FCC Test Report

Report No.:	RF191106E07-1
FCC ID:	Q87-08177
Test Model:	EA8100 V2
Received Date:	Nov. 06, 2019
Test Date:	Nov. 13 to 26, 2019
Issued Date:	Dec. 20, 2019
Applicant:	LINKSYS LLC
Address:	121 Theory Drive Irvine California 92617 United States
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
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF191106E07-1	Original release.	Dec. 20, 2019

1 Certificate of Conformity

Product:	LINKSYS MAX-STREAM AC2600 MU-MIMO GIGABIT ROUTER
Brand:	Linksys
Test Model:	EA8100 V2
Sample Status:	ENGINEERING SAMPLE
Applicant:	LINKSYS LLC
Test Date:	Nov. 13 to 26, 2019
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 : Vivian Huang , **Date:** Dec. 20, 2019

Vivian Huang / Specialist

Approved by : , **Date:** Dec. 20, 2019

Clark Lin / Technical 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 -14.02 dB at 0.34922 MHz.
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 -0.1 dB at 5150.00 MHz, 11650.00 MHz.
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.

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	LINKSYS MAX-STREAM AC2600 MU-MIMO GIGABIT ROUTER
Brand	Linksys
Test Model	EA8100 V2
Status of EUT	ENGINEERING SAMPLE
Driver Version	HW: HW2.0 (Verison code:20) SW: 2.0.0.1xxxxx
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 VHT20/40 in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
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	**CDD Mode:** **2.4GHz:** 855.123 mW **5.18 ~ 5.24GHz:** 560.772 mW **5.745 ~ 5.825GHz:** 771.566 mW **Beamforming Mode:** **2.4GHz:** 616.742mW **5.18 ~ 5.24GHz:** 560.772 mW **5.745 ~ 5.825GHz:** 771.566 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ45 Cable x1 (Unshielded, 1m)

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

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

No.	Brand	Model No.	Spec.	Plug
1	Ktec	KSA-36W-120250HU	AC Input: 100-240Vac, 1.0A, 50/60Hz DC Output: 12V, 2.5A DC Output Cable: 1.5m, Unshielded	FCC/IC
2	APD	WA-30P12FU	AC Input: 100-240Vac, 0.9AMAX, 50-60Hz DC Output: 12V, 2.5A DC Output Cable: 1.5m, Unshielded	FCC/IC
3	Ktec	KSA-36W-120250D5	AC Input: 100-240Vac, 1.0A, 50/60Hz DC Output: 12V, 2.5A DC Output Cable: 1.5m, Unshielded	FCC/CE/UK
4	APD	WA-30P12R	AC Input: 100-240Vac, 0.9AMAX, 50/60Hz DC Output: 12V, 2.5A DC Output Cable: 1.5m, Unshielded	FCC/CE/UK

Note:
1. The adapters 3 is as same as adapter 1 except for plug shapes is different ; adapters 4 is as same as adapter 2 except for plug shapes is different
2. From the above adapters, the worst radiated emission test was found in Adapter 1 and the worst conducted emission test was found in Adapter 2. Therefore only the test data of the modes were recorded in this report.

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

Antenna NO.	RF Chain NO.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length	Cable Loss(dB)	excluding cable loss Antenna Gain(dBi)
1	Chain3	0.38	2.4~2.4835GHz	Dipole	i-pex(MHF)	290mm	0.9	1.28
	Chain0	0.14	5.15~5.47GHz				1.8	1.94
		0.78	5.5~5.85GHz					2.58
2	Chain2	0.63	2.4~2.4835GHz	Dipole	i-pex(MHF)	245mm	0.75	1.38
	Chain1	0.09	5.15~5.47GHz				1.5	1.59
		0.96	5.5~5.85GHz					2.46
3	Chain1	0.64	2.4~2.4835GHz	Dipole	i-pex(MHF)	300mm	0.9	1.54
	Chain2	0.25	5.15~5.47GHz				1.8	2.05
		0.84	5.5~5.85GHz					2.64
4	Chain0	0.94	2.4~2.4835GHz	Dipole	i-pex(MHF)	215mm	0.6	1.54
	Chain3	0.93	5.15~5.47GHz				1.2	2.13
		1.44	5.5~5.85GHz					2.64

4. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore the manufacturer will control the 802.11n mode power as same as 802.11ac and investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

NOTE:
1. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

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)	5180-5240 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)	5180-5240 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:

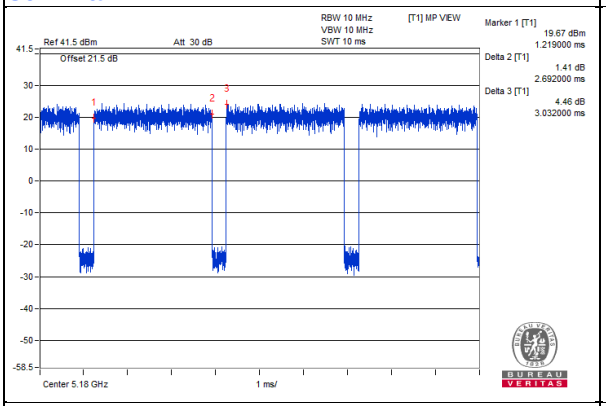
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23deg. C, 71%RH	120Vac, 60Hz	Jeff Lee
RE<1G	23deg. C, 62%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

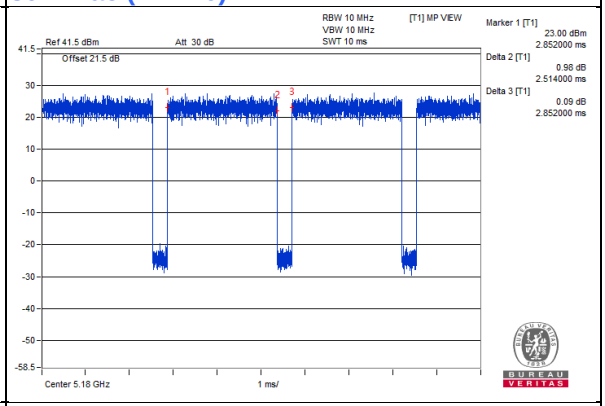
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11a: Duty cycle = 2.692 ms/3.032 ms = 0.888, Duty factor = 10 * log (1/Duty cycle) = 0.52
802.11ac (VHT20): Duty cycle = 2.514 ms/2.852 ms = 0.881, Duty factor = 10 * log (1/Duty cycle) = 0.55
802.11ac (VHT40): Duty cycle = 2.419 ms/2.773 ms = 0.872, Duty factor = 10 * log (1/Duty cycle) = 0.59
802.11ac (VHT80): Duty cycle = 4.418 ms/4.778 ms = 0.925, Duty factor = 10 * log (1/Duty cycle) = 0.34

802.11a

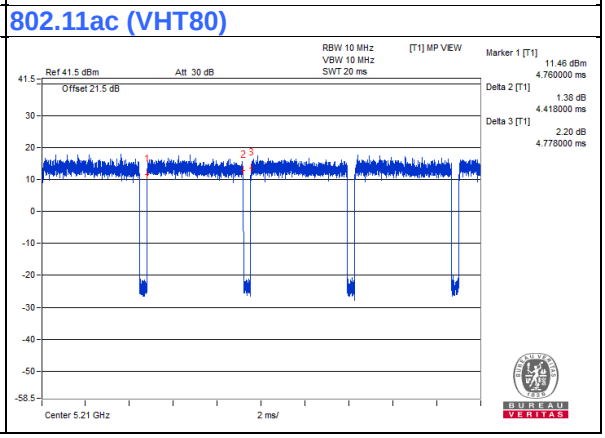


802.11ac (VHT20)



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.

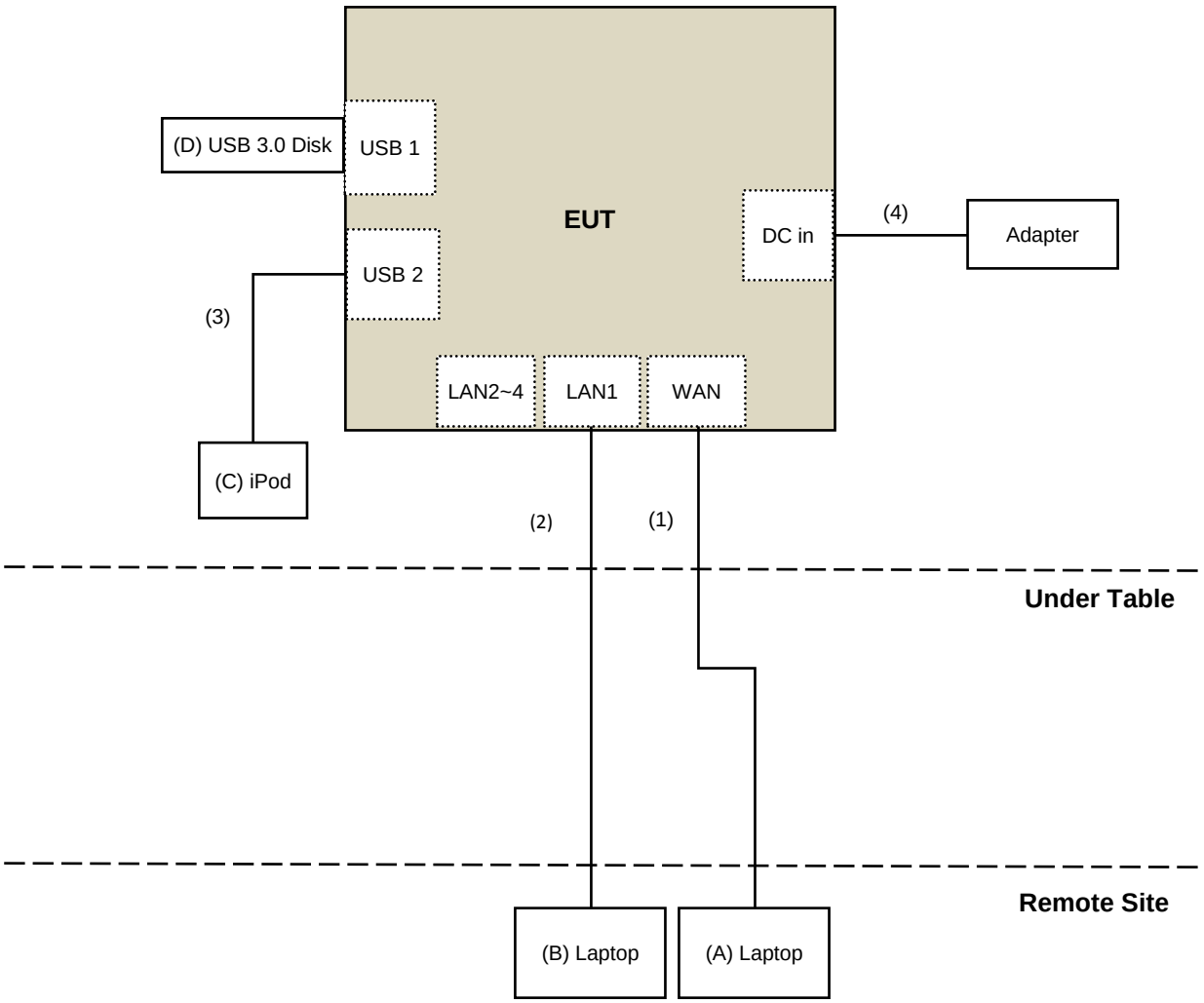
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	DM1SKV1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	iPod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
D.	USB 3.0 Disk	NA	NA	NA	NA	Provided by Lab

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.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	USB Cable	1	0.1	Yes	0	Provided by Lab
4.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and references

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

Test Standard:

FCC Part 15, Subpart E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" 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="4">*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

For OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: Nov. 13, 2019

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Nov. 26, 2019

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

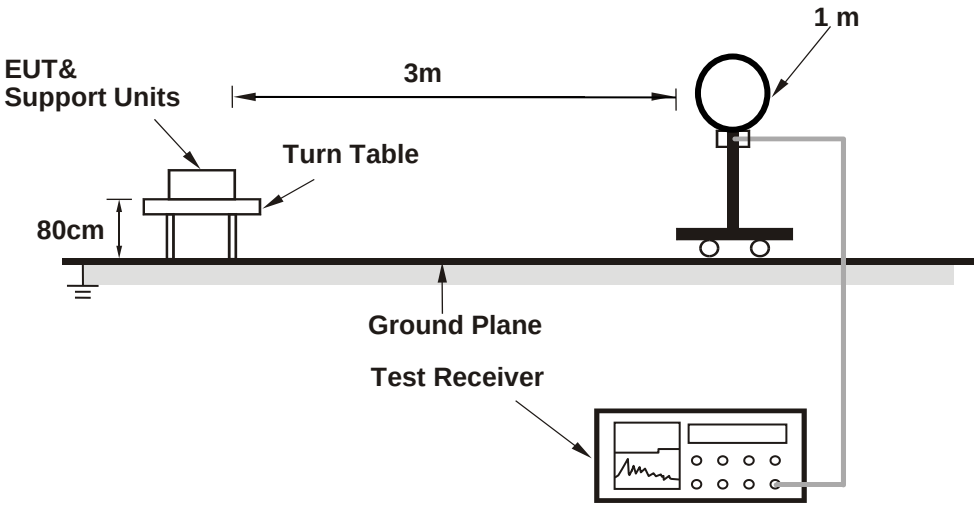
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

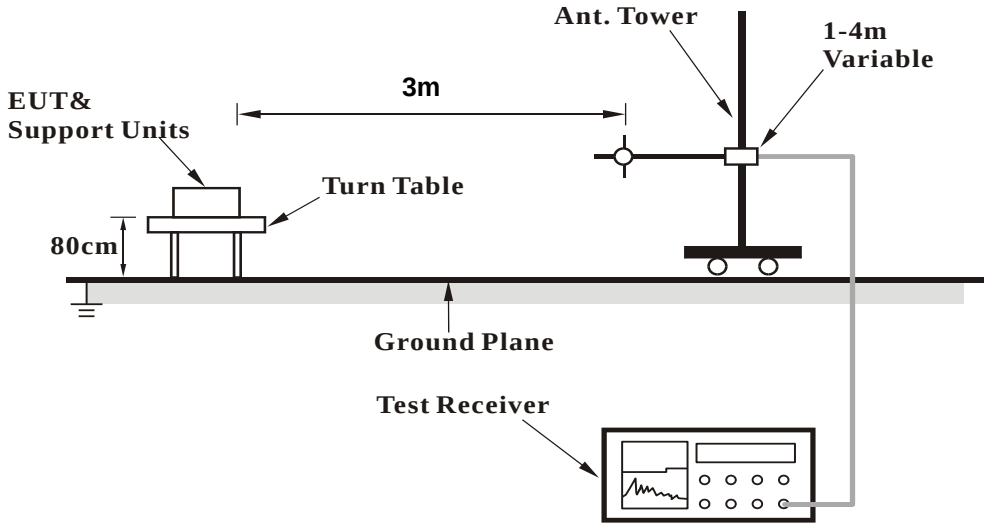
No deviation.

