

## FCC Test Report (WLAN)

**Report No.:** RF160810E03-1

**FCC ID:** Q87-WHW03

**Test Model:** WHW03

**Received Date:** Aug. 10, 2016

**Test Date:** Oct. 06 to 12, 2016

**Issued Date:** Nov. 03, 2016

**Applicant:** Linksys LLC

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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### Release Control Record

Issue No.	Description	Date Issued
RF160810E03-1	Original release.	Nov. 03, 2016

## 1 Certificate of Conformity

**Product:** Access Point

**Brand:** LINKSYS

**Test Model:** WHW03

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Linksys LLC

**Test Date:** Oct. 06 to 12, 2016

**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:** Nov. 03, 2016  
Wendy Wu / Specialist

**Approved by :** May Chen , **Date:** Nov. 03, 2016  
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 -9.46dB at 0.41172MHz.
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 -1.0dB at 5657.82MHz.
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	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.40 dB
	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

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

Product	Access Point
Brand	LINKSYS
Test Model	WHW03
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
Driver Version	0.0.19
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz band.
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> 2.412GHz ~ 2.462GHz <b>5GHz:</b> 5.18GHz ~ 5.24GHz, 5.745GHz ~ 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> <b>CDD Mode:</b> 783.486mW <b>Beamforming Mode:</b> 741.194mW <b>5GHz:</b> <b>5.18GHz ~ 5.24GHz:</b> 765.255mW <b>5.745GHz ~ 5.825GHz:</b> 938.187mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. There are WLAN, Bluetooth, Zigbee technology used for the EUT.

## 2. Simultaneously transmission condition

Condition	Technology			
1	WLAN (Radio 1) (2.4GHz / 5GHz-UNII-1)	WLAN (Radio 2) (5GHz-UNII-3)	Bluetooth	Zigbee
<b>Note:</b> The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

## 3. The EUT power needs to be supplied from one power adapter , the information is as below table:

Brand	Model	Spec.
Linksys	MU24A6120200-A1	Input: 100-240Vac, 50/60Hz, 0.7A Output: 12V, 2A DC output cable (Unshielded, 1.5m)

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

BT Antenna Spec.							
Antenna No	Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	
1	galtronics	60-2703-03	3.13	2.4~2.4835	Dipole	i-pex(MHF)	
Zigbee Antenna Spec.							
Antenna No	Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	
2	galtronics	60-2699-03	2.52	2.4~2.4835	Dipole	i-pex(MHF)	
WLAN (Radio 2) Antenna Spec.							
Antenna No	Transmitter Circuit	Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type
3	5GHz-Chain (1) (UNII-2C,UNII-3)	galtronics	60-2704-03	3.86	5.5~5.825	Dipole	i-pex(MHF)
4	5GHz-Chain (0) (UNII-2C,UNII-3)	galtronics	60-2708-03	2.36	5.5~5.825	Dipole	i-pex(MHF)
WLAN (Radio 1) Antenna Spec.							
Antenna No	Transmitter Circuit	Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type
5	2.4GHz-Chain (0)	galtronics	60-2698-03	3.43	2.4~2.4835	Dipole	i-pex(MHF)
	5GHz-Chain (1) (UNII-1, UNII-2A)			3.62	5.18~5.320		
6	2.4GHz-Chain (1)	galtronics	60-2697-03	1.49	2.4~2.4835	Dipole	i-pex(MHF)
	5GHz-Chain (0) (UNII-1, UNII-2A)			4.35	5.18~5.320		



5. The EUT incorporates a MIMO function.

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

1. All of modulation mode support beamforming function except 802.11b modulation mode.
2. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. 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	5210MHz

#### FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

**NOTE:**

- The EUT had been tested under beamforming mode for 5GHz band.

#### **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.

Radio 1						
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
Radio 2						
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.

Radio 1						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240	38 to 46	46	OFDM	BPSK	13.5
Radio 2						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5745-5825	149 to 165	157	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.

Radio 1						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240	38 to 46	46	OFDM	BPSK	13.5
Radio 2						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5745-5825	149 to 165	157	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.

Radio 1						
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
Radio 2						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
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	Tested By
RE $\geq$ 1G	24deg. C, 65%RH	120Vac, 60Hz	Jyunchun Lin
RE $<$ 1G	23deg. C, 61%RH	120Vac, 60Hz	Jyunchun Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

### 3.3 Duty Cycle of Test Signal

#### Radio 1

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

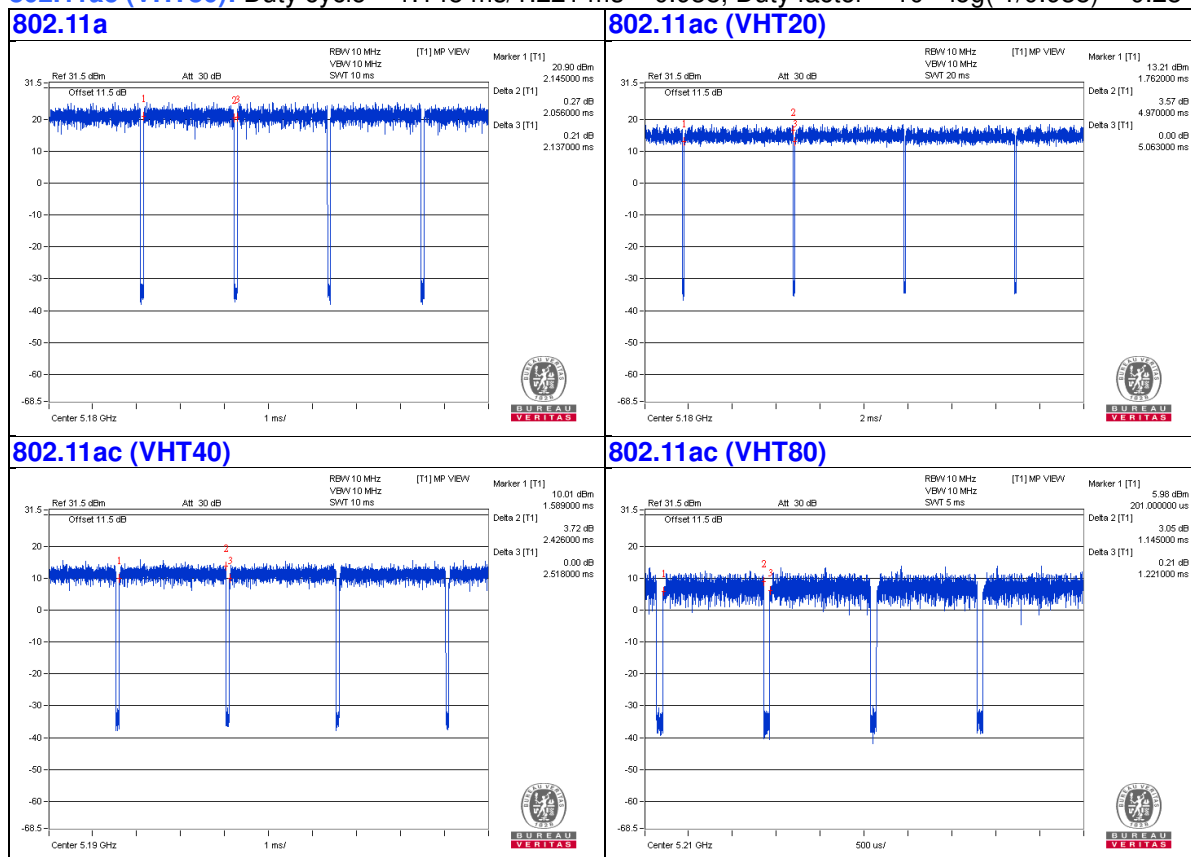
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle =  $2.056 \text{ ms} / 2.137 \text{ ms} = 0.962$ , Duty factor =  $10 * \log(1/0.962) = 0.17$

**802.11ac (VHT20):** Duty cycle =  $4.97 \text{ ms} / 5.063 \text{ ms} = 0.982$

**802.11ac (VHT40):** Duty cycle =  $2.426 \text{ ms} / 2.518 \text{ ms} = 0.963$ , Duty factor =  $10 * \log(1/0.963) = 0.16$

**802.11ac (VHT80):** Duty cycle =  $1.145 \text{ ms} / 1.221 \text{ ms} = 0.938$ , Duty factor =  $10 * \log(1/0.938) = 0.28$



## Radio 2

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.

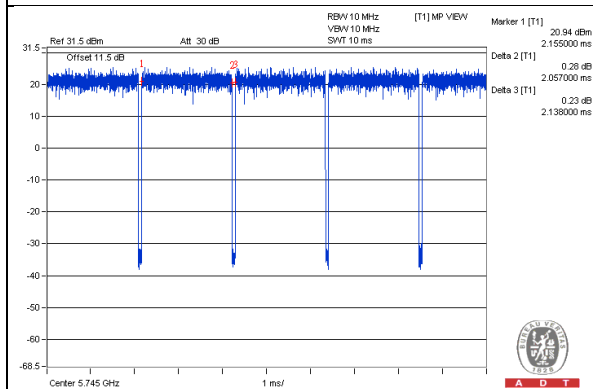
**802.11a:** Duty cycle =  $2.057 \text{ ms} / 2.138 \text{ ms} = 0.962$ , Duty factor =  $10 * \log(1/0.962) = 0.17$

**802.11ac (VHT20):** Duty cycle =  $4.99 \text{ ms} / 5.062 \text{ ms} = 0.986$

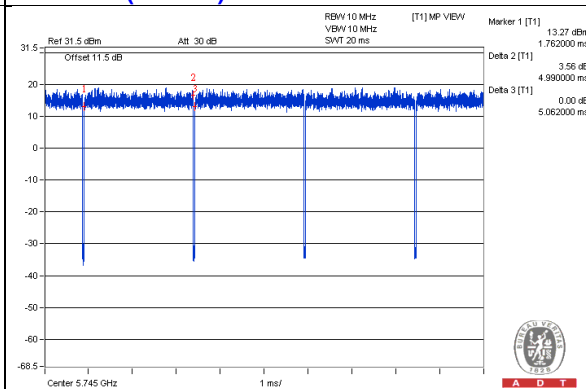
**802.11ac (VHT40):** Duty cycle =  $2.428 \text{ ms} / 2.52 \text{ ms} = 0.963$ , Duty factor =  $10 * \log(1/0.963) = 0.16$

**802.11ac (VHT80):** Duty cycle =  $1.148 \text{ ms} / 1.224 \text{ ms} = 0.938$ , Duty factor =  $10 * \log(1/0.938) = 0.28$

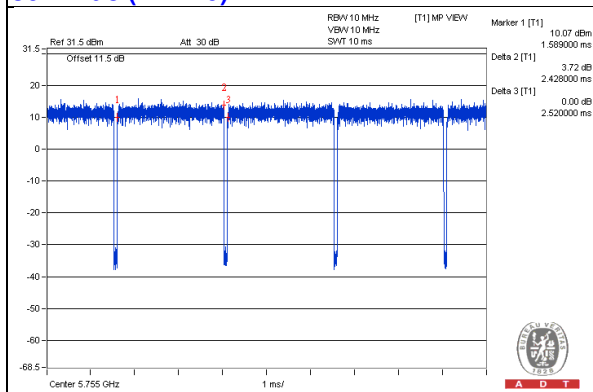
### 802.11a



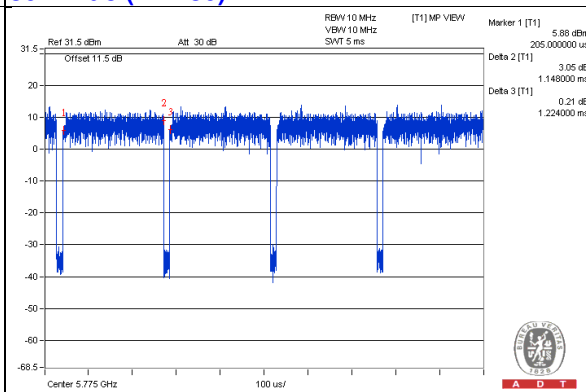
### 802.11ac (VHT20)



### 802.11ac (VHT40)



### 802.11ac (VHT80)



### 3.4 Description of Support Units

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

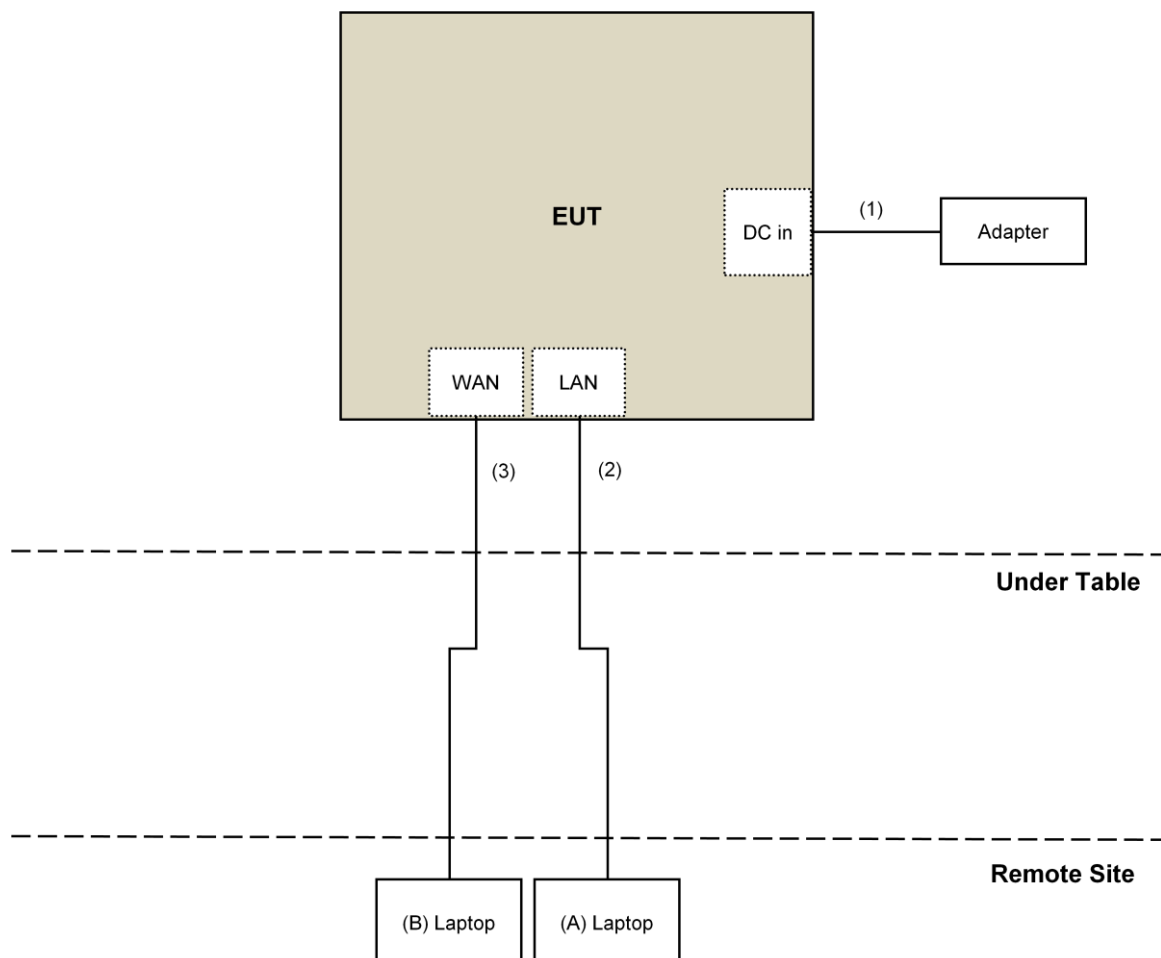
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	HP	Pavilion 14-ab023TU	5CD5340WXZ	NA	Provided by Lab
B.	Laptop	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab

