

**Report No.:** RF171024E05B-1

**FCC ID:** KA2AP2680A1

**Test Model:** DAP-2680

**Received Date:** Oct. 24, 2017

**Test Date:** Nov. 13 to 28, 2017

**Issued Date:** Jan. 25, 2018

**Applicant:** D-Link Corporation

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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Taiwan R.O.C.

**FCC Registration /  
Designation Number:** 723255 / TW2022



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### Release Control Record

Issue No.	Description	Date Issued
RF171024E05B-1	Original release.	Jan. 25, 2018

## 1 Certificate of Conformity

**Product:** Wireless AC1750 Wave 2 Dual-Band PoE Access Point

**Brand:** D-Link

**Test Model:** DAP-2680

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** D-Link Corporation

**Test Date:** Nov. 13 to 28, 2017

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

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

**Prepared by :** Wendy Wu , **Date:** Jan. 25, 2018  
Wendy Wu / Specialist

**Approved by :** May Chen , **Date:** Jan. 25, 2018  
May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -14.74dB at 0.4000MHz.
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 5470.00MHz, 5350.00MHz, 5725.00MHz, 15780.00MHz, 15900.00MHz.
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(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (DFS Band)

Product	Wireless AC1750 Wave 2 Dual-Band PoE Access Point
Brand	D-Link
Test Model	DAP-2680
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter or DC 56V from PoE
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 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	5.26 ~ 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	<b>CDD Mode:</b> <b>5.26 ~ 5.32GHz:</b> 246.757mW <b>5.50 ~ 5.70GHz:</b> 246.496mW <b>Beamforming Mode:</b> <b>5.26 ~ 5.32GHz:</b> 128.09mW <b>5.50 ~ 5.70GHz:</b> 127.968mW
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.: RF171024E05-1 as the following:

- ◆ Add DFS band <5.26 ~ 5.32GHz, 5.5 ~ 5.70GHz>

2. According to above condition, all test items need to be performed. And all data weres verified to meet the requirements.

3. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

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

4. The EUT power needs to be supplied from power adapters or a PoE, the information is as below table:

Adapter			
No.	Brand	Model No.	Spec.
1	D-Link	WA-24Q12R	Input: 100-240Vac, 0.7A, 50-60Hz Output: 12V, 2.0A DC output cable: Unshielded 1.2m
2	D-Link	MU24-Y120200-A1	Input: 100-240Vac, 0.7A, 50/60Hz Output: 12V, 2.0A DC output cable: Unshielded 1.6m

PoE (Only for test not for sale)

No.	Brand	Model No.	Spec.
1	PHIHONG	POE29U-560	Input: 100-240Vac, 0.8A, 50-60Hz Output: 56V, 0.536A

Note:

1. From the above adapters, the radiated emissions worse case was found in **PoE**. Therefore only the test data of the mode was recorded in this report.

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

Antenna No.	Model	Antenna Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	NYS3072	3.6	2.4~2.4835	PIFA	i-pex (MHF)	60
		4.2	5.15~5.85			
2	NYS3073	3.6	2.4~2.4835	PIFA	i-pex (MHF)	70
		4.2	5.15~5.85			
3	NYS3074	3.5	2.4~2.4835	PIFA	i-pex (MHF)	160
		4	5.15~5.85			



6. The EUT incorporates a MIMO function:

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

Note:

1. All of modulation mode support beamforming function except 802.11a and 2.4GHz modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

7. The above EUT information is declared by manufacturer and for more detailed features description, please 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 ~ 5580 & 5660 ~ 5700MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	116	5580 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz
112	5560 MHz	140	5700 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 $\geq$ 1G	RE<1G	PLC	APCM	
1	√	√	√	√	Power from PoE
2	-	-	√	-	Power from adapter 1
3	-	-	√	-	Power from adapter 2

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

**NOTE:**

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

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	5500-5700	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 5500-5700	54 to 62 102 to 134	134	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 5500-5700	54 to 62 102 to 134	134	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	5500-5700	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)	5500-5700	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 $\geq$ 1G	23deg. C, 65%RH	120Vac, 60Hz	Rey Chen
RE $<$ 1G	23deg. C, 68%RH	120Vac, 60Hz	Rey Chen
PLC	25deg. C, 68%RH	120Vac, 60Hz	Weiwei Lo
APCM	24deg. C, 65%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.

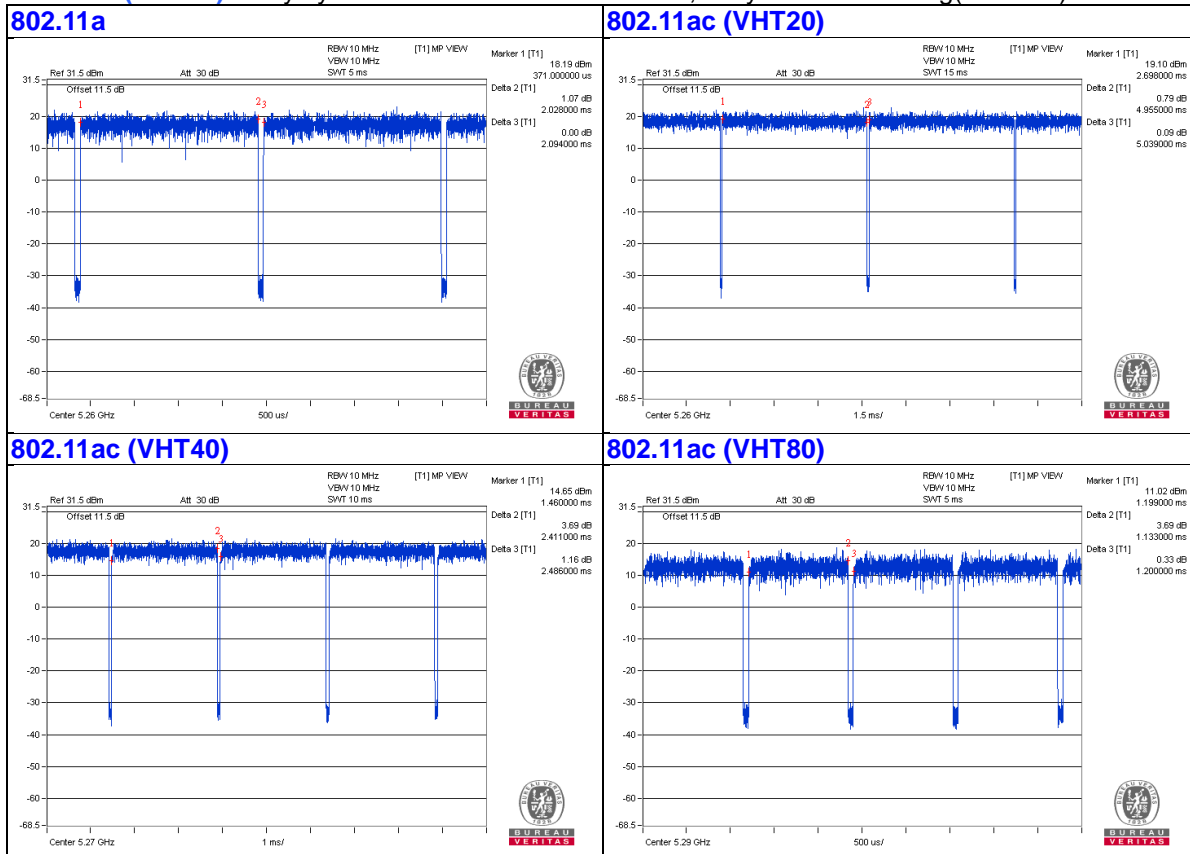
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle =  $2.028 \text{ ms} / 2.094 \text{ ms} = 0.968$ , Duty factor =  $10 * \log(1/0.968) = 0.14$

**802.11ac (VHT20):** Duty cycle =  $4.955 \text{ ms} / 5.039 \text{ ms} = 0.983$

**802.11ac (VHT40):** Duty cycle =  $2.411 \text{ ms} / 2.486 \text{ ms} = 0.97$ , Duty factor =  $10 * \log(1/0.97) = 0.13$

**802.11ac (VHT80):** Duty cycle =  $1.133 \text{ ms} / 1.2 \text{ ms} = 0.944$ , Duty factor =  $10 * \log(1/0.944) = 0.25$



### 3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
B.	PoE	PHIHONG	POE29U-560	NA	NA	Supplied by client

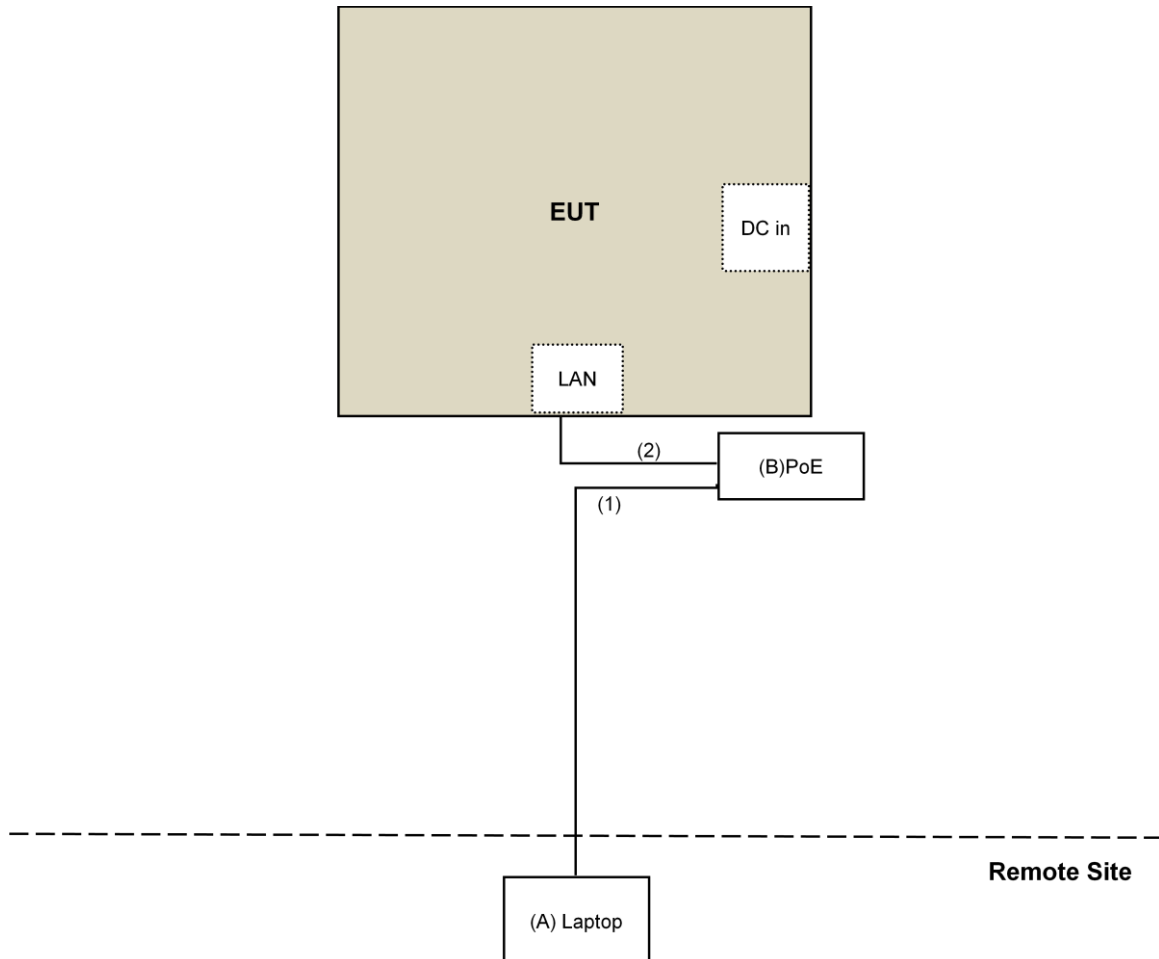
Note:

