



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF141024E06-1

**MODEL NO.:** AP One AC mini, Pismo AC0, Surf series, AP series, Mesh Connector series, MAX series

**FCC ID:** U8G-P1AC0

**RECEIVED:** Oct. 24, 2014

**TESTED:** Nov. 28 to Dec. 03, 2014

**ISSUED:** Dec. 16, 2014

**APPLICANT:** Pismo Labs Technology Limited

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141024E06-1	Original release	Dec. 16, 2014



## 1. CERTIFICATION

**PRODUCT:** Pepwave / Peplink / Pismo Wireless Product  
**BRAND NAME:** Pepwave / Peplink / Pismo  
**MODEL NO.:** AP One AC mini, Pismo AC0, Surf series, AP series, Mesh Connector series, MAX series  
**TEST SAMPLE:** ENGINEER SAMPLE  
**APPLICANT:** Pismo Labs Technology Limited  
**TESTED:** Nov. 28 to Dec. 03, 2014  
**STANDARDS:** **FCC Part 15, Subpart E (Section 15.407)**  
ANSI C63.10-2009

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

**Prepared by :** Phoenix Huang , **Date:** Dec. 16, 2014  
( Phoenix Huang, Specialist )

**Approved by :** May Chen , **Date:** Dec. 16, 2014  
( May Chen, Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.68dB at 0.23203MHz
15.407 (b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz, 5715.00MHz & 17355.00MHz.
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
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	1. For 2.4G WLAN: No antenna connector is used. 2. For 5G WLAN: Antenna connector is i-pex not a standard connector.

**NOTE:** 1. The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz and 5.725~5.850GHz. For the 2.400 ~ 2.4835GHz RF parameters was recorded in another test report.

## 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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.43 dB
Radiated emissions (1GHz -6GHz) for Chamber G	3.65 dB
Radiated emissions (1GHz -6GHz) for Chamber H	3.72 dB
Radiated emissions (6GHz -18GHz) for Chamber G	3.88 dB
Radiated emissions (6GHz -18GHz) for Chamber H	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Pepwave / Peplink / Pismo Wireless Product
<b>MODEL NO.</b>	AP One AC mini, Pismo AC0, Surf series, AP series, Mesh Connector series, MAX series
<b>POWER SUPPLY</b>	12Vdc from power adapter
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
<b>MODULATION TECHNOLOGY</b>	DSSS,OFDM
<b>TRANSFER RATE</b>	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	<b>For 15.247</b> 2.412 ~ 2.462GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	<b>For 15.247</b> 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 176.85mW 802.11ac (VHT20): 185.651mW 802.11ac (VHT40): 200.594mW 802.11ac (VHT80): 37.077mW <b>For 15.247</b> 802.11b: 204.326mW 802.11g: 934.394mW 802.11n (HT20): 920.711mW 802.11n (HT40): 781.783mW





<b>ANTENNA TYPE</b>	Please see Note
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	Adapter x 1

**Note:**

- The EUT has below model names, which are identical to each other in all aspects except for the following information:

Product Name	Brand Name	Model Name	Difference
Pepwave / Peplink / Pismo Wireless Product	Pepwave / Peplink / Pismo	AP One AC mini	for marketing requirement
		Pismo AC0	
		Surf series	
		AP series	
		Mesh Connector series	
		MAX series	

From the above models, model: AP One AC mini was selected as representative model for the test and its data was recorded in this report.

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

2.4GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
2	Chain (1)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
5GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	2.91	PCB	i-pex	7	5150~5250
				3.70				5725~5850
2	Chain (1)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	3.06	PCB	i-pex	11	5150~5250
				3.20				5725~5850

- The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
DVE	DSA-12G-12 FUS	AC Input: 120-240V, 0.3A, 50/60Hz DC Output: 12V, 1A DC Output cable: Unshielded, 1.8m

4. The EUT incorporates a MIMO function.

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

**Note:** The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
6. The above EUT information was 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

#### Operated in 5150 ~ 5250MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210 MHz

#### Operated in 5725 ~ 5850MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

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

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
-	√	√	√	√	-

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

#### **POWER LINE CONDUCTED EMISSION TEST:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	38 to 46 & 151 to 159	159	OFDM	BPSK	13.5

#### **RADIATED EMISSION TEST (BELOW 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	38 to 46 & 151 to 159	159	OFDM	BPSK	13.5



**RADIATED EMISSION TEST (ABOVE 1 GHz):**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	38 to 46 & 151 to 159	38, 46, 151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	42, 155	42, 155	OFDM	BPSK	29.3

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	38 to 46 & 151 to 159	38, 46, 151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	42, 155	42, 155	OFDM	BPSK	29.3

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	24deg. C, 71,%RH	120Vac, 60Hz	Wythe Lin
RE<1G	21deg. C, 64%RH	120Vac, 60Hz	Andy Ho
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
	26deg. C, 71%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Andy Ho

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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)**

**789033 D02 General UNII Test Procedures New Rules v01**

**662911 D01 Multiple Transmitter Output v02r01**

ANSI C63.10-2009

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.



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### 3.4 DUTY CYCLE OF TEST SIGNAL

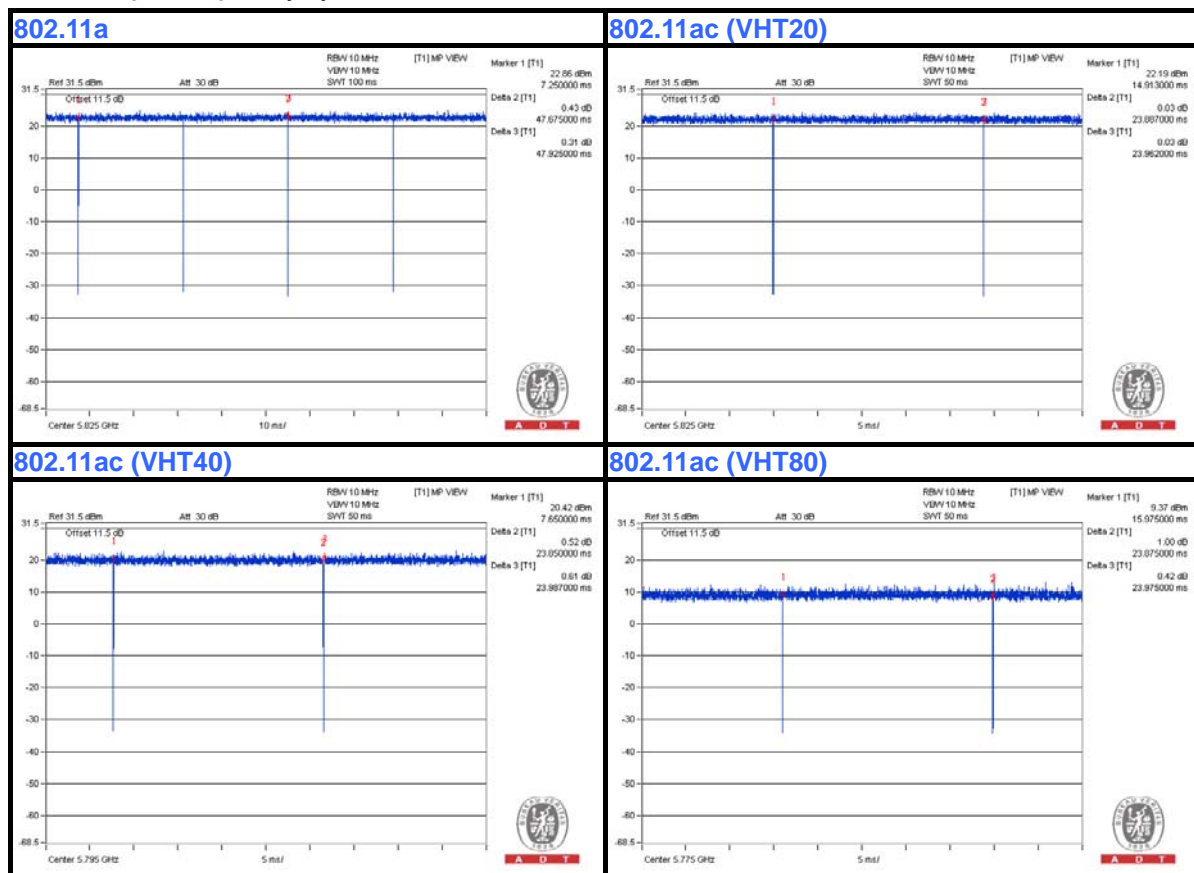
Duty cycle of test signal is  $\geq 98\%$ , duty factor is not required.