4.1.5 Test Setup

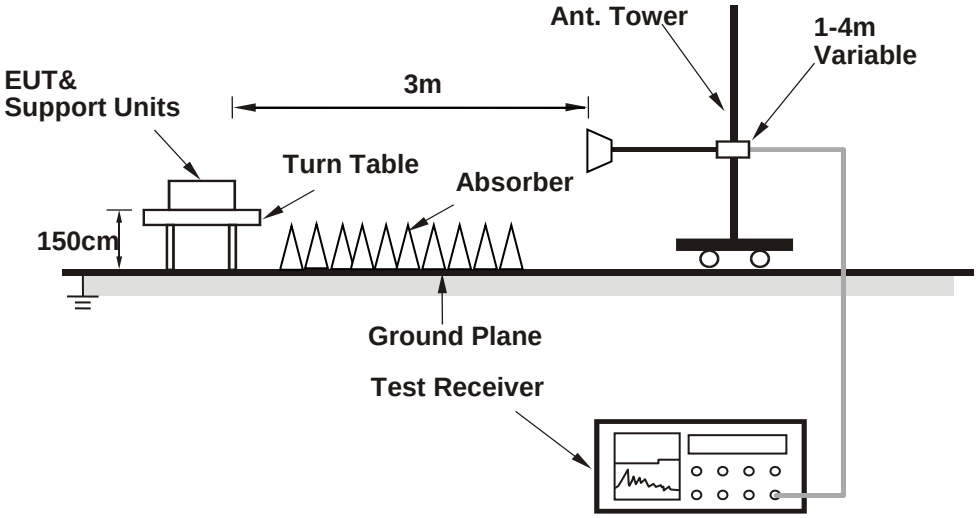
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (MT7615 QA V0.0.1.91) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

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	46.6 PK	74.0	-27.4	1.51 H	198	43.1	3.5
2	5150.00	37.9 AV	54.0	-16.1	1.51 H	198	34.4	3.5
3	*5180.00	104.2 PK			1.51 H	198	100.8	3.4
4	*5180.00	93.3 AV			1.51 H	198	89.9	3.4
5	#10360.00	50.3 PK	68.2	-17.9	2.86 H	66	37.2	13.1
6	15540.00	46.7 PK	74.0	-27.3	2.03 H	154	33.1	13.6
7	15540.00	34.9 AV	54.0	-19.1	2.03 H	154	21.3	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	5150.00	62.9 PK	74.0	-11.1	2.16 V	353	59.4	3.5
2	5150.00	53.6 AV	54.0	-0.4	2.16 V	353	50.1	3.5
3	*5180.00	118.6 PK			2.16 V	353	115.2	3.4
4	*5180.00	107.5 AV			2.16 V	353	104.1	3.4
5	#10360.00	58.8 PK	68.2	-9.4	2.49 V	90	45.7	13.1
6	15540.00	48.5 PK	74.0	-25.5	2.52 V	119	34.9	13.6
7	15540.00	36.4 AV	54.0	-17.6	2.52 V	119	22.8	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	48.9 PK	74.0	-25.1	1.55 H	202	45.4	3.5
2	5150.00	38.2 AV	54.0	-15.8	1.55 H	202	34.7	3.5
3	*5200.00	105.3 PK			1.55 H	202	101.9	3.4
4	*5200.00	94.5 AV			1.55 H	202	91.1	3.4
5	#10400.00	51.2 PK	68.2	-17.0	2.90 H	61	37.8	13.4
6	15600.00	47.3 PK	74.0	-26.7	2.01 H	152	33.9	13.4
7	15600.00	35.8 AV	54.0	-18.2	2.01 H	152	22.4	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	1.84 V	335	59.7	3.5
2	5150.00	53.8 AV	54.0	-0.2	1.84 V	335	50.3	3.5
3	*5200.00	119.8 PK			1.84 V	335	116.4	3.4
4	*5200.00	108.6 AV			1.84 V	335	105.2	3.4
5	#10400.00	59.6 PK	68.2	-8.6	2.48 V	91	46.2	13.4
6	15600.00	49.4 PK	74.0	-24.6	2.48 V	120	36.0	13.4
7	15600.00	37.6 AV	54.0	-16.4	2.48 V	120	24.2	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	105.2 PK			1.58 H	203	102.2	3.0
2	*5240.00	94.7 AV			1.58 H	203	91.7	3.0
3	5350.00	49.5 PK	74.0	-24.5	1.58 H	203	46.2	3.3
4	5350.00	38.4 AV	54.0	-15.6	1.58 H	203	35.1	3.3
5	#10480.00	50.9 PK	68.2	-17.3	2.83 H	64	37.4	13.5
6	15720.00	47.1 PK	74.0	-26.9	2.01 H	151	34.3	12.8
7	15720.00	35.7 AV	54.0	-18.3	2.01 H	151	22.9	12.8
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	*5240.00	1120.3 PK			2.22 V	344	1117.3	3.0
2	*5240.00	109.0 AV			2.22 V	344	106.0	3.0
3	5350.00	63.6 PK	74.0	-10.4	2.22 V	344	60.3	3.3
4	5350.00	53.7 AV	54.0	-0.3	2.22 V	344	50.4	3.3
5	#10480.00	60.0 PK	68.2	-8.2	2.53 V	89	46.5	13.5
6	15720.00	49.7 PK	74.0	-24.3	2.46 V	119	36.9	12.8
7	15720.00	37.8 AV	54.0	-16.2	2.46 V	119	25.0	12.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5745.00	107.2 PK			1.47 H	202	103.3	3.9
2	*5745.00	97.9 AV			1.47 H	202	94.0	3.9
3	11490.00	56.7 PK	74.0	-17.3	2.87 H	61	42.5	14.2
4	11490.00	44.3 AV	54.0	-9.7	2.87 H	61	30.1	14.2
5	#17235.00	52.5 PK	68.2	-15.7	1.99 H	154	35.2	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	*5745.00	121.9 PK			1.61 V	346	118.0	3.9
2	*5745.00	112.7 AV			1.61 V	346	108.8	3.9
3	11490.00	65.2 PK	74.0	-8.8	2.50 V	91	51.0	14.2
4	11490.00	53.7 AV	54.0	-0.3	2.50 V	91	39.5	14.2
5	#17235.00	53.7 PK	68.2	-14.5	2.47 V	121	36.4	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5785.00	107.5 PK			1.58 H	196	103.5	4.0
2	*5785.00	98.2 AV			1.58 H	196	94.2	4.0
3	11570.00	56.5 PK	74.0	-17.5	2.82 H	60	42.3	14.2
4	11570.00	44.4 AV	54.0	-9.6	2.82 H	60	30.2	14.2
5	#17355.00	52.6 PK	68.2	-15.6	2.02 H	159	34.9	17.7
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	*5785.00	122.1 PK			1.57 V	346	118.1	4.0
2	*5785.00	112.8 AV			1.57 V	346	108.8	4.0
3	11570.00	65.7 PK	74.0	-8.3	2.50 V	90	51.5	14.2
4	11570.00	53.7 AV	54.0	-0.3	2.50 V	90	39.5	14.2
5	#17355.00	53.5 PK	68.2	-14.7	2.50 V	122	35.8	17.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5825.00	107.4 PK			1.63 H	217	103.2	4.2
2	*5825.00	97.8 AV			1.63 H	217	93.6	4.2
3	11650.00	56.3 PK	74.0	-17.7	2.86 H	69	42.4	13.9
4	11650.00	44.7 AV	54.0	-9.3	2.86 H	69	30.8	13.9
5	#17475.00	52.4 PK	68.2	-15.8	2.06 H	148	33.6	18.8
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	*5825.00	121.7 PK			1.73 V	347	117.5	4.2
2	*5825.00	112.5 AV			1.73 V	347	108.3	4.2
3	11650.00	65.5 PK	74.0	-8.5	2.49 V	89	51.6	13.9
4	**11650.00**	**53.9 AV**	**54.0**	**-0.1**	**2.49 V**	**89**	**40.0**	**13.9**
5	#17475.00	53.6 PK	68.2	-14.6	2.47 V	122	34.8	18.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	46.8 PK	74.0	-27.2	1.48 H	200	43.3	3.5
2	5150.00	38.3 AV	54.0	-15.7	1.48 H	200	34.8	3.5
3	*5180.00	104.5 PK			1.48 H	200	101.1	3.4
4	*5180.00	93.3 AV			1.48 H	200	89.9	3.4
5	#10360.00	50.0 PK	68.2	-18.2	2.90 H	64	36.9	13.1
6	15540.00	46.0 PK	74.0	-28.0	2.00 H	166	32.4	13.6
7	15540.00	34.5 AV	54.0	-19.5	2.00 H	166	20.9	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	5150.00	64.2 PK	74.0	-9.8	2.66 V	157	60.7	3.5
2	5150.00	53.6 AV	54.0	-0.4	2.66 V	157	50.1	3.5
3	*5180.00	117.9 PK			2.66 V	157	114.5	3.4
4	*5180.00	107.6 AV			2.66 V	157	104.2	3.4
5	#10360.00	58.9 PK	68.2	-9.3	2.47 V	91	45.8	13.1
6	15540.00	48.1 PK	74.0	-25.9	2.53 V	118	34.5	13.6
7	15540.00	35.9 AV	54.0	-18.1	2.53 V	118	22.3	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	49.8 PK	74.0	-24.2	1.57 H	190	46.3	3.5
2	5150.00	38.6 AV	54.0	-15.4	1.57 H	190	35.1	3.5
3	*5200.00	105.4 PK			1.57 H	190	102.0	3.4
4	*5200.00	94.7 AV			1.57 H	190	91.3	3.4
5	#10400.00	51.2 PK	68.2	-17.0	2.91 H	66	37.8	13.4
6	15600.00	47.1 PK	74.0	-26.9	1.97 H	162	33.7	13.4
7	15600.00	35.7 AV	54.0	-18.3	1.97 H	162	22.3	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	1.95 V	243	61.1	3.5
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.95 V**	**243**	**50.4**	**3.5**
3	*5200.00	118.7 PK			1.95 V	243	115.3	3.4
4	*5200.00	109.1 AV			1.95 V	243	105.7	3.4
5	#10400.00	60.1 PK	68.2	-8.1	2.57 V	88	46.7	13.4
6	15600.00	49.8 PK	74.0	-24.2	2.47 V	124	36.4	13.4
7	15600.00	37.8 AV	54.0	-16.2	2.47 V	124	24.4	13.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	49.8 PK	74.0	-24.2	1.54 H	208	46.3	3.5
2	5150.00	38.5 AV	54.0	-15.5	1.54 H	208	35.0	3.5
3	*5240.00	104.8 PK			1.54 H	208	101.8	3.0
4	*5240.00	94.2 AV			1.54 H	208	91.2	3.0
5	5350.00	47.7 PK	74.0	-26.3	1.54 H	208	44.4	3.3
6	5350.00	36.6 AV	54.0	-17.4	1.54 H	208	33.3	3.3
7	#10480.00	51.6 PK	68.2	-16.6	2.90 H	54	38.1	13.5
8	15720.00	47.3 PK	74.0	-26.7	2.01 H	157	34.5	12.8
9	15720.00	35.5 AV	54.0	-18.5	2.01 H	157	22.7	12.8
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	65.6 PK	74.0	-8.4	2.09 V	242	62.1	3.5
2	5150.00	53.8 AV	54.0	-0.2	2.09 V	242	50.3	3.5
3	*5240.00	118.3 PK			2.09 V	242	115.3	3.0
4	*5240.00	108.8 AV			2.09 V	242	105.8	3.0
5	5350.00	62.5 PK	74.0	-11.5	2.09 V	242	59.2	3.3
6	5350.00	50.3 AV	54.0	-3.7	2.09 V	242	47.0	3.3
7	#10480.00	60.0 PK	68.2	-8.2	2.50 V	78	46.5	13.5
8	15720.00	49.2 PK	74.0	-24.8	2.47 V	134	36.4	12.8
9	15720.00	37.4 AV	54.0	-16.6	2.47 V	134	24.6	12.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5745.00	106.2 PK			1.71 H	218	102.3	3.9
2	*5745.00	96.8 AV			1.71 H	218	92.9	3.9
3	11490.00	56.8 PK	74.0	-17.2	2.78 H	63	42.6	14.2
4	11490.00	44.3 AV	54.0	-9.7	2.78 H	63	30.1	14.2
5	#17235.00	52.6 PK	68.2	-15.6	2.07 H	158	35.3	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	*5745.00	121.8 PK			1.97 V	279	117.9	3.9
2	*5745.00	111.4 AV			1.97 V	279	107.5	3.9
3	11490.00	65.5 PK	74.0	-8.5	2.55 V	93	51.3	14.2
4	11490.00	53.1 AV	54.0	-0.9	2.55 V	93	38.9	14.2
5	#17235.00	54.1 PK	68.2	-14.1	2.54 V	130	36.8	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5785.00	106.5 PK			1.83 H	206	102.5	4.0
2	*5785.00	97.0 AV			1.83 H	206	93.0	4.0
3	11570.00	56.1 PK	74.0	-17.9	2.84 H	71	41.9	14.2
4	11570.00	44.5 AV	54.0	-9.5	2.84 H	71	30.3	14.2
5	#17355.00	52.1 PK	68.2	-16.1	2.04 H	165	34.4	17.7
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	*5785.00	121.9 PK			2.02 V	263	117.9	4.0
2	*5785.00	111.6 AV			2.02 V	263	107.6	4.0
3	11570.00	64.9 PK	74.0	-9.1	2.49 V	90	50.7	14.2
4	11570.00	53.2 AV	54.0	-0.8	2.49 V	90	39.0	14.2
5	#17355.00	53.5 PK	68.2	-14.7	2.51 V	125	35.8	17.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5825.00	106.8 PK			1.76 H	221	102.6	4.2
2	*5825.00	97.1 AV			1.76 H	221	92.9	4.2
3	11650.00	56.4 PK	74.0	-17.6	2.76 H	67	42.5	13.9
4	11650.00	43.8 AV	54.0	-10.2	2.76 H	67	29.9	13.9
5	#17475.00	52.5 PK	68.2	-15.7	2.06 H	161	33.7	18.8
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	*5825.00	121.7 PK			2.04 V	283	117.5	4.2
2	*5825.00	111.4 AV			2.04 V	283	107.2	4.2
3	11650.00	65.3 PK	74.0	-8.7	2.50 V	94	51.4	13.9
4	11650.00	52.9 AV	54.0	-1.1	2.50 V	94	39.0	13.9
5	#17475.00	53.4 PK	68.2	-14.8	2.52 V	128	34.6	18.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	49.6 PK	74.0	-24.4	1.68 H	210	46.1	3.5
2	5150.00	38.3 AV	54.0	-15.7	1.68 H	210	34.8	3.5
3	*5190.00	100.4 PK			1.68 H	210	97.0	3.4
4	*5190.00	91.2 AV			1.68 H	210	87.8	3.4
5	#10380.00	47.6 PK	68.2	-20.6	2.85 H	77	34.3	13.3
6	15570.00	44.3 PK	74.0	-29.7	1.98 H	164	30.9	13.4
7	15570.00	32.6 AV	54.0	-21.4	1.98 H	164	19.2	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.6 PK	74.0	-8.4	2.06 V	243	62.1	3.5
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.06 V**	**243**	**50.4**	**3.5**
3	*5190.00	110.4 PK			2.06 V	243	107.0	3.4
4	*5190.00	101.6 AV			2.06 V	243	98.2	3.4
5	#10380.00	60.7 PK	68.2	-7.5	2.54 V	90	47.4	13.3
6	15570.00	46.5 PK	74.0	-27.5	2.47 V	131	33.1	13.4
7	15570.00	34.3 AV	54.0	-19.7	2.47 V	131	20.9	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	49.3 PK	74.0	-24.7	1.64 H	207	45.8	3.5
2	5150.00	38.3 AV	54.0	-15.7	1.64 H	207	34.8	3.5
3	*5230.00	101.7 PK			1.64 H	207	98.6	3.1
4	*5230.00	92.5 AV			1.64 H	207	89.4	3.1
5	5350.00	47.6 PK	74.0	-26.4	1.64 H	207	44.3	3.3
6	5350.00	36.5 AV	54.0	-17.5	1.64 H	207	33.2	3.3
7	#10460.00	48.5 PK	68.2	-19.7	2.72 H	76	35.0	13.5
8	15690.00	45.8 PK	74.0	-28.2	2.10 H	169	32.9	12.9
9	15690.00	33.5 AV	54.0	-20.5	2.10 H	169	20.6	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	2.04 V	261	61.1	3.5
2	5150.00	53.8 AV	54.0	-0.2	2.04 V	261	50.3	3.5
3	*5230.00	114.7 PK			2.04 V	261	111.6	3.1
4	*5230.00	105.4 AV			2.04 V	261	102.3	3.1
5	5350.00	60.2 PK	74.0	-13.8	2.04 V	261	56.9	3.3
6	5350.00	50.1 AV	54.0	-3.9	2.04 V	261	46.8	3.3
7	#10460.00	62.2 PK	68.2	-6.0	2.53 V	84	48.7	13.5
8	15690.00	47.3 PK	74.0	-26.7	2.51 V	129	34.4	12.9
9	15690.00	35.2 AV	54.0	-18.8	2.51 V	129	22.3	12.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5755.00	103.4 PK			1.70 H	221	99.5	3.9
2	*5755.00	94.1 AV			1.70 H	221	90.2	3.9
3	11510.00	53.4 PK	74.0	-20.6	2.66 H	77	39.2	14.2
4	11510.00	41.4 AV	54.0	-12.6	2.66 H	77	27.2	14.2
5	#17265.00	50.9 PK	68.2	-17.3	2.03 H	80	33.7	17.2
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	*5755.00	118.6 PK			1.96 V	292	114.7	3.9
2	*5755.00	108.6 AV			1.96 V	292	104.7	3.9
3	11510.00	63.7 PK	74.0	-10.3	2.60 V	80	49.5	14.2
4	11510.00	50.7 AV	54.0	-3.3	2.60 V	80	36.5	14.2
5	#17265.00	52.4 PK	68.2	-15.8	2.45 V	128	35.2	17.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5795.00	103.7 PK			1.76 H	206	99.7	4.0
2	*5795.00	94.2 AV			1.76 H	206	90.2	4.0
3	11590.00	53.2 PK	74.0	-20.8	2.70 H	66	39.0	14.2
4	11590.00	41.9 AV	54.0	-12.1	2.70 H	66	27.7	14.2
5	#17385.00	50.7 PK	68.2	-17.5	2.01 H	70	32.9	17.8
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	*5795.00	118.9 PK			2.00 V	286	114.9	4.0
2	*5795.00	108.8 AV			2.00 V	286	104.8	4.0
3	11590.00	64.1 PK	74.0	-9.9	2.66 V	69	49.9	14.2
4	11590.00	51.2 AV	54.0	-2.8	2.66 V	69	37.0	14.2
5	#17385.00	52.3 PK	68.2	-15.9	2.48 V	125	34.5	17.8

