

## FCC Test Report (WLAN)

**Report No.:** RF180430E08-1

**FCC ID:** SUZ-WB01

**Test Model:** WB01

**Received Date:** Apr. 30, 2018

**Test Date:** May 07 to 22, 2018

**Issued Date:** June 21, 2018

**Applicant:** Coretronic Corp.

**Address:** No. 11, Li Hsing Rd, Science-Based Industrial Park, Hsinchu, Taiwan.

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location :** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

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



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### Release Control Record

Issue No.	Description	Date Issued
RF180430E08-1	Original release.	June 21, 2018

## 1 Certificate of Conformity

**Product:** WiFi 11a/b/g/n/ac 2T2R and BT4.0 Module

**Brand:** Coretronic

**Test Model:** WB01

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Coretronic Corp.

**Test Date:** May 07 to 22, 2018

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

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

**Prepared by :** Wendy Wu , **Date:** June 21, 2018  
Wendy Wu / Specialist

**Approved by :** May Chen , **Date:** June 21, 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 Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.98dB at 0.19687MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz, 15600.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

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

### 2.1 Measurement Uncertainty

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

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

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (WLAN)

Product	WiFi 11a/b/g/n/ac 2T2R and BT4.0 Module
Brand	Coretronic
Test Model	WB01
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	<b>2.4GHz:</b> 2.412 ~ 2.462GHz <b>5GHz:</b> 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	<b>2.4GHz:</b> 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 <b>5GHz:</b> 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	<b>2.4GHz:</b> 371.435mW <b>5GHz:</b> <b>5.18 ~ 5.24GHz:</b> 131.287mW <b>5.745 ~ 5.825GHz:</b> 233.814mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are WLAN and Bluetooth technology used for the EUT.
2. Simultaneously transmission condition.

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

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

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

<b>For WLAN</b>					
Ant No.	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector Type	Cable Length
1	3.61	2.4~2.4835	FPCB	i-pex(MHF)	230mm
	5.55	5.15~5.85			
2	6.47	2.4~2.4835	FPCB	i-pex(MHF)	230mm
	3.94	5.15~5.85			
<b>For Bluetooth</b>					
Ant No.	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector Type	Cable Length
1	5.44	2.4~2.4835	FPCB	i-pex(MHF)	170mm

4. The EUT incorporates a MIMO function.

<b>2.4GHz Band</b>			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
<b>5GHz Band</b>			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note: 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)

5. 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 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

#### FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	-

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's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

#### **Radiated Emission Test (Above 1GHz):**

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

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

#### **Radiated Emission Test (Below 1GHz):**

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDM	BPSK	6

### **Power Line Conducted Emission Test:**

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDM	BPSK	6

### **Antenna Port Conducted Measurement:**

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

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

### **Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	20deg. C, 64%RH	120Vac, 60Hz	Eason Tseng
RE $<$ 1G	23deg. C, 67%RH	120Vac, 60Hz	Frank Chuang
PLC	23deg. C, 74%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

### 3.3 Duty Cycle of Test Signal

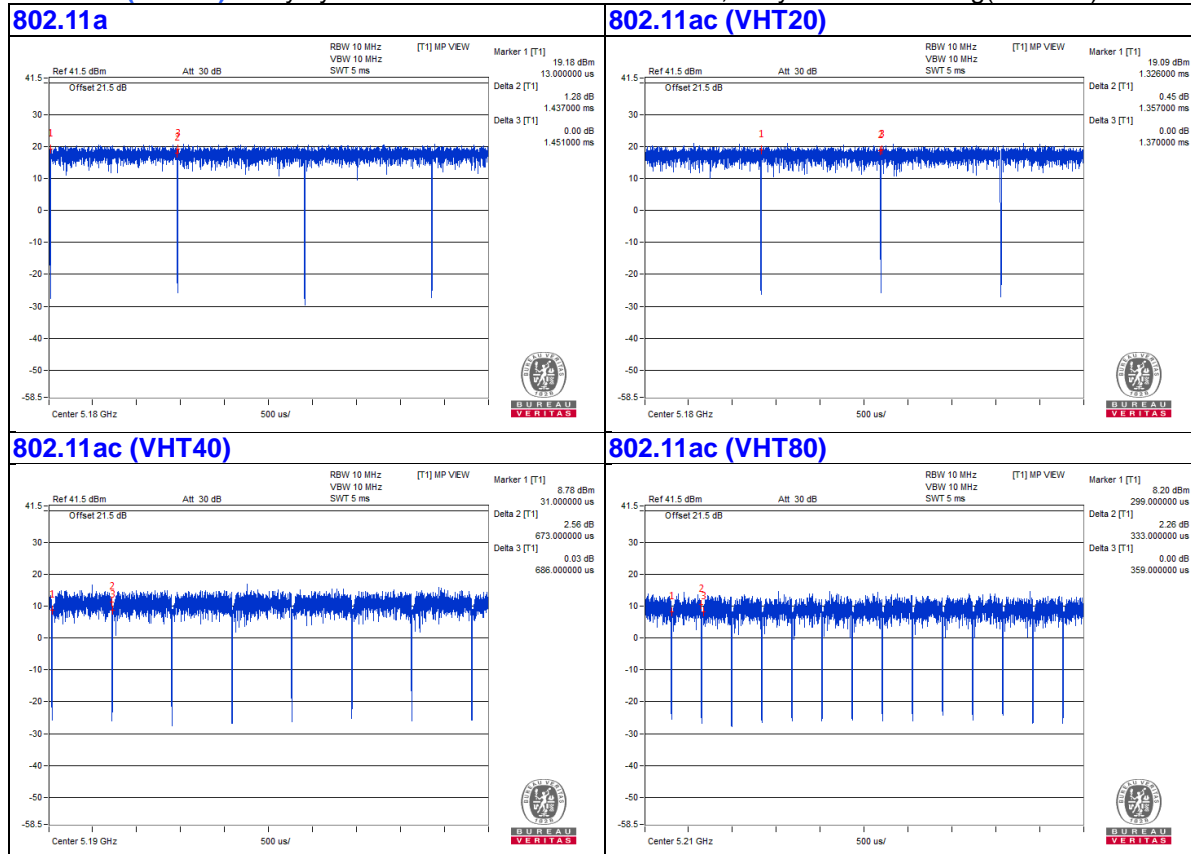
If duty cycle of test signal is < 98%, duty factor shall be considered.

**802.11a:** Duty cycle = 1.437 ms/1.451 ms = 0.99

**802.11ac (VHT20):** Duty cycle = 1.357 ms/1.37 ms = 0.991

**802.11ac (VHT40):** Duty cycle = 0.673 ms/0.686 ms = 0.981

**802.11ac (VHT80):** Duty cycle = 0.333 ms/0.359 ms = 0.928, Duty factor =  $10 * \log(1/0.928) = 0.33$



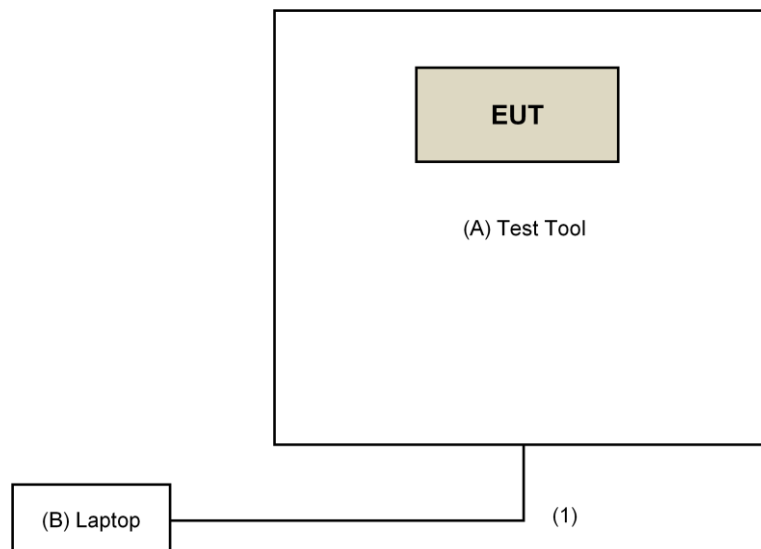
### 3.4 Description of Support Units

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.	Test Tool	NA	NA	NA	NA	Supplied by client
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	2	Yes	0	Supplied by client

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standard

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

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

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

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

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

#### NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" 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:

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

## 4.1.2 Test Instruments

## For OOB test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

**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: May 07, 2018



**For other test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: May 11 to 22, 2018

#### 4.1.3 Test Procedure

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

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

##### **NOTE:**

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

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

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

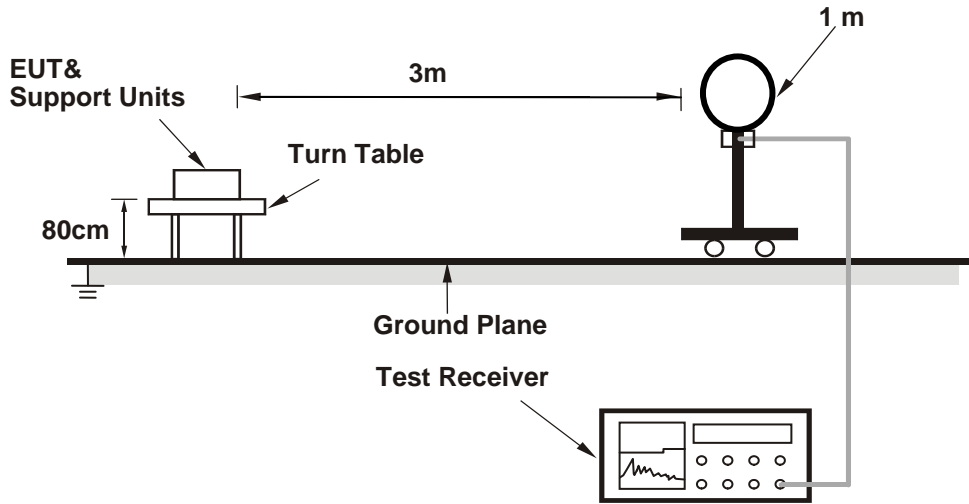
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

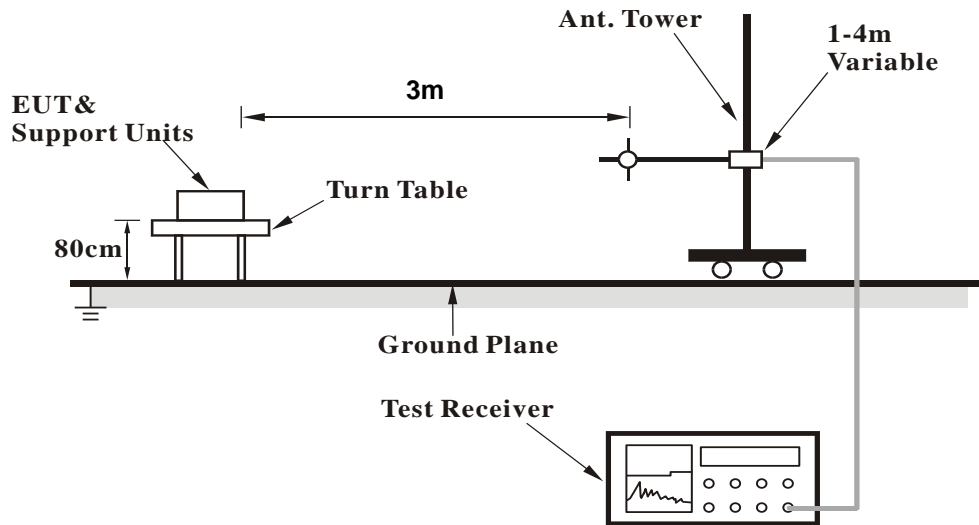
No deviation.

