FCC Test Report

Report No.:	RF180822E04B-1
FCC ID:	XCNUBC1322
Test Model:	UBC1322
Received Date:	Nov. 12, 2018
Test Date:	Dec. 03 to 05, 2018
Issued Date:	Feb. 26, 2019
Applicant:	Ubee Interactive Corp.
Address:	10F-1, No. 5, Taiyuan 1st St. Jhubei Ci, Hsinchu County 302, Taiwan , R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF180822E04B-1	Original release.	Feb. 26, 2019

1 Certificate of Conformity

Product:	Wireless eMTA
Brand:	Ubee
Test Model:	UBC1322
Applicant:	Ubee Interactive Corp.
Test Date:	Dec. 03 to 05, 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 : Wendy Wu , **Date:** Feb. 26, 2019

Wendy Wu / Specialist

Approved by : , **Date:** Feb. 26, 2019

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -21.83dB at 0.16562MHz.
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 -0.2dB at 5354.00MHz, 5470.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex (MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless eMTA
Brand	Ubee
Test Model	UBC1322
Power Supply Rating	12Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz 1024QAM for OFDM VHT (20/40/80) in 5GHz
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps OFDM VHT (20/40/80) 1024QAM: up to 2166 Mbps
Operating Frequency	5.26GHz ~ 5.32GHz, 5.50GHz ~ 5.72GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 16 802.11n (HT40), 802.11ac (VHT40): 8 802.11ac (VHT80): 4
Output Power	**CDD Mode:** **5.26 ~ 5.32GHz:** 178.236mW **5.50 ~ 5.72GHz:** 235.236mW **Beamforming Mode:** **5.26 ~ 5.32GHz:** 90.674mW **5.50 ~ 5.72GHz:** 90.84mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	RJ45 Cable × 1 (Unshielded, 1.8m)

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF180822E04-1 as the following:
   - ◆ Add DFS band <5.26 ~ 5.32GHz, 5.5 ~ 5.72GHz>
2. According to above condition, all test items need to be performed. And all data weres verified to meet the requirements.
3. The EUT has below Ubee P/N, which are identical to each other in all aspects except for the followings:

Model Name	Ubee P/N	Difference
UBC1322	UBC1322AA	With MoCA, CPU 3390
	UBC1322BA	Without MoCA, CPU 3390
Note: 1. There are two versions for Model UBC1322, same PCBA, one is with MoCA, and the other is no MoCA. 2. From the above Ubee P/N, Ubee P/N: UBC1322AA was selected as representative for the test and its data was recorded in this report.		

4. Simultaneously transmission condition.

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

5. The EUT must be supplied from power adapter as the following table:

Brand	Model No.	Spec.
LEI	MU30AY120250-A1	Input: 100-240Vac, 800mA, 50/60Hz Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.5m)

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

Antenna No.	Transmitter Circuit	Ant. Net Gain (dBi)	Freq. range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
1	Chain 2	3.48	2.4~2.4835	Dipole	i-pex(MHF)	85
	Chain 1	4.08	5.15~5.85			
2	Chain 1	3.49	2.4~2.4835	Dipole	i-pex(MHF)	73
	Chain 2	4.49	5.15~5.85			
3	Chain 0	4.49	5.15~5.85	Dipole	i-pex(MHF)	42
4	Chain 0	3.49	2.4~2.4835	Dipole	i-pex(MHF)	81
	Chain 3	4.47	5.15~5.85			

7. 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 (Support 256QAM)	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
VHT40 (Support 256QAM)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, 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)	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~8, Nss=4	4TX	4RX
802.11ac (VHT40)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
802.11ac (VHT80)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
VHT20 (Support 1024QAM)	MCS 0~11, Nss=1	4TX	4RX
	MCS 0~11, Nss=2	4TX	4RX
	MCS 0~11, Nss=3	4TX	4RX
	MCS 0~11, Nss=4	4TX	4RX
VHT40 (Support 1024QAM)	MCS 0~11, Nss=1	4TX	4RX
	MCS 0~11, Nss=2	4TX	4RX
	MCS 0~11, Nss=3	4TX	4RX
	MCS 0~11, Nss=4	4TX	4RX
VHT80 (Support 1024QAM)	MCS 0~11, Nss=1	4TX	4RX
	MCS 0~11, Nss=2	4TX	4RX
	MCS 0~11, Nss=3	4TX	4RX
	MCS 0~11, Nss=4	4TX	4RX

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

8. 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 5260 ~ 5320MHz

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

FOR 5500 ~ 5720MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Radiated Emission Test (Above 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	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 (VHT80)	5260-5320 5500-5720	58 106 to 138	122	OFDM	BPSK	29.3

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 (VHT80)	5260-5320 5500-5720	58 106 to 138	122	OFDM	BPSK	29.3

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	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	29.3
Beamforming Mode (Output power only)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	29.3

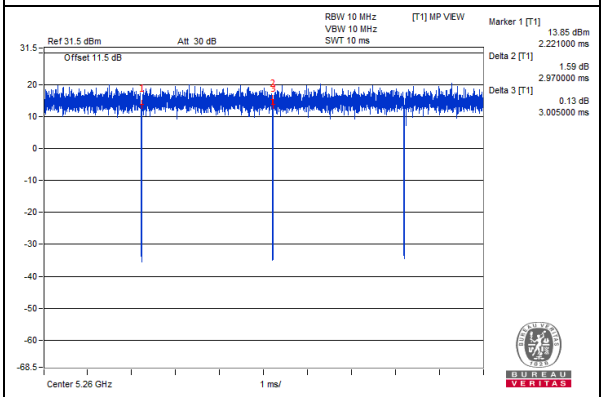
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	21deg. C, 63%RH	120Vac, 60Hz	Robert Cheng
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	23deg. C, 76%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

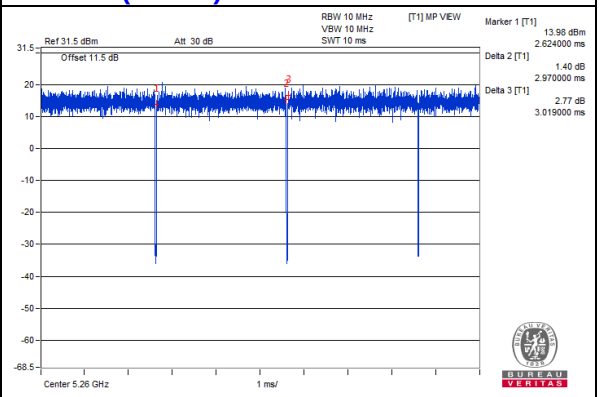
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
802.11a: Duty cycle = 2.97/3.005 = 0.988
802.11ac (VHT20): Duty cycle = 2.97/3.019 = 0.984
802.11ac (VHT40): Duty cycle = 2.969/3.002 = 0.989
802.11ac (VHT80): Duty cycle = 2.961/2.994 = 0.989

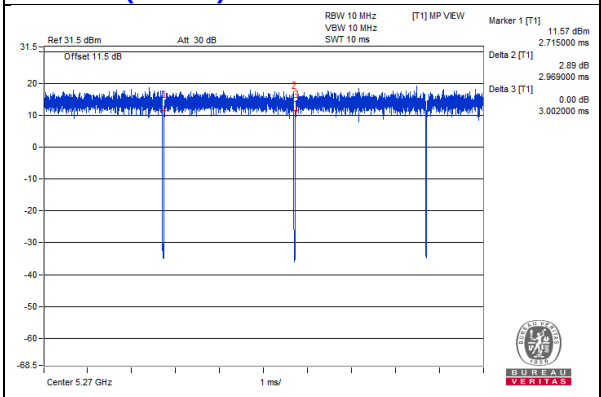
802.11a



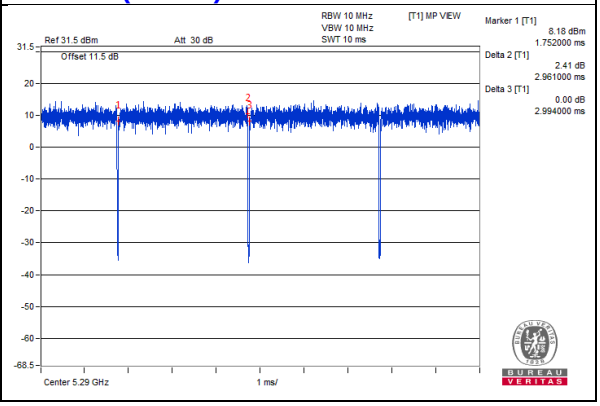
802.11ac (VHT20)



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.

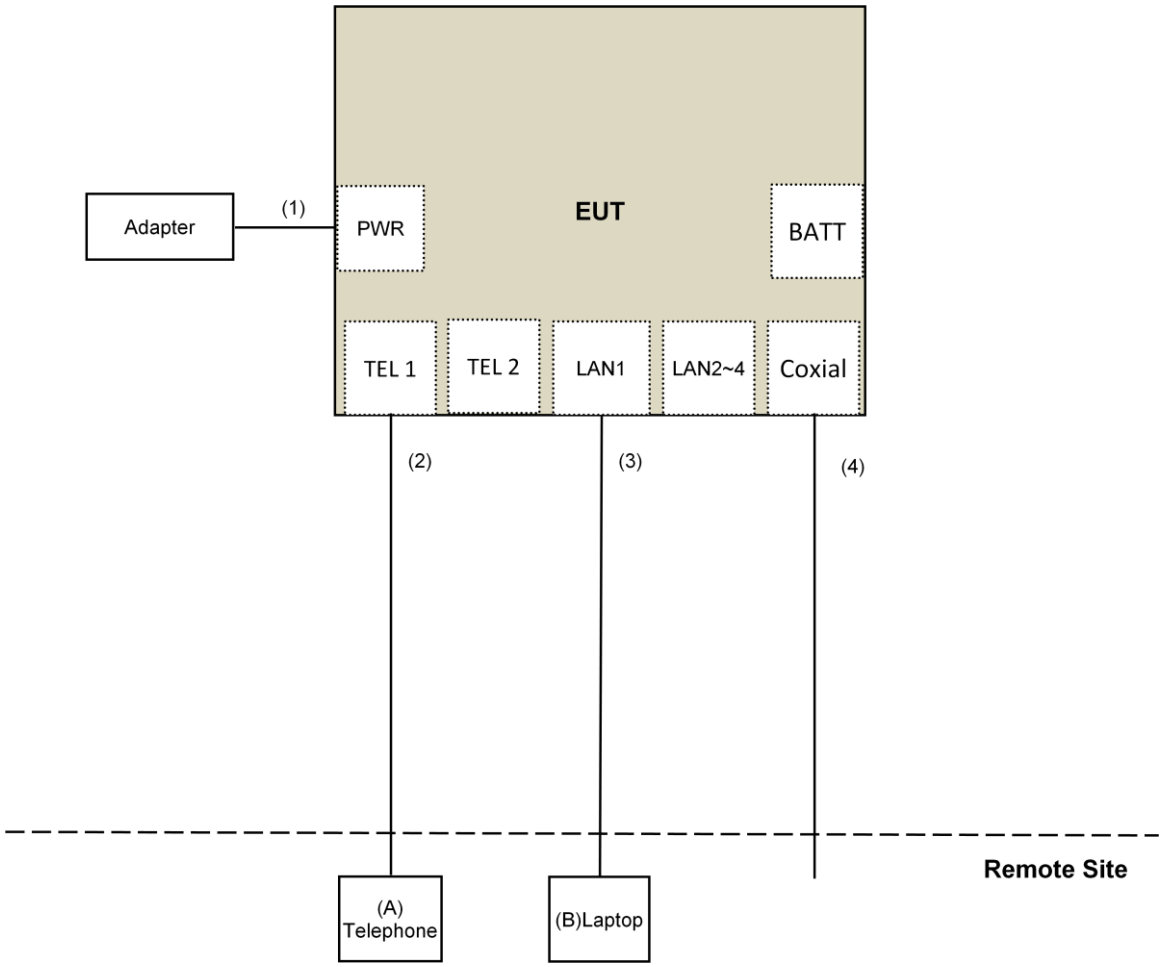
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Telephone	WONDER	WD-303	7C17KA04011	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client
2.	RJ-11 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	Coaxial Cable	1	10	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

