FCC Test Report (WLAN)

Report No.:	RF180625E05-1
FCC ID:	2ABTEG1500
Test Model:	Fios-G1500
Received Date:	July 20, 2018
Test Date:	July 30 to Aug. 27, 2018
Issued Date:	Sep. 12, 2018
Applicant:	Verizon Online LLC
Address:	1300 I Street NW, Room 400W, Washington, District of Columbia, 20005 United State
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180625E05-1	Original release.	Sep. 12, 2018

1 Certificate of Conformity

Product:	Fios-G1500
Brand:	Verizon
Test Model:	Fios-G1500
Sample Status:	ENGINEERING SAMPLE
Applicant:	Verizon Online LLC
Test Date:	July 30 to Aug. 27, 2018
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** Sep. 12, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** Sep. 12, 2018

Max Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.18dB at 0.36094MHz.
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.

2.1 Measurement Uncertainty

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

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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Fios-G1500
Brand	Verizon
Test Model	Fios-G1500
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 996.372mW **5GHz:** **CDD Mode:** **5.18 ~ 5.24GHz:** 564.338mW **5.745 ~ 5.825GHz:** 480.318mW **Beamforming Mode:** **5.18 ~ 5.24GHz:** 564.338mW **5.745 ~ 5.825GHz:** 480.318Mw **SDM Mode:** **5.18 ~ 5.24GHz:** 564.338mW **5.745 ~ 5.825GHz:** 480.318mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. There are WLAN and Z-Wave technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz)	WLAN (5GHz)	Z-Wave

2. Simultaneously transmission condition.

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

3. The USB port of the EUT, it can't connect a WiFi/WWAN dongle and transmit simultaneously.

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

No.	Brand	Model No.	Spec.
1	Ktec	KSA20C1200300HU	Input: 100-240Vac, 1A, 50-60Hz Output: 12V, 3A DC output cable: Unshielded, 1.5m
2	LEI	MU36-D120300-A1	Input: 100-240Vac, 1.5A, 50-60Hz Output: 12V, 3A DC output cable: Unshielded, 1.5m
Note: From the above adapters, the radiated emissions worse case was found in **Adapter No. 2**. Therefore only the test data of the mode was recorded in this report.			

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

WLAN Directional gain table			
Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	2.94	Dipole	i-pex(MHF)
5.15 ~ 5.25	3.56		
5.25 ~ 5.35	3.56		
5.47 ~ 5.725	3.56		
5.725 ~ 5.85	3.56		
Z-Wave antenna spec.			
Antenna Net Gain (dBi)	Frequency range (MHz)	Antenna Type	Antenna Connector
1.73	902~928	Dipole	None
Note: More detailed information, please refer to operating description.			

6. The EUT incorporates a MIMO function:

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

Note:
1. All of modulation mode support beamforming function except 2.4GHz & 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)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	Adapter No. 2
2	-	-	√	-	Adapter No. 1

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement
Note: "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

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

Antenna Port Conducted Measurement:

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

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

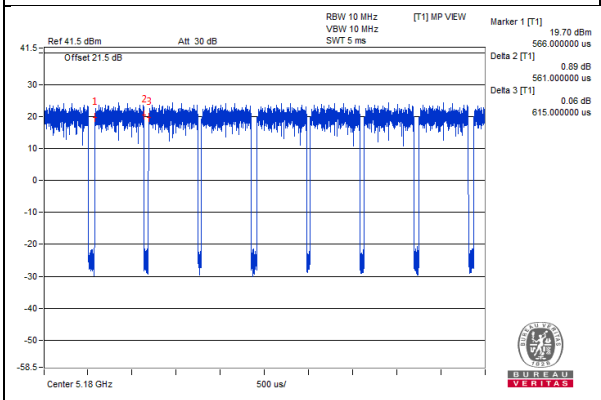
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23deg. C, 63%RH	120Vac, 60Hz	Frank Chuang
RE<1G	21deg. C, 67%RH	120Vac, 60Hz	Eason Tseng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Frank Chuang
APCM	21deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

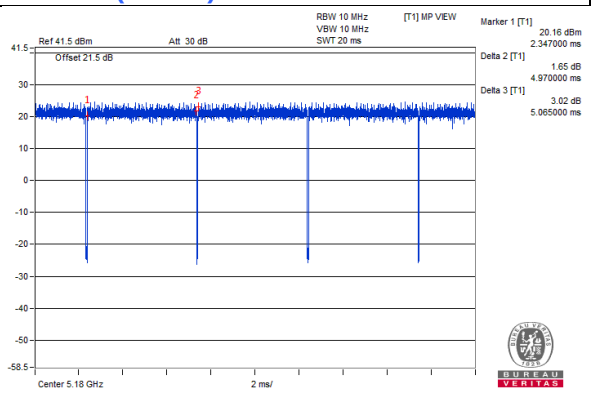
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 0.561 ms/0.615 ms = 0.912, Duty factor = 10 * log (1/Duty cycle) = 0.4
802.11ac (VHT20): Duty cycle = 4.97 ms/5.065 ms = 0.981
802.11ac (VHT40): Duty cycle = 2.415 ms/2.492 ms = 0.969, Duty factor = 10 * log (1/Duty cycle) = 0.14
802.11ac (VHT80): Duty cycle = 1.139 ms/1.201 ms = 0.948, Duty factor = 10 * log (1/Duty cycle) = 0.23

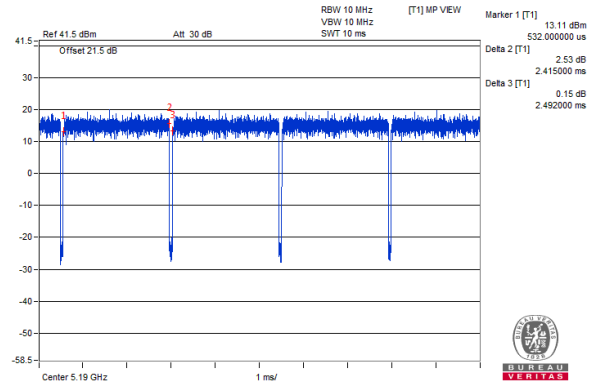
802.11a



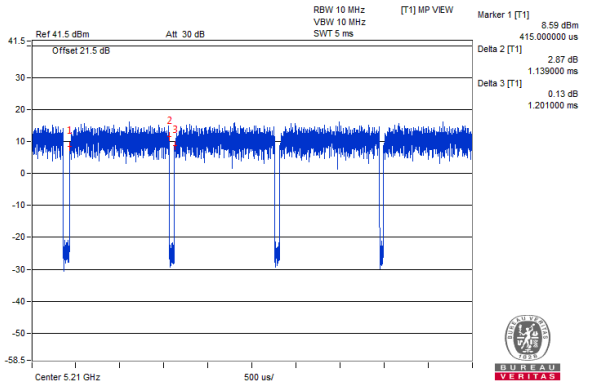
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

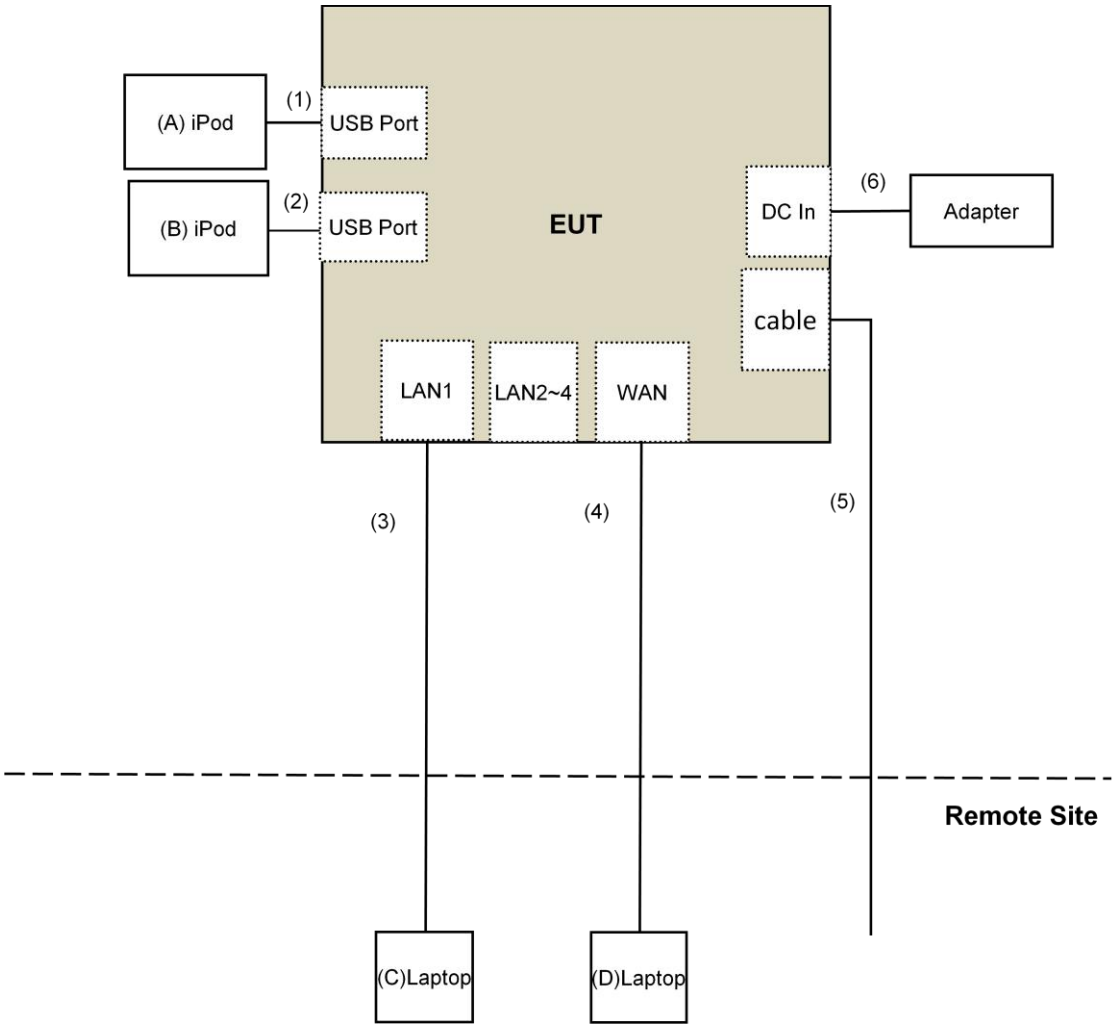
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod	Apple	MC749TA/A	CC4DMFKUDFDM	NA	Provided by Lab
B.	iPod	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
C.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	0.1	Yes	0	Provided by Lab
2.	USB Cable	1	0.1	Yes	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	Coaxial Cable	1	10	Yes	0	Provided by Lab
6.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
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	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
True RMS Clamp Meter FLUKE	325	31130711WS	May 22, 2018	May 21, 2019

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: July 30 to Aug. 27, 2018

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

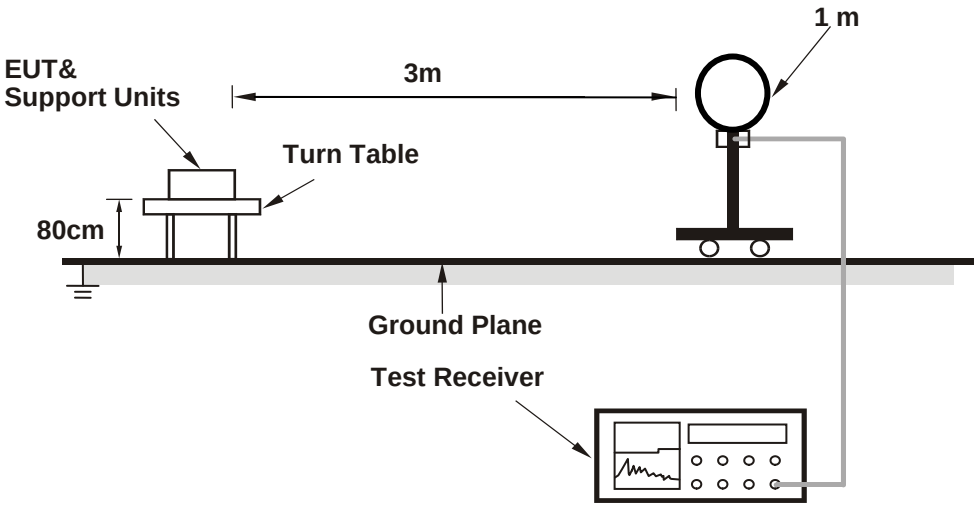
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

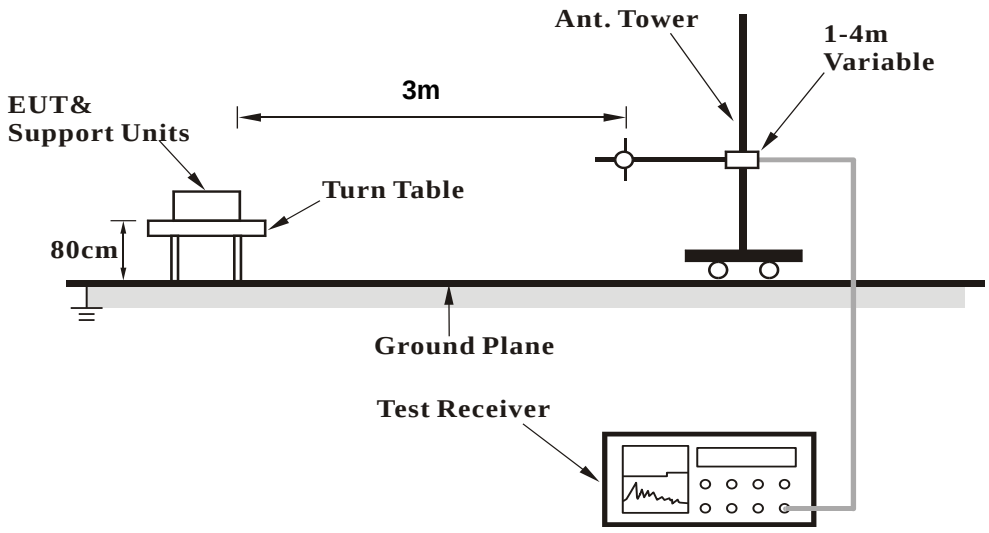
No deviation.

