

FCC Test Report (DFS Band)

Report No.: RF180206E03B-1

FCC ID: S9GM510

Test Model: M510

Received Date: Feb. 09, 2018

Test Date: Feb. 23 to Mar. 27, 2018

Issued Date: May 17, 2018

Applicant: Ruckus Wireless, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180206E03B-1	Original release.	May 17, 2018

1 Certificate of Conformity

Product: M510 Access Point

Brand: Ruckus Wireless

Test Model: M510

Sample Status: ENGINEERING SAMPLE

Applicant: Ruckus Wireless, Inc.

Test Date: Feb. 23 to Mar. 27, 2018

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** May 17, 2018
Phoenix Huang / Specialist

Approved by : May Chen , **Date:** May 17, 2018
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.33dB at 0.46119MHz.
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 -0.6dB at 5350.00MHz, 5725.00 MHz.
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(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
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	M510 Access Point
Brand	Ruckus Wireless
Test Model	M510
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 48V from POE or DC 12V from adapter or DC 12V from Terminal
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5.26 ~ 5.32GHz, 5.50 ~ 5.70GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 15 802.11n (HT40), 802.11ac (VHT40): 7 802.11ac (VHT80): 3
Output Power	5.26 ~ 5.32GHz: 239.163mW 5.50 ~ 5.70GHz: 249.53mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF180206E03-1 as the following:

◆ Add DFS band <5.26GHz ~ 5.32GHz, 5.50GHz ~ 5.70GHz>

2. According to above condition, all test items need to be performed. And all data were verified to meet the requirements.
3. There are WLAN, WWAN and GPS technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2
WLAN (2.4GHz + 5GHz)	WWAN (LTE + WCDMA) +GPS

4. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	WLAN 5GHz	WWAN WCDMA	GPS
2	WLAN 2.4GHz	WLAN 5GHz	WWAN LTE	GPS

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

5. The EUT must be supplied with a POE or power adapter as following table:

PoE (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	740-64214-001	Input: 100-240V, 0.75A, 50/60Hz Output: 48V, 0.5A
Adapter (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	NBS24J120200B3	Input: 100-240V, 0.6A, 50/60Hz Output: 12V, 2.0A

6. For radiated emissions test, the EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Power from POE
Mode B	Power from Adapter
Mode C	Power from Terminal

Note: In the original report, from the above modes, the worst cases were found in **Mode A**. Therefore only the test data of the mode was recorded in this report.

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

1. The antennas provided to the EOI, please refer to the following table:

WLAN								
Antenna NO.	Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1	5GHz_chain_0 2.4GHz_chain_1	1	2.4~2.4835	PIFA	i-pex (MHF)	120	0	1
		3	5.15~5.85				0	3
2	5GHz_chain_1 2.4GHz_chain_0	1.2	2.4~2.4835	PIFA	i-pex (MHF)	70	0	1.2
		3	5.15~5.85				0	3
GPS								
Antenna Net Gain(dBi)		Frequency range (MHz)	Antenna Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)	
1.66		1575.42	Dipole	i-pex (MHF)	80	0.34	2	
WWAN								
Antenna NO.	Antenna Type	Brand	Model	Band		Freq. Range	Gain (dBi)	
1 (Main)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)		1850~1910	1.66	
				WCDMA IV (B4)		1710~1755	1.66	
				WCDMA V (B5)		824~849	1.66	
				LTE Band (2)		1850~1910	1.66	
				LTE Band (4)		1710~1755	1.66	
				LTE Band (12)		698~716	1.53	
2 (Aux)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)		1850~1910	1.5	
				WCDMA IV (B4)		1710~1755	1.5	
				WCDMA V (B5)		824~849	1.5	
				LTE Band (2)		1850~1910	1.5	
				LTE Band (4)		1710~1755	1.5	
				LTE Band (12)		698~716	1.37	

Note: There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

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
802.11ac (VHT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
VHT40	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
5GHz Band			
Modulation Mode	Data Rate (MCS)	TX & RX Configuration	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11ac (VHT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT40)	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. 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 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 ~ 5700MHz

11 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		

5 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		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 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	
1	√	√	√	√	With PoE
2	-	-	√	-	With Adapter
3	-	-	√	-	With Terminal Blocking

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. In the original report, the EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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	5500-5700	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 to 122	106, 122	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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5260-5320, 5500-5700	52 to 64, 100 to 140	100	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5260-5320, 5500-5700	52 to 64, 100 to 140	100	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

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	5500-5700	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 to 122	106, 122	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power (system)	Tested By
RE $\geq$ 1G	23deg. C, 67%RH	120Vac, 60Hz	Eason Tseng
RE<1G	23deg. C, 61%RH	120Vac, 60Hz	Eason Tseng
PLC	24deg. C, 67%RH	120Vac, 60Hz	Andy Ho
	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

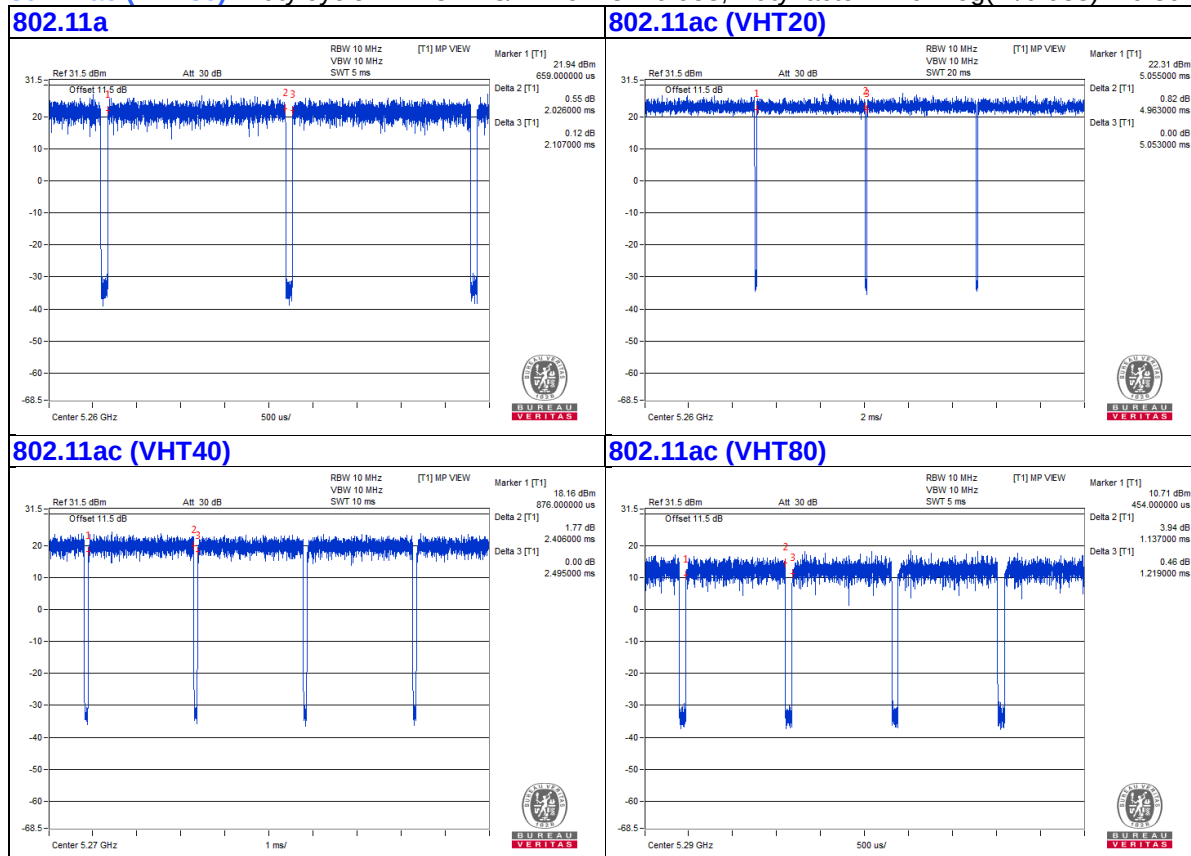
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = $2.026 \text{ ms} / 2.107 \text{ ms} = 0.962$, Duty factor = $10 * \log(1/0.962) = 0.17$

802.11ac (VHT20): Duty cycle = $4.963 \text{ ms} / 5.053 \text{ ms} = 0.982$

802.11ac (VHT40): Duty cycle = $2.406 \text{ ms} / 2.495 \text{ ms} = 0.964$, Duty factor = $10 * \log(1/0.964) = 0.16$

802.11ac (VHT80): Duty cycle = $1.137 \text{ ms} / 1.219 \text{ ms} = 0.933$, Duty factor = $10 * \log(1/0.933) = 0.30$



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.	SIM Card	R&S	CMW-Z04	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JL03FF4T1	NA	Provided by Lab
E.	PoE Adapter	Ruckus Wireless	740-64214-001	NA	NA	Supplied by client
F.	DC Power supply	GOOD WILL INSTRUMENT CO., LTD	GPC-3030D	E847076	NA	Provided by Lab
G.	Adapter	Ruckus Wireless	NBS24J120200B3	NA	NA	Supplied by client

Note:

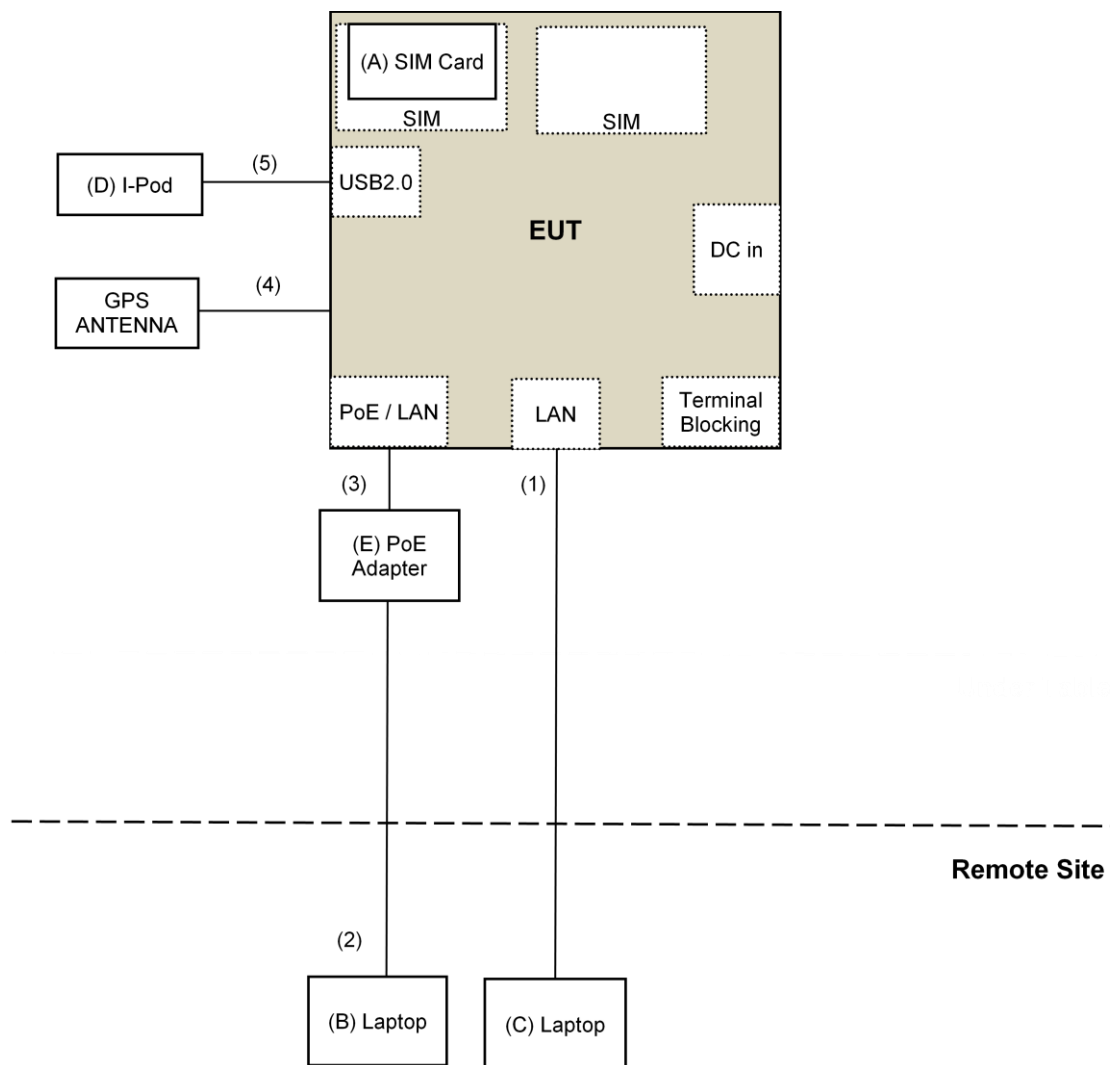
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	3	No	0	Provided by Lab
4.	GPS Cable	1	5	No	0	Supplied by client
5.	USB Cable	1	0.1	Yes	0	Provided by Lab
6.	AC Cable	1	1.8	No	0	Supplied by client
7.	DC Cable	1	1.8	No	0	Supplied by client
8.	DC Cable	1	1.2	No	0	Provided by Lab

