FCC Test Report

Report No.:	RF171204E07-1
FCC ID:	Q87-03331
Test Model:	WHW01
Series Model:	VLP01, A01
Received Date:	Dec. 04, 2017
Test Date:	Dec. 09, 2017 to Jan. 12, 2018
Issued Date:	Feb. 06, 2018
Applicant:	Linksys LLC
Address:	121 Theory Drive, Irvine, CA 92617, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF171204E07-1	Original release.	Feb. 06, 2018

1 Certificate of Conformity

Product:	Velop
Brand:	Linksys
Test Model:	WHW01
Series Model:	VLP01, A01
Sample Status:	ENGINEERING SAMPLE
Applicant:	Linksys LLC
Test Date:	Dec. 09, 2017 to Jan. 12, 2018
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Feb. 06, 2018

Wendy Wu / Specialist

Approved by : _____ , **Date:** Feb. 06, 2018

May Chen / 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 -3.1dB at 0.5000MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz, 5635.18MHz,
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 OOBE test plots were recorded in Annex A.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Velop
Brand	Linksys
Test Model	WHW01
Series Model	VLP01, A01
Status of EUT	ENGINEERING SAMPLE
Driver version	1.1.3.186486
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** **CDD Mode:** 474.875mW **Beamforming Mode:** 331.939mW **5GHz:** **CDD Mode:** **5.18 ~ 5.24GHz:** 658.559mW **5.745 ~ 5.825GHz:** 700.831mW **Beamforming Mode:** **5.18 ~ 5.24GHz:** 658.559mW **5.745 ~ 5.825GHz:** 700.831mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. There are WLAN and Bluetooth technology used for the EUT.
2. The EUT has below model names, which are identical to each other in all aspects except for the following table:

Brand	Model Name	Different
Linksys	WHW01	For maketing request Color : Black & White
	VLP01	
	A01	

From the above models, model: **WHW01** was selected as representative model for the test and its data was recorded in this report.

3. Simultaneously transmission condition.

Condition	**Technology**		
1	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

4. The EUT must be supplied with a power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	Spec.	Plug	Remark
1	APD	WA-12M12R	Input: 100-240Vac, 0.5A, 50-60Hz Output: 12V, 1A Output cable: Unshielded, 1.5m	Universal	Black & White
2	APD	WB-12G12FU	Input: 100-240Vac, 0.3A, 50-60Hz Output: 12V, 1A Output cable: Unshielded, 1.5m	FCC	Black & White
3	Ktec	KSAS0121200100D5	Input: 100-240Vac, 0.4A, 50-60Hz Output: 12V, 1A Output cable: Unshielded, 1.5m	Universal	Black & White
4	Ktec	KSA-12W-120100VU	Input: 100-240Vac, 0.4A, 50/60Hz Output: 12V, 1A Output cable: Unshielded, 1.5m	FCC	Black & White
Note: From the above models, the worst radiated emission test was found in **Adapter 4**. Therefore only the test data of the modes were recorded in this report.					

5. The DDR3 Memory of EUT as following table

Item	Brand	Model No.	Different
Main source	Winbond	W632GU6MB-12	1. For maketing request. 2. DDR3 Memory.
Second source	Nanya	NT5CC128M16IP-DI	
Note: From the above models, the worst case was found in **Main source**. Therefore only the test data of the modes were recorded in this report.			

6. The antennas provided to the EUT, please refer to the following table:

WLAN						
Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
1	ARISTOTLE	AP571-P11-P2	2.4	2.4~2.4835	PCB	i-pex(MHF)
			3.6	5.15~5.85		
2	ARISTOTLE	AP571-P22-P5	1.36	2.4~2.4835	PCB	i-pex(MHF)
			3.5	5.15~5.85		
Bluetooth						
Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
1	ARISTOTLE	AP571-BT-1	1.48	2.4~2.4835	PCB	i-pex(MHF)

7. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
VHT40	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. 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)

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
1	-	-	√	-	Power from Adapter 1
2	-	-	√	-	Power from Adapter 2
3	-	-	√	-	Power from Adapter 3
4	√	√	√	√	Power from Adapter 4

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: "-"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.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5320 5745-5825	36 to 48 149 to 165	165	OFDM	BPSK	6.5

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.

CDD Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11ac (VHT20)	5180-5320 5745-5825	36 to 48 149 to 165	165	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (output power only)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

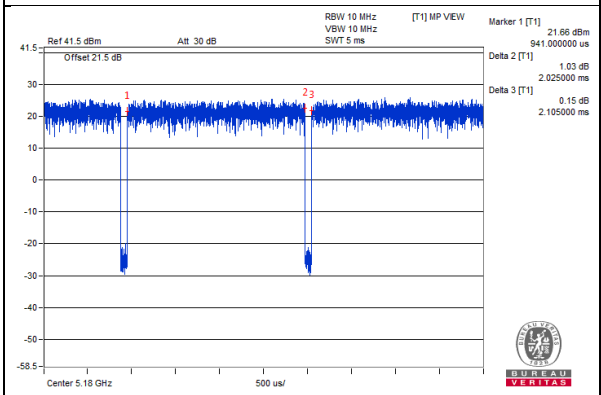
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23deg. C, 68%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Frank Chuang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 65%RH	120Vac, 60Hz	Jyunchun Lin

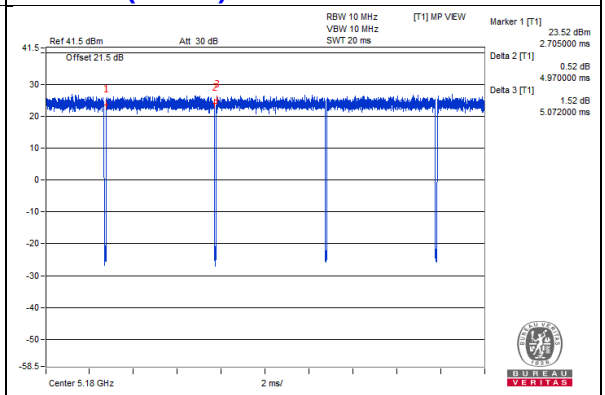
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.025 ms/2.105 ms = 0.962, Duty factor = 10 * log(1/0.962) = 0.17
802.11ac (VHT20): Duty cycle = 4.97 ms/5.072 ms = 0.98
802.11ac (VHT40): Duty cycle = 2.415 ms/2.503 ms = 0.965, Duty factor = 10 * log(1/0.965) = 0.16
802.11ac (VHT80): Duty cycle = 1.133 ms/1.209 ms = 0.937, Duty factor = 10 * log(1/0.937) = 0.28

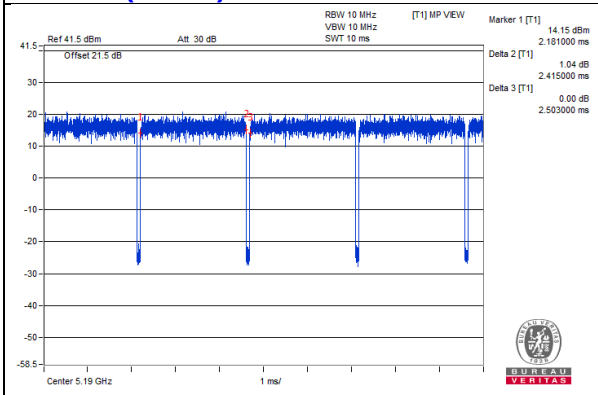
802.11a



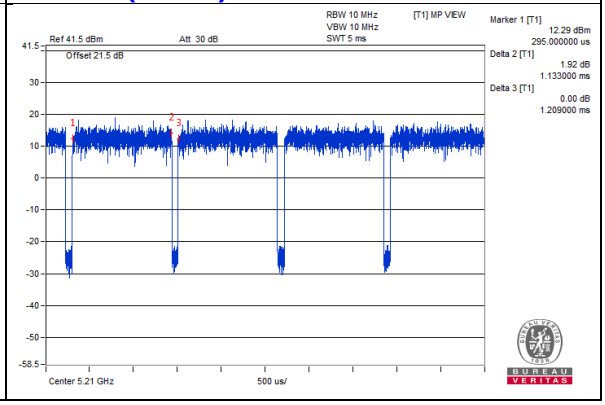
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

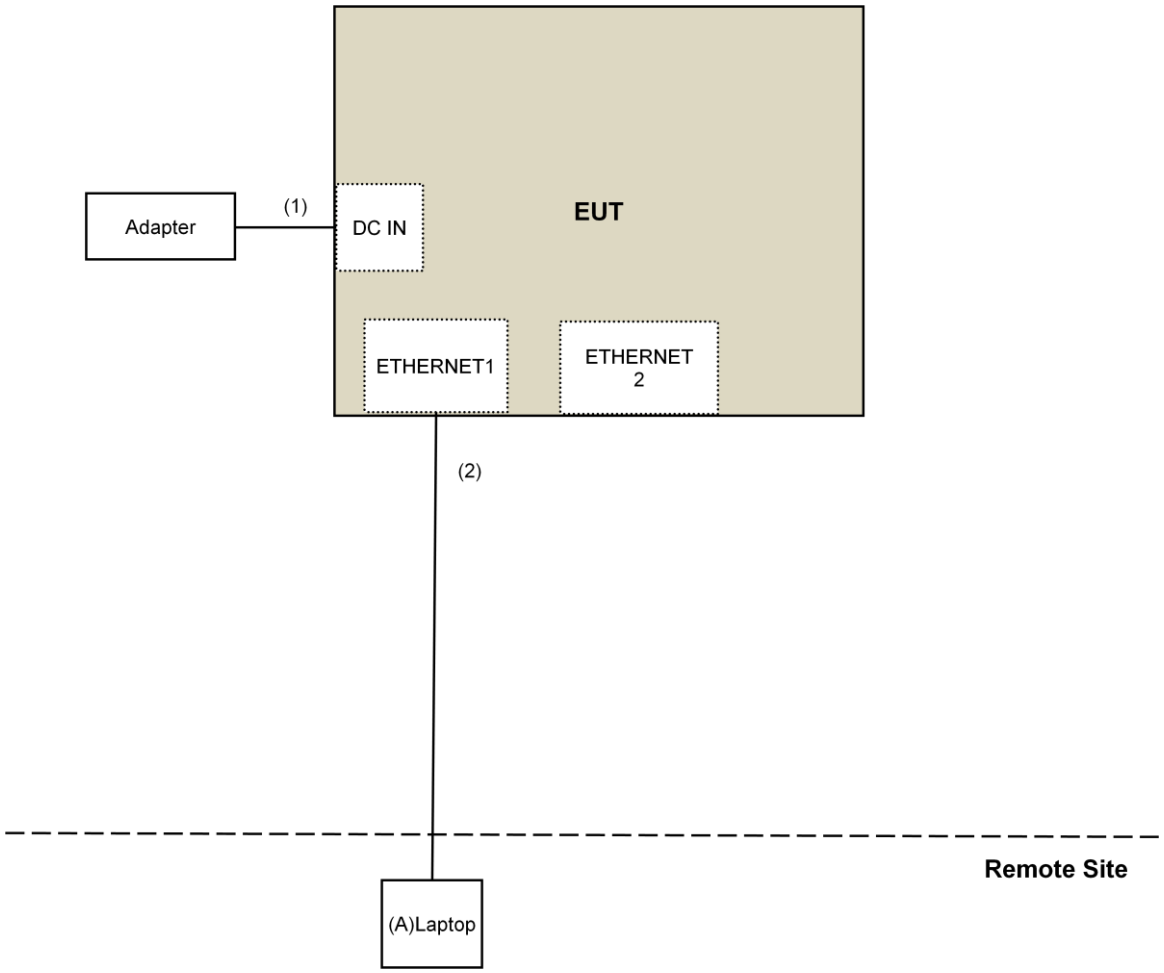
Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Loop Antenna(*) TESEQ	HLA 6121	45745	May 19, 2017	May 18, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Dec. 09 to 12, 2017

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

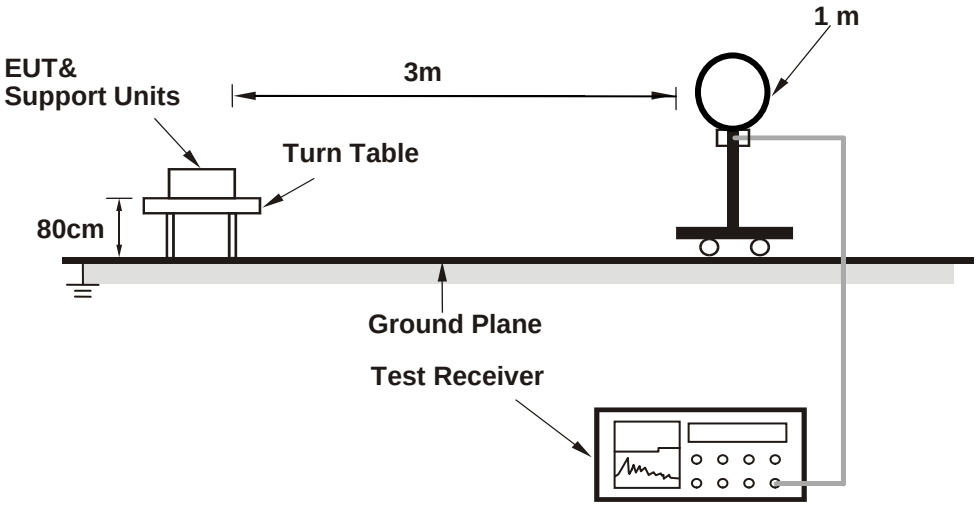
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

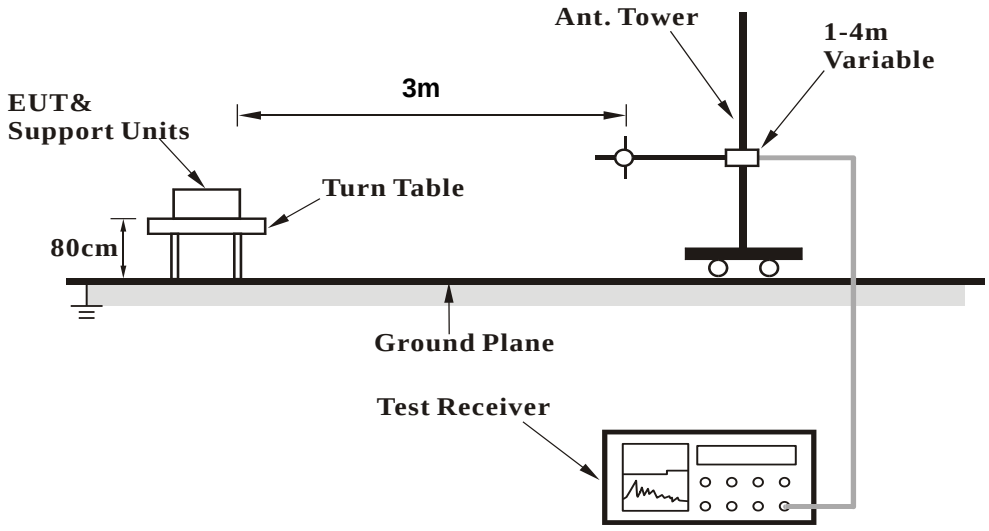
No deviation.