#### 4.1.5 Test Setup

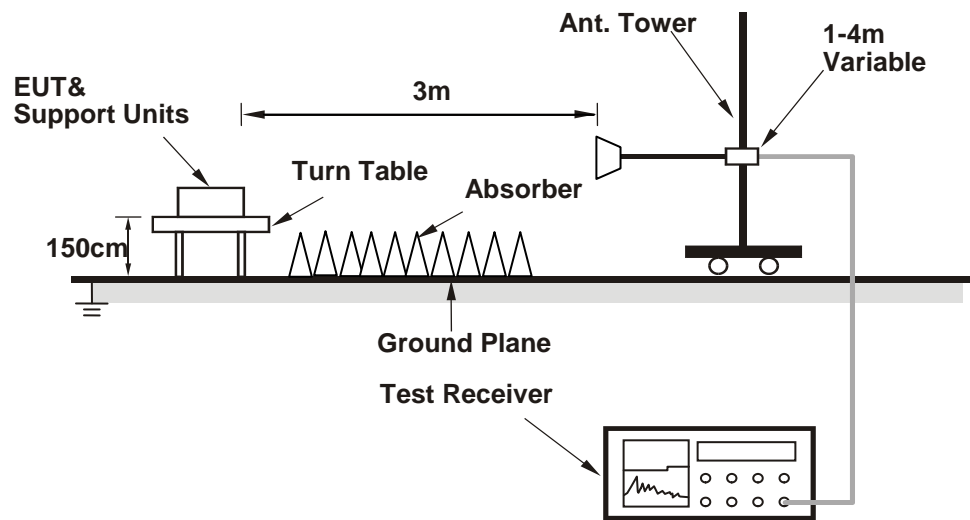
##### For Radiated emission below 30MHz



##### 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

- Placed the EUT on the testing table.
- Controlling software (MT7662 QA V1.0.3.14) 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 36	<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	61.3 PK	74.0	-12.7	1.01 H	279	58.3	3.0
2	5150.00	47.2 AV	54.0	-6.8	1.01 H	279	44.2	3.0
3	*5180.00	111.7 PK			1.01 H	279	108.9	2.8
4	*5180.00	100.8 AV			1.01 H	279	98.0	2.8
5	#10360.00	55.8 PK	74.0	-18.2	1.24 H	79	43.4	12.4
6	#10360.00	42.4 AV	54.0	-11.6	1.24 H	79	30.0	12.4
7	15540.00	68.8 PK	74.0	-5.2	1.25 H	277	56.0	12.8
8	15540.00	53.6 AV	54.0	-0.4	1.25 H	277	40.8	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.5 PK	74.0	-13.5	3.66 V	109	57.5	3.0
2	5150.00	46.8 AV	54.0	-7.2	3.66 V	109	43.8	3.0
3	*5180.00	101.3 PK			3.66 V	109	98.5	2.8
4	*5180.00	91.5 AV			3.66 V	109	88.7	2.8
5	#10360.00	54.5 PK	74.0	-19.5	1.37 V	277	42.1	12.4
6	#10360.00	41.4 AV	54.0	-12.6	1.37 V	277	29.0	12.4
7	15540.00	64.7 PK	74.0	-9.3	1.17 V	82	51.9	12.8
8	15540.00	49.1 AV	54.0	-4.9	1.17 V	82	36.3	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 40	<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	*5200.00	107.8 PK			1.00 H	325	105.1	2.7
2	*5200.00	99.1 AV			1.00 H	325	96.4	2.7
3	#10400.00	55.1 PK	74.0	-18.9	1.31 H	84	42.6	12.5
4	#10400.00	41.9 AV	54.0	-12.1	1.31 H	84	29.4	12.5
5	15600.00	66.2 PK	74.0	-7.8	1.21 H	253	53.4	12.8
6	15600.00	53.9 AV	54.0	-0.1	1.21 H	253	41.1	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	*5200.00	100.4 PK			3.63 V	94	97.7	2.7
2	*5200.00	90.8 AV			3.63 V	94	88.1	2.7
3	#10400.00	53.9 PK	74.0	-20.1	1.36 V	287	41.4	12.5
4	#10400.00	40.9 AV	54.0	-13.1	1.36 V	287	28.4	12.5
5	15600.00	64.7 PK	74.0	-9.3	1.26 V	103	51.9	12.8
6	15600.00	48.9 AV	54.0	-5.1	1.26 V	103	36.1	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 48	<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	*5240.00	112.5 PK			1.00 H	129	110.0	2.5
2	*5240.00	102.4 AV			1.00 H	129	99.9	2.5
3	5350.00	47.9 PK	74.0	-26.1	1.00 H	129	45.3	2.6
4	5350.00	36.8 AV	54.0	-17.2	1.00 H	129	34.2	2.6
5	#10480.00	56.2 PK	74.0	-17.8	1.21 H	78	43.2	13.0
6	#10480.00	42.8 AV	54.0	-11.2	1.21 H	78	29.8	13.0
7	15720.00	68.1 PK	74.0	-5.9	1.14 H	75	55.7	12.4
8	15720.00	53.3 AV	54.0	-0.7	1.14 H	75	40.9	12.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	102.1 PK			3.63 V	103	99.6	2.5
2	*5240.00	92.3 AV			3.63 V	103	89.8	2.5
3	5350.00	46.7 PK	74.0	-27.3	3.63 V	103	44.1	2.6
4	5350.00	36.2 AV	54.0	-17.8	3.63 V	103	33.6	2.6
5	#10480.00	54.6 PK	74.0	-19.4	1.32 V	276	41.6	13.0
6	#10480.00	42.1 AV	54.0	-11.9	1.32 V	276	29.1	13.0
7	15720.00	65.4 PK	74.0	-8.6	1.22 V	88	53.0	12.4
8	15720.00	50.3 AV	54.0	-3.7	1.22 V	88	37.9	12.4

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 149	<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	#5626.26	56.4 PK	68.2	-11.8	1.04 H	244	53.1	3.3
2	*5745.00	117.5 PK			1.04 H	244	114.2	3.3
3	*5745.00	106.6 AV			1.04 H	244	103.3	3.3
4	#5963.97	56.9 PK	68.2	-11.3	1.04 H	244	53.4	3.5
5	11490.00	46.8 PK	74.0	-27.2	2.03 H	221	33.4	13.4
6	11490.00	35.2 AV	54.0	-18.8	2.03 H	221	21.8	13.4
7	#17235.00	59.7 PK	74.0	-14.3	1.26 H	260	43.0	16.7
8	#17235.00	46.6 AV	54.0	-7.4	1.26 H	260	29.9	16.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.31	57.0 PK	68.2	-11.2	2.29 V	116	53.8	3.2
2	*5745.00	106.6 PK			3.64 V	109	103.3	3.3
3	*5745.00	95.7 AV			3.64 V	109	92.4	3.3
4	#6003.42	56.8 PK	68.2	-11.4	2.29 V	116	53.1	3.7
5	11490.00	45.5 PK	74.0	-28.5	1.14 V	250	32.1	13.4
6	11490.00	34.6 AV	54.0	-19.4	1.14 V	250	21.2	13.4
7	#17235.00	59.6 PK	74.0	-14.4	1.24 V	12	42.9	16.7
8	#17235.00	46.3 AV	54.0	-7.7	1.24 V	12	29.6	16.7

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 157	<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	#5617.16	56.7 PK	68.2	-11.5	1.01 H	244	53.4	3.3
2	*5785.00	117.3 PK			1.01 H	244	114.0	3.3
3	*5785.00	106.3 AV			1.01 H	244	103.0	3.3
4	#5944.78	56.3 PK	68.2	-11.9	1.01 H	244	52.8	3.5
5	11570.00	47.3 PK	74.0	-26.7	2.01 H	210	33.9	13.4
6	11570.00	35.6 AV	54.0	-18.4	2.01 H	210	22.2	13.4
7	#17355.00	59.9 PK	74.0	-14.1	1.29 H	259	42.6	17.3
8	#17355.00	46.6 AV	54.0	-7.4	1.29 H	259	29.3	17.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5574.34	56.6 PK	68.2	-11.6	2.71 V	299	53.4	3.2
2	*5785.00	107.5 PK			3.65 V	122	104.2	3.3
3	*5785.00	97.5 AV			3.65 V	122	94.2	3.3
4	#5956.60	55.7 PK	68.2	-12.5	2.71 V	299	52.2	3.5
5	11570.00	45.5 PK	74.0	-28.5	1.12 V	250	32.1	13.4
6	11570.00	34.8 AV	54.0	-19.2	1.12 V	250	21.4	13.4
7	#17355.00	60.1 PK	74.0	-13.9	1.25 V	27	42.8	17.3
8	#17355.00	46.8 AV	54.0	-7.2	1.25 V	27	29.5	17.3

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 165	<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	#5596.45	56.7 PK	68.2	-11.5	1.13 H	243	53.5	3.2
2	*5825.00	116.5 PK			1.13 H	243	113.0	3.5
3	*5825.00	106.1 AV			1.13 H	243	102.6	3.5
4	#6011.55	57.0 PK	68.2	-11.2	1.13 H	243	53.3	3.7
5	11650.00	46.5 PK	74.0	-27.5	2.00 H	218	33.2	13.3
6	11650.00	35.1 AV	54.0	-18.9	2.00 H	218	21.8	13.3
7	#17475.00	59.4 PK	74.0	-14.6	1.30 H	245	41.2	18.2
8	#17475.00	46.1 AV	54.0	-7.9	1.30 H	245	27.9	18.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5586.68	56.1 PK	68.2	-12.1	3.30 V	284	52.9	3.2
2	*5825.00	108.3 PK			3.71 V	124	104.8	3.5
3	*5825.00	98.2 AV			3.71 V	124	94.7	3.5
4	#5934.58	56.7 PK	68.2	-11.5	3.30 V	284	53.1	3.6
5	11650.00	44.8 PK	74.0	-29.2	1.17 V	245	31.5	13.3
6	11650.00	34.1 AV	54.0	-19.9	1.17 V	245	20.8	13.3
7	#17475.00	59.5 PK	74.0	-14.5	1.22 V	6	41.3	18.2
8	#17475.00	46.4 AV	54.0	-7.6	1.22 V	6	28.2	18.2

**REMARKS:**

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

**802.11ac (VHT20)**

<b>CHANNEL</b>	TX Channel 36	<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	56.9 PK	74.0	-17.1	1.05 H	301	53.9	3.0
2	5150.00	45.7 AV	54.0	-8.3	1.05 H	301	42.7	3.0
3	*5180.00	111.4 PK			1.05 H	301	108.6	2.8
4	*5180.00	101.8 AV			1.05 H	301	99.0	2.8
5	#10360.00	55.5 PK	74.0	-18.5	1.29 H	76	43.1	12.4
6	#10360.00	42.0 AV	54.0	-12.0	1.29 H	76	29.6	12.4
7	15540.00	67.4 PK	74.0	-6.6	1.14 H	250	54.6	12.8
8	15540.00	53.6 AV	54.0	-0.4	1.14 H	250	40.8	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.6 PK	74.0	-13.4	3.66 V	99	57.6	3.0
2	5150.00	46.7 AV	54.0	-7.3	3.66 V	99	43.7	3.0
3	*5180.00	102.5 PK			3.66 V	99	99.7	2.8
4	*5180.00	92.1 AV			3.66 V	99	89.3	2.8
5	#10360.00	54.3 PK	74.0	-19.7	1.37 V	269	41.9	12.4
6	#10360.00	41.2 AV	54.0	-12.8	1.37 V	269	28.8	12.4
7	15540.00	64.5 PK	74.0	-9.5	1.11 V	78	51.7	12.8
8	15540.00	49.0 AV	54.0	-5.0	1.11 V	78	36.2	12.8

**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 40	<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	*5200.00	109.4 PK			1.02 H	302	106.7	2.7
2	*5200.00	99.5 AV			1.02 H	302	96.8	2.7
3	#10400.00	55.8 PK	74.0	-18.2	1.21 H	87	43.3	12.5
4	#10400.00	42.5 AV	54.0	-11.5	1.21 H	87	30.0	12.5
5	15600.00	66.1 PK	74.0	-7.9	1.22 H	250	53.3	12.8
6	15600.00	53.8 AV	54.0	-0.2	1.22 H	250	41.0	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	102.1 PK			3.66 V	117	99.4	2.7
2	*5200.00	91.7 AV			3.66 V	117	89.0	2.7
3	#10400.00	54.6 PK	74.0	-19.4	1.32 V	289	42.1	12.5
4	#10400.00	41.6 AV	54.0	-12.4	1.32 V	289	29.1	12.5
5	15600.00	64.0 PK	74.0	-10.0	1.11 V	70	51.2	12.8
6	15600.00	48.7 AV	54.0	-5.3	1.11 V	70	35.9	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 48	<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	*5240.00	111.9 PK			1.08 H	303	109.4	2.5
2	*5240.00	102.3 AV			1.08 H	303	99.8	2.5
3	5350.00	49.4 PK	74.0	-24.6	1.08 H	309	46.8	2.6
4	5350.00	37.9 AV	54.0	-16.1	1.08 H	309	35.3	2.6
5	#10480.00	55.8 PK	74.0	-18.2	1.25 H	64	42.8	13.0
6	#10480.00	42.5 AV	54.0	-11.5	1.25 H	64	29.5	13.0
7	15720.00	67.2 PK	74.0	-6.8	1.20 H	252	54.8	12.4
8	15720.00	52.9 AV	54.0	-1.1	1.20 H	252	40.5	12.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	103.7 PK			3.63 V	119	101.2	2.5
2	*5240.00	93.9 AV			3.63 V	119	91.4	2.5
3	5350.00	46.7 PK	74.0	-27.3	3.63 V	119	44.1	2.6
4	5350.00	36.0 AV	54.0	-18.0	3.63 V	119	33.4	2.6
5	#10480.00	54.0 PK	74.0	-20.0	1.33 V	281	41.0	13.0
6	#10480.00	41.1 AV	54.0	-12.9	1.33 V	281	28.1	13.0
7	15720.00	64.2 PK	74.0	-9.8	1.17 V	67	51.8	12.4
8	15720.00	48.7 AV	54.0	-5.3	1.17 V	67	36.3	12.4