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 Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	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-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
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. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Dec. 03 to 04, 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:

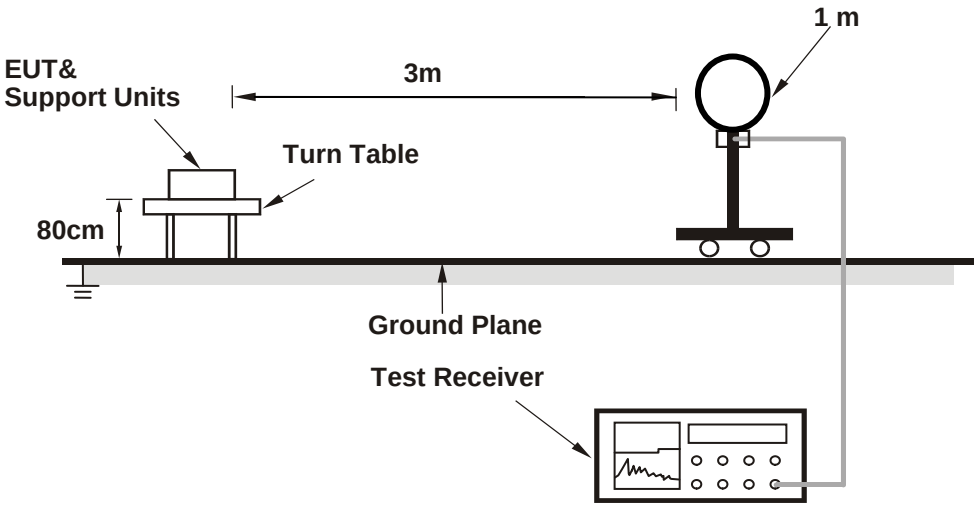
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

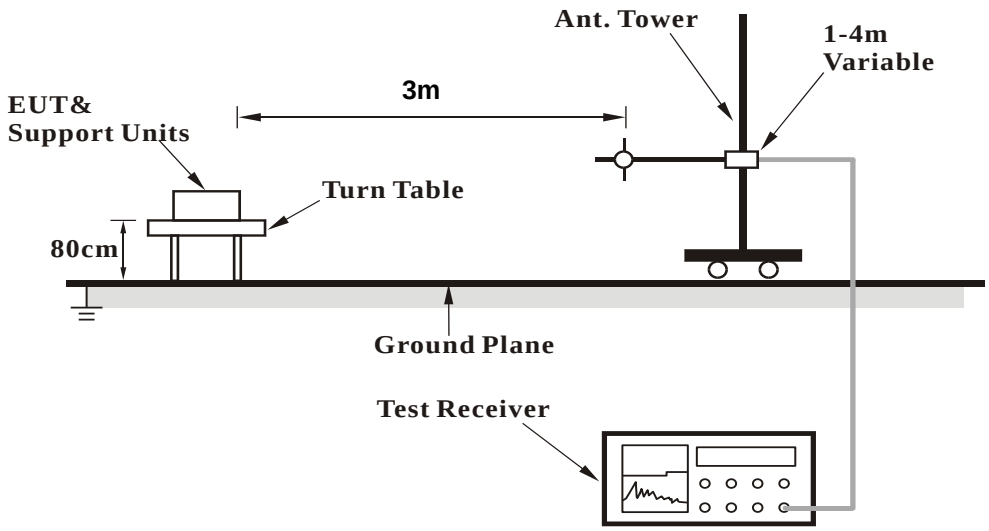
No deviation.

4.1.5 Test Setup

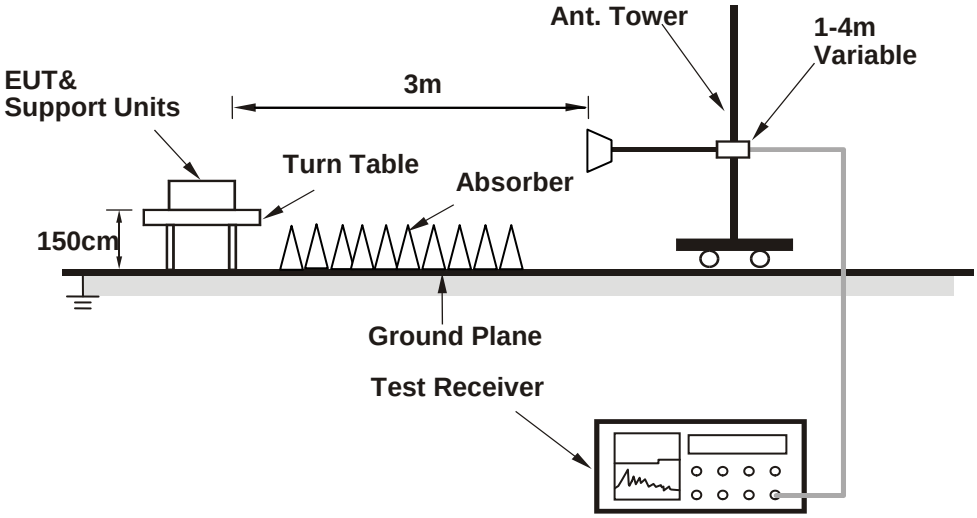
For Radiated emission below 30MHz



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 (MTool_3.0.0.6) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.3 PK	74.0	-20.7	1.46 H	337	50.3	3.0
2	5150.00	42.1 AV	54.0	-11.9	1.46 H	337	39.1	3.0
3	*5260.00	112.1 PK			1.46 H	337	109.7	2.4
4	*5260.00	102.3 AV			1.46 H	337	99.9	2.4
5	#10520.00	50.5 PK	68.2	-17.7	1.56 H	101	37.6	12.9
6	15780.00	52.7 PK	74.0	-21.3	1.47 H	99	40.2	12.5
7	15780.00	41.4 AV	54.0	-12.6	1.47 H	99	28.9	12.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.3 PK	74.0	-23.7	3.30 V	33	47.3	3.0
2	5150.00	40.2 AV	54.0	-13.8	3.30 V	33	37.2	3.0
3	*5260.00	108.8 PK			3.30 V	33	106.4	2.4
4	*5260.00	98.3 AV			3.30 V	33	95.9	2.4
5	#5780.00	51.9 PK	68.2	-16.3	1.43 V	111	48.5	3.4
6	#5780.00	40.5 AV	54.0	-13.5	1.43 V	111	37.1	3.4
7	#10520.00	50.5 PK	68.2	-17.7	1.49 V	62	37.6	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 60	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	*5300.00	112.4 PK			1.48 H	342	109.9	2.5
2	*5300.00	102.3 AV			1.48 H	342	99.8	2.5
3	10600.00	51.1 PK	74.0	-22.9	1.52 H	102	38.7	12.4
4	10600.00	40.2 AV	54.0	-13.8	1.52 H	102	27.8	12.4
5	15900.00	52.3 PK	74.0	-21.7	1.46 H	100	40.0	12.3
6	15900.00	41.2 AV	54.0	-12.8	1.46 H	100	28.9	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	108.1 PK			3.39 V	25	105.6	2.5
2	*5300.00	97.6 AV			3.39 V	25	95.1	2.5
3	10600.00	50.3 PK	74.0	-23.7	1.54 V	76	37.9	12.4
4	10600.00	39.8 AV	54.0	-14.2	1.54 V	76	27.4	12.4
5	15900.00	51.3 PK	74.0	-22.7	1.47 V	123	39.0	12.3
6	15900.00	40.1 AV	54.0	-13.9	1.47 V	123	27.8	12.3

REMARKS:

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

CHANNEL	TX Channel 64	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	*5320.00	112.3 PK			1.43 H	335	109.8	2.5
2	*5320.00	102.4 AV			1.43 H	335	99.9	2.5
3	5350.00	62.4 PK	74.0	-11.6	1.43 H	335	59.8	2.6
4	5350.00	49.3 AV	54.0	-4.7	1.43 H	335	46.7	2.6
5	10640.00	51.0 PK	74.0	-23.0	1.51 H	87	38.4	12.6
6	10640.00	40.2 AV	54.0	-13.8	1.51 H	87	27.6	12.6
7	15960.00	52.0 PK	74.0	-22.0	1.47 H	93	39.5	12.5
8	15960.00	41.0 AV	54.0	-13.0	1.47 H	93	28.5	12.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	108.5 PK			3.35 V	33	106.0	2.5
2	*5320.00	98.1 AV			3.35 V	33	95.6	2.5
3	5350.00	55.6 PK	74.0	-18.4	3.35 V	33	53.0	2.6
4	5350.00	44.3 AV	54.0	-9.7	3.35 V	33	41.7	2.6
5	10640.00	50.4 PK	74.0	-23.6	1.51 V	74	37.8	12.6
6	10640.00	40.1 AV	54.0	-13.9	1.51 V	74	27.5	12.6
7	15960.00	51.2 PK	74.0	-22.8	1.53 V	108	38.7	12.5
8	15960.00	40.3 AV	54.0	-13.7	1.53 V	108	27.8	12.5

REMARKS:

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

CHANNEL	TX Channel 100	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	5460.00	63.5 PK	74.0	-10.5	1.41 H	337	60.6	2.9
2	5460.00	50.4 AV	54.0	-3.6	1.41 H	337	47.5	2.9
3	#5470.00	64.1 PK	68.2	-4.1	1.41 H	337	61.2	2.9
4	*5500.00	112.4 PK			1.41 H	337	109.5	2.9
5	*5500.00	102.5 AV			1.41 H	337	99.6	2.9
6	11000.00	51.1 PK	74.0	-22.9	1.54 H	107	37.9	13.2
7	11000.00	40.3 AV	54.0	-13.7	1.54 H	107	27.1	13.2
8	#16500.00	52.8 PK	68.2	-15.4	1.47 H	112	37.8	15.0
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	5460.00	54.6 PK	74.0	-19.4	3.30 V	28	51.7	2.9
2	5460.00	43.6 AV	54.0	-10.4	3.30 V	28	40.7	2.9
3	#5470.00	56.4 PK	68.2	-11.8	3.30 V	28	53.5	2.9
4	*5500.00	108.3 PK			3.30 V	28	105.4	2.9
5	*5500.00	97.7 AV			3.30 V	28	94.8	2.9
6	11000.00	50.3 PK	74.0	-23.7	1.49 V	65	37.1	13.2
7	11000.00	39.7 AV	54.0	-14.3	1.49 V	65	26.5	13.2
8	#16500.00	51.4 PK	68.2	-16.8	1.46 V	122	36.4	15.0

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 116	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	*5580.00	112.6 PK			1.40 H	329	109.4	3.2
2	*5580.00	102.6 AV			1.40 H	329	99.4	3.2
3	11160.00	51.8 PK	74.0	-22.2	1.56 H	87	38.7	13.1
4	11160.00	40.6 AV	54.0	-13.4	1.56 H	87	27.5	13.1
5	#16740.00	52.3 PK	68.2	-15.9	1.51 H	86	35.9	16.4
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	*5580.00	108.4 PK			3.34 V	43	105.2	3.2
2	*5580.00	97.9 AV			3.34 V	43	94.7	3.2
3	11160.00	50.3 PK	74.0	-23.7	1.56 V	90	37.2	13.1
4	11160.00	39.7 AV	54.0	-14.3	1.56 V	90	26.6	13.1
5	#16740.00	51.2 PK	68.2	-17.0	1.49 V	134	34.8	16.4

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 140	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	*5700.00	113.2 PK			1.46 H	326	109.8	3.4
2	*5700.00	103.0 AV			1.46 H	326	99.6	3.4
3	#5725.00	55.9 PK	68.2	-12.3	1.46 H	326	52.6	3.3
4	11400.00	50.7 PK	74.0	-23.3	1.51 H	102	37.2	13.5
5	11400.00	40.1 AV	54.0	-13.9	1.51 H	102	26.6	13.5
6	#17100.00	52.7 PK	68.2	-15.5	1.45 H	106	36.6	16.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	109.2 PK			3.34 V	27	105.8	3.4
2	*5700.00	98.6 AV			3.34 V	27	95.2	3.4
3	#5725.00	51.8 PK	68.2	-16.4	3.34 V	27	48.5	3.3
4	11400.00	50.0 PK	74.0	-24.0	1.54 V	68	36.5	13.5
5	11400.00	39.7 AV	54.0	-14.3	1.54 V	68	26.2	13.5
6	#17100.00	51.2 PK	68.2	-17.0	1.53 V	120	35.1	16.1

