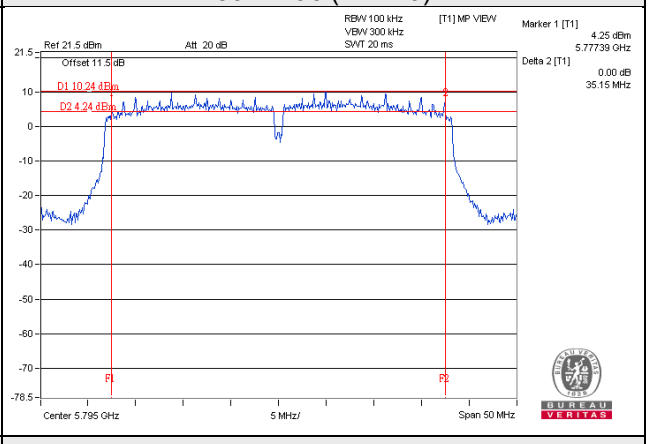
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.76	76.00	75.64	75.99	0.5	Pass

Spectrum Plot of Worst Value

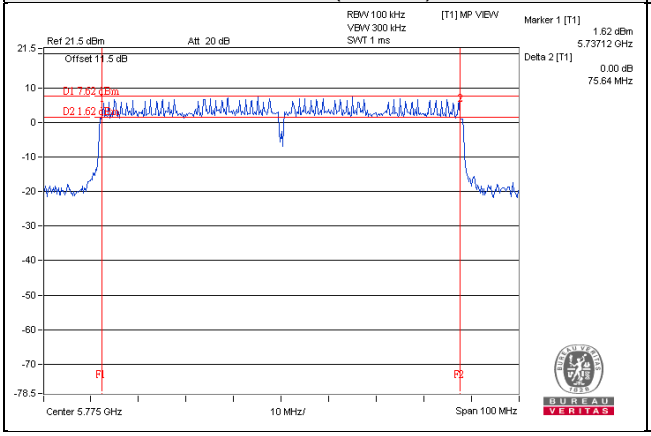
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

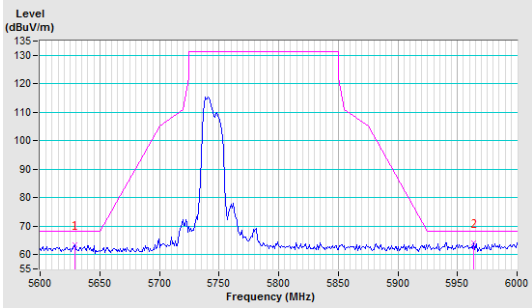
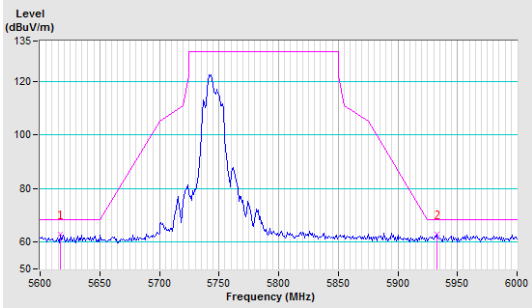
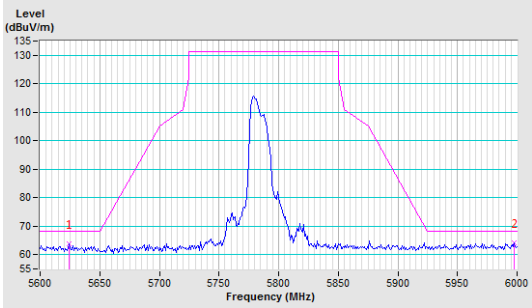
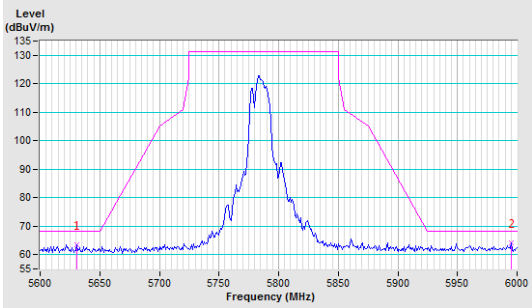
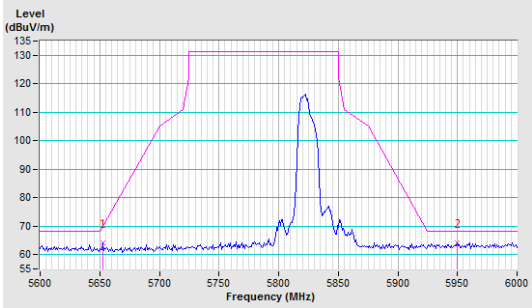
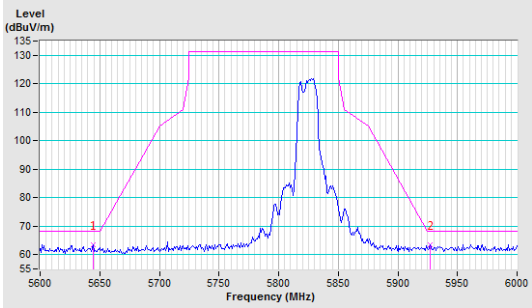