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

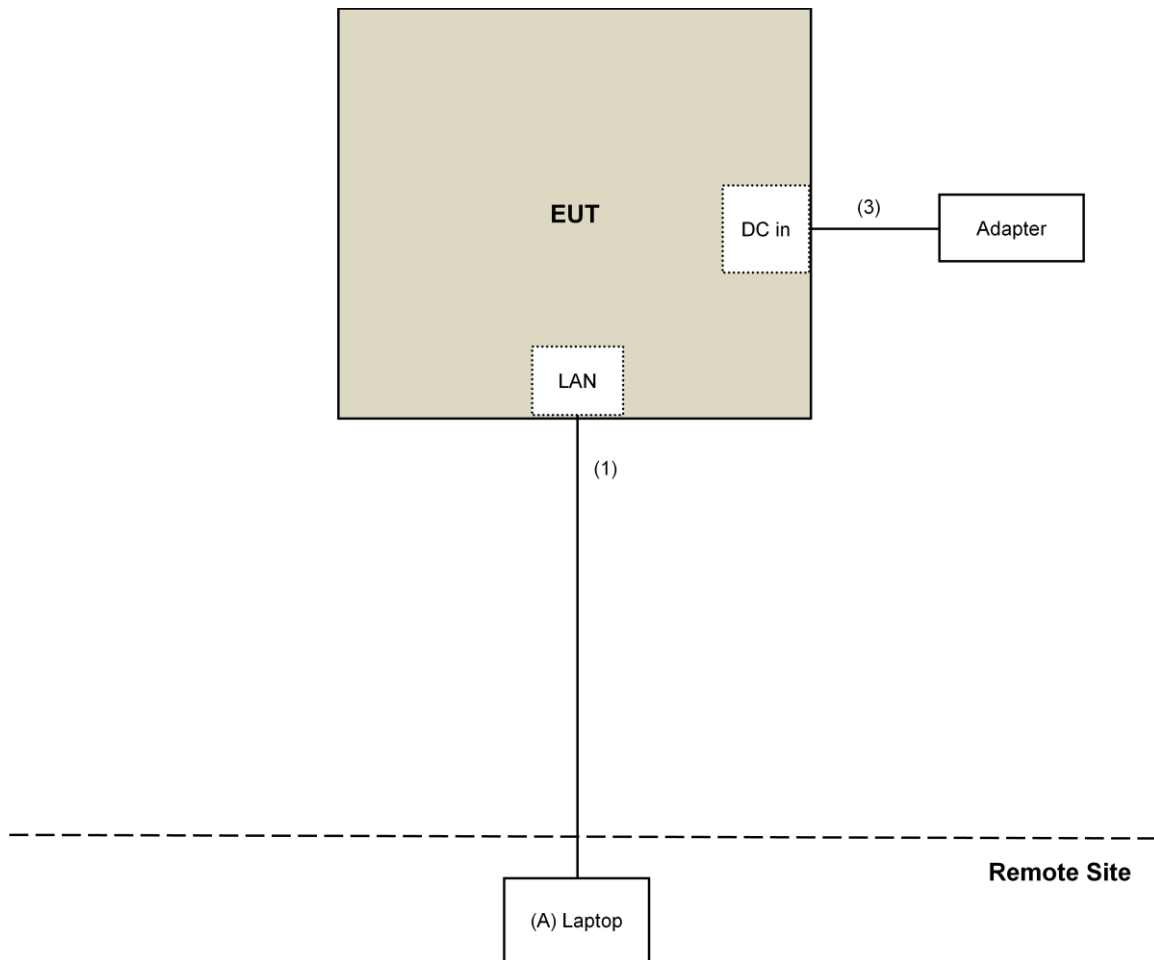
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	3	No	0	Provided by Lab
3.	DC Cable	1	1.6	No	0	Supplied by client
	DC Cable	1	1.2	No	0	Supplied by client

### 3.4.1 Configuration of System under Test

For Conducted Emission (PoE):

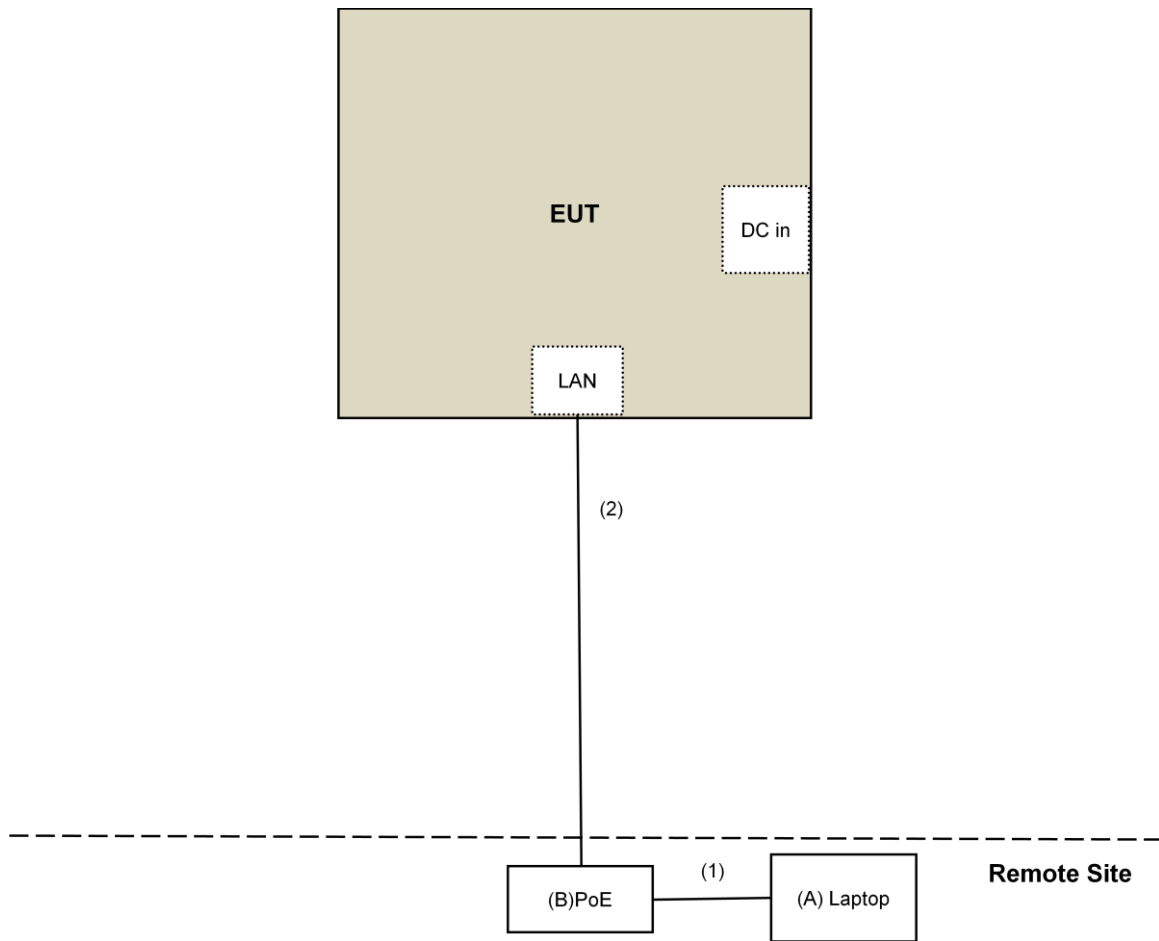


For Conducted Emission (Adapter):





For other 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 v01r04**  
**KDB 662911 D01 Multiple Transmitter Output v02r01**  
**ANSI C63.10-2013**

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

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

#### NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v01r04		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	<input type="checkbox"/> 15.407(b)(4)(i)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:10 (dBm/MHz) <sup>*2</sup> PK:15.6 (dBm/MHz) <sup>*3</sup> PK:27 (dBm/MHz) <sup>*4</sup>	PK: 68.2(dBuV/m) <sup>*1</sup> PK:105.2 (dBuV/m) <sup>*2</sup> PK: 110.8(dBuV/m) <sup>*3</sup> PK:122.2 (dBuV/m) <sup>*4</sup>
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
<sup>*1</sup> beyond 75 MHz or more above of the band edge.		<sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
<sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		<sup>*4</sup> 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 <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
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. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Nov. 13 to 28, 2017

#### 4.1.3 Test Procedure

##### **For Radiated emission below 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### **NOTE:**

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

##### **For Radiated emission above 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

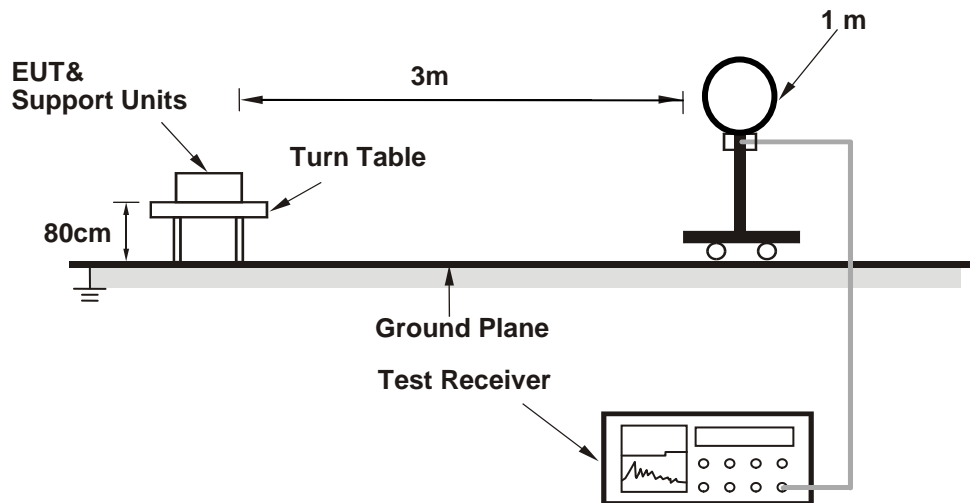
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

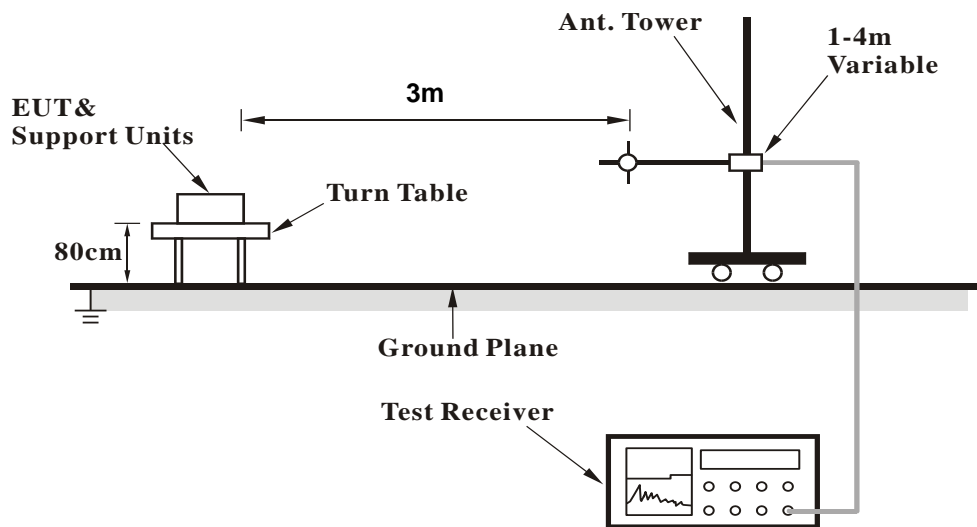
No deviation.