REMARKS:

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

CHANNEL	TX Channel 144	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	*5720.00	112.5 PK			1.44 H	329	109.2	3.3
2	*5720.00	102.3 AV			1.44 H	329	99.0	3.3
3	#5850.00	56.3 PK	68.2	-11.9	1.44 H	329	52.7	3.6
4	11440.00	51.5 PK	74.0	-22.5	1.57 H	96	38.1	13.4
5	11440.00	40.5 AV	54.0	-13.5	1.57 H	96	27.1	13.4
6	#17160.00	51.9 PK	68.2	-16.3	1.42 H	101	35.6	16.3
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	*5720.00	108.3 PK			3.40 V	34	105.0	3.3
2	*5720.00	97.7 AV			3.40 V	34	94.4	3.3
3	#5850.00	53.2 PK	68.2	-15.0	3.40 V	34	49.6	3.6
4	11440.00	50.8 PK	74.0	-23.2	1.50 V	87	37.4	13.4
5	11440.00	40.2 AV	54.0	-13.8	1.50 V	87	26.8	13.4
6	#17160.00	51.4 PK	68.2	-16.8	1.50 V	121	35.1	16.3

REMARKS:

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

802.11ac (VHT20)

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.0 PK	74.0	-20.0	1.42 H	337	51.0	3.0
2	5150.00	42.5 AV	54.0	-11.5	1.42 H	337	39.5	3.0
3	*5260.00	112.3 PK			1.42 H	337	109.9	2.4
4	*5260.00	102.5 AV			1.42 H	337	100.1	2.4
5	#10520.00	50.9 PK	68.2	-17.3	1.55 H	113	38.0	12.9
6	15780.00	52.6 PK	74.0	-21.4	1.41 H	116	40.1	12.5
7	15780.00	41.7 AV	54.0	-12.3	1.41 H	116	29.2	12.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.1 PK	74.0	-21.9	3.36 V	43	49.1	3.0
2	5150.00	41.5 AV	54.0	-12.5	3.36 V	43	38.5	3.0
3	*5260.00	108.3 PK			3.36 V	43	105.9	2.4
4	*5260.00	97.9 AV			3.36 V	43	95.5	2.4
5	#10520.00	50.2 PK	68.2	-18.0	1.59 V	84	37.3	12.9
6	15780.00	50.9 PK	74.0	-23.1	1.46 V	123	38.4	12.5
7	15780.00	39.9 AV	54.0	-14.1	1.46 V	123	27.4	12.5

REMARKS:

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

CHANNEL	TX Channel 60	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	*5300.00	112.4 PK			1.38 H	339	109.9	2.5
2	*5300.00	102.3 AV			1.38 H	339	99.8	2.5
3	10600.00	51.5 PK	74.0	-22.5	1.50 H	111	39.1	12.4
4	10600.00	40.4 AV	54.0	-13.6	1.50 H	111	28.0	12.4
5	15900.00	51.9 PK	74.0	-22.1	1.41 H	114	39.6	12.3
6	15900.00	40.8 AV	54.0	-13.2	1.41 H	114	28.5	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	108.4 PK			3.40 V	22	105.9	2.5
2	*5300.00	97.7 AV			3.40 V	22	95.2	2.5
3	10600.00	50.2 PK	74.0	-23.8	1.55 V	73	37.8	12.4
4	10600.00	39.5 AV	54.0	-14.5	1.55 V	73	27.1	12.4
5	15900.00	51.6 PK	74.0	-22.4	1.46 V	137	39.3	12.3
6	15900.00	40.4 AV	54.0	-13.6	1.46 V	137	28.1	12.3

REMARKS:

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

CHANNEL	TX Channel 64	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	*5320.00	112.6 PK			1.42 H	348	110.1	2.5
2	*5320.00	102.5 AV			1.42 H	348	100.0	2.5
3	5350.00	62.2 PK	74.0	-11.8	1.42 H	348	59.6	2.6
4	5350.00	48.9 AV	54.0	-5.1	1.42 H	348	46.3	2.6
5	10640.00	50.9 PK	74.0	-23.1	1.46 H	117	38.3	12.6
6	10640.00	39.8 AV	54.0	-14.2	1.46 H	117	27.2	12.6
7	15960.00	52.3 PK	74.0	-21.7	1.51 H	99	39.8	12.5
8	15960.00	41.2 AV	54.0	-12.8	1.51 H	99	28.7	12.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	108.6 PK			3.37 V	30	106.1	2.5
2	*5320.00	98.3 AV			3.37 V	30	95.8	2.5
3	5350.00	55.2 PK	74.0	-18.8	3.37 V	30	52.6	2.6
4	5350.00	43.9 AV	54.0	-10.1	3.37 V	30	41.3	2.6
5	10640.00	50.3 PK	74.0	-23.7	1.56 V	84	37.7	12.6
6	10640.00	39.9 AV	54.0	-14.1	1.56 V	84	27.3	12.6
7	15960.00	51.0 PK	74.0	-23.0	1.43 V	130	38.5	12.5
8	15960.00	39.8 AV	54.0	-14.2	1.43 V	130	27.3	12.5

REMARKS:

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

CHANNEL	TX Channel 100	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	5460.00	57.5 PK	74.0	-16.5	1.44 H	350	54.6	2.9
2	5460.00	43.1 AV	54.0	-10.9	1.44 H	350	40.2	2.9
3	#5470.00	55.2 PK	68.2	-13.0	1.44 H	350	52.3	2.9
4	*5500.00	112.7 PK			1.44 H	350	109.8	2.9
5	*5500.00	102.5 AV			1.44 H	350	99.6	2.9
6	11000.00	51.4 PK	74.0	-22.6	1.55 H	87	38.2	13.2
7	11000.00	40.2 AV	54.0	-13.8	1.55 H	87	27.0	13.2
8	#16500.00	51.7 PK	68.2	-16.5	1.41 H	85	36.7	15.0
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	5460.00	52.5 PK	74.0	-21.5	3.32 V	49	49.6	2.9
2	5460.00	39.2 AV	54.0	-14.8	3.32 V	49	36.3	2.9
3	#5470.00	52.3 PK	68.2	-15.9	3.32 V	49	49.4	2.9
4	*5500.00	108.7 PK			3.32 V	49	105.8	2.9
5	*5500.00	98.3 AV			3.32 V	49	95.4	2.9
6	11000.00	50.8 PK	74.0	-23.2	1.60 V	82	37.6	13.2
7	11000.00	40.2 AV	54.0	-13.8	1.60 V	82	27.0	13.2
8	#16500.00	51.3 PK	68.2	-16.9	1.44 V	114	36.3	15.0

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 116	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	*5580.00	112.2 PK			1.47 H	349	109.0	3.2
2	*5580.00	102.4 AV			1.47 H	349	99.2	3.2
3	11160.00	51.4 PK	74.0	-22.6	1.48 H	95	38.3	13.1
4	11160.00	40.4 AV	54.0	-13.6	1.48 H	95	27.3	13.1
5	#16740.00	51.7 PK	68.2	-16.5	1.45 H	93	35.3	16.4
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	*5580.00	108.7 PK			3.40 V	22	105.5	3.2
2	*5580.00	98.3 AV			3.40 V	22	95.1	3.2
3	11160.00	50.1 PK	74.0	-23.9	1.50 V	77	37.0	13.1
4	11160.00	39.7 AV	54.0	-14.3	1.50 V	77	26.6	13.1
5	#16740.00	51.9 PK	68.2	-16.3	1.50 V	135	35.5	16.4

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 140	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	*5700.00	112.4 PK			1.43 H	344	109.0	3.4
2	*5700.00	102.5 AV			1.43 H	344	99.1	3.4
3	#5725.00	55.6 PK	68.2	-12.6	1.51 H	334	52.3	3.3
4	11400.00	50.8 PK	74.0	-23.2	1.53 H	115	37.3	13.5
5	11400.00	39.7 AV	54.0	-14.3	1.53 H	115	26.2	13.5
6	#17100.00	53.0 PK	68.2	-15.2	1.50 H	86	36.9	16.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	108.0 PK			3.32 V	24	104.6	3.4
2	*5700.00	97.4 AV			3.32 V	24	94.0	3.4
3	#5725.00	54.3 PK	68.2	-13.9	3.32 V	24	51.0	3.3
4	11400.00	50.4 PK	74.0	-23.6	1.59 V	87	36.9	13.5
5	11400.00	40.2 AV	54.0	-13.8	1.59 V	87	26.7	13.5
6	#17100.00	51.4 PK	68.2	-16.8	1.51 V	139	35.3	16.1

REMARKS:

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

CHANNEL	TX Channel 144	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	*5720.00	113.2 PK			1.39 H	360	109.9	3.3
2	*5720.00	102.8 AV			1.39 H	360	99.5	3.3
3	#5850.00	56.4 PK	68.2	-11.8	1.39 H	360	52.8	3.6
4	11440.00	50.6 PK	74.0	-23.4	1.47 H	107	37.2	13.4
5	11440.00	39.9 AV	54.0	-14.1	1.47 H	107	26.5	13.4
6	#17160.00	52.0 PK	68.2	-16.2	1.40 H	104	35.7	16.3
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	*5720.00	108.3 PK			3.37 V	31	105.0	3.3
2	*5720.00	97.8 AV			3.37 V	31	94.5	3.3
3	#5850.00	55.6 PK	68.2	-12.6	3.37 V	31	52.0	3.6
4	11440.00	50.5 PK	74.0	-23.5	1.57 V	78	37.1	13.4
5	11440.00	40.2 AV	54.0	-13.8	1.57 V	78	26.8	13.4
6	#17160.00	50.8 PK	68.2	-17.4	1.41 V	138	34.5	16.3

REMARKS:

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

802.11ac (VHT40)

CHANNEL	TX Channel 54	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.6 PK	74.0	-20.4	1.48 H	338	50.6	3.0
2	5150.00	42.0 AV	54.0	-12.0	1.48 H	338	39.0	3.0
3	*5270.00	111.8 PK			1.48 H	338	109.4	2.4
4	*5270.00	102.6 AV			1.48 H	338	100.2	2.4
5	#10540.00	51.2 PK	68.2	-17.0	1.50 H	99	38.4	12.8
6	15810.00	52.6 PK	74.0	-21.4	1.42 H	84	40.2	12.4
7	15810.00	41.2 AV	54.0	-12.8	1.42 H	84	28.8	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.6 PK	74.0	-21.4	3.40 V	35	49.6	3.0
2	5150.00	41.8 AV	54.0	-12.2	3.40 V	35	38.8	3.0
3	*5270.00	108.8 PK			3.40 V	35	106.4	2.4
4	*5270.00	98.2 AV			3.40 V	35	95.8	2.4
5	#10540.00	49.6 PK	68.2	-18.6	1.50 V	64	36.8	12.8
6	15810.00	51.7 PK	74.0	-22.3	1.45 V	124	39.3	12.4
7	15810.00	40.2 AV	54.0	-13.8	1.45 V	124	27.8	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 62	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	*5310.00	111.1 PK			1.40 H	338	108.7	2.4
2	*5310.00	102.5 AV			1.40 H	338	100.1	2.4
3	5350.00	66.3 PK	74.0	-7.7	1.40 H	338	63.7	2.6
4	5350.00	51.3 AV	54.0	-2.7	1.40 H	338	48.7	2.6
5	10620.00	50.6 PK	74.0	-23.4	1.53 H	87	38.1	12.5
6	10620.00	39.9 AV	54.0	-14.1	1.53 H	87	27.4	12.5
7	15930.00	52.4 PK	74.0	-21.6	1.41 H	95	40.0	12.4
8	15930.00	41.6 AV	54.0	-12.4	1.41 H	95	29.2	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	*5310.00	108.4 PK			3.33 V	18	106.0	2.4
2	*5310.00	97.8 AV			3.33 V	18	95.4	2.4
3	5350.00	61.4 PK	74.0	-12.6	3.33 V	18	58.8	2.6
4	5350.00	46.5 AV	54.0	-7.5	3.33 V	18	43.9	2.6
5	10620.00	50.0 PK	74.0	-24.0	1.53 V	68	37.5	12.5
6	10620.00	39.3 AV	54.0	-14.7	1.53 V	68	26.8	12.5
7	15930.00	51.6 PK	74.0	-22.4	1.47 V	108	39.2	12.4
8	15930.00	40.6 AV	54.0	-13.4	1.47 V	108	28.2	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.