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 149	<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	#5641.92	57.7 PK	68.2	-10.5	1.09 H	234	54.5	3.2
2	*5745.00	115.8 PK			1.09 H	234	112.5	3.3
3	*5745.00	105.2 AV			1.09 H	234	101.9	3.3
4	#5967.37	56.7 PK	68.2	-11.5	1.09 H	234	53.1	3.6
5	11490.00	47.0 PK	74.0	-27.0	2.00 H	204	33.6	13.4
6	11490.00	35.6 AV	54.0	-18.4	2.00 H	204	22.2	13.4
7	#17235.00	58.6 PK	74.0	-15.4	1.25 H	243	41.9	16.7
8	#17235.00	45.1 AV	54.0	-8.9	1.25 H	243	28.4	16.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5631.46	56.4 PK	68.2	-11.8	2.29 V	117	53.2	3.2
2	*5745.00	108.3 PK			2.29 V	117	105.0	3.3
3	*5745.00	98.2 AV			2.29 V	117	94.9	3.3
4	#5992.76	56.0 PK	68.2	-12.2	2.29 V	117	52.3	3.7
5	11490.00	44.5 PK	74.0	-29.5	1.15 V	243	31.1	13.4
6	11490.00	34.1 AV	54.0	-19.9	1.15 V	243	20.7	13.4
7	#17235.00	59.6 PK	74.0	-14.4	1.24 V	1	42.9	16.7
8	#17235.00	46.5 AV	54.0	-7.5	1.24 V	1	29.8	16.7

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 157	<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	#5604.99	56.8 PK	68.2	-11.4	1.14 H	233	53.5	3.3
2	*5785.00	114.8 PK			1.14 H	233	111.5	3.3
3	*5785.00	104.5 AV			1.14 H	233	101.2	3.3
4	#5966.44	56.6 PK	68.2	-11.6	1.14 H	233	53.1	3.5
5	11570.00	46.7 PK	74.0	-27.3	2.01 H	205	33.3	13.4
6	11570.00	35.2 AV	54.0	-18.8	2.01 H	205	21.8	13.4
7	#17355.00	58.8 PK	74.0	-15.2	1.24 H	258	41.5	17.3
8	#17355.00	45.6 AV	54.0	-8.4	1.24 H	258	28.3	17.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5594.79	57.9 PK	68.2	-10.3	2.97 V	116	54.7	3.2
2	*5785.00	107.4 PK			2.97 V	116	104.1	3.3
3	*5785.00	97.2 AV			2.97 V	116	93.9	3.3
4	#6016.79	57.2 PK	68.2	-11.0	2.97 V	116	53.4	3.8
5	11570.00	45.4 PK	74.0	-28.6	1.12 V	255	32.0	13.4
6	11570.00	34.4 AV	54.0	-19.6	1.12 V	255	21.0	13.4
7	#17355.00	59.4 PK	74.0	-14.6	1.25 V	2	42.1	17.3
8	#17355.00	46.0 AV	54.0	-8.0	1.25 V	2	28.7	17.3

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 165	<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	#5620.88	56.2 PK	68.2	-12.0	1.07 H	228	52.9	3.3
2	*5825.00	114.1 PK			1.07 H	228	110.6	3.5
3	*5825.00	104.0 AV			1.07 H	228	100.5	3.5
4	#6003.11	57.2 PK	68.2	-11.0	1.07 H	228	53.5	3.7
5	11650.00	46.1 PK	74.0	-27.9	1.95 H	221	32.8	13.3
6	11650.00	34.8 AV	54.0	-19.2	1.95 H	221	21.5	13.3
7	#17475.00	57.8 PK	74.0	-16.2	1.26 H	261	39.6	18.2
8	#17475.00	45.1 AV	54.0	-8.9	1.26 H	261	26.9	18.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5573.76	56.2 PK	68.2	-12.0	3.13 V	300	53.0	3.2
2	*5825.00	105.7 PK			3.13 V	300	102.2	3.5
3	*5825.00	95.6 AV			3.13 V	300	92.1	3.5
4	#5994.60	56.0 PK	68.2	-12.2	3.13 V	300	52.3	3.7
5	11650.00	44.2 PK	74.0	-29.8	1.17 V	253	30.9	13.3
6	11650.00	33.8 AV	54.0	-20.2	1.17 V	253	20.5	13.3
7	#17475.00	58.8 PK	74.0	-15.2	1.21 V	8	40.6	18.2
8	#17475.00	45.9 AV	54.0	-8.1	1.21 V	8	27.7	18.2

**REMARKS:**

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

802.11ac (VHT40)

<b>CHANNEL</b>	TX Channel 38	<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	65.1 PK	74.0	-8.9	1.06 H	287	62.1	3.0
2	5150.00	53.7 AV	54.0	-0.3	1.06 H	287	50.7	3.0
3	*5190.00	106.4 PK			1.06 H	287	103.6	2.8
4	*5190.00	97.5 AV			1.06 H	287	94.7	2.8
5	5350.00	48.6 PK	74.0	-25.4	1.06 H	287	46.0	2.6
6	5350.00	36.9 AV	54.0	-17.1	1.06 H	287	34.3	2.6
7	#10380.00	52.1 PK	74.0	-21.9	1.16 H	93	39.7	12.4
8	#10380.00	37.5 AV	54.0	-16.5	1.16 H	93	25.1	12.4
9	15570.00	63.1 PK	74.0	-10.9	1.28 H	253	50.3	12.8
10	15570.00	51.8 AV	54.0	-2.2	1.28 H	253	39.0	12.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.5 PK	74.0	-9.5	3.72 V	118	61.5	3.0
2	5150.00	48.7 AV	54.0	-5.3	3.72 V	118	45.7	3.0
3	*5190.00	98.1 PK			3.72 V	118	95.3	2.8
4	*5190.00	89.4 AV			3.72 V	118	86.6	2.8
5	5350.00	47.1 PK	74.0	-26.9	3.72 V	118	44.5	2.6
6	5350.00	36.5 AV	54.0	-17.5	3.72 V	118	33.9	2.6
7	#10380.00	48.2 PK	74.0	-25.8	1.37 V	277	35.8	12.4
8	#10380.00	33.8 AV	54.0	-20.2	1.37 V	277	21.4	12.4
9	15570.00	57.3 PK	74.0	-16.7	1.17 V	77	44.5	12.8
10	15570.00	43.5 AV	54.0	-10.5	1.17 V	77	30.7	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 46	<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	*5230.00	108.9 PK			1.16 H	291	106.4	2.5
2	*5230.00	99.1 AV			1.16 H	291	96.6	2.5
3	5350.00	55.1 PK	74.0	-18.9	1.16 H	291	52.5	2.6
4	5350.00	42.2 AV	54.0	-11.8	1.16 H	291	39.6	2.6
5	#10460.00	51.5 PK	74.0	-22.5	1.15 H	84	38.6	12.9
6	#10460.00	37.0 AV	54.0	-17.0	1.15 H	84	24.1	12.9
7	15690.00	67.1 PK	74.0	-6.9	1.21 H	252	54.7	12.4
8	15690.00	53.2 AV	54.0	-0.8	1.21 H	252	40.8	12.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	100.6 PK			3.69 V	120	98.1	2.5
2	*5230.00	91.6 AV			3.69 V	120	89.1	2.5
3	5350.00	46.7 PK	74.0	-27.3	3.69 V	120	44.1	2.6
4	5350.00	36.3 AV	54.0	-17.7	3.69 V	120	33.7	2.6
5	#10460.00	48.3 PK	74.0	-25.7	1.39 V	281	35.4	12.9
6	#10460.00	34.0 AV	54.0	-20.0	1.39 V	281	21.1	12.9
7	15690.00	57.7 PK	74.0	-16.3	1.22 V	74	45.3	12.4
8	15690.00	44.0 AV	54.0	-10.0	1.22 V	74	31.6	12.4

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 151	<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	#5644.76	58.3 PK	68.2	-9.9	1.00 H	231	55.1	3.2
2	*5755.00	111.8 PK			1.00 H	231	108.5	3.3
3	*5755.00	101.4 AV			1.00 H	231	98.1	3.3
4	#5997.56	56.3 PK	68.2	-11.9	1.00 H	231	52.6	3.7
5	11510.00	42.5 PK	74.0	-31.5	1.95 H	227	29.1	13.4
6	11510.00	31.6 AV	54.0	-22.4	1.95 H	227	18.2	13.4
7	#17265.00	52.3 PK	74.0	-21.7	1.96 H	351	35.5	16.8
8	#17265.00	39.3 AV	54.0	-14.7	1.96 H	351	22.5	16.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5610.91	56.2 PK	68.2	-12.0	2.20 V	134	52.9	3.3
2	*5755.00	102.9 PK			3.60 V	95	99.6	3.3
3	*5755.00	92.2 AV			3.60 V	95	88.9	3.3
4	#5984.45	56.8 PK	68.2	-11.4	2.20 V	134	53.1	3.7
5	11510.00	42.3 PK	74.0	-31.7	1.32 V	284	28.9	13.4
6	11510.00	30.1 AV	54.0	-23.9	1.32 V	284	16.7	13.4
7	#17265.00	50.9 PK	74.0	-23.1	1.12 V	88	34.1	16.8
8	#17265.00	36.4 AV	54.0	-17.6	1.12 V	88	19.6	16.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 159	<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	#5609.16	56.5 PK	68.2	-11.7	1.00 H	232	53.2	3.3
2	*5795.00	111.2 PK			1.00 H	232	107.9	3.3
3	*5795.00	100.9 AV			1.00 H	232	97.6	3.3
4	#5993.60	56.7 PK	68.2	-11.5	1.00 H	232	53.0	3.7
5	11590.00	42.0 PK	74.0	-32.0	1.91 H	214	28.6	13.4
6	11590.00	31.2 AV	54.0	-22.8	1.91 H	214	17.8	13.4
7	#17385.00	52.3 PK	74.0	-21.7	1.98 H	344	34.8	17.5
8	#17385.00	39.4 AV	54.0	-14.6	1.98 H	344	21.9	17.5

**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	#5623.78	56.4 PK	68.2	-11.8	3.95 V	115	53.1	3.3
2	*5795.00	103.3 PK			3.68 V	115	100.0	3.3
3	*5795.00	92.4 AV			3.68 V	115	89.1	3.3
4	#5980.30	56.5 PK	68.2	-11.7	3.95 V	115	52.8	3.7
5	11590.00	42.6 PK	74.0	-31.4	1.28 V	284	29.2	13.4
6	11590.00	30.5 AV	54.0	-23.5	1.28 V	284	17.1	13.4
7	#17385.00	51.1 PK	74.0	-22.9	1.15 V	95	33.6	17.5
8	#17385.00	36.8 AV	54.0	-17.2	1.15 V	95	19.3	17.5

**REMARKS:**

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

**802.11ac (VHT80)**

<b>CHANNEL</b>	TX Channel 42	<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	67.9 PK	74.0	-6.1	1.20 H	192	64.9	3.0
2	<b>5150.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.20 H</b>	<b>192</b>	<b>50.9</b>	<b>3.0</b>
3	*5210.00	100.6 PK			1.20 H	192	97.9	2.7
4	*5210.00	91.8 AV			1.20 H	192	89.1	2.7
5	5350.00	49.5 PK	74.0	-24.5	1.20 H	192	46.9	2.6
6	5350.00	39.0 AV	54.0	-15.0	1.20 H	192	36.4	2.6
7	#10420.00	45.6 PK	74.0	-28.4	1.22 H	76	33.0	12.6
8	#10420.00	32.3 AV	54.0	-21.7	1.22 H	76	19.7	12.6
9	15630.00	51.5 PK	74.0	-22.5	1.21 H	246	38.8	12.7
10	15630.00	42.2 AV	54.0	-11.8	1.21 H	246	29.5	12.7

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.0 PK	74.0	-22.0	3.82 V	347	49.0	3.0
2	5150.00	40.1 AV	54.0	-13.9	3.82 V	347	37.1	3.0
3	*5210.00	93.0 PK			3.82 V	347	90.3	2.7
4	*5210.00	83.8 AV			3.82 V	347	81.1	2.7
5	5350.00	48.2 PK	74.0	-25.8	3.82 V	347	45.6	2.6
6	5350.00	37.0 AV	54.0	-17.0	3.82 V	347	34.4	2.6
7	#10420.00	41.1 PK	74.0	-32.9	1.31 V	286	28.5	12.6
8	#10420.00	30.6 AV	54.0	-23.4	1.31 V	286	18.0	12.6
9	15630.00	46.9 PK	74.0	-27.1	1.12 V	86	34.2	12.7
10	15630.00	35.2 AV	54.0	-18.8	1.12 V	86	22.5	12.7

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 155	<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	#5650.62	68.0 PK	68.7	-0.7	1.02 H	231	64.8	3.2
2	*5775.00	108.8 PK			1.02 H	231	105.4	3.4
3	*5775.00	99.3 AV			1.02 H	231	95.9	3.4
4	#5935.52	64.9 PK	68.2	-3.3	1.02 H	231	61.3	3.6
5	11550.00	40.2 PK	74.0	-33.8	1.89 H	230	26.9	13.3
6	11550.00	30.1 AV	54.0	-23.9	1.89 H	230	16.8	13.3
7	#17325.00	45.2 PK	74.0	-28.8	1.36 H	263	28.1	17.1
8	#17325.00	34.3 AV	54.0	-19.7	1.36 H	263	17.2	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	#5654.16	67.6 PK	71.3	-3.7	3.88 V	69	64.3	3.3
2	*5775.00	99.5 PK			3.88 V	69	96.1	3.4
3	*5775.00	89.9 AV			3.88 V	69	86.5	3.4
4	#5932.16	57.9 PK	68.2	-10.3	3.88 V	69	54.3	3.6
5	11550.00	42.4 PK	74.0	-31.6	1.29 V	290	29.1	13.3
6	11550.00	30.3 AV	54.0	-23.7	1.29 V	290	17.0	13.3
7	#17325.00	43.0 PK	74.0	-31.0	1.10 V	102	25.9	17.1
8	#17325.00	31.1 AV	54.0	-22.9	1.10 V	102	14.0	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.

