

## FCC Test Report

**Report No.:** RF170510C11C-1 R1

**FCC ID:** VUICGA4131

**Test Model:** CGA4131

**Series Model:** CGA4131XXXXX  
(X = 0-1, A-Z, a-z, "-" or blank, for marketing purpose)

**Received Date:** May 15, 2017

**Test Date:** Sep. 07, 2017; May 20, 2020

**Issued Date:** June 10, 2020

**Applicant:** PEGATRON CORPORATION

**Address:** 5F, No. 76 Ligong St., Beitou, Taipei 112, Taiwan

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

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

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

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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty .....	6
2.2 Modification Record .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT (DFS Band) .....	7
3.2 Description of Test Modes .....	10
3.2.1 Test Mode Applicability and Tested Channel Detail .....	11
3.3 Duty Cycle of Test Signal .....	14
3.4 Description of Support Units .....	15
3.4.1 Configuration of System under Test .....	16
3.5 General Description of Applied Standard and references .....	17
<b>4 Test Types and Results</b> .....	<b>18</b>
4.1 Radiated Emission and Bandedge Measurement .....	18
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	18
4.1.2 Test Instruments .....	19
4.1.3 Test Procedure .....	21
4.1.4 Deviation from Test Standard .....	21
4.1.5 Test Setup .....	22
4.1.6 EUT Operating Condition .....	23
4.1.7 Test Results .....	24
4.2 Conducted Emission Measurement .....	52
4.2.1 Limits of Conducted Emission Measurement .....	52
4.2.2 Test Instruments .....	52
4.2.3 Test Procedure .....	53
4.2.4 Deviation from Test Standard .....	53
4.2.5 Test Setup .....	53
4.2.6 EUT Operating Condition .....	53
4.2.7 Test Results .....	54
4.3 Transmit Power Measurement .....	56
4.3.1 Limits of Transmit Power Measurement .....	56
4.3.2 Test Setup .....	57
4.3.3 Test Instruments .....	57
4.3.4 Test Procedure .....	58
4.3.5 Deviation from Test Standard .....	58
4.3.6 EUT Operating Condition .....	58
4.3.7 Test Result .....	59
4.4 Occupied Bandwidth Measurement .....	75
4.4.1 Test Setup .....	75
4.4.2 Test Instruments .....	75
4.4.3 Test Procedure .....	75
4.4.4 Test Results .....	76
4.5 Peak Power Spectral Density Measurement .....	79
4.5.1 Limits of Peak Power Spectral Density Measurement .....	79
4.5.2 Test Setup .....	79
4.5.3 Test Instruments .....	79
4.5.4 Test Procedure .....	80
4.5.5 Deviation from Test Standard .....	80
4.5.6 EUT Operating Condition .....	80
4.5.7 Test Results .....	81
4.6 Frequency Stability Measurement .....	85
4.6.1 Limits of Frequency Stability Measurement .....	85

4.6.2	Test Setup.....	85
4.6.3	Test Instruments .....	85
4.6.4	Test Procedure .....	85
4.6.5	Deviation from Test Standard .....	85
4.6.6	EUT Operating Condition .....	85
4.6.7	Test Results .....	86
4.7	6dB Bandwidth Measurement .....	87
4.7.1	Limits of 6dB Bandwidth Measurement.....	87
4.7.2	Test Setup.....	87
4.7.3	Test Instruments .....	87
4.7.4	Test Procedure .....	87
4.7.5	Deviation from Test Standard .....	87
4.7.6	EUT Operating Condition .....	87
4.7.7	Test Results .....	88
<b>5</b>	<b>Pictures of Test Arrangements.....</b>	<b>90</b>
	<b>Appendix – Information of the Testing Laboratories .....</b>	<b>91</b>

### Release Control Record

Issue No.	Description	Date Issued
RF170510C11C-1	Original release.	Nov. 13, 2019
RF170510C11C-1 R1	According to below conditions, modified the test data of conducted emissions and radiated emission test items: 1. Follow KDB 789033 D02 General UNII Test Procedures New Rules v02r01) 2. Remove the reserved power components 3. Move PCIE trace from top to inner layer	June 10, 2020

## 1 Certificate of Conformity

**Product:** D3.1 Cable Gateway

**Brand:** technicolor

**Test Model:** CGA4131

**Series Model:** CGA4131XXXXX  
(X = 0-1, A-Z, a-z, "-" or blank, for marketing purpose)

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** PEGATRON CORPORATION

**Test Date:** Sep. 07, 2017; May 20, 2020

**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 :** Joyce Kuo , **Date:** June 10, 2020  
Joyce Kuo / Specialist

**Approved by :** Clark Lin , **Date:** June 10, 2020  
Clark Lin / Technical 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 -4.71dB at 0.63828MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5350.00MHz, 5470.00MHz, 5150.00MHz, 5725.00MHz
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

### Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

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

Product	D3.1 Cable Gateway
Brand	technicolor
Test Model	CGA4131
Series Model:	CGA4131XXXXX (X = 0-1, A-Z, a-z, "-" or blank, for marketing purpose)
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	100-240Vac, 50-60Hz
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps 802.11ac (80+80): up to 3466.7Mbps
Operating Frequency	5.26GHz ~ 5.32GHz, 5.50GHz ~ 5.72GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 16 802.11n (HT40), 802.11ac (VHT40): 8 802.11ac (VHT80): 4 802.11ac (VHT80+80): 2 sets
Output Power	<b>5.26 ~ 5.32GHz:</b> <b>CDD Mode:</b> 240.857mW <b>Beamforming Mode:</b> 134.647mW <b>5.50 ~ 5.72GHz</b> <b>CDD Mode:</b> 249.383mW <b>Beamforming Mode:</b> 134.216mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	AC cable (Unshielded, 1.8m)
Data Cable Supplied	NA

Note:

- This is a supplementary report of Report No.: RF170510C11B-1 R1. The differences between them are as below information:
  - ◆ Add DFS band <5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz>
  - ◆ Change Brand.
  - ◆ Remove the reserved power components
  - ◆ Move PCIE trace from top to inner layer
- According to above condition, all test items need to be performed. And all data weres verified to meet the requirements.

3. The EUT has two model names, which are identical to each other in all aspects except for the following:

Brand	Model	Difference
technicolor	CGA4131XXXXX (X = 0-1, A-Z, a-z, "-" or blank, for marketing purpose)	Test Model: CGA4131 Appearance of the Hypotenuse, With PoE out Function
		Test Model: CGA4131TCH Appearance of the arc, Without PoE out function

From the above models, model: **CGA4131** was selected as representative model for the test and its data was recorded in this report.

4. 2.4GHz and 5GHz technology cannot transmit at same time.

5. The EUT uses following internal power supply as the following table:

Spec.
AC input: 100-240Vac, 1.65A, 50-60Hz
DC input: 12Vdc, 10A

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

2.4GHz					
Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type	Cable Length
Chain 0	2.0	2400 ~ 2483.5	PCB	i-pex(MHF)	95mm
Chain 1	2.0	2400 ~ 2483.5	PCB	i-pex(MHF)	210mm
5GHz					
Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type	Cable Length
Chain 0	2.1	5150 ~ 5250	PCB	i-pex(MHF)	55mm
	2.6	5250 ~ 5350			
	2.4	5470 ~ 5725			
	2.4	5725 ~ 5850			
Chain 1	2.7	5150 ~ 5250	PCB	i-pex(MHF)	135mm
	2.3	5250 ~ 5350			
	2.3	5470 ~ 5725			
	2.7	5725 ~ 5850			
Chain 2	2.7	5150 ~ 5250	PCB	i-pex(MHF)	170mm
	2.6	5250 ~ 5350			
	2.4	5470 ~ 5725			
	2.4	5725 ~ 5850			
Chain 3	3.5	5150 ~ 5250	PCB	i-pex(MHF)	240mm
	3.0	5250 ~ 5350			
	3.4	5470 ~ 5725			
	3.9	5725 ~ 5850			



7. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX Fixed Chain 0	1RX Diversity
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
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80+VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note: 1. All of modulation mode support beamforming function except 2.4GHz and 5GHz (802.11a) 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).  
 3. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report (except Output power test item).

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 Description of Test Modes

#### FOR 5260 ~ 5320MHz

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

Channel	Frequency	Channel	Frequency
52	5260MHz	60	5300MHz
56	5280MHz	64	5320MHz

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

Channel	Frequency	Channel	Frequency
54	5270MHz	62	5310MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

#### FOR 5500 ~ 5720MHz

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

Channel	Frequency	Channel	Frequency
100	5500MHz	124	5620MHz
104	5520MHz	128	5640MHz
108	5540MHz	132	5660MHz
112	5560MHz	136	5680MHz
116	5580MHz	140	5700MHz
120	5600MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510MHz	126	5630MHz
110	5550MHz	134	5670MHz
118	5590MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610MHz
138	5690MHz		

#### For simultaneous transmission:

2 sets are provided for 802.11ac (VHT80+80):

Channel	Frequency
42+58	5210MHz + 5290MHz
106+122	5530MHz + 5610MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	29.3
802.11ac (VHT80+80)	5260-5320 5500-5720	42 to 58 106 to 122	42+58 106+122	OFDM	BPSK	58.5

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5260-5320 5500-5720	58 106 to 138	106	OFDM	BPSK	29.3

### Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5260-5320 5500-5720	58 106 to 138	106	OFDM	BPSK	29.3

### Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	29.3
802.11ac (VHT80+80)	5260-5320 5500-5720	42 to 58 106 to 122	42+58 106+122	OFDM	BPSK	58.5
Beamforming Mode (output power only)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	13
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	27
802.11ac (VHT80)		58	58	OFDM	BPSK	58.5
802.11ac (VHT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	13
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	27
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	58.5

**Test Condition:**

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 66%RH 23deg. C, 65%RH	120Vac, 60Hz	JyunChun.Lin
RE<1G	24deg. C, 72%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

### 3.3 Duty Cycle of Test Signal

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

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

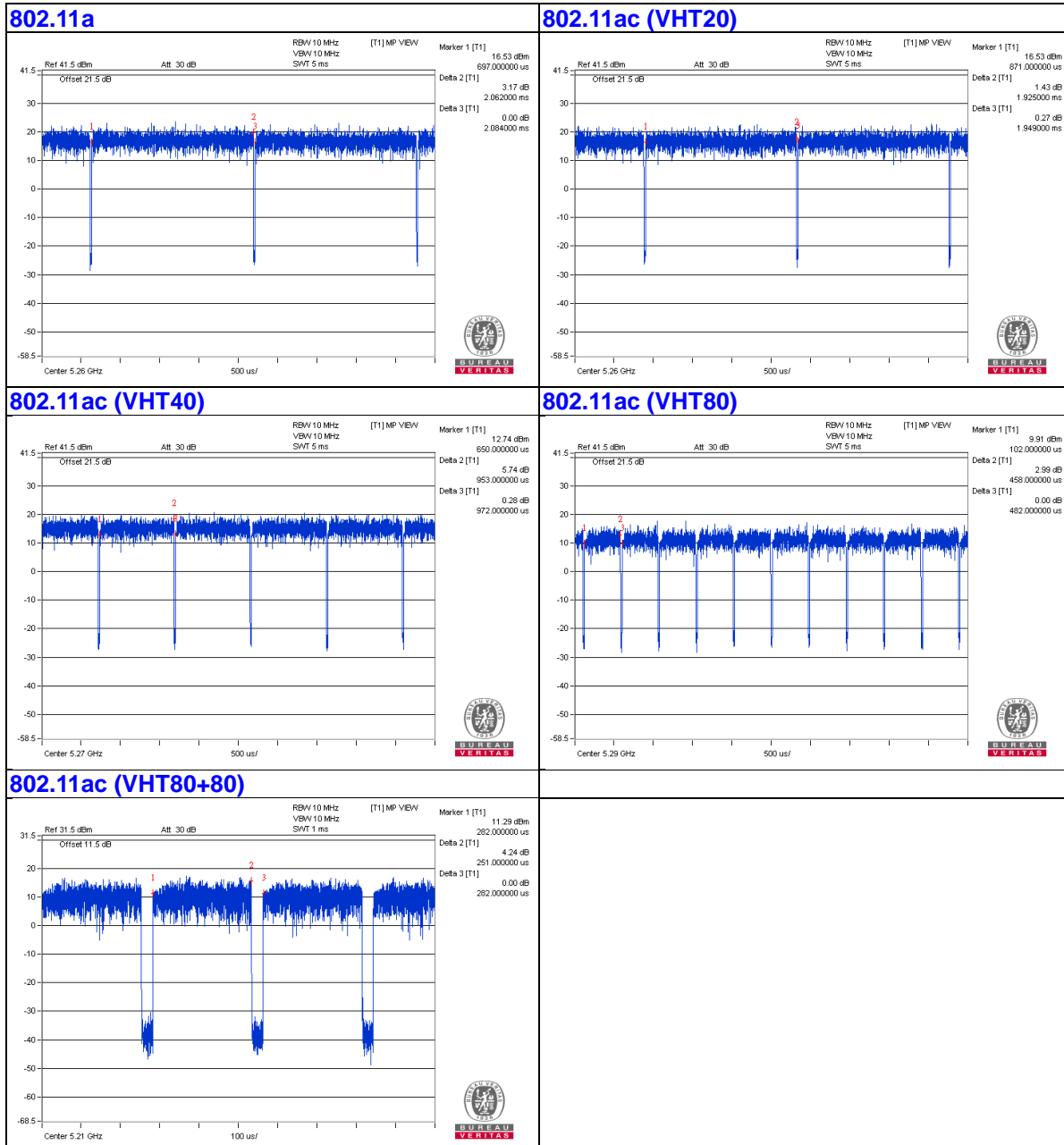
**802.11a:** Duty cycle =  $2.062 \text{ ms} / 2.084 \text{ ms} = 0.989$

**802.11ac (VHT20):** Duty cycle =  $1.925 \text{ ms} / 1.949 \text{ ms} = 0.988$

**802.11ac (VHT40):** Duty cycle =  $0.953 \text{ ms} / 0.972 \text{ ms} = 0.98$

**802.11ac (VHT80):** Duty cycle =  $0.458 \text{ ms} / 0.482 \text{ ms} = 0.95$ , Duty factor =  $10 * \log(1/0.95) = 0.22$

**802.11ac (VHT80+80):** Duty cycle =  $0.251 \text{ ms} / 0.282 \text{ ms} = 0.89$ , Duty factor =  $10 * \log(1/0.89) = 0.51$