CHANNEL	TX Channel 102	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	5460.00	57.6 PK	74.0	-16.4	1.35 H	346	54.7	2.9
2	5460.00	43.0 AV	54.0	-11.0	1.35 H	346	40.1	2.9
3	#5470.00	54.8 PK	68.2	-13.4	1.35 H	346	51.9	2.9
4	*5510.00	110.6 PK			1.35 H	346	107.7	2.9
5	*5510.00	102.3 AV			1.35 H	346	99.4	2.9
6	11020.00	50.7 PK	74.0	-23.3	1.52 H	94	37.5	13.2
7	11020.00	39.7 AV	54.0	-14.3	1.52 H	94	26.5	13.2
8	#16530.00	52.2 PK	68.2	-16.0	1.45 H	98	37.3	14.9
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	5460.00	54.4 PK	74.0	-19.6	3.34 V	27	51.5	2.9
2	5460.00	40.6 AV	54.0	-13.4	3.34 V	27	37.7	2.9
3	#5470.00	53.6 PK	68.2	-14.6	3.34 V	27	50.7	2.9
4	*5510.00	108.2 PK			3.34 V	27	105.3	2.9
5	*5510.00	97.8 AV			3.34 V	27	94.9	2.9
6	11020.00	50.7 PK	74.0	-23.3	1.51 V	80	37.5	13.2
7	11020.00	40.2 AV	54.0	-13.8	1.51 V	80	27.0	13.2
8	#16530.00	50.8 PK	68.2	-17.4	1.47 V	115	35.9	14.9

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 110	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	*5550.00	111.9 PK			1.36 H	360	108.9	3.0
2	*5550.00	102.4 AV			1.36 H	360	99.4	3.0
3	11100.00	51.3 PK	74.0	-22.7	1.46 H	94	38.3	13.0
4	11100.00	40.4 AV	54.0	-13.6	1.46 H	94	27.4	13.0
5	#16650.00	52.0 PK	68.2	-16.2	1.49 H	104	36.4	15.6
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	*5550.00	108.0 PK			3.30 V	40	105.0	3.0
2	*5550.00	97.7 AV			3.30 V	40	94.7	3.0
3	11100.00	50.3 PK	74.0	-23.7	1.51 V	61	37.3	13.0
4	11100.00	39.6 AV	54.0	-14.4	1.51 V	61	26.6	13.0
5	#16650.00	51.0 PK	68.2	-17.2	1.49 V	120	35.4	15.6

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 134	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	*5670.00	111.6 PK			1.36 H	358	108.3	3.3
2	*5670.00	102.2 AV			1.36 H	358	98.9	3.3
3	#5725.00	58.7 PK	68.2	-9.5	1.36 H	358	55.4	3.3
4	11340.00	51.0 PK	74.0	-23.0	1.53 H	88	37.5	13.5
5	11340.00	40.4 AV	54.0	-13.6	1.53 H	88	26.9	13.5
6	#17010.00	51.6 PK	68.2	-16.6	1.44 H	111	35.1	16.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	108.0 PK			3.36 V	33	104.7	3.3
2	*5670.00	97.5 AV			3.36 V	33	94.2	3.3
3	#5725.00	54.6 PK	68.2	-13.6	3.36 V	33	51.3	3.3
4	11340.00	50.3 PK	74.0	-23.7	1.55 V	72	36.8	13.5
5	11340.00	39.9 AV	54.0	-14.1	1.55 V	72	26.4	13.5
6	#17010.00	51.3 PK	68.2	-16.9	1.50 V	109	34.8	16.5

REMARKS:

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

CHANNEL	TX Channel 142	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	*5710.00	111.2 PK			1.36 H	357	107.9	3.3
2	*5710.00	102.7 AV			1.36 H	357	99.4	3.3
3	#5850.00	56.6 PK	68.2	-11.6	1.36 H	357	53.0	3.6
4	11420.00	50.9 PK	74.0	-23.1	1.47 H	116	37.5	13.4
5	11420.00	40.2 AV	54.0	-13.8	1.47 H	116	26.8	13.4
6	#17130.00	51.7 PK	68.2	-16.5	1.48 H	112	35.4	16.3
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	*5710.00	108.6 PK			3.38 V	30	105.3	3.3
2	*5710.00	98.1 AV			3.38 V	30	94.8	3.3
3	#5850.00	56.3 PK	68.2	-11.9	3.38 V	30	52.7	3.6
4	11420.00	50.6 PK	74.0	-23.4	1.53 V	67	37.2	13.4
5	11420.00	40.2 AV	54.0	-13.8	1.53 V	67	26.8	13.4
6	#17130.00	51.4 PK	68.2	-16.8	1.44 V	115	35.1	16.3

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.

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CHANNEL	TX Channel 58	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.6 PK	74.0	-14.4	1.55 H	343	56.6	3.0
2	5150.00	45.1 AV	54.0	-8.9	1.55 H	343	42.1	3.0
3	*5290.00	106.9 PK			1.55 H	343	104.5	2.4
4	*5290.00	98.7 AV			1.55 H	343	96.3	2.4
5	5350.00	67.9 PK	74.0	-6.1	1.55 H	343	65.3	2.6
6	5350.00	53.0 AV	54.0	-1.0	1.55 H	343	50.4	2.6
7	5354.00	67.1 PK	74.0	-6.9	1.55 H	343	64.5	2.6
8	**5354.00**	**53.8 AV**	**54.0**	**-0.2**	**1.55 H**	**343**	**51.2**	**2.6**
9	#10580.00	51.1 PK	68.2	-17.1	1.47 H	105	38.5	12.6
10	15870.00	51.8 PK	74.0	-22.2	1.44 H	90	39.4	12.4
11	15870.00	40.9 AV	54.0	-13.1	1.44 H	90	28.5	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	57.2 PK	74.0	-16.8	3.39 V	34	54.2	3.0
2	5150.00	43.2 AV	54.0	-10.8	3.39 V	34	40.2	3.0
3	*5290.00	102.3 PK			3.39 V	34	99.9	2.4
4	*5290.00	94.2 AV			3.39 V	34	91.8	2.4
5	5350.00	64.3 PK	74.0	-9.7	3.39 V	34	61.7	2.6
6	5350.00	50.6 AV	54.0	-3.4	3.39 V	34	48.0	2.6
7	5354.00	63.2 PK	74.0	-10.8	3.39 V	34	60.6	2.6
8	5354.00	51.0 AV	54.0	-3.0	3.39 V	34	48.4	2.6
9	#10580.00	50.6 PK	68.2	-17.6	1.59 V	88	38.0	12.6
10	15870.00	51.5 PK	74.0	-22.5	1.50 V	112	39.1	12.4
11	15870.00	40.2 AV	54.0	-13.8	1.50 V	112	27.8	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 106	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	60.5 PK	74.0	-13.5	1.38 H	346	57.6	2.9
2	5460.00	46.8 AV	54.0	-7.2	1.38 H	346	43.9	2.9
3	**#5470.00**	**68.0 PK**	**68.2**	**-0.2**	**1.38 H**	**346**	**65.1**	**2.9**
4	*5530.00	105.3 PK			1.38 H	346	102.3	3.0
5	*5530.00	96.5 AV			1.38 H	346	93.5	3.0
6	11060.00	50.8 PK	74.0	-23.2	1.52 H	104	37.6	13.2
7	11060.00	39.8 AV	54.0	-14.2	1.52 H	104	26.6	13.2
8	#16590.00	52.5 PK	68.2	-15.7	1.43 H	105	37.4	15.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	55.2 PK	74.0	-18.8	3.31 V	25	52.3	2.9
2	5460.00	41.3 AV	54.0	-12.7	3.31 V	25	38.4	2.9
3	#5470.00	64.2 PK	68.2	-4.0	3.31 V	25	61.3	2.9
4	*5530.00	101.3 PK			3.31 V	25	98.3	3.0
5	*5530.00	92.5 AV			3.31 V	25	89.5	3.0
6	11060.00	50.6 PK	74.0	-23.4	1.49 V	65	37.4	13.2
7	11060.00	39.8 AV	54.0	-14.2	1.49 V	65	26.6	13.2
8	#16590.00	51.4 PK	68.2	-16.8	1.49 V	134	36.3	15.1

REMARKS:

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

CHANNEL	TX Channel 122	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	*5610.00	110.0 PK			1.38 H	360	106.7	3.3
2	*5610.00	99.9 AV			1.38 H	360	96.6	3.3
3	#5725.00	58.7 PK	68.2	-9.5	1.38 H	360	55.4	3.3
4	11220.00	50.8 PK	74.0	-23.2	1.48 H	100	37.6	13.2
5	11220.00	40.0 AV	54.0	-14.0	1.48 H	100	26.8	13.2
6	#16830.00	52.0 PK	68.2	-16.2	1.45 H	85	35.4	16.6
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	*5610.00	105.8 PK			3.38 V	49	102.5	3.3
2	*5610.00	96.2 AV			3.38 V	49	92.9	3.3
3	#5725.00	54.2 PK	68.2	-14.0	3.38 V	49	50.9	3.3
4	11220.00	50.4 PK	74.0	-23.6	1.49 V	66	37.2	13.2
5	11220.00	40.0 AV	54.0	-14.0	1.49 V	66	26.8	13.2
6	#16830.00	51.6 PK	68.2	-16.6	1.46 V	127	35.0	16.6

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 138	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	*5690.00	110.6 PK			1.40 H	341	107.3	3.3
2	*5690.00	100.5 AV			1.40 H	341	97.2	3.3
3	#5850.00	55.7 PK	68.2	-12.5	1.40 H	341	52.1	3.6
4	11380.00	51.5 PK	74.0	-22.5	1.46 H	88	38.0	13.5
5	11380.00	40.7 AV	54.0	-13.3	1.46 H	88	27.2	13.5
6	#17070.00	52.2 PK	68.2	-16.0	1.43 H	93	36.0	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	*5690.00	106.5 PK			3.34 V	35	103.2	3.3
2	*5690.00	96.6 AV			3.34 V	35	93.3	3.3
3	#5850.00	51.8 PK	68.2	-16.4	3.34 V	35	48.2	3.6
4	11380.00	50.7 PK	74.0	-23.3	1.49 V	87	37.2	13.5
5	11380.00	40.2 AV	54.0	-13.8	1.49 V	87	26.7	13.5
6	#17070.00	51.2 PK	68.2	-17.0	1.41 V	133	35.0	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.