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	46.4 PK	74.0	-27.6	1.67 H	210	42.9	3.5
2	5150.00	38.2 AV	54.0	-15.8	1.67 H	210	34.7	3.5
3	*5210.00	99.7 PK			1.67 H	210	96.4	3.3
4	*5210.00	88.3 AV			1.67 H	210	85.0	3.3
5	5350.00	47.6 PK	74.0	-26.4	1.67 H	210	44.3	3.3
6	5350.00	36.7 AV	54.0	-17.3	1.67 H	210	33.4	3.3
7	#10420.00	46.7 PK	68.2	-21.5	2.69 H	70	33.2	13.5
8	15630.00	44.7 PK	74.0	-29.3	2.12 H	72	31.5	13.2
9	15630.00	31.6 AV	54.0	-22.4	2.12 H	72	18.4	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.8 PK	74.0	-7.2	1.99 V	271	63.3	3.5
2	5150.00	53.8 AV	54.0	-0.2	1.99 V	271	50.3	3.5
3	*5210.00	105.1 PK			1.99 V	271	101.8	3.3
4	*5210.00	96.3 AV			1.99 V	271	93.0	3.3
5	5350.00	60.5 PK	74.0	-13.5	1.99 V	271	57.2	3.3
6	5350.00	43.0 AV	54.0	-11.0	1.99 V	271	39.7	3.3
7	#10420.00	60.1 PK	68.2	-8.1	2.64 V	74	46.6	13.5
8	15630.00	47.2 PK	74.0	-26.8	2.52 V	136	34.0	13.2
9	15630.00	33.7 AV	54.0	-20.3	2.52 V	136	20.5	13.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5775.00	100.6 PK			1.65 H	228	96.7	3.9
2	*5775.00	90.4 AV			1.65 H	228	86.5	3.9
3	11550.00	52.4 PK	74.0	-21.6	2.65 H	74	38.2	14.2
4	11550.00	41.2 AV	54.0	-12.8	2.65 H	74	27.0	14.2
5	#17325.00	45.5 PK	68.2	-22.7	2.02 H	78	28.1	17.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5775.00	113.9 PK			1.98 V	261	110.0	3.9
2	*5775.00	104.6 AV			1.98 V	261	100.7	3.9
3	11550.00	64.0 PK	74.0	-10.0	2.60 V	72	49.8	14.2
4	11550.00	50.3 AV	54.0	-3.7	2.60 V	72	36.1	14.2
5	#17325.00	52.5 PK	68.2	-15.7	2.50 V	134	35.1	17.4

REMARKS:

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

Below 1GHz Data:

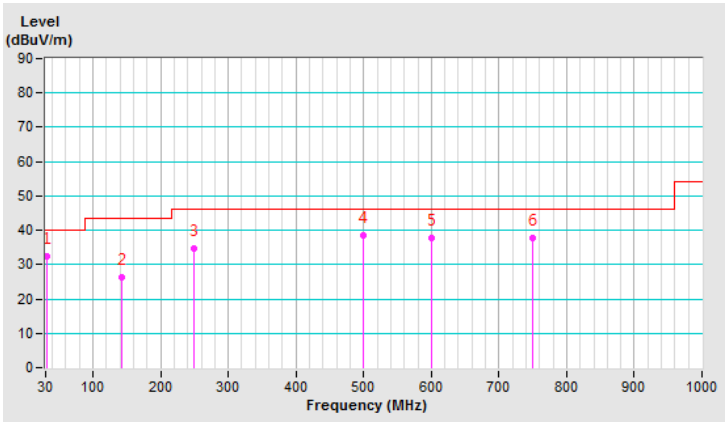
802.11ac (HT20)

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	32.72	32.3 QP	40.0	-7.7	1.00 H	266	41.4	-9.1
2	141.74	26.4 QP	43.5	-17.1	2.00 H	231	34.4	-8.0
3	249.83	34.6 QP	46.0	-11.4	1.00 H	113	43.4	-8.8
4	500.03	38.4 QP	46.0	-7.6	2.00 H	157	40.2	-1.8
5	599.93	37.9 QP	46.0	-8.1	1.50 H	124	37.1	0.8
6	749.90	37.6 QP	46.0	-8.4	2.00 H	333	34.0	3.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

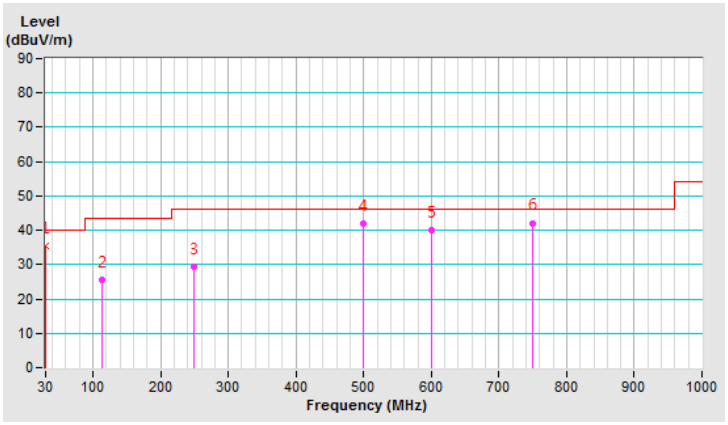


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.69	35.6 QP	40.0	-4.4	1.00 V	182	44.9	-9.3
2	113.23	25.5 QP	43.5	-18.0	2.00 V	265	35.9	-10.4
3	249.70	29.5 QP	46.0	-16.5	1.50 V	111	38.3	-8.8
4	500.00	42.0 QP	46.0	-4.0	1.00 V	259	43.8	-1.8
5	600.03	39.9 QP	46.0	-6.1	1.00 V	220	39.1	0.8
6	749.93	42.1 QP	46.0	-3.9	1.50 V	114	38.5	3.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
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 Conduction 1.
3 Tested Date: Nov. 23, 2019

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.