#### 4.1.5 Test Setup

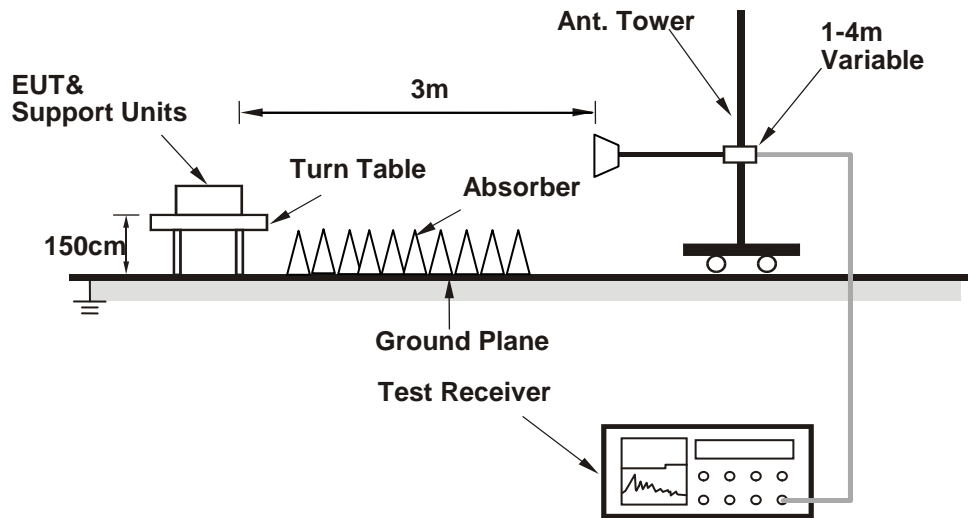
##### For Radiated emission below 30MHz



##### 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**

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (DAP2680 QRCT Tool SOP.pptx) has been activated to set the EUT on specific status.



## 4.1.7 Test Results

## Above 1GHz Data:

## 802.11a

<b>CHANNEL</b>	TX Channel 52	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	51.0 PK	74.0	-23.0	1.43 H	24	47.3	3.7
2	5150.00	39.1 AV	54.0	-14.9	1.43 H	24	35.4	3.7
3	*5260.00	117.5 PK			1.43 H	24	113.5	4.0
4	*5260.00	107.8 AV			1.43 H	24	103.8	4.0
5	#10520.00	51.8 PK	74.0	-22.2	1.47 H	176	38.6	13.2
6	#10520.00	39.0 AV	54.0	-15.0	1.47 H	176	25.8	13.2
7	15780.00	71.5 PK	74.0	-2.5	3.01 H	135	57.9	13.6
8	15780.00	53.9 AV	54.0	-0.1	3.01 H	135	40.3	13.6

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	51.9 PK	74.0	-22.1	1.14 V	32	48.2	3.7
2	5150.00	39.9 AV	54.0	-14.1	1.14 V	32	36.2	3.7
3	*5260.00	120.8 PK			1.14 V	32	116.8	4.0
4	*5260.00	110.1 AV			1.14 V	32	106.1	4.0
5	#10520.00	52.2 PK	74.0	-21.8	1.03 V	195	39.0	13.2
6	#10520.00	39.2 AV	54.0	-14.8	1.03 V	195	26.0	13.2
7	15780.00	69.3 PK	74.0	-4.7	1.32 V	220	55.7	13.6
8	15780.00	53.0 AV	54.0	-1.0	1.32 V	220	39.4	13.6

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	117.5 PK			1.43 H	23	113.4	4.1
2	*5300.00	107.7 AV			1.43 H	23	103.6	4.1
3	5350.00	55.7 PK	74.0	-18.3	1.43 H	23	51.6	4.1
4	5350.00	44.4 AV	54.0	-9.6	1.43 H	23	40.3	4.1
5	10600.00	52.1 PK	74.0	-21.9	3.82 H	77	38.6	13.5
6	10600.00	39.4 AV	54.0	-14.6	3.82 H	77	25.9	13.5
7	15900.00	69.9 PK	74.0	-4.1	3.40 H	148	57.0	12.9
8	15900.00	53.9 AV	54.0	-0.1	3.40 H	148	41.0	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	*5300.00	121.0 PK			1.14 V	30	116.9	4.1
2	*5300.00	110.3 AV			1.14 V	30	106.2	4.1
3	5350.00	56.6 PK	74.0	-17.4	1.14 V	30	52.5	4.1
4	5350.00	45.2 AV	54.0	-8.8	1.14 V	30	41.1	4.1
5	10600.00	54.7 PK	74.0	-19.3	1.15 V	194	41.2	13.5
6	10600.00	40.6 AV	54.0	-13.4	1.15 V	194	27.1	13.5
7	15900.00	68.7 PK	74.0	-5.3	1.34 V	220	55.8	12.9
8	15900.00	52.6 AV	54.0	-1.4	1.34 V	220	39.7	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.

<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	117.0 PK			2.29 H	12	112.9	4.1
2	*5320.00	107.2 AV			2.29 H	12	103.1	4.1
3	5350.00	63.9 PK	74.0	-10.1	2.29 H	12	59.8	4.1
4	5350.00	50.1 AV	54.0	-3.9	2.29 H	12	46.0	4.1
5	10640.00	61.1 PK	74.0	-12.9	3.90 H	73	47.6	13.5
6	10640.00	47.1 AV	54.0	-6.9	3.90 H	73	33.6	13.5
7	15960.00	68.5 PK	74.0	-5.5	2.99 H	145	55.6	12.9
8	15960.00	53.3 AV	54.0	-0.7	2.99 H	145	40.4	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	120.7 PK			1.14 V	30	116.6	4.1
2	*5320.00	109.6 AV			1.14 V	30	105.5	4.1
3	5350.00	66.9 PK	74.0	-7.1	1.14 V	30	62.8	4.1
4	5350.00	53.0 AV	54.0	-1.0	1.14 V	30	48.9	4.1
5	10640.00	61.5 PK	74.0	-12.5	1.00 V	177	48.0	13.5
6	10640.00	47.2 AV	54.0	-6.8	1.00 V	177	33.7	13.5
7	15960.00	65.4 PK	74.0	-8.6	1.35 V	219	52.5	12.9
8	15960.00	50.2 AV	54.0	-3.8	1.35 V	219	37.3	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.

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5464.00	66.8 PK	74.0	-7.2	2.29 H	70	62.6	4.2
2	#5464.00	52.5 AV	54.0	-1.5	2.29 H	70	48.3	4.2
3	*5500.00	116.8 PK			2.29 H	70	112.6	4.2
4	*5500.00	106.6 AV			2.29 H	70	102.4	4.2
5	11000.00	61.0 PK	74.0	-13.0	3.85 H	83	46.9	14.1
6	11000.00	47.2 AV	54.0	-6.8	3.85 H	83	33.1	14.1
7	#16500.00	65.5 PK	74.0	-8.5	3.39 H	148	51.0	14.5
8	#16500.00	51.5 AV	54.0	-2.5	3.39 H	148	37.0	14.5

**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	#5464.00	67.7 PK	74.0	-6.3	1.14 V	30	63.5	4.2
2	#5464.00	53.3 AV	54.0	-0.7	1.14 V	30	49.1	4.2
3	*5500.00	119.0 PK			1.14 V	30	114.8	4.2
4	*5500.00	108.5 AV			1.14 V	30	104.3	4.2
5	11000.00	61.8 PK	74.0	-12.2	1.00 V	185	47.7	14.1
6	11000.00	47.7 AV	54.0	-6.3	1.00 V	185	33.6	14.1
7	#16500.00	61.3 PK	74.0	-12.7	1.34 V	234	46.8	14.5
8	#16500.00	47.0 AV	54.0	-7.0	1.34 V	234	32.5	14.5

**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.

<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	116.0 PK			2.34 H	85	111.8	4.2
2	*5580.00	106.1 AV			2.34 H	85	101.9	4.2
3	11160.00	62.5 PK	74.0	-11.5	3.89 H	97	48.8	13.7
4	11160.00	48.5 AV	54.0	-5.5	3.89 H	97	34.8	13.7
5	#16740.00	67.8 PK	74.0	-6.2	3.86 H	154	52.1	15.7
6	#16740.00	53.8 AV	54.0	-0.2	3.86 H	154	38.1	15.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	120.9 PK			1.14 V	29	116.7	4.2
2	*5580.00	110.4 AV			1.14 V	29	106.2	4.2
3	11160.00	63.3 PK	74.0	-10.7	1.00 V	175	49.6	13.7
4	11160.00	49.0 AV	54.0	-5.0	1.00 V	175	35.3	13.7
5	#16740.00	63.5 PK	74.0	-10.5	2.68 V	152	47.8	15.7
6	#16740.00	50.2 AV	54.0	-3.8	2.68 V	152	34.5	15.7

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	117.0 PK			2.25 H	61	112.5	4.5
2	*5700.00	106.9 AV			2.25 H	61	102.4	4.5
3	#5725.00	66.7 PK	74.0	-7.3	2.25 H	61	62.3	4.4
4	#5725.00	52.8 AV	54.0	-1.2	2.25 H	61	48.4	4.4
5	11400.00	61.7 PK	74.0	-12.3	1.68 H	63	48.1	13.6
6	11400.00	47.9 AV	54.0	-6.1	1.68 H	63	34.3	13.6
7	#17100.00	65.2 PK	74.0	-8.8	3.89 H	165	47.8	17.4
8	#17100.00	50.9 AV	54.0	-3.1	3.89 H	165	33.5	17.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	118.0 PK			1.14 V	38	113.5	4.5
2	*5700.00	107.7 AV			1.14 V	38	103.2	4.5
3	#5725.00	67.6 PK	74.0	-6.4	1.14 V	38	63.2	4.4
4	#5725.00	53.6 AV	54.0	-0.4	1.14 V	38	49.2	4.4
5	11400.00	59.1 PK	74.0	-14.9	1.34 V	197	45.5	13.6
6	11400.00	46.6 AV	54.0	-7.4	1.34 V	197	33.0	13.6
7	#17100.00	62.9 PK	74.0	-11.1	3.04 V	155	45.5	17.4
8	#17100.00	49.2 AV	54.0	-4.8	3.04 V	155	31.8	17.4

**REMARKS:**

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

802.11ac (VHT20)

<b>CHANNEL</b>	TX Channel 52	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	48.9 PK	74.0	-25.1	1.28 H	29	45.2	3.7
2	5150.00	39.4 AV	54.0	-14.6	1.28 H	29	35.7	3.7
3	*5260.00	117.2 PK			1.28 H	29	113.2	4.0
4	*5260.00	106.6 AV			1.28 H	29	102.6	4.0
5	#10520.00	60.7 PK	74.0	-13.3	1.45 H	88	47.5	13.2
6	#10520.00	47.1 AV	54.0	-6.9	1.45 H	88	33.9	13.2
7	15780.00	70.0 PK	74.0	-4.0	2.89 H	140	56.4	13.6
8	15780.00	53.9 AV	54.0	-0.1	2.89 H	140	40.3	13.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	47.6 PK	74.0	-26.4	1.54 V	360	43.9	3.7
2	5150.00	38.1 AV	54.0	-15.9	1.54 V	360	34.4	3.7
3	*5260.00	119.1 PK			1.54 V	360	115.1	4.0
4	*5260.00	108.9 AV			1.54 V	360	104.9	4.0
5	#10520.00	60.4 PK	74.0	-13.6	3.82 V	342	47.2	13.2
6	#10520.00	46.2 AV	54.0	-7.8	3.82 V	342	33.0	13.2
7	15780.00	64.0 PK	74.0	-10.0	3.75 V	151	50.4	13.6
8	15780.00	49.2 AV	54.0	-4.8	3.75 V	151	35.6	13.6

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	116.8 PK			1.33 H	15	112.7	4.1
2	*5300.00	106.1 AV			1.33 H	15	102.0	4.1
3	10600.00	60.8 PK	74.0	-13.2	1.47 H	89	47.3	13.5
4	10600.00	47.6 AV	54.0	-6.4	1.47 H	89	34.1	13.5
5	15900.00	71.1 PK	74.0	-2.9	3.00 H	139	58.2	12.9
6	15900.00	53.8 AV	54.0	-0.2	3.00 H	139	40.9	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	*5300.00	118.7 PK			1.59 V	360	114.6	4.1
2	*5300.00	108.4 AV			1.59 V	360	104.3	4.1
3	10600.00	60.9 PK	74.0	-13.1	3.78 V	331	47.4	13.5
4	10600.00	46.6 AV	54.0	-7.4	3.78 V	331	33.1	13.5
5	15900.00	64.1 PK	74.0	-9.9	3.78 V	157	51.2	12.9
6	15900.00	49.5 AV	54.0	-4.5	3.78 V	157	36.6	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.