Below 1GHz Data:

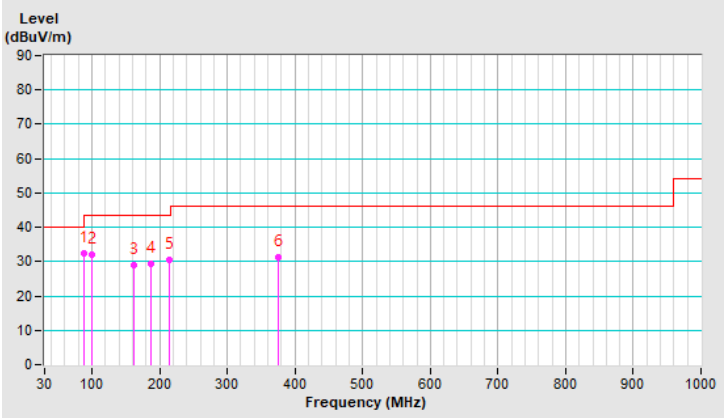
802.11ac (VHT80)

CHANNEL	TX Channel 122	**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	**87.31**	**32.5 QP**	**40.0**	**-7.5**	**2.00 H**	**84**	**46.1**	**-13.6**
2	100.12	32.1 QP	43.5	-11.4	1.65 H	100	44.4	-12.3
3	161.62	28.9 QP	43.5	-14.6	1.71 H	66	36.7	-7.8
4	186.82	29.2 QP	43.5	-14.3	1.42 H	144	39.5	-10.3
5	214.95	30.4 QP	43.5	-13.1	1.42 H	88	41.6	-11.2
6	375.03	31.2 QP	46.0	-14.8	1.20 H	100	36.0	-4.8

REMARKS:

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

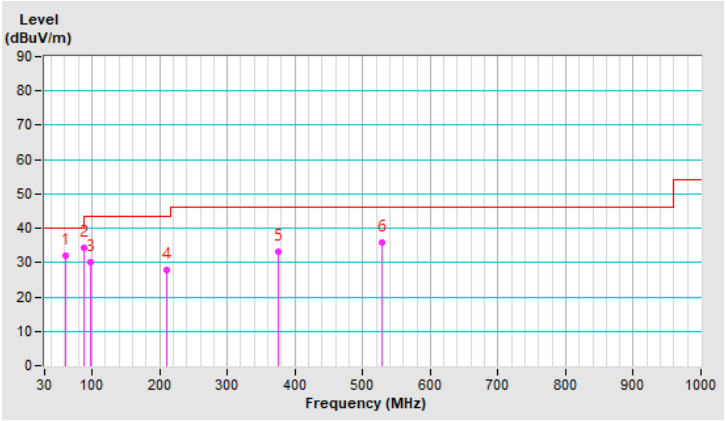


CHANNEL	TX Channel 122	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	60.15	32.1 QP	40.0	-7.9	1.20 V	100	40.4	-8.3
2	88.31	34.2 QP	43.5	-9.3	1.65 V	100	47.8	-13.6
3	97.98	30.1 QP	43.5	-13.4	1.65 V	134	42.7	-12.6
4	210.02	27.8 QP	43.5	-15.7	1.32 V	200	38.9	-11.1
5	375.01	33.1 QP	46.0	-12.9	1.74 V	211	37.9	-4.8
6	529.01	35.8 QP	46.0	-10.2	1.65 V	100	37.1	-1.3

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Dec. 05, 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.

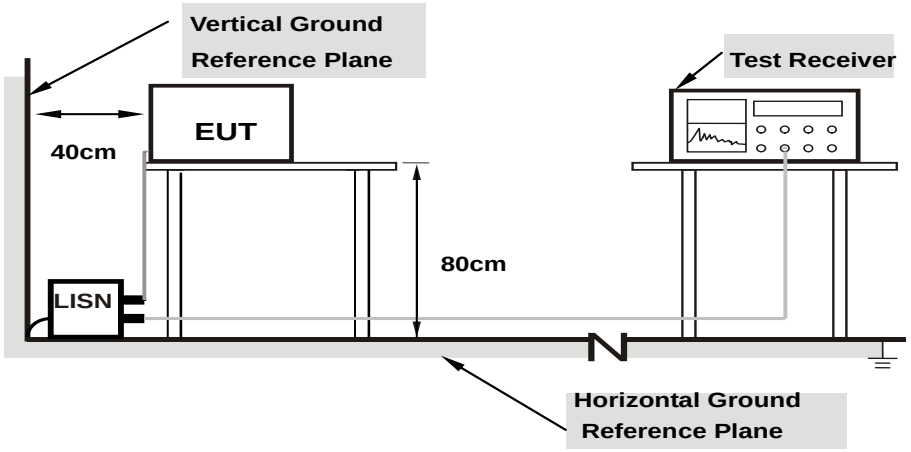
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

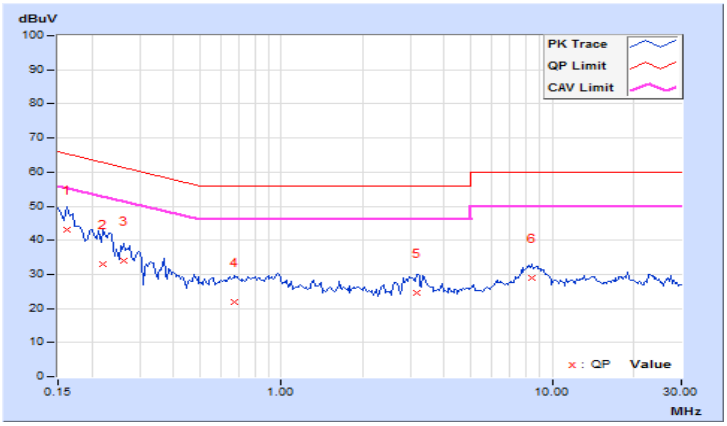
4.2.7 Test Results

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	0.16170	10.03	33.13	17.91	43.16	27.94	65.38	55.38	-22.22	-27.44
2	0.22030	10.05	23.04	10.12	33.09	20.17	62.81	52.81	-29.72	-32.64
3	0.26326	10.06	23.96	15.11	34.02	25.17	61.33	51.33	-27.31	-26.16
4	0.67343	10.10	11.83	1.53	21.93	11.63	56.00	46.00	-34.07	-34.37
5	3.18360	10.27	14.24	4.56	24.51	14.83	56.00	46.00	-31.49	-31.17
6	8.42186	10.60	18.31	13.34	28.91	23.94	60.00	50.00	-31.09	-26.06

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.

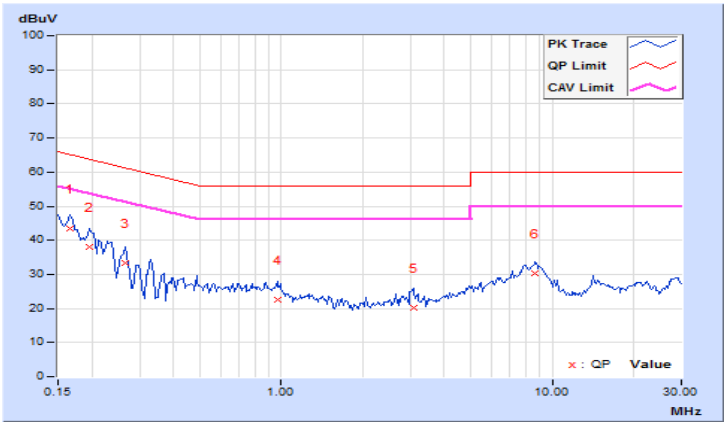


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	**0.16562**	**9.94**	**33.41**	**20.13**	**43.35**	**30.07**	**65.18**	**55.18**	**-21.83**	**-25.11**
2	0.19686	9.95	28.02	16.94	37.97	26.89	63.74	53.74	-25.77	-26.85
3	0.26718	9.96	23.53	14.54	33.49	24.50	61.21	51.21	-27.72	-26.71
4	0.96640	10.00	12.69	6.16	22.69	16.16	56.00	46.00	-33.31	-29.84
5	3.07030	10.12	10.23	1.23	20.35	11.35	56.00	46.00	-35.65	-34.65
6	8.65625	10.45	19.94	14.94	30.39	25.39	60.00	50.00	-29.61	-24.61

REMARKS:

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



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,

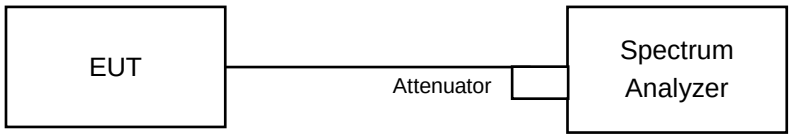
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

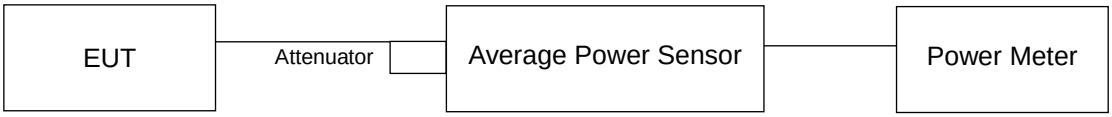
4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

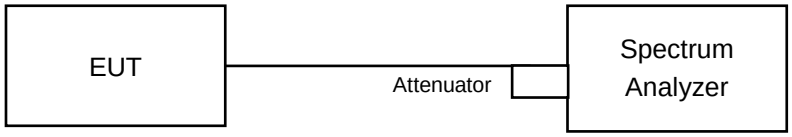
For channel straddling 5725MHz:



For other channels:



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 Average Power Measurement

For channel straddling 5725MHz:

Method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW ≥ 3 x RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle ≥ 98 percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

For other channels:

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 Result

CDD Mode

802.11a

Power Output:

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				
52	5260	12.57	13.89	13.72	13.96	91.002	19.59	24.00	Pass
60	5300	12.55	13.84	13.69	13.89	90.078	19.55	24.00	Pass
64	5320	12.62	13.70	13.76	14.01	90.668	19.57	24.00	Pass
100	5500	14.06	13.17	13.09	13.89	91.078	19.59	24.00	Pass
116	5580	13.97	13.53	13.10	13.58	90.708	19.58	24.00	Pass
140	5700	13.45	13.10	13.21	13.72	87.039	19.40	24.00	Pass
*144 (UNII-2C Band)	5720	9.80	9.96	9.88	11.41	43.021	16.34	22.95	Pass
*144 (UNII-3 Band)	5720	3.69	3.54	3.78	5.02	10.163	10.07	30.00	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	53.184	17.26
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.76	21.49	21.47	21.71
60	5300	21.71	21.61	21.43	21.54
64	5320	21.75	21.57	21.48	21.72
100	5500	21.77	21.71	21.45	21.69
116	5580	21.77	21.73	21.40	21.53
140	5700	21.68	21.64	21.50	21.60
144 (UNII-2C Band)	5720	15.96	15.80	15.68	15.78

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.47	24.31 > 24
60	5300	21.43	24.31 > 24
64	5320	21.48	24.32 > 24
100	5500	21.45	24.31 > 24
116	5580	21.40	24.3 > 24
140	5700	21.50	24.32 > 24
144 (UNII-2C Band)	5720	15.68	22.95 < 24

802.11ac (VHT20)

Power Output:

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				
52	5260	12.51	13.55	13.85	14.02	89.971	19.54	24.00	Pass
60	5300	12.65	13.88	13.88	13.62	90.29	19.56	24.00	Pass
64	5320	12.73	13.91	13.78	13.70	90.674	19.57	24.00	Pass
100	5500	13.94	13.19	12.92	13.89	89.698	19.53	24.00	Pass
116	5580	14.08	13.22	13.01	13.85	90.84	19.58	24.00	Pass
140	5700	13.37	12.95	13.03	13.65	84.716	19.28	24.00	Pass
*144 (UNII-2C Band)	5720	9.79	9.75	9.87	11.10	41.556	16.19	23.01	Pass
*144 (UNII-3 Band)	5720	4.03	4.04	4.32	5.29	11.149	10.47	30.00	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	52.705	17.22
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.88	21.62	21.63	21.72
60	5300	21.82	21.60	21.93	21.75
64	5320	21.94	21.64	21.83	21.74
100	5500	22.20	21.45	21.57	21.69
116	5580	21.64	21.45	21.65	21.74
140	5700	22.00	21.69	21.98	21.58
144 (UNII-2C Band)	5720	16.05	15.97	15.97	15.90

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.62	24.34 > 24
60	5300	21.60	24.34 > 24
64	5320	21.64	24.35 > 24
100	5500	21.45	24.31 > 24
116	5580	21.45	24.31 > 24
140	5700	21.58	24.34 > 24
144 (UNII-2C Band)	5720	15.90	23.01 < 24

802.11ac (VHT40)

Power Output:

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				
54	5270	15.57	16.84	16.73	16.70	178.236	22.51	24.00	Pass
62	5310	15.53	16.85	16.59	16.61	175.562	22.44	24.00	Pass
102	5510	16.66	15.94	15.89	17.01	174.658	22.42	24.00	Pass
110	5550	16.89	16.07	16.02	16.82	177.401	22.49	24.00	Pass
134	5670	16.26	15.99	16.01	17.01	172.122	22.36	24.00	Pass
*142 (UNII-2C Band)	5710	13.33	13.22	13.47	14.62	93.723	19.72	24.00	Pass
*142 (UNII-3 Band)	5710	2.93	2.87	3.15	4.13	8.552	9.32	30.00	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	102.275	20.1
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	44.93	41.19	41.39	41.09
62	5310	41.70	41.29	41.36	41.11
102	5510	41.53	41.26	41.27	41.19
110	5550	41.52	41.00	41.20	41.18
134	5670	41.13	41.39	41.33	51.38
142 (UNII-2C Band)	5710	38.44	35.69	35.68	43.63