### 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.

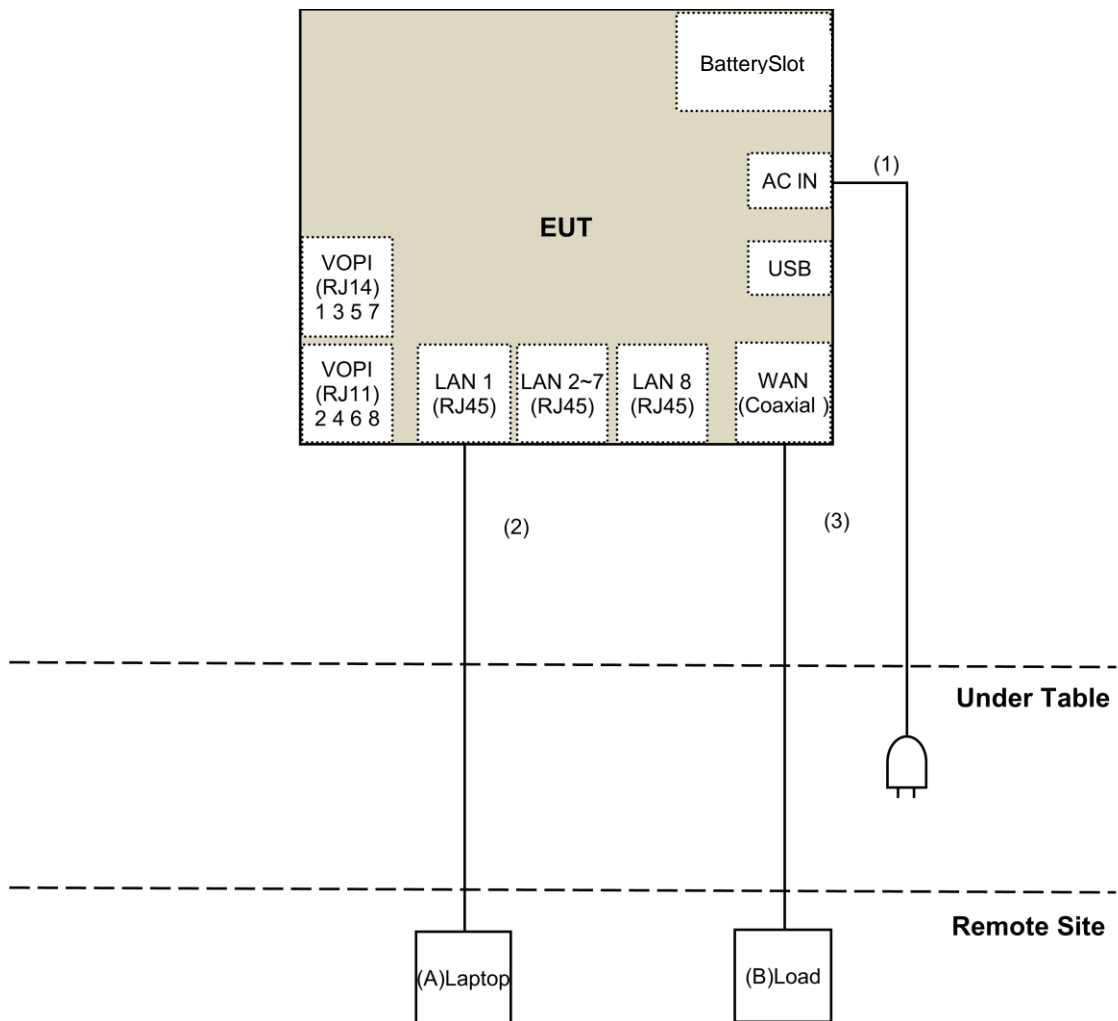
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	HP	Pavilion 14-ab023TU	5CD5340WXZ	NA	Provided by Lab
B.	Load	NA	NA	NA	NA	Provided by Lab

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.	AC Cable	1	1.8	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	Coaxial Cable	1	10	Yes	0	Provided by Lab

### 3.4.1 Configuration of System under Test



NOTE: The test configuration was defined by the applicant requirement.



### 3.5 General Description of Applied Standard and references

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

**Test standard:**

**FCC Part 15, Subpart E (15.407)**  
**ANSI C63.10-2013**

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

**References Test Guidance:**

**KDB 789033 D02 General UNII Test Procedure New Rules v02r01**  
**KDB 662911 D01 Multiple Transmitter Output v02r01**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

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

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

#### NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules 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	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>
<sup>*1</sup> beyond 75 MHz or more above of the band edge. <sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		<sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. <sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

#### Note:

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

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

## 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
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

**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 966 Chamber No. 3.
3. Tested Date: May 20, 2020

**For other test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
DC Power Supply Topward	6603D	795558	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
- 6 Tested Date: Sep. 07, 2017

#### 4.1.3 Test Procedure

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

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

##### **NOTE:**

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

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

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

##### **Note:**

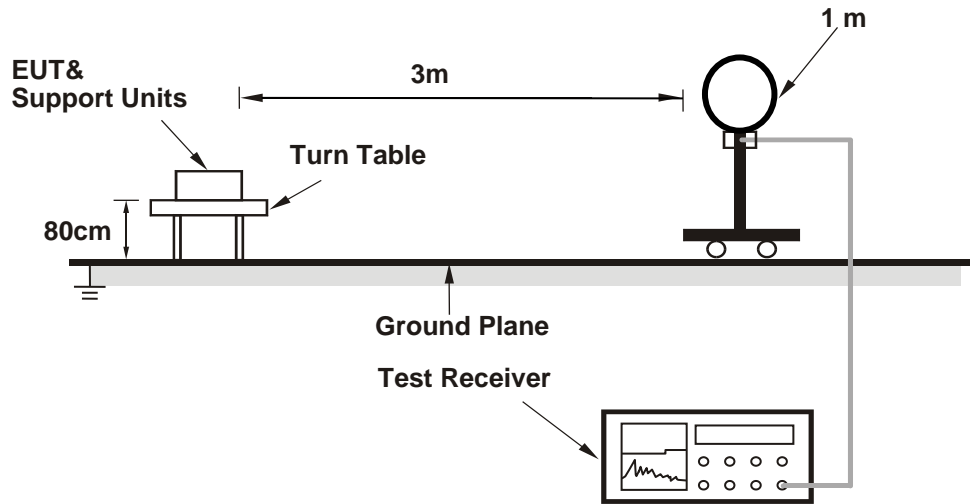
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

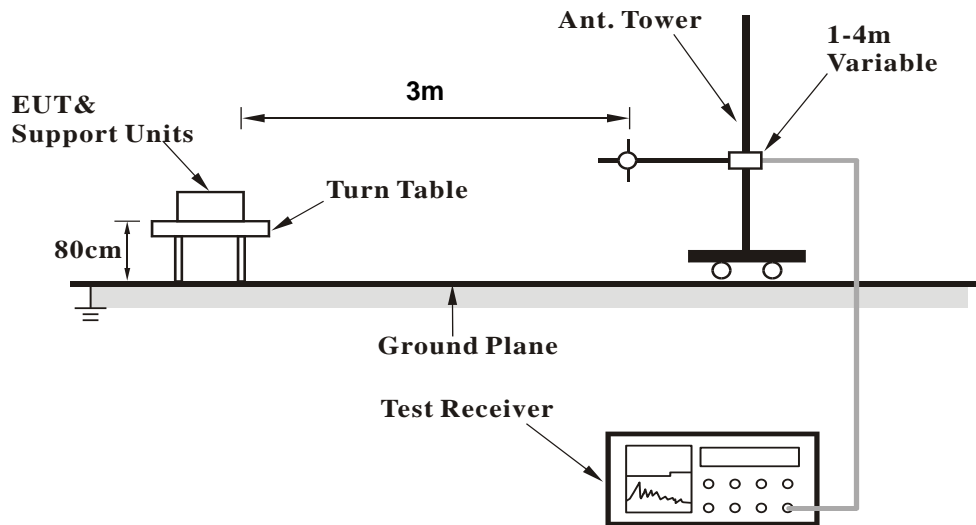
No deviation.

#### 4.1.5 Test Setup

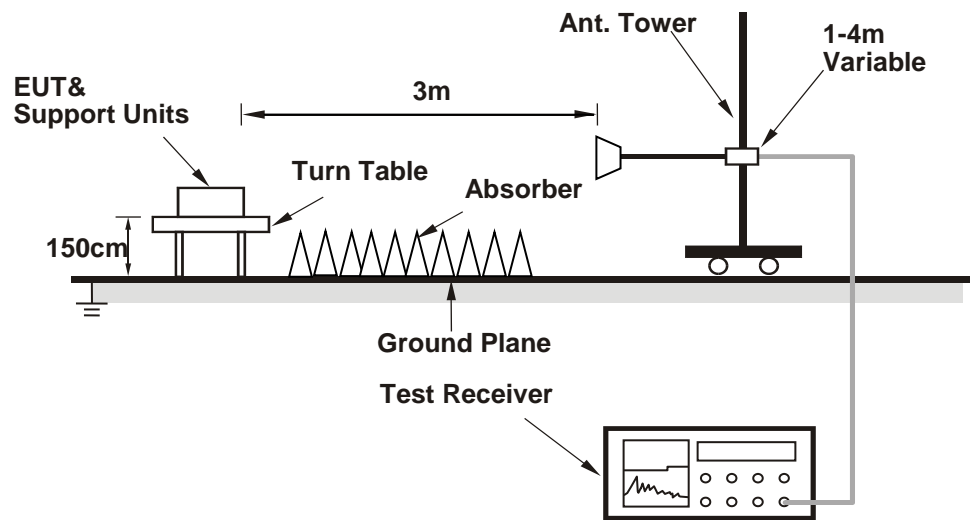
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Condition

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (Mtool 3.0.0.1) has been activated to set the EUT on specific status.

## 4.1.7 Test Results

## Above 1GHz Data:

## 802.11a

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5104.00	51.1 PK	74.0	-22.9	1.07 H	203	47.4	3.7
2	5104.00	39.0 AV	54.0	-15.0	1.07 H	203	35.3	3.7
3	5150.00	52.8 PK	74.0	-21.2	1.07 H	203	49.1	3.7
4	5150.00	39.4 AV	54.0	-14.6	1.07 H	203	35.7	3.7
5	*5260.00	110.6 PK			1.07 H	203	107.2	3.4
6	*5260.00	100.4 AV			1.07 H	203	97.0	3.4
7	5416.00	52.5 PK	74.0	-21.5	1.07 H	203	48.9	3.6
8	5416.00	39.3 AV	54.0	-14.7	1.07 H	203	35.7	3.6
9	#10520.00	48.2 PK	68.2	-20.0	1.10 H	211	35.1	13.1
10	15780.00	52.4 PK	74.0	-21.6	1.08 H	179	38.9	13.5
11	15780.00	40.2 AV	54.0	-13.8	1.08 H	179	26.7	13.5

**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	5104.00	51.3 PK	74.0	-22.7	2.61 V	155	47.6	3.7
2	5104.00	39.4 AV	54.0	-14.6	2.61 V	155	35.7	3.7
3	5150.00	53.1 PK	74.0	-20.9	2.61 V	155	49.4	3.7
4	5150.00	39.4 AV	54.0	-14.6	2.61 V	155	35.7	3.7
5	*5260.00	113.6 PK			2.61 V	155	110.2	3.4
6	*5260.00	103.7 AV			2.61 V	155	100.3	3.4
7	5416.00	52.5 PK	74.0	-21.5	2.61 V	155	48.9	3.6
8	5416.00	39.5 AV	54.0	-14.5	2.61 V	155	35.9	3.6
9	#10520.00	47.8 PK	68.2	-20.4	1.10 V	180	34.7	13.1
10	15780.00	51.8 PK	74.0	-22.2	1.13 V	211	38.3	13.5
11	15780.00	40.0 AV	54.0	-14.0	1.13 V	211	26.5	13.5

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	110.5 PK			1.01 H	195	107.2	3.3
2	*5300.00	100.4 AV			1.01 H	195	97.1	3.3
3	5350.00	51.6 PK	74.0	-22.4	1.01 H	195	48.2	3.4
4	5350.00	39.6 AV	54.0	-14.4	1.01 H	195	36.2	3.4
5	10600.00	48.0 PK	74.0	-26.0	1.05 H	215	35.1	12.9
6	10600.00	35.7 AV	54.0	-18.3	1.05 H	215	22.8	12.9
7	15900.00	51.9 PK	74.0	-22.1	1.01 H	187	39.1	12.8
8	15900.00	39.9 AV	54.0	-14.1	1.01 H	187	27.1	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	113.4 PK			2.74 V	156	110.1	3.3
2	*5300.00	103.4 AV			2.74 V	156	100.1	3.3
3	5350.00	52.5 PK	74.0	-21.5	2.74 V	156	49.1	3.4
4	5350.00	41.8 AV	54.0	-12.2	2.74 V	156	38.4	3.4
5	10600.00	48.1 PK	74.0	-25.9	1.14 V	180	35.2	12.9
6	10600.00	35.8 AV	54.0	-18.2	1.14 V	180	22.9	12.9
7	15900.00	51.7 PK	74.0	-22.3	1.12 V	208	38.9	12.8
8	15900.00	39.9 AV	54.0	-14.1	1.12 V	208	27.1	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	110.8 PK			1.04 H	201	107.4	3.4
2	*5320.00	100.5 AV			1.04 H	201	97.1	3.4
3	5350.00	56.7 PK	74.0	-17.3	1.04 H	201	53.3	3.4
4	5350.00	43.4 AV	54.0	-10.6	1.04 H	201	40.0	3.4
5	10640.00	47.7 PK	74.0	-26.3	1.03 H	234	34.8	12.9
6	10640.00	35.5 AV	54.0	-18.5	1.03 H	234	22.6	12.9
7	15960.00	52.5 PK	74.0	-21.5	1.03 H	198	39.7	12.8
8	15960.00	40.2 AV	54.0	-13.8	1.03 H	198	27.4	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	114.0 PK			2.71 V	178	110.6	3.4
2	*5320.00	103.9 AV			2.71 V	178	100.5	3.4
3	5350.00	61.2 PK	74.0	-12.8	2.71 V	178	57.8	3.4
4	5350.00	47.9 AV	54.0	-6.1	2.71 V	178	44.5	3.4
5	10640.00	47.8 PK	74.0	-26.2	1.10 V	190	34.9	12.9
6	10640.00	35.3 AV	54.0	-18.7	1.10 V	190	22.4	12.9
7	15960.00	52.0 PK	74.0	-22.0	1.10 V	224	39.2	12.8
8	15960.00	40.3 AV	54.0	-13.7	1.10 V	224	27.5	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	53.7 PK	74.0	-20.3	1.09 H	192	49.9	3.8
2	5460.00	43.8 AV	54.0	-10.2	1.09 H	192	40.0	3.8
3	#5470.00	53.8 PK	68.2	-14.4	1.09 H	192	49.9	3.9
4	*5500.00	111.4 PK			1.09 H	192	107.5	3.9
5	*5500.00	100.8 AV			1.09 H	192	96.9	3.9
6	11000.00	48.0 PK	74.0	-26.0	1.01 H	206	35.0	13.0
7	11000.00	35.8 AV	54.0	-18.2	1.01 H	206	22.8	13.0
8	#16500.00	52.2 PK	68.2	-16.0	1.00 H	192	37.6	14.6