<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	116.8 PK			1.59 H	26	112.7	4.1
2	*5320.00	105.8 AV			1.59 H	26	101.7	4.1
3	5350.00	69.1 PK	74.0	-4.9	1.59 H	26	65.0	4.1
4	5350.00	53.8 AV	54.0	-0.2	1.59 H	26	49.7	4.1
5	10640.00	60.2 PK	74.0	-13.8	1.48 H	77	46.7	13.5
6	10640.00	46.7 AV	54.0	-7.3	1.48 H	77	33.2	13.5
7	15960.00	65.0 PK	74.0	-9.0	2.02 H	197	52.1	12.9
8	15960.00	51.7 AV	54.0	-2.3	2.02 H	197	38.8	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	118.7 PK			1.53 V	360	114.6	4.1
2	*5320.00	108.1 AV			1.53 V	360	104.0	4.1
3	5350.00	67.8 PK	74.0	-6.2	1.53 V	360	63.7	4.1
4	5350.00	52.5 AV	54.0	-1.5	1.53 V	360	48.4	4.1
5	10640.00	60.9 PK	74.0	-13.1	3.74 V	326	47.4	13.5
6	10640.00	46.5 AV	54.0	-7.5	3.74 V	326	33.0	13.5
7	15960.00	63.9 PK	74.0	-10.1	3.85 V	160	51.0	12.9
8	15960.00	49.2 AV	54.0	-4.8	3.85 V	160	36.3	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.

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	67.9 PK	74.0	-6.1	3.48 H	22	63.7	4.2
2	#5470.00	53.9 AV	54.0	-0.1	3.48 H	22	49.7	4.2
3	*5500.00	117.3 PK			3.48 H	22	113.1	4.2
4	*5500.00	106.1 AV			3.48 H	22	101.9	4.2
5	11000.00	60.0 PK	74.0	-14.0	1.47 H	101	45.9	14.1
6	11000.00	46.8 AV	54.0	-7.2	1.47 H	101	32.7	14.1
7	#16500.00	69.1 PK	74.0	-4.9	1.77 H	115	54.6	14.5
8	#16500.00	52.9 AV	54.0	-1.1	1.77 H	115	38.4	14.5

**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	#5470.00	66.6 PK	74.0	-7.4	1.65 V	360	62.4	4.2
2	#5470.00	52.6 AV	54.0	-1.4	1.65 V	360	48.4	4.2
3	*5500.00	119.2 PK			1.65 V	360	115.0	4.2
4	*5500.00	108.4 AV			1.65 V	360	104.2	4.2
5	11000.00	60.7 PK	74.0	-13.3	3.75 V	338	46.6	14.1
6	11000.00	46.3 AV	54.0	-7.7	3.75 V	338	32.2	14.1
7	#16500.00	63.6 PK	74.0	-10.4	3.80 V	157	49.1	14.5
8	#16500.00	49.0 AV	54.0	-5.0	3.80 V	157	34.5	14.5

**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.

<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	49.7 PK	74.0	-24.3	2.59 H	66	45.5	4.2
2	#5470.00	37.0 AV	54.0	-17.0	2.59 H	66	32.8	4.2
3	*5580.00	118.1 PK			2.59 H	66	113.9	4.2
4	*5580.00	107.7 AV			2.59 H	66	103.5	4.2
5	#5725.00	50.1 PK	74.0	-23.9	2.59 H	66	45.7	4.4
6	#5725.00	38.1 AV	54.0	-15.9	2.59 H	66	33.7	4.4
7	11160.00	60.5 PK	74.0	-13.5	1.50 H	88	46.8	13.7
8	11160.00	47.1 AV	54.0	-6.9	1.50 H	88	33.4	13.7
9	#16740.00	66.7 PK	74.0	-7.3	1.69 H	163	51.0	15.7
10	#16740.00	53.6 AV	54.0	-0.4	1.69 H	163	37.9	15.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	48.4 PK	74.0	-25.6	1.61 V	360	44.2	4.2
2	#5470.00	35.7 AV	54.0	-18.3	1.61 V	360	31.5	4.2
3	*5580.00	120.0 PK			1.61 V	360	115.8	4.2
4	*5580.00	110.0 AV			1.61 V	360	105.8	4.2
5	#5725.00	48.8 PK	74.0	-25.2	1.61 V	360	44.4	4.4
6	#5725.00	36.8 AV	54.0	-17.2	1.61 V	360	32.4	4.4
7	11160.00	60.9 PK	74.0	-13.1	3.71 V	341	47.2	13.7
8	11160.00	46.5 AV	54.0	-7.5	3.71 V	341	32.8	13.7
9	#16740.00	63.6 PK	74.0	-10.4	3.84 V	136	47.9	15.7
10	#16740.00	49.1 AV	54.0	-4.9	3.84 V	136	33.4	15.7

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	117.8 PK			1.03 H	76	113.3	4.5
2	*5700.00	106.5 AV			1.03 H	76	102.0	4.5
3	#5735.90	64.8 PK	74.0	-9.2	1.03 H	76	60.4	4.4
4	#5735.90	51.5 AV	54.0	-2.5	1.03 H	76	47.1	4.4
5	11400.00	60.6 PK	74.0	-13.4	1.60 H	95	47.0	13.6
6	11400.00	47.3 AV	54.0	-6.7	1.60 H	95	33.7	13.6
7	#17100.00	66.7 PK	74.0	-7.3	1.00 H	165	49.3	17.4
8	#17100.00	53.8 AV	54.0	-0.2	1.00 H	165	36.4	17.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	119.7 PK			1.59 V	360	115.2	4.5
2	*5700.00	108.8 AV			1.59 V	360	104.3	4.5
3	#5725.00	63.5 PK	74.0	-10.5	1.59 V	360	59.1	4.4
4	#5725.00	50.2 AV	54.0	-3.8	1.59 V	360	45.8	4.4
5	11400.00	60.7 PK	74.0	-13.3	3.76 V	338	47.1	13.6
6	11400.00	46.2 AV	54.0	-7.8	3.76 V	338	32.6	13.6
7	#17100.00	64.0 PK	74.0	-10.0	3.82 V	148	46.6	17.4
8	#17100.00	49.3 AV	54.0	-4.7	3.82 V	148	31.9	17.4

**REMARKS:**

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

**802.11ac (VHT40)**

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.9 PK	74.0	-13.1	1.07 H	360	57.2	3.7
2	5150.00	53.7 AV	54.0	-0.3	1.07 H	360	50.0	3.7
3	*5270.00	116.3 PK			1.07 H	360	112.3	4.0
4	*5270.00	107.2 AV			1.07 H	360	103.2	4.0
5	#10540.00	51.2 PK	74.0	-22.8	1.66 H	179	37.9	13.3
6	#10540.00	39.0 AV	54.0	-15.0	1.66 H	179	25.7	13.3
7	15810.00	53.9 PK	74.0	-20.1	1.70 H	151	40.5	13.4
8	15810.00	42.8 AV	54.0	-11.2	1.70 H	151	29.4	13.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.8 PK	74.0	-10.2	1.13 V	359	60.1	3.7
2	5150.00	51.8 AV	54.0	-2.2	1.13 V	359	48.1	3.7
3	*5270.00	118.4 PK			1.13 V	359	114.4	4.0
4	*5270.00	108.1 AV			1.13 V	359	104.1	4.0
5	#10540.00	52.6 PK	74.0	-21.4	3.76 V	329	39.3	13.3
6	#10540.00	40.1 AV	54.0	-13.9	3.76 V	329	26.8	13.3
7	15810.00	55.8 PK	74.0	-18.2	3.87 V	146	42.4	13.4
8	15810.00	44.6 AV	54.0	-9.4	3.87 V	146	31.2	13.4

**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.

<b>CHANNEL</b>	TX Channel 62	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	114.2 PK			1.05 H	58	110.1	4.1
2	*5310.00	104.4 AV			1.05 H	58	100.3	4.1
3	5350.00	69.4 PK	74.0	-4.6	1.05 H	58	65.3	4.1
4	5350.00	53.2 AV	54.0	-0.8	1.05 H	58	49.1	4.1
5	10620.00	50.7 PK	74.0	-23.3	1.59 H	160	37.2	13.5
6	10620.00	38.5 AV	54.0	-15.5	1.59 H	160	25.0	13.5
7	15930.00	54.3 PK	74.0	-19.7	1.67 H	155	41.5	12.8
8	15930.00	43.0 AV	54.0	-11.0	1.67 H	155	30.2	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	114.8 PK			1.51 V	360	110.7	4.1
2	*5310.00	105.1 AV			1.51 V	360	101.0	4.1
3	5350.00	70.0 PK	74.0	-4.0	1.51 V	360	65.9	4.1
4	5350.00	53.8 AV	54.0	-0.2	1.51 V	360	49.7	4.1
5	10620.00	52.5 PK	74.0	-21.5	3.77 V	326	39.0	13.5
6	10620.00	39.9 AV	54.0	-14.1	3.77 V	326	26.4	13.5
7	15930.00	56.0 PK	74.0	-18.0	3.80 V	143	43.2	12.8
8	15930.00	44.6 AV	54.0	-9.4	3.80 V	143	31.8	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.

<b>CHANNEL</b>	TX Channel 102	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	71.7 PK	74.0	-2.3	1.11 H	81	67.5	4.2
2	#5470.00	53.9 AV	54.0	-0.1	1.11 H	81	49.7	4.2
3	*5510.00	112.8 PK			1.11 H	81	108.6	4.2
4	*5510.00	103.6 AV			1.11 H	81	99.4	4.2
5	11020.00	50.9 PK	74.0	-23.1	1.62 H	170	36.9	14.0
6	11020.00	38.5 AV	54.0	-15.5	1.62 H	170	24.5	14.0
7	#16530.00	54.1 PK	74.0	-19.9	1.64 H	159	39.2	14.9
8	#16530.00	42.9 AV	54.0	-11.1	1.64 H	159	28.0	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	#5470.00	68.5 PK	74.0	-5.5	1.71 V	13	64.3	4.2
2	#5470.00	53.5 AV	54.0	-0.5	1.71 V	13	49.3	4.2
3	*5510.00	114.8 PK			1.71 V	13	110.6	4.2
4	*5510.00	104.5 AV			1.71 V	13	100.3	4.2
5	11020.00	52.2 PK	74.0	-21.8	3.74 V	342	38.2	14.0
6	11020.00	39.8 AV	54.0	-14.2	3.74 V	342	25.8	14.0
7	#16530.00	55.4 PK	74.0	-18.6	3.82 V	144	40.5	14.9
8	#16530.00	44.2 AV	54.0	-9.8	3.82 V	144	29.3	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.