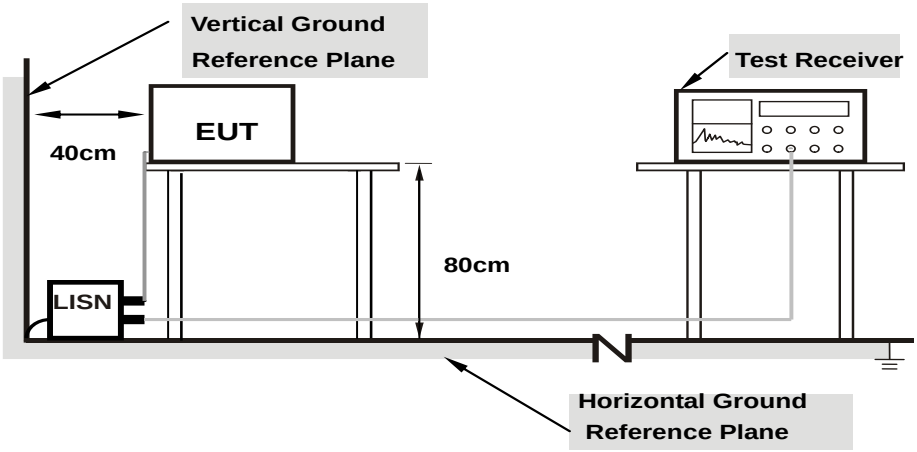
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

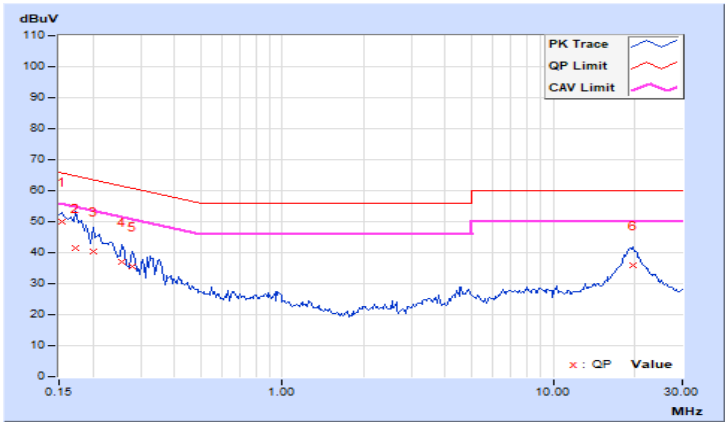
4.2.7 Test Results

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	9.99	39.88	19.24	49.87	29.23	65.79	55.79	-15.92	-26.56
2	0.17344	9.99	31.67	18.73	41.66	28.72	64.79	54.79	-23.13	-26.07
3	0.20078	9.99	30.39	12.26	40.38	22.25	63.58	53.58	-23.20	-31.33
4	0.25547	9.99	26.97	19.59	36.96	29.58	61.58	51.58	-24.62	-22.00
5	0.27891	9.99	25.50	17.72	35.49	27.71	60.85	50.85	-25.36	-23.14
6	19.81250	11.36	24.72	18.70	36.08	30.06	60.00	50.00	-23.92	-19.94

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.

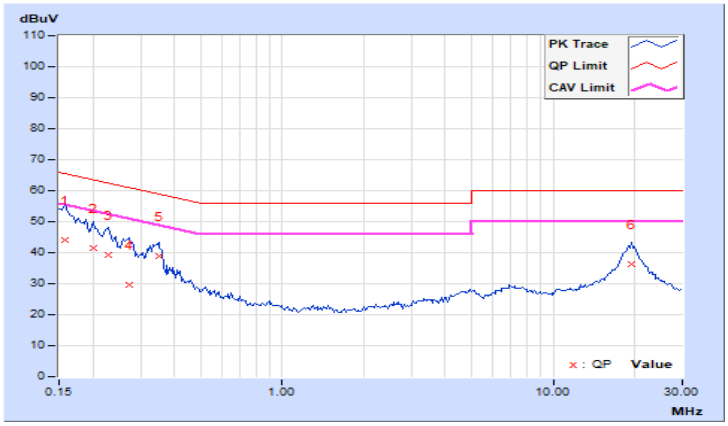


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15781	9.99	34.14	21.51	44.13	31.50	65.58	55.58	-21.45	-24.08
2	0.20078	9.99	31.59	17.59	41.58	27.58	63.58	53.58	-22.00	-26.00
3	0.22812	9.99	29.13	17.75	39.12	27.74	62.52	52.52	-23.40	-24.78
4	0.27109	10.00	19.60	7.67	29.60	17.67	61.08	51.08	-31.48	-33.41
5	**0.34922**	**10.00**	**28.89**	**24.96**	**38.89**	**34.96**	**58.98**	**48.98**	**-20.09**	**-14.02**
6	19.39063	11.08	25.05	18.59	36.13	29.67	60.00	50.00	-23.87	-20.33

REMARKS:

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



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

Refer to section 4.1.2 to get information of above instrument.

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	Chain 2	Chain 3				
36	5180	18.35	19.31	19.47	18.53	313.498	24.96	30.00	Pass
40	5200	19.18	20.11	19.96	19.27	368.97	25.67	30.00	Pass
48	5240	19.42	19.52	20.06	19.45	366.53	25.64	30.00	Pass
149	5745	23.33	22.63	22.42	22.45	748.883	28.74	30.00	Pass
157	5785	22.96	23.03	22.64	22.48	759.271	28.80	30.00	Pass
165	5825	23.13	22.63	22.11	22.97	749.528	28.75	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	Chain 2	Chain 3				
36	5180	20.02	21.37	21.22	20.08	471.843	26.74	30.00	Pass
40	5200	20.93	22.02	21.46	20.83	544.12	27.36	30.00	Pass
48	5240	21.27	21.42	21.49	20.96	538.311	27.31	30.00	Pass
149	5745	23.07	22.72	22.53	22.51	747.135	28.73	30.00	Pass
157	5785	22.63	23.06	22.88	22.69	765.402	28.84	30.00	Pass
165	5825	22.73	22.87	22.93	22.88	771.566	28.87	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	Chain 2	Chain 3				
38	5190	17.33	18.21	18.11	17.02	235.361	23.72	30.00	Pass
46	5230	21.52	21.63	21.66	21.03	560.772	27.49	30.00	Pass
151	5755	23.07	22.78	22.65	22.55	756.403	28.79	30.00	Pass
159	5795	22.67	23.06	22.86	22.76	769.225	28.86	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	Chain 2	Chain 3				
42	5210	16.63	16.81	17.58	16.02	191.273	22.82	30.00	Pass
155	5775	22.87	22.99	22.81	22.58	764.828	28.84	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	Chain 2	Chain 3				
36	5180	20.02	21.37	21.22	20.08	471.843	26.74	29.62	Pass
40	5200	20.93	22.02	21.46	20.83	544.12	27.36	29.62	Pass
48	5240	21.27	21.42	21.49	20.96	538.311	27.31	29.62	Pass
149	5745	23.07	22.72	22.53	22.51	747.135	28.73	28.97	Pass
157	5785	22.63	23.06	22.88	22.69	765.402	28.84	28.97	Pass
165	5825	22.73	22.87	22.93	22.88	771.566	28.87	28.97	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 30-(6.38-6) = 29.62 dBm.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 7.03dBi > 6dBi , so the power limit shall be reduced to 30-(7.03-6) = 28.97 dBm.

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	Chain 2	Chain 3				
38	5190	17.33	18.21	18.11	17.02	235.361	23.72	29.62	Pass
46	5230	21.52	21.63	21.66	21.03	560.772	27.49	29.62	Pass
151	5755	23.07	22.78	22.65	22.55	756.403	28.79	28.97	Pass
159	5795	22.67	23.06	22.86	22.76	769.225	28.86	28.97	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 30-(6.38-6) = 29.62 dBm.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 7.03dBi > 6dBi , so the power limit shall be reduced to 30-(7.03-6) = 28.97 dBm.

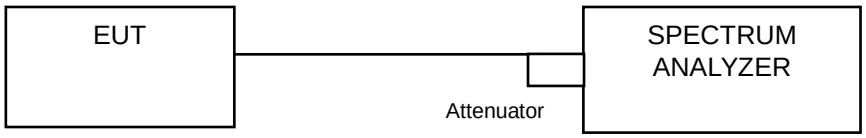
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.63	16.81	17.58	16.02	191.273	22.82	29.62	Pass
155	5775	22.87	22.99	22.81	22.58	764.828	28.84	28.97	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 30-(6.38-6) = 29.62 dBm.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 7.03dBi > 6dBi , so the power limit shall be reduced to 30-(7.03-6) = 28.97 dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to 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	Chain 2	Chain 3
36	5180	16.68	16.68	16.56	16.44
40	5200	16.68	16.56	16.56	16.44
48	5240	16.56	16.56	16.44	16.44
149	5745	16.56	16.80	16.68	16.68
157	5785	16.56	16.68	16.56	16.68
165	5825	16.68	16.68	16.68	16.68

802.11ac (VHT20)

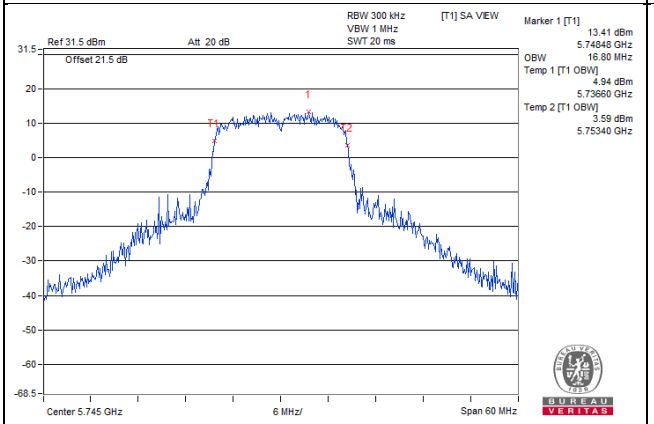
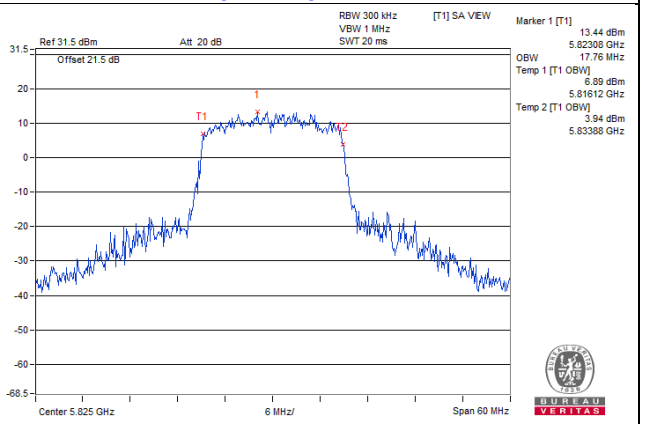
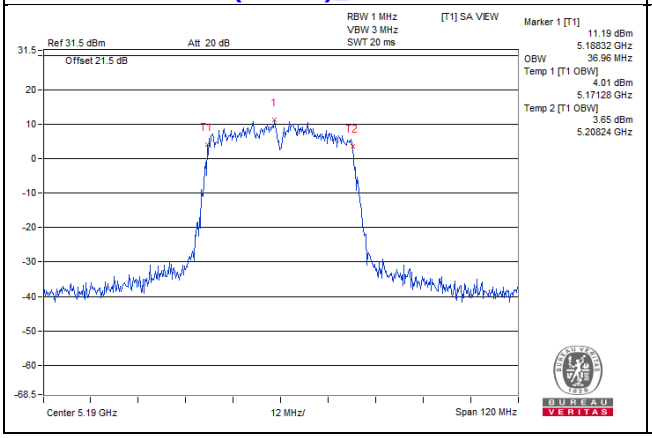
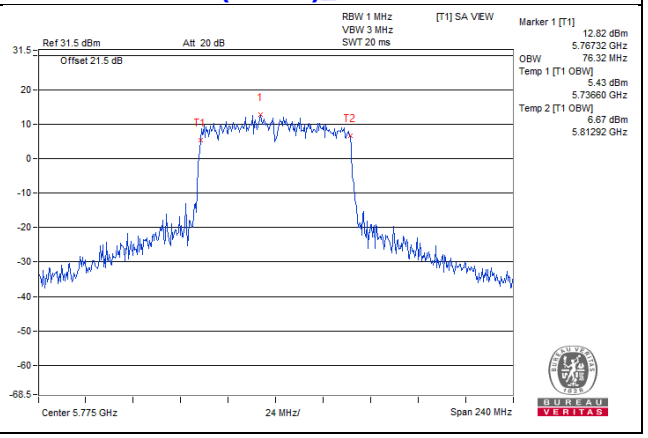
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.64	17.64	17.52	17.52
40	5200	17.64	17.64	17.64	17.52
48	5240	17.64	17.64	17.64	17.52
149	5745	17.76	17.64	17.76	17.64
157	5785	17.64	17.64	17.76	17.64
165	5825	17.76	17.64	17.76	17.76

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.00	36.24	36.48	36.96
46	5230	36.24	36.48	36.48	36.24
151	5755	36.72	36.72	36.48	36.24
159	5795	36.24	36.48	36.48	36.24

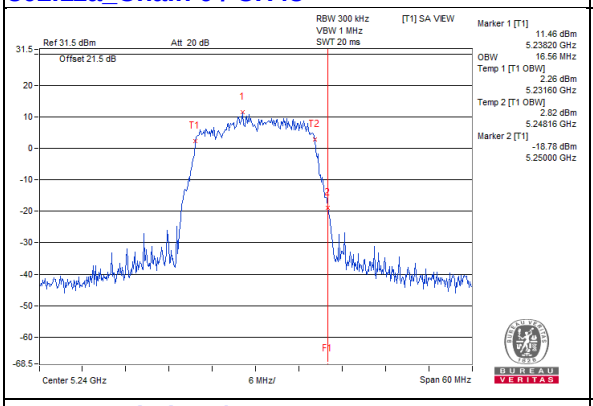
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.36	75.84	75.84	75.84
155	5775	76.32	75.36	75.84	75.36

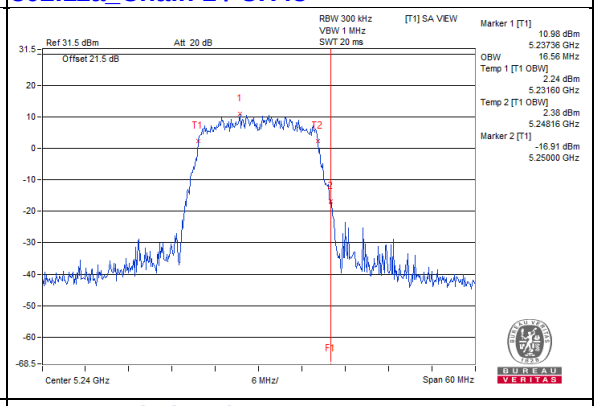
Spectrum Plot of Max. Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 0 / CH165**
	