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.09	27.13 > 24
62	5310	41.11	27.13 > 24
102	5510	41.19	27.14 > 24
110	5550	41.00	27.12 > 24
134	5670	41.13	27.14 > 24
142 (UNII-2C Band)	5710	35.68	26.52 > 24

802.11ac (VHT80)

Power Output:

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				
58	5290	14.65	15.52	15.56	15.33	134.913	21.30	24.00	Pass
106	5530	14.67	14.31	14.13	14.67	111.477	20.47	24.00	Pass
122	5610	17.93	17.28	17.02	18.41	235.236	23.72	24.00	Pass
*138 (UNII-2C Band)	5690	15.61	15.27	15.31	16.60	149.715	21.75	24.00	Pass
*138 (UNII-3 Band)	5690	1.68	1.40	1.52	2.24	5.946	7.74	30.00	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	155.661	21.92
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.02	82.23	82.28	82.19
106	5530	82.47	82.43	82.22	81.81
122	5610	82.55	82.44	82.22	82.21
138 (UNII-2C Band)	5690	79.24	76.24	75.97	76.19

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidt

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.19	30.14 > 24
106	5530	81.81	30.12 > 24
122	5610	82.21	30.14 > 24
138 (UNII-2C Band)	5690	75.97	29.8 > 24

Beamforming Mode

802.11ac (VHT20)

Power Output:

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				
52	5260	12.51	13.55	13.85	14.02	89.971	19.54	19.60	Pass
60	5300	12.65	13.88	13.88	13.62	90.29	19.56	19.60	Pass
64	5320	12.73	13.91	13.78	13.70	90.674	19.57	19.60	Pass
100	5500	13.94	13.19	12.92	13.89	89.698	19.53	19.60	Pass
116	5580	14.08	13.22	13.01	13.85	90.84	19.58	19.60	Pass
140	5700	13.37	12.95	13.03	13.65	84.716	19.28	19.60	Pass
*144 (UNII-2C Band)	5720	9.79	9.75	9.87	11.10	41.556	16.19	18.61	Pass
*144 (UNII-3 Band)	5720	4.03	4.04	4.32	5.29	11.149	10.47	25.60	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

2. For UNII-2A, UNII-2C: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit” -(10.4-6).

3. For UNII-3: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to 30-(10.4-6) = 25.6dBm.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	52.705	17.22
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.88	21.62	21.63	21.72
60	5300	21.82	21.60	21.93	21.75
64	5320	21.94	21.64	21.83	21.74
100	5500	22.20	21.45	21.57	21.69
116	5580	21.64	21.45	21.65	21.74
140	5700	22.00	21.69	21.98	21.58
144 (UNII-2C Band)	5720	16.05	15.97	15.97	15.90

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.62	24.34 > 24
60	5300	21.60	24.34 > 24
64	5320	21.64	24.35 > 24
100	5500	21.45	24.31 > 24
116	5580	21.45	24.31 > 24
140	5700	21.58	24.34 > 24
144 (UNII-2C Band)	5720	15.90	23.01 < 24

802.11ac (VHT40)

Power Output:

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				
54	5270	12.61	13.86	13.80	13.78	90.427	19.56	19.60	Pass
62	5310	12.66	13.79	13.85	13.65	89.823	19.53	19.60	Pass
102	5510	13.43	12.80	12.92	14.03	85.965	19.34	19.60	Pass
110	5550	13.65	13.03	13.07	14.17	89.664	19.53	19.60	Pass
134	5670	13.43	12.85	12.86	14.44	88.421	19.47	19.60	Pass
*142 (UNII-2C Band)	5710	10.78	10.52	10.56	12.02	50.537	17.04	19.60	Pass
*142 (UNII-3 Band)	5710	0.29	0.00	0.03	1.41	4.46	6.49	25.60	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

2. For UNII-2A, UNII-2C: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit” -(10.4-6).

3. For UNII-3: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to 30-(10.4-6) = 25.6dBm.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	54.997	17.4
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	44.93	41.19	41.39	41.09
62	5310	41.70	41.29	41.36	41.11
102	5510	41.53	41.26	41.27	41.19
110	5550	41.52	41.00	41.20	41.18
134	5670	41.13	41.39	41.33	51.38
142 (UNII-2C Band)	5710	38.44	35.69	35.68	43.63

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.09	27.13 > 24
62	5310	41.11	27.13 > 24
102	5510	41.19	27.14 > 24
110	5550	41.00	27.12 > 24
134	5670	41.13	27.14 > 24
142 (UNII-2C Band)	5710	35.68	26.52 > 24

802.11ac (VHT80)

Power Output:

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				
58	5290	12.57	13.36	13.96	13.79	88.571	19.47	19.60	Pass
106	5530	13.67	12.74	12.93	13.81	85.752	19.33	19.60	Pass
122	5610	13.48	12.76	12.75	14.26	86.669	19.38	19.60	Pass
*138 (UNII-2C Band)	5690	10.66	10.15	10.44	11.73	47.952	16.81	19.60	Pass
*138 (UNII-3 Band)	5690	-3.12	-3.81	-3.47	-2.45	1.9221	2.84	25.60	Pass

Note: 1. * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

2. For UNII-2A, UNII-2C: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit” -(10.4-6).

3. For UNII-3: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power limit shall be reduced to 30-(10.4-6) = 25.6dBm.

The Total Power for the straddle channel:

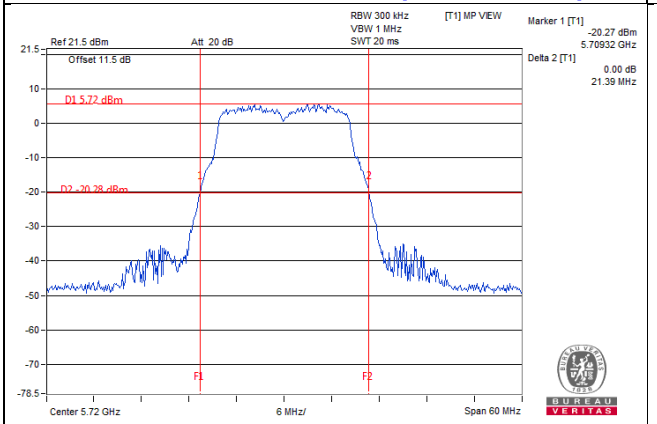
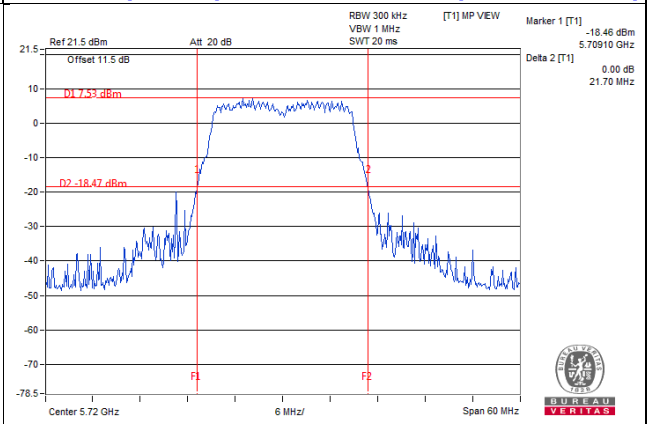
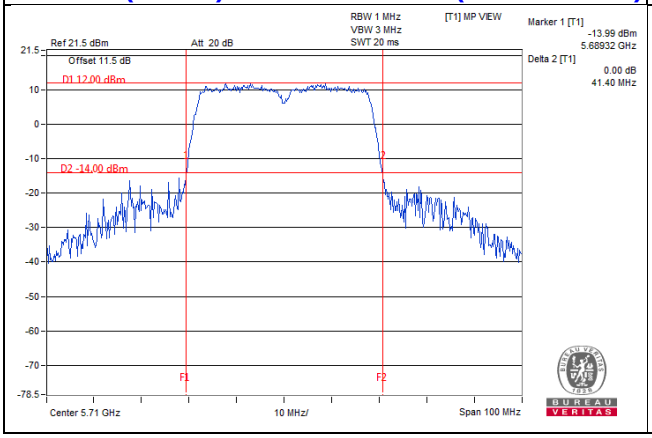
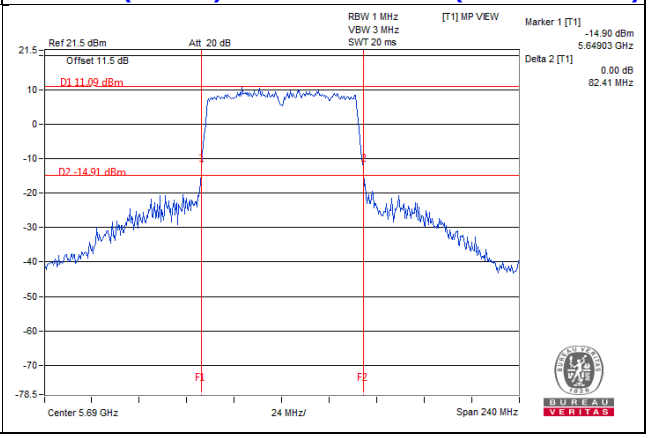
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	49.8741	16.98
Note: The total power was calculated through formula and record the value for reference only.			

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.02	82.23	82.28	82.19
106	5530	82.47	82.43	82.22	81.81
122	5610	82.55	82.44	82.22	82.21
138 (UNII-2C Band)	5690	79.24	76.24	75.97	76.19

Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidt

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.19	30.14 > 24
106	5530	81.81	30.12 > 24
122	5610	82.21	30.14 > 24
138 (UNII-2C Band)	5690	75.97	29.8 > 24

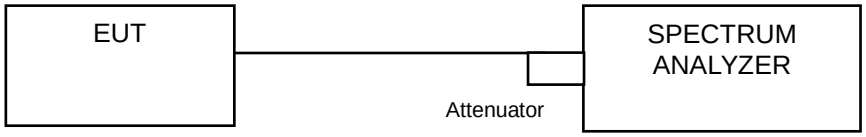
Spectrum Plot of Worst Value	
802.11a / Chain 2 – CH144 (UNII-2C Band)	**802.11ac (VHT20) / Chain 3 - CH144 (UNII-2C Band)**
	
802.11ac (VHT40) / Chain 2 - CH142 (UNII-2C Band)	**802.11ac (VHT80) / Chain 2 - CH138 (UNII-2C Band)**
	

NOTE:

For CH144 (UNII-2C Band) = 5725MHz - Marker 1
For CH142 (UNII-2C Band) = 5725MHz - Marker 1
For CH138 (UNII-2C Band) = 5725MHz - Marker 1

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	17.04	16.92	16.92	16.68
60	5300	16.80	16.92	16.92	16.92
64	5320	17.04	16.80	16.92	16.80
100	5500	16.92	16.80	16.92	16.92
116	5580	17.04	16.92	16.92	16.80
140	5700	16.92	16.80	16.80	17.04
144 (UNII-2C Band)	5720	13.64	13.64	13.52	13.64
144 (UNII-3 Band)	5720	3.40	3.28	3.40	3.40

802.11ac (VHT20)

