Report No.:	RF190122E03-1
FCC ID:	PKRISGSKR3MD8800
Test Model:	SKR3MD8800
Received Date:	Jan. 14, 2019
Test Date:	Jan. 14 to 26, 2019
Issued Date:	Mar. 06, 2019
Applicant:	Inseego Corp.
Address:	9605 Scranton Road Suite 300, San Diego, CA 92121 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 R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF190122E03-1	Original release.	Mar. 06, 2019

1 Certificate of Conformity

Product:	4G LTE Wireless Router
Brand:	Inseego
Test Model:	SKR3MD8800
Sample Status:	ENGINEERING SAMPLE
Applicant:	Inseego Corp.
Test Date:	Jan. 14 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 : Phoenix Huang , **Date:** Mar. 06, 2019

Phoenix Huang / Specialist

Approved by : , **Date:** Mar. 06, 2019

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -12.84dB at 0.43516MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz.
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 R-SMA 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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.12 dB
	6GHz ~ 18GHz	4.86 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	4G LTE Wireless Router
Brand	Inseego
Test Model	SKR3MD8800
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc ~ 24Vdc
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462GHz** **CDD Mode:** 608.881mW **Beamforming Mode:** 516.453mW **5.18 ~ 5.24GHz** **CDD Mode:** 323.377mW **Beamforming Mode:** 310.293mW **5.745 ~ 5.825GHz** **CDD Mode:** 524.248mW **Beamforming Mode:** 481.695mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz + 5GHz)	Bluetooth + GPS	WWAN

2. Simultaneously transmission condition.

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

3. The antennas and antenna RF cables (option) provided to the EUT, please refer to the following table:

Antenna No.	Brand Name	Model Name	Antenna Gain (dBi)	Frequency Range	Antenna Type	Antenna Connector Type
WLAN_1	RF link	RF21S00506AX1	4.11	2.4~2.4835GHz	Dipole	R-SMA
			6.12	5.15~5.85GHz		
WLAN_2	M.gear	C037-511343-A	4.11	2.4~2.4835GHz	Dipole	R-SMA
			6.12	5.15~5.85GHz		
BT_ANT	RF link	RF21S00506AX1	4.11	2,402~2,480GHz	Dipole	R-SMA
WWAN_1_1	-	SWX-614XRSXX-999	2.1	1850 MHz to 1910 MHz	Dipole	SMA
			1.8	1710 MHz to 1755 MHz		
			1.8	824 MHz to 849 MHz		
			2.7	2500 MHz to 2570 MHz		
			0.4	777 MHz to 787 MHz		
			0.4	788 MHz to 798 MHz		
			1.8	1710 MHz to 1780 MHz		
WWAN_1_2	-	SWX-614XRSXX-999	2.1	1850 MHz to 1910 MHz	Dipole	SMA
			1.8	1710 MHz to 1755 MHz		
			1.8	824 MHz to 849 MHz		
			2.7	2500 MHz to 2570 MHz		
			0.4	777 MHz to 787 MHz		
			0.4	788 MHz to 798 MHz		
			1.8	1710 MHz to 1780 MHz		
GPS_ANT	-	-	2.4	1575.4	Dipole	SMA

Antenna RF Cable (Option)			
For WLAN & BT	Cable Loss (dB)	Frequency Range	Cable Connector Type
	3.5	1850 MHz to 1910 MHz	R-SMA
	3.5	1710 MHz to 1755 MHz	
	2.5	824 MHz to 849 MHz	
	4.5	2.4~2.4835 GHz	
	4.5	2500 MHz to 2570 MHz	
	2.5	777 MHz to 787 MHz	
	2.5	788 MHz to 798 MHz	
	3.5	1710 MHz to 1780 MHz	
	4.5	3550 MHz to 3700 MHz	
	6.93	5.15~5.85GHz	
For WWAN & GPS	Cable Loss (dB)	Frequency Range	Cable Connector Type
	3.5	1850 MHz to 1910 MHz	SMA
	3.5	1710 MHz to 1755 MHz	
	2.5	824 MHz to 849 MHz	
	4.5	2.4~2.4835 GHz	
	4.5	2500 MHz to 2570 MHz	
	2.5	777 MHz to 787 MHz	
	2.5	788 MHz to 798 MHz	
	3.5	1710 MHz to 1780 MHz	
	4.5	3550 MHz to 3700 MHz	
	6.93	5.15~5.85GHz	

4. The EUT was pre-tested under the following modes:

For Radiated Emission test	
Pre-test Mode	Description
Mode A	EUT (X plane) without antenna cable: 12Vdc power from adapter
Mode B	EUT (Y plane) without antenna cable: 12Vdc power from power supply
Mode C	EUT (X plane) without antenna cable: 24Vdc power from power supply
Mode D	**EUT (Y plane) without antenna cable: 24Vdc power from power supply**
Mode E	EUT (Y plane) with antenna cable: 24Vdc power from power supply
From the above modes, the worst case was found in **Mode D**. Therefore only the test data of the mode was recorded in this report.	
For AC Power Conducted Emission test	
Pre-test Mode	Description
Mode F	**12Vdc power from adapter**
Mode G	12Vdc power from power supply
Mode H	24Vdc power from power supply
From the above modes, the worst case was found in **Mode F**. Therefore only the test data of the mode was recorded in this report.	

5. The EUT incorporates a MIMO function.

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD 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 investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. 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: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-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)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	149	OFDM	BPSK	6

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)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	149	OFDM	BPSK	6

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:

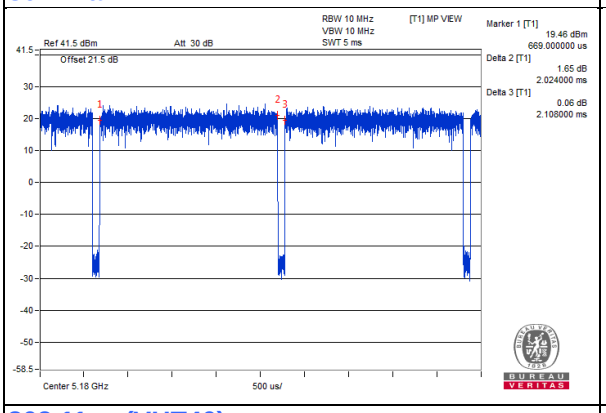
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Rey Chen
	23deg. C, 67%RH	120Vac, 60Hz	Rey Chen
RE<1G	22deg. C, 69%RH	120Vac, 60Hz	Steven Chiang
PLC	23deg. C, 74%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

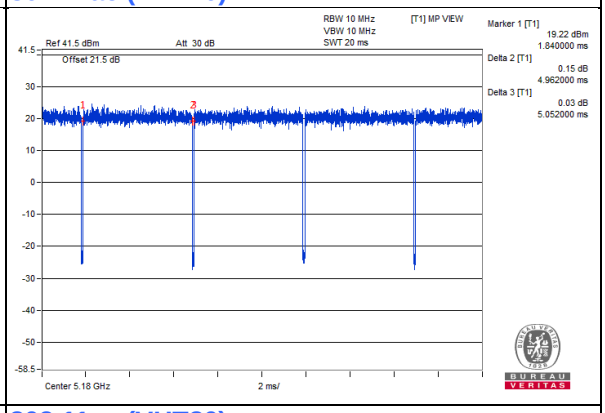
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.024 ms/2.108 ms = 0.96, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11ac (VHT20): Duty cycle = 4.962 ms/5.052 ms = 0.982
802.11ac (VHT40): Duty cycle = 2.414 ms/2.499 ms = 0.966, Duty factor = 10 * log (1/Duty cycle) = 0.15
802.11ac (VHT80): Duty cycle = 1.133 ms/1.215 ms = 0.933, Duty factor = 10 * log (1/Duty cycle) = 0.3

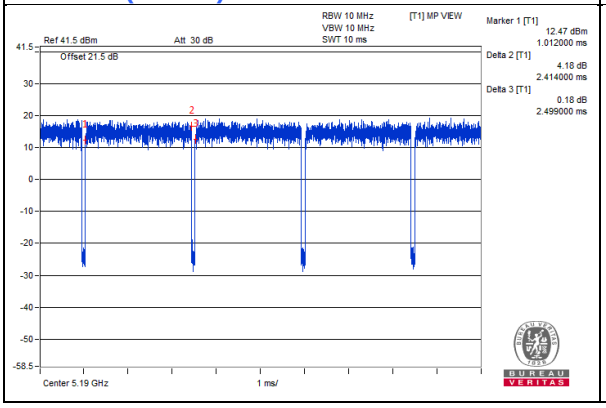
802.11a



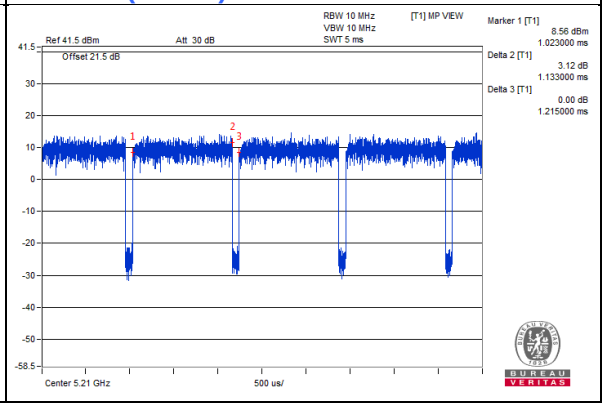
802.11ac (VHT20)



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.	DC Power Supply	GOOD WILL INSTRUMENT CO., LTD.	GPC-3030D	7700087	NA	Provided by Lab
B.	PoE Load	Luxul	XAP-1440	NA	NA	Supplied by client
C.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
E.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab
F.	Adapter	CWT	2ABF060F	NA	NA	Supplied by client

Note:

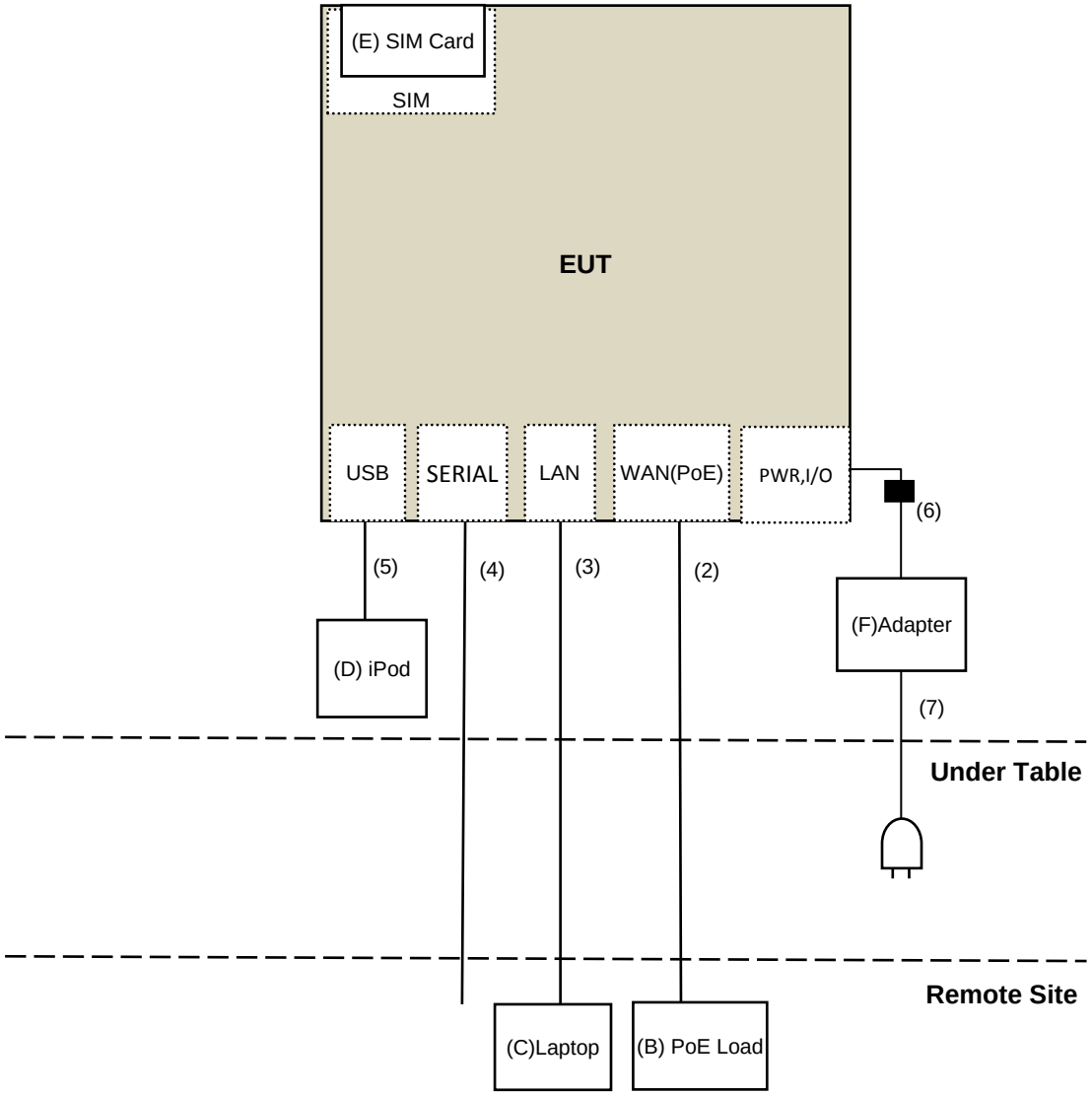
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.4	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	USB Cable	1	0.1	Yes	0	Provided by Lab
6.	DC Cable	1	1.2	No	1	Supplied by client
7.	AC Cable	1	0.8	No	0	Supplied by client