<b>CHANNEL</b>	TX Channel 110	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	64.7 PK	74.0	-9.3	1.11 H	80	60.5	4.2
2	#5470.00	53.9 AV	54.0	-0.1	1.11 H	80	49.7	4.2
3	*5550.00	114.7 PK			1.11 H	80	110.5	4.2
4	*5550.00	105.6 AV			1.11 H	80	101.4	4.2
5	#5725.00	70.6 PK	74.0	-3.4	1.11 H	80	66.2	4.4
6	#5725.00	52.5 AV	54.0	-1.5	1.11 H	80	48.1	4.4
7	11100.00	51.0 PK	74.0	-23.0	1.66 H	159	37.2	13.8
8	11100.00	38.4 AV	54.0	-15.6	1.66 H	159	24.6	13.8
9	#16650.00	54.2 PK	74.0	-19.8	1.67 H	164	38.6	15.6
10	#16650.00	43.0 AV	54.0	-11.0	1.67 H	164	27.4	15.6

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	66.8 PK	74.0	-7.2	1.52 V	360	62.6	4.2
2	#5470.00	52.7 AV	54.0	-1.3	1.52 V	360	48.5	4.2
3	*5550.00	117.0 PK			1.52 V	360	112.8	4.2
4	*5550.00	106.5 AV			1.52 V	360	102.3	4.2
5	#5725.00	52.5 PK	74.0	-21.5	1.52 V	360	48.1	4.4
6	#5725.00	40.7 AV	54.0	-13.3	1.52 V	360	36.3	4.4
7	11100.00	52.2 PK	74.0	-21.8	3.77 V	355	38.4	13.8
8	11100.00	39.6 AV	54.0	-14.4	3.77 V	355	25.8	13.8
9	#16650.00	55.3 PK	74.0	-18.7	3.81 V	150	39.7	15.6
10	#16650.00	44.0 AV	54.0	-10.0	3.81 V	150	28.4	15.6

**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.



<b>CHANNEL</b>	TX Channel 134	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	112.3 PK			1.06 H	64	108.0	4.3
2	*5670.00	103.6 AV			1.06 H	64	99.3	4.3
3	#5725.00	63.1 PK	74.0	-10.9	1.06 H	64	58.7	4.4
4	#5725.00	52.8 AV	54.0	-1.2	1.06 H	64	48.4	4.4
5	11340.00	51.2 PK	74.0	-22.8	1.61 H	174	37.6	13.6
6	11340.00	38.6 AV	54.0	-15.4	1.61 H	174	25.0	13.6
7	#17010.00	53.9 PK	74.0	-20.1	1.61 H	164	36.8	17.1
8	#17010.00	42.9 AV	54.0	-11.1	1.61 H	164	25.8	17.1

**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	*5670.00	114.7 PK			1.61 V	360	110.4	4.3
2	*5670.00	104.3 AV			1.61 V	360	100.0	4.3
3	#5725.00	63.5 PK	74.0	-10.5	1.61 V	360	59.1	4.4
4	#5725.00	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.61 V</b>	<b>360</b>	<b>49.5</b>	<b>4.4</b>
5	11340.00	52.1 PK	74.0	-21.9	3.74 V	338	38.5	13.6
6	11340.00	39.6 AV	54.0	-14.4	3.74 V	338	26.0	13.6
7	#17010.00	55.7 PK	74.0	-18.3	3.78 V	133	38.6	17.1
8	#17010.00	44.5 AV	54.0	-9.5	3.78 V	133	27.4	17.1

**REMARKS:**

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

**802.11ac (VHT80)**

<b>CHANNEL</b>	TX Channel 58	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	53.1 PK	74.0	-20.9	1.12 H	64	49.4	3.7
2	5150.00	40.7 AV	54.0	-13.3	1.12 H	64	37.0	3.7
3	*5290.00	107.4 PK			1.12 H	64	103.3	4.1
4	*5290.00	97.6 AV			1.12 H	64	93.5	4.1
5	5350.00	66.6 PK	74.0	-7.4	1.12 H	64	62.5	4.1
6	5350.00	52.6 AV	54.0	-1.4	1.12 H	64	48.5	4.1
7	#10580.00	50.7 PK	74.0	-23.3	1.65 H	177	37.3	13.4
8	#10580.00	38.4 AV	54.0	-15.6	1.65 H	177	25.0	13.4
9	15870.00	54.5 PK	74.0	-19.5	1.63 H	171	41.5	13.0
10	15870.00	43.3 AV	54.0	-10.7	1.63 H	171	30.3	13.0

**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	5150.00	54.4 PK	74.0	-19.6	1.47 V	19	50.7	3.7
2	5150.00	42.0 AV	54.0	-12.0	1.47 V	19	38.3	3.7
3	*5290.00	109.3 PK			1.47 V	19	105.2	4.1
4	*5290.00	99.9 AV			1.47 V	19	95.8	4.1
5	5350.00	67.9 PK	74.0	-6.1	1.47 V	19	63.8	4.1
<b>6</b>	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.47 V</b>	<b>19</b>	<b>49.8</b>	<b>4.1</b>
7	#10580.00	51.9 PK	74.0	-22.1	3.73 V	328	38.5	13.4
8	#10580.00	39.4 AV	54.0	-14.6	3.73 V	328	26.0	13.4
9	15870.00	56.0 PK	74.0	-18.0	3.87 V	139	43.0	13.0
10	15870.00	44.7 AV	54.0	-9.3	3.87 V	139	31.7	13.0

**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.

<b>CHANNEL</b>	TX Channel 106	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	66.2 PK	74.0	-7.8	1.12 H	62	62.0	4.2
2	#5470.00	52.6 AV	54.0	-1.4	1.12 H	62	48.4	4.2
3	*5530.00	107.1 PK			1.12 H	62	102.9	4.2
4	*5530.00	97.0 AV			1.12 H	62	92.8	4.2
5	#5725.00	54.1 PK	74.0	-19.9	1.12 H	62	49.7	4.4
6	#5725.00	42.7 AV	54.0	-11.3	1.12 H	62	38.3	4.4
7	11060.00	51.0 PK	74.0	-23.0	1.59 H	175	37.1	13.9
8	11060.00	38.8 AV	54.0	-15.2	1.59 H	175	24.9	13.9
9	#16590.00	54.2 PK	74.0	-19.8	1.66 H	149	38.6	15.6
10	#16590.00	43.3 AV	54.0	-10.7	1.66 H	149	27.7	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	67.5 PK	74.0	-6.5	1.48 V	16	63.3	4.2
2	#5470.00	53.9 AV	54.0	-0.1	1.48 V	16	49.7	4.2
3	*5530.00	109.0 PK			1.48 V	16	104.8	4.2
4	*5530.00	99.3 AV			1.48 V	16	95.1	4.2
5	#5725.00	55.4 PK	74.0	-18.6	1.48 V	16	51.0	4.4
6	#5725.00	44.0 AV	54.0	-10.0	1.48 V	16	39.6	4.4
7	11060.00	52.1 PK	74.0	-21.9	3.80 V	350	38.2	13.9
8	11060.00	39.5 AV	54.0	-14.5	3.80 V	350	25.6	13.9
9	#16590.00	55.2 PK	74.0	-18.8	3.86 V	159	39.6	15.6
10	#16590.00	43.9 AV	54.0	-10.1	3.86 V	159	28.3	15.6

**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.

**Below 1GHz Data:**

**802.11ac (VHT40)**

<b>CHANNEL</b>	TX Channel 134	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	59.49	31.2 QP	40.0	-8.8	1.00 H	116	39.6	-8.4
2	147.30	28.8 QP	43.5	-14.7	2.00 H	88	36.8	-8.0
3	198.97	30.7 QP	43.5	-12.8	1.00 H	292	41.8	-11.1
4	294.74	28.7 QP	46.0	-17.3	2.50 H	72	36.3	-7.6
5	375.00	29.7 QP	46.0	-16.3	2.00 H	77	35.2	-5.5
6	625.00	31.2 QP	46.0	-14.8	1.00 H	312	31.0	0.2
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	65.79	36.2 QP	40.0	-3.8	1.00 V	127	45.4	-9.2
2	98.41	32.6 QP	43.5	-10.9	2.00 V	256	45.3	-12.7
3	187.43	31.0 QP	43.5	-12.5	1.00 V	360	41.4	-10.4
4	293.50	25.2 QP	46.0	-20.8	2.00 V	360	32.8	-7.6
5	375.00	29.8 QP	46.0	-16.2	3.00 V	15	35.3	-5.5
6	625.02	31.7 QP	46.0	-14.3	1.00 V	360	31.5	0.2

**REMARKS:**

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

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

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

### 4.2.2 Test Instruments

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

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: Nov. 28, 2017

#### 4.2.3 Test Procedure

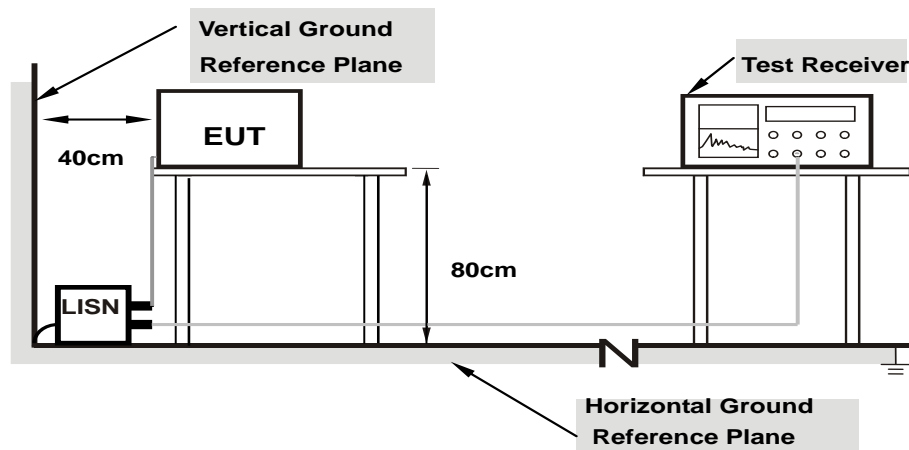
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

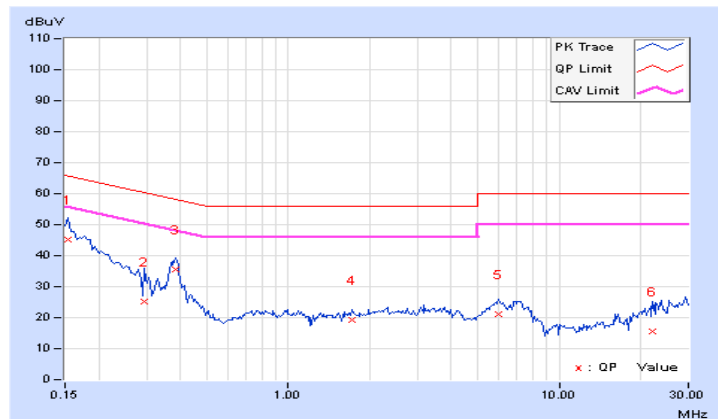
#### 4.2.7 Test Results (Mode 1)

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	0.15391	0.14	44.87	29.27	45.01	29.41	65.79	55.79	-20.78	-26.38
2	0.29453	0.15	25.11	13.33	25.26	13.48	60.40	50.40	-35.14	-36.92
3	0.38438	0.18	35.43	29.90	35.61	30.08	58.18	48.18	-22.57	-18.10
4	1.72266	0.21	18.96	14.27	19.17	14.48	56.00	46.00	-36.83	-31.52
5	5.96094	0.45	20.71	15.41	21.16	15.86	60.00	50.00	-38.84	-34.14
6	22.14844	1.34	14.30	8.91	15.64	10.25	60.00	50.00	-44.36	-39.75

#### 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.

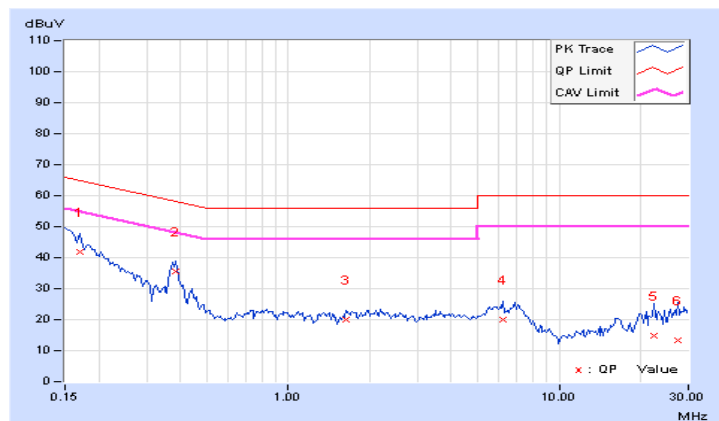


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.16953	0.12	41.83	27.37	41.95	27.49	64.98	54.98	-23.03
2	0.38438	0.16	35.22	29.37	35.38	29.53	58.18	48.18	-22.80	-18.65
3	1.64063	0.23	19.63	14.61	19.86	14.84	56.00	46.00	-36.14	-31.16
4	6.24609	0.39	19.60	14.73	19.99	15.12	60.00	50.00	-40.01	-34.88
5	22.41016	1.03	13.60	7.01	14.63	8.04	60.00	50.00	-45.37	-41.96
6	27.59375	1.00	12.30	5.45	13.30	6.45	60.00	50.00	-46.70	-43.55