**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	5460.00	57.4 PK	74.0	-16.6	3.22 V	184	53.6	3.8
2	5460.00	47.7 AV	54.0	-6.3	3.22 V	184	43.9	3.8
3	#5470.00	57.6 PK	68.2	-10.6	3.22 V	184	53.7	3.9
4	*5500.00	114.6 PK			3.22 V	184	110.7	3.9
5	*5500.00	104.5 AV			3.22 V	184	100.6	3.9
6	11000.00	47.8 PK	74.0	-26.2	1.15 V	169	34.8	13.0
7	11000.00	35.5 AV	54.0	-18.5	1.15 V	169	22.5	13.0
8	#16500.00	52.2 PK	68.2	-16.0	1.11 V	225	37.6	14.6

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5416.00	55.1 PK	74.0	-18.9	1.15 H	189	51.5	3.6
2	5416.00	45.2 AV	54.0	-8.8	1.15 H	189	41.6	3.6
3	5460.00	53.4 PK	74.0	-20.6	1.15 H	189	49.6	3.8
4	5460.00	43.7 AV	54.0	-10.3	1.15 H	189	39.9	3.8
5	#5470.00	53.5 PK	68.2	-14.7	1.15 H	189	49.6	3.9
6	*5580.00	111.1 PK			1.15 H	189	107.3	3.8
7	*5580.00	100.6 AV			1.15 H	189	96.8	3.8
8	11160.00	47.7 PK	74.0	-26.3	1.08 H	229	34.6	13.1
9	11160.00	35.5 AV	54.0	-18.5	1.08 H	229	22.4	13.1
10	#16740.00	52.9 PK	68.2	-15.3	1.00 H	181	36.7	16.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5416.00	59.3 PK	74.0	-14.7	3.23 V	182	55.7	3.6
2	5416.00	49.5 AV	54.0	-4.5	3.23 V	182	45.9	3.6
3	5460.00	57.6 PK	74.0	-16.4	3.23 V	182	53.8	3.8
4	5460.00	48.1 AV	54.0	-5.9	3.23 V	182	44.3	3.8
5	#5470.00	57.7 PK	68.2	-10.5	3.23 V	182	53.8	3.9
6	*5580.00	114.5 PK			3.23 V	182	110.7	3.8
7	*5580.00	104.4 AV			3.23 V	182	100.6	3.8
8	11160.00	47.9 PK	74.0	-26.1	1.20 V	161	34.8	13.1
9	11160.00	35.6 AV	54.0	-18.4	1.20 V	161	22.5	13.1
10	#16740.00	52.3 PK	68.2	-15.9	1.12 V	214	36.1	16.2

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	111.0 PK			1.12 H	198	107.0	4.0
2	*5700.00	100.4 AV			1.12 H	198	96.4	4.0
3	#5725.00	60.7 PK	68.2	-7.5	1.12 H	198	56.7	4.0
4	#5861.00	58.7 PK	68.2	-9.5	1.12 H	198	54.2	4.5
5	11400.00	47.9 PK	74.0	-26.1	1.09 H	233	34.7	13.2
6	11400.00	35.7 AV	54.0	-18.3	1.09 H	233	22.5	13.2
7	#17100.00	53.0 PK	68.2	-15.2	1.04 H	191	35.8	17.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	114.5 PK			3.21 V	181	110.5	4.0
2	*5700.00	104.3 AV			3.21 V	181	100.3	4.0
3	#5725.00	64.8 PK	68.2	-3.4	3.21 V	181	60.8	4.0
4	#5861.00	62.8 PK	68.2	-5.4	3.21 V	181	58.3	4.5
5	11400.00	47.8 PK	74.0	-26.2	1.17 V	176	34.6	13.2
6	11400.00	35.5 AV	54.0	-18.5	1.17 V	176	22.3	13.2
7	#17100.00	52.7 PK	68.2	-15.5	1.07 V	225	35.5	17.2

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 144	<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	5460.00	53.1 PK	74.0	-20.9	1.17 H	209	49.3	3.8
2	5460.00	39.9 AV	54.0	-14.1	1.17 H	209	36.1	3.8
3	#5470.00	53.1 PK	68.2	-15.1	1.17 H	209	49.2	3.9
4	*5720.00	111.7 PK			1.17 H	209	107.8	3.9
5	*5720.00	100.9 AV			1.17 H	209	97.0	3.9
6	#5850.00	53.2 PK	68.2	-15.0	1.17 H	209	48.8	4.4
7	#5876.00	56.5 PK	68.2	-11.7	1.17 H	209	52.1	4.4
8	11440.00	48.3 PK	74.0	-25.7	1.12 H	223	35.0	13.3
9	11440.00	36.0 AV	54.0	-18.0	1.12 H	223	22.7	13.3
10	#17160.00	52.5 PK	68.2	-15.7	1.02 H	183	35.1	17.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	54.8 PK	74.0	-19.2	3.65 V	181	51.0	3.8
2	5460.00	41.9 AV	54.0	-12.1	3.65 V	181	38.1	3.8
3	#5470.00	54.2 PK	68.2	-14.0	3.65 V	181	50.3	3.9
4	*5720.00	115.5 PK			3.65 V	181	111.6	3.9
5	*5720.00	105.2 AV			3.65 V	181	101.3	3.9
6	#5850.00	54.8 PK	68.2	-13.4	3.65 V	181	50.4	4.4
7	#5876.00	60.0 PK	68.2	-8.2	3.65 V	181	55.6	4.4
8	11440.00	48.1 PK	74.0	-25.9	1.22 V	183	34.8	13.3
9	11440.00	35.7 AV	54.0	-18.3	1.22 V	183	22.4	13.3
10	#17160.00	52.9 PK	68.2	-15.3	1.01 V	213	35.5	17.4

**REMARKS:**

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

**802.11ac (VHT20)**

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5094.00	51.3 PK	74.0	-22.7	1.12 H	210	47.6	3.7
2	5094.00	38.3 AV	54.0	-15.7	1.12 H	210	34.6	3.7
3	5150.00	52.4 PK	74.0	-21.6	1.12 H	210	48.7	3.7
4	5150.00	39.2 AV	54.0	-14.8	1.12 H	210	35.5	3.7
5	*5260.00	110.1 PK			1.12 H	210	106.7	3.4
6	*5260.00	100.7 AV			1.12 H	210	97.3	3.4
7	5416.00	51.0 PK	74.0	-23.0	1.12 H	210	47.4	3.6
8	5416.00	39.1 AV	54.0	-14.9	1.12 H	210	35.5	3.6
9	#10520.00	47.8 PK	68.2	-20.4	1.12 H	238	34.7	13.1
10	15780.00	53.4 PK	74.0	-20.6	1.06 H	203	39.9	13.5
11	15780.00	40.7 AV	54.0	-13.3	1.06 H	203	27.2	13.5

**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	5094.00	50.9 PK	74.0	-23.1	2.58 V	181	47.2	3.7
2	5094.00	37.9 AV	54.0	-16.1	2.58 V	181	34.2	3.7
3	5150.00	52.9 PK	74.0	-21.1	2.58 V	181	49.2	3.7
4	5150.00	39.0 AV	54.0	-15.0	2.58 V	181	35.3	3.7
5	*5260.00	113.6 PK			2.58 V	181	110.2	3.4
6	*5260.00	103.9 AV			2.58 V	181	100.5	3.4
7	5416.00	52.2 PK	74.0	-21.8	2.58 V	181	48.6	3.6
8	5416.00	39.5 AV	54.0	-14.5	2.58 V	181	35.9	3.6
9	#10520.00	47.5 PK	68.2	-20.7	1.19 V	160	34.4	13.1
10	15780.00	52.1 PK	74.0	-21.9	1.16 V	228	38.6	13.5
11	15780.00	40.4 AV	54.0	-13.6	1.16 V	228	26.9	13.5

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	110.0 PK			1.17 H	221	106.7	3.3
2	*5300.00	100.6 AV			1.17 H	221	97.3	3.3
3	5350.00	51.7 PK	74.0	-22.3	1.17 H	221	48.3	3.4
4	5350.00	39.6 AV	54.0	-14.4	1.17 H	221	36.2	3.4
5	10600.00	47.7 PK	74.0	-26.3	1.05 H	224	34.8	12.9
6	10600.00	35.3 AV	54.0	-18.7	1.05 H	224	22.4	12.9
7	15900.00	53.6 PK	74.0	-20.4	1.01 H	193	40.8	12.8
8	15900.00	40.9 AV	54.0	-13.1	1.01 H	193	28.1	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	113.5 PK			2.59 V	201	110.2	3.3
2	*5300.00	103.7 AV			2.59 V	201	100.4	3.3
3	5350.00	55.2 PK	74.0	-18.8	2.59 V	201	51.8	3.4
4	5350.00	41.8 AV	54.0	-12.2	2.59 V	201	38.4	3.4
5	10600.00	48.0 PK	74.0	-26.0	1.14 V	155	35.1	12.9
6	10600.00	35.5 AV	54.0	-18.5	1.14 V	155	22.6	12.9
7	15900.00	52.5 PK	74.0	-21.5	1.06 V	227	39.7	12.8
8	15900.00	40.4 AV	54.0	-13.6	1.06 V	227	27.6	12.8

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	109.8 PK			1.14 H	225	106.4	3.4
2	*5320.00	100.4 AV			1.14 H	225	97.0	3.4
3	5350.00	54.1 PK	74.0	-19.9	1.14 H	225	50.7	3.4
4	5350.00	43.5 AV	54.0	-10.5	1.14 H	225	40.1	3.4
5	10640.00	47.9 PK	74.0	-26.1	1.11 H	238	35.0	12.9
6	10640.00	35.9 AV	54.0	-18.1	1.11 H	238	23.0	12.9
7	15960.00	53.0 PK	74.0	-21.0	1.03 H	190	40.2	12.8
8	15960.00	40.7 AV	54.0	-13.3	1.03 H	190	27.9	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	113.4 PK			2.46 V	157	110.0	3.4
2	*5320.00	103.5 AV			2.46 V	157	100.1	3.4
3	5350.00	57.8 PK	74.0	-16.2	2.46 V	157	54.4	3.4
4	5350.00	47.3 AV	54.0	-6.7	2.46 V	157	43.9	3.4
5	10640.00	47.6 PK	74.0	-26.4	1.20 V	165	34.7	12.9
6	10640.00	35.4 AV	54.0	-18.6	1.20 V	165	22.5	12.9
7	15960.00	52.7 PK	74.0	-21.3	1.13 V	231	39.9	12.8
8	15960.00	40.5 AV	54.0	-13.5	1.13 V	231	27.7	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	53.6 PK	74.0	-20.4	1.14 H	234	49.8	3.8
2	5460.00	43.9 AV	54.0	-10.1	1.14 H	234	40.1	3.8
3	#5470.00	55.3 PK	68.2	-12.9	1.14 H	234	51.4	3.9
4	*5500.00	110.3 PK			1.14 H	234	106.4	3.9
5	*5500.00	100.7 AV			1.14 H	234	96.8	3.9
6	11000.00	48.3 PK	74.0	-25.7	1.07 H	222	35.3	13.0
7	11000.00	35.9 AV	54.0	-18.1	1.07 H	222	22.9	13.0
8	#16500.00	52.9 PK	68.2	-15.3	1.00 H	192	38.3	14.6

**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	5460.00	57.2 PK	74.0	-16.8	2.75 V	180	53.4	3.8
2	5460.00	47.4 AV	54.0	-6.6	2.75 V	180	43.6	3.8
3	#5470.00	59.2 PK	68.2	-9.0	2.75 V	180	55.3	3.9
4	*5500.00	114.4 PK			2.75 V	180	110.5	3.9
5	*5500.00	104.0 AV			2.75 V	180	100.1	3.9
6	11000.00	47.6 PK	74.0	-26.4	1.11 V	167	34.6	13.0
7	11000.00	35.2 AV	54.0	-18.8	1.11 V	167	22.2	13.0
8	#16500.00	52.2 PK	68.2	-16.0	1.06 V	234	37.6	14.6

**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)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " \* ": Fundamental frequency.
- " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5417.00	54.6 PK	74.0	-19.4	1.18 H	222	51.0	3.6
2	5417.00	44.5 AV	54.0	-9.5	1.18 H	222	40.9	3.6
3	5460.00	55.2 PK	74.0	-18.8	1.18 H	222	51.4	3.8
4	5460.00	45.5 AV	54.0	-8.5	1.18 H	222	41.7	3.8
5	#5470.00	53.1 PK	68.2	-15.1	1.18 H	222	49.2	3.9
6	*5580.00	110.1 PK			1.18 H	222	106.3	3.8
7	*5580.00	100.6 AV			1.18 H	222	96.8	3.8
8	11160.00	47.7 PK	74.0	-26.3	1.07 H	231	34.6	13.1
9	11160.00	35.3 AV	54.0	-18.7	1.07 H	231	22.2	13.1
10	#16740.00	52.7 PK	68.2	-15.5	1.05 H	201	36.5	16.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5417.00	58.2 PK	74.0	-15.8	2.73 V	182	54.6	3.6
2	5417.00	48.3 AV	54.0	-5.7	2.73 V	182	44.7	3.6
3	5460.00	57.3 PK	74.0	-16.7	2.73 V	182	53.5	3.8
4	5460.00	47.6 AV	54.0	-6.4	2.73 V	182	43.8	3.8
5	#5470.00	57.7 PK	68.2	-10.5	2.73 V	182	53.8	3.9
6	*5580.00	114.2 PK			2.73 V	182	110.4	3.8
7	*5580.00	103.8 AV			2.73 V	182	100.0	3.8
8	11160.00	47.5 PK	74.0	-26.5	1.18 V	154	34.4	13.1
9	11160.00	35.3 AV	54.0	-18.7	1.18 V	154	22.2	13.1
10	#16740.00	52.9 PK	68.2	-15.3	1.11 V	227	36.7	16.2

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	110.5 PK			1.15 H	219	106.5	4.0
2	*5700.00	100.7 AV			1.15 H	219	96.7	4.0
3	#5725.00	56.1 PK	68.2	-12.1	1.15 H	219	52.1	4.0
4	11400.00	47.5 PK	74.0	-26.5	1.13 H	226	34.3	13.2
5	11400.00	35.6 AV	54.0	-18.4	1.13 H	226	22.4	13.2
6	#17100.00	53.0 PK	68.2	-15.2	1.04 H	179	35.8	17.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	114.5 PK			2.77 V	177	110.5	4.0
2	*5700.00	104.1 AV			2.77 V	177	100.1	4.0
3	#5725.00	59.8 PK	68.2	-8.4	2.77 V	177	55.8	4.0
4	11400.00	47.9 PK	74.0	-26.1	1.09 V	184	34.7	13.2
5	11400.00	35.9 AV	54.0	-18.1	1.09 V	184	22.7	13.2
6	#17100.00	52.3 PK	68.2	-15.9	1.14 V	229	35.1	17.2