**802.11a:** Duty cycle =  $47.675 \text{ ms} / 47.925 \text{ ms} = 0.995$

**802.11ac (VHT20):** Duty cycle =  $23.887 \text{ ms} / 23.962 \text{ ms} = 0.997$

**802.11ac (VHT40):** Duty cycle =  $23.85 \text{ ms} / 23.987 \text{ ms} = 0.994$

**802.11ac (VHT80):** Duty cycle =  $23.875 \text{ ms} / 23.975 \text{ ms} = 0.996$





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### 3.5 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.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

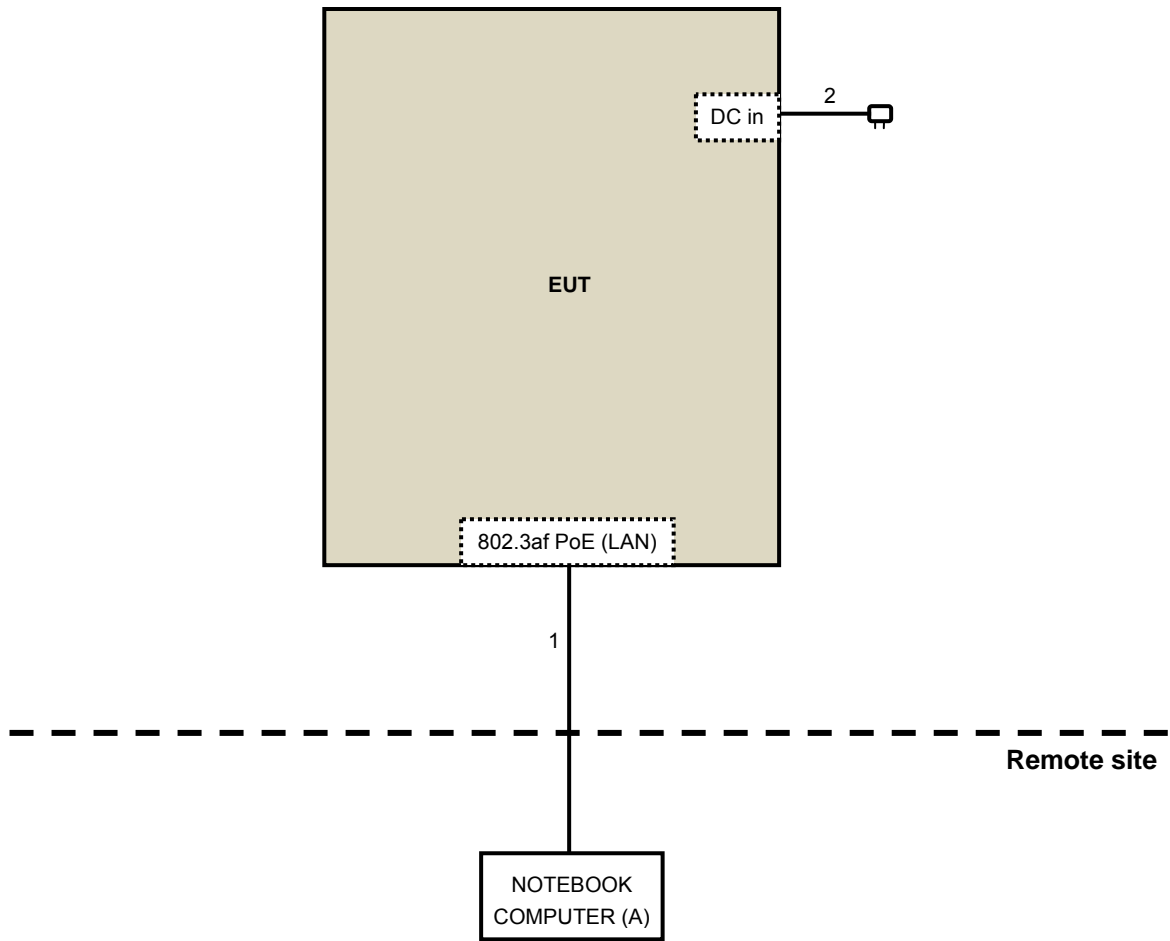
**NOTE:**

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	RJ-45	1	10	No	0	Provided by Lab
2.	DC	1	1.8	No	0	Supplied by Client



### 3.6 CONFIGURATION OF SYSTEM UNDER TEST



## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 28, 2014

### 4.1.3 TEST PROCEDURES

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

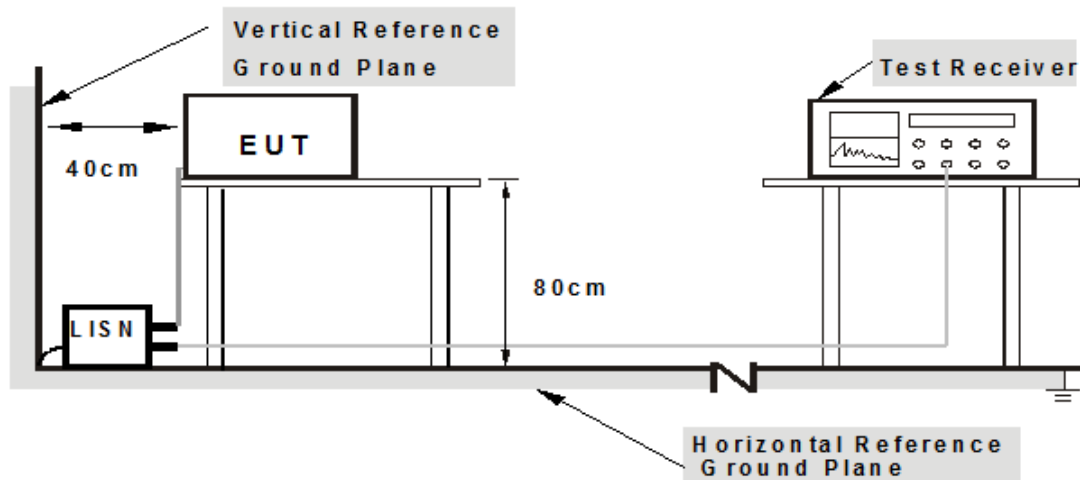
#### NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit A (Notebook Computer) which is placed in remote site.
2. Controlling software (artgui.exe) has been activated to set the EUT on specific status.

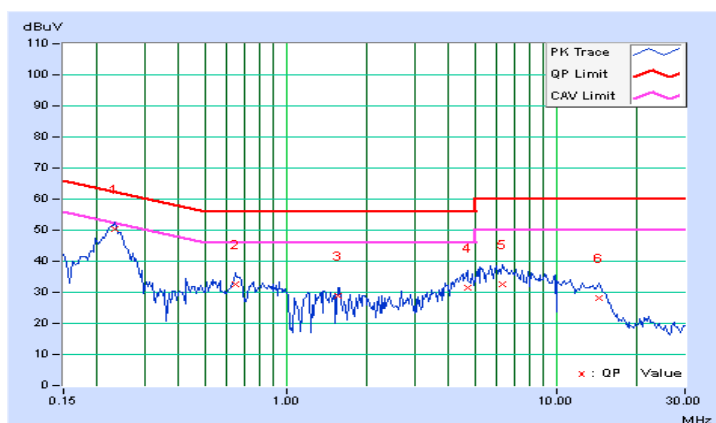
### 4.1.7 TEST RESULTS

<b>PHASE</b>	Line (L)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
--------------	----------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	0.07	50.20	41.62	50.27	41.69	62.38	52.38	-12.10	-10.68
2	0.65391	0.11	32.50	19.29	32.61	19.40	56.00	46.00	-23.39	-26.60
3	1.55859	0.16	28.62	16.14	28.78	16.30	56.00	46.00	-27.22	-29.70
4	4.68750	0.27	31.03	23.46	31.30	23.73	56.00	46.00	-24.70	-22.27
5	6.30078	0.33	32.20	24.37	32.53	24.70	60.00	50.00	-27.47	-25.30
6	14.37500	0.57	27.74	19.87	28.31	20.44	60.00	50.00	-31.69	-29.56

#### 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

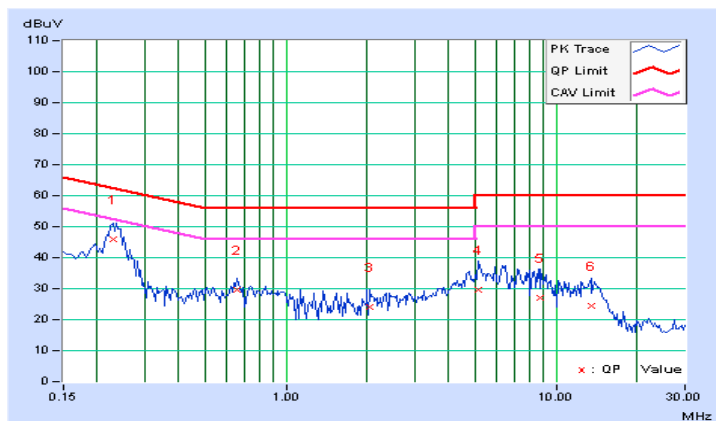


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22812	0.06	45.94	35.88	46.00	35.94	62.52	52.52	-16.51	-16.57
2	0.65781	0.11	29.70	17.48	29.81	17.59	56.00	46.00	-26.19	-28.41
3	2.04688	0.18	23.96	14.48	24.14	14.66	56.00	46.00	-31.86	-31.34
4	5.17969	0.30	29.39	21.75	29.69	22.05	60.00	50.00	-30.31	-27.95
5	8.77734	0.42	26.61	18.76	27.03	19.18	60.00	50.00	-32.97	-30.82
6	13.48047	0.56	23.94	16.02	24.50	16.58	60.00	50.00	-35.50	-33.42

**REMARKS:**

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



## 4.2 RADIATED EMISSION AND BANDEGE MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION AND BANDEGE 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.