4.1.5 Test Setup

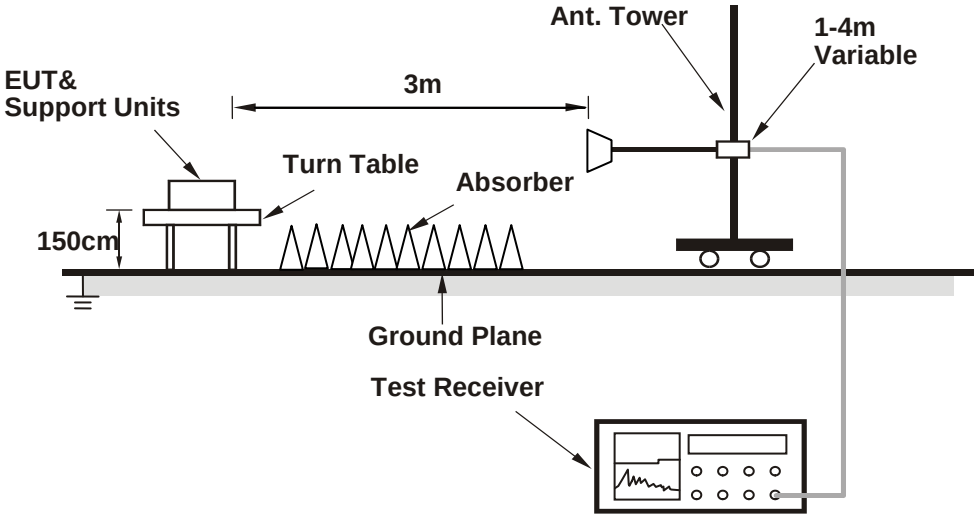
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (Telnet paste command) has been activated to set the EUT on specific status.

4.1.7 Test Results

CDD Mode

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	64.5 PK	74.0	-9.5	1.46 H	353	61.9	2.6
2	5150.00	50.2 AV	54.0	-3.8	1.46 H	353	47.6	2.6
3	*5180.00	113.8 PK			1.46 H	353	111.3	2.5
4	*5180.00	104.2 AV			1.46 H	353	101.7	2.5
5	#10360.00	55.5 PK	68.2	-12.7	1.47 H	169	43.6	11.9
6	15540.00	62.1 PK	74.0	-11.9	1.52 H	300	49.7	12.4
7	15540.00	47.5 AV	54.0	-6.5	1.52 H	300	35.1	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	67.2 PK	74.0	-6.8	1.92 V	246	64.6	2.6
2	5150.00	53.6 AV	54.0	-0.4	1.92 V	246	51.0	2.6
3	*5180.00	114.4 PK			1.92 V	246	111.9	2.5
4	*5180.00	105.7 AV			1.92 V	246	103.2	2.5
5	#10360.00	57.3 PK	68.2	-10.9	3.84 V	105	45.4	11.9
6	15540.00	65.2 PK	74.0	-8.8	1.64 V	128	52.8	12.4
7	15540.00	50.6 AV	54.0	-3.4	1.64 V	128	38.2	12.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.6 PK	74.0	-16.4	1.60 H	329	55.0	2.6
2	5150.00	48.8 AV	54.0	-5.2	1.60 H	329	46.2	2.6
3	*5200.00	116.8 PK			1.60 H	329	114.4	2.4
4	*5200.00	108.6 AV			1.60 H	329	106.2	2.4
5	5350.00	56.9 PK	74.0	-17.1	1.60 H	329	54.6	2.3
6	5350.00	45.8 AV	54.0	-8.2	1.60 H	329	43.5	2.3
7	#10400.00	56.7 PK	68.2	-11.5	1.41 H	174	44.5	12.2
8	15600.00	65.2 PK	74.0	-8.8	1.50 H	317	52.3	12.9
9	15600.00	51.9 AV	54.0	-2.1	1.50 H	317	39.0	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.2 PK	74.0	-13.8	2.23 V	261	57.6	2.6
2	5150.00	51.1 AV	54.0	-2.9	2.23 V	261	48.5	2.6
3	*5200.00	117.8 PK			2.23 V	261	115.4	2.4
4	*5200.00	109.5 AV			2.23 V	261	107.1	2.4
5	5350.00	58.1 PK	74.0	-15.9	2.23 V	261	55.8	2.3
6	5350.00	46.9 AV	54.0	-7.1	2.23 V	261	44.6	2.3
7	#10400.00	58.6 PK	68.2	-9.6	3.94 V	91	46.4	12.2
8	15600.00	66.3 PK	74.0	-7.7	1.53 V	113	53.4	12.9
9	15600.00	53.7 AV	54.0	-0.3	1.53 V	113	40.8	12.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.6 PK			1.55 H	326	113.4	2.2
2	*5240.00	107.2 AV			1.55 H	326	105.0	2.2
3	5350.00	53.6 PK	74.0	-20.4	1.55 H	326	51.3	2.3
4	5350.00	43.3 AV	54.0	-10.7	1.55 H	326	41.0	2.3
5	#10480.00	53.8 PK	68.2	-14.4	1.43 H	162	41.4	12.4
6	15720.00	61.6 PK	74.0	-12.4	1.47 H	312	49.6	12.0
7	15720.00	47.6 AV	54.0	-6.4	1.47 H	312	35.6	12.0
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	*5240.00	116.8 PK			1.70 V	246	114.6	2.2
2	*5240.00	108.2 AV			1.70 V	246	106.0	2.2
3	5350.00	56.5 PK	74.0	-17.5	1.70 V	246	54.2	2.3
4	5350.00	46.1 AV	54.0	-7.9	1.70 V	246	43.8	2.3
5	#10480.00	56.7 PK	68.2	-11.5	3.77 V	111	44.3	12.4
6	15720.00	64.8 PK	74.0	-9.2	1.54 V	131	52.8	12.0
7	15720.00	50.4 AV	54.0	-3.6	1.54 V	131	38.4	12.0

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 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	#5638.14	58.1 PK	68.2	-10.1	1.62 H	284	55.4	2.7
2	*5745.00	115.4 PK			1.62 H	284	112.5	2.9
3	*5745.00	107.5 AV			1.62 H	284	104.6	2.9
4	#5962.80	60.5 PK	68.2	-7.7	1.62 H	284	57.2	3.3
5	11490.00	53.9 PK	74.0	-20.1	1.50 H	274	41.6	12.3
6	11490.00	43.2 AV	54.0	-10.8	1.50 H	274	30.9	12.3
7	#17235.00	61.3 PK	68.2	-6.9	1.50 H	323	46.0	15.3
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	#5620.66	58.2 PK	68.2	-10.0	1.73 V	294	55.4	2.8
2	*5745.00	116.5 PK			1.73 V	294	113.6	2.9
3	*5745.00	108.3 AV			1.73 V	294	105.4	2.9
4	#5945.46	60.6 PK	68.2	-7.6	1.73 V	294	57.4	3.2
5	11490.00	56.4 PK	74.0	-17.6	1.45 V	238	44.1	12.3
6	11490.00	45.3 AV	54.0	-8.7	1.45 V	238	33.0	12.3
7	#17235.00	63.8 PK	68.2	-4.4	1.71 V	135	48.5	15.3

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	#5585.27	58.6 PK	68.2	-9.6	1.64 H	285	55.8	2.8
2	*5785.00	115.9 PK			1.64 H	285	112.8	3.1
3	*5785.00	107.8 AV			1.64 H	285	104.7	3.1
4	#5976.74	59.1 PK	68.2	-9.1	1.64 H	285	55.9	3.2
5	11570.00	54.2 PK	74.0	-19.8	1.55 H	266	41.8	12.4
6	11570.00	43.7 AV	54.0	-10.3	1.55 H	266	31.3	12.4
7	#17355.00	61.6 PK	68.2	-6.6	1.48 H	322	45.6	16.0
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	#5608.07	58.6 PK	68.2	-9.6	1.72 V	293	55.8	2.8
2	*5785.00	116.9 PK			1.72 V	293	113.8	3.1
3	*5785.00	108.6 AV			1.72 V	293	105.5	3.1
4	#5938.95	60.3 PK	68.2	-7.9	1.72 V	293	56.9	3.4
5	11570.00	56.7 PK	74.0	-17.3	1.47 V	233	44.3	12.4
6	11570.00	45.4 AV	54.0	-8.6	1.47 V	233	33.0	12.4
7	#17355.00	64.2 PK	68.2	-4.0	1.68 V	142	48.2	16.0

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	#5577.43	58.4 PK	68.2	-9.8	1.62 H	283	55.6	2.8
2	*5825.00	115.7 PK			1.62 H	183	112.5	3.2
3	*5825.00	107.6 AV			1.62 H	183	104.4	3.2
4	#5948.03	59.9 PK	68.2	-8.3	1.62 H	283	56.7	3.2
5	11650.00	54.6 PK	74.0	-19.4	1.52 H	269	42.2	12.4
6	11650.00	43.9 AV	54.0	-10.1	1.52 H	269	31.5	12.4
7	#17475.00	61.9 PK	68.2	-6.3	1.47 H	321	44.5	17.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5600.68	58.4 PK	68.2	-9.8	1.73 V	291	55.6	2.8
2	*5825.00	116.6 PK			1.73 V	360	113.4	3.2
3	*5825.00	108.5 AV			1.73 V	360	105.3	3.2
4	#5947.03	60.8 PK	68.2	-7.4	1.73 V	291	57.6	3.2
5	11650.00	56.3 PK	74.0	-17.7	1.49 V	234	43.9	12.4
6	11650.00	45.1 AV	54.0	-8.9	1.49 V	234	32.7	12.4
7	#17475.00	64.0 PK	68.2	-4.2	1.75 V	127	46.6	17.4

REMARKS:

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

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	64.6 PK	74.0	-9.4	1.50 H	324	62.0	2.6
2	5150.00	50.9 AV	54.0	-3.1	1.50 H	324	48.3	2.6
3	*5180.00	113.6 PK			1.50 H	324	111.1	2.5
4	*5180.00	104.0 AV			1.50 H	324	101.5	2.5
5	#10360.00	50.3 PK	68.2	-17.9	1.45 H	162	38.4	11.9
6	15540.00	63.5 PK	74.0	-10.5	1.47 H	328	51.1	12.4
7	15540.00	48.7 AV	54.0	-5.3	1.47 H	328	36.3	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.6 PK	74.0	-8.4	1.50 V	219	63.0	2.6
2	5150.00	53.6 AV	54.0	-0.4	1.50 V	219	51.0	2.6
3	*5180.00	114.4 PK			1.50 V	219	111.9	2.5
4	*5180.00	104.8 AV			1.50 V	219	102.3	2.5
5	#10360.00	58.9 PK	68.2	-9.3	2.80 V	84	47.0	11.9
6	15540.00	64.9 PK	74.0	-9.1	1.74 V	114	52.5	12.4
7	15540.00	50.5 AV	54.0	-3.5	1.74 V	114	38.1	12.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.1 PK	74.0	-9.9	1.57 H	336	61.5	2.6
2	5150.00	47.7 AV	54.0	-6.3	1.57 H	336	45.1	2.6
3	*5200.00	113.8 PK			1.57 H	336	111.4	2.4
4	*5200.00	104.9 AV			1.57 H	336	102.5	2.4
5	#10400.00	55.2 PK	68.2	-13.0	1.47 H	158	43.0	12.2
6	15600.00	63.8 PK	74.0	-10.2	1.50 H	329	50.9	12.9
7	15600.00	50.5 AV	54.0	-3.5	1.50 H	329	37.6	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.2 PK	74.0	-7.8	1.50 V	220	63.6	2.6
2	5150.00	49.8 AV	54.0	-4.2	1.50 V	220	47.2	2.6
3	*5200.00	114.8 PK			1.50 V	220	112.4	2.4
4	*5200.00	105.6 AV			1.50 V	220	103.2	2.4
5	#10400.00	63.2 PK	68.2	-5.0	3.92 V	96	51.0	12.2
6	15600.00	67.2 PK	74.0	-6.8	1.76 V	114	54.3	12.9
7	15600.00	52.8 AV	54.0	-1.2	1.76 V	114	39.9	12.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.1 PK			1.61 H	352	111.9	2.2
2	*5240.00	104.6 AV			1.61 H	352	102.4	2.2
3	5350.00	56.5 PK	74.0	-17.5	1.61 H	352	54.2	2.3
4	5350.00	44.1 AV	54.0	-9.9	1.61 H	352	41.8	2.3
5	#10480.00	55.1 PK	68.2	-13.1	1.47 H	163	42.7	12.4
6	15720.00	62.5 PK	74.0	-11.5	1.49 H	333	50.5	12.0
7	15720.00	47.6 AV	54.0	-6.4	1.49 H	333	35.6	12.0
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	*5240.00	115.2 PK			2.26 V	254	113.0	2.2
2	*5240.00	106.2 AV			2.26 V	254	104.0	2.2
3	5350.00	58.1 PK	74.0	-15.9	2.26 V	254	55.8	2.3
4	5350.00	46.2 AV	54.0	-7.8	2.26 V	254	43.9	2.3
5	#10480.00	57.5 PK	68.2	-10.7	3.81 V	72	45.1	12.4
6	15720.00	62.7 PK	74.0	-11.3	1.85 V	124	50.7	12.0
7	15720.00	49.8 AV	54.0	-4.2	1.85 V	124	37.8	12.0

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 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	#5625.12	59.5 PK	68.2	-8.7	1.61 H	288	56.7	2.8
2	*5745.00	116.4 PK			1.61 H	288	113.5	2.9
3	*5745.00	106.5 AV			1.61 H	288	103.6	2.9
4	#5983.44	60.2 PK	68.2	-8.0	1.61 H	288	57.0	3.2
5	11490.00	55.6 PK	74.0	-18.4	1.63 H	159	43.3	12.3
6	11490.00	44.8 AV	54.0	-9.2	1.63 H	159	32.5	12.3
7	#17235.00	62.3 PK	68.2	-5.9	1.48 H	158	47.0	15.3
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	#5631.41	59.0 PK	68.2	-9.2	1.66 V	299	56.2	2.8
2	*5745.00	116.8 PK			1.74 V	272	113.9	2.9
3	*5745.00	108.3 AV			1.74 V	272	105.4	2.9
4	#5951.40	60.9 PK	68.2	-7.3	1.66 V	299	57.7	3.2
5	11490.00	56.7 PK	74.0	-17.3	1.50 V	217	44.4	12.3
6	11490.00	45.2 AV	54.0	-8.8	1.50 V	217	32.9	12.3
7	#17235.00	64.2 PK	68.2	-4.0	1.71 V	123	48.9	15.3

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	#5595.62	58.6 PK	68.2	-9.6	1.62 H	286	55.8	2.8
2	*5785.00	116.2 PK			1.62 H	286	113.1	3.1
3	*5785.00	106.3 AV			1.62 H	286	103.2	3.1
4	#5963.04	59.0 PK	68.2	-9.2	1.62 H	286	55.7	3.3
5	11570.00	55.8 PK	74.0	-18.2	1.60 H	175	43.4	12.4
6	11570.00	44.6 AV	54.0	-9.4	1.60 H	175	32.2	12.4
7	#17355.00	62.5 PK	68.2	-5.7	1.51 H	151	46.5	16.0
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	#5585.46	58.1 PK	68.2	-10.1	1.67 V	298	55.3	2.8
2	*5785.00	117.2 PK			1.72 V	269	114.1	3.1
3	*5785.00	108.5 AV			1.72 V	269	105.4	3.1
4	#5970.09	60.6 PK	68.2	-7.6	1.67 V	298	57.4	3.2
5	11570.00	56.9 PK	74.0	-17.1	1.52 V	214	44.5	12.4
6	11570.00	45.3 AV	54.0	-8.7	1.52 V	214	32.9	12.4
7	#17355.00	64.5 PK	68.2	-3.7	1.67 V	153	48.5	16.0

