FCC Test Report (WLAN)

Report No.:	RF171027E03-1
FCC ID:	2AF5PMR2600
Test Model:	MR2600
Series Model:	MR2600XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank, for identical hardware models for marketing purposes only)
Received Date:	Oct. 27, 2017
Test Date:	Nov. 30 to Dec. 13, 2017
Issued Date:	Jan. 04, 2018
Applicant:	MTRLC LLC
Address:	PO Box 121147 Boston, MA 02112-1147, 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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF171027E03-1	Original release.	Jan. 04, 2018

1 Certificate of Conformity

Product:	AC2600 WiFi Gigabit Router
Brand:	Motorola
Test Model:	MR2600
Series Model:	MR2600XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank, for identical hardware models for marketing purposes only)
Sample Status:	ENGINEERING SAMPLE
Applicant:	MTRLC LLC
Test Date:	Nov. 30 to Dec. 13, 2017
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 : Mary Ko , **Date:** Jan. 04, 2018

Mary Ko / Specialist

Approved by : , **Date:** Jan. 04, 2018

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -14.66dB at 0.41172MHz.
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 i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.32 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.14 dB
	6GHz ~ 18GHz	5.04 dB
	18GHz ~ 40GHz	5.25 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	AC2600 WiFi Gigabit Router
Brand	Motorola
Test Model	MR2600
Series Model	MR2600XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank, for identical hardware models for marketing purposes only)
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 mode in 2.4GHz band
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps 802.11ac (80+80): up to 1733.3Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b/g, 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): 2 802.11ac (VHT80+80): 1 set
Output Power	**2.4GHz:** 906.761mW **5.18 ~ 5.24GHz:** **CDD Mode:** 389.192mW **Beamforming Mode:** 382.231mW **5.745 ~ 5.825GHz:** **CDD Mode:** 994.756mW **Beamforming Mode:** 407.669mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT has below model names, which are identical to each other in all aspects except for the following:

Brand	Model	Product name	Different
Motorola	MR2600	AC2600 WiFi Gigabit Router	For identical hardware models and for marketing purposes only
	MR2600XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D, or blank, for identical hardware models for marketing purposes only)		

From the above models, model: **MR2600** was selected as representative model for the test and its data was recorded in this report.

2. Simultaneously transmission condition.

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

3. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
Shenzhen Gongjin Electronics Co., Ltd	S24B72-120A200-C4	AC Input: 100-240Vac, 0.8A, 50/60Hz DC Output: 12V, 2A DC Output cable: Unshielded, 1.4m

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

Antenna NO.	Ant. Gain (dBi)	Ant. Net Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type	Connecter Type	Cable Loss(dB)	Cable Length (mm)
1	5	4.42	2.4~2.4835GHz	Dipole	i-pex(MHF)	0.58	150
	5	4.04	5.15~5.85GHz	Dipole	i-pex(MHF)	0.96	150
2	5	4.27	2.4~2.4835GHz	Dipole	i-pex(MHF)	0.73	180
	5	3.7	5.15~5.85GHz	Dipole	i-pex(MHF)	1.3	180
3	5	4.27	2.4~2.4835GHz	Dipole	i-pex(MHF)	0.73	180
	5	3.7	5.15~5.85GHz	Dipole	i-pex(MHF)	1.3	180
4	5	4.42	2.4~2.4835GHz	Dipole	i-pex(MHF)	0.58	150
	5	4.04	5.15~5.85GHz	Dipole	i-pex(MHF)	0.96	150

5. The EUT incorporates a MIMO function:

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	4TX	4RX
802.11g	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
VHT20	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~8, Nss=4	4TX	4RX
VHT40	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~8, Nss=4	4TX	4RX
802.11ac (VHT40)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
802.11ac (VHT80)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
802.11ac (VHT80+VHT80) noncontigurus	MCS 0~9, Nss=1	2TX+2TX	2RX +2RX
	MCS 0~9, Nss=2	2TX+2TX	2RX +2RX

Note:
1. All of modulation mode support beamforming function except 2.4GHz and 802.11a 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 refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

Channel	Frequency	Channel	Frequency
36	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

For simultaneous transmission:

1 set is provided for 802.11ac (VHT80+80):

Channel	Frequency
42+155	5210MHz + 5775MHz

Note: The transmission is for noncontiguous transmission using two nonadjacent 80MHz channels.

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

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
802.11ac (VHT80+80)	5180-5240 5745-5825	42 + 155	42 + 155	OFDM	BPSK	58.5

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
802.11ac (VHT80+80)	5180-5240 5745-5825	42 + 155	42 + 155	OFDM	BPSK	58.5
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
802.11ac (VHT80+80)	5180-5240 5745-5825	42 + 155	42 + 155	OFDM	BPSK	58.5

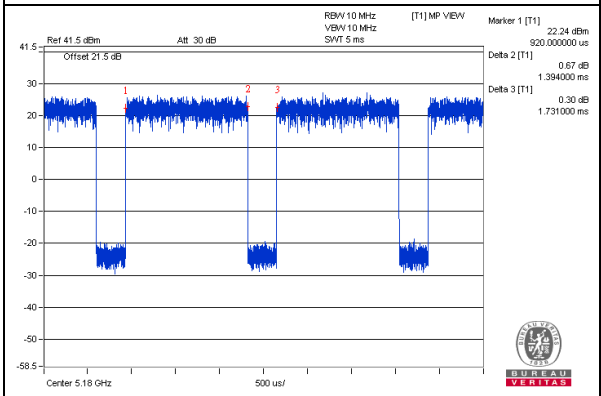
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 64%RH	120Vac, 60Hz	Eason Tseng
RE<1G	24deg. C, 66%RH	120Vac, 60Hz	Eason Tseng
PLC	24deg. C, 76%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

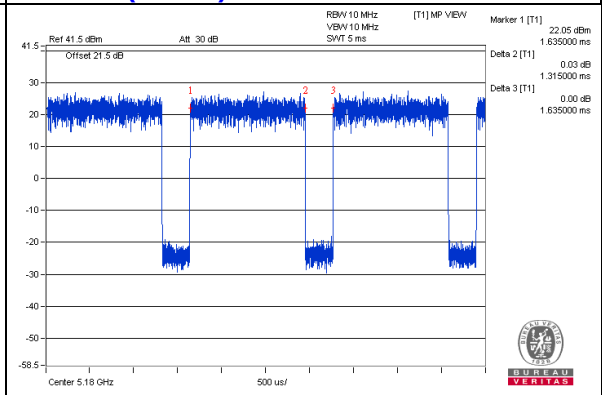
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 1.394 ms/1.731 ms = 0.805, Duty factor = 10 * log(1/0.805) = 0.94
802.11ac (VHT20): Duty cycle = 1.315 ms/1.635 ms = 0.804, Duty factor = 10 * log(1/0.804) = 0.95
802.11ac (VHT40): Duty cycle = 0.654 ms/0.995 ms = 0.657, Duty factor = 10 * log(1/0.657) = 1.82
802.11ac (VHT80): Duty cycle = 0.324 ms/0.633 ms = 0.512, Duty factor = 10 * log(1/0.512) = 2.91
802.11ac (VHT80+80): Duty cycle = 0.324 ms/0.633 ms = 0.512, Duty factor = 10 * log(1/0.512) = 2.91

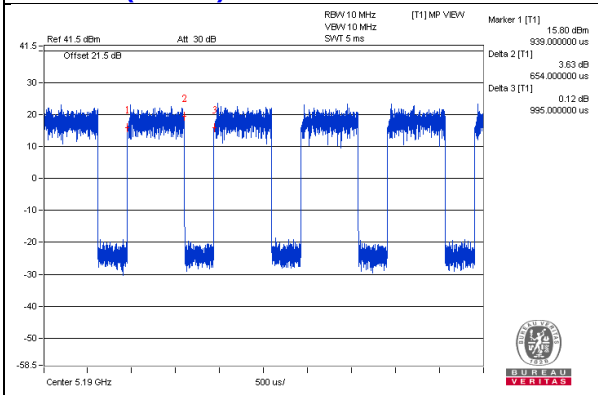
802.11a



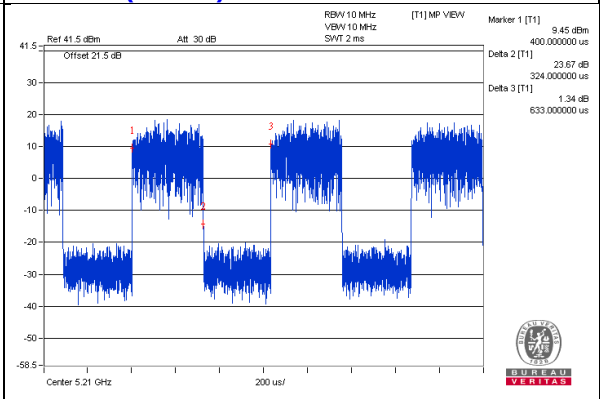
802.11ac (VHT20)



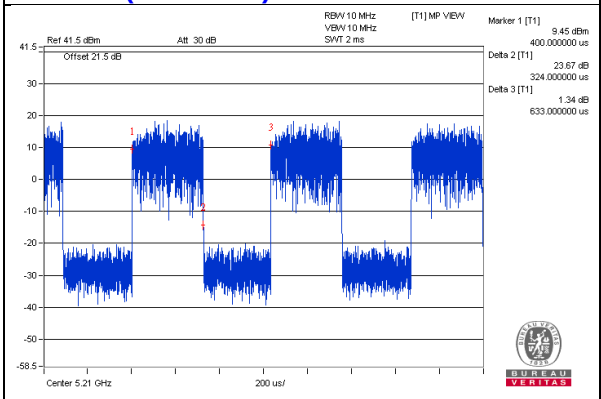
802.11ac (VHT40)



802.11ac (VHT80)



802.11ac (VHT80+80)



3.4 Description of Support Units

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

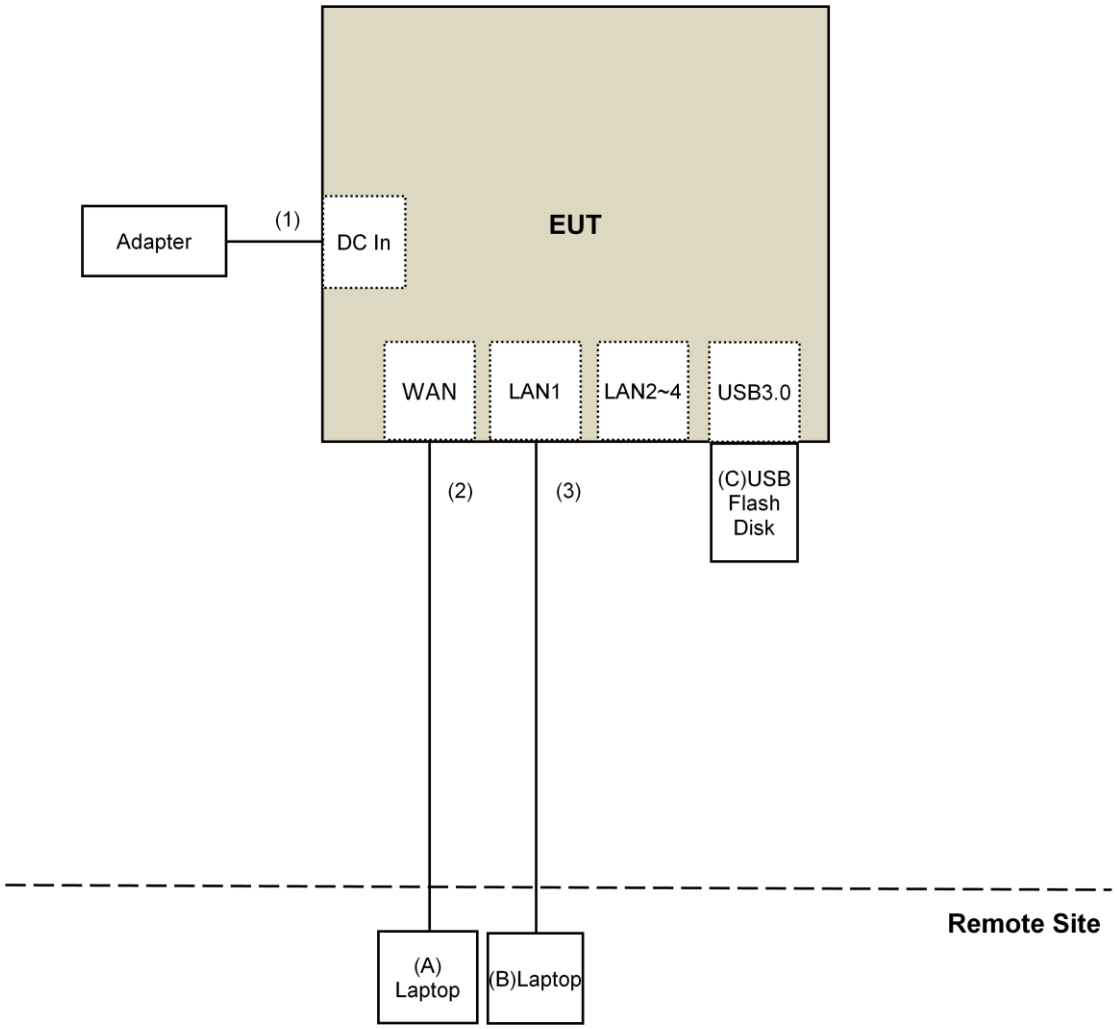
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C.	USB Disk	Transcend	16GB	NA	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="4">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Designation Number is TW2022.
5 Loop antenna was used for all emissions below 30 MHz.
6. The CANADA Site Registration No. is 20331-1
7. Tested Date: Dec. 12 to 13, 2017

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

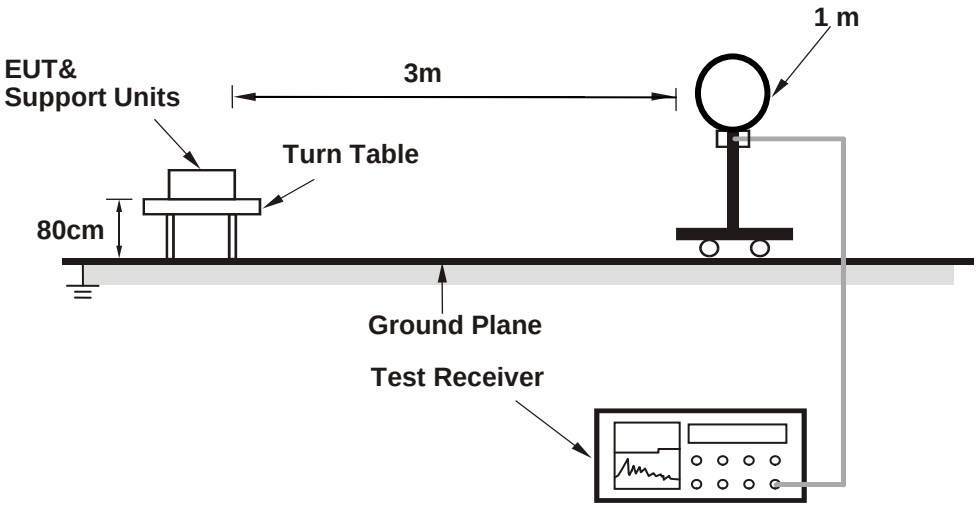
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

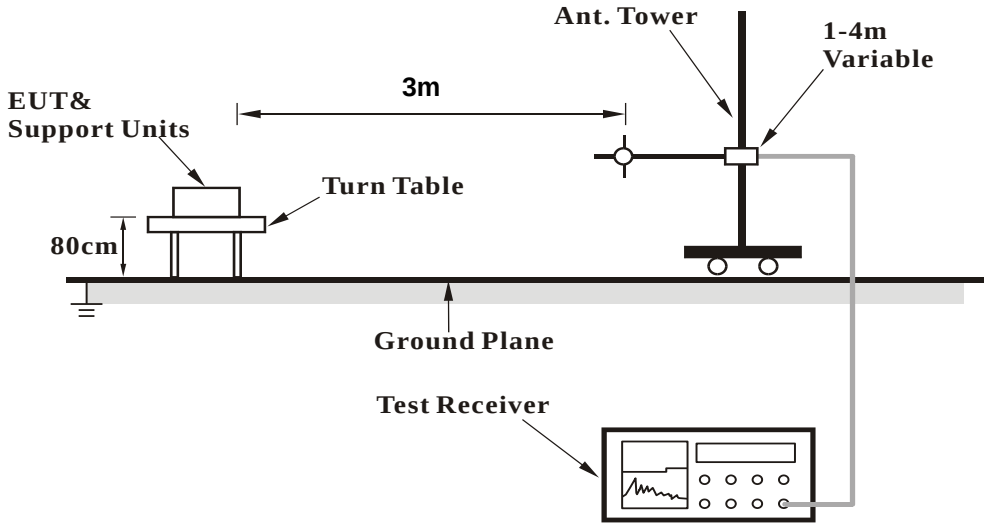
No deviation.