#### 4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2(dBμV/m) <sup>*1</sup> PK:78.2 (dBμV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge    <sup>\*2</sup> within 10 MHz of band edge

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

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





A D T

### 4.2.3 TEST INSTRUMENTS

For Below 1GHz and U-NII-1 band above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Nov. 28 to 29, 2014



A D T

**For U-NII-3 band above 1GHz:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21,2014	July 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISl	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCl	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Antenna Tower & Turn Table CT	NA	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Dec. 01, 2014

#### 4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters 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:**

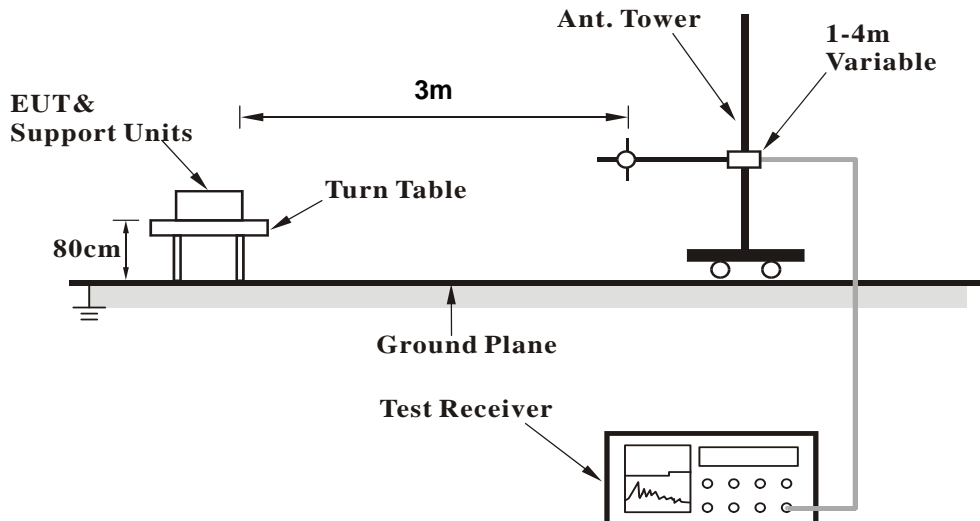
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.5 DEVIATION FROM TEST STANDARD

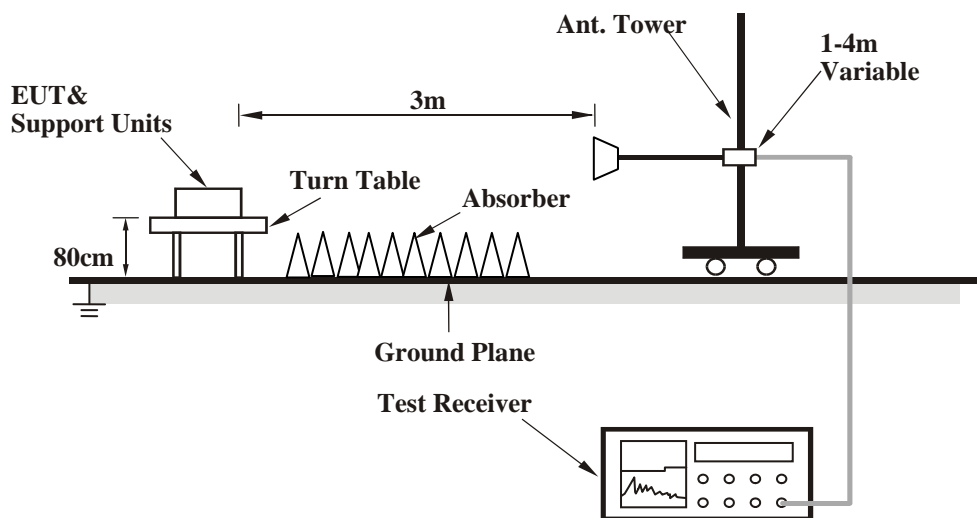
No deviation

#### 4.2.6 TEST SETUP

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

## 4.2.8 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11ac (VHT40)

<b>CHANNEL</b>	TX Channel 159	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 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	162.79	31.6 QP	43.5	-11.9	2.00 H	83	44.69	-13.11
2	220.02	34.0 QP	46.0	-12.1	1.00 H	101	49.96	-16.01
3	250.00	39.2 QP	46.0	-6.8	1.00 H	87	53.14	-13.91
4	600.02	41.7 QP	46.0	-4.3	1.50 H	313	46.53	-4.79
5	625.00	31.8 QP	46.0	-14.2	1.50 H	314	36.13	-4.30
6	899.90	37.1 QP	46.0	-8.9	1.50 H	142	36.96	0.18
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	75.49	33.4 QP	40.0	-6.6	1.18 V	145	50.10	-16.67
2	144.66	37.4 QP	43.5	-6.1	1.50 V	169	50.46	-13.02
3	250.00	33.4 QP	46.0	-12.6	1.00 V	150	47.29	-13.91
4	500.02	33.5 QP	46.0	-12.5	1.00 V	165	40.67	-7.19
5	600.02	38.3 QP	46.0	-7.7	1.50 V	140	43.09	-4.79
6	956.98	34.2 QP	46.0	-11.8	1.00 V	225	33.06	1.17

#### 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

**ABOVE 1GHz DATA**

**802.11a**

<b>CHANNEL</b>	TX Channel 36	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.1 PK	74.0	-6.9	1.02 H	203	62.82	4.28
2	5150.00	53.7 AV	54.0	-0.3	1.02 H	203	49.42	4.28
3	*5180.00	115.1 PK			1.01 H	194	110.71	4.39
4	*5180.00	107.4 AV			1.01 H	194	103.01	4.39
5	#10360.00	57.7 PK	74.0	-16.3	1.27 H	263	47.64	10.06
6	#10360.00	44.7 AV	54.0	-9.3	1.27 H	263	34.64	10.06
7	15540.00	69.2 PK	74.0	-4.8	1.23 H	235	54.36	14.84
8	15540.00	53.2 AV	54.0	-0.8	1.23 H	235	38.36	14.84

**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	59.2 PK	74.0	-14.8	1.12 V	97	54.92	4.28
2	5150.00	47.4 AV	54.0	-6.6	1.12 V	97	43.12	4.28
3	*5180.00	109.1 PK			1.12 V	97	104.71	4.39
4	*5180.00	101.6 AV			1.12 V	97	97.21	4.39
5	#10360.00	60.1 PK	74.0	-13.9	1.34 V	201	50.04	10.06
6	#10360.00	42.8 AV	54.0	-11.2	1.34 V	201	32.74	10.06
7	15540.00	67.6 PK	74.0	-6.4	1.18 V	141	52.76	14.84
8	15540.00	52.8 AV	54.0	-1.2	1.18 V	141	37.96	14.84

**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	67.2 PK	74.0	-6.8	1.02 H	192	62.92	4.28
2	5150.00	50.1 AV	54.0	-3.9	1.02 H	192	45.82	4.28
3	*5200.00	114.6 PK			1.00 H	192	110.16	4.44
4	*5200.00	107.0 AV			1.00 H	192	102.56	4.44
5	#10400.00	57.2 PK	74.0	-16.8	1.21 H	273	47.13	10.07
6	#10400.00	44.1 AV	54.0	-9.9	1.21 H	273	34.03	10.07
7	15600.00	67.2 PK	74.0	-6.8	1.13 H	235	52.14	15.06
8	15600.00	53.5 AV	54.0	-0.5	1.13 H	235	38.44	15.06

**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	53.6 PK	74.0	-20.4	1.13 V	89	49.32	4.28
2	5150.00	42.1 AV	54.0	-11.9	1.13 V	89	37.82	4.28
3	*5200.00	109.0 PK			1.13 V	89	104.56	4.44
4	*5200.00	101.8 AV			1.13 V	89	97.36	4.44
5	#10400.00	60.3 PK	74.0	-13.7	1.30 V	202	50.23	10.07
6	#10400.00	43.1 AV	54.0	-10.9	1.30 V	202	33.03	10.07
7	15600.00	67.1 PK	74.0	-6.9	1.26 V	121	52.04	15.06
8	15600.00	52.9 AV	54.0	-1.1	1.26 V	121	37.84	15.06

**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	115.7 PK			1.04 H	189	111.29	4.41
2	*5240.00	107.9 AV			1.04 H	189	103.49	4.41
3	5350.00	56.2 PK	74.0	-17.8	1.00 H	204	51.69	4.51
4	5350.00	45.3 AV	54.0	-8.7	1.00 H	204	40.79	4.51
5	#10480.00	57.1 PK	74.0	-16.9	1.31 H	288	46.84	10.26
6	#10480.00	43.9 AV	54.0	-10.1	1.31 H	288	33.64	10.26
7	15720.00	67.4 PK	74.0	-6.6	1.13 H	235	52.73	14.67
8	15720.00	53.8 AV	54.0	-0.2	1.13 H	235	39.13	14.67