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	#5596.12	58.6 PK	68.2	-9.6	1.64 H	288	55.8	2.8
2	*5825.00	116.5 PK			1.64 H	288	113.3	3.2
3	*5825.00	106.6 AV			1.64 H	288	103.4	3.2
4	#5937.79	60.7 PK	68.2	-7.5	1.64 H	288	57.3	3.4
5	11650.00	55.9 PK	74.0	-18.1	1.66 H	166	43.5	12.4
6	11650.00	45.1 AV	54.0	-8.9	1.66 H	166	32.7	12.4
7	#17475.00	62.8 PK	68.2	-5.4	1.53 H	153	45.4	17.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5633.22	59.3 PK	68.2	-8.9	1.67 V	296	56.5	2.8
2	*5825.00	117.3 PK			1.74 V	282	114.1	3.2
3	*5825.00	108.7 AV			1.74 V	282	105.5	3.2
4	#5948.93	61.3 PK	68.2	-6.9	1.67 V	296	58.1	3.2
5	11650.00	56.9 PK	74.0	-17.1	1.51 V	226	44.5	12.4
6	11650.00	45.4 AV	54.0	-8.6	1.51 V	226	33.0	12.4
7	#17475.00	64.1 PK	68.2	-4.1	1.73 V	138	46.7	17.4

REMARKS:

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

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	64.2 PK	74.0	-9.8	1.68 H	289	61.6	2.6
2	5150.00	49.4 AV	54.0	-4.6	1.68 H	289	46.8	2.6
3	*5190.00	107.4 PK			1.68 H	289	104.9	2.5
4	*5190.00	97.5 AV			1.68 H	289	95.0	2.5
5	5350.00	50.2 PK	74.0	-23.8	1.68 H	289	47.9	2.3
6	5350.00	38.7 AV	54.0	-15.3	1.68 H	289	36.4	2.3
7	#10380.00	54.2 PK	68.2	-14.0	1.62 H	172	42.2	12.0
8	15570.00	59.3 PK	74.0	-14.7	1.58 H	164	46.7	12.6
9	15570.00	45.2 AV	54.0	-8.8	1.58 H	164	32.6	12.6
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	67.3 PK	74.0	-6.7	1.74 V	248	64.7	2.6
2	5150.00	53.6 AV	54.0	-0.4	1.74 V	248	51.0	2.6
3	*5190.00	109.3 PK			1.74 V	248	106.8	2.5
4	*5190.00	99.7 AV			1.74 V	248	97.2	2.5
5	5350.00	53.4 PK	74.0	-20.6	1.74 V	248	51.1	2.3
6	5350.00	41.2 AV	54.0	-12.8	1.74 V	248	38.9	2.3
7	#10380.00	56.3 PK	68.2	-11.9	3.84 V	114	44.3	12.0
8	15570.00	61.2 PK	74.0	-12.8	1.86 V	117	48.6	12.6
9	15570.00	47.6 AV	54.0	-6.4	1.86 V	117	35.0	12.6

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.8 PK	74.0	-7.2	1.70 H	298	64.2	2.6
2	5150.00	49.2 AV	54.0	-4.8	1.70 H	298	46.6	2.6
3	*5230.00	112.5 PK			1.70 H	298	110.3	2.2
4	*5230.00	102.2 AV			1.70 H	298	100.0	2.2
5	5350.00	56.3 PK	74.0	-17.7	1.70 H	298	54.0	2.3
6	5350.00	43.5 AV	54.0	-10.5	1.70 H	298	41.2	2.3
7	#10460.00	55.6 PK	68.2	-12.6	1.61 H	180	43.2	12.4
8	15690.00	60.2 PK	74.0	-13.8	1.59 H	169	48.0	12.2
9	15690.00	47.5 AV	54.0	-6.5	1.59 H	169	35.3	12.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.2 PK	74.0	-4.8	2.30 V	249	66.6	2.6
2	5150.00	53.7 AV	54.0	-0.3	2.30 V	249	51.1	2.6
3	*5230.00	114.3 PK			2.30 V	249	112.1	2.2
4	*5230.00	104.3 AV			2.30 V	249	102.1	2.2
5	5350.00	58.1 PK	74.0	-15.9	2.30 V	249	55.8	2.3
6	5350.00	46.3 AV	54.0	-7.7	2.30 V	249	44.0	2.3
7	#10460.00	57.4 PK	68.2	-10.8	3.86 V	104	45.0	12.4
8	15690.00	63.1 PK	74.0	-10.9	1.84 V	117	50.9	12.2
9	15690.00	49.8 AV	54.0	-4.2	1.84 V	117	37.6	12.2

REMARKS:

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

CHANNEL	TX Channel 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	#5643.19	65.1 PK	68.2	-3.1	1.64 H	285	62.4	2.7
2	*5755.00	111.9 PK			1.64 H	285	108.9	3.0
3	*5755.00	101.8 AV			1.64 H	285	98.8	3.0
4	#5939.74	59.8 PK	68.2	-8.4	1.64 H	285	56.4	3.4
5	11510.00	56.1 PK	74.0	-17.9	1.60 H	171	43.8	12.3
6	11510.00	41.5 AV	54.0	-12.5	1.60 H	171	29.2	12.3
7	#17265.00	61.5 PK	68.2	-6.7	1.56 H	157	46.1	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5647.73	63.5 PK	68.2	-4.7	1.67 V	299	60.8	2.7
2	*5755.00	113.8 PK			1.67 V	299	110.8	3.0
3	*5755.00	103.9 AV			1.67 V	299	100.9	3.0
4	#5979.52	60.7 PK	68.2	-7.5	1.67 V	299	57.5	3.2
5	11510.00	58.2 PK	74.0	-15.8	1.52 V	231	45.9	12.3
6	11510.00	43.4 AV	54.0	-10.6	1.52 V	231	31.1	12.3
7	#17265.00	63.1 PK	68.2	-5.1	1.67 V	126	47.7	15.4

REMARKS:

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

CHANNEL	TX Channel 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	#5626.78	59.6 PK	68.2	-8.6	1.62 H	289	56.8	2.8
2	*5795.00	111.8 PK			1.62 H	289	108.8	3.0
3	*5795.00	101.6 AV			1.62 H	289	98.6	3.0
4	#5929.26	60.0 PK	68.2	-8.2	1.62 H	289	56.6	3.4
5	11590.00	55.8 PK	74.0	-18.2	1.61 H	167	43.4	12.4
6	11590.00	41.8 AV	54.0	-12.2	1.61 H	167	29.4	12.4
7	#17385.00	61.1 PK	68.2	-7.1	1.54 H	145	44.9	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5592.11	58.7 PK	68.2	-9.5	1.66 V	295	55.9	2.8
2	*5795.00	113.9 PK			1.66 V	295	110.9	3.0
3	*5795.00	103.8 AV			1.66 V	295	100.8	3.0
4	#5930.85	61.9 PK	68.2	-6.3	1.66 V	295	58.5	3.4
5	11590.00	57.4 PK	74.0	-16.6	1.52 V	212	45.0	12.4
6	11590.00	42.9 AV	54.0	-11.1	1.52 V	212	30.5	12.4
7	#17385.00	62.7 PK	68.2	-5.5	1.77 V	147	46.5	16.2

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.6 PK	74.0	-8.4	1.63 H	283	63.0	2.6
2	5150.00	48.4 AV	54.0	-5.6	1.63 H	283	45.8	2.6
3	*5210.00	103.5 PK			1.63 H	283	101.1	2.4
4	*5210.00	94.3 AV			1.63 H	283	91.9	2.4
5	5350.00	49.8 PK	74.0	-24.2	1.63 H	283	47.5	2.3
6	5350.00	38.6 AV	54.0	-15.4	1.63 H	283	36.3	2.3
7	#10420.00	52.7 PK	68.2	-15.5	1.64 H	181	40.5	12.2
8	15630.00	57.5 PK	74.0	-16.5	1.57 H	152	44.8	12.7
9	15630.00	44.5 AV	54.0	-9.5	1.57 H	152	31.8	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.0 PK	74.0	-4.0	2.20 V	254	67.4	2.6
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.20 V**	**254**	**51.3**	**2.6**
3	*5210.00	105.3 PK			2.20 V	254	102.9	2.4
4	*5210.00	96.6 AV			2.20 V	254	94.2	2.4
5	5350.00	54.2 PK	74.0	-19.8	2.20 V	254	51.9	2.3
6	5350.00	43.2 AV	54.0	-10.8	2.20 V	254	40.9	2.3
7	#10420.00	55.4 PK	68.2	-12.8	3.80 V	99	43.2	12.2
8	15630.00	60.8 PK	74.0	-13.2	1.90 V	122	48.1	12.7
9	15630.00	47.1 AV	54.0	-6.9	1.90 V	122	34.4	12.7

REMARKS:

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

CHANNEL	TX Channel 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	#5651.08	68.3 PK	69.0	-0.7	1.63 H	287	65.5	2.8
2	*5775.00	110.3 PK			1.63 H	287	107.3	3.0
3	*5775.00	100.3 AV			1.63 H	287	97.3	3.0
4	#5938.38	65.0 PK	68.2	-3.2	1.63 H	287	61.6	3.4
5	11550.00	54.7 PK	74.0	-19.3	1.58 H	177	42.3	12.4
6	11550.00	42.5 AV	54.0	-11.5	1.58 H	177	30.1	12.4
7	#17325.00	60.6 PK	68.2	-7.6	1.49 H	137	44.9	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5641.77	68.0 PK	68.2	-0.2	1.68 V	298	65.3	2.7
2	*5775.00	110.9 PK			1.68 V	298	107.9	3.0
3	*5775.00	100.8 AV			1.68 V	298	97.8	3.0
4	#5940.16	67.5 PK	68.2	-0.7	1.68 V	298	64.2	3.3
5	11550.00	55.8 PK	74.0	-18.2	1.57 V	210	43.4	12.4
6	11550.00	43.2 AV	54.0	-10.8	1.57 V	210	30.8	12.4
7	#17325.00	61.8 PK	68.2	-6.4	1.77 V	144	46.1	15.7

REMARKS:

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

Below 1GHz Data:

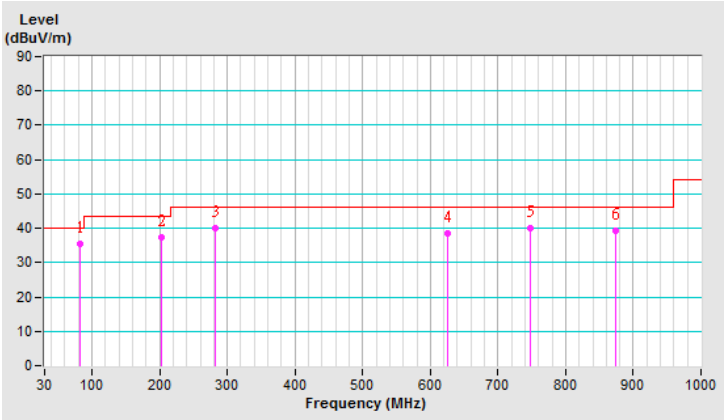
802.11ac (VHT20)

CHANNEL	TX Channel 48	**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	82.87	35.3 QP	40.0	-4.7	1.00 H	159	48.5	-13.2
2	202.83	37.4 QP	43.5	-6.1	1.00 H	238	48.3	-10.9
3	281.84	39.9 QP	46.0	-6.1	1.50 H	94	47.5	-7.6
4	624.98	38.4 QP	46.0	-7.6	1.00 H	164	37.5	0.9
5	748.52	40.1 QP	46.0	-5.9	1.50 H	167	36.8	3.3
6	873.64	39.2 QP	46.0	-6.8	1.00 H	298	34.7	4.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

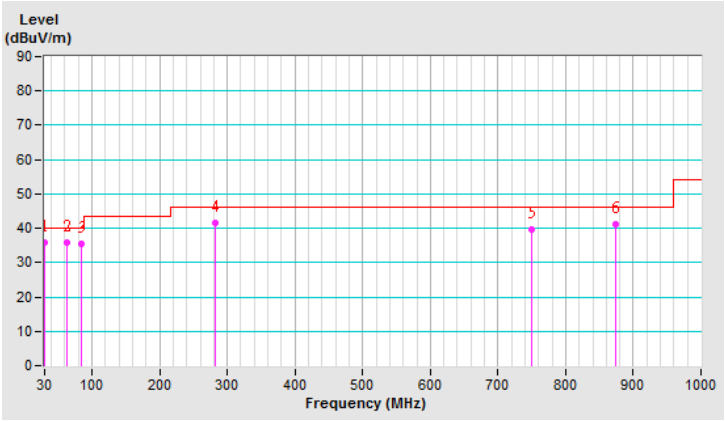


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.73	35.8 QP	40.0	-4.2	1.00 V	284	44.9	-9.1
2	62.85	35.9 QP	40.0	-4.1	1.50 V	134	44.8	-8.9
3	83.92	35.4 QP	40.0	-4.6	2.00 V	289	48.8	-13.4
4	281.93	41.6 QP	46.0	-4.4	1.50 V	277	49.2	-7.6
5	749.74	39.8 QP	46.0	-6.2	1.00 V	26	36.5	3.3
6	874.75	41.1 QP	46.0	-4.9	1.00 V	198	36.6	4.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
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
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Aug. 23, 2018

4.2.3 Test Procedure

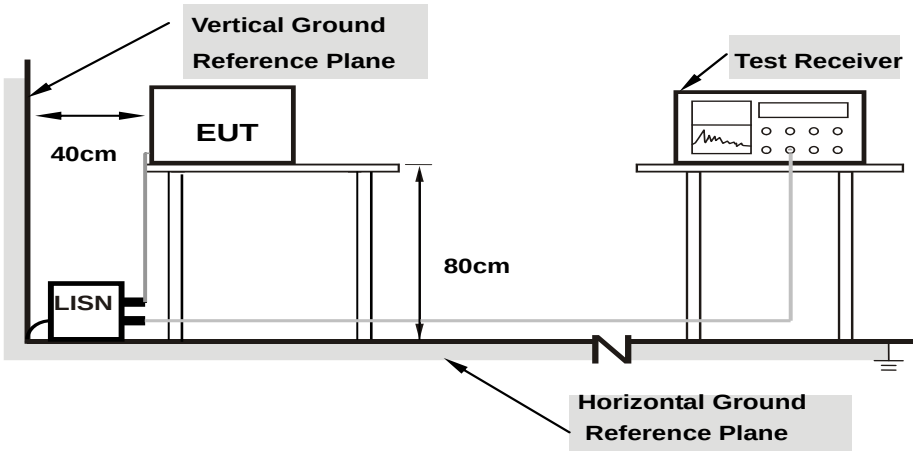
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