4.1.5 Test Setup

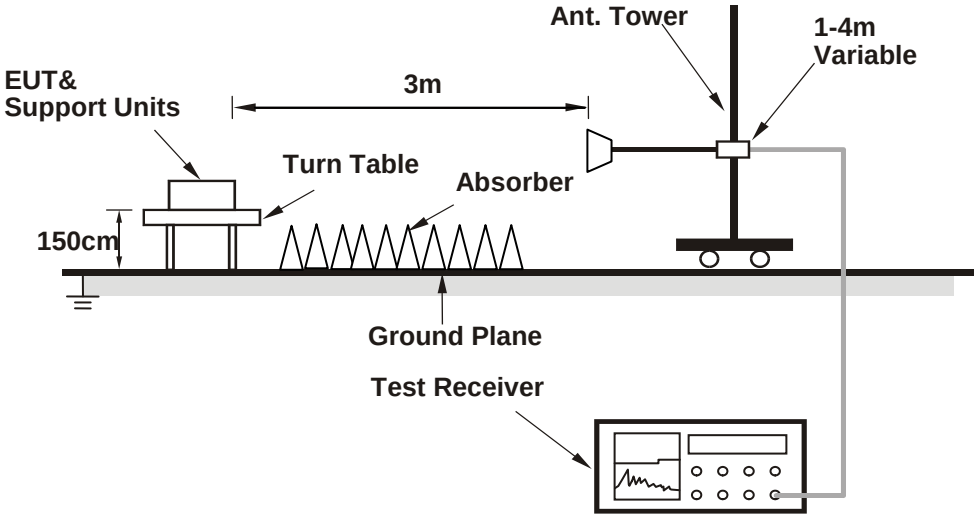
For Radiated emission below 30MHz



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 (QATool_Dbg.exe Ver 0.0.1.73) 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	56.9 PK	74.0	-17.1	1.21 H	232	53.2	3.7
2	5150.00	45.5 AV	54.0	-8.5	1.21 H	232	41.8	3.7
3	*5180.00	107.8 PK			1.21 H	232	104.1	3.7
4	*5180.00	97.7 AV			1.21 H	232	94.0	3.7
5	#10360.00	43.4 PK	74.0	-30.6	1.34 H	219	30.4	13.0
6	#10360.00	32.5 AV	54.0	-21.5	1.34 H	219	19.5	13.0
7	15540.00	41.2 PK	74.0	-32.8	2.00 H	123	28.1	13.1
8	15540.00	31.1 AV	54.0	-22.9	2.00 H	123	18.0	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.5 PK	74.0	-6.5	1.01 V	300	63.8	3.7
2	5150.00	50.9 AV	54.0	-3.1	1.01 V	300	47.2	3.7
3	*5180.00	118.7 PK			1.01 V	300	115.0	3.7
4	*5180.00	108.4 AV			1.01 V	300	104.7	3.7
5	#10360.00	45.3 PK	74.0	-28.7	1.49 V	305	32.3	13.0
6	#10360.00	34.1 AV	54.0	-19.9	1.49 V	305	21.1	13.0
7	15540.00	43.9 PK	74.0	-30.1	1.21 V	136	30.8	13.1
8	15540.00	33.2 AV	54.0	-20.8	1.21 V	136	20.1	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	49.9 PK	74.0	-24.1	1.22 H	237	46.2	3.7
2	5150.00	38.3 AV	54.0	-15.7	1.22 H	237	34.6	3.7
3	*5200.00	107.5 PK			1.22 H	237	103.8	3.7
4	*5200.00	97.8 AV			1.22 H	237	94.1	3.7
5	5350.00	48.4 PK	74.0	-25.6	1.22 H	237	44.3	4.1
6	5350.00	36.9 AV	54.0	-17.1	1.22 H	237	32.8	4.1
7	#6906.00	48.6 PK	74.0	-25.4	1.22 H	237	40.8	7.8
8	#6906.00	35.6 AV	54.0	-18.4	1.22 H	237	27.8	7.8
9	#10400.00	43.4 PK	74.0	-30.6	1.30 H	221	30.4	13.0
10	#10400.00	32.2 AV	54.0	-21.8	1.30 H	221	19.2	13.0
11	15600.00	41.5 PK	74.0	-32.5	2.01 H	114	28.2	13.3
12	15600.00	31.2 AV	54.0	-22.8	2.01 H	114	17.9	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.8 PK	74.0	-12.2	1.01 V	299	58.1	3.7
2	5150.00	49.9 AV	54.0	-4.1	1.01 V	299	46.2	3.7
3	*5200.00	118.8 PK			1.01 V	299	115.1	3.7
4	*5200.00	108.5 AV			1.01 V	299	104.8	3.7
5	5350.00	57.4 PK	74.0	-16.6	1.01 V	299	53.3	4.1
6	5350.00	46.8 AV	54.0	-7.2	1.01 V	299	42.7	4.1
7	#6906.00	47.4 PK	74.0	-26.6	1.01 V	299	39.6	7.8
8	#6906.00	35.6 AV	54.0	-18.4	1.01 V	299	27.8	7.8
9	#10400.00	45.4 PK	74.0	-28.6	1.51 V	310	32.4	13.0
10	#10400.00	34.2 AV	54.0	-19.8	1.51 V	310	21.2	13.0
11	15600.00	43.5 PK	74.0	-30.5	1.24 V	124	30.2	13.3
12	15600.00	33.2 AV	54.0	-20.8	1.24 V	124	19.9	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.7 PK	74.0	-17.3	1.27 H	231	53.0	3.7
2	5150.00	45.5 AV	54.0	-8.5	1.27 H	231	41.8	3.7
3	*5240.00	108.2 PK			1.27 H	231	104.4	3.8
4	*5240.00	98.1 AV			1.27 H	231	94.3	3.8
5	5350.00	57.1 PK	74.0	-16.9	1.27 H	231	53.0	4.1
6	5350.00	45.8 AV	54.0	-8.2	1.27 H	231	41.7	4.1
7	#10480.00	43.8 PK	74.0	-30.2	1.38 H	226	30.6	13.2
8	#10480.00	32.9 AV	54.0	-21.1	1.38 H	226	19.7	13.2
9	15720.00	41.6 PK	74.0	-32.4	2.05 H	133	28.0	13.6
10	15720.00	31.7 AV	54.0	-22.3	2.05 H	133	18.1	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.1 PK	74.0	-12.9	1.00 V	298	57.4	3.7
2	5150.00	50.7 AV	54.0	-3.3	1.00 V	298	47.0	3.7
3	*5240.00	118.9 PK			1.00 V	298	115.1	3.8
4	*5240.00	108.5 AV			1.00 V	298	104.7	3.8
5	5350.00	61.2 PK	74.0	-12.8	1.00 V	298	57.1	4.1
6	5350.00	51.0 AV	54.0	-3.0	1.00 V	298	46.9	4.1
7	#10480.00	45.5 PK	74.0	-28.5	1.51 V	298	32.3	13.2
8	#10480.00	34.5 AV	54.0	-19.5	1.51 V	298	21.3	13.2
9	15720.00	43.8 PK	74.0	-30.2	1.30 V	124	30.2	13.6
10	15720.00	33.4 AV	54.0	-20.6	1.30 V	124	19.8	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	*5745.00	113.5 PK			1.41 H	218	109.1	4.4
2	*5745.00	103.6 AV			1.41 H	218	99.2	4.4
3	11490.00	52.9 PK	74.0	-21.1	1.61 H	42	39.4	13.5
4	11490.00	42.2 AV	54.0	-11.8	1.61 H	42	28.7	13.5
5	#17235.00	57.6 PK	74.0	-16.4	3.91 H	269	40.3	17.3
6	#17235.00	47.5 AV	54.0	-6.5	3.91 H	269	30.2	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	123.6 PK			2.65 V	14	119.2	4.4
2	*5745.00	113.5 AV			2.65 V	14	109.1	4.4
3	11490.00	54.7 PK	74.0	-19.3	2.30 V	348	41.2	13.5
4	11490.00	43.6 AV	54.0	-10.4	2.30 V	348	30.1	13.5
5	#17235.00	59.5 PK	74.0	-14.5	1.20 V	355	42.2	17.3
6	#17235.00	50.1 AV	54.0	-3.9	1.20 V	355	32.8	17.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	*5785.00	114.3 PK			1.46 H	221	109.9	4.4
2	*5785.00	104.1 AV			1.46 H	221	99.7	4.4
3	11570.00	53.6 PK	74.0	-20.4	1.58 H	50	40.1	13.5
4	11570.00	42.6 AV	54.0	-11.4	1.58 H	50	29.1	13.5
5	#17355.00	57.8 PK	74.0	-16.2	3.87 H	277	39.8	18.0
6	#17355.00	47.9 AV	54.0	-6.1	3.87 H	277	29.9	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	124.6 PK			2.13 V	14	120.2	4.4
2	*5785.00	114.2 AV			2.13 V	14	109.8	4.4
3	11570.00	56.3 PK	74.0	-17.7	1.14 V	137	42.8	13.5
4	11570.00	44.9 AV	54.0	-9.1	1.14 V	137	31.4	13.5
5	#17355.00	61.6 PK	74.0	-12.4	1.21 V	9	43.6	18.0
6	#17355.00	51.9 AV	54.0	-2.1	1.21 V	9	33.9	18.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	114.9 PK			1.41 H	228	110.5	4.4
2	*5825.00	104.6 AV			1.41 H	228	100.2	4.4
3	11650.00	53.1 PK	74.0	-20.9	1.65 H	58	39.4	13.7
4	11650.00	42.5 AV	54.0	-11.5	1.65 H	58	28.8	13.7
5	#17475.00	57.8 PK	74.0	-16.2	3.94 H	269	39.2	18.6
6	#17475.00	47.6 AV	54.0	-6.4	3.94 H	269	29.0	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	*5825.00	124.4 PK			2.97 V	15	120.0	4.4
2	*5825.00	114.1 AV			2.97 V	15	109.7	4.4
3	11650.00	55.3 PK	74.0	-18.7	1.58 V	302	41.6	13.7
4	11650.00	44.2 AV	54.0	-9.8	1.58 V	302	30.5	13.7
5	#17475.00	60.1 PK	74.0	-13.9	1.21 V	23	41.5	18.6
6	#17475.00	51.5 AV	54.0	-2.5	1.21 V	23	32.9	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	51.9 PK	74.0	-22.1	2.74 H	175	48.2	3.7
2	5150.00	40.6 AV	54.0	-13.4	2.74 H	175	36.9	3.7
3	*5180.00	116.5 PK			2.74 H	175	112.8	3.7
4	*5180.00	96.7 AV			2.74 H	175	93.0	3.7
5	5350.00	50.2 PK	74.0	-23.8	2.74 H	175	46.1	4.1
6	5350.00	38.7 AV	54.0	-15.3	2.74 H	175	34.6	4.1
7	#10360.00	43.7 PK	74.0	-30.3	1.29 H	212	30.7	13.0
8	#10360.00	32.4 AV	54.0	-21.6	1.29 H	212	19.4	13.0
9	15540.00	41.6 PK	74.0	-32.4	1.95 H	102	28.5	13.1
10	15540.00	31.2 AV	54.0	-22.8	1.95 H	102	18.1	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	61.5 PK	74.0	-12.5	1.00 V	302	57.8	3.7
2	5150.00	49.9 AV	54.0	-4.1	1.00 V	302	46.2	3.7
3	*5180.00	116.9 PK			1.00 V	302	113.2	3.7
4	*5180.00	106.8 AV			1.00 V	302	103.1	3.7
5	5350.00	54.3 PK	74.0	-19.7	1.00 V	320	50.2	4.1
6	5350.00	43.2 AV	54.0	-10.8	1.00 V	320	39.1	4.1
7	#10360.00	45.5 PK	74.0	-28.5	1.51 V	298	32.5	13.0
8	#10360.00	34.5 AV	54.0	-19.5	1.51 V	298	21.5	13.0
9	15540.00	43.8 PK	74.0	-30.2	1.30 V	124	30.7	13.1
10	15540.00	33.4 AV	54.0	-20.6	1.30 V	124	20.3	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.8 PK	74.0	-21.2	2.69 H	166	49.1	3.7
2	5150.00	40.2 AV	54.0	-13.8	2.69 H	166	36.5	3.7
3	*5200.00	106.4 PK			2.69 H	166	102.7	3.7
4	*5200.00	96.3 AV			2.69 H	166	92.6	3.7
5	5350.00	50.6 PK	74.0	-23.4	2.69 H	166	46.5	4.1
6	5350.00	38.7 AV	54.0	-15.3	2.69 H	166	34.6	4.1
7	#10400.00	43.4 PK	74.0	-30.6	1.30 H	221	30.4	13.0
8	#10400.00	32.2 AV	54.0	-21.8	1.30 H	221	19.2	13.0
9	15600.00	41.5 PK	74.0	-32.5	2.01 H	114	28.2	13.3
10	15600.00	31.2 AV	54.0	-22.8	2.01 H	114	17.9	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.3 PK	74.0	-13.7	1.10 V	295	56.6	3.7
2	5150.00	48.9 AV	54.0	-5.1	1.10 V	295	45.2	3.7
3	*5200.00	116.8 PK			1.02 V	295	113.1	3.7
4	*5200.00	106.9 AV			1.02 V	295	103.2	3.7
5	5350.00	58.7 PK	74.0	-15.3	1.10 V	295	54.6	4.1
6	5350.00	46.1 AV	54.0	-7.9	1.10 V	295	42.0	4.1
7	#10400.00	45.5 PK	74.0	-28.5	1.51 V	298	32.5	13.0
8	#10400.00	34.5 AV	54.0	-19.5	1.51 V	298	21.5	13.0
9	15600.00	43.8 PK	74.0	-30.2	1.30 V	124	30.5	13.3
10	15600.00	33.4 AV	54.0	-20.6	1.30 V	124	20.1	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.6 PK	74.0	-21.4	2.65 H	173	48.9	3.7
2	5150.00	40.8 AV	54.0	-13.2	2.65 H	173	37.1	3.7
3	*5240.00	117.3 PK			2.65 H	173	113.5	3.8
4	*5240.00	97.2 AV			2.65 H	173	93.4	3.8
5	5350.00	50.4 PK	74.0	-23.6	2.65 H	173	46.3	4.1
6	5350.00	38.9 AV	54.0	-15.1	2.65 H	173	34.8	4.1
7	#10480.00	43.9 PK	74.0	-30.1	1.26 H	210	30.7	13.2
8	#10480.00	32.5 AV	54.0	-21.5	1.26 H	210	19.3	13.2
9	15720.00	41.1 PK	74.0	-32.9	1.98 H	129	27.5	13.6
10	15720.00	30.8 AV	54.0	-23.2	1.98 H	129	17.2	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.4 PK	74.0	-13.6	1.01 V	304	56.7	3.7
2	5150.00	48.9 AV	54.0	-5.1	1.01 V	304	45.2	3.7
3	*5240.00	117.2 PK			1.01 V	304	113.4	3.8
4	*5240.00	107.1 AV			1.01 V	304	103.3	3.8
5	5350.00	58.7 PK	74.0	-15.3	1.01 V	304	54.6	4.1
6	5350.00	47.6 AV	54.0	-6.4	1.01 V	304	43.5	4.1
7	#10480.00	45.5 PK	74.0	-28.5	1.51 V	298	32.3	13.2
8	#10480.00	34.5 AV	54.0	-19.5	1.51 V	298	21.3	13.2
9	15720.00	43.8 PK	74.0	-30.2	1.30 V	124	30.2	13.6
10	15720.00	33.4 AV	54.0	-20.6	1.30 V	124	19.8	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	*5745.00	112.6 PK			1.22 H	155	108.2	4.4
2	*5745.00	102.3 AV			1.22 H	155	97.9	4.4
3	11490.00	52.1 PK	74.0	-21.9	1.61 H	45	38.6	13.5
4	11490.00	41.2 AV	54.0	-12.8	1.61 H	45	27.7	13.5
5	#17235.00	55.7 PK	74.0	-18.3	3.89 H	251	38.4	17.3
6	#17235.00	45.4 AV	54.0	-8.6	3.89 H	251	28.1	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	120.1 PK			1.99 V	340	115.7	4.4
2	*5745.00	111.1 AV			1.99 V	340	106.7	4.4
3	11490.00	55.9 PK	74.0	-18.1	1.57 V	300	42.4	13.5
4	11490.00	44.7 AV	54.0	-9.3	1.57 V	300	31.2	13.5
5	#17235.00	60.0 PK	74.0	-14.0	1.19 V	27	42.7	17.3
6	#17235.00	51.2 AV	54.0	-2.8	1.19 V	27	33.9	17.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	113.2 PK			1.27 H	148	108.8	4.4
2	*5785.00	103.1 AV			1.27 H	148	98.7	4.4
3	11570.00	53.0 PK	74.0	-21.0	1.62 H	36	39.5	13.5
4	11570.00	42.3 AV	54.0	-11.7	1.62 H	36	28.8	13.5
5	#17355.00	56.8 PK	74.0	-17.2	3.90 H	242	38.8	18.0
6	#17355.00	46.6 AV	54.0	-7.4	3.90 H	242	28.6	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	120.8 PK			2.19 V	339	116.4	4.4
2	*5785.00	111.5 AV			2.19 V	339	107.1	4.4
3	11570.00	56.0 PK	74.0	-18.0	1.52 V	315	42.5	13.5
4	11570.00	44.7 AV	54.0	-9.3	1.52 V	315	31.2	13.5
5	#17355.00	59.8 PK	74.0	-14.2	1.18 V	32	41.8	18.0
6	#17355.00	51.3 AV	54.0	-2.7	1.18 V	32	33.3	18.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	113.9 PK			1.24 H	161	109.5	4.4
2	*5825.00	103.4 AV			1.24 H	161	99.0	4.4
3	11650.00	53.0 PK	74.0	-21.0	1.59 H	50	39.3	13.7
4	11650.00	42.2 AV	54.0	-11.8	1.59 H	50	28.5	13.7
5	#17475.00	57.5 PK	74.0	-16.5	3.95 H	255	38.9	18.6
6	#17475.00	47.0 AV	54.0	-7.0	3.95 H	255	28.4	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	121.1 PK			1.97 V	340	116.7	4.4
2	*5825.00	111.9 AV			1.97 V	340	107.5	4.4
3	11650.00	55.9 PK	74.0	-18.1	1.55 V	330	42.2	13.7
4	11650.00	44.8 AV	54.0	-9.2	1.55 V	330	31.1	13.7
5	#17475.00	59.9 PK	74.0	-14.1	1.22 V	31	41.3	18.6
6	#17475.00	51.2 AV	54.0	-2.8	1.22 V	31	32.6	18.6