**Below 1GHz Data:**

**802.11a**

<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.34	33.2 QP	40.0	-6.8	2.00 H	59	41.2	-8.0
2	249.29	33.1 QP	46.0	-12.9	2.00 H	133	42.0	-8.9
3	374.98	25.6 QP	46.0	-20.4	1.00 H	77	30.4	-4.8
4	600.02	36.4 QP	46.0	-9.6	1.50 H	284	35.6	0.8
5	748.24	33.3 QP	46.0	-12.7	2.00 H	332	30.2	3.1
6	871.96	37.1 QP	46.0	-8.9	1.00 H	166	32.2	4.9

**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	52.04	22.4 QP	40.0	-17.6	1.00 V	308	30.3	-7.9
2	99.11	21.3 QP	43.5	-22.2	2.00 V	360	33.7	-12.4
3	134.71	21.4 QP	43.5	-22.1	2.00 V	223	30.1	-8.7
4	303.42	20.8 QP	46.0	-25.2	1.00 V	232	27.8	-7.0
5	481.32	26.1 QP	46.0	-19.9	1.00 V	99	28.3	-2.2
6	600.00	37.4 QP	46.0	-8.6	1.00 V	50	36.6	0.8

**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



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

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

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

### 4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
Fixed attenuator EMEC	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: May 19, 2018

#### 4.2.3 Test Procedure

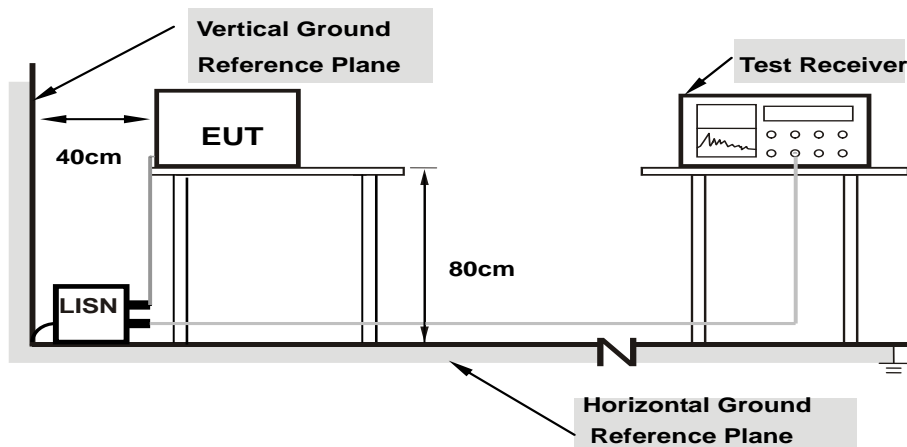
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Condition

Same as 4.1.6.

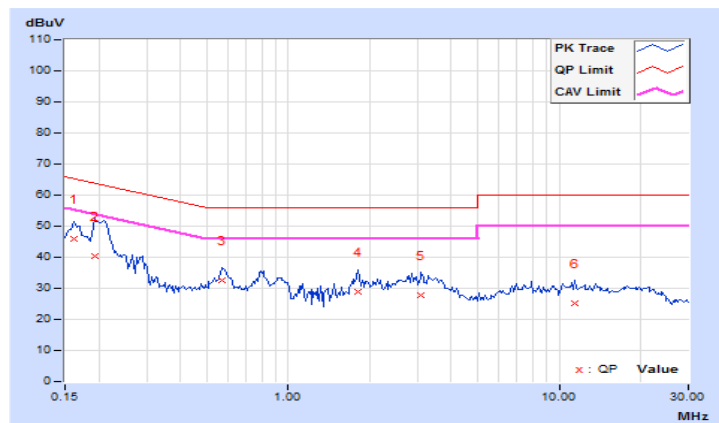
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.16172	10.04	35.89	22.54	45.93	32.58	65.38	55.38	-19.45
2	0.19297	10.06	30.24	26.81	40.30	36.87	63.91	53.91	-23.61	-17.04
3	0.57188	10.12	22.29	13.05	32.41	23.17	56.00	46.00	-23.59	-22.83
4	1.81641	10.18	18.84	12.97	29.02	23.15	56.00	46.00	-26.98	-22.85
5	3.07422	10.23	17.37	12.32	27.60	22.55	56.00	46.00	-28.40	-23.45
6	11.48828	10.63	14.66	9.84	25.29	20.47	60.00	50.00	-34.71	-29.53

#### Remarks:

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

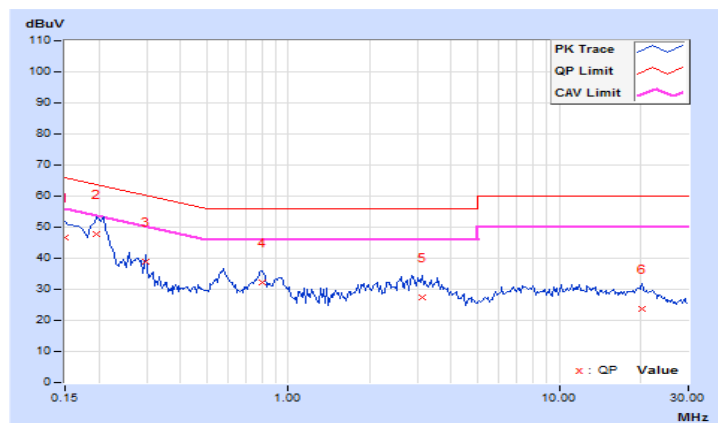


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.15000	9.94	36.85	25.15	46.79	35.09	66.00	56.00	-19.21	-20.91
<b>2</b>	<b>0.19687</b>	<b>9.96</b>	<b>37.80</b>	<b>23.11</b>	<b>47.76</b>	<b>33.07</b>	<b>63.74</b>	<b>53.74</b>	<b>-15.98</b>	<b>-20.67</b>
3	0.29844	9.98	28.87	10.50	38.85	20.48	60.29	50.29	-21.44	-29.81
4	0.80234	10.02	22.12	11.44	32.14	21.46	56.00	46.00	-23.86	-24.54
5	3.13672	10.11	17.17	12.34	27.28	22.45	56.00	46.00	-28.72	-23.55
6	20.34375	10.90	12.95	7.40	23.85	18.30	60.00	50.00	-36.15	-31.70

**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,

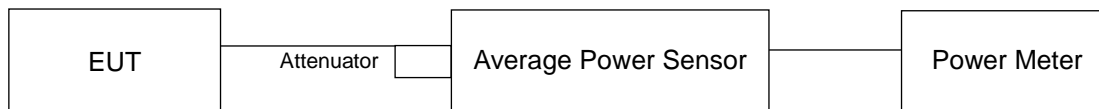
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

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



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

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.

#### 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

## 802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.42	17.36	109.658	20.40	24.00	Pass
40	5200	16.68	16.95	96.104	19.83	24.00	Pass
48	5240	17.92	18.41	131.287	21.18	24.00	Pass
149	5745	21.06	20.26	233.814	23.69	30.00	Pass
157	5785	20.91	20.10	225.639	23.53	30.00	Pass
165	5825	20.63	19.72	209.367	23.21	30.00	Pass

## 802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.12	16.95	101.068	20.05	24.00	Pass
40	5200	16.71	16.73	93.979	19.73	24.00	Pass
48	5240	16.86	16.78	96.172	19.83	24.00	Pass
149	5745	20.56	19.85	210.368	23.23	30.00	Pass
157	5785	20.71	20.06	219.152	23.41	30.00	Pass
165	5825	20.43	19.68	203.305	23.08	30.00	Pass

## 802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	13.36	13.48	43.961	16.43	24.00	Pass
46	5230	17.03	17.41	105.547	20.23	24.00	Pass
151	5755	20.51	19.89	209.959	23.22	30.00	Pass
159	5795	20.36	19.56	199.008	22.99	30.00	Pass

**802.11ac (VHT80)**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.92	14.75	60.9	17.85	24.00	Pass
155	5775	20.23	19.78	200.499	23.02	30.00	Pass



## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup



### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 Test Procedure

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

#### 4.4.4 Test Results

##### 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.12	17.52
40	5200	17.28	16.92
48	5240	17.88	17.40
149	5745	28.32	27.72
157	5785	26.64	26.88
165	5825	27.00	25.80

##### 802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.36	18.12
40	5200	18.24	17.88
48	5240	18.00	17.76
149	5745	27.96	27.72
157	5785	26.52	26.16
165	5825	28.08	27.24

**802.11ac (VHT40)**

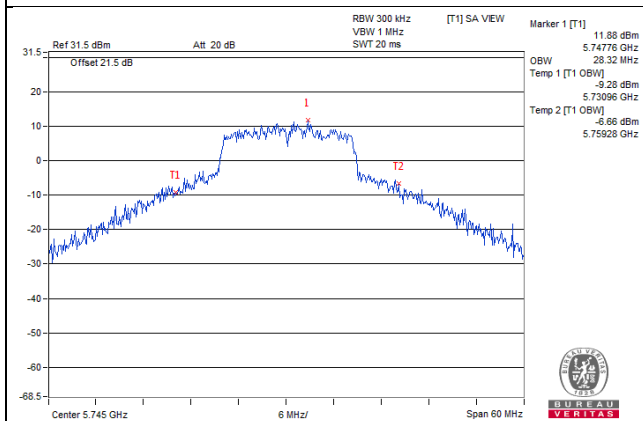
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.48	36.48
46	5230	37.20	36.96
151	5755	54.96	53.52
159	5795	53.76	57.36

**802.11ac (VHT80)**

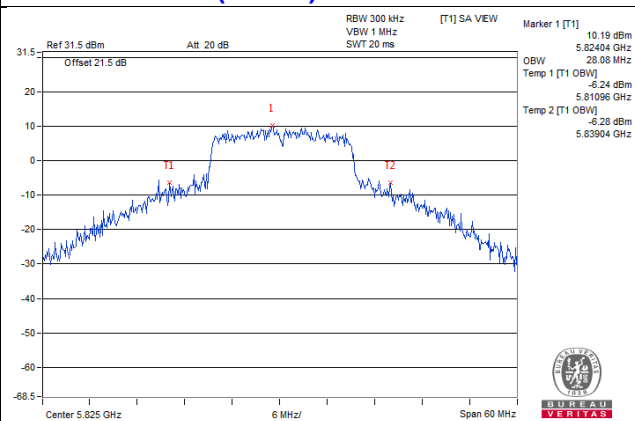
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.36	74.88
155	5775	96.48	86.88

