FCC Test Report (DFS Band)

Report No.:	RF160914E09E-1
FCC ID:	UXX-S5A643A
Test Model:	S5A643A
Series Model:	S5A644A
Received Date:	Nov. 09, 2018
Test Date:	Dec. 14 to 18, 2018
Issued Date:	Jan. 04, 2019
Applicant:	Cradlepoint, Inc
Address:	1111 W. Jefferson Street Suite 400 Boise, ID 83702 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF160914E09E-1	Original release.	Jan. 04, 2019

1 Certificate of Conformity

Product:	2x2 Dual Band Concurrent AP
Brand:	Cradlepoint
Test Model:	S5A643A
Series Model:	S5A644A
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cradlepoint, Inc
Test Date:	Dec. 14 to 18, 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 : _____ , **Date:** Jan. 04, 2019

Wendy Wu / Specialist

Approved by : _____ , **Date:** Jan. 04, 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 -8.5dB at 0.40391MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5350.00MHz, 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 R-SMA not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.33 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 (DFS Band)

Product	2x2 Dual Band Concurrent AP
Brand	Cradlepoint
Test Model	S5A643A
Series Model	S5A644A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5.26GHz ~ 5.32GHz, 5.50 ~ 5.58GHz & 5.66 ~ 5.70GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 5 802.11ac (VHT80): 2
Output Power	**CDD Mode:** **5.26 ~ 5.32GHz:** 231.489mW **5.50 ~ 5.58GHz & 5.66 ~ 5.70GHz:** 219.767mW **Beamforming Mode:** **5.26 ~ 5.32GHz:** 173.998mW **5.50 ~ 5.58GHz & 5.66 ~ 5.70GHz:** 164.21mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF160914E09-1 R1 as the following:
   - Add DFS band <5.26 ~ 5.32GHz, 5.5 ~ 5.58GHz & 5.66 ~ 5.70GHz>
   - Add U-NII1/U-NII3 client mode, orginal grant for U-NII1/U-NII3 power already meet the 15.407(a)(1)(iv) equirement, no need additional test.
2. According to above condition, all test items need to be performed. And all data weres verified to meet the requirements.
3. All models are listed as below.

Model	Different			
	WiFi function	LTE function	Embedded radio	SKU
S5A643A	V	V	Model: MC7455 (FCC ID: N7NMC7455)	IBR900LP6
S5A644A	V	-	-	IBR900NM

From the above models, the worse case was found in model: **S5A643A**. Therefore only the test data of the model was recorded in this report.

4. There are WLAN, GPS and WWAN(LTE) technology used for the EUT.
5. Simultaneously transmission condition.

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

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

No	Brand	Model No.	Spec.
1	Asian Power Devices Inc.	WA-36A12R	Input: 100-240V~50-60Hz, 0.9A Max. Output: 12V / 3A DC output cable: 1.45m, unshielded
2	LEI	MU30-P120200-A1	Input: 100-240V~50/60Hz, 0.8A Output: 12V / 2A DC output cable: 1.5m, unshielded
3	Ten Pao International Inc.	S024WM1200150	Input: 100-240V~50/60Hz 600mA Max. Output: 12V / 1500mA DC output cable: 2m, unshielded
Note: For conducted emissions and radiated emissions test, the EUT was pre-tested with above adapters, the worst case was found in adapter 3. Therefore only the test data of the adapter was recorded in this report.			

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

Antenna No.	Antenna Gain(dBi) Including cable loss	Frequency Range (GHz to GHz)	Antenna Type	Connector Type
1	4.49	2.4~2.4835	Dipole	R-SMA
	4.56	5.15~5.25		
	4.56	5.25~5.35		
	4.63	5.47~5.725		
	4.44	5.725~5.85		
2	4.49	2.4~2.4835	Dipole	R-SMA
	4.56	5.15~5.25		
	4.56	5.25~5.35		
	4.63	5.47~5.725		
	4.44	5.725~5.85		

8. The EUT incorporates a MIMO function:

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

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. 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)

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

3.2 Description of Test Modes

FOR 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 ~ 5580MHz & 5660 ~ 5700MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	132	5660 MHz
104	5520 MHz	136	5680 MHz
108	5540 MHz	140	5700 MHz
112	5560 MHz		
116	5580 MHz		

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	134	5670 MHz
110	5550 MHz		

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
106	5530 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Radiated Emission Test (Above 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	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	5500-5580 & 5660-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106	106	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 (VHT40)	5260-5320 5500-5580 & 5660-5700	54 to 62 102 to 134	54	OFDM	BPSK	13.5

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5260-5320 5500-5580 & 5660-5700	54 to 62 102 to 134	54	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	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	5500-5580 & 5660-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106	106	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)	5500-5580 & 5660-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106	106	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Robert Cheng
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required

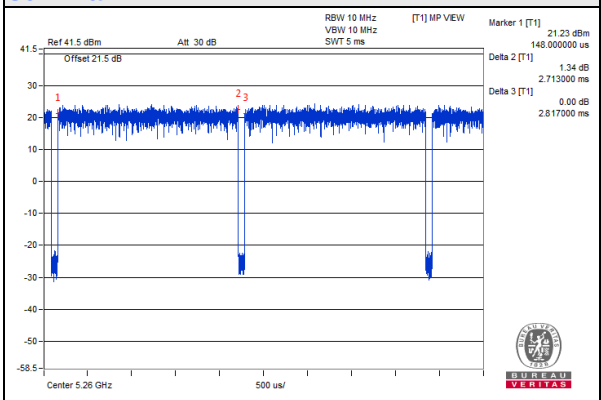
802.11a: Duty cycle = 2.713/2.817 = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

802.11ac (VHT20): Duty cycle = 2.514/2.605 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15

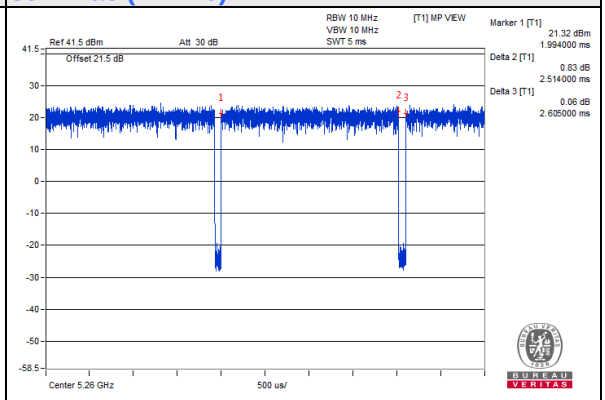
802.11ac (VHT40): Duty cycle = 1.84/1.925 = 0.956, Duty factor = 10 * log(1/0.956) = 0.20

802.11ac (VHT80): Duty cycle = 0.871/0.957 = 0.91, Duty factor = 10 * log(1/0.91) = 0.41

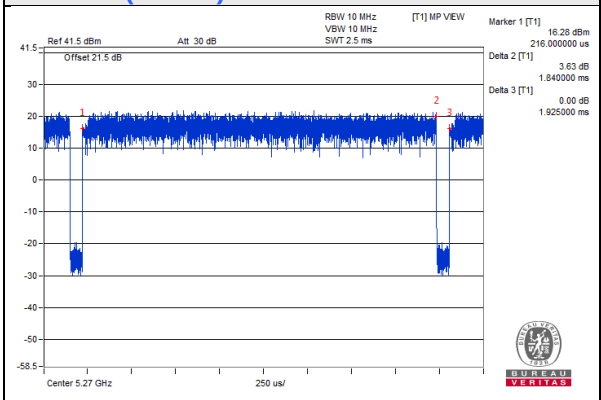
802.11a



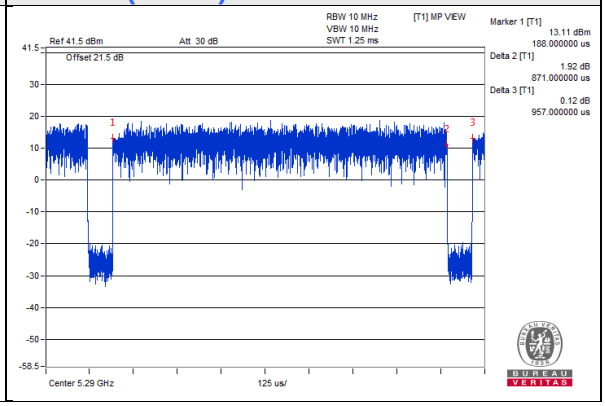
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