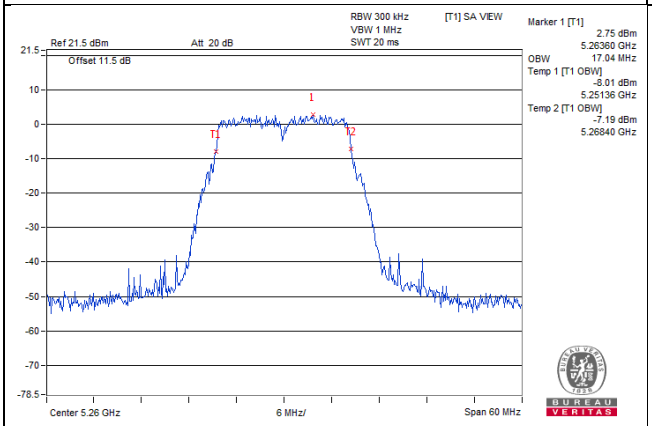
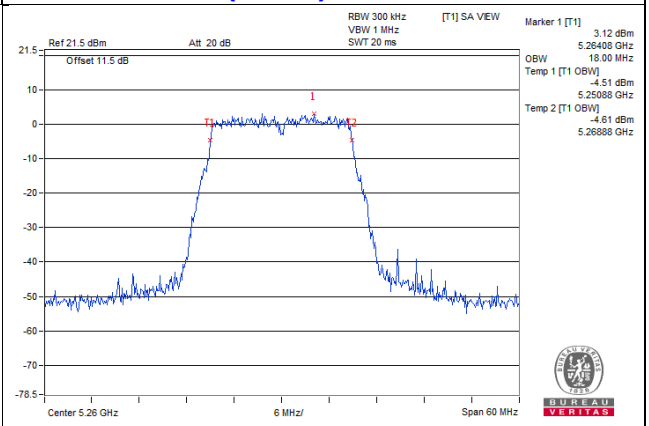
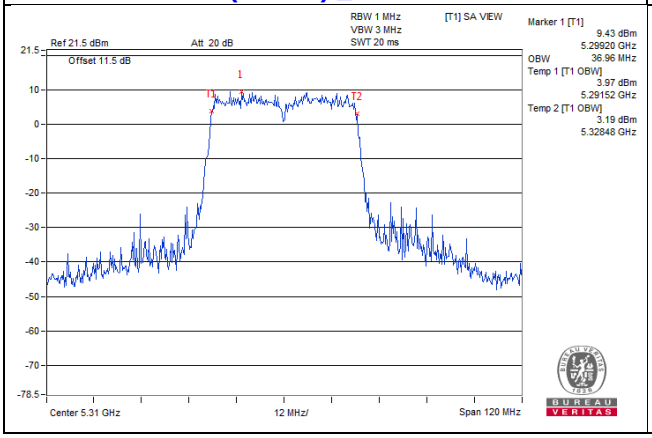
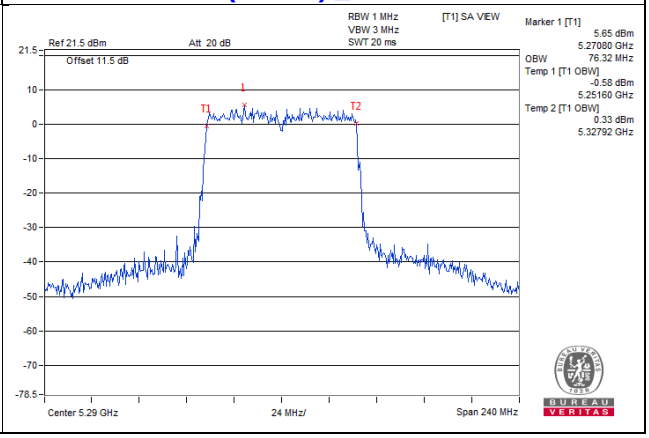
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	18.00	18.00	18.00	18.00
60	5300	18.00	18.00	18.00	18.00
64	5320	18.00	18.00	18.00	18.00
100	5500	18.00	17.88	18.00	18.00
116	5580	18.00	18.00	18.00	18.00
140	5700	18.00	18.00	17.88	18.00
144 (UNII-2C Band)	5720	14.24	14.00	14.24	14.12
144 (UNII-3 Band)	5720	3.88	3.88	4.00	4.00

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	36.72	36.72	36.48	36.72
62	5310	36.96	36.72	36.72	36.48
102	5510	36.72	36.96	36.72	36.48
110	5550	36.72	36.48	36.72	36.48
134	5670	36.72	36.96	36.72	36.72
142 (UNII-2C Band)	5710	33.40	33.40	33.40	33.60
142 (UNII-3 Band)	5710	3.20	3.20	3.20	3.20

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	76.32	76.32	75.36	76.32
106	5530	76.32	75.84	76.32	76.32
122	5610	75.84	76.32	75.84	75.84
138 (UNII-2C Band)	5690	73.40	72.92	73.40	73.40
138 (UNII-3 Band)	5690	2.44	2.44	2.92	2.44

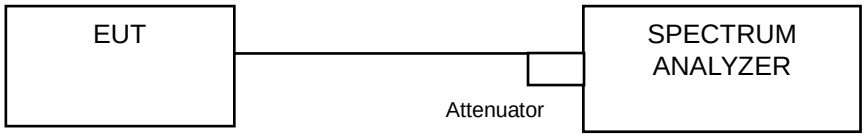
Spectrum Plot of Max. Value	
802.11a_Chain 0 / CH52	**802.11ac (VHT20)_ Chain 0 / CH52**
	
802.11ac (VHT40) _Chain 0 / CH62	**802.11ac (VHT80) _Chain 0 / CH58**
	

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-2A, UNII-2C:

Using method SA-1

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For UNII-2A & UNII-2C:

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
52	5260	-1.03	0.76	0.16	1.14	6.35	6.60	Pass
60	5300	-0.78	0.49	0.48	1.17	6.42	6.60	Pass
64	5320	-0.58	0.64	0.55	1.32	6.56	6.60	Pass
100	5500	0.57	0.72	0.17	0.40	6.49	6.60	Pass
116	5580	0.88	0.58	0.21	0.55	6.58	6.60	Pass
140	5700	-0.51	-0.28	0.04	1.22	6.19	6.60	Pass
144 (UNII-2C Band)	5720	-0.35	-0.21	-0.04	0.95	6.14	6.60	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 11-(10.4-6) = 6.6dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
52	5260	-1.15	0.36	0.48	0.65	6.16	6.60	Pass
60	5300	-0.91	0.28	0.79	0.54	6.24	6.60	Pass
64	5320	-0.99	0.41	0.74	0.59	6.26	6.60	Pass
100	5500	0.72	0.35	-0.20	0.79	6.45	6.60	Pass
116	5580	0.85	0.26	0.13	0.71	6.52	6.60	Pass
140	5700	0.30	-0.99	0.39	0.80	6.20	6.60	Pass
144 (UNII-2C Band)	5720	0.21	-0.50	0.24	0.55	6.16	6.60	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 11-(10.4-6) = 6.6dBm.

802.11ac (VHT40)

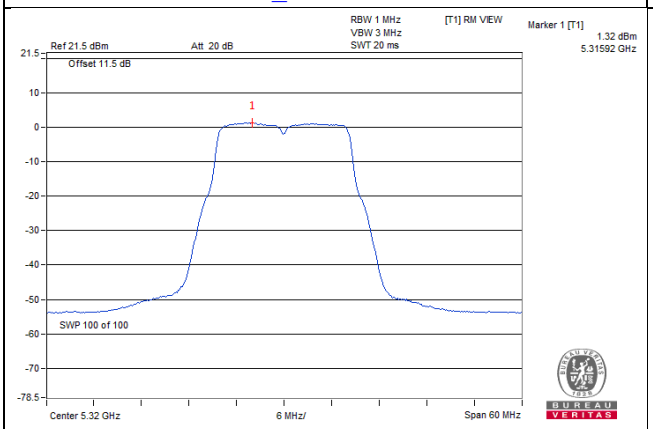
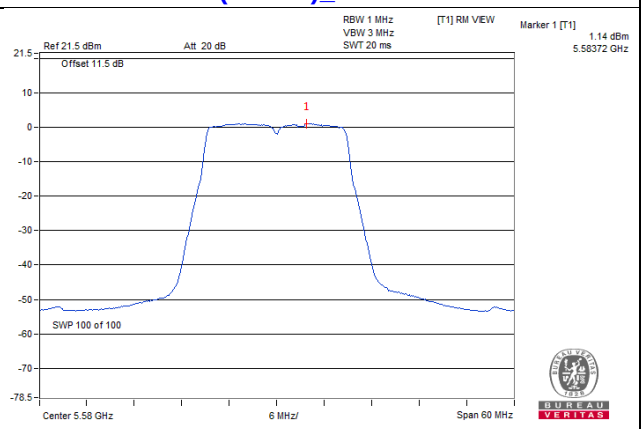
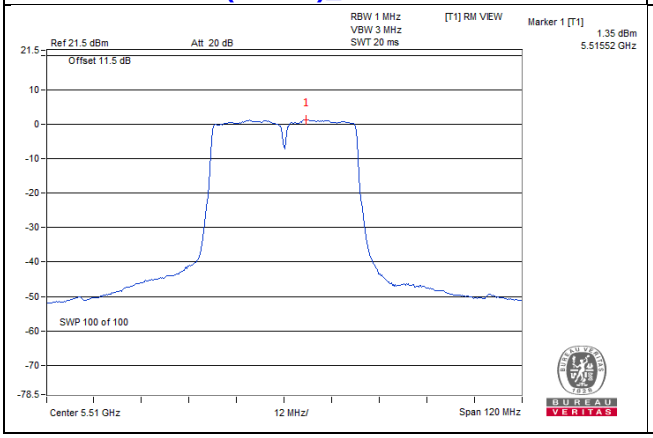
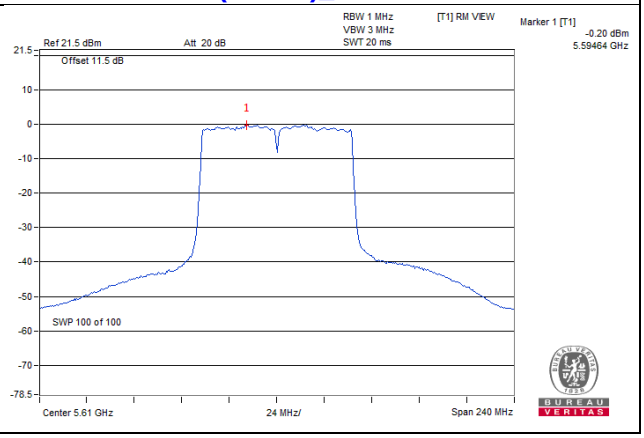
Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
54	5270	-0.92	0.38	0.53	0.28	6.12	6.60	Pass
62	5310	-1.14	0.46	0.60	0.64	6.22	6.60	Pass
102	5510	0.59	-0.13	-0.04	1.35	6.50	6.60	Pass
118	5590	0.86	0.31	0.37	0.33	6.49	6.60	Pass
134	5670	0.26	-0.63	-0.30	1.05	6.16	6.60	Pass
142 (UNII-2C Band)	5710	0.25	-0.43	-0.40	0.90	6.14	6.60	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 11-(10.4-6) = 6.6dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
58	5290	-5.28	-3.65	-3.63	-4.62	1.78	6.60	Pass
106	5530	-4.36	-4.95	-5.24	-4.03	1.40	6.60	Pass
122	5610	-1.26	-1.74	-1.87	-0.44	4.73	6.60	Pass
138 (UNII-2C Band)	5690	-1.84	-2.32	-1.98	-1.00	4.26	6.60	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 11-(10.4-6) = 6.6dBm.

Spectrum Plot of Worst Value	
802.11a_Chain 3 / CH64	**802.11ac (VHT20)_Chain 0 / CH116**
	
802.11ac (VHT40)_Chain 3 / CH102	**802.11ac (VHT80)_Chain 3 / CH122**
	

For UNII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
144 (UNII-3 Band)	5720	-8.74	-8.81	-8.69	-7.71	0.5698	-2.44	-0.22	25.60	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 30-(10.4-6) = 25.6dBm.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
144 (UNII-3 Band)	5720	-8.41	-9.48	-8.38	-8.08	0.5577	-2.54	-0.32	25.60	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 30-(10.4-6) = 25.6dBm.