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	109.5 PK			1.06 V	99	105.09	4.41
2	*5240.00	101.7 AV			1.06 V	99	97.29	4.41
3	5350.00	53.1 PK	74.0	-20.9	1.06 V	99	48.59	4.51
4	5350.00	41.9 AV	54.0	-12.1	1.06 V	99	37.39	4.51
5	#10480.00	59.7 PK	74.0	-14.3	1.25 V	201	49.44	10.26
6	#10480.00	42.7 AV	54.0	-11.3	1.25 V	201	32.44	10.26
7	15720.00	66.8 PK	74.0	-7.2	1.26 V	106	52.13	14.67
8	15720.00	52.8 AV	54.0	-1.2	1.26 V	106	38.13	14.67

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	62.1 PK	74.0	-11.9	1.60 H	113	53.73	8.37
2	#5715.00	49.1 AV	54.0	-4.9	1.60 H	113	40.73	8.37
3	#5725.00	77.1 PK	78.2	-1.1	1.60 H	113	68.71	8.39
4	*5745.00	112.8 PK			1.62 H	128	104.38	8.42
5	*5745.00	101.7 AV			1.62 H	128	93.28	8.42
6	11490.00	50.4 PK	74.0	-23.6	1.00 H	142	36.05	14.35
7	11490.00	38.6 AV	54.0	-15.4	1.00 H	142	24.25	14.35
8	#17235.00	56.2 PK	74.0	-17.8	1.08 H	107	33.76	22.44
9	#17235.00	45.3 AV	54.0	-8.7	1.08 H	107	22.86	22.44

**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	#5715.00	59.5 PK	74.0	-14.5	1.01 V	82	51.13	8.37
2	#5715.00	46.2 AV	54.0	-7.8	1.01 V	82	37.83	8.37
3	#5725.00	74.2 PK	78.2	-4.0	1.17 V	93	65.81	8.39
4	*5745.00	110.2 PK			1.17 V	93	101.78	8.42
5	*5745.00	99.2 AV			1.17 V	93	90.78	8.42
6	11490.00	49.5 PK	74.0	-24.5	1.01 V	82	35.15	14.35
7	11490.00	37.6 AV	54.0	-16.4	1.01 V	82	23.25	14.35
8	#17235.00	55.2 PK	74.0	-18.8	1.15 V	140	32.76	22.44
9	#17235.00	44.2 AV	54.0	-9.8	1.15 V	140	21.76	22.44

**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	#5715.00	56.0 PK	74.0	-18.0	1.59 H	202	47.63	8.37
2	#5715.00	45.0 AV	54.0	-9.0	1.59 H	202	36.63	8.37
3	#5725.00	57.6 PK	78.2	-20.6	1.59 H	202	49.21	8.39
4	*5785.00	112.5 PK			1.59 H	202	104.01	8.49
5	*5785.00	104.5 AV			1.59 H	202	96.01	8.49
6	#5850.00	55.0 PK	78.2	-23.2	1.59 H	202	46.33	8.67
7	#5860.00	55.3 PK	74.0	-18.7	1.59 H	202	46.59	8.71
8	#5860.00	43.6 AV	54.0	-10.4	1.59 H	202	34.89	8.71
9	11570.00	57.5 PK	74.0	-16.5	1.27 H	276	43.19	14.31
10	11570.00	44.3 AV	54.0	-9.7	1.27 H	276	29.99	14.31
11	#17355.00	67.9 PK	74.0	-6.1	1.09 H	94	44.90	23.00
12	#17355.00	53.9 AV	54.0	-0.1	1.09 H	94	30.90	23.00

**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	#5715.00	55.4 PK	74.0	-18.6	1.22 V	87	47.03	8.37
2	#5715.00	44.2 AV	54.0	-9.8	1.22 V	87	35.83	8.37
3	#5725.00	55.9 PK	78.2	-22.3	1.22 V	87	47.51	8.39
4	*5785.00	110.8 PK			1.22 V	87	102.31	8.49
5	*5785.00	102.3 AV			1.22 V	87	93.81	8.49
6	#5850.00	54.3 PK	78.2	-23.9	1.22 V	87	45.63	8.67
7	#5860.00	54.8 PK	74.0	-19.2	1.22 V	87	46.09	8.71
8	#5860.00	43.5 AV	54.0	-10.5	1.22 V	87	34.79	8.71
9	11570.00	57.2 PK	74.0	-16.8	1.00 V	95	42.89	14.31
10	11570.00	43.8 AV	54.0	-10.2	1.00 V	95	29.49	14.31
11	#17355.00	67.1 PK	74.0	-6.9	1.20 V	132	44.10	23.00
12	#17355.00	53.1 AV	54.0	-0.9	1.20 V	132	30.10	23.00

**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	*5825.00	111.5 PK			1.62 H	111	102.91	8.59
2	*5825.00	103.9 AV			1.62 H	111	95.31	8.59
3	#5850.00	77.4 PK	78.2	-0.8	1.62 H	111	68.73	8.67
4	#5860.00	61.6 PK	74.0	-12.4	1.62 H	111	52.89	8.71
5	#5860.00	47.3 AV	54.0	-6.7	1.62 H	111	38.59	8.71
6	11650.00	57.5 PK	74.0	-16.5	1.00 H	145	43.12	14.38
7	11650.00	44.5 AV	54.0	-9.5	1.00 H	145	30.12	14.38
8	#17475.00	68.3 PK	74.0	-5.7	1.07 H	123	45.00	23.30
9	#17475.00	53.1 AV	54.0	-0.9	1.07 H	123	29.80	23.30

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	*5825.00	109.1 PK			1.20 V	87	100.51	8.59
2	*5825.00	101.5 AV			1.20 V	87	92.91	8.59
3	#5850.00	75.4 PK	78.2	-2.8	1.20 V	87	66.73	8.67
4	#5860.00	58.7 PK	74.0	-15.3	1.20 V	87	49.99	8.71
5	#5860.00	45.1 AV	54.0	-8.9	1.20 V	87	36.39	8.71
6	11650.00	57.0 PK	74.0	-17.0	1.03 V	91	42.62	14.38
7	11650.00	43.6 AV	54.0	-10.4	1.03 V	91	29.22	14.38
8	#17475.00	67.4 PK	74.0	-6.6	1.15 V	140	44.10	23.30
9	#17475.00	52.9 AV	54.0	-1.1	1.15 V	140	29.60	23.30

**REMARKS:**

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



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## 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	64.1 PK	74.0	-9.9	1.02 H	192	59.82	4.28
2	5150.00	53.9 AV	54.0	-0.1	1.02 H	192	49.62	4.28
3	*5180.00	114.9 PK			1.00 H	181	110.51	4.39
4	*5180.00	107.3 AV			1.00 H	181	102.91	4.39
5	#10360.00	57.6 PK	74.0	-16.4	1.24 H	289	47.54	10.06
6	#10360.00	44.5 AV	54.0	-9.5	1.24 H	289	34.44	10.06
7	15540.00	70.3 PK	74.0	-3.7	1.01 H	191	55.46	14.84
8	15540.00	53.7 AV	54.0	-0.3	1.01 H	191	38.86	14.84

**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	59.4 PK	74.0	-14.6	1.11 V	92	55.12	4.28
2	5150.00	47.5 AV	54.0	-6.5	1.11 V	92	43.22	4.28
3	*5180.00	108.8 PK			1.11 V	92	104.41	4.39
4	*5180.00	101.5 AV			1.11 V	92	97.11	4.39
5	#10360.00	60.9 PK	74.0	-13.1	1.35 V	207	50.84	10.06
6	#10360.00	43.6 AV	54.0	-10.4	1.35 V	207	33.54	10.06
7	15540.00	66.6 PK	74.0	-7.4	1.26 V	125	51.76	14.84
8	15540.00	52.6 AV	54.0	-1.4	1.26 V	125	37.76	14.84

**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	66.9 PK	74.0	-7.1	1.03 H	186	62.62	4.28
2	5150.00	49.9 AV	54.0	-4.1	1.03 H	186	45.62	4.28
3	*5200.00	115.0 PK			1.06 H	196	110.56	4.44
4	*5200.00	107.5 AV			1.06 H	196	103.06	4.44
5	#10400.00	57.1 PK	74.0	-16.9	1.23 H	291	47.03	10.07
6	#10400.00	43.9 AV	54.0	-10.1	1.23 H	291	33.83	10.07
7	15600.00	67.3 PK	74.0	-6.7	1.17 H	227	52.24	15.06
8	15600.00	53.3 AV	54.0	-0.7	1.17 H	227	38.24	15.06

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.0 PK	74.0	-20.0	1.18 V	84	49.72	4.28
2	5150.00	42.4 AV	54.0	-11.6	1.18 V	84	38.12	4.28
3	*5200.00	108.8 PK			1.18 V	84	104.36	4.44
4	*5200.00	101.3 AV			1.18 V	84	96.86	4.44
5	#10400.00	59.7 PK	74.0	-14.3	1.33 V	210	49.63	10.07
6	#10400.00	42.7 AV	54.0	-11.3	1.33 V	210	32.63	10.07
7	15600.00	67.0 PK	74.0	-7.0	1.29 V	109	51.94	15.06
8	15600.00	52.8 AV	54.0	-1.2	1.29 V	109	37.74	15.06