802.11ac (VHT40)_Chain 3 / CH38	**802.11ac (VHT80)_Chain 0 / CH155**
	

Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

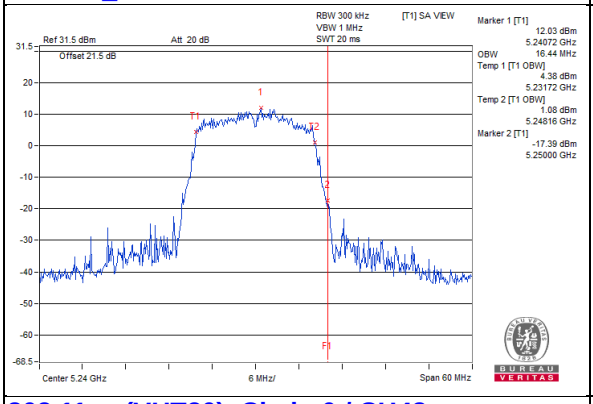
802.11a_Chain 0 / CH48



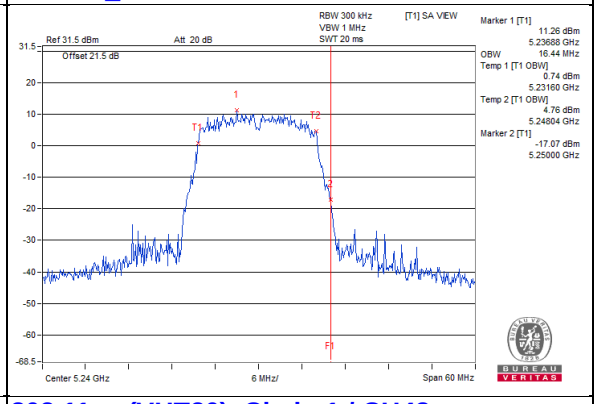
802.11a_Chain 1 / CH48



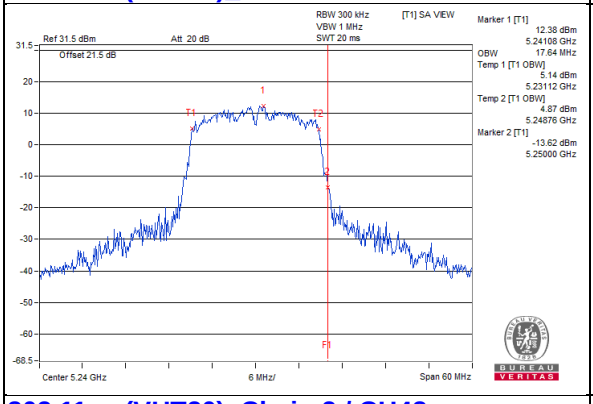
802.11a_Chain 2 / CH48



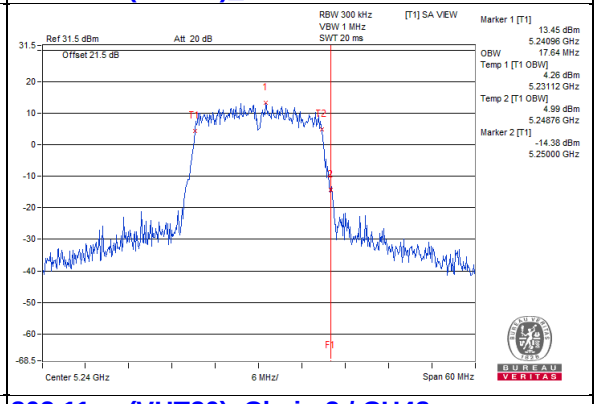
802.11a_Chain 3 / CH48



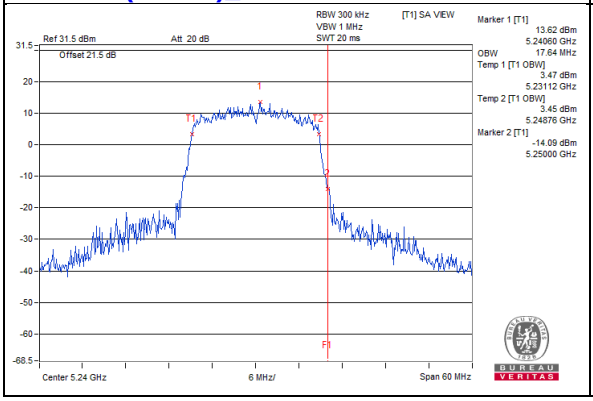
802.11ac (VHT20)_Chain 0 / CH48



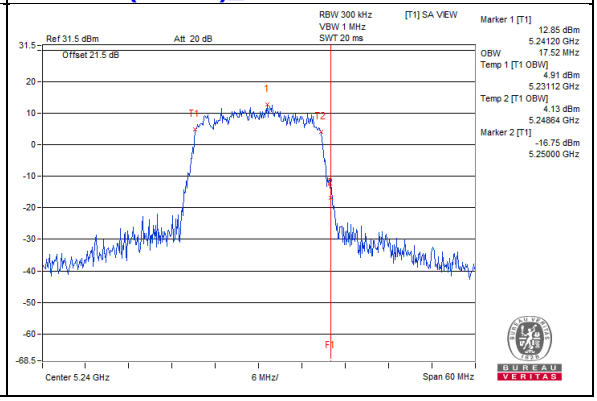
802.11ac (VHT20)_Chain 1 / CH48



802.11ac (VHT20)_Chain 2 / CH48

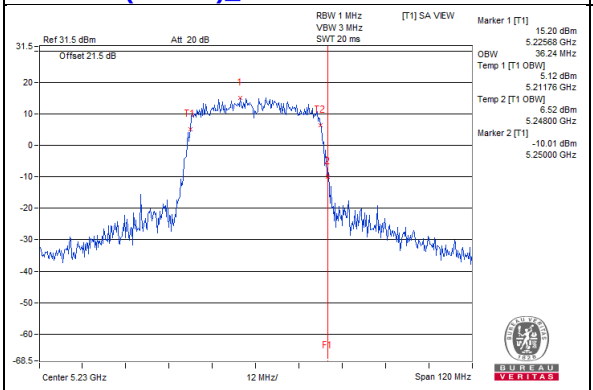


802.11ac (VHT20)_Chain 3 / CH48

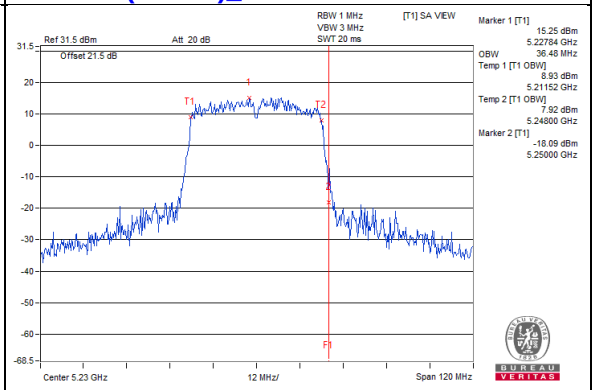


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

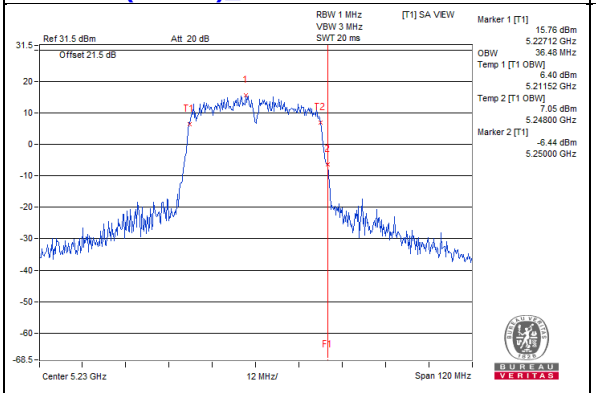
802.11ac (VHT40)_Chain 0 / CH46



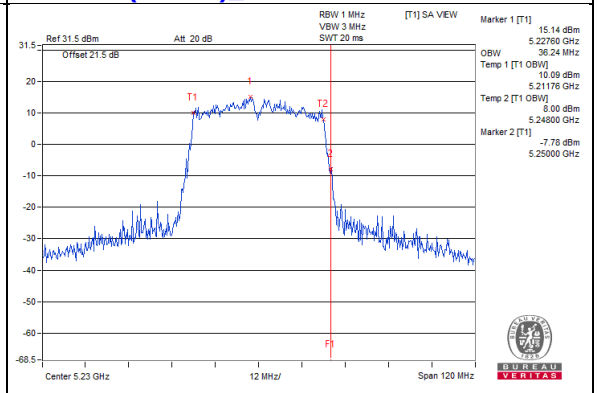
802.11ac (VHT40)_Chain 1 / CH46



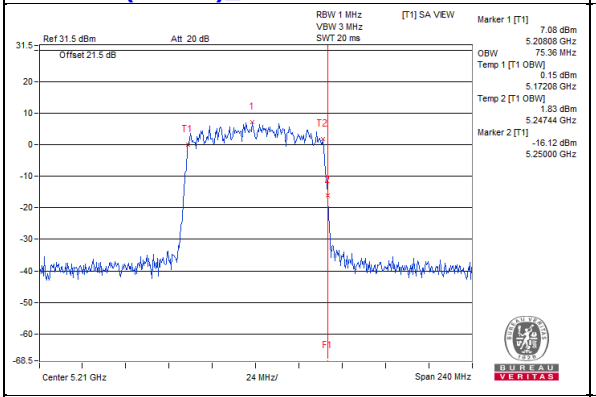
802.11ac (VHT40)_Chain 2 / CH46



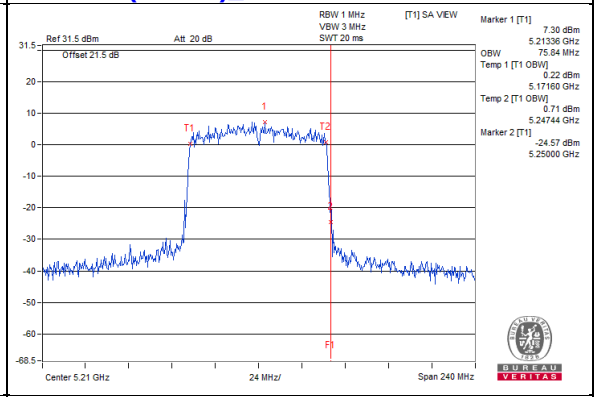
802.11ac (VHT40)_Chain 3 / CH46



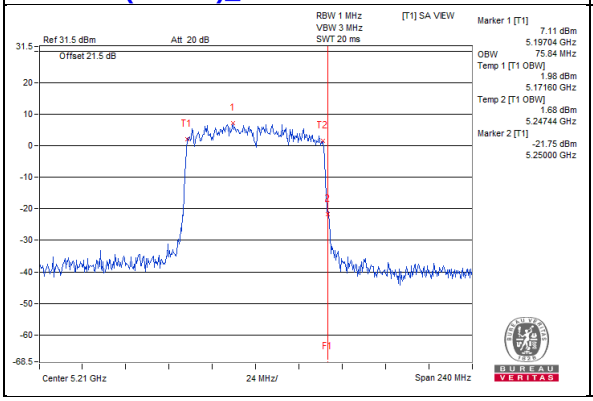
802.11ac (VHT80)_Chain 0 / CH42



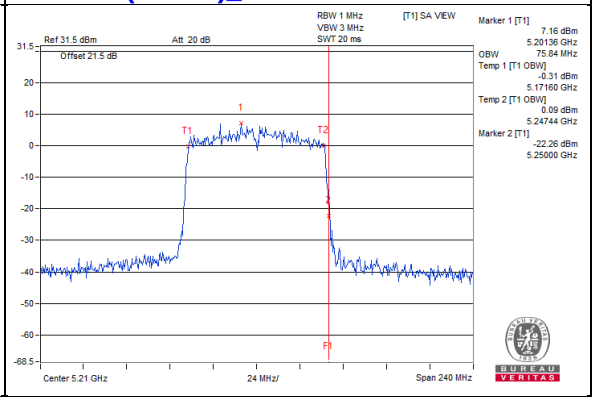
802.11ac (VHT80)_Chain 1 / CH42



802.11ac (VHT80)_Chain 2 / CH42

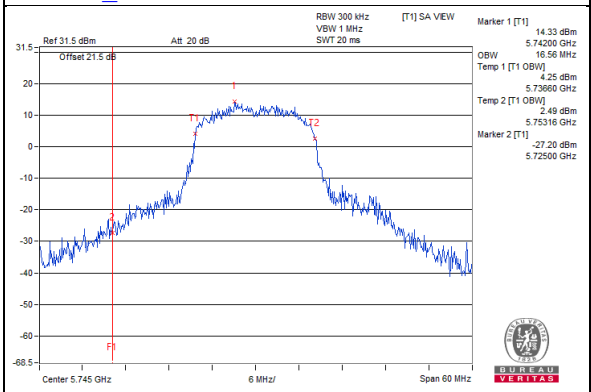


802.11ac (VHT80)_Chain 3 / CH42

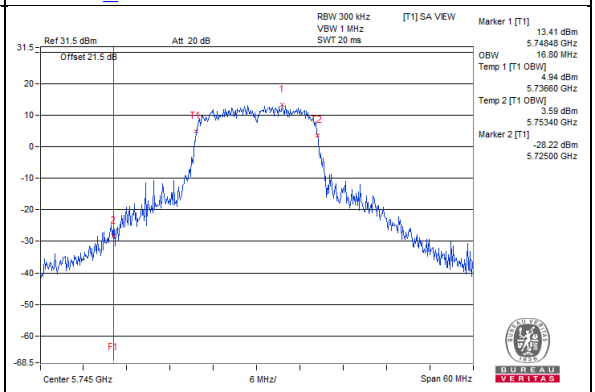


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

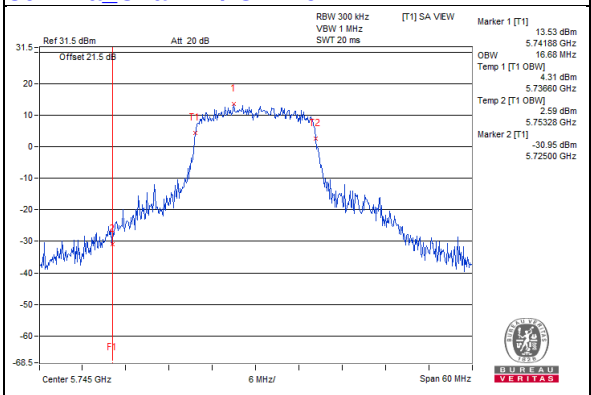
802.11a_Chain 0 / CH149



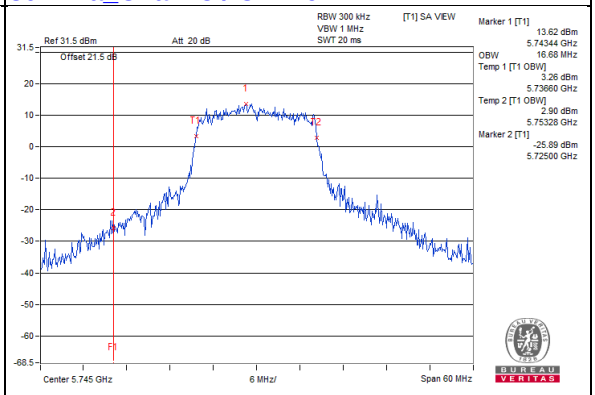
802.11a_Chain 1 / CH149



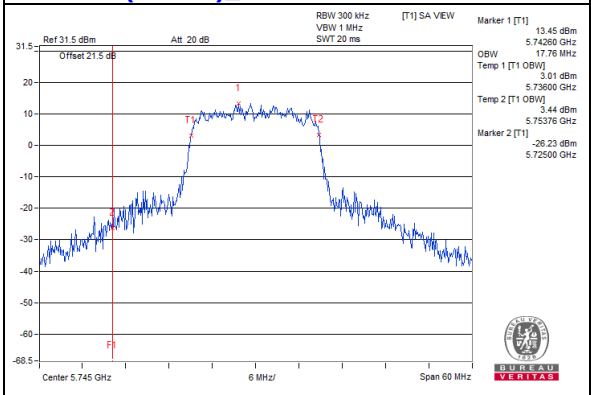
802.11a_Chain 2 / CH149



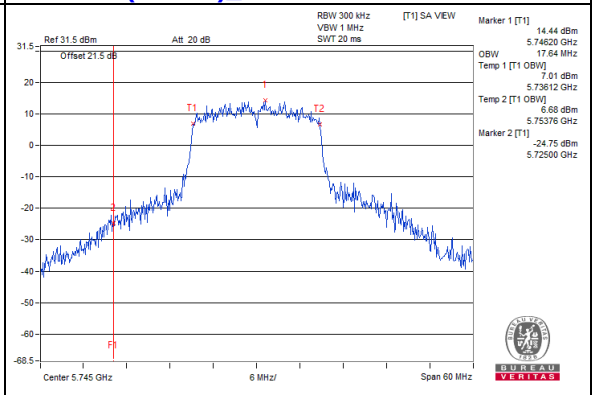
802.11a_Chain 3 / CH149



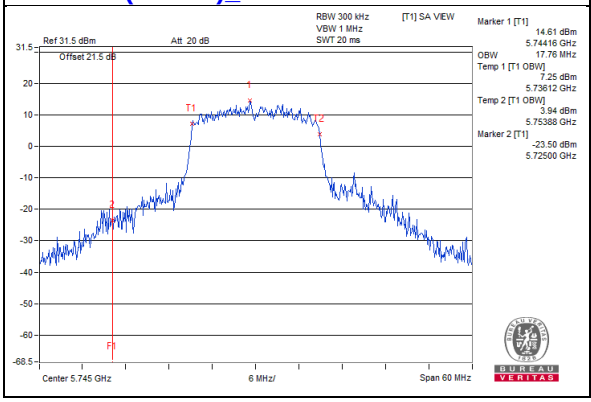
802.11ac (VHT20)_Chain 0 / CH149



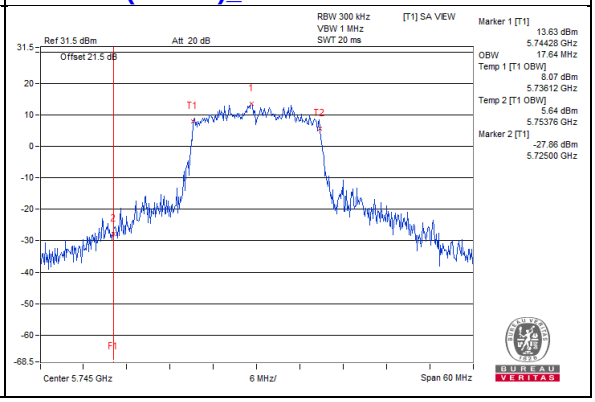
802.11ac (VHT20)_Chain 1 / CH149



802.11ac (VHT20)_Chain 2 / CH149