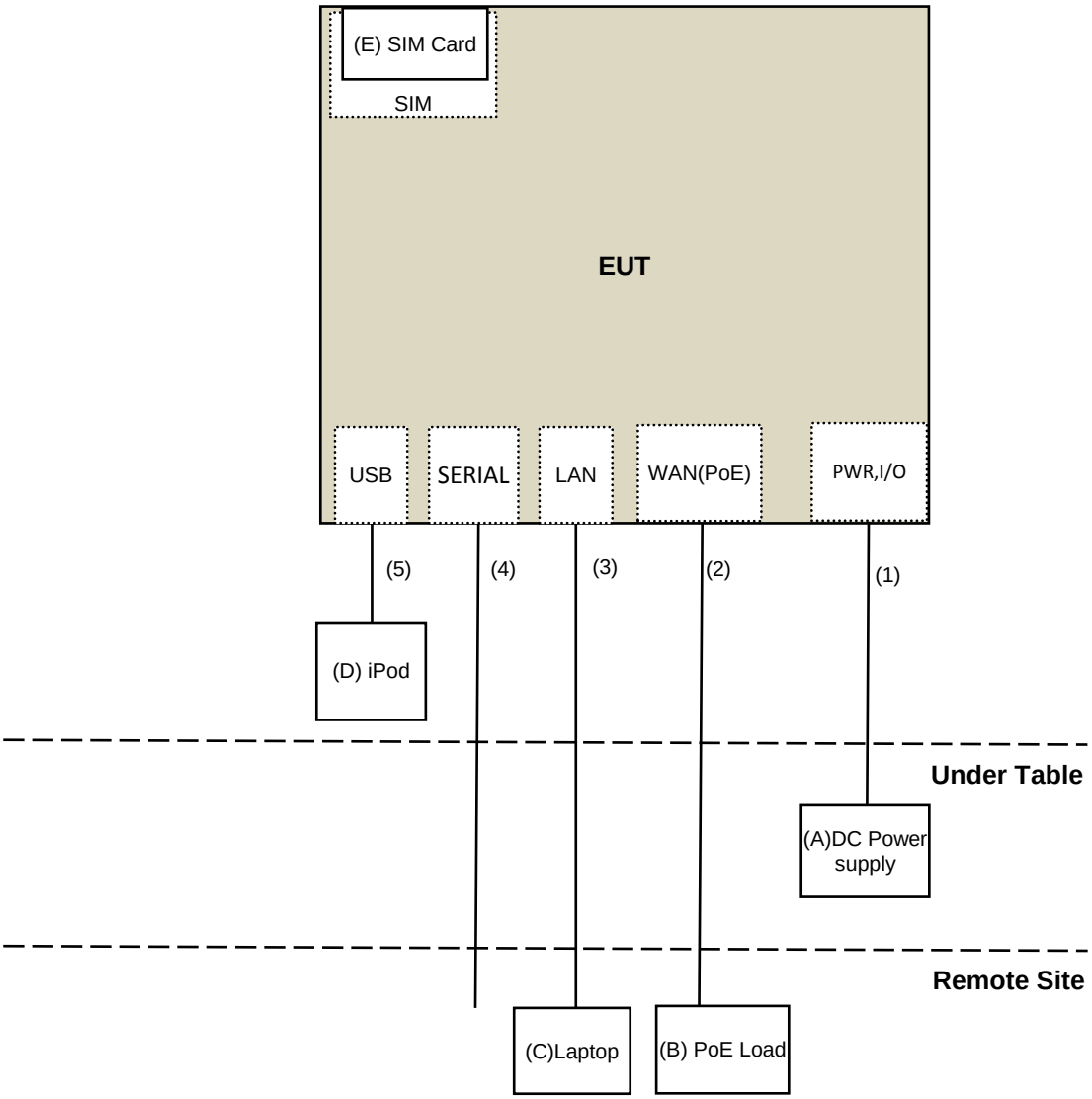
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For Power Line Conducted Emission test:



For other test:



3.5 General Description of Applied Standard

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

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

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

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="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
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. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
DC Power Supply Topward	6603D	795558	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 22, 2018	May 21, 2019

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Tested Date: Jan. 14 to 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:

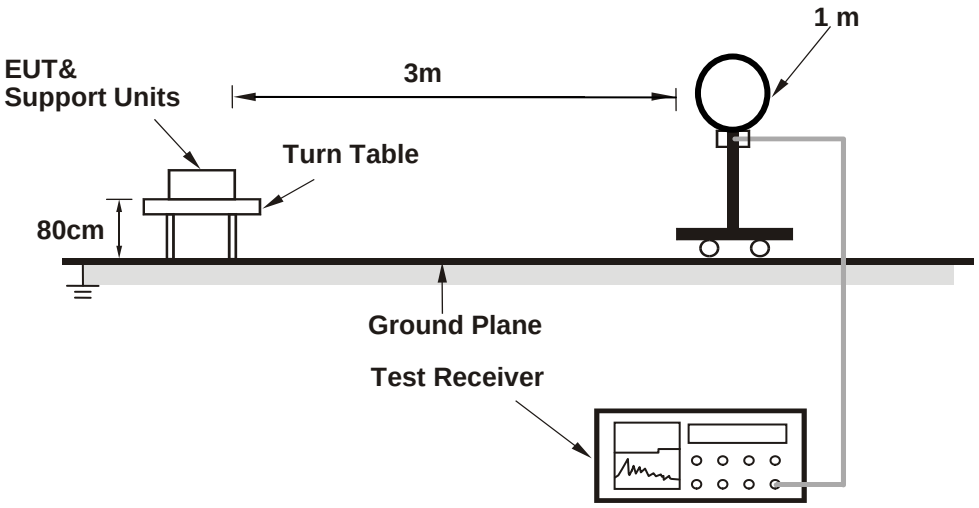
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

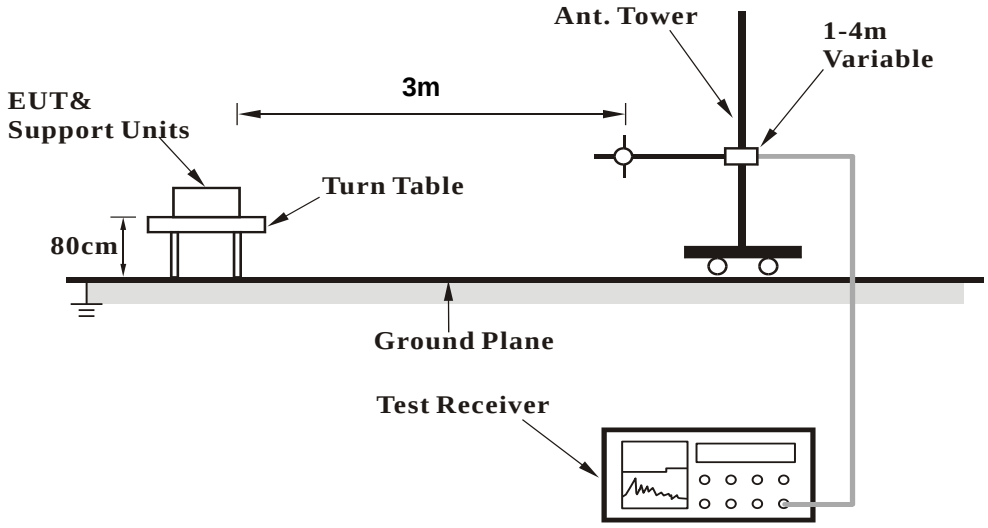
No deviation.

4.1.5 Test Setup

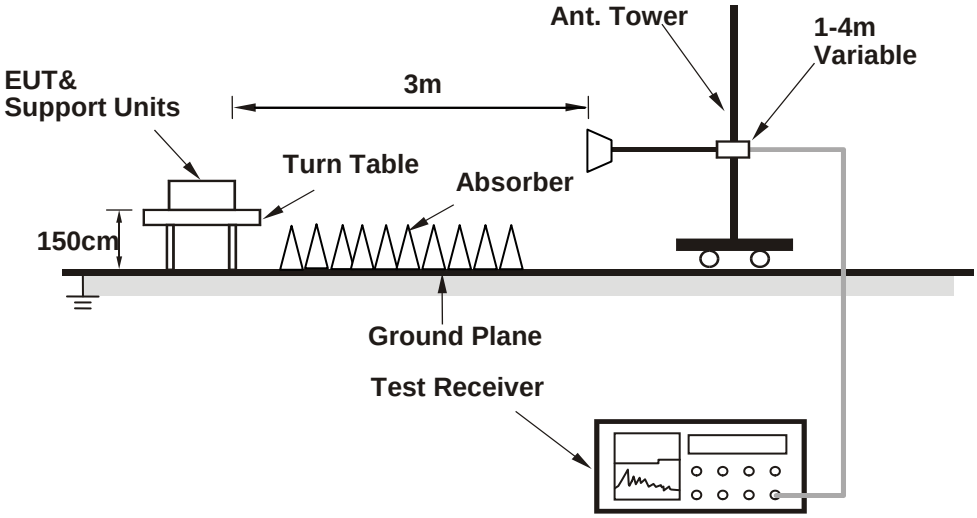
For Radiated emission below 30MHz



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 (QDART-Connectivity (1.0.38)) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	54.8 PK	74.0	-19.2	1.39 H	224	51.8	3.0
2	5150.00	42.3 AV	54.0	-11.7	1.39 H	224	39.3	3.0
3	*5180.00	101.4 PK			1.39 H	224	98.5	2.9
4	*5180.00	91.3 AV			1.39 H	224	88.4	2.9
5	#10360.00	44.0 PK	68.2	-24.2	2.26 H	230	31.0	13.0
6	15540.00	46.5 PK	74.0	-27.5	2.52 H	360	33.4	13.1
7	15540.00	33.9 AV	54.0	-20.1	2.52 H	360	20.8	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	67.9 PK	74.0	-6.1	1.73 V	340	64.9	3.0
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.73 V**	**340**	**50.9**	**3.0**
3	*5180.00	117.6 PK			1.73 V	340	114.7	2.9
4	*5180.00	107.9 AV			1.73 V	340	105.0	2.9
5	#10360.00	45.4 PK	68.2	-22.8	2.17 V	48	32.4	13.0
6	15540.00	47.1 PK	74.0	-26.9	2.06 V	163	34.0	13.1
7	15540.00	35.1 AV	54.0	-18.9	2.06 V	163	22.0	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.0 PK	74.0	-14.0	1.40 H	238	57.0	3.0
2	5150.00	41.9 AV	54.0	-12.1	1.40 H	238	38.9	3.0
3	*5200.00	105.2 PK			1.40 H	238	102.3	2.9
4	*5200.00	95.4 AV			1.40 H	238	92.5	2.9
5	#5600.00	48.5 PK	68.2	-19.7	2.57 H	351	45.1	3.4
6	#5600.00	36.2 AV	54.0	-17.8	2.57 H	351	32.8	3.4
7	#10400.00	46.4 PK	68.2	-21.8	2.23 H	236	33.3	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	73.1 PK	74.0	-0.9	1.92 V	161	70.1	3.0
2	5150.00	53.5 AV	54.0	-0.5	1.92 V	161	50.5	3.0
3	*5200.00	121.4 PK			1.92 V	161	118.5	2.9
4	*5200.00	112.0 AV			1.92 V	161	109.1	2.9
5	#10400.00	47.1 PK	68.2	-21.1	2.16 V	34	34.0	13.1
6	15600.00	49.6 PK	74.0	-24.4	2.11 V	176	36.6	13.0
7	15600.00	37.3 AV	54.0	-16.7	2.11 V	176	24.3	13.0

REMARKS:

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

CHANNEL	TX Channel 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	105.7 PK			1.42 H	223	103.2	2.5
2	*5240.00	94.9 AV			1.42 H	223	92.4	2.5
3	5423.90	40.1 PK	74.0	-33.9	1.42 H	223	37.1	3.0
4	5423.90	30.7 AV	54.0	-23.3	1.42 H	223	27.7	3.0
5	#10480.00	46.9 PK	68.2	-21.3	2.21 H	239	33.7	13.2
6	15720.00	48.5 PK	74.0	-25.5	2.55 H	360	36.1	12.4
7	15720.00	36.4 AV	54.0	-17.6	2.55 H	360	24.0	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.9 PK			1.89 V	342	119.4	2.5
2	*5240.00	111.5 AV			1.89 V	342	109.0	2.5
3	5423.90	53.2 PK	74.0	-20.8	1.89 V	342	50.2	3.0
4	5423.90	42.3 AV	54.0	-11.7	1.89 V	342	39.3	3.0
5	#10480.00	47.0 PK	68.2	-21.2	2.20 V	30	33.8	13.2
6	15720.00	48.9 PK	74.0	-25.1	2.05 V	163	36.5	12.4
7	15720.00	36.9 AV	54.0	-17.1	2.05 V	163	24.5	12.4

REMARKS:

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

CHANNEL	TX Channel 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	#5607.72	56.0 PK	68.2	-12.2	1.42 H	336	52.6	3.4
2	*5745.00	106.2 PK			1.42 H	336	102.6	3.6
3	*5745.00	95.3 AV			1.42 H	336	91.7	3.6
4	#5978.59	56.0 PK	68.2	-12.2	1.42 H	336	52.0	4.0
5	11490.00	49.0 PK	74.0	-25.0	2.30 H	235	35.2	13.8
6	11490.00	36.5 AV	54.0	-17.5	2.30 H	235	22.7	13.8
7	#17235.00	50.5 PK	68.2	-17.7	2.53 H	360	33.4	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.75	63.1 PK	68.2	-5.1	2.02 V	349	59.9	3.2
2	*5745.00	124.4 PK			2.02 V	349	120.8	3.6
3	*5745.00	113.1 AV			2.02 V	349	109.5	3.6
4	#5947.25	56.4 PK	68.2	-11.8	2.02 V	349	52.5	3.9
5	11490.00	49.7 PK	74.0	-24.3	1.45 V	352	35.9	13.8
6	11490.00	37.8 AV	54.0	-16.2	1.45 V	352	24.0	13.8
7	#17235.00	52.1 PK	68.2	-16.1	2.06 V	174	35.0	17.1