4.2.7 Test Results (Mode 1)

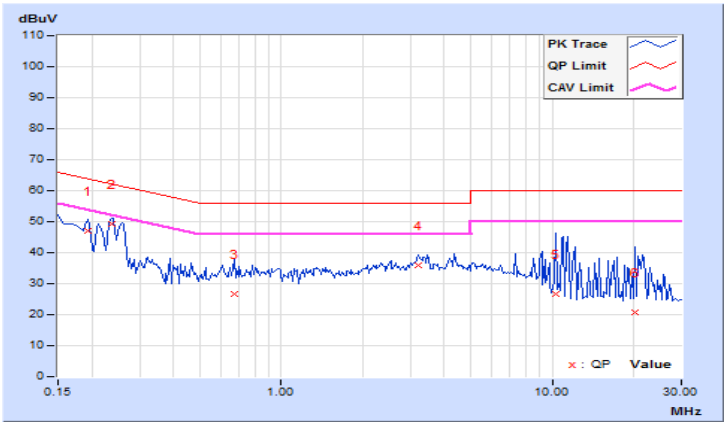
CDD Mode

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19297	10.07	37.03	33.78	47.10	43.85	63.91	53.91	-16.81	-10.06
2	0.23594	10.08	39.15	36.74	49.23	46.82	62.24	52.24	-13.01	-5.42
3	0.66953	10.14	16.44	12.71	26.58	22.85	56.00	46.00	-29.42	-23.15
4	3.21875	10.29	25.78	18.29	36.07	28.58	56.00	46.00	-19.93	-17.42
5	10.37109	10.74	15.78	8.13	26.52	18.87	60.00	50.00	-33.48	-31.13
6	20.30859	11.40	9.39	-2.76	20.79	8.64	60.00	50.00	-39.21	-41.36

Remarks:

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

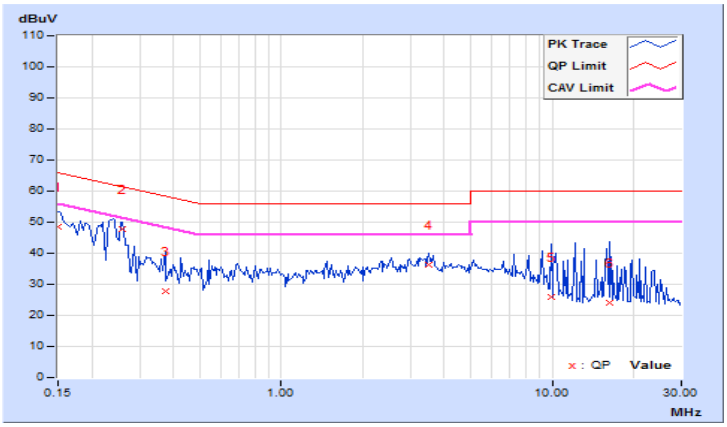


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	38.50	30.12	48.45	40.07	66.00	56.00	-17.55	-15.93
2	0.25938	9.98	37.72	35.98	47.70	45.96	61.45	51.45	-13.75	-5.49
3	0.37266	10.01	17.76	10.03	27.77	20.04	58.44	48.44	-30.67	-28.40
4	3.50000	10.17	26.02	17.88	36.19	28.05	56.00	46.00	-19.81	-17.95
5	9.93750	10.54	15.25	8.91	25.79	19.45	60.00	50.00	-34.21	-30.55
6	16.35938	10.95	13.16	3.40	24.11	14.35	60.00	50.00	-35.89	-35.65

Remarks:

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



4.2.8 Test Results (Mode 2)

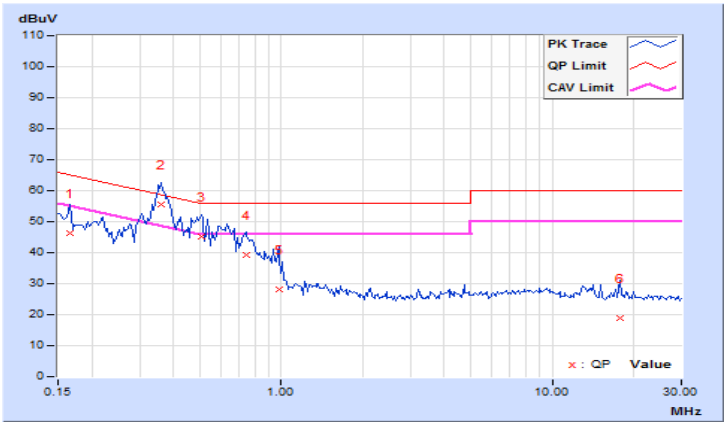
CDD Mode

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	0.16562	10.05	36.30	20.63	46.35	30.68	65.18	55.18	-18.83	-24.50
2	**0.36094**	**10.11**	**45.42**	**30.16**	**55.53**	**40.27**	**58.71**	**48.71**	**-3.18**	**-8.44**
3	0.50547	10.13	35.15	18.35	45.28	28.48	56.00	46.00	-10.72	-17.52
4	0.73984	10.15	28.97	14.71	39.12	24.86	56.00	46.00	-16.88	-21.14
5	0.98203	10.17	18.06	9.66	28.23	19.83	56.00	46.00	-27.77	-26.17
6	17.83594	11.25	7.68	2.86	18.93	14.11	60.00	50.00	-41.07	-35.89

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

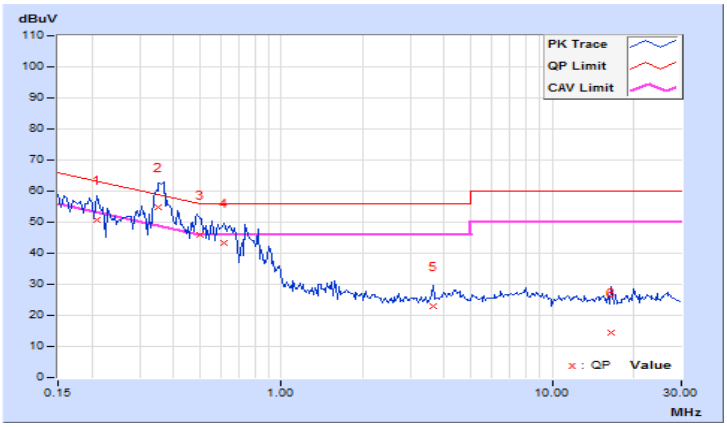


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.20859	9.97	40.88	24.73	50.85	34.70	63.26	53.26	-12.41	-18.56
2	0.35313	10.01	44.95	29.23	54.96	39.24	58.89	48.89	-3.93	-9.65
3	0.50000	10.02	35.96	18.57	45.98	28.59	56.00	46.00	-10.02	-17.41
4	0.61484	10.03	33.36	17.47	43.39	27.50	56.00	46.00	-12.61	-18.50
5	3.61719	10.17	12.68	6.20	22.85	16.37	56.00	46.00	-33.15	-29.63
6	16.53906	10.96	3.56	-3.12	14.52	7.84	60.00	50.00	-45.48	-42.16

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

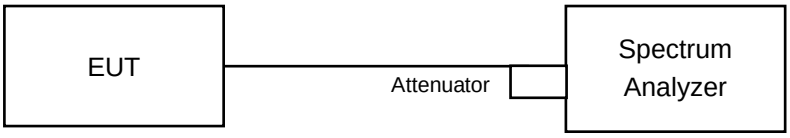
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR POWER OUTPUT MEASUREMENT

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

FOR 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	19.50	19.47	19.39	19.29	349.451	25.43	30	Pass
40	5200	20.85	20.84	20.92	21.25	499.905	26.99	30	Pass
48	5240	20.76	20.55	20.98	20.95	482.39	26.83	30	Pass
149	5745	20.02	20.40	20.72	20.31	435.541	26.39	30	Pass
157	5785	20.11	20.36	20.42	20.48	433.048	26.37	30	Pass
165	5825	20.03	20.36	20.61	20.74	442.993	26.46	30	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	18.22	18.35	18.51	18.78	281.232	24.49	30	Pass
40	5200	20.49	20.58	20.67	21.01	469.096	26.71	30	Pass
48	5240	21.22	21.27	21.64	21.82	564.338	27.52	30	Pass
149	5745	20.03	20.47	20.51	20.76	443.706	26.47	30	Pass
157	5785	20.16	20.57	20.62	20.56	446.886	26.50	30	Pass
165	5825	20.04	20.53	20.48	20.84	446.93	26.50	30	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	16.52	16.29	16.74	16.91	183.732	22.64	30	Pass
46	5230	21.12	20.82	20.89	21.49	513.874	27.11	30	Pass
151	5755	20.04	20.94	20.84	20.88	468.891	26.71	30	Pass
159	5795	20.35	20.94	20.92	20.94	480.318	26.82	30	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	15.08	14.97	15.71	15.75	138.439	21.41	30	Pass
155	5775	19.96	20.15	20.10	19.21	388.294	25.89	30	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	18.22	18.35	18.51	18.78	281.232	24.49	30	Pass
40	5200	20.49	20.58	20.67	21.01	469.096	26.71	30	Pass
48	5240	21.22	21.27	21.64	21.82	564.338	27.52	30	Pass
149	5745	20.03	20.47	20.51	20.76	443.706	26.47	30	Pass
157	5785	20.16	20.57	20.62	20.56	446.886	26.50	30	Pass
165	5825	20.04	20.53	20.48	20.84	446.93	26.50	30	Pass

Note: 1. The directional gain is 3.56dBi < 6dBi, so the power limit shall not be reduced.

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	16.52	16.29	16.74	16.91	183.732	22.64	30	Pass
46	5230	21.12	20.82	20.89	21.49	513.874	27.11	30	Pass
151	5755	20.04	20.94	20.84	20.88	468.891	26.71	30	Pass
159	5795	20.35	20.94	20.92	20.94	480.318	26.82	30	Pass

Note: 1. The directional gain is 3.56dBi < 6dBi, so the power limit shall not be reduced.

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	15.08	14.97	15.71	15.75	138.439	21.41	30	Pass
155	5775	19.96	20.15	20.10	19.21	388.294	25.89	30	Pass

Note: 1. The directional gain is 3.56dBi < 6dBi, so the power limit shall not be reduced.

SDM 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	18.22	18.35	18.51	18.78	281.232	24.49	30	Pass
40	5200	20.49	20.58	20.67	21.01	469.096	26.71	30	Pass
48	5240	21.22	21.27	21.64	21.82	564.338	27.52	30	Pass
149	5745	20.03	20.47	20.51	20.76	443.706	26.47	30	Pass
157	5785	20.16	20.57	20.62	20.56	446.886	26.50	30	Pass
165	5825	20.04	20.53	20.48	20.84	446.93	26.50	30	Pass

802.11ac (VHT40)

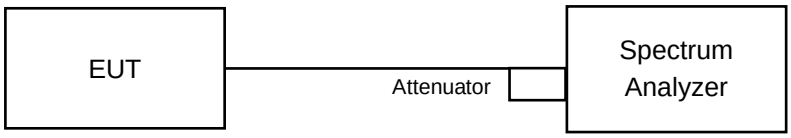
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.52	16.29	16.74	16.91	183.732	22.64	30	Pass
46	5230	21.12	20.82	20.89	21.49	513.874	27.11	30	Pass
151	5755	20.04	20.94	20.84	20.88	468.891	26.71	30	Pass
159	5795	20.35	20.94	20.92	20.94	480.318	26.82	30	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	15.08	14.97	15.71	15.75	138.439	21.41	30	Pass
155	5775	19.96	20.15	20.10	19.21	388.294	25.89	30	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.92	17.16	16.92	17.16
40	5200	17.04	17.64	17.16	17.64
48	5240	16.92	17.40	17.04	17.40
149	5745	17.04	17.16	17.28	17.16
157	5785	17.40	17.16	17.40	17.40
165	5825	17.40	17.52	17.40	17.52

802.11ac (VHT20)

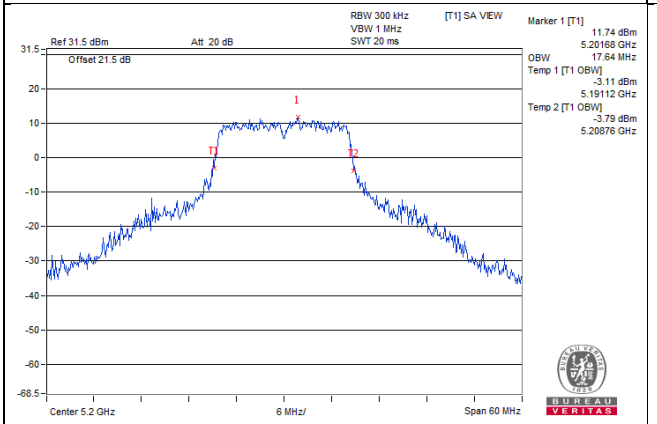
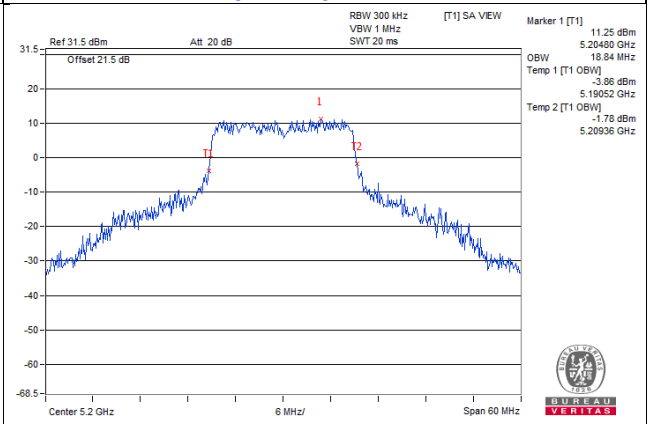
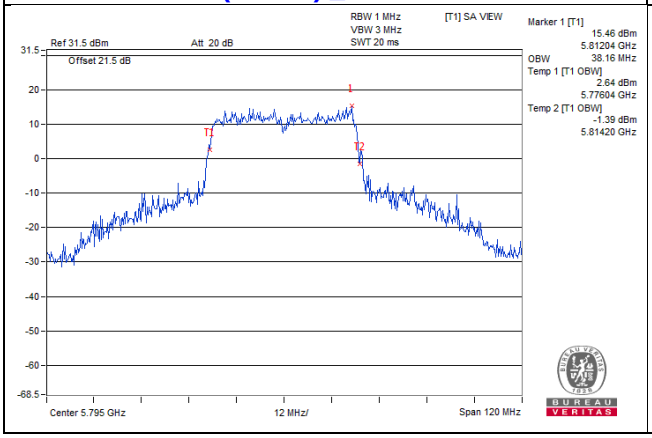
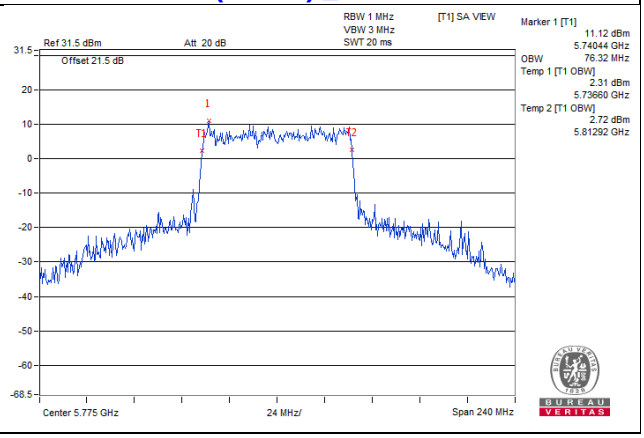
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.24	18.24	18.24	18.12
40	5200	18.36	18.48	18.36	18.84
48	5240	18.36	18.36	18.24	18.84
149	5745	18.48	18.24	18.36	18.24
157	5785	18.60	18.48	18.36	18.24
165	5825	18.72	18.48	18.48	18.72