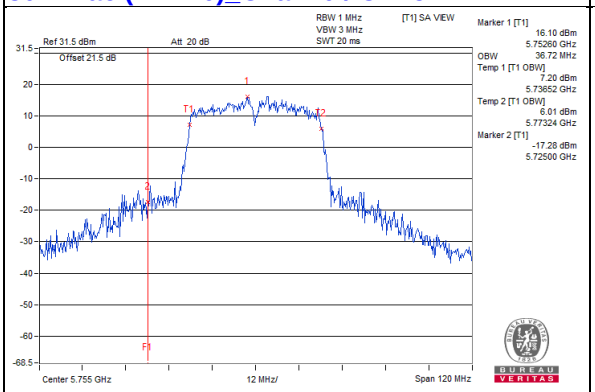


802.11ac (VHT20)_Chain 3 / CH149

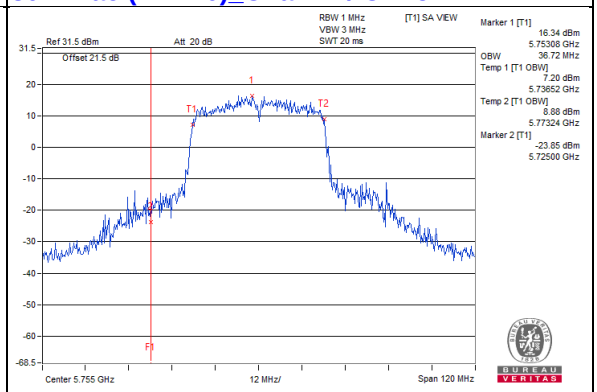


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

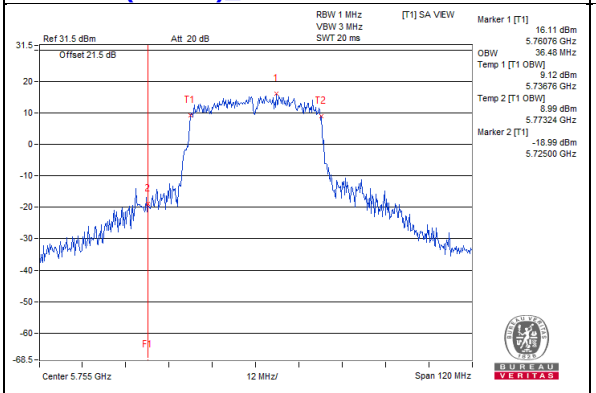
802.11ac (VHT40)_Chain 0 / CH151



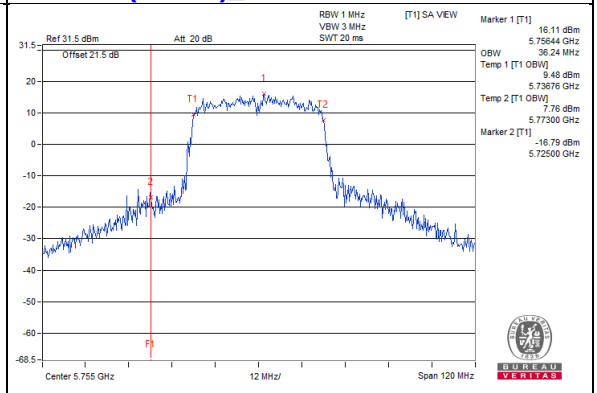
802.11ac (VHT40)_Chain 1 / CH151



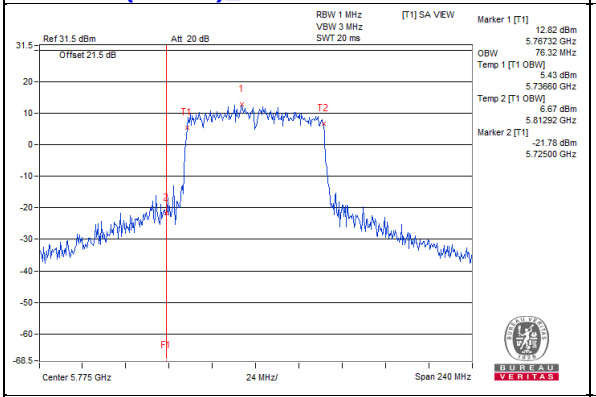
802.11ac (VHT40)_Chain 2 / CH151



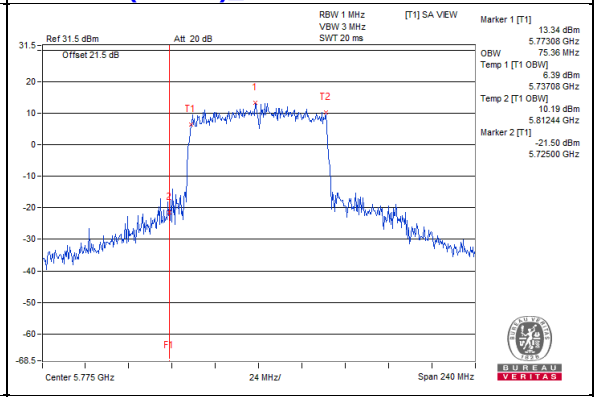
802.11ac (VHT40)_Chain 3 / CH151



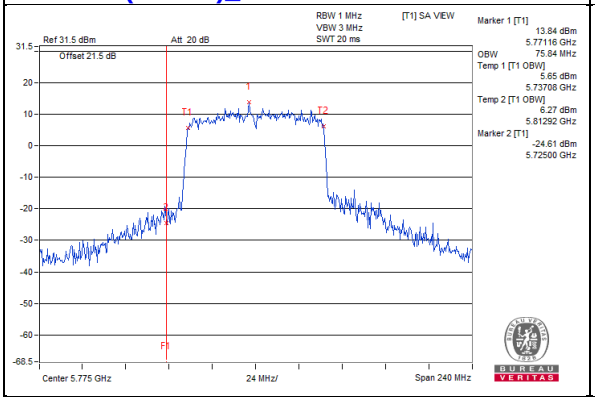
802.11ac (VHT80)_Chain 0 / CH155



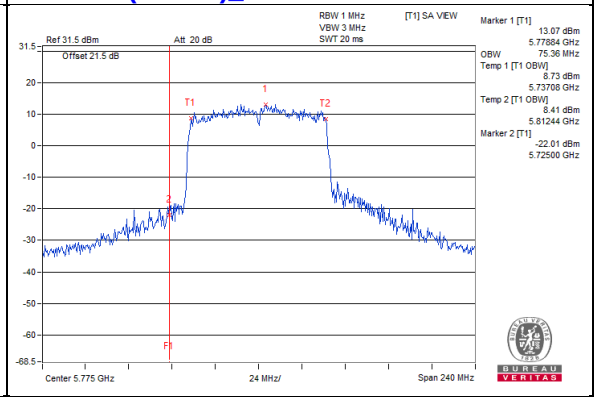
802.11ac (VHT80)_Chain 1 / CH155



802.11ac (VHT80)_Chain 2 / CH155



802.11ac (VHT80)_Chain 3 / CH155

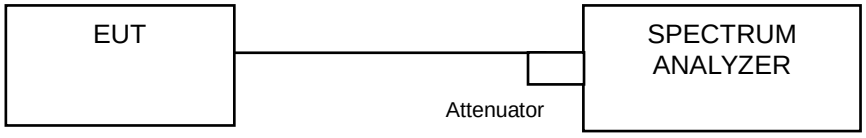


4.5 Peak Power Spectral Density Measurement

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

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.67	5.57	6.03	4.85	0.52	12.09	16.62	Pass
40	5200	6.76	7.32	6.51	5.86	0.52	13.18	16.62	Pass
48	5240	7.05	6.40	7.10	5.85	0.52	13.17	16.62	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[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 17-(6.38-6) = 16.62dBm.

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

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	7.63	8.27	7.41	6.57	0.55	14.08	16.62	Pass
40	5200	8.12	8.95	8.12	7.35	0.55	14.74	16.62	Pass
48	5240	8.65	7.95	8.52	7.61	0.55	14.77	16.62	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[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 17-(6.38-6) = 16.62dBm.

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

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	1.13	2.46	2.28	2.03	0.59	8.61	16.62	Pass
46	5230	4.68	5.81	6.09	5.97	0.59	12.28	16.62	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[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 17-(6.38-6) = 16.62dBm.

