

#### 8.OUT OF BAND EMISSIONS AND SPURIOUS EMISSION

#### 8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

#### 8.2 TEST PROCEDURE

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.8.3 DEVIATION FROM STANDARDNo deviation.8.4 TEST SETUP

POWER METER

#### **8.5 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

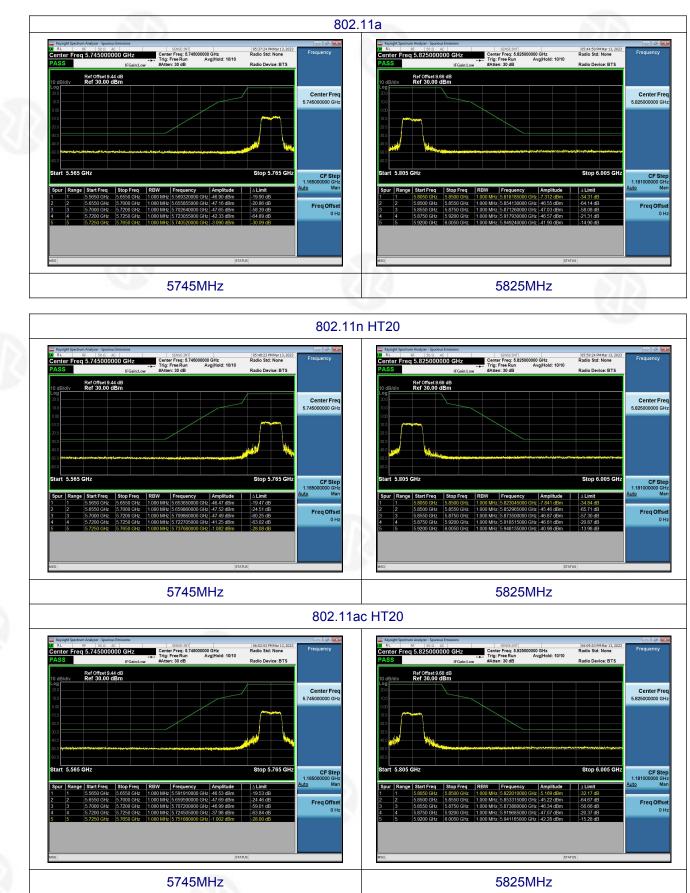
#### 8.6 TEST RESULTS

EUT





### ANT 1

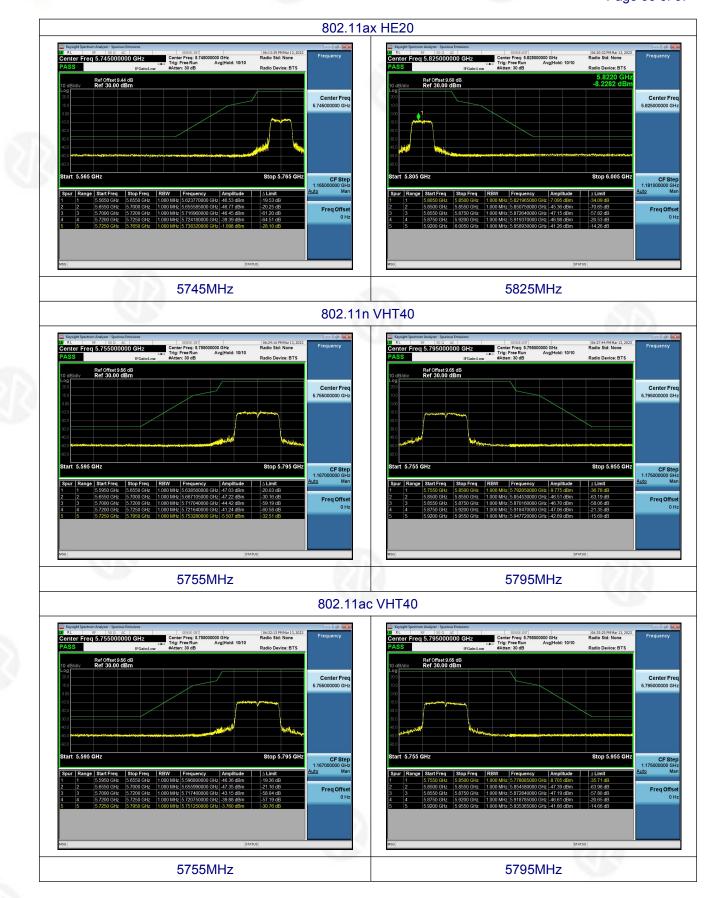


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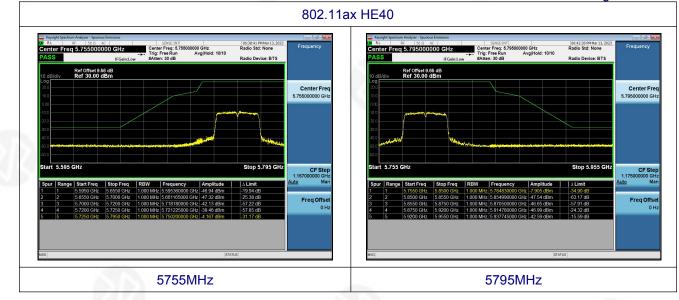
Shenzhen ZKT Technology Co., Ltd.

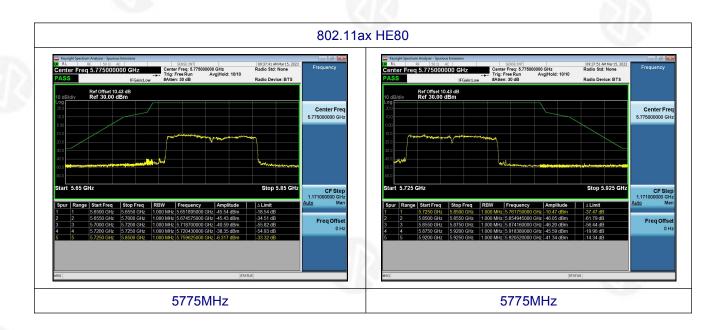
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## Test plot as follows: We test all the modes and recorded the worst mode

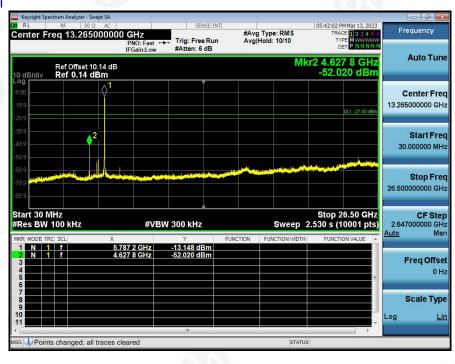