802.11ac (VHT40)

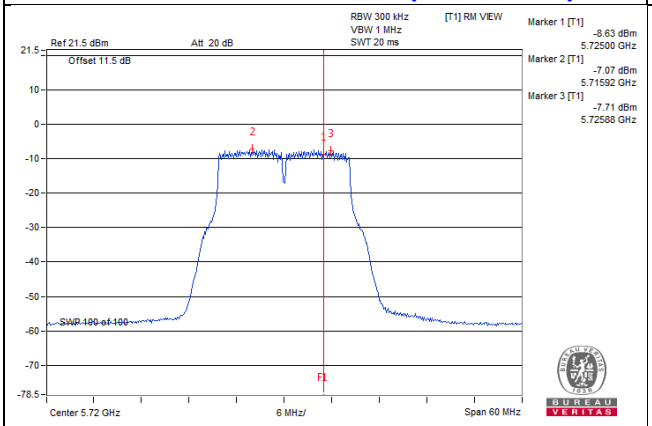
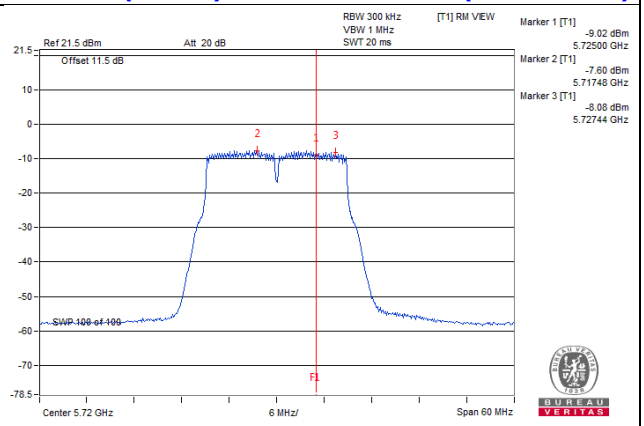
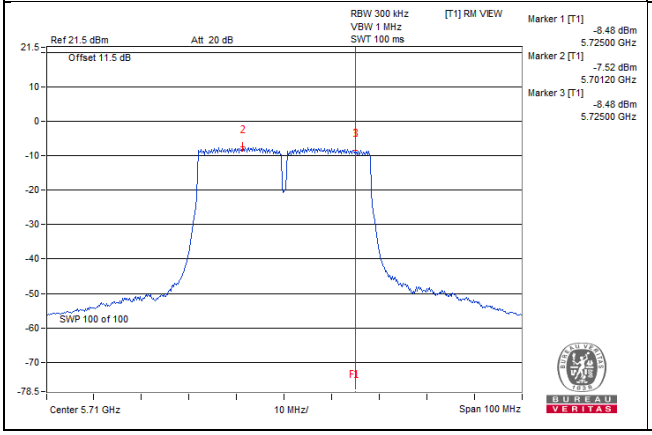
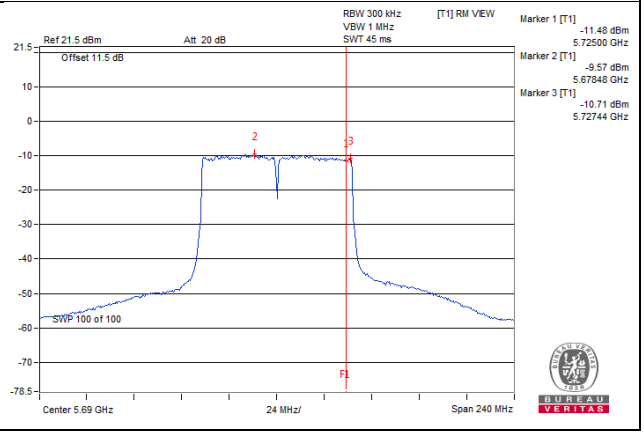
Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
142 (UNII-3 Band)	5710	-8.60	-9.43	-9.68	-8.48	0.5016	-3.00	-0.78	25.60	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 30-(10.4-6) = 25.6dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
138 (UNII-3 Band)	5690	-11.43	-11.79	-11.34	-10.71	0.29654	-5.28	-3.06	25.60	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.4dBi > 6dBi , so the power density limit shall be reduced to 30-(10.4-6) = 25.6dBm.

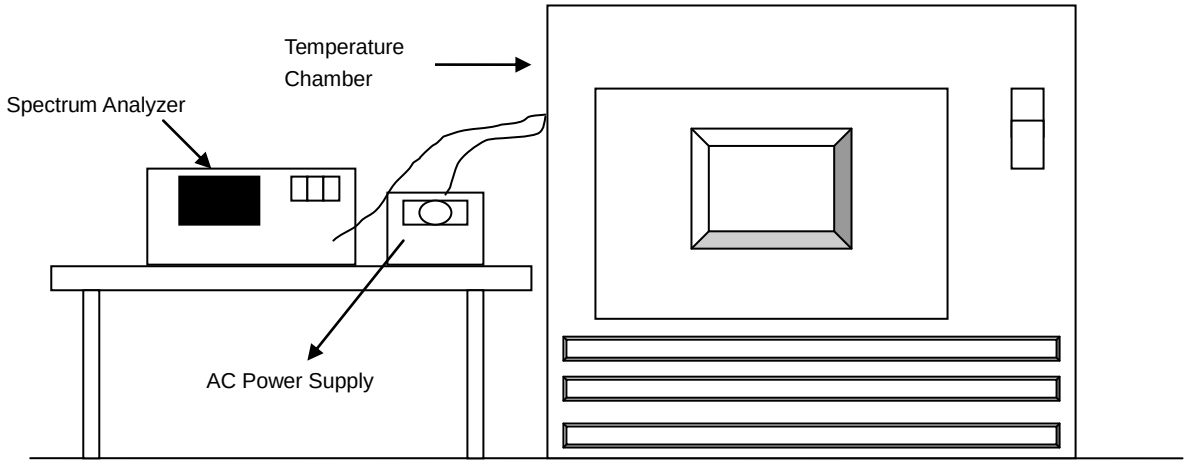
Spectrum Plot of Worst Value	
802.11a / Chain 3 – CH144 (UNII-3 Band)	**802.11ac (VHT20) / Chain 3 – CH144 (UNII-3 Band)**
	
802.11ac (VHT40) / Chain 3 – CH142 (UNII-3 Band)	**802.11ac (VHT80) / Chain 3 – CH138 (UNII-3 Band)**
	

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: 5260 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	5259.9812	PASS	5259.9833	PASS	5259.9807	PASS	5259.9808	PASS
40	120	5260.0039	PASS	5260.0032	PASS	5260.0035	PASS	5260.0024	PASS
30	120	5259.9977	PASS	5259.9944	PASS	5259.9944	PASS	5259.9984	PASS
20	120	5260.0127	PASS	5260.0128	PASS	5260.0116	PASS	5260.0097	PASS
10	120	5259.9862	PASS	5259.9894	PASS	5259.9866	PASS	5259.989	PASS
0	120	5260.0125	PASS	5260.0126	PASS	5260.0074	PASS	5260.0111	PASS
-10	120	5260.0042	PASS	5260.0065	PASS	5260.0024	PASS	5260.0068	PASS
-20	120	5259.9985	PASS	5259.995	PASS	5259.9975	PASS	5259.9951	PASS
-30	120	5259.9945	PASS	5259.9967	PASS	5259.9967	PASS	5259.9963	PASS

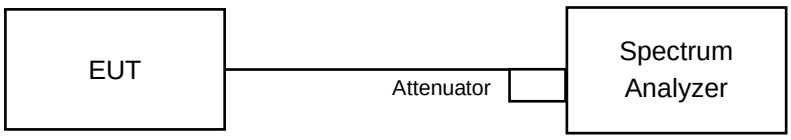
Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5260.0135	PASS	5260.0128	PASS	5260.0117	PASS	5260.0106	PASS
	120	5260.0127	PASS	5260.0128	PASS	5260.0116	PASS	5260.0097	PASS
	102	5260.0134	PASS	5260.0128	PASS	5260.0111	PASS	5260.0097	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (UNII-3 Band)	5720	3.13	3.12	3.14	3.15	0.5	PASS

802.11ac (VHT20)

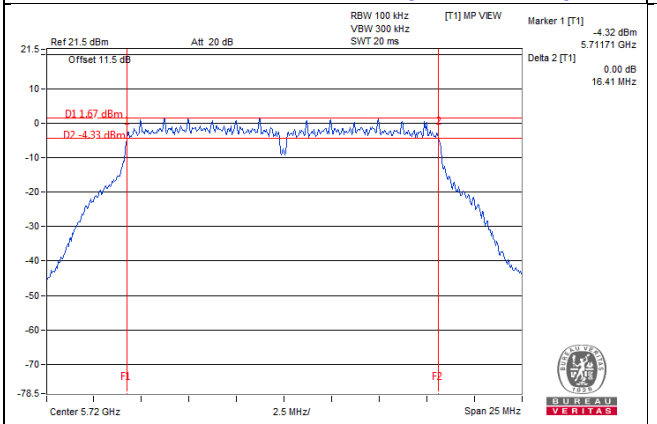
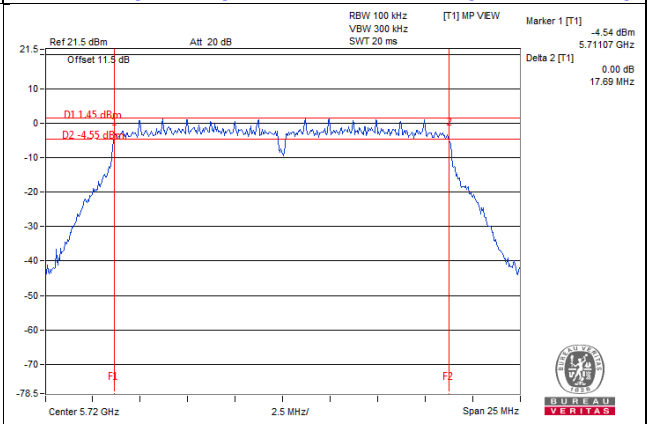
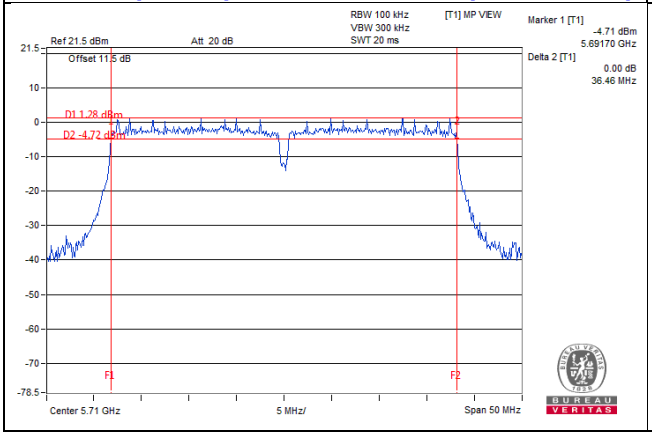
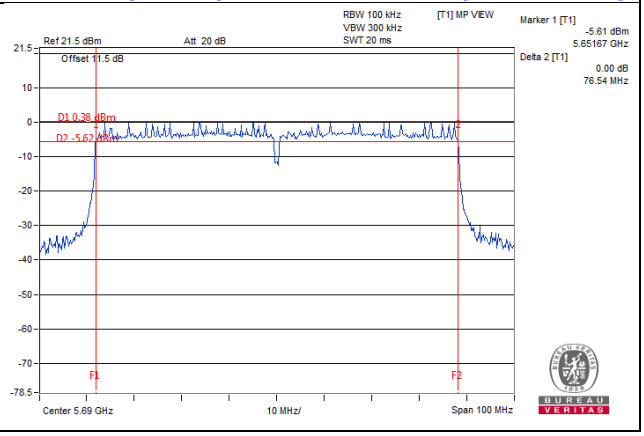
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (UNII-3 Band)	5720	3.76	3.77	3.77	3.77	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
142 (UNII-3 Band)	5710	3.16	3.19	3.22	3.20	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		
138 (UNII-3 Band)	5690	3.21	3.27	3.25	3.24	0.5	PASS

Spectrum Plot of Worst Value	
802.11a / Chain 1 - CH144 (UNII-3 Band)	**802.11ac (VHT20) / Chain 0 - CH144 (UNII-3 Band)**
	
802.11ac (VHT40) / Chain 0 - CH142 (UNII-3 Band)	**802.11ac (VHT80) / Chain 0 - CH138 (UNII-3 Band)**
	

Note: The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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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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