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 144	<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	5460.00	52.7 PK	74.0	-21.3	1.23 H	213	48.9	3.8
2	5460.00	39.4 AV	54.0	-14.6	1.23 H	213	35.6	3.8
3	#5470.00	53.0 PK	68.2	-15.2	1.22 H	212	49.1	3.9
4	*5720.00	111.5 PK			1.23 H	213	107.6	3.9
5	*5720.00	100.7 AV			1.23 H	213	96.8	3.9
6	#5850.00	56.4 PK	68.2	-11.8	1.13 H	199	52.0	4.4
7	11440.00	48.5 PK	74.0	-25.5	1.11 H	235	35.2	13.3
8	11440.00	36.3 AV	54.0	-17.7	1.11 H	235	23.0	13.3
9	#17160.00	52.7 PK	68.2	-15.5	1.07 H	187	35.3	17.4

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	55.1 PK	74.0	-18.9	3.68 V	197	51.3	3.8
2	5460.00	42.4 AV	54.0	-11.6	3.68 V	197	38.6	3.8
3	#5470.00	53.8 PK	68.2	-14.4	3.68 V	197	49.9	3.9
4	*5720.00	115.2 PK			3.68 V	197	111.3	3.9
5	*5720.00	105.1 AV			3.68 V	197	101.2	3.9
6	#5850.00	60.3 PK	68.2	-7.9	3.68 V	197	55.9	4.4
7	11440.00	48.2 PK	74.0	-25.8	1.27 V	196	34.9	13.3
8	11440.00	36.0 AV	54.0	-18.0	1.27 V	196	22.7	13.3
9	#17160.00	53.1 PK	68.2	-15.1	1.00 V	205	35.7	17.4

**REMARKS:**

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

**802.11ac (VHT40)**

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5121.00	54.6 PK	74.0	-19.4	1.22 H	207	50.9	3.7
2	5121.00	43.6 AV	54.0	-10.4	1.22 H	207	39.9	3.7
3	5150.00	55.0 PK	74.0	-19.0	1.22 H	207	51.3	3.7
4	5150.00	41.6 AV	54.0	-12.4	1.22 H	207	37.9	3.7
5	*5270.00	112.2 PK			1.22 H	207	108.8	3.4
6	*5270.00	100.5 AV			1.22 H	207	97.1	3.4
7	5350.00	58.0 PK	74.0	-16.0	1.22 H	207	54.6	3.4
8	5350.00	44.1 AV	54.0	-9.9	1.22 H	207	40.7	3.4
9	#10540.00	47.3 PK	68.2	-20.9	1.15 H	217	34.3	13.0
10	15810.00	52.4 PK	74.0	-21.6	1.01 H	172	39.2	13.2
11	15810.00	40.0 AV	54.0	-14.0	1.01 H	172	26.8	13.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5121.00	58.0 PK	74.0	-16.0	1.19 V	93	54.3	3.7
2	5121.00	47.3 AV	54.0	-6.7	1.19 V	93	43.6	3.7
3	5150.00	55.6 PK	74.0	-18.4	1.19 V	93	51.9	3.7
4	5150.00	41.7 AV	54.0	-12.3	1.19 V	93	38.0	3.7
5	*5270.00	116.2 PK			1.19 V	93	112.8	3.4
6	*5270.00	104.0 AV			1.19 V	93	100.6	3.4
7	5350.00	61.8 PK	74.0	-12.2	1.19 V	93	58.4	3.4
8	5350.00	47.8 AV	54.0	-6.2	1.19 V	93	44.4	3.4
9	#10540.00	49.1 PK	68.2	-19.1	1.10 V	186	36.1	13.0
10	15810.00	51.9 PK	74.0	-22.1	1.18 V	234	38.7	13.2
11	15810.00	40.0 AV	54.0	-14.0	1.18 V	234	26.8	13.2

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 62	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	111.3 PK			1.17 H	216	108.0	3.3
2	*5310.00	99.6 AV			1.17 H	216	96.3	3.3
3	5350.00	61.8 PK	74.0	-12.2	1.17 H	216	58.4	3.4
4	5350.00	50.1 AV	54.0	-3.9	1.17 H	216	46.7	3.4
5	10620.00	47.1 PK	74.0	-26.9	1.16 H	221	34.2	12.9
6	10620.00	35.3 AV	54.0	-18.7	1.16 H	221	22.4	12.9
7	15930.00	52.4 PK	74.0	-21.6	1.09 H	171	39.6	12.8
8	15930.00	39.8 AV	54.0	-14.2	1.09 H	171	27.0	12.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	114.8 PK			1.17 V	87	111.5	3.3
2	*5310.00	103.1 AV			1.17 V	87	99.8	3.3
3	5350.00	65.4 PK	74.0	-8.6	1.17 V	87	62.0	3.4
4	5350.00	53.7 AV	54.0	-0.3	1.17 V	87	50.3	3.4
5	10620.00	48.5 PK	74.0	-25.5	1.08 V	196	35.6	12.9
6	10620.00	36.3 AV	54.0	-17.7	1.08 V	196	23.4	12.9
7	15930.00	51.6 PK	74.0	-22.4	1.20 V	220	38.8	12.8
8	15930.00	40.0 AV	54.0	-14.0	1.20 V	220	27.2	12.8

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 102	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	57.3 PK	74.0	-16.7	1.15 H	222	53.5	3.8
2	5460.00	46.4 AV	54.0	-7.6	1.15 H	222	42.6	3.8
3	#5470.00	63.9 PK	68.2	-4.3	1.15 H	222	60.0	3.9
4	*5510.00	112.1 PK			1.15 H	222	108.2	3.9
5	*5510.00	100.3 AV			1.15 H	222	96.4	3.9
6	11020.00	47.3 PK	74.0	-26.7	1.09 H	233	34.3	13.0
7	11020.00	35.2 AV	54.0	-18.8	1.09 H	233	22.2	13.0
8	#16530.00	53.2 PK	68.2	-15.0	1.00 H	192	38.5	14.7

**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	5460.00	60.8 PK	74.0	-13.2	1.21 V	89	57.0	3.8
2	5460.00	50.2 AV	54.0	-3.8	1.21 V	89	46.4	3.8
3	#5470.00	67.5 PK	68.2	-0.7	1.21 V	89	63.6	3.9
4	*5510.00	115.5 PK			1.21 V	89	111.6	3.9
5	*5510.00	103.8 AV			1.21 V	89	99.9	3.9
6	11020.00	47.5 PK	74.0	-26.5	1.12 V	172	34.5	13.0
7	11020.00	35.5 AV	54.0	-18.5	1.12 V	172	22.5	13.0
8	#16530.00	52.4 PK	68.2	-15.8	1.10 V	215	37.7	14.7

**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)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " \* ": Fundamental frequency.
- " # ": The radiated frequency is out of the restricted band.



<b>CHANNEL</b>	TX Channel 110	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5401.00	56.9 PK	74.0	-17.1	1.11 H	210	53.3	3.6
2	5401.00	46.1 AV	54.0	-7.9	1.11 H	210	42.5	3.6
3	5460.00	53.4 PK	74.0	-20.6	1.11 H	210	49.6	3.8
4	5460.00	45.5 AV	54.0	-8.5	1.11 H	210	41.7	3.8
5	#5470.00	52.9 PK	68.2	-15.3	1.11 H	210	49.0	3.9
6	*5550.00	112.3 PK			1.11 H	210	108.5	3.8
7	*5550.00	100.5 AV			1.11 H	210	96.7	3.8
8	11100.00	47.6 PK	74.0	-26.4	1.09 H	216	34.6	13.0
9	11100.00	35.9 AV	54.0	-18.1	1.09 H	216	22.9	13.0
10	#16650.00	53.5 PK	68.2	-14.7	1.09 H	189	37.8	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	5401.00	60.6 PK	74.0	-13.4	1.20 V	90	57.0	3.6
2	5401.00	49.7 AV	54.0	-4.3	1.20 V	90	46.1	3.6
3	5460.00	57.2 PK	74.0	-16.8	1.20 V	90	53.4	3.8
4	5460.00	47.5 AV	54.0	-6.5	1.20 V	90	43.7	3.8
5	#5470.00	57.7 PK	68.2	-10.5	1.20 V	90	53.8	3.9
6	*5550.00	116.3 PK			1.20 V	90	112.5	3.8
7	*5550.00	104.1 AV			1.20 V	90	100.3	3.8
8	11100.00	47.4 PK	74.0	-26.6	1.09 V	195	34.4	13.0
9	11100.00	35.6 AV	54.0	-18.4	1.09 V	195	22.6	13.0
10	#16650.00	52.2 PK	68.2	-16.0	1.12 V	232	36.5	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 134	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	112.4 PK			1.10 H	223	108.4	4.0
2	*5670.00	100.8 AV			1.10 H	223	96.8	4.0
3	#5725.00	60.7 PK	68.2	-7.5	1.10 H	223	56.7	4.0
4	11340.00	47.3 PK	74.0	-26.7	1.09 H	213	34.1	13.2
5	11340.00	35.5 AV	54.0	-18.5	1.09 H	213	22.3	13.2
6	#17010.00	52.6 PK	68.2	-15.6	1.06 H	190	35.6	17.0

**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	*5670.00	116.5 PK			1.16 V	92	112.5	4.0
2	*5670.00	104.3 AV			1.16 V	92	100.3	4.0
3	#5725.00	64.4 PK	68.2	-3.8	1.16 V	92	60.4	4.0
4	11340.00	48.3 PK	74.0	-25.7	1.12 V	169	35.1	13.2
5	11340.00	36.1 AV	54.0	-17.9	1.12 V	169	22.9	13.2
6	#17010.00	52.1 PK	68.2	-16.1	1.15 V	224	35.1	17.0

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 142	<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	5460.00	55.3 PK	74.0	-18.7	1.25 H	227	51.5	3.8
2	5460.00	45.3 AV	54.0	-8.7	1.25 H	227	41.5	3.8
3	#5461.00	56.5 PK	68.2	-11.7	1.25 H	227	52.7	3.8
4	#5470.00	53.6 PK	68.2	-14.6	1.25 H	227	49.7	3.9
5	*5710.00	113.1 PK			1.25 H	227	109.1	4.0
6	*5710.00	101.3 AV			1.25 H	227	97.3	4.0
7	#5850.00	56.8 PK	68.2	-11.4	1.25 H	227	52.4	4.4
8	11420.00	46.6 PK	74.0	-27.4	1.07 H	202	33.4	13.2
9	11420.00	35.0 AV	54.0	-19.0	1.07 H	202	21.8	13.2
10	#17130.00	52.5 PK	68.2	-15.7	1.12 H	201	35.3	17.2

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	57.3 PK	74.0	-16.7	3.74 V	210	53.5	3.8
2	5460.00	47.6 AV	54.0	-6.4	3.74 V	210	43.8	3.8
3	#5461.00	58.9 PK	68.2	-9.3	3.74 V	210	55.1	3.8
4	#5470.00	57.0 PK	68.2	-11.2	3.74 V	210	53.1	3.9
5	*5710.00	116.8 PK			3.74 V	210	112.8	4.0
6	*5710.00	104.8 AV			3.74 V	210	100.8	4.0
7	#5850.00	59.2 PK	68.2	-9.0	3.74 V	210	54.8	4.4
8	11420.00	48.3 PK	74.0	-25.7	1.17 V	154	35.1	13.2
9	11420.00	35.9 AV	54.0	-18.1	1.17 V	154	22.7	13.2
10	#17130.00	52.7 PK	68.2	-15.5	1.13 V	226	35.5	17.2

**REMARKS:**

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.1 PK	74.0	-20.9	1.13 H	217	49.4	3.7
2	5150.00	42.4 AV	54.0	-11.6	1.13 H	217	38.7	3.7
3	*5290.00	109.2 PK			1.13 H	217	105.9	3.3
4	*5290.00	100.1 AV			1.13 H	217	96.8	3.3
5	5350.00	61.2 PK	74.0	-12.8	1.13 H	217	57.8	3.4
6	5350.00	50.0 AV	54.0	-4.0	1.13 H	217	46.6	3.4
7	#10580.00	47.9 PK	68.2	-20.3	1.12 H	217	35.0	12.9
8	15870.00	53.4 PK	74.0	-20.6	1.03 H	204	40.5	12.9
9	15870.00	40.7 AV	54.0	-13.3	1.03 H	204	27.8	12.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.8 PK	74.0	-17.2	1.19 V	93	53.1	3.7
2	5150.00	46.1 AV	54.0	-7.9	1.19 V	93	42.4	3.7
3	*5290.00	113.0 PK			1.19 V	93	109.7	3.3
4	*5290.00	103.5 AV			1.19 V	93	100.2	3.3
5	5350.00	65.0 PK	74.0	-9.0	1.19 V	93	61.6	3.4
<b>6</b>	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.19 V</b>	<b>93</b>	<b>50.5</b>	<b>3.4</b>
7	#10580.00	47.6 PK	68.2	-20.6	1.08 V	191	34.7	12.9
8	15870.00	52.6 PK	74.0	-21.4	1.13 V	242	39.7	12.9
9	15870.00	40.8 AV	54.0	-13.2	1.13 V	242	27.9	12.9

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 106	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	59.8 PK	74.0	-14.2	1.03 H	224	56.0	3.8
2	5460.00	46.7 AV	54.0	-7.3	1.03 H	224	42.9	3.8
3	#5470.00	64.5 PK	68.2	-3.7	1.03 H	224	60.6	3.9
4	*5530.00	109.9 PK			1.03 H	224	106.1	3.8
5	*5530.00	100.7 AV			1.03 H	224	96.9	3.8
6	#5725.00	51.8 PK	68.2	-16.4	1.03 H	224	47.8	4.0
7	11060.00	47.9 PK	74.0	-26.1	1.03 H	206	35.0	12.9
8	11060.00	36.3 AV	54.0	-17.7	1.03 H	206	23.4	12.9
9	#16590.00	54.3 PK	68.2	-13.9	1.07 H	181	39.4	14.9

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	63.2 PK	74.0	-10.8	1.00 V	188	59.4	3.8
2	5460.00	50.5 AV	54.0	-3.5	1.00 V	188	46.7	3.8
3	#5470.00	68.1 PK	68.2	-0.1	1.00 V	188	64.2	3.9
4	*5530.00	113.6 PK			1.00 V	188	109.8	3.8
5	*5530.00	104.2 AV			1.00 V	188	100.4	3.8
6	#5725.00	55.7 PK	68.2	-12.5	1.00 V	188	51.7	4.0
7	11060.00	47.7 PK	74.0	-26.3	1.13 V	180	34.8	12.9
8	11060.00	35.8 AV	54.0	-18.2	1.13 V	180	22.9	12.9
9	#16590.00	52.0 PK	68.2	-16.2	1.08 V	217	37.1	14.9

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 122	<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	*5610.00	110.0 PK			1.03 H	213	106.3	3.7
2	*5610.00	100.8 AV			1.03 H	213	97.1	3.7
3	#5725.00	61.0 PK	68.2	-7.2	1.03 H	213	57.0	4.0
4	11220.00	47.6 PK	74.0	-26.4	1.12 H	207	34.4	13.2
5	11220.00	36.0 AV	54.0	-18.0	1.12 H	207	22.8	13.2
6	#16830.00	53.5 PK	68.2	-14.7	1.11 H	184	37.4	16.1