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.72	36.72	36.72	36.72
46	5230	37.20	37.44	37.44	37.44
151	5755	37.20	37.44	37.68	37.20
159	5795	37.20	38.16	37.92	37.20

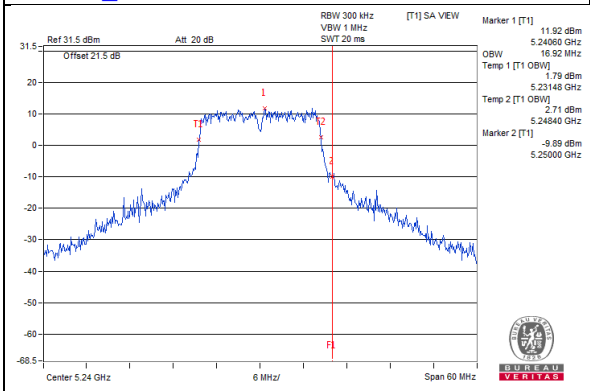
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.84	74.88	75.36	75.36
155	5775	76.32	75.36	76.32	75.84

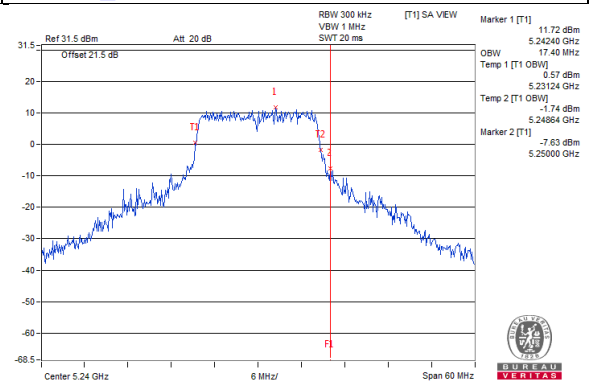
Spectrum Plot of Max Value	
802.11a_Chain 1 / CH40	**802.11ac (VHT20)_Chain 3 / CH40**
	