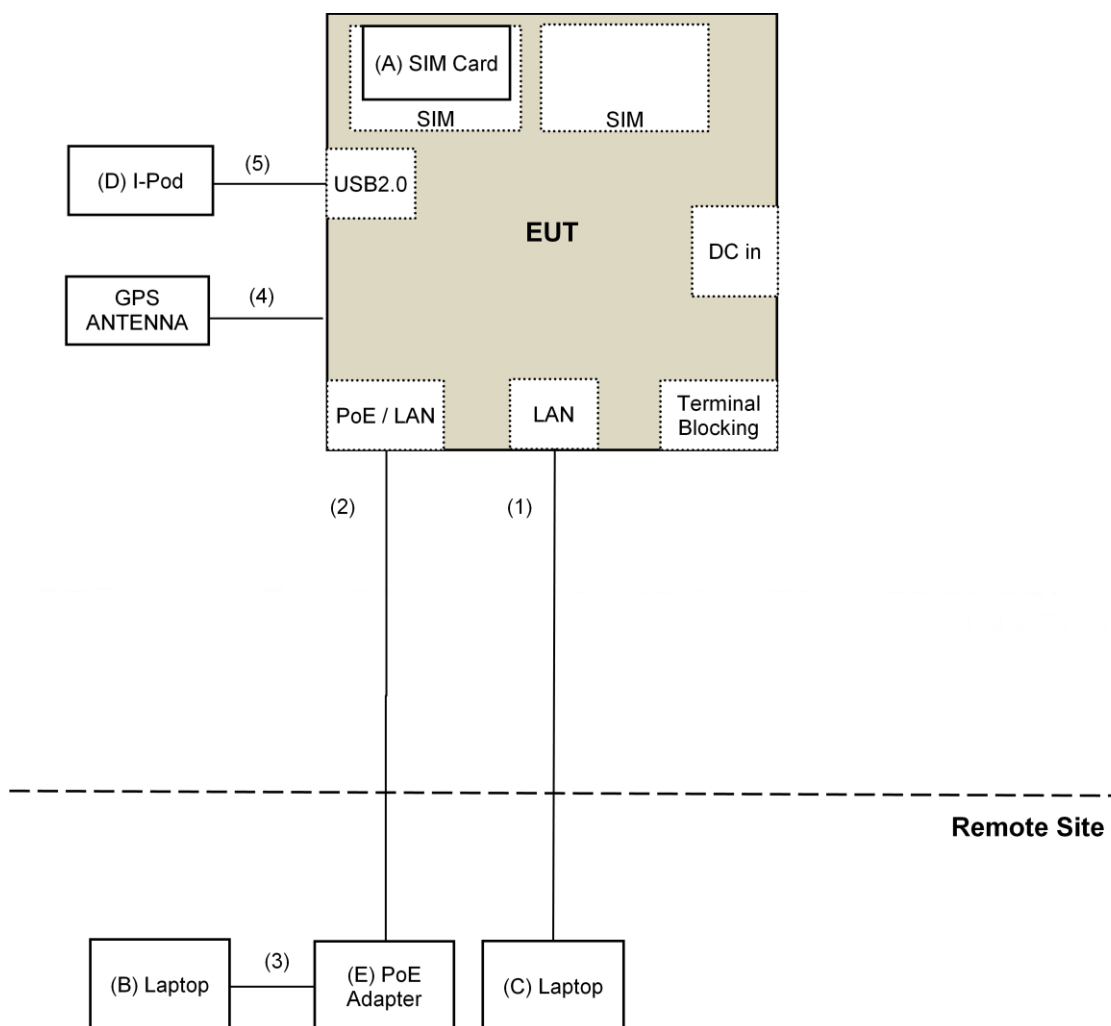
3.4.1 Configuration of System under Test

For Mode 1:

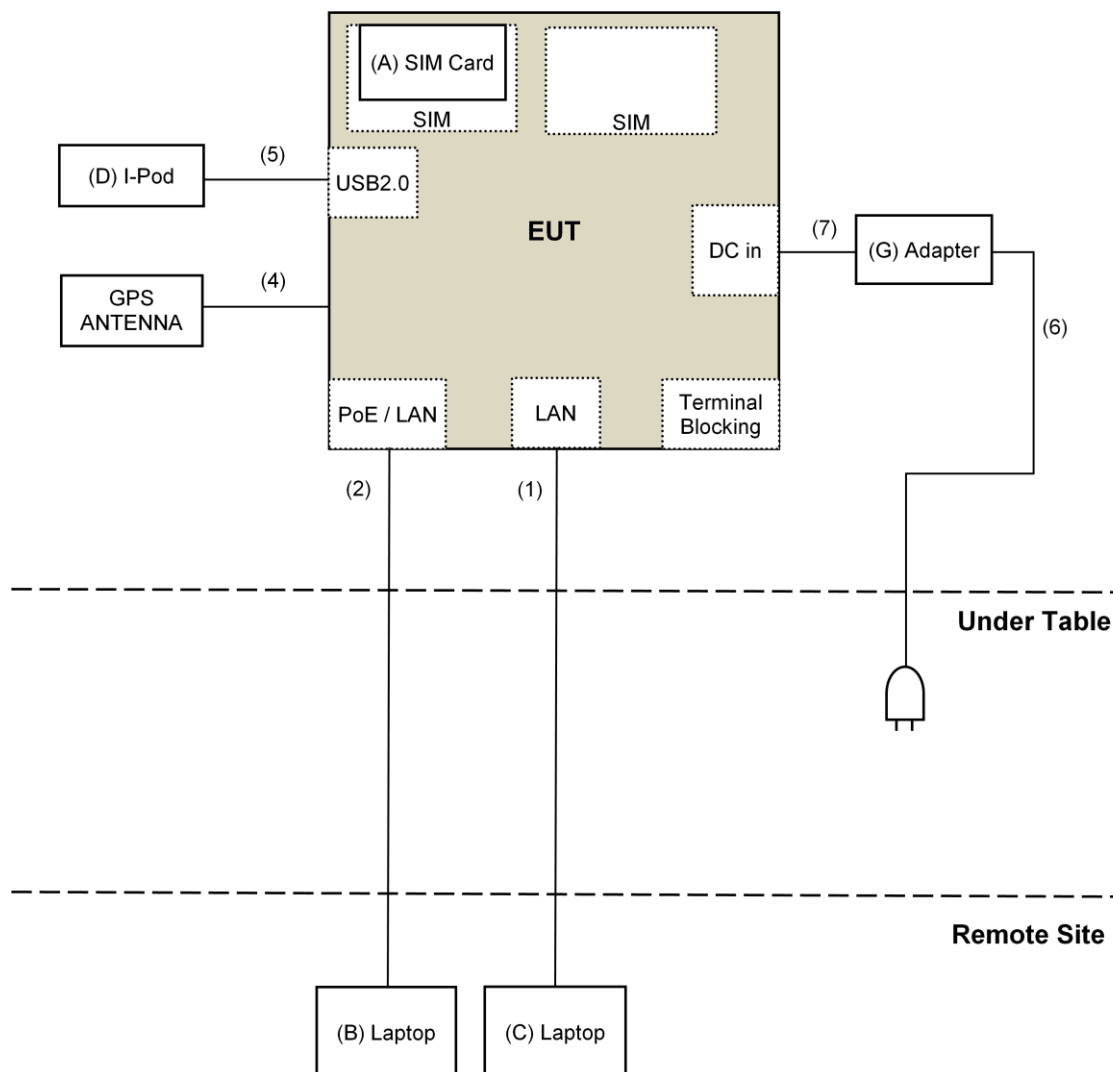
Conducted emission test item



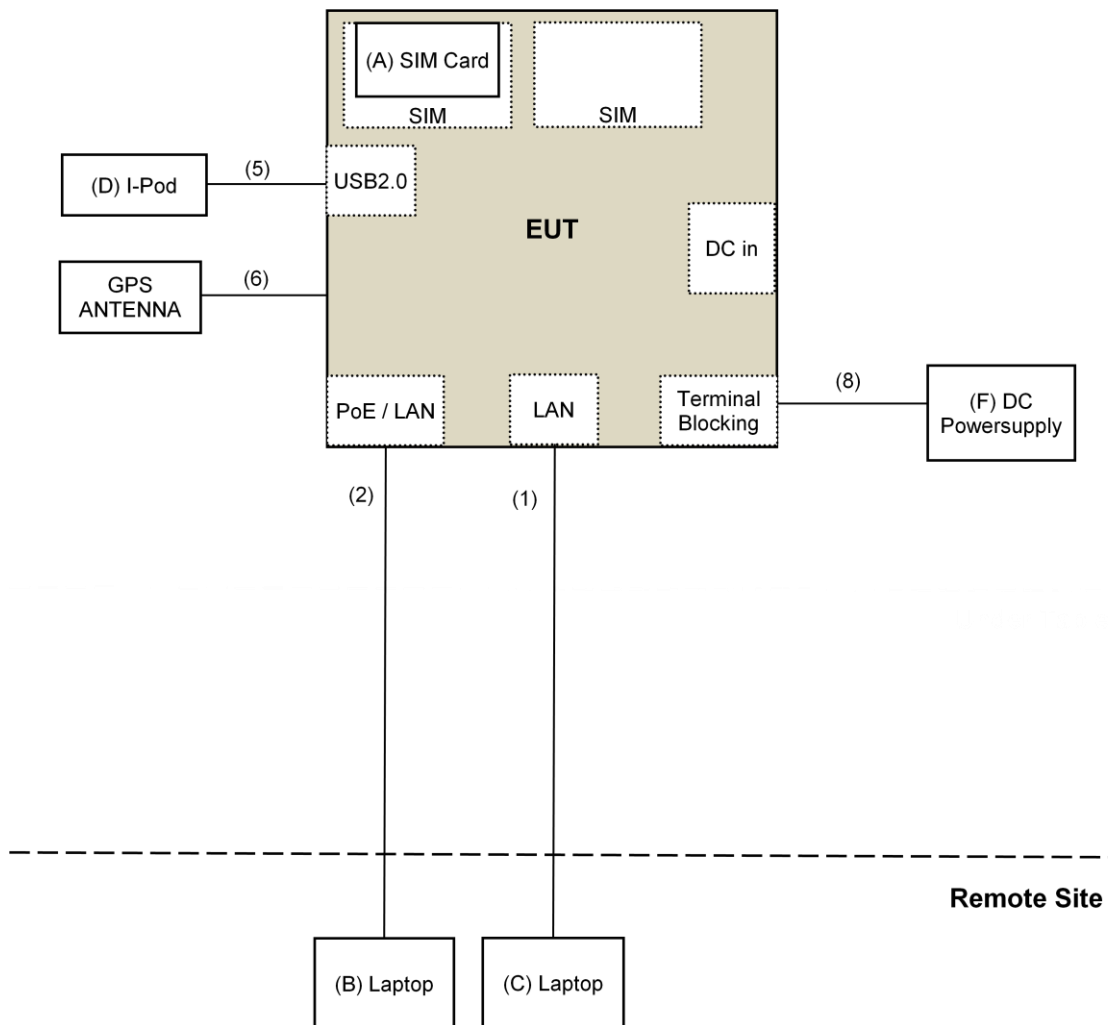
Other test items



For Mode 2



For Mode 3



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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☐ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
	☐ 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*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.	

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
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	5D-FB	LOOPCAB-001 LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCi	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCi	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Feb. 24 to Mar. 21, 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:

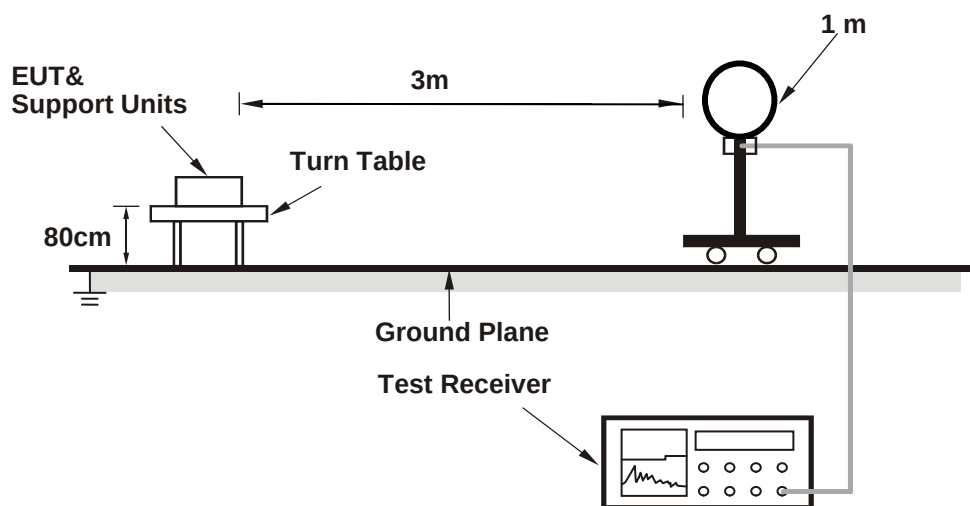
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) 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

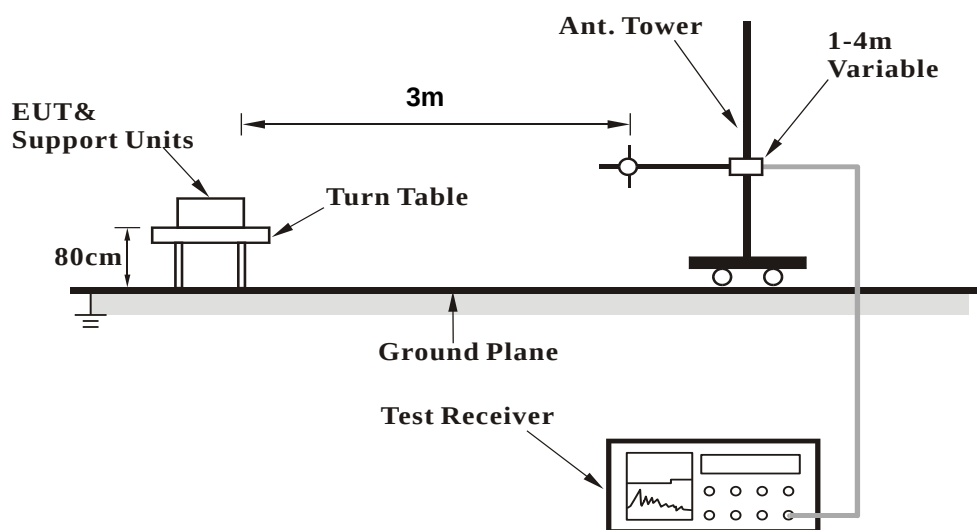
No deviation.

4.1.5 Test Setup

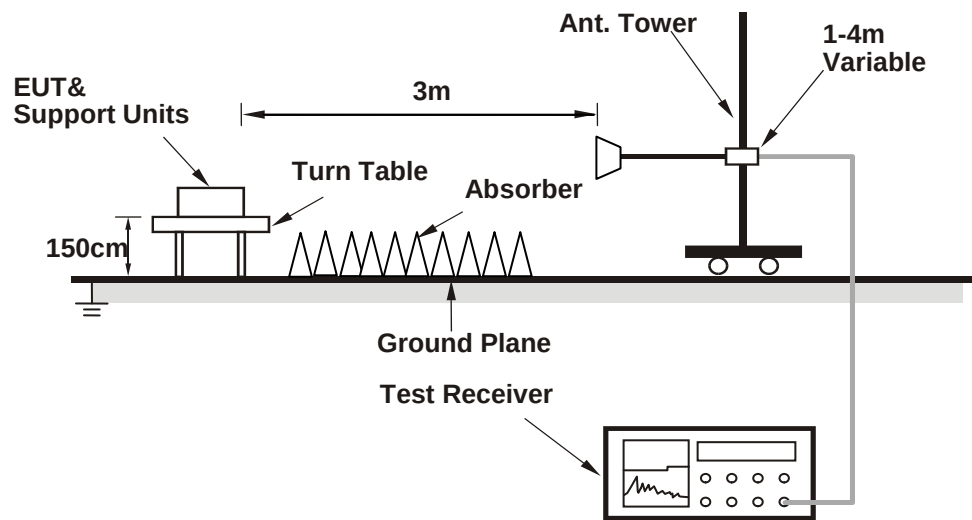
For Radiated emission below 30MHz



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

- Connected the EUT with the Notebook Computer which is placed on remote site.
- Controlling software (QRCT.exe VER 3.0.297.0) 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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	45.6 PK	74.0	-28.4	1.06 H	240	41.5	4.1
2	5150.00	35.4 AV	54.0	-18.6	1.06 H	240	31.3	4.1
3	*5260.00	114.5 PK			1.06 H	240	111.1	3.4
4	*5260.00	103.2 AV			1.06 H	240	99.8	3.4
5	#10520.00	64.0 PK	74.0	-10.0	2.05 H	192	50.6	13.4
6	#10520.00	52.6 AV	54.0	-1.4	2.05 H	192	39.2	13.4
7	15780.00	47.1 PK	74.0	-26.9	1.24 H	64	34.2	12.9
8	15780.00	36.9 AV	54.0	-17.1	1.24 H	64	24.0	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	48.5 PK	74.0	-25.5	2.09 V	121	44.4	4.1
2	5150.00	38.3 AV	54.0	-15.7	2.09 V	121	34.2	4.1
3	*5260.00	115.6 PK			2.09 V	121	112.2	3.4
4	*5260.00	104.7 AV			2.09 V	121	101.3	3.4
5	#10520.00	63.6 PK	74.0	-10.4	1.72 V	238	50.2	13.4
6	#10520.00	51.6 AV	54.0	-2.4	1.72 V	238	38.2	13.4
7	15780.00	49.2 PK	74.0	-24.8	1.53 V	183	36.3	12.9
8	15780.00	38.1 AV	54.0	-15.9	1.53 V	183	25.2	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)
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	*5300.00	114.6 PK			1.12 H	242	111.1	3.5
2	*5300.00	103.4 AV			1.12 H	242	99.9	3.5
3	10600.00	65.7 PK	74.0	-8.3	1.89 H	193	52.9	12.8
4	10600.00	52.8 AV	54.0	-1.2	1.89 H	193	40.0	12.8
5	15900.00	46.8 PK	74.0	-27.2	1.23 H	230	34.1	12.7
6	15900.00	36.7 AV	54.0	-17.3	1.23 H	230	24.0	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	115.8 PK			2.18 V	123	112.3	3.5
2	*5300.00	104.9 AV			2.18 V	123	101.4	3.5
3	10600.00	63.2 PK	74.0	-10.8	1.66 V	242	50.4	12.8
4	10600.00	51.5 AV	54.0	-2.5	1.66 V	242	38.7	12.8
5	15900.00	49.2 PK	74.0	-24.8	1.49 V	181	36.5	12.7
6	15900.00	38.2 AV	54.0	-15.8	1.49 V	181	25.5	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)
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	*5320.00	113.2 PK			1.28 H	245	109.7	3.5
2	*5320.00	101.8 AV			1.28 H	245	98.3	3.5
3	5350.00	50.8 PK	74.0	-23.2	1.28 H	245	47.2	3.6
4	5350.00	46.7 AV	54.0	-7.3	1.28 H	245	43.1	3.6
5	10640.00	64.1 PK	74.0	-9.9	1.93 H	181	51.1	13.0
6	10640.00	51.2 AV	54.0	-2.8	1.93 H	181	38.2	13.0
7	15960.00	45.6 PK	74.0	-28.4	1.33 H	234	32.8	12.8
8	15960.00	35.1 AV	54.0	-18.9	1.33 H	234	22.3	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	114.3 PK			2.61 V	125	110.8	3.5
2	*5320.00	103.6 AV			2.61 V	125	100.1	3.5
3	5350.00	68.5 PK	74.0	-5.5	2.61 V	125	64.9	3.6
4	5350.00	53.4 AV	54.0	-0.6	2.61 V	125	49.8	3.6
5	10640.00	61.6 PK	74.0	-12.4	1.70 V	245	48.6	13.0
6	10640.00	50.1 AV	54.0	-3.9	1.70 V	245	37.1	13.0
7	15960.00	47.4 PK	74.0	-26.6	1.49 V	191	34.6	12.8
8	15960.00	36.5 AV	54.0	-17.5	1.49 V	191	23.7	12.8

REMARKS:

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

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	#5470.00	50.4 PK	74.0	-23.6	1.31 H	257	46.5	3.9
2	#5470.00	46.2 AV	54.0	-7.8	1.31 H	257	42.3	3.9
3	*5500.00	113.1 PK			1.31 H	257	109.2	3.9
4	*5500.00	102.2 AV			1.31 H	257	98.3	3.9
5	11000.00	64.8 PK	74.0	-9.2	1.64 H	178	50.9	13.9
6	11000.00	52.8 AV	54.0	-1.2	1.64 H	178	38.9	13.9
7	#16500.00	51.9 PK	74.0	-22.1	1.31 H	242	36.6	15.3
8	#16500.00	42.1 AV	54.0	-11.9	1.31 H	242	26.8	15.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	69.1 PK	74.0	-4.9	2.47 V	122	65.2	3.9
2	#5470.00	52.8 AV	54.0	-1.2	2.47 V	122	48.9	3.9
3	*5500.00	115.2 PK			2.47 V	122	111.3	3.9
4	*5500.00	104.3 AV			2.47 V	122	100.4	3.9
5	11000.00	63.6 PK	74.0	-10.4	1.43 V	208	49.7	13.9
6	11000.00	52.0 AV	54.0	-2.0	1.43 V	208	38.1	13.9
7	#16500.00	47.2 PK	74.0	-26.8	1.60 V	215	31.9	15.3
8	#16500.00	36.4 AV	54.0	-17.6	1.60 V	215	21.1	15.3

REMARKS:

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

CHANNEL	TX Channel 116	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	*5580.00	113.4 PK			1.36 H	268	109.1	4.3
2	*5580.00	102.4 AV			1.36 H	268	98.1	4.3
3	11160.00	65.1 PK	74.0	-8.9	2.05 H	183	51.5	13.6
4	11160.00	52.9 AV	54.0	-1.1	2.05 H	183	39.3	13.6
5	#16740.00	51.7 PK	74.0	-22.3	1.69 H	184	35.0	16.7
6	#16740.00	41.5 AV	54.0	-12.5	1.69 H	184	24.8	16.7
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	*5580.00	115.5 PK			2.14 V	118	111.2	4.3
2	*5580.00	104.4 AV			2.14 V	118	100.1	4.3
3	11160.00	63.7 PK	74.0	-10.3	1.47 V	211	50.1	13.6
4	11160.00	52.1 AV	54.0	-1.9	1.47 V	211	38.5	13.6
5	#16740.00	47.5 PK	74.0	-26.5	1.57 V	203	30.8	16.7
6	#16740.00	36.6 AV	54.0	-17.4	1.57 V	203	19.9	16.7

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 140	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	*5700.00	112.3 PK			1.37 H	253	107.8	4.5
2	*5700.00	101.2 AV			1.37 H	253	96.7	4.5
3	#5725.00	50.5 PK	74.0	-23.5	1.37 H	253	46.1	4.4
4	#5725.00	46.7 AV	54.0	-7.3	1.37 H	253	42.3	4.4
5	11400.00	64.4 PK	74.0	-9.6	2.98 H	199	50.3	14.1
6	11400.00	52.3 AV	54.0	-1.7	2.98 H	199	38.2	14.1
7	#17100.00	50.8 PK	74.0	-23.2	1.71 H	204	34.3	16.5
8	#17100.00	41.4 AV	54.0	-12.6	1.71 H	204	24.9	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	*5700.00	113.5 PK			2.06 V	117	109.0	4.5
2	*5700.00	103.5 AV			2.06 V	117	99.0	4.5
3	#5725.00	64.5 PK	74.0	-9.5	2.06 V	117	60.1	4.4
4	#5725.00	53.2 AV	54.0	-0.8	2.06 V	117	48.8	4.4
5	11400.00	62.1 PK	74.0	-11.9	1.43 V	212	48.0	14.1
6	11400.00	51.1 AV	54.0	-2.9	1.43 V	212	37.0	14.1
7	#17100.00	46.9 PK	74.0	-27.1	1.60 V	194	30.4	16.5
8	#17100.00	36.3 AV	54.0	-17.7	1.60 V	194	19.8	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.

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	44.8 PK	74.0	-29.2	1.02 H	225	40.7	4.1
2	5150.00	35.1 AV	54.0	-18.9	1.02 H	225	31.0	4.1
3	*5260.00	114.6 PK			1.04 H	253	111.2	3.4
4	*5260.00	103.2 AV			1.04 H	253	99.8	3.4
5	#10520.00	65.3 PK	74.0	-8.7	2.06 H	191	51.9	13.4
6	#10520.00	52.9 AV	54.0	-1.1	2.06 H	191	39.5	13.4
7	15780.00	49.4 PK	74.0	-24.6	1.27 H	65	36.5	12.9
8	15780.00	35.2 AV	54.0	-18.8	1.27 H	65	22.3	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	47.6 PK	74.0	-26.4	2.53 V	125	43.5	4.1
2	5150.00	38.5 AV	54.0	-15.5	2.53 V	125	34.4	4.1
3	*5260.00	116.2 PK			2.53 V	125	112.8	3.4
4	*5260.00	105.3 AV			2.53 V	125	101.9	3.4
5	#10520.00	62.4 PK	74.0	-11.6	1.70 V	245	49.0	13.4
6	#10520.00	50.7 AV	54.0	-3.3	1.70 V	245	37.3	13.4
7	15780.00	48.3 PK	74.0	-25.7	1.51 V	194	35.4	12.9
8	15780.00	37.2 AV	54.0	-16.8	1.51 V	194	24.3	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)
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	*5300.00	114.9 PK			1.07 H	257	111.4	3.5
2	*5300.00	103.4 AV			1.07 H	257	99.9	3.5
3	10600.00	65.9 PK	74.0	-8.1	2.00 H	190	53.1	12.8
4	10600.00	52.7 AV	54.0	-1.3	2.00 H	190	39.9	12.8
5	15900.00	46.3 PK	74.0	-27.7	1.07 H	233	33.6	12.7
6	15900.00	36.1 AV	54.0	-17.9	1.07 H	233	23.4	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	*5300.00	115.1 PK			2.69 V	122	111.6	3.5
2	*5300.00	104.9 AV			2.69 V	122	101.4	3.5
3	10600.00	62.7 PK	74.0	-11.3	1.69 V	243	49.9	12.8
4	10600.00	51.1 AV	54.0	-2.9	1.69 V	243	38.3	12.8
5	15900.00	47.9 PK	74.0	-26.1	1.56 V	197	35.2	12.7
6	15900.00	37.1 AV	54.0	-16.9	1.56 V	197	24.4	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)
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	*5320.00	110.8 PK			1.15 H	255	107.3	3.5
2	*5320.00	100.6 AV			1.15 H	255	97.1	3.5
3	5350.00	64.5 PK	74.0	-9.5	1.10 H	227	60.9	3.6
4	5350.00	49.9 AV	54.0	-4.1	1.10 H	227	46.3	3.6
5	10640.00	65.2 PK	74.0	-8.8	2.01 H	193	52.2	13.0
6	10640.00	52.6 AV	54.0	-1.4	2.01 H	193	39.6	13.0
7	15960.00	45.9 PK	74.0	-28.1	1.25 H	57	33.1	12.8
8	15960.00	35.1 AV	54.0	-18.9	1.25 H	57	22.3	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	112.4 PK			2.69 V	120	108.9	3.5
2	*5320.00	102.3 AV			2.69 V	120	98.8	3.5
3	5350.00	67.2 PK	74.0	-6.8	2.69 V	120	63.6	3.6
4	5350.00	53.4 AV	54.0	-0.6	2.69 V	120	49.8	3.6
5	10640.00	61.6 PK	74.0	-12.4	1.71 V	224	48.6	13.0
6	10640.00	49.4 AV	54.0	-4.6	1.71 V	224	36.4	13.0
7	15960.00	45.2 PK	74.0	-28.8	1.63 V	201	32.4	12.8
8	15960.00	35.5 AV	54.0	-18.5	1.63 V	201	22.7	12.8

REMARKS:

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

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	#5470.00	58.7 PK	74.0	-15.3	1.40 H	268	54.8	3.9
2	#5470.00	45.2 AV	54.0	-8.8	1.40 H	268	41.3	3.9
3	*5500.00	112.0 PK			1.40 H	268	108.1	3.9
4	*5500.00	100.5 AV			1.40 H	268	96.6	3.9
5	11000.00	65.7 PK	74.0	-8.3	1.93 H	187	51.8	13.9
6	11000.00	52.8 AV	54.0	-1.2	1.93 H	187	38.9	13.9
7	#16500.00	50.0 PK	74.0	-24.0	1.74 H	166	34.7	15.3
8	#16500.00	40.3 AV	54.0	-13.7	1.74 H	166	25.0	15.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	63.8 PK	74.0	-10.2	2.44 V	118	59.9	3.9
2	#5470.00	50.1 AV	54.0	-3.9	2.44 V	118	46.2	3.9
3	*5500.00	113.8 PK			2.44 V	118	109.9	3.9
4	*5500.00	103.7 AV			2.44 V	118	99.8	3.9
5	11000.00	63.2 PK	74.0	-10.8	1.41 V	214	49.3	13.9
6	11000.00	51.1 AV	54.0	-2.9	1.41 V	214	37.2	13.9
7	#16500.00	46.7 PK	74.0	-27.3	1.61 V	229	31.4	15.3
8	#16500.00	36.2 AV	54.0	-17.8	1.61 V	229	20.9	15.3

REMARKS:

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

CHANNEL	TX Channel 116	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	*5580.00	112.4 PK			1.41 H	272	108.1	4.3
2	*5580.00	100.8 AV			1.41 H	272	96.5	4.3
3	11160.00	66.1 PK	74.0	-7.9	1.98 H	184	52.5	13.6
4	11160.00	52.8 AV	54.0	-1.2	1.98 H	184	39.2	13.6
5	#16740.00	50.2 PK	74.0	-23.8	1.70 H	171	33.5	16.7
6	#16740.00	40.7 AV	54.0	-13.3	1.70 H	171	24.0	16.7
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	*5580.00	113.7 PK			2.47 V	120	109.4	4.3
2	*5580.00	104.3 AV			2.47 V	120	100.0	4.3
3	11160.00	63.2 PK	74.0	-10.8	1.41 V	222	49.6	13.6
4	11160.00	51.0 AV	54.0	-3.0	1.41 V	222	37.4	13.6
5	#16740.00	46.3 PK	74.0	-27.7	1.61 V	233	29.6	16.7
6	#16740.00	35.9 AV	54.0	-18.1	1.61 V	233	19.2	16.7

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 140	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	*5700.00	112.6 PK			1.37 H	262	108.1	4.5
2	*5700.00	101.0 AV			1.37 H	262	96.5	4.5
3	#5725.00	58.8 PK	74.0	-15.2	1.37 H	262	54.4	4.4
4	#5725.00	45.4 AV	54.0	-8.6	1.37 H	262	41.0	4.4
5	11400.00	65.1 PK	74.0	-8.9	2.91 H	188	51.0	14.1
6	11400.00	52.2 AV	54.0	-1.8	2.91 H	188	38.1	14.1
7	#17100.00	49.5 PK	74.0	-24.5	1.74 H	165	33.0	16.5
8	#17100.00	40.2 AV	54.0	-13.8	1.74 H	165	23.7	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	*5700.00	104.3 PK			2.76 V	117	99.8	4.5
2	*5700.00	103.9 AV			2.76 V	117	99.4	4.5
3	#5725.00	65.6 PK	74.0	-8.4	2.76 V	117	61.2	4.4
4	#5725.00	53.4 AV	54.0	-0.6	2.76 V	117	49.0	4.4
5	11400.00	62.5 PK	74.0	-11.5	1.42 V	218	48.4	14.1
6	11400.00	50.6 AV	54.0	-3.4	1.42 V	218	36.5	14.1
7	#17100.00	46.6 PK	74.0	-27.4	1.60 V	245	30.1	16.5
8	#17100.00	36.1 AV	54.0	-17.9	1.60 V	245	19.6	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.