Note:

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

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

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standard

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

**FCC Part 15, Subpart E (15.407)**  
**KDB 789033 D02 General UNII Test Procedure New Rules v01r03**  
**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 v01r03		Field Strength at 3m	
		PK:74 (dBμV/m)	AV:54 (dBμV/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(dBμV/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(dBμV/m) <sup>*1</sup> PK:105.2 (dBμV/m) <sup>*2</sup> PK: 110.8(dBμV/m) <sup>*3</sup> PK:122.2 (dBμV/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 Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-156	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2015	Nov. 09, 2016

**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. 3.
4. The FCC Site Registration No. is 147459
5. The CANADA Site Registration No. is 20331-1
6. Loop antenna was used for all emissions below 30 MHz
7. Tested Date: Oct. 06 to 12, 2016

#### 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:**

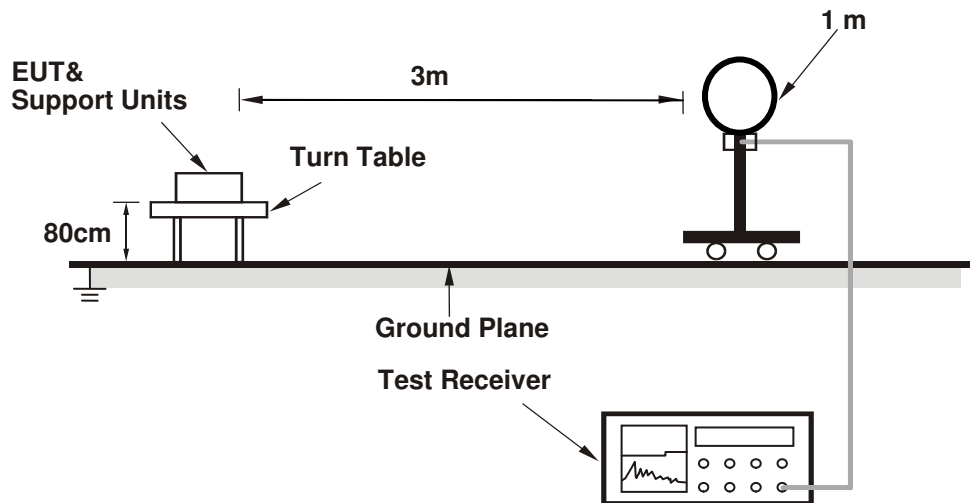
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

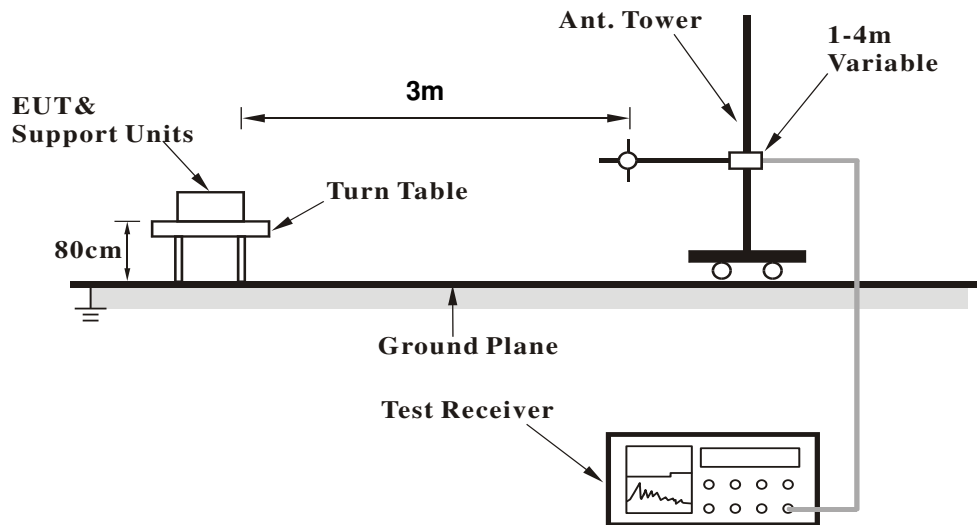
No deviation.

#### 4.1.5 Test Setup

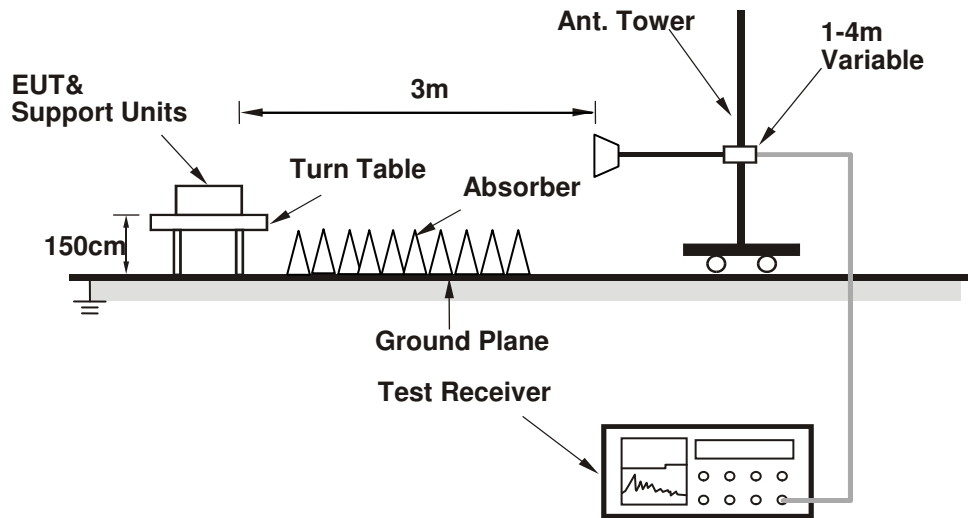
##### For Radiated emission below 30MHz



##### 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 (Telnet paste IPQ4019 2G power command.txt/IPQ4019 5G power command band 1-2.txt/nodes\_QCA9886\_power command band 3-4.txt command) has been activated to set the EUT on specific status.

#### 4.1.7 Test Results

#### Above 1GHz Data:

#### Radio 1

#### 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	66.5 PK	74.0	-7.5	2.25 H	269	63.5	3.0
2	5150.00	48.8 AV	54.0	-5.2	2.25 H	269	45.8	3.0
3	*5180.00	113.0 PK			2.25 H	269	109.9	3.1
4	*5180.00	103.3 AV			2.25 H	269	100.2	3.1
5	#10360.00	56.4 PK	74.0	-17.6	1.52 H	224	42.8	13.6
6	#10360.00	43.6 AV	54.0	-10.4	1.52 H	224	30.0	13.6
7	15540.00	53.6 PK	74.0	-20.4	2.06 H	277	37.9	15.7
8	15540.00	40.7 AV	54.0	-13.3	2.06 H	277	25.0	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	5150.00	70.3 PK	74.0	-3.7	1.85 V	291	67.3	3.0
2	5150.00	52.8 AV	54.0	-1.2	1.85 V	291	49.8	3.0
3	*5180.00	117.2 PK			1.85 V	291	114.1	3.1
4	*5180.00	107.5 AV			1.85 V	291	104.4	3.1
5	#10360.00	51.1 PK	74.0	-22.9	2.81 V	153	37.5	13.6
6	#10360.00	40.1 AV	54.0	-13.9	2.81 V	153	26.5	13.6
7	15540.00	52.9 PK	74.0	-21.1	1.66 V	315	37.2	15.7
8	15540.00	40.3 AV	54.0	-13.7	1.66 V	315	24.6	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 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	5150.00	62.1 PK	74.0	-11.9	2.26 H	272	59.1	3.0
2	5150.00	46.0 AV	54.0	-8.0	2.26 H	272	43.0	3.0
3	*5200.00	116.9 PK			2.26 H	272	113.8	3.1
4	*5200.00	106.7 AV			2.26 H	272	103.6	3.1
5	#10400.00	56.5 PK	74.0	-17.5	1.53 H	215	42.9	13.6
6	#10400.00	44.0 AV	54.0	-10.0	1.53 H	215	30.4	13.6
7	15600.00	53.1 PK	74.0	-20.9	1.96 H	264	37.4	15.7
8	15600.00	40.4 AV	54.0	-13.6	1.96 H	264	24.7	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	5150.00	65.9 PK	74.0	-8.1	1.73 V	92	62.9	3.0
2	5150.00	50.0 AV	54.0	-4.0	1.73 V	92	47.0	3.0
3	*5200.00	121.1 PK			1.73 V	92	118.0	3.1
4	*5200.00	110.8 AV			1.73 V	92	107.7	3.1
5	#10400.00	51.6 PK	74.0	-22.4	2.81 V	164	38.0	13.6
6	#10400.00	40.8 AV	54.0	-13.2	2.81 V	164	27.2	13.6
7	15600.00	52.8 PK	74.0	-21.2	1.71 V	301	37.1	15.7
8	15600.00	40.4 AV	54.0	-13.6	1.71 V	301	24.7	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 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	118.1 PK			2.29 H	262	114.9	3.2
2	*5240.00	108.5 AV			2.29 H	262	105.3	3.2
3	#10480.00	56.2 PK	74.0	-17.8	1.57 H	223	42.2	14.0
4	#10480.00	43.6 AV	54.0	-10.4	1.57 H	223	29.6	14.0
5	15720.00	53.4 PK	74.0	-20.6	2.02 H	276	38.0	15.4
6	15720.00	40.5 AV	54.0	-13.5	2.02 H	276	25.1	15.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	122.3 PK			1.80 V	308	119.1	3.2
2	*5240.00	112.3 AV			1.80 V	308	109.1	3.2
3	#10480.00	51.4 PK	74.0	-22.6	2.79 V	149	37.4	14.0
4	#10480.00	40.6 AV	54.0	-13.4	2.79 V	149	26.6	14.0
5	15720.00	53.2 PK	74.0	-20.8	1.67 V	302	37.8	15.4
6	15720.00	40.7 AV	54.0	-13.3	1.67 V	302	25.3	15.4

**REMARKS:**

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



**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	66.4 PK	74.0	-7.6	2.25 H	261	63.4	3.0
2	5150.00	49.0 AV	54.0	-5.0	2.25 H	261	46.0	3.0
3	*5180.00	114.3 PK			2.25 H	261	111.2	3.1
4	*5180.00	103.8 AV			2.25 H	261	100.7	3.1
5	#10360.00	53.8 PK	74.0	-20.2	1.53 H	223	40.2	13.6
6	#10360.00	41.3 AV	54.0	-12.7	1.53 H	223	27.7	13.6
7	15540.00	53.0 PK	74.0	-21.0	2.10 H	262	37.3	15.7
8	15540.00	40.4 AV	54.0	-13.6	2.10 H	262	24.7	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	5150.00	70.3 PK	74.0	-3.7	2.13 V	293	67.3	3.0
2	5150.00	52.9 AV	54.0	-1.1	2.13 V	293	49.9	3.0
3	*5180.00	118.6 PK			2.13 V	293	115.5	3.1
4	*5180.00	108.1 AV			2.13 V	293	105.0	3.1
5	#10360.00	51.6 PK	74.0	-22.4	2.82 V	154	38.0	13.6
6	#10360.00	40.9 AV	54.0	-13.1	2.82 V	154	27.3	13.6
7	15540.00	53.4 PK	74.0	-20.6	1.67 V	288	37.7	15.7
8	15540.00	40.8 AV	54.0	-13.2	1.67 V	288	25.1	15.7

**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 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	5150.00	66.3 PK	74.0	-7.7	2.24 H	247	63.3	3.0
2	5150.00	48.8 AV	54.0	-5.2	2.24 H	247	45.8	3.0
3	*5200.00	117.8 PK			2.24 H	247	114.7	3.1
4	*5200.00	107.2 AV			2.24 H	247	104.1	3.1
5	#10400.00	56.4 PK	74.0	-17.6	1.53 H	231	42.8	13.6
6	#10400.00	43.4 AV	54.0	-10.6	1.53 H	231	29.8	13.6
7	15600.00	53.5 PK	74.0	-20.5	2.04 H	288	37.8	15.7
8	15600.00	40.4 AV	54.0	-13.6	2.04 H	288	24.7	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	5150.00	70.5 PK	74.0	-3.5	1.75 V	97	67.5	3.0
2	5150.00	52.9 AV	54.0	-1.1	1.75 V	97	49.9	3.0
3	*5200.00	121.8 PK			1.75 V	97	118.7	3.1
4	*5200.00	112.3 AV			1.75 V	97	109.2	3.1
5	#10400.00	51.2 PK	74.0	-22.8	2.83 V	145	37.6	13.6
6	#10400.00	40.2 AV	54.0	-13.8	2.83 V	145	26.6	13.6
7	15600.00	53.5 PK	74.0	-20.5	1.64 V	288	37.8	15.7
8	15600.00	41.2 AV	54.0	-12.8	1.64 V	288	25.5	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 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	117.2 PK			2.29 H	247	114.0	3.2
2	*5240.00	107.0 AV			2.29 H	247	103.8	3.2
3	#10480.00	56.1 PK	74.0	-17.9	1.57 H	221	42.1	14.0
4	#10480.00	43.6 AV	54.0	-10.4	1.57 H	221	29.6	14.0
5	15720.00	53.2 PK	74.0	-20.8	2.07 H	272	37.8	15.4
6	15720.00	40.5 AV	54.0	-13.5	2.07 H	272	25.1	15.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	121.2 PK			2.16 V	281	118.0	3.2
2	*5240.00	110.9 AV			2.16 V	281	107.7	3.2
3	#10480.00	50.9 PK	74.0	-23.1	2.77 V	133	36.9	14.0
4	#10480.00	40.3 AV	54.0	-13.7	2.77 V	133	26.3	14.0
5	15720.00	52.8 PK	74.0	-21.2	1.66 V	317	37.4	15.4
6	15720.00	40.5 AV	54.0	-13.5	1.66 V	317	25.1	15.4