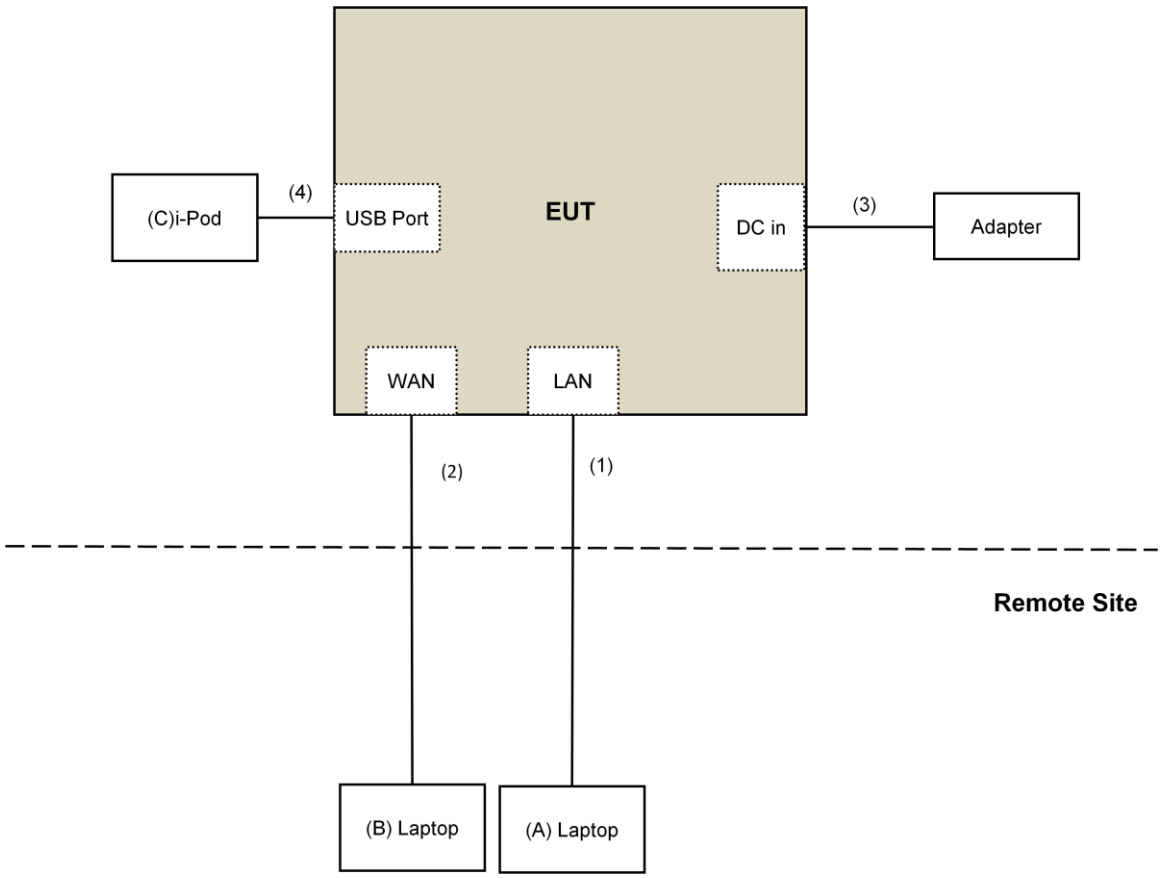
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	Laptop	DELL	PP32LA	FSLB32S	FCC DoC	Provided by Lab
C.	i-Pod	Apple	MD778TA/A	CC4JMFL0F4T1	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	DC Cable	1	2	No	0	Supplied by client
4.	USB Cable	1	0.1	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="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td>Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td>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>15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td>15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</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>☐ 15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="4">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver 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. 14, 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:

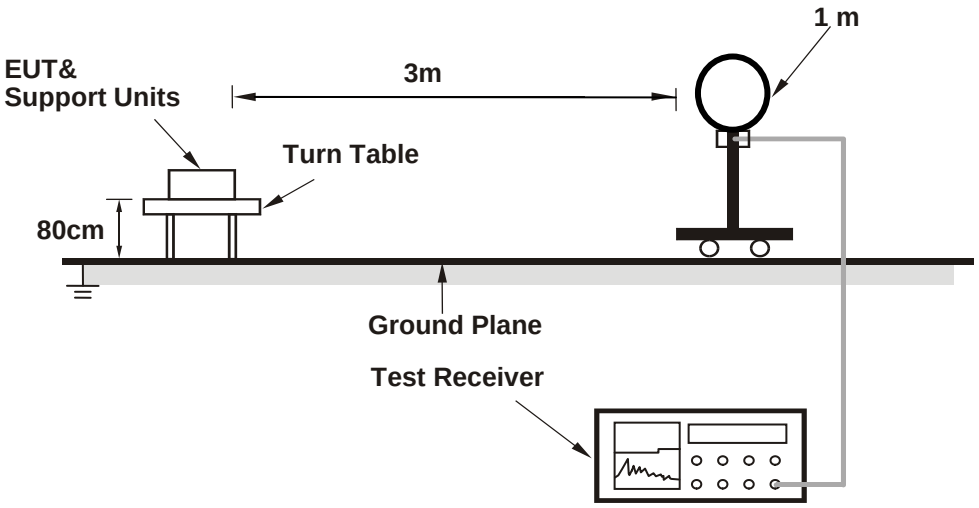
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

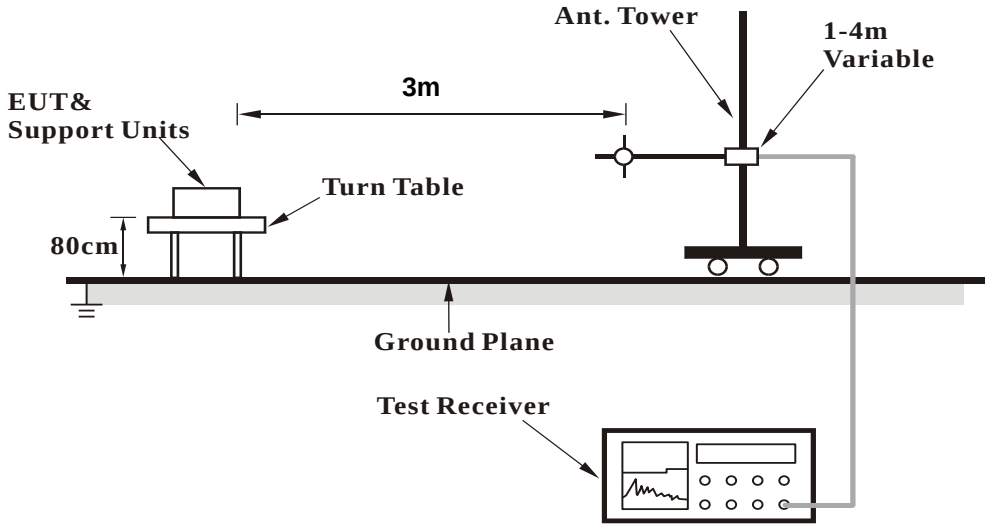
No deviation.

4.1.5 Test Setup

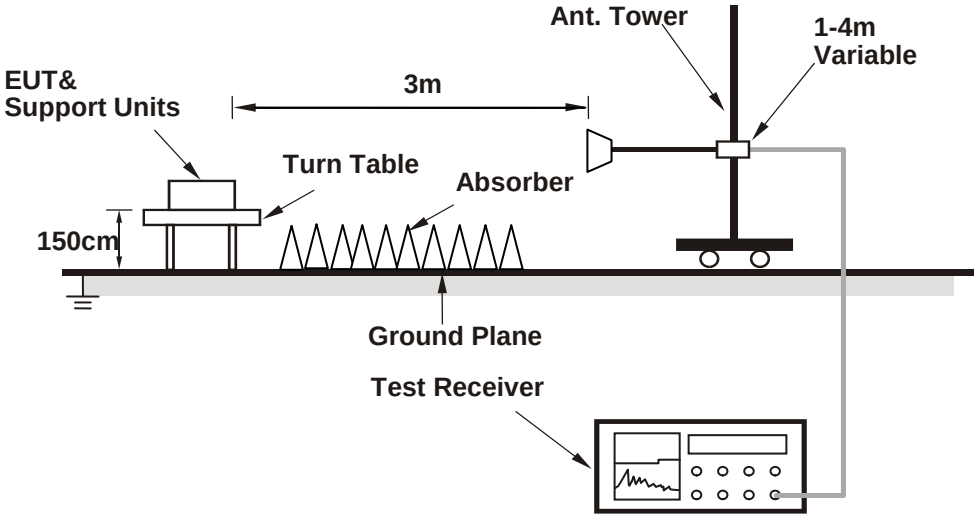
For Radiated emission below 30MHz



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. Contorlling software (QDART-connectivity (1.0.44)) 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	48.6 PK	74.0	-25.4	1.08 H	187	45.6	3.0
2	5150.00	36.6 AV	54.0	-17.4	1.08 H	187	33.6	3.0
3	*5260.00	105.4 PK			1.08 H	187	102.9	2.5
4	*5260.00	94.4 AV			1.08 H	187	91.9	2.5
5	#10520.00	51.9 PK	68.2	-16.3	1.72 H	328	38.7	13.2
6	15780.00	52.6 PK	74.0	-21.4	1.57 H	318	40.0	12.6
7	15780.00	42.1 AV	54.0	-11.9	1.57 H	318	29.5	12.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.1 PK	74.0	-23.9	2.06 V	355	47.1	3.0
2	5150.00	38.3 AV	54.0	-15.7	2.06 V	355	35.3	3.0
3	*5260.00	117.2 PK			2.06 V	355	114.7	2.5
4	*5260.00	105.5 AV			2.06 V	355	103.0	2.5
5	#10520.00	52.4 PK	68.2	-15.8	1.59 V	233	39.2	13.2
6	15780.00	53.6 PK	74.0	-20.4	1.88 V	201	41.0	12.6
7	15780.00	42.1 AV	54.0	-11.9	1.88 V	201	29.5	12.6