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	45.0 PK	74.0	-29.0	1.07 H	226	40.9	4.1
2	5150.00	35.4 AV	54.0	-18.6	1.07 H	226	31.3	4.1
3	*5270.00	109.7 PK			1.07 H	226	106.3	3.4
4	*5270.00	100.4 AV			1.07 H	226	97.0	3.4
5	#10540.00	61.4 PK	74.0	-12.6	2.32 H	192	48.2	13.2
6	#10540.00	51.9 AV	54.0	-2.1	2.32 H	192	38.7	13.2
7	15810.00	46.1 PK	74.0	-27.9	1.31 H	60	33.4	12.7
8	15810.00	32.6 AV	54.0	-21.4	1.31 H	60	19.9	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	51.6 PK	74.0	-22.4	3.02 V	128	47.5	4.1
2	5150.00	40.2 AV	54.0	-13.8	3.02 V	128	36.1	4.1
3	*5270.00	111.4 PK			3.02 V	128	108.0	3.4
4	*5270.00	102.3 AV			3.02 V	128	98.9	3.4
5	#10540.00	59.6 PK	74.0	-14.4	1.64 V	232	46.4	13.2
6	#10540.00	47.2 AV	54.0	-6.8	1.64 V	232	34.0	13.2
7	15810.00	45.1 PK	74.0	-28.9	1.54 V	182	32.4	12.7
8	15810.00	34.8 AV	54.0	-19.2	1.54 V	182	22.1	12.7

REMARKS:

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

CHANNEL	TX Channel 62	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	*5310.00	105.4 PK			1.09 H	234	102.0	3.4
2	*5310.00	96.3 AV			1.09 H	234	92.9	3.4
3	5350.00	43.6 PK	74.0	-30.4	1.09 H	234	40.0	3.6
4	5350.00	34.8 AV	54.0	-19.2	1.09 H	234	31.2	3.6
5	10620.00	58.1 PK	74.0	-15.9	2.34 H	191	45.2	12.9
6	10620.00	48.3 AV	54.0	-5.7	2.34 H	191	35.4	12.9
7	15930.00	45.4 PK	74.0	-28.6	1.36 H	72	32.6	12.8
8	15930.00	31.5 AV	54.0	-22.5	1.36 H	72	18.7	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	107.1 PK			2.65 V	124	103.7	3.4
2	*5310.00	98.3 AV			2.65 V	124	94.9	3.4
3	5350.00	69.4 PK	74.0	-4.6	2.65 V	124	65.8	3.6
4	5350.00	53.4 AV	54.0	-0.6	2.65 V	124	49.8	3.6
5	10620.00	56.2 PK	74.0	-17.8	1.59 V	248	43.3	12.9
6	10620.00	44.8 AV	54.0	-9.2	1.59 V	248	31.9	12.9
7	15930.00	44.2 PK	74.0	-29.8	1.53 V	168	31.4	12.8
8	15930.00	33.4 AV	54.0	-20.6	1.53 V	168	20.6	12.8

REMARKS:

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

CHANNEL	TX Channel 102	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	#5470.00	58.4 PK	74.0	-15.6	1.43 H	256	54.5	3.9
2	#5470.00	44.9 AV	54.0	-9.1	1.43 H	256	41.0	3.9
3	*5510.00	107.6 PK			1.43 H	256	103.7	3.9
4	*5510.00	98.4 AV			1.43 H	256	94.5	3.9
5	11020.00	64.2 PK	74.0	-9.8	2.19 H	185	50.3	13.9
6	11020.00	49.9 AV	54.0	-4.1	2.19 H	185	36.0	13.9
7	#16530.00	47.6 PK	74.0	-26.4	1.79 H	180	32.3	15.3
8	#16530.00	37.4 AV	54.0	-16.6	1.79 H	180	22.1	15.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	67.4 PK	74.0	-6.6	2.49 V	121	63.5	3.9
2	#5470.00	53.3 AV	54.0	-0.7	2.49 V	121	49.4	3.9
3	*5510.00	108.7 PK			2.49 V	121	104.8	3.9
4	*5510.00	99.6 AV			2.49 V	121	95.7	3.9
5	11020.00	60.9 PK	74.0	-13.1	1.35 V	231	47.0	13.9
6	11020.00	48.4 AV	54.0	-5.6	1.35 V	231	34.5	13.9
7	#16530.00	44.2 PK	74.0	-29.8	1.61 V	231	28.9	15.3
8	#16530.00	33.8 AV	54.0	-20.2	1.61 V	231	18.5	15.3

REMARKS:

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

CHANNEL	TX Channel 110	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	*5550.00	109.4 PK			1.39 H	260	105.3	4.1
2	*5550.00	100.5 AV			1.39 H	260	96.4	4.1
3	11100.00	66.6 PK	74.0	-7.4	2.08 H	183	52.9	13.7
4	11100.00	52.7 AV	54.0	-1.3	2.08 H	183	39.0	13.7
5	#16650.00	49.1 PK	74.0	-24.9	1.42 H	256	33.1	16.0
6	#16650.00	38.5 AV	54.0	-15.5	1.42 H	256	22.5	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	111.9 PK			2.39 V	121	107.8	4.1
2	*5550.00	102.6 AV			2.39 V	121	98.5	4.1
3	11100.00	61.1 PK	74.0	-12.9	1.36 V	222	47.4	13.7
4	11100.00	49.6 AV	54.0	-4.4	1.36 V	222	35.9	13.7
5	#16650.00	45.1 PK	74.0	-28.9	1.58 V	232	29.1	16.0
6	#16650.00	34.8 AV	54.0	-19.2	1.58 V	232	18.8	16.0

REMARKS:

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

CHANNEL	TX Channel 134	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	*5670.00	109.9 PK			1.41 H	269	105.6	4.3
2	*5670.00	101.0 AV			1.41 H	269	96.7	4.3
3	#5725.00	58.6 PK	74.0	-15.4	1.41 H	269	54.2	4.4
4	#5725.00	45.2 AV	54.0	-8.8	1.41 H	269	40.8	4.4
5	11340.00	61.3 PK	74.0	-12.7	1.66 H	127	47.3	14.0
6	11340.00	51.2 AV	54.0	-2.8	1.66 H	127	37.2	14.0
7	#17010.00	49.1 PK	74.0	-24.9	1.42 H	253	32.3	16.8
8	#17010.00	38.4 AV	54.0	-15.6	1.42 H	253	21.6	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	111.1 PK			2.62 V	120	106.8	4.3
2	*5670.00	102.2 AV			2.62 V	120	97.9	4.3
3	#5725.00	64.8 PK	74.0	-9.2	2.62 V	120	60.4	4.4
4	#5725.00	53.4 AV	54.0	-0.6	2.62 V	120	49.0	4.4
5	11340.00	61.2 PK	74.0	-12.8	1.35 V	230	47.2	14.0
6	11340.00	49.4 AV	54.0	-4.6	1.35 V	230	35.4	14.0
7	#17010.00	45.4 PK	74.0	-28.6	1.57 V	230	28.6	16.8
8	#17010.00	35.0 AV	54.0	-19.0	1.57 V	230	18.2	16.8

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	44.2 PK	74.0	-29.8	1.13 H	242	40.1	4.1
2	5150.00	35.5 AV	54.0	-18.5	1.13 H	242	31.4	4.1
3	*5290.00	100.2 PK			1.13 H	242	96.8	3.4
4	*5290.00	91.1 AV			1.13 H	242	87.7	3.4
5	5350.00	62.4 PK	74.0	-11.6	1.13 H	242	58.8	3.6
6	5350.00	47.2 AV	54.0	-6.8	1.13 H	242	43.6	3.6
7	#10580.00	54.2 PK	74.0	-19.8	2.02 H	191	41.2	13.0
8	#10580.00	44.2 AV	54.0	-9.8	2.02 H	191	31.2	13.0
9	15870.00	45.6 PK	74.0	-28.4	1.37 H	79	32.8	12.8
10	15870.00	32.8 AV	54.0	-21.2	1.37 H	79	20.0	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	49.3 PK	74.0	-24.7	2.54 V	121	45.2	4.1
2	5150.00	39.8 AV	54.0	-14.2	2.54 V	121	35.7	4.1
3	*5290.00	102.7 PK			2.54 V	121	99.3	3.4
4	*5290.00	93.5 AV			2.54 V	121	90.1	3.4
5	5350.00	63.3 PK	74.0	-10.7	2.54 V	121	59.7	3.6
6	5350.00	53.4 AV	54.0	-0.6	2.54 V	121	49.8	3.6
7	#10580.00	55.7 PK	74.0	-18.3	1.58 V	259	42.7	13.0
8	#10580.00	44.4 AV	54.0	-9.6	1.58 V	259	31.4	13.0
9	15870.00	43.8 PK	74.0	-30.2	1.55 V	180	31.0	12.8
10	15870.00	33.2 AV	54.0	-20.8	1.55 V	180	20.4	12.8

REMARKS:

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

CHANNEL	TX Channel 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	#5470.00	47.6 PK	74.0	-26.4	1.47 H	267	43.7	3.9
2	#5470.00	37.7 AV	54.0	-16.3	1.47 H	267	33.8	3.9
3	*5530.00	103.5 PK			1.47 H	267	99.4	4.1
4	*5530.00	94.4 AV			1.47 H	267	90.3	4.1
5	#5725.00	58.6 PK	74.0	-15.4	1.47 H	267	54.2	4.4
6	#5725.00	45.0 AV	54.0	-9.0	1.47 H	267	40.6	4.4
7	11060.00	59.8 PK	74.0	-14.2	2.34 H	190	46.0	13.8
8	11060.00	46.2 AV	54.0	-7.8	2.34 H	190	32.4	13.8
9	#16590.00	64.3 PK	74.0	-9.7	2.23 H	169	48.9	15.4
10	#16590.00	50.0 AV	54.0	-4.0	2.23 H	169	34.6	15.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	63.5 PK	74.0	-10.5	2.52 V	122	59.6	3.9
2	#5470.00	53.2 AV	54.0	-0.8	2.52 V	122	49.3	3.9
3	*5530.00	105.7 PK			2.52 V	122	101.6	4.1
4	*5530.00	96.1 AV			2.52 V	122	92.0	4.1
5	#5725.00	49.9 PK	74.0	-24.1	2.52 V	122	45.5	4.4
6	#5725.00	39.4 AV	54.0	-14.6	2.52 V	122	35.0	4.4
7	11060.00	61.1 PK	74.0	-12.9	1.36 V	226	47.3	13.8
8	11060.00	48.4 AV	54.0	-5.6	1.36 V	226	34.6	13.8
9	#16590.00	43.8 PK	74.0	-30.2	1.55 V	220	28.4	15.4
10	#16590.00	33.5 AV	54.0	-20.5	1.55 V	220	18.1	15.4

REMARKS:

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

CHANNEL	TX Channel 122	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	*5610.00	105.8 PK			1.43 H	262	101.5	4.3
2	*5610.00	96.7 AV			1.43 H	262	92.4	4.3
3	#5725.00	59.0 PK	74.0	-15.0	1.46 H	259	54.6	4.4
4	#5725.00	45.7 AV	54.0	-8.3	1.46 H	259	41.3	4.4
5	11220.00	61.0 PK	74.0	-13.0	1.62 H	141	47.3	13.7
6	11220.00	51.0 AV	54.0	-3.0	1.62 H	141	37.3	13.7
7	#16830.00	49.0 PK	74.0	-25.0	1.38 H	260	32.1	16.9
8	#16830.00	38.2 AV	54.0	-15.8	1.38 H	260	21.3	16.9
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	*5610.00	108.4 PK			1.99 V	113	104.1	4.3
2	*5610.00	99.1 AV			1.99 V	113	94.8	4.3
3	#5725.00	63.4 PK	74.0	-10.6	1.99 V	113	59.0	4.4
4	#5725.00	53.4 AV	54.0	-0.6	1.99 V	113	49.0	4.4
5	11220.00	61.1 PK	74.0	-12.9	1.38 V	156	47.4	13.7
6	11220.00	49.0 AV	54.0	-5.0	1.38 V	156	35.3	13.7
7	#16830.00	45.1 PK	74.0	-28.9	2.27 V	224	28.2	16.9
8	#16830.00	34.7 AV	54.0	-19.3	2.27 V	224	17.8	16.9

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 (VHT20)

CHANNEL	TX Channel 100	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	81.93	34.2 QP	40.0	-5.8	2.19 H	83	47.1	-12.9
2	277.55	37.9 QP	46.0	-8.1	1.48 H	64	45.8	-7.9
3	321.25	39.3 QP	46.0	-6.7	1.48 H	62	45.8	-6.5
4	341.28	38.5 QP	46.0	-7.5	1.29 H	344	44.6	-6.1
5	352.25	37.1 QP	46.0	-8.9	1.63 H	34	43.0	-5.9
6	374.52	40.7 QP	46.0	-5.3	3.31 H	241	45.8	-5.1
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	34.37	34.8 QP	40.0	-5.2	1.41 V	57	43.6	-8.8
2	88.56	34.7 QP	43.5	-8.8	1.62 V	143	48.3	-13.6
3	251.63	34.8 QP	46.0	-11.2	3.05 V	217	43.7	-8.9
4	361.33	38.2 QP	46.0	-7.8	1.29 V	84	43.7	-5.5
5	437.26	40.1 QP	46.0	-5.9	1.74 V	203	43.3	-3.2
6	493.62	36.4 QP	46.0	-9.6	2.51 V	209	38.7	-2.3

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

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

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Feb. 23 to Mar. 27, 2018

4.2.3 Test Procedure

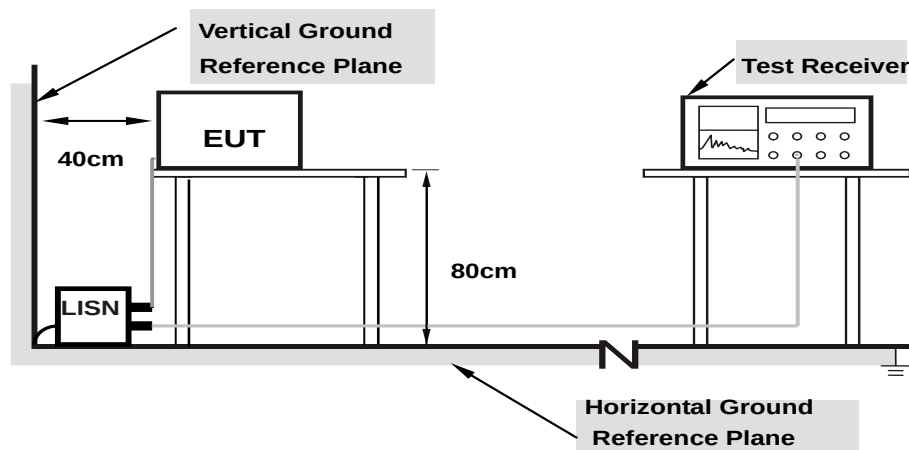
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

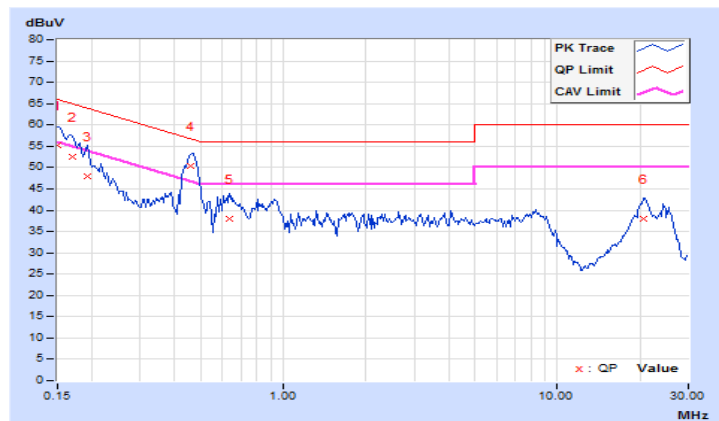
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.13	45.15	27.73	55.28	37.86	66.00	56.00	-10.72	-18.14
2	0.16953	10.13	42.38	26.21	52.51	36.34	64.98	54.98	-12.47	-18.64
3	0.19297	10.14	37.74	19.58	47.88	29.72	63.91	53.91	-16.03	-24.19
4	0.45681	10.19	40.20	33.14	50.39	43.33	56.75	46.75	-6.36	-3.42
5	0.63828	10.21	27.87	20.76	38.08	30.97	56.00	46.00	-17.92	-15.03
6	20.62891	11.23	26.68	20.95	37.91	32.18	60.00	50.00	-22.09	-17.82

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

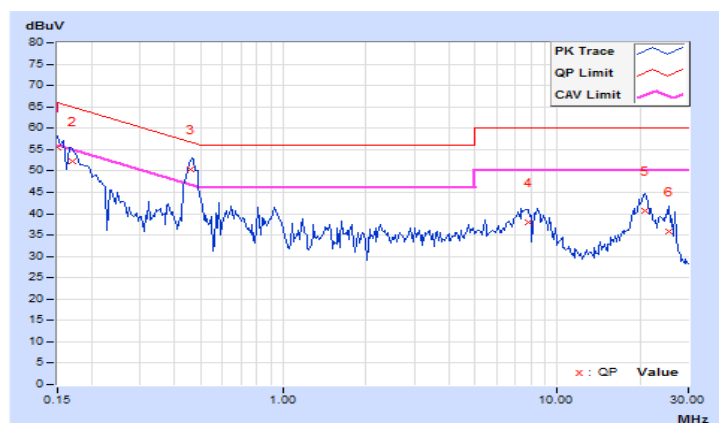


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	45.51	27.81	55.55	37.85	66.00	56.00	-10.45	-18.15
2	0.16953	10.04	42.10	25.02	52.14	35.06	64.98	54.98	-12.84	-19.92
3	0.46119	10.08	40.26	33.26	50.34	43.34	56.67	46.67	-6.33	-3.33
4	7.84375	10.40	27.52	22.32	37.92	32.72	60.00	50.00	-22.08	-17.28
5	20.79688	11.02	29.56	23.92	40.58	34.94	60.00	50.00	-19.42	-15.06
6	25.43359	11.05	24.82	17.50	35.87	28.55	60.00	50.00	-24.13	-21.45

Remarks:

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



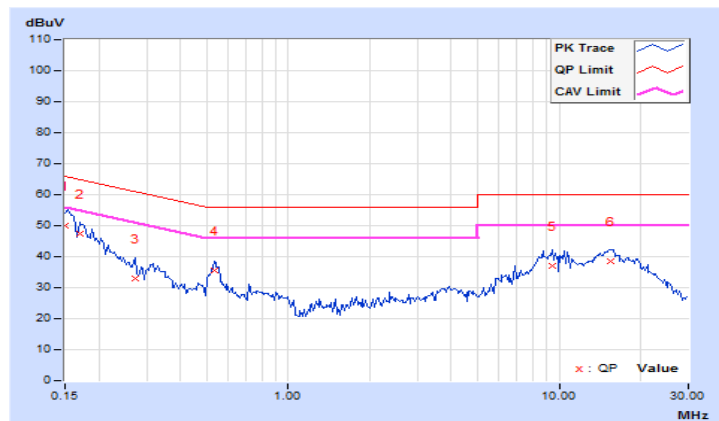
4.2.8 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	40.06	24.00	50.09	34.03	66.00	56.00	-15.91	-21.97
2	0.16953	10.04	37.52	21.84	47.56	31.88	64.98	54.98	-17.42	-23.10
3	0.27109	10.08	23.01	10.50	33.09	20.58	61.08	51.08	-27.99	-30.50
4	0.53281	10.12	25.53	17.51	35.65	27.63	56.00	46.00	-20.35	-18.37
5	9.46094	10.52	26.70	20.44	37.22	30.96	60.00	50.00	-22.78	-19.04
6	15.50391	10.86	27.57	22.51	38.43	33.37	60.00	50.00	-21.57	-16.63

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

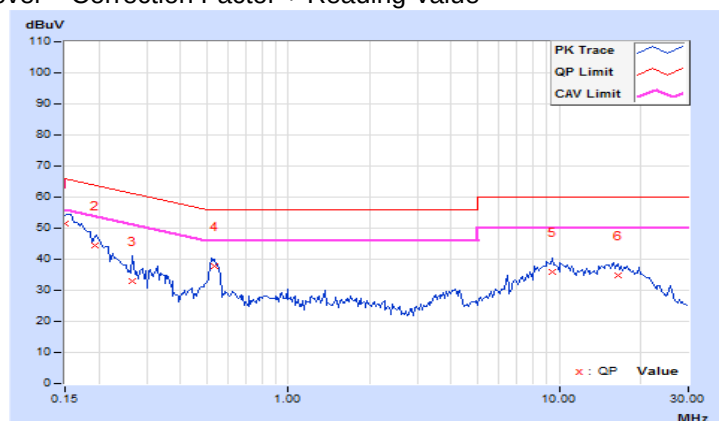


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	41.49	25.58	51.43	35.52	66.00	56.00	-14.57	-20.48
2	0.19297	9.96	34.48	20.45	44.44	30.41	63.91	53.91	-19.47	-23.50
3	0.26719	9.97	22.95	11.21	32.92	21.18	61.20	51.20	-28.28	-30.02
4	0.53672	10.01	27.60	19.22	37.61	29.23	56.00	46.00	-18.39	-16.77
5	9.45313	10.37	25.74	18.68	36.11	29.05	60.00	50.00	-23.89	-20.95
6	16.46094	10.73	24.14	18.77	34.87	29.50	60.00	50.00	-25.13	-20.50

Remarks:

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



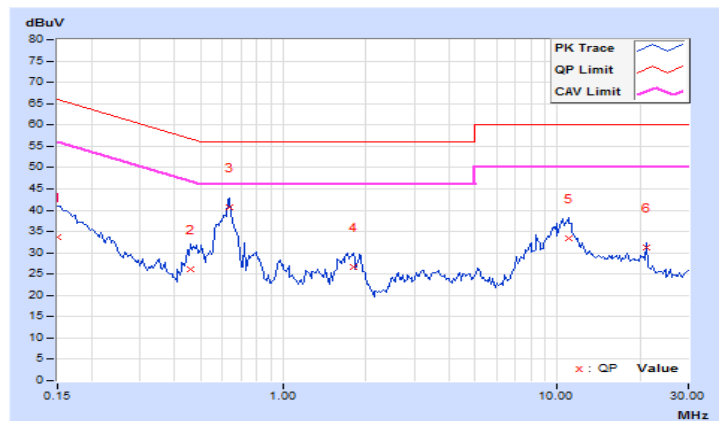
4.2.9 Test Results (Mode 3)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.13	23.52	8.41	33.65	18.54	66.00	56.00	-32.35	-37.46
2	0.45859	10.19	15.97	11.58	26.16	21.77	56.72	46.72	-30.56	-24.95
3	0.63438	10.21	30.54	26.82	40.75	37.03	56.00	46.00	-15.25	-8.97
4	1.79297	10.26	16.44	8.71	26.70	18.97	56.00	46.00	-29.30	-27.03
5	10.96094	10.70	22.65	15.55	33.35	26.25	60.00	50.00	-26.65	-23.75
6	21.16797	11.23	20.13	19.31	31.36	30.54	60.00	50.00	-28.64	-19.46

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. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	22.70	8.89	32.74	18.93	66.00	56.00	-33.26	-37.07
2	0.23594	10.05	14.77	5.73	24.82	15.78	62.24	52.24	-37.42	-36.46
3	0.63438	10.09	30.30	25.17	40.39	35.26	56.00	46.00	-15.61	-10.74
4	1.73438	10.14	14.61	6.40	24.75	16.54	56.00	46.00	-31.25	-29.46
5	10.83984	10.54	21.85	15.52	32.39	26.06	60.00	50.00	-27.61	-23.94
6	21.16797	11.02	19.63	18.70	30.65	29.72	60.00	50.00	-29.35	-20.28

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 $\leq$ 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	$\sqrt{\quad}$		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	$\sqrt{\quad}$		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 $N_{ANT} \leq 4$;

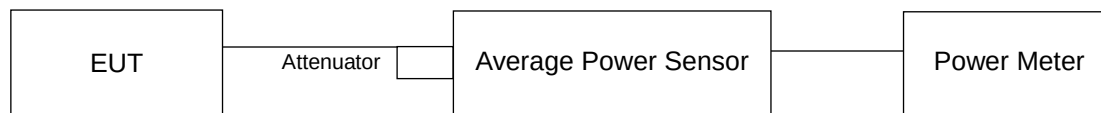
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

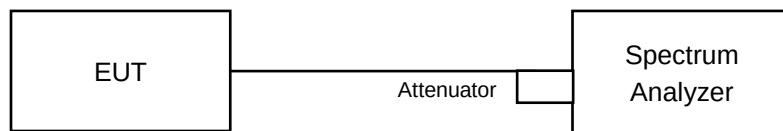
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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 Results

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	20.89	20.30	229.896	23.62	24.00	Pass
60	5300	21.00	20.51	238.353	23.77	24.00	Pass
64	5320	21.08	20.43	238.641	23.78	23.98	Pass
100	5500	20.99	20.25	231.528	23.65	23.94	Pass
116	5580	20.83	20.23	226.499	23.55	23.88	Pass
140	5700	20.86	20.17	225.891	23.54	23.92	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.71	20.11
60	5300	20.17	20.70
64	5320	21.57	19.90
100	5500	19.71	19.81
116	5580	19.45	19.75
140	5700	19.63	19.66

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	20.11	24.03 > 24
60	5300	20.17	24.04 > 24
64	5320	19.90	23.98 < 24
100	5500	19.71	23.94 < 24
116	5580	19.45	23.88 < 24
140	5700	19.63	23.92 < 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	20.81	20.24	226.186	23.54	24.00	Pass
60	5300	20.92	20.51	236.055	23.73	24.00	Pass
64	5320	20.98	20.39	234.71	23.71	24.00	Pass
100	5500	21.41	20.46	249.53	23.97	24.00	Pass
116	5580	21.12	20.61	244.5	23.88	24.00	Pass
140	5700	21.26	20.61	248.74	23.96	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.82	20.55
60	5300	20.65	20.47
64	5320	20.98	20.64
100	5500	20.76	20.65
116	5580	20.67	20.36
140	5700	20.47	20.73

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	20.55	24.12 > 24
60	5300	20.47	24.11 > 24
64	5320	20.64	24.14 > 24
100	5500	20.65	24.14 > 24
116	5580	20.36	24.08 > 24
140	5700	20.47	24.11 > 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	21.01	20.53	239.163	23.79	24.00	Pass
62	5310	20.21	19.71	198.495	22.98	24.00	Pass
102	5510	20.93	19.92	222.055	23.46	24.00	Pass
110	5550	20.89	20.33	230.639	23.63	24.00	Pass
134	5670	20.72	20.29	224.937	23.52	24.00	Pass

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	41.23	41.06
62	5310	40.78	40.93
102	5510	41.12	40.67
110	5550	40.96	41.06
134	5670	40.92	40.89

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	41.06	27.13 > 24
62	5310	40.78	27.1 > 24
102	5510	40.67	27.09 > 24
110	5550	40.96	27.12 > 24
134	5670	40.89	27.11 > 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	18.13	17.46	120.732	20.82	24.00	Pass
106	5530	20.48	19.67	204.369	23.10	24.00	Pass
122	5610	20.82	20.48	232.467	23.66	24.00	Pass

26dB BANDWIDTH:

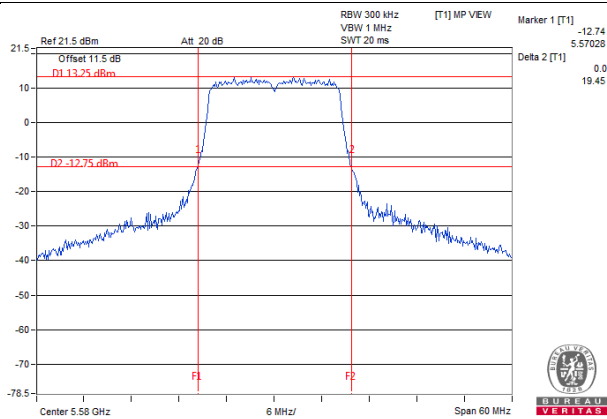
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	84.20	83.96
106	5530	83.55	84.18
122	5610	83.40	83.89

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

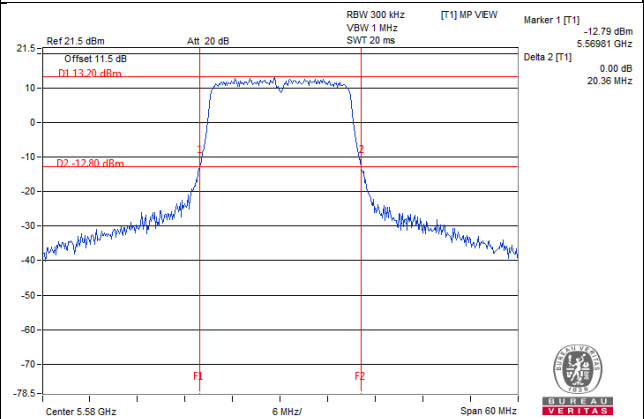
Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.96	30.24 > 24
106	5530	83.55	30.21 > 24
122	5610	83.40	30.21 > 24

Spectrum Plot of Worst Value

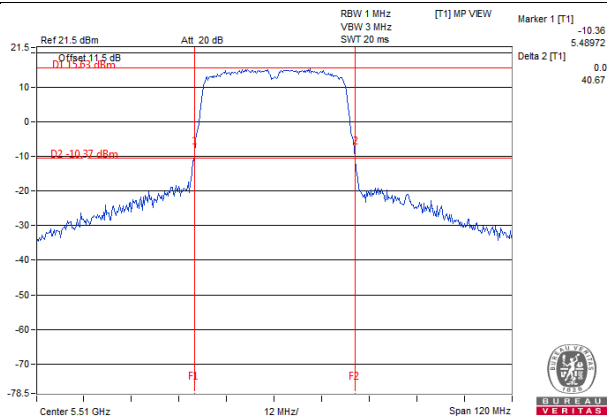
802.11a / Chain 0 – CH116



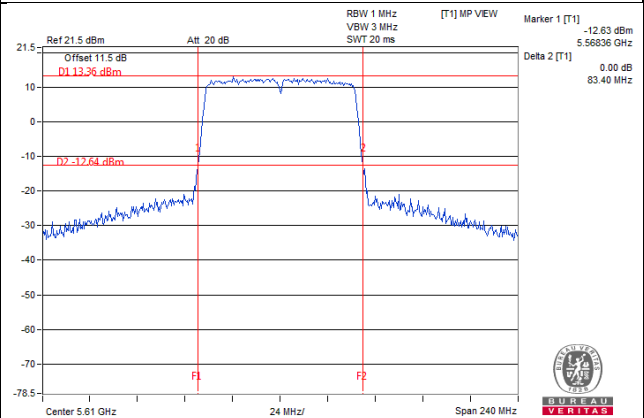
802.11ac (VHT20) / Chain 1 - CH116



802.11ac (VHT40) / Chain 1 – CH102

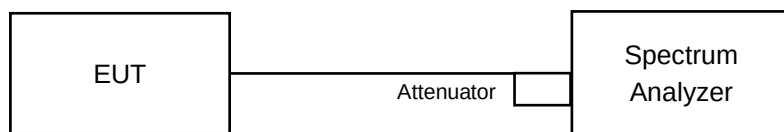


802.11ac (VHT80) / Chain 0 - CH122



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	16.56	16.56
60	5300	16.56	16.44
64	5320	16.56	16.56
100	5500	16.56	16.56
116	5580	16.68	16.44
140	5700	16.56	16.44

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	17.76	17.64
60	5300	17.76	17.64
64	5320	17.76	17.64
100	5500	17.76	17.64
116	5580	17.76	17.76
140	5700	17.64	17.64

802.11ac (VHT40)

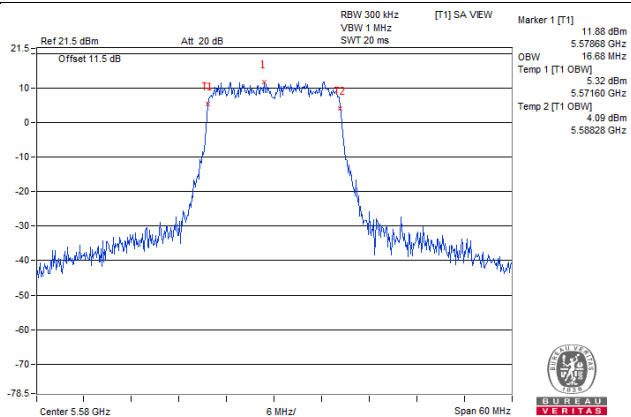
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	36.24	36.24
62	5310	36.48	36.48
102	5510	36.24	36.24
110	5550	36.24	36.24
134	5670	36.24	36.24

802.11ac (VHT80)

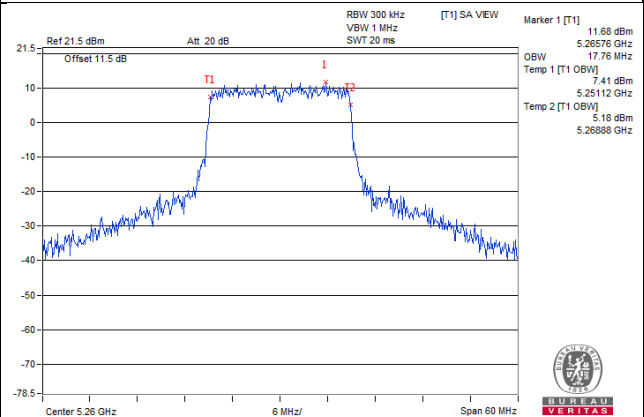
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	76.32	75.36
106	5530	75.36	76.32
122	5610	75.84	75.84

