

## FCC Test Report (WLAN)

**Report No.:** RF170513E01E-1

**FCC ID:** R68XPICO200

**Test Model:** xPico 270

**Series Model:** xPico 250, xPico 240

**Received Date:** Apr. 15, 2019

**Test Date:** Apr. 30 to May 03, 2019

**Issued Date:** June 14, 2019

**Applicant:** Lantronix, Inc.

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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**FCC Registration /  
Designation Number:** 723255 / TW2022



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### Release Control Record

Issue No.	Description	Date Issued
RF170513E01E-1	Original release.	June 14, 2019

## 1 Certificate of Conformity

**Product:** xPico<sup>®</sup> 200 Series Wi-Fi<sup>®</sup> IoT Gateway

**Brand:** Lantronix

**Test Model:** xPico 270

**Series Model:** xPico 250, xPico 240

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Lantronix, Inc.

**Test Date:** Apr. 30 to May 03, 2019

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

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

**Prepared by :** Wendy Wu , **Date:** June 14, 2019  
Wendy Wu / Specialist

**Approved by :** May Chen , **Date:** June 14, 2019  
May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.19dB at 0.38438MHz.
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 5460.00MHz, 5350.00MHz.
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)
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) and R-SMA not a standard connector.

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

1. This report is prepared for FCC Class II permissive change.
2. 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

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

Product	xPico® 200 Series Wi-Fi® IoT Gateway
Brand	Lantronix
Test Model	xPico 270
Series Model	xPico 250, xPico 240
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	<b>2.4GHz:</b> 2.412 ~ 2.462GHz <b>5GHz:</b> 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.70GHz, 5.745 ~ 5.825GHz
Number of Channel	<b>2.4GHz:</b> 802.11b, 802.11g, 802.11n (HT20): 11 <b>5GHz:</b> 802.11a, 802.11n (HT20), 802.11ac (VHT20): 24 802.11n (HT40), 802.11ac (VHT40): 11 802.11ac (VHT80): 5
Output Power	<b>2.4GHz:</b> 291.743mW <b>5GHz:</b> <b>5.18 ~ 5.24GHz:</b> 17.14mW <b>5.26 ~ 5.32GHz:</b> 17.742mW <b>5.50 ~ 5.70GHz:</b> 18.836mW <b>5.745 ~ 5.825GHz:</b> 32.961mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II permissive change. The difference compared with the Report No.: RF170513E01-1 design is as the following information:

- ◆ Add new model.

Original				
Product	Brand	Model	Difference	Antenna
xPico® 200 Series Wi-Fi® IoT Gateway module	Lantronix	xPico 250	SKU A: SIP with two UFL connectors Wi-Fi Chip and Bluetooth chip	Dipole Antenna (long) Dipole Antenna (short) PCB Antenna
		xPico 240	SKU B: same as SKU A, no BT function.	Dipole Antenna (long) Dipole Antenna (short) PCB Antenna
			SKU C: same SKU B except the two UFLs are replaced by a single on-module stamped metal antenna. Circuit board is the same. BOM population option for UFL or on-module antenna circuit is the difference.	On-board Antenna
Newly				
Product	Brand	Model	Difference	Antenna
xPico® 200 Series Wi-Fi® IoT Gateway module	Lantronix	xPico 270	SIP with two UFL connectors Wi-Fi Chip and Bluetooth chip uses a TCXO in place of the crystal that runs the Wi-Fi radio and add ac mode	Dipole Antenna (long) Dipole Antenna (short) PCB Antenna

From the above models, model: **xPico 270** was selected as representative model for the test and its data was recorded in this report.

2. According to above conditions, for 802.11ac (VHT80) mode all test items of new model need to be performed except frequency stability. And all data was verified to meet the requirements.
3. There are WLAN, BT technology used for the EUT.
4. Simultaneously transmission condition.

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

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



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

Ant Set.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type	*Cable Length	*Cable Loss(dB)	excluding cable loss Antenna Gain(dBi)
1	Taoglas	GW.71.5153	2.8	2.4~2.4835	Dipole	R-SMA	45mm	1	3.8
			3.8	5.15~5.85				1.7	5.5
	Taoglas	GW.71.5153	2.8	2.4~2.4835			45mm	1	3.8
			3.8	5.15~5.85				1.7	5.5
2	NA	WSS002	1	2.4~2.4835	Dipole	R-SMA	45mm	1	2
			0.3	5.15~5.85				1.7	2
	NA	WSS002	1	2.4~2.5			45mm	1	2
			0.3	5.15~5.25				1.7	2
3	ethertronics	1000668	2.5	2.4~2.4835	PCB	i-pex(MHF)	50mm	NA	NA
			5	5.15~5.85					
	ethertronics	1000668	2.5	2.4~2.4835					
			5	5.15~5.85					
4	ProAnt	PRO-OB-536	0.02	2.4~2.4835	Metal	NA	NA	NA	NA
			3.31	5.15~5.85					

Note:

1. Ant Set 4 only for model: xPico 240.

2. From the above antennas, Ant Set 1, 3 were selected as representative antenna for the test.

6. The EUT incorporates a SISO function.

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX Diversity	1RX
802.11g	1TX Diversity	1RX
802.11n (HT20)	1TX Diversity	1RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	1TX Diversity	1RX
802.11n (HT20)	1TX Diversity	1RX
802.11n (HT40)	1TX Diversity	1RX
802.11ac (VHT20)	1TX Diversity	1RX
802.11ac (VHT40)	1TX Diversity	1RX
802.11ac (VHT80)	1TX Diversity	1RX

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

### 3.2 Description of Test Modes

#### FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

#### FOR 5260 ~ 5320MHz

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

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

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

### FOR 5500 ~ 5700MHz

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

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

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

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

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610 MHz

### FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
1	√	√	-	-	With Antenna Set 1 (Dipole)
2	√	√	√	√	With Antenna Set 3 (PCB)

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

**Note:** 1. In original report, the EUT's antenna (PCB) had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

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

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5180-5240	42	42	OFDM	BPSK	29.3
802.11ac (VHT80)	5260-5320	58	58	OFDM	BPSK	29.3
802.11ac (VHT80)	5500-5720	106 to 122	106, 122	OFDM	BPSK	29.3
802.11ac (VHT80)	5745-5825	155	155	OFDM	BPSK	29.3

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

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5180-5240	42	155	OFDM	BPSK	29.3
	5260-5320	58				
	5500-5700	106 to 122				
	5745-5825	155				

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

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5180-5240	42	155	OFDM	BPSK	29.3
	5260-5320	58				
	5500-5700	106 to 122				
	5745-5825	155				

### Antenna Port Conducted Measurement:

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT80)	5180-5240	42	42	OFDM	BPSK	29.3
802.11ac (VHT80)	5260-5320	58	58	OFDM	BPSK	29.3
802.11ac (VHT80)	5500-5720	106 to 122	106, 122	OFDM	BPSK	29.3
802.11ac (VHT80)	5745-5825	155	155	OFDM	BPSK	29.3

### Test Condition:

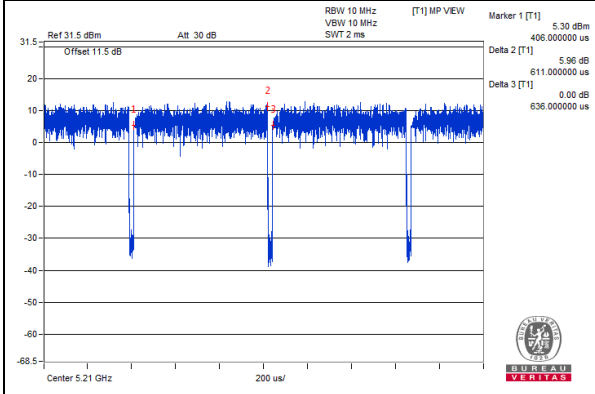
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	22deg. C, 65%RH	120Vac, 60Hz	Robert Cheng
RE<1G	26deg. C, 71%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