REMARKS:

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

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.5 PK	74.0	-12.5	2.62 H	177	57.8	3.7
2	5150.00	49.4 AV	54.0	-4.6	2.62 H	177	45.7	3.7
3	*5190.00	102.5 PK			2.62 H	177	98.8	3.7
4	*5190.00	92.4 AV			2.62 H	177	88.7	3.7
5	5350.00	53.4 PK	74.0	-20.6	2.62 H	177	49.3	4.1
6	5350.00	42.1 AV	54.0	-11.9	2.62 H	177	38.0	4.1
7	#10380.00	44.3 PK	74.0	-29.7	1.25 H	226	31.2	13.1
8	#10380.00	32.7 AV	54.0	-21.3	1.25 H	226	19.6	13.1
9	15570.00	42.2 PK	74.0	-31.8	1.98 H	109	28.9	13.3
10	15570.00	31.6 AV	54.0	-22.4	1.98 H	109	18.3	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.5 PK	74.0	-3.5	1.00 V	56	66.8	3.7
2	5150.00	53.8 AV	54.0	-0.2	1.00 V	56	50.1	3.7
3	*5190.00	109.2 PK			1.00 V	56	105.5	3.7
4	*5190.00	100.1 AV			1.00 V	56	96.4	3.7
5	5350.00	58.2 PK	74.0	-15.8	1.00 V	56	54.1	4.1
6	5350.00	46.4 AV	54.0	-7.6	1.00 V	56	42.3	4.1
7	#10380.00	46.0 PK	74.0	-28.0	1.55 V	291	32.9	13.1
8	#10380.00	34.8 AV	54.0	-19.2	1.55 V	291	21.7	13.1
9	15570.00	43.0 PK	74.0	-31.0	1.39 V	96	29.7	13.3
10	15570.00	32.8 AV	54.0	-21.2	1.39 V	96	19.5	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.7 PK	74.0	-13.3	2.66 H	165	57.0	3.7
2	5150.00	48.9 AV	54.0	-5.1	2.66 H	165	45.2	3.7
3	*5230.00	103.1 PK			2.66 H	165	99.3	3.8
4	*5230.00	92.6 AV			2.66 H	165	88.8	3.8
5	5350.00	52.8 PK	74.0	-21.2	2.66 H	165	48.7	4.1
6	5350.00	41.1 AV	54.0	-12.9	2.66 H	165	37.0	4.1
7	#10460.00	44.0 PK	74.0	-30.0	1.25 H	197	30.9	13.1
8	#10460.00	32.6 AV	54.0	-21.4	1.25 H	197	19.5	13.1
9	15690.00	41.9 PK	74.0	-32.1	2.00 H	89	28.1	13.8
10	15690.00	31.6 AV	54.0	-22.4	2.00 H	89	17.8	13.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.2 PK	74.0	-8.8	1.01 V	57	61.5	3.7
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.01 V**	**57**	**50.2**	**3.7**
3	*5230.00	109.3 PK			1.01 V	57	105.5	3.8
4	*5230.00	100.2 AV			1.01 V	57	96.4	3.8
5	5350.00	61.8 PK	74.0	-12.2	1.01 V	57	57.7	4.1
6	5350.00	51.6 AV	54.0	-2.4	1.01 V	57	47.5	4.1
7	#10460.00	45.3 PK	74.0	-28.7	1.53 V	306	32.2	13.1
8	#10460.00	34.4 AV	54.0	-19.6	1.53 V	306	21.3	13.1
9	15690.00	43.4 PK	74.0	-30.6	1.33 V	109	29.6	13.8
10	15690.00	33.0 AV	54.0	-21.0	1.33 V	109	19.2	13.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5755.00	101.5 PK			1.17 H	176	97.1	4.4
2	*5755.00	90.4 AV			1.17 H	176	86.0	4.4
3	11510.00	53.1 PK	74.0	-20.9	1.60 H	55	39.5	13.6
4	11510.00	42.1 AV	54.0	-11.9	1.60 H	55	28.5	13.6
5	#17265.00	57.4 PK	74.0	-16.6	3.94 H	248	39.8	17.6
6	#17265.00	46.7 AV	54.0	-7.3	3.94 H	248	29.1	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	*5755.00	107.2 PK			1.87 V	340	102.8	4.4
2	*5755.00	98.4 AV			1.87 V	340	94.0	4.4
3	11510.00	56.0 PK	74.0	-18.0	1.59 V	317	42.4	13.6
4	11510.00	44.8 AV	54.0	-9.2	1.59 V	317	31.2	13.6
5	#17265.00	60.3 PK	74.0	-13.7	1.12 V	29	42.7	17.6
6	#17265.00	51.3 AV	54.0	-2.7	1.12 V	29	33.7	17.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	101.7 PK			1.11 H	166	97.3	4.4
2	*5795.00	90.6 AV			1.11 H	166	86.2	4.4
3	11590.00	53.2 PK	74.0	-20.8	1.55 H	64	39.7	13.5
4	11590.00	42.7 AV	54.0	-11.3	1.55 H	64	29.2	13.5
5	#17385.00	58.0 PK	74.0	-16.0	3.98 H	243	39.7	18.3
6	#17385.00	47.4 AV	54.0	-6.6	3.98 H	243	29.1	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	106.9 PK			2.20 V	339	102.5	4.4
2	*5795.00	98.3 AV			2.20 V	339	93.9	4.4
3	11590.00	56.2 PK	74.0	-17.8	1.64 V	303	42.7	13.5
4	11590.00	45.1 AV	54.0	-8.9	1.64 V	303	31.6	13.5
5	#17385.00	60.4 PK	74.0	-13.6	1.17 V	33	42.1	18.3
6	#17385.00	51.6 AV	54.0	-2.4	1.17 V	33	33.3	18.3

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.1 PK	74.0	-10.9	2.64 H	165	59.4	3.7
2	5150.00	49.1 AV	54.0	-4.9	2.64 H	165	45.4	3.7
3	*5210.00	98.5 PK			2.64 H	165	94.8	3.7
4	*5210.00	88.6 AV			2.64 H	165	84.9	3.7
5	5350.00	53.2 PK	74.0	-20.8	2.64 H	165	49.1	4.1
6	5350.00	40.2 AV	54.0	-13.8	2.64 H	165	36.1	4.1
7	#10420.00	44.6 PK	74.0	-29.4	1.30 H	232	31.5	13.1
8	#10420.00	32.7 AV	54.0	-21.3	1.30 H	232	19.6	13.1
9	15630.00	41.8 PK	74.0	-32.2	2.03 H	94	28.2	13.6
10	15630.00	31.3 AV	54.0	-22.7	2.03 H	94	17.7	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.8 PK	74.0	-7.2	1.25 V	7	63.1	3.7
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.25 V**	**7**	**50.2**	**3.7**
3	*5210.00	106.4 PK			1.25 V	7	102.7	3.7
4	*5210.00	96.6 AV			1.25 V	7	92.9	3.7
5	5350.00	55.2 PK	74.0	-18.8	1.25 V	7	51.1	4.1
6	5350.00	44.6 AV	54.0	-9.4	1.25 V	7	40.5	4.1
7	#10420.00	46.5 PK	74.0	-27.5	1.60 V	302	33.4	13.1
8	#10420.00	35.1 AV	54.0	-18.9	1.60 V	302	22.0	13.1
9	15630.00	43.1 PK	74.0	-30.9	1.38 V	109	29.5	13.6
10	15630.00	32.8 AV	54.0	-21.2	1.38 V	109	19.2	13.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5775.00	100.1 PK			1.07 H	164	95.7	4.4
2	*5775.00	90.2 AV			1.07 H	164	85.8	4.4
3	11550.00	43.8 PK	74.0	-30.2	1.28 H	217	30.3	13.5
4	11550.00	32.3 AV	54.0	-21.7	1.28 H	217	18.8	13.5
5	#17325.00	42.7 PK	74.0	-31.3	2.03 H	122	24.9	17.8
6	#17325.00	31.2 AV	54.0	-22.8	2.03 H	122	13.4	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5775.00	107.6 PK			2.21 V	353	103.2	4.4
2	*5775.00	97.5 AV			2.21 V	353	93.1	4.4
3	11550.00	56.1 PK	74.0	-17.9	1.63 V	315	42.6	13.5
4	11550.00	45.3 AV	54.0	-8.7	1.63 V	315	31.8	13.5
5	#17325.00	60.1 PK	74.0	-13.9	1.11 V	18	42.3	17.8
6	#17325.00	51.5 AV	54.0	-2.5	1.11 V	18	33.7	17.8

REMARKS:

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

802.11ac (VHT80+80)

CHANNEL	TX Channel 42+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	5150.00	62.8 PK	74.0	-11.2	2.64 H	152	59.1	3.7
2	5150.00	48.9 AV	54.0	-5.1	2.64 H	152	45.2	3.7
3	*5210.00	98.6 PK			2.64 H	152	94.9	3.7
4	*5210.00	88.7 AV			2.64 H	152	85.0	3.7
5	5350.00	53.1 PK	74.0	-20.9	2.64 H	152	49.0	4.1
6	5350.00	49.7 PK	74.0	-24.3	1.15 H	155	45.6	4.1
7	5350.00	39.8 AV	54.0	-14.2	2.64 H	152	35.7	4.1
8	5350.00	39.6 AV	54.0	-14.4	1.15 H	155	35.5	4.1
9	*5775.00	97.8 PK			1.15 H	155	93.4	4.4
10	*5775.00	90.1 AV			1.15 H	155	85.7	4.4
11	#10420.00	44.7 PK	74.0	-29.3	1.27 H	241	31.6	13.1
12	#10420.00	32.8 AV	54.0	-21.2	1.27 H	241	19.7	13.1
13	11550.00	44.4 PK	74.0	-29.6	1.22 H	213	30.9	13.5
14	11550.00	32.6 AV	54.0	-21.4	1.22 H	213	19.1	13.5
15	15630.00	41.9 PK	74.0	-32.1	2.04 H	81	28.3	13.6
16	15630.00	31.6 AV	54.0	-22.4	2.04 H	81	18.0	13.6
17	#17325.00	42.5 PK	74.0	-31.5	1.99 H	132	24.7	17.8
18	#17325.00	31.2 AV	54.0	-22.8	1.99 H	132	13.4	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.4 PK	74.0	-5.6	1.46 V	7	64.7	3.7
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.46 V**	**7**	**50.2**	**3.7**
3	*5210.00	105.2 PK			1.46 V	7	101.5	3.7
4	*5210.00	96.7 AV			1.46 V	7	93.0	3.7
5	5350.00	57.9 PK	74.0	-16.1	1.46 V	7	53.8	4.1
6	5350.00	53.2 PK	74.0	-20.8	1.55 V	14	49.1	4.1
7	5350.00	44.9 AV	54.0	-9.1	1.46 V	7	40.8	4.1
8	5350.00	43.7 AV	54.0	-10.3	1.55 V	14	39.6	4.1
9	*5775.00	102.5 PK			1.55 V	14	98.1	4.4
10	*5775.00	95.1 AV			1.55 V	14	90.7	4.4
11	#10420.00	46.9 PK	74.0	-27.1	1.58 V	294	33.8	13.1
12	#10420.00	35.6 AV	54.0	-18.4	1.58 V	294	22.5	13.1
13	11550.00	56.3 PK	74.0	-17.7	1.63 V	304	42.8	13.5
14	11550.00	45.5 AV	54.0	-8.5	1.63 V	304	32.0	13.5
15	15630.00	43.0 PK	74.0	-31.0	1.41 V	117	29.4	13.6
16	15630.00	32.8 AV	54.0	-21.2	1.41 V	117	19.2	13.6
17	#17325.00	60.3 PK	74.0	-13.7	1.05 V	27	42.5	17.8
18	#17325.00	51.6 AV	54.0	-2.4	1.05 V	27	33.8	17.8

REMARKS:

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

Below 1GHz Data:

802.11ac (VHT20)

CHANNEL	TX Channel 157	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	99.34	30.2 QP	43.5	-13.3	2.50 H	144	42.8	-12.6
2	155.63	34.1 QP	43.5	-9.4	2.50 H	122	42.4	-8.3
3	341.62	38.9 QP	46.0	-7.1	1.00 H	56	45.4	-6.5
4	498.62	31.2 QP	46.0	-14.8	2.50 H	77	34.3	-3.1
5	645.12	30.5 QP	46.0	-15.5	3.00 H	228	30.7	-0.2
6	796.31	35.1 QP	46.0	-10.9	1.50 H	204	33.1	2.0
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	121.55	34.5 QP	43.5	-9.0	2.50 V	21	44.5	-10.0
2	288.01	31.2 QP	46.0	-14.8	3.00 V	193	39.1	-7.9
3	502.31	38.5 QP	46.0	-7.5	1.50 V	296	41.5	-3.0
4	781.54	34.7 QP	46.0	-11.3	1.50 V	203	32.6	2.1
5	821.14	35.4 QP	46.0	-10.6	3.00 V	287	33.1	2.3
6	875.11	37.9 QP	46.0	-8.1	1.50 V	42	35.3	2.6

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 20167	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3 Tested Date: Nov. 30 ,2017

4.2.3 Test Procedure

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

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

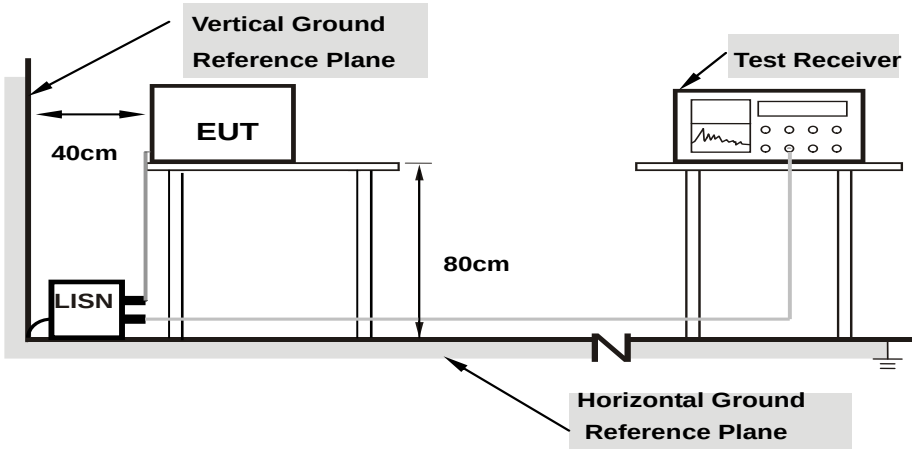
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