REMARKS:

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

CHANNEL	TX Channel 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	105.6 PK			1.18 H	189	102.9	2.7
2	*5300.00	94.6 AV			1.18 H	189	91.9	2.7
3	10600.00	51.6 PK	74.0	-22.4	1.75 H	313	38.5	13.1
4	10600.00	39.1 AV	54.0	-14.9	1.75 H	313	26.0	13.1
5	15900.00	52.7 PK	74.0	-21.3	1.59 H	319	40.0	12.7
6	15900.00	41.9 AV	54.0	-12.1	1.59 H	319	29.2	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	117.1 PK			2.04 V	360	114.4	2.7
2	*5300.00	105.2 AV			2.04 V	360	102.5	2.7
3	10600.00	52.1 PK	74.0	-21.9	1.56 V	229	39.0	13.1
4	10600.00	39.2 AV	54.0	-14.8	1.56 V	229	26.1	13.1
5	15900.00	53.4 PK	74.0	-20.6	1.91 V	208	40.7	12.7
6	15900.00	42.1 AV	54.0	-11.9	1.91 V	208	29.4	12.7

REMARKS:

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

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	104.9 PK			1.13 H	202	102.1	2.8
2	*5320.00	92.6 AV			1.13 H	202	89.8	2.8
3	5350.00	56.4 PK	74.0	-17.6	1.13 H	202	53.6	2.8
4	5350.00	42.7 AV	54.0	-11.3	1.13 H	202	39.9	2.8
5	10640.00	51.7 PK	74.0	-22.3	1.80 H	319	38.5	13.2
6	10640.00	39.2 AV	54.0	-14.8	1.80 H	319	26.0	13.2
7	15960.00	52.5 PK	74.0	-21.5	1.64 H	332	39.6	12.9
8	15960.00	41.8 AV	54.0	-12.2	1.64 H	332	28.9	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	115.3 PK			2.02 V	358	112.5	2.8
2	*5320.00	103.4 AV			2.02 V	358	100.6	2.8
3	5350.00	69.1 PK	74.0	-4.9	2.02 V	358	66.3	2.8
4	5350.00	53.2 AV	54.0	-0.8	2.02 V	358	50.4	2.8
5	10640.00	52.7 PK	74.0	-21.3	1.50 V	236	39.5	13.2
6	10640.00	39.6 AV	54.0	-14.4	1.50 V	236	26.4	13.2
7	15960.00	54.1 PK	74.0	-19.9	1.88 V	222	41.2	12.9
8	15960.00	42.5 AV	54.0	-11.5	1.88 V	222	29.6	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.

CHANNEL	TX Channel 100	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	48.3 PK	74.0	-25.7	1.11 H	214	45.2	3.1
2	5460.00	36.7 AV	54.0	-17.3	1.11 H	214	33.6	3.1
3	#5470.00	60.2 PK	68.2	-8.0	1.11 H	214	57.1	3.1
4	*5500.00	103.2 PK			1.11 H	214	100.1	3.1
5	*5500.00	91.4 AV			1.11 H	214	88.3	3.1
6	11000.00	52.2 PK	74.0	-21.8	1.73 H	304	38.2	14.0
7	11000.00	39.6 AV	54.0	-14.4	1.73 H	304	25.6	14.0
8	#16500.00	53.1 PK	68.2	-15.1	1.63 H	315	38.1	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	63.8 PK	74.0	-10.2	1.91 V	358	60.7	3.1
2	5460.00	43.4 AV	54.0	-10.6	1.91 V	358	40.3	3.1
3	**#5470.00**	**68.1 PK**	**68.2**	**-0.1**	**1.91 V**	**358**	**65.0**	**3.1**
4	*5500.00	112.7 PK			1.91 V	358	109.6	3.1
5	*5500.00	101.9 AV			1.91 V	358	98.8	3.1
6	11000.00	52.0 PK	74.0	-22.0	1.56 V	222	38.0	14.0
7	11000.00	38.8 AV	54.0	-15.2	1.56 V	222	24.8	14.0
8	#16500.00	53.0 PK	68.2	-15.2	1.91 V	217	38.0	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	106.0 PK			1.07 H	190	102.7	3.3
2	*5580.00	94.8 AV			1.07 H	190	91.5	3.3
3	11160.00	52.2 PK	74.0	-21.8	1.77 H	299	38.8	13.4
4	11160.00	39.4 AV	54.0	-14.6	1.77 H	299	26.0	13.4
5	#16740.00	52.7 PK	68.2	-15.5	1.61 H	308	36.1	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	*5580.00	115.6 PK			2.01 V	357	112.3	3.3
2	*5580.00	104.8 AV			2.01 V	357	101.5	3.3
3	11160.00	51.5 PK	74.0	-22.5	1.59 V	215	38.1	13.4
4	11160.00	38.7 AV	54.0	-15.3	1.59 V	215	25.3	13.4
5	#16740.00	53.9 PK	68.2	-14.3	1.97 V	206	37.3	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 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	100.2 PK			1.18 H	217	96.6	3.6
2	*5700.00	88.8 AV			1.18 H	217	85.2	3.6
3	#5725.00	60.6 PK	68.2	-7.6	1.18 H	217	57.1	3.5
4	11400.00	52.0 PK	74.0	-22.0	1.69 H	308	38.4	13.6
5	11400.00	39.4 AV	54.0	-14.6	1.69 H	308	25.8	13.6
6	#17100.00	52.6 PK	68.2	-15.6	1.60 H	316	36.3	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	*5700.00	111.4 PK			1.83 V	356	107.8	3.6
2	*5700.00	99.8 AV			1.83 V	356	96.2	3.6
3	#5725.00	67.7 PK	68.2	-0.5	1.83 V	356	64.2	3.5
4	11400.00	51.5 PK	74.0	-22.5	1.55 V	223	37.9	13.6
5	11400.00	38.8 AV	54.0	-15.2	1.55 V	223	25.2	13.6
6	#17100.00	52.8 PK	68.2	-15.4	1.91 V	214	36.5	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 (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	48.4 PK	74.0	-25.6	1.18 H	204	45.4	3.0
2	5150.00	36.3 AV	54.0	-17.7	1.18 H	204	33.3	3.0
3	*5260.00	105.4 PK			1.18 H	204	102.9	2.5
4	*5260.00	94.1 AV			1.18 H	204	91.6	2.5
5	#10520.00	51.5 PK	68.2	-16.7	1.78 H	298	38.3	13.2
6	15780.00	52.6 PK	74.0	-21.4	1.65 H	325	40.0	12.6
7	15780.00	41.9 AV	54.0	-12.1	1.65 H	325	29.3	12.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.9 PK	74.0	-23.1	2.03 V	360	47.9	3.0
2	5150.00	38.9 AV	54.0	-15.1	2.03 V	360	35.9	3.0
3	*5260.00	117.0 PK			2.03 V	360	114.5	2.5
4	*5260.00	105.3 AV			2.03 V	360	102.8	2.5
5	#10520.00	51.8 PK	68.2	-16.4	1.59 V	231	38.6	13.2
6	15780.00	53.1 PK	74.0	-20.9	1.85 V	219	40.5	12.6
7	15780.00	42.0 AV	54.0	-12.0	1.85 V	219	29.4	12.6

REMARKS:

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

CHANNEL	TX Channel 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	105.4 PK			1.16 H	196	102.7	2.7
2	*5300.00	94.5 AV			1.16 H	196	91.8	2.7
3	10600.00	51.0 PK	74.0	-23.0	1.74 H	325	37.9	13.1
4	10600.00	38.8 AV	54.0	-15.2	1.74 H	325	25.7	13.1
5	15900.00	52.5 PK	74.0	-21.5	1.55 H	325	39.8	12.7
6	15900.00	41.5 AV	54.0	-12.5	1.55 H	325	28.8	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	117.2 PK			2.08 V	355	114.5	2.7
2	*5300.00	105.4 AV			2.08 V	355	102.7	2.7
3	10600.00	52.2 PK	74.0	-21.8	1.57 V	241	39.1	13.1
4	10600.00	39.3 AV	54.0	-14.7	1.57 V	241	26.2	13.1
5	15900.00	53.9 PK	74.0	-20.1	1.87 V	220	41.2	12.7
6	15900.00	42.4 AV	54.0	-11.6	1.87 V	220	29.7	12.7

REMARKS:

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

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	105.5 PK			1.09 H	190	102.7	2.8
2	*5320.00	93.1 AV			1.09 H	190	90.3	2.8
3	5350.00	56.5 PK	74.0	-17.5	1.09 H	190	53.7	2.8
4	5350.00	42.8 AV	54.0	-11.2	1.09 H	190	40.0	2.8
5	10640.00	51.5 PK	74.0	-22.5	1.76 H	301	38.3	13.2
6	10640.00	38.7 AV	54.0	-15.3	1.76 H	301	25.5	13.2
7	15960.00	53.2 PK	74.0	-20.8	1.61 H	328	40.3	12.9
8	15960.00	42.4 AV	54.0	-11.6	1.61 H	328	29.5	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	114.1 PK			1.88 V	276	111.3	2.8
2	*5320.00	103.6 AV			1.88 V	276	100.8	2.8
3	5350.00	71.1 PK	74.0	-2.9	1.88 V	276	68.3	2.8
4	5350.00	53.7 AV	54.0	-0.3	1.88 V	276	50.9	2.8
5	10640.00	52.1 PK	74.0	-21.9	1.57 V	235	38.9	13.2
6	10640.00	39.2 AV	54.0	-14.8	1.57 V	235	26.0	13.2
7	15960.00	53.5 PK	74.0	-20.5	1.87 V	205	40.6	12.9
8	15960.00	41.9 AV	54.0	-12.1	1.87 V	205	29.0	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.