### Spectrum Plot of Worst Value

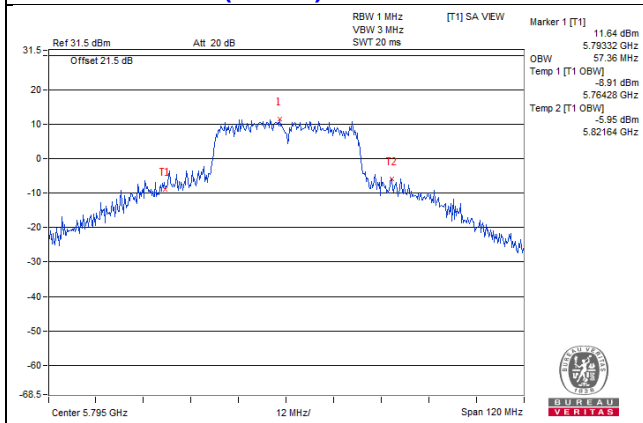
**802.11a / Chain 0 : CH149**



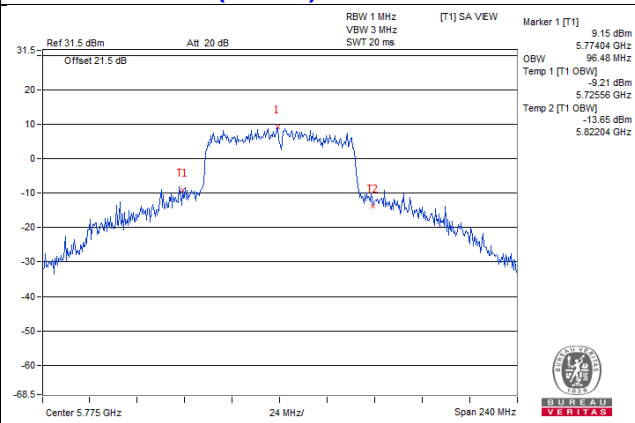
**802.11ac (VHT20) / Chain 0 : CH165**



**802.11ac (VHT40) / Chain 1 : CH159**

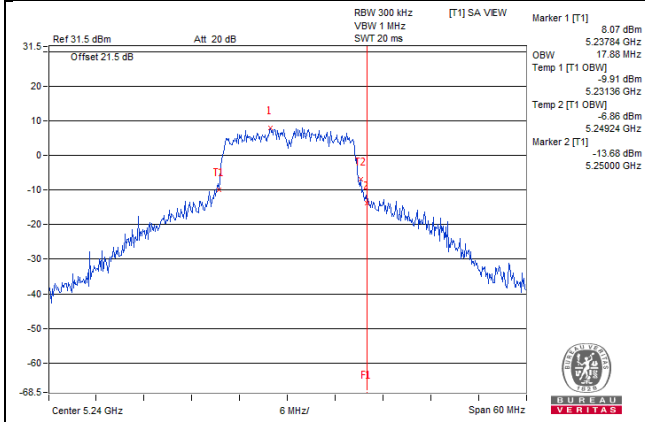


**802.11ac (VHT80) / Chain 0 : CH155**

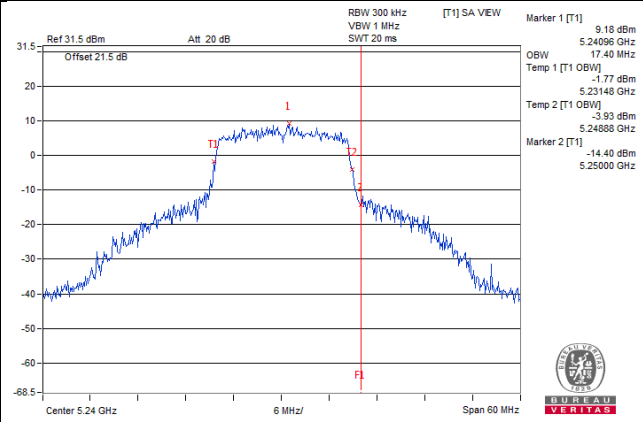


**Spectrum Plot for near by DFS band  
(DFS is required, if 99% OCP straddle into U-NII-2A band)**

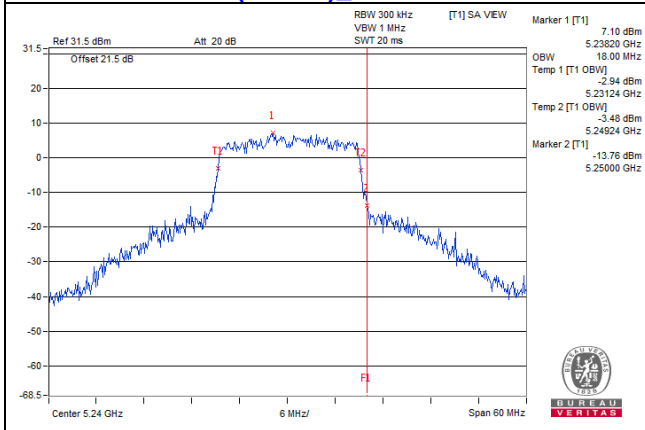
**802.11a\_Chain0 / CH48**



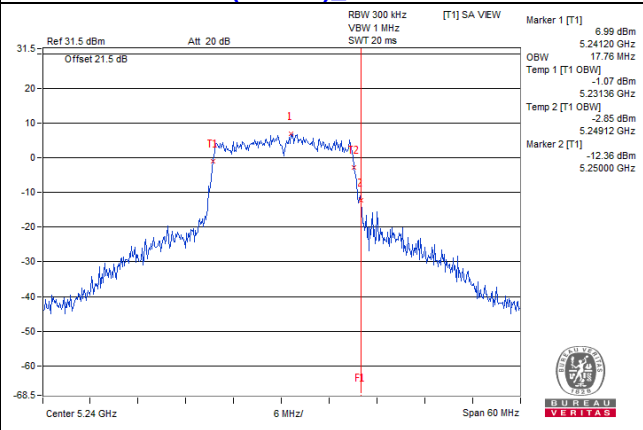
**802.11a\_Chain1 / CH48**



**802.11ac(VHT20)\_Chain0 / CH48**

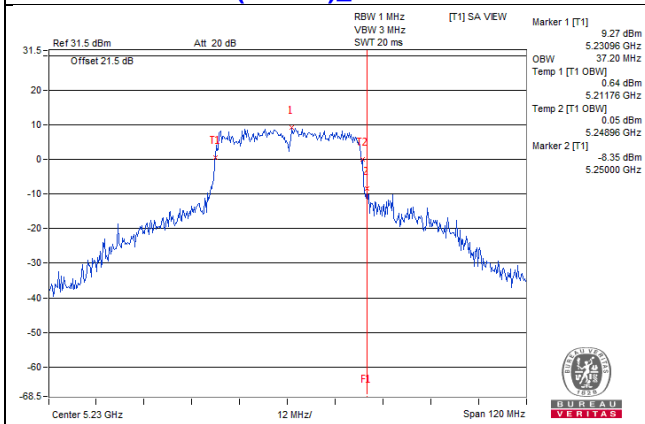


**802.11ac(VHT20)\_Chain1 / CH48**

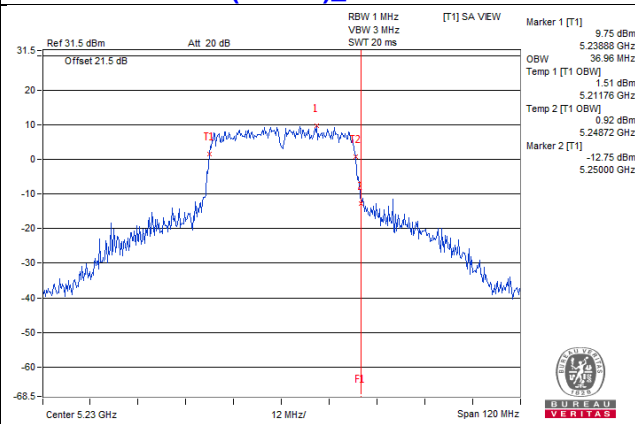


**Spectrum Plot for near by DFS band  
(DFS is required, if 99% OCP straddle into U-NII-2A band)**

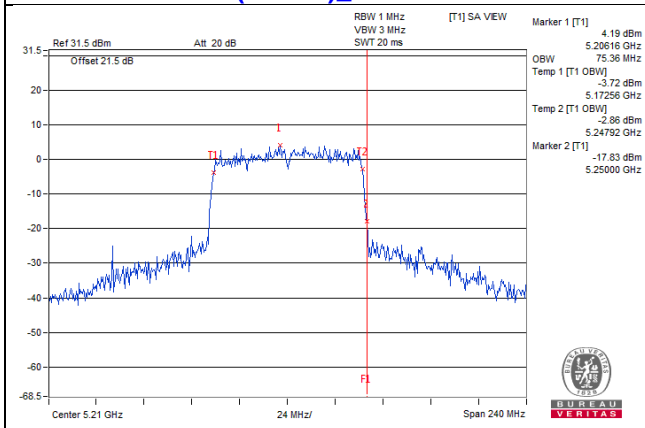
**802.11ac(VHT40)\_Chain0 / CH46**



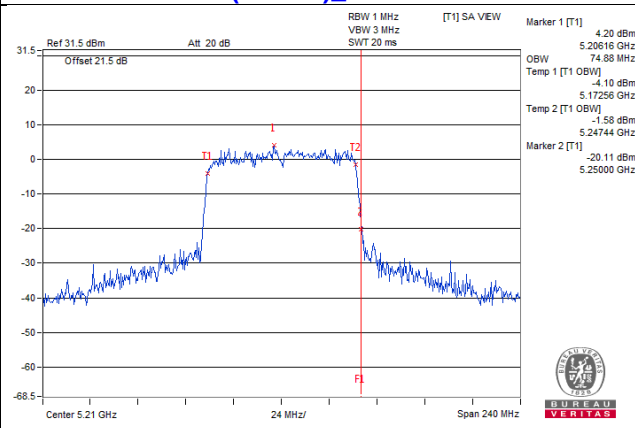
**802.11ac(VHT40)\_Chain1 / CH46**



**802.11ac(VHT80)\_Chain0 / CH42**

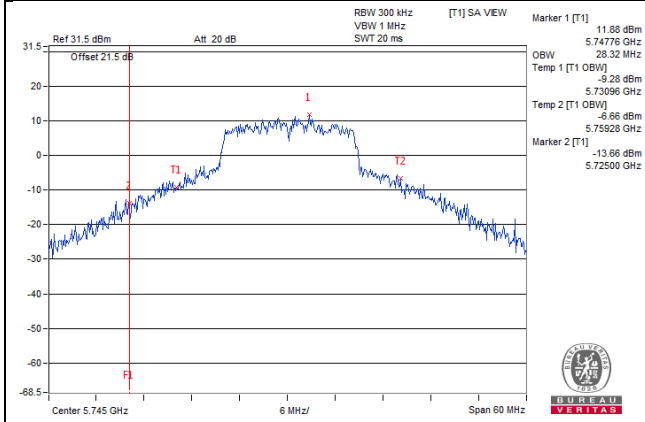


**802.11ac(VHT80)\_Chain1 / CH42**

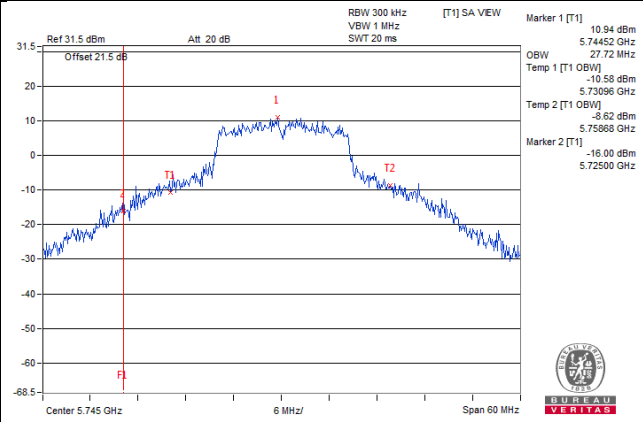


**Spectrum Plot for near by DFS band  
(DFS is required, if 99% OCP straddle into U-NII-2C band)**

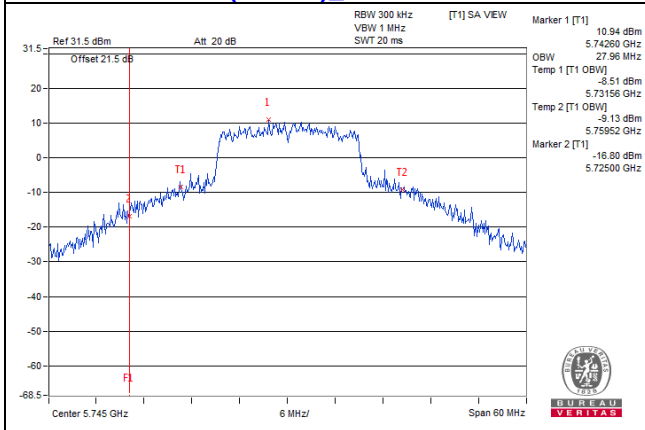
**802.11a\_Chain0 / CH149**



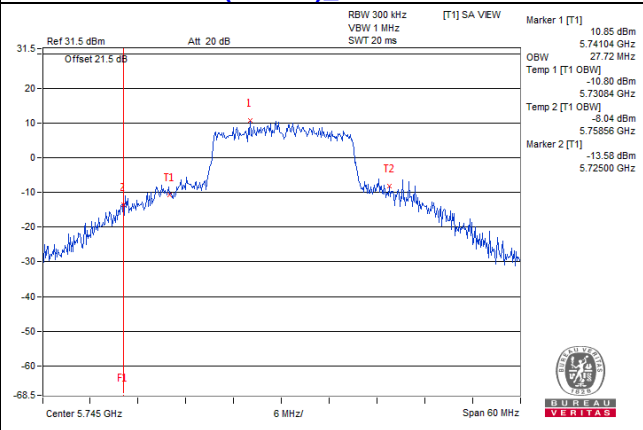
**802.11a\_Chain1 / CH149**



**802.11ac(VHT20)\_Chain0 / CH149**

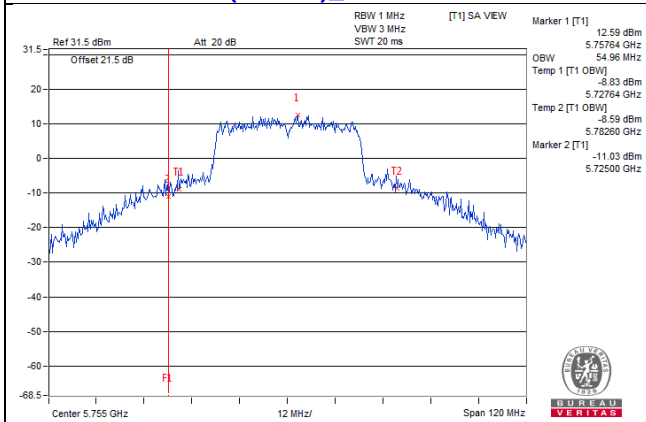


**802.11ac(VHT20)\_Chain1 / CH149**

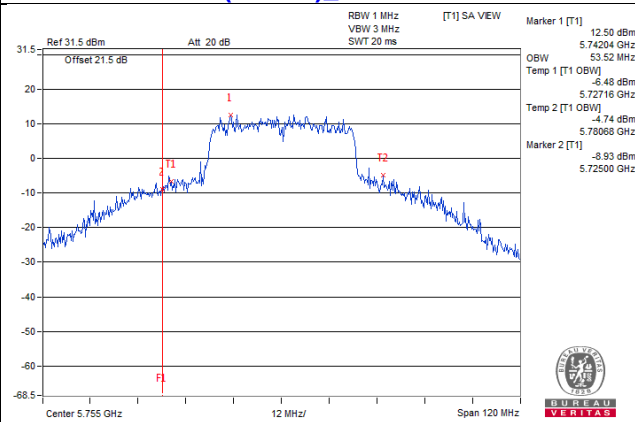


**Spectrum Plot for near by DFS band  
(DFS is required, if 99% OCP straddle into U-NII-2C band)**

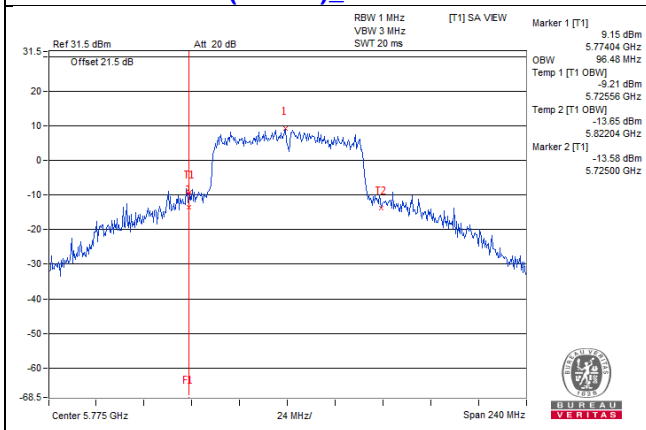
**802.11ac(VHT40)\_Chain0 / CH151**



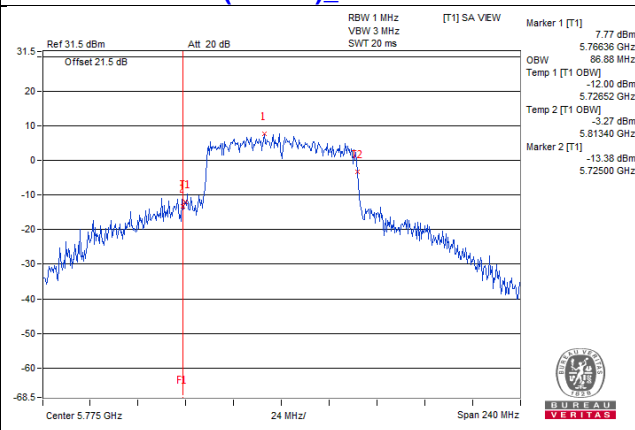
**802.11ac(VHT40)\_Chain1 / CH151**



**802.11ac(VHT80)\_Chain0 / CH155**



**802.11ac(VHT80)\_Chain1 / CH155**



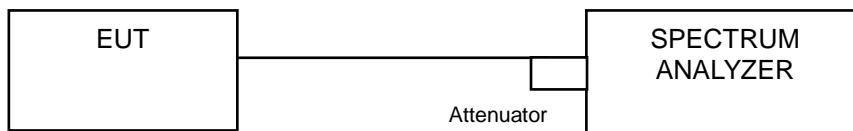


## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.5.4 Test Procedure

##### For U-NII-1:

##### 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

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

##### 802.11ac (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  $10 \log (1/\text{duty cycle})$

##### For U-NII-3:

##### 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

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

##### 802.11ac (VHT80)

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

#### 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

##### For U-NII-1:

##### 802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	4.09	4.06	7.09	9.21	Pass
40	5200	3.20	3.62	6.43	9.21	Pass