**REMARKS:**

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

**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	61.8 PK	74.0	-12.2	2.30 H	265	58.8	3.0
2	5150.00	48.2 AV	54.0	-5.8	2.30 H	265	45.2	3.0
3	*5190.00	110.1 PK			2.30 H	265	107.0	3.1
4	*5190.00	99.5 AV			2.30 H	265	96.4	3.1
5	#10380.00	51.7 PK	74.0	-22.3	2.81 H	128	38.0	13.7
6	#10380.00	40.5 AV	54.0	-13.5	2.81 H	128	26.8	13.7
7	15570.00	52.9 PK	74.0	-21.1	1.76 H	311	37.3	15.6
8	15570.00	41.3 AV	54.0	-12.7	1.76 H	311	25.7	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	5150.00	64.9 PK	74.0	-9.1	1.63 V	305	61.9	3.0
2	5150.00	52.8 AV	54.0	-1.2	1.63 V	305	49.8	3.0
3	*5190.00	114.0 PK			1.63 V	305	110.9	3.1
4	*5190.00	102.8 AV			1.63 V	305	99.7	3.1
5	#10380.00	50.7 PK	74.0	-23.3	2.83 V	131	37.0	13.7
6	#10380.00	40.0 AV	54.0	-14.0	2.83 V	131	26.3	13.7
7	15570.00	52.4 PK	74.0	-21.6	1.61 V	322	36.8	15.6
8	15570.00	40.3 AV	54.0	-13.7	1.61 V	322	24.7	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 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	5150.00	67.9 PK	74.0	-6.1	2.29 H	253	64.9	3.0
2	5150.00	48.0 AV	54.0	-6.0	2.29 H	253	45.0	3.0
3	*5230.00	115.3 PK			2.29 H	253	112.1	3.2
4	*5230.00	104.0 AV			2.29 H	253	100.8	3.2
5	5350.00	54.8 PK	74.0	-19.2	2.29 H	253	51.3	3.5
6	5350.00	41.5 AV	54.0	-12.5	2.29 H	253	38.0	3.5
7	#10460.00	51.5 PK	74.0	-22.5	2.82 H	139	37.6	13.9
8	#10460.00	40.5 AV	54.0	-13.5	2.82 H	139	26.6	13.9
9	15690.00	53.3 PK	74.0	-20.7	1.66 H	293	37.7	15.6
10	15690.00	41.3 AV	54.0	-12.7	1.66 H	293	25.7	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	5150.00	72.8 PK	74.0	-1.2	2.55 V	311	69.8	3.0
2	5150.00	52.8 AV	54.0	-1.2	2.55 V	311	49.8	3.0
3	*5230.00	119.5 PK			2.55 V	311	116.3	3.2
4	*5230.00	108.3 AV			2.55 V	311	105.1	3.2
5	5350.00	55.3 PK	74.0	-18.7	2.55 V	311	51.8	3.5
6	5350.00	41.8 AV	54.0	-12.2	2.55 V	311	38.3	3.5
7	#10460.00	50.9 PK	74.0	-23.1	2.77 V	125	37.0	13.9
8	#10460.00	40.4 AV	54.0	-13.6	2.77 V	125	26.5	13.9
9	15690.00	52.7 PK	74.0	-21.3	1.66 V	312	37.1	15.6
10	15690.00	40.6 AV	54.0	-13.4	1.66 V	312	25.0	15.6

**REMARKS:**

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

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	67.2 PK	74.0	-6.8	3.15 H	296	64.2	3.0
2	5150.00	47.6 AV	54.0	-6.4	3.15 H	296	44.6	3.0
3	*5210.00	105.5 PK			3.15 H	296	102.3	3.2
4	*5210.00	95.6 AV			3.15 H	296	92.4	3.2
5	5350.00	52.1 PK	74.0	-21.9	3.15 H	296	48.6	3.5
6	5350.00	40.0 AV	54.0	-14.0	3.15 H	296	36.5	3.5
7	#10420.00	51.6 PK	74.0	-22.4	2.78 H	129	37.8	13.8
8	#10420.00	40.7 AV	54.0	-13.3	2.78 H	129	26.9	13.8
9	15630.00	53.6 PK	74.0	-20.4	1.71 H	306	37.9	15.7
10	15630.00	41.8 AV	54.0	-12.2	1.71 H	306	26.1	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	5150.00	70.1 PK	74.0	-3.9	2.52 V	308	67.1	3.0
2	5150.00	52.7 AV	54.0	-1.3	2.52 V	308	49.7	3.0
3	*5210.00	110.2 PK			2.52 V	308	107.0	3.2
4	*5210.00	99.9 AV			2.52 V	308	96.7	3.2
5	5350.00	57.2 PK	74.0	-16.8	2.52 V	308	53.7	3.5
6	5350.00	45.1 AV	54.0	-8.9	2.52 V	308	41.6	3.5
7	#10420.00	50.5 PK	74.0	-23.5	2.74 V	121	36.7	13.8
8	#10420.00	40.1 AV	54.0	-13.9	2.74 V	121	26.3	13.8
9	15630.00	53.3 PK	74.0	-20.7	1.62 V	319	37.6	15.7
10	15630.00	41.1 AV	54.0	-12.9	1.62 V	319	25.4	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.

**Radio 2**
**802.11a**

<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	#5634.07	55.9 PK	68.2	-12.3	3.53 H	359	51.9	4.0
2	*5745.00	116.3 PK			3.53 H	359	112.1	4.2
3	*5745.00	107.3 AV			3.53 H	359	103.1	4.2
4	#5928.10	55.1 PK	68.2	-13.1	3.53 H	359	50.7	4.4
5	11490.00	55.7 PK	74.0	-18.3	1.47 H	207	40.5	15.2
6	11490.00	43.3 AV	54.0	-10.7	1.47 H	207	28.1	15.2
7	#17235.00	58.2 PK	74.0	-15.8	1.96 H	282	38.2	20.0
8	#17235.00	46.0 AV	54.0	-8.0	1.96 H	282	26.0	20.0

**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	#5597.02	59.4 PK	68.2	-8.8	2.22 V	266	55.5	3.9
2	*5745.00	120.8 PK			2.22 V	266	116.6	4.2
3	*5745.00	110.8 AV			2.22 V	266	106.6	4.2
4	#5997.45	58.1 PK	68.2	-10.1	2.22 V	266	53.6	4.5
5	11490.00	53.3 PK	74.0	-20.7	1.32 V	329	38.1	15.2
6	11490.00	41.3 AV	54.0	-12.7	1.32 V	329	26.1	15.2
7	#17235.00	58.8 PK	74.0	-15.2	1.42 V	227	38.8	20.0
8	#17235.00	47.2 AV	54.0	-6.8	1.42 V	227	27.2	20.0

**REMARKS:**

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

<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	#5564.25	55.8 PK	68.2	-12.4	3.53 H	335	51.9	3.9
2	*5785.00	116.2 PK			3.53 H	335	112.1	4.1
3	*5785.00	106.3 AV			3.53 H	335	102.2	4.1
4	#6010.75	55.4 PK	68.2	-12.8	3.53 H	335	50.9	4.5
5	11570.00	56.0 PK	74.0	-18.0	1.45 H	215	40.9	15.1
6	11570.00	43.6 AV	54.0	-10.4	1.45 H	215	28.5	15.1
7	#17355.00	57.7 PK	74.0	-16.3	1.95 H	282	37.2	20.5
8	#17355.00	45.7 AV	54.0	-8.3	1.95 H	282	25.2	20.5

**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	#5632.18	59.5 PK	68.2	-8.7	1.50 V	309	55.5	4.0
2	*5785.00	120.3 PK			1.50 V	309	116.2	4.1
3	*5785.00	110.5 AV			1.50 V	309	106.4	4.1
4	#5960.40	58.0 PK	68.2	-10.2	1.50 V	309	53.5	4.5
5	11570.00	53.4 PK	74.0	-20.6	1.34 V	331	38.3	15.1
6	11570.00	41.6 AV	54.0	-12.4	1.34 V	331	26.5	15.1
7	#17355.00	58.6 PK	74.0	-15.4	1.35 V	246	38.1	20.5
8	#17355.00	47.3 AV	54.0	-6.7	1.35 V	246	26.8	20.5

**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 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	#5597.02	55.5 PK	68.2	-12.7	3.53 H	333	51.6	3.9
2	*5825.00	115.8 PK			3.53 H	333	111.6	4.2
3	*5825.00	105.2 AV			3.53 H	333	101.0	4.2
4	#5978.93	54.5 PK	68.2	-13.7	3.53 H	333	50.0	4.5
5	11650.00	56.0 PK	74.0	-18.0	1.48 H	211	41.0	15.0
6	11650.00	43.4 AV	54.0	-10.6	1.48 H	211	28.4	15.0
7	#17475.00	58.4 PK	74.0	-15.6	1.94 H	293	37.3	21.1
8	#17475.00	46.2 AV	54.0	-7.8	1.94 H	293	25.1	21.1

**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	#5636.93	57.5 PK	68.2	-10.7	1.99 V	318	53.5	4.0
2	*5825.00	120.8 PK			2.18 V	209	116.6	4.2
3	*5825.00	111.4 AV			2.18 V	209	107.2	4.2
4	#6016.45	56.5 PK	68.2	-11.7	1.99 V	318	52.0	4.5
5	11650.00	53.5 PK	74.0	-20.5	1.37 V	324	38.5	15.0
6	11650.00	41.5 AV	54.0	-12.5	1.37 V	324	26.5	15.0
7	#17475.00	58.8 PK	74.0	-15.2	1.37 V	234	37.7	21.1
8	#17475.00	47.3 AV	54.0	-6.7	1.37 V	234	26.2	21.1

**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 (VHT20)**

<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	#5615.55	55.6 PK	68.2	-12.6	3.57 H	355	51.7	3.9
2	*5745.00	115.8 PK			3.57 H	355	111.6	4.2
3	*5745.00	105.7 AV			3.57 H	355	101.5	4.2
4	#5961.35	54.9 PK	68.2	-13.3	3.57 H	355	50.4	4.5
5	11490.00	56.3 PK	74.0	-17.7	1.45 H	219	41.1	15.2
6	11490.00	43.5 AV	54.0	-10.5	1.45 H	219	28.3	15.2
7	#17235.00	58.6 PK	74.0	-15.4	1.94 H	308	38.6	20.0
8	#17235.00	46.3 AV	54.0	-7.7	1.94 H	308	26.3	20.0

**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	#5588.00	58.3 PK	68.2	-9.9	2.43 V	297	54.4	3.9
2	*5745.00	121.4 PK			2.43 V	297	117.2	4.2
3	*5745.00	110.3 AV			2.43 V	297	106.1	4.2
4	#6004.10	56.8 PK	68.2	-11.4	2.43 V	297	52.3	4.5
5	11490.00	53.6 PK	74.0	-20.4	1.32 V	339	38.4	15.2
6	11490.00	41.3 AV	54.0	-12.7	1.32 V	339	26.1	15.2
7	#17235.00	58.3 PK	74.0	-15.7	1.42 V	224	38.3	20.0
8	#17235.00	46.9 AV	54.0	-7.1	1.42 V	224	26.9	20.0

**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 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	#5619.35	56.2 PK	68.2	-12.0	3.57 H	336	52.2	4.0
2	*5785.00	116.5 PK			3.57 H	336	112.4	4.1
3	*5785.00	105.9 AV			3.57 H	336	101.8	4.1
4	#5966.57	56.1 PK	68.2	-12.1	3.57 H	336	51.6	4.5
5	11570.00	55.5 PK	74.0	-18.5	1.45 H	207	40.4	15.1
6	11570.00	43.2 AV	54.0	-10.8	1.45 H	207	28.1	15.1
7	#17355.00	57.7 PK	74.0	-16.3	1.95 H	301	37.2	20.5
8	#17355.00	45.9 AV	54.0	-8.1	1.95 H	301	25.4	20.5

**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	#5632.65	60.0 PK	68.2	-8.2	1.50 V	315	56.0	4.0
2	*5785.00	120.7 PK			1.50 V	315	116.6	4.1
3	*5785.00	110.1 AV			1.50 V	315	106.0	4.1
4	#5972.75	57.4 PK	68.2	-10.8	1.50 V	315	52.9	4.5
5	11570.00	53.7 PK	74.0	-20.3	1.41 V	327	38.6	15.1
6	11570.00	41.5 AV	54.0	-12.5	1.41 V	327	26.4	15.1
7	#17355.00	59.1 PK	74.0	-14.9	1.37 V	235	38.6	20.5
8	#17355.00	47.4 AV	54.0	-6.6	1.37 V	235	26.9	20.5

**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 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	#5573.27	55.3 PK	68.2	-12.9	3.55 H	333	51.4	3.9
2	*5825.00	116.1 PK			3.55 H	333	111.9	4.2
3	*5825.00	105.4 AV			3.55 H	333	101.2	4.2
4	#5926.68	55.4 PK	68.2	-12.8	3.55 H	333	51.0	4.4
5	11650.00	56.0 PK	74.0	-18.0	1.46 H	199	41.0	15.0
6	11650.00	43.6 AV	54.0	-10.4	1.46 H	199	28.6	15.0
7	#17475.00	57.9 PK	74.0	-16.1	1.99 H	310	36.8	21.1
8	#17475.00	45.9 AV	54.0	-8.1	1.99 H	310	24.8	21.1