### 3.3 Duty Cycle of Test Signal

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

Duty cycle = 0.611 ms/0.636 ms = 0.961, Duty factor = 10 \* log( 1/0.961) = 0.17

#### 802.11ac (VHT80)



### 3.4 Description of Support Units

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

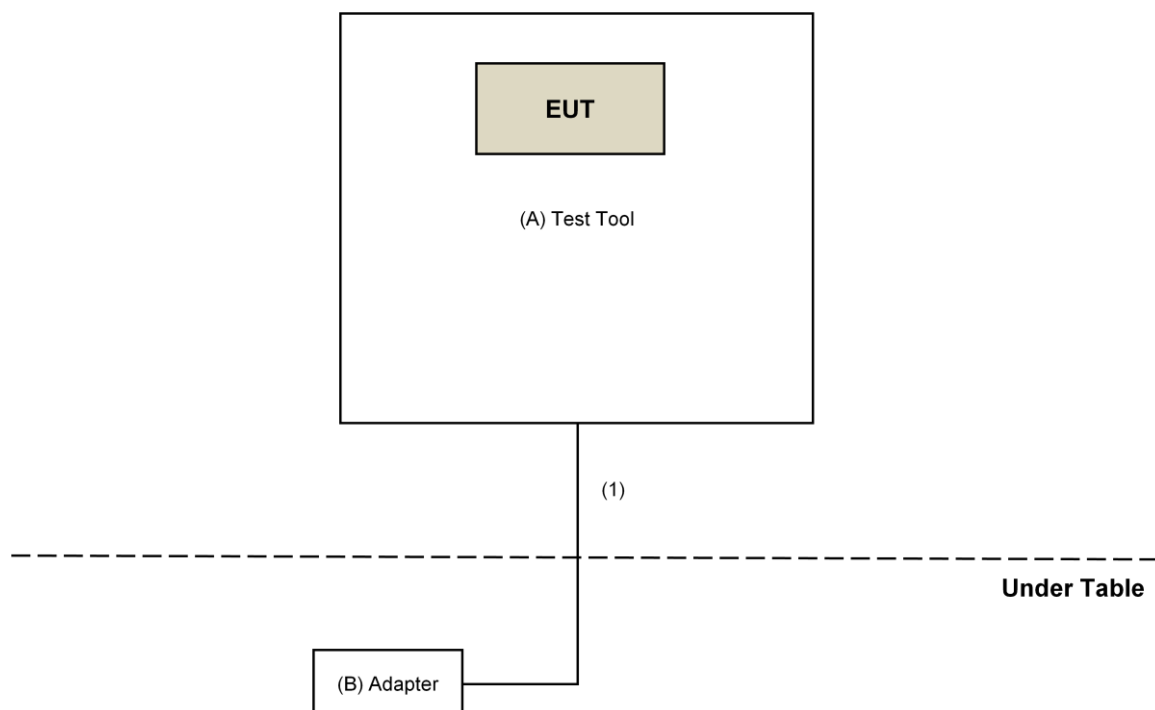
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Test Tool	Lantronix	NA	NA	NA	Supplied by client
B.	Adapter	TOP	W050010GPX1 L1	NA	NA	Supplied by client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	0	Supplied by client

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standard

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

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

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



## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

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

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

#### NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 15.407(b)(4)(i)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:10 (dBm/MHz) <sup>*2</sup> PK:15.6 (dBm/MHz) <sup>*3</sup> PK:27 (dBm/MHz) <sup>*4</sup>	PK: 68.2(dBµV/m) <sup>*1</sup> PK:105.2 (dBµV/m) <sup>*2</sup> PK: 110.8(dBµV/m) <sup>*3</sup> PK:122.2 (dBµV/m) <sup>*4</sup>
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
<sup>*1</sup> beyond 75 MHz or more above of the band edge.		<sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
<sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		<sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

#### Note:

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

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

## 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 07, 2018	May 06, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019

**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. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Apr. 30 to May 03, 2019

#### 4.1.3 Test Procedure

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

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

##### **NOTE:**

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

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

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

##### **Note:**

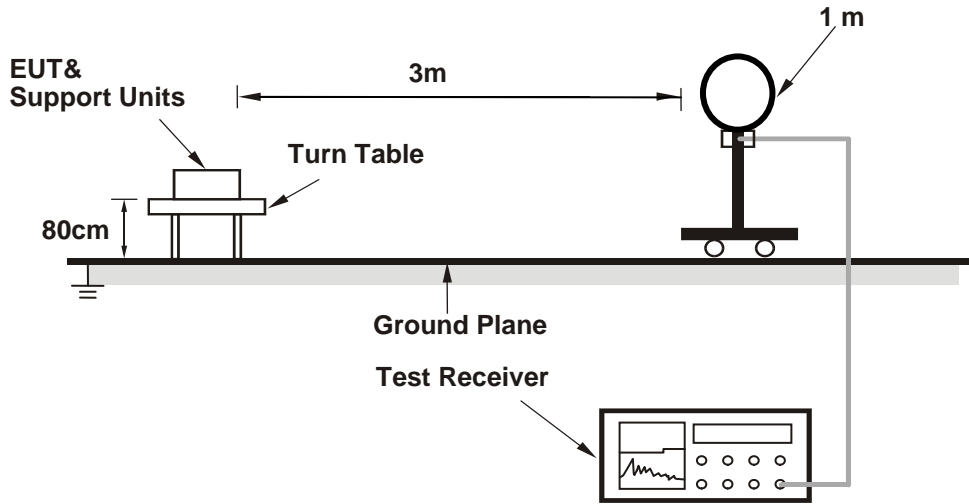
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

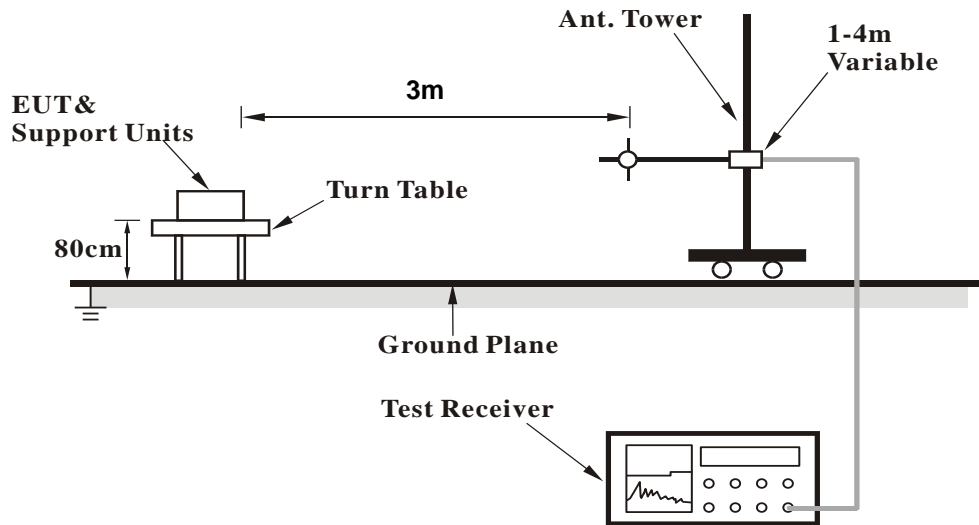
No deviation.