802.11ac (VHT40) _Chain 1 / CH159	**802.11ac (VHT80) _Chain 0 / CH155**
	

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

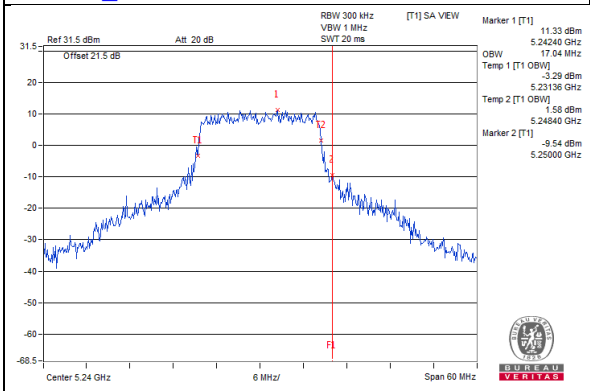
802.11a_Chain 0 / CH48



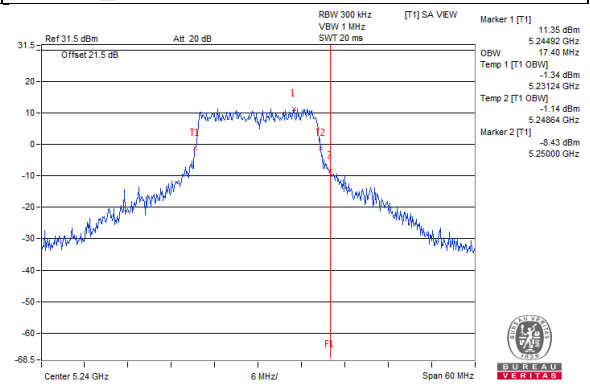
802.11a_Chain 1 / CH48



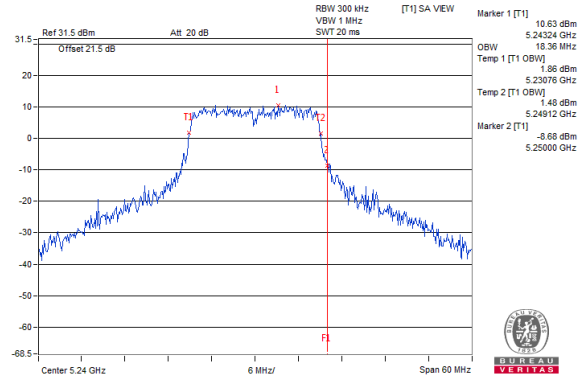
802.11a_Chain 2 / CH48



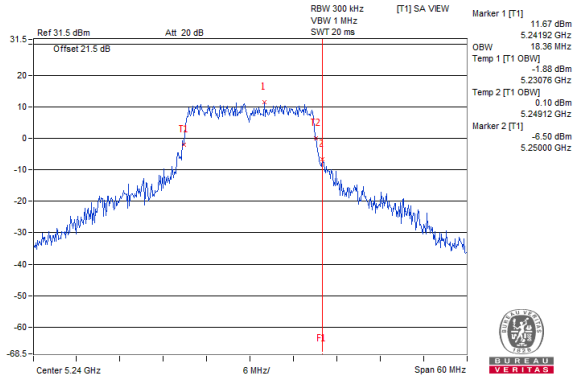
802.11a_Chain 3 / CH48



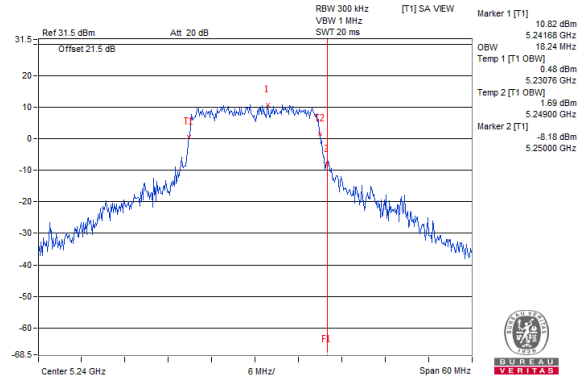
802.11ac (VHT20)_Chain 0 / CH48



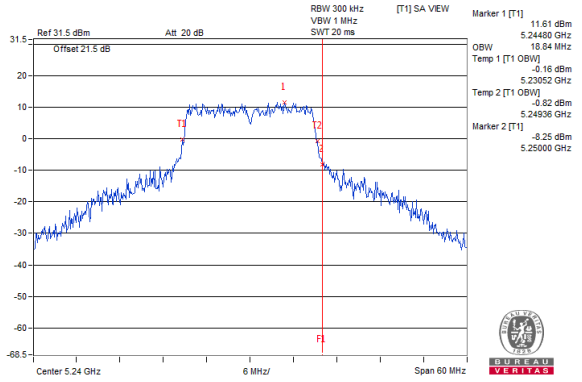
802.11ac (VHT20)_Chain 1 / CH48



802.11ac (VHT20)_Chain 2 / CH48

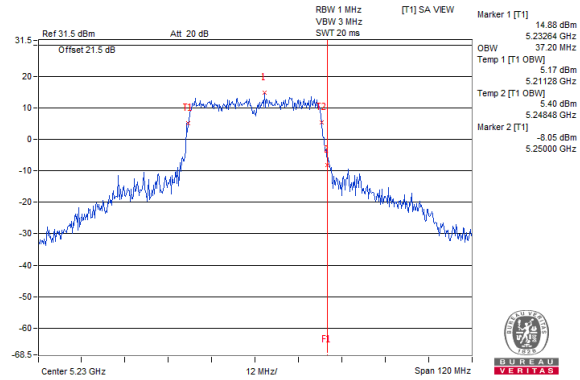


802.11ac (VHT20)_Chain 3 / CH48

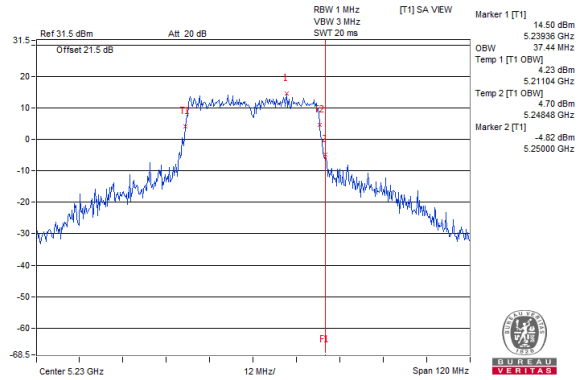


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

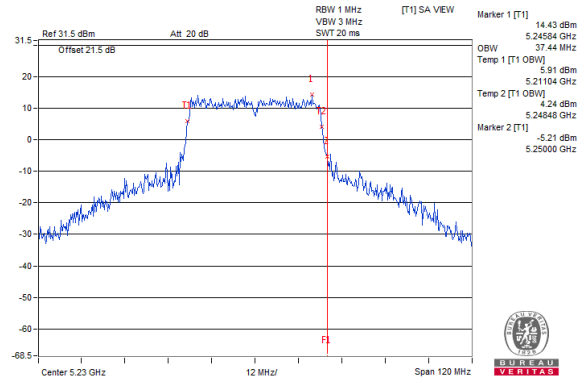
802.11ac (VHT40)_Chain 0 / CH46



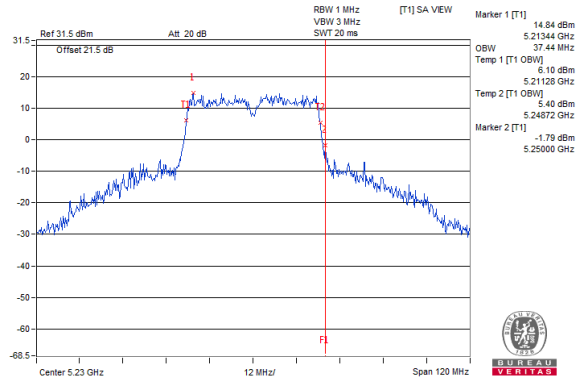
802.11ac (VHT40)_Chain 1 / CH46



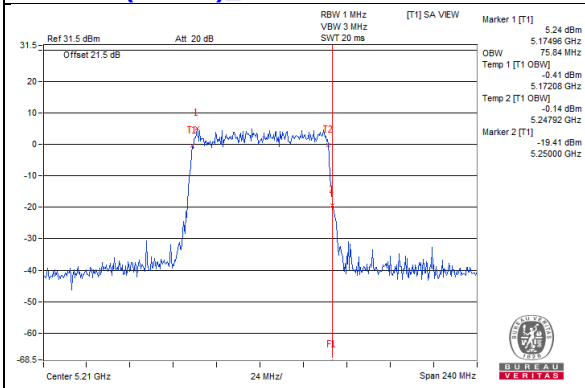
802.11ac (VHT40)_Chain 2 / CH46



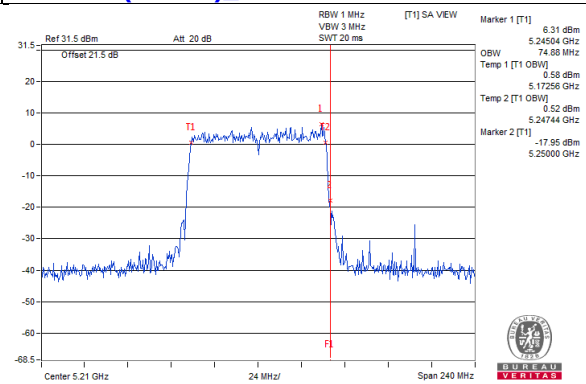
802.11ac (VHT40)_Chain 3 / CH46



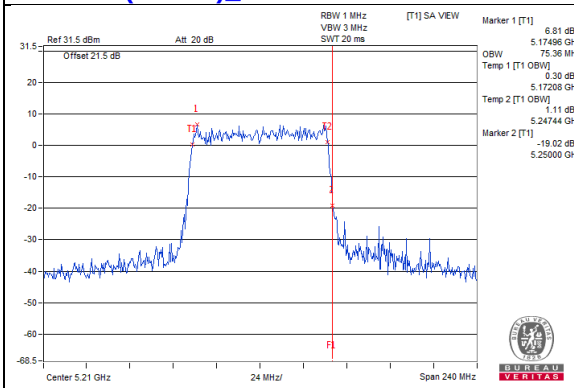
802.11ac (VHT80)_Chain 0 / CH42



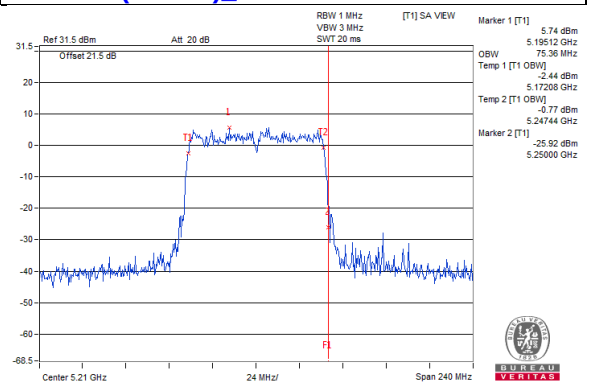
802.11ac (VHT80)_Chain 1 / CH42



802.11ac (VHT80)_Chain 2 / CH42

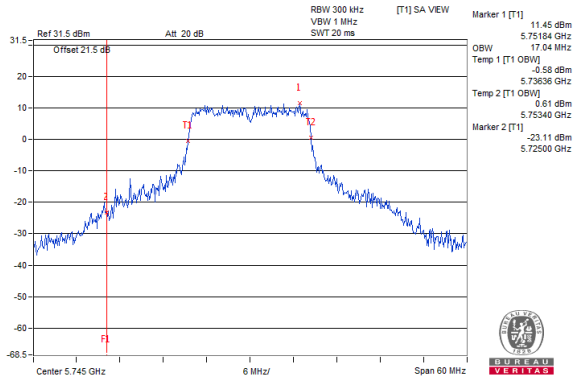


802.11ac (VHT80)_Chain 3 / CH42

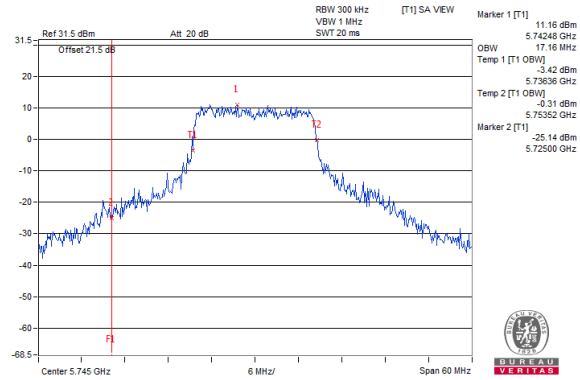


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

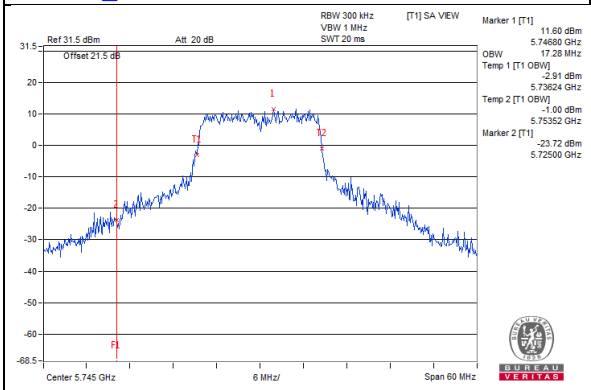
802.11a_Chain 0 / CH149



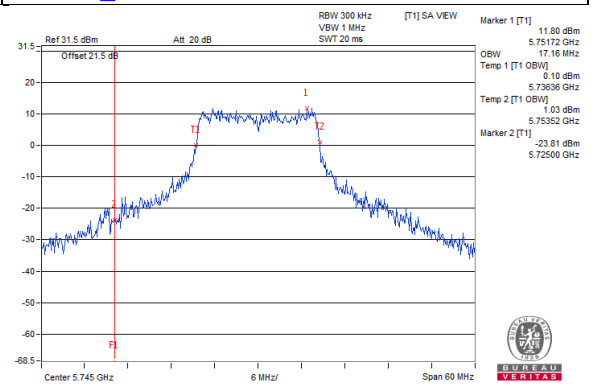
802.11a_Chain 1 / CH149



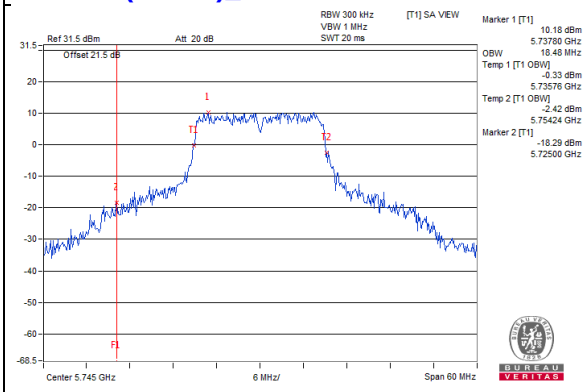
802.11a_Chain 2 / CH149



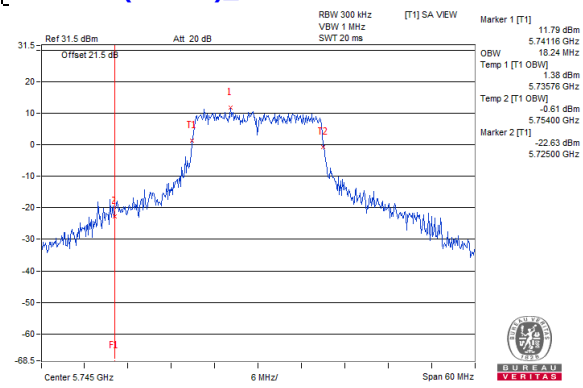
802.11a_Chain 3 / CH149



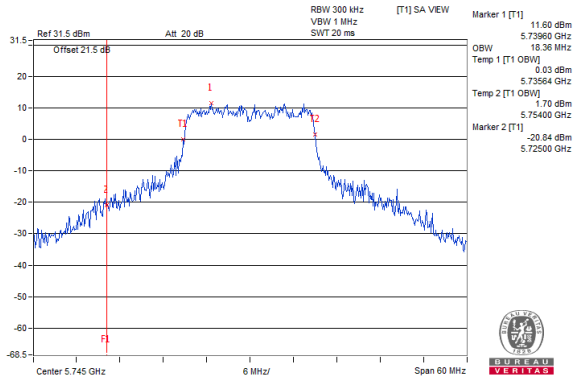
802.11ac (VHT20)_Chain 0 / CH149



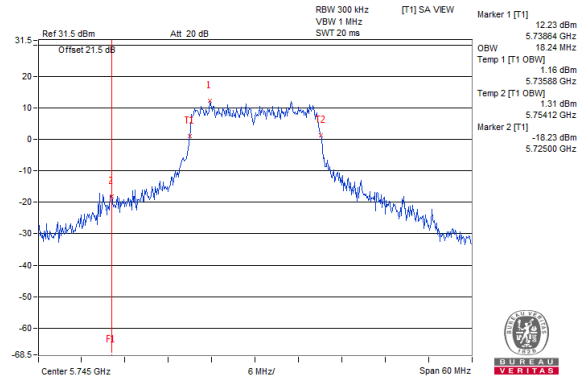
802.11ac (VHT20)_Chain 1 / CH149



802.11ac (VHT20)_Chain 2 / CH149

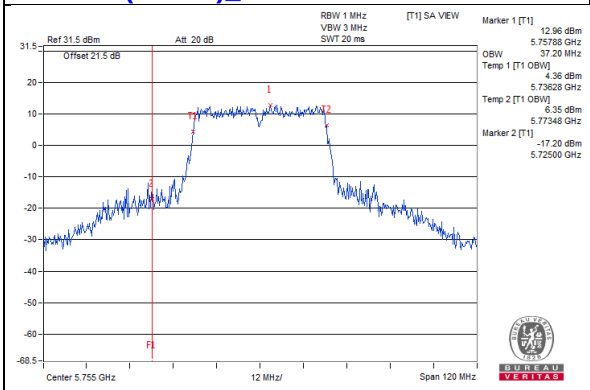


802.11ac (VHT20)_Chain 3 / CH149

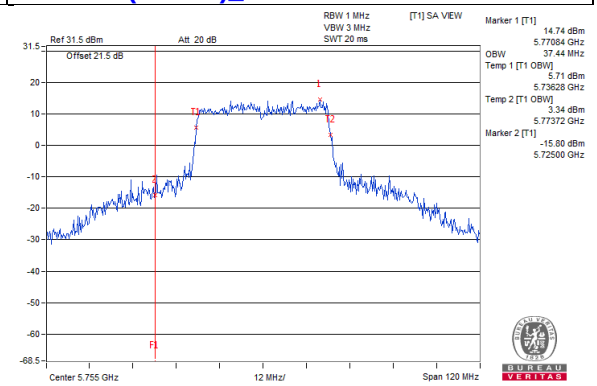


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

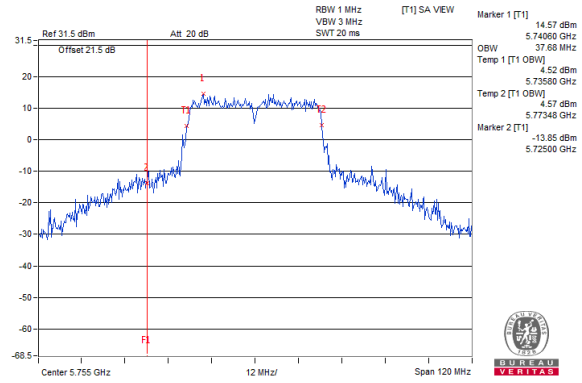
802.11ac (VHT40)_Chain 0 / CH151



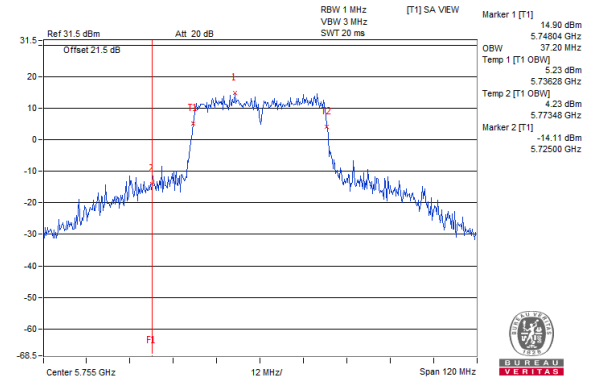
802.11ac (VHT40)_Chain 1 / CH151



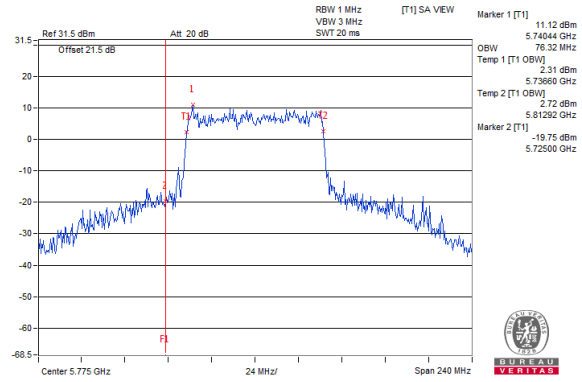
802.11ac (VHT40)_Chain 2 / CH151



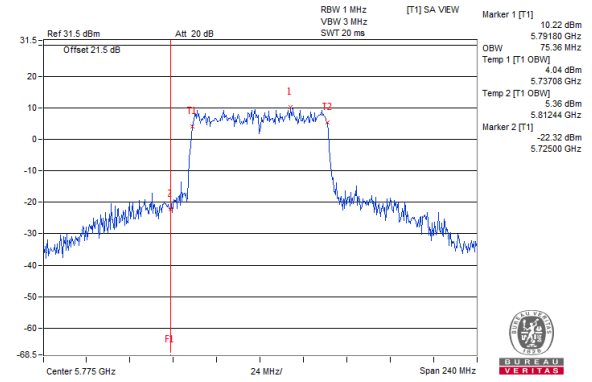
802.11ac (VHT40)_Chain 3 / CH151



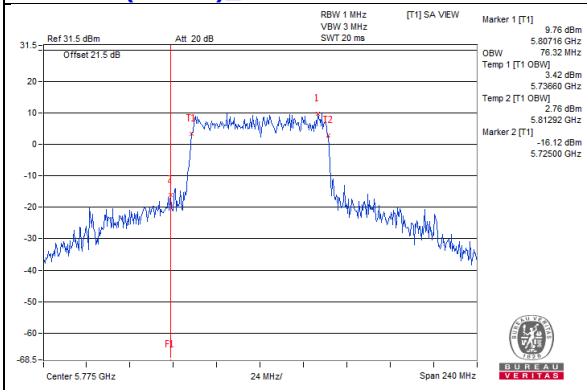
802.11ac (VHT80)_Chain 0 / CH155



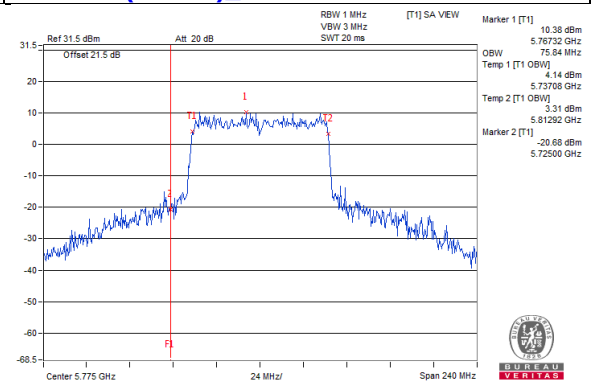
802.11ac (VHT80)_Chain 1 / CH155



802.11ac (VHT80)_Chain 2 / CH155



802.11ac (VHT80)_Chain 3 / CH155

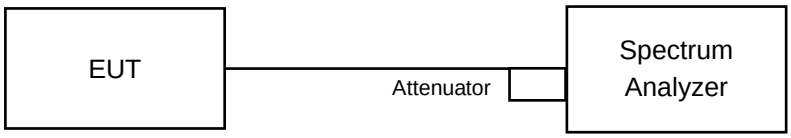


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

For 802.11ac (VHT20)

Using method SA-1

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

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

Using method SA-2

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

For U-NII-3:
For 802.11ac (VHT20)

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

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.84	5.01	4.23	4.90	0.40	11.18	17	Pass
40	5200	5.81	6.76	6.80	6.69	0.40	12.95	17	Pass
48	5240	6.75	5.88	6.82	4.68	0.40	12.53	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.99	4.23	5.08	4.87	10.83	17	Pass
40	5200	6.47	6.79	6.91	7.16	12.86	17	Pass
48	5240	6.31	6.83	6.40	6.83	12.62	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-0.17	-0.48	-0.38	-0.25	0.14	5.84	17	Pass
46	5230	3.74	3.55	3.75	4.57	0.14	10.08	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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

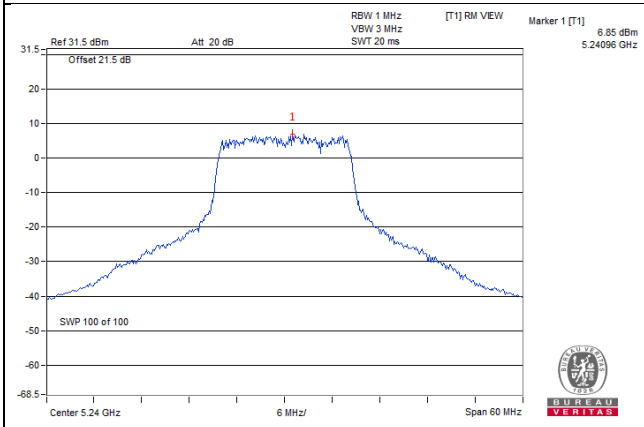
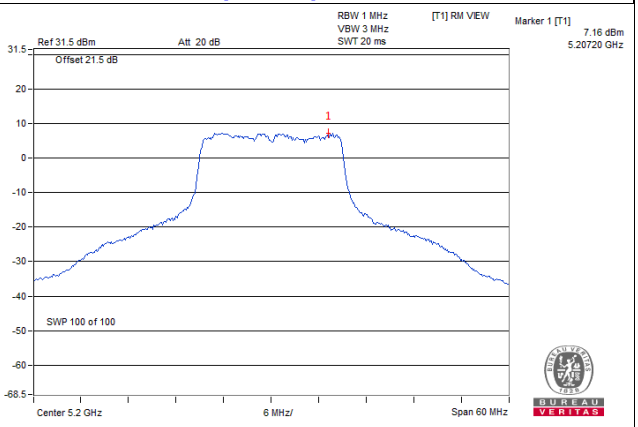
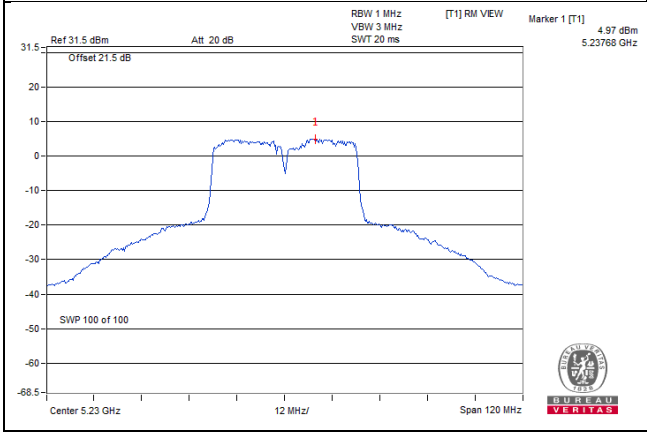
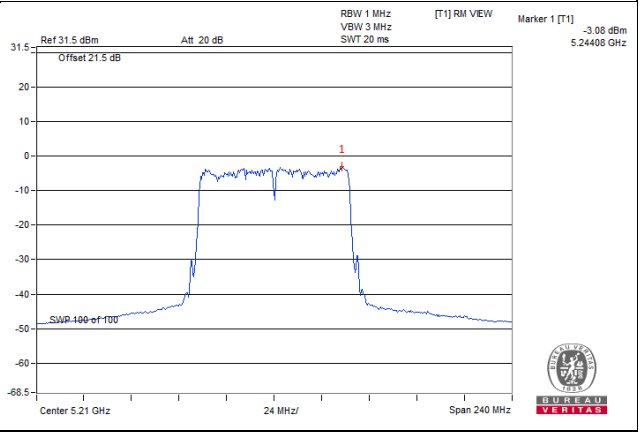
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-3.75	-4.16	-3.16	-4.10	0.23	2.48	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH48	**802.11ac (VHT20)_Chain 3 / CH40**
	