**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	#5621.25	57.9 PK	68.2	-10.3	1.99 V	318	53.9	4.0
2	*5825.00	122.1 PK			1.99 V	318	117.9	4.2
3	*5825.00	113.1 AV			1.99 V	318	108.9	4.2
4	#5980.82	58.5 PK	68.2	-9.7	1.99 V	318	54.0	4.5
5	11650.00	52.9 PK	74.0	-21.1	1.42 V	337	37.9	15.0
6	11650.00	41.1 AV	54.0	-12.9	1.42 V	337	26.1	15.0
7	#17475.00	58.7 PK	74.0	-15.3	1.31 V	236	37.6	21.1
8	#17475.00	46.9 AV	54.0	-7.1	1.31 V	236	25.8	21.1

**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 (VHT40)**

<b>CHANNEL</b>	TX Channel 151	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

<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	#5649.27	65.2 PK	68.2	-3.0	3.57 H	356	61.2	4.0
2	*5755.00	116.0 PK			3.57 H	356	111.8	4.2
3	*5755.00	105.7 AV			3.57 H	356	101.5	4.2
4	#5938.07	56.8 PK	68.2	-11.4	3.57 H	356	52.4	4.4
5	11510.00	56.3 PK	74.0	-17.7	1.49 H	186	41.2	15.1
6	11510.00	43.8 AV	54.0	-10.2	1.49 H	186	28.7	15.1
7	#17265.00	58.0 PK	74.0	-16.0	1.99 H	296	38.1	19.9
8	#17265.00	46.0 AV	54.0	-8.0	1.99 H	296	26.1	19.9

<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	#5652.12	67.3 PK	69.8	-2.5	1.43 V	199	63.3	4.0
2	*5755.00	120.1 PK			1.43 V	199	115.9	4.2
3	*5755.00	110.7 AV			1.43 V	199	106.5	4.2
4	#5911.95	63.4 PK	77.8	-14.4	1.43 V	199	59.0	4.4
5	11510.00	52.7 PK	74.0	-21.3	1.47 V	327	37.6	15.1
6	11510.00	40.8 AV	54.0	-13.2	1.47 V	327	25.7	15.1
7	#17265.00	58.4 PK	74.0	-15.6	1.32 V	250	38.5	19.9
8	#17265.00	46.8 AV	54.0	-7.2	1.32 V	250	26.9	19.9

**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 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	#5644.52	55.9 PK	68.2	-12.3	3.50 H	347	51.9	4.0
2	*5795.00	114.5 PK			3.50 H	347	110.4	4.1
3	*5795.00	104.9 AV			3.50 H	347	100.8	4.1
4	#5923.82	59.3 PK	69.1	-9.8	3.50 H	347	54.9	4.4
5	11590.00	55.8 PK	74.0	-18.2	1.49 H	208	40.7	15.1
6	11590.00	43.5 AV	54.0	-10.5	1.49 H	208	28.4	15.1
7	#17385.00	58.1 PK	74.0	-15.9	2.02 H	282	37.5	20.6
8	#17385.00	46.4 AV	54.0	-7.6	2.02 H	282	25.8	20.6

**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	#5645.95	58.6 PK	68.2	-9.6	1.29 V	197	54.6	4.0
2	*5795.00	118.9 PK			1.29 V	197	114.8	4.1
3	*5795.00	108.9 AV			1.29 V	197	104.8	4.1
4	#5924.77	62.2 PK	68.4	-6.2	1.29 V	197	57.8	4.4
5	11590.00	53.6 PK	74.0	-20.4	1.37 V	328	38.5	15.1
6	11590.00	41.5 AV	54.0	-12.5	1.37 V	328	26.4	15.1
7	#17385.00	58.6 PK	74.0	-15.4	1.32 V	236	38.0	20.6
8	#17385.00	46.9 AV	54.0	-7.1	1.32 V	236	26.3	20.6

**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.

**802.11ac (VHT80)**

<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	#5627.90	65.6 PK	68.2	-2.6	3.57 H	354	61.6	4.0
2	*5775.00	114.4 PK			3.57 H	354	110.2	4.2
3	*5775.00	98.8 AV			3.57 H	354	94.6	4.2
4	#5938.07	65.9 PK	68.2	-2.3	3.57 H	354	61.5	4.4
5	11550.00	55.4 PK	74.0	-18.6	1.44 H	184	40.2	15.2
6	11550.00	43.3 AV	54.0	-10.7	1.44 H	184	28.1	15.2
7	#17325.00	58.6 PK	74.0	-15.4	2.04 H	289	38.3	20.3
8	#17325.00	46.8 AV	54.0	-7.2	2.04 H	289	26.5	20.3

**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	#5657.82	73.0 PK	74.0	-1.0	1.81 V	109	69.0	4.0
2	*5775.00	116.9 PK			1.81 V	109	112.7	4.2
3	*5775.00	101.1 AV			1.81 V	109	96.9	4.2
4	#5976.07	62.7 PK	68.2	-5.5	1.81 V	109	58.2	4.5
5	11550.00	53.0 PK	74.0	-21.0	1.38 V	352	37.8	15.2
6	11550.00	41.2 AV	54.0	-12.8	1.38 V	352	26.0	15.2
7	#17325.00	59.1 PK	74.0	-14.9	1.28 V	237	38.8	20.3
8	#17325.00	47.1 AV	54.0	-6.9	1.28 V	237	26.8	20.3

**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:**

**Radio 1**

**802.11ac (VHT40)**

<b>CHANNEL</b>	TX Channel 46	<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	35.07	24.2 QP	40.0	-15.8	2.50 H	243	33.8	-9.6
2	85.97	26.7 QP	40.0	-13.3	1.00 H	242	40.5	-13.8
3	140.05	26.2 QP	43.5	-17.3	2.50 H	75	35.2	-9.0
4	169.22	27.6 QP	43.5	-15.9	1.50 H	313	36.3	-8.7
5	303.71	30.9 QP	46.0	-15.1	1.00 H	57	38.2	-7.3
6	570.87	39.2 QP	46.0	-6.8	1.50 H	94	40.3	-1.1

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	34.20	36.9 QP	40.0	-3.1	1.00 V	38	46.5	-9.6
2	47.82	31.4 QP	40.0	-8.6	1.50 V	360	39.7	-8.3
3	86.04	35.6 QP	40.0	-4.4	1.50 V	2	49.4	-13.8
4	320.54	32.5 QP	46.0	-13.5	1.50 V	2	39.3	-6.8
5	570.85	38.7 QP	46.0	-7.3	1.00 V	40	39.8	-1.1
6	951.45	35.6 QP	46.0	-10.4	1.00 V	83	30.8	4.8

**REMARKS:**

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



**Radio 2**
**802.11a**

<b>CHANNEL</b>	TX Channel 157	<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	87.18	27.3 QP	40.0	-12.7	2.50 H	273	41.3	-14.0
2	133.28	26.6 QP	43.5	-16.9	2.50 H	65	36.3	-9.7
3	177.68	26.8 QP	43.5	-16.7	1.50 H	320	36.2	-9.4
4	299.95	30.8 QP	46.0	-15.2	1.00 H	41	38.3	-7.5
5	570.87	40.1 QP	46.0	-5.9	1.50 H	91	41.2	-1.1
6	951.43	32.4 QP	46.0	-13.6	1.00 H	187	27.6	4.8

**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	36.18	33.3 QP	40.0	-6.7	1.00 V	299	43.0	-9.7
2	86.24	36.8 QP	40.0	-3.2	1.50 V	11	50.6	-13.8
3	132.77	27.4 QP	43.5	-16.1	1.00 V	346	37.1	-9.7
4	321.75	32.8 QP	46.0	-13.2	1.00 V	0	39.6	-6.8
5	570.87	41.0 QP	46.0	-5.0	1.00 V	46	42.1	-1.1
6	951.45	36.3 QP	46.0	-9.7	1.00 V	84	31.5	4.8

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	100375	May 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral ) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	04	Nov. 18, 2015	Nov. 17, 2016
50 ohms Terminator	50	3	Oct. 21, 2015	Oct. 20, 2016
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. C.
- 3 The VCCI Con C Registration No. is C-3611.
- 4 Tested Date: Oct, 06, 2016

#### 4.2.3 Test Procedure

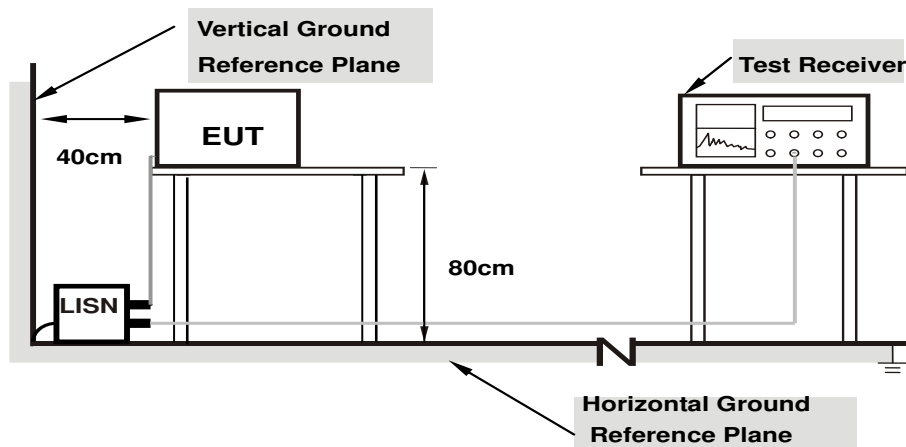
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

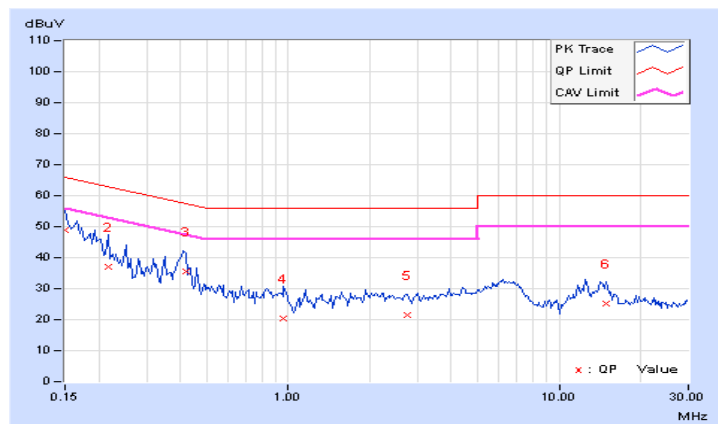
##### Radio 1

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.14	38.60	24.26	48.74	34.40	66.00	56.00	-17.26	-21.60
2	0.21641	10.12	26.76	15.55	36.88	25.67	62.96	52.96	-26.08	-27.29
3	0.41953	10.11	25.46	16.07	35.57	26.18	57.46	47.46	-21.89	-21.28
4	0.95859	10.12	10.40	4.87	20.52	14.99	56.00	46.00	-35.48	-31.01
5	2.76172	10.27	11.21	6.69	21.48	16.96	56.00	46.00	-34.52	-29.04
6	14.89063	10.63	14.49	6.32	25.12	16.95	60.00	50.00	-34.88	-33.05

#### 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.

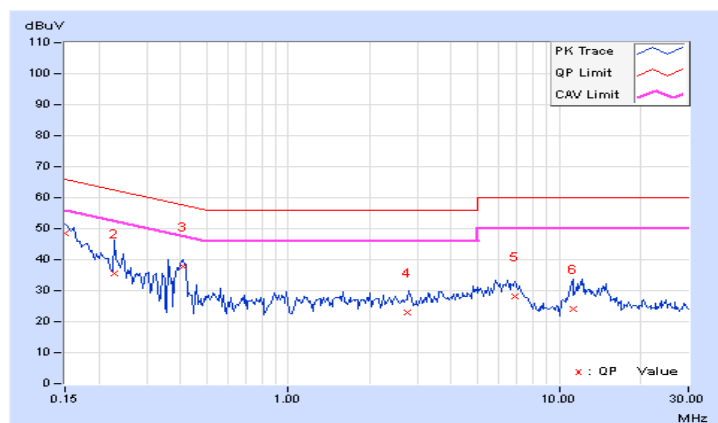


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15000	10.19	38.26	24.32	48.45	34.51	66.00	56.00	-17.55
2	0.22812	10.07	25.44	14.62	35.51	24.69	62.52	52.52	-27.01	-27.83
3	0.40781	10.09	27.63	24.88	37.72	34.97	57.69	47.69	-19.97	-12.72
4	2.74609	10.22	12.86	6.81	23.08	17.03	56.00	46.00	-32.92	-28.97
5	6.87109	10.40	17.76	12.56	28.16	22.96	60.00	50.00	-31.84	-27.04
6	11.24219	10.53	13.49	8.89	24.02	19.42	60.00	50.00	-35.98	-30.58

#### 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.



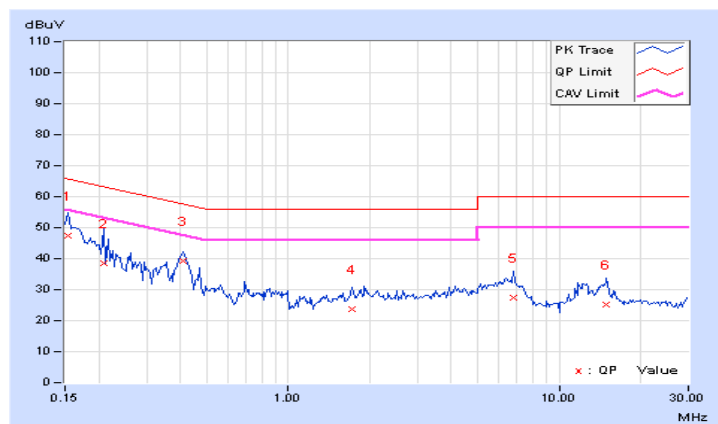
## Radio 2

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	0.15391	10.14	37.14	24.34	47.28	34.48	65.79	55.79	-18.51	-21.31
2	0.20859	10.12	28.31	16.29	38.43	26.41	63.26	53.26	-24.83	-26.85
3	0.40781	10.11	29.26	25.78	39.37	35.89	57.69	47.69	-18.32	-11.80
4	1.73047	10.21	13.64	8.99	23.85	19.20	56.00	46.00	-32.15	-26.80
5	6.77734	10.37	17.15	12.15	27.52	22.52	60.00	50.00	-32.48	-27.48
6	14.87500	10.63	14.63	6.46	25.26	17.09	60.00	50.00	-34.74	-32.91