48	5240	4.50	5.27	7.91	9.21	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (7.79 - 6) = 9.21\text{dBm}$ .

##### 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			
36	5180	3.96	3.40	6.70	9.21	Pass
40	5200	3.11	3.30	6.22	9.21	Pass
48	5240	3.31	3.26	6.30	9.21	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (7.79 - 6) = 9.21\text{dBm}$ .

##### 802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
38	5190	-3.32	-3.40	-0.35	9.21	Pass
46	5230	0.31	0.64	3.49	9.21	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (7.79 - 6) = 9.21\text{dBm}$ .

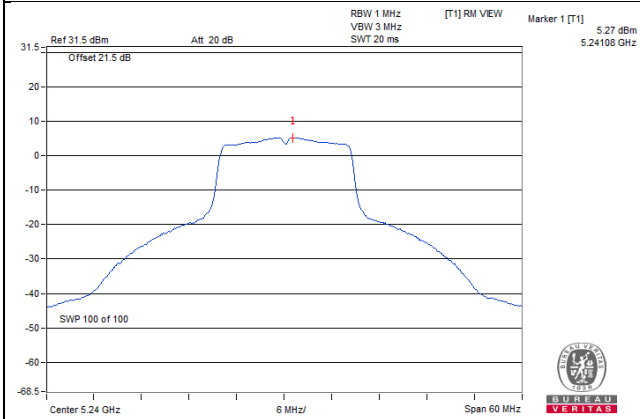
**802.11ac (VHT80)**

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				
42	5210	-4.95	-4.98	0.33	-1.63	9.21	Pass

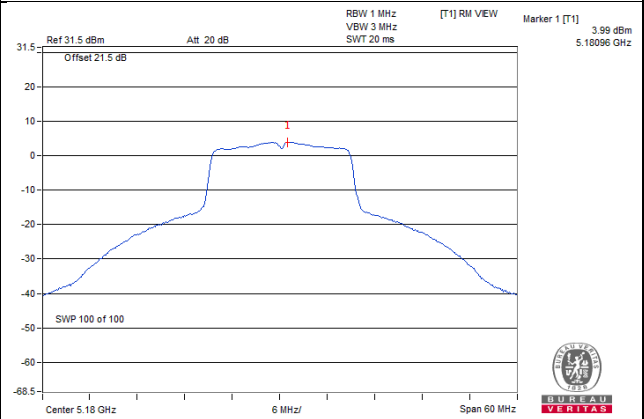
- Note:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
  - Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$  , so the power density limit shall be reduced to  $11-(7.79-6) = 9.21\text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

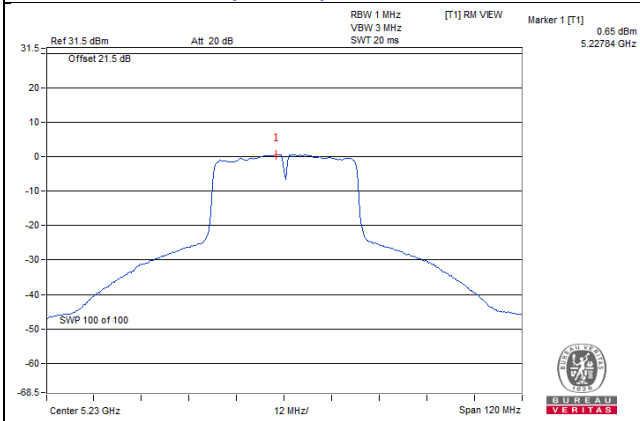
802.11a / Chain 1 : CH48



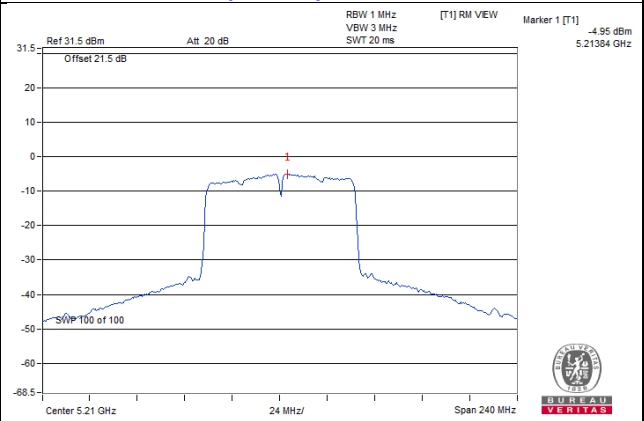
802.11ac (VHT20) / Chain 0 : CH36



802.11ac (VHT40) / Chain 1 : CH46



802.11ac (VHT80) / Chain 0 : CH42



**For U-NII-3:**
**802.11a**

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-1.38	0.84	3.01	3.85	28.21	Pass
	157	5785	-1.78	0.44	3.01	3.45	28.21	Pass
	165	5825	-1.36	0.86	3.01	3.87	28.21	Pass
1	149	5745	-1.76	0.46	3.01	3.47	28.21	Pass
	157	5785	-1.68	0.54	3.01	3.55	28.21	Pass
	165	5825	-2.86	-0.64	3.01	2.37	28.21	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(7.79-6) = 28.21\text{dBm}$ .

**802.11ac (VHT20)**

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-1.92	0.30	3.01	3.31	28.21	Pass
	157	5785	-2.25	-0.03	3.01	2.98	28.21	Pass
	165	5825	-1.77	0.45	3.01	3.46	28.21	Pass
1	149	5745	-1.97	0.25	3.01	3.26	28.21	Pass
	157	5785	-2.63	-0.41	3.01	2.60	28.21	Pass
	165	5825	-3.08	-0.86	3.01	2.15	28.21	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(7.79-6) = 28.21\text{dBm}$ .

### 802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-5.90	-3.68	3.01	-0.67	28.21	Pass
	159	5795	-5.99	-3.77	3.01	-0.76	28.21	Pass
1	151	5755	-5.88	-3.66	3.01	-0.65	28.21	Pass
	159	5795	-6.31	-4.09	3.01	-1.08	28.21	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(7.79-6) = 28.21\text{dBm}$ .

### 802.11ac (VHT80)

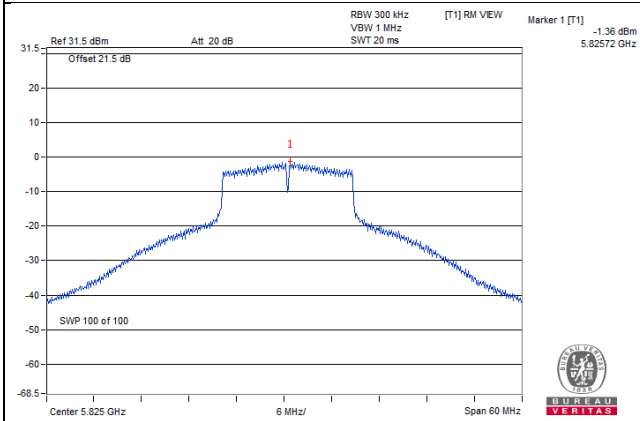
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-9.57	-7.35	3.01	0.33	-4.01	28.21	Pass
1	155	5775	-10.29	-8.07	3.01	0.33	-4.73	28.21	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G_0/20} + 10^{G_1/20})^2 / 2] = 7.79 > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(7.79-6) = 28.21\text{dBm}$ .