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	48.1 PK	74.0	-25.9	1.17 H	188	45.0	3.1
2	5460.00	36.6 AV	54.0	-17.4	1.17 H	188	33.5	3.1
3	#5470.00	59.7 PK	68.2	-8.5	1.17 H	188	56.6	3.1
4	*5500.00	101.8 PK			1.17 H	188	98.7	3.1
5	*5500.00	91.1 AV			1.17 H	188	88.0	3.1
6	11000.00	51.7 PK	74.0	-22.3	1.76 H	304	37.7	14.0
7	11000.00	39.1 AV	54.0	-14.9	1.76 H	304	25.1	14.0
8	#16500.00	53.1 PK	68.2	-15.1	1.56 H	320	38.1	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	62.2 PK	74.0	-11.8	1.71 V	0	59.1	3.1
2	5460.00	42.0 AV	54.0	-12.0	1.71 V	0	38.9	3.1
3	#5470.00	67.8 PK	68.2	-0.4	1.71 V	0	64.7	3.1
4	*5500.00	112.8 PK			1.71 V	0	109.7	3.1
5	*5500.00	102.0 AV			1.71 V	0	98.9	3.1
6	11000.00	52.2 PK	74.0	-21.8	1.61 V	218	38.2	14.0
7	11000.00	39.2 AV	54.0	-14.8	1.61 V	218	25.2	14.0
8	#16500.00	52.9 PK	68.2	-15.3	1.94 V	200	37.9	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	105.3 PK			1.11 H	212	102.0	3.3
2	*5580.00	94.4 AV			1.11 H	212	91.1	3.3
3	11160.00	51.3 PK	74.0	-22.7	1.79 H	324	37.9	13.4
4	11160.00	38.7 AV	54.0	-15.3	1.79 H	324	25.3	13.4
5	#16740.00	52.3 PK	68.2	-15.9	1.59 H	307	35.7	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	*5580.00	115.2 PK			1.68 V	0	111.9	3.3
2	*5580.00	105.0 AV			1.68 V	0	101.7	3.3
3	11160.00	52.3 PK	74.0	-21.7	1.55 V	224	38.9	13.4
4	11160.00	39.3 AV	54.0	-14.7	1.55 V	224	25.9	13.4
5	#16740.00	53.5 PK	68.2	-14.7	1.92 V	214	36.9	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 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	99.8 PK			1.15 H	190	96.2	3.6
2	*5700.00	89.2 AV			1.15 H	190	85.6	3.6
3	#5725.00	61.2 PK	68.2	-7.0	1.15 H	190	57.7	3.5
4	11400.00	51.6 PK	74.0	-22.4	1.79 H	313	38.0	13.6
5	11400.00	39.0 AV	54.0	-15.0	1.79 H	313	25.4	13.6
6	#17100.00	52.3 PK	68.2	-15.9	1.64 H	316	36.0	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	*5700.00	110.2 PK			1.71 V	358	106.6	3.6
2	*5700.00	100.0 AV			1.71 V	358	96.4	3.6
3	#5725.00	67.9 PK	68.2	-0.3	1.71 V	358	64.4	3.5
4	11400.00	51.9 PK	74.0	-22.1	1.61 V	218	38.3	13.6
5	11400.00	39.2 AV	54.0	-14.8	1.61 V	218	25.6	13.6
6	#17100.00	52.8 PK	68.2	-15.4	1.87 V	198	36.5	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	48.3 PK	74.0	-25.7	1.10 H	202	45.3	3.0
2	5150.00	36.1 AV	54.0	-17.9	1.10 H	202	33.1	3.0
3	*5270.00	105.0 PK			1.10 H	202	102.5	2.5
4	*5270.00	93.0 AV			1.10 H	202	90.5	2.5
5	5350.00	57.8 PK	74.0	-16.2	1.10 H	202	55.0	2.8
6	5350.00	43.6 AV	54.0	-10.4	1.10 H	202	40.8	2.8
7	#10540.00	51.5 PK	68.2	-16.7	1.79 H	305	38.3	13.2
8	15810.00	53.0 PK	74.0	-21.0	1.56 H	332	40.3	12.7
9	15810.00	42.3 AV	54.0	-11.7	1.56 H	332	29.6	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.7 PK	74.0	-15.3	1.84 V	359	55.7	3.0
2	5150.00	46.7 AV	54.0	-7.3	1.84 V	359	43.7	3.0
3	*5270.00	113.6 PK			1.84 V	359	111.1	2.5
4	*5270.00	102.9 AV			1.84 V	359	100.4	2.5
5	5350.00	67.5 PK	74.0	-6.5	1.84 V	359	64.7	2.8
6	5350.00	53.1 AV	54.0	-0.9	1.84 V	359	50.3	2.8
7	#10540.00	52.1 PK	68.2	-16.1	1.59 V	223	38.9	13.2
8	15810.00	53.9 PK	74.0	-20.1	1.93 V	223	41.2	12.7
9	15810.00	42.3 AV	54.0	-11.7	1.93 V	223	29.6	12.7

REMARKS:

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

CHANNEL	TX Channel 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	96.5 PK			1.14 H	190	93.8	2.7
2	*5310.00	86.1 AV			1.14 H	190	83.4	2.7
3	5350.00	57.4 PK	74.0	-16.6	1.14 H	190	54.6	2.8
4	5350.00	43.3 AV	54.0	-10.7	1.14 H	190	40.5	2.8
5	10620.00	51.7 PK	74.0	-22.3	1.70 H	305	38.6	13.1
6	10620.00	39.4 AV	54.0	-14.6	1.70 H	305	26.3	13.1
7	15930.00	53.0 PK	74.0	-21.0	1.53 H	307	40.3	12.7
8	15930.00	42.1 AV	54.0	-11.9	1.53 H	307	29.4	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	107.6 PK			1.84 V	0	104.9	2.7
2	*5310.00	97.8 AV			1.84 V	0	95.1	2.7
3	5350.00	71.5 PK	74.0	-2.5	1.84 V	0	68.7	2.8
4	5350.00	53.5 AV	54.0	-0.5	1.84 V	0	50.7	2.8
5	10620.00	52.6 PK	74.0	-21.4	1.51 V	214	39.5	13.1
6	10620.00	39.5 AV	54.0	-14.5	1.51 V	214	26.4	13.1
7	15930.00	53.5 PK	74.0	-20.5	1.96 V	220	40.8	12.7
8	15930.00	41.9 AV	54.0	-12.1	1.96 V	220	29.2	12.7

REMARKS:

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

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	48.3 PK	74.0	-25.7	1.14 H	190	45.2	3.1
2	5460.00	37.0 AV	54.0	-17.0	1.14 H	190	33.9	3.1
3	#5470.00	59.7 PK	68.2	-8.5	1.14 H	190	56.6	3.1
4	*5510.00	96.8 PK			1.14 H	190	93.7	3.1
5	*5510.00	86.4 AV			1.14 H	190	83.3	3.1
6	11020.00	51.1 PK	74.0	-22.9	1.79 H	299	37.2	13.9
7	11020.00	38.9 AV	54.0	-15.1	1.79 H	299	25.0	13.9
8	#16530.00	53.2 PK	68.2	-15.0	1.62 H	332	38.3	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	62.2 PK	74.0	-11.8	1.90 V	359	59.1	3.1
2	5460.00	48.4 AV	54.0	-5.6	1.90 V	359	45.3	3.1
3	**#5470.00**	**68.1 PK**	**68.2**	**-0.1**	**1.90 V**	**359**	**65.0**	**3.1**
4	*5510.00	108.1 PK			1.90 V	359	105.0	3.1
5	*5510.00	97.4 AV			1.90 V	359	94.3	3.1
6	11020.00	52.3 PK	74.0	-21.7	1.54 V	240	38.4	13.9
7	11020.00	39.1 AV	54.0	-14.9	1.54 V	240	25.2	13.9
8	#16530.00	53.5 PK	68.2	-14.7	1.88 V	216	38.6	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	#5470.00	59.3 PK	68.2	-8.9	1.18 H	208	56.2	3.1
2	*5550.00	105.4 PK			1.18 H	208	102.2	3.2
3	*5550.00	93.0 AV			1.18 H	208	89.8	3.2
4	11100.00	52.3 PK	74.0	-21.7	1.73 H	305	39.0	13.3
5	11100.00	39.6 AV	54.0	-14.4	1.73 H	305	26.3	13.3
6	#16650.00	53.4 PK	68.2	-14.8	1.55 H	326	37.8	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	#5470.00	68.0 PK	68.2	-0.2	1.90 V	358	64.9	3.1
2	*5550.00	115.2 PK			1.90 V	358	112.0	3.2
3	*5550.00	103.6 AV			1.90 V	358	100.4	3.2
4	11100.00	52.2 PK	74.0	-21.8	1.54 V	221	38.9	13.3
5	11100.00	39.5 AV	54.0	-14.5	1.54 V	221	26.2	13.3
6	#16650.00	54.0 PK	68.2	-14.2	1.91 V	195	38.4	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	98.3 PK			1.10 H	212	94.9	3.4
2	*5670.00	88.8 AV			1.10 H	212	85.4	3.4
3	#5725.00	59.7 PK	68.2	-8.5	1.10 H	212	56.2	3.5
4	11340.00	50.8 PK	74.0	-23.2	1.73 H	300	37.1	13.7
5	11340.00	38.6 AV	54.0	-15.4	1.73 H	300	24.9	13.7
6	#17010.00	52.9 PK	68.2	-15.3	1.58 H	329	36.3	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	*5670.00	110.6 PK			1.89 V	356	107.2	3.4
2	*5670.00	99.9 AV			1.89 V	356	96.5	3.4
3	#5725.00	67.9 PK	68.2	-0.3	1.89 V	356	64.4	3.5
4	11340.00	52.2 PK	74.0	-21.8	1.58 V	223	38.5	13.7
5	11340.00	39.6 AV	54.0	-14.4	1.58 V	223	25.9	13.7
6	#17010.00	53.1 PK	68.2	-15.1	1.89 V	224	36.5	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.