### 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.

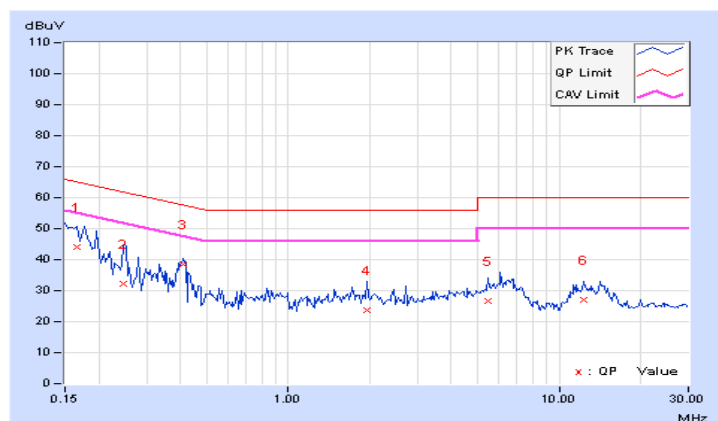


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.16562	10.15	33.94	22.07	44.09	32.22	65.18	55.18	-21.09
2	0.24766	10.07	22.05	11.42	32.12	21.49	61.84	51.84	-29.72	-30.35
3	<b>0.41172</b>	<b>10.09</b>	<b>28.30</b>	<b>28.06</b>	<b>38.39</b>	<b>38.15</b>	<b>57.61</b>	<b>47.61</b>	<b>-19.22</b>	<b>-9.46</b>
4	1.94141	10.16	13.53	9.21	23.69	19.37	56.00	46.00	-32.31	-26.63
5	5.46484	10.36	16.14	9.23	26.50	19.59	60.00	50.00	-33.50	-30.41
6	12.31641	10.57	16.35	10.47	26.92	21.04	60.00	50.00	-33.08	-28.96

#### 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)
		Mobile and Portable 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,

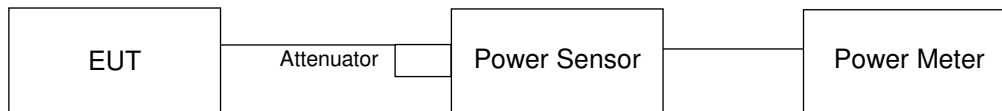
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

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

##### Radio 1

##### 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	21.73	22.22	315.661	24.99	29.00	Pass
40	5200	25.42	25.56	708.086	28.50	29.00	Pass
48	5240	25.44	25.83	732.77	28.65	29.00	Pass

**Note:** 1. For UNII-1: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(7-6) = 29\text{dBm}$ .

##### 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	21.72	22.24	316.088	25.00	29.00	Pass
40	5200	25.46	25.66	719.689	28.57	29.00	Pass
48	5240	25.49	25.87	740.364	28.69	29.00	Pass

**Note:** 1. For UNII-1: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(7-6) = 29\text{dBm}$ .

##### 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	21.15	20.79	250.267	23.98	29.00	Pass
46	5230	26.25	25.36	765.255	28.84	29.00	Pass

**Note:** 1. For UNII-1: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(7-6) = 29\text{dBm}$ .

##### 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	20.76	19.86	215.952	23.34	29.00	Pass

**Note:** 1. For UNII-1: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(7-6) = 29\text{dBm}$ .

## Radio 2

### 802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	26.26	26.54	873.486	29.41	29.85	Pass
157	5785	26.56	26.86	938.187	29.72	29.85	Pass
165	5825	26.40	26.80	915.146	29.61	29.85	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$

### 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				
149	5745	25.69	25.84	754.388	28.78	29.85	Pass
157	5785	25.72	25.99	770.442	28.87	29.85	Pass
165	5825	26.12	26.51	856.974	29.33	29.85	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$

### 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				
151	5755	26.53	26.75	922.931	29.65	29.85	Pass
159	5795	26.53	26.82	930.619	29.69	29.85	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$

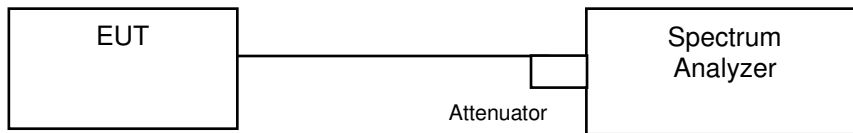
### 802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	23.34	23.54	441.718	26.45	29.85	Pass

**Note:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$

## 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

##### Radio 1

##### 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.44
40	5200	20.52	18.72
48	5240	17.40	17.28

##### 802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.76	17.76
40	5200	19.80	18.96
48	5240	18.24	18.36

##### 802.11ac (VHT40)

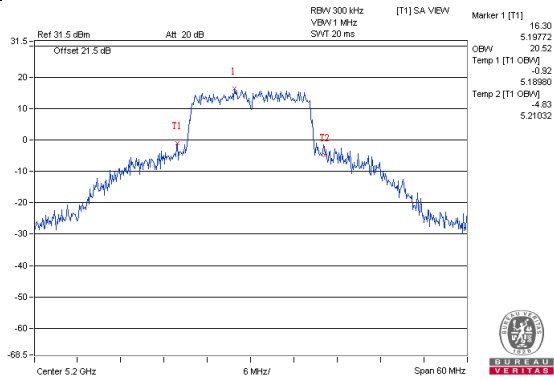
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.72	36.24
46	5230	36.96	36.72

##### 802.11ac (VHT80)

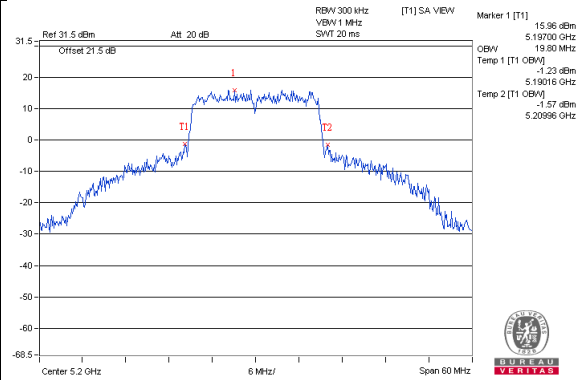
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.84

### Spectrum Plot of Worst Value

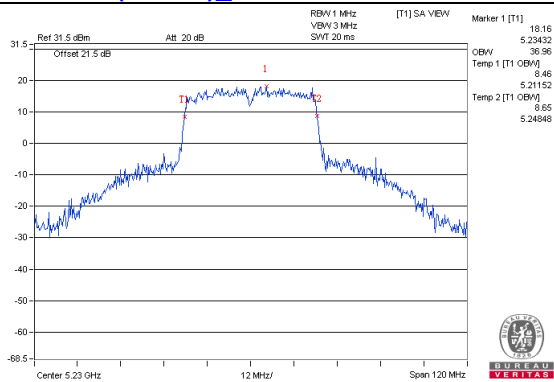
**802.11a\_Chain0 / CH40**



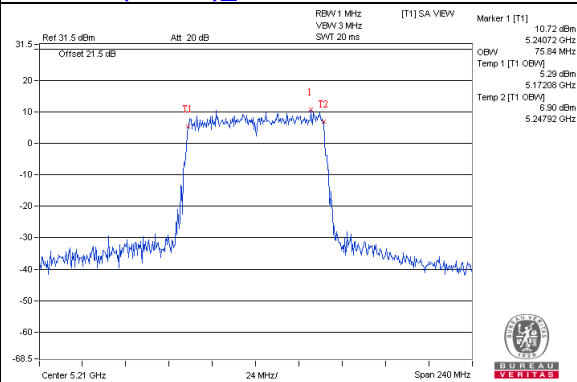
**802.11ac (VHT20)\_Chain0 / CH40**



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



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



## Radio 2

### 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
149	5745	16.68	16.80
157	5785	16.92	16.92
165	5825	16.92	16.80

### 802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
149	5745	17.88	17.76
157	5785	18.00	18.00
165	5825	18.00	17.88

### 802.11ac (VHT40)

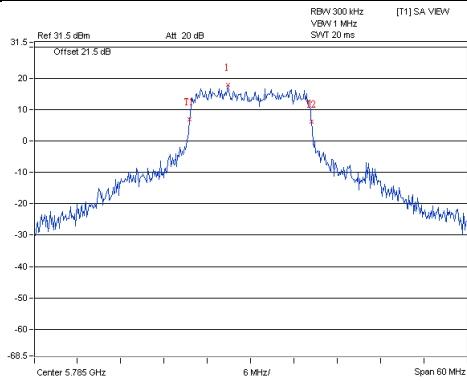
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
151	5755	39.12	38.40
159	5795	41.28	38.88

### 802.11ac (VHT80)

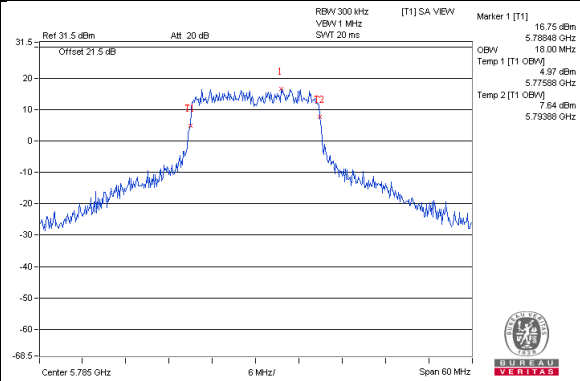
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
155	5775	75.84	76.32

### Spectrum Plot of Worst Value

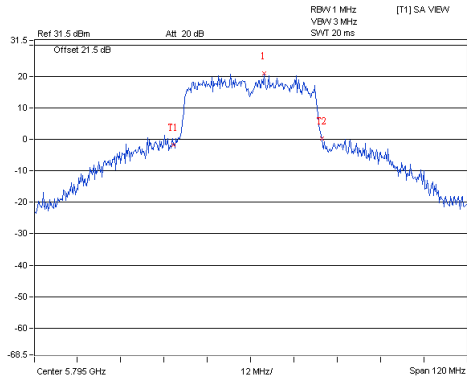
**802.11a\_Chain0 / CH157**



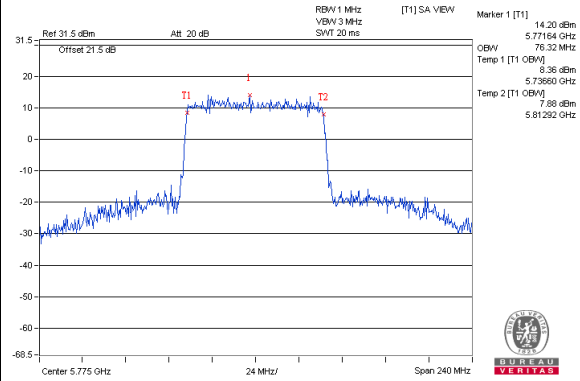
**802.11a (VHT20)\_Chain0 / CH157**



**802.11ac (VHT40)\_Chain0 / CH159**

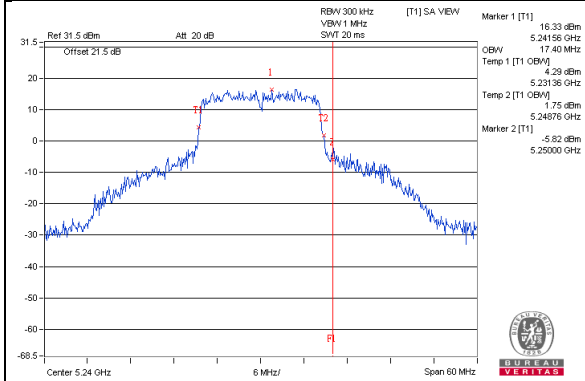


**802.11ac (VHT80)\_Chain1 / CH155**

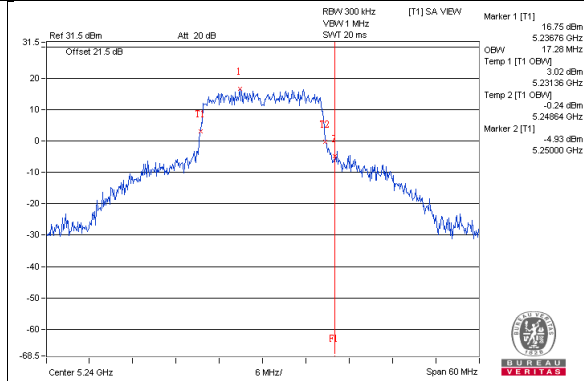


### Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)