REMARKS:

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

CHANNEL	TX Channel 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	#5647.85	55.6 PK	68.2	-12.6	1.52 H	308	52.4	3.2
2	*5785.00	106.5 PK			1.52 H	308	102.9	3.6
3	*5785.00	95.1 AV			1.52 H	308	91.5	3.6
4	#6013.79	56.7 PK	68.2	-11.5	1.52 H	308	52.7	4.0
5	11570.00	48.8 PK	74.0	-25.2	2.29 H	228	35.1	13.7
6	11570.00	36.1 AV	54.0	-17.9	2.29 H	228	22.4	13.7
7	#17355.00	50.5 PK	68.2	-17.7	2.48 H	352	32.9	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5631.01	56.7 PK	68.2	-11.5	2.05 V	164	53.5	3.2
2	*5785.00	124.0 PK			2.05 V	164	120.4	3.6
3	*5785.00	113.7 AV			2.05 V	164	110.1	3.6
4	#5985.90	56.4 PK	68.2	-11.8	2.05 V	164	52.4	4.0
5	11570.00	49.5 PK	74.0	-24.5	1.46 V	352	35.8	13.7
6	11570.00	37.4 AV	54.0	-16.6	1.46 V	352	23.7	13.7
7	#17355.00	52.1 PK	68.2	-16.1	2.08 V	190	34.5	17.6

REMARKS:

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

CHANNEL	TX Channel 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	#5634.21	55.7 PK	68.2	-12.5	1.47 H	323	52.5	3.2
2	*5825.00	106.4 PK			1.47 H	323	102.6	3.8
3	*5825.00	95.3 AV			1.47 H	323	91.5	3.8
4	#5994.04	56.4 PK	68.2	-11.8	1.47 H	323	52.4	4.0
5	11650.00	48.6 PK	74.0	-25.4	2.22 H	238	35.0	13.6
6	11650.00	36.0 AV	54.0	-18.0	2.22 H	238	22.4	13.6
7	#17475.00	50.9 PK	68.2	-17.3	2.47 H	360	32.3	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5575.48	55.8 PK	68.2	-12.4	2.02 V	341	52.5	3.3
2	*5825.00	122.4 PK			2.02 V	341	118.6	3.8
3	*5825.00	112.2 AV			2.02 V	341	108.4	3.8
4	#6008.66	56.8 PK	68.2	-11.4	2.02 V	341	52.8	4.0
5	11650.00	49.3 PK	74.0	-24.7	1.47 V	348	35.7	13.6
6	11650.00	37.3 AV	54.0	-16.7	1.47 V	348	23.7	13.6
7	#17475.00	52.5 PK	68.2	-15.7	2.08 V	181	33.9	18.6

REMARKS:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.0 PK	74.0	-17.0	1.37 H	252	54.0	3.0
2	5150.00	42.3 AV	54.0	-11.7	1.37 H	252	39.3	3.0
3	*5180.00	101.4 PK			1.37 H	252	98.5	2.9
4	*5180.00	90.4 AV			1.37 H	252	87.5	2.9
5	#10360.00	44.5 PK	68.2	-23.7	2.20 H	239	31.5	13.0
6	15540.00	46.4 PK	74.0	-27.6	2.46 H	360	33.3	13.1
7	15540.00	33.6 AV	54.0	-20.4	2.46 H	360	20.5	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.1 PK	74.0	-3.9	1.88 V	343	67.1	3.0
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.88 V**	**343**	**50.9**	**3.0**
3	*5180.00	117.6 PK			1.88 V	343	114.7	2.9
4	*5180.00	107.0 AV			1.88 V	343	104.1	2.9
5	#10360.00	45.2 PK	68.2	-23.0	2.15 V	62	32.2	13.0
6	15540.00	46.8 PK	74.0	-27.2	2.06 V	149	33.7	13.1
7	15540.00	34.8 AV	54.0	-19.2	2.06 V	149	21.7	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.4 PK	74.0	-16.6	1.40 H	253	54.4	3.0
2	5150.00	42.2 AV	54.0	-11.8	1.40 H	253	39.2	3.0
3	*5200.00	104.4 PK			1.40 H	253	101.5	2.9
4	*5200.00	94.1 AV			1.40 H	253	91.2	2.9
5	5424.00	40.6 PK	74.0	-33.4	1.40 H	253	37.6	3.0
6	5424.00	31.4 AV	54.0	-22.6	1.40 H	253	28.4	3.0
7	#10400.00	46.0 PK	68.2	-22.2	2.20 H	230	32.9	13.1
8	15600.00	48.7 PK	74.0	-25.3	2.51 H	353	35.7	13.0
9	15600.00	36.2 AV	54.0	-17.8	2.51 H	353	23.2	13.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.5 PK	74.0	-3.5	1.85 V	343	67.5	3.0
2	5150.00	53.8 AV	54.0	-0.2	1.85 V	343	50.8	3.0
3	*5200.00	120.6 PK			1.85 V	343	117.7	2.9
4	*5200.00	110.7 AV			1.85 V	343	107.8	2.9
5	5424.00	51.7 PK	74.0	-22.3	1.85 V	343	48.7	3.0
6	5424.00	41.0 AV	54.0	-13.0	1.85 V	343	38.0	3.0
7	#10400.00	47.4 PK	68.2	-20.8	2.18 V	23	34.3	13.1
8	15600.00	49.5 PK	74.0	-24.5	2.15 V	170	36.5	13.0
9	15600.00	36.9 AV	54.0	-17.1	2.15 V	170	23.9	13.0

REMARKS:

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

CHANNEL	TX Channel 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	105.5 PK			1.39 H	244	103.0	2.5
2	*5240.00	95.1 AV			1.39 H	244	92.6	2.5
3	5350.00	42.1 PK	74.0	-31.9	1.00 H	0	39.3	2.8
4	5350.00	31.1 AV	54.0	-22.9	1.00 H	0	28.3	2.8
5	#10480.00	46.7 PK	68.2	-21.5	2.26 H	231	33.5	13.2
6	15720.00	48.2 PK	74.0	-25.8	2.55 H	347	35.8	12.4
7	15720.00	36.2 AV	54.0	-17.8	2.55 H	347	23.8	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.7 PK			1.82 V	360	119.2	2.5
2	*5240.00	111.7 AV			1.82 V	360	109.2	2.5
3	5350.00	54.2 PK	74.0	-19.8	1.82 V	360	51.4	2.8
4	5350.00	41.7 AV	54.0	-12.3	1.82 V	360	38.9	2.8
5	#10480.00	47.5 PK	68.2	-20.7	2.12 V	48	34.3	13.2
6	15720.00	49.3 PK	74.0	-24.7	2.15 V	181	36.9	12.4
7	15720.00	36.9 AV	54.0	-17.1	2.15 V	181	24.5	12.4

REMARKS:

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

CHANNEL	TX Channel 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	#5647.21	56.2 PK	68.2	-12.0	1.69 H	317	53.0	3.2
2	*5745.00	105.4 PK			1.69 H	317	101.8	3.6
3	*5745.00	95.1 AV			1.69 H	317	91.5	3.6
4	#5971.48	57.1 PK	68.2	-11.1	1.69 H	317	53.1	4.0
5	11490.00	49.3 PK	74.0	-24.7	2.22 H	225	35.5	13.8
6	11490.00	36.5 AV	54.0	-17.5	2.22 H	225	22.7	13.8
7	#17235.00	50.4 PK	68.2	-17.8	2.49 H	357	33.3	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.63	65.7 PK	68.2	-2.5	2.11 V	357	62.5	3.2
2	*5745.00	123.3 PK			2.11 V	357	119.7	3.6
3	*5745.00	112.9 AV			2.11 V	357	109.3	3.6
4	#5990.53	56.7 PK	68.2	-11.5	2.11 V	357	52.7	4.0
5	11490.00	50.0 PK	74.0	-24.0	1.47 V	350	36.2	13.8
6	11490.00	37.8 AV	54.0	-16.2	1.47 V	350	24.0	13.8
7	#17235.00	52.0 PK	68.2	-16.2	2.03 V	182	34.9	17.1

REMARKS:

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

CHANNEL	TX Channel 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	#5582.74	55.7 PK	68.2	-12.5	1.74 H	309	52.4	3.3
2	*5785.00	106.1 PK			1.74 H	309	102.5	3.6
3	*5785.00	95.5 AV			1.74 H	309	91.9	3.6
4	#6001.44	56.7 PK	68.2	-11.5	1.74 H	309	52.7	4.0
5	11570.00	49.0 PK	74.0	-25.0	2.25 H	236	35.3	13.7
6	11570.00	36.2 AV	54.0	-17.8	2.25 H	236	22.5	13.7
7	#17355.00	50.7 PK	68.2	-17.5	2.53 H	360	33.1	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5622.45	57.0 PK	68.2	-11.2	2.06 V	350	53.6	3.4
2	*5785.00	123.5 PK			2.06 V	360	119.9	3.6
3	*5785.00	112.9 AV			2.06 V	360	109.3	3.6
4	#5949.69	57.9 PK	68.2	-10.3	2.06 V	360	54.0	3.9
5	11570.00	49.7 PK	74.0	-24.3	1.41 V	350	36.0	13.7
6	11570.00	37.5 AV	54.0	-16.5	1.41 V	350	23.8	13.7
7	#17355.00	52.3 PK	68.2	-15.9	2.05 V	206	34.7	17.6

REMARKS:

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

CHANNEL	TX Channel 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	#5606.82	56.0 PK	68.2	-12.2	1.70 H	320	52.6	3.4
2	*5825.00	106.1 PK			1.70 H	320	102.3	3.8
3	*5825.00	95.6 AV			1.70 H	320	91.8	3.8
4	#5967.06	56.3 PK	68.2	-11.9	1.70 H	320	52.3	4.0
5	11650.00	49.5 PK	74.0	-24.5	2.27 H	216	35.9	13.6
6	11650.00	36.5 AV	54.0	-17.5	2.27 H	216	22.9	13.6
7	#17475.00	50.4 PK	68.2	-17.8	2.52 H	356	31.8	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5573.85	56.9 PK	68.2	-11.3	2.11 V	349	53.6	3.3
2	*5825.00	122.9 PK			2.11 V	349	119.1	3.8
3	*5825.00	112.8 AV			2.11 V	349	109.0	3.8
4	#5937.07	60.8 PK	68.2	-7.4	2.11 V	349	56.9	3.9
5	11650.00	50.2 PK	74.0	-23.8	1.49 V	360	36.6	13.6
6	11650.00	37.8 AV	54.0	-16.2	1.49 V	360	24.2	13.6
7	#17475.00	52.0 PK	68.2	-16.2	2.08 V	199	33.4	18.6

REMARKS:

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

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.2 PK	74.0	-20.8	1.45 H	228	50.2	3.0
2	5150.00	42.2 AV	54.0	-11.8	1.45 H	228	39.2	3.0
3	*5190.00	96.2 PK			1.45 H	228	93.3	2.9
4	*5190.00	86.7 AV			1.45 H	228	83.8	2.9
5	5424.00	40.6 PK	74.0	-33.4	1.45 H	228	37.6	3.0
6	5424.00	31.6 AV	54.0	-22.4	1.45 H	228	28.6	3.0
7	#10380.00	43.9 PK	68.2	-24.3	2.20 H	242	30.9	13.0
8	15570.00	46.5 PK	74.0	-27.5	2.50 H	351	33.5	13.0
9	15570.00	33.7 AV	54.0	-20.3	2.50 H	351	20.7	13.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.3 PK	74.0	-7.7	1.92 V	341	63.3	3.0
2	5150.00	53.8 AV	54.0	-0.2	1.92 V	341	50.8	3.0
3	*5190.00	112.4 PK			1.92 V	341	109.5	2.9
4	*5190.00	103.3 AV			1.92 V	341	100.4	2.9
5	5424.00	52.7 PK	74.0	-21.3	1.92 V	341	49.7	3.0
6	5424.00	42.2 AV	54.0	-11.8	1.92 V	341	39.2	3.0
7	#10380.00	45.1 PK	68.2	-23.1	2.11 V	52	32.1	13.0
8	15570.00	47.4 PK	74.0	-26.6	2.02 V	156	34.4	13.0
9	15570.00	35.5 AV	54.0	-18.5	2.02 V	156	22.5	13.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.8 PK	74.0	-19.2	1.45 H	230	51.8	3.0
2	5150.00	41.4 AV	54.0	-12.6	1.45 H	230	38.4	3.0
3	*5230.00	101.5 PK			1.45 H	230	98.9	2.6
4	*5230.00	91.9 AV			1.45 H	230	89.3	2.6
5	5350.00	46.9 PK	74.0	-27.1	1.45 H	230	44.1	2.8
6	5350.00	33.1 AV	54.0	-20.9	1.45 H	230	30.3	2.8
7	#10460.00	46.6 PK	68.2	-21.6	2.29 H	233	33.4	13.2
8	15690.00	48.7 PK	74.0	-25.3	2.59 H	337	36.4	12.3
9	15690.00	36.5 AV	54.0	-17.5	2.59 H	337	24.2	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.9 PK	74.0	-6.1	1.90 V	340	64.9	3.0
2	5150.00	53.0 AV	54.0	-1.0	1.90 V	340	50.0	3.0
3	*5230.00	117.7 PK			1.90 V	340	115.1	2.6
4	*5230.00	108.5 AV			1.90 V	340	105.9	2.6
5	5350.00	60.0 PK	74.0	-14.0	1.90 V	340	57.2	2.8
6	5350.00	44.7 AV	54.0	-9.3	1.90 V	340	41.9	2.8
7	#10460.00	47.0 PK	68.2	-21.2	2.12 V	50	33.8	13.2
8	15690.00	49.3 PK	74.0	-24.7	2.07 V	171	37.0	12.3
9	15690.00	37.2 AV	54.0	-16.8	2.07 V	171	24.9	12.3