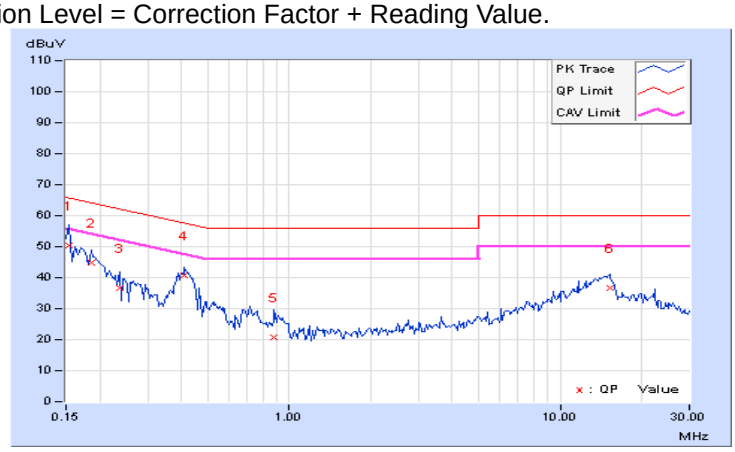
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.08	40.20	24.29	50.28	34.37	65.79	55.79	-15.51	-21.42
2	0.18516	10.07	34.81	17.81	44.88	27.88	64.25	54.25	-19.37	-26.37
3	0.23594	10.08	26.57	11.78	36.65	21.86	62.24	52.24	-25.59	-30.38
4	**0.41172**	**10.12**	**30.44**	**22.83**	**40.56**	**32.95**	**57.61**	**47.61**	**-17.05**	**-14.66**
5	0.87656	10.16	10.42	4.27	20.58	14.43	56.00	46.00	-35.42	-31.57
6	15.24609	11.22	25.48	20.43	36.70	31.65	60.00	50.00	-23.30	-18.35

REMARKS:

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

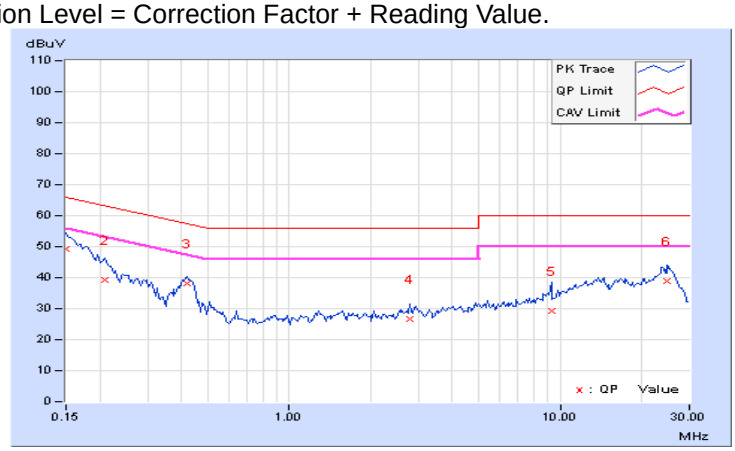


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.08	39.35	23.78	49.43	33.86	66.00	56.00	-16.57	-22.14
2	0.20859	10.04	29.23	11.26	39.27	21.30	63.26	53.26	-23.99	-31.96
3	0.41953	10.12	27.96	20.70	38.08	30.82	57.46	47.46	-19.38	-16.64
4	2.77344	10.23	16.55	8.37	26.78	18.60	56.00	46.00	-29.22	-27.40
5	9.34766	10.66	18.69	13.15	29.35	23.81	60.00	50.00	-30.65	-26.19
6	24.86719	11.28	27.59	22.14	38.87	33.42	60.00	50.00	-21.13	-16.58

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 Measurment

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	19.41	19.69	19.73	19.92	372.555	25.71	30.00	Pass
40	5200	19.99	19.85	19.74	19.94	389.192	25.90	30.00	Pass
48	5240	19.58	19.69	19.85	19.93	378.899	25.79	30.00	Pass
149	5745	23.37	23.33	24.44	24.16	971.134	29.87	30.00	Pass
157	5785	23.64	23.21	24.56	24.22	990.617	29.96	30.00	Pass
165	5825	23.72	23.53	24.57	23.35	963.619	29.84	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	19.47	19.58	19.71	20.39	382.231	25.82	30.00	Pass
40	5200	19.63	19.43	19.61	20.44	381.606	25.82	30.00	Pass
48	5240	19.42	19.62	19.62	20.41	380.643	25.81	30.00	Pass
149	5745	23.45	23.47	24.52	24.02	979.127	29.91	30.00	Pass
157	5785	24.01	23.48	24.06	24.24	994.756	29.98	30.00	Pass
165	5825	23.81	23.67	24.06	24.07	983.198	29.93	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.00	17.98	17.65	18.77	259.448	24.14	30.00	Pass
46	5230	19.43	19.31	18.23	20.08	341.396	25.33	30.00	Pass
151	5755	22.29	21.69	21.66	22.39	636.94	28.04	30.00	Pass
159	5795	22.16	21.96	21.85	21.89	629.107	27.99	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	15.59	15.61	16.12	15.17	146.427	21.66	30.00	Pass
155	5775	20.68	20.33	19.59	19.63	407.669	26.10	30.00	Pass

802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42 +155	5210	19.87	20.02	-	-	197.513	22.96	30.00	Pass
	5775	-	-	20.01	20.48	211.917	23.26	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	19.47	19.58	19.71	20.39	382.231	25.82	26.11	Pass
40	5200	19.63	19.43	19.61	20.44	381.606	25.82	26.11	Pass
48	5240	19.42	19.62	19.62	20.41	380.643	25.81	26.11	Pass
149	5745	19.62	19.89	20.49	19.12	382.723	25.83	26.11	Pass
157	5785	19.56	19.71	19.99	19.93	382.077	25.82	26.11	Pass
165	5825	19.69	19.99	20.45	19.13	385.644	25.86	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power limit shall be reduced to 30-(9.89-6) = 26.11dBm

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.00	17.98	17.65	18.77	259.448	24.14	26.11	Pass
46	5230	19.43	19.31	18.23	20.08	341.396	25.33	26.11	Pass
151	5755	19.72	20.27	19.89	20.21	402.623	26.05	26.11	Pass
159	5795	19.45	19.78	20.55	20.02	397.128	25.99	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power limit shall be reduced to 30-(9.89-6) = 26.11dBm

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	15.59	15.61	16.12	15.17	146.427	21.66	26.11	Pass
155	5775	20.68	20.33	19.59	19.63	407.669	26.10	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power limit shall be reduced to 30-(9.89-6) = 26.11dBm

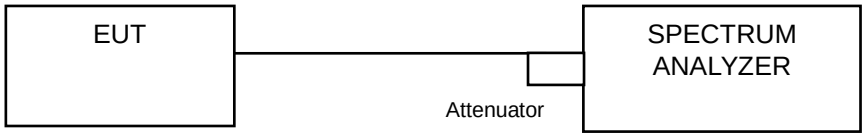
802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42+155	5210	19.87	20.02	-	-	197.513	22.96	29.29	Pass
	5775	-	-	20.01	20.48	211.917	23.26	28.95	Pass

Note: 1. For UNII-1: Directional gain = 3.70dBi + 10log(2) = 6.71dBi > 6dBi , so the power limit shall be reduced to 30-(6.71-6) = 29.29dBm.
2. For UNII-3: Directional gain = 4.04dBi + 10log(2) = 7.05dBi > 6dBi , so the power limit shall be reduced to 30-(7.05-6) = 28.95dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.56	16.68	16.56	16.56
40	5200	16.80	16.56	16.68	16.56
48	5240	16.44	16.68	16.68	16.56
149	5745	17.76	18.36	20.16	18.00
157	5785	18.24	17.64	20.16	18.48
165	5825	17.88	17.88	20.64	18.36

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.64	17.52	17.76	17.76
40	5200	17.76	17.64	17.64	17.76
48	5240	17.64	17.64	17.64	17.76
149	5745	18.60	19.08	21.48	18.96
157	5785	18.72	19.44	18.96	18.96
165	5825	18.72	19.20	23.40	21.00

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.24	36.48	36.24	36.48
46	5230	36.24	36.24	36.24	36.24
151	5755	36.48	37.20	36.48	36.72
159	5795	37.20	37.20	36.96	36.96

802.11ac (VHT80)

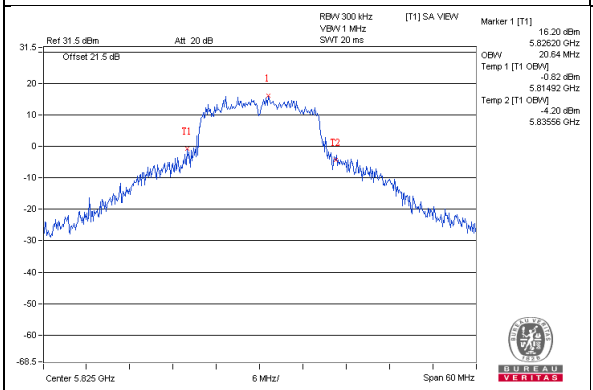
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	76.32	75.36	75.36	75.84
155	5775	76.32	76.32	76.32	75.84

802.11ac (VHT80+80)

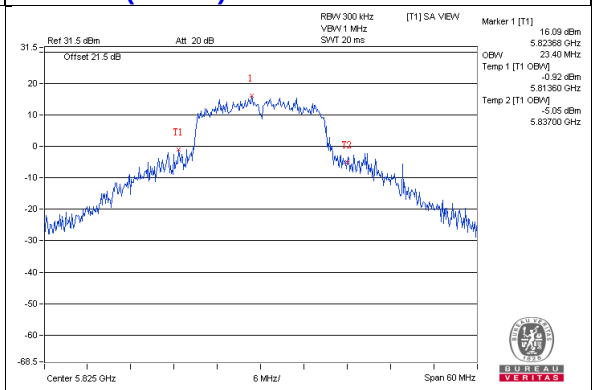
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42+155	5210	76.32	75.84	-	-
	5775	-	-	76.32	76.32