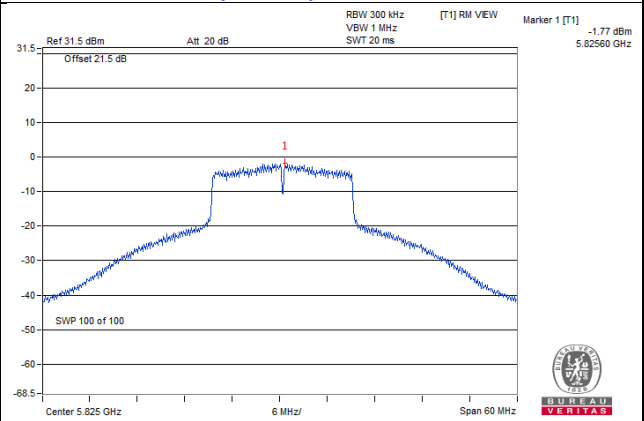
2. Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

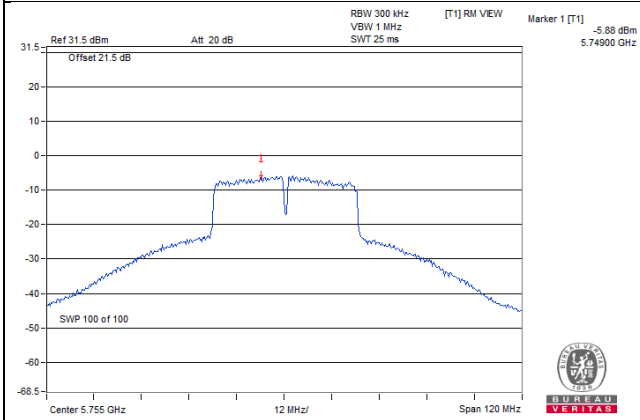
**802.11a / Chain 0 : CH165**



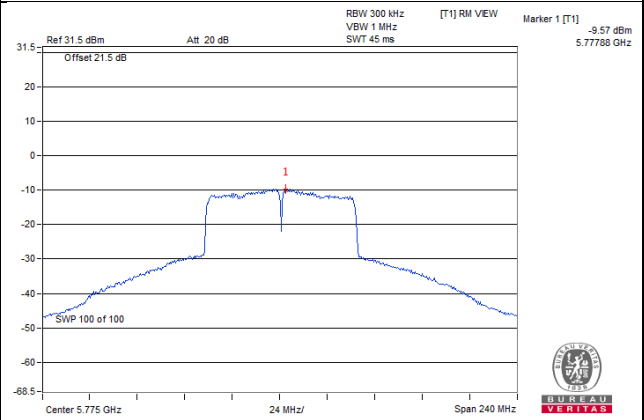
**802.11ac (VHT20) / Chain 0 : CH165**



**802.11ac (VHT40) / Chain 1 : CH151**



**802.11ac (VHT80) / Chain 0 : CH155**



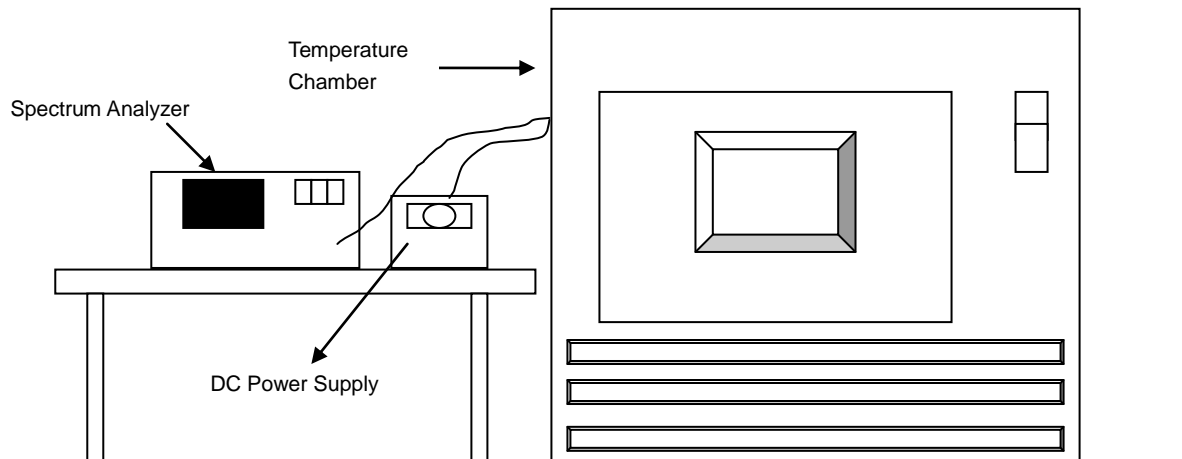


## 4.6 Frequency Stability Measurement

### 4.6.1 Limits of Frequency Stability Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

## 4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	3.3	5179.9924	PASS	5179.992	PASS	5179.9897	PASS	5179.9906	PASS
40	3.3	5179.998	PASS	5179.9998	PASS	5179.9995	PASS	5179.995	PASS
30	3.3	5180.0192	PASS	5180.0215	PASS	5180.0209	PASS	5180.0203	PASS
20	3.3	5179.9994	PASS	5179.9971	PASS	5179.997	PASS	5179.9999	PASS
10	3.3	5179.9789	PASS	5179.9784	PASS	5179.9791	PASS	5179.978	PASS
0	3.3	5179.9921	PASS	5179.9953	PASS	5179.993	PASS	5179.9936	PASS
-10	3.3	5179.9764	PASS	5179.9756	PASS	5179.9761	PASS	5179.9761	PASS
-20	3.3	5179.9936	PASS	5179.9936	PASS	5179.9899	PASS	5179.9932	PASS
-30	3.3	5179.9788	PASS	5179.9744	PASS	5179.9763	PASS	5179.9773	PASS

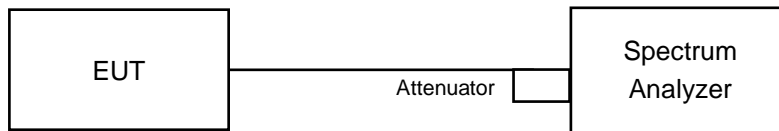
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	3.795	5179.9986	PASS	5179.998	PASS	5179.9974	PASS	5180.0006	PASS
	3.3	5179.9994	PASS	5179.9971	PASS	5179.997	PASS	5179.9999	PASS
	2.805	5179.9989	PASS	5179.9963	PASS	5179.9975	PASS	5179.9997	PASS

## 4.7 6dB Bandwidth Measurement

### 4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.7.2 Test Setup



### 4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.7.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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

### 4.7.5 Deviation from Test Standard

No deviation.

### 4.7.6 EUT Operating Condition

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

#### 4.7.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.38	16.36	0.5	PASS
157	5785	16.36	16.39	0.5	PASS
165	5825	16.38	16.35	0.5	PASS

##### 802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.08	17.23	0.5	PASS
157	5785	16.99	17.35	0.5	PASS
165	5825	17.36	17.37	0.5	PASS

##### 802.11ac (VHT40)

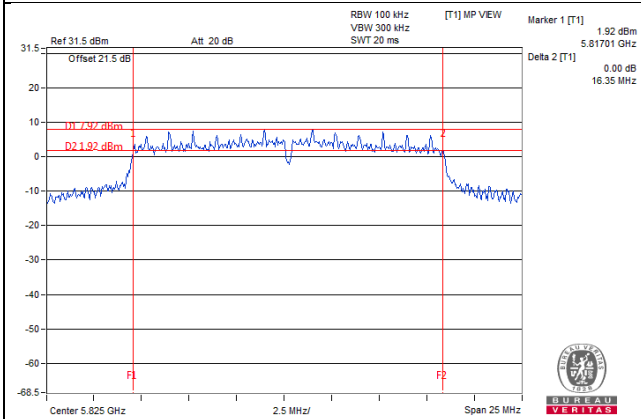
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.21	35.23	0.5	PASS
159	5795	35.31	35.26	0.5	PASS

##### 802.11ac (VHT80)

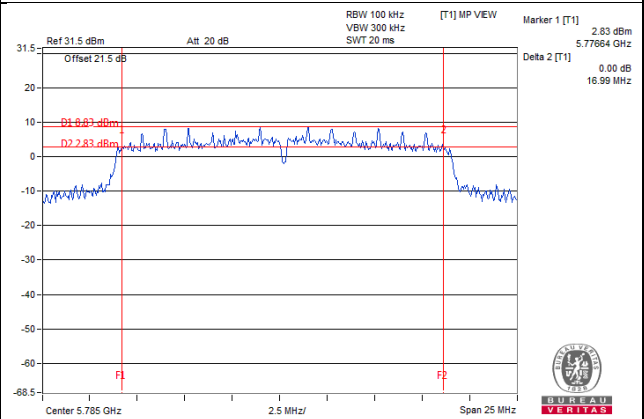
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	74.16	74.10	0.5	PASS

### Spectrum Plot of Worst Value

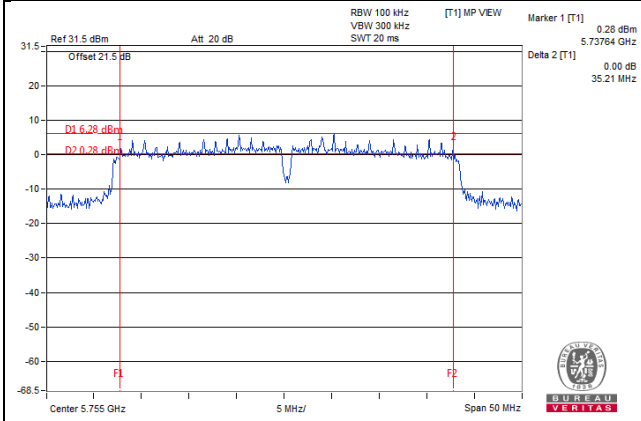
**802.11a / Chain 1 : CH165**



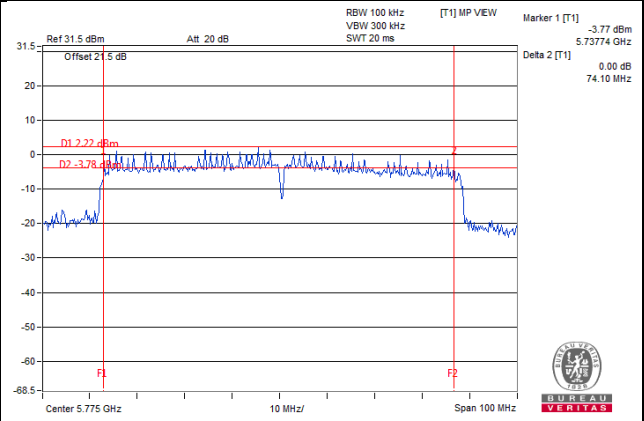
**802.11ac (VHT20) / Chain 0 : CH157**



**802.11ac (VHT40) / Chain 0 : CH151**



**802.11ac (VHT80) / Chain 1 : CH155**



## 5 Pictures of Test Arrangements

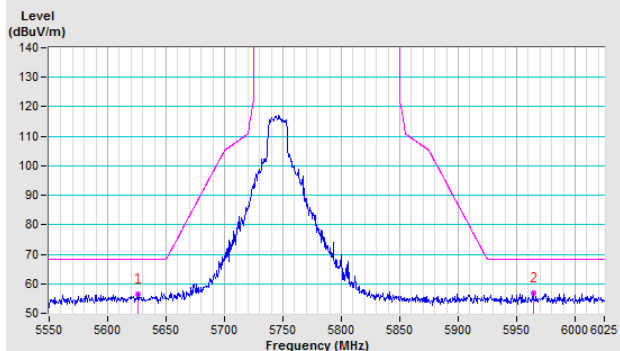
Please refer to the attached file (Test Setup Photo).