#### 4.1.5 Test Setup

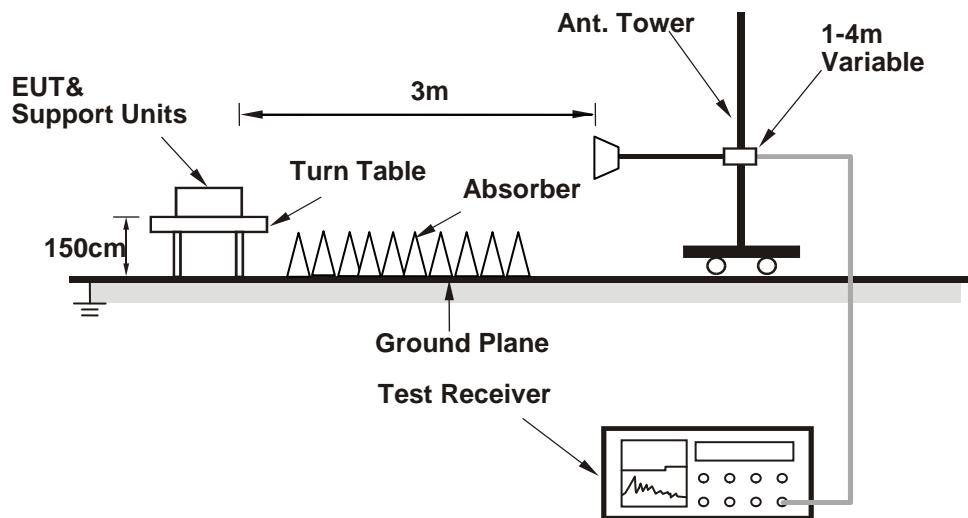
##### For Radiated emission below 30MHz



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



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Condition

- a. Placed the EUT on the testing table.
- b. Controlling software (Tera team paste xPico 250\_BT+WiFi SOP.doc command.) has been activated to set EUT under transmission condition continuously.

#### 4.1.7 Test Results (Mode 1)

##### Above 1GHz Data:

##### 802.11ac (VHT80)

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.2 PK	74.0	-18.8	1.12 H	75	52.5	2.7
2	5150.00	44.1 AV	54.0	-9.9	1.12 H	75	41.4	2.7
3	*5210.00	87.9 PK			1.12 H	75	85.3	2.6
4	*5210.00	77.5 AV			1.12 H	75	74.9	2.6
5	5350.00	52.1 PK	74.0	-21.9	1.12 H	75	49.5	2.6
6	5350.00	38.9 AV	54.0	-15.1	1.12 H	75	36.3	2.6
7	#10420.00	41.6 PK	68.2	-26.6	1.66 H	145	28.6	13.0
8	15630.00	46.5 PK	74.0	-27.5	1.32 H	177	33.9	12.6
9	15630.00	33.5 AV	54.0	-20.5	1.32 H	177	20.9	12.6

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.0 PK	74.0	-9.0	2.16 V	88	62.3	2.7
2	5150.00	53.8 AV	54.0	-0.2	2.16 V	88	51.1	2.7
3	*5210.00	96.8 PK			2.16 V	88	94.2	2.6
4	*5210.00	88.1 AV			2.16 V	88	85.5	2.6
5	5350.00	52.4 PK	74.0	-21.6	2.16 V	88	49.8	2.6
6	5350.00	39.4 AV	54.0	-14.6	2.16 V	88	36.8	2.6
7	#10420.00	41.7 PK	68.2	-26.5	1.44 V	321	28.7	13.0
8	15630.00	46.4 PK	74.0	-27.6	3.11 V	88	33.8	12.6
9	15630.00	33.8 AV	54.0	-20.2	3.11 V	88	21.2	12.6

#### 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 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	52.1 PK	74.0	-21.9	1.20 H	65	49.4	2.7
2	5150.00	39.4 AV	54.0	-14.6	1.20 H	65	36.7	2.7
3	*5290.00	88.2 PK			1.20 H	65	85.8	2.4
4	*5290.00	77.9 AV			1.20 H	65	75.5	2.4
5	5350.00	56.7 PK	74.0	-17.3	1.20 H	65	54.1	2.6
6	5350.00	44.5 AV	54.0	-9.5	1.20 H	65	41.9	2.6
7	#10580.00	41.5 PK	68.2	-26.7	1.71 H	145	28.7	12.8
8	15870.00	46.6 PK	74.0	-27.4	1.34 H	188	34.5	12.1
9	15870.00	33.8 AV	54.0	-20.2	1.34 H	188	21.7	12.1

**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	5150.00	52.4 PK	74.0	-21.6	2.19 V	97	49.7	2.7
2	5150.00	39.9 AV	54.0	-14.1	2.19 V	97	37.2	2.7
3	*5290.00	98.0 PK			2.19 V	97	95.6	2.4
4	*5290.00	87.8 AV			2.19 V	97	85.4	2.4
5	5350.00	68.0 PK	74.0	-6.0	2.19 V	97	65.4	2.6
<b>6</b>	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>2.19 V</b>	<b>97</b>	<b>51.3</b>	<b>2.6</b>
7	#10580.00	41.7 PK	68.2	-26.5	1.43 V	324	28.9	12.8
8	15870.00	46.9 PK	74.0	-27.1	3.15 V	88	34.8	12.1
9	15870.00	34.2 AV	54.0	-19.8	3.15 V	88	22.1	12.1

**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 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	57.7 PK	74.0	-16.3	1.10 H	75	54.8	2.9
2	5460.00	44.6 AV	54.0	-9.4	1.10 H	75	41.7	2.9
3	#5470.00	58.5 PK	68.2	-9.7	1.10 H	75	55.6	2.9
4	*5530.00	88.0 PK			1.10 H	75	85.1	2.9
5	*5530.00	77.6 AV			1.10 H	75	74.7	2.9
6	11060.00	42.0 PK	74.0	-32.0	1.60 H	154	28.7	13.3
7	11060.00	31.0 AV	54.0	-23.0	1.60 H	154	17.7	13.3
8	#16590.00	46.5 PK	68.2	-21.7	1.32 H	177	31.5	15.0

**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	66.5 PK	74.0	-7.5	2.24 V	93	63.6	2.9
2	5460.00	53.8 AV	54.0	-0.2	2.24 V	93	50.9	2.9
3	#5470.00	67.5 PK	68.2	-0.7	2.24 V	93	64.6	2.9
4	*5530.00	96.6 PK			2.24 V	93	93.7	2.9
5	*5530.00	87.7 AV			2.24 V	93	84.8	2.9
6	11060.00	42.1 PK	74.0	-31.9	1.50 V	326	28.8	13.3
7	11060.00	31.2 AV	54.0	-22.8	1.50 V	326	17.9	13.3
8	#16590.00	46.3 PK	68.2	-21.9	3.13 V	87	31.3	15.0

**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 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	89.9 PK			1.20 H	65	86.9	3.0
2	*5610.00	78.7 AV			1.20 H	65	75.7	3.0
3	#5725.00	48.2 PK	68.2	-20.0	1.20 H	65	45.0	3.2
4	11220.00	41.4 PK	74.0	-32.6	1.62 H	148	28.3	13.1
5	11220.00	30.6 AV	54.0	-23.4	1.62 H	148	17.5	13.1
6	#16830.00	46.4 PK	68.2	-21.8	1.33 H	172	30.1	16.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5610.00	99.5 PK			2.27 V	96	96.5	3.0
2	*5610.00	89.5 AV			2.27 V	96	86.5	3.0
3	#5725.00	56.2 PK	68.2	-12.0	2.27 V	96	53.0	3.2
4	11220.00	41.6 PK	74.0	-32.4	1.40 V	323	28.5	13.1
5	11220.00	30.7 AV	54.0	-23.3	1.40 V	323	17.6	13.1
6	#16830.00	46.5 PK	68.2	-21.7	3.12 V	90	30.2	16.3