Spectrum Plot of Worst Value

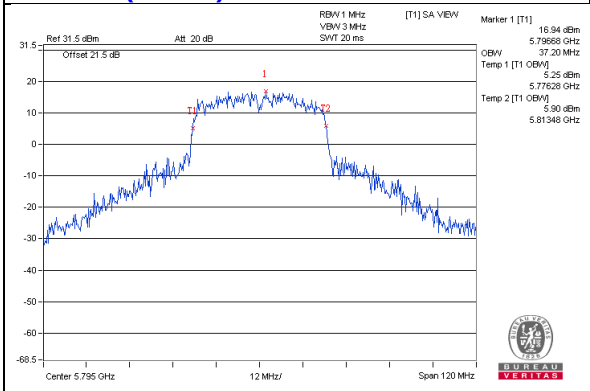
802.11a / Chain 2 : CH165



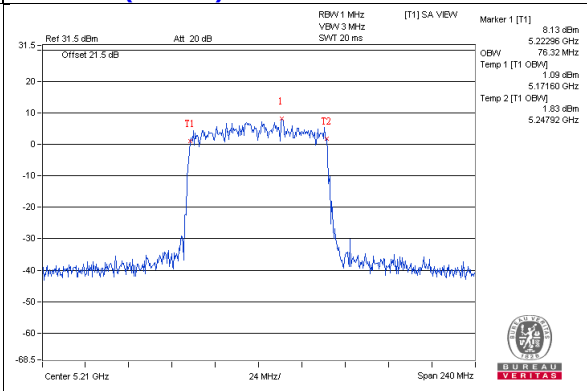
802.11ac (VHT20) / Chain 2 : CH165



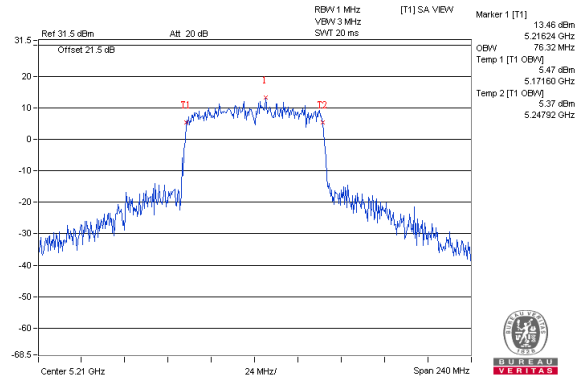
802.11ac (VHT40) / Chain 0 : CH159



802.11ac (VHT80) / Chain 0 : CH42

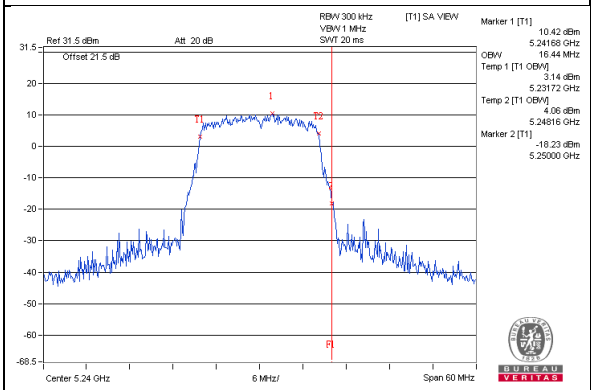


802.11ac (VHT80+80) / Chain 0 : CH42

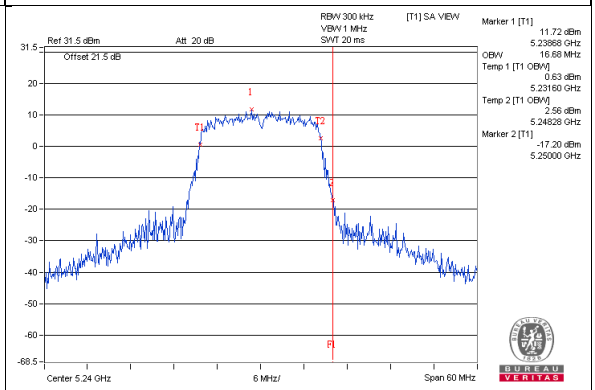


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

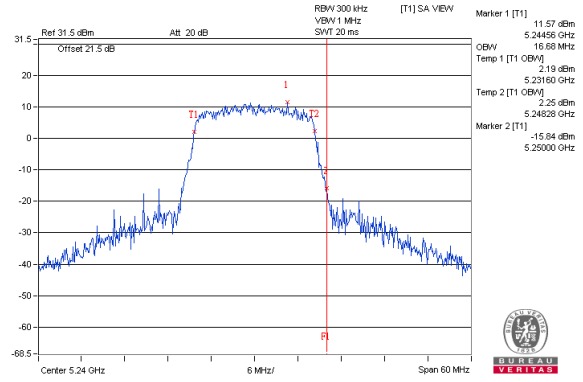
802.11a / Chain 0 : CH48



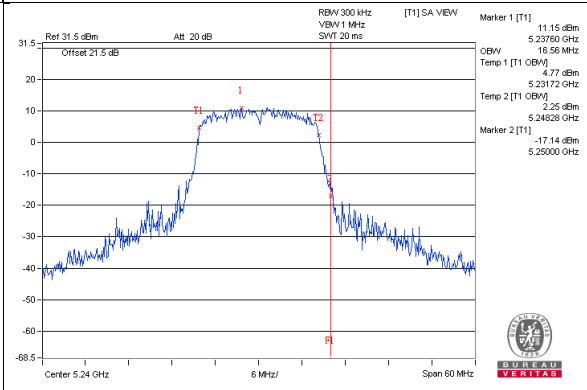
802.11a / Chain 1 : CH48



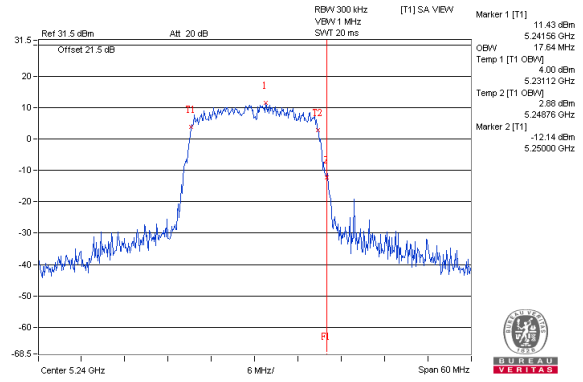
802.11a / Chain 2 : CH48



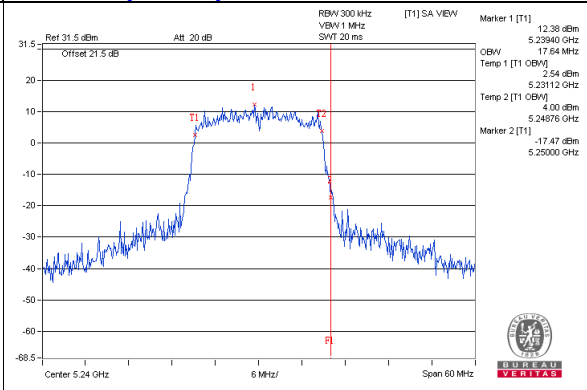
802.11a / Chain 3 : CH48



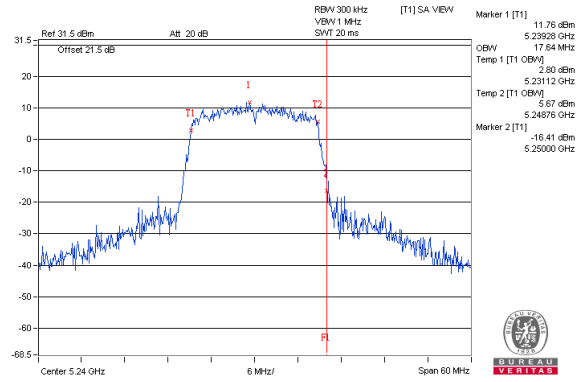
802.11ac (VHT20) / Chain 0 : CH48



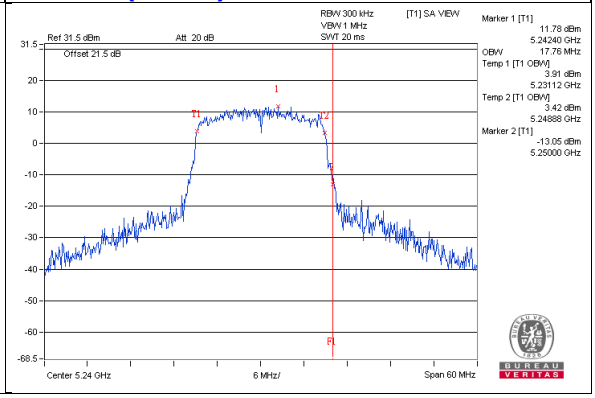
802.11ac (VHT20) / Chain 1 : CH48



802.11ac (VHT20) / Chain 2 : CH48

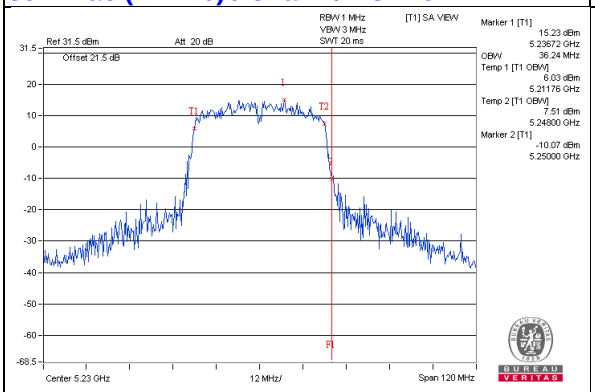


802.11ac (VHT20) / Chain 3 : CH48

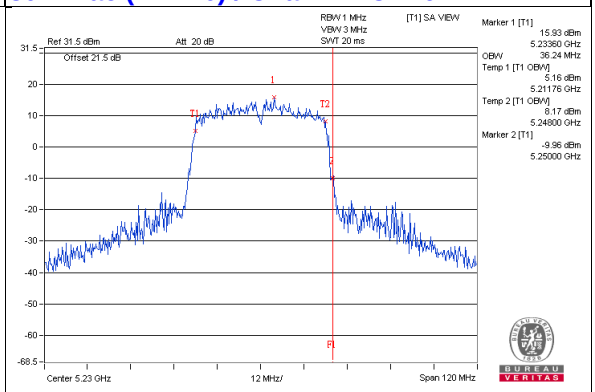


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

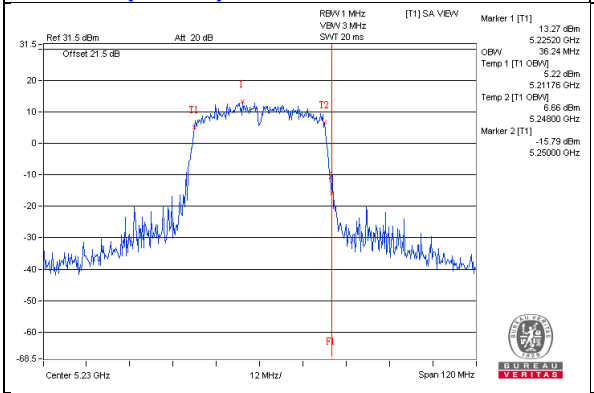
802.11ac (VHT40) / Chain 0 : CH46



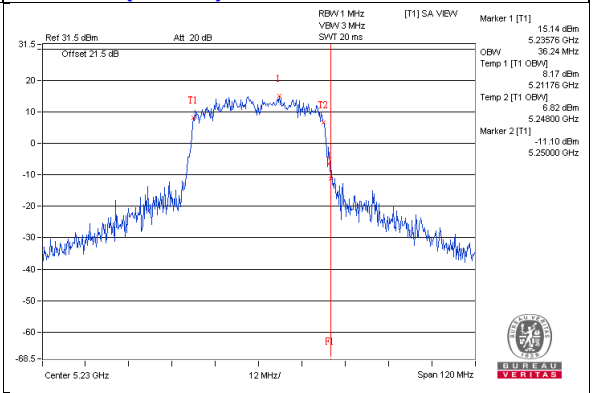
802.11ac (VHT40) / Chain 1 : CH46



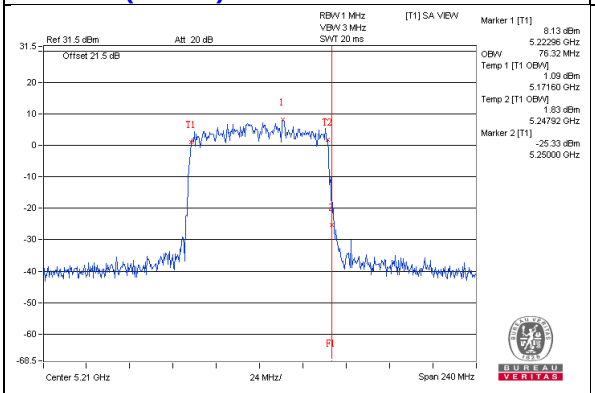
802.11ac (VHT40) / Chain 2 : CH46



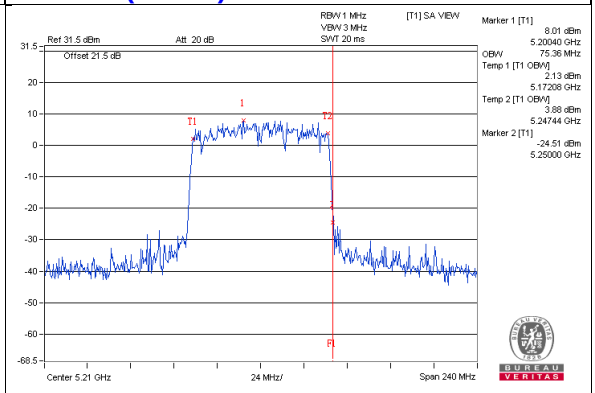
802.11ac (VHT40) / Chain 3 : CH46



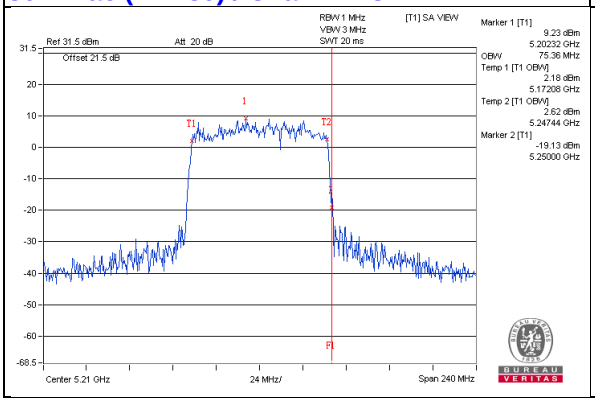
802.11ac (VHT80) / Chain 0 : CH42



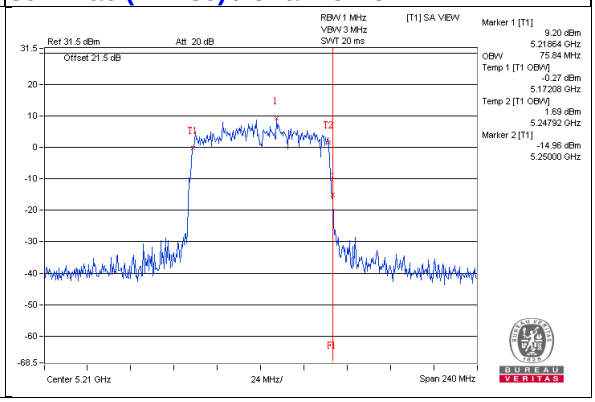
802.11ac (VHT80) / Chain 1 : CH42

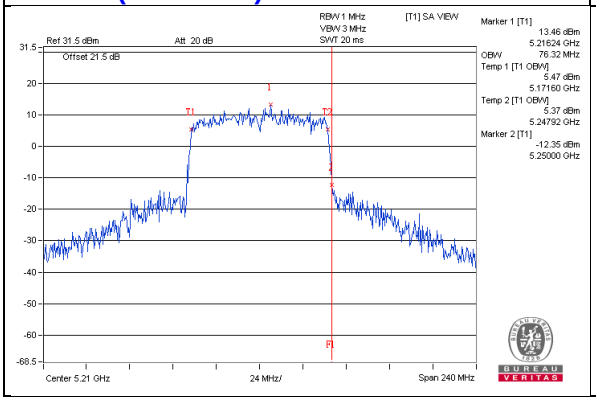
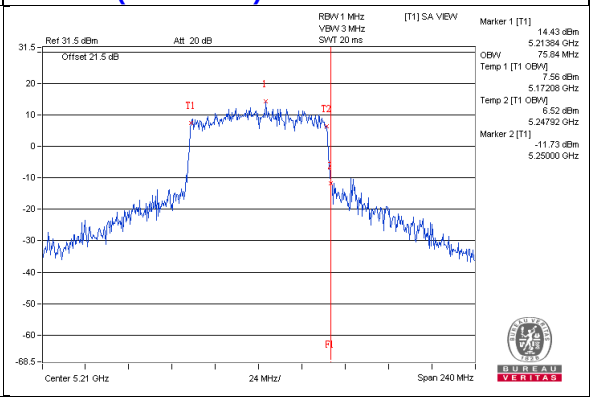


802.11ac (VHT80) / Chain 2 : CH42



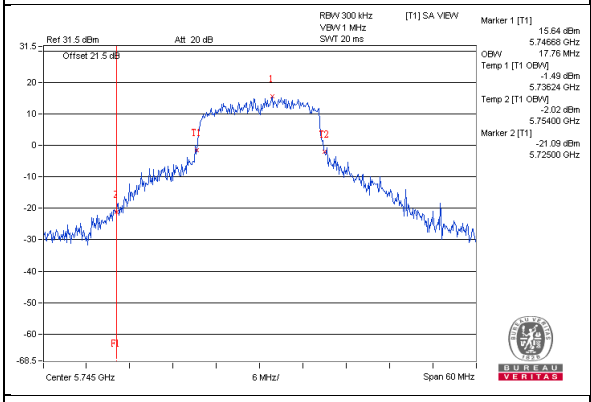
802.11ac (VHT80) / Chain 3 : CH42



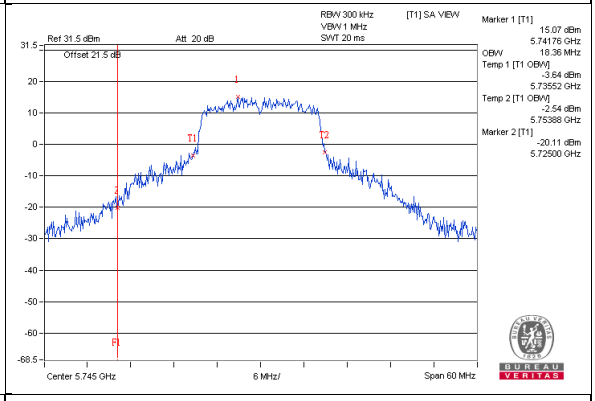
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11ac(VHT80+80) / Chain 0 : CH42	**802.11ac(VHT80+80) / Chain 1 : CH42**
	