REMARKS:

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

CHANNEL	TX Channel 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	#5585.57	56.0 PK	68.2	-12.2	1.72 H	319	52.7	3.3
2	*5755.00	101.1 PK			1.72 H	319	97.5	3.6
3	*5755.00	91.2 AV			1.72 H	319	87.6	3.6
4	#5950.37	56.6 PK	68.2	-11.6	1.72 H	319	52.7	3.9
5	11510.00	46.5 PK	74.0	-27.5	2.19 H	249	32.7	13.8
6	11510.00	33.8 AV	54.0	-20.2	2.19 H	249	20.0	13.8
7	#17265.00	48.3 PK	68.2	-19.9	2.60 H	346	31.2	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.70	65.0 PK	68.2	-3.2	2.06 V	345	61.8	3.2
2	*5755.00	118.3 PK			2.06 V	345	114.7	3.6
3	*5755.00	108.8 AV			2.06 V	345	105.2	3.6
4	#6011.30	57.0 PK	68.2	-11.2	2.06 V	345	53.0	4.0
5	11510.00	47.1 PK	74.0	-26.9	2.21 V	46	33.3	13.8
6	11510.00	35.2 AV	54.0	-18.8	2.21 V	46	21.4	13.8
7	#17265.00	49.5 PK	68.2	-18.7	2.05 V	164	32.4	17.1

REMARKS:

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

CHANNEL	TX Channel 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	#5627.39	57.3 PK	68.2	-10.9	1.69 H	317	54.0	3.3
2	*5795.00	102.2 PK			1.69 H	317	98.6	3.6
3	*5795.00	92.6 AV			1.69 H	317	89.0	3.6
4	#6019.97	57.0 PK	68.2	-11.2	1.69 H	317	53.0	4.0
5	11590.00	49.1 PK	74.0	-24.9	2.22 H	244	35.5	13.6
6	11590.00	36.3 AV	54.0	-17.7	2.22 H	244	22.7	13.6
7	#17385.00	50.3 PK	68.2	-17.9	2.46 H	355	32.4	17.9
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	#5644.41	67.8 PK	68.2	-0.4	2.04 V	332	64.6	3.2
2	*5795.00	119.0 PK			2.04 V	332	115.4	3.6
3	*5795.00	109.3 AV			2.04 V	332	105.7	3.6
4	#5926.86	66.7 PK	68.2	-1.5	2.04 V	332	62.8	3.9
5	11590.00	49.8 PK	74.0	-24.2	1.44 V	355	36.2	13.6
6	11590.00	37.6 AV	54.0	-16.4	1.44 V	355	24.0	13.6
7	#17385.00	51.9 PK	68.2	-16.3	2.10 V	188	34.0	17.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	51.3 PK	74.0	-22.7	1.46 H	232	48.3	3.0
2	5150.00	42.3 AV	54.0	-11.7	1.46 H	232	39.3	3.0
3	*5210.00	91.5 PK			1.46 H	232	88.7	2.8
4	*5210.00	81.9 AV			1.46 H	232	79.1	2.8
5	5350.00	41.8 PK	74.0	-32.2	1.46 H	232	39.0	2.8
6	5350.00	31.5 AV	54.0	-22.5	1.46 H	232	28.7	2.8
7	#10420.00	44.3 PK	68.2	-23.9	2.30 H	227	31.2	13.1
8	15630.00	46.4 PK	74.0	-27.6	2.46 H	360	33.6	12.8
9	15630.00	34.0 AV	54.0	-20.0	2.46 H	360	21.2	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	64.4 PK	74.0	-9.6	1.99 V	341	61.4	3.0
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.99 V**	**341**	**50.9**	**3.0**
3	*5210.00	107.7 PK			1.99 V	341	104.9	2.8
4	*5210.00	98.5 AV			1.99 V	341	95.7	2.8
5	5350.00	53.9 PK	74.0	-20.1	1.99 V	341	51.1	2.8
6	5350.00	42.1 AV	54.0	-11.9	1.99 V	341	39.3	2.8
7	#10420.00	46.1 PK	68.2	-22.1	2.14 V	49	33.0	13.1
8	15630.00	47.2 PK	74.0	-26.8	2.11 V	151	34.4	12.8
9	15630.00	35.5 AV	54.0	-18.5	2.11 V	151	22.7	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5585.53	56.4 PK	68.2	-11.8	1.72 H	323	53.1	3.3
2	*5775.00	93.1 PK			1.72 H	323	89.5	3.6
3	*5775.00	84.2 AV			1.72 H	323	80.6	3.6
4	#5976.15	56.9 PK	68.2	-11.3	1.72 H	323	52.9	4.0
5	11550.00	48.5 PK	74.0	-25.5	2.20 H	230	34.9	13.6
6	11550.00	35.7 AV	54.0	-18.3	2.20 H	230	22.1	13.6
7	#17325.00	50.3 PK	68.2	-17.9	2.48 H	354	32.9	17.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.17	68.0 PK	68.2	-0.2	2.13 V	338	64.8	3.2
2	*5775.00	111.3 PK			2.13 V	338	107.7	3.6
3	*5775.00	101.7 AV			2.13 V	338	98.1	3.6
4	#5929.89	60.7 PK	68.2	-7.5	2.13 V	338	56.8	3.9
5	11550.00	49.2 PK	74.0	-24.8	1.50 V	345	35.6	13.6
6	11550.00	37.0 AV	54.0	-17.0	1.50 V	345	23.4	13.6
7	#17325.00	51.9 PK	68.2	-16.3	2.12 V	206	34.5	17.4

REMARKS:

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

Below 1GHz Data:

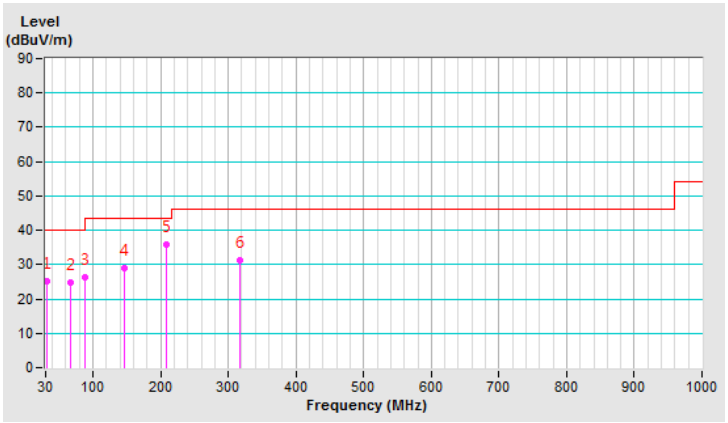
802.11a

CHANNEL	TX Channel 149	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	31.02	25.1 QP	40.0	-14.9	1.00 H	88	34.8	-9.7
2	67.22	24.7 QP	40.0	-15.3	1.50 H	306	34.4	-9.7
3	89.10	26.2 QP	43.5	-17.3	1.50 H	75	39.6	-13.4
4	147.30	28.8 QP	43.5	-14.7	1.00 H	292	36.7	-7.9
5	209.01	35.9 QP	43.5	-7.6	1.00 H	86	46.3	-10.4
6	316.32	31.1 QP	46.0	-14.9	1.00 H	57	37.7	-6.6

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 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.

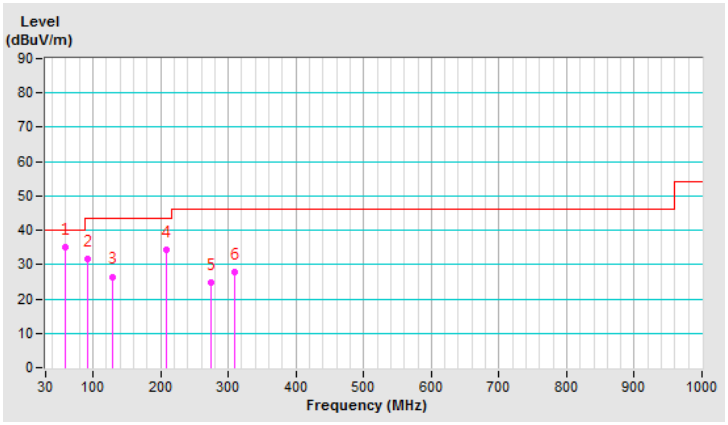


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	59.37	35.0 QP	40.0	-5.0	1.00 V	229	43.8	-8.8
2	91.33	31.8 QP	43.5	-11.7	1.50 V	201	44.9	-13.1
3	129.11	26.5 QP	43.5	-17.0	1.50 V	118	35.7	-9.2
4	209.35	34.4 QP	43.5	-9.1	1.00 V	61	44.8	-10.4
5	274.37	24.9 QP	46.0	-21.1	1.00 V	61	32.7	-7.8
6	310.06	27.8 QP	46.0	-18.2	1.00 V	21	34.6	-6.8

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 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. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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: Jan. 23, 2019

4.2.3 Test Procedure

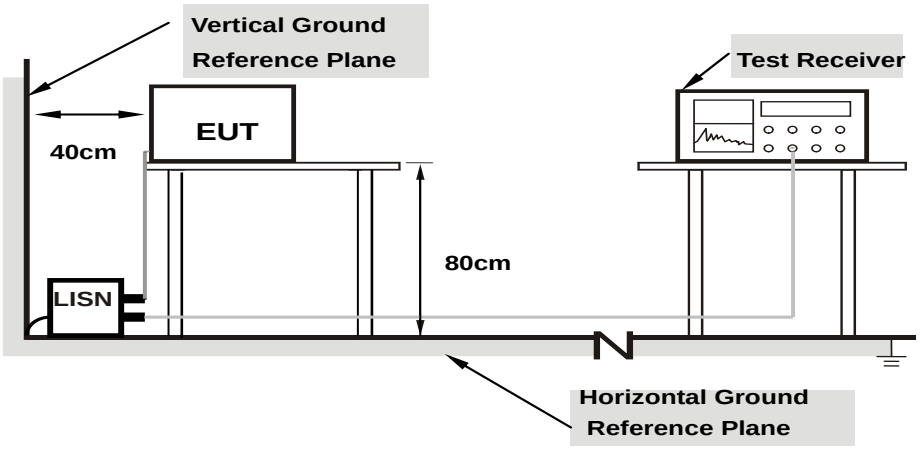
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

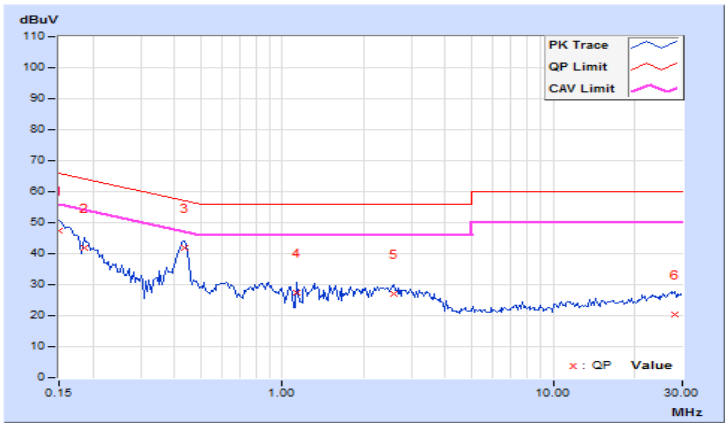
4.2.7 Test Results

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	0.15000	10.02	37.35	22.53	47.37	32.55	66.00	56.00	-18.63	-23.45
2	0.18516	10.03	31.76	19.21	41.79	29.24	64.25	54.25	-22.46	-25.01
3	**0.43516**	**10.07**	**31.81**	**24.24**	**41.88**	**34.31**	**57.15**	**47.15**	**-15.27**	**-12.84**
4	1.12891	10.12	17.25	6.25	27.37	16.37	56.00	46.00	-28.63	-29.63
5	2.57813	10.19	16.70	10.07	26.89	20.26	56.00	46.00	-29.11	-25.74
6	28.05859	11.20	9.27	3.84	20.47	15.04	60.00	50.00	-39.53	-34.96

Remarks:

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

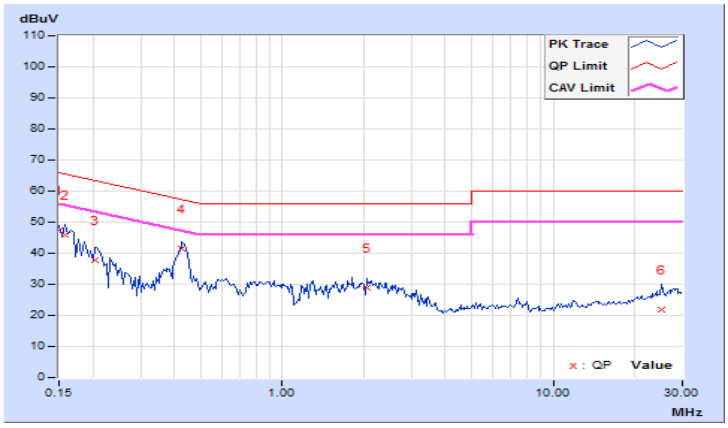


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.93	37.61	22.59	47.54	32.52	66.00	56.00	-18.46	-23.48
2	0.15781	9.93	36.18	21.82	46.11	31.75	65.58	55.58	-19.47	-23.83
3	0.20469	9.94	27.70	14.59	37.64	24.53	63.42	53.42	-25.78	-28.89
4	0.42734	9.96	31.34	24.32	41.30	34.28	57.30	47.30	-16.00	-13.02
5	2.05469	10.04	18.92	11.50	28.96	21.54	56.00	46.00	-27.04	-24.46
6	25.00000	10.92	10.98	5.48	21.90	16.40	60.00	50.00	-38.10	-33.60