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 155	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.63	56.0 PK	68.2	-12.2	1.15 H	75	53.1	2.9
2	*5775.00	91.6 PK			1.15 H	75	88.3	3.3
3	*5775.00	82.3 AV			1.15 H	75	79.0	3.3
4	#6016.14	51.3 PK	68.2	-16.9	1.15 H	75	47.7	3.6
5	11550.00	40.9 PK	74.0	-33.1	1.69 H	148	27.9	13.0
6	11550.00	30.5 AV	54.0	-23.5	1.69 H	148	17.5	13.0
7	#17325.00	46.3 PK	68.2	-21.9	1.38 H	189	29.5	16.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.47	66.7 PK	68.2	-1.5	2.25 V	91	63.8	2.9
2	*5775.00	101.8 PK			2.25 V	91	98.5	3.3
3	*5775.00	92.5 AV			2.25 V	91	89.2	3.3
4	#5927.23	55.2 PK	68.2	-13.0	2.25 V	91	51.6	3.6
5	11550.00	41.6 PK	74.0	-32.4	1.50 V	335	28.6	13.0
6	11550.00	30.9 AV	54.0	-23.1	1.50 V	335	17.9	13.0
7	#17325.00	47.1 PK	68.2	-21.1	3.15 V	78	30.3	16.8

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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:

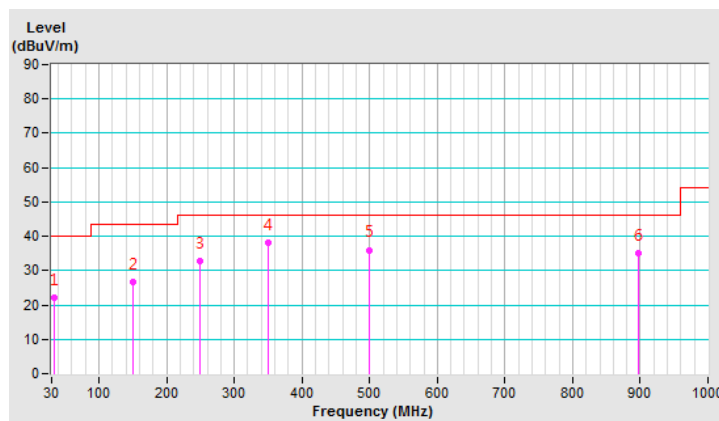
802.11ac (VHT80)

<b>CHANNEL</b>	TX Channel 155	<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	33.12	22.2 QP	40.0	-17.8	1.46 H	166	31.2	-9.0
2	150.32	26.6 QP	43.5	-16.9	1.52 H	77	34.8	-8.2
3	250.01	32.9 QP	46.0	-13.1	1.65 H	321	42.3	-9.4
4	350.01	38.1 QP	46.0	-7.9	1.69 H	244	44.6	-6.5
5	500.06	36.0 QP	46.0	-10.0	1.77 H	287	38.8	-2.8
6	896.21	35.0 QP	46.0	-11.0	1.78 H	100	31.2	3.8

**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 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.

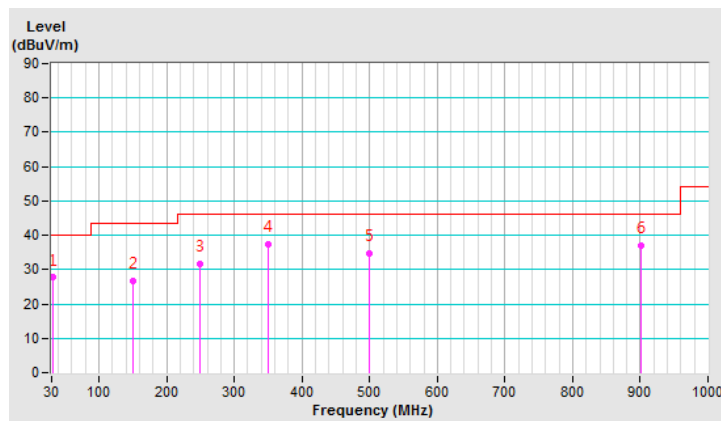


<b>CHANNEL</b>	TX Channel 155	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

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	31.62	27.6 QP	40.0	-12.4	1.11 V	63	37.0	-9.4
2	150.03	26.6 QP	43.5	-16.9	1.44 V	100	34.8	-8.2
3	250.01	31.5 QP	46.0	-14.5	2.77 V	69	40.9	-9.4
4	350.01	37.5 QP	46.0	-8.5	1.46 V	92	44.0	-6.5
5	500.11	34.6 QP	46.0	-11.4	1.77 V	57	37.4	-2.8
6	900.46	37.1 QP	46.0	-8.9	1.25 V	72	33.2	3.9

**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.



#### 4.1.8 Test Results (Mode 2)

##### Above 1GHz Data:

##### 802.11ac (VHT80)

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.1 PK	74.0	-7.9	1.14 H	342	63.4	2.7
2	5150.00	53.7 AV	54.0	-0.3	1.14 H	342	51.0	2.7
3	*5210.00	96.2 PK			1.14 H	342	93.6	2.6
4	*5210.00	87.7 AV			1.14 H	342	85.1	2.6
5	5350.00	53.1 PK	74.0	-20.9	1.14 H	342	50.5	2.6
6	5350.00	40.2 AV	54.0	-13.8	1.14 H	342	37.6	2.6
7	#10420.00	42.5 PK	68.2	-25.7	1.27 H	93	29.5	13.0
8	15630.00	46.7 PK	74.0	-27.3	3.69 H	319	34.1	12.6
9	15630.00	33.8 AV	54.0	-20.2	3.69 H	319	21.2	12.6

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.8 PK	74.0	-20.2	3.20 V	291	51.1	2.7
2	5150.00	42.2 AV	54.0	-11.8	3.20 V	291	39.5	2.7
3	*5210.00	91.1 PK			3.20 V	291	88.5	2.6
4	*5210.00	82.6 AV			3.20 V	291	80.0	2.6
5	5350.00	52.6 PK	74.0	-21.4	3.20 V	291	50.0	2.6
6	5350.00	39.8 AV	54.0	-14.2	3.20 V	291	37.2	2.6
7	#10420.00	41.9 PK	68.2	-26.3	2.13 V	244	28.9	13.0
8	15630.00	46.3 PK	74.0	-27.7	1.97 V	177	33.7	12.6
9	15630.00	33.7 AV	54.0	-20.3	1.97 V	177	21.1	12.6

#### 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 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	53.5 PK	74.0	-20.5	1.00 H	338	50.8	2.7
2	5150.00	40.7 AV	54.0	-13.3	1.00 H	338	38.0	2.7
3	*5290.00	95.9 PK			1.00 H	338	93.5	2.4
4	*5290.00	86.8 AV			1.00 H	338	84.4	2.4
5	5350.00	67.9 PK	74.0	-6.1	1.00 H	338	65.3	2.6
6	5350.00	53.7 AV	54.0	-0.3	1.00 H	338	51.1	2.6
7	#10580.00	42.3 PK	68.2	-25.9	1.30 H	102	29.5	12.8
8	15870.00	46.6 PK	74.0	-27.4	3.70 H	317	34.5	12.1
9	15870.00	33.8 AV	54.0	-20.2	3.70 H	317	21.7	12.1

**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	5150.00	52.7 PK	74.0	-21.3	3.19 V	290	50.0	2.7
2	5150.00	39.9 AV	54.0	-14.1	3.19 V	290	37.2	2.7
3	*5290.00	90.2 PK			3.19 V	290	87.8	2.4
4	*5290.00	81.5 AV			3.19 V	290	79.1	2.4
5	5350.00	60.3 PK	74.0	-13.7	3.19 V	290	57.7	2.6
6	5350.00	49.6 AV	54.0	-4.4	3.19 V	290	47.0	2.6
7	#10580.00	41.9 PK	68.2	-26.3	2.14 V	236	29.1	12.8
8	15870.00	46.8 PK	74.0	-27.2	1.99 V	176	34.7	12.1
9	15870.00	34.5 AV	54.0	-19.5	1.99 V	176	22.4	12.1