**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.





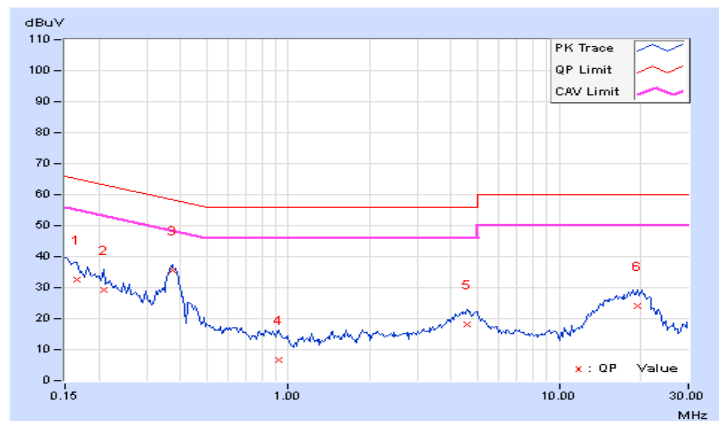
#### 4.2.8 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	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	0.16562	0.15	32.31	22.69	32.46	22.84	65.18	55.18	-32.72	-32.34
2	0.20859	0.14	29.01	20.14	29.15	20.28	63.26	53.26	-34.11	-32.98
3	0.37266	0.18	35.51	33.19	35.69	33.37	58.44	48.44	-22.75	-15.07
4	0.92734	0.23	6.46	3.30	6.69	3.53	56.00	46.00	-49.31	-42.47
5	4.57422	0.45	17.63	8.22	18.08	8.67	56.00	46.00	-37.92	-37.33
6	19.56641	1.59	22.36	16.52	23.95	18.11	60.00	50.00	-36.05	-31.89

#### REMARKS:

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

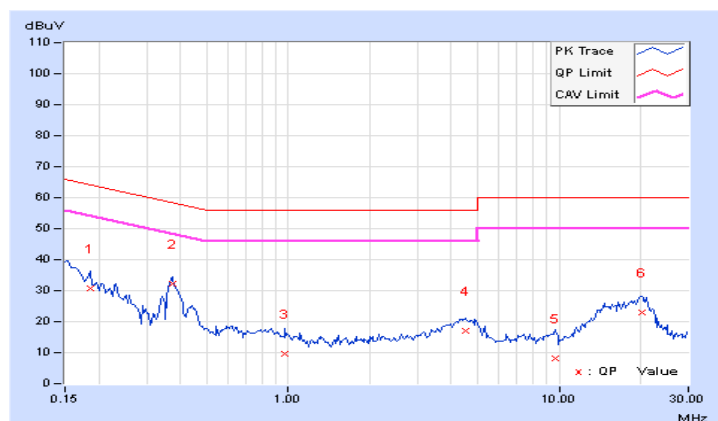


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.18516	0.12	30.44	20.14	30.56	20.26	64.25	54.25	-33.69
2	0.37266	0.18	32.05	28.69	32.23	28.87	58.44	48.44	-26.21	-19.57
3	0.97422	0.20	9.58	6.20	9.78	6.40	56.00	46.00	-46.22	-39.60
4	4.50781	0.35	16.66	8.51	17.01	8.86	56.00	46.00	-38.99	-37.14
5	9.66016	0.73	7.56	0.49	8.29	1.22	60.00	50.00	-51.71	-48.78
6	20.13281	1.32	21.55	16.00	22.87	17.32	60.00	50.00	-37.13	-32.68

#### 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.



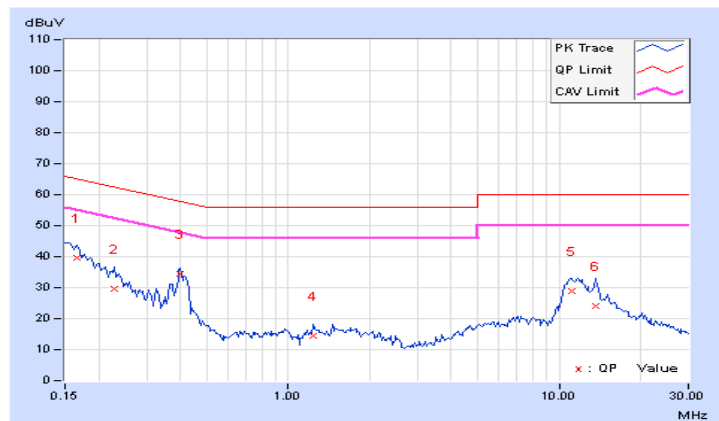
#### 4.2.9 Test Results (Mode 3)

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

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	0.16562	0.15	39.37	24.91	39.52	25.06	65.18	55.18	-25.66
2	0.22812	0.15	29.64	20.56	29.79	20.71	62.52	52.52	-32.73	-31.81
<b>3</b>	<b>0.40000</b>	<b>0.19</b>	<b>34.33</b>	<b>32.92</b>	<b>34.52</b>	<b>33.11</b>	<b>57.85</b>	<b>47.85</b>	<b>-23.33</b>	<b>-14.74</b>
4	1.24219	0.24	14.17	9.60	14.41	9.84	56.00	46.00	-41.59	-36.16
5	11.07813	0.93	27.83	22.72	28.76	23.65	60.00	50.00	-31.24	-26.35
6	13.68359	1.13	22.78	18.41	23.91	19.54	60.00	50.00	-36.09	-30.46

#### 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.

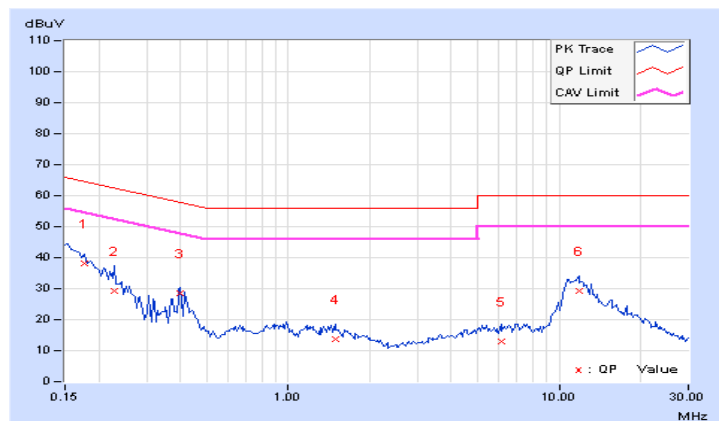


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. 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	0.17734	0.12	38.19	24.36	38.31	24.48	64.61	54.61	-26.30
2	0.22812	0.12	29.32	19.65	29.44	19.77	62.52	52.52	-33.08	-32.75
3	0.40000	0.19	28.22	25.37	28.41	25.56	57.85	47.85	-29.44	-22.29
4	1.48828	0.24	13.48	9.29	13.72	9.53	56.00	46.00	-42.28	-36.47
5	6.10156	0.47	12.54	4.23	13.01	4.70	60.00	50.00	-46.99	-45.30
6	11.80859	0.86	28.58	23.13	29.44	23.99	60.00	50.00	-30.56	-26.01

**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	√		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  $N_{ANT} \leq 4$ ;

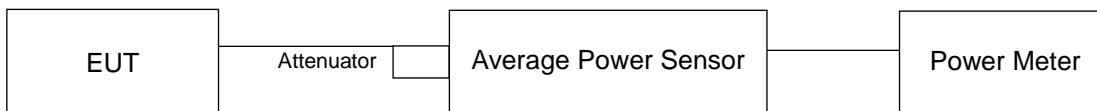
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

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

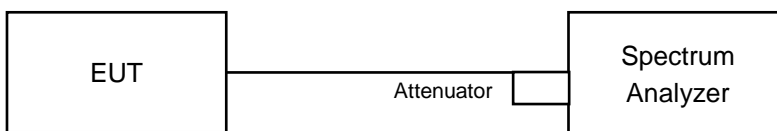
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 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	Chain 2				
52	5260	16.60	16.36	15.80	126.979	21.04	23.92	Pass
60	5300	16.62	16.40	15.83	127.854	21.07	23.99	Pass
64	5320	16.59	16.42	15.82	127.651	21.06	23.97	Pass
100	5500	16.24	16.65	15.92	127.395	21.05	24.00	Pass
116	5580	16.12	16.62	15.90	125.751	21.00	23.94	Pass
140	5700	15.68	16.74	16.34	127.242	21.05	24.00	Pass

#### 26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	19.61	19.98	19.86
60	5300	20.01	19.91	19.94
64	5320	19.98	20.29	19.84
100	5500	19.97	20.26	20.19
116	5580	19.85	20.13	19.72
140	5700	20.18	20.36	20.29

**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	19.61	23.92 < 24
60	5300	19.91	23.99 < 24
64	5320	19.84	23.97 < 24
100	5500	19.97	24 = 24
116	5580	19.72	23.94 < 24
140	5700	20.18	24.04 > 24

**802.11ac (VHT20)**
**POWER OUTPUT:**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
52	5260	16.16	15.82	16.08	120.05	20.79	24.00	Pass
60	5300	16.36	16.20	16.35	128.09	21.08	24.00	Pass
64	5320	16.42	16.10	16.34	127.644	21.06	24.00	Pass
100	5500	16.52	16.13	16.24	127.968	21.07	24.00	Pass
116	5580	16.22	16.57	15.70	124.427	20.95	24.00	Pass
140	5700	16.32	16.47	15.98	126.844	21.03	24.00	Pass

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	21.05	20.87	20.68
60	5300	20.63	20.80	20.63
64	5320	20.87	20.86	20.85
100	5500	20.72	20.81	20.69
116	5580	20.72	20.86	20.79
140	5700	20.93	21.20	21.18

**Note: For FCC output power limitation is determined based on 26dB bandwidth.**

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.68	24.15 > 24
60	5300	20.63	24.14 > 24
64	5320	20.85	24.19 > 24
100	5500	20.69	24.15 > 24
116	5580	20.72	24.16 > 24
140	5700	20.93	24.2 > 24



### 802.11ac (VHT40)

#### POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
54	5270	19.42	18.93	19.09	246.757	23.92	24.00	Pass
62	5310	19.22	18.80	18.92	237.401	23.75	24.00	Pass
102	5510	19.12	18.63	18.64	227.718	23.57	24.00	Pass
110	5550	18.76	19.04	18.43	224.993	23.52	24.00	Pass
134	5670	18.34	20.19	18.68	246.496	23.92	24.00	Pass

#### 26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
54	5270	40.91	40.82	40.82
62	5310	40.95	41.27	40.73
102	5510	40.98	40.95	40.97
110	5550	40.90	40.89	40.88
134	5670	40.99	41.10	40.97

**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	40.82	27.1 > 24
62	5310	40.73	27.09 > 24
102	5510	40.95	27.12 > 24
110	5550	40.88	27.11 > 24
134	5670	40.97	27.12 > 24

**802.11ac (VHT80)**
**POWER OUTPUT:**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
58	5290	18.59	18.44	18.60	214.544	23.32	24.00	Pass
106	5530	18.28	18.11	17.20	184.493	22.66	24.00	Pass