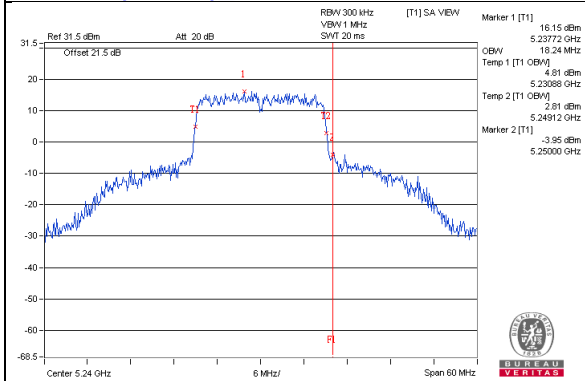
**802.11a\_Chain0 / CH48**



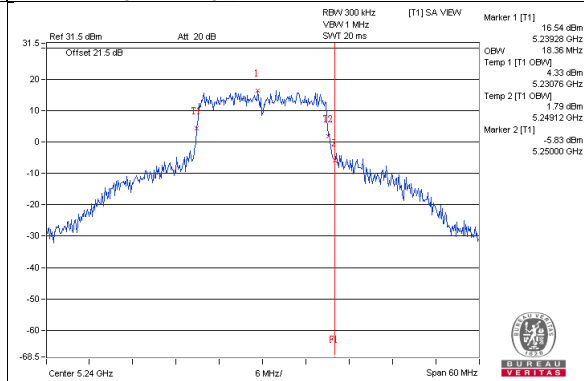
**802.11a\_Chain1 / CH48**



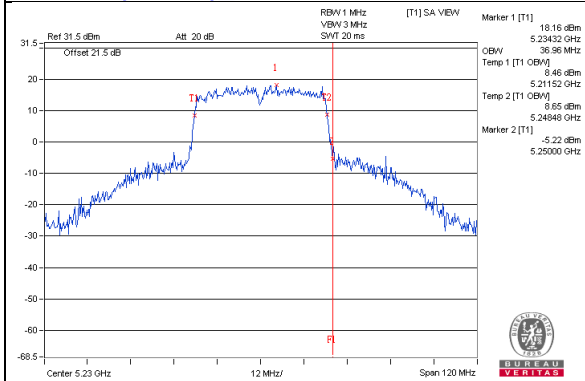
**802.11ac(VHT20)\_Chain0 / CH48**



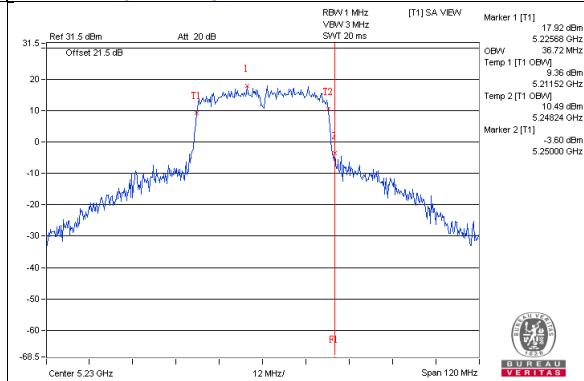
**802.11ac(VHT20)\_Chain1 / CH48**



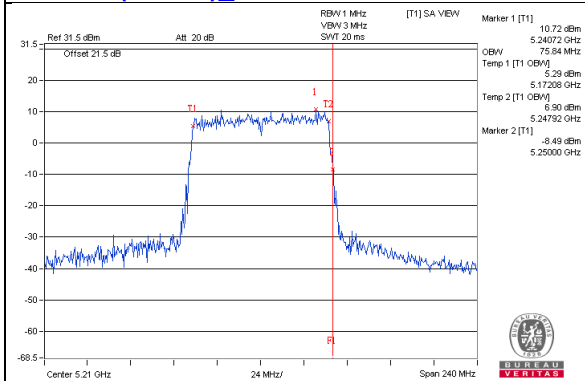
**802.11ac(VHT40)\_Chain0 / CH46**



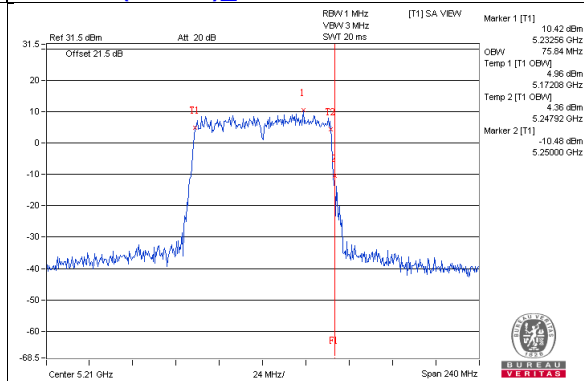
**802.11ac(VHT40)\_Chain1 / CH46**



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



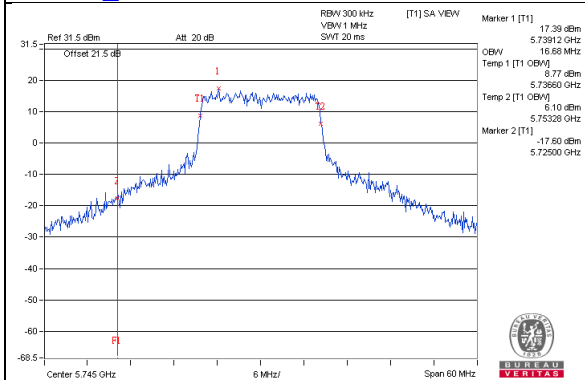
**802.11ac(VHT80)\_Chain1 / CH42**



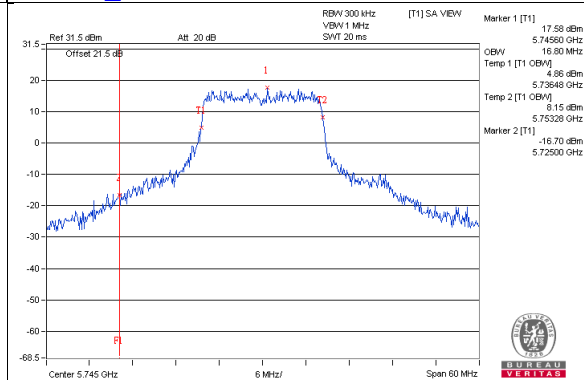


### Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)

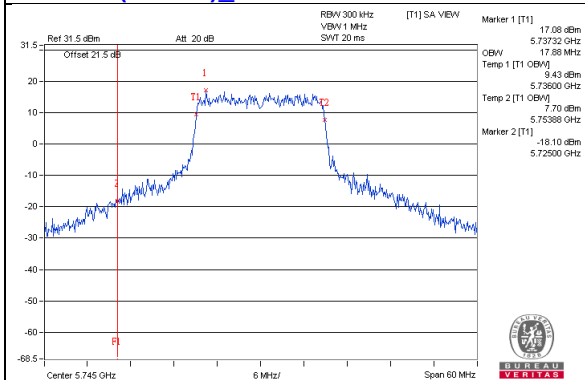
**802.11a\_Chain0 / CH149**



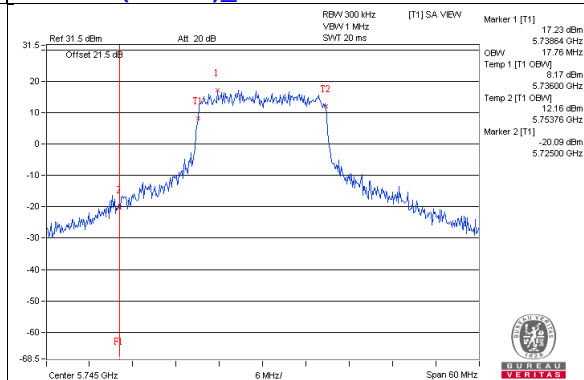
**802.11a\_Chain1 / CH149**



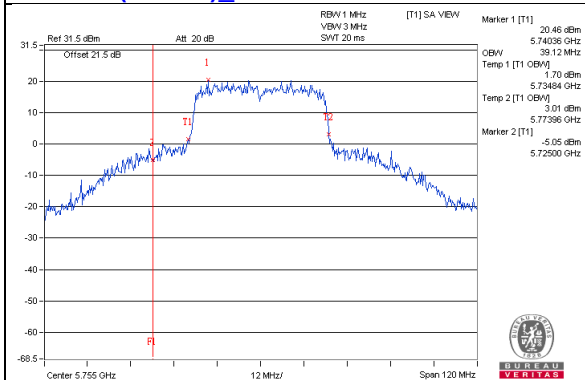
**802.11ac(VHT20)\_Chain0 / CH149**



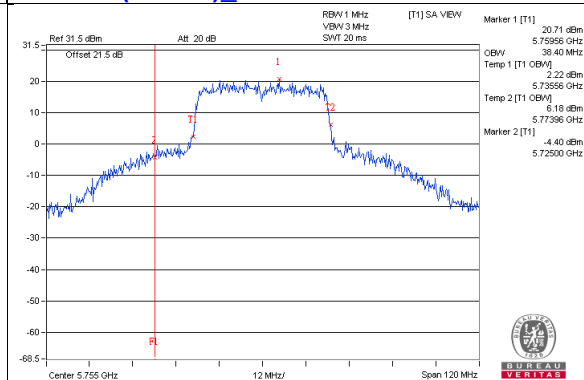
**802.11ac(VHT20)\_Chain1 / CH149**



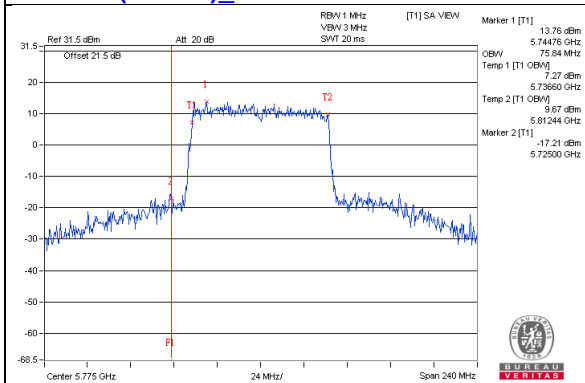
**802.11ac(VHT40)\_Chain0 / CH151**



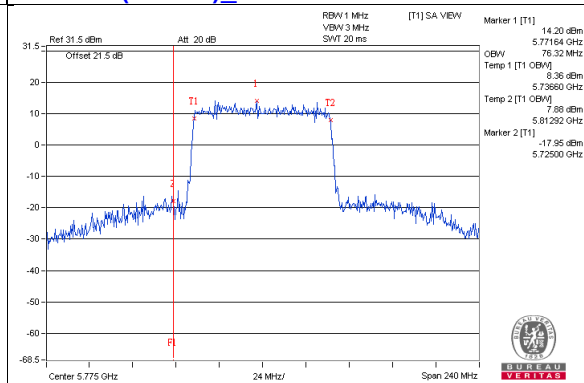
**802.11ac(VHT40)\_Chain1 / CH151**



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



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

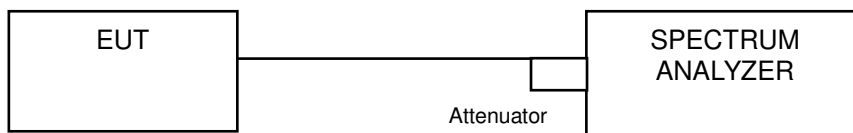


## 4.5 Peak Power Spectral Density Measurement

### 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	
		Mobile and Portable 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)**

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

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

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

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  $BWCF = 10\log(500\text{ kHz}/300\text{kHz})$
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

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

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

Using method SA-2

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

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

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  $BWCF = 10\log(500\text{ kHz}/300\text{kHz})$
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/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:

##### Radio 1

##### 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				
36	5180	7.45	8.04	0.17	10.93	16.00	Pass
40	5200	11.83	11.53	0.17	14.86	16.00	Pass
48	5240	11.85	11.94	0.17	15.07	16.00	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(7-6) = 16\text{dBm}$ .  
 3. 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			
36	5180	7.78	8.03	10.92	16.00	Pass
40	5200	11.56	11.46	14.52	16.00	Pass
48	5240	12.10	11.93	15.03	16.00	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(7-6) = 16\text{dBm}$ .

##### 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				
38	5190	3.29	3.10	0.16	6.37	16.00	Pass
46	5230	8.82	8.07	0.16	11.63	16.00	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(7-6) = 16\text{dBm}$ .  
 3. Refer to section 3.3 for duty cycle spectrum plot.

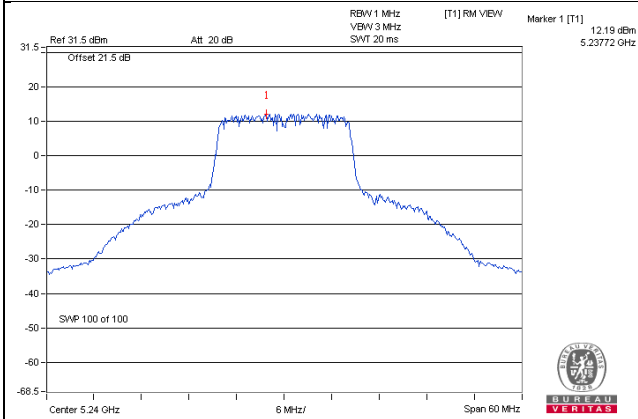
### 802.11ac (VHT80)

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				
42	5210	-0.06	-0.68	0.28	2.93	16.00	Pass

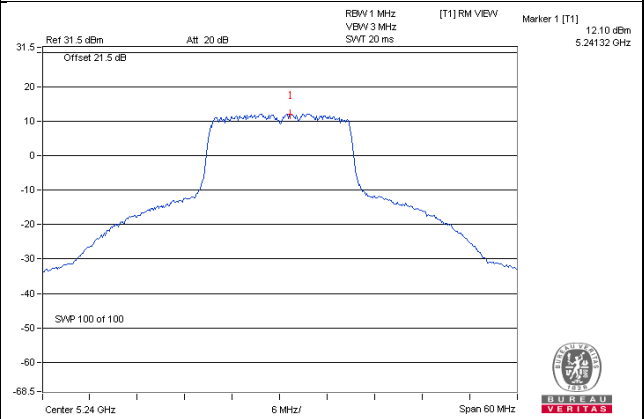
- Note:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
  - Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $17-(7-6) = 16\text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

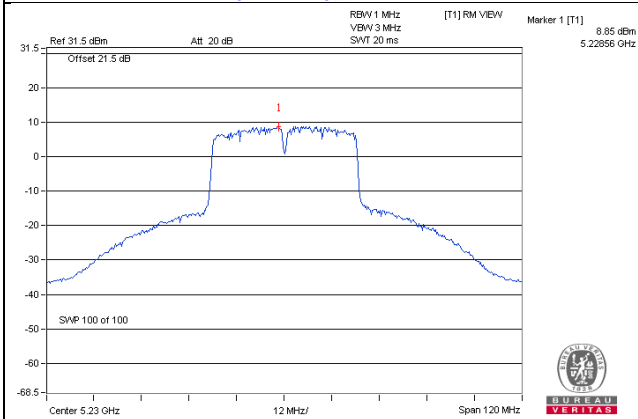
802.11a\_Chain 1 / CH48



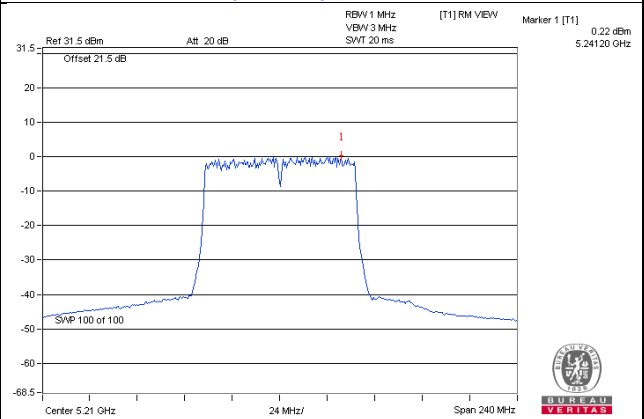
802.11ac (VHT20)\_Chain 0 / CH48



802.11ac (VHT40)\_Chain 0 / CH46



802.11ac (VHT80)\_Chain 0 / CH42



**For U-NII-3:**
**Radio 2**
**802.11a**

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	149	5745	4.69	6.91	3.01	0.17	10.09	29.85	Pass
	157	5785	4.78	7.00	3.01	0.17	10.18	29.85	Pass
	165	5825	4.60	6.82	3.01	0.17	10.00	29.85	Pass
1	149	5745	4.88	7.10	3.01	0.17	10.28	29.85	Pass
	157	5785	4.80	7.02	3.01	0.17	10.20	29.85	Pass
	165	5825	5.01	7.23	3.01	0.17	10.41	29.85	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.15\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$ .