4.1.5 Test Setup

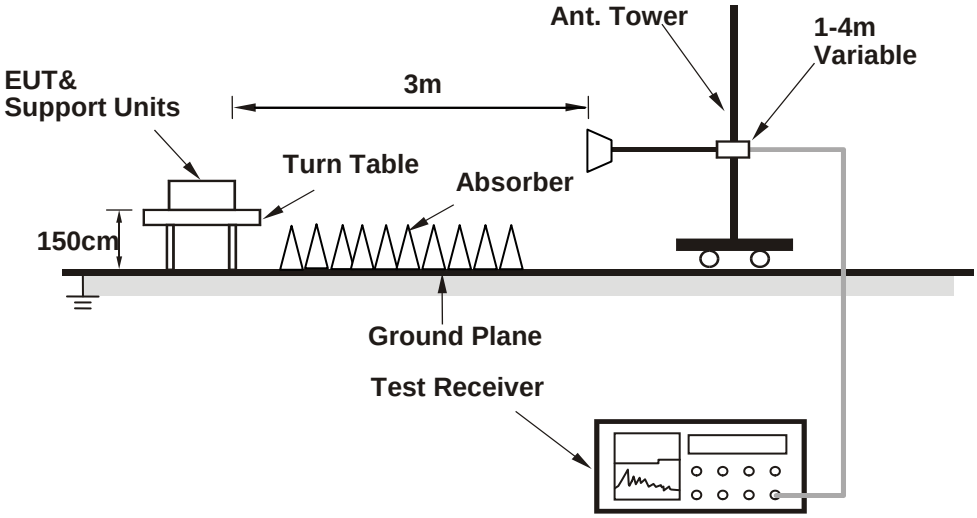
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QARCT.exe V3.0.210.0) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.4 PK	74.0	-13.6	2.67 H	230	56.7	3.7
2	5150.00	45.4 AV	54.0	-8.6	2.67 H	230	41.7	3.7
3	*5180.00	110.6 PK			2.67 H	230	106.9	3.7
4	*5180.00	99.7 AV			2.67 H	230	96.0	3.7
5	#6250.10	48.2 PK	74.0	-25.8	2.89 H	239	42.6	5.6
6	#6250.10	44.5 AV	54.0	-9.5	2.89 H	239	38.9	5.6
7	#6432.10	42.9 PK	74.0	-31.1	2.17 H	339	36.4	6.5
8	#6432.10	34.1 AV	54.0	-19.9	2.17 H	339	27.6	6.5
9	#6906.60	42.2 PK	74.0	-31.8	1.55 H	20	34.4	7.8
10	#6906.60	34.5 AV	54.0	-19.5	1.55 H	20	26.7	7.8
11	#10360.00	46.2 PK	74.0	-27.8	2.14 H	302	33.2	13.0
12	#10360.00	33.6 AV	54.0	-20.4	2.14 H	302	20.6	13.0
13	15540.00	46.5 PK	74.0	-27.5	1.54 H	360	33.4	13.1
14	15540.00	33.8 AV	54.0	-20.2	1.54 H	360	20.7	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.9 PK	74.0	-3.1	1.76 V	360	67.2	3.7
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.76 V**	**360**	**50.2**	**3.7**
3	*5180.00	114.9 PK			1.76 V	360	111.2	3.7
4	*5180.00	105.5 AV			1.76 V	360	101.8	3.7
5	#6250.10	56.4 PK	74.0	-17.6	1.33 V	25	50.8	5.6
6	#6250.10	51.5 AV	54.0	-2.5	1.33 V	25	45.9	5.6
7	#6432.10	44.4 PK	74.0	-29.6	1.87 V	360	37.9	6.5
8	#6432.10	39.0 AV	54.0	-15.0	1.87 V	360	32.5	6.5
9	#6906.60	47.0 PK	74.0	-27.0	1.91 V	34	39.2	7.8
10	#6906.60	42.5 AV	54.0	-11.5	1.91 V	34	34.7	7.8
11	#10360.00	46.0 PK	74.0	-28.0	1.69 V	318	33.0	13.0
12	#10360.00	33.4 AV	54.0	-20.6	1.69 V	318	20.4	13.0
13	15540.00	45.8 PK	74.0	-28.2	1.29 V	254	32.7	13.1
14	15540.00	33.2 AV	54.0	-20.8	1.29 V	254	20.1	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.0 PK	74.0	-15.0	2.65 H	243	55.3	3.7
2	5150.00	42.2 AV	54.0	-11.8	2.65 H	243	38.5	3.7
3	*5200.00	109.4 PK			2.65 H	243	105.7	3.7
4	*5200.00	98.9 AV			2.65 H	243	95.2	3.7
5	#10400.00	46.1 PK	74.0	-27.9	2.19 H	302	33.1	13.0
6	#10400.00	33.6 AV	54.0	-20.4	2.19 H	302	20.6	13.0
7	15600.00	54.8 PK	74.0	-19.2	1.62 H	163	41.5	13.3
8	15600.00	42.1 AV	54.0	-11.9	1.62 H	163	28.8	13.3
9	20800.00	52.8 PK	74.0	-21.2	1.88 H	146	75.3	-22.5
10	20800.00	43.2 AV	54.0	-10.8	1.88 H	146	65.7	-22.5
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	1.83 V	14	62.3	3.7
2	5150.00	49.2 AV	54.0	-4.8	1.83 V	14	45.5	3.7
3	*5200.00	113.7 PK			1.83 V	14	110.0	3.7
4	*5200.00	104.7 AV			1.83 V	14	101.0	3.7
5	#10400.00	45.7 PK	74.0	-28.3	1.66 V	327	32.7	13.0
6	#10400.00	33.2 AV	54.0	-20.8	1.66 V	327	20.2	13.0
7	15600.00	57.4 PK	74.0	-16.6	1.66 V	298	44.1	13.3
8	15600.00	45.5 AV	54.0	-8.5	1.66 V	298	32.2	13.3
9	20800.00	48.1 PK	74.0	-25.9	1.98 V	235	70.6	-22.5
10	20800.00	41.1 AV	54.0	-12.9	1.98 V	235	63.6	-22.5

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	111.0 PK			2.61 H	233	107.2	3.8
2	*5240.00	99.6 AV			2.61 H	233	95.8	3.8
3	5350.00	45.3 PK	74.0	-28.7	2.61 H	233	41.2	4.1
4	5350.00	37.2 AV	54.0	-16.8	2.61 H	233	33.1	4.1
5	#10480.00	46.0 PK	74.0	-28.0	2.23 H	302	32.8	13.2
6	#10480.00	33.4 AV	54.0	-20.6	2.23 H	302	20.2	13.2
7	15720.00	55.1 PK	74.0	-18.9	1.66 H	177	41.5	13.6
8	15720.00	42.2 AV	54.0	-11.8	1.66 H	177	28.6	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.3 PK			1.84 V	360	111.5	3.8
2	*5240.00	105.4 AV			1.84 V	360	101.6	3.8
3	5350.00	49.3 PK	74.0	-24.7	1.84 V	360	45.2	4.1
4	5350.00	39.7 AV	54.0	-14.3	1.84 V	360	35.6	4.1
5	#10480.00	46.0 PK	74.0	-28.0	1.62 V	314	32.8	13.2
6	#10480.00	33.6 AV	54.0	-20.4	1.62 V	314	20.4	13.2
7	15720.00	57.3 PK	74.0	-16.7	1.67 V	292	43.7	13.6
8	15720.00	45.6 AV	54.0	-8.4	1.67 V	292	32.0	13.6

REMARKS:

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

CHANNEL	TX Channel 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	#5601.07	58.6 PK	68.2	-9.6	2.06 H	218	54.2	4.4
2	*5745.00	113.9 PK			2.06 H	218	109.5	4.4
3	*5745.00	104.2 AV			2.06 H	218	99.8	4.4
4	#5964.33	58.3 PK	68.2	-9.9	2.06 H	218	53.6	4.7
5	11490.00	49.4 PK	74.0	-24.6	1.69 H	234	35.9	13.5
6	11490.00	37.7 AV	54.0	-16.3	1.69 H	234	24.2	13.5
7	#17235.00	64.2 PK	74.0	-9.8	1.65 H	123	46.9	17.3
8	#17235.00	51.2 AV	54.0	-2.8	1.65 H	123	33.9	17.3
9	22980.00	58.6 PK	74.0	-15.4	1.50 H	144	80.3	-21.7
10	22980.00	48.1 AV	54.0	-5.9	1.50 H	144	69.8	-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	#5649.61	60.5 PK	68.2	-7.7	1.21 V	15	56.1	4.4
2	*5745.00	121.1 PK			1.21 V	15	116.7	4.4
3	*5745.00	112.2 AV			1.21 V	15	107.8	4.4
4	#5993.69	58.1 PK	68.2	-10.1	1.21 V	15	53.4	4.7
5	11490.00	52.9 PK	74.0	-21.1	2.51 V	45	39.4	13.5
6	11490.00	40.2 AV	54.0	-13.8	2.51 V	45	26.7	13.5
7	#17235.00	56.4 PK	74.0	-17.6	1.55 V	185	39.1	17.3
8	#17235.00	43.9 AV	54.0	-10.1	1.55 V	185	26.6	17.3
9	22980.00	54.6 PK	74.0	-19.4	1.43 V	256	76.3	-21.7
10	22980.00	46.1 AV	54.0	-7.9	1.43 V	256	67.8	-21.7

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5611.00	57.9 PK	68.2	-10.3	2.02 H	215	53.5	4.4
2	*5785.00	114.1 PK			2.02 H	215	109.7	4.4
3	*5785.00	104.2 AV			2.02 H	215	99.8	4.4
4	#5952.79	57.3 PK	68.2	-10.9	2.02 H	215	52.6	4.7
5	11570.00	49.6 PK	74.0	-24.4	1.70 H	242	36.1	13.5
6	11570.00	37.8 AV	54.0	-16.2	1.70 H	242	24.3	13.5
7	#17355.00	63.9 PK	74.0	-10.1	1.64 H	136	45.9	18.0
8	#17355.00	50.8 AV	54.0	-3.2	1.64 H	136	32.8	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5635.24	62.1 PK	68.2	-6.1	1.28 V	13	57.7	4.4
2	*5785.00	120.1 PK			1.28 V	13	115.7	4.4
3	*5785.00	111.1 AV			1.28 V	13	106.7	4.4
4	#5965.38	58.1 PK	68.2	-10.1	1.28 V	13	53.4	4.7
5	11570.00	52.6 PK	74.0	-21.4	2.57 V	60	39.1	13.5
6	11570.00	40.0 AV	54.0	-14.0	2.57 V	60	26.5	13.5
7	#17355.00	56.6 PK	74.0	-17.4	1.58 V	195	38.6	18.0
8	#17355.00	44.3 AV	54.0	-9.7	1.58 V	195	26.3	18.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.20	58.8 PK	68.2	-9.4	2.06 H	212	54.4	4.4
2	*5825.00	113.4 PK			2.06 H	212	109.0	4.4
3	*5825.00	103.6 AV			2.06 H	212	99.2	4.4
4	#5929.26	60.6 PK	68.2	-7.6	2.06 H	212	55.9	4.7
5	11650.00	49.6 PK	74.0	-24.4	1.67 H	239	35.9	13.7
6	11650.00	37.7 AV	54.0	-16.3	1.67 H	239	24.0	13.7
7	#17475.00	64.5 PK	74.0	-9.5	1.64 H	173	45.9	18.6
8	#17475.00	52.8 AV	54.0	-1.2	1.64 H	173	34.2	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.60	59.7 PK	68.2	-8.5	1.75 V	12	55.3	4.4
2	*5825.00	120.1 PK			1.75 V	12	115.7	4.4
3	*5825.00	110.7 AV			1.75 V	12	106.3	4.4
4	#5928.48	60.9 PK	68.2	-7.3	1.75 V	12	56.2	4.7
5	11650.00	53.3 PK	74.0	-20.7	2.48 V	45	39.6	13.7
6	11650.00	40.6 AV	54.0	-13.4	2.48 V	45	26.9	13.7
7	#17475.00	56.6 PK	74.0	-17.4	1.60 V	188	38.0	18.6
8	#17475.00	44.1 AV	54.0	-9.9	1.60 V	188	25.5	18.6