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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	48.8 PK	74.0	-25.2	1.09 H	210	45.8	3.0
2	5150.00	36.6 AV	54.0	-17.4	1.09 H	210	33.6	3.0
3	*5290.00	92.1 PK			1.09 H	210	89.5	2.6
4	*5290.00	82.9 AV			1.09 H	210	80.3	2.6
5	5350.00	57.8 PK	74.0	-16.2	1.09 H	210	55.0	2.8
6	5350.00	43.4 AV	54.0	-10.6	1.09 H	210	40.6	2.8
7	#10580.00	52.2 PK	68.2	-16.0	1.78 H	305	39.0	13.2
8	15870.00	52.8 PK	74.0	-21.2	1.55 H	320	40.1	12.7
9	15870.00	41.9 AV	54.0	-12.1	1.55 H	320	29.2	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	1.89 V	356	55.8	3.0
2	5150.00	46.3 AV	54.0	-7.7	1.89 V	356	43.3	3.0
3	*5290.00	103.2 PK			1.89 V	356	100.6	2.6
4	*5290.00	94.2 AV			1.89 V	356	91.6	2.6
5	5350.00	66.1 PK	74.0	-7.9	1.89 V	356	63.3	2.8
6	**5350.00**	**53.9 AV**	**54.0**	**-0.1**	**1.89 V**	**356**	**51.1**	**2.8**
7	#10580.00	51.6 PK	68.2	-16.6	1.62 V	239	38.4	13.2
8	15870.00	53.7 PK	74.0	-20.3	1.92 V	210	41.0	12.7
9	15870.00	42.3 AV	54.0	-11.7	1.92 V	210	29.6	12.7

REMARKS:

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

CHANNEL	TX Channel 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	55.8 PK	74.0	-18.2	1.11 H	214	52.7	3.1
2	5460.00	41.8 AV	54.0	-12.2	1.11 H	214	38.7	3.1
3	#5470.00	48.3 PK	68.2	-19.9	1.11 H	214	45.2	3.1
4	*5530.00	93.5 PK			1.11 H	214	90.3	3.2
5	*5530.00	84.1 AV			1.11 H	214	80.9	3.2
6	11060.00	51.1 PK	74.0	-22.9	1.79 H	306	37.5	13.6
7	11060.00	38.6 AV	54.0	-15.4	1.79 H	306	25.0	13.6
8	#16590.00	52.2 PK	68.2	-16.0	1.63 H	306	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	64.4 PK	74.0	-9.6	1.93 V	356	61.3	3.1
2	5460.00	50.8 AV	54.0	-3.2	1.93 V	356	47.7	3.1
3	**#5470.00**	**68.1 PK**	**68.2**	**-0.1**	**1.93 V**	**356**	**65.0**	**3.1**
4	*5530.00	104.7 PK			1.93 V	356	101.5	3.2
5	*5530.00	95.3 AV			1.93 V	356	92.1	3.2
6	11060.00	52.0 PK	74.0	-22.0	1.53 V	232	38.4	13.6
7	11060.00	39.4 AV	54.0	-14.6	1.53 V	232	25.8	13.6
8	#16590.00	53.1 PK	68.2	-15.1	1.85 V	222	38.2	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.

Below 1GHz Data:

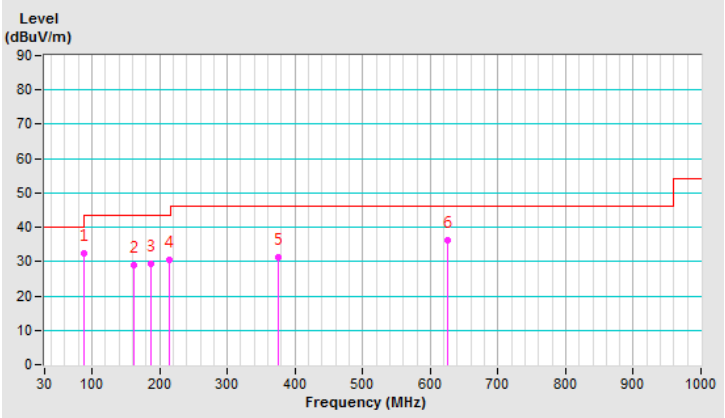
802.11ac (VHT40)

CHANNEL	TX Channel 54	**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	45.9	-13.4
2	161.62	28.9 QP	43.5	-14.6	1.71 H	66	36.8	-7.9
3	186.82	29.2 QP	43.5	-14.3	1.42 H	144	39.2	-10.0
4	214.95	30.4 QP	43.5	-13.1	1.42 H	88	40.8	-10.4
5	375.03	31.2 QP	46.0	-14.8	1.20 H	100	36.2	-5.0
6	625.11	36.1 QP	46.0	-9.9	1.47 H	85	35.1	1.0

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. 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.

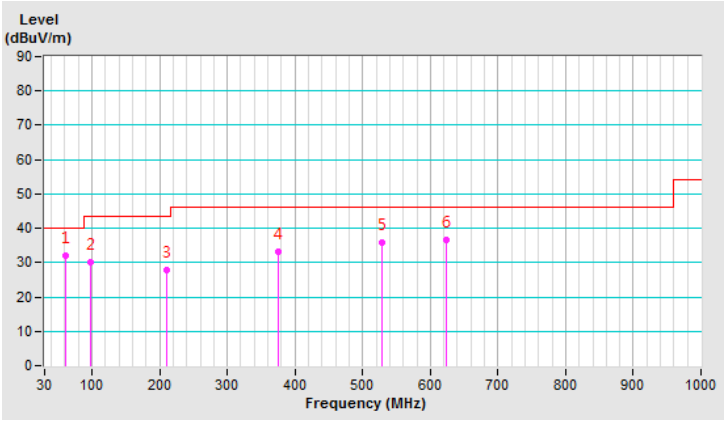


CHANNEL	TX Channel 54	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.9	-8.8
2	97.98	30.1 QP	43.5	-13.4	1.65 V	134	42.5	-12.4
3	210.02	27.8 QP	43.5	-15.7	1.32 V	200	38.2	-10.4
4	375.01	33.1 QP	46.0	-12.9	1.74 V	211	38.1	-5.0
5	529.01	35.8 QP	46.0	-10.2	1.65 V	100	37.2	-1.4
6	624.11	36.5 QP	46.0	-9.5	1.47 V	100	35.6	0.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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. 18, 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.

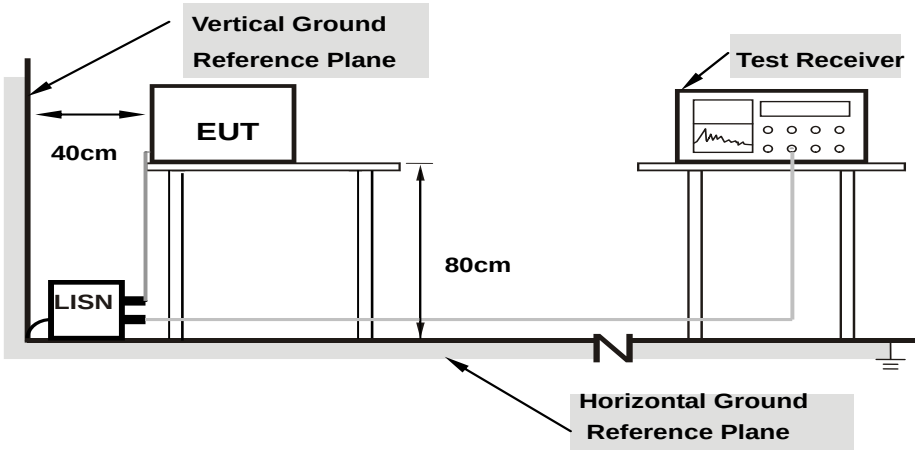
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