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

**802.11ac (VHT20)**

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	4.26	6.48	3.01	9.49	29.85	Pass
	157	5785	3.97	6.19	3.01	9.20	29.85	Pass
	165	5825	4.33	6.55	3.01	9.56	29.85	Pass
1	149	5745	4.37	6.59	3.01	9.60	29.85	Pass
	157	5785	4.39	6.61	3.01	9.62	29.85	Pass
	165	5825	4.63	6.85	3.01	9.86	29.85	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.15\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$ .

### 802.11ac (VHT40)

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	151	5755	1.45	3.67	3.01	0.16	6.84	29.85	Pass
	159	5795	1.69	3.91	3.01	0.16	7.08	29.85	Pass
1	151	5755	1.86	4.08	3.01	0.16	7.25	29.85	Pass
	159	5795	2.06	4.28	3.01	0.16	7.45	29.85	Pass

Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$ .

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

### 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	-4.88	-2.66	3.01	0.28	0.63	29.85	Pass
1	155	5775	-4.84	-2.62	3.01	0.28	0.67	29.85	Pass

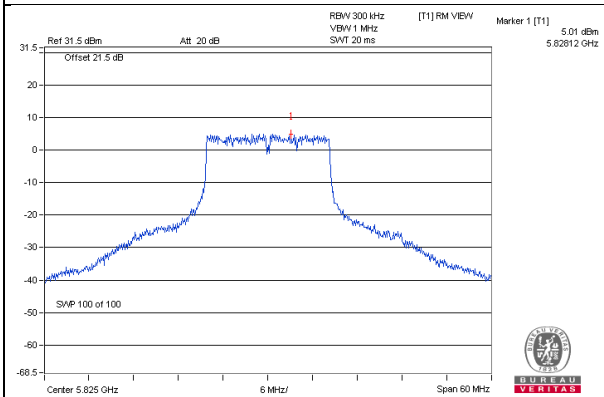
Note: 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.15dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.15-6) = 29.85\text{dBm}$ .

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

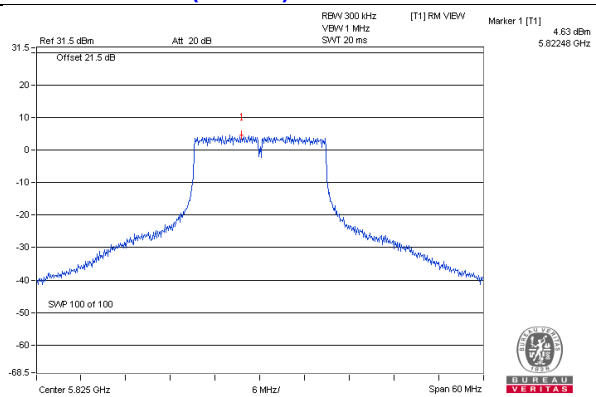


Spectrum Plot of Worst Value

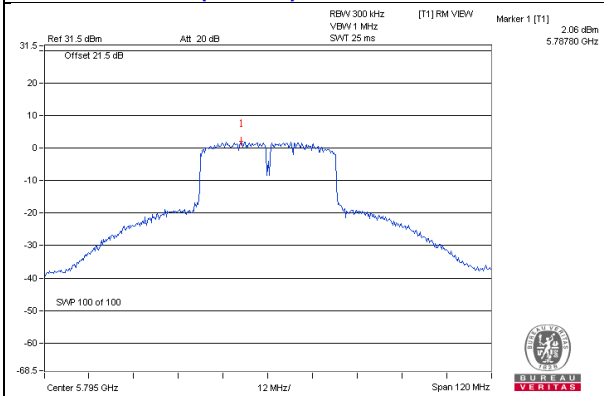
802.11a – Chain 1: CH 165



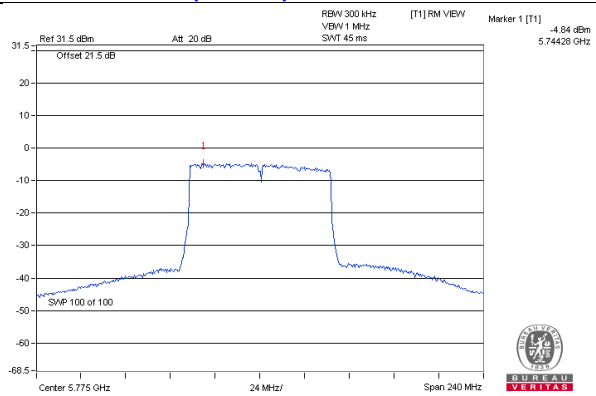
802.11ac (VHT20) – Chain 1: CH 165



802.11ac (VHT40) – Chain 1: CH 159



802.11ac (VHT80) – Chain 1: CH 155

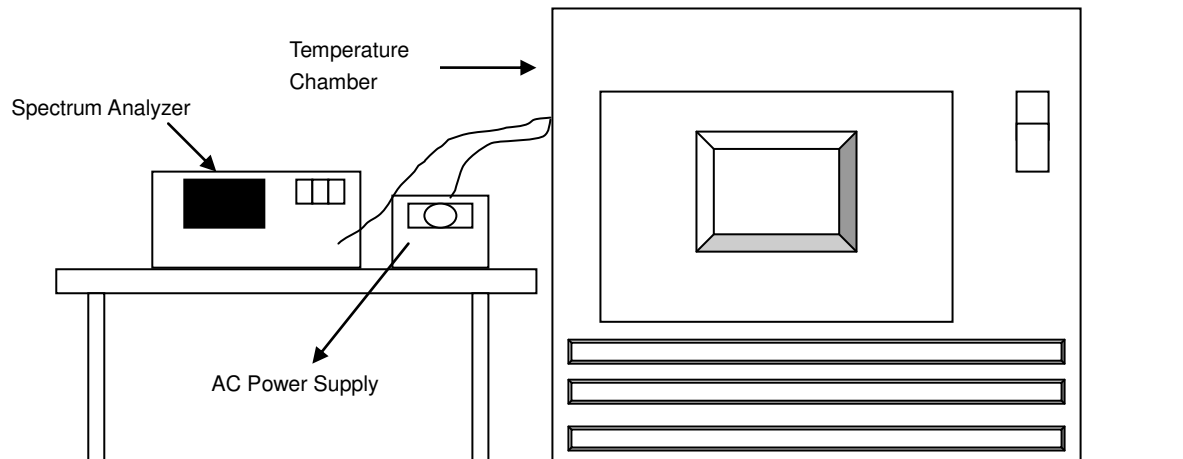


## 4.6 Frequency Stability Measurement

### 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

**Radio 1**

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5179.9773	Pass	5179.9788	Pass	5179.9761	Pass	5179.977	Pass
40	120	5179.9792	Pass	5179.9792	Pass	5179.9783	Pass	5179.9786	Pass
30	120	5180.0244	Pass	5180.0203	Pass	5180.021	Pass	5180.0235	Pass
20	120	5179.9766	Pass	5179.978	Pass	5179.9786	Pass	5179.9801	Pass
10	120	5180.0198	Pass	5180.0156	Pass	5180.0175	Pass	5180.0168	Pass
0	120	5180.0138	Pass	5180.0122	Pass	5180.0128	Pass	5180.0131	Pass
-10	120	5180.0119	Pass	5180.0126	Pass	5180.0117	Pass	5180.0122	Pass
-20	120	5179.9994	Pass	5179.9994	Pass	5179.9975	Pass	5180.0012	Pass
-30	120	5180.0085	Pass	5180.0064	Pass	5180.0069	Pass	5180.0109	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9762	Pass	5179.9786	Pass	5179.9784	Pass	5179.9811	Pass
	120	5179.9766	Pass	5179.978	Pass	5179.9786	Pass	5179.9801	Pass
	102	5179.9759	Pass	5179.9788	Pass	5179.9792	Pass	5179.9795	Pass

**Radio 2**

**Frequency Stability Versus Temp.**

**Operating Frequency: 5745 MHz**

TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5745.019	Pass	5745.0198	Pass	5745.0173	Pass	5745.0178	Pass
40	120	5745.0109	Pass	5745.0111	Pass	5745.01	Pass	5745.0085	Pass
30	120	5745.0177	Pass	5745.0201	Pass	5745.0209	Pass	5745.0185	Pass
20	120	5745.0242	Pass	5745.028	Pass	5745.0285	Pass	5745.0283	Pass
10	120	5745.0248	Pass	5745.0274	Pass	5745.0283	Pass	5745.0264	Pass
0	120	5744.9843	Pass	5744.9835	Pass	5744.9821	Pass	5744.9805	Pass
-10	120	5744.9857	Pass	5744.9873	Pass	5744.9873	Pass	5744.9915	Pass
-20	120	5744.9769	Pass	5744.9722	Pass	5744.9732	Pass	5744.9716	Pass
-30	120	5745.0262	Pass	5745.026	Pass	5745.0238	Pass	5745.0258	Pass

**Frequency Stability Versus Voltage**

**Operating Frequency: 5745 MHz**

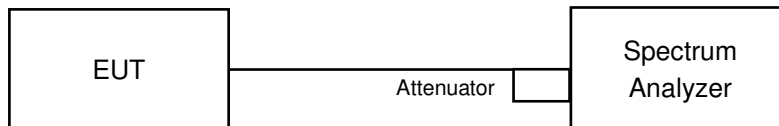
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5745.0233	Pass	5745.0269	Pass	5745.0292	Pass	5745.0283	Pass
	120	5745.0242	Pass	5745.028	Pass	5745.0285	Pass	5745.0283	Pass
	102	5745.0243	Pass	5745.0287	Pass	5745.0296	Pass	5745.0288	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

##### Radio 2

##### 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.34	16.33	0.5	PASS
157	5785	16.37	16.36	0.5	PASS
165	5825	16.35	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	17.32	16.97	0.5	PASS
157	5785	17.58	17.60	0.5	PASS
165	5825	17.56	17.59	0.5	PASS

##### 802.11ac (VHT40)

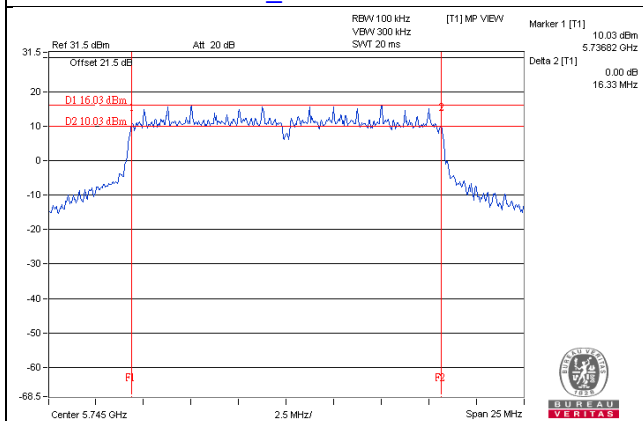
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.28	35.39	0.5	PASS
159	5795	35.25	35.42	0.5	PASS

##### 802.11ac (VHT80)

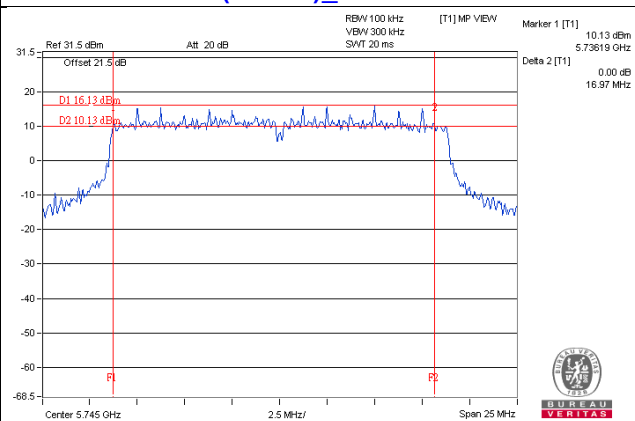
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.02	76.00	0.5	PASS

