

FCC Test Report

Report No.: RF170905C13-1

FCC ID: PY317200377

Test Model: RBS50Y

Received Date: Sep. 05, 2017

Test Date: Sep. 14 ~ Oct. 06, 2017

Issued Date: Oct. 11, 2017

Applicant: NETGEAR, INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF170905C13-1	Original release.	Oct. 11, 2017

1 Certificate of Conformity

Product: Orbi Router, Orbi Satellite, Orbi AC3000 Tri-band WiFi System

Brand: NETGEAR

Test Model: RBS50Y

Sample Status: Engineering sample

Applicant: NETGEAR, INC.

Test Date: Sep. 14 ~ Oct. 06, 2017

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

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

Prepared by : Celine Chou , **Date:** Oct. 11, 2017
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Oct. 11, 2017
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.39dB at 0.30777MHz.
15.407(b)(1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5141.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex (MHF) not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB 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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Orbi Router, Orbi Satellite, Orbi AC3000 Tri-band WiFi System
Brand	NETGEAR
Test Model	RBS50Y
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 600Mbps 802.11ac: up to 1734Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz 1TX: 52.000mW 5180 ~ 5240MHz 2TX: 52.124mW 5745 ~ 5825MHz: 930.220mW Beamforming Mode: 5180 ~ 5240MHz: 26.154mW 5745 ~ 5825MHz: 660.130mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	N/A

Note:

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

Band	Modulation Mode	Beamforming Mode	TX Function
5GHz Band 1	802.11a	Not Support	1TX / 2TX
	802.11n (HT20)	Not Support / Support (CDD / NSS=1)	1TX / 2TX
	802.11n (HT40)	Not Support / Support (CDD / NSS=1)	1TX / 2TX
	802.11ac (VHT20)	Not Support / Support (CDD / NSS=1)	1TX / 2TX
	802.11ac (VHT40)	Not Support / Support (CDD / NSS=1)	1TX / 2TX
	802.11ac (VHT80)	Not Support / Support (CDD / NSS=1)	1TX / 2TX
5GHz Band 4	802.11a	Not Support	4TX
	802.11n (HT20)	Support (CDD / NSS=1)	4TX
	802.11n (HT40)	Support (CDD / NSS=1)	4TX
	802.11ac (VHT20)	Support (CDD / NSS=1)	4TX
	802.11ac (VHT40)	Support (CDD / NSS=1)	4TX
	802.11ac (VHT80)	Support (CDD / NSS=1)	4TX

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

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

2. The following RF Modules are for the EUT.

Brand	Model	RF Module	Band
NETGEAR	RBS50Y	Module 1	2.4G
		Module 2	UNII-1
		BT Module	UNII-3
			BT LE

3. The EUT uses following antennas.

Ant. Type	Dipole		
Connector Type	i-pex(MHF)		
Directional Antenna Gain (dBi)			
Item	2.4G	UNII-1	UNII-3
-	5.31	5.97	7.57

4. The EUT consumes power from the following adapters.

Adapter 1 (US)	
Brand	NETGEAR
Model	AD2110F10
P/N	332-10999-01
Input Power	100-120Vac, 50/60Hz, 1.0A
Output Power	12Vdc, 2.5A
Power Line	3m power cable without core attached on adapter

Adapter 2 (US)	
Brand	NETGEAR
Model	2ADF030F1 NA
P/N	332-11000-01
Input Power	100-120Vac, 50/60Hz, 1.0A
Output Power	12Vdc, 2.5A
Power Line	3m power cable without core attached on adapter

5. Spurious emission of the simultaneous operation mode as below and the test data please refer to report no.: RF170905C13-3.

No	Mode
1	WLAN 2.4GHz + WLAN 5GHz B1 (1TX) + WLAN 5GHz B4 + BT LE
2	WLAN 2.4GHz + WLAN 5GHz B1 (2TX) + WLAN 5GHz B4 + BT LE

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE $<$ 1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	TX Function
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	1TX / 2TX
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5	1TX / 2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5	1TX / 2TX
	802.11ac (VHT80)		42	42	OFDM	29.3	1TX / 2TX
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	4TX
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5	4TX
	802.11ac (VHT80)		155	155	OFDM	29.3	4TX

Radiated Emission Test (Below 1GHz):

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

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

Power Line Conducted Emission Test:

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

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

Transmit Power Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	TX Function
CDD Mode							
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	1TX / 2TX
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5	1TX / 2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5	1TX / 2TX
	802.11ac (VHT80)		42	42	OFDM	29.3	1TX / 2TX
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	4TX
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5	4TX
	802.11ac (VHT80)		155	155	OFDM	29.3	4TX
Beamforming Mode							
A	802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	6.5	1TX / 2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5	1TX / 2TX
	802.11ac (VHT80)		42	42	OFDM	29.3	1TX / 2TX
A	802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	6.5	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5	4TX
	802.11ac (VHT80)		155	155	OFDM	29.3	4TX

Peak Power Spectral Density, Bandwidth and Frequency Stability Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	TX Function
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0	1TX / 2TX
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5	1TX / 2TX
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5	1TX / 2TX
	802.11ac (VHT80)		42	42	OFDM	29.3	1TX / 2TX
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0	4TX
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5	4TX
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5	4TX
	802.11ac (VHT80)		155	155	OFDM	29.3	4TX

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
RE<1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

3.3 Duty Cycle of Test Signal

For U-NII-1 Band 1TX

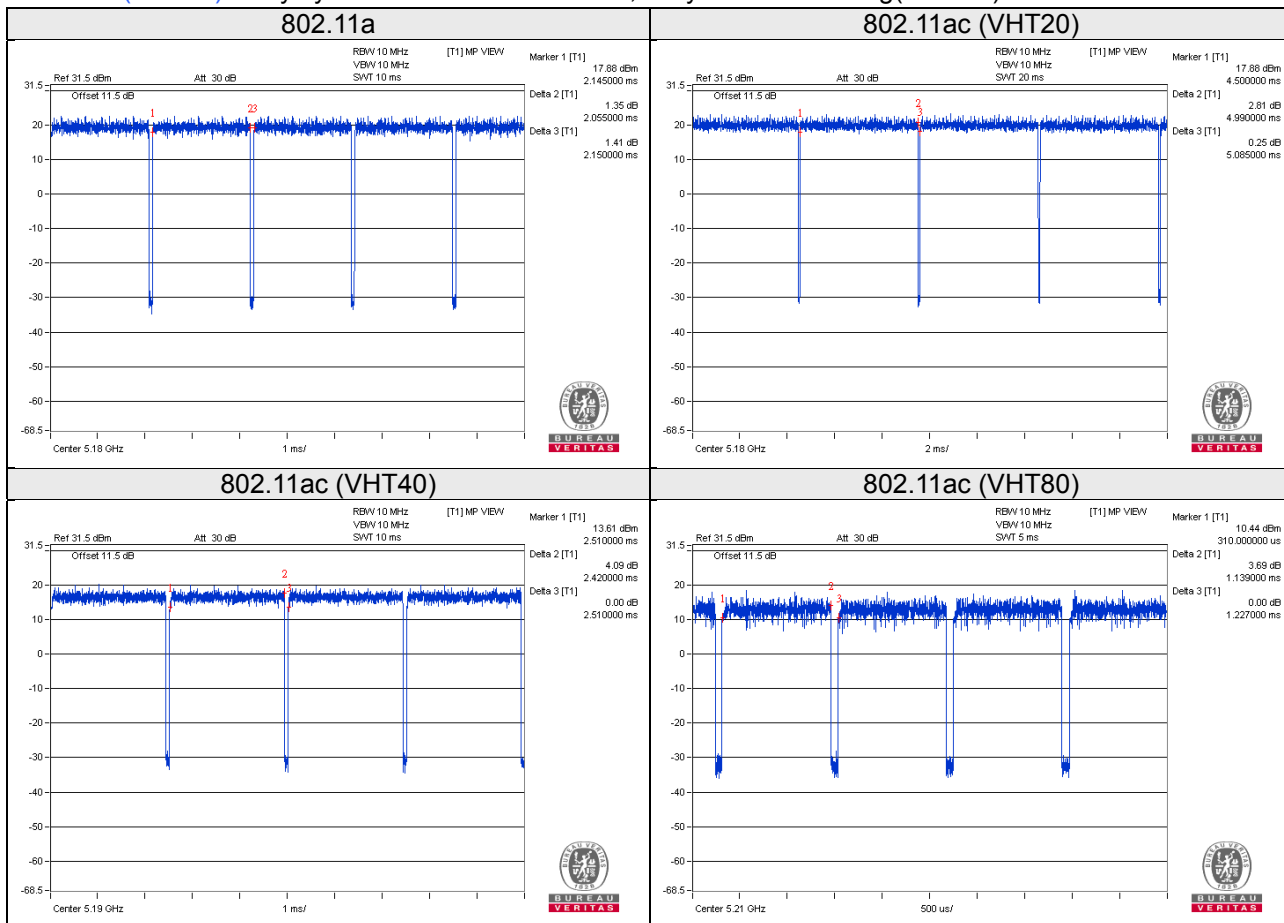
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.055/2.150 = 0.956, Duty factor = 10 * log(1/0.956) = 0.20

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

802.11ac (VHT40): Duty cycle = 2.420/2.510 = 0.964, Duty factor = 10 * log(1/0.964) = 0.16

802.11ac (VHT80): Duty cycle = 1.139/1.227 = 0.928, Duty factor = 10 * log(1/0.928) = 0.32



For U-NII-1 Band 2TX

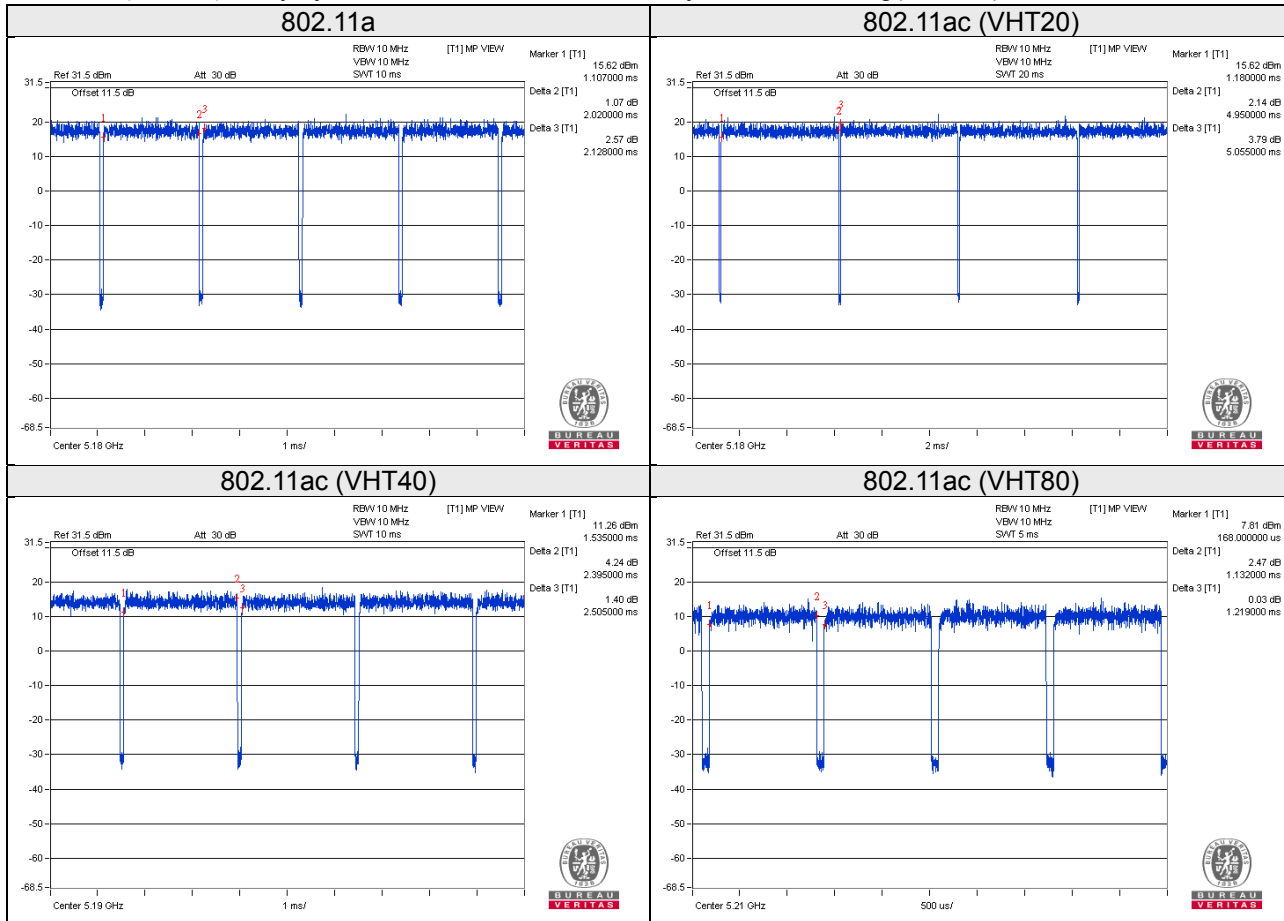
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.020/2.128 = 0.949, Duty factor = $10 \cdot \log(1/0.949) = 0.23$

802.11ac (VHT20): Duty cycle = 4.950/5.055 = 0.979, Duty factor = $10 \cdot \log(1/0.979) = 0.09$

802.11ac (VHT40): Duty cycle = 2.395/2.505 = 0.956, Duty factor = $10 \cdot \log(1/0.956) = 0.20$

802.11ac (VHT80): Duty cycle = 1.132/1.219 = 0.929, Duty factor = $10 \cdot \log(1/0.929) = 0.32$



For U-NII-3 Band

802.11ac (VHT20): Duty cycle of test signal is > 98%, duty factor is not required.