REMARKS:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.2 PK	74.0	-14.8	2.62 H	231	55.5	3.7
2	5150.00	43.1 AV	54.0	-10.9	2.62 H	231	39.4	3.7
3	*5180.00	111.0 PK			2.62 H	231	107.3	3.7
4	*5180.00	98.6 AV			2.62 H	231	94.9	3.7
5	#10360.00	46.0 PK	74.0	-28.0	2.16 H	300	33.0	13.0
6	#10360.00	33.5 AV	54.0	-20.5	2.16 H	300	20.5	13.0
7	15540.00	46.7 PK	74.0	-27.3	1.50 H	360	33.6	13.1
8	15540.00	37.1 AV	54.0	-16.9	1.50 H	360	24.0	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.7 PK	74.0	-4.3	1.94 V	11	66.0	3.7
2	5150.00	51.6 AV	54.0	-2.4	1.94 V	11	47.9	3.7
3	*5180.00	115.3 PK			1.94 V	11	111.6	3.7
4	*5180.00	104.4 AV			1.94 V	11	100.7	3.7
5	#10360.00	46.6 PK	74.0	-27.4	1.72 V	325	33.6	13.0
6	#10360.00	33.9 AV	54.0	-20.1	1.72 V	325	20.9	13.0
7	15540.00	46.1 PK	74.0	-27.9	1.26 V	249	33.0	13.1
8	15540.00	36.4 AV	54.0	-17.6	1.26 V	249	23.3	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5145.70	58.3 PK	74.0	-15.7	2.66 H	241	54.7	3.6
2	5145.70	40.0 AV	54.0	-14.0	2.66 H	241	36.4	3.6
3	*5200.00	110.1 PK			2.66 H	241	106.4	3.7
4	*5200.00	97.5 AV			2.66 H	241	93.8	3.7
5	#10400.00	46.1 PK	74.0	-27.9	2.22 H	303	33.1	13.0
6	#10400.00	33.8 AV	54.0	-20.2	2.22 H	303	20.8	13.0
7	15600.00	47.1 PK	74.0	-26.9	1.47 H	360	33.8	13.3
8	15600.00	38.0 AV	54.0	-16.0	1.47 H	360	24.7	13.3
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	5145.70	68.3 PK	74.0	-5.7	1.39 V	24	64.7	3.6
2	5145.70	48.0 AV	54.0	-6.0	1.39 V	24	44.4	3.6
3	*5200.00	114.4 PK			1.39 V	24	110.7	3.7
4	*5200.00	103.3 AV			1.39 V	24	99.6	3.7
5	#10400.00	45.9 PK	74.0	-28.1	1.66 V	328	32.9	13.0
6	#10400.00	33.4 AV	54.0	-20.6	1.66 V	328	20.4	13.0
7	15600.00	46.1 PK	74.0	-27.9	1.27 V	250	32.8	13.3
8	15600.00	34.2 AV	54.0	-19.8	1.27 V	250	20.9	13.3

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	111.1 PK			2.67 H	232	107.3	3.8
2	*5240.00	98.8 AV			2.67 H	232	95.0	3.8
3	5350.00	48.4 PK	74.0	-25.6	2.67 H	232	44.3	4.1
4	5350.00	37.4 AV	54.0	-16.6	2.67 H	232	33.3	4.1
5	#10480.00	45.5 PK	74.0	-28.5	2.17 H	293	32.3	13.2
6	#10480.00	33.0 AV	54.0	-21.0	2.17 H	293	19.8	13.2
7	15720.00	46.4 PK	74.0	-27.6	1.44 H	356	32.8	13.6
8	15720.00	37.2 AV	54.0	-16.8	1.44 H	356	23.6	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.4 PK			1.93 V	360	111.6	3.8
2	*5240.00	104.6 AV			1.93 V	360	100.8	3.8
3	5350.00	49.2 PK	74.0	-24.8	1.93 V	360	45.1	4.1
4	5350.00	38.1 AV	54.0	-15.9	1.93 V	360	34.0	4.1
5	#10480.00	46.9 PK	74.0	-27.1	1.69 V	334	33.7	13.2
6	#10480.00	33.9 AV	54.0	-20.1	1.69 V	334	20.7	13.2
7	15720.00	45.7 PK	74.0	-28.3	1.24 V	239	32.1	13.6
8	15720.00	34.1 AV	54.0	-19.9	1.24 V	239	20.5	13.6

REMARKS:

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

CHANNEL	TX Channel 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	#5623.49	59.2 PK	68.2	-9.0	2.58 H	70	54.8	4.4
2	*5745.00	113.6 PK			2.58 H	70	109.2	4.4
3	*5745.00	102.0 AV			2.58 H	70	97.6	4.4
4	#5929.70	58.3 PK	68.2	-9.9	2.58 H	70	53.6	4.7
5	11490.00	49.9 PK	74.0	-24.1	1.74 H	232	36.4	13.5
6	11490.00	37.9 AV	54.0	-16.1	1.74 H	232	24.4	13.5
7	#17235.00	64.7 PK	74.0	-9.3	1.69 H	115	47.4	17.3
8	#17235.00	51.6 AV	54.0	-2.4	1.69 H	115	34.3	17.3
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	#5648.74	61.4 PK	68.2	-6.8	1.20 V	15	57.0	4.4
2	*5745.00	121.5 PK			1.20 V	15	117.1	4.4
3	*5745.00	110.2 AV			1.20 V	15	105.8	4.4
4	#5965.74	58.8 PK	68.2	-9.4	1.20 V	15	54.1	4.7
5	11490.00	52.8 PK	74.0	-21.2	2.55 V	59	39.3	13.5
6	11490.00	40.1 AV	54.0	-13.9	2.55 V	59	26.6	13.5
7	#17235.00	56.9 PK	74.0	-17.1	1.50 V	175	39.6	17.3
8	#17235.00	44.4 AV	54.0	-9.6	1.50 V	175	27.1	17.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5630.64	58.1 PK	68.2	-10.1	2.00 H	67	53.7	4.4
2	*5785.00	113.5 PK			2.00 H	67	109.1	4.4
3	*5785.00	102.1 AV			2.00 H	67	97.7	4.4
4	#5956.86	58.1 PK	68.2	-10.1	2.00 H	67	53.4	4.7
5	11570.00	49.3 PK	74.0	-24.7	1.73 H	239	35.8	13.5
6	11570.00	37.6 AV	54.0	-16.4	1.73 H	239	24.1	13.5
7	#17355.00	63.8 PK	74.0	-10.2	1.67 H	138	45.8	18.0
8	#17355.00	51.1 AV	54.0	-2.9	1.67 H	138	33.1	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.80	61.1 PK	68.2	-7.1	1.53 V	12	56.7	4.4
2	*5785.00	121.1 PK			1.53 V	12	116.7	4.4
3	*5785.00	110.3 AV			1.53 V	12	105.9	4.4
4	#5944.62	58.8 PK	68.2	-9.4	1.53 V	12	54.1	4.7
5	11570.00	52.9 PK	74.0	-21.1	2.54 V	46	39.4	13.5
6	11570.00	40.0 AV	54.0	-14.0	2.54 V	46	26.5	13.5
7	#17355.00	56.5 PK	74.0	-17.5	1.46 V	185	38.5	18.0
8	#17355.00	44.1 AV	54.0	-9.9	1.46 V	185	26.1	18.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5638.62	57.6 PK	68.2	-10.6	1.94 H	66	53.2	4.4
2	*5825.00	113.4 PK			1.94 H	66	109.0	4.4
3	*5825.00	101.8 AV			1.94 H	66	97.4	4.4
4	#5934.77	57.7 PK	68.2	-10.5	1.94 H	66	53.0	4.7
5	11650.00	49.2 PK	74.0	-24.8	1.75 H	248	35.5	13.7
6	11650.00	37.6 AV	54.0	-16.4	1.75 H	248	23.9	13.7
7	#17475.00	63.9 PK	74.0	-10.1	1.61 H	115	45.3	18.6
8	#17475.00	51.0 AV	54.0	-3.0	1.61 H	115	32.4	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5633.99	58.1 PK	68.2	-10.1	1.51 V	12	53.7	4.4
2	*5825.00	120.8 PK			1.51 V	12	116.4	4.4
3	*5825.00	109.9 AV			1.51 V	12	105.5	4.4
4	#5937.83	60.4 PK	68.2	-7.8	1.51 V	12	55.7	4.7
5	11650.00	52.4 PK	74.0	-21.6	2.59 V	64	38.7	13.7
6	11650.00	39.6 AV	54.0	-14.4	2.59 V	64	25.9	13.7
7	#17475.00	56.7 PK	74.0	-17.3	1.54 V	188	38.1	18.6
8	#17475.00	44.2 AV	54.0	-9.8	1.54 V	188	25.6	18.6

REMARKS:

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

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	54.4 PK	74.0	-19.6	2.66 H	243	50.7	3.7
2	5150.00	45.1 AV	54.0	-8.9	2.66 H	243	41.4	3.7
3	*5190.00	106.5 PK			2.66 H	243	102.8	3.7
4	*5190.00	94.6 AV			2.66 H	243	90.9	3.7
5	5350.00	42.6 PK	74.0	-31.4	2.66 H	243	38.5	4.1
6	5350.00	37.4 AV	54.0	-16.6	2.66 H	243	33.3	4.1
7	#10380.00	45.3 PK	74.0	-28.7	2.19 H	307	32.2	13.1
8	#10380.00	33.0 AV	54.0	-21.0	2.19 H	307	19.9	13.1
9	15570.00	46.3 PK	74.0	-27.7	1.55 H	357	33.0	13.3
10	15570.00	33.5 AV	54.0	-20.5	1.55 H	357	20.2	13.3
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	5150.00	64.9 PK	74.0	-9.1	1.78 V	32	61.2	3.7
2	5150.00	53.6 AV	54.0	-0.4	1.78 V	32	49.9	3.7
3	*5190.00	110.8 PK			1.78 V	32	107.1	3.7
4	*5190.00	100.4 AV			1.78 V	32	96.7	3.7
5	5350.00	52.5 PK	74.0	-21.5	1.78 V	32	48.4	4.1
6	5350.00	41.5 AV	54.0	-12.5	1.78 V	32	37.4	4.1
7	#10380.00	46.5 PK	74.0	-27.5	1.68 V	330	33.4	13.1
8	#10380.00	34.0 AV	54.0	-20.0	1.68 V	330	20.9	13.1
9	15570.00	46.2 PK	74.0	-27.8	1.27 V	235	32.9	13.3
10	15570.00	33.7 AV	54.0	-20.3	1.27 V	235	20.4	13.3

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.9 PK	74.0	-18.1	2.64 H	234	52.2	3.7
2	5150.00	42.2 AV	54.0	-11.8	2.64 H	234	38.5	3.7
3	*5230.00	108.7 PK			2.64 H	234	104.9	3.8
4	*5230.00	98.1 AV			2.64 H	234	94.3	3.8
5	5350.00	48.4 PK	74.0	-25.6	2.64 H	234	44.3	4.1
6	5350.00	37.4 AV	54.0	-16.6	2.64 H	234	33.3	4.1
7	#10460.00	46.3 PK	74.0	-27.7	2.21 H	312	33.2	13.1
8	#10460.00	33.8 AV	54.0	-20.2	2.21 H	312	20.7	13.1
9	15690.00	47.8 PK	74.0	-26.2	1.48 H	360	34.0	13.8
10	15690.00	35.2 AV	54.0	-18.8	1.48 H	360	21.4	13.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	1.75 V	11	60.2	3.7
2	5150.00	50.2 AV	54.0	-3.8	1.75 V	11	46.5	3.7
3	*5230.00	113.0 PK			1.75 V	11	109.2	3.8
4	*5230.00	103.9 AV			1.75 V	11	100.1	3.8
5	5350.00	52.0 PK	74.0	-22.0	1.75 V	11	47.9	4.1
6	5350.00	40.8 AV	54.0	-13.2	1.75 V	11	36.7	4.1
7	#10460.00	46.2 PK	74.0	-27.8	1.67 V	311	33.1	13.1
8	#10460.00	33.5 AV	54.0	-20.5	1.67 V	311	20.4	13.1
9	15690.00	46.8 PK	74.0	-27.2	1.29 V	247	33.0	13.8
10	15690.00	34.2 AV	54.0	-19.8	1.29 V	247	20.4	13.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5645.96	63.0 PK	68.2	-5.2	2.04 H	193	58.6	4.4
2	*5755.00	108.6 PK			2.04 H	193	104.2	4.4
3	*5755.00	99.3 AV			2.04 H	193	94.9	4.4
4	#5942.97	59.1 PK	68.2	-9.1	2.04 H	193	54.4	4.7
5	11510.00	50.3 PK	74.0	-23.7	1.75 H	225	36.7	13.6
6	11510.00	38.3 AV	54.0	-15.7	1.75 H	225	24.7	13.6
7	#17265.00	64.3 PK	74.0	-9.7	1.66 H	104	46.7	17.6
8	#17265.00	51.5 AV	54.0	-2.5	1.66 H	104	33.9	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**#5635.18**	**68.1 PK**	**68.2**	**-0.1**	**1.53 V**	**14**	**63.7**	**4.4**
2	*5755.00	117.2 PK			1.53 V	14	112.8	4.4
3	*5755.00	107.9 AV			1.53 V	14	103.5	4.4
4	#5927.33	58.2 PK	68.2	-10.0	1.53 V	14	53.5	4.7
5	11510.00	52.8 PK	74.0	-21.2	2.58 V	32	39.2	13.6
6	11510.00	39.7 AV	54.0	-14.3	2.58 V	32	26.1	13.6
7	#17265.00	56.5 PK	74.0	-17.5	1.48 V	194	38.9	17.6
8	#17265.00	44.3 AV	54.0	-9.7	1.48 V	194	26.7	17.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5638.23	58.3 PK	68.2	-9.9	1.89 H	71	53.9	4.4
2	*5795.00	109.8 PK			1.89 H	71	105.4	4.4
3	*5795.00	100.3 AV			1.89 H	71	95.9	4.4
4	#5933.17	59.5 PK	68.2	-8.7	1.89 H	71	54.8	4.7
5	11590.00	49.5 PK	74.0	-24.5	1.74 H	225	36.0	13.5
6	11590.00	37.5 AV	54.0	-16.5	1.74 H	225	24.0	13.5
7	#17385.00	64.5 PK	74.0	-9.5	1.73 H	104	46.2	18.3
8	#17385.00	51.4 AV	54.0	-2.6	1.73 H	104	33.1	18.3
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	#5635.74	63.9 PK	68.2	-4.3	1.61 V	12	59.5	4.4
2	*5795.00	117.8 PK			1.61 V	12	113.4	4.4
3	*5795.00	108.5 AV			1.61 V	12	104.1	4.4
4	#5934.70	64.2 PK	68.2	-4.0	1.61 V	12	59.5	4.7
5	11590.00	52.5 PK	74.0	-21.5	2.53 V	57	39.0	13.5
6	11590.00	39.6 AV	54.0	-14.4	2.53 V	57	26.1	13.5
7	#17385.00	56.4 PK	74.0	-17.6	1.43 V	185	38.1	18.3
8	#17385.00	44.0 AV	54.0	-10.0	1.43 V	185	25.7	18.3