802.11ac (VHT40)_Chain 3 / CH46	**802.11ac (VHT80)_Chain 2 / CH42**
	

CDD Mode

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	-2.21	0.01	6.02	0.40	6.43	30	Pass
	157	5785	-1.74	0.48	6.02	0.40	6.90	30	Pass
	165	5825	-1.37	0.85	6.02	0.40	7.27	30	Pass
1	149	5745	-1.76	0.46	6.02	0.40	6.88	30	Pass
	157	5785	-1.35	0.87	6.02	0.40	7.29	30	Pass
	165	5825	-1.56	0.66	6.02	0.40	7.08	30	Pass
2	149	5745	-1.57	0.65	6.02	0.40	7.07	30	Pass
	157	5785	-2.03	0.19	6.02	0.40	6.61	30	Pass
	165	5825	-1.50	0.72	6.02	0.40	7.14	30	Pass
3	149	5745	-1.25	0.97	6.02	0.40	7.39	30	Pass
	157	5785	-1.76	0.46	6.02	0.40	6.88	30	Pass
	165	5825	-1.61	0.61	6.02	0.40	7.03	30	Pass

Note: 1. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-1.65	0.57	6.02	6.59	30	Pass
	157	5785	-1.31	0.91	6.02	6.93	30	Pass
	165	5825	-1.02	1.20	6.02	7.22	30	Pass
1	149	5745	-1.11	1.11	6.02	7.13	30	Pass
	157	5785	-0.83	1.39	6.02	7.41	30	Pass
	165	5825	-1.03	1.19	6.02	7.21	30	Pass
2	149	5745	-1.43	0.79	6.02	6.81	30	Pass
	157	5785	-1.28	0.94	6.02	6.96	30	Pass
	165	5825	-1.16	1.06	6.02	7.08	30	Pass
3	149	5745	-0.81	1.41	6.02	7.43	30	Pass
	157	5785	-1.23	0.99	6.02	7.01	30	Pass
	165	5825	-0.65	1.57	6.02	7.59	30	Pass

Note: 1. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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	-5.66	-3.44	6.02	0.14	2.72	30	Pass
	159	5795	-5.25	-3.03	6.02	0.14	3.13	30	Pass
1	151	5755	-4.26	-2.04	6.02	0.14	4.12	30	Pass
	159	5795	-3.94	-1.72	6.02	0.14	4.44	30	Pass
2	151	5755	-4.14	-1.92	6.02	0.14	4.24	30	Pass
	159	5795	-4.59	-2.37	6.02	0.14	3.79	30	Pass
3	151	5755	-4.25	-2.03	6.02	0.14	4.13	30	Pass
	159	5795	-4.30	-2.08	6.02	0.14	4.08	30	Pass

Note: 1. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

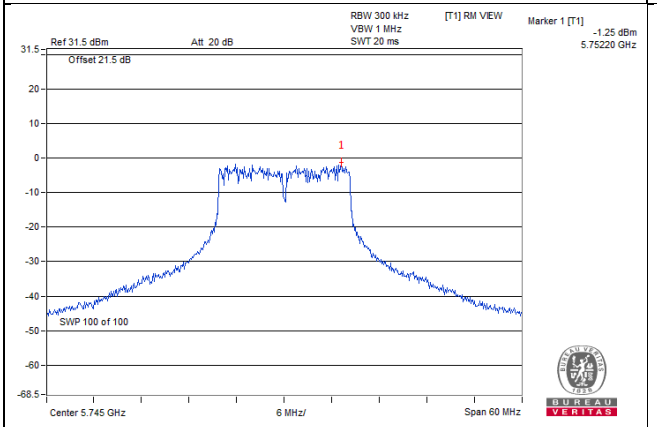
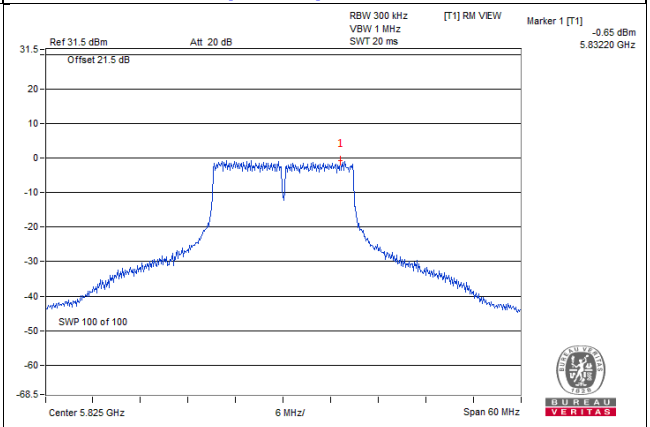
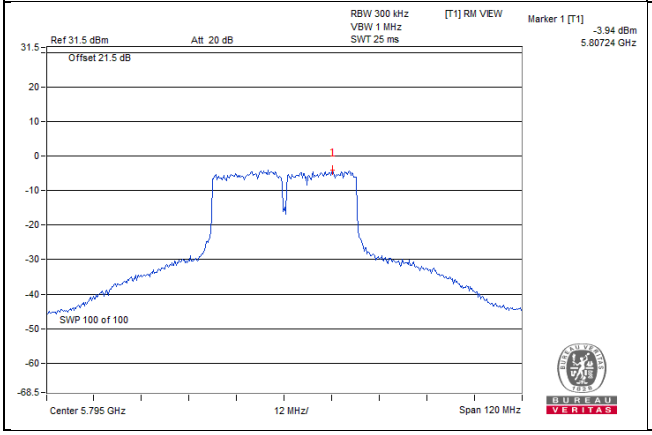
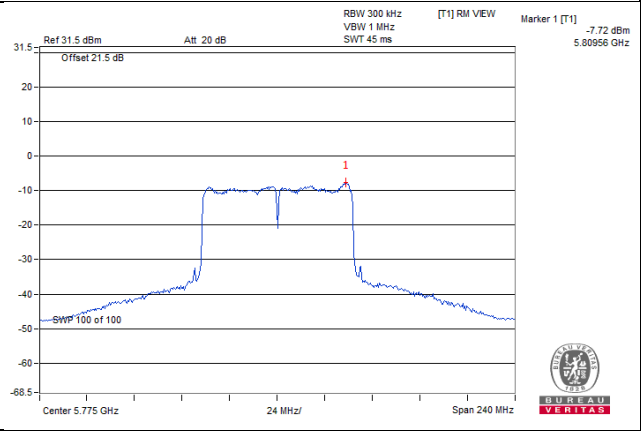
2. Refer to section 3.3 for duty cycle spectrum plot.

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	-8.04	-5.82	6.02	0.23	0.43	30	Pass
1	155	5775	-7.72	-5.50	6.02	0.23	0.75	30	Pass
2	155	5775	-9.21	-6.99	6.02	0.23	-0.74	30	Pass
3	155	5775	-8.56	-6.34	6.02	0.23	-0.09	30	Pass

Note: 1. The directional gain = 3.56dBi < 6dBi, so the power density limit shall not be reduced.

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

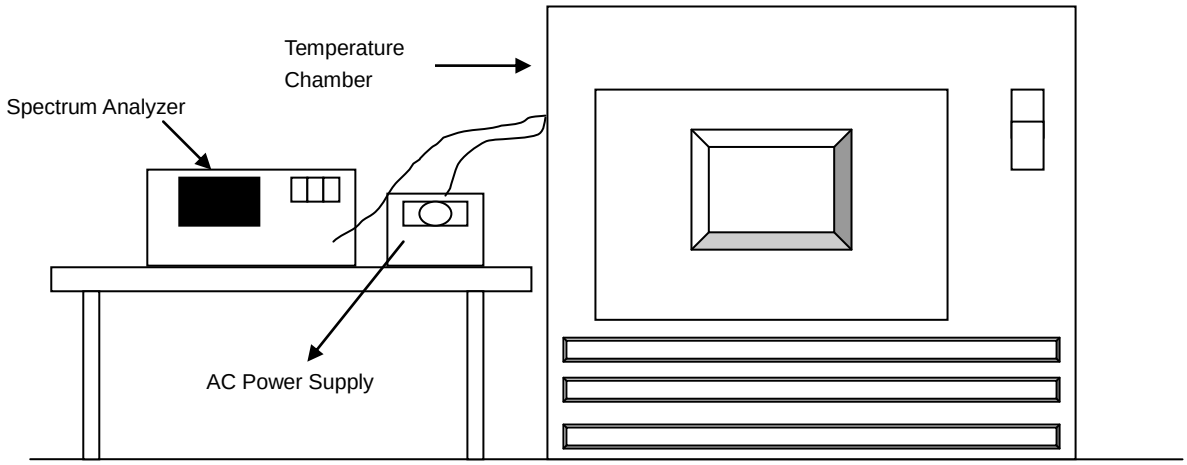
Spectrum Plot of Worst Value	
802.11a_Chain 3 / CH149	**802.11ac (VHT20)_Chain 3 / CH165**
	
802.11ac (VHT40)_Chain 1 / CH159	**802.11ac (VHT80)_Chain 1 / CH155**
	

4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal 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	5180.0123	Pass	5180.0093	Pass	5180.0096	Pass	5180.0121	Pass
40	120	5179.9819	Pass	5179.9812	Pass	5179.9822	Pass	5179.9821	Pass
30	120	5179.9799	Pass	5179.9832	Pass	5179.9825	Pass	5179.9789	Pass
20	120	5180.024	Pass	5180.023	Pass	5180.0256	Pass	5180.0261	Pass
10	120	5180.0025	Pass	5179.998	Pass	5180.0006	Pass	5179.9979	Pass
0	120	5180.004	Pass	5180.0047	Pass	5180.0035	Pass	5180.0037	Pass
-10	120	5179.9908	Pass	5179.99	Pass	5179.9933	Pass	5179.992	Pass
-20	120	5179.978	Pass	5179.9759	Pass	5179.975	Pass	5179.9755	Pass
-30	120	5179.9763	Pass	5179.9782	Pass	5179.9771	Pass	5179.9755	Pass

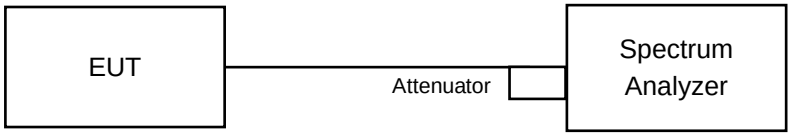
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0244	Pass	5180.0231	Pass	5180.025	Pass	5180.027	Pass
	120	5180.024	Pass	5180.023	Pass	5180.0256	Pass	5180.0261	Pass
	102	5180.0248	Pass	5180.0232	Pass	5180.0256	Pass	5180.0255	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.40	16.40	16.40	16.44	0.5	Pass
157	5785	16.36	16.38	16.41	16.45	0.5	Pass
165	5825	16.38	16.40	16.41	16.42	0.5	Pass

802.11ac (VHT20)

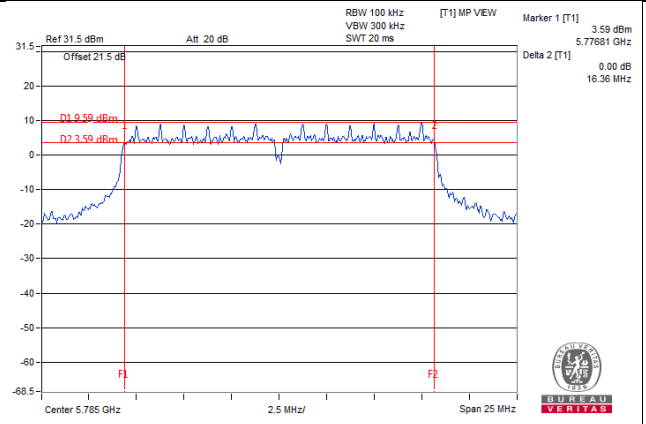
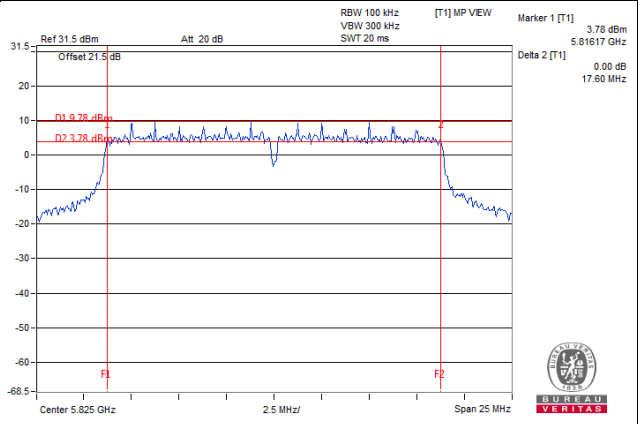
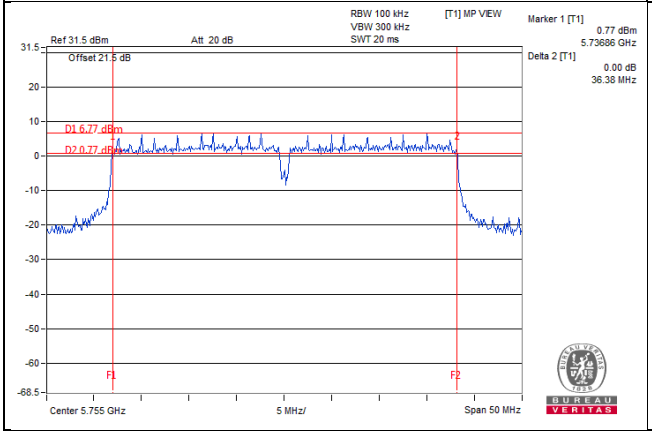
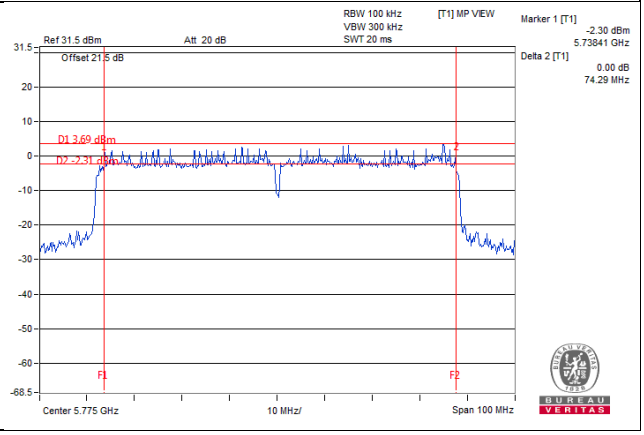
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.62	17.69	17.69	17.67	0.5	Pass
157	5785	17.63	17.63	17.67	17.68	0.5	Pass
165	5825	17.62	17.60	17.65	17.65	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.46	36.45	36.44	36.38	0.5	Pass
159	5795	36.43	36.43	36.44	36.43	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	75.33	75.43	75.53	74.29	0.5	Pass