**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 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	65.4 PK	74.0	-8.6	1.02 H	325	62.5	2.9
2	<b>5460.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.02 H</b>	<b>325</b>	<b>51.0</b>	<b>2.9</b>
3	#5470.00	67.1 PK	68.2	-1.1	1.02 H	325	64.2	2.9
4	*5530.00	96.3 PK			1.02 H	325	93.4	2.9
5	*5530.00	86.8 AV			1.02 H	325	83.9	2.9
6	11060.00	42.3 PK	74.0	-31.7	1.29 H	100	29.0	13.3
7	11060.00	31.1 AV	54.0	-22.9	1.29 H	100	17.8	13.3
8	#16590.00	46.8 PK	68.2	-21.4	3.65 H	317	31.8	15.0

**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	60.2 PK	74.0	-13.8	3.20 V	289	57.3	2.9
2	5460.00	49.3 AV	54.0	-4.7	3.20 V	289	46.4	2.9
3	#5470.00	62.1 PK	68.2	-6.1	3.20 V	289	59.2	2.9
4	*5530.00	90.3 PK			3.20 V	289	87.4	2.9
5	*5530.00	81.5 AV			3.20 V	289	78.6	2.9
6	11060.00	42.7 PK	74.0	-31.3	2.20 V	245	29.4	13.3
7	11060.00	31.7 AV	54.0	-22.3	2.20 V	245	18.4	13.3
8	#16590.00	46.5 PK	68.2	-21.7	1.99 V	170	31.5	15.0

**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 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	97.6 PK			1.16 H	327	94.6	3.0
2	*5610.00	87.8 AV			1.16 H	327	84.8	3.0
3	#5725.00	59.2 PK	68.2	-9.0	1.16 H	327	56.0	3.2
4	11220.00	41.8 PK	74.0	-32.2	1.23 H	106	28.7	13.1
5	11220.00	30.7 AV	54.0	-23.3	1.23 H	106	17.6	13.1
6	#16830.00	47.0 PK	68.2	-21.2	3.65 H	308	30.7	16.3

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5610.00	91.3 PK			3.17 V	298	88.3	3.0
2	*5610.00	82.5 AV			3.17 V	298	79.5	3.0
3	#5725.00	55.4 PK	68.2	-12.8	3.17 V	298	52.2	3.2
4	11220.00	42.5 PK	74.0	-31.5	2.16 V	244	29.4	13.1
5	11220.00	31.3 AV	54.0	-22.7	2.16 V	244	18.2	13.1
6	#16830.00	46.7 PK	68.2	-21.5	1.95 V	165	30.4	16.3

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 155	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.60	63.9 PK	68.2	-4.3	1.17 H	330	61.0	2.9
2	*5775.00	99.3 PK			1.17 H	330	96.0	3.3
3	*5775.00	90.7 AV			1.17 H	330	87.4	3.3
4	#5964.13	53.5 PK	68.2	-14.7	1.17 H	330	49.9	3.6
5	11550.00	42.2 PK	74.0	-31.8	1.33 H	106	29.2	13.0
6	11550.00	30.9 AV	54.0	-23.1	1.33 H	106	17.9	13.0
7	#17325.00	46.9 PK	68.2	-21.3	3.65 H	315	30.1	16.8

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.31	60.6 PK	68.2	-7.6	3.16 V	290	57.7	2.9
2	*5775.00	95.6 PK			3.16 V	290	92.3	3.3
3	*5775.00	86.8 AV			3.16 V	290	83.5	3.3
4	#5927.73	52.2 PK	68.2	-16.0	3.16 V	290	48.6	3.6
5	11550.00	41.8 PK	74.0	-32.2	2.11 V	260	28.8	13.0
6	11550.00	30.9 AV	54.0	-23.1	2.11 V	260	17.9	13.0
7	#17325.00	47.1 PK	68.2	-21.1	1.92 V	176	30.3	16.8

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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:**

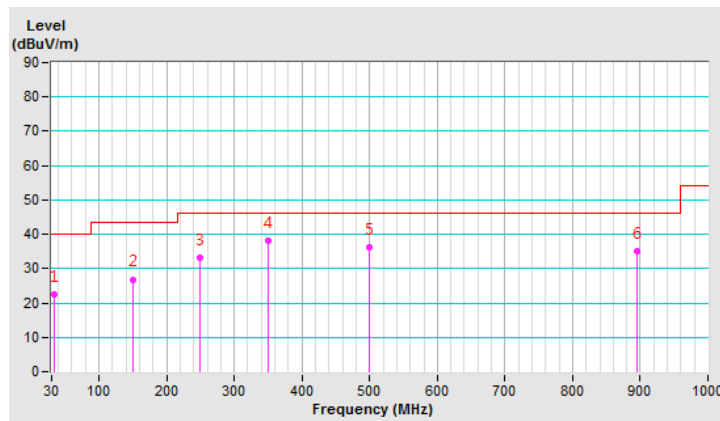
**802.11ac (VHT80)**

<b>CHANNEL</b>	TX Channel 155	<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	33.02	22.3 QP	40.0	-17.7	1.88 H	93	31.3	-9.0
2	150.13	26.9 QP	43.5	-16.6	1.63 H	211	35.1	-8.2
3	250.06	33.1 QP	46.0	-12.9	2.47 H	165	42.5	-9.4
4	350.02	38.2 QP	46.0	-7.8	1.77 H	302	44.7	-6.5
5	500.01	36.1 QP	46.0	-9.9	3.66 H	210	38.9	-2.8
6	896.16	35.1 QP	46.0	-10.9	1.24 H	42	31.3	3.8

**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 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.



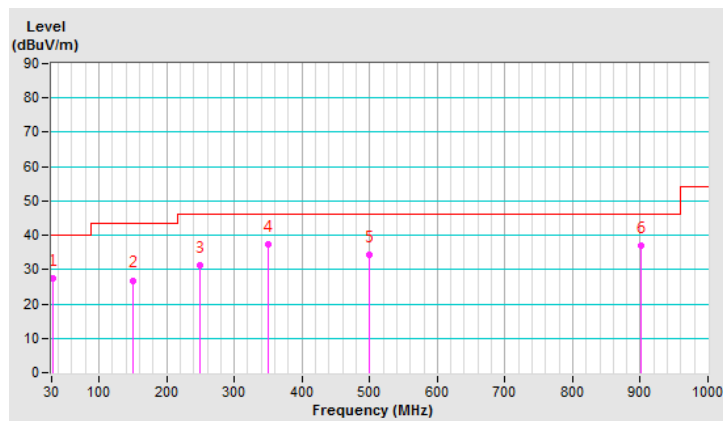
<b>CHANNEL</b>	TX Channel 155	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	31.45	27.5 QP	40.0	-12.5	1.22 V	100	37.0	-9.5
2	150.02	26.9 QP	43.5	-16.6	1.92 V	75	35.1	-8.2
3	250.06	31.4 QP	46.0	-14.6	2.22 V	33	40.8	-9.4
4	350.03	37.5 QP	46.0	-8.5	2.47 V	75	44.0	-6.5
5	500.16	34.2 QP	46.0	-11.8	1.88 V	99	37.0	-2.8
6	900.32	37.0 QP	46.0	-9.0	1.51 V	15	33.1	3.9

**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.



## 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. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 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 03, 2019