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 (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	5135.00	58.0 PK	74.0	-16.0	2.62 H	252	54.4	3.6
2	5135.00	45.2 AV	54.0	-8.8	2.62 H	252	41.6	3.6
3	*5210.00	102.1 PK			2.62 H	252	98.4	3.7
4	*5210.00	90.1 AV			2.62 H	252	86.4	3.7
5	5350.00	48.8 PK	74.0	-25.2	2.62 H	252	44.7	4.1
6	5350.00	37.4 AV	54.0	-16.6	2.62 H	252	33.3	4.1
7	#10420.00	45.2 PK	74.0	-28.8	2.15 H	293	32.1	13.1
8	#10420.00	32.6 AV	54.0	-21.4	2.15 H	293	19.5	13.1
9	15630.00	49.1 PK	74.0	-24.9	1.54 H	360	35.5	13.6
10	15630.00	37.3 AV	54.0	-16.7	1.54 H	360	23.7	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5135.00	68.4 PK	74.0	-5.6	1.50 V	32	64.8	3.6
2	5135.00	53.6 AV	54.0	-0.4	1.50 V	32	50.0	3.6
3	*5210.00	106.4 PK			1.50 V	32	102.7	3.7
4	*5210.00	95.9 AV			1.50 V	32	92.2	3.7
5	5350.00	55.8 PK	74.0	-18.2	1.50 V	32	51.7	4.1
6	5350.00	44.0 AV	54.0	-10.0	1.50 V	32	39.9	4.1
7	#10420.00	46.4 PK	74.0	-27.6	1.69 V	325	33.3	13.1
8	#10420.00	34.1 AV	54.0	-19.9	1.69 V	325	21.0	13.1
9	15630.00	47.8 PK	74.0	-26.2	1.24 V	239	34.2	13.6
10	15630.00	35.2 AV	54.0	-18.8	1.24 V	239	21.6	13.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.76	66.0 PK	68.2	-2.2	1.98 H	241	61.9	4.1
2	*5775.00	105.5 PK			1.98 H	241	101.3	4.2
3	*5775.00	96.8 AV			1.98 H	241	92.6	4.2
4	#5939.36	59.8 PK	68.2	-8.4	1.98 H	241	55.1	4.7
5	11550.00	49.2 PK	74.0	-24.8	1.78 H	217	35.3	13.9
6	11550.00	37.3 AV	54.0	-16.7	1.78 H	217	23.4	13.9
7	#17325.00	59.8 PK	74.0	-14.2	1.77 H	87	42.8	17.0
8	#17325.00	46.6 AV	54.0	-7.4	1.77 H	87	29.6	17.0
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	#5636.12	67.9 PK	68.2	-0.3	1.65 V	34	63.8	4.1
2	*5775.00	112.9 PK			1.65 V	34	108.7	4.2
3	*5775.00	104.2 AV			1.65 V	34	100.0	4.2
4	#5934.51	66.7 PK	68.2	-1.5	1.65 V	34	62.0	4.7
5	11550.00	52.2 PK	74.0	-21.8	2.51 V	86	38.3	13.9
6	11550.00	39.8 AV	54.0	-14.2	2.51 V	86	25.9	13.9
7	#17325.00	57.1 PK	74.0	-16.9	1.44 V	188	40.1	17.0
8	#17325.00	44.6 AV	54.0	-9.4	1.44 V	188	27.6	17.0

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.

Below 1GHz Data:

802.11ac (VHT20)

CHANNEL	TX Channel 165	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	125.01	35.4 QP	43.5	-8.1	1.50 H	86	45.1	-9.7
2	143.37	29.8 QP	43.5	-13.7	1.50 H	98	38.0	-8.2
3	196.16	24.4 QP	43.5	-19.1	1.00 H	254	35.6	-11.2
4	250.00	29.3 QP	46.0	-16.7	1.00 H	69	38.8	-9.5
5	356.70	31.8 QP	46.0	-14.2	1.00 H	112	38.2	-6.4
6	639.33	28.9 QP	46.0	-17.1	1.00 H	160	29.1	-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	50.43	35.4 QP	40.0	-4.6	1.00 V	325	43.7	-8.3
2	106.73	34.1 QP	43.5	-9.4	1.00 V	340	45.5	-11.4
3	125.01	39.8 QP	43.5	-3.7	1.00 V	236	49.5	-9.7
4	250.00	28.6 QP	46.0	-17.4	1.00 V	117	38.1	-9.5
5	356.67	31.5 QP	46.0	-14.5	1.50 V	126	37.9	-6.4
6	644.37	31.3 QP	46.0	-14.7	1.00 V	238	31.5	-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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3 Tested Date: Dec. 12, 2017

4.2.3 Test Procedure

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

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

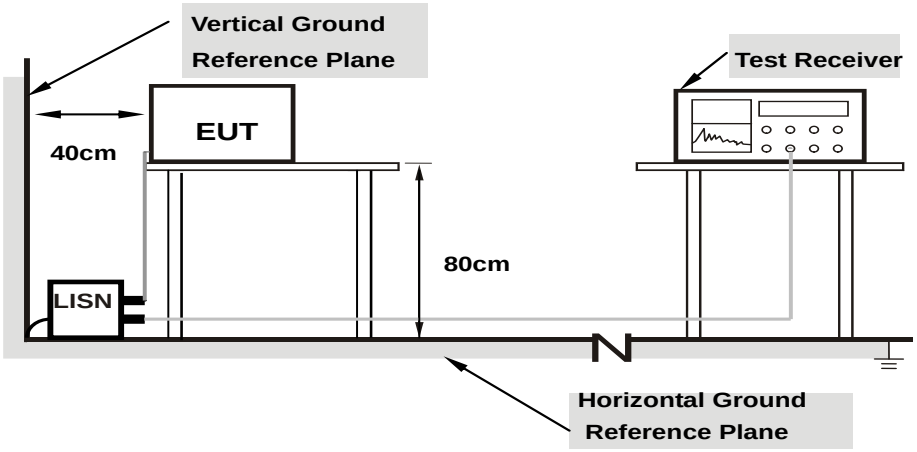
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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 Condition

Same as 4.1.6.

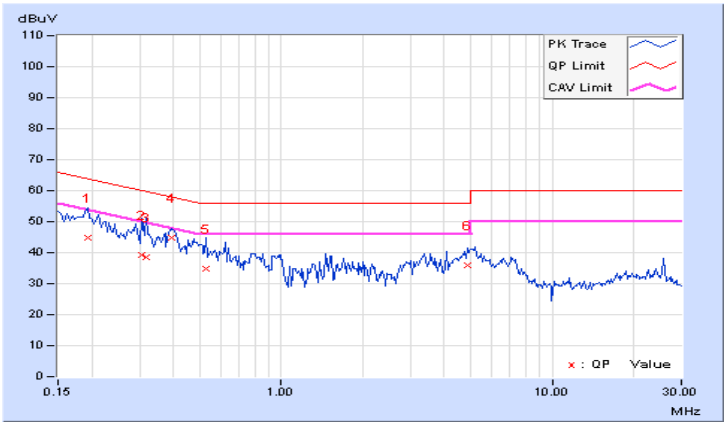
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19297	10.07	34.75	21.40	44.82	31.47	63.91	53.91	-19.09	-22.44
2	0.30625	10.10	29.07	16.76	39.17	26.86	60.07	50.07	-20.90	-23.21
3	0.31797	10.10	28.46	18.04	38.56	28.14	59.76	49.76	-21.20	-21.62
4	0.39609	10.12	34.61	25.72	44.73	35.84	57.93	47.93	-13.20	-12.09
5	0.52891	10.13	24.62	13.43	34.75	23.56	56.00	46.00	-21.25	-22.44
6	4.85547	10.42	25.67	17.06	36.09	27.48	56.00	46.00	-19.91	-18.52

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.

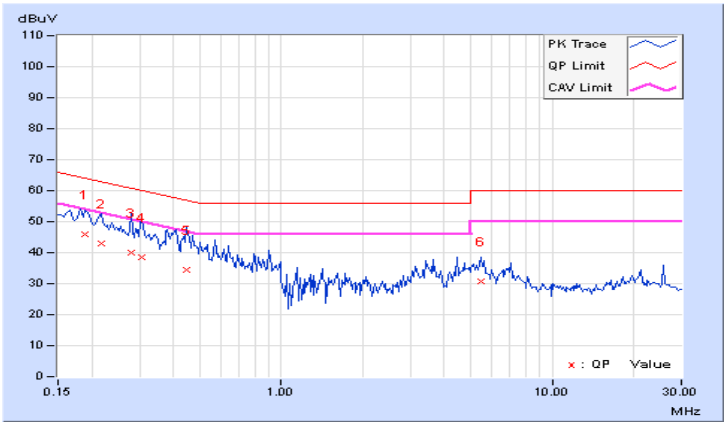


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	10.05	35.71	20.96	45.76	31.01	64.08	54.08	-18.32	-23.07
2	0.21641	10.05	32.93	20.78	42.98	30.83	62.96	52.96	-19.98	-22.13
3	0.27891	10.07	30.08	17.63	40.15	27.70	60.85	50.85	-20.70	-23.15
4	0.30625	10.08	28.43	14.95	38.51	25.03	60.07	50.07	-21.56	-25.04
5	0.44688	10.12	24.28	11.43	34.40	21.55	56.93	46.93	-22.53	-25.38
6	5.46094	10.37	20.53	12.65	30.90	23.02	60.00	50.00	-29.10	-26.98

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.



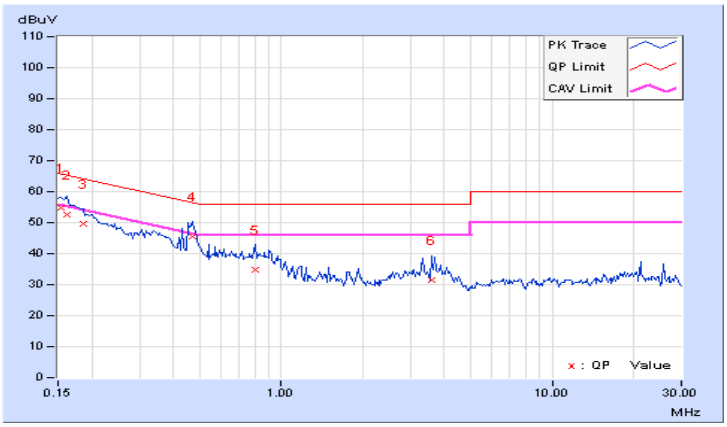
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.08	44.77	33.02	54.85	43.10	65.79	55.79	-10.94	-12.69
2	0.16172	10.08	42.68	29.96	52.76	40.04	65.38	55.38	-12.62	-15.34
3	0.18516	10.07	39.47	26.48	49.54	36.55	64.25	54.25	-14.71	-17.70
4	0.47031	10.13	35.30	29.69	45.43	39.82	56.51	46.51	-11.08	-6.69
5	0.80625	10.15	24.59	17.28	34.74	27.43	56.00	46.00	-21.26	-18.57
6	3.59766	10.32	21.13	14.07	31.45	24.39	56.00	46.00	-24.55	-21.61

REMARKS:

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

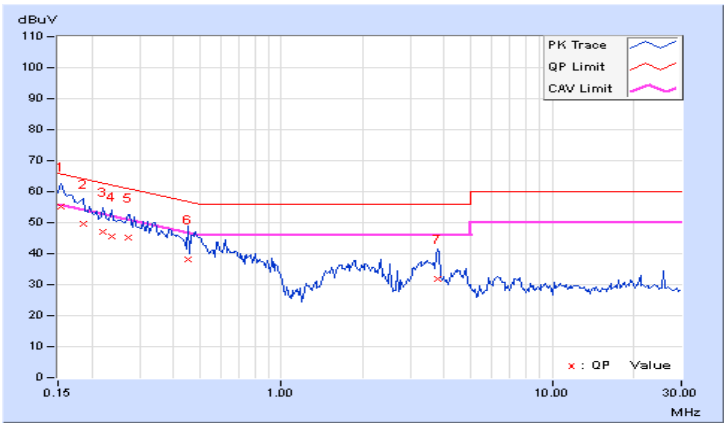


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.07	44.96	33.10	55.03	43.17	65.79	55.79	-10.76	-12.62
2	0.18516	10.05	39.43	26.32	49.48	36.37	64.25	54.25	-14.77	-17.88
3	0.22031	10.05	36.88	23.43	46.93	33.48	62.81	52.81	-15.88	-19.33
4	0.23594	10.05	35.48	21.05	45.53	31.10	62.24	52.24	-16.71	-21.14
5	0.27109	10.07	34.99	20.76	45.06	30.83	61.08	51.08	-16.02	-20.25
6	0.45078	10.12	28.13	17.84	38.25	27.96	56.86	46.86	-18.61	-18.90
7	3.78516	10.25	21.49	10.52	31.74	20.77	56.00	46.00	-24.26	-25.23

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.



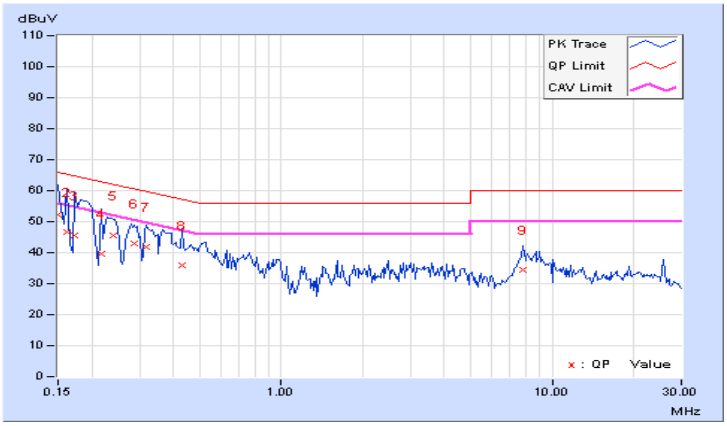
4.2.9 Test Results (Mode 3)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.09	41.97	26.74	52.06	36.83	66.00	56.00	-13.94	-19.17
2	0.16172	10.08	36.43	15.56	46.51	25.64	65.38	55.38	-18.87	-29.74
3	0.17344	10.08	35.52	17.65	45.60	27.73	64.79	54.79	-19.19	-27.06
4	0.21641	10.07	29.43	10.64	39.50	20.71	62.96	52.96	-23.46	-32.25
5	0.23984	10.08	35.48	23.04	45.56	33.12	62.10	52.10	-16.54	-18.98
6	0.28672	10.09	32.92	23.11	43.01	33.20	60.62	50.62	-17.61	-17.42
7	0.31797	10.10	31.86	19.20	41.96	29.30	59.76	49.76	-17.80	-20.46
8	0.43125	10.12	25.76	16.31	35.88	26.43	57.23	47.23	-21.35	-20.80
9	7.79297	10.63	23.82	16.23	34.45	26.86	60.00	50.00	-25.55	-23.14

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.