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

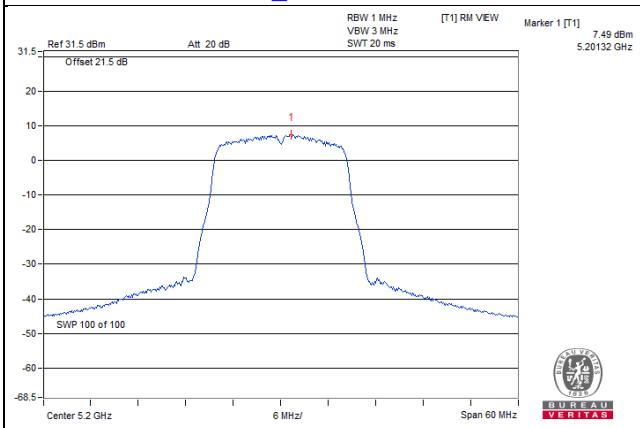
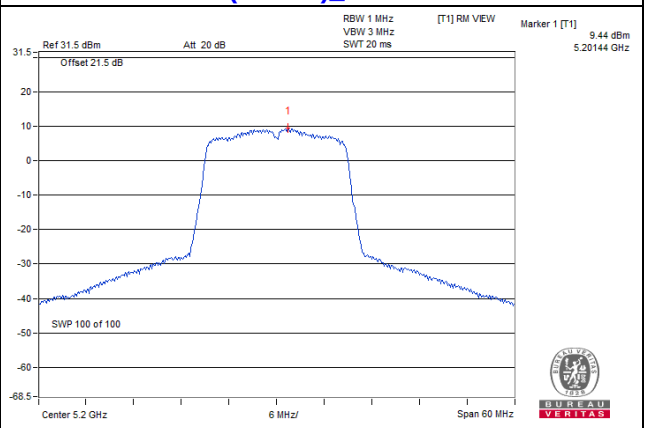
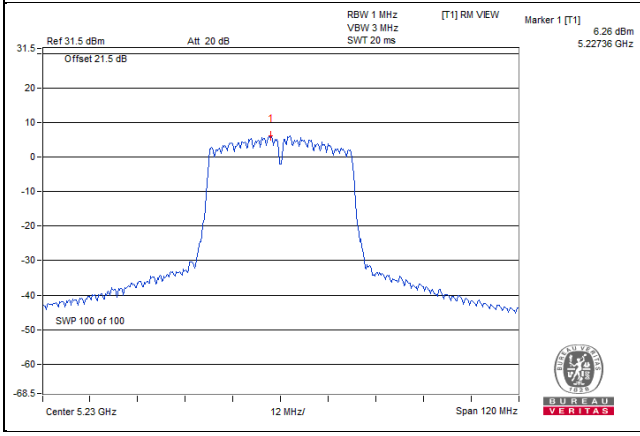
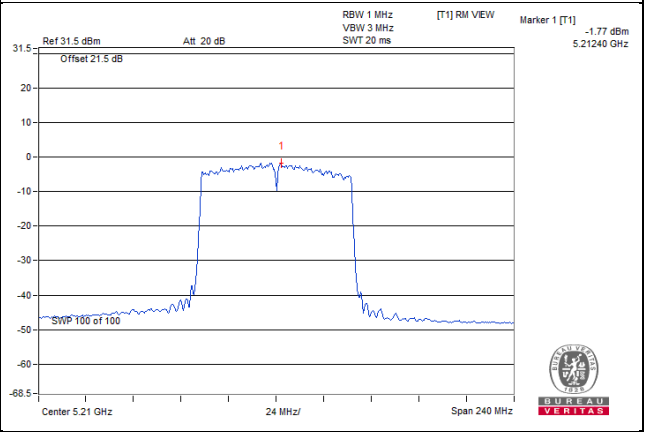
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-3.60	-2.58	-1.81	-2.47	0.34	3.79	16.62	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[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 6.38dBi > 6dBi , so the power limit shall be reduced to 17-(6.38-6) = 16.62dBm.

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

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH40	**802.11ac (VHT20)_Chain 1 / CH40**
	
802.11ac (VHT40)_Chain 2 / CH46	**802.11ac (VHT80)_Chain 2 / CH42**
	

For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Total PSD With Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/300 kHz	dBm/300kHz				
149	5745	2.09	1.63	1.28	2.04	6.7757	8.31	0.52	10.53	28.97	Pass
157	5785	1.81	2.56	1.55	1.82	7.0613	8.49	0.52	10.71	28.97	Pass
165	5825	2.44	1.90	1.07	2.22	7.0386	8.47	0.52	10.69	28.97	Pass

Note:
1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 7.03dBi > 6dBi, so the power density limit shall be reduced to 30-(7.03-6)=28.97 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Duty Factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz				
149	5745	1.49	0.00	2.09	1.89	6.3218	8.01	0.55	10.23	28.97	Pass
157	5785	1.41	2.46	2.86	2.66	7.8532	8.95	0.55	11.17	28.97	Pass
165	5825	1.75	2.20	2.93	2.57	7.8576	8.95	0.55	11.17	28.97	Pass

Note:
1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 7.03dBi > 6dBi, so the power density limit shall be reduced to 30-(7.03-6)=28.97 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

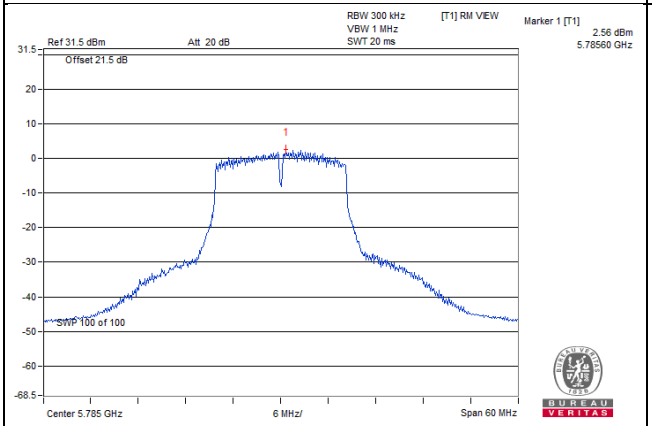
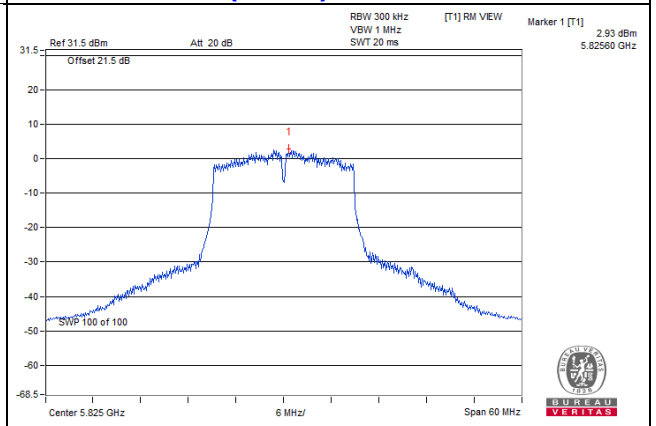
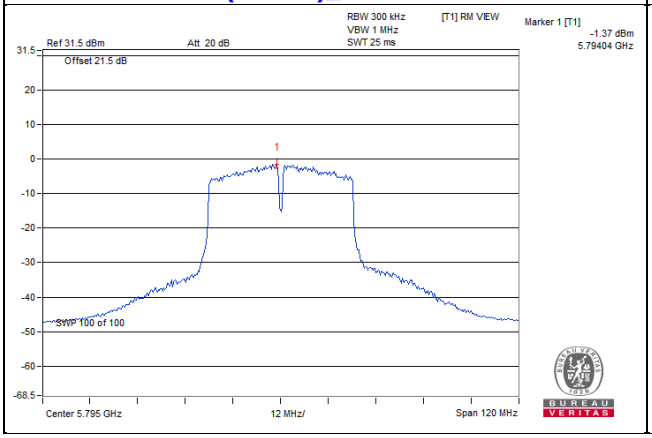
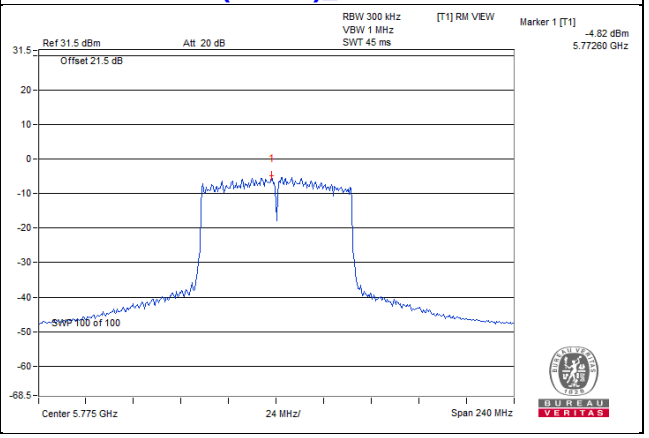
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Total PSD With Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/300 kHz	dBm/300kHz				
151	5755	-2.39	-2.36	-2.32	-1.97	2.7271	4.36	0.59	6.58	28.97	Pass
159	5795	-2.48	-1.37	-1.77	-1.64	3.0323	4.82	0.59	7.04	28.97	Pass

Note:
1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ /4] = 7.03dBi > 6dBi, so the power density limit shall be reduced to 30-(7.03-6)=28.97 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Total PSD With Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/300 kHz	dBm/300kHz				
155	5775	-4.82	-5.36	-5.69	-5.67	1.2561	0.99	0.34	3.21	28.97	Pass

Note:
1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 /4] = 7.03dBi > 6dBi, so the power density limit shall be reduced to 30-(7.03-6)=28.97 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

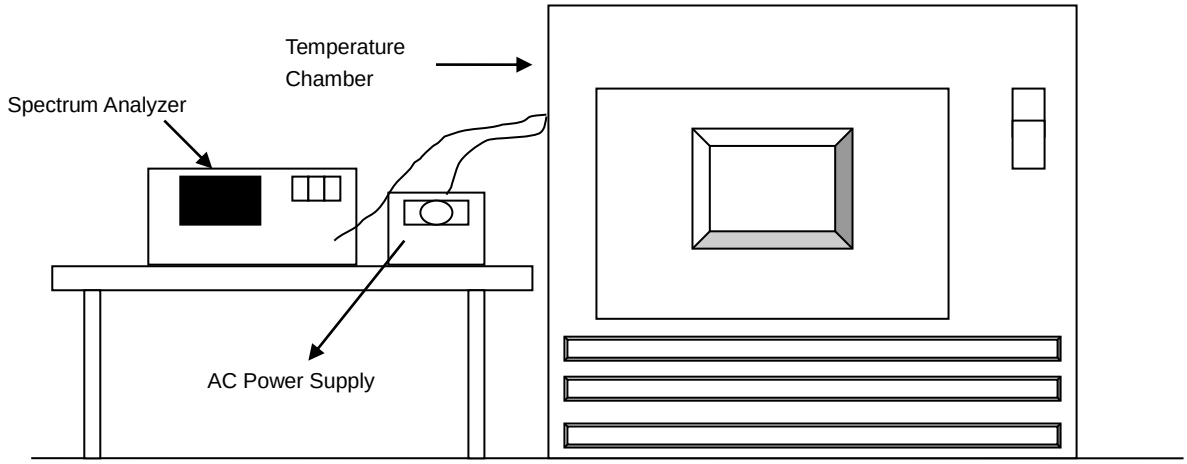
Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH157	**802.11ac (VHT20)_Chain 2 / CH165**
	
802.11ac (VHT40)_Chain 1 / CH159	**802.11ac (VHT80)_Chain 0 / CH155**
	

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

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
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
40	120	5179.9745	PASS	5179.9745	PASS	5179.9743	PASS	5179.9789	PASS
30	120	5180.0209	PASS	5180.0238	PASS	5180.02	PASS	5180.0218	PASS
20	120	5179.9786	PASS	5179.975	PASS	5179.9774	PASS	5179.9753	PASS
10	120	5180.0158	PASS	5180.0131	PASS	5180.0112	PASS	5180.0128	PASS
0	120	5180.0022	PASS	5179.9986	PASS	5180.0017	PASS	5179.9982	PASS

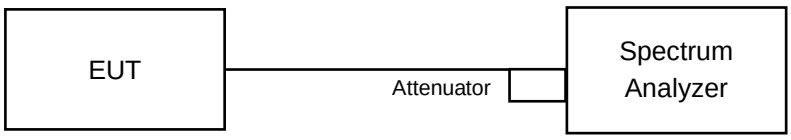
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9792	PASS	5179.9752	PASS	5179.9783	PASS	5179.9748	PASS
	120	5179.9786	PASS	5179.975	PASS	5179.9774	PASS	5179.9753	PASS
	102	5179.9784	PASS	5179.9748	PASS	5179.9777	PASS	5179.9759	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	Chain 2	Chain 3		
149	5745	13.85	15.12	15.17	15.33	0.5	Pass
157	5785	13.87	15.12	15.11	15.17	0.5	Pass
165	5825	15.13	15.12	15.16	15.12	0.5	Pass

802.11ac (VHT20)