**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	*5610.00	113.8 PK			1.12 V	98	110.1	3.7
2	*5610.00	104.3 AV			1.12 V	98	100.6	3.7
3	#5725.00	64.8 PK	68.2	-3.4	1.12 V	98	60.8	4.0
4	11220.00	47.3 PK	74.0	-26.7	1.12 V	208	34.1	13.2
5	11220.00	35.5 AV	54.0	-18.5	1.12 V	208	22.3	13.2
6	#16830.00	52.2 PK	68.2	-16.0	1.12 V	228	36.1	16.1

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

<b>CHANNEL</b>	TX Channel 138	<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	5460.00	55.0 PK	74.0	-19.0	1.04 H	202	51.2	3.8
2	5460.00	45.3 AV	54.0	-8.7	1.04 H	202	41.5	3.8
3	#5470.00	54.6 PK	68.2	-13.6	1.04 H	202	50.7	3.9
4	*5690.00	109.5 PK			1.04 H	202	105.5	4.0
5	*5690.00	100.2 AV			1.04 H	202	96.2	4.0
6	#5850.00	53.5 PK	68.2	-14.7	1.04 H	202	49.1	4.4
7	11380.00	47.8 PK	74.0	-26.2	1.11 H	196	34.6	13.2
8	11380.00	36.1 AV	54.0	-17.9	1.11 H	196	22.9	13.2
9	#17070.00	53.3 PK	68.2	-14.9	1.10 H	180	36.3	17.0

**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	5460.00	57.6 PK	74.0	-16.4	3.65 V	181	53.8	3.8
2	5460.00	48.0 AV	54.0	-6.0	3.65 V	181	44.2	3.8
3	#5470.00	57.8 PK	68.2	-10.4	3.65 V	181	53.9	3.9
4	*5690.00	113.2 PK			3.65 V	181	109.2	4.0
5	*5690.00	103.5 AV			3.65 V	181	99.5	4.0
6	#5850.00	56.2 PK	68.2	-12.0	3.65 V	181	51.8	4.4
7	11380.00	47.1 PK	74.0	-26.9	1.15 V	221	33.9	13.2
8	11380.00	35.1 AV	54.0	-18.9	1.15 V	221	21.9	13.2
9	#17070.00	52.6 PK	68.2	-15.6	1.06 V	232	35.6	17.0

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80+80)

<b>CHANNEL</b>	TX Channel 42+58	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.2 PK	74.0	-12.8	1.00 H	205	57.5	3.7
2	5150.00	49.5 AV	54.0	-4.5	1.00 H	205	45.8	3.7
3	*5210.00	108.3 PK			1.00 H	205	104.7	3.6
4	*5210.00	98.1 AV			1.00 H	205	94.5	3.6
5	*5290.00	107.5 PK			3.96 H	243	104.2	3.3
6	*5290.00	97.2 AV			3.96 H	243	93.9	3.3
7	5350.00	60.3 PK	74.0	-13.7	1.00 H	186	56.9	3.4
8	5350.00	48.1 AV	54.0	-5.9	1.00 H	186	44.7	3.4
9	#10420.00	48.6 PK	68.2	-19.6	1.13 H	203	35.8	12.8
10	#10580.00	48.4 PK	68.2	-19.8	1.12 H	218	35.5	12.9
11	15630.00	53.5 PK	74.0	-20.5	1.06 H	163	39.8	13.7
12	15630.00	40.8 AV	54.0	-13.2	1.06 H	163	27.1	13.7
13	15870.00	53.1 PK	74.0	-20.9	1.09 H	212	40.2	12.9
14	15870.00	40.7 AV	54.0	-13.3	1.09 H	212	27.8	12.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	73.9 PK	74.0	-0.1	1.50 V	195	70.2	3.7
2	5150.00	53.0 AV	54.0	-1.0	1.50 V	195	49.3	3.7
3	*5210.00	110.1 PK			2.75 V	169	106.5	3.6
4	*5210.00	99.1 AV			2.75 V	169	95.5	3.6
5	*5290.00	112.3 PK			1.50 V	173	109.0	3.3
6	*5290.00	101.2 AV			1.50 V	173	97.9	3.3
7	5350.00	72.9 PK	74.0	-1.1	1.50 V	195	69.5	3.4
8	5350.00	53.4 AV	54.0	-0.6	1.50 V	195	50.0	3.4
9	#10420.00	46.7 PK	68.2	-21.5	1.11 V	213	33.9	12.8
10	#10580.00	47.5 PK	68.2	-20.7	1.11 V	205	34.6	12.9
11	15630.00	52.1 PK	74.0	-21.9	1.10 V	223	38.4	13.7
12	15630.00	40.1 AV	54.0	-13.9	1.10 V	223	26.4	13.7
13	15870.00	52.4 PK	74.0	-21.6	1.09 V	233	39.5	12.9
14	15870.00	40.6 AV	54.0	-13.4	1.09 V	233	27.7	12.9

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 106+122	<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	5460.00	59.7 PK	74.0	-14.3	1.05 H	205	55.9	3.8
2	5460.00	46.9 AV	54.0	-7.1	1.05 H	205	43.1	3.8
3	#5470.00	67.8 PK	68.2	-0.4	1.05 H	205	63.9	3.9
4	*5530.00	107.8 PK			1.05 H	205	104.0	3.8
5	*5530.00	97.7 AV			1.05 H	205	93.9	3.8
6	*5610.00	106.9 PK			3.90 H	255	103.2	3.7
7	*5610.00	96.0 AV			3.90 H	255	92.3	3.7
8	#5725.00	58.9 PK	68.2	-9.3	1.50 H	255	54.9	4.0
9	11060.00	48.0 PK	74.0	-26.0	1.01 H	194	35.1	12.9
10	11060.00	36.6 AV	54.0	-17.4	1.01 H	194	23.7	12.9
11	11220.00	47.2 PK	74.0	-26.8	1.16 H	206	34.0	13.2
12	11220.00	35.7 AV	54.0	-18.3	1.16 H	206	22.5	13.2
13	#16590.00	54.6 PK	68.2	-13.6	1.02 H	190	39.7	14.9
14	#16830.00	53.5 PK	68.2	-14.7	1.14 H	171	37.4	16.1

**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	5460.00	61.3 PK	74.0	-12.7	4.00 V	190	57.5	3.8
2	5460.00	50.7 AV	54.0	-3.3	4.00 V	190	46.9	3.8
3	#5470.00	68.0 PK	68.2	-0.2	4.00 V	190	64.1	3.9
4	*5530.00	109.3 PK			4.00 V	190	105.5	3.8
5	*5530.00	98.7 AV			4.00 V	190	94.9	3.8
6	*5610.00	112.1 PK			1.50 V	181	108.4	3.7
7	*5610.00	100.0 AV			1.50 V	181	96.3	3.7
<b>8</b>	<b>#5725.00</b>	<b>68.1 PK</b>	<b>68.2</b>	<b>-0.1</b>	<b>2.75 V</b>	<b>178</b>	<b>64.1</b>	<b>4.0</b>
9	11060.00	48.1 PK	74.0	-25.9	1.19 V	195	35.2	12.9
10	11060.00	36.0 AV	54.0	-18.0	1.19 V	195	23.1	12.9
11	11220.00	46.9 PK	74.0	-27.1	1.15 V	216	33.7	13.2
12	11220.00	35.3 AV	54.0	-18.7	1.15 V	216	22.1	13.2
13	#16590.00	51.9 PK	68.2	-16.3	1.07 V	229	37.0	14.9
14	#16830.00	52.1 PK	68.2	-16.1	1.10 V	227	36.0	16.1

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11ac (VHT80)

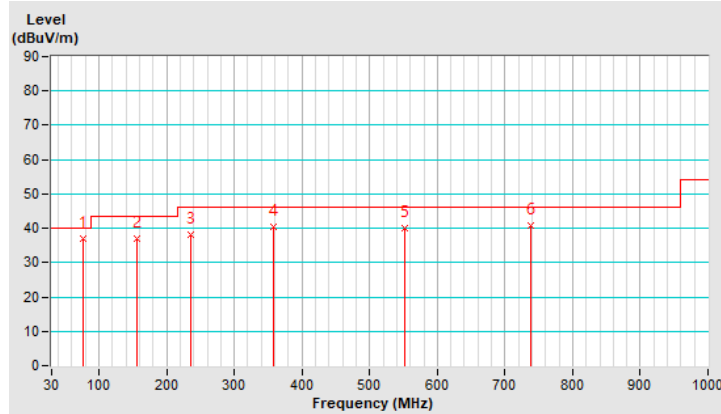
<b>CHANNEL</b>	TX Channel 106	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	77.18	36.9 QP	40.0	-3.1	2.50 H	82	48.7	-11.8
2	155.44	37.0 QP	43.5	-6.5	1.50 H	99	43.9	-6.9
3	235.50	38.0 QP	46.0	-8.0	1.50 H	49	46.4	-8.4
4	357.65	40.5 QP	46.0	-5.5	1.00 H	137	44.6	-4.1
5	551.88	39.9 QP	46.0	-6.1	1.50 H	73	39.3	0.6
6	737.16	40.8 QP	46.0	-5.2	1.00 H	106	35.9	4.9

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



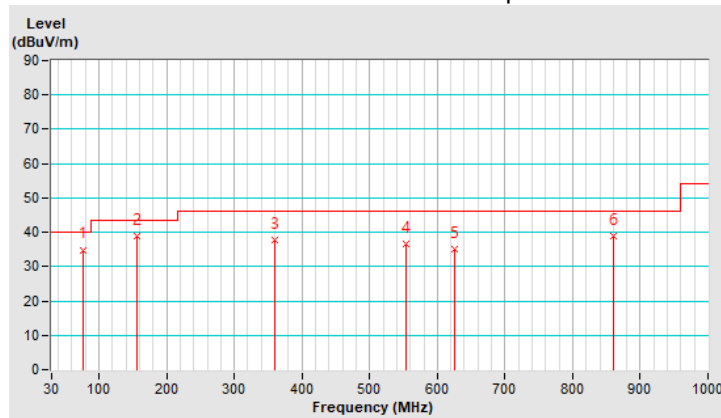
<b>CHANNEL</b>	TX Channel 106	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	77.46	34.9 QP	40.0	-5.1	1.50 V	360	46.7	-11.8
2	155.61	38.7 QP	43.5	-4.8	1.00 V	132	45.6	-6.9
3	360.14	37.6 QP	46.0	-8.4	1.00 V	300	41.5	-3.9
4	553.32	36.6 QP	46.0	-9.4	1.50 V	247	35.9	0.7
5	625.05	35.0 QP	46.0	-11.0	2.00 V	270	32.3	2.7
6	860.23	38.7 QP	46.0	-7.3	1.00 V	230	32.0	6.7

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

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

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

### 4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: May 20, 2020

#### 4.2.3 Test Procedure

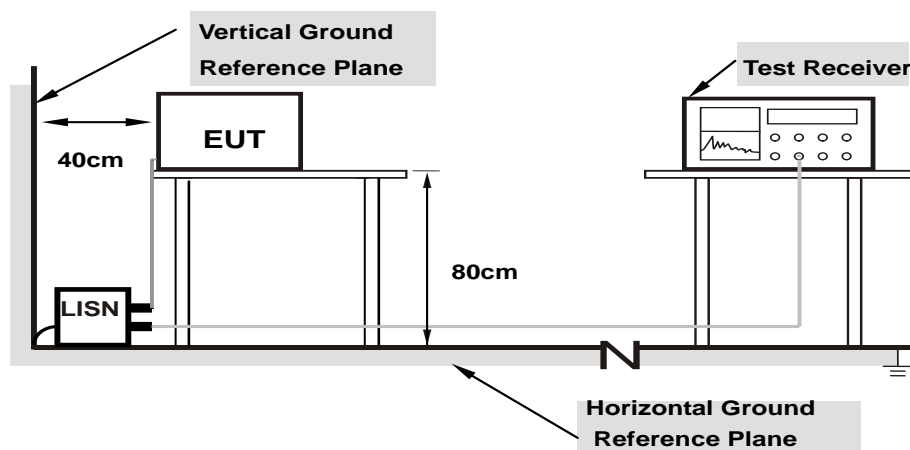
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Condition

Same as 4.1.6.

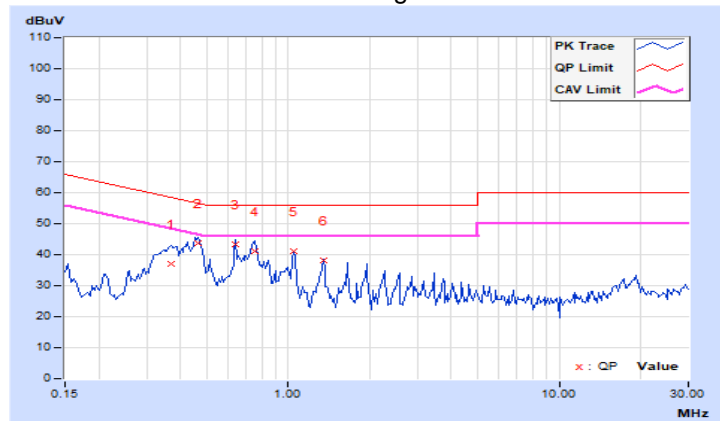
#### 4.2.7 Test Results

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

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.36875	9.98	27.09	17.36	37.07	27.34	58.53	48.53	-21.46	-21.19
2	0.46250	9.98	33.73	26.43	43.71	36.41	56.65	46.65	-12.94	-10.24
3	0.63828	10.00	33.34	30.88	43.34	40.88	56.00	46.00	-12.66	-5.12
4	0.75156	10.00	30.97	27.67	40.97	37.67	56.00	46.00	-15.03	-8.33
5	1.04688	10.02	31.24	27.94	41.26	37.96	56.00	46.00	-14.74	-8.04
6	1.34375	10.04	28.24	25.31	38.28	35.35	56.00	46.00	-17.72	-10.65

#### Remarks:

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

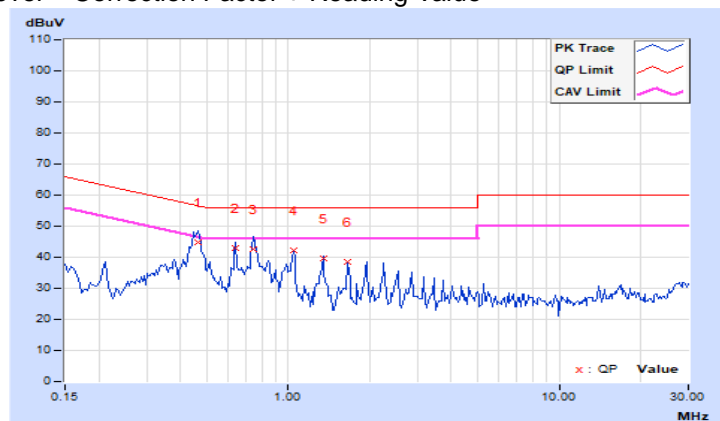


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.46250	9.98	34.97	28.17	44.95	38.15	56.65	46.65	-11.70
<b>2</b>	<b>0.63828</b>	<b>10.00</b>	<b>32.90</b>	<b>31.29</b>	<b>42.90</b>	<b>41.29</b>	<b>56.00</b>	<b>46.00</b>	<b>-13.10</b>	<b>-4.71</b>
3	0.74375	10.00	32.43	29.80	42.43	39.80	56.00	46.00	-13.57	-6.20
4	1.04297	10.02	32.11	29.24	42.13	39.26	56.00	46.00	-13.87	-6.74
5	1.34375	10.03	29.60	26.51	39.63	36.54	56.00	46.00	-16.37	-9.46
6	1.64844	10.05	28.64	25.66	38.69	35.71	56.00	46.00	-17.31	-10.29

**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  $N_{ANT} \geq 5$ .

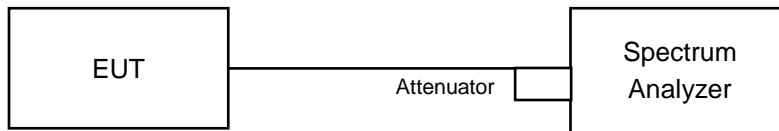
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.