#### 4.2.3 Test Procedure

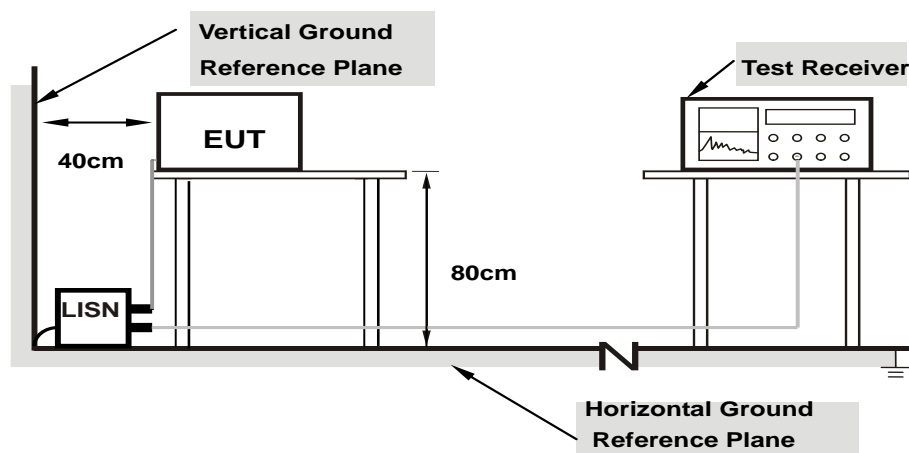
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Condition

Same as 4.1.6.

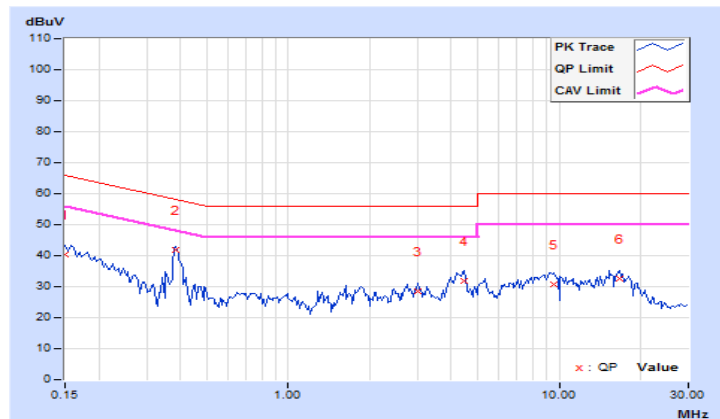
#### 4.2.7 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	30.44	15.06	40.47	25.09	66.00	56.00	-25.53	-30.91
<b>2</b>	<b>0.38438</b>	<b>10.08</b>	<b>31.91</b>	<b>31.01</b>	<b>41.99</b>	<b>41.09</b>	<b>58.18</b>	<b>48.18</b>	<b>-16.19</b>	<b>-7.09</b>
3	3.01953	10.26	18.14	11.11	28.40	21.37	56.00	46.00	-27.60	-24.63
4	4.45703	10.35	21.50	13.17	31.85	23.52	56.00	46.00	-24.15	-22.48
5	9.58984	10.67	20.15	11.03	30.82	21.70	60.00	50.00	-29.18	-28.30
6	16.73828	11.14	21.62	12.30	32.76	23.44	60.00	50.00	-27.24	-26.56

#### REMARKS:

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

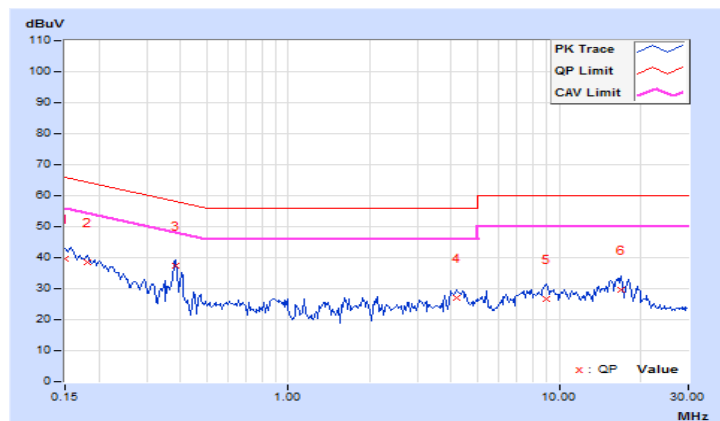


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15000	9.94	29.80	13.22	39.74	23.16	66.00	56.00	-26.26
2	0.18125	9.95	28.39	12.90	38.34	22.85	64.43	54.43	-26.09	-31.58
3	0.38438	9.98	27.60	19.31	37.58	29.29	58.18	48.18	-20.60	-18.89
4	4.19922	10.18	16.77	7.18	26.95	17.36	56.00	46.00	-29.05	-28.64
5	8.98047	10.47	16.15	5.98	26.62	16.45	60.00	50.00	-33.38	-33.55
6	17.04297	10.96	18.72	6.91	29.68	17.87	60.00	50.00	-30.32	-32.13

**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  $N_{ANT} \leq 4$ ;

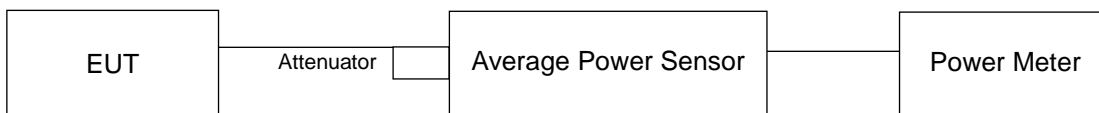
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

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

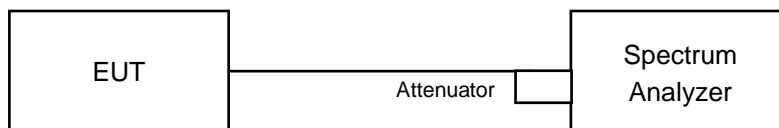
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup

##### FOR POWER OUTPUT MEASUREMENT



##### FOR 26dB OCCUPIED BANDWIDTH



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.



#### 4.3.4 Test Procedure

##### **For Average Power Measurement**

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

##### **FOR 26dB OCCUPIED BANDWIDTH**

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

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Condition

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

#### 4.3.7 Test Result

#### 802.11ac (VHT80)

#### Power Output:

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
42	5210	17.14	12.34	24.00	Pass
58	5290	17.742	12.49	24.00	Pass
106	5530	17.14	12.34	24.00	Pass
122	5610	18.836	12.75	24.00	Pass
155	5775	32.961	15.18	30.00	Pass

#### 26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
58	5290	122.43
106	5530	83.91
122	5610	112.22

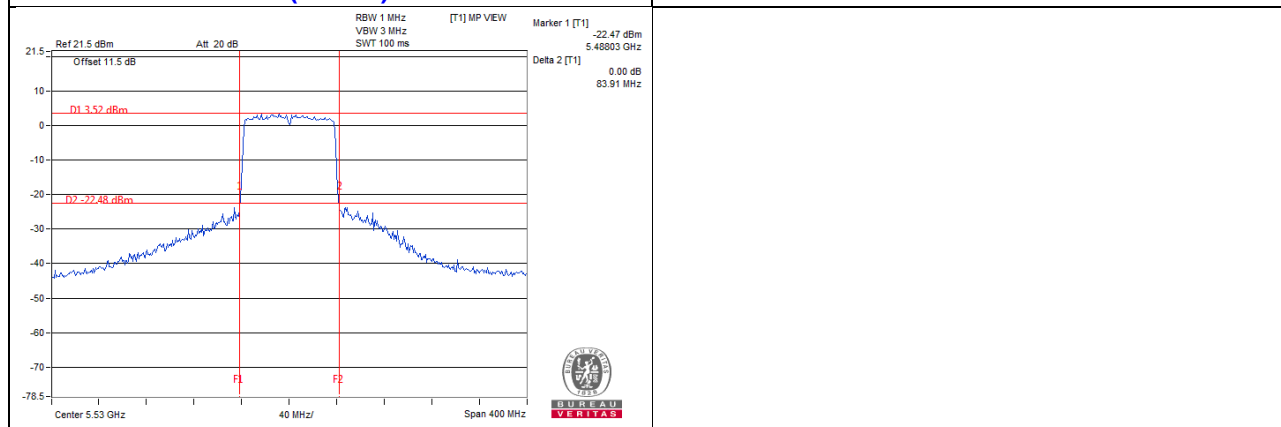
**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth**