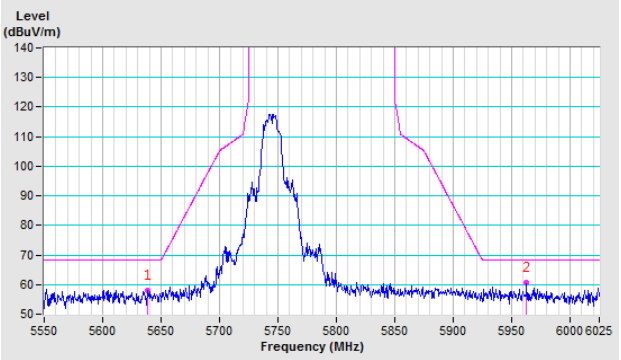
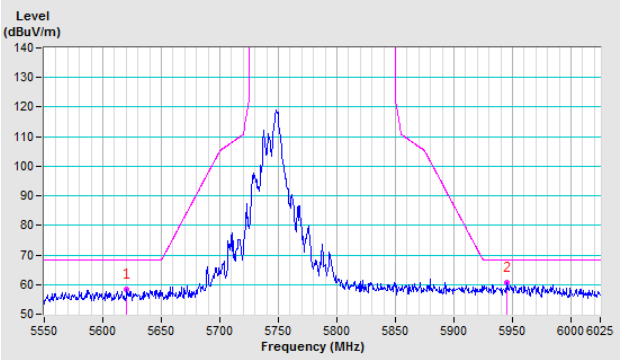
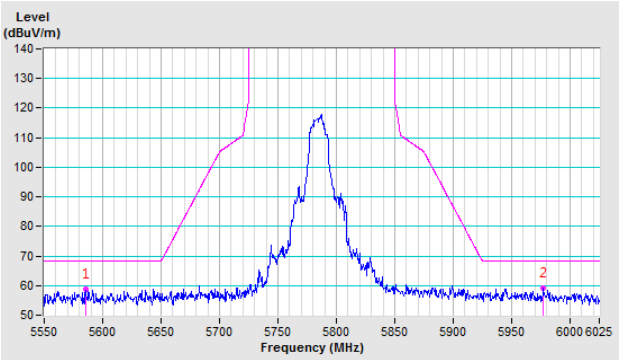
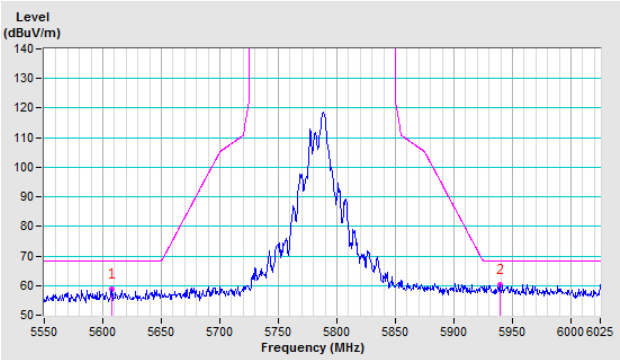
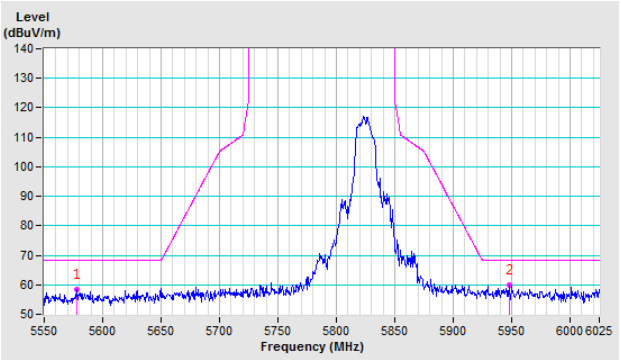
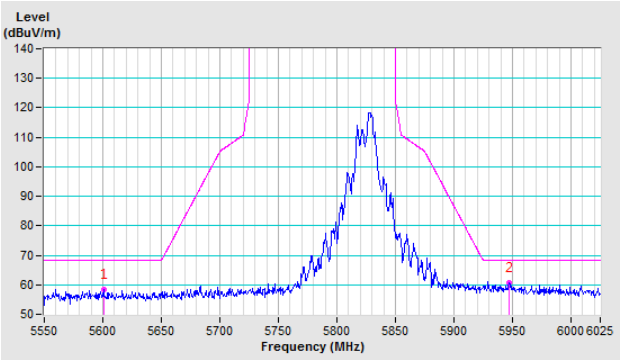
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH157	**802.11ac (VHT20)_Chain 1 / CH165**
	
802.11ac (VHT40)_Chain 3 / CH151	**802.11ac (VHT80)_Chain 3 / CH155**
	

5 Pictures of Test Arrangements

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

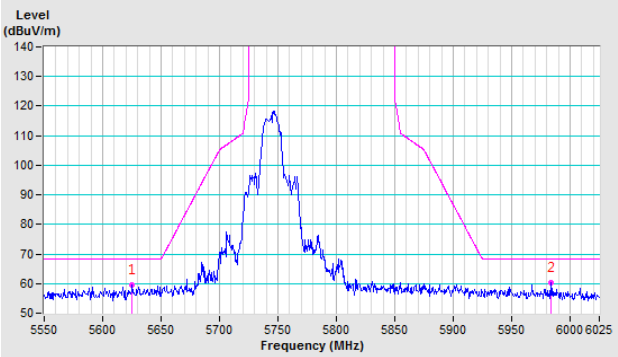
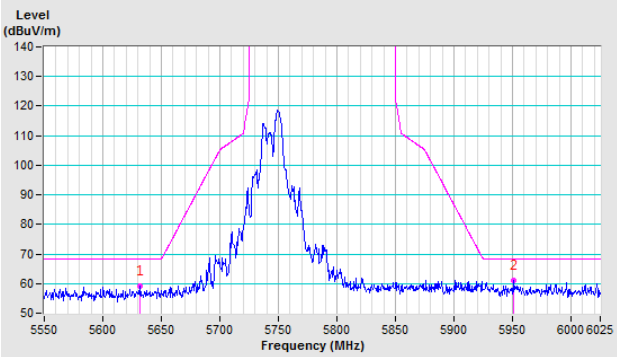
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

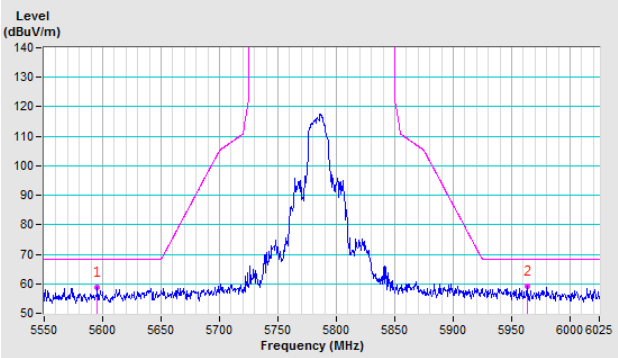
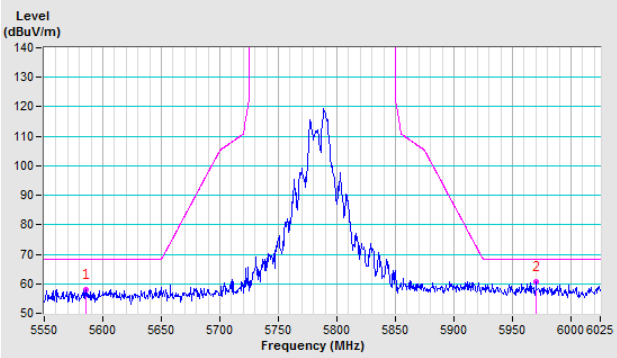
CH 149 5745 MHz	
Horizontal	**Vertical**
	
CH 157 5785 MHz	
Horizontal	**Vertical**
	
CH 165 5825 MHz	
Horizontal	**Vertical**
	

802.11ac (VHT20)

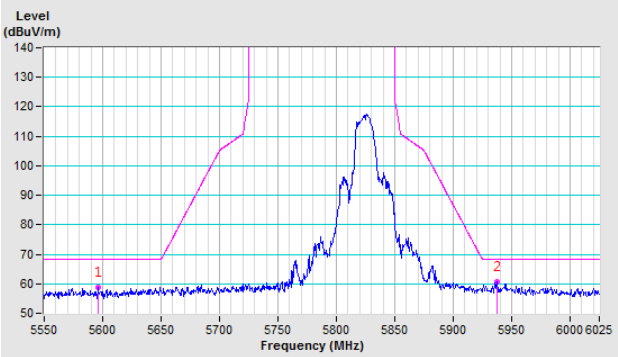
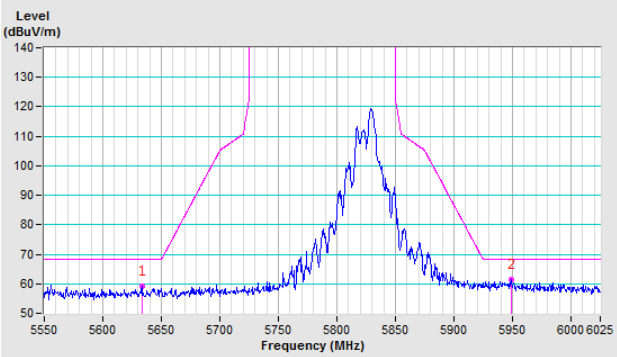
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

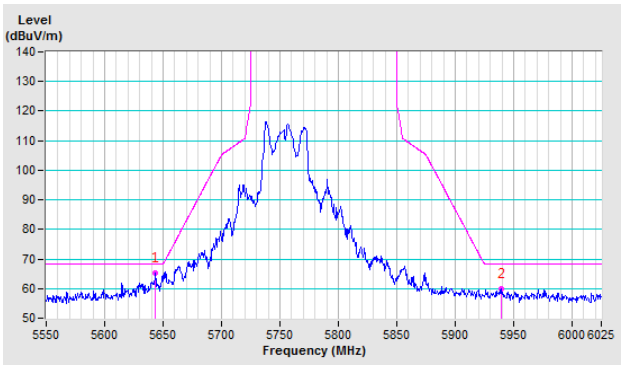
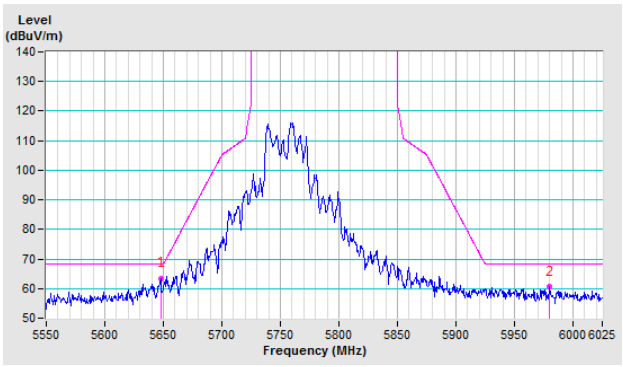
Horizontal	Vertical
	

CH 165 5825 MHz

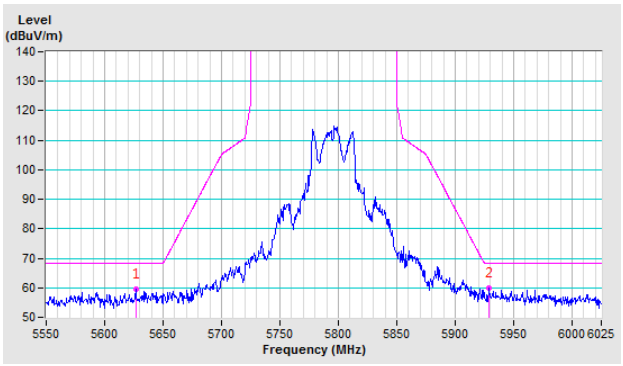
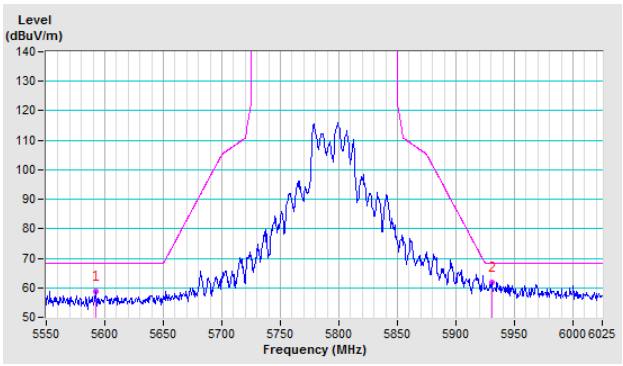
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

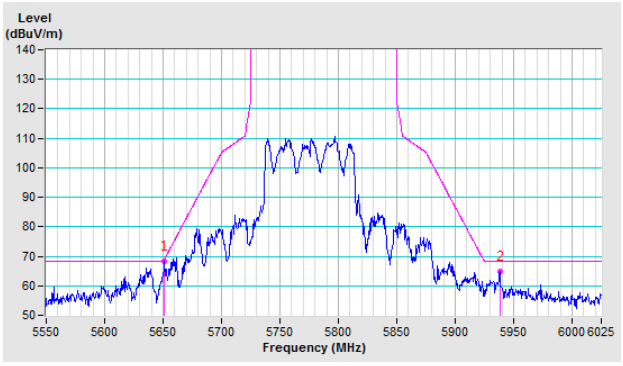
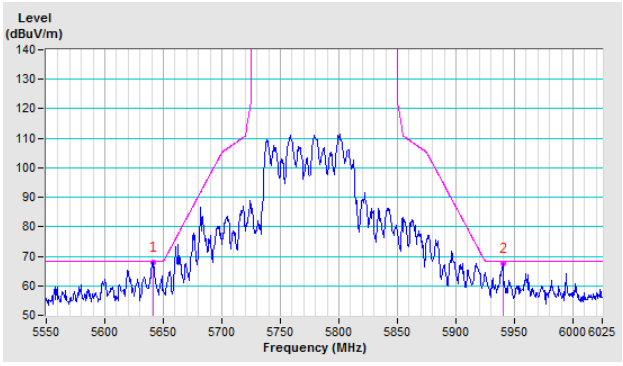
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

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:

Linkou 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.

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