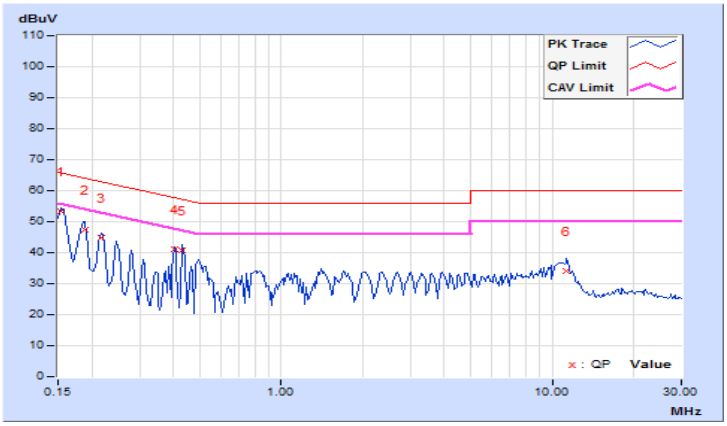
4.2.7 Test Results

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	0.15391	10.03	43.12	30.62	53.15	40.65	65.79	55.79	-12.64	-15.14
2	0.18906	10.05	37.40	26.44	47.45	36.49	64.08	54.08	-16.63	-17.59
3	0.21641	10.05	34.76	26.34	44.81	36.39	62.96	52.96	-18.15	-16.57
4	**0.40391**	**10.08**	**30.85**	**29.19**	**40.93**	**39.27**	**57.77**	**47.77**	**-16.84**	**-8.50**
5	0.43125	10.08	30.49	27.44	40.57	37.52	57.23	47.23	-16.66	-9.71
6	11.26953	10.78	23.18	16.23	33.96	27.01	60.00	50.00	-26.04	-22.99

REMARKS:

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

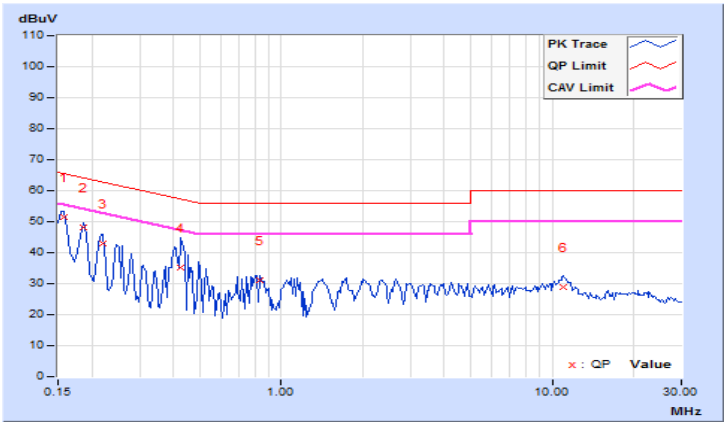


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.94	41.57	29.20	51.51	39.14	65.58	55.58	-14.07	-16.44
2	0.18516	9.95	38.33	26.84	48.28	36.79	64.25	54.25	-15.97	-17.46
3	0.22031	9.95	33.05	23.54	43.00	33.49	62.81	52.81	-19.81	-19.32
4	0.42734	9.98	25.05	24.95	35.03	34.93	57.30	47.30	-22.27	-12.37
5	0.83750	9.99	21.23	19.74	31.22	29.73	56.00	46.00	-24.78	-16.27
6	10.97266	10.59	18.32	11.88	28.91	22.47	60.00	50.00	-31.09	-27.53

REMARKS:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

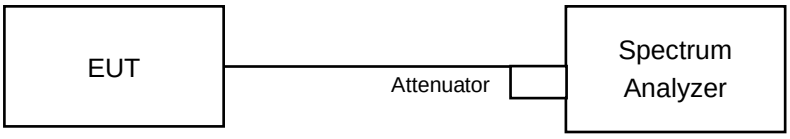
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

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

FOR 26dB OCCUPIED BANDWIDTH

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test 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				
52	5260	19.39	19.32	172.403	22.37	24.00	Pass
60	5300	19.34	19.27	170.429	22.32	24.00	Pass
64	5320	17.87	17.71	120.255	20.80	24.00	Pass
100	5500	17.42	17.66	113.553	20.55	24.00	Pass
116	5580	18.95	19.49	167.444	22.24	24.00	Pass
140	5700	14.96	15.13	63.917	18.06	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	35.67	36.59
60	5300	34.88	34.88
64	5320	25.83	25.57
100	5500	25.65	25.37
116	5580	34.92	34.60
140	5700	24.32	22.35

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)
52	5260	35.67	26.52 > 24
60	5300	34.88	26.42 > 24
64	5320	25.57	25.07 > 24
100	5500	25.37	25.04 > 24
116	5580	34.60	26.39 > 24
140	5700	22.35	24.49 > 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				
52	5260	19.33	19.37	172.201	22.36	24.00	Pass
60	5300	19.43	19.36	173.998	22.41	24.00	Pass
64	5320	17.94	17.73	121.523	20.85	24.00	Pass
100	5500	16.16	16.26	83.572	19.22	24.00	Pass
116	5580	18.86	19.41	164.21	22.15	24.00	Pass
140	5700	13.95	14.28	51.623	17.13	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	42.61	42.15
60	5300	38.10	39.99
64	5320	26.76	25.64
100	5500	24.31	23.33
116	5580	35.86	37.07
140	5700	23.90	23.21

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)
52	5260	42.15	27.24 > 24
60	5300	38.10	26.8 > 24
64	5320	25.64	25.08 > 24
100	5500	23.33	24.67 > 24
116	5580	35.86	26.54 > 24
140	5700	23.21	24.65 > 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				
54	5270	20.63	20.64	231.489	23.65	24.00	Pass
62	5310	15.30	14.58	62.592	17.97	24.00	Pass
102	5510	14.96	15.12	63.842	18.05	24.00	Pass
110	5550	19.98	20.80	219.767	23.42	24.00	Pass
134	5670	17.56	17.69	115.765	20.64	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	85.90	85.44
62	5310	48.64	47.17
102	5510	46.58	46.79
110	5550	84.63	86.16
134	5670	70.85	70.41

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)
54	5270	85.44	30.31 > 24
62	5310	47.17	27.73 > 24
102	5510	46.58	27.68 > 24
110	5550	84.63	30.27 > 24
134	5670	70.41	29.47 > 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				
58	5290	13.56	13.09	43.069	16.34	24.00	Pass
106	5530	14.36	14.43	55.023	17.41	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	90.99	89.27
106	5530	90.65	88.71

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	89.27	30.5 > 24
106	5530	88.71	30.47 > 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				
52	5260	19.33	19.37	172.201	22.36	22.43	Pass
60	5300	19.43	19.36	173.998	22.41	22.43	Pass
64	5320	17.94	17.73	121.523	20.85	22.43	Pass
100	5500	16.16	16.26	83.572	19.22	22.36	Pass
116	5580	18.86	19.41	164.21	22.15	22.36	Pass
140	5700	13.95	14.28	51.623	17.13	22.36	Pass

Note: 1. For UNII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.57-6).

2. For UNII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.64-6).

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	42.61	42.15
60	5300	38.10	39.99
64	5320	26.76	25.64
100	5500	24.31	23.33
116	5580	35.86	37.07
140	5700	23.90	23.21

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	42.15	27.24 > 24
60	5300	38.10	26.8 > 24
64	5320	25.64	25.08 > 24
100	5500	23.33	24.67 > 24
116	5580	35.86	26.54 > 24
140	5700	23.21	24.65 > 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				
54	5270	19.14	18.98	161.103	22.07	22.43	Pass
62	5310	15.30	14.58	62.592	17.97	22.43	Pass
102	5510	14.96	15.12	63.842	18.05	22.36	Pass
110	5550	18.88	19.39	164.164	22.15	22.36	Pass
134	5670	17.56	17.69	115.765	20.64	22.36	Pass

Note: 1. For UNII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.57-6).

2. For UNII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.64-6).

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	85.90	85.44
62	5310	48.64	47.17
102	5510	46.58	46.79
110	5550	84.63	86.16
134	5670	70.85	70.41

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)
54	5270	85.44	30.31 > 24
62	5310	47.17	27.73 > 24
102	5510	46.58	27.68 > 24
110	5550	84.63	30.27 > 24
134	5670	70.41	29.47 > 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				
58	5290	13.56	13.09	43.069	16.34	22.43	Pass
106	5530	14.36	14.43	55.023	17.41	22.36	Pass

Note: 1. For UNII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.57-6).