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >

Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	122.43	31.87 > 24
106	5530	83.91	30.23 > 24
122	5610	112.22	31.50 > 24

#### Spectrum Plot of Worst Value

#### 802.11ac (VHT80): CH106



## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup



### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

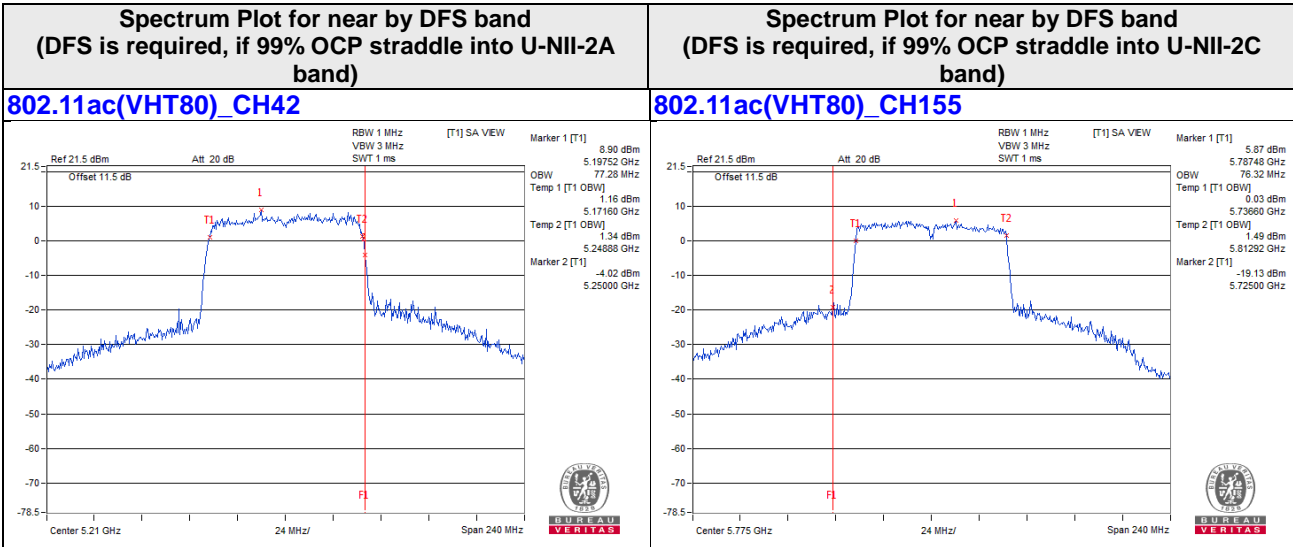
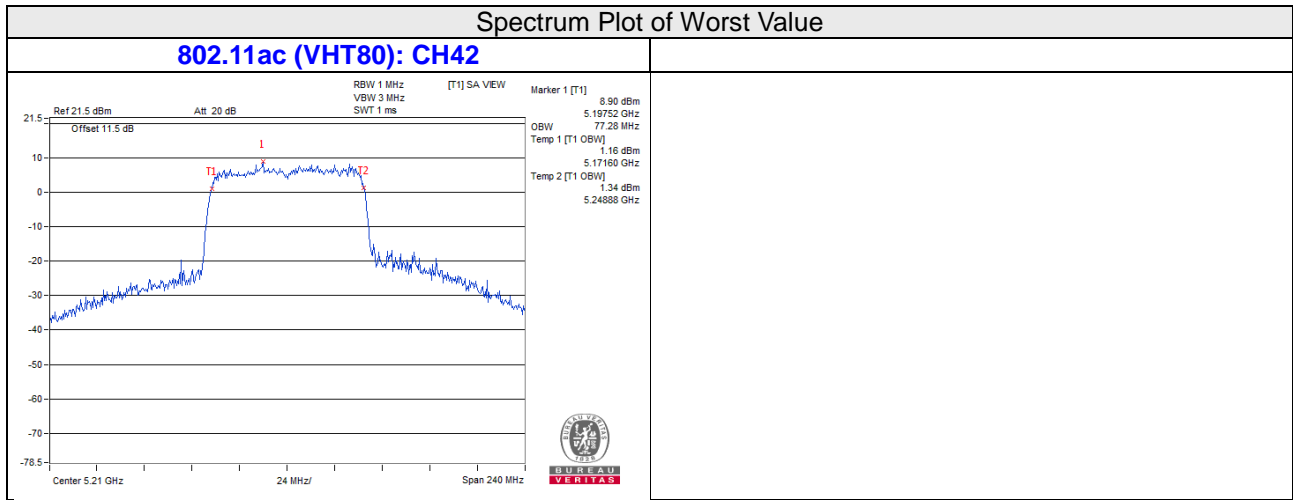
### 4.4.3 Test Procedure

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

#### 4.4.4 Test Results

#### 802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	77.28
58	5290	75.84
106	5530	75.84
122	5610	75.84
155	5775	76.32



## 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 U-NII-1, U-NII-2A, U-NII-2C:

Using method SA-2

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

#### For U-NII-3:

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

#### 4.5.5 Deviation from Test Standard

No deviation.

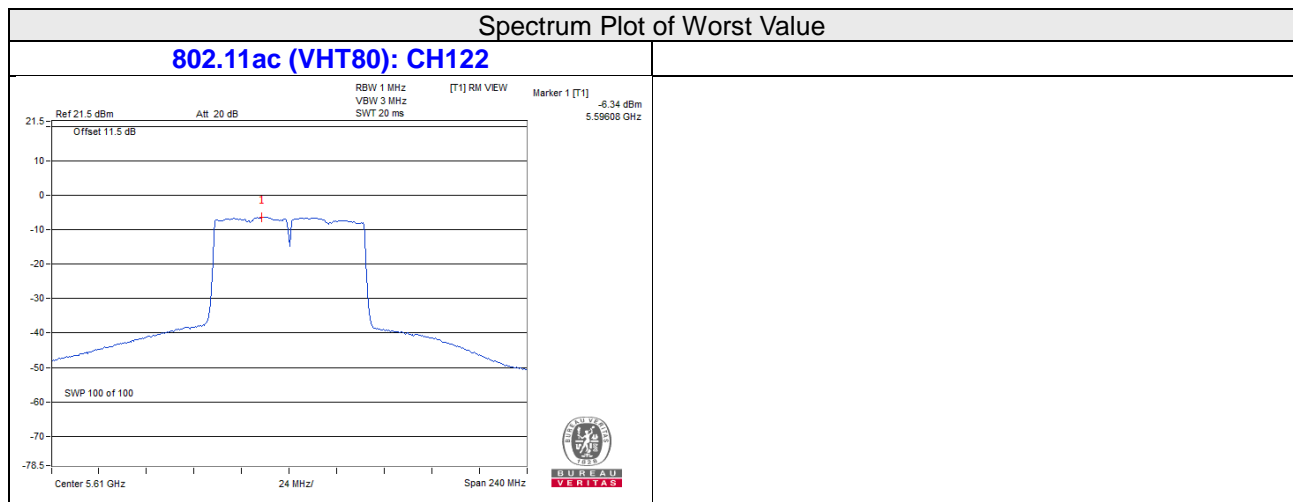
#### 4.5.6 EUT Operating Condition

Same as Item 4.3.6.