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

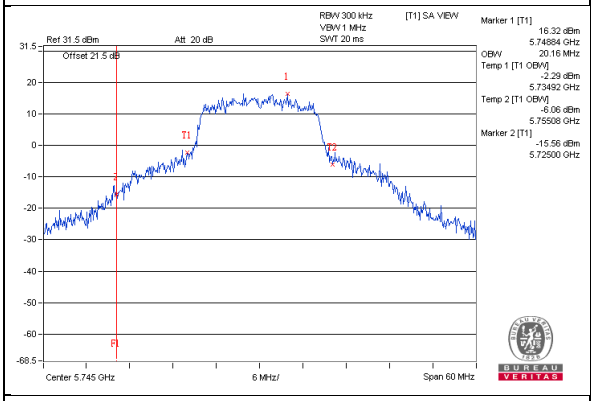
802.11a / Chain 0 : CH149



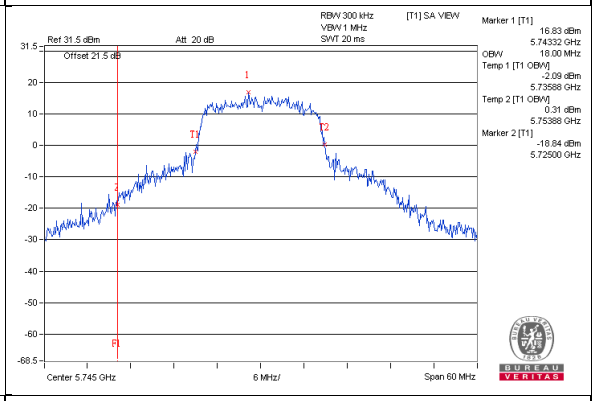
802.11a / Chain 1 : CH149



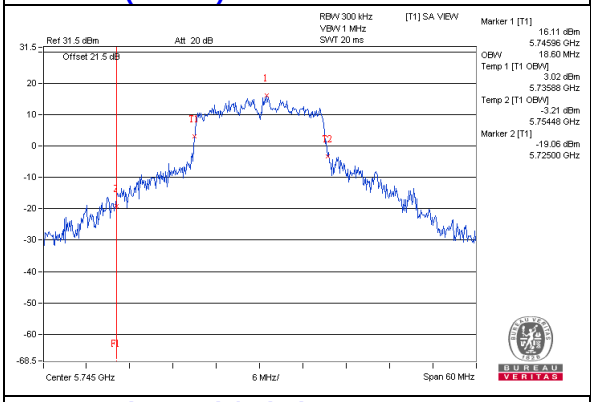
802.11a / Chain 2 : CH149



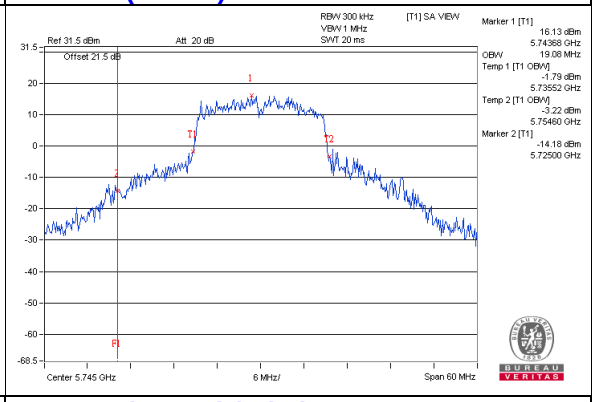
802.11a / Chain 3 : CH149



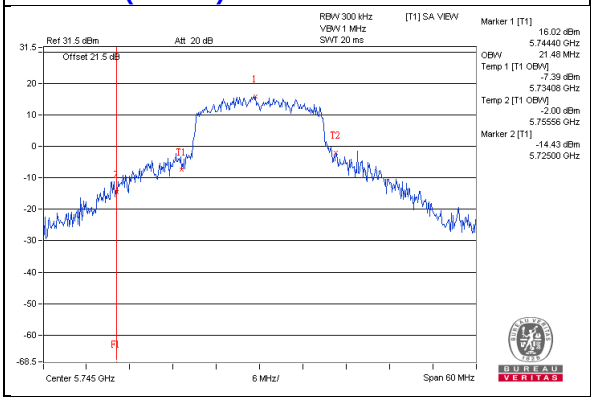
802.11ac (VHT20) / Chain 0 : CH149



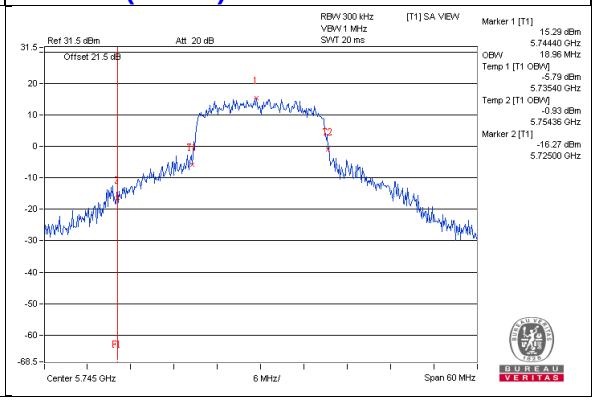
802.11ac (VHT20) / Chain 1 : CH149



802.11ac (VHT20) / Chain 2 : CH149

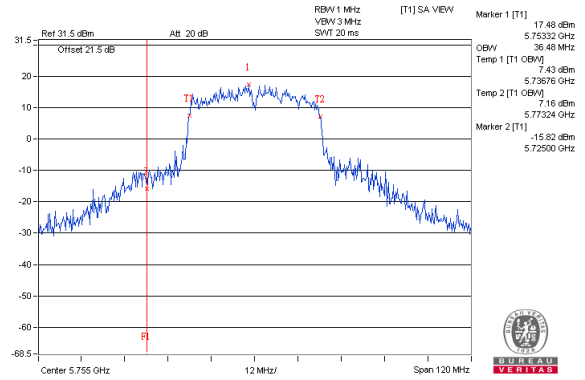


802.11ac (VHT20) / Chain 3 : CH149

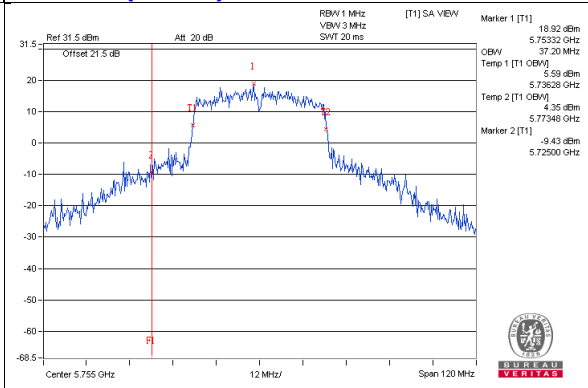


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

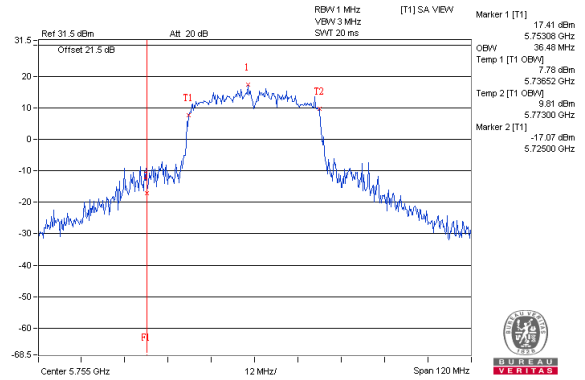
802.11ac (VHT40) / Chain 0 : CH151



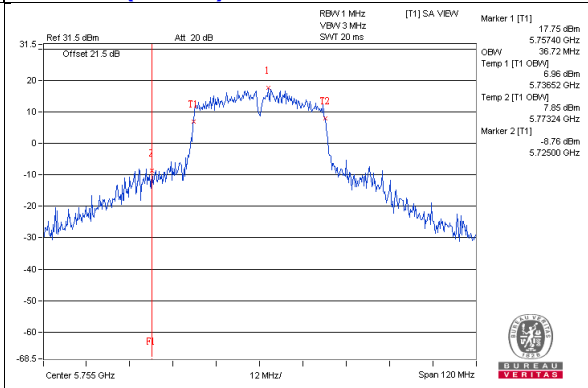
802.11ac (VHT40) / Chain 1 : CH151



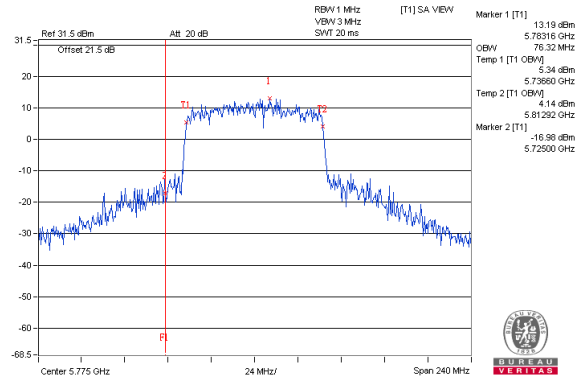
802.11ac (VHT40) / Chain 2 : CH151



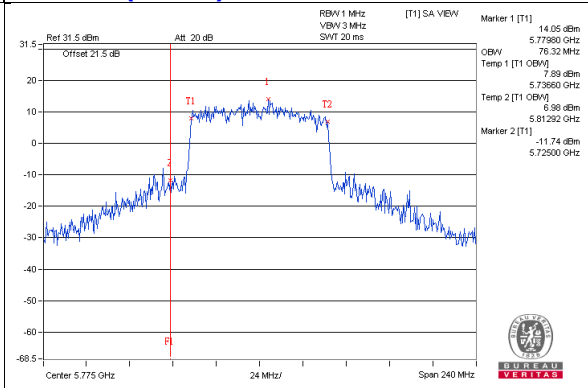
802.11ac (VHT40) / Chain 3 : CH151



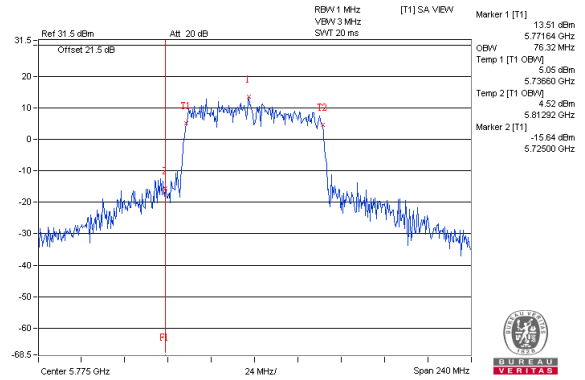
802.11ac (VHT80) / Chain 0 : CH155



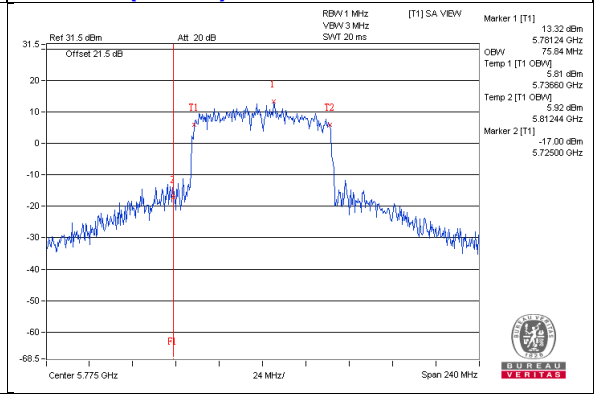
802.11ac (VHT80) / Chain 1 : CH155

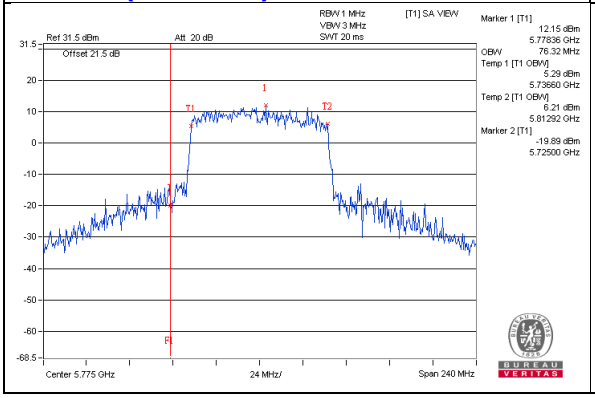
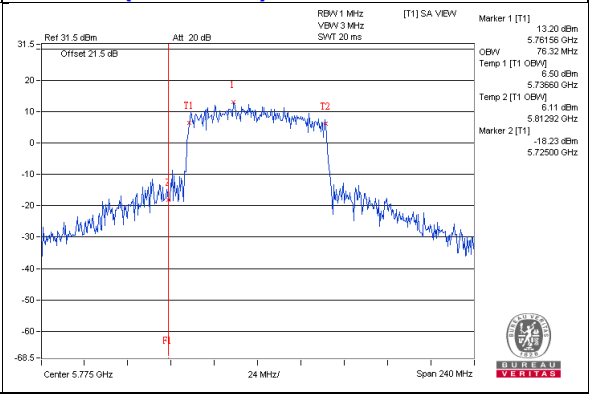


802.11ac (VHT80) / Chain 2 : CH155



802.11ac (VHT80) / Chain 3 : CH155



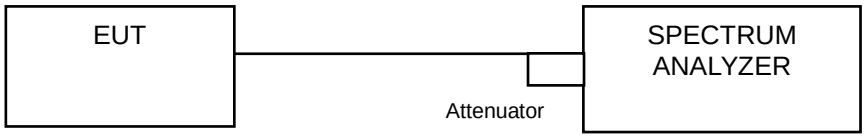
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ac (VHT80+80) / Chain 2 : CH155	**802.11ac (VHT80+80) / Chain 3 : CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.35	4.35	4.46	5.20	0.94	11.82	13.11	Pass
40	5200	4.95	4.68	4.75	5.60	0.94	11.97	13.11	Pass
48	5240	5.03	4.99	4.10	5.31	0.94	11.84	13.11	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 17-(9.89-6) = 13.11dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.89	4.30	4.23	5.12	0.95	11.62	13.11	Pass
40	5200	5.03	4.65	4.20	5.35	0.59	11.80	13.11	Pass
48	5240	5.54	3.67	4.48	5.89	0.95	11.95	13.11	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 17-(9.89-6) = 13.11dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-0.36	-2.03	-1.20	0.52	1.82	7.18	13.11	Pass
46	5230	3.87	4.21	4.20	4.68	1.82	12.09	13.11	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 17-(9.89-6) = 13.11dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-7.38	-8.01	-8.15	-6.58	2.91	1.44	13.11	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 17-(9.89-6) = 13.11dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

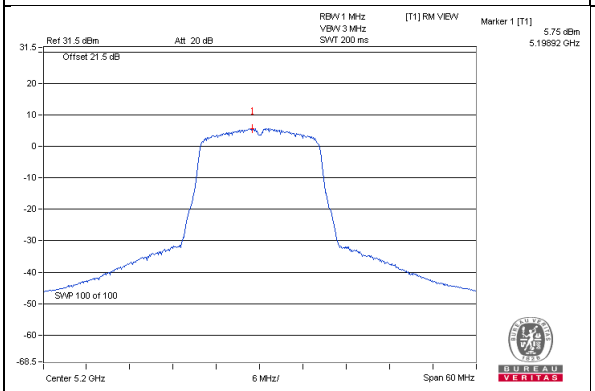
802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42+ 155	5210	-1.77	-1.20	-	-	2.91	4.44	16.29	Pass
	5775	Test results refer to U_NII-3 data							

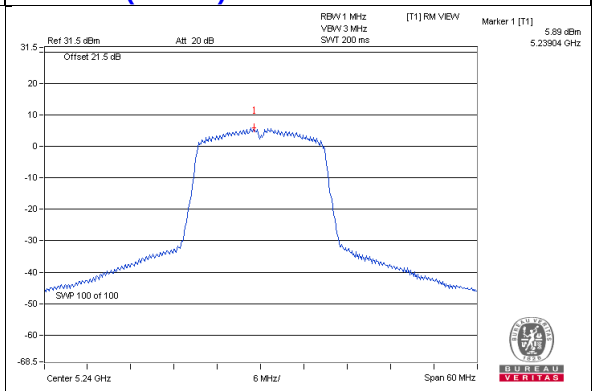
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 3.70dBi + 10log(2) = 6.71dBi > 6dBi, so the power density limit shall be reduced to 17-(6.71-6) = 16.29dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

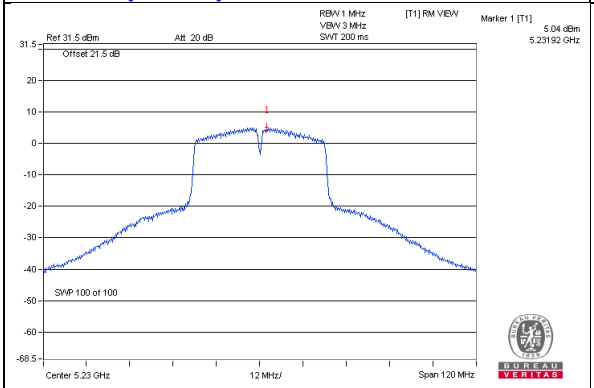
802.11a / Chain 3 : CH40



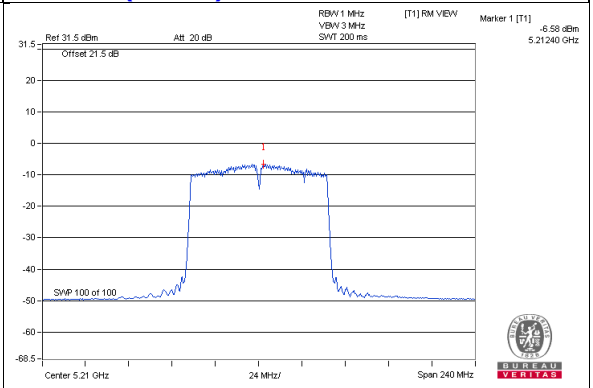
802.11ac (VHT20) / Chain 3 : CH48



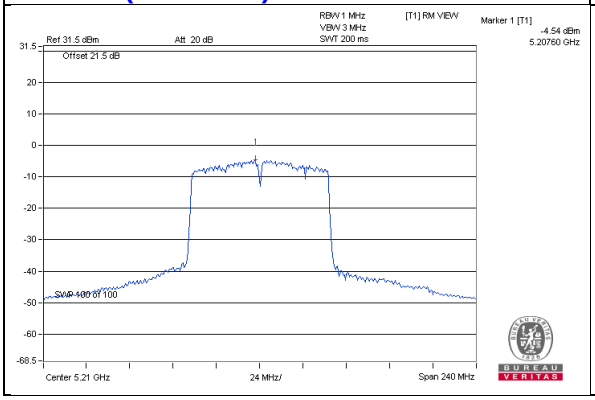
802.11ac (VHT40) / Chain 3 : CH46



802.11ac (VHT80) / Chain 3 : CH42



802.11ac (VHT80+80) / Chain 1 : CH42



For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-3.61	-1.39	6.02	0.94	5.57	26.11	Pass
	157	5785	-3.19	-0.97	6.02	0.94	5.99	26.11	Pass
	165	5825	-3.36	-1.14	6.02	0.94	5.82	26.11	Pass
1	149	5745	-0.71	1.51	6.02	0.94	8.47	26.11	Pass
	157	5785	-3.81	-1.59	6.02	0.94	5.37	26.11	Pass
	165	5825	-3.08	-0.86	6.02	0.94	6.10	26.11	Pass
2	149	5745	-0.70	1.52	6.02	0.94	8.48	26.11	Pass
	157	5785	-0.26	1.96	6.02	0.94	8.92	26.11	Pass
	165	5825	-0.09	2.13	6.02	0.94	9.09	26.11	Pass
3	149	5745	-1.17	1.05	6.02	0.94	8.01	26.11	Pass
	157	5785	-3.44	-1.22	6.02	0.94	5.74	26.11	Pass
	165	5825	-2.74	-0.52	6.02	0.94	6.44	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 30-(9.89-6) = 26.11dBm.