**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	114.5 PK			1.02 H	204	110.09	4.41
2	*5240.00	107.0 AV			1.02 H	204	102.59	4.41
3	5350.00	56.2 PK	74.0	-17.8	1.00 H	208	51.69	4.51
4	5350.00	45.3 AV	54.0	-8.7	1.00 H	208	40.79	4.51
5	#10480.00	57.5 PK	74.0	-16.5	1.32 H	281	47.24	10.26
6	#10480.00	44.1 AV	54.0	-9.9	1.32 H	281	33.84	10.26
7	15720.00	67.9 PK	74.0	-6.1	1.14 H	223	53.23	14.67
8	15720.00	53.6 AV	54.0	-0.4	1.14 H	223	38.93	14.67

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	109.4 PK			1.09 V	105	104.99	4.41
2	*5240.00	102.1 AV			1.09 V	105	97.69	4.41
3	5350.00	53.4 PK	74.0	-20.6	1.09 V	105	48.89	4.51
4	5350.00	42.0 AV	54.0	-12.0	1.09 V	105	37.49	4.51
5	#10480.00	60.4 PK	74.0	-13.6	1.31 V	212	50.14	10.26
6	#10480.00	43.5 AV	54.0	-10.5	1.31 V	212	33.24	10.26
7	15720.00	66.9 PK	74.0	-7.1	1.29 V	130	52.23	14.67
8	15720.00	52.8 AV	54.0	-1.2	1.29 V	130	38.13	14.67

**REMARKS:**

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



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<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	#5715.00	63.1 PK	74.0	-10.9	1.15 H	166	54.73	8.37
2	#5715.00	49.3 AV	54.0	-4.7	1.15 H	166	40.93	8.37
3	#5725.00	77.8 PK	78.2	-0.4	1.15 H	166	69.41	8.39
4	*5745.00	110.1 PK			1.14 H	172	101.68	8.42
5	*5745.00	101.6 AV			1.14 H	172	93.18	8.42
6	11490.00	50.7 PK	74.0	-23.3	1.06 H	148	36.35	14.35
7	11490.00	39.1 AV	54.0	-14.9	1.06 H	148	24.75	14.35
8	#17235.00	56.2 PK	74.0	-17.8	1.20 H	121	33.76	22.44
9	#17235.00	45.4 AV	54.0	-8.6	1.20 H	121	22.96	22.44

**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	#5715.00	59.4 PK	74.0	-14.6	1.22 V	96	51.03	8.37
2	#5715.00	45.8 AV	54.0	-8.2	1.22 V	96	37.43	8.37
3	#5725.00	74.0 PK	78.2	-4.2	1.22 V	96	65.61	8.39
4	*5745.00	109.9 PK			1.22 V	96	101.48	8.42
5	*5745.00	99.0 AV			1.22 V	96	90.58	8.42
6	11490.00	49.2 PK	74.0	-24.8	1.03 V	95	34.85	14.35
7	11490.00	37.3 AV	54.0	-16.7	1.03 V	95	22.95	14.35
8	#17235.00	54.8 PK	74.0	-19.2	1.16 V	146	32.36	22.44
9	#17235.00	44.1 AV	54.0	-9.9	1.16 V	146	21.66	22.44

**REMARKS:**

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



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<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	#5715.00	56.3 PK	74.0	-17.7	1.62 H	201	47.93	8.37
2	#5715.00	45.3 AV	54.0	-8.7	1.62 H	201	36.93	8.37
3	#5725.00	57.0 PK	78.2	-21.2	1.56 H	193	48.61	8.39
4	*5785.00	112.9 PK			1.63 H	211	104.41	8.49
5	*5785.00	104.9 AV			1.63 H	211	96.41	8.49
6	#5850.00	55.3 PK	78.2	-22.9	1.54 H	205	46.63	8.67
7	#5860.00	55.2 PK	74.0	-18.8	1.59 H	201	46.49	8.71
8	#5860.00	43.6 AV	54.0	-10.4	1.59 H	201	34.89	8.71
9	11570.00	60.0 PK	74.0	-14.0	1.46 H	287	45.69	14.31
10	11570.00	48.4 AV	54.0	-5.6	1.46 H	287	34.09	14.31
11	#17355.00	67.9 PK	74.0	-6.1	1.09 H	83	44.90	23.00
12	#17355.00	53.8 AV	54.0	-0.2	1.09 H	83	30.80	23.00

**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	#5715.00	55.3 PK	74.0	-18.7	1.20 V	91	46.93	8.37
2	#5715.00	43.9 AV	54.0	-10.1	1.20 V	91	35.53	8.37
3	#5725.00	56.2 PK	78.2	-22.0	1.20 V	91	47.81	8.39
4	*5785.00	110.9 PK			1.20 V	91	102.41	8.49
5	*5785.00	102.6 AV			1.20 V	91	94.11	8.49
6	#5850.00	54.1 PK	78.2	-24.1	1.20 V	91	45.43	8.67
7	#5860.00	55.3 PK	74.0	-18.7	1.20 V	91	46.59	8.71
8	#5860.00	43.9 AV	54.0	-10.1	1.20 V	91	35.19	8.71
9	11570.00	57.3 PK	74.0	-16.7	1.00 V	90	42.99	14.31
10	11570.00	44.1 AV	54.0	-9.9	1.00 V	90	29.79	14.31
11	#17355.00	66.9 PK	74.0	-7.1	1.23 V	142	43.90	23.00
12	#17355.00	52.7 AV	54.0	-1.3	1.23 V	142	29.70	23.00

**REMARKS:**

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





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<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	*5825.00	114.1 PK			1.12 H	169	105.51	8.59
2	*5825.00	103.5 AV			1.12 H	169	94.91	8.59
3	#5850.00	77.9 PK	78.2	-0.3	1.12 H	169	69.23	8.67
4	#5860.00	64.5 PK	74.0	-9.5	1.12 H	169	55.79	8.71
5	#5860.00	47.9 AV	54.0	-6.1	1.12 H	169	39.19	8.71
6	11650.00	57.7 PK	74.0	-16.3	1.00 H	156	43.32	14.38
7	11650.00	44.2 AV	54.0	-9.8	1.00 H	156	29.82	14.38
8	#17475.00	67.9 PK	74.0	-6.1	1.14 H	122	44.60	23.30
9	#17475.00	53.1 AV	54.0	-0.9	1.14 H	122	29.80	23.30

**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	*5825.00	109.1 PK			1.18 V	95	100.51	8.59
2	*5825.00	101.6 AV			1.18 V	95	93.01	8.59
3	#5850.00	74.7 PK	78.2	-3.5	1.18 V	95	66.03	8.67
4	#5860.00	58.3 PK	74.0	-15.7	1.18 V	95	49.59	8.71
5	#5860.00	44.6 AV	54.0	-9.4	1.18 V	95	35.89	8.71
6	11650.00	57.1 PK	74.0	-16.9	1.00 V	86	42.72	14.38
7	11650.00	43.7 AV	54.0	-10.3	1.00 V	86	29.32	14.38
8	#17475.00	67.5 PK	74.0	-6.5	1.15 V	123	44.20	23.30
9	#17475.00	53.2 AV	54.0	-0.8	1.15 V	123	29.90	23.30

**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	68.2 PK	74.0	-5.8	1.01 H	194	63.92	4.28
2	5150.00	53.7 AV	54.0	-0.3	1.01 H	194	49.42	4.28
3	*5190.00	108.1 PK			1.00 H	183	103.69	4.41
4	*5190.00	98.3 AV			1.00 H	183	93.89	4.41
5	#10380.00	55.7 PK	74.0	-18.3	1.30 H	280	45.63	10.07
6	#10380.00	42.1 AV	54.0	-11.9	1.30 H	280	32.03	10.07
7	15570.00	62.4 PK	74.0	-11.6	1.20 H	228	47.45	14.95
8	15570.00	50.1 AV	54.0	-3.9	1.20 H	228	35.15	14.95

**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	59.5 PK	74.0	-14.5	1.02 V	110	55.22	4.28
2	5150.00	47.7 AV	54.0	-6.3	1.02 V	110	43.42	4.28
3	*5190.00	102.7 PK			1.02 V	110	98.29	4.41
4	*5190.00	93.2 AV			1.02 V	110	88.79	4.41
5	#10380.00	57.2 PK	74.0	-16.8	1.34 V	193	47.13	10.07
6	#10380.00	41.3 AV	54.0	-12.7	1.34 V	193	31.23	10.07
7	15570.00	64.2 PK	74.0	-9.8	1.23 V	121	49.25	14.95
8	15570.00	48.9 AV	54.0	-5.1	1.23 V	121	33.95	14.95