## Middle channel

+86-400-000-9970

1









## Highest channel

Keysight Spectrum Analyzer	- Swept SA 50 Ω AC	SENSE:IN	T I		05:46:05 PM Mar 13, 2023	
enter Freq 13.26		Trig: Free Run	#Avg	Type: RMS lold: 10/10	TRACE 1 2 3 4 5 0 TYPE MWWWW DET P N N N N	Frequency
Ref Offset dB/div Ref -0.3	t 9.68 dB	/ #Atten. o ub		Mk	r2 4.659 6 GHz -51.646 dBm	
<b>99</b> 0.3 0.3					DL1 -27.00 dBm	Center F 13.265000000
).3 ).3 ).3	¢ <sup>2</sup>					<b>Start F</b> 30.000000
3.3 3.3 3.3		ter in terrestere de la second				Stop I 26.500000000
tart 30 MHz Res BW 100 kHz	#V	/BW 300 kHz	FUNCTION	Sweep 2	Stop 26.50 GHz 2.530 s (10001 pts)	CF 9 2.647000000 Auto
1 N 1 f 2 N 1 f 3 4 5 5 6	5.821 6 GHz 4.659 6 GHz	-14.653 dBm -51.646 dBm	PORCHON	PONCHON THE	E	Freq Of
0 7 8 9 0 1						Scale 1