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

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-3.83	-1.61	6.02	0.95	5.36	26.11	Pass
	157	5785	-1.94	0.28	6.02	0.95	7.25	26.11	Pass
	165	5825	-3.31	-1.09	6.02	0.95	5.88	26.11	Pass
1	149	5745	-1.10	1.12	6.02	0.95	8.09	26.11	Pass
	157	5785	-3.58	-1.36	6.02	0.95	5.61	26.11	Pass
	165	5825	-3.90	-1.68	6.02	0.95	5.29	26.11	Pass
2	149	5745	-2.69	-0.47	6.02	0.95	6.50	26.11	Pass
	157	5785	-2.97	-0.75	6.02	0.95	6.22	26.11	Pass
	165	5825	-3.42	-1.20	6.02	0.95	5.77	26.11	Pass
3	149	5745	-3.54	-1.32	6.02	0.95	5.65	26.11	Pass
	157	5785	-2.53	-0.31	6.02	0.95	6.66	26.11	Pass
	165	5825	-2.02	0.20	6.02	0.95	7.17	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 30-(9.89-6) = 26.11dBm.

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

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-5.78	-3.56	6.02	1.82	4.28	26.11	Pass
	159	5795	-11.38	-9.16	6.02	1.82	-1.32	26.11	Pass
1	151	5755	-6.64	-4.42	6.02	1.82	3.42	26.11	Pass
	159	5795	-12.09	-9.87	6.02	1.82	-2.03	26.11	Pass
2	151	5755	-6.91	-4.69	6.02	1.82	3.15	26.11	Pass
	159	5795	-12.45	-10.23	6.02	1.82	-2.39	26.11	Pass
3	151	5755	-9.03	-6.81	6.02	1.82	1.03	26.11	Pass
	159	5795	-10.70	-8.48	6.02	1.82	-0.64	26.11	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 30-(9.89-6) = 26.11dBm.

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

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-16.12	-13.90	6.02	2.91	-4.97	26.11	Pass
1	155	5775	-15.80	-13.58	6.02	2.91	-4.65	26.11	Pass
2	155	5775	-17.38	-15.16	6.02	2.91	-6.23	26.11	Pass
3	155	5775	-18.03	-15.81	6.02	2.91	-6.88	26.11	Pass

Note: 1. Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$+ $10^{G2/20}$+ $10^{G3/20}$)^2 / 4] = 9.89dBi > 6dBi , so the power density limit shall be reduced to 30-(9.89-6) = 26.11dBm.

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

802.11ac (VHT80+80)

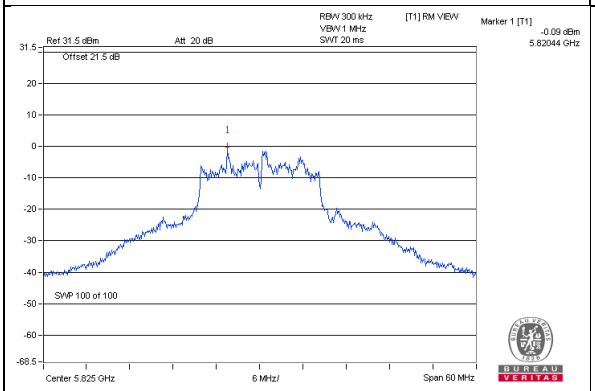
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	42	5210	Test results refer to U_NII-1 data						
1	42	5210	Test results refer to U_NII-1 data						
2	155	5775	-15.19	-12.97	3.01	2.91	-7.05	28.95	Pass
3	155	5775	-17.87	-15.65	3.01	2.91	-9.73	28.95	Pass

Note: 1. Directional gain = 4.04dBi + 10log(2) = 7.05dBi > 6dBi, so the power density limit shall be reduced to 30-(7.05-6) = 28.95dBm.

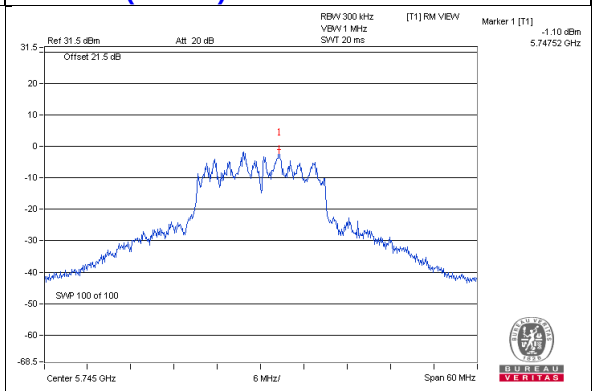
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

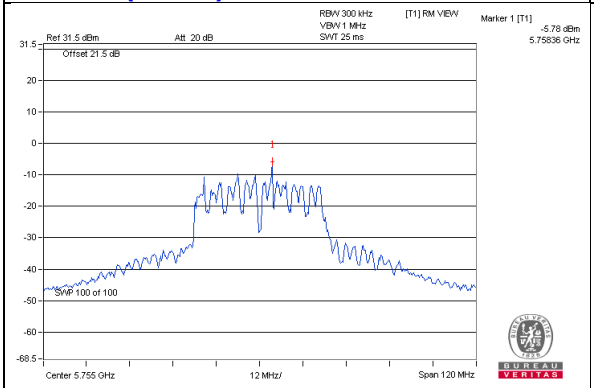
802.11a / Chain 2 : CH165



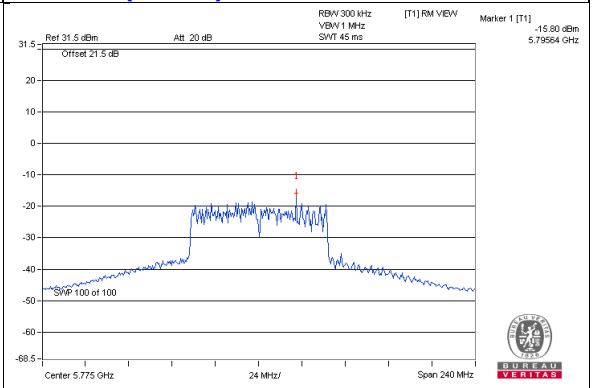
802.11ac (VHT20) / Chain 1 : CH149



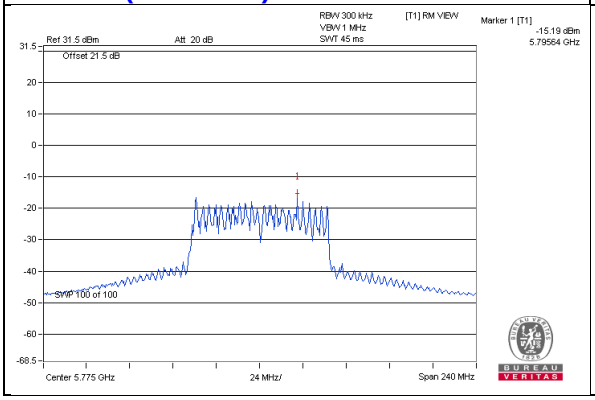
802.11ac (VHT40) / Chain 0 : CH151



802.11ac (VHT80) / Chain 1 : CH155



802.11ac (VHT80+80) / Chain 2 : CH155

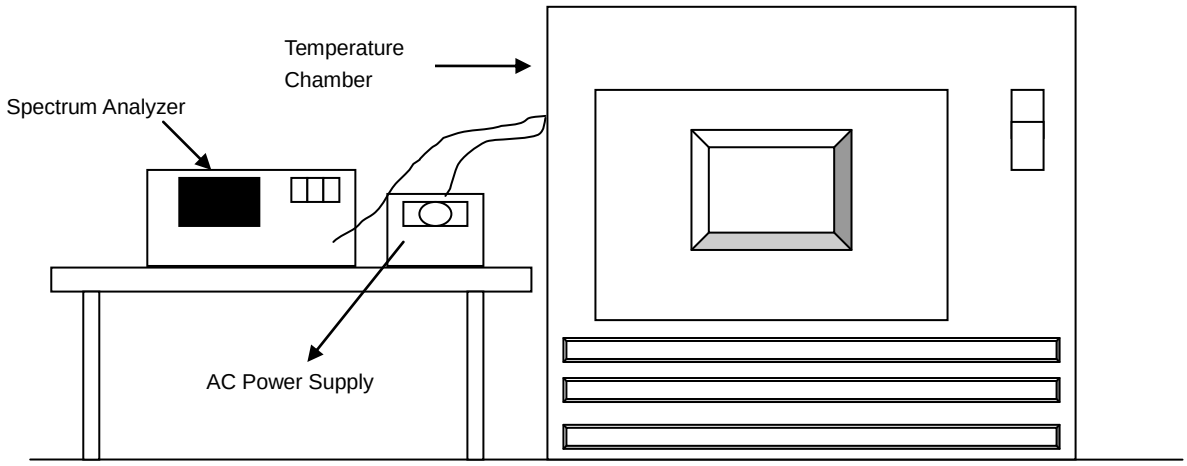


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5180.0121	PASS	5180.0126	PASS	5180.0096	PASS	5180.0109	PASS
40	120	5179.9753	PASS	5179.9746	PASS	5179.975	PASS	5179.9786	PASS
30	120	5179.9831	PASS	5179.9843	PASS	5179.9814	PASS	5179.9834	PASS
20	120	5180.0013	PASS	5180.0015	PASS	5180.0001	PASS	5179.9991	PASS
10	120	5179.9954	PASS	5179.9946	PASS	5179.9931	PASS	5179.9918	PASS
0	120	5179.9878	PASS	5179.9894	PASS	5179.99	PASS	5179.9921	PASS
-10	120	5180.0151	PASS	5180.0118	PASS	5180.0143	PASS	5180.0144	PASS
-20	120	5180.0153	PASS	5180.011	PASS	5180.0109	PASS	5180.011	PASS
-30	120	5180.0195	PASS	5180.0155	PASS	5180.0184	PASS	5180.0146	PASS

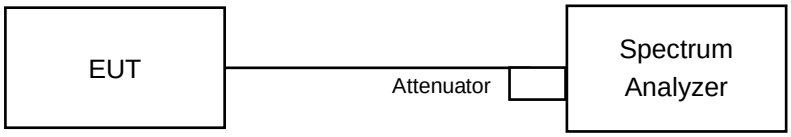
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.001	PASS	5180.0019	PASS	5180	PASS	5180	PASS
	120	5180.0013	PASS	5180.0015	PASS	5180.0001	PASS	5179.9991	PASS
	102	5180.0012	PASS	5180.0023	PASS	5180.0003	PASS	5179.999	PASS

4.7 6dB Bandwidth Measurment

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.75	15.74	15.08	15.20	0.5	PASS
157	5785	16.30	15.19	15.14	15.17	0.5	PASS
165	5825	15.37	15.14	15.11	15.19	0.5	PASS

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.11	15.15	15.18	15.19	0.5	PASS
157	5785	15.08	15.15	15.19	15.18	0.5	PASS
165	5825	15.15	15.12	15.15	15.18	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.02	35.23	35.19	35.24	0.5	PASS
159	5795	33.96	35.23	35.20	35.19	0.5	PASS

802.11ac (VHT80)

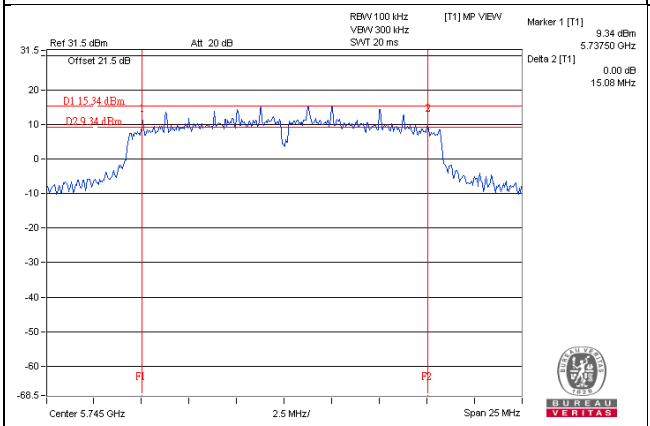
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.38	75.58	75.48	75.45	0.5	PASS

802.11ac (VHT80+80)

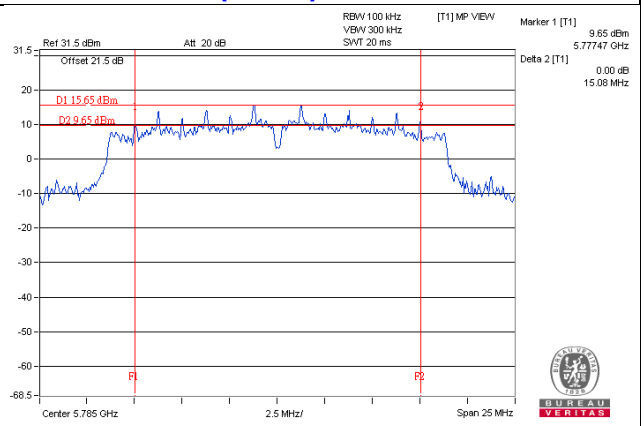
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
42+155	5210	-					
	5775	-	-	75.62	73.04	0.5	PASS

Spectrum Plot of Worst Value

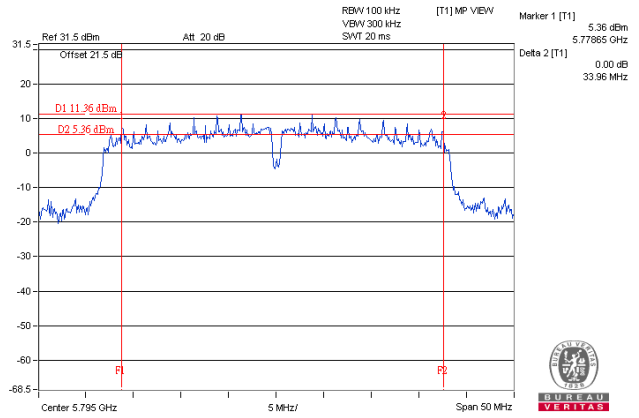
802.11a_Chain 2 / CH149



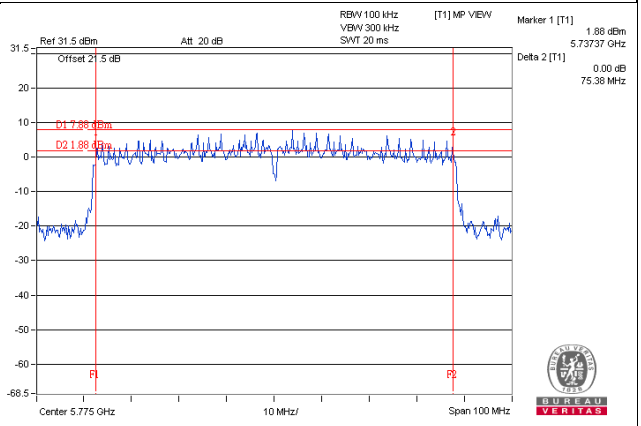
802.11ac (VHT20)_Chain 0 / CH157



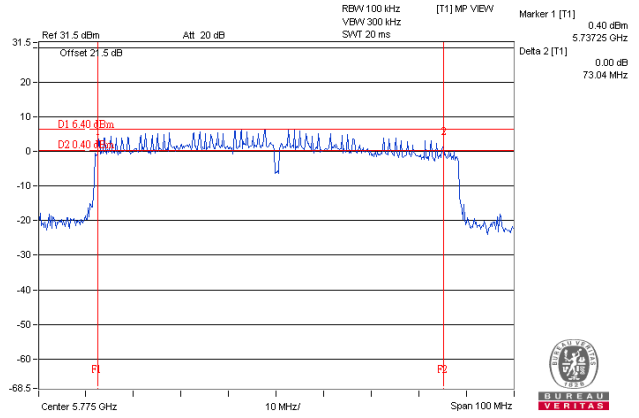
802.11ac (VHT40)_Chain 0 / CH159



802.11ac (VHT80)_Chain 0 / CH155



802.11ac (VHT80+80)_Chain 3 / CH155



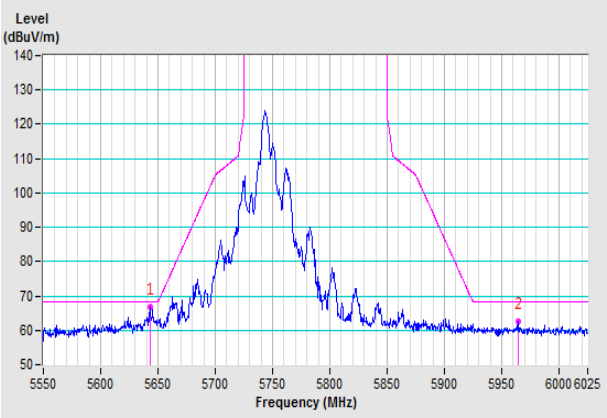
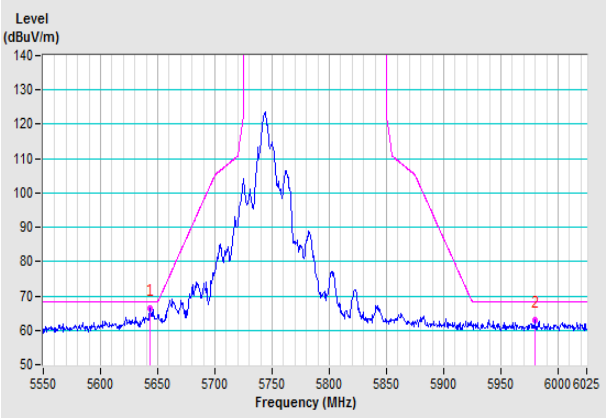
5 Pictures of Test Arrangements