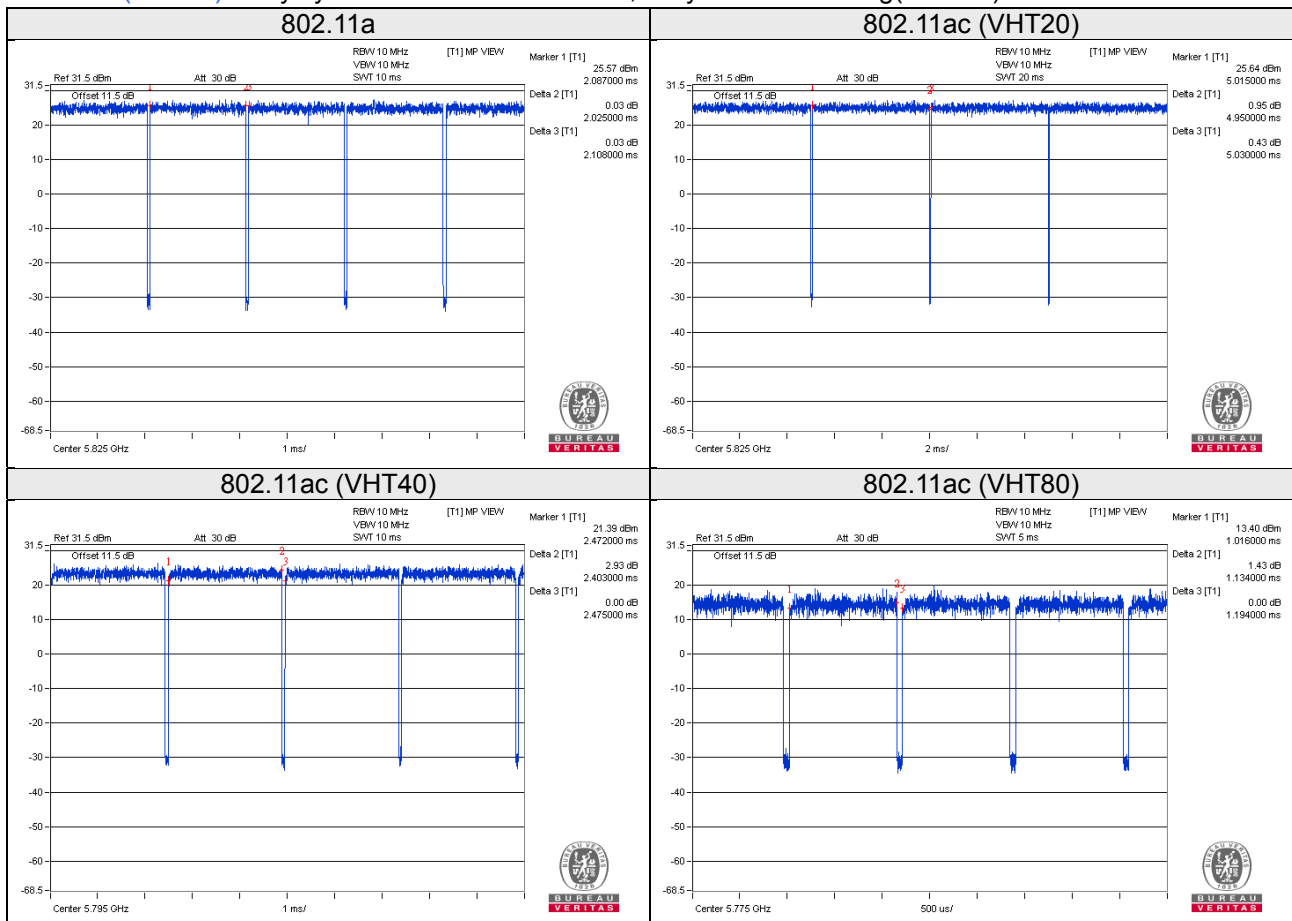
802.11a, 802.11ac (VHT40), 802.11ac (VHT80): Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = $2.025/2.108 = 0.961$, Duty factor = $10 * \log(1/0.961) = 0.17$

802.11ac (VHT20): Duty cycle = $4.950/5.030 = 0.984$

802.11ac (VHT40): Duty cycle = $2.403/2.475 = 0.971$, Duty factor = $10 * \log(1/0.971) = 0.13$

802.11ac (VHT80): Duty cycle = $1.134/1.194 = 0.950$, Duty factor = $10 * \log(1/0.950) = 0.22$



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.

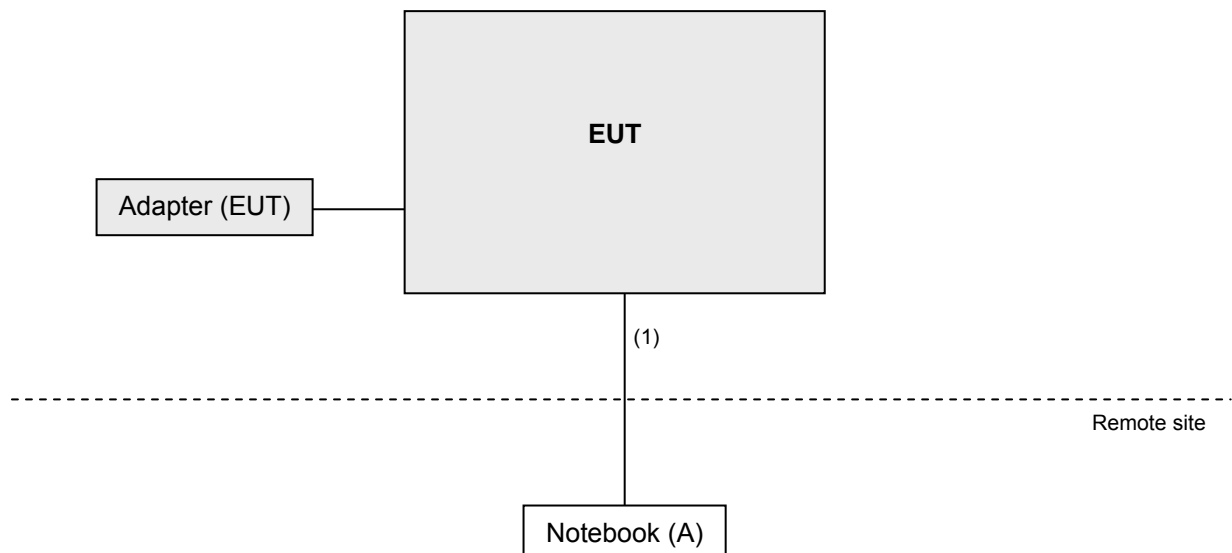
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v01r04

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2016	Oct. 23, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 18, 2017	Aug. 17, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 28, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 15, 2016	Dec. 14, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent	8449B	3008A01960	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent	8447D	2944A10631	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017	Aug. 07, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2017	Aug. 07, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 07, 2017	Jun. 06, 2018

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 4.
 3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
 5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

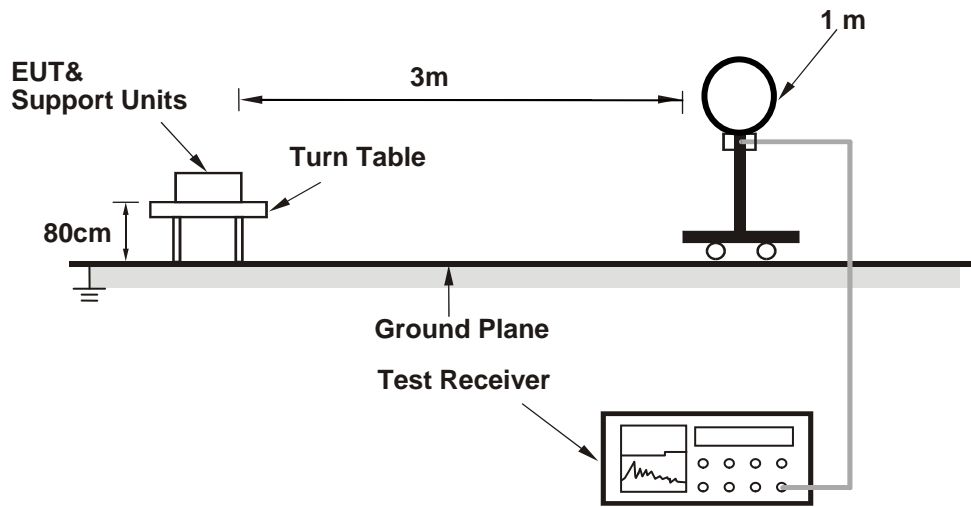
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) 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

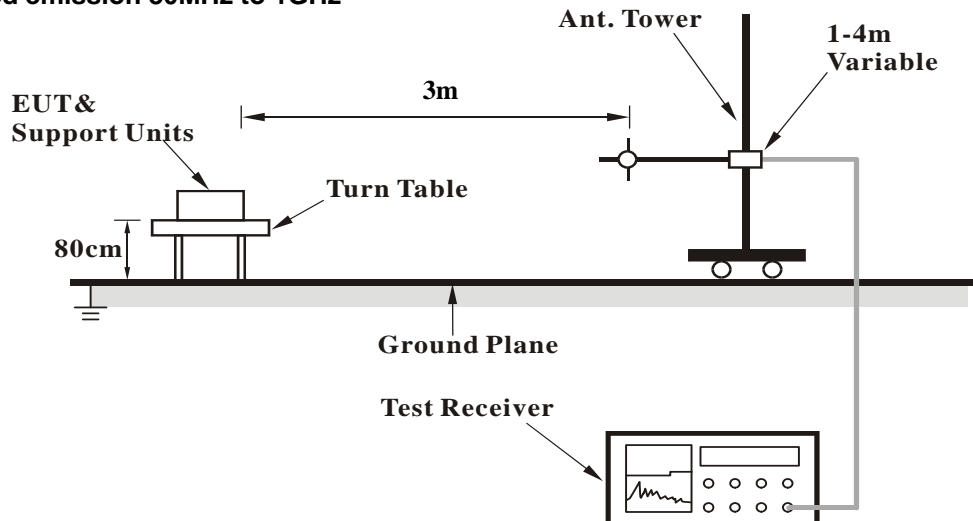
No deviation.

4.1.5 Test Setup

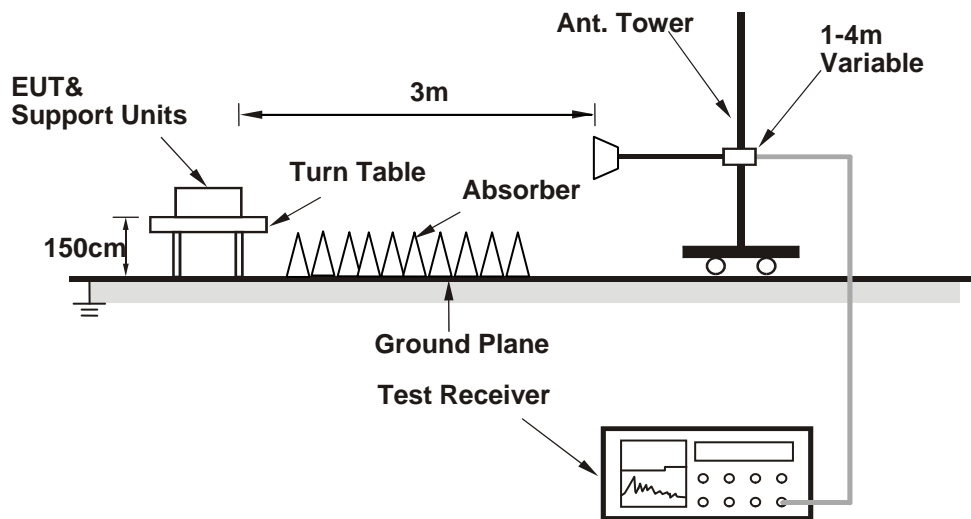
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- 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.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz data:

For U-NII-1 Band 1TX

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	2.52 H	354	51.4	7.4
2	5150.00	45.2 AV	54.0	-8.8	2.52 H	354	37.8	7.4
3	*5180.00	82.9 PK			2.52 H	354	41.6	41.3
4	*5180.00	71.7 AV			2.52 H	354	30.4	41.3
5	#10360.00	61.3 PK	74.0	-12.7	2.14 H	118	41.3	20.0
6	#10360.00	48.2 AV	54.0	-5.8	2.14 H	118	28.2	20.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.7 PK	74.0	-9.3	1.15 V	118	57.3	7.4
2	5150.00	48.9 AV	54.0	-5.1	1.15 V	118	41.5	7.4
3	*5180.00	112.0 PK			1.15 V	118	70.7	41.3
4	*5180.00	101.0 AV			1.15 V	118	59.7	41.3
5	#10360.00	62.0 PK	74.0	-12.0	1.28 V	234	42.0	20.0
6	#10360.00	48.7 AV	54.0	-5.3	1.28 V	234	28.7	20.0

Remarks:

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

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

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	84.2 PK			3.07 H	353	42.9	41.3
2	*5200.00	72.7 AV			3.07 H	353	31.4	41.3
3	#10400.00	61.7 PK	74.0	-12.3	2.17 H	188	41.5	20.2
4	#10400.00	49.0 AV	54.0	-5.0	2.17 H	188	28.8	20.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.2 PK			1.30 V	120	70.9	41.3
2	*5200.00	101.2 AV			1.30 V	120	59.9	41.3
3	#10400.00	62.3 PK	74.0	-11.7	1.39 V	241	42.1	20.2
4	#10400.00	49.4 AV	54.0	-4.6	1.39 V	241	29.2	20.2

Remarks:

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

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

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	86.0 PK			2.29 H	349	44.5	41.5
2	*5240.00	74.7 AV			2.29 H	349	33.2	41.5
3	5350.00	58.4 PK	74.0	-15.6	2.29 H	349	50.4	8.0
4	5350.00	45.5 AV	54.0	-8.5	2.29 H	349	37.5	8.0
5	#10480.00	61.8 PK	74.0	-12.2	2.14 H	119	41.5	20.3
6	#10480.00	49.2 AV	54.0	-4.8	2.14 H	119	28.9	20.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.9 PK			1.19 V	123	72.4	41.5
2	*5240.00	102.1 AV			1.19 V	123	60.6	41.5
3	5350.00	59.4 PK	74.0	-14.6	1.19 V	123	51.4	8.0
4	5350.00	46.5 AV	54.0	-7.5	1.19 V	123	38.5	8.0
5	#10480.00	62.5 PK	74.0	-11.5	1.40 V	225	42.2	20.3
6	#10480.00	49.3 AV	54.0	-4.7	1.40 V	225	29.0	20.3

Remarks:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.5 PK	74.0	-15.5	2.28 H	349	51.1	7.4
2	5150.00	44.9 AV	54.0	-9.1	2.28 H	349	37.5	7.4
3	*5180.00	82.8 PK			2.28 H	349	41.5	41.3
4	*5180.00	71.5 AV			2.28 H	349	30.2	41.3
5	#10360.00	61.8 PK	74.0	-12.2	2.16 H	221	41.8	20.0
6	#10360.00	48.4 AV	54.0	-5.6	2.16 H	221	28.4	20.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.0 PK	74.0	-9.0	1.22 V	122	57.6	7.4
2	5150.00	49.4 AV	54.0	-4.6	1.22 V	122	42.0	7.4
3	*5180.00	112.2 PK			1.22 V	122	70.9	41.3
4	*5180.00	100.6 AV			1.22 V	122	59.3	41.3
5	#10360.00	62.2 PK	74.0	-11.8	1.37 V	189	42.2	20.0
6	#10360.00	49.1 AV	54.0	-4.9	1.37 V	189	29.1	20.0

Remarks:

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

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

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	83.6 PK			2.24 H	349	42.3	41.3
2	*5200.00	72.7 AV			2.24 H	349	31.4	41.3
3	#10400.00	62.1 PK	74.0	-11.9	2.12 H	302	41.9	20.2
4	#10400.00	48.8 AV	54.0	-5.2	2.12 H	302	28.6	20.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.0 PK			1.33 V	122	70.7	41.3
2	*5200.00	100.7 AV			1.33 V	122	59.4	41.3
3	#10400.00	62.5 PK	74.0	-11.5	1.44 V	201	42.3	20.2
4	#10400.00	49.1 AV	54.0	-4.9	1.44 V	201	28.9	20.2

Remarks:

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

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

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	85.6 PK			2.30 H	348	44.1	41.5
2	*5240.00	74.1 AV			2.30 H	348	32.6	41.5
3	5350.00	58.8 PK	74.0	-15.2	2.30 H	348	50.8	8.0
4	5350.00	45.8 AV	54.0	-8.2	2.30 H	348	37.8	8.0
5	#10480.00	61.9 PK	74.0	-12.1	2.64 H	283	41.6	20.3
6	#10480.00	48.6 AV	54.0	-5.4	2.64 H	283	28.3	20.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.7 PK			1.17 V	121	72.2	41.5
2	*5240.00	101.9 AV			1.17 V	121	60.4	41.5
3	5350.00	59.1 PK	74.0	-14.9	1.17 V	121	51.1	8.0
4	5350.00	46.3 AV	54.0	-7.7	1.17 V	121	38.3	8.0
5	#10480.00	62.4 PK	74.0	-11.6	1.42 V	199	42.1	20.3
6	#10480.00	49.1 AV	54.0	-4.9	1.42 V	199	28.8	20.3