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)

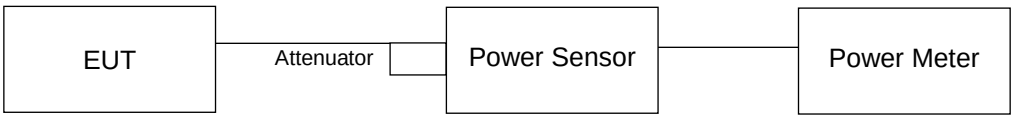
*B is the 26 dB emission bandwidth in megahertz

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 Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	18.24	18.52	137.802	21.39	29.88	Pass
40	5200	21.96	22.21	323.377	25.10	29.88	Pass
48	5240	20.99	21.27	259.571	24.14	29.88	Pass
149	5745	23.97	24.39	524.248	27.20	29.88	Pass
157	5785	23.64	23.95	479.519	26.81	29.88	Pass
165	5825	23.05	23.63	432.512	26.36	29.88	Pass

Note: The max. gain is 6.12dBi > 6dBi, so the power limit shall be reduced to 30-(6.12-6) = 29.88dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.78	18.23	126.506	21.02	29.88	Pass
40	5200	21.45	21.91	294.876	24.70	29.88	Pass
48	5240	21.76	22.05	310.293	24.92	29.88	Pass
149	5745	23.33	23.52	440.183	26.44	29.88	Pass
157	5785	23.67	23.96	481.695	26.83	29.88	Pass
165	5825	23.07	23.70	437.191	26.41	29.88	Pass

Note: The max. gain is 6.12dBi > 6dBi, so the power limit shall be reduced to 30-(6.12-6) = 29.88dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.95	16.31	82.111	19.14	29.88	Pass
46	5230	20.53	21.25	246.332	23.92	29.88	Pass
151	5755	21.25	21.56	276.571	24.42	29.88	Pass
159	5795	23.25	23.75	448.486	26.52	29.88	Pass

Note: The max. gain is 6.12dBi > 6dBi, so the power limit shall be reduced to 30-(6.12-6) = 29.88dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.34	14.47	55.154	17.42	29.88	Pass
155	5775	17.54	17.98	119.56	20.78	29.88	Pass

Note: The max. gain is 6.12dBi > 6dBi, so the power limit shall be reduced to 30-(6.12-6) = 29.88dBm.

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.78	18.23	126.506	21.02	26.87	Pass
40	5200	21.45	21.91	294.876	24.70	26.87	Pass
48	5240	21.76	22.05	310.293	24.92	26.87	Pass
149	5745	23.33	23.52	440.183	26.44	26.87	Pass
157	5785	23.67	23.96	481.695	26.83	26.87	Pass
165	5825	23.07	23.70	437.191	26.41	26.87	Pass

Note: The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi, so the power limit shall be reduced to 30-(9.13-6) = 26.87dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.95	16.31	82.111	19.14	26.87	Pass
46	5230	20.53	21.25	246.332	23.92	26.87	Pass
151	5755	21.25	21.56	276.571	24.42	26.87	Pass
159	5795	23.25	23.75	448.486	26.52	26.87	Pass

Note: The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi, so the power limit shall be reduced to 30-(9.13-6) = 26.87dBm.

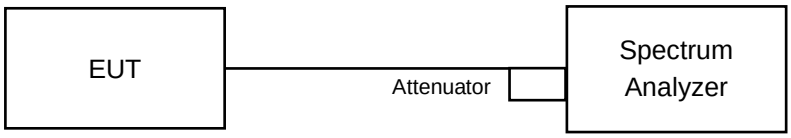
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.34	14.47	55.154	17.42	26.87	Pass
155	5775	17.54	17.98	119.56	20.78	26.87	Pass

Note: The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi, so the power limit shall be reduced to 30-(9.13-6) = 26.87dBm.

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

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.68	16.56
40	5200	20.64	24.36
48	5240	16.92	19.20
149	5745	34.56	32.16
157	5785	34.72	31.36
165	5825	34.40	32.00

802.11ac (VHT20)

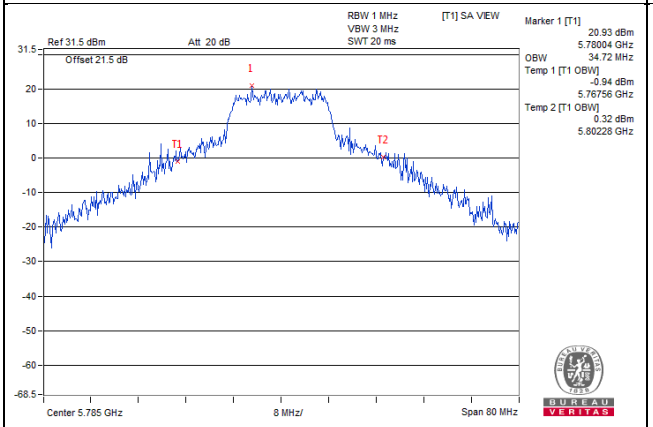
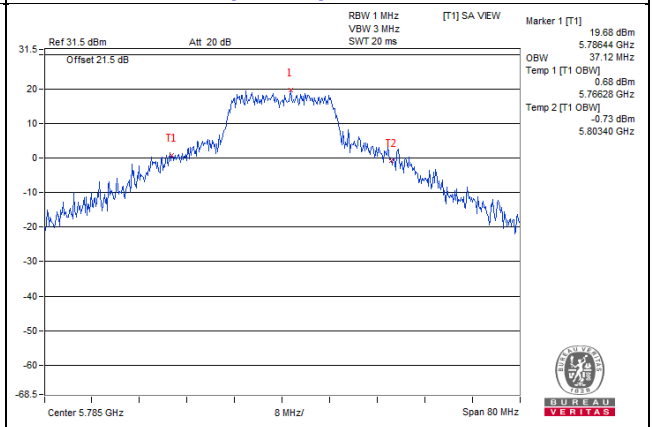
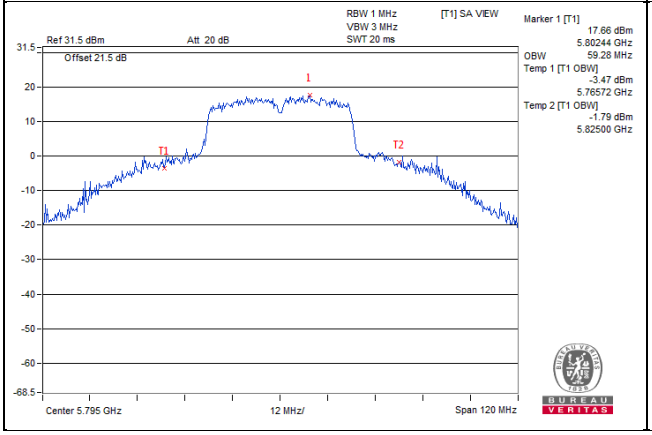
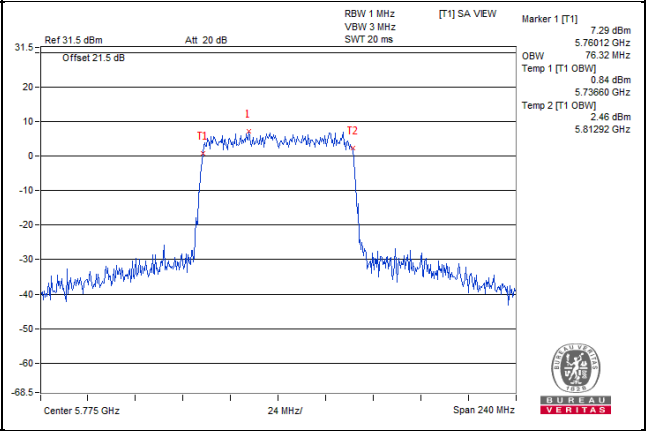
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.76
40	5200	18.36	21.60
48	5240	19.08	19.08
149	5745	32.96	30.72
157	5785	37.12	33.76
165	5825	36.16	33.44

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.72	38.40
151	5755	37.68	36.96
159	5795	58.08	59.28

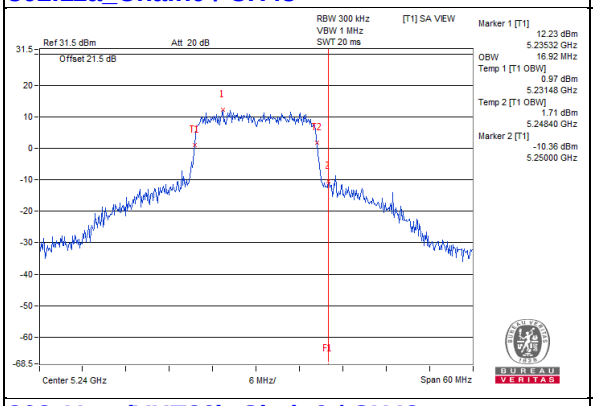
802.11ac (VHT80)

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

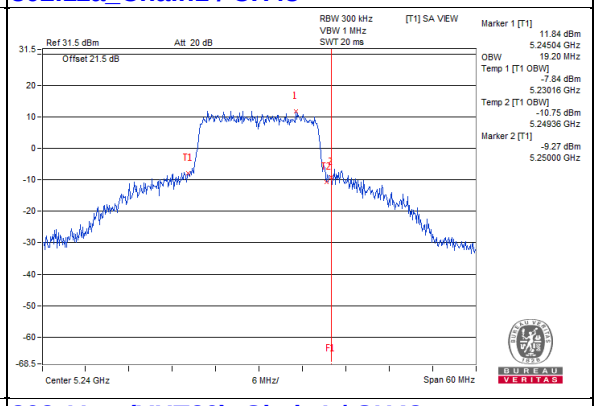
Spectrum Plot of Max. Value	
802.11a_Chain 0 / CH157	**802.11ac (VHT20)_Chain 0 / CH157**
	