5 Pictures of Test Arrangements

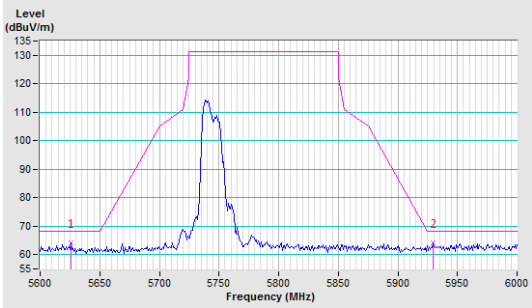
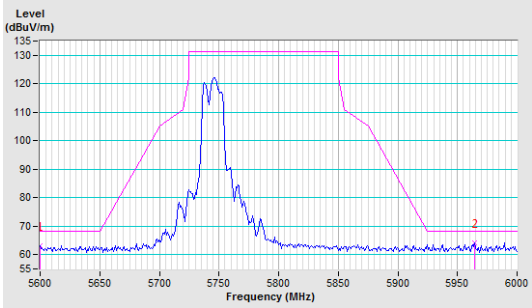
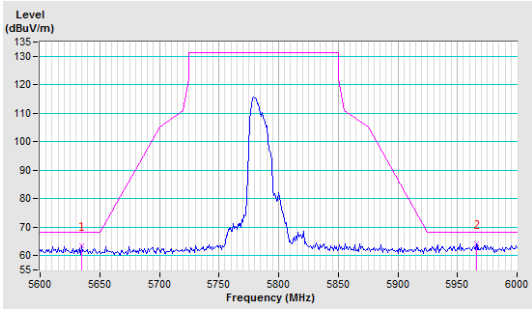
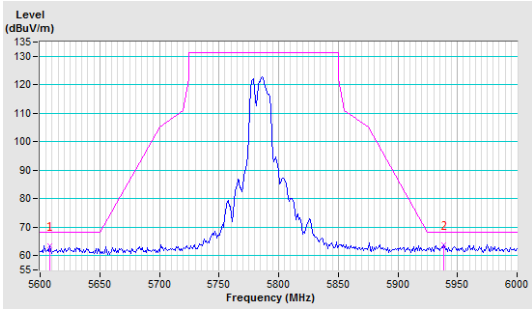
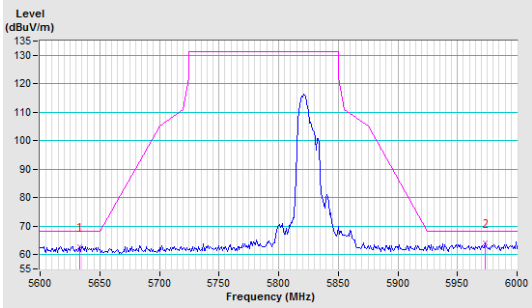
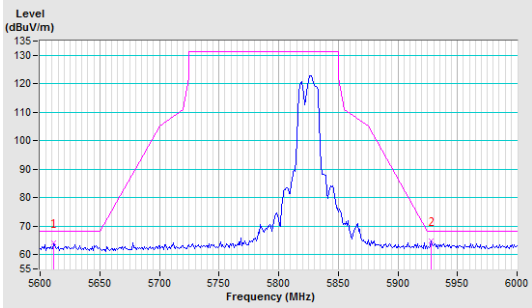
Please refer to the attached file (Test Setup Photo).