Remarks:

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

802.11ac (VHT40)

CHANNEL	TX Channel 38	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.3 PK	74.0	-15.7	2.29 H	348	50.9	7.4
2	5150.00	45.1 AV	54.0	-8.9	2.29 H	348	37.7	7.4
3	*5190.00	80.4 PK			2.29 H	348	39.1	41.3
4	*5190.00	69.8 AV			2.29 H	348	28.5	41.3
5	#10380.00	61.8 PK	74.0	-12.2	2.16 H	129	41.8	20.0
6	#10380.00	48.9 AV	54.0	-5.1	2.16 H	129	28.9	20.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.2 PK	74.0	-4.8	1.26 V	115	61.8	7.4
2	5150.00	53.3 AV	54.0	-0.7	1.26 V	115	45.9	7.4
3	*5190.00	108.2 PK			1.26 V	115	66.9	41.3
4	*5190.00	98.1 AV			1.26 V	115	56.8	41.3
5	#10380.00	62.7 PK	74.0	-11.3	1.38 V	176	42.7	20.0
6	#10380.00	49.7 AV	54.0	-4.3	1.38 V	176	29.7	20.0

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	82.4 PK			2.29 H	350	41.0	41.4
2	*5230.00	71.9 AV			2.29 H	350	30.5	41.4
3	5350.00	59.0 PK	74.0	-15.0	2.29 H	350	51.0	8.0
4	5350.00	45.4 AV	54.0	-8.6	2.29 H	350	37.4	8.0
5	#10460.00	62.0 PK	74.0	-12.0	1.69 H	330	41.8	20.2
6	#10460.00	49.1 AV	54.0	-4.9	1.69 H	330	28.9	20.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	109.2 PK			1.56 V	125	67.8	41.4
2	*5230.00	99.1 AV			1.56 V	125	57.7	41.4
3	5350.00	59.7 PK	74.0	-14.3	1.56 V	125	51.7	8.0
4	5350.00	46.4 AV	54.0	-7.6	1.56 V	125	38.4	8.0
5	#10460.00	63.1 PK	74.0	-10.9	1.40 V	170	42.9	20.2
6	#10460.00	50.3 AV	54.0	-3.7	1.40 V	170	30.1	20.2

Remarks:

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

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	58.2 PK	74.0	-15.8	2.28 H	347	50.8	7.4
2	5150.00	45.0 AV	54.0	-9.0	2.28 H	347	37.6	7.4
3	*5210.00	79.3 PK			2.28 H	347	37.9	41.4
4	*5210.00	69.1 AV			2.28 H	347	27.7	41.4
5	5350.00	58.6 PK	74.0	-15.4	2.28 H	347	50.6	8.0
6	5350.00	45.5 AV	54.0	-8.5	2.28 H	347	37.5	8.0
7	#10420.00	61.8 PK	74.0	-12.2	2.46 H	284	41.8	20.0
8	#10420.00	48.9 AV	54.0	-5.1	2.46 H	284	28.9	20.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.0 PK	74.0	-8.0	1.50 V	114	58.6	7.4
2	5150.00	53.1 AV	54.0	-0.9	1.50 V	114	45.7	7.4
3	*5210.00	106.1 PK			1.50 V	114	64.7	41.4
4	*5210.00	96.2 AV			1.50 V	114	54.8	41.4
5	5350.00	58.8 PK	74.0	-15.2	1.50 V	114	50.8	8.0
6	5350.00	46.9 AV	54.0	-7.1	1.50 V	114	38.9	8.0
7	#10420.00	62.6 PK	74.0	-11.4	1.35 V	169	42.6	20.0
8	#10420.00	49.9 AV	54.0	-4.1	1.35 V	169	29.9	20.0

Remarks:

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

For U-NII-1 Band 2TX

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.0 PK	74.0	-10.0	3.66 H	123	56.6	7.4
2	5150.00	47.8 AV	54.0	-6.2	3.66 H	123	40.4	7.4
3	*5180.00	109.4 PK			3.66 H	123	68.1	41.3
4	*5180.00	98.8 AV			3.66 H	123	57.5	41.3
5	#10360.00	62.7 PK	74.0	-11.3	2.75 H	51	42.7	20.0
6	#10360.00	50.0 AV	54.0	-4.0	2.75 H	51	30.0	20.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	73.6 PK	74.0	-0.4	1.14 V	269	66.2	7.4
2	5150.00	53.7 AV	54.0	-0.3	1.14 V	269	46.3	7.4
3	*5180.00	116.9 PK			1.14 V	269	75.6	41.3
4	*5180.00	105.7 AV			1.14 V	269	64.4	41.3
5	#10360.00	62.2 PK	74.0	-11.8	1.32 V	168	42.2	20.0
6	#10360.00	49.2 AV	54.0	-4.8	1.32 V	168	29.2	20.0

Remarks:

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

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

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	63.5 PK	74.0	-10.5	3.85 H	120	56.1	7.4
2	5150.00	48.9 AV	54.0	-5.1	3.85 H	120	41.5	7.4
3	*5200.00	113.2 PK			3.85 H	120	71.9	41.3
4	*5200.00	102.4 AV			3.85 H	120	61.1	41.3
5	#10400.00	63.0 PK	74.0	-11.0	2.79 H	56	42.8	20.2
6	#10400.00	50.4 AV	54.0	-3.6	2.79 H	56	30.2	20.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.5 PK	74.0	-2.5	1.12 V	291	64.1	7.4
2	5150.00	53.5 AV	54.0	-0.5	1.12 V	291	46.1	7.4
3	*5200.00	119.5 PK			1.12 V	291	78.2	41.3
4	*5200.00	108.8 AV			1.12 V	291	67.5	41.3
5	#10400.00	62.8 PK	74.0	-11.2	1.30 V	177	42.6	20.2
6	#10400.00	49.8 AV	54.0	-4.2	1.30 V	177	29.6	20.2

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.3 PK			3.82 H	124	71.8	41.5
2	*5240.00	101.7 AV			3.82 H	124	60.2	41.5
3	5350.00	59.3 PK	74.0	-14.7	3.82 H	124	51.3	8.0
4	5350.00	46.6 AV	54.0	-7.4	3.82 H	124	38.6	8.0
5	#10480.00	63.0 PK	74.0	-11.0	2.85 H	60	42.7	20.3
6	#10480.00	50.1 AV	54.0	-3.9	2.85 H	60	29.8	20.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.1 PK			1.23 V	264	79.6	41.5
2	*5240.00	109.9 AV			1.23 V	264	68.4	41.5
3	5350.00	59.5 PK	74.0	-14.5	1.23 V	264	51.5	8.0
4	5350.00	47.2 AV	54.0	-6.8	1.23 V	264	39.2	8.0
5	#10480.00	62.8 PK	74.0	-11.2	1.40 V	182	42.5	20.3
6	#10480.00	49.8 AV	54.0	-4.2	1.40 V	182	29.5	20.3

Remarks:

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

802.11ac (VHT20)

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

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	63.9 PK	74.0	-10.1	3.77 H	108	56.5	7.4
2	5150.00	48.6 AV	54.0	-5.4	3.77 H	108	41.2	7.4
3	*5180.00	109.2 PK			3.77 H	108	67.9	41.3
4	*5180.00	98.2 AV			3.77 H	108	56.9	41.3
5	#10360.00	62.6 PK	74.0	-11.4	2.91 H	76	42.6	20.0
6	#10360.00	49.8 AV	54.0	-4.2	2.91 H	76	29.8	20.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.7 PK	74.0	-1.3	1.25 V	270	65.3	7.4
2	5150.00	53.6 AV	54.0	-0.4	1.25 V	270	46.2	7.4
3	*5180.00	117.4 PK			1.25 V	270	76.1	41.3
4	*5180.00	106.2 AV			1.25 V	270	64.9	41.3
5	#10360.00	62.4 PK	74.0	-11.6	1.33 V	212	42.4	20.0
6	#10360.00	49.4 AV	54.0	-4.6	1.33 V	212	29.4	20.0

Remarks:

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

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

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	5141.00	66.0 PK	74.0	-8.0	3.73 H	122	58.5	7.5
2	5141.00	51.1 AV	54.0	-2.9	3.73 H	122	43.6	7.5
3	*5200.00	112.2 PK			3.73 H	122	70.9	41.3
4	*5200.00	100.7 AV			3.73 H	122	59.4	41.3
5	#10400.00	63.2 PK	74.0	-10.8	2.96 H	82	43.0	20.2
6	#10400.00	50.4 AV	54.0	-3.6	2.96 H	82	30.2	20.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5141.00	71.0 PK	74.0	-3.0	1.11 V	290	63.5	7.5
2	5141.00	53.9 AV	54.0	-0.1	1.11 V	290	46.4	7.5
3	*5200.00	119.7 PK			1.11 V	290	78.4	41.3
4	*5200.00	109.1 AV			1.11 V	290	67.8	41.3
5	#10400.00	62.9 PK	74.0	-11.1	1.28 V	207	42.7	20.2
6	#10400.00	50.0 AV	54.0	-4.0	1.28 V	207	29.8	20.2

Remarks:

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

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

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	112.0 PK			3.74 H	119	70.5	41.5
2	*5240.00	101.5 AV			3.74 H	119	60.0	41.5
3	5350.00	58.9 PK	74.0	-15.1	3.74 H	119	50.9	8.0
4	5350.00	46.5 AV	54.0	-7.5	3.74 H	119	38.5	8.0
5	#10480.00	63.1 PK	74.0	-10.9	3.02 H	78	42.8	20.3
6	#10480.00	50.2 AV	54.0	-3.8	3.02 H	78	29.9	20.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.0 PK			1.23 V	266	79.5	41.5
2	*5240.00	109.8 AV			1.23 V	266	68.3	41.5
3	5350.00	59.6 PK	74.0	-14.4	1.23 V	266	51.6	8.0
4	5350.00	47.1 AV	54.0	-6.9	1.23 V	266	39.1	8.0
5	#10480.00	62.9 PK	74.0	-11.1	1.39 V	204	42.6	20.3
6	#10480.00	50.0 AV	54.0	-4.0	1.39 V	204	29.7	20.3

Remarks:

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

802.11ac (VHT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.6 PK	74.0	-11.4	3.81 H	114	55.2	7.4
2	5150.00	48.7 AV	54.0	-5.3	3.81 H	114	41.3	7.4
3	*5190.00	105.4 PK			3.81 H	114	64.1	41.3
4	*5190.00	94.6 AV			3.81 H	114	53.3	41.3
5	#10380.00	63.1 PK	74.0	-10.9	3.14 H	102	43.1	20.0
6	#10380.00	49.7 AV	54.0	-4.3	3.14 H	102	29.7	20.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.9 PK	74.0	-3.1	1.13 V	270	63.5	7.4
2	5150.00	53.7 AV	54.0	-0.3	1.13 V	270	46.3	7.4
3	*5190.00	112.0 PK			1.13 V	270	70.7	41.3
4	*5190.00	101.4 AV			1.13 V	270	60.1	41.3
5	#10380.00	63.0 PK	74.0	-11.0	1.45 V	105	43.0	20.0
6	#10380.00	49.2 AV	54.0	-4.8	1.45 V	105	29.2	20.0

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	63.4 PK	74.0	-10.6	3.78 H	118	56.0	7.4
2	5150.00	48.3 AV	54.0	-5.7	3.78 H	118	40.9	7.4
3	*5230.00	107.6 PK			3.78 H	118	66.2	41.4
4	*5230.00	97.0 AV			3.78 H	118	55.6	41.4
5	#10460.00	63.0 PK	74.0	-11.0	3.09 H	97	42.8	20.2
6	#10460.00	50.0 AV	54.0	-4.0	3.09 H	97	29.8	20.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.0 PK	74.0	-3.0	1.13 V	271	63.6	7.4
2	5150.00	53.5 AV	54.0	-0.5	1.13 V	271	46.1	7.4
3	*5230.00	116.4 PK			1.13 V	271	75.0	41.4
4	*5230.00	105.5 AV			1.13 V	271	64.1	41.4
5	#10460.00	62.6 PK	74.0	-11.4	1.47 V	102	42.4	20.2
6	#10460.00	49.7 AV	54.0	-4.3	1.47 V	102	29.5	20.2

Remarks:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5147.00	62.2 PK	74.0	-11.8	3.80 H	116	54.8	7.4
2	5147.00	49.1 AV	54.0	-4.9	3.80 H	116	41.7	7.4
3	*5210.00	99.2 PK			3.80 H	116	57.8	41.4
4	*5210.00	89.2 AV			3.80 H	116	47.8	41.4
5	5350.00	58.7 PK	74.0	-15.3	3.80 H	116	50.7	8.0
6	5350.00	46.3 AV	54.0	-7.7	3.80 H	116	38.3	8.0
7	#10420.00	62.5 PK	74.0	-11.5	3.00 H	46	42.5	20.0
8	#10420.00	49.4 AV	54.0	-4.6	3.00 H	46	29.4	20.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5147.00	68.8 PK	74.0	-5.2	1.12 V	269	61.4	7.4
2	5147.00	53.8 AV	54.0	-0.2	1.12 V	269	46.4	7.4
3	*5210.00	106.9 PK			1.12 V	269	65.5	41.4
4	*5210.00	96.2 AV			1.12 V	269	54.8	41.4
5	5350.00	60.4 PK	74.0	-13.6	1.12 V	269	52.4	8.0
6	5350.00	46.8 AV	54.0	-7.2	1.12 V	269	38.8	8.0
7	#10420.00	62.1 PK	74.0	-11.9	1.45 V	88	42.1	20.0
8	#10420.00	49.1 AV	54.0	-4.9	1.45 V	88	29.1	20.0

Remarks:

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

For U-NII-3 Band

802.11a

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

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	#5648.00	61.9 PK	68.2	-6.3	1.73 H	53	53.3	8.6
2	*5745.00	120.1 PK			1.73 H	53	77.4	42.7
3	*5745.00	109.4 AV			1.73 H	53	66.7	42.7
4	#5935.20	61.5 PK	68.2	-6.7	1.73 H	53	52.1	9.4
5	11490.00	63.8 PK	74.0	-10.2	2.65 H	311	42.0	21.8
6	11490.00	50.6 AV	54.0	-3.4	2.65 H	311	28.8	21.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.80	62.0 PK	68.2	-6.2	1.15 V	33	54.2	7.8
2	*5745.00	126.9 PK			1.15 V	33	85.1	41.8
3	*5745.00	115.9 AV			1.15 V	33	74.1	41.8
4	#5985.60	60.7 PK	68.2	-7.5	1.15 V	33	52.1	8.6
5	11490.00	63.7 PK	74.0	-10.3	1.69 V	225	42.3	21.4
6	11490.00	50.5 AV	54.0	-3.5	1.69 V	225	29.1	21.4

Remarks:

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

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

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	#5623.20	60.7 PK	68.2	-7.5	1.74 H	50	52.2	8.5
2	*5785.00	120.3 PK			1.74 H	50	77.6	42.7
3	*5785.00	109.6 AV			1.74 H	50	66.9	42.7
4	#5997.60	61.2 PK	68.2	-7.0	1.74 H	50	51.5	9.7
5	11570.00	63.9 PK	74.0	-10.1	2.70 H	308	42.1	21.8
6	11570.00	50.8 AV	54.0	-3.2	2.70 H	308	29.0	21.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5626.40	60.5 PK	68.2	-7.7	1.21 V	33	52.7	7.8
2	*5785.00	126.9 PK			1.21 V	33	85.0	41.9
3	*5785.00	116.1 AV			1.21 V	33	74.2	41.9
4	#5992.80	61.1 PK	68.2	-7.1	1.21 V	33	52.4	8.7
5	11570.00	63.8 PK	74.0	-10.2	2.41 V	118	42.4	21.4
6	11570.00	50.7 AV	54.0	-3.3	2.41 V	118	29.3	21.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5609.60	60.6 PK	68.2	-7.6	1.64 H	52	52.1	8.5
2	*5825.00	119.0 PK			1.64 H	52	76.1	42.9
3	*5825.00	108.2 AV			1.64 H	52	65.3	42.9
4	#5973.60	61.0 PK	68.2	-7.2	1.64 H	52	51.4	9.6
5	11650.00	63.3 PK	74.0	-10.7	2.78 H	322	41.9	21.4
6	11650.00	50.2 AV	54.0	-3.8	2.78 H	322	28.8	21.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5611.20	60.2 PK	68.2	-8.0	1.65 V	29	52.4	7.8
2	*5825.00	126.5 PK			1.65 V	29	84.5	42.0
3	*5825.00	115.2 AV			1.65 V	29	73.2	42.0
4	#5927.20	61.2 PK	68.2	-7.0	1.65 V	29	52.8	8.4
5	11650.00	63.3 PK	74.0	-10.7	2.29 V	307	42.4	20.9
6	11650.00	50.0 AV	54.0	-4.0	2.29 V	307	29.1	20.9

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.