802.11ac (VHT40)_Chain 1 / CH159	**802.11ac (VHT80)_Chain 0 / CH155**
	

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

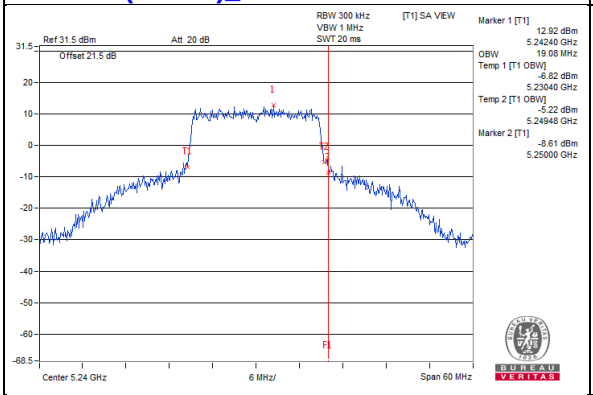
802.11a_Chain0 / CH48



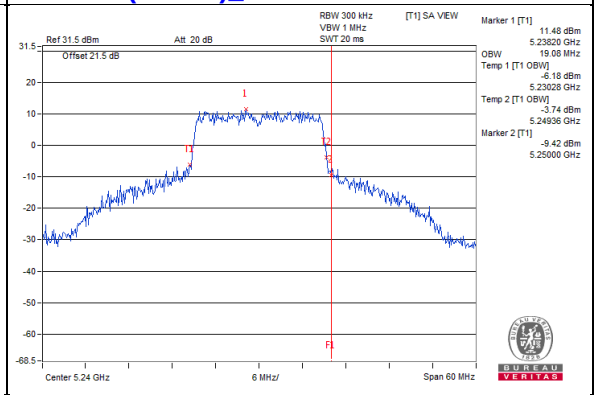
802.11a_Chain1 / CH48



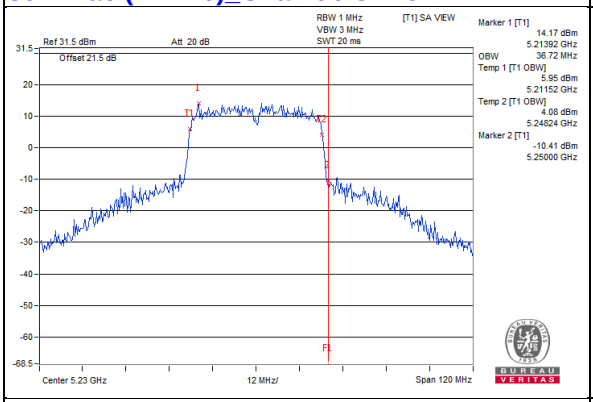
802.11ac (VHT20)_Chain0 / CH48



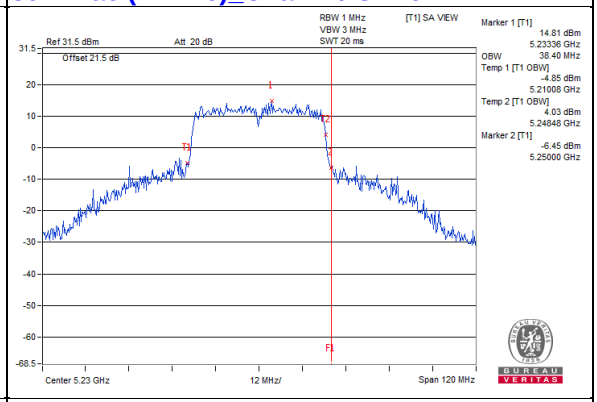
802.11ac (VHT20)_Chain1 / CH48



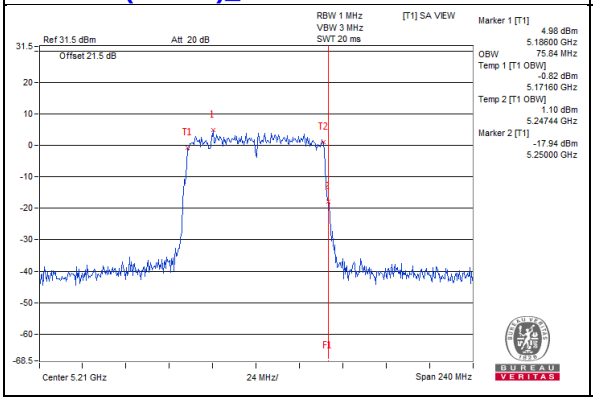
802.11ac (VHT40)_Chain0 / CH46



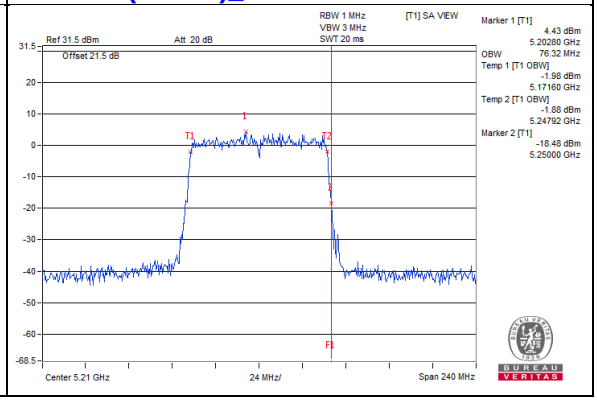
802.11ac (VHT40)_Chain1 / CH46

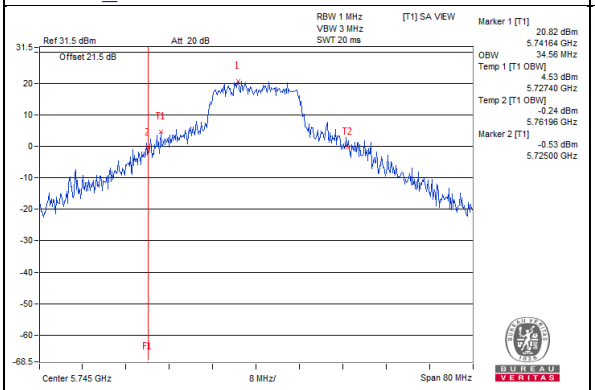
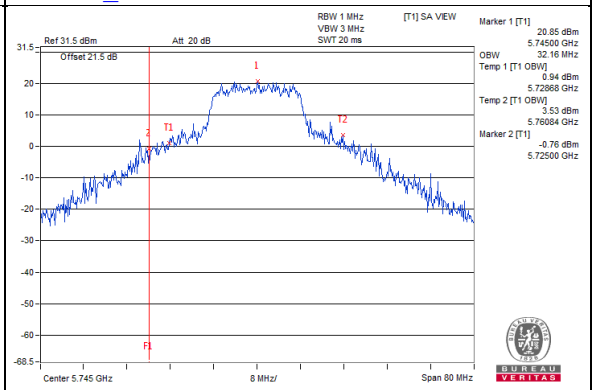
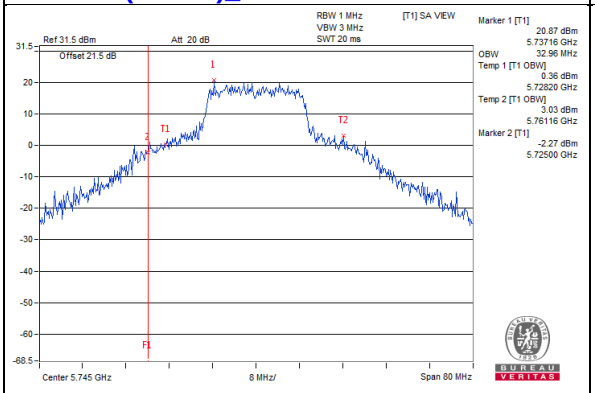
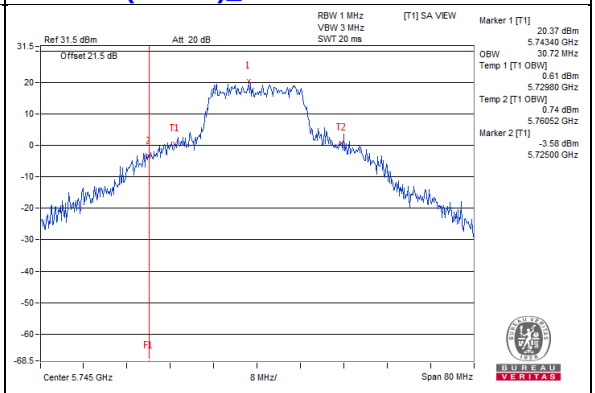
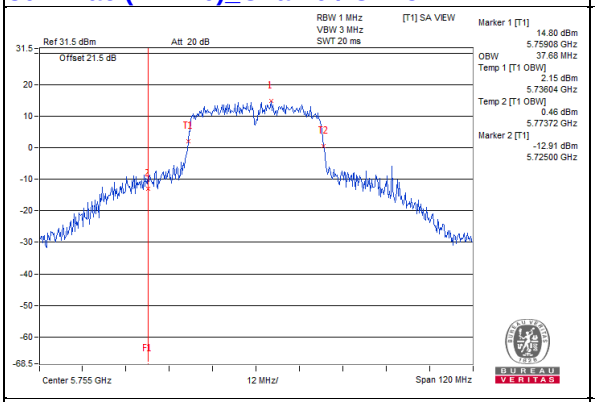
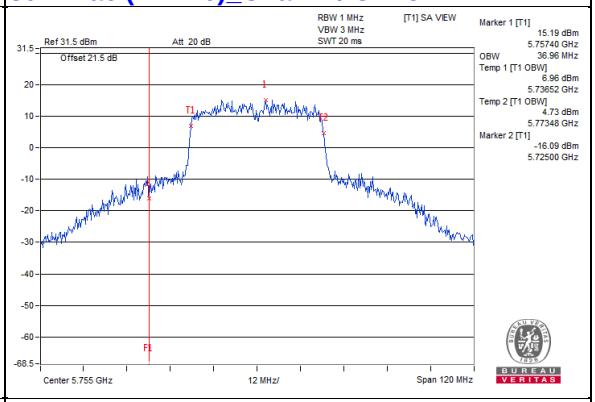
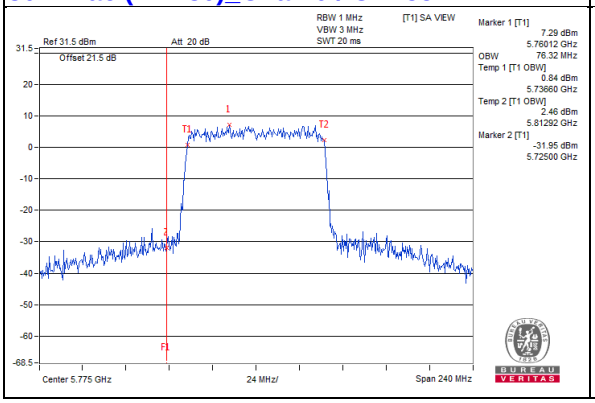
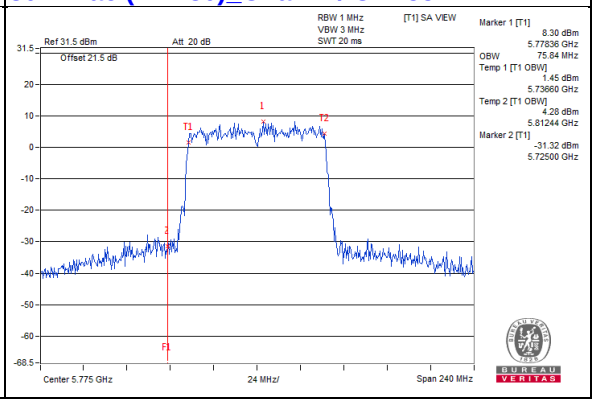


802.11ac (VHT80)_Chain0 / CH42



802.11ac (VHT80)_Chain1 / CH42



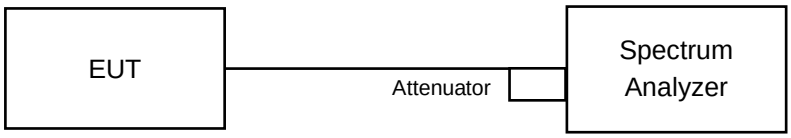
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	**802.11a_Chain1 / CH149**
	
802.11ac (VHT20)_Chain0 / CH149	**802.11ac (VHT20)_Chain1 / CH149**
	
802.11ac (VHT40)_Chain0 / CH151	**802.11ac (VHT40)_Chain1 / CH151**
	
802.11ac (VHT80)_Chain0 / CH155	**802.11ac (VHT80)_Chain1 / CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:
For 802.11ac (VHT20)

Using method SA-1

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

For other modulation mode

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:
For 802.11ac (VHT20)

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(500kHz/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

For other modulation mode

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(500kHz/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

CDD Mode

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				
36	5180	4.80	4.07	0.18	7.64	13.87	Pass
40	5200	8.63	8.56	0.18	11.79	13.87	Pass
48	5240	7.53	7.55	0.18	10.73	13.87	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. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 17-(9.13-6) = 13.87dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	4.11	4.52	7.33	13.87	Pass
40	5200	7.73	7.93	10.84	13.87	Pass
48	5240	8.10	7.63	10.88	13.87	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. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 17-(9.13-6) = 13.87dBm.

802.11ac (VHT40)

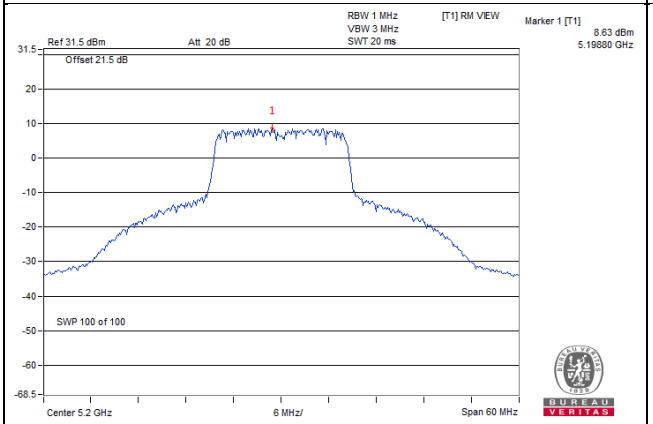
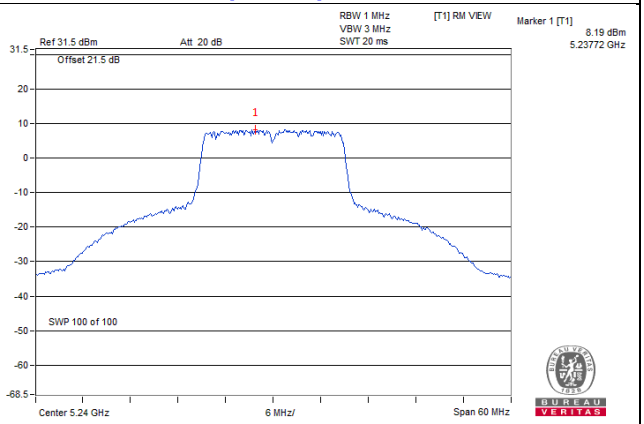
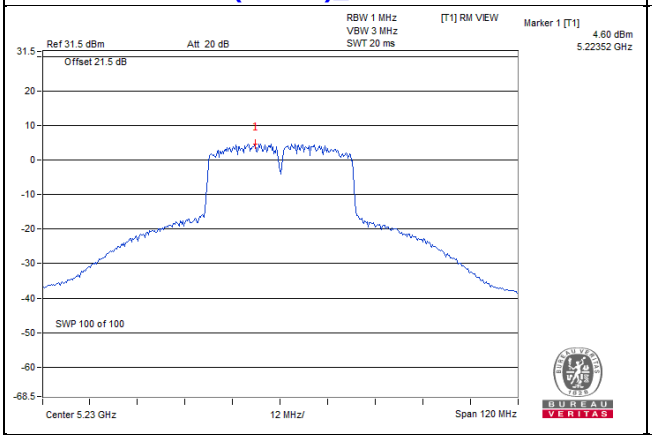
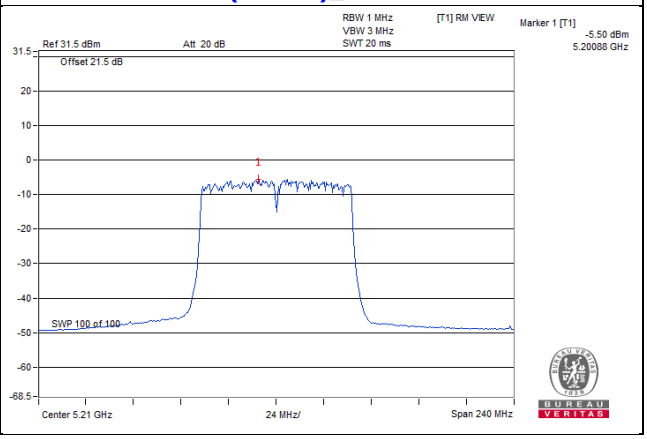
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.08	-0.37	0.15	2.45	13.87	Pass
46	5230	4.07	4.40	0.15	7.40	13.87	Pass

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. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 17-(9.13-6) = 13.87dBm.
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				
42	5210	-6.23	-6.26	0.30	-2.93	13.87	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. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 17-(9.13-6) = 13.87dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH40	**802.11ac (VHT20)_Chain 0 / CH48**
	
802.11ac (VHT40)_Chain 1 / CH46	**802.11ac (VHT80)_Chain 0 / CH42**
	

CDD Mode

For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1		mW/300kHz	dBm/300kHz			
149	5745	2.18	2.52	0.18	3.5812	5.54	7.76	26.87	Pass
157	5785	1.71	2.06	0.18	3.2177	5.08	7.30	26.87	Pass
165	5825	1.61	1.61	0.18	3.0178	4.80	7.02	26.87	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 30-(9.13-6) = 26.87dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	dBm/300kHz	dBm/500kHz		
149	5745	1.67	1.78	4.74	6.96	26.87	Pass
157	5785	1.62	1.92	4.78	7.00	26.87	Pass
165	5825	1.38	1.79	4.60	6.82	26.87	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 30-(9.13-6) = 26.87dBm.