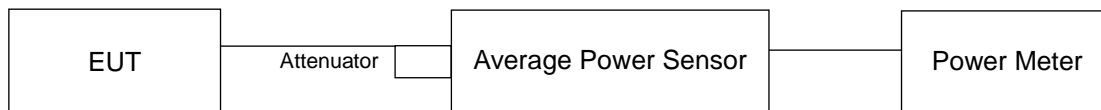
#### 4.3.2 Test Setup

##### FOR POWER OUTPUT MEASUREMENT

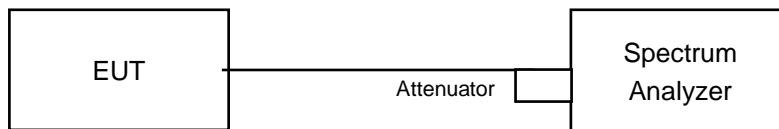
For channel straddling 5725MHz:



For other channels:



##### FOR 26dB OCCUPIED BANDWIDTH



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

##### For Average Power Measurement

##### For channel straddling 5725MHz:

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

###### Method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Number of points in sweep  $\geq 2$  Span / RBW.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle  $\geq 98$  percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

##### 802.11ac (VHT80), 802.11ac (VHT80+80)

###### Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Number of points in sweep  $\geq 2$  Span / RBW.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

##### For other channels:

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

##### FOR 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Condition

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

#### 4.3.7 Test Result

#### CDD Mode

#### 802.11a

#### Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	15.66	15.46	15.51	14.38	134.948	21.30	24.00	Pass
60	5300	15.72	15.45	15.26	14.13	131.856	21.20	24.00	Pass
64	5320	15.61	15.59	15.23	14.52	134.273	21.28	24.00	Pass
100	5500	15.31	14.80	14.61	15.73	130.481	21.16	24.00	Pass
116	5580	15.55	15.10	14.65	15.32	131.466	21.19	24.00	Pass
140	5700	15.69	15.44	15.22	13.75	129.043	21.11	24.00	Pass
*144 (UNII-2C Band)	5720	11.97	12.30	12.12	9.36	57.645	17.61	22.96	Pass
*144 (UNII-3 Band)	5720	5.82	5.76	6.05	2.97	13.595	11.33	30.00	Pass

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	71.24	18.53

Note: The total power was calculated through formula and record the value for reference only.

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.67	21.69	21.42	21.53
60	5300	21.72	21.65	21.56	21.56
64	5320	21.74	21.62	21.57	21.51
100	5500	21.70	21.67	21.44	21.44
116	5580	21.71	21.52	21.52	21.59
140	5700	21.75	21.75	21.52	21.44
144 (UNII-2C Band)	5720	15.94	15.92	15.78	15.73

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.42	24.3 > 24
60	5300	21.56	24.33 > 24
64	5320	21.51	24.32 > 24
100	5500	21.44	24.31 > 24
116	5580	21.52	24.32 > 24
140	5700	21.44	24.31 > 24
144 (UNII-2C Band)	5720	15.73	22.96 < 24

## 802.11ac (VHT20)

### Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	15.71	15.45	15.53	14.43	135.774	21.33	24.00	Pass
60	5300	15.71	15.32	15.46	14.17	132.558	21.22	24.00	Pass
64	5320	15.44	15.51	15.26	14.52	132.446	21.22	24.00	Pass
100	5500	15.41	14.75	14.43	15.64	128.985	21.11	24.00	Pass
116	5580	15.51	15.03	14.50	15.49	130.989	21.17	24.00	Pass
140	5700	15.45	15.43	15.17	13.75	126.588	21.02	24.00	Pass
*144 (UNII-2C Band)	5720	12.00	12.20	12.29	9.47	58.239	17.65	22.98	Pass
*144 (UNII-3 Band)	5720	6.17	6.26	6.40	3.75	15.103	11.79	30.00	Pass

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	73.342	18.65

Note: The total power was calculated through formula and record the value for reference only.

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.92	21.78	21.69	21.81
60	5300	22.05	21.74	21.69	21.62
64	5320	22.01	21.75	21.75	21.59
100	5500	21.98	21.49	21.72	21.67
116	5580	21.95	21.59	21.67	21.83
140	5700	21.97	21.63	21.72	21.68
144 (UNII-2C Band)	5720	15.97	15.81	15.85	15.86

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.69	24.36 > 24
60	5300	21.62	24.34 > 24
64	5320	21.59	24.34 > 24
100	5500	21.49	24.32 > 24
116	5580	21.59	24.34 > 24
140	5700	21.63	24.35 > 24
144 (UNII-2C Band)	5720	15.81	22.98 < 24

**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	Chain 2	Chain 3				
54	5270	18.28	17.84	18.33	16.50	240.857	23.82	24.00	Pass
62	5310	17.06	16.91	17.27	15.76	190.91	22.81	24.00	Pass
102	5510	17.13	18.52	16.85	18.00	234.276	23.70	24.00	Pass
110	5550	17.46	18.51	17.00	17.91	238.598	23.78	24.00	Pass
134	5670	17.76	18.10	17.56	17.09	240.857	23.82	24.00	Pass
*142 (UNII-2C Band)	5710	14.64	15.09	15.23	13.32	116.213	20.65	24.00	Pass
*142 (UNII-3 Band)	5710	4.18	4.43	4.42	2.98	10.144	10.06	30.00	Pass

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	126.357	21.02

Note: The total power was calculated through formula and record the value for reference only.

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	41.47	41.03	41.29	41.24
62	5310	41.60	41.37	41.33	41.30
102	5510	41.22	41.32	41.17	41.17
110	5550	41.54	41.26	41.38	41.08
134	5670	41.38	41.46	40.99	41.20
142 (UNII-2C Band)	5710	35.89	35.69	35.65	35.63

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.03	27.13 > 24
62	5310	41.30	27.15 > 24
102	5510	41.17	27.14 > 24
110	5550	41.08	27.13 > 24
134	5670	40.99	27.12 > 24
142 (UNII-2C Band)	5710	35.63	26.51 > 24



### 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	Chain 2	Chain 3				
58	5290	17.97	17.62	17.27	18.03	237.337	23.75	24.00	Pass
106	5530	17.56	17.96	17.81	18.02	243.315	23.86	24.00	Pass
122	5610	18.18	18.00	17.58	18.01	249.383	23.97	24.00	Pass
*138 (UNII-2C Band)	5690	15.35	15.37	15.23	13.91	133.296	21.25	24.00	Pass
*138 (UNII-3 Band)	5690	0.94	0.84	0.83	0.25	4.973	6.97	30.00	Pass

Note: \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	138.269	21.41

Note: The total power was calculated through formula and record the value for reference only.

### 26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	82.91	82.03	81.77	82.34
106	5530	82.47	82.64	82.60	82.12
122	5610	82.73	83.07	82.25	82.37
138 (UNII-2C Band)	5690	76.25	76.22	76.12	76.38

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.77	30.12 > 24
106	5530	82.12	30.14 > 24
122	5610	82.25	30.15 > 24
138 (UNII-2C Band)	5690	76.12	29.81 > 24

**802.11ac (VHT80+80)**

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42 +58	5210	18.90	18.56			149.404	21.74	30.00	Pass
	5290			18.30	18.22	133.982	21.27	24.00	Pass
106 + 122	5530	17.89	17.60			242.42	23.85	24.00	Pass
	5610			17.79	18.01				Pass

**26dB OCCUPIED BANDWIDTH**

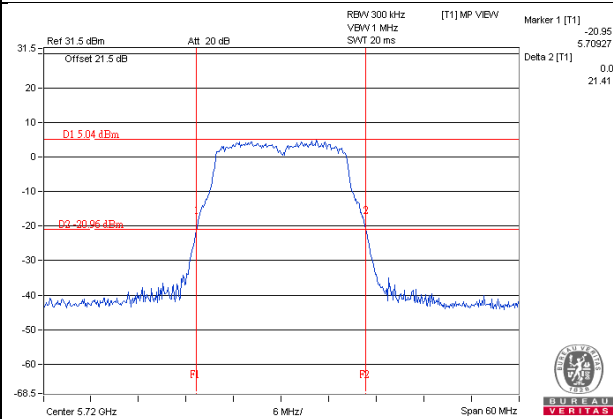
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42 +58	5210	81.82	81.33		
	5290			81.61	81.24
106 + 122	5530	82.33	81.37		
	5610			81.81	81.51

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

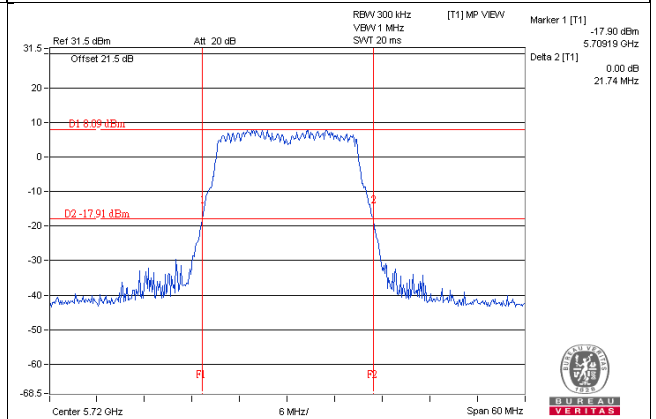
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
42 +58	5210	-	-
	5290	81.24	30.09 > 24
106 + 122	5530	81.37	30.1 > 24
	5610	81.51	30.11 > 24

**Spectrum Plot of Worst Value**

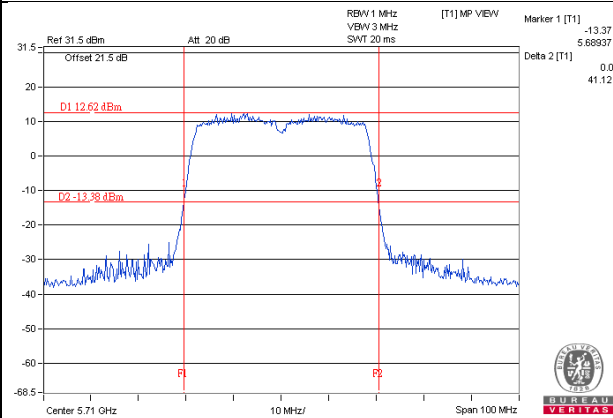
**802.11a\_Chain 3 / CH144 (UNII-2C Band)**



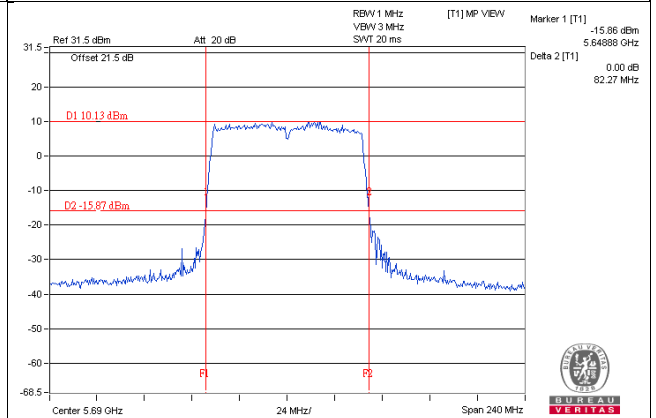
**802.11ac (VHT20)\_Chain 1 / CH144 (UNII-2C Band)**



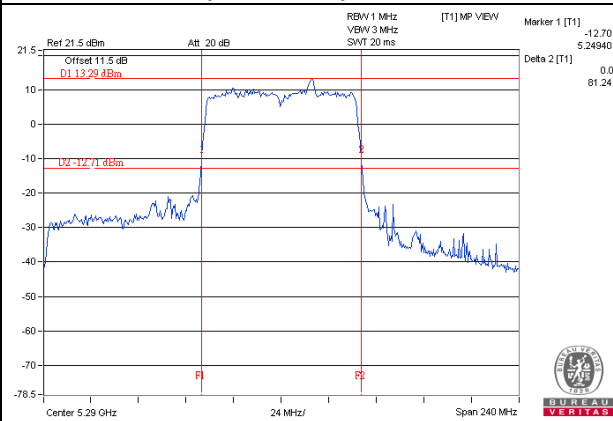
**802.11ac (VHT40)\_Chain 3 / CH142 (UNII-2C Band)**



**802.11ac (VHT80)\_Chain 2 / CH138 (UNII-2C Band)**



**802.11ac (VHT80+80)\_Chain 3 / CH58**



**NOTE:**

- For CH144 (UNII-2C Band) = 5725MHz - Marker 1
- For CH142 (UNII-2C Band) = 5725MHz - Marker 1
- For CH138 (UNII-2C Band) = 5725MHz - Marker 1

## Beamforming Mode

### 802.11ac (VHT20)

#### Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	15.51	15.39	15.41	14.47	132.901	21.24	21.35	Pass
60	5300	15.55	15.22	15.27	14.20	129.112	21.11	21.35	Pass
64	5320	15.37	15.47	15.11	14.59	130.88	21.17	21.35	Pass
100	5500	15.43	14.68	14.46	15.55	128.107	21.08	21.34	Pass
116	5580	15.59	15.10	14.58	15.58	133.432	21.25	21.34	Pass
140	5700	15.47	15.49	15.25	13.68	127.469	21.05	21.34	Pass
*144 (UNII-2C Band)	5720	12.00	12.20	12.29	9.47	58.239	17.65	20.32	Pass
*144 (UNII-3 Band)	5720	6.17	6.26	6.40	3.75	15.103	11.79	27.11	Pass

- Note:**
1. For UNII-2A: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.65\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.65 - 6) = 21.35\text{dBm}$ .
  2. For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.66\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.66 - 6) = 21.34\text{dBm}$ .
- \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	73.342	18.65

Note: The total power was calculated through formula and record the value for reference only.