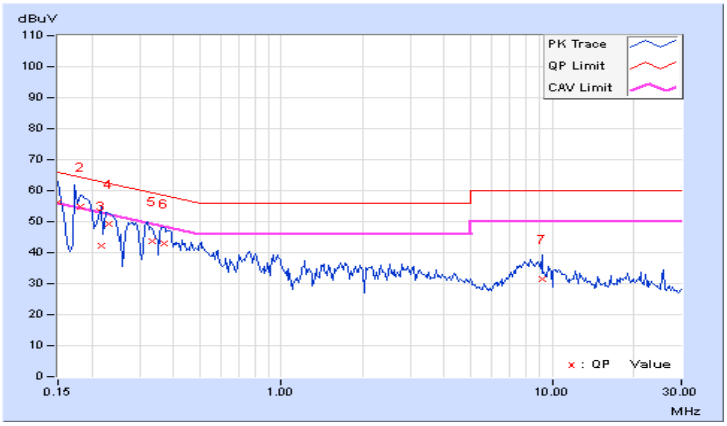


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.08	46.40	30.78	56.48	40.86	66.00	56.00	-9.52	-15.14
2	0.18194	10.05	44.69	30.06	54.74	40.11	64.40	54.40	-9.66	-14.29
3	0.21641	10.05	32.07	12.53	42.12	22.58	62.96	52.96	-20.84	-30.38
4	0.23128	10.05	39.32	26.31	49.37	36.36	62.40	52.40	-13.03	-16.04
5	0.33237	10.09	33.58	24.90	43.67	34.99	59.39	49.39	-15.72	-14.40
6	0.37097	10.11	32.84	26.75	42.95	36.86	58.48	48.48	-15.53	-11.62

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.



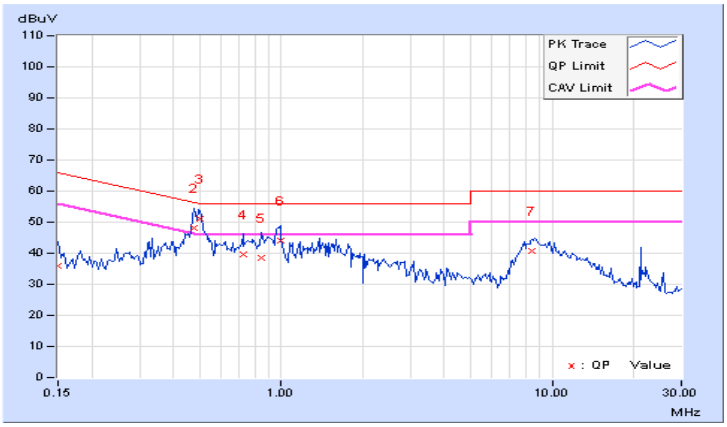
4.2.10 Test Results (Mode 4)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.09	25.71	16.93	35.80	27.02	66.00	56.00	-30.20	-28.98
2	0.47813	10.13	37.90	29.47	48.03	39.60	56.37	46.37	-8.34	-6.77
3	**0.50000**	**10.13**	**40.93**	**32.77**	**51.06**	**42.90**	**56.00**	**46.00**	**-4.94**	**-3.10**
4	0.72422	10.15	29.65	17.86	39.80	28.01	56.00	46.00	-16.20	-17.99
5	0.84922	10.16	28.52	17.43	38.68	27.59	56.00	46.00	-17.32	-18.41
6	0.99375	10.17	33.76	22.22	43.93	32.39	56.00	46.00	-12.07	-13.61
7	8.46484	10.68	30.14	20.49	40.82	31.17	60.00	50.00	-19.18	-18.83

REMARKS:

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

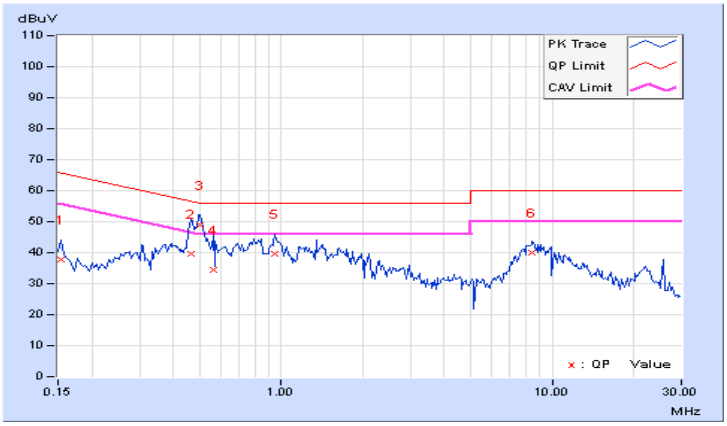


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.07	27.56	18.58	37.63	28.65	65.79	55.79	-28.16	-27.14
2	0.46250	10.12	29.68	16.17	39.80	26.29	56.65	46.65	-16.85	-20.36
3	0.49928	10.12	38.83	27.29	48.95	37.41	56.01	46.01	-7.06	-8.60
4	0.56406	10.12	24.34	11.10	34.46	21.22	56.00	46.00	-21.54	-24.78
5	0.95078	10.13	29.64	17.51	39.77	27.64	56.00	46.00	-16.23	-18.36
6	8.46094	10.59	29.38	18.45	39.97	29.04	60.00	50.00	-20.03	-20.96

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)
		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

4.3.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Jan. 12, 2018

4.3.4 Test Procedure

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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.22	19.96	204.279	23.10	30.00	Pass
40	5200	24.83	24.40	579.512	27.63	30.00	Pass
48	5240	23.41	23.00	418.806	26.22	30.00	Pass
149	5745	25.38	25.40	691.881	28.40	30.00	Pass
157	5785	25.52	25.25	691.416	28.40	30.00	Pass
165	5825	25.59	25.24	696.438	28.43	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.21	22.06	327.035	25.15	30.00	Pass
40	5200	25.25	25.10	658.559	28.19	30.00	Pass
48	5240	23.83	23.65	473.285	26.75	30.00	Pass
149	5745	25.39	25.27	682.451	28.34	30.00	Pass
157	5785	25.54	25.32	698.504	28.44	30.00	Pass
165	5825	25.53	25.36	700.831	28.46	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.34	17.15	106.08	20.26	30.00	Pass
46	5230	22.33	22.16	335.439	25.26	30.00	Pass
151	5755	24.17	24.13	520.037	27.16	30.00	Pass
159	5795	25.31	25.26	675.363	28.30	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	18.26	17.94	129.218	21.11	30.00	Pass
155	5775	20.97	20.56	238.789	23.78	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.21	22.06	327.035	25.15	29.44	Pass
40	5200	25.25	25.10	658.559	28.19	29.44	Pass
48	5240	23.83	23.65	473.285	26.75	29.44	Pass
149	5745	25.39	25.27	682.451	28.34	29.44	Pass
157	5785	25.54	25.32	698.504	28.44	29.44	Pass
165	5825	25.53	25.36	700.831	28.46	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power limit shall be reduced to 30-(6.56-6) = 29.44dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.34	17.15	106.08	20.26	29.44	Pass
46	5230	22.33	22.16	335.439	25.26	29.44	Pass
151	5755	24.17	24.13	520.037	27.16	29.44	Pass
159	5795	25.31	25.26	675.363	28.30	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power limit shall be reduced to 30-(6.56-6) = 29.44dBm.

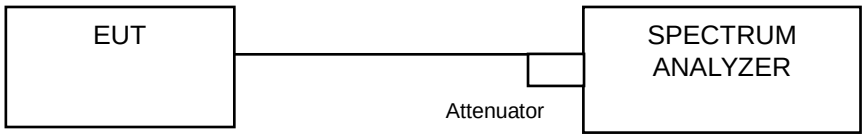
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	18.26	17.94	129.218	21.11	29.44	Pass
155	5775	20.97	20.56	238.789	23.78	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power limit shall be reduced to 30-(6.56-6) = 29.44dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Jan. 12, 2018

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 SAMPLE. 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 Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.44
40	5200	21.00	23.16
48	5240	17.04	17.64
149	5745	30.36	28.56
157	5785	30.60	29.04
165	5825	28.20	29.28

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.88	18.00
40	5200	29.28	30.84
48	5240	18.60	19.20
149	5745	31.44	29.40
157	5785	32.04	29.40
165	5825	29.40	31.92

802.11ac (VHT40)

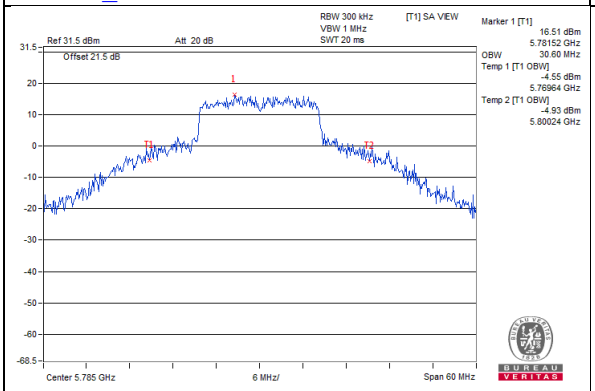
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.72	36.72
151	5755	46.08	43.20
159	5795	59.76	58.08

802.11ac (VHT80)

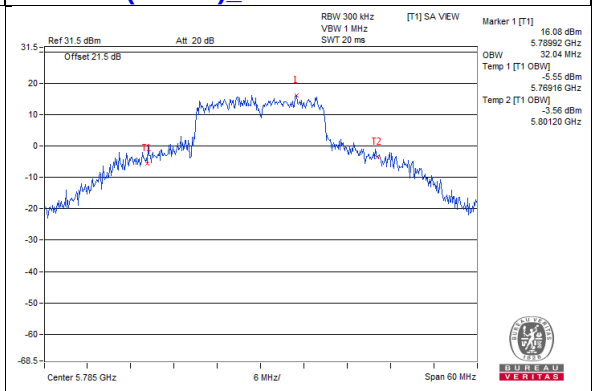
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	76.32
155	5775	75.84	76.32

Spectrum Plot of Worst Value

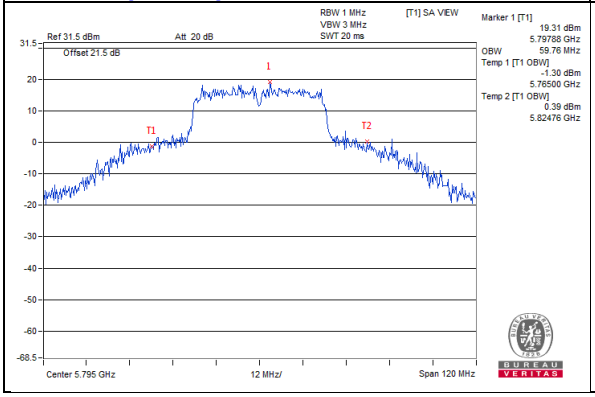
802.11a_Chain0 / CH157



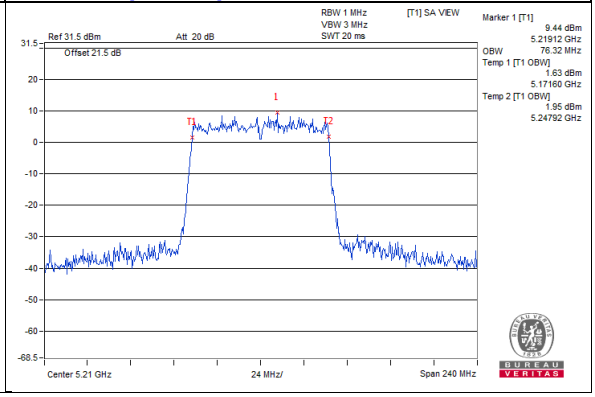
802.11ac (VHT20)_Chain0 / CH157

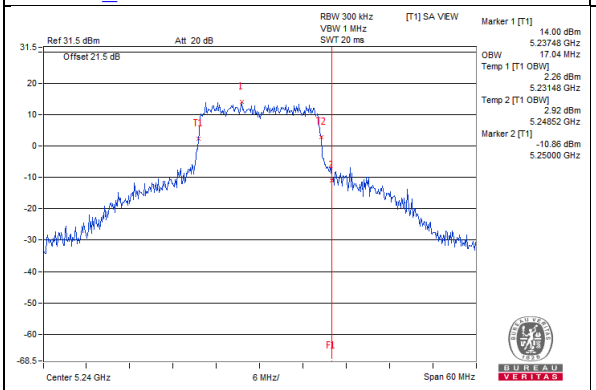
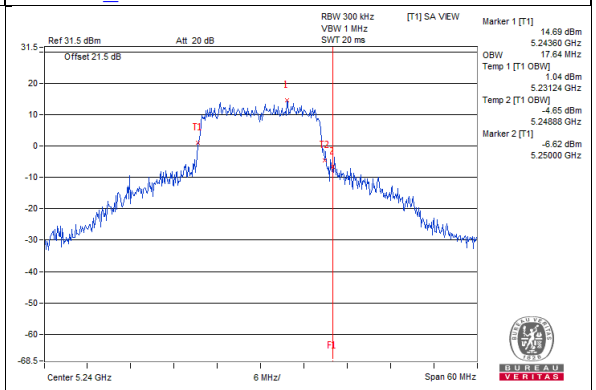
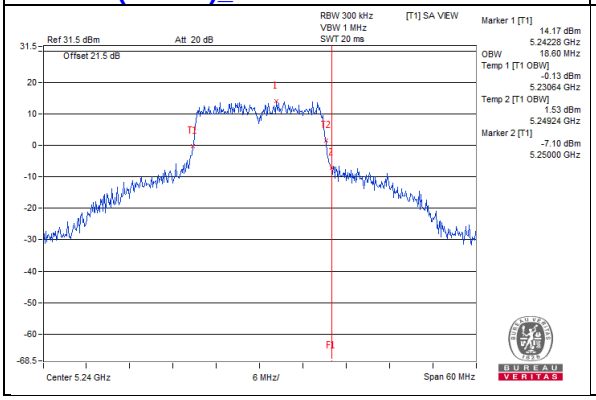
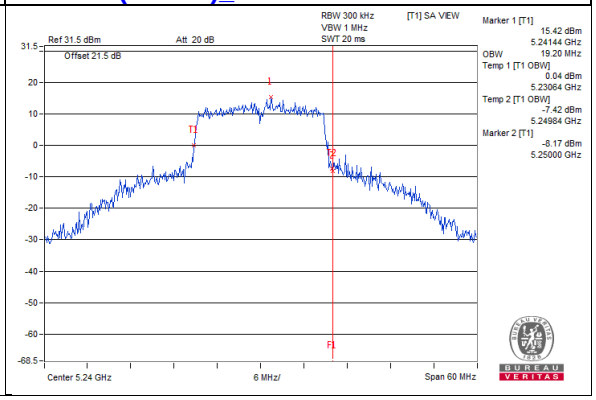