802.11ac (VHT20)

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	#5624.80	61.2 PK	68.2	-7.0	1.76 H	54	52.7	8.5
2	*5745.00	119.8 PK			1.76 H	54	77.1	42.7
3	*5745.00	109.2 AV			1.76 H	54	66.5	42.7
4	#5989.60	61.2 PK	68.2	-7.0	1.76 H	54	51.5	9.7
5	11460.00	63.6 PK	74.0	-10.4	2.82 H	310	41.8	21.8
6	11460.00	50.5 AV	54.0	-3.5	2.82 H	310	28.7	21.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5636.80	61.8 PK	68.2	-6.4	1.30 V	29	54.0	7.8
2	*5745.00	126.3 PK			1.30 V	29	84.5	41.8
3	*5745.00	115.0 AV			1.30 V	29	73.2	41.8
4	#5992.80	61.1 PK	68.2	-7.1	1.30 V	29	52.4	8.7
5	11490.00	63.5 PK	74.0	-10.5	2.67 V	148	42.1	21.4
6	11490.00	50.6 AV	54.0	-3.4	2.67 V	148	29.2	21.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5605.60	60.7 PK	68.2	-7.5	1.76 H	55	52.2	8.5
2	*5785.00	119.9 PK			1.76 H	55	77.2	42.7
3	*5785.00	109.1 AV			1.76 H	55	66.4	42.7
4	#5944.80	60.9 PK	68.2	-7.3	1.76 H	55	51.5	9.4
5	11570.00	64.1 PK	74.0	-9.9	2.88 H	313	42.3	21.8
6	11570.00	51.2 AV	54.0	-2.8	2.88 H	313	29.4	21.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5621.60	61.1 PK	68.2	-7.1	1.41 V	23	53.3	7.8
2	*5785.00	126.5 PK			1.41 V	23	84.6	41.9
3	*5785.00	115.0 AV			1.41 V	23	73.1	41.9
4	#5925.60	65.9 PK	68.2	-2.3	1.41 V	23	57.5	8.4
5	11570.00	63.9 PK	74.0	-10.1	3.18 V	227	42.5	21.4
6	11570.00	51.1 AV	54.0	-2.9	3.18 V	227	29.7	21.4

Remarks:

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

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

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	60.8 PK	68.2	-7.4	1.65 H	51	52.3	8.5
2	*5825.00	118.7 PK			1.65 H	51	75.8	42.9
3	*5825.00	107.5 AV			1.65 H	51	64.6	42.9
4	#6000.00	61.6 PK	68.2	-6.6	1.65 H	51	51.9	9.7
5	11650.00	63.4 PK	74.0	-10.6	2.85 H	304	42.0	21.4
6	11650.00	50.1 AV	54.0	-3.9	2.85 H	304	28.7	21.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	61.2 PK	68.2	-7.0	1.41 V	24	53.4	7.8
2	*5825.00	125.9 PK			1.41 V	24	83.9	42.0
3	*5825.00	114.7 AV			1.41 V	24	72.7	42.0
4	#5965.60	61.7 PK	68.2	-6.5	1.41 V	24	53.1	8.6
5	11650.00	63.4 PK	74.0	-10.6	1.99 V	97	42.5	20.9
6	11650.00	50.0 AV	54.0	-4.0	1.99 V	97	29.1	20.9

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.

802.11ac (VHT40)

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

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	#5638.40	65.3 PK	68.2	-2.9	1.71 H	49	56.8	8.5
2	*5755.00	116.4 PK			1.71 H	49	73.7	42.7
3	*5755.00	106.4 AV			1.71 H	49	63.7	42.7
4	#5948.00	60.9 PK	68.2	-7.3	1.71 H	49	51.5	9.4
5	11510.00	63.6 PK	74.0	-10.4	2.90 H	320	41.9	21.7
6	11510.00	50.5 AV	54.0	-3.5	2.90 H	320	28.8	21.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	67.8 PK	68.2	-0.4	1.33 V	18	60.0	7.8
2	*5755.00	124.2 PK			1.33 V	18	82.4	41.8
3	*5755.00	112.8 AV			1.33 V	18	71.0	41.8
4	#5988.00	59.4 PK	68.2	-8.8	1.33 V	18	50.7	8.7
5	11510.00	63.4 PK	74.0	-10.6	3.18 V	224	42.1	21.3
6	11510.00	50.5 AV	54.0	-3.5	3.18 V	224	29.2	21.3

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

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	#5650.40	65.0 PK	68.2	-3.2	1.68 H	48	56.4	8.6
2	*5795.00	117.4 PK			1.68 H	48	74.7	42.7
3	*5795.00	107.1 AV			1.68 H	48	64.4	42.7
4	#5925.60	64.6 PK	68.2	-3.6	1.68 H	48	55.2	9.4
5	11590.00	63.8 PK	74.0	-10.2	2.96 H	323	42.1	21.7
6	11590.00	51.0 AV	54.0	-3.0	2.96 H	323	29.3	21.7

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5641.60	66.3 PK	68.2	-1.9	1.25 V	19	58.5	7.8
2	*5795.00	124.5 PK			1.25 V	19	82.6	41.9
3	*5795.00	114.0 AV			1.25 V	19	72.1	41.9
4	#5925.60	68.0 PK	68.2	-0.2	1.25 V	19	59.6	8.4
5	11590.00	63.8 PK	74.0	-10.2	1.93 V	227	42.6	21.2
6	11590.00	50.7 AV	54.0	-3.3	1.93 V	227	29.5	21.2

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

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	#5636.00	64.7 PK	68.2	-3.5	1.70 H	54	56.2	8.5
2	*5775.00	109.8 PK			1.70 H	54	67.1	42.7
3	*5775.00	99.7 AV			1.70 H	54	57.0	42.7
4	#5956.80	61.6 PK	68.2	-6.6	1.70 H	54	52.0	9.6
5	11550.00	63.9 PK	74.0	-10.1	2.98 H	311	42.1	21.8
6	11550.00	50.8 AV	54.0	-3.2	2.98 H	311	29.0	21.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.20	67.5 PK	68.2	-0.7	1.32 V	17	59.7	7.8
2	*5775.00	116.0 PK			1.32 V	17	74.2	41.8
3	*5775.00	105.7 AV			1.32 V	17	63.9	41.8
4	#5927.20	63.3 PK	68.2	-4.9	1.32 V	17	54.9	8.4
5	11550.00	63.9 PK	74.0	-10.1	2.19 V	273	42.6	21.3
6	11550.00	50.6 AV	54.0	-3.4	2.19 V	273	29.3	21.3

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.

Below 1GHz Worst-Case Data: 802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	76.47	22.9 QP	40.0	-17.1	2.00 H	83	40.2	-17.3
2	97.81	26.8 QP	43.5	-16.7	2.00 H	276	45.5	-18.7
3	142.44	29.0 QP	43.5	-14.5	2.00 H	76	43.0	-14.0
4	249.17	31.3 QP	46.0	-14.7	1.01 H	280	45.4	-14.1
5	580.97	39.6 QP	46.0	-6.4	1.51 H	130	46.2	-6.6
6	936.07	39.8 QP	46.0	-6.2	2.00 H	235	39.6	0.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.36	33.3 QP	40.0	-6.7	2.00 V	213	47.8	-14.5
2	64.83	31.7 QP	40.0	-8.3	1.00 V	277	47.0	-15.3
3	142.44	26.7 QP	43.5	-16.8	1.00 V	53	40.7	-14.0
4	249.17	26.8 QP	46.0	-19.2	1.00 V	169	40.9	-14.1
5	582.91	39.8 QP	46.0	-6.2	1.50 V	162	46.4	-6.6
6	938.01	39.8 QP	46.0	-6.2	1.50 V	254	39.3	0.5

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	97.81	27.7 QP	43.5	-15.8	2.00 H	297	46.4	-18.7
2	138.56	28.1 QP	43.5	-15.4	1.25 H	89	42.4	-14.3
3	567.39	42.9 QP	46.0	-3.1	2.00 H	228	50.0	-7.1
4	730.38	37.5 QP	46.0	-8.5	1.50 H	6	40.9	-3.4
5	889.50	40.1 QP	46.0	-5.9	1.50 H	18	41.0	-0.9
6	936.07	41.9 QP	46.0	-4.1	1.50 H	6	41.7	0.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.42	28.0 QP	40.0	-12.0	1.25 V	238	42.7	-14.7
2	80.35	26.8 QP	40.0	-13.2	1.25 V	163	45.1	-18.3
3	340.36	22.1 QP	46.0	-23.9	1.25 V	32	33.4	-11.3
4	567.39	37.6 QP	46.0	-8.4	1.51 V	184	44.7	-7.1
5	747.85	37.0 QP	46.0	-9.0	1.51 V	264	39.8	-2.8
6	936.07	40.4 QP	46.0	-5.6	1.51 V	255	40.2	0.2

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 21, 2016	Nov. 20, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

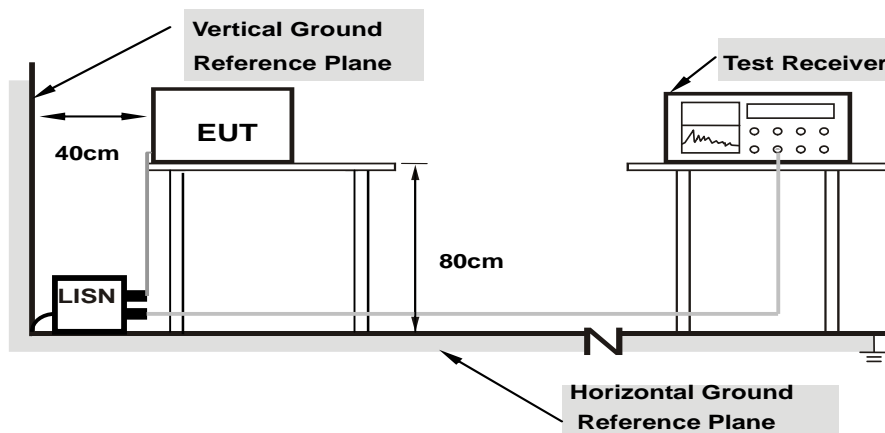
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

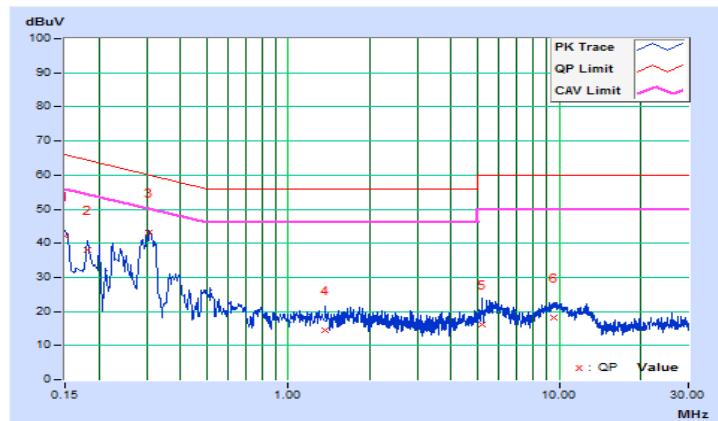
Worst-case data: 802.11a

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.45	31.61	16.74	42.06	27.19	66.00	56.00	-23.94	-28.81
2	0.18128	10.45	27.66	16.16	38.11	26.61	64.43	54.43	-26.32	-27.82
3	0.30696	10.49	32.53	27.02	43.02	37.51	60.05	50.05	-17.03	-12.54
4	1.37383	10.50	4.09	-0.02	14.59	10.48	56.00	46.00	-41.41	-35.52
5	5.18217	10.70	5.34	-0.56	16.04	10.14	60.00	50.00	-43.96	-39.86
6	9.51054	10.91	7.22	2.62	18.13	13.53	60.00	50.00	-41.87	-36.47

Remarks:

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

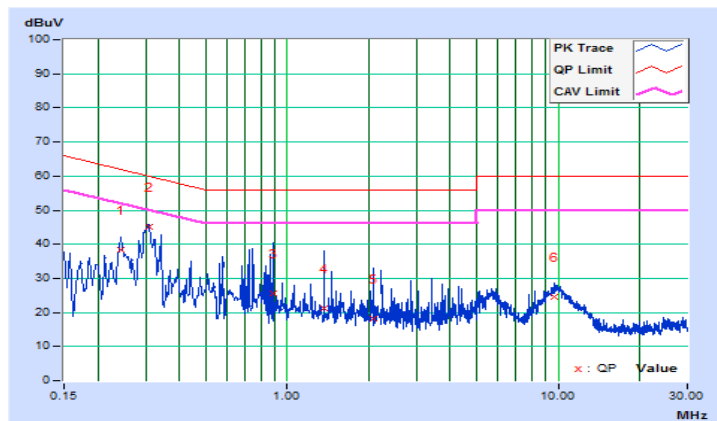


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.24384	10.23	28.04	21.00	38.27	31.23	61.96
2	0.30777	10.23	34.94	29.41	45.17	39.64	60.03	50.03	-14.86	-10.39
3	0.88899	10.26	15.26	5.44	25.52	15.70	56.00	46.00	-30.48	-30.30
4	1.36601	10.28	10.99	2.84	21.27	13.12	56.00	46.00	-34.73	-32.88
5	2.07763	10.32	8.01	0.58	18.33	10.90	56.00	46.00	-37.67	-35.10
6	9.72559	10.66	13.80	9.31	24.46	19.97	60.00	50.00	-35.54	-30.03

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.