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.92	21.78	21.69	21.81
60	5300	22.05	21.74	21.69	21.62
64	5320	22.01	21.75	21.75	21.59
100	5500	21.98	21.49	21.72	21.67
116	5580	21.95	21.59	21.67	21.83
140	5700	21.97	21.63	21.72	21.68
144 (UNII-2C Band)	5720	15.97	15.81	15.85	15.86

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.69	24.36 > 24
60	5300	21.62	24.34 > 24
64	5320	21.59	24.34 > 24
100	5500	21.49	24.32 > 24
116	5580	21.59	24.34 > 24
140	5700	21.63	24.35 > 24
144 (UNII-2C Band)	5720	15.81	22.98 < 24

**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	Chain 2	Chain 3				
54	5270	15.66	15.40	15.65	13.95	133.046	21.24	21.35	Pass
62	5310	15.57	15.40	15.66	14.33	134.647	21.29	21.35	Pass
102	5510	14.75	16.53	14.66	14.95	135.335	21.31	21.34	Pass
110	5550	14.69	16.47	14.57	15.02	134.216	21.28	21.34	Pass
134	5670	15.44	15.77	15.08	13.99	130.024	21.14	21.34	Pass
*142 (UNII-2C Band)	5710	12.59	12.97	12.96	10.98	70.271	18.47	21.34	Pass
*142 (UNII-3 Band)	5710	1.91	2.32	2.23	0.59	6.075	7.84	27.11	Pass

- Note:**
1. For UNII-2A: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.65\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.65 - 6) = 21.35\text{dBm}$ .
  2. For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.66\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.66 - 6) = 21.34\text{dBm}$ .

\* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	76.346	18.83

Note: The total power was calculated through formula and record the value for reference only.

**26dB BANDWIDTH:**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	41.47	41.03	41.29	41.24
62	5310	41.60	41.37	41.33	41.30
102	5510	41.22	41.32	41.17	41.17
110	5550	41.54	41.26	41.38	41.08
134	5670	41.38	41.46	40.99	41.20
142 (UNII-2C Band)	5710	35.89	35.69	35.65	35.63

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.03	27.13 > 24
62	5310	41.30	27.15 > 24
102	5510	41.17	27.14 > 24
110	5550	41.08	27.13 > 24
134	5670	40.99	27.12 > 24
142 (UNII-2C Band)	5710	35.63	26.51 < 24

**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	Chain 2	Chain 3				
58	5290	15.47	15.24	14.88	15.43	134.332	21.28	21.35	Pass
106	5530	14.97	15.33	15.20	15.41	133.391	21.25	21.34	Pass
122	5610	15.59	16.02	14.73	14.47	133.925	21.27	21.34	Pass
*138 (UNII-2C Band)	5690	13.02	13.28	12.74	11.44	77.931	18.92	21.34	Pass
*138 (UNII-3 Band)	5690	-1.34	-1.32	-1.63	-2.31	2.8909	4.61	27.11	Pass

- Note:**
1. For UNII-2A: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.65\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.65 - 6) = 21.35\text{dBm}$ .
  2. For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.66\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $24 - (8.66 - 6) = 21.34\text{dBm}$ .
- \* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	80.8219	19.08

Note: The total power was calculated through formula and record the value for reference only.



### 26dB OCCUPIED BANDWIDTH

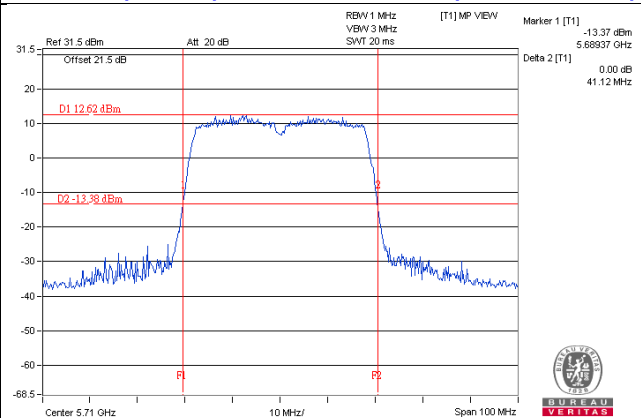
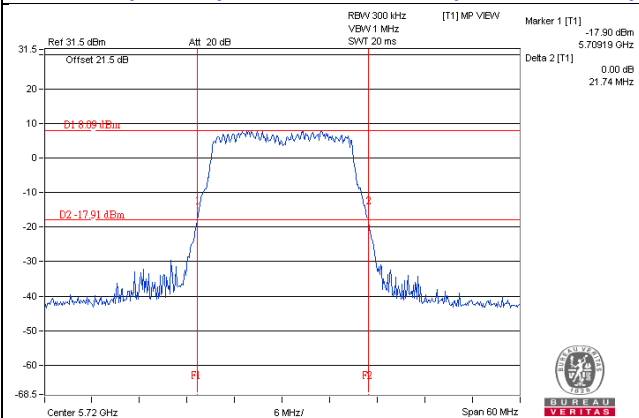
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	82.91	82.03	81.77	82.34
106	5530	82.47	82.64	82.60	82.12
122	5610	82.73	83.07	82.25	82.37
138 (UNII-2C Band)	5690	76.25	76.22	76.12	76.38

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

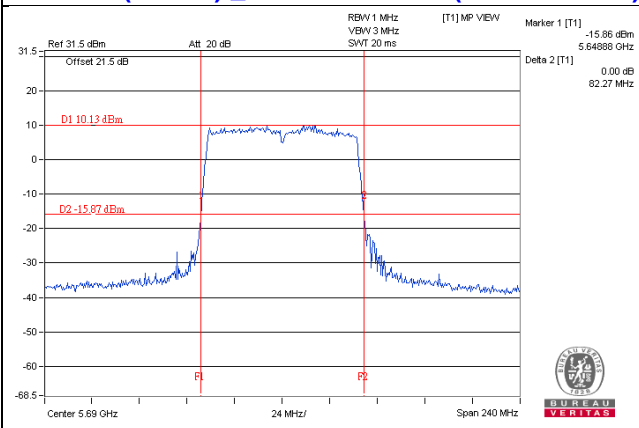
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.77	30.12 > 24
106	5530	82.12	30.14 > 24
122	5610	82.25	30.15 > 24
138 (UNII-2C Band)	5690	76.12	29.81 > 24

Spectrum Plot of Worst Value

**802.11ac (VHT20)\_Chain 1 / CH144 (UNII-2C Band)** **802.11ac (VHT40)\_Chain 3 / CH142 (UNII-2C Band)**

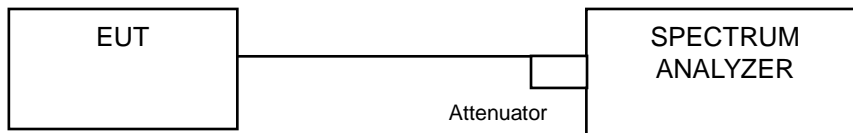


**802.11ac (VHT80)\_Chain 2 / CH138 (UNII-2C Band)**



## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup



### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 Test Procedure

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

## 4.4.4 Test Results

## 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
52	5260	16.92	16.92	16.92	16.92
60	5300	16.92	16.92	16.92	16.68
64	5320	16.92	16.92	16.92	16.92
100	5500	17.04	16.92	16.92	16.80
116	5580	16.92	16.92	16.92	16.68
140	5700	16.92	16.92	16.92	16.80
144 (UNII-2C Band)	5720	13.52	13.52	13.52	13.52
144 (UNII-3 Band)	5720	3.40	3.40	3.40	3.40

## 802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
52	5260	18.12	17.88	18.00	18.00
60	5300	18.00	18.00	18.00	18.00
64	5320	18.12	17.88	17.88	17.88
100	5500	18.00	17.88	18.00	18.12
116	5580	18.12	18.00	17.88	18.12
140	5700	18.00	17.88	17.88	17.88
144 (UNII-2C Band)	5720	14.12	14.12	14.12	14.12
144 (UNII-3 Band)	5720	3.88	3.88	3.88	3.88

## 802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
54	5270	36.72	36.72	36.48	36.72
62	5310	36.72	36.72	36.72	36.72
102	5510	36.72	36.72	36.72	36.48
110	5550	36.72	36.72	36.72	36.72
134	5670	36.72	36.48	36.72	36.48
142 (UNII-2C Band)	5720	33.40	33.60	33.40	33.40
142 (UNII-3 Band)	5720	3.20	3.20	3.20	3.20

**802.11ac (VHT80)**

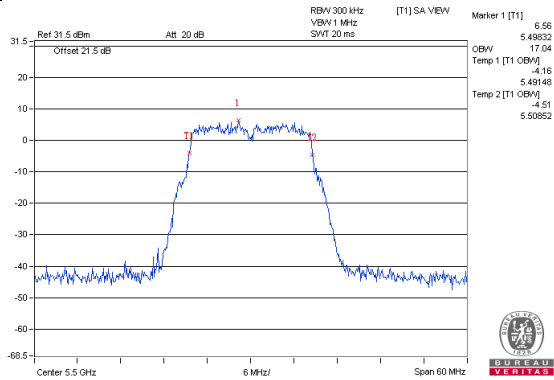
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
58	5290	76.32	76.32	76.32	76.32
106	5530	76.32	76.32	76.32	75.36
122	5610	75.84	76.32	75.84	76.32
138 (UNII-2C Band)	5690	73.40	73.40	72.92	72.92
138 (UNII-3 Band)	5690	2.92	2.92	2.44	2.92

**802.11ac (VHT80+80)**

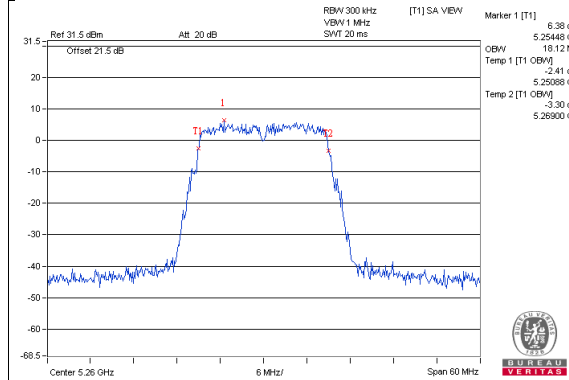
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
42+58	5210	75.84	75.84	-	-
	5290	-	-	75.84	76.32
106+122	5530	75.36	75.84	-	-
	5610	-	-	76.32	75.36

### Spectrum Plot of Worst Value

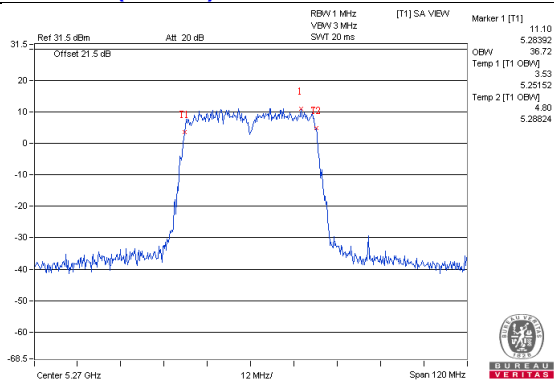
**802.11a\_Chain0 / CH100**



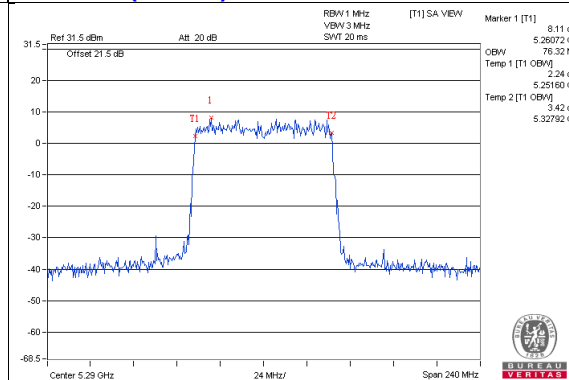
**802.11ac (VHT20)\_Chain0 / CH52**



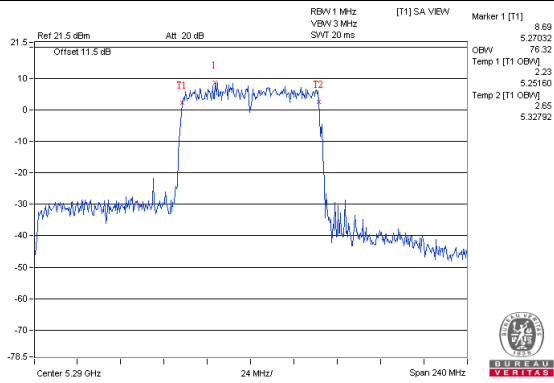
**802.11ac (VHT40)\_Chain0 / CH54**



**802.11ac (VHT80)\_Chain3/ CH58**



**802.11ac (VHT80+80)\_Chain3 / CH58**



## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		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

##### **For channel straddling 5725MHz:**

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 (VHT20), 802.11ac (VHT40)**

Using method SA-1

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

##### **802.11ac (VHT80), 802.11ac (VHT80+80)**

Using method SA-2

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

#### 4.5.5 Deviation from Test Standard

No deviation.

#### 4.5.6 EUT Operating Condition

Same as Item 4.3.6.



#### 4.5.7 Test Results

##### 802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
52	5260	2.46	2.25	2.03	0.79	7.95	8.35	Pass
60	5300	2.37	1.76	2.11	0.78	7.82	8.35	Pass
64	5320	2.02	1.95	2.01	0.99	7.78	8.35	Pass
100	5500	1.51	1.15	1.24	2.13	7.55	8.34	Pass
116	5580	2.12	1.83	0.96	2.21	7.83	8.34	Pass
140	5700	2.26	1.95	1.50	-0.17	7.50	8.34	Pass
144 (UNII-2C Band)	5720	1.61	2.65	2.05	-0.63	7.60	8.34	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. For UNII-2A : Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4]$  = 8.65dBi > 6dBi, so the power density limit shall be reduced to 11-(8.65-6) = 8.35dBm.
3. For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4]$  = 8.66dBi > 6dBi, so the power density limit shall be reduced to 11-(8.66-6) = 8.34dBm.

##### 802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
52	5260	2.22	1.11	1.47	1.03	7.50	8.35	Pass
60	5300	2.22	1.54	1.59	0.72	7.57	8.35	Pass
64	5320	1.69	1.84	1.48	0.93	7.52	8.35	Pass
100	5500	1.47	0.77	0.35	1.54	7.08	8.34	Pass
116	5580	1.64	1.37	1.12	1.63	7.47	8.34	Pass
140	5700	1.47	1.19	1.12	-0.36	6.93	8.34	Pass
144 (UNII-2C Band)	5720	1.88	2.15	1.94	-0.82	7.46	8.34	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. For UNII-2A : Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4]$  = 8.65dBi > 6dBi, so the power density limit shall be reduced to 11-(8.65-6) = 8.35dBm.
3. For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4]$  = 8.66dBi > 6dBi, so the power density limit shall be reduced to 11-(8.66-6) = 8.34dBm.