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

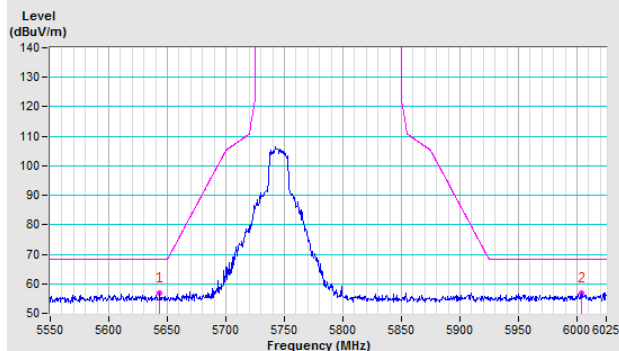
802.11a

**CH 149 5745 MHz**

**Horizontal**

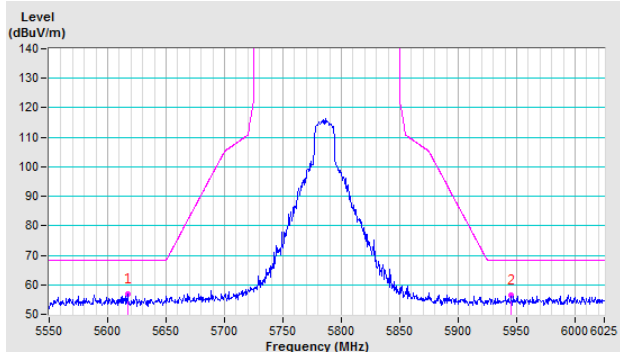


**Vertical**

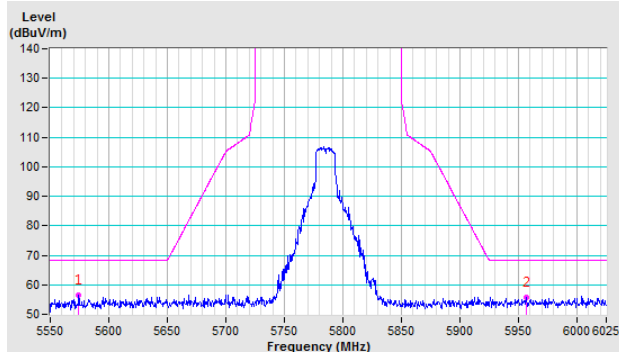


**CH 157 5785 MHz**

**Horizontal**

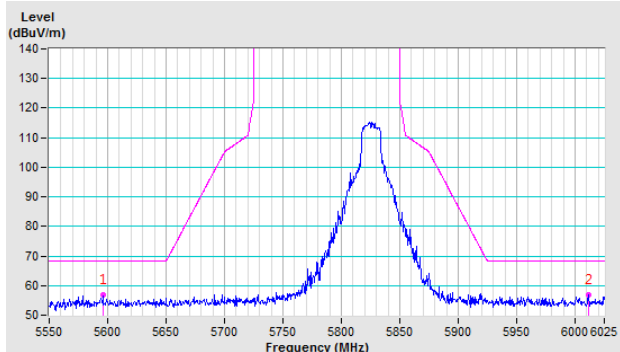


**Vertical**

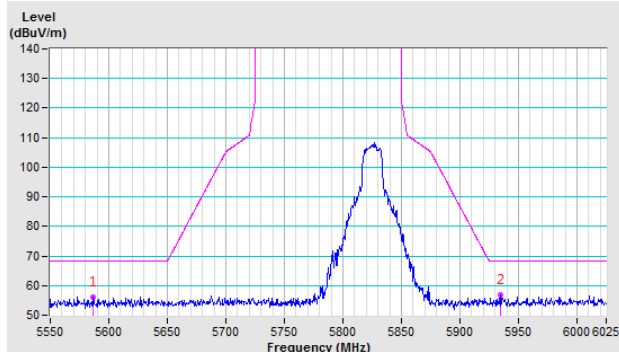


**CH 165 5825 MHz**

**Horizontal**



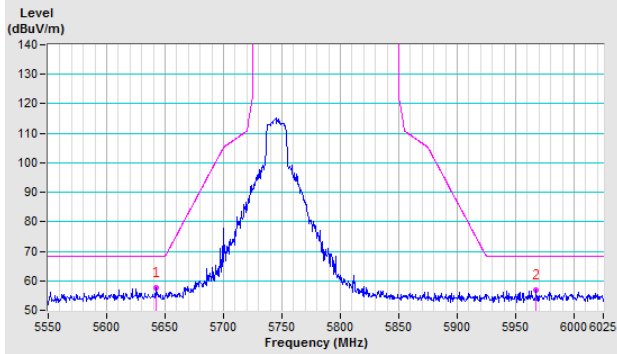
**Vertical**



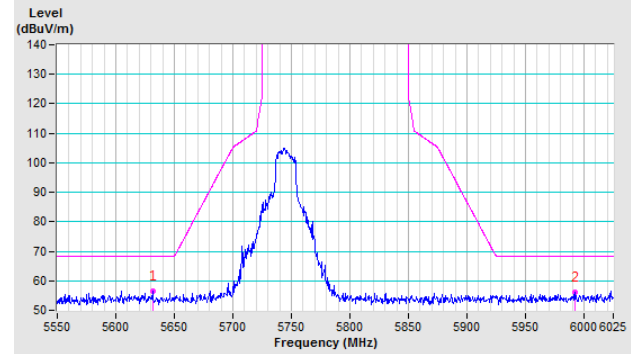
802.11ac (VHT20)

CH 149 5745 MHz

Horizontal

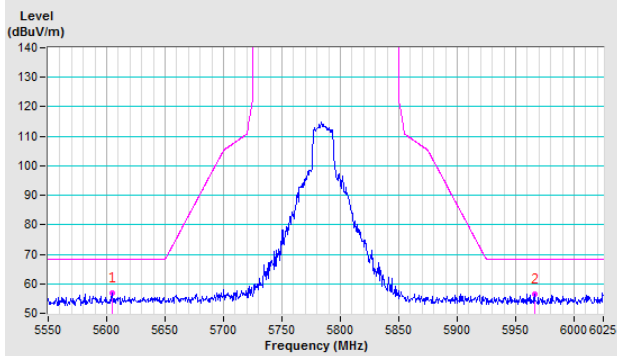


Vertical

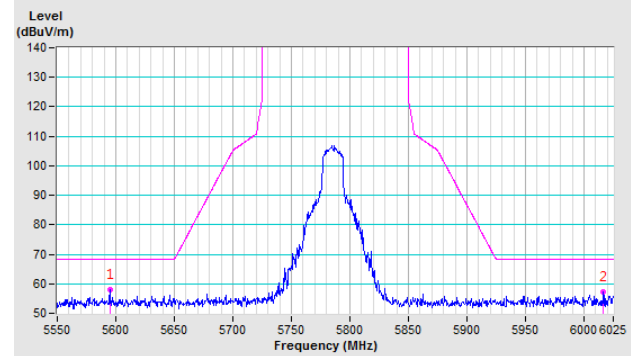


CH 157 5785 MHz

Horizontal

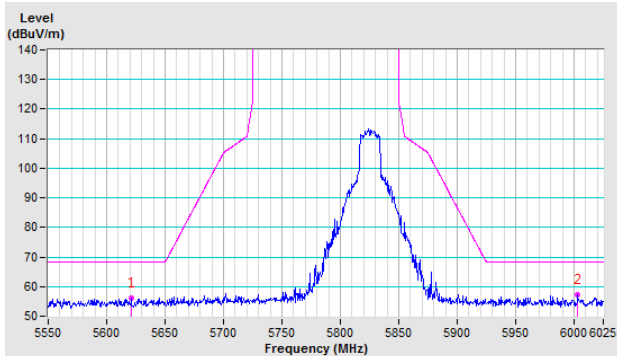


Vertical

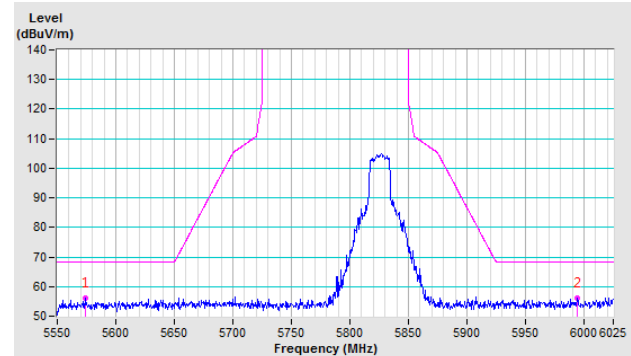


CH 165 5825 MHz

Horizontal



Vertical

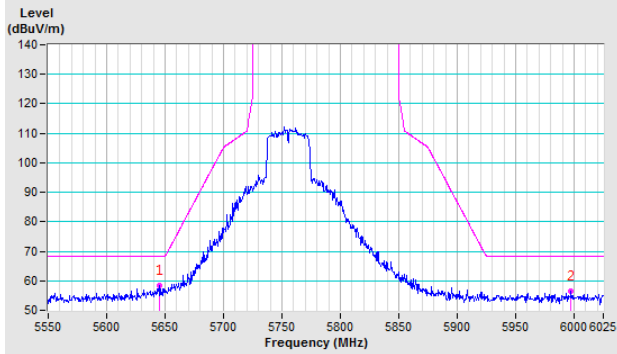




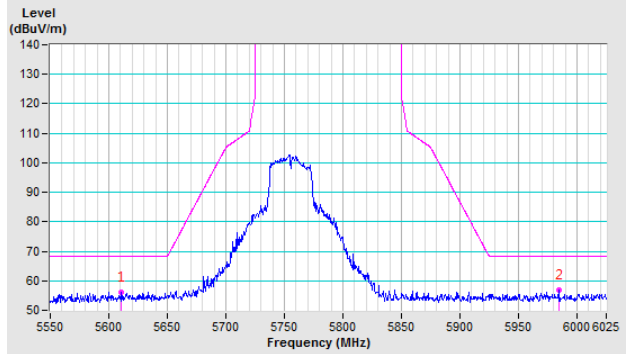
### 802.11ac (VHT40)

**CH 151 5755 MHz**

**Horizontal**

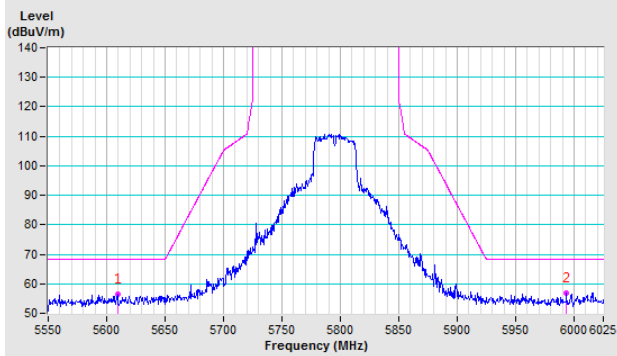


**Vertical**

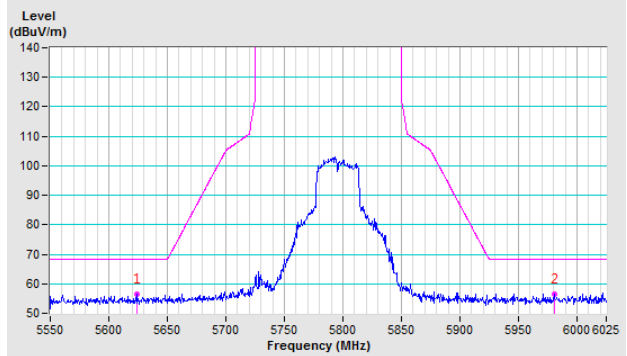


**CH 159 5795 MHz**

**Horizontal**



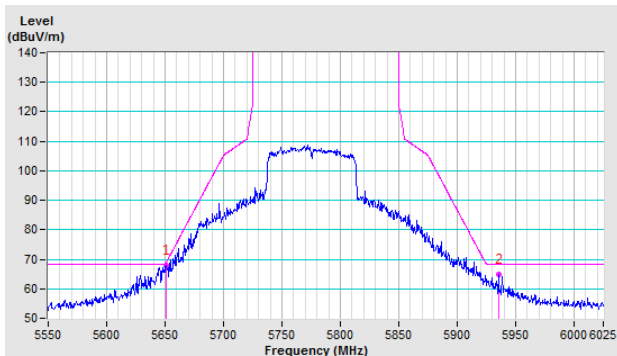
**Vertical**



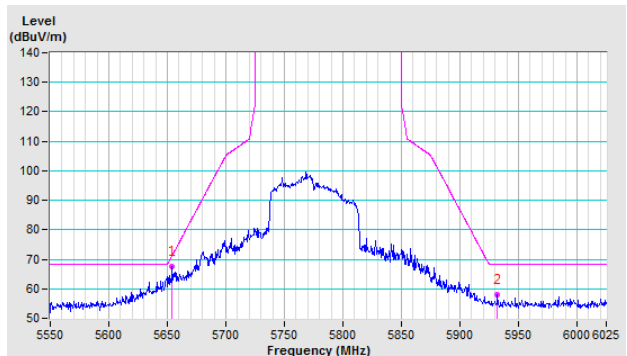
### 802.11ac (VHT80)

**CH 155 5775 MHz**

**Horizontal**



**Vertical**



## Appendix – Information on the Testing Laboratories

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

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

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