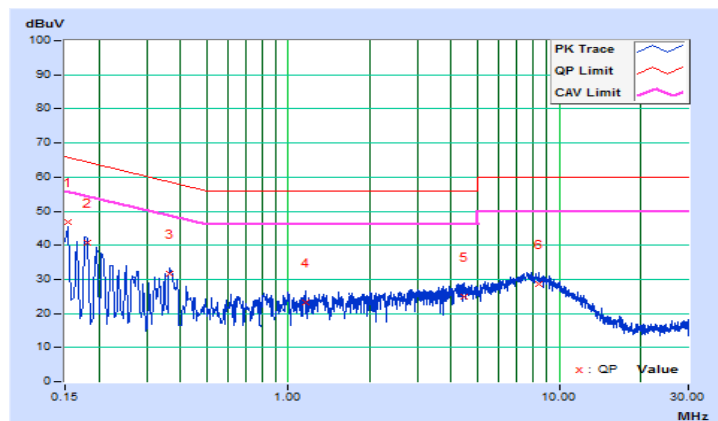


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15391	10.45	36.31	22.85	46.76	33.30	65.79
2	0.18128	10.45	30.18	16.30	40.63	26.75	64.43	54.43	-23.80	-27.68
3	0.36526	10.51	21.19	16.13	31.70	26.64	58.61	48.61	-26.91	-21.97
4	1.15878	10.49	12.80	6.35	23.29	16.84	56.00	46.00	-32.71	-29.16
5	4.46664	10.67	14.36	6.75	25.03	17.42	56.00	46.00	-30.97	-28.58
6	8.38837	10.85	17.81	11.46	28.66	22.31	60.00	50.00	-31.34	-27.69

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.

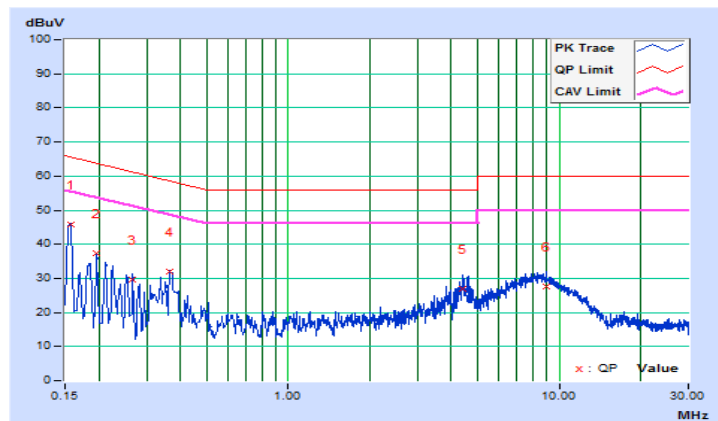


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15782	10.21	35.50	22.09	45.71	32.30	65.58
2	0.19692	10.22	27.30	13.45	37.52	23.67	63.74	53.74	-26.22	-30.07
3	0.26730	10.23	19.50	7.14	29.73	17.37	61.20	51.20	-31.47	-33.83
4	0.36526	10.23	21.60	16.60	31.83	26.83	58.61	48.61	-26.78	-21.78
5	4.41581	10.42	16.51	5.36	26.93	15.78	56.00	46.00	-29.07	-30.22
6	8.95923	10.62	17.04	10.93	27.66	21.55	60.00	50.00	-32.34	-28.45

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

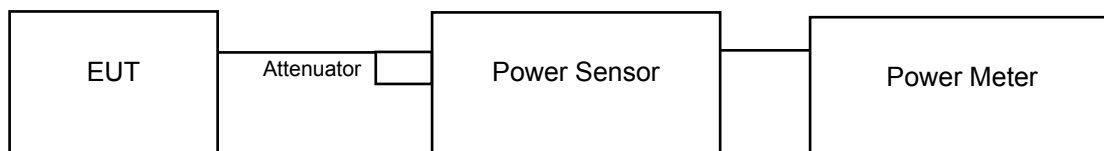
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

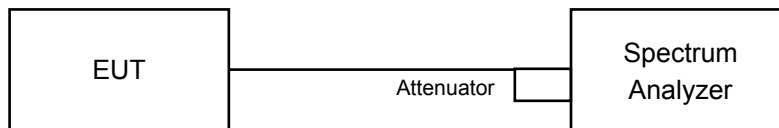
4.3.2 Test Setup

For Power Output

802.11a, 802.11ac (VHT20), 802.11ac (VHT40)



802.11ac (VHT80)



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

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

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (VHT80)

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

For U-NII-1 Band 1TX

802.11a

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
36	5180	51.761	17.14	30.00	3.71	20.85	21.00	Pass
40	5200	50.816	17.06	30.00	3.71	20.77	21.00	Pass
48	5240	51.286	17.10	30.00	3.71	20.81	21.00	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
36	5180	52.000	17.16	30.00	3.71	20.87	21.00	Pass
40	5200	51.050	17.08	30.00	3.71	20.79	21.00	Pass
48	5240	51.523	17.12	30.00	3.71	20.83	21.00	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
38	5190	51.286	17.10	30.00	3.71	20.81	21.00	Pass
46	5230	50.699	17.05	30.00	3.71	20.76	21.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
42	5210	51.880	17.15	30.00	3.71	20.86	21.00	Pass

For U-NII-1 Band 2TX

CDD Mode

802.11a

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	14.11	14.02	50.998	17.08	30.00	3.71	20.79	21.00	Pass
40	5200	14.02	14.13	51.117	17.09	30.00	3.71	20.80	21.00	Pass
48	5240	14.09	14.08	51.231	17.10	30.00	3.71	20.81	21.00	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	14.12	14.16	51.885	17.15	30.00	3.71	20.86	21.00	Pass
40	5200	14.04	14.09	50.996	17.08	30.00	3.71	20.79	21.00	Pass
48	5240	14.13	14.19	52.124	17.17	30.00	3.71	20.88	21.00	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	14.07	14.05	50.937	17.07	30.00	3.71	20.78	21.00	Pass
46	5230	14.06	14.10	51.172	17.09	30.00	3.71	20.80	21.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	14.02	14.11	50.998	17.08	30.00	3.71	20.79	21.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	11.11	11.17	26.004	14.15	30.00	5.97	20.12	21.00	Pass
40	5200	11.18	11.15	26.154	14.18	30.00	5.97	20.15	21.00	Pass
48	5240	11.15	11.16	26.094	14.17	30.00	5.97	20.14	21.00	Pass

Note: Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	11.15	11.13	26.004	14.15	30.00	5.97	20.12	21.00	Pass
46	5230	11.16	11.14	26.064	14.16	30.00	5.97	20.13	21.00	Pass

Note: Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	11.07	11.16	25.856	14.13	30.00	5.97	20.10	21.00	Pass

Note: Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.

For U-NII-3 Band

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.56	23.66	23.66	23.61	921.149	29.64	30.00	Pass
157	5785	23.64	23.63	23.66	23.65	925.894	29.67	30.00	Pass
165	5825	23.74	23.67	23.63	23.62	930.220	29.69	30.00	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.62	23.55	23.60	23.59	914.255	29.61	30.00	Pass
157	5785	23.64	23.59	23.66	23.62	922.184	29.65	30.00	Pass
165	5825	23.54	23.57	23.68	23.62	916.944	29.62	30.00	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	22.56	22.71	22.61	22.55	729.217	28.63	30.00	Pass
159	5795	23.60	23.66	23.61	23.52	915.881	29.62	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	19.10	19.13	18.92	18.99	320.362	25.06	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	22.15	22.07	22.08	22.05	646.885	28.11	28.43	Pass
157	5785	22.17	22.08	22.12	22.11	651.737	28.14	28.43	Pass
165	5825	22.05	22.02	22.15	22.11	646.160	28.10	28.43	Pass

Note: Directional gain = 7.57dBi > 6dBi, so the power limit shall be reduced to $30 - (7.57 - 6) = 28.43$ dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	22.12	22.27	22.23	22.08	660.130	28.20	28.43	Pass
159	5795	22.12	22.15	22.08	22.04	648.381	28.12	28.43	Pass

Note: Directional gain = 7.57dBi > 6dBi, so the power limit shall be reduced to $30 - (7.57 - 6) = 28.43$ dBm.

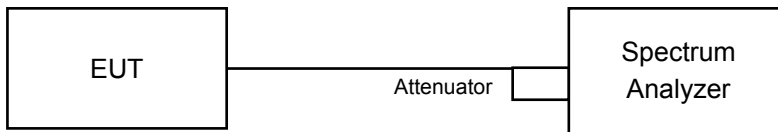
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	19.10	19.13	18.92	18.99	320.362	25.06	28.43	Pass

Note: Directional gain = 7.57dBi > 6dBi, so the power limit shall be reduced to $30 - (7.57 - 6) = 28.43$ dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

For U-NII-1 Band 1TX

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	16.56
40	5200	16.44
48	5240	16.44

802.11ac (VHT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	17.64
40	5200	17.64
48	5240	17.64

802.11ac (VHT40)

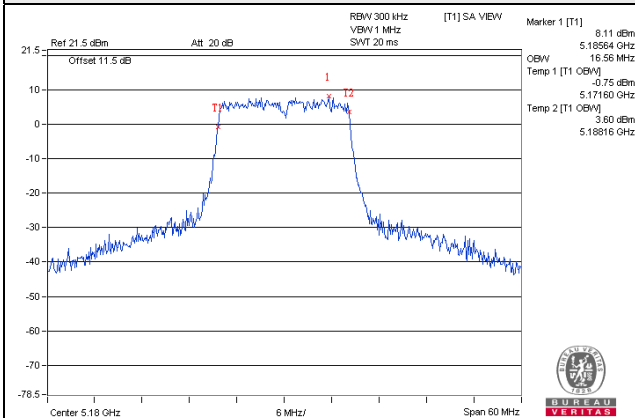
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
38	5190	36.24
46	5230	36.24

802.11ac (VHT80)

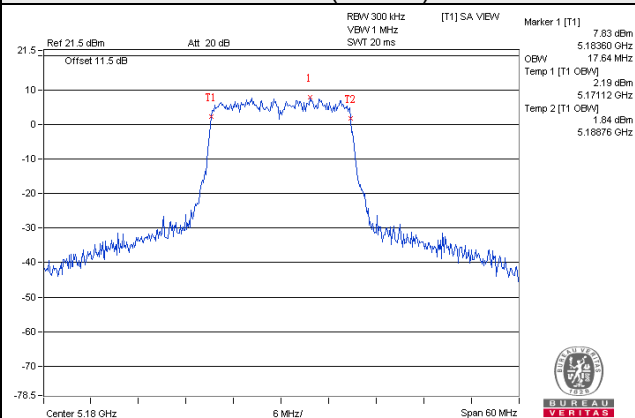
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
42	5210	75.84

Spectrum Plot of Worst Value

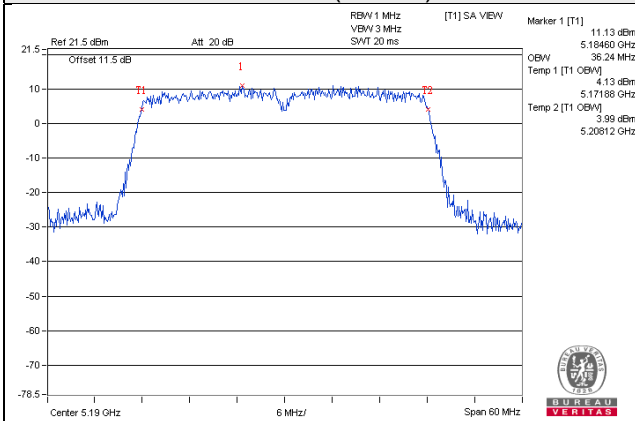
802.11a



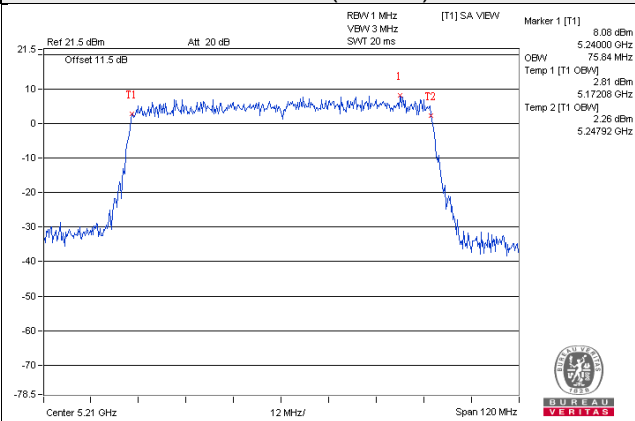
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



For U-NII-1 Band 2TX

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.56	16.44
40	5200	16.44	16.56
48	5240	16.56	16.44

802.11ac (VHT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.76
40	5200	17.64	17.64
48	5240	17.76	17.76

802.11ac (VHT40)

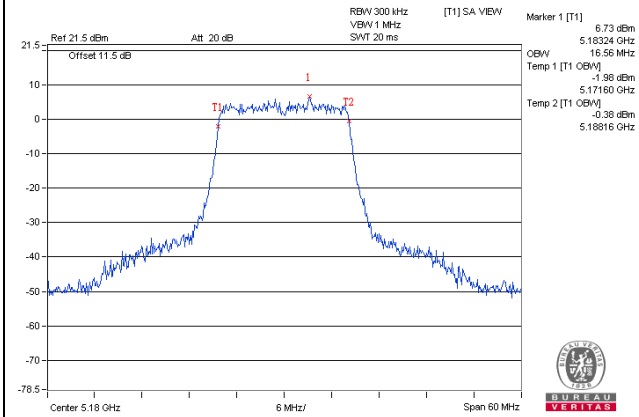
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.36	36.48

802.11ac (VHT80)

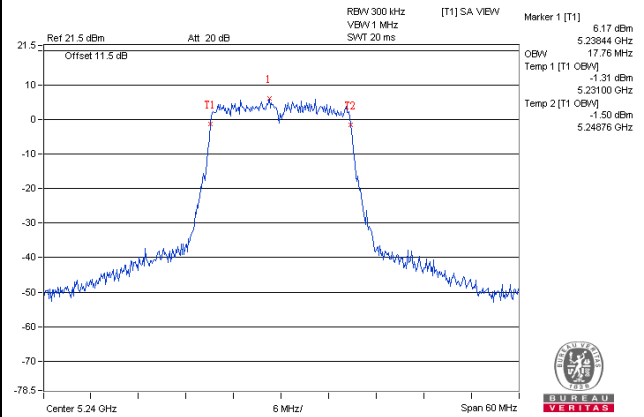
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.84