### 802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
54	5270	0.99	0.95	1.76	-0.25	6.94	8.35	Pass
62	5310	0.13	0.32	0.71	-1.41	6.03	8.35	Pass
102	5510	0.04	1.93	0.46	1.20	6.99	8.34	Pass
110	5550	0.19	1.86	-0.11	0.94	6.81	8.34	Pass
134	5670	0.75	0.80	0.74	0.57	6.74	8.34	Pass
142 (UNII-2C Band)	5710	1.21	1.42	1.48	-0.20	7.05	8.34	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.
  - For UNII-2A : Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.65\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11-(8.65-6) = 8.35\text{dBm}$ .
  - For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.66\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11-(8.66-6) = 8.34\text{dBm}$ .

### 802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	-2.24	-2.28	-2.80	-2.31	0.22	3.84	8.35	Pass
106	5530	-2.60	-1.85	-2.32	-1.55	0.22	4.18	8.34	Pass
122	5610	-1.69	-1.46	-2.38	-1.76	0.22	4.43	8.34	Pass
138 (UNII-2C Band)	5690	-1.49	-1.75	-1.86	-3.00	0.22	4.25	8.34	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.
  - For UNII-2A : Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.65\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11-(8.65-6) = 8.35\text{dBm}$ .
  - For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.66\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11-(8.66-6) = 8.34\text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

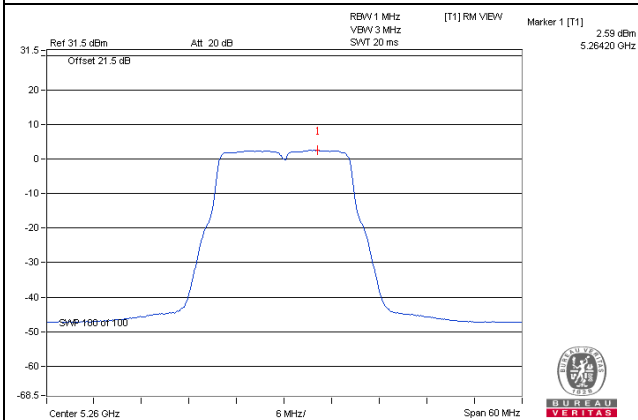
### 802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42+58	5210	-0.98	-0.85	-	-	0.51	2.60	17.00	Pass
	5290	-	-	-1.88	-1.65	0.51	1.75	11.00	Pass
106+122	5530	-2.18	-2.39	-	-	0.51	4.34	8.37	Pass
	5610	-	-	-2.31	-1.88	0.51			Pass

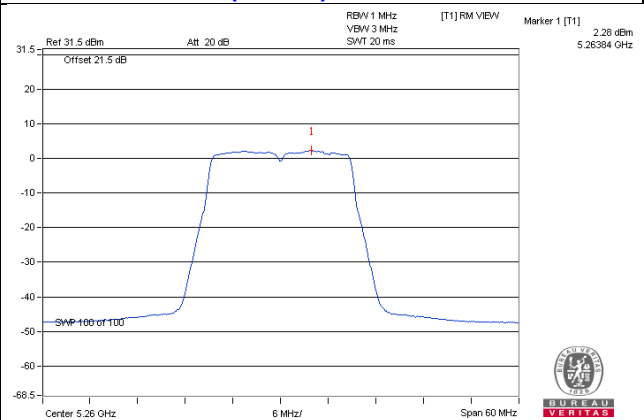
- Note:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
  - For UNII-2A: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.81\text{dBi} < 6\text{dBi}$ , so the power density limit shall not be reduced.
  - For UNII-2C: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 8.63\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (8.63 - 6) = 8.37\text{dBm}$ .
  - Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

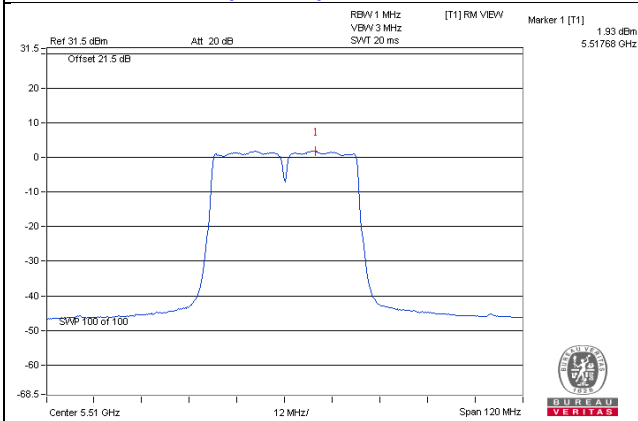
**802.11a\_Chain 0 / CH52**



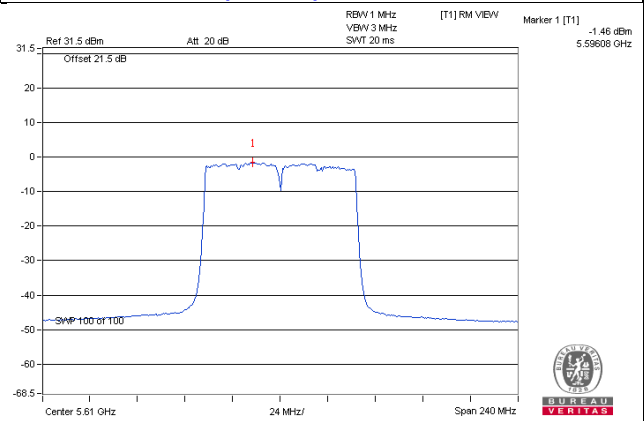
**802.11ac (VHT20)\_Chain 0 / CH52**



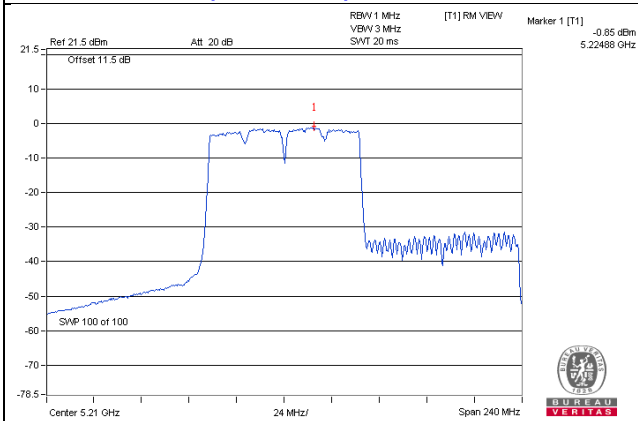
**802.11ac (VHT40)\_Chain 1 / CH102**



**802.11ac (VHT80)\_Chain 1 / CH122**



**802.11ac (VHT80+80)\_Chain 1 / CH42**

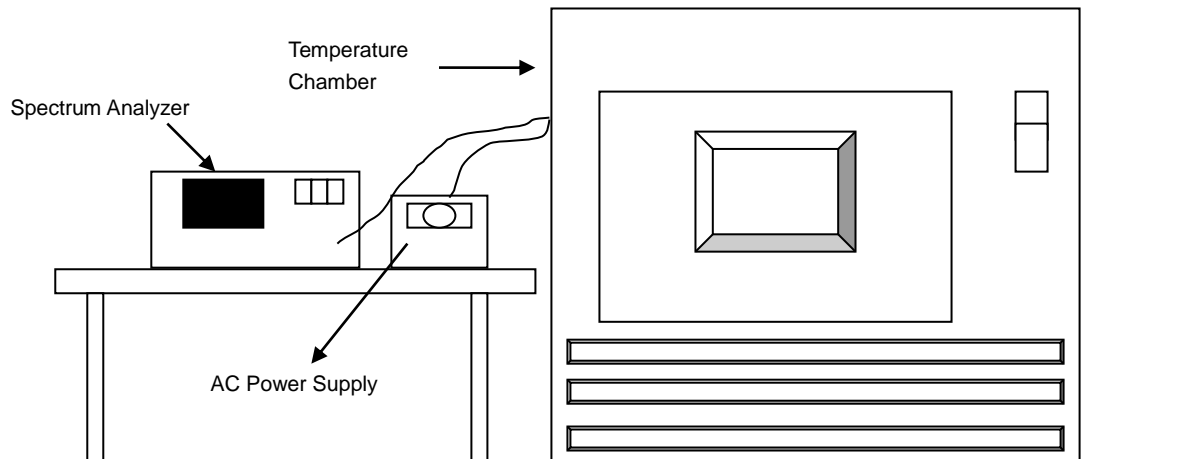


## 4.6 Frequency Stability Measurement

### 4.6.1 Limits of Frequency Stability Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

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

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

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

## 4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 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	5259.9784	PASS	5259.9776	PASS	5259.9792	PASS	5259.9805	PASS
40	120	5260.001	PASS	5259.9968	PASS	5260.0004	PASS	5260.0006	PASS
30	120	5260.0107	PASS	5260.013	PASS	5260.0127	PASS	5260.0102	PASS
20	120	5259.9795	PASS	5259.9799	PASS	5259.9809	PASS	5259.9783	PASS
10	120	5259.9759	PASS	5259.9757	PASS	5259.9783	PASS	5259.9783	PASS
0	120	5259.975	PASS	5259.9743	PASS	5259.9749	PASS	5259.9777	PASS
-10	120	5260.0217	PASS	5260.0197	PASS	5260.0187	PASS	5260.0225	PASS
-20	120	5260.0081	PASS	5260.011	PASS	5260.0081	PASS	5260.0068	PASS
-30	120	5259.9898	PASS	5259.991	PASS	5259.9893	PASS	5259.9922	PASS

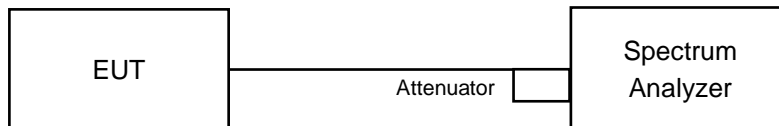
Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5259.9792	PASS	5259.9793	PASS	5259.9814	PASS	5259.9782	PASS
	120	5259.9795	PASS	5259.9799	PASS	5259.9809	PASS	5259.9783	PASS
	102	5259.9791	PASS	5259.979	PASS	5259.9804	PASS	5259.9775	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

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

### 4.7.5 Deviation from Test Standard

No deviation.

### 4.7.6 EUT Operating Condition

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

#### 4.7.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (UNII-3 Band)	5720	3.19	3.20	3.19	3.19	0.5	Pass

##### 802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (UNII-3 Band)	5720	3.82	3.82	3.83	3.82	0.5	Pass

##### 802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
142 (UNII-3 Band)	5710	3.25	3.24	3.24	3.24	0.5	Pass

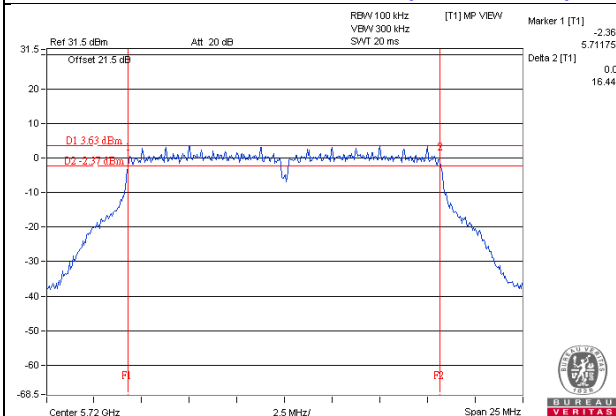
##### 802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
138 (UNII-3 Band)	5690	3.23	3.25	3.25	3.24	0.5	Pass

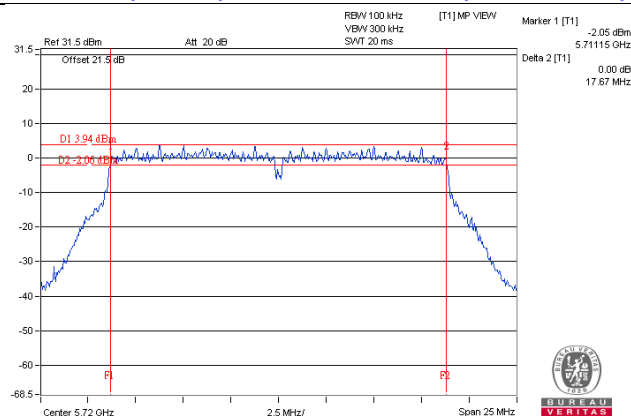


Spectrum Plot of Worst Value

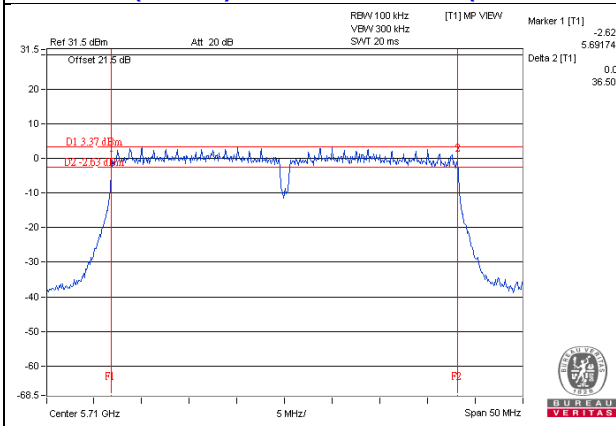
802.11a / Chain 2 - CH144 (UNII-3 Band)



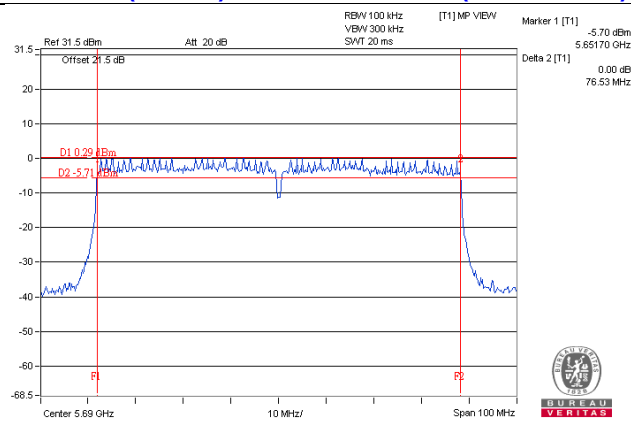
802.11ac (VHT20) / Chain 1 - CH144 (UNII-3 Band)



802.11ac (VHT40) / Chain 2 - CH142 (UNII-3 Band)



802.11ac (VHT80) / Chain 0 - CH138 (UNII-3 Band)



Note: The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

## 5 Pictures of Test Arrangements

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

## Appendix – Information of the Testing Laboratories

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

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

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

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

Tel: 886-3-6668565

Fax: 886-3-6668323

**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.

--- END ---