802.11ac (VHT40)

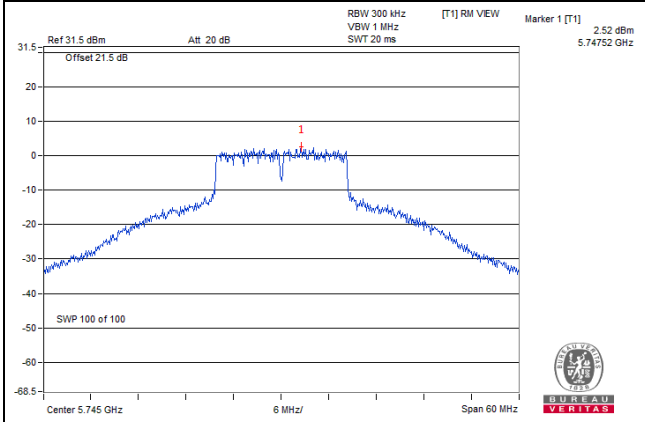
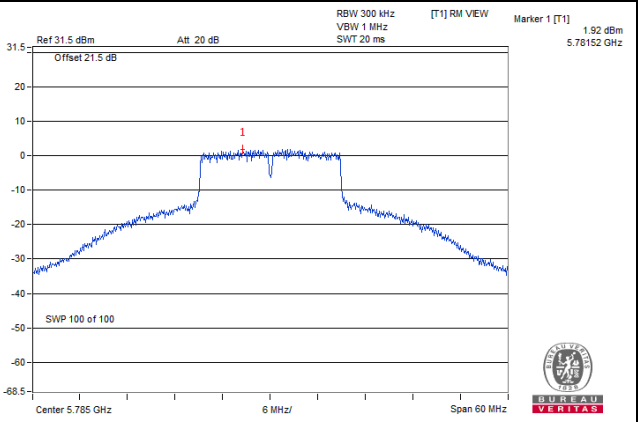
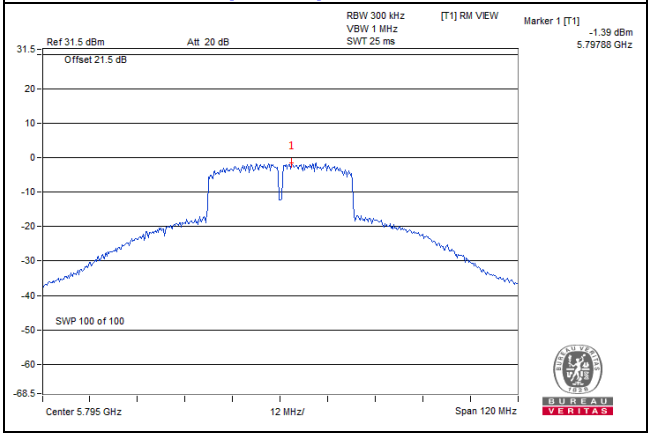
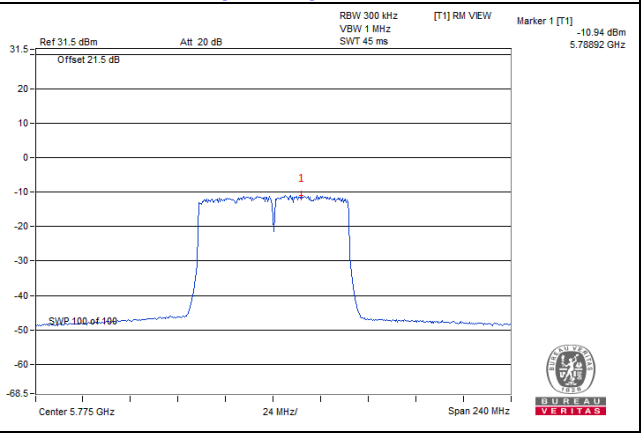
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1		mW/300kHz	dBm/300kHz			
151	5755	-3.65	-3.38	0.15	0.9221	-0.35	1.87	26.87	Pass
159	5795	-2.34	-1.39	0.15	1.3557	1.32	3.54	26.87	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 30-(9.13-6) = 26.87dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1		mW/300kHz	dBm/300kHz			
155	5775	-11.21	-10.94	0.30	0.16753	-7.76	-5.54	26.87	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 6.12dBi + 10log(2) = 9.13dBi > 6dBi , so the power density limit shall be reduced to 30-(9.13-6) = 26.87dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

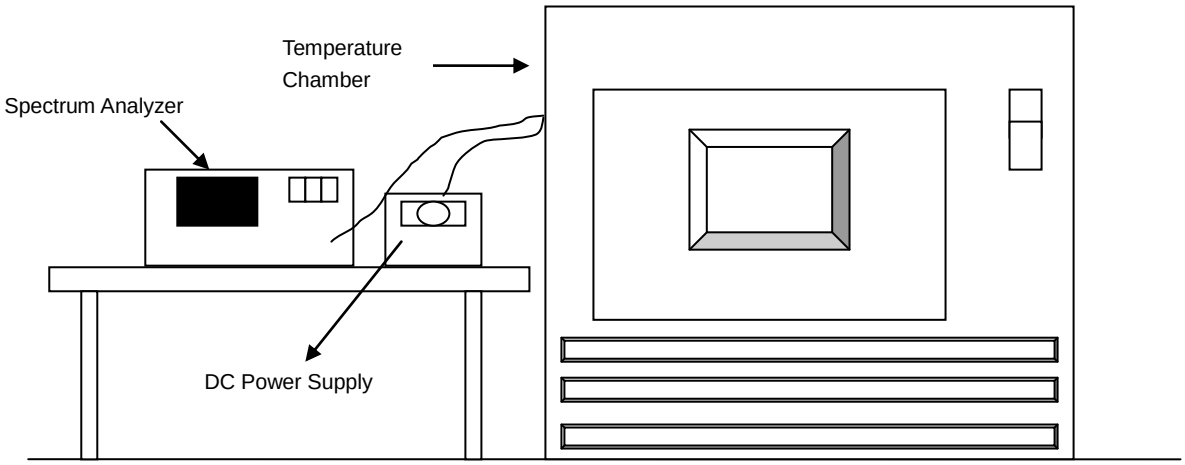
Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 1 / CH157**
	
802.11ac (VHT40)_Chain 1 / CH159	**802.11ac (VHT80)_Chain 1 / CH155**
	

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 DC 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 (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	12	5180.0198	Pass	5180.0201	Pass	5180.0206	Pass	5180.0184	Pass
40	12	5180.0197	Pass	5180.0177	Pass	5180.0184	Pass	5180.0212	Pass
30	12	5180.0016	Pass	5180.0026	Pass	5180.0008	Pass	5180.0038	Pass
20	12	5179.9741	Pass	5179.9764	Pass	5179.9781	Pass	5179.9757	Pass
10	12	5180.0224	Pass	5180.0258	Pass	5180.025	Pass	5180.0233	Pass
0	12	5180.0105	Pass	5180.0094	Pass	5180.0094	Pass	5180.0085	Pass
-10	12	5179.9994	Pass	5179.9972	Pass	5179.9968	Pass	5179.9995	Pass
-20	12	5180.0082	Pass	5180.0118	Pass	5180.0131	Pass	5180.0119	Pass
-30	12	5180.0031	Pass	5180.0045	Pass	5180.0044	Pass	5180.0009	Pass

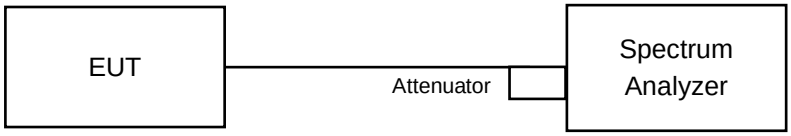
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	13.8	5179.9739	Pass	5179.9757	Pass	5179.9772	Pass	5179.9763	Pass
	12	5179.9741	Pass	5179.9764	Pass	5179.9781	Pass	5179.9757	Pass
	10.2	5179.9743	Pass	5179.9769	Pass	5179.9788	Pass	5179.9764	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

CDD Mode

802.11a

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

802.11ac (VHT20)

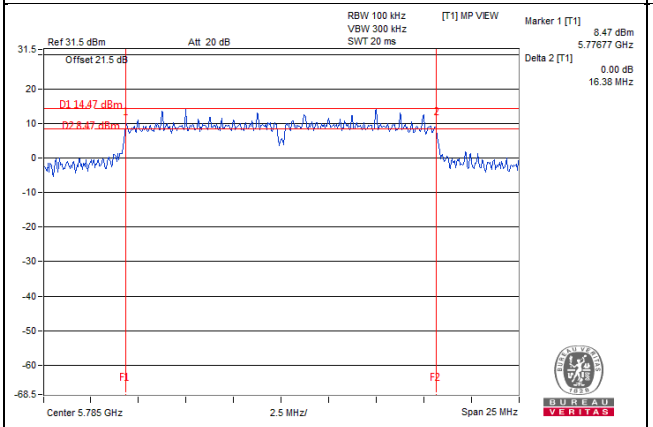
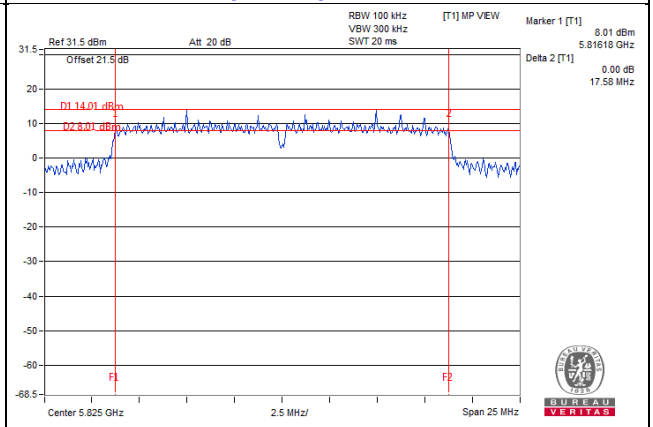
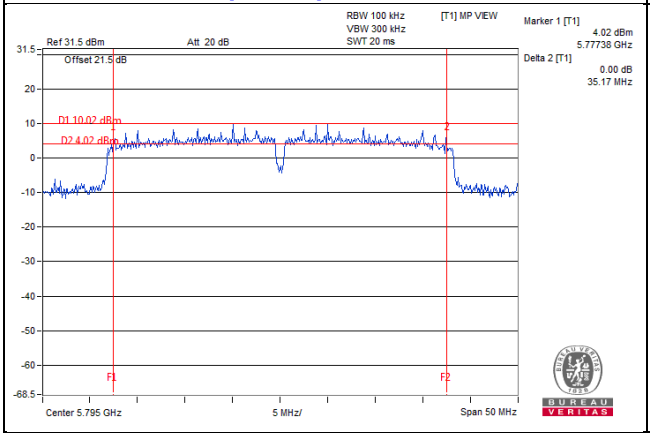
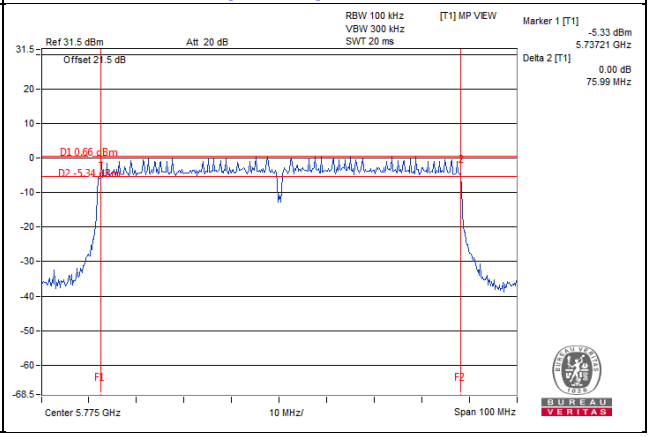
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.59	17.62	0.5	Pass
157	5785	17.62	17.63	0.5	Pass
165	5825	17.58	17.58	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.42	35.23	0.5	Pass
159	5795	35.17	35.55	0.5	Pass

802.11ac (VHT80)

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

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

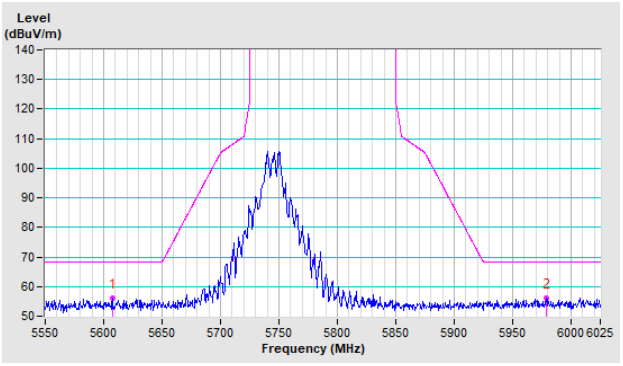
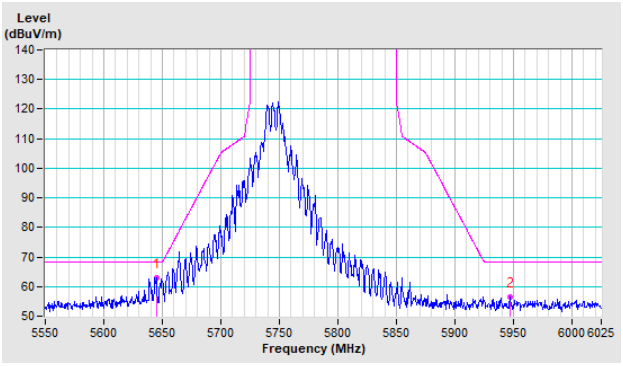
5 Pictures of Test Arrangements