Spectrum Plot of Worst Value

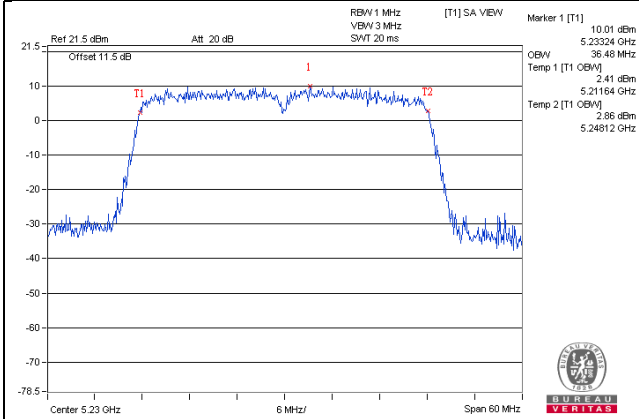
802.11a



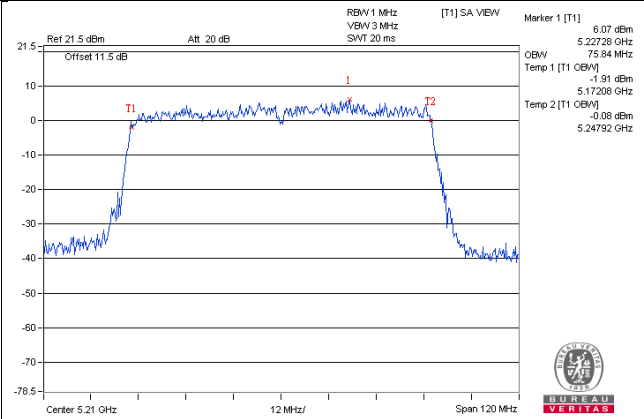
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



For U-NII-3 Band

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	22.32	24.12	28.44	20.52
157	5785	18.48	18.96	21.48	17.64
165	5825	16.92	16.68	17.40	16.80

802.11ac (VHT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	21.96	19.92	26.64	19.44
157	5785	18.36	18.24	20.76	18.24
165	5825	17.88	17.88	18.00	18.00

802.11ac (VHT40)

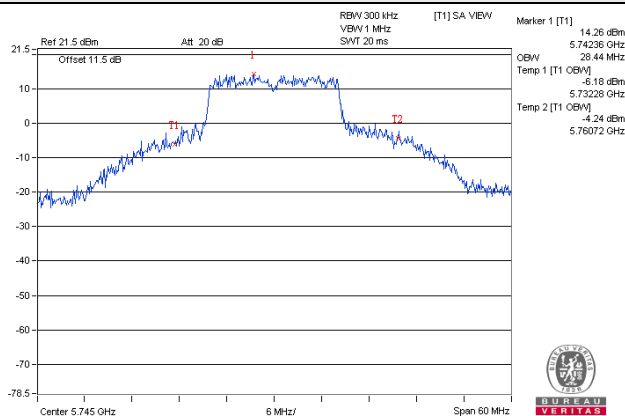
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	37.08	36.72	38.28	36.60
159	5795	47.64	46.56	50.28	42.96

802.11ac (VHT80)

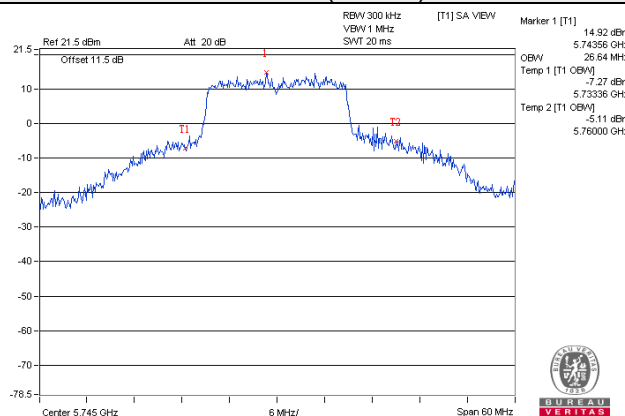
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	76.08	75.84	76.08	75.84

Spectrum Plot of Worst Value

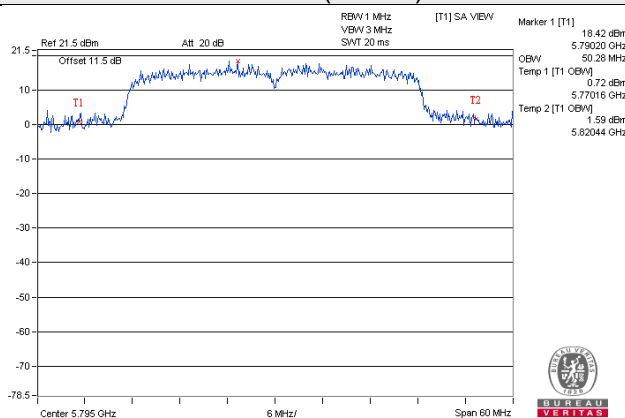
802.11a



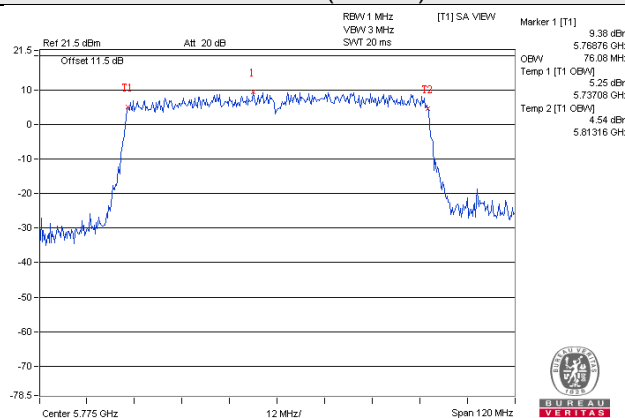
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

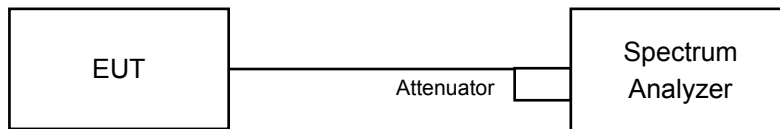


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-2A, U-NII-2C band:

Duty cycle of test signal is > 98%

Using method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value

Duty cycle of test signal is < 98%

Using method SA-2

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

For U-NII-3 band:

Duty cycle of test signal is > 98%

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW \geq 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. Record the max value

Duty cycle of test signal is < 98%

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW \geq 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. Record the max value and add $10 \log (1/\text{duty cycle})$

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 Band 1TX

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	3.37	0.20	3.57	17.00	Pass
40	5200	3.62	0.20	3.82	17.00	Pass
48	5240	3.83	0.20	4.03	17.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	3.25	17.00	Pass
40	5200	3.54	17.00	Pass
48	5240	3.65	17.00	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
38	5190	0.73	0.16	0.89	17.00	Pass
46	5230	1.13	0.16	1.29	17.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

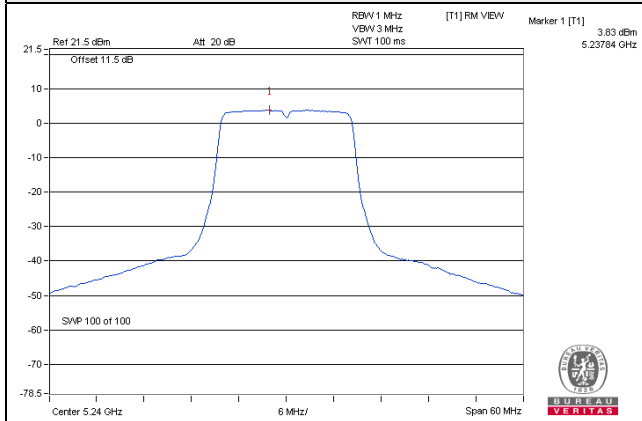
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
42	5210	-2.36	0.32	-2.03	17.00	Pass

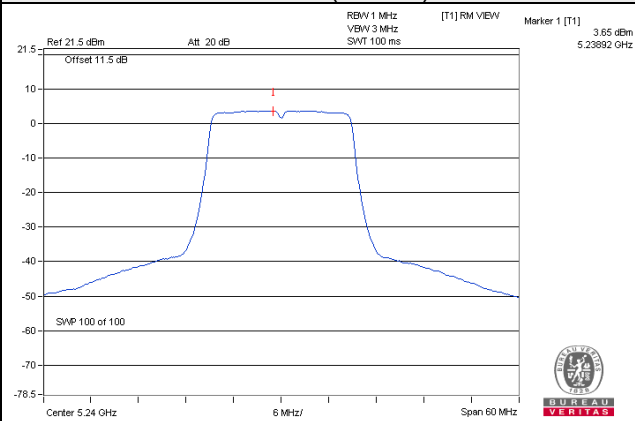
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

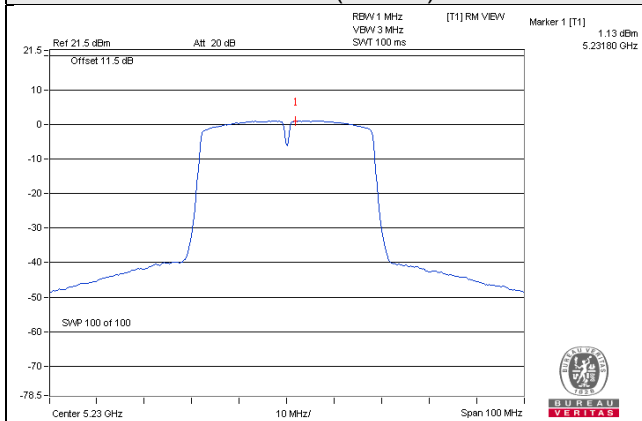
802.11a



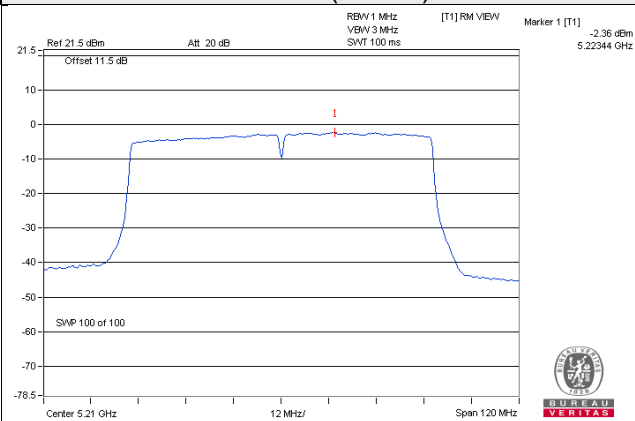
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



For U-NII-1 Band 2TX

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	1.12	1.92	0.23	4.78	17.00	Pass
40	5200	1.30	1.94	0.23	4.87	17.00	Pass
48	5240	1.63	2.07	0.23	5.09	17.00	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	0.57	1.60	0.09	4.22	17.00	Pass
40	5200	1.09	1.77	0.09	4.55	17.00	Pass
48	5240	1.52	2.05	0.09	4.90	17.00	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.50	-1.07	0.20	1.93	17.00	Pass
46	5230	-0.98	-0.63	0.20	2.40	17.00	Pass

Note:

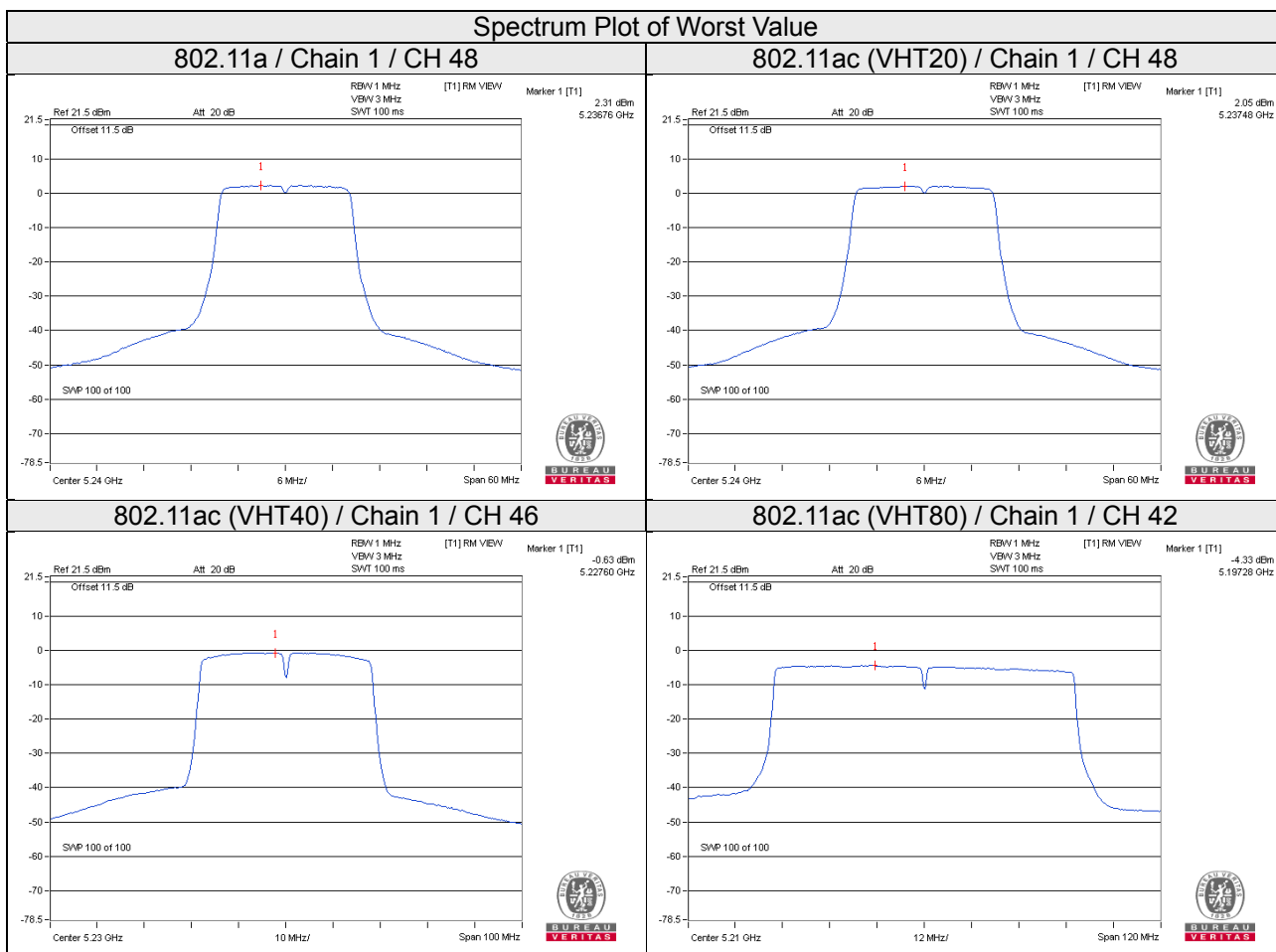
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-5.00	-4.67	0.32	-1.50	17.00	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.97dBi < 6dBi, so the limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.