**26dB BANDWIDTH:**

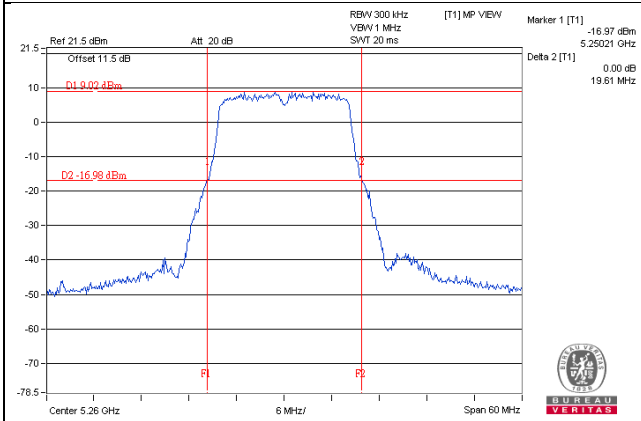
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
58	5290	83.47	83.65	83.97
106	5530	84.32	84.15	83.29

**Note: For U\_NII-2A, U\_NII-2C Band output power limitation is determined based on 26dBc bandwidth**

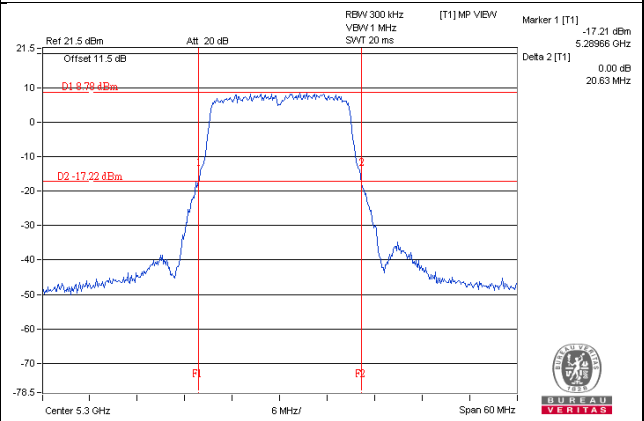
Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.47	30.21 > 24
106	5530	83.29	30.2 > 24

**Spectrum Plot of Worst Value**

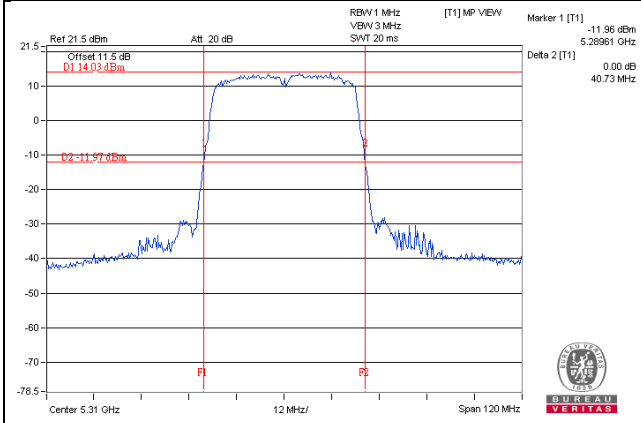
**802.11a / Chain 0 – CH52**



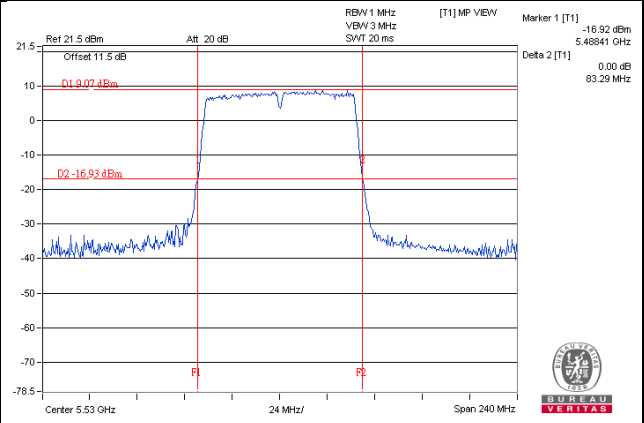
**802.11ac (VHT20) / Chain 0 – CH60**



**802.11ac (VHT40) / Chain 2 – CH64**



**802.11ac (VHT80) / Chain 2 - CH106**



## Beamforming Mode

### 802.11ac (VHT20)

#### POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
52	5260	16.16	15.82	16.08	120.05	20.79	21.09	Pass
60	5300	16.36	16.20	16.35	128.09	21.08	21.09	Pass
64	5320	16.42	16.10	16.34	127.644	21.06	21.09	Pass
100	5500	16.52	16.13	16.24	127.968	21.07	21.09	Pass
116	5580	16.22	16.57	15.70	124.427	20.95	21.09	Pass
140	5700	16.32	16.47	15.98	126.844	21.03	21.09	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.9.1\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to "Determined Conducted Limit"-(8.91-6).

#### 26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	21.05	20.87	20.68
60	5300	20.63	20.80	20.63
64	5320	20.87	20.86	20.85
100	5500	20.72	20.81	20.69
116	5580	20.72	20.86	20.79
140	5700	20.93	21.20	21.18

**Note: For FCC output power limitation is determined based on 26dB bandwidth.**

Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.68	24.15 > 24
60	5300	20.63	24.14 > 24
64	5320	20.85	24.19 > 24
100	5500	20.69	24.15 > 24
116	5580	20.72	24.16 > 24
140	5700	20.93	24.2 > 24

### 802.11ac (VHT40)

#### POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
54	5270	16.42	15.93	16.09	123.671	20.92	21.09	Pass
62	5310	16.22	15.80	15.92	118.982	20.75	21.09	Pass
102	5510	16.12	15.63	15.64	114.129	20.57	21.09	Pass
110	5550	15.76	16.04	15.43	112.763	20.52	21.09	Pass
134	5670	15.56	17.19	15.68	125.318	20.98	21.09	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.9.1\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to "Determined Conducted Limit"-(8.91-6).

#### 26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
54	5270	40.91	40.82	40.82
62	5310	40.95	41.27	40.73
102	5510	40.98	40.95	40.97
110	5550	40.90	40.89	40.88
134	5670	40.99	41.10	40.97

**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	40.82	27.1 > 24
62	5310	40.73	27.09 > 24
102	5510	40.95	27.12 > 24
110	5550	40.88	27.11 > 24
134	5670	40.97	27.12 > 24

### 802.11ac (VHT80)

#### POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
58	5290	16.09	15.94	16.10	120.646	20.82	21.09	Pass
106	5530	16.28	16.11	15.20	116.407	20.66	21.09	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.9.1\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to "Determined Conducted Limit"-(8.91-6).

#### 26dB BANDWIDTH:

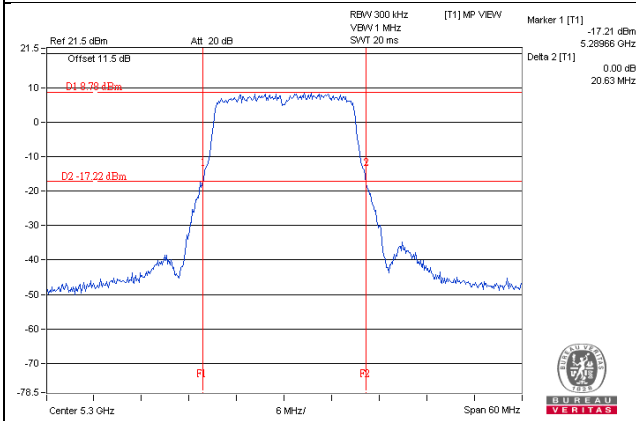
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
58	5290	83.47	83.65	83.97
106	5530	84.32	84.15	83.29

**Note: For U\_NII-2A, U\_NII-2C Band output power limitation is determined based on 26dBc bandwidth**

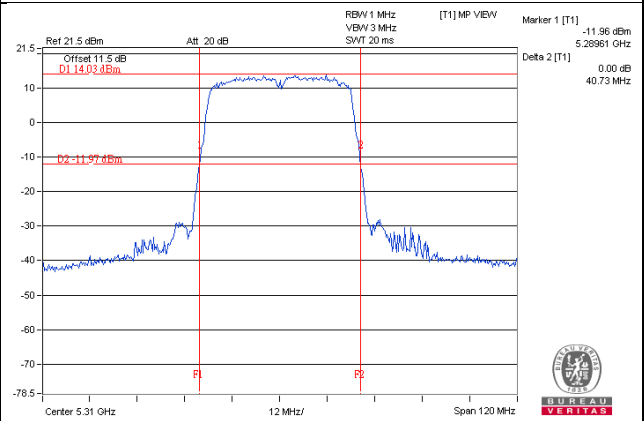
Power Limit = 11dBm + 10logB < U_NII-2A, U_NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.47	30.21 > 24
106	5530	83.29	30.2 > 24

### Spectrum Plot of Worst Value

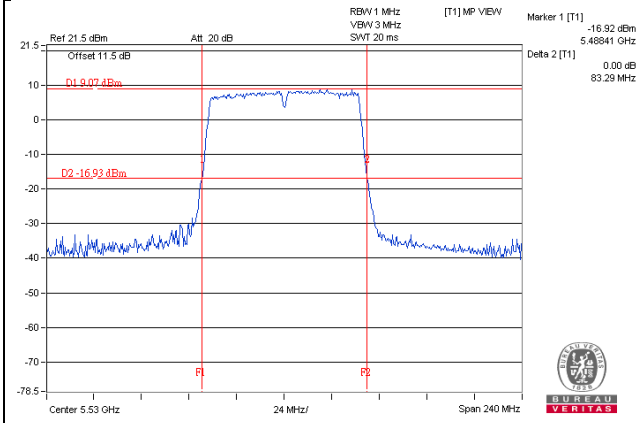
#### 802.11ac (VHT20) / Chain 0 – CH60



#### 802.11ac (VHT40) / Chain 2 – CH64

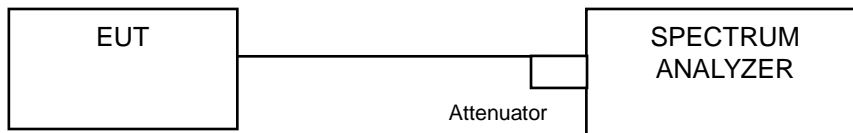


#### 802.11ac (VHT80) / Chain 2 - CH106



## 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	Chain 2
52	5260	16.44	16.56	16.44
60	5300	16.56	16.44	16.56
64	5320	16.56	16.56	16.56
100	5500	16.56	16.56	16.56
116	5580	16.44	16.56	16.44
140	5700	16.44	16.56	16.56

##### 802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	17.76	17.64	17.64
60	5300	17.64	17.76	17.64
64	5320	17.76	17.64	17.76
100	5500	17.76	17.76	17.64
116	5580	17.64	17.76	17.88
140	5700	17.64	17.76	17.64

##### 802.11ac (VHT40)

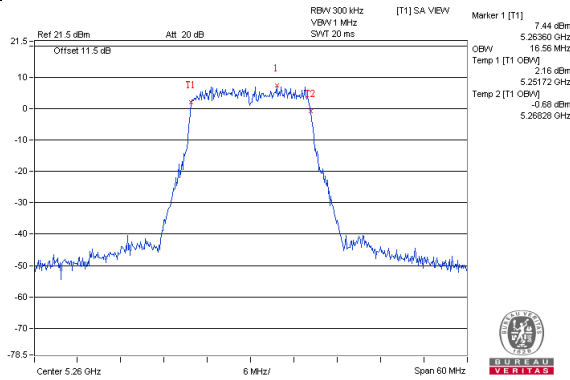
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
54	5270	36.24	36.24	36.24
62	5310	36.24	36.24	36.24
102	5510	36.24	36.24	36.24
110	5550	36.24	36.00	36.24
134	5670	36.24	36.24	36.24

802.11ac (VHT80)