#### 4.5.7 Test Results

**For U-NII-1, U-NII-2A, U-NII-2C:  
802.11ac (VHT80)**

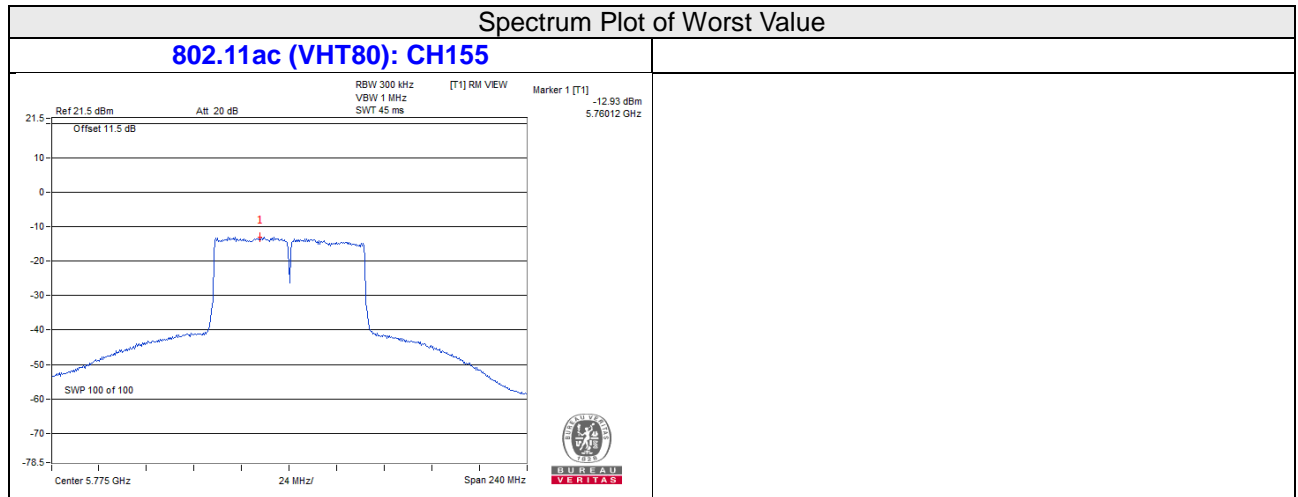
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
42	5210	-6.88	0.17	-6.71	11.00	Pass
58	5290	-6.90	0.17	-6.73	11.00	Pass
106	5530	-7.30	0.17	-7.13	11.00	Pass
122	5610	-6.34	0.17	-6.17	11.00	Pass



**For U-NII-3:**

**802.11ac (VHT80)**

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
155	5775	-12.93	0.17	-12.76	-10.54	30.00	Pass



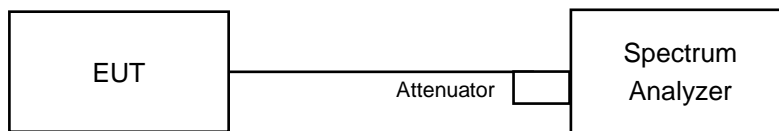


## 4.6 6dB Bandwidth Measurement

### 4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 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

#### 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

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

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

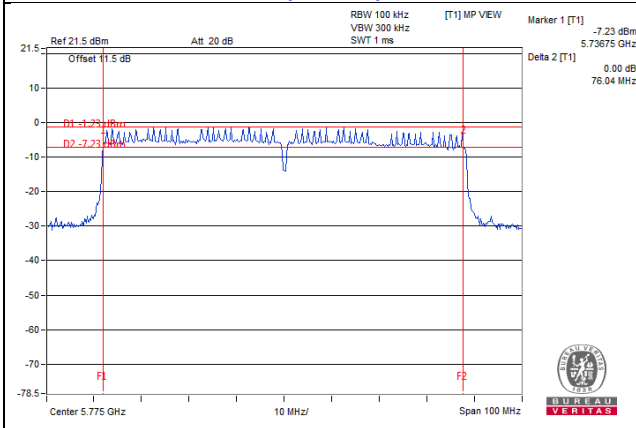
#### 4.6.7 Test Results

#### 802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	76.04	0.5	PASS

#### Spectrum Plot of Worst Value

#### 802.11ac (VHT80): CH155



## 5 Pictures of Test Arrangements

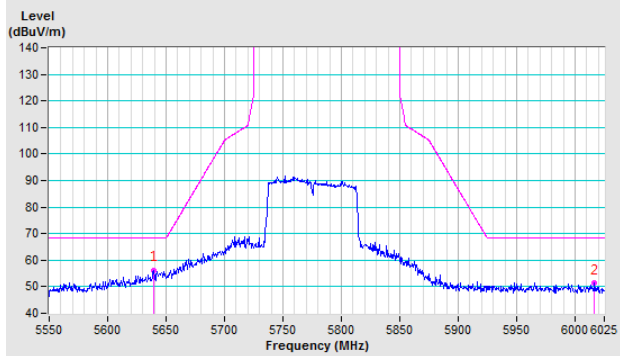
Please refer to the attached file (Test Setup Photo).

# Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band) (Mode 1)

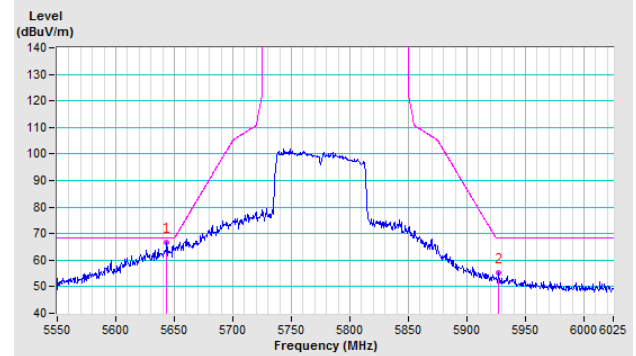
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal



Vertical

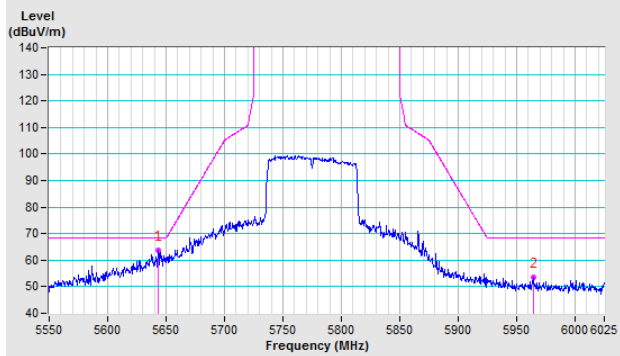


# Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band) (Mode 2)

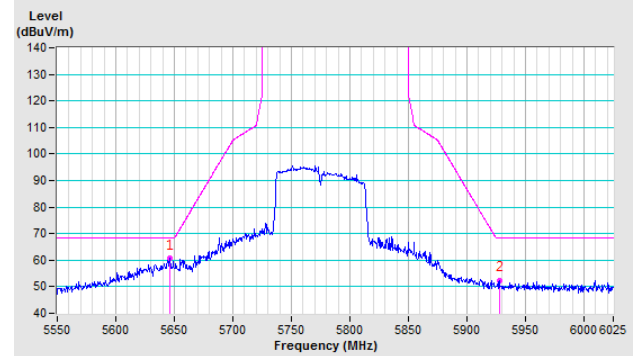
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal



Vertical



## 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:

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

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