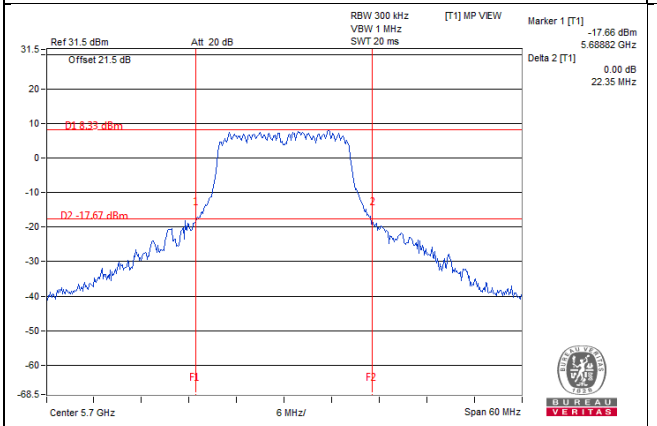
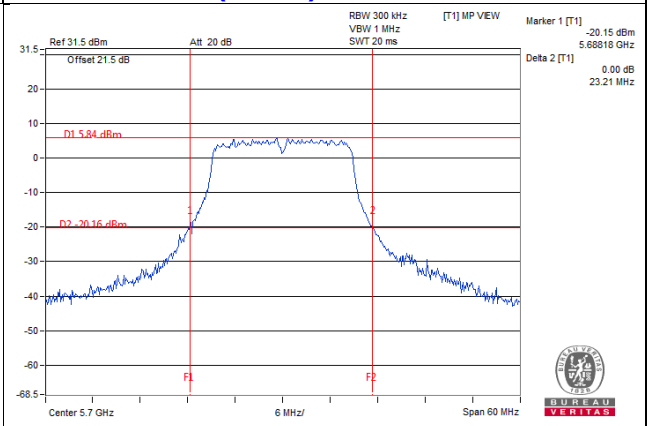
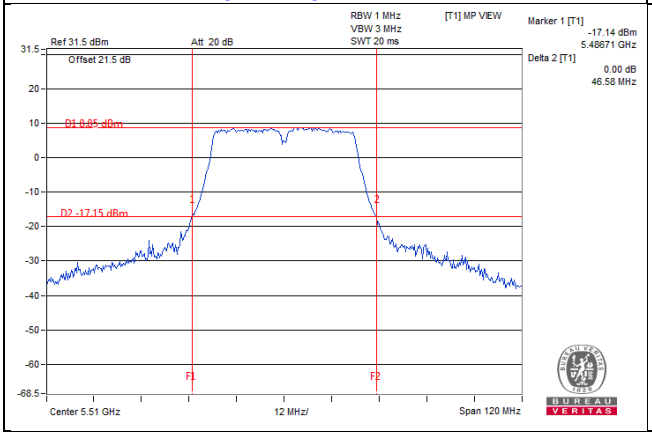
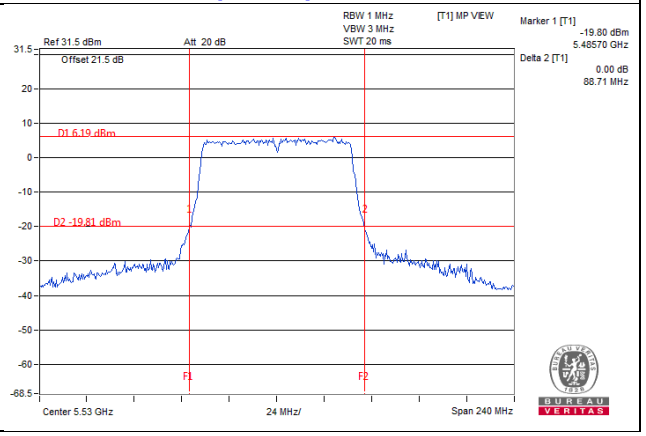
2. For UNII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit” -(7.64-6).

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	90.99	89.27
106	5530	90.65	88.71

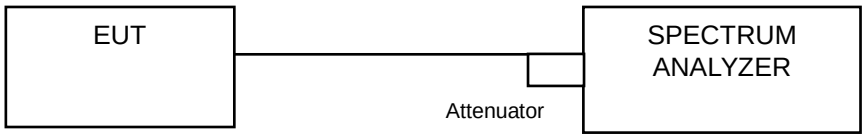
Note: For U_NII-2A, U_NII-2C Band output power limitation is determined based on 26dBc bandwidtl

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	89.27	30.5 > 24
106	5530	88.71	30.47 > 24

Spectrum Plot of Worst Value	
802.11a / Chain 1 – CH140	**802.11ac (VHT20) / Chain 1 – CH140**
	
802.11ac (VHT40) / Chain 0 - CH102	**802.11ac (VHT80) / Chain 1 - CH106**
	

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
52	5260	18.12	19.44
60	5300	17.64	17.88
64	5320	16.80	16.92
100	5500	16.80	16.92
116	5580	17.40	17.40
140	5700	16.80	16.68

802.11ac (VHT20)

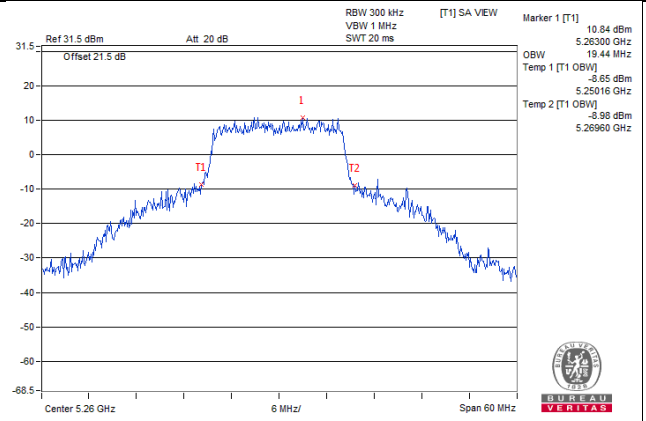
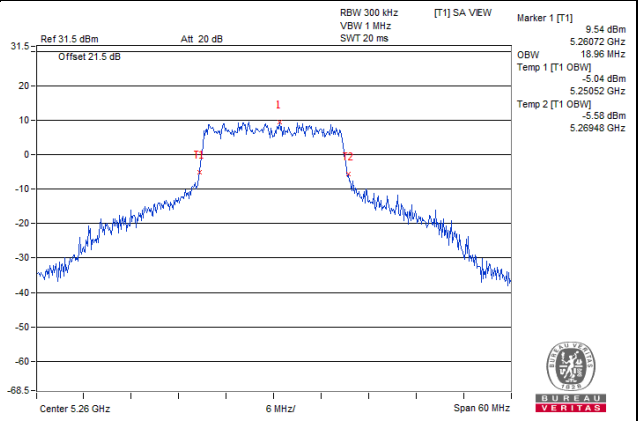
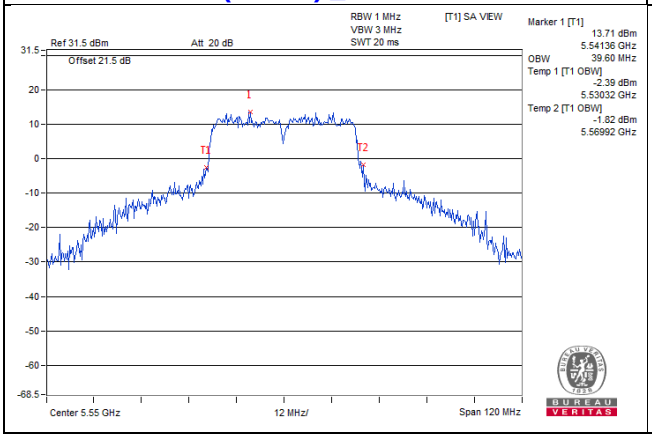
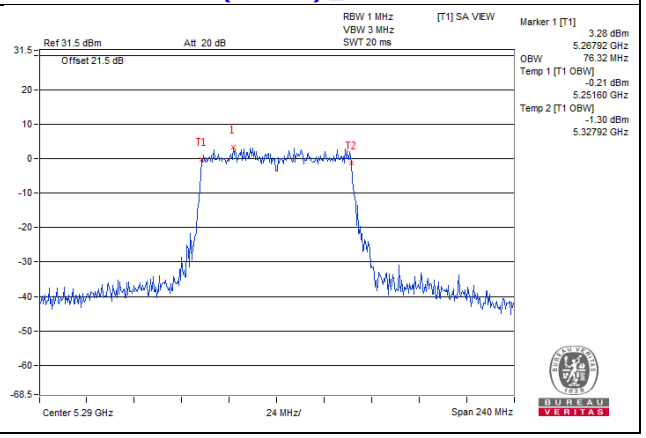
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	18.84	18.96
60	5300	18.72	18.96
64	5320	18.24	18.00
100	5500	18.00	18.00
116	5580	18.36	18.72
140	5700	18.00	17.88

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	38.64	38.40
62	5310	36.96	36.96
102	5510	36.72	36.96
110	5550	37.68	39.60
134	5670	37.44	37.44

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	76.32	75.84
106	5530	76.32	76.32

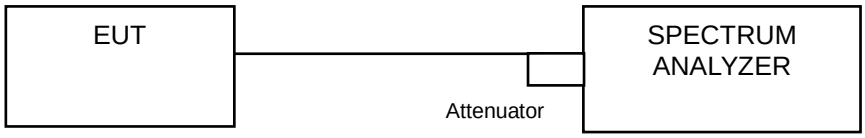
Spectrum Plot of Max. Value	
802.11a_Chain 1 / CH52	**802.11ac (VHT20)_ Chain 1 / CH52**
	