802.11ac (VHT40)_Chain0 / CH159



802.11ac (VHT80)_Chain1 / CH42



Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	802.11a_Chain1 / CH48
	
802.11ac(VHT20)_Chain0 / CH48	802.11ac(VHT20)_Chain1 / CH48
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
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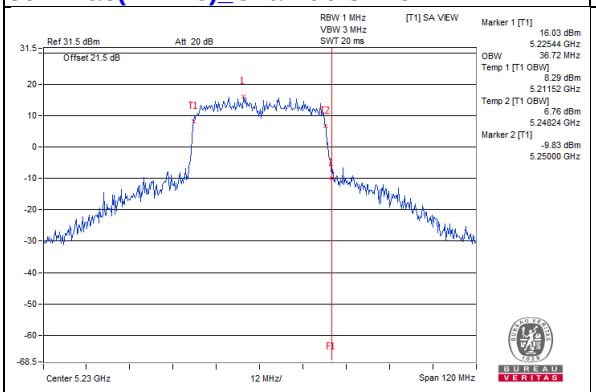
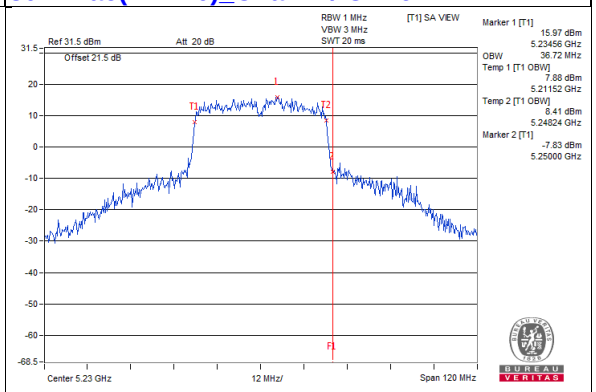
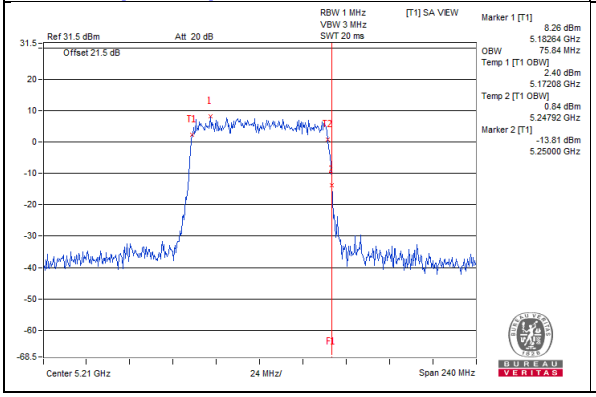
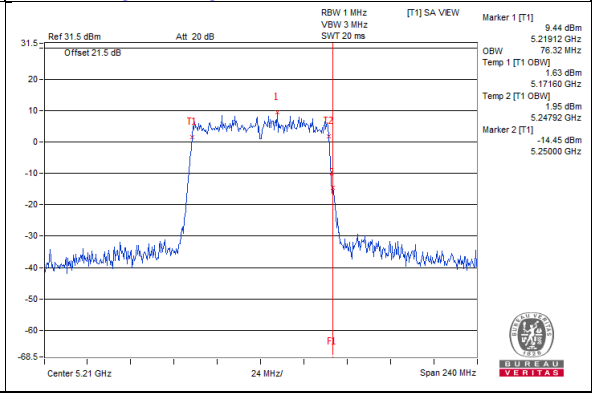
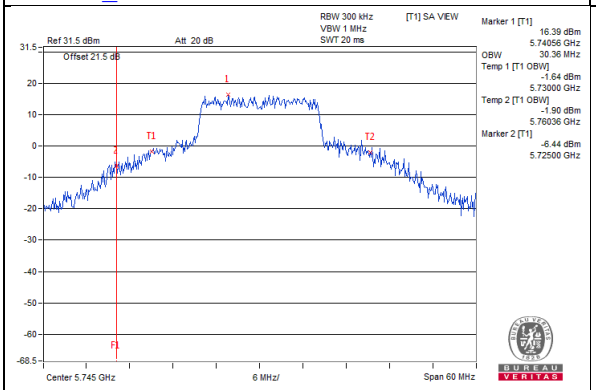
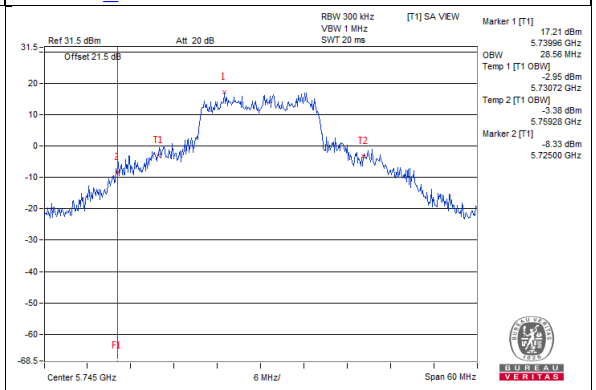
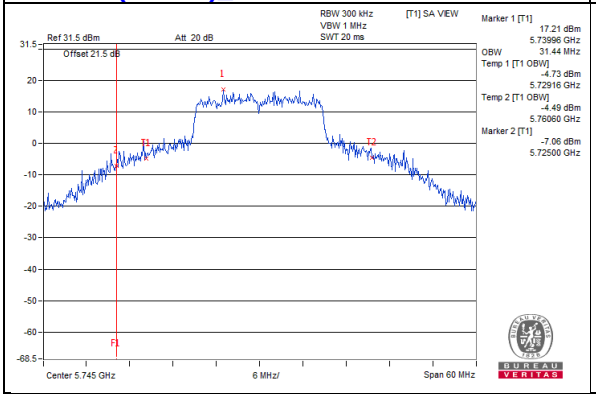
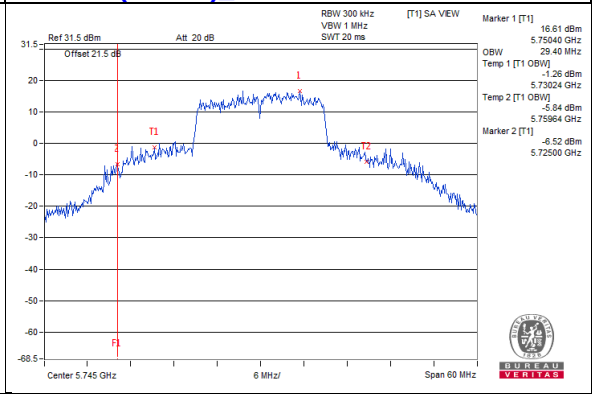
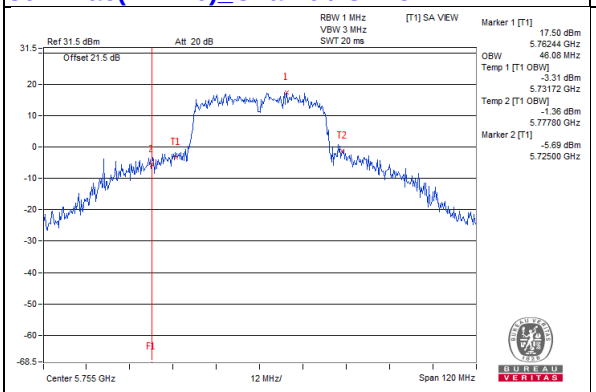
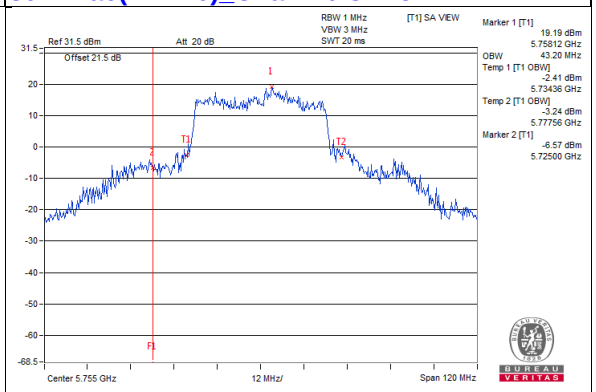
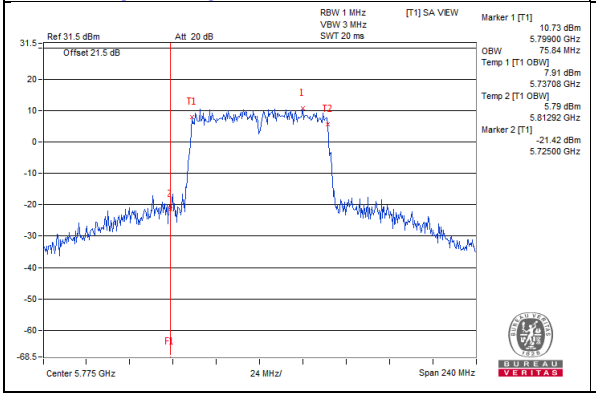
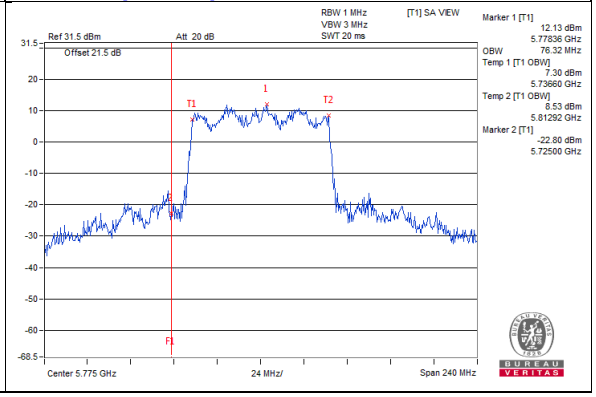
	
802.11ac(VHT80)_Chain0 / CH42	802.11ac(VHT80)_Chain1 / CH42
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	802.11a_Chain1 / CH149
	
802.11ac(VHT20)_Chain0 / CH149	802.11ac(VHT20)_Chain1 / CH149
	

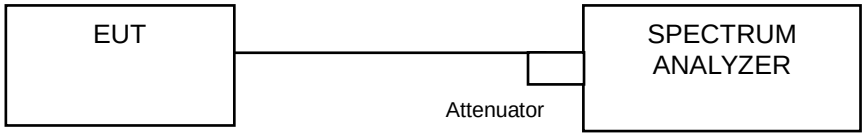
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ac(VHT40)_Chain0 / CH151	802.11ac(VHT40)_Chain1 / CH151
	
802.11ac(VHT80)_Chain0 / CH155	802.11ac(VHT80)_Chain1 / CH155
	

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	
		Client device	11dBm/ MHz
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Jan. 12, 2018

4.5.4 Test Procedure

802.11ac (VHT20)

For U-NII-1:

Using method SA-1

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

For U-NII-3:

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

802.11a, 802.11ac (VHT40), 802.11ac (VHT80)

For U-NII-1:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	6.72	6.44	0.17	9.76	16.44	Pass
40	5200	10.73	10.06	0.17	13.59	16.44	Pass
48	5240	9.11	9.39	0.17	12.43	16.44	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 17-(6.56-6) = 16.44dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	7.83	8.11	10.98	16.44	Pass
40	5200	11.20	11.28	14.25	16.44	Pass
48	5240	9.45	9.92	12.70	16.44	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 17-(6.56-6) = 16.44dBm.