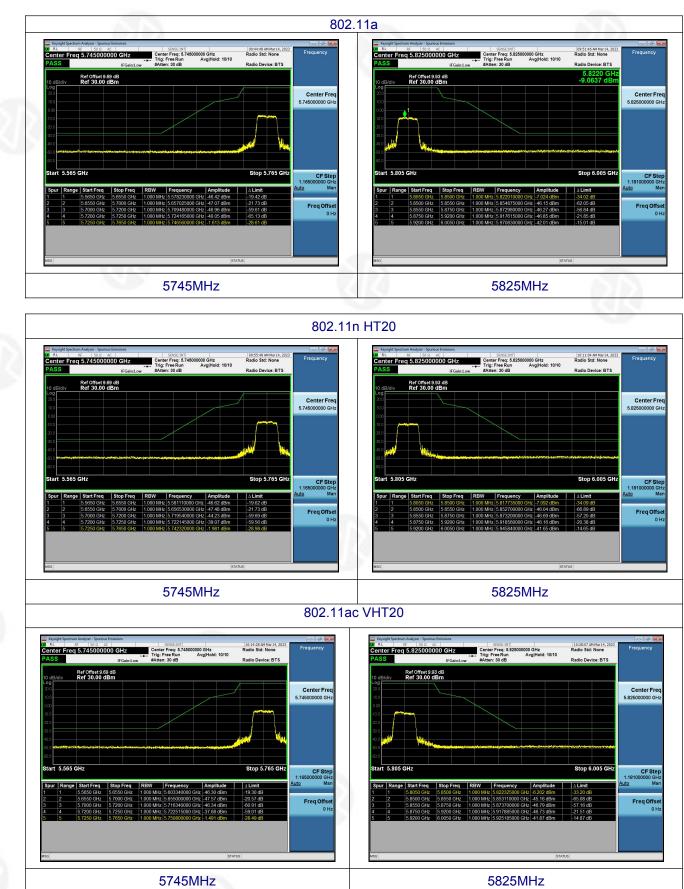








## ANT 2



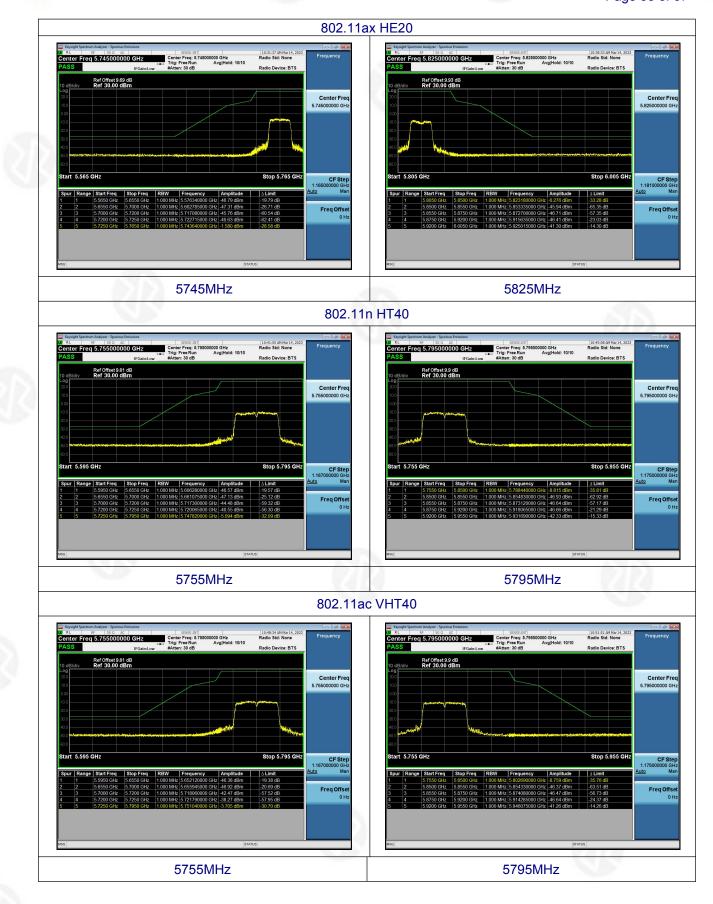
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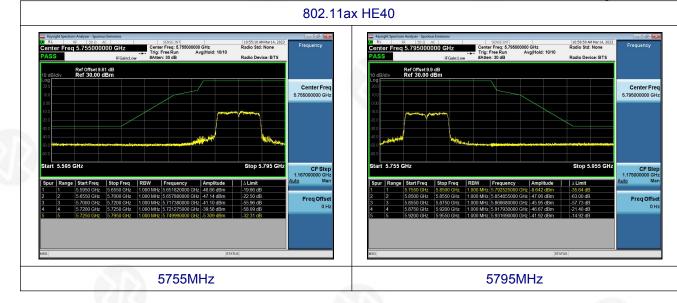
Shenzhen ZKT Technology Co., Ltd.