802.11ac (VHT40) _Chain 1 / CH110	**802.11ac (VHT80) _Chain 0 / CH58**
	

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

Using method SA-2

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

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

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
52	5260	5.91	5.91	0.16	9.08	9.43	Pass
60	5300	5.59	5.76	0.16	8.85	9.43	Pass
64	5320	3.95	3.96	0.16	7.13	9.43	Pass
100	5500	3.98	4.04	0.16	7.18	9.36	Pass
116	5580	5.27	5.77	0.16	8.70	9.36	Pass
140	5700	1.47	1.61	0.16	4.71	9.36	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. U-NII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi , so the power density limit shall be reduced 11-(7.57-6) = 9.43dBm.
3. U-NII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced 11-(7.64-6) = 9.36dBm.
4. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
52	5260	5.59	5.21	0.15	8.56	9.43	Pass
60	5300	5.50	5.59	0.15	8.71	9.43	Pass
64	5320	3.80	3.85	0.15	6.99	9.43	Pass
100	5500	2.20	2.29	0.15	5.41	9.36	Pass
116	5580	4.99	5.63	0.15	8.48	9.36	Pass
140	5700	-0.06	0.62	0.15	3.45	9.36	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. U-NII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi , so the power density limit shall be reduced 11-(7.57-6) = 9.43dBm.
3. U-NII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced 11-(7.64-6) = 9.36dBm.
4. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

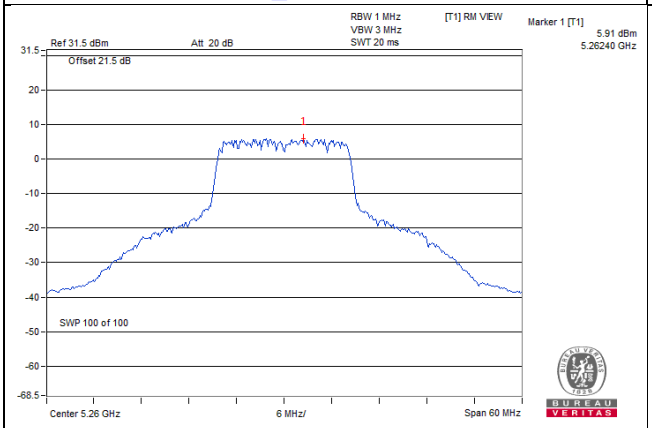
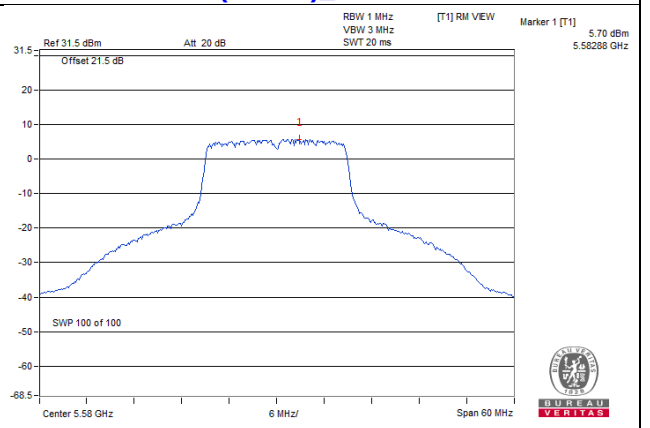
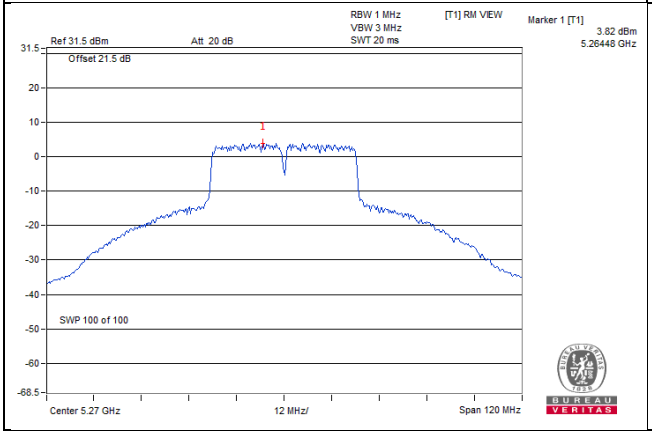
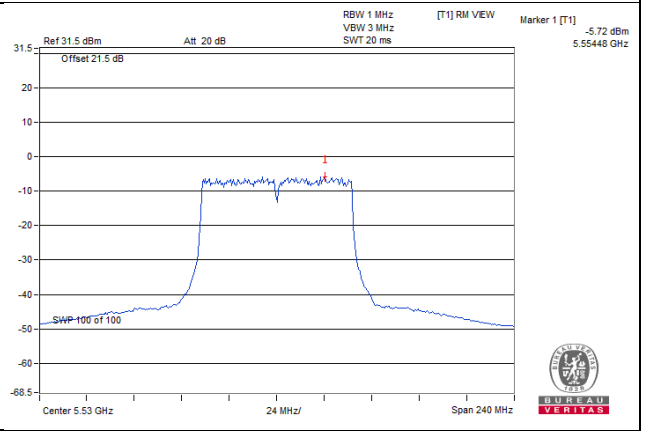
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
54	5270	3.53	3.79	0.20	6.87	9.43	Pass
62	5310	-1.74	-2.05	0.20	1.32	9.43	Pass
102	5510	-1.85	-1.74	0.20	1.42	9.36	Pass
118	5590	2.71	3.74	0.20	6.47	9.36	Pass
134	5670	1.02	1.12	0.20	4.28	9.36	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. U-NII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi , so the power density limit shall be reduced 11-(7.57-6) = 9.43dBm.
3. U-NII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced 11-(7.64-6) = 9.36dBm.
4. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
58	5290	-7.11	-7.81	0.41	-4.03	9.43	Pass
106	5530	-6.38	-5.82	0.41	-2.67	9.36	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. U-NII-2A: Directional gain = 4.56dBi + 10log(2) = 7.57dBi > 6dBi , so the power density limit shall be reduced 11-(7.57-6) = 9.43dBm.
3. U-NII-2C: Directional gain = 4.63dBi + 10log(2) = 7.64dBi > 6dBi , so the power density limit shall be reduced 11-(7.64-6) = 9.36dBm.
4. Refer to section 3.3 for duty cycle spectrum plot.

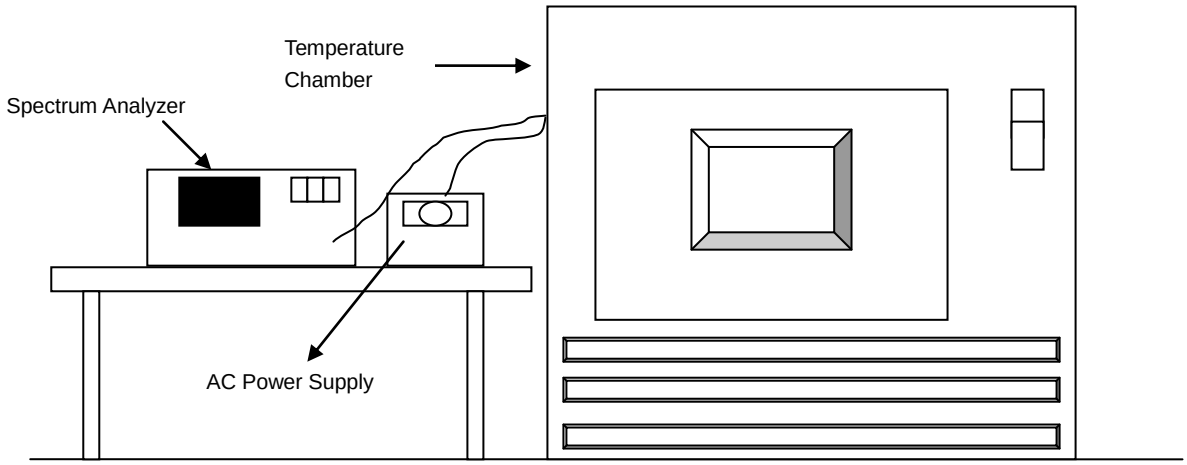
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH52	**802.11ac (VHT20)_Chain 1 / CH116**
	
802.11ac (VHT40)_Chain 1 / CH54	**802.11ac (VHT80)_Chain 1 / CH106**
	

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	5260.0228	PASS	5260.0221	PASS	5260.0185	PASS	5260.0187	PASS
40	120	5259.9749	PASS	5259.9761	PASS	5259.9782	PASS	5259.9751	PASS
30	120	5259.9898	PASS	5259.9906	PASS	5259.9928	PASS	5259.9898	PASS
20	120	5259.9998	PASS	5259.999	PASS	5260.0001	PASS	5259.9977	PASS
10	120	5260.0188	PASS	5260.0172	PASS	5260.0192	PASS	5260.0202	PASS
0	120	5259.9826	PASS	5259.982	PASS	5259.9811	PASS	5259.9808	PASS
-10	120	5260.0028	PASS	5260.0036	PASS	5260.0026	PASS	5260.0025	PASS
-20	120	5259.9876	PASS	5259.9858	PASS	5259.9883	PASS	5259.9868	PASS
-30	120	5260.0115	PASS	5260.0112	PASS	5260.0092	PASS	5260.012	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	5260.0006	PASS	5259.9994	PASS	5259.9992	PASS	5259.9975	PASS
	120	5259.9998	PASS	5259.999	PASS	5260.0001	PASS	5259.9977	PASS
	102	5259.9994	PASS	5259.9999	PASS	5259.9999	PASS	5259.9973	PASS

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.

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

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