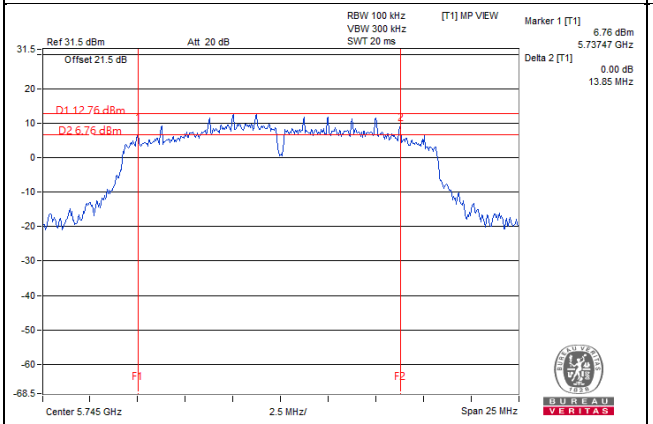
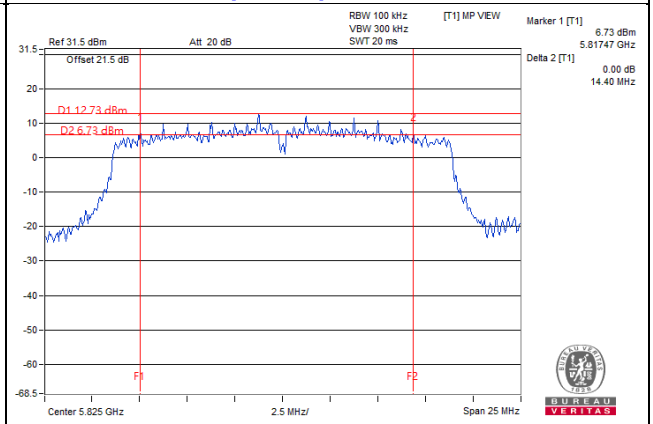
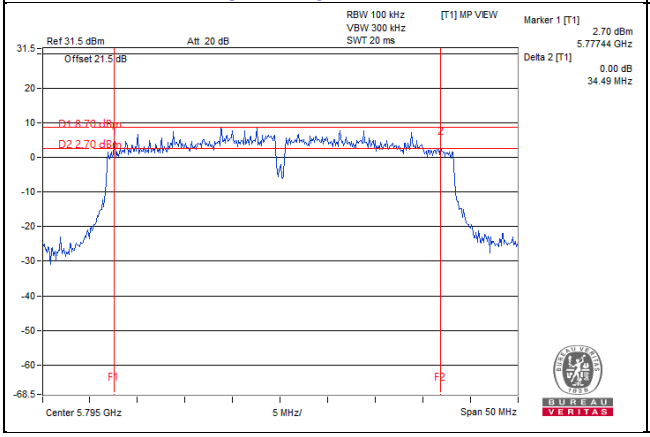
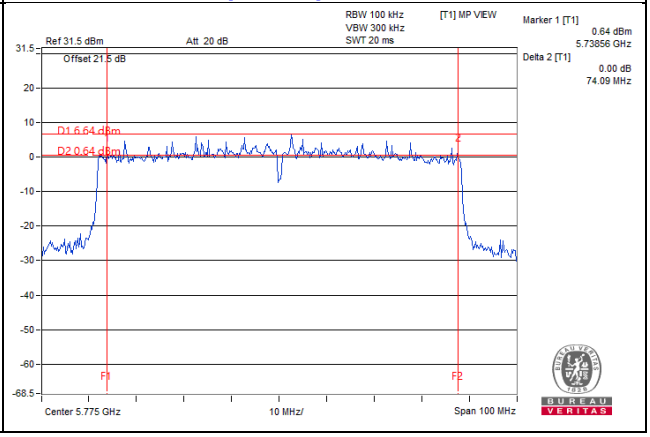
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.15	16.36	15.14	16.96	0.5	Pass
157	5785	15.52	16.31	15.12	17.19	0.5	Pass
165	5825	15.17	16.36	15.10	14.40	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.16	34.58	35.13	35.10	0.5	Pass
159	5795	35.25	35.15	34.54	34.49	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	74.09	75.37	74.70	74.86	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH149	**802.11ac (VHT20)_Chain 3 / CH165**
	
802.11ac (VHT40)_Chain 3 / CH159	**802.11ac (VHT80)_Chain 0 / CH155**
	

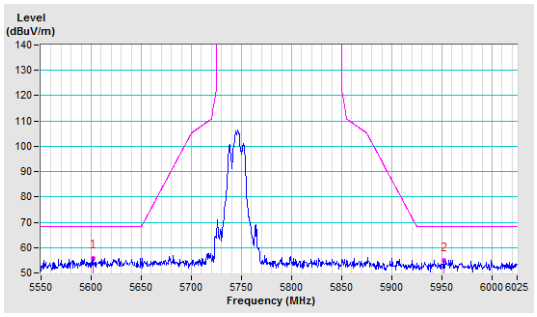
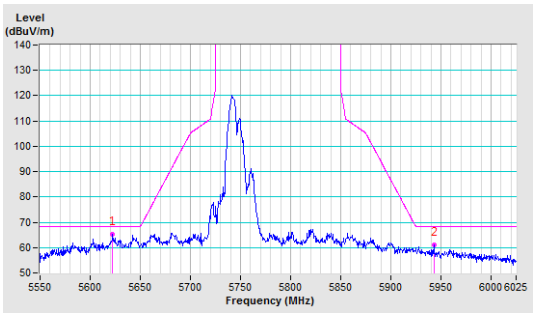
5 Pictures of Test Arrangements

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

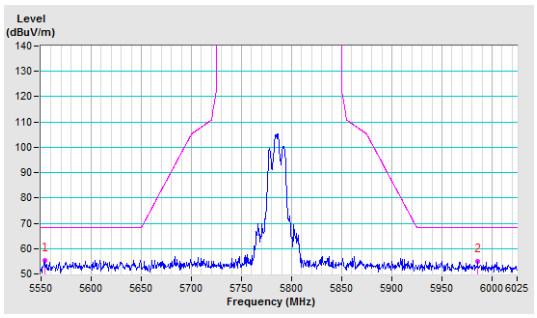
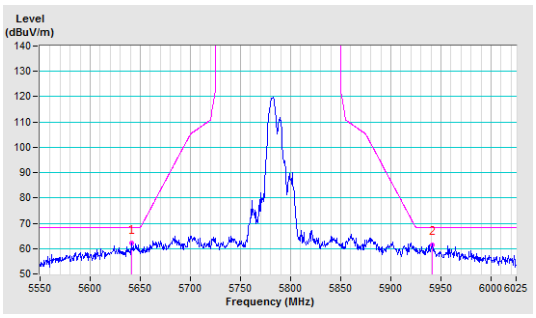
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

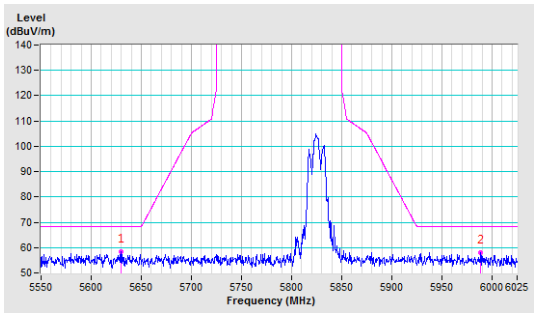
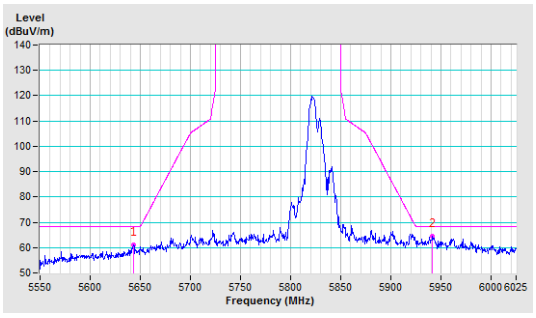
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

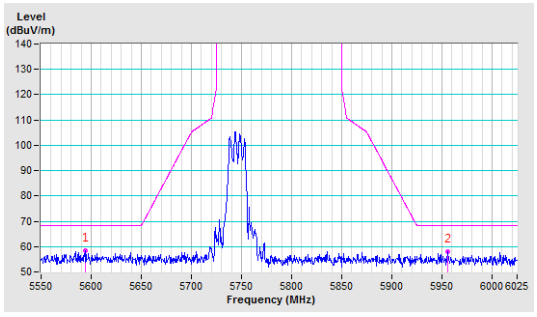
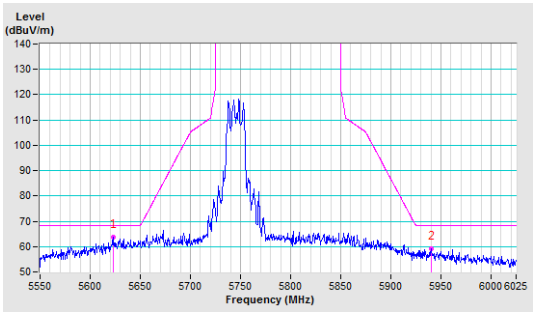
Horizontal	Vertical
	

CH 165 5825 MHz

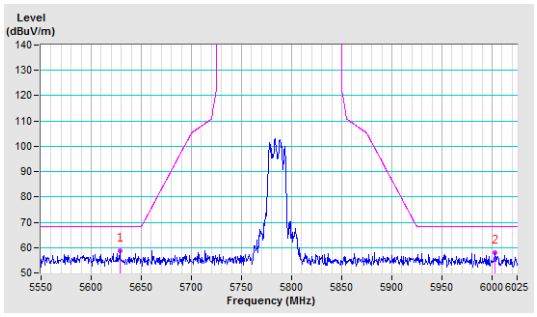
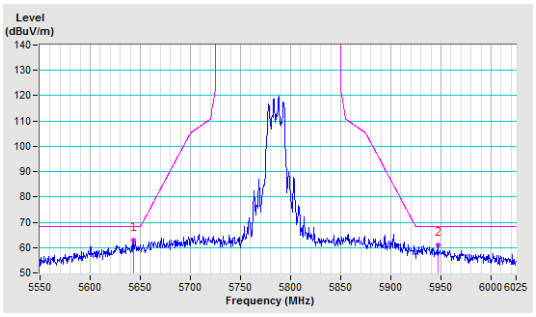
Horizontal	Vertical
	

802.11ac (VHT20)

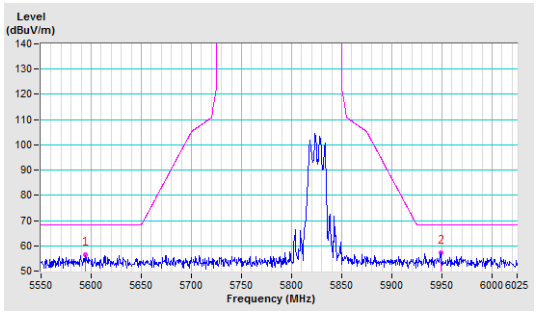
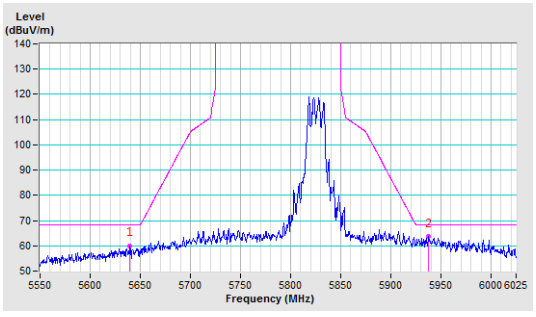
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

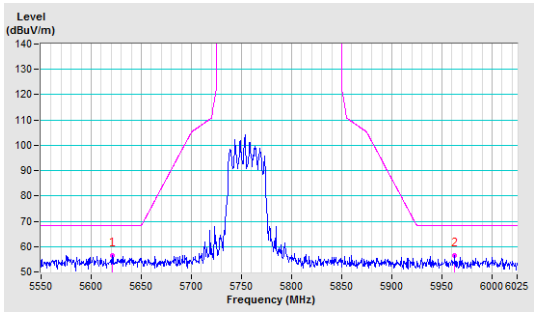
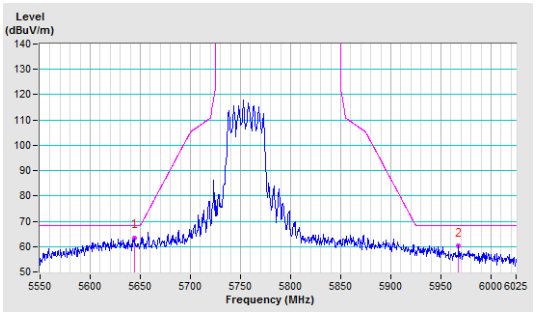
Horizontal	Vertical
	

CH 165 5825 MHz

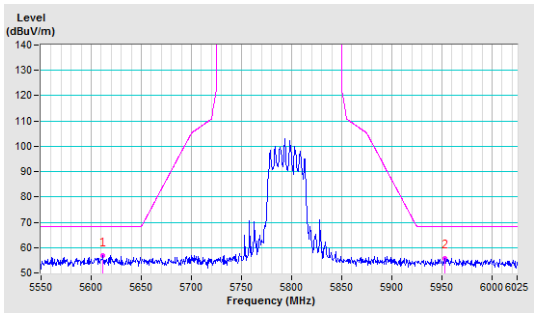
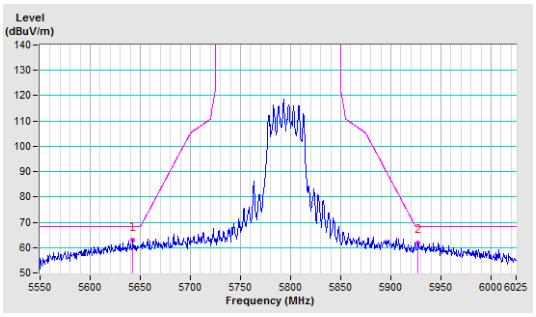
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

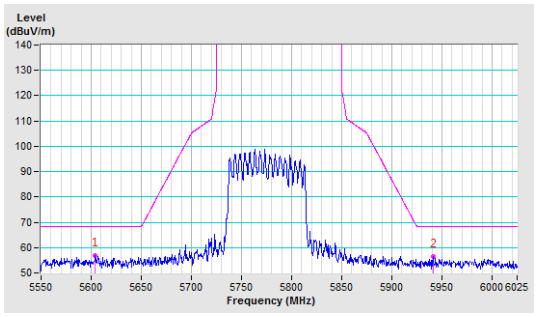
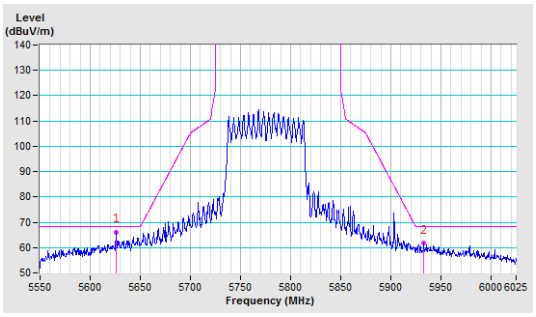
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information of 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.

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

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

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