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

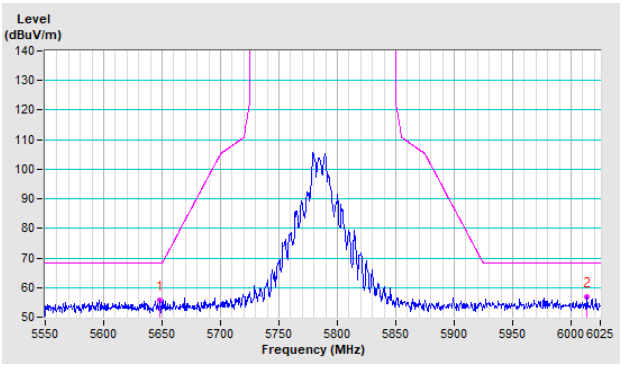
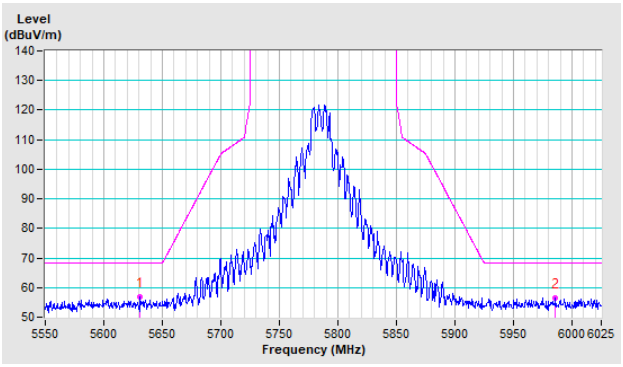
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

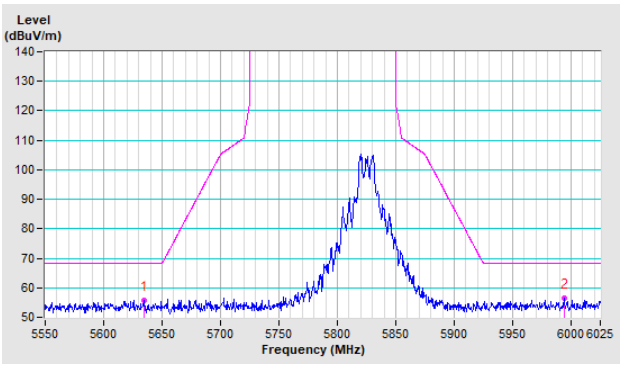
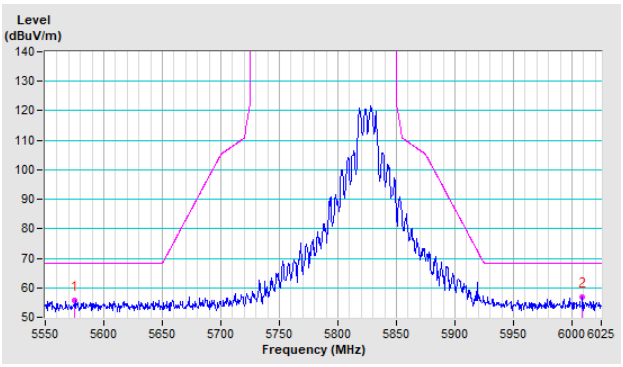
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

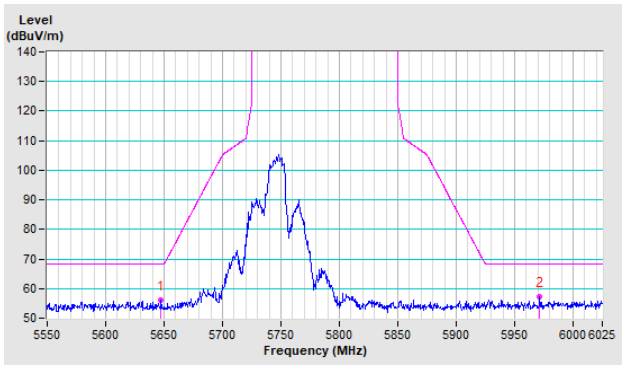
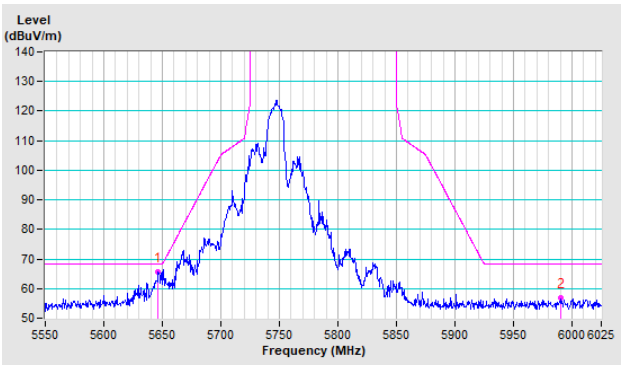
Horizontal	Vertical
	

CH 165 5825 MHz

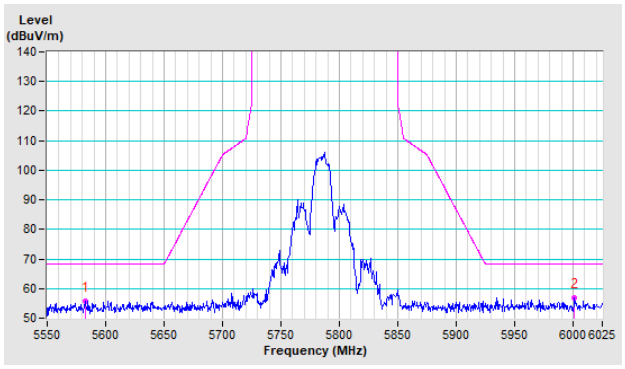
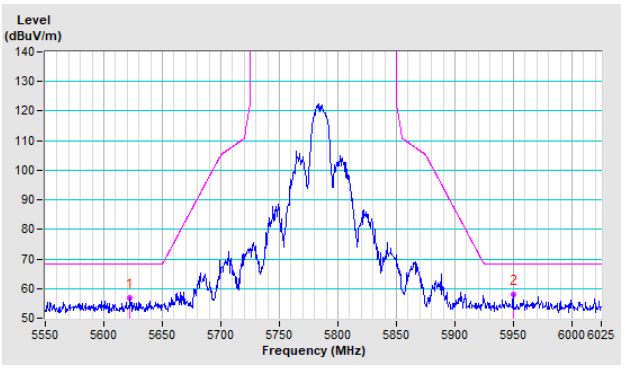
Horizontal	Vertical
	

802.11ac (VHT20)

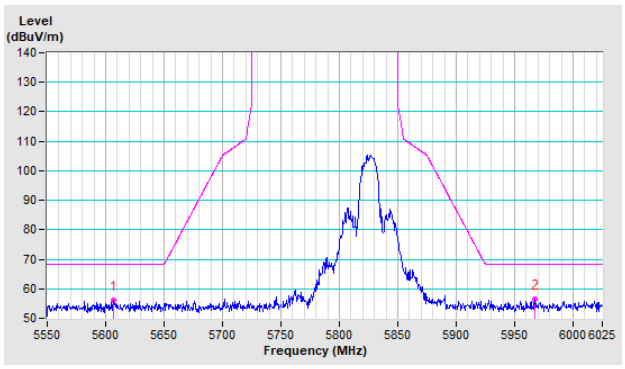
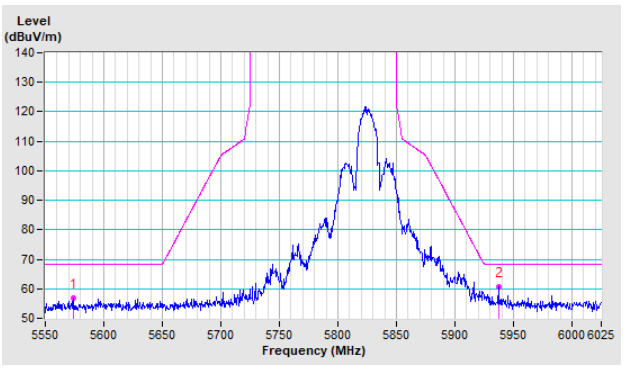
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

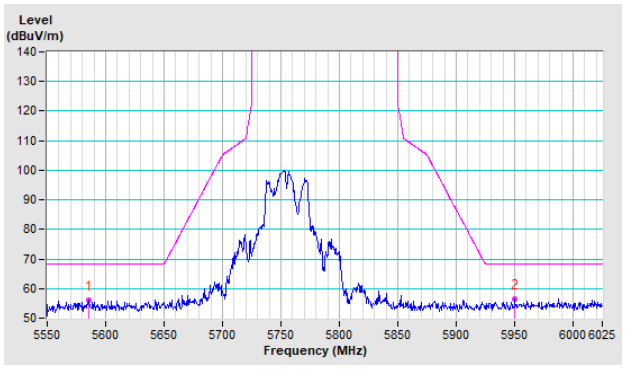
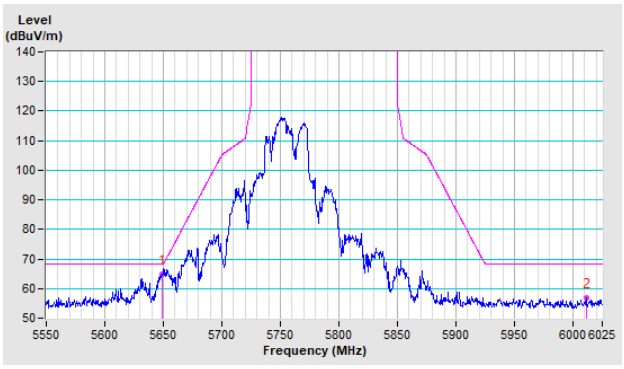
Horizontal	Vertical
	

CH 165 5825 MHz

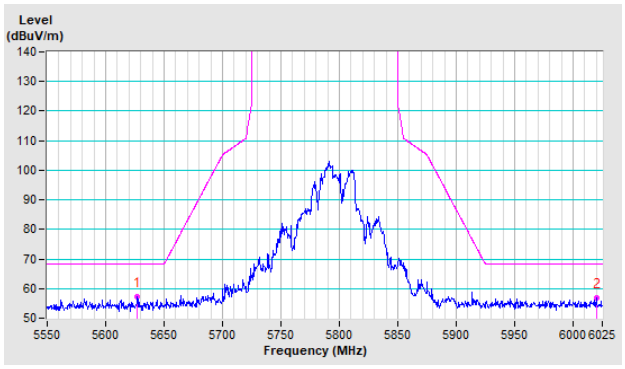
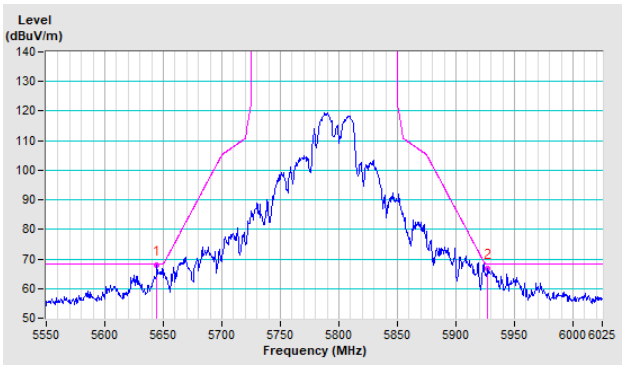
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

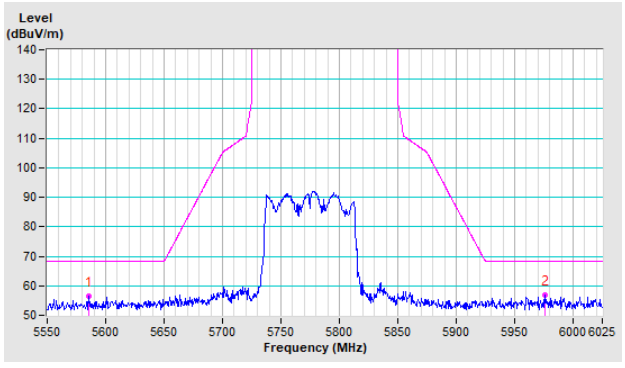
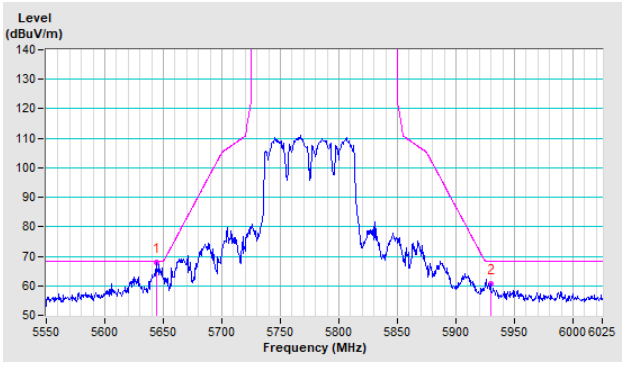
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

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

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

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