**REMARKS:**

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



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<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	65.0 PK	74.0	-9.0	1.01 H	192	60.72	4.28
2	5150.00	51.1 AV	54.0	-2.9	1.01 H	192	46.82	4.28
3	*5230.00	111.1 PK			1.00 H	199	106.68	4.42
4	*5230.00	102.4 AV			1.00 H	199	97.98	4.42
5	5350.00	53.3 PK	74.0	-20.7	1.01 H	192	48.79	4.51
6	5350.00	41.8 AV	54.0	-12.2	1.01 H	192	37.29	4.51
7	#10460.00	56.9 PK	74.0	-17.1	1.32 H	267	46.69	10.21
8	#10460.00	43.5 AV	54.0	-10.5	1.32 H	267	33.29	10.21
9	15690.00	65.7 PK	74.0	-8.3	1.22 H	231	51.02	14.68
10	15690.00	53.2 AV	54.0	-0.8	1.22 H	231	38.52	14.68

**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	59.6 PK	74.0	-14.4	1.02 V	107	55.32	4.28
2	5150.00	47.6 AV	54.0	-6.4	1.02 V	107	43.32	4.28
3	*5230.00	106.2 PK			1.02 V	107	101.78	4.42
4	*5230.00	97.1 AV			1.02 V	107	92.68	4.42
5	5350.00	50.2 PK	74.0	-23.8	1.02 V	107	45.69	4.51
6	5350.00	39.7 AV	54.0	-14.3	1.02 V	107	35.19	4.51
7	#10460.00	60.1 PK	74.0	-13.9	1.38 V	201	49.89	10.21
8	#10460.00	42.3 AV	54.0	-11.7	1.38 V	201	32.09	10.21
9	15690.00	66.3 PK	74.0	-7.7	1.24 V	124	51.62	14.68
10	15690.00	51.0 AV	54.0	-3.0	1.24 V	124	36.32	14.68

**REMARKS:**

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

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	68.1 PK	68.2	-0.1	1.15 H	190	59.73	8.37
2	#5725.00	72.4 PK	78.2	-5.8	1.15 H	166	64.01	8.39
3	*5755.00	106.4 PK			1.15 H	193	97.96	8.44
4	*5755.00	97.2 AV			1.15 H	193	88.76	8.44
5	11510.00	49.5 PK	74.0	-24.5	1.04 H	126	35.16	14.34
6	11510.00	38.5 AV	54.0	-15.5	1.04 H	126	24.16	14.34
7	#17265.00	55.2 PK	68.2	-13.0	1.11 H	99	32.52	22.68

**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	#5715.00	65.2 PK	68.2	-3.0	1.22 V	87	56.83	8.37
2	#5725.00	70.1 PK	78.2	-8.1	1.22 V	87	61.71	8.39
3	*5755.00	103.4 PK			1.22 V	87	94.96	8.44
4	*5755.00	94.8 AV			1.22 V	87	86.36	8.44
5	11510.00	48.5 PK	74.0	-25.5	1.05 V	93	34.16	14.34
6	11510.00	37.2 AV	54.0	-16.8	1.05 V	93	22.86	14.34
7	#17265.00	54.2 PK	68.2	-14.0	1.17 V	127	31.52	22.68

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 159	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	111.7 PK			1.13 H	168	103.20	8.50
2	*5795.00	101.9 AV			1.13 H	168	93.40	8.50
3	#5850.00	74.2 PK	78.2	-4.0	1.23 H	171	65.53	8.67
4	#5860.00	70.4 PK	74.0	-3.6	1.12 H	163	61.69	8.71
5	#5860.00	53.4 AV	54.0	-0.6	1.12 H	163	44.69	8.71
6	11590.00	53.4 PK	74.0	-20.6	1.00 H	133	39.10	14.30
7	11590.00	44.2 AV	54.0	-9.8	1.00 H	133	29.90	14.30
8	#17385.00	64.5 PK	74.0	-9.5	1.10 H	91	41.47	23.03
9	#17385.00	52.1 AV	54.0	-1.9	1.10 H	91	29.07	23.03

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	*5795.00	109.2 PK			1.17 V	102	100.70	8.50
2	*5795.00	98.5 AV			1.17 V	102	90.00	8.50
3	#5850.00	72.5 PK	78.2	-5.7	1.17 V	102	63.83	8.67
4	#5860.00	68.5 PK	74.0	-5.5	1.17 V	102	59.79	8.71
5	#5860.00	51.4 AV	54.0	-2.6	1.17 V	102	42.69	8.71
6	11590.00	55.4 PK	74.0	-18.6	1.05 V	108	41.10	14.30
7	11590.00	42.2 AV	54.0	-11.8	1.05 V	108	27.90	14.30
8	#17385.00	63.4 PK	74.0	-10.6	1.25 V	120	40.37	23.03
9	#17385.00	51.4 AV	54.0	-2.6	1.25 V	120	28.37	23.03

**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	1.01 H	198	62.92	4.28
2	5150.00	53.9 AV	54.0	-0.1	1.01 H	198	49.62	4.28
3	*5210.00	102.3 PK			1.01 H	198	97.87	4.43
4	*5210.00	93.3 AV			1.01 H	198	88.87	4.43
5	5350.00	53.1 PK	74.0	-20.9	1.01 H	198	48.59	4.51
6	5350.00	39.6 AV	54.0	-14.4	1.01 H	198	35.09	4.51
7	#10420.00	55.8 PK	74.0	-18.2	1.32 H	294	45.69	10.11
8	#10420.00	42.2 AV	54.0	-11.8	1.32 H	294	32.09	10.11
9	15630.00	59.2 PK	74.0	-14.8	1.22 H	231	44.26	14.94
10	15630.00	47.3 AV	54.0	-6.7	1.22 H	231	32.36	14.94

**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	59.2 PK	74.0	-14.8	1.02 V	109	54.92	4.28
2	5150.00	47.3 AV	54.0	-6.7	1.02 V	109	43.02	4.28
3	*5210.00	97.2 PK			1.02 V	109	92.77	4.43
4	*5210.00	88.1 AV			1.02 V	109	83.67	4.43
5	5350.00	53.5 PK	74.0	-20.5	1.02 V	109	48.99	4.51
6	5350.00	42.2 AV	54.0	-11.8	1.02 V	109	37.69	4.51
7	#10420.00	53.2 PK	74.0	-20.8	1.37 V	184	43.09	10.11
8	#10420.00	40.4 AV	54.0	-13.6	1.37 V	184	30.29	10.11
9	15630.00	59.8 PK	74.0	-14.2	1.23 V	121	44.86	14.94
10	15630.00	45.9 AV	54.0	-8.1	1.23 V	121	30.96	14.94

**REMARKS:**

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



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<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	#5715.00	68.1 PK	68.2	-0.1	1.24 H	160	59.73	8.37
2	#5725.00	73.2 PK	78.2	-5.0	1.24 H	160	64.81	8.39
3	*5775.00	100.8 PK			1.24 H	170	92.33	8.47
4	*5775.00	91.6 AV			1.24 H	170	83.13	8.47
5	#5850.00	56.2 PK	78.2	-22.0	1.24 H	160	47.53	8.67
6	#5860.00	55.6 PK	68.2	-12.6	1.24 H	160	46.89	8.71
7	11550.00	51.4 PK	74.0	-22.6	1.00 H	133	37.08	14.32
8	11550.00	42.4 AV	54.0	-11.6	1.00 H	133	28.08	14.32
9	#17325.00	56.2 PK	68.2	-12.0	1.07 H	115	33.22	22.98

**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	#5715.00	67.1 PK	68.2	-1.1	1.23 V	86	58.73	8.37
2	#5725.00	70.1 PK	78.2	-8.1	1.23 V	86	61.71	8.39
3	*5775.00	98.1 PK			1.23 V	86	89.63	8.47
4	*5775.00	89.1 AV			1.23 V	86	80.63	8.47
5	#5850.00	55.1 PK	78.2	-23.1	1.23 V	86	46.43	8.67
6	#5860.00	54.2 PK	68.2	-14.0	1.23 V	86	45.49	8.71
7	11550.00	50.2 PK	74.0	-23.8	1.01 V	110	35.88	14.32
8	11550.00	41.4 AV	54.0	-12.6	1.01 V	110	27.08	14.32
9	#17325.00	54.2 PK	68.2	-14.0	1.15 V	126	31.22	22.98

**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.

### 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)

**Note:** Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

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

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

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT  $\geq$  5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.



### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

**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. Tested date : Dec. 03, 2014

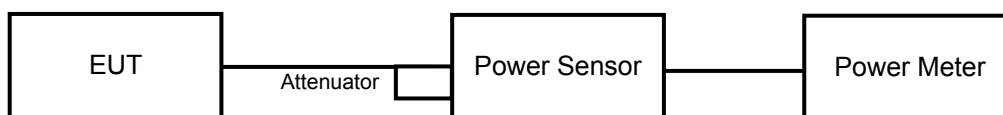
### 4.3.3 TEST PROCEDURE

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.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



## 4.3.7 TEST RESULTS

## 802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	17.82	18.54	131.984	21.21	30	PASS
40	5200	18.11	18.64	137.828	21.39	30	PASS
48	5240	18.69	18.81	149.994	21.76	30	PASS
149	5745	16.59	14.26	72.273	18.59	30	PASS
157	5785	20.34	18.37	176.85	22.48	30	PASS
165	5825	19.78	17.53	151.684	21.81	30	PASS

## 802.11ac (VHT20)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	17.76	18.42	129.206	21.11	30	PASS
40	5200	18.01	18.56	135.02	21.30	30	PASS
48	5240	18.57	18.72	146.418	21.66	30	PASS
149	5745	16.97	14.56	78.35	18.94	30	PASS
157	5785	20.44	18.75	185.651	22.69	30	PASS
165	5825	19.58	17.51	147.146	21.68	30	PASS

## 802.11ac (VHT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	14.51	14.91	59.223	17.72	30	PASS
46	5230	18.91	19.35	163.903	22.15	30	PASS
151	5755	15.25	12.88	52.906	17.24	30	PASS
159	5795	20.76	19.11	200.594	23.02	30	PASS

## 802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	12.45	12.90	37.077	15.69	30	PASS
155	5775	12.87	11.87	34.746	15.41	30	PASS



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## 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.4.1 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

### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

**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. Tested date : Dec. 03, 2014

### 4.4.3 TEST PROCEDURES

Using method SA-1

**For U-NII-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

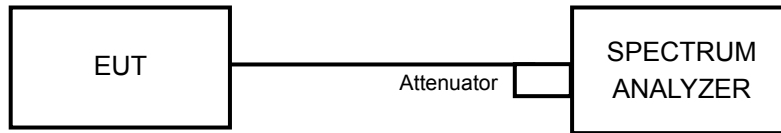
**For U-NII-3:**

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

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6



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#### 4.4.7 TEST RESULTS

For U-NII-1:

##### 802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	2.39	3.69	6.10	17	PASS
40	5200	3.99	3.99	7.00	17	PASS
48	5240	4.00	4.03	7.03	17	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$ , so the power density limit shall not be reduced.

##### 802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	2.65	3.39	6.05	17	PASS
40	5200	3.50	3.75	6.64	17	PASS
48	5240	3.87	4.13	7.01	17	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$ , so the power density limit shall not be reduced.



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**802.11ac (VHT40)**

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
38	5190	-3.52	-2.89	-0.18	17	PASS
46	5230	1.25	1.64	4.46	17	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6dBi, so the power density limit shall not be reduced.

**802.11ac (VHT80)**

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
42	5210	-8.67	-8.13	-5.38	17	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 =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6dBi, so the power density limit shall not be reduced.

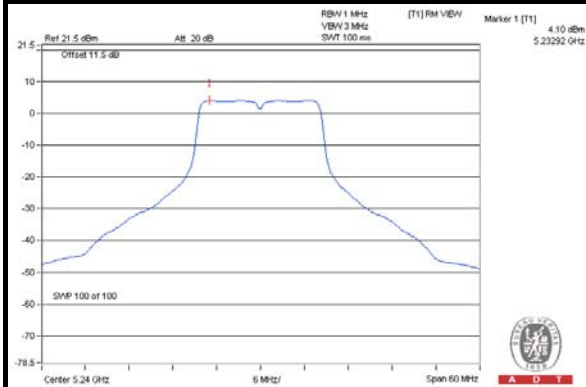




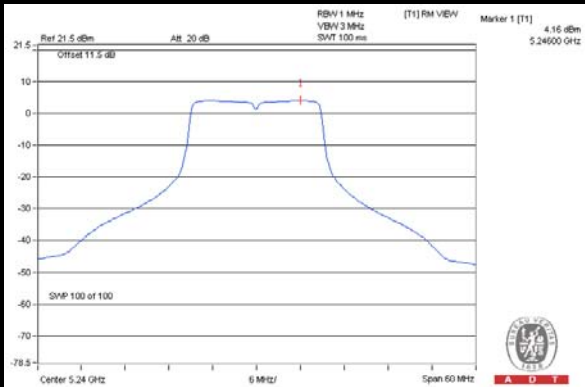
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### SPECTRUM PLOT OF WORST VALUE

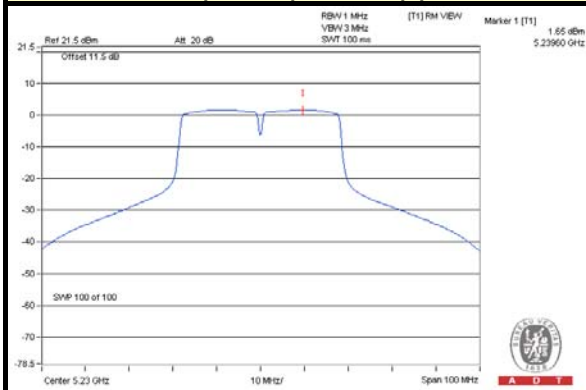
#### 802.11a / Chain(1) : CH48



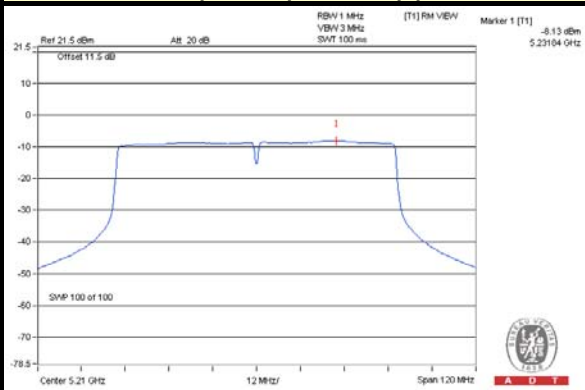
#### 802.11ac (VHT20) / Chain(1) : CH48



#### 802.11ac (VHT40) / Chain(1) : CH46



#### 802.11ac (VHT80) / Chain(1) : CH42





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For U-NII-3:

802.11a

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-4.53	-2.31	3.01	0.70	29.54	PASS
	157	5785	-1.24	0.98	3.01	3.99	29.54	PASS
	165	5825	-1.86	0.36	3.01	3.37	29.54	PASS
1	149	5745	-7.45	-5.23	3.01	-2.22	29.54	PASS
	157	5785	-3.60	-1.38	3.01	1.63	29.54	PASS
	165	5825	-4.83	-2.61	3.01	0.40	29.54	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.46dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.46-6) = 29.54$ dBm.

802.11ac (VHT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-6.97	-4.75	3.01	-1.74	29.54	PASS
	157	5785	-1.59	0.63	3.01	3.64	29.54	PASS
	165	5825	-2.21	0.01	3.01	3.02	29.54	PASS
1	149	5745	-7.54	-5.32	3.01	-2.31	29.54	PASS
	157	5785	-3.87	-1.65	3.01	1.36	29.54	PASS
	165	5825	-4.83	-2.61	3.01	0.40	29.54	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.46dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.46-6) = 29.54$ dBm.



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### 802.11ac (VHT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	151	5755	-9.91	-7.69	3.01	-4.68	29.54	PASS
	159	5795	-4.44	-2.22	3.01	0.79	29.54	PASS
1	151	5755	-12.75	-10.53	3.01	-7.52	29.54	PASS
	159	5795	-6.30	-4.08	3.01	-1.07	29.54	PASS

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.46dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.46-6) = 29.54$ dBm.

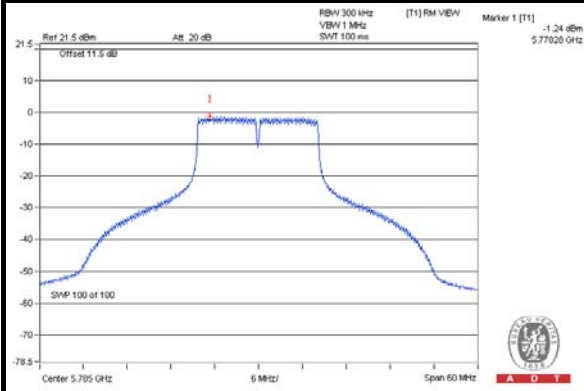
### 802.11ac (VHT80)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	151	5755	-15.21	-12.99	3.01	-9.98	29.54	PASS
1	151	5755	-17.86	-15.64	3.01	-12.63	29.54	PASS

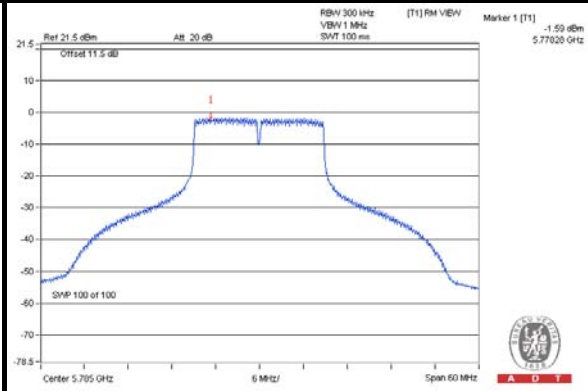
**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 6.46dBi > 6dBi , so the power density limit shall be reduced to  $30-(6.46-6) = 29.54$ dBm.