Spectrum Plot of Worst Value

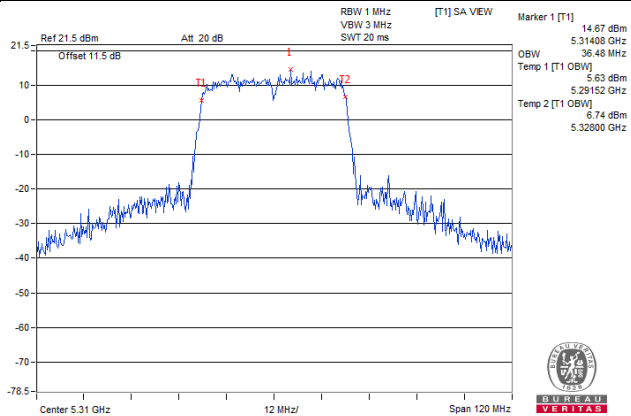
802.11a_Chain 0 / CH116



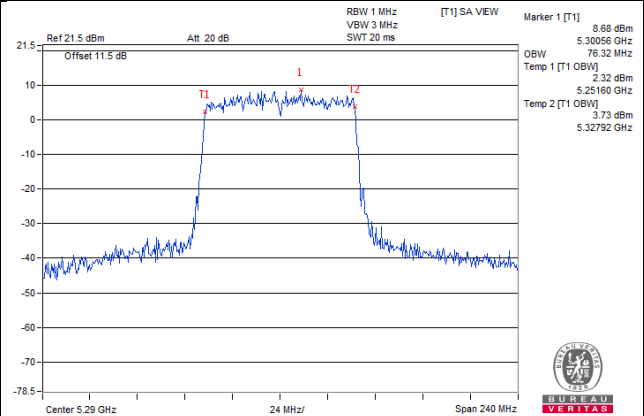
802.11ac (VHT20)_Chain 0 / CH52



802.11ac (VHT40)_Chain 0 / CH62



802.11ac (VHT80)_Chain 0 / CH58

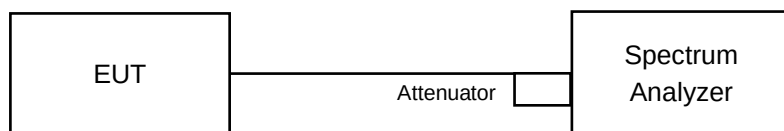


4.5 Peak Power Spectral Density Measurement

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

802.11ac (VHT20)

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 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

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

Using method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 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	7.31	6.68	0.17	10.19	11	Pass
60	5300	7.62	6.88	0.17	10.45	11	Pass
64	5320	7.73	6.90	0.17	10.52	11	Pass
100	5500	7.77	7.43	0.17	10.78	11	Pass
116	5580	7.49	6.93	0.17	10.40	11	Pass
140	5700	7.42	6.69	0.17	10.25	11	Pass

- Note:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. Refer to section 3.3 for duty cycle spectrum plot.
 3. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one H
 4. The max gain is 3dBi < 6dBi, so the power density limit shall not be reduced.

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			
52	5260	7.34	6.68	10.03	11	Pass
60	5300	7.30	6.81	10.07	11	Pass
64	5320	7.50	6.75	10.15	11	Pass
100	5500	8.22	7.49	10.88	11	Pass
116	5580	7.93	7.47	10.72	11	Pass
140	5700	7.05	6.74	9.91	11	Pass

- Note:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one H
 3. The max gain is 3dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
54	5270	4.13	4.21	0.16	7.34	11	Pass
62	5310	3.86	3.23	0.16	6.72	11	Pass
102	5510	4.99	4.03	0.16	7.70	11	Pass
110	5550	4.85	4.89	0.16	8.04	11	Pass
134	5670	4.24	3.66	0.16	7.13	11	Pass

- Note:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. Refer to section 3.3 for duty cycle spectrum plot.
 3. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one H
 4. The max gain is 3dBi < 6dBi, so the power density limit shall not be reduced.

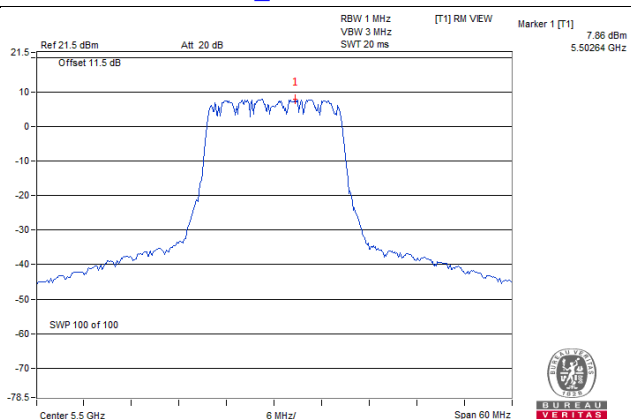
802.11ac (VHT80)

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	-1.81	-3.51	0.30	0.74	11	Pass
106	5530	0.57	-0.35	0.30	3.45	11	Pass
122	5610	0.78	0.85	0.30	4.13	11	Pass

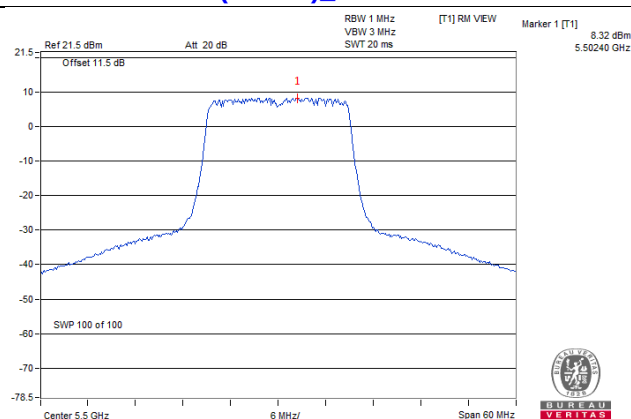
- Note:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. Refer to section 3.3 for duty cycle spectrum plot.
 3. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one H
 4. The max gain is 3dBi < 6dBi, so the power density limit shall not be reduced.

Spectrum Plot of Worst Value

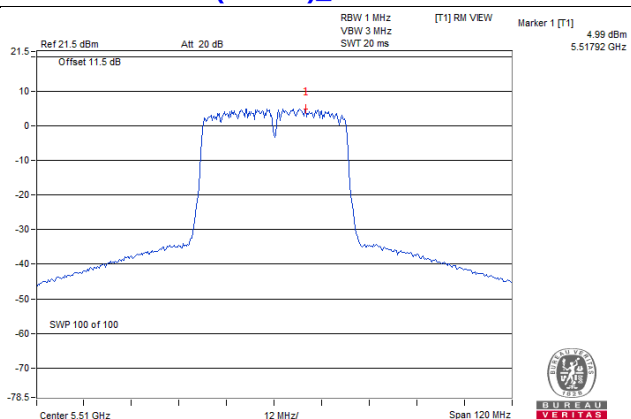
802.11a_Chain 0 / CH100



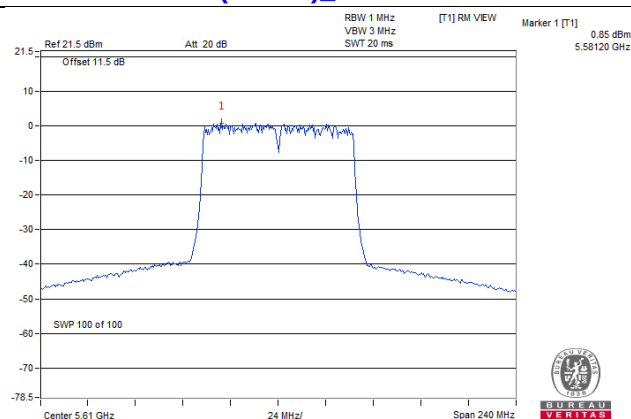
802.11ac (VHT20)_Chain 0 / CH100



802.11ac (VHT40)_Chain 0 / CH102



802.11ac (VHT80)_Chain 1 / CH122

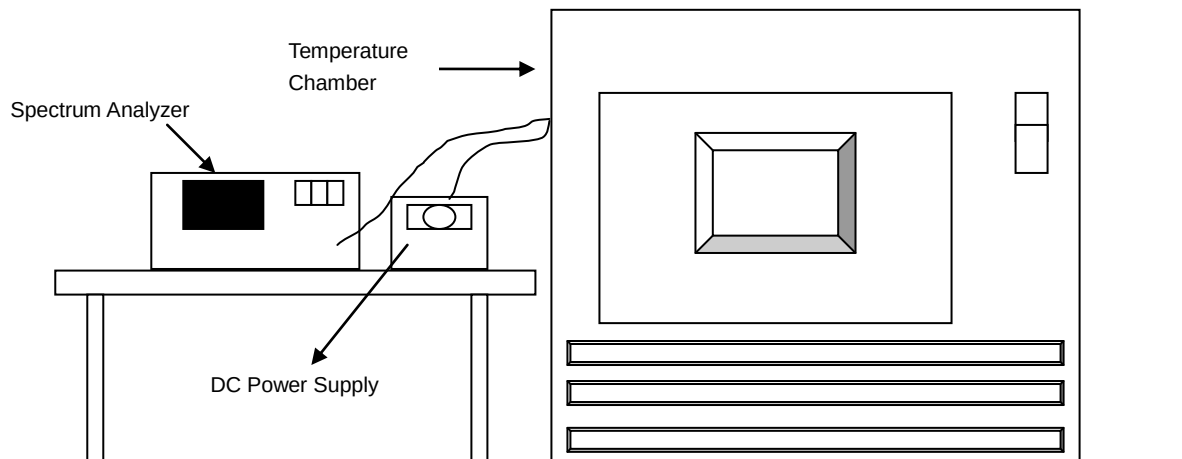


4.6 Frequency Stability Measurement

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

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	12	5259.9858	Pass	5259.9873	Pass	5259.9841	Pass	5259.9876	Pass
40	12	5259.9849	Pass	5259.9828	Pass	5259.9837	Pass	5259.9863	Pass
30	12	5260.0046	Pass	5260.0053	Pass	5260.0043	Pass	5260.0049	Pass
20	12	5260.0182	Pass	5260.017	Pass	5260.0186	Pass	5260.0165	Pass
10	12	5260.0178	Pass	5260.0183	Pass	5260.0161	Pass	5260.0183	Pass
0	12	5260.0119	Pass	5260.0131	Pass	5260.0115	Pass	5260.0101	Pass
-10	12	5260.0075	Pass	5260.0085	Pass	5260.0086	Pass	5260.01	Pass
-20	12	5259.9886	Pass	5259.9884	Pass	5259.9906	Pass	5259.992	Pass
-30	12	5259.9843	Pass	5259.9837	Pass	5259.9846	Pass	5259.9833	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	13.8	5260.018	Pass	5260.0161	Pass	5260.018	Pass	5260.0175	Pass
	12	5260.0182	Pass	5260.017	Pass	5260.0186	Pass	5260.0165	Pass
	10.2	5260.0185	Pass	5260.0161	Pass	5260.0185	Pass	5260.0161	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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The address and road map of all our labs can be found in our web site also.

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