For U-NII-3 Band

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.81	4.03	6.02	0.17	10.22	28.43	Pass
	157	5785	1.75	3.97	6.02	0.17	10.16	28.43	Pass
	165	5825	1.46	3.68	6.02	0.17	9.87	28.43	Pass
1	149	5745	1.80	4.02	6.02	0.17	10.21	28.43	Pass
	157	5785	1.52	3.74	6.02	0.17	9.93	28.43	Pass
	165	5825	1.21	3.43	6.02	0.17	9.62	28.43	Pass
2	149	5745	1.74	3.96	6.02	0.17	10.15	28.43	Pass
	157	5785	1.50	3.72	6.02	0.17	9.91	28.43	Pass
	165	5825	1.81	4.03	6.02	0.17	10.22	28.43	Pass
3	149	5745	1.68	3.90	6.02	0.17	10.09	28.43	Pass
	157	5785	1.83	4.05	6.02	0.17	10.24	28.43	Pass
	165	5825	1.81	4.03	6.02	0.17	10.21	28.43	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 = 7.57dBi > 6dBi, so the power density limit shall be reduced to $30 - (7.57 - 6) = 28.43$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=4) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	149	5745	1.57	3.79	6.02	9.81	28.43	Pass
	157	5785	1.26	3.48	6.02	9.50	28.43	Pass
	165	5825	1.10	3.32	6.02	9.34	28.43	Pass
1	149	5745	1.47	3.69	6.02	9.71	28.43	Pass
	157	5785	1.25	3.47	6.02	9.49	28.43	Pass
	165	5825	0.56	2.78	6.02	8.80	28.43	Pass
2	149	5745	1.25	3.47	6.02	9.49	28.43	Pass
	157	5785	1.16	3.38	6.02	9.40	28.43	Pass
	165	5825	1.17	3.39	6.02	9.41	28.43	Pass
3	149	5745	1.46	3.68	6.02	9.70	28.43	Pass
	157	5785	1.45	3.67	6.02	9.69	28.43	Pass
	165	5825	1.27	3.49	6.02	9.51	28.43	Pass

Note:

- 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.
- Directional gain = 7.57dBi > 6dBi, so the power density limit shall be reduced to $30-(7.57-6) = 28.43\text{dBm}$.

802.11ac (VHT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.78	0.44	6.02	0.13	6.59	28.43	Pass
	159	5795	-0.47	1.75	6.02	0.13	7.90	28.43	Pass
1	151	5755	-1.96	0.26	6.02	0.13	6.41	28.43	Pass
	159	5795	-0.80	1.42	6.02	0.13	7.57	28.43	Pass
2	151	5755	-1.96	0.26	6.02	0.13	6.41	28.43	Pass
	159	5795	-0.93	1.29	6.02	0.13	7.44	28.43	Pass
3	151	5755	-2.12	0.10	6.02	0.13	6.25	28.43	Pass
	159	5795	-0.70	1.52	6.02	0.13	7.67	28.43	Pass

Note:

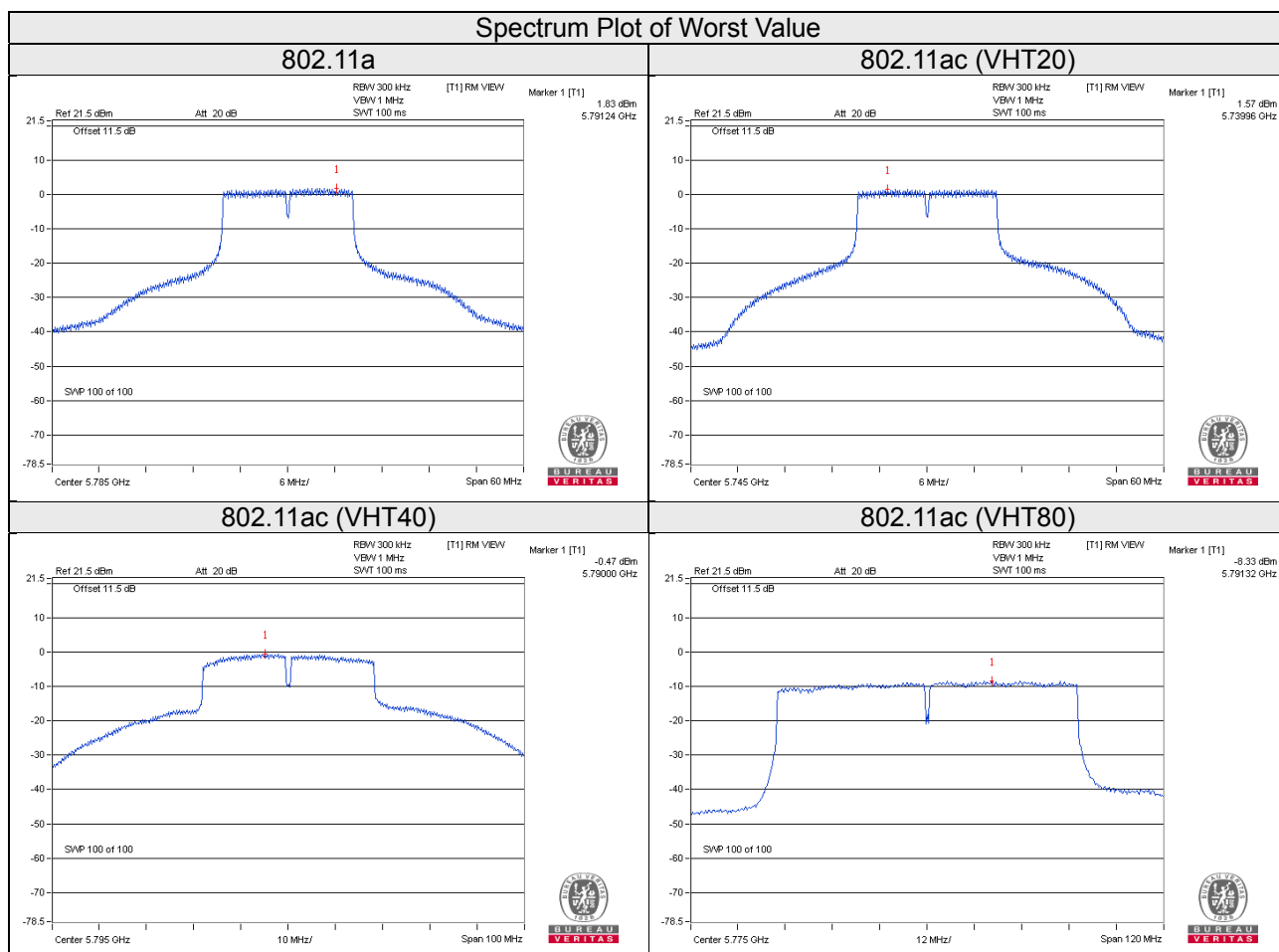
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = 7.57dBi > 6dBi, so the power density limit shall be reduced to $30-(7.57-6) = 28.43\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.84	-6.62	6.02	0.22	-0.38	28.43	Pass
1	155	5775	-8.89	-6.67	6.02	0.22	-0.43	28.43	Pass
2	155	5775	-8.33	-6.11	6.02	0.22	0.13	28.43	Pass
3	155	5775	-8.86	-6.64	6.02	0.22	-0.40	28.43	Pass

Note:

- 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.
- Directional gain = 7.57dBi > 6dBi, so the power density limit shall be reduced to $30 - (7.57 - 6) = 28.43\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

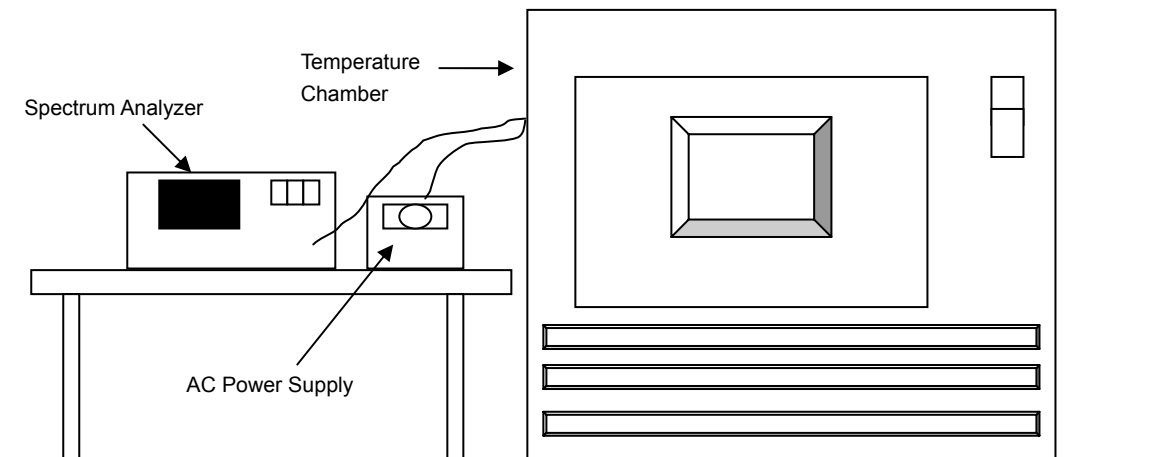


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

For U-NII-1 Band 1TX

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	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	5180.0018	0.00003	5180.001	0.00002	5180.0005	0.00001	5179.999	-0.00002
40	120	5180.0178	0.00034	5180.0211	0.00041	5180.0196	0.00038	5180.0196	0.00038
30	120	5179.9854	-0.00028	5179.9839	-0.00031	5179.9851	-0.00029	5179.9824	-0.00034
20	120	5179.9959	-0.00008	5179.996	-0.00008	5179.997	-0.00006	5179.9973	-0.00005
10	120	5180.02	0.00039	5180.0213	0.00041	5180.0223	0.00043	5180.0237	0.00046
0	120	5179.9994	-0.00001	5180	0.00000	5180.0035	0.00007	5180.003	0.00006
-10	120	5179.9942	-0.00011	5179.9961	-0.00008	5179.9942	-0.00011	5179.9942	-0.00011
-20	120	5179.9859	-0.00027	5179.9883	-0.00023	5179.986	-0.00027	5179.9909	-0.00018
-30	120	5180.0247	0.00048	5180.0233	0.00045	5180.0219	0.00042	5180.0254	0.00049

Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	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	5179.9952	-0.00009	5179.9956	-0.00008	5179.9963	-0.00007	5179.9981	-0.00004
	120	5179.9959	-0.00008	5179.996	-0.00008	5179.997	-0.00006	5179.9973	-0.00005
	102	5179.9964	-0.00007	5179.996	-0.00008	5179.997	-0.00006	5179.9968	-0.00006

For U-NII-1 Band 2TX

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	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	5179.9925	-0.00014	5179.9934	-0.00013	5179.9946	-0.00010	5179.9929	-0.00014
40	120	5179.9959	-0.00008	5179.9937	-0.00012	5179.9926	-0.00014	5179.9933	-0.00013
30	120	5180.0124	0.00024	5180.0149	0.00029	5180.0163	0.00031	5180.0124	0.00024
20	120	5180.0143	0.00028	5180.0126	0.00024	5180.0132	0.00025	5180.0116	0.00022
10	120	5180.0232	0.00045	5180.0215	0.00042	5180.0231	0.00045	5180.0217	0.00042
0	120	5179.9769	-0.00045	5179.9781	-0.00042	5179.9791	-0.00040	5179.9777	-0.00043
-10	120	5180.0047	0.00009	5180.005	0.00010	5180.0047	0.00009	5180.0046	0.00009
-20	120	5180.0216	0.00042	5180.024	0.00046	5180.0209	0.00040	5180.025	0.00048
-30	120	5179.9784	-0.00042	5179.9799	-0.00039	5179.977	-0.00044	5179.9793	-0.00040

Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0151	0.00029	5180.0119	0.00023	5180.0138	0.00027	5180.0122	0.00024
	120	5180.0143	0.00028	5180.0126	0.00024	5180.0132	0.00025	5180.0116	0.00022
	102	5180.0134	0.00026	5180.0129	0.00025	5180.0135	0.00026	5180.0119	0.00023

For U-NII-3 Band

Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	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	5744.9894	-0.00018	5744.9854	-0.00025	5744.9886	-0.00020	5744.9861	-0.00024
40	120	5745.0046	0.00008	5745.0091	0.00016	5745.0094	0.00016	5745.0066	0.00011
30	120	5744.9714	-0.00050	5744.9732	-0.00047	5744.973	-0.00047	5744.9708	-0.00051
20	120	5744.9803	-0.00034	5744.9798	-0.00035	5744.9789	-0.00037	5744.98	-0.00035
10	120	5745.0025	0.00004	5745.0071	0.00012	5745.005	0.00009	5745.0036	0.00006
0	120	5744.9724	-0.00048	5744.9721	-0.00049	5744.972	-0.00049	5744.9693	-0.00053
-10	120	5744.9848	-0.00026	5744.9821	-0.00031	5744.9805	-0.00034	5744.9809	-0.00033
-20	120	5745.0189	0.00033	5745.0144	0.00025	5745.0178	0.00031	5745.0173	0.00030
-30	120	5744.9917	-0.00014	5744.9938	-0.00011	5744.9933	-0.00012	5744.993	-0.00012

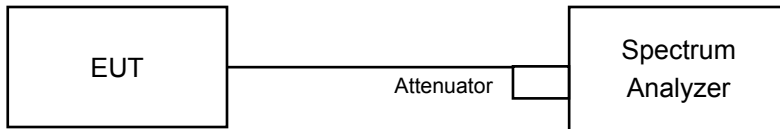
Frequency Stability Versus Voltage									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5744.9799	-0.00035	5744.9793	-0.00036	5744.9786	-0.00037	5744.9803	-0.00034
	120	5744.9803	-0.00034	5744.9798	-0.00035	5744.9789	-0.00037	5744.98	-0.00035
	102	5744.9792	-0.00036	5744.979	-0.00037	5744.9788	-0.00037	5744.9797	-0.00035

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.34	16.37	16.35	16.40	0.5	Pass
157	5785	16.39	16.38	16.36	16.36	0.5	Pass
165	5825	16.39	16.39	16.37	16.33	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	17.61	17.21	17.62	17.61	0.5	Pass
157	5785	17.63	17.57	17.00	17.60	0.5	Pass
165	5825	17.56	17.61	17.58	17.60	0.5	Pass

802.11ac (VHT40)

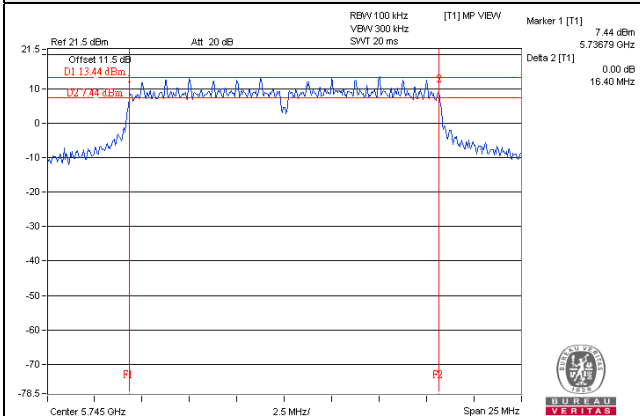
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.48	35.27	33.96	35.14	0.5	Pass
159	5795	33.86	35.21	35.37	35.09	0.5	Pass

802.11ac (VHT80)

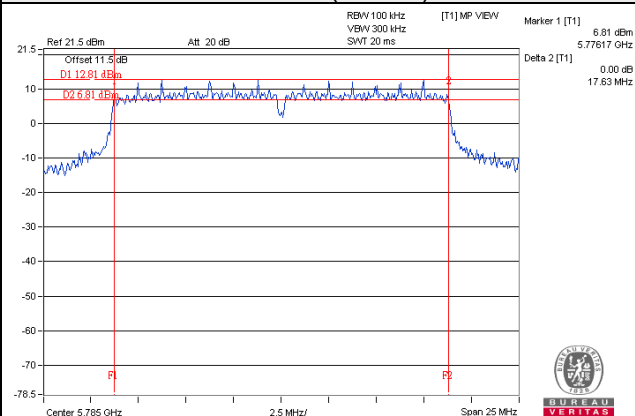
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.98	75.94	75.91	75.99	0.5	Pass