### Spectrum Plot of Worst Value

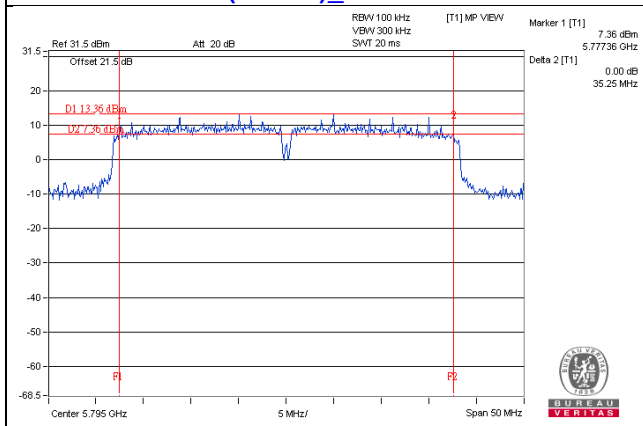
#### 802.11a\_Chain 1 / CH149



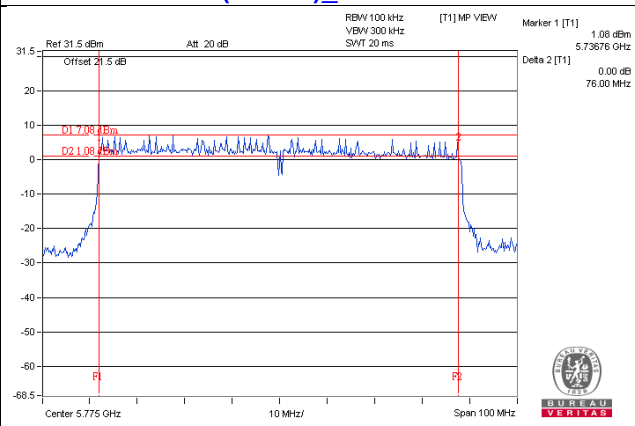
#### 802.11ac (VHT20)\_Chain 1 / CH149



#### 802.11ac (VHT40)\_Chain 0 / CH159



#### 802.11ac (VHT80)\_Chain 1 / CH155



## 5 Pictures of Test Arrangements

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

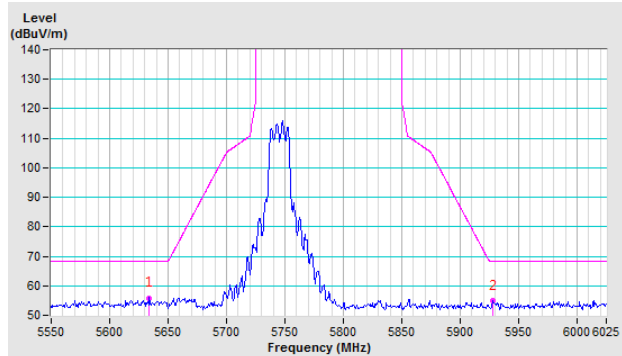


### Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

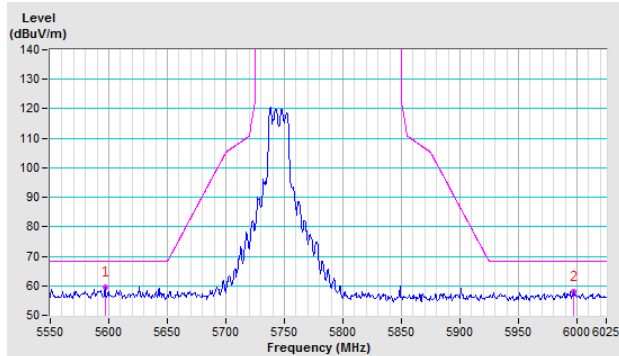
802.11a

**CH 149 5745 MHz**

**Horizontal**

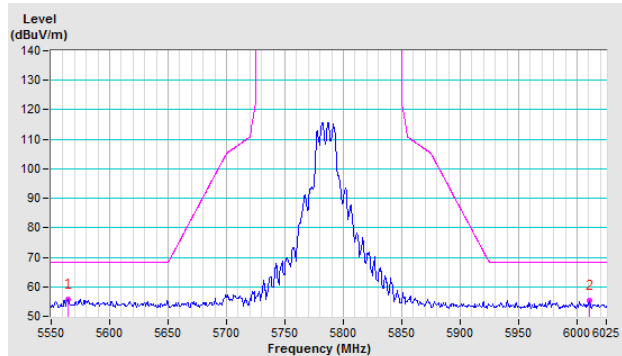


**Vertical**

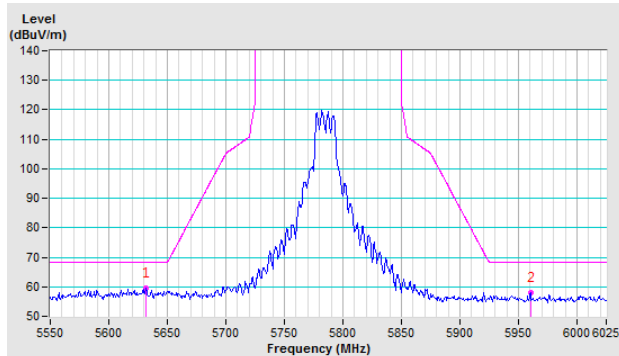


**CH 157 5785 MHz**

**Horizontal**

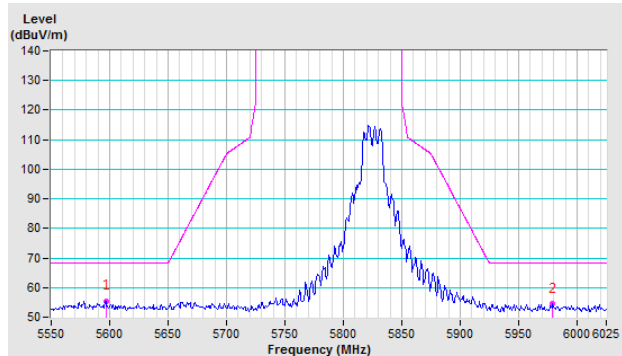


**Vertical**

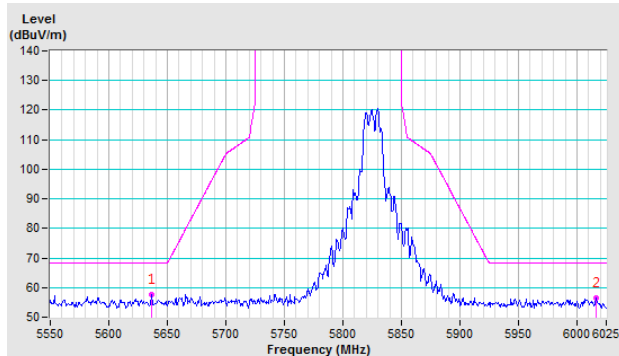


**CH 165 5825 MHz**

**Horizontal**



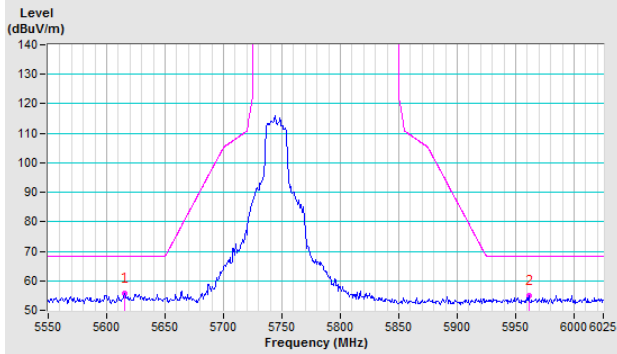
**Vertical**



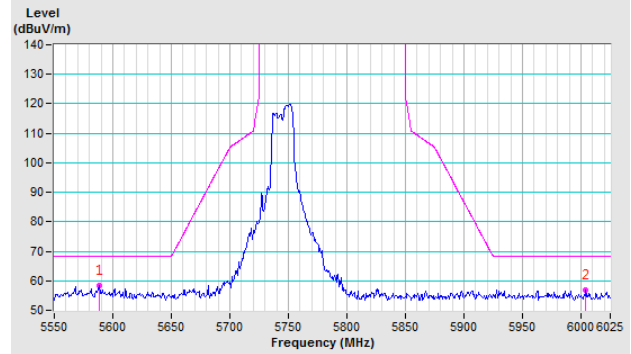
### 802.11ac (VHT20)

**CH 149 5745 MHz**

**Horizontal**

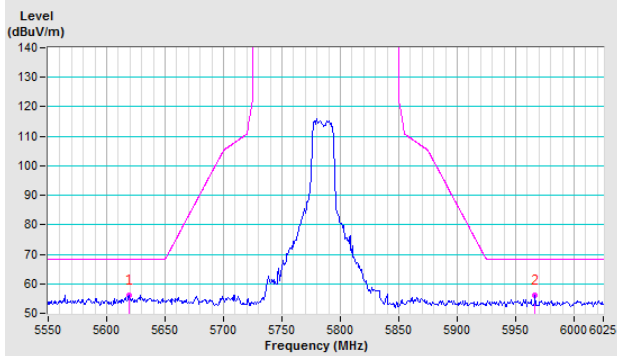


**Vertical**

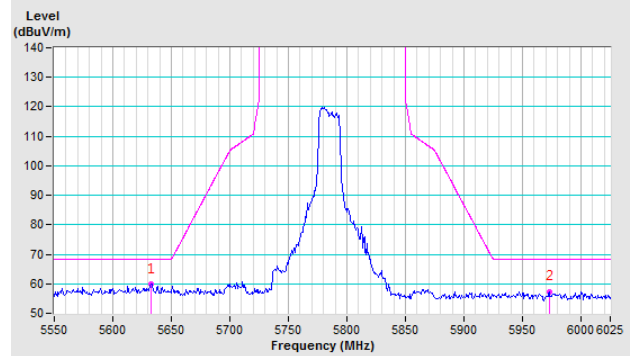


**CH 157 5785 MHz**

**Horizontal**

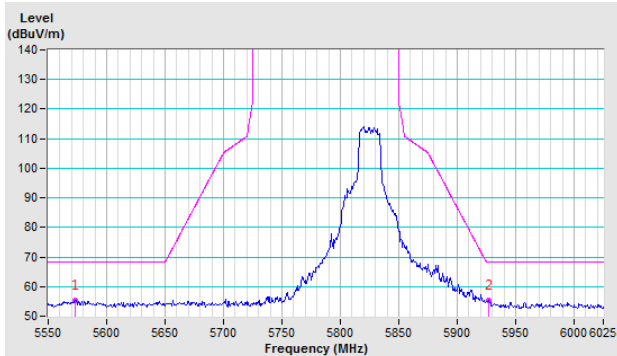


**Vertical**

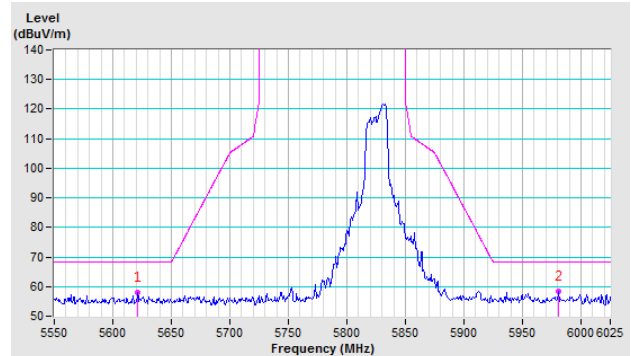


**CH 165 5825 MHz**

**Horizontal**



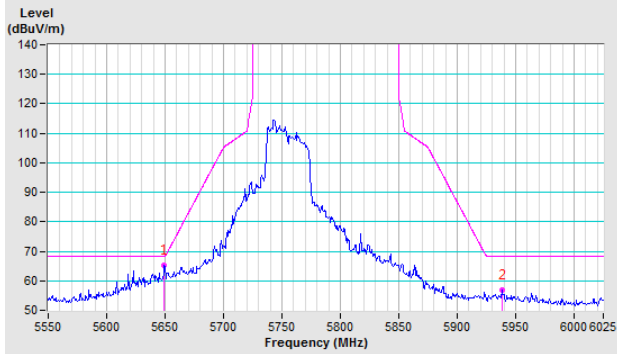
**Vertical**



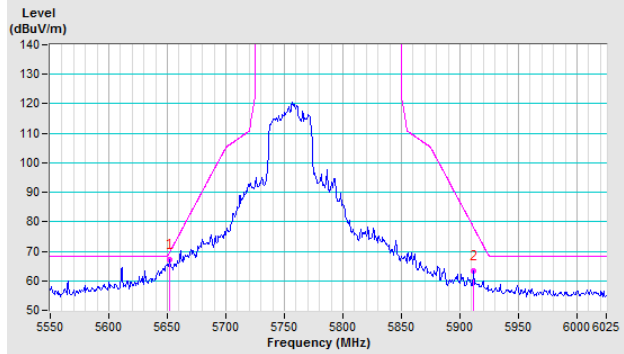
### 802.11ac (VHT40)

**CH 151 5755 MHz**

**Horizontal**

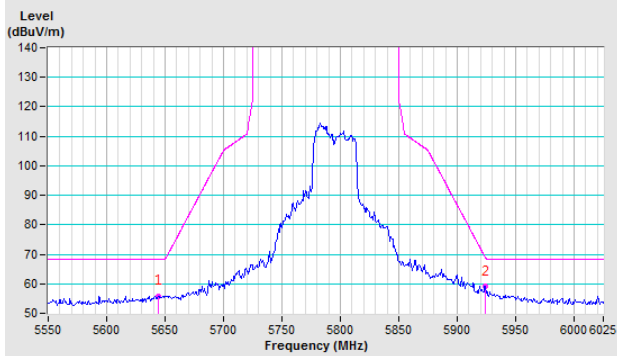


**Vertical**

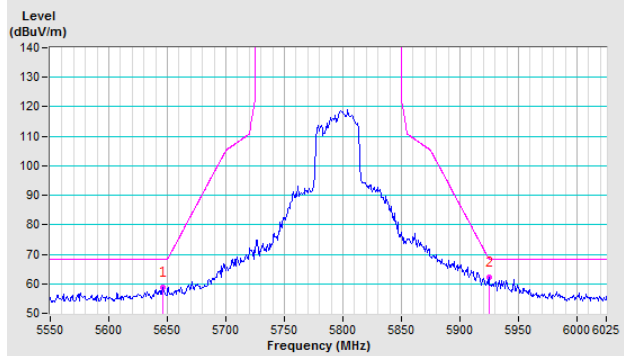


**CH 159 5795 MHz**

**Horizontal**



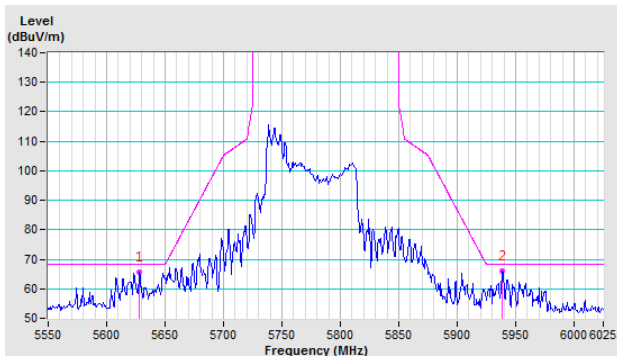
**Vertical**



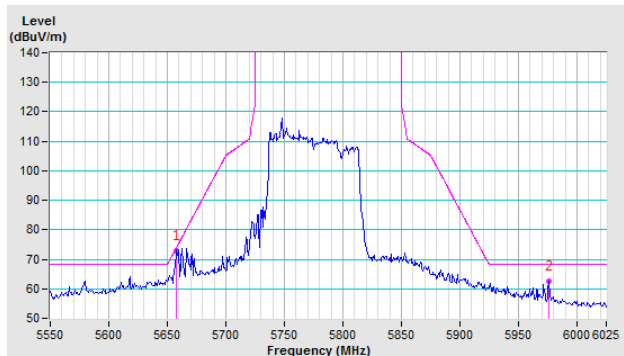
### 802.11ac (VHT80)

**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 accredited and approved according to ISO/IEC 17025.

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

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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.

--- END ---