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

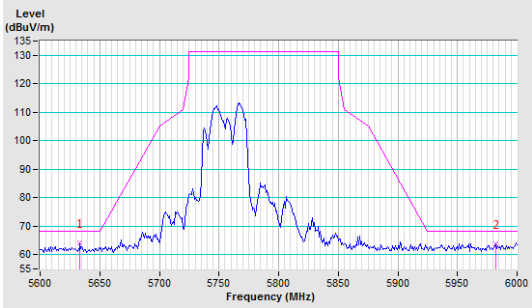
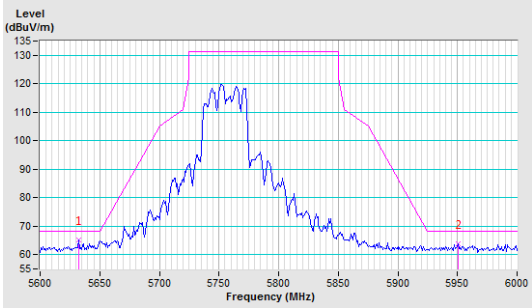
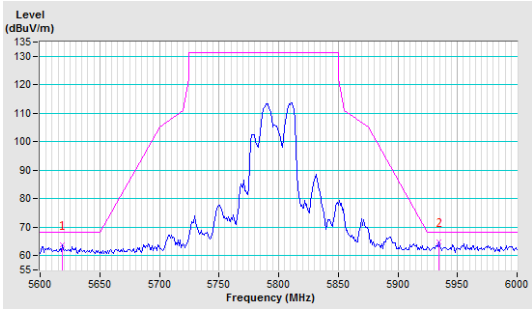
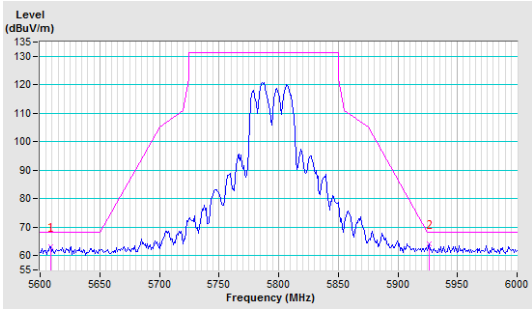
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

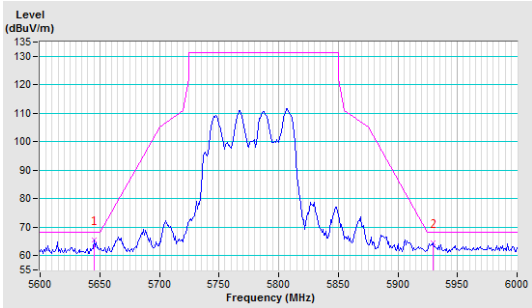
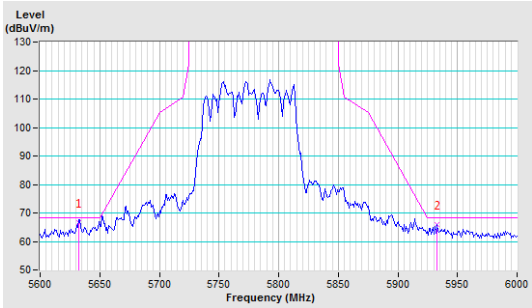
802.11ac (VHT20)

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 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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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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