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

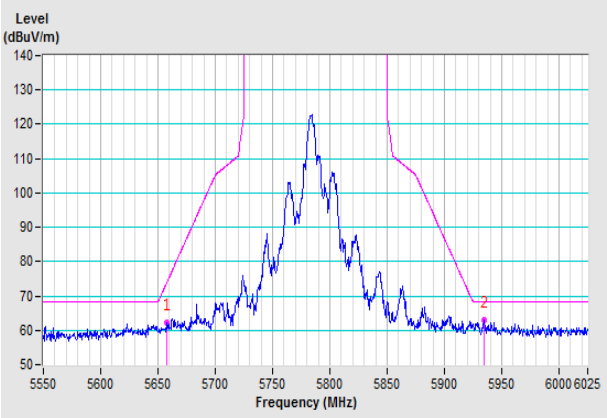
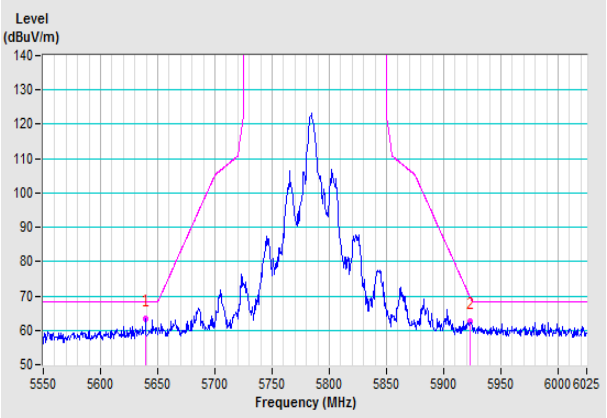
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

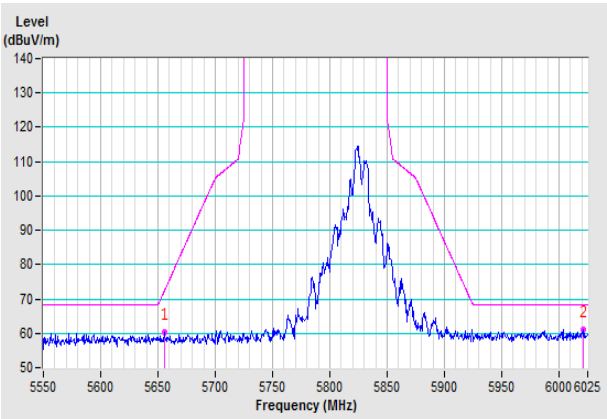
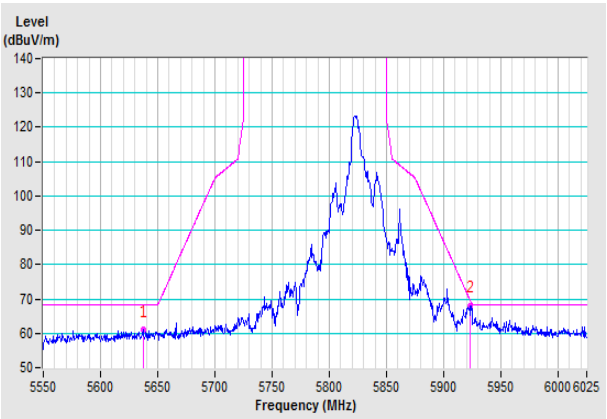
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

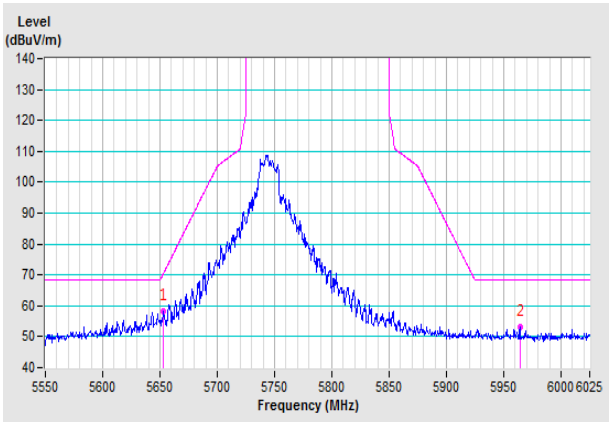
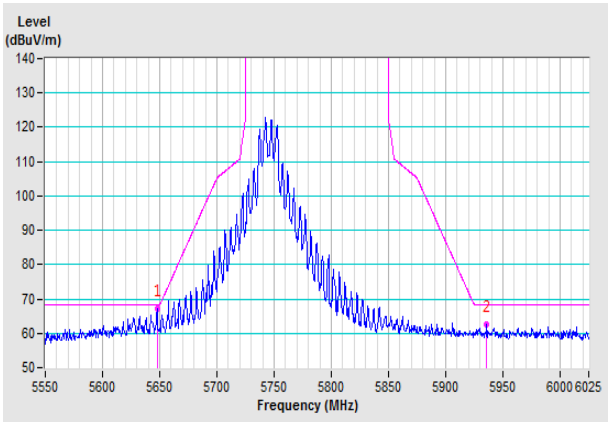
Horizontal	Vertical
	

CH 165 5825 MHz

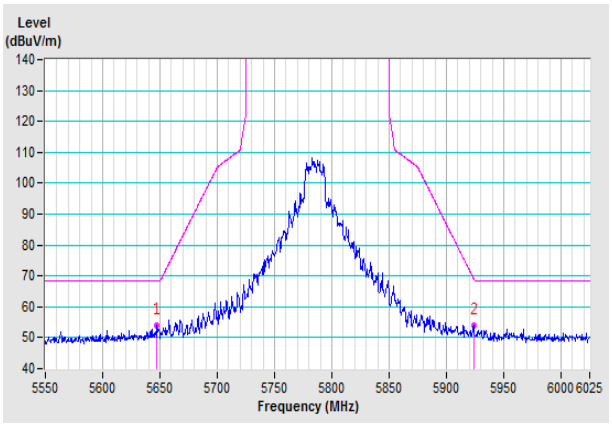
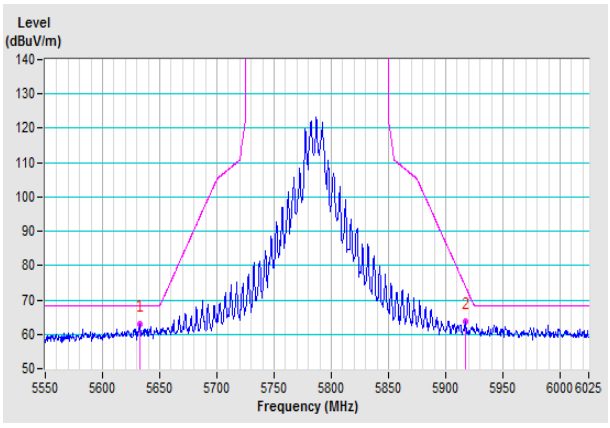
Horizontal	Vertical
	

802.11ac (VHT20)

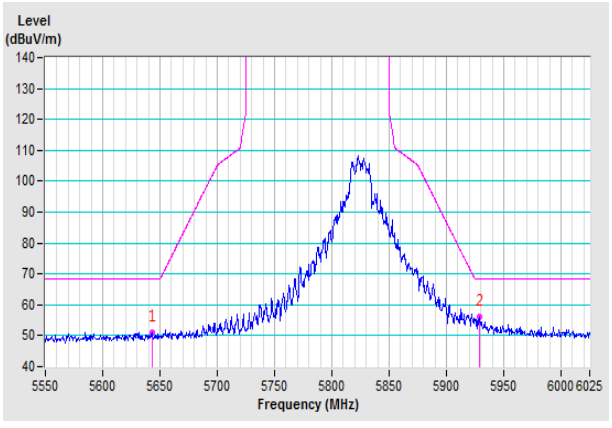
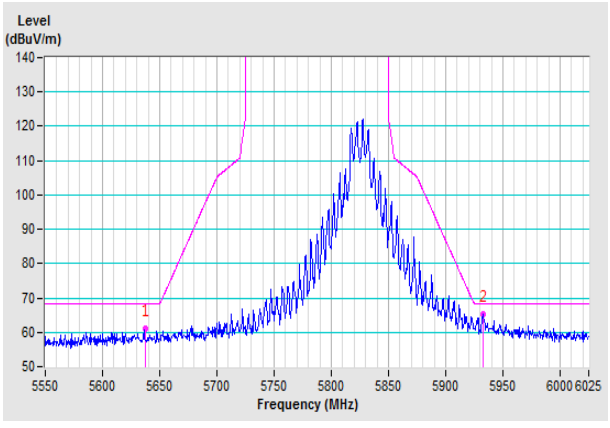
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

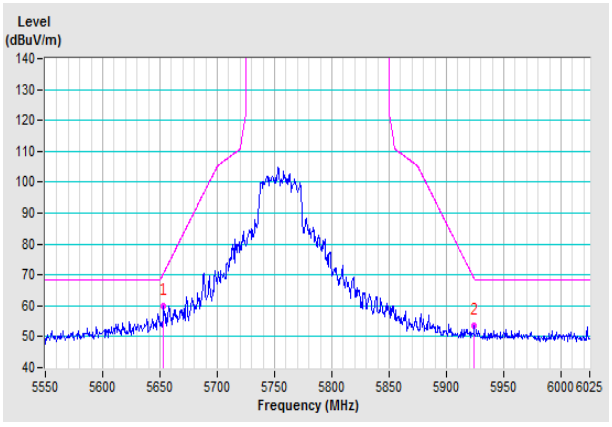
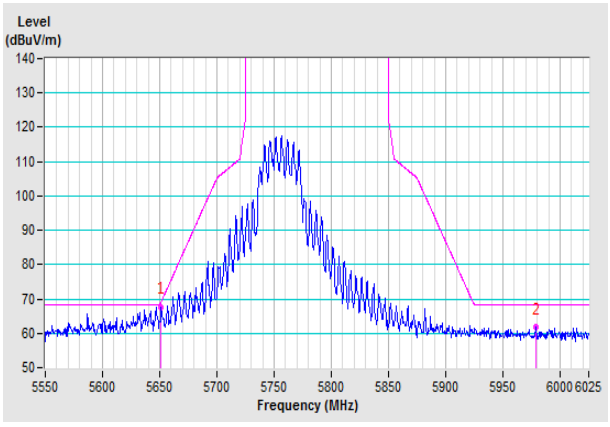
Horizontal	Vertical
	

CH 165 5825 MHz

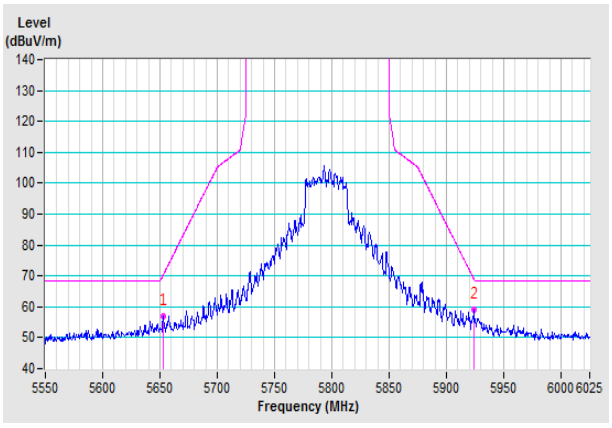
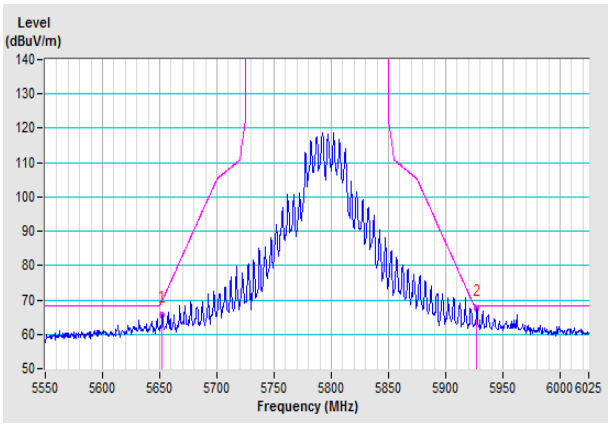
Horizontal	Vertical
	

802.11ac (VHT40)

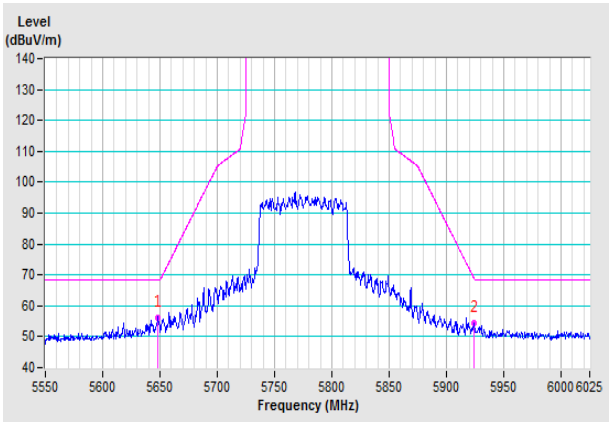
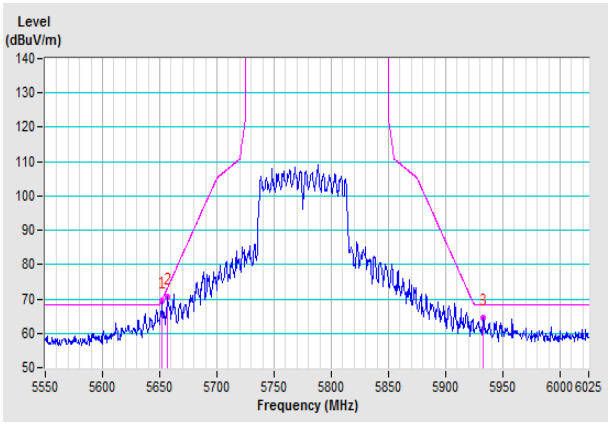
CH 151 5755 MHz

Horizontal	Vertical
	

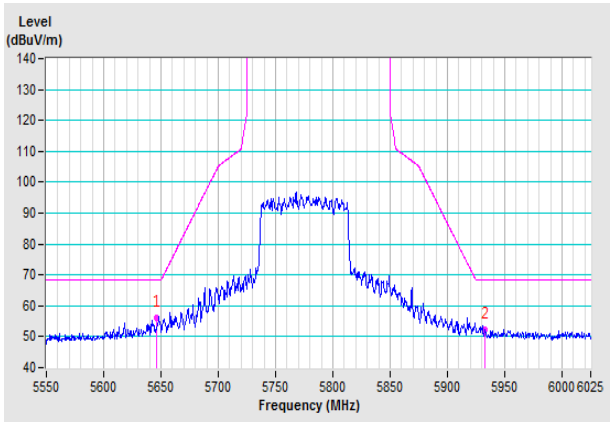
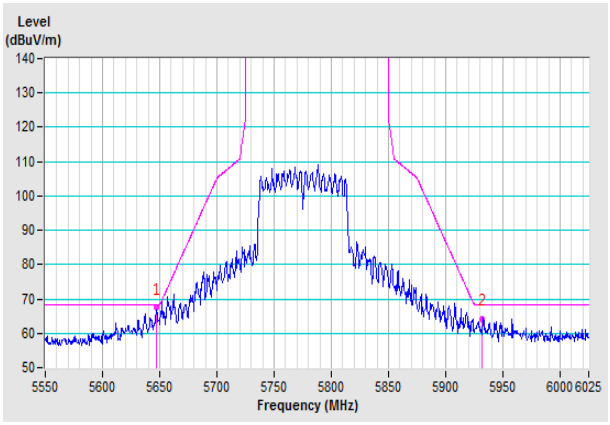
CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz	
Horizontal	**Vertical**
	

802.11ac (VHT80+80)

CH 42+155 5210+5775 MHz	
Horizontal	**Vertical**
	

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

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.

--- END ---