Spectrum Plot of Worst Value

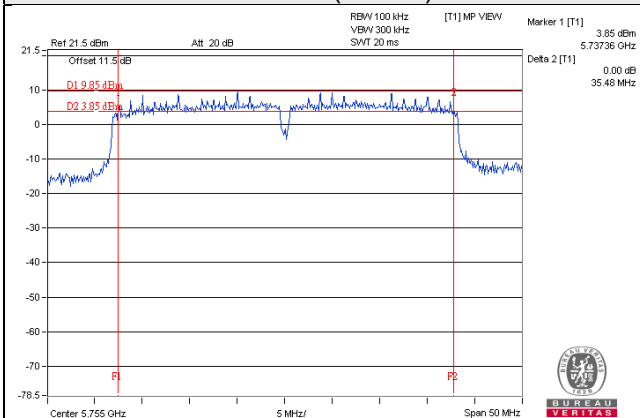
802.11a



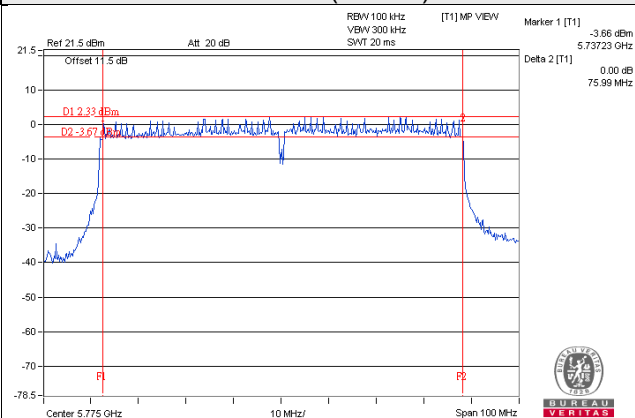
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

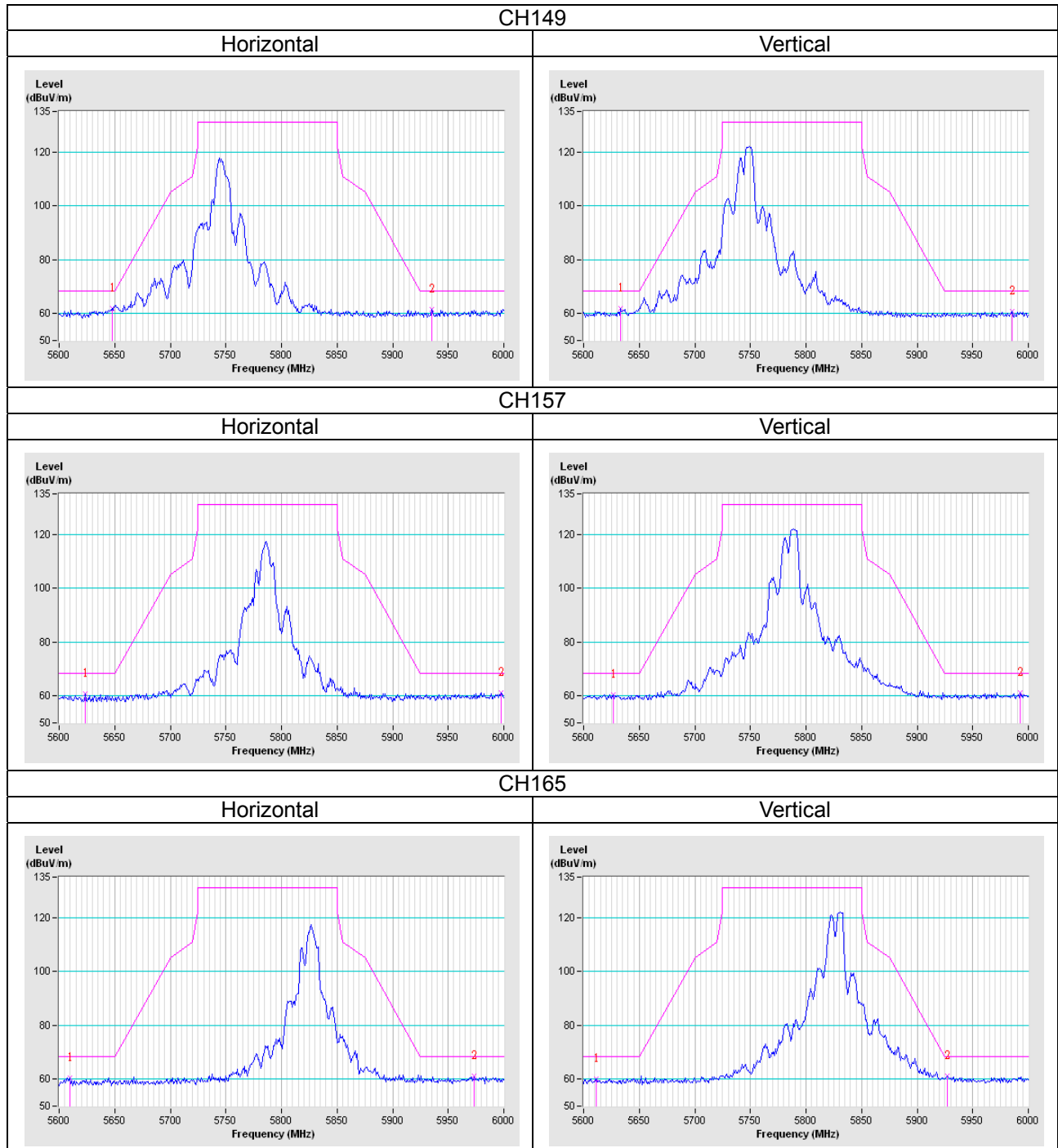


5 Pictures of Test Arrangements

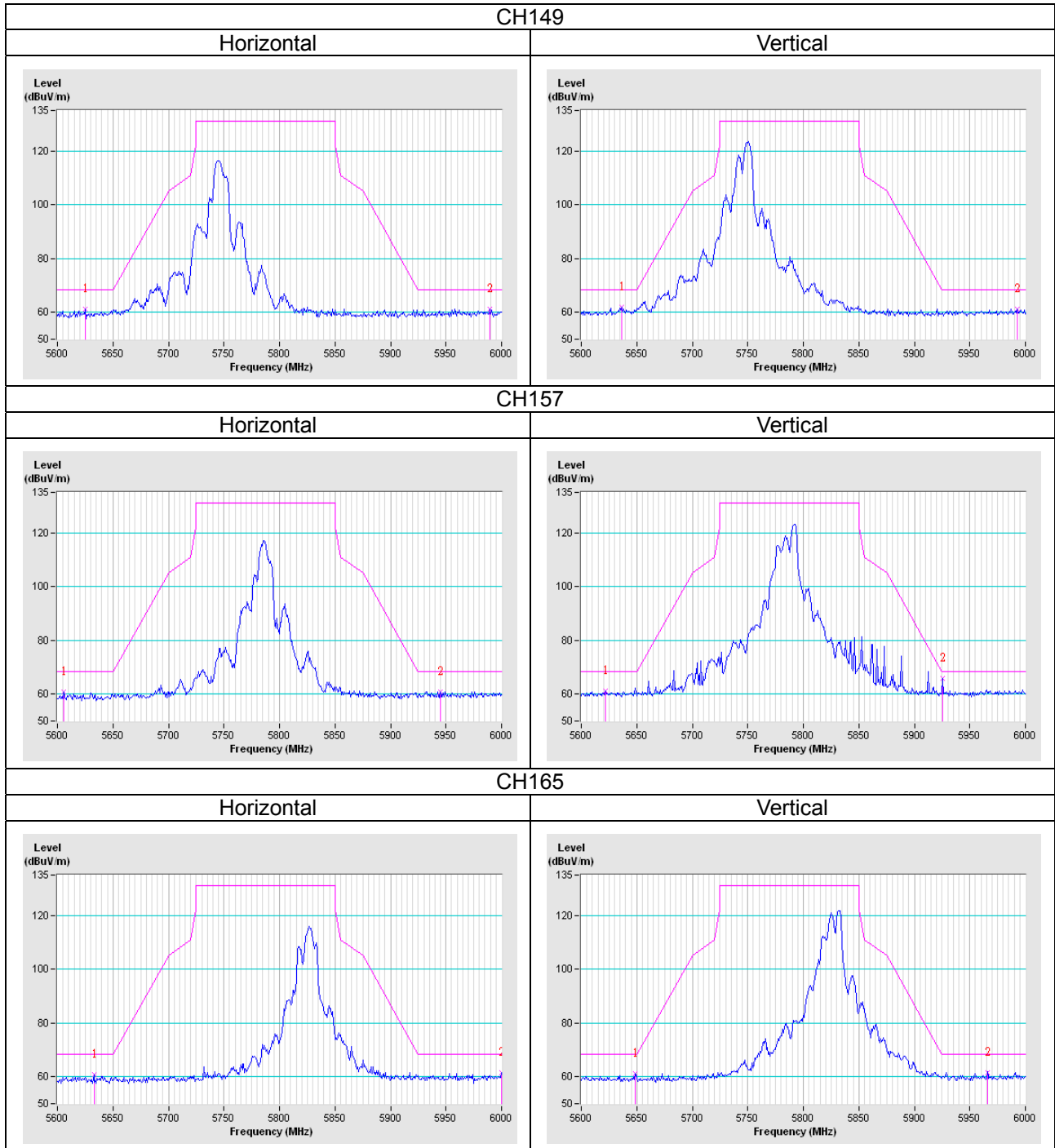
Please refer to the attached file (Test Setup Photo).

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

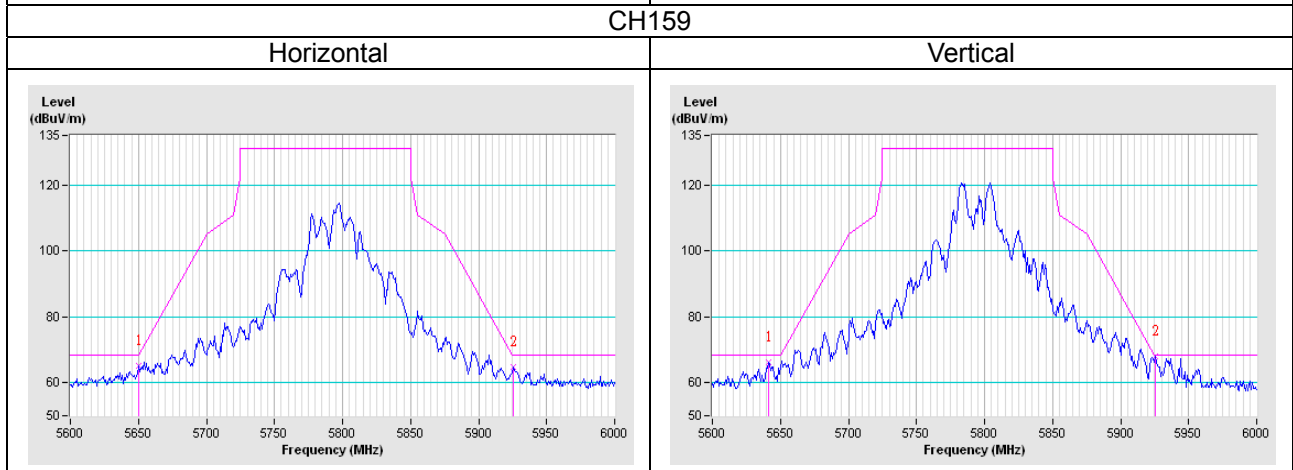
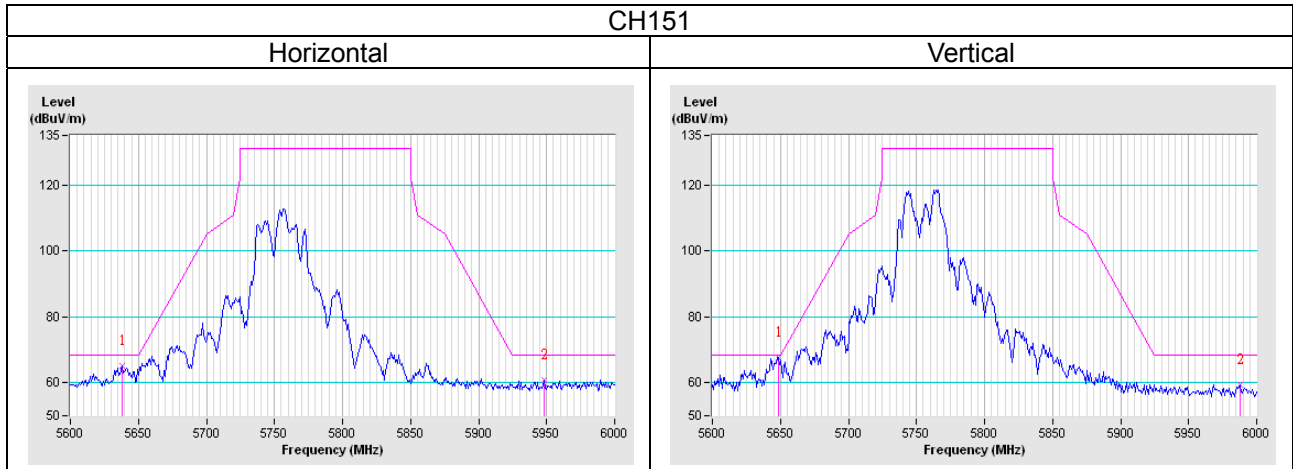
802.11a



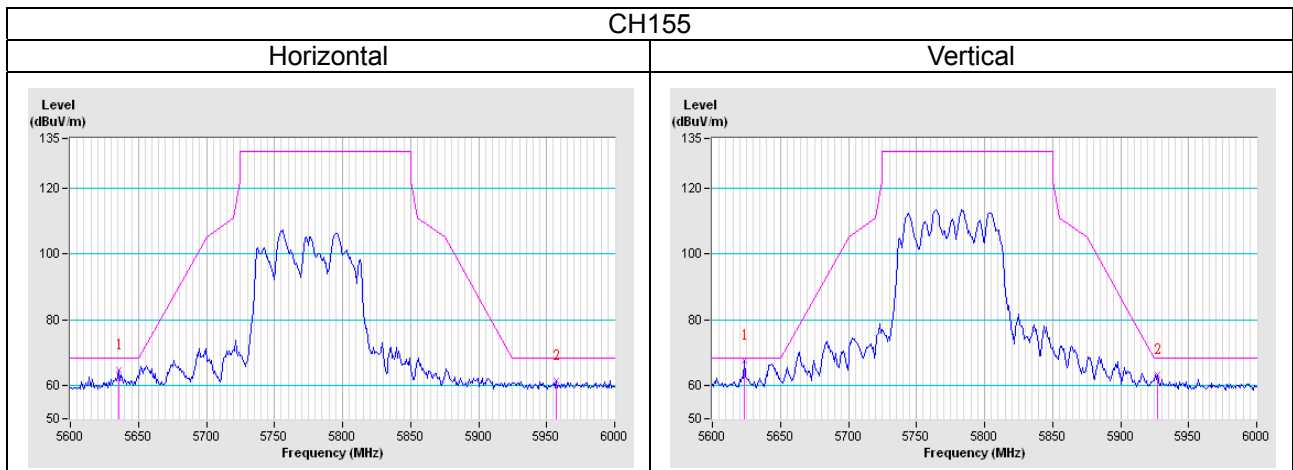
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Appendix – Information on the Testing Laboratories

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

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

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Web Site: www.bureauveritas-adt.com

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

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