802.11ac (VHT40)

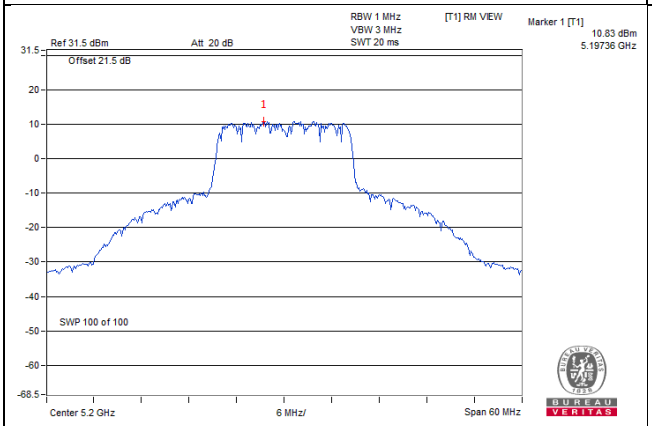
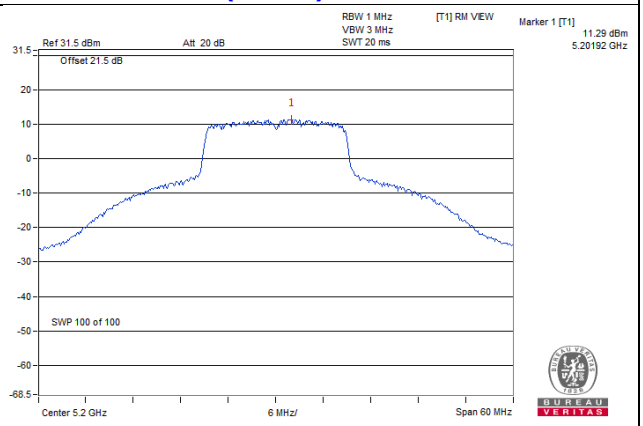
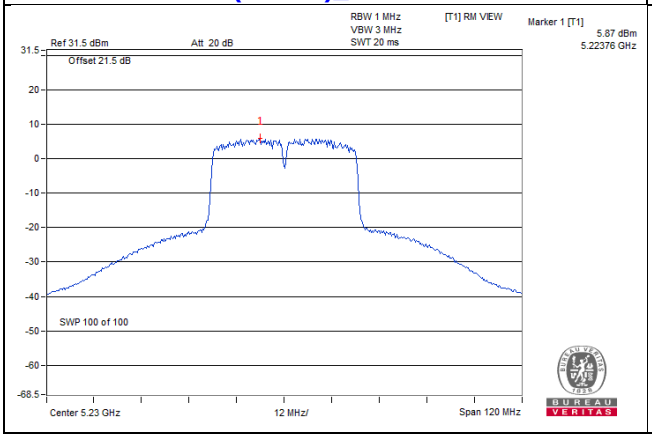
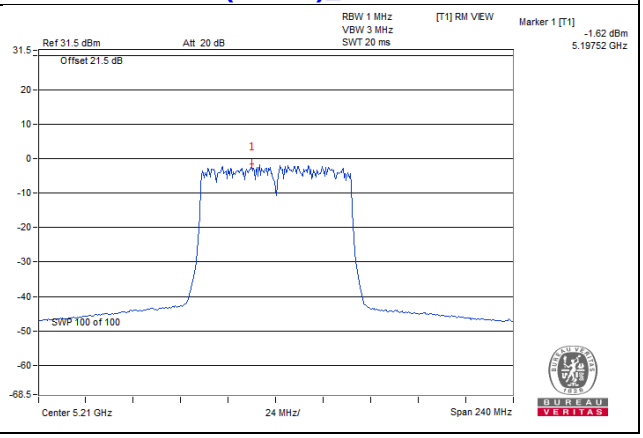
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	0.63	0.68	0.16	3.82	16.44	Pass
46	5230	5.66	5.64	0.16	8.82	16.44	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 17-(6.56-6) = 16.44dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-1.81	-2.52	0.28	1.14	16.44	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 17-(6.56-6) = 16.44dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH40	**802.11ac (VHT20)_Chain 1 / CH40**
	
802.11ac (VHT40)_Chain 0 / CH46	**802.11ac (VHT80)_Chain 0 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	3.50	5.72	3.01	0.17	8.90	29.44	Pass
	157	5785	3.52	5.74	3.01	0.17	8.92	29.44	Pass
	165	5825	3.43	5.65	3.01	0.17	8.83	29.44	Pass
1	149	5745	3.79	6.01	3.01	0.17	9.19	29.44	Pass
	157	5785	4.13	6.35	3.01	0.17	9.53	29.44	Pass
	165	5825	4.38	6.60	3.01	0.17	9.78	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 30-(6.56-6) = 29.44dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	3.31	5.53	3.01	8.54	29.44	Pass
	157	5785	3.63	5.85	3.01	8.86	29.44	Pass
	165	5825	3.36	5.58	3.01	8.59	29.44	Pass
1	149	5745	4.57	6.79	3.01	9.80	29.44	Pass
	157	5785	4.36	6.58	3.01	9.59	29.44	Pass
	165	5825	4.41	6.63	3.01	9.64	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 30-(6.56-6) = 29.44dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.00	1.22	3.01	0.16	4.39	29.44	Pass
	159	5795	0.15	2.37	3.01	0.16	5.54	29.44	Pass
1	151	5755	-0.09	2.13	3.01	0.16	5.30	29.44	Pass
	159	5795	0.87	3.09	3.01	0.16	6.26	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 30-(6.56-6) = 29.44dBm.

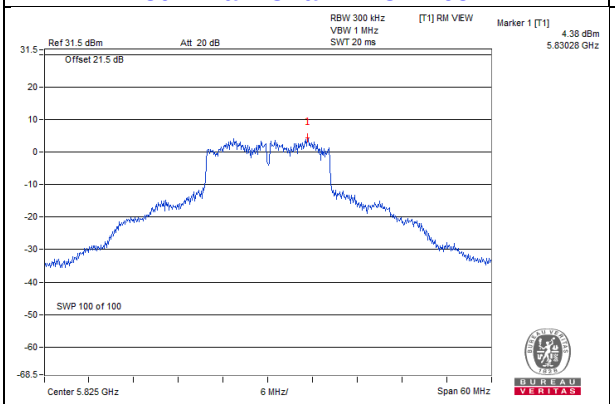
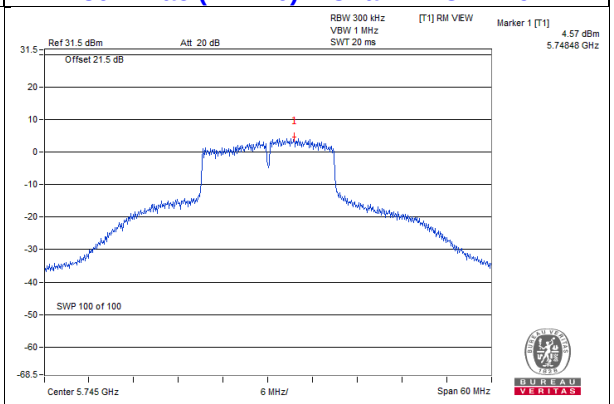
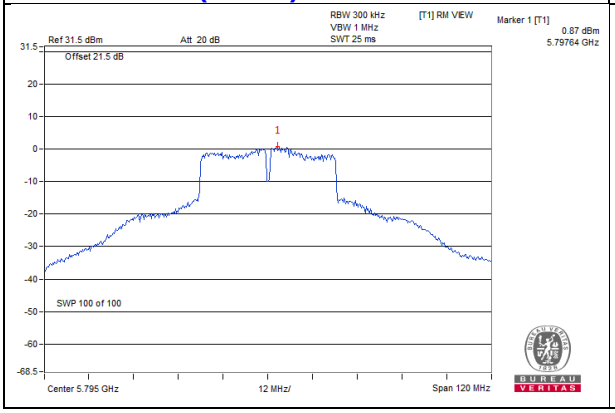
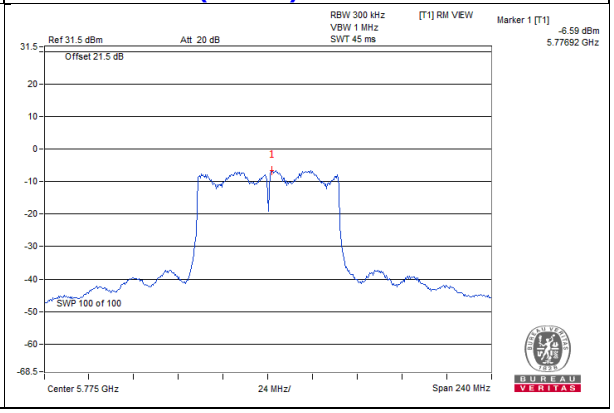
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-7.35	-5.13	3.01	0.28	-1.84	29.44	Pass
1	155	5775	-6.59	-4.37	3.01	0.28	-1.08	29.44	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.56dBi > 6dBi , so the power density limit shall be reduced to 30-(6.56-6) = 29.44dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

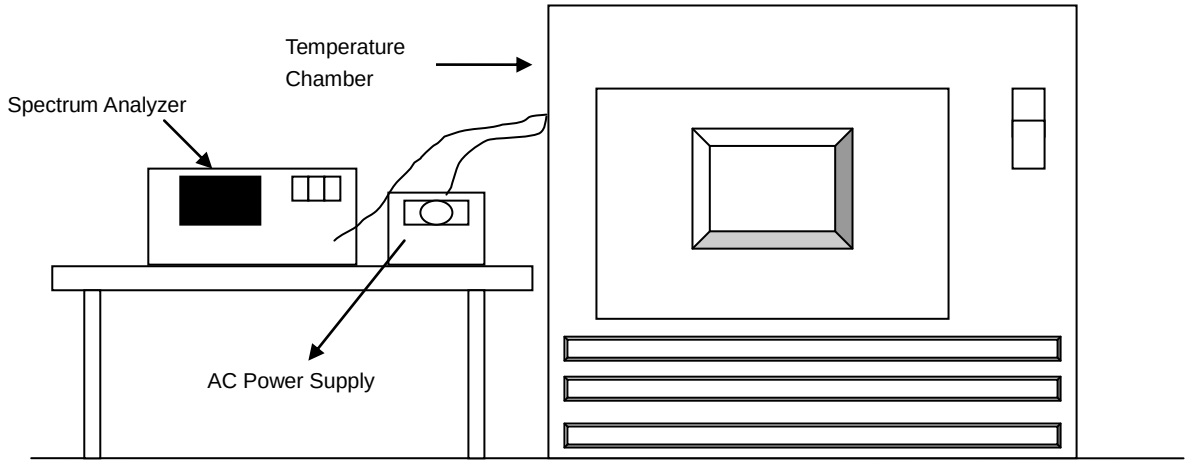
Spectrum Plot of Worst Value	
802.11a – Chain 1: CH 165	**802.11ac (VHT20) – Chain 1: CH 149**
	
802.11ac (VHT40) – Chain 1: CH 159	**802.11ac (VHT80) – Chain 1: CH 155**
	

4.6 Frequency Stability Measurement

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Jan. 12, 2018

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5179.991	PASS	5179.9894	PASS	5179.9885	PASS	5179.9908	PASS
40	120	5180.0102	PASS	5180.0112	PASS	5180.0088	PASS	5180.0087	PASS
30	120	5180.0066	PASS	5180.0054	PASS	5180.003	PASS	5180.0035	PASS
20	120	5179.9904	PASS	5179.9917	PASS	5179.9915	PASS	5179.9929	PASS
10	120	5179.9895	PASS	5179.9911	PASS	5179.9886	PASS	5179.9925	PASS
0	120	5180.0076	PASS	5180.0086	PASS	5180.0081	PASS	5180.0068	PASS
-10	120	5179.9809	PASS	5179.978	PASS	5179.9776	PASS	5179.9811	PASS
-20	120	5180.0263	PASS	5180.0253	PASS	5180.0255	PASS	5180.0257	PASS
-30	120	5180.0154	PASS	5180.016	PASS	5180.0166	PASS	5180.0168	PASS

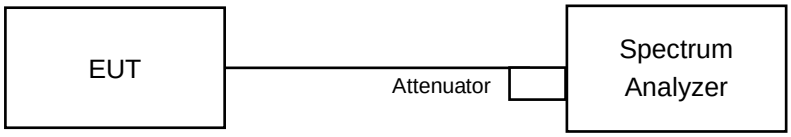
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9905	PASS	5179.9914	PASS	5179.991	PASS	5179.9925	PASS
	120	5179.9904	PASS	5179.9917	PASS	5179.9915	PASS	5179.9929	PASS
	102	5179.9904	PASS	5179.9912	PASS	5179.9908	PASS	5179.9937	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.38	15.74	0.5	PASS
157	5785	16.42	15.14	0.5	PASS
165	5825	16.39	15.08	0.5	PASS

802.11ac (VHT20)

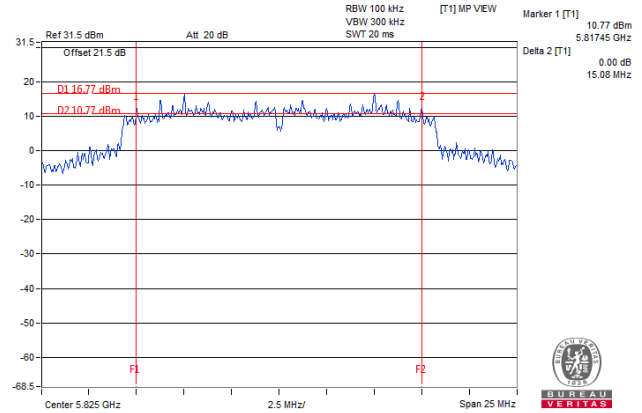
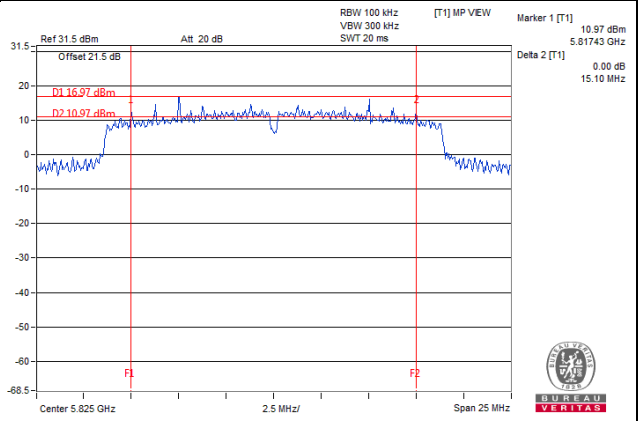
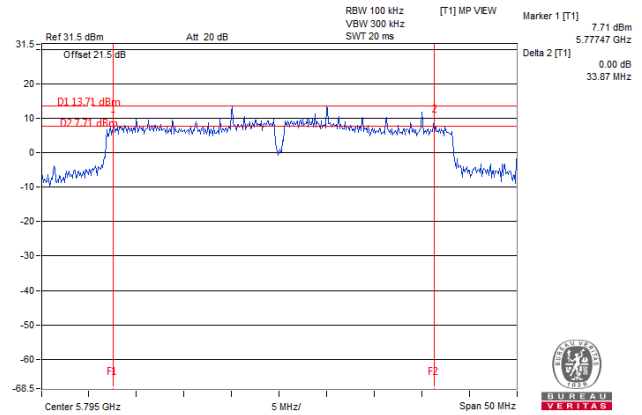
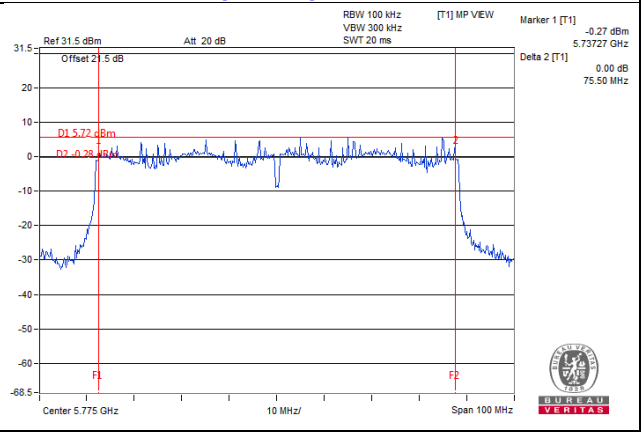
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.55	16.10	0.5	PASS
157	5785	17.64	15.11	0.5	PASS
165	5825	17.61	15.10	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.16	35.76	0.5	PASS
159	5795	35.08	33.87	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.99	75.50	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH165	**802.11ac (VHT20)_Chain 1 / CH165**
	