### SPECTRUM PLOT OF WORST VALUE

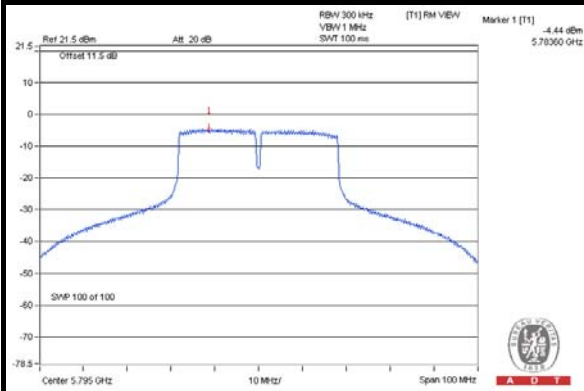
**802.11a / Chain(0) : CH157**



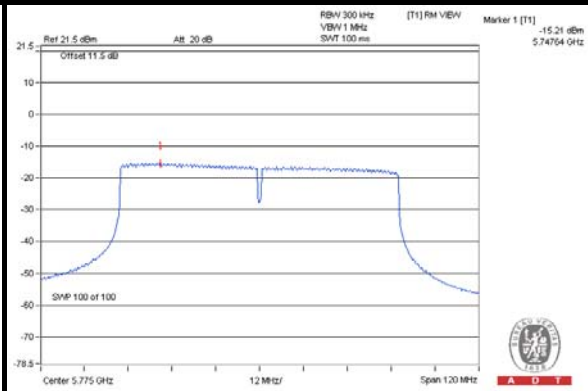
**802.11ac (VHT20) / Chain(0) : CH157**



**802.11ac (VHT40) / Chain(0) : CH159**



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



## 4.5 FREQUENCY STABILITY

### 4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015
Temperature Humidity Chamber GIANTFORCE &	GTH-150-40-SP -AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 2015

**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. Tested date : Dec. 03, 2014

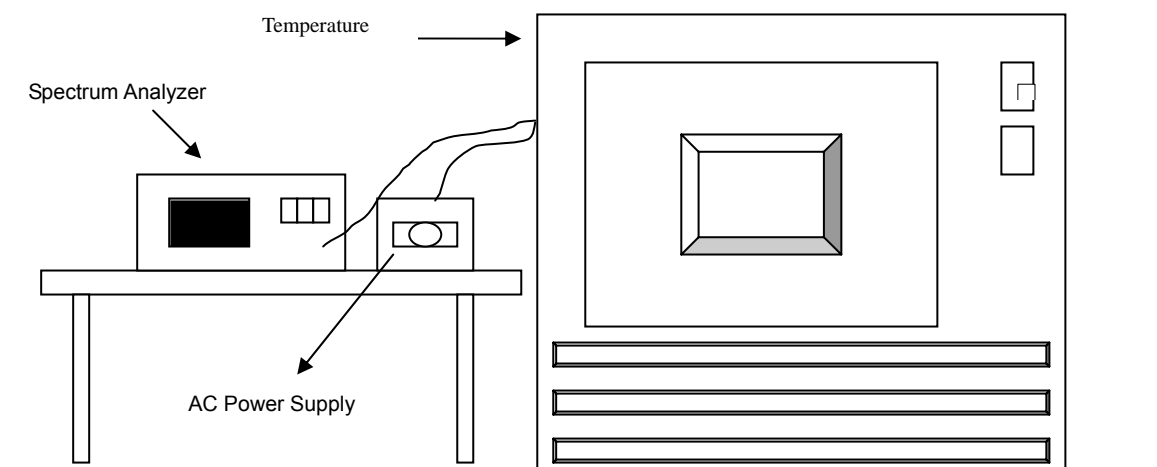
### 4.5.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. 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.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. 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.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

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



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#### 4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	5240.0056	0.00011	5240.0035	0.00007	5240.0065	0.00012	5240.006	0.00011
40	120	5240.0142	0.00027	5240.0164	0.00031	5240.0191	0.00036	5240.0191	0.00036
30	120	5240.0004	0.00001	5239.9972	-0.00005	5240.0005	0.00001	5240.0002	0.00000
20	120	5240.0111	0.00021	5240.0106	0.00020	5240.0068	0.00013	5240.0107	0.00020
10	120	5239.9967	-0.00006	5239.9944	-0.00011	5239.9954	-0.00009	5239.9977	-0.00004
0	120	5240.0057	0.00011	5240.0023	0.00004	5240.0031	0.00006	5240.0028	0.00005
-10	120	5240.0049	0.00009	5240.0055	0.00010	5240.0098	0.00019	5240.0054	0.00010
-20	120	5239.9879	-0.00023	5239.9856	-0.00027	5239.9851	-0.00028	5239.9846	-0.00029
-30	120	5239.9953	-0.00009	5239.9931	-0.00013	5239.9938	-0.00012	5239.9921	-0.00015

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5240.0119	0.00023	5240.0116	0.00022	5240.0074	0.00014	5240.0107	0.00020
	120	5240.0111	0.00021	5240.0106	0.00020	5240.0068	0.00013	5240.0107	0.00020
	102	5240.012	0.00023	5240.0114	0.00022	5240.006	0.00011	5240.0098	0.00019

## 4.6 6dB BANDWIDTH MEASUREMENT

### 4.6.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

**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. Tested date : Dec. 03, 2014

### 4.6.3 TEST PROCEDURE

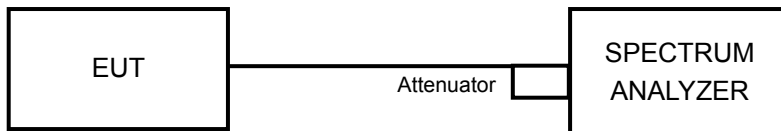
1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and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

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation



#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITIONS

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



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#### 4.6.7 TEST RESULTS

##### 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.40	16.44	0.5	PASS
157	5785	16.39	16.45	0.5	PASS
165	5825	16.43	16.44	0.5	PASS

##### 802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.65	17.70	0.5	PASS
157	5785	17.60	17.69	0.5	PASS
165	5825	17.61	17.67	0.5	PASS

##### 802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	36.47	36.33	0.5	PASS
159	5795	36.39	36.06	0.5	PASS

##### 802.11ac (VHT80)

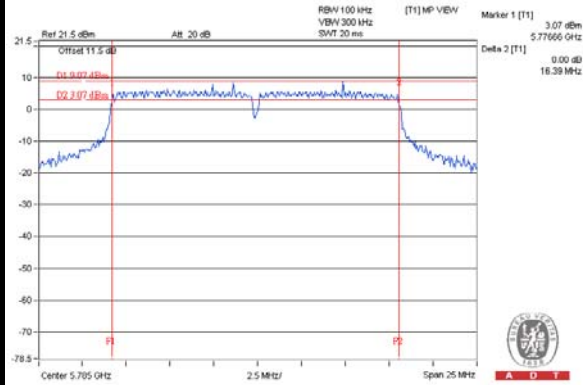
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
155	5775	76.21	73.33	0.5	PASS



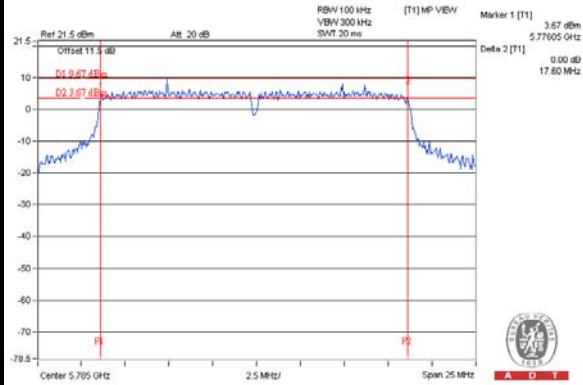
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### SPECTRUM PLOT OF WORST VALUE

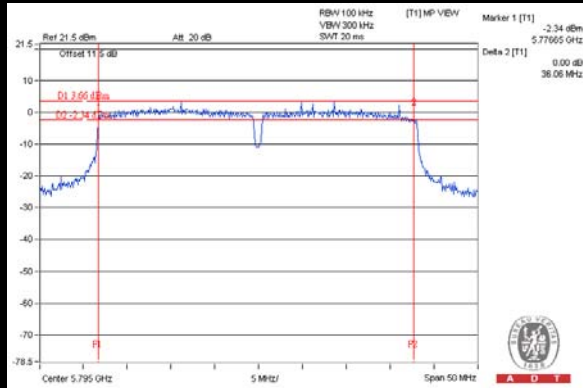
#### 802.11a / Chain(0): CH157



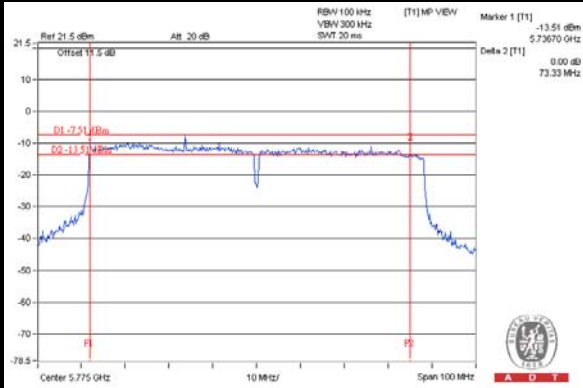
#### 802.11ac (VHT20) / Chain(0) : CH157



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



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



## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 6. 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:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Lab:**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**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.

## 7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---