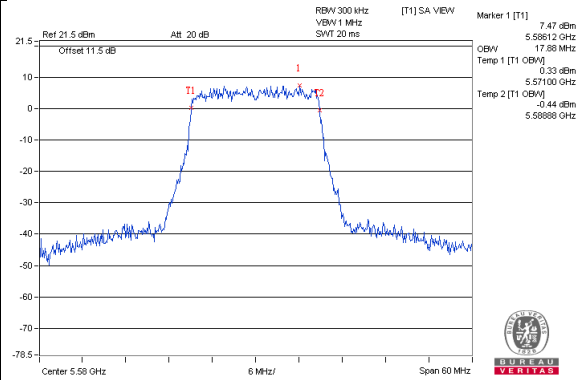
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
58	5290	75.84	75.84	75.84
106	5530	76.32	76.32	76.32

### Spectrum Plot of Worst Value

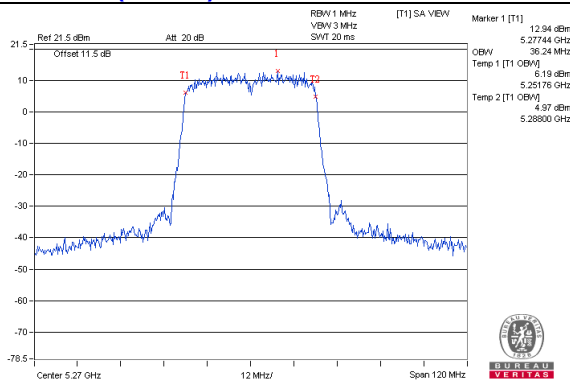
**802.11a\_Chain1/ CH52**



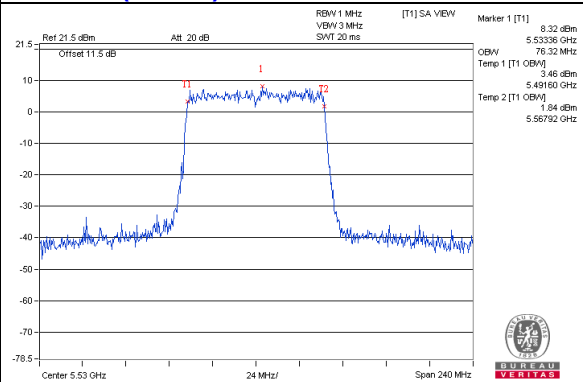
**802.11ac (VHT20)\_Chain2/ CH116**



**802.11ac (VHT40)\_Chain0/ CH54**



**802.11ac (VHT80)\_Chain0 / CH106**

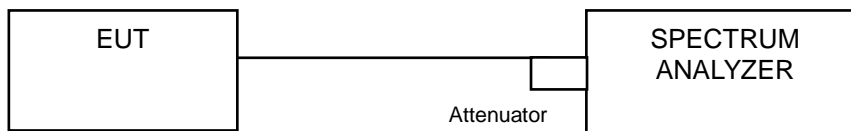


## 4.5 Peak Power Spectral Density Measurement

### 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  $10 \log (1/\text{duty cycle})$

#### 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	Chain 2				
52	5260	2.91	2.69	2.72	0.14	7.68	8.09	Pass
60	5300	3.14	2.81	2.48	0.14	7.73	8.09	Pass
64	5320	2.89	2.98	2.35	0.14	7.66	8.09	Pass
100	5500	2.97	2.24	2.60	0.14	7.52	8.09	Pass
116	5580	2.91	3.16	2.91	0.14	7.91	8.09	Pass
140	5700	2.32	2.97	2.88	0.14	7.64	8.09	Pass

- Note:**
- 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.
  - Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.91 \text{dBi} > 6 \text{dBi}$ , so the power density limit shall be reduced to  $11 - (8.91 - 6) = 8.09 \text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
52	5260	2.68	2.75	2.69	7.48	8.09	Pass
60	5300	2.64	2.85	2.58	7.46	8.09	Pass
64	5320	2.51	2.90	2.43	7.39	8.09	Pass
100	5500	2.62	2.46	2.61	7.34	8.09	Pass
116	5580	2.84	2.67	3.00	7.61	8.09	Pass
140	5700	2.43	2.75	2.29	7.27	8.09	Pass

- Note:**
- 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.
  - Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.91 \text{dBi} > 6 \text{dBi}$ , so the power density limit shall be reduced to  $11 - (8.91 - 6) = 8.09 \text{dBm}$ .

### 802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
54	5270	2.47	2.62	2.13	0.13	7.32	8.09	Pass
62	5310	2.67	2.86	1.86	0.13	7.39	8.09	Pass
102	5510	2.46	1.82	1.85	0.13	6.96	8.09	Pass
110	5550	2.73	2.26	2.36	0.13	7.36	8.09	Pass
134	5670	1.33	3.40	1.31	0.13	7.03	8.09	Pass

- Note:**
- 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.
  - Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.91 \text{dBi} > 6 \text{dBi}$ , so the power density limit shall be reduced to  $11 - (8.91 - 6) = 8.09 \text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

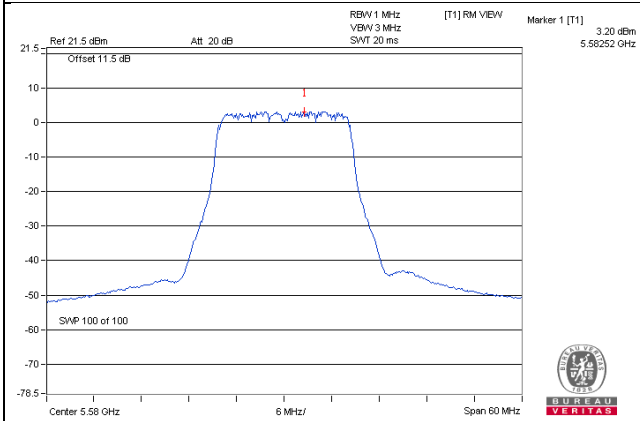
### 802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
58	5290	-1.71	-1.48	-1.78	0.25	3.37	8.09	Pass
106	5530	-1.59	-3.29	-2.77	0.25	2.53	8.09	Pass

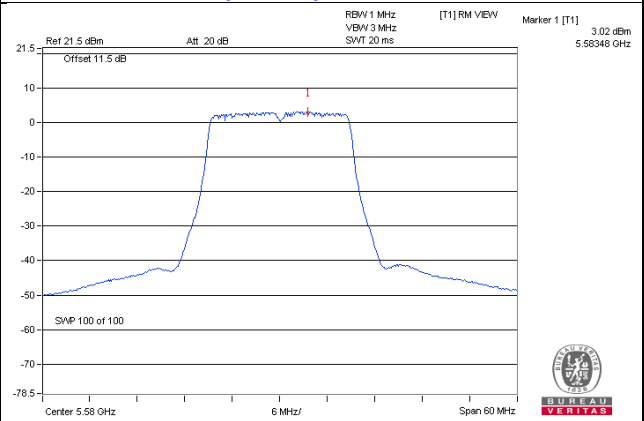
- Note:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
  - Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.91 \text{dBi} > 6 \text{dBi}$ , so the power density limit shall be reduced to  $11 - (8.91 - 6) = 8.09 \text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

**Spectrum Plot of Worst Value**

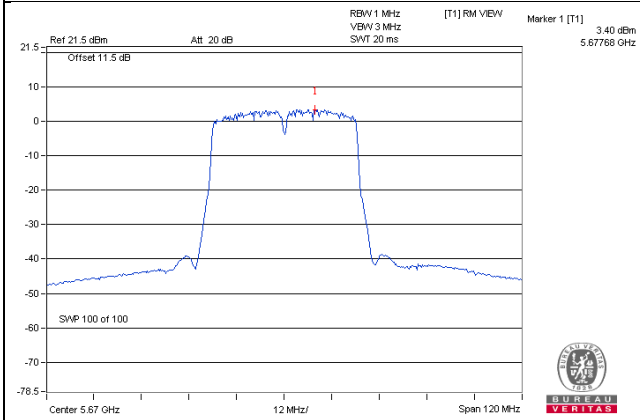
**802.11a\_Chain 1 / CH116**



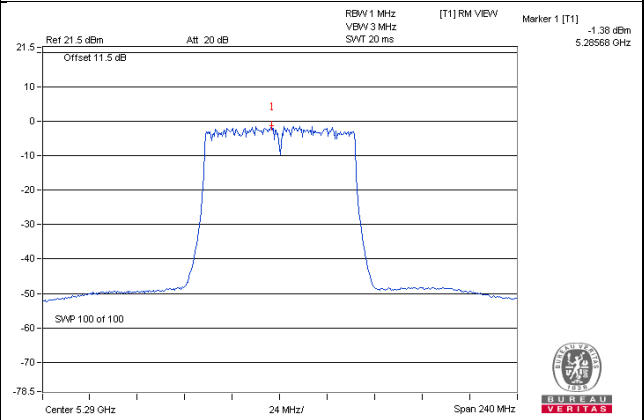
**802.11ac (VHT20)\_Chain 2 / CH116**



**802.11ac (VHT40)\_Chain 1 / CH134**



**802.11ac (VHT80)\_Chain 1 / CH58**



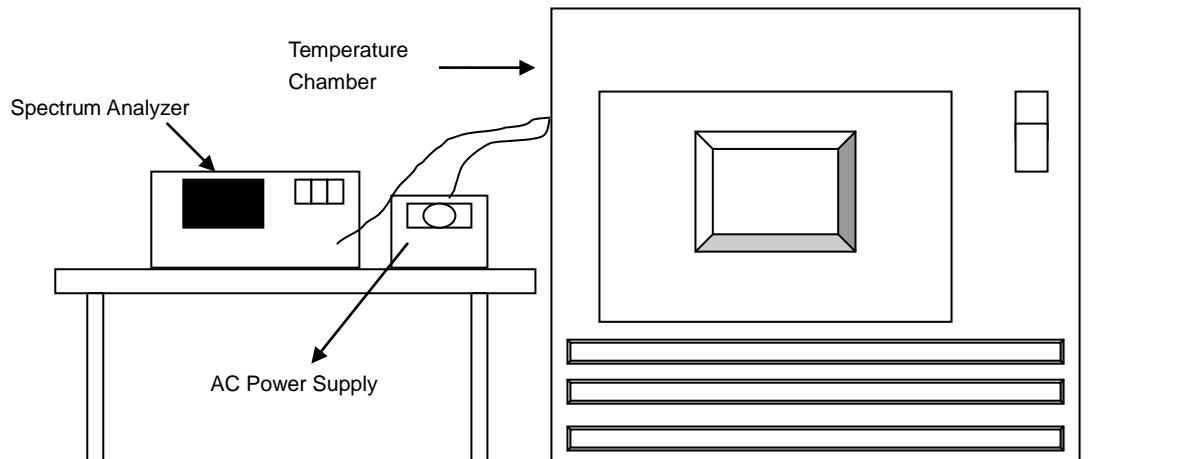


## 4.6 Frequency Stability Measurement

### 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 AC 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 (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	5260.0109	PASS	5260.01	PASS	5260.0066	PASS	5260.007	PASS
40	120	5259.9963	PASS	5259.9973	PASS	5259.9958	PASS	5259.9953	PASS
30	120	5259.9938	PASS	5259.991	PASS	5259.9902	PASS	5259.9945	PASS
20	120	5260.0142	PASS	5260.013	PASS	5260.0136	PASS	5260.0123	PASS
10	120	5260.0062	PASS	5260.0022	PASS	5260.0057	PASS	5260.003	PASS
0	120	5259.9844	PASS	5259.9881	PASS	5259.9858	PASS	5259.9865	PASS
-10	120	5260.0084	PASS	5260.0076	PASS	5260.0085	PASS	5260.0063	PASS
-20	120	5260.0054	PASS	5260.0027	PASS	5260.0009	PASS	5260.0015	PASS
-30	120	5259.9913	PASS	5259.9889	PASS	5259.9927	PASS	5259.9898	PASS

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	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	5260.0134	PASS	5260.0132	PASS	5260.0143	PASS	5260.0133	PASS
	120	5260.0142	PASS	5260.013	PASS	5260.0136	PASS	5260.0123	PASS
	102	5260.0137	PASS	5260.0122	PASS	5260.0129	PASS	5260.0129	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 accredited and approved according to ISO/IEC 17025.

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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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