802.11ac (VHT40)_Chain 1 / CH159	**802.11ac (VHT80)_Chain 1 / CH155**
	

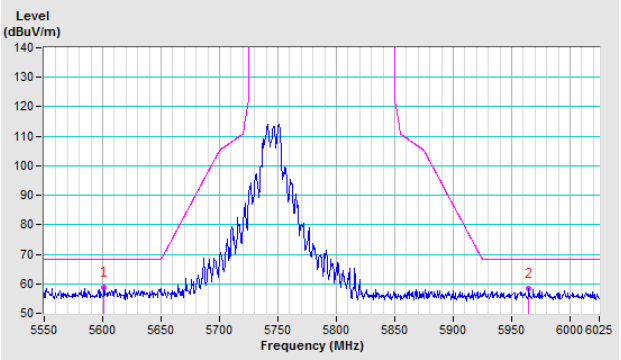
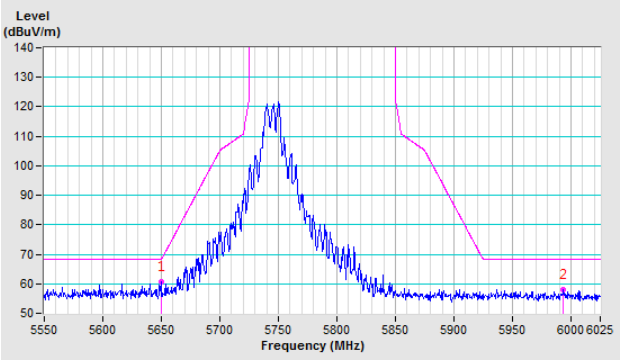
5 Pictures of Test Arrangements

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

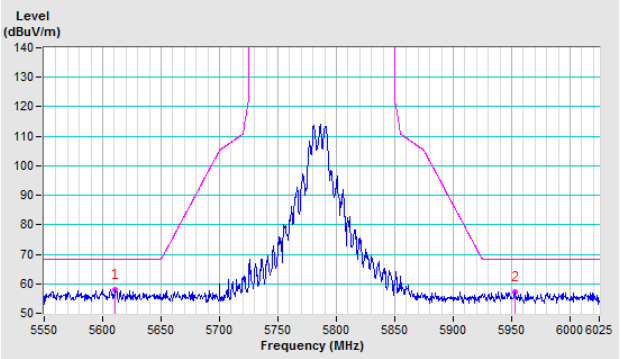
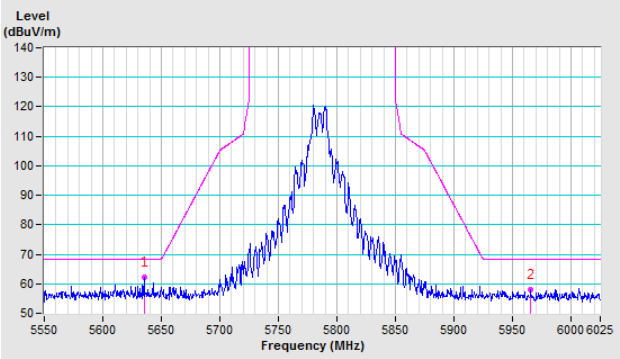
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

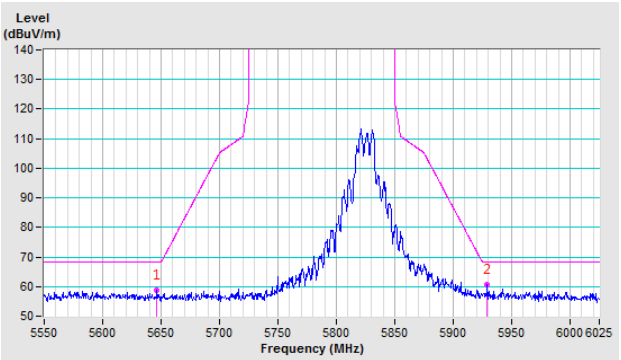
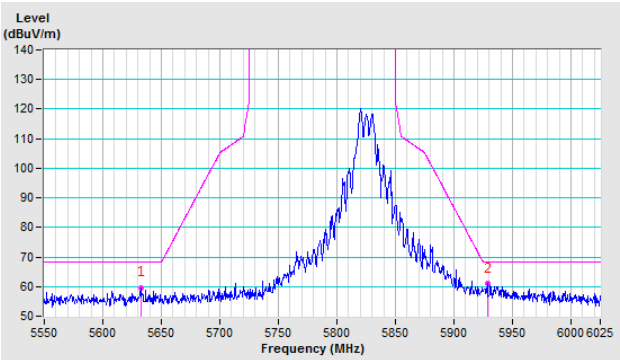
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

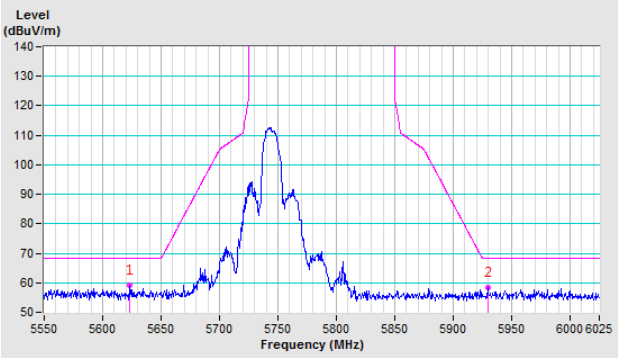
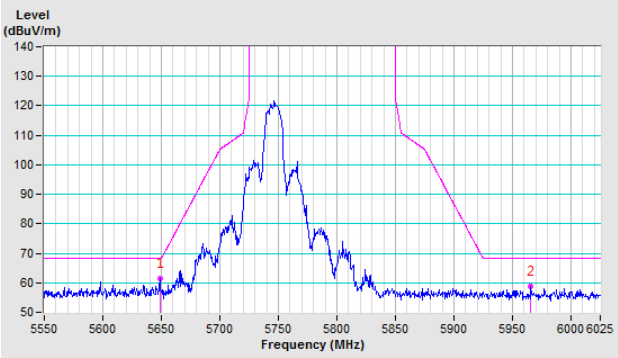
Horizontal	Vertical
	

CH 165 5825 MHz

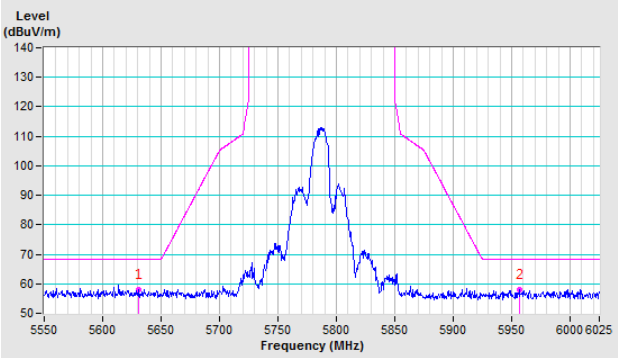
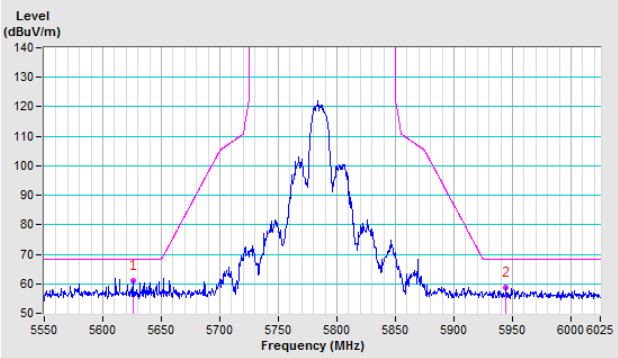
Horizontal	Vertical
	

802.11ac (VHT20)

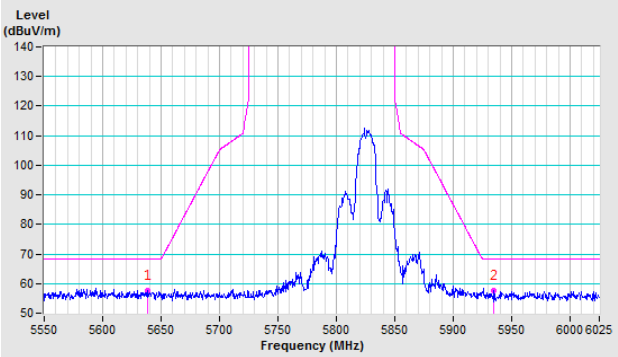
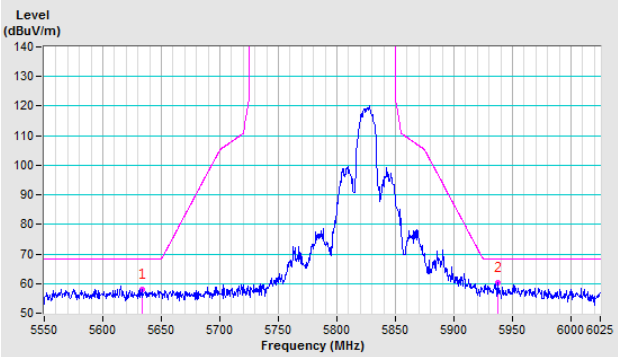
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

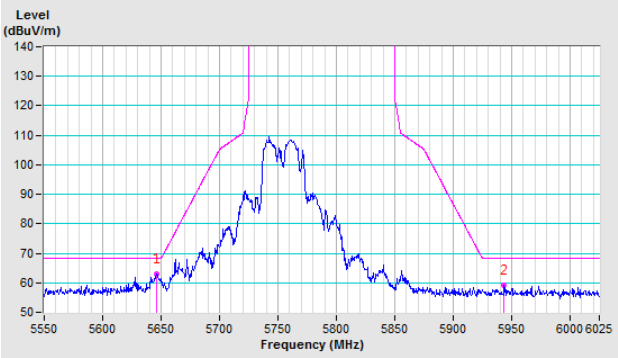
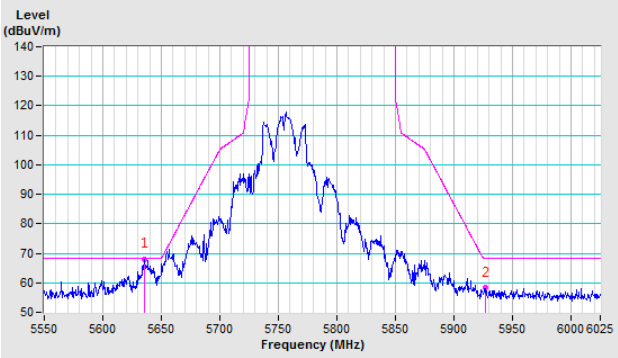
Horizontal	Vertical
	

CH 165 5825 MHz

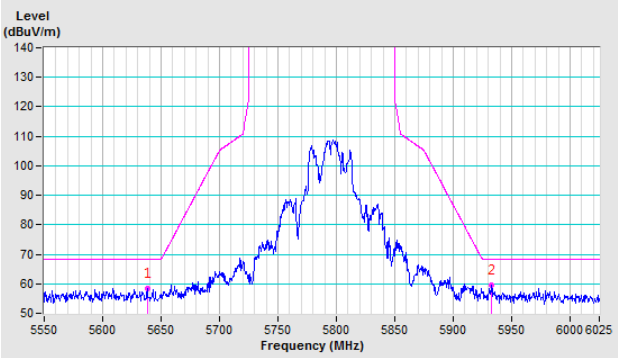
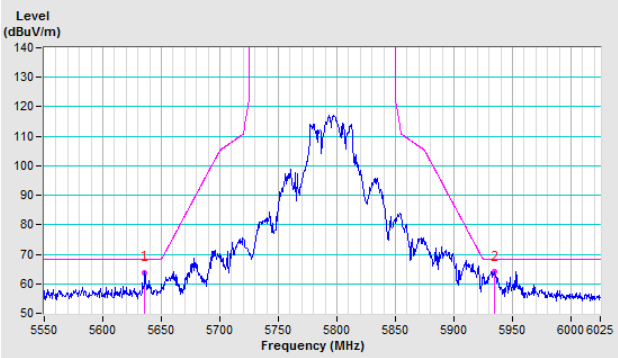
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

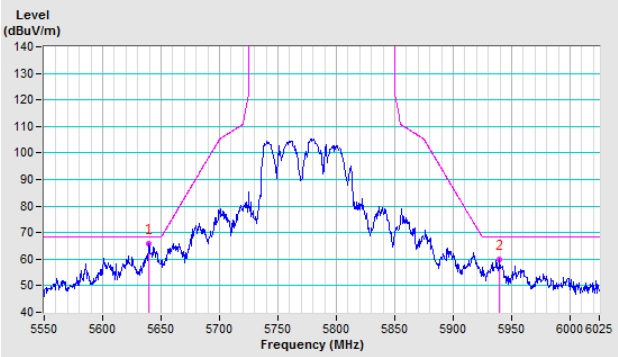
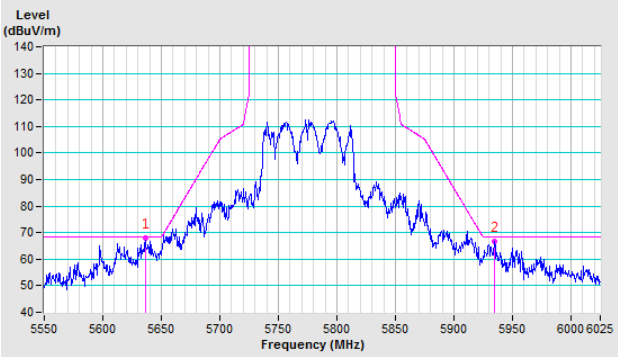
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

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

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

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