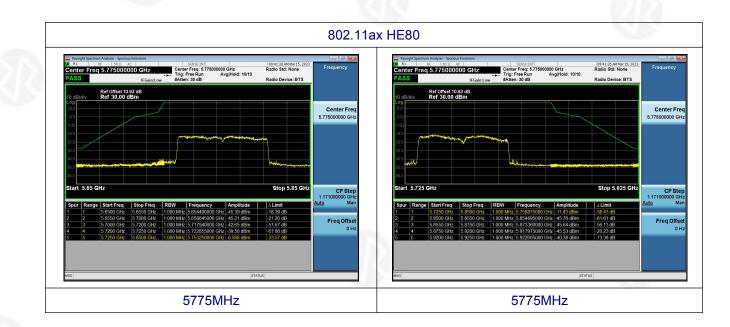
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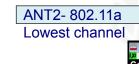








## Test plot as follows: We test all the modes and recorded the worst mode

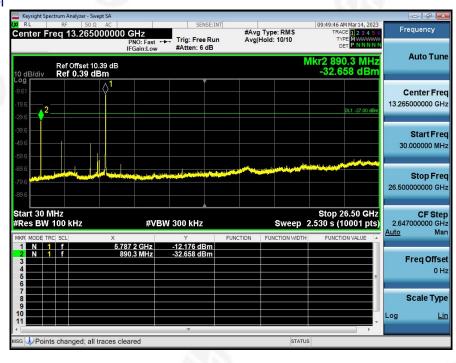




## Middle channel

+86-400-000-9970

1



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## Highest channel

Center Freq 13.265000000 GHz     Trig: Free Run     #Avg Type: RMS     Trace     2.3.4     Frequence       PN0: Fast     Ifgaint.ow     Ifgaint.ow     Ifgaint.ow     Ifgaint.ow     Iffaint.ow     I	Keysight Spectrum Anal	lyzer - Swept SA		CENCE A	NT.		00.52.01 00.05.1	. 2022	
Ref Offseti9.93 dB Mkr2 4.659 6 GHz   0g 1   1 <td></td> <td>.265000000</td> <td>PNO: Fast ↔</td> <td></td> <td>#Avg</td> <td></td> <td>TRACE 1 2 3 TYPE MWA</td> <td>3456</td> <td>Frequency</td>		.265000000	PNO: Fast ↔		#Avg		TRACE 1 2 3 TYPE MWA	3456	Frequency
01   01 <td< th=""><th>dB/div Ref -</th><th>ffset 9.93 dB</th><th>IFGain:Low</th><th>#Atten: 6 db</th><th></th><th>Mk</th><th>(r2 4.659 6 G</th><th>GHZ</th><th>Auto Tu</th></td<>	dB/div Ref -	ffset 9.93 dB	IFGain:Low	#Atten: 6 db		Mk	(r2 4.659 6 G	GHZ	Auto Tu
1   2   3   3   1   f   4.659 6 GHz   50.674 dBm   50.674 dBm   Finction watches   Freq C     3   1   f   4.659 6 GHz   50.674 dBm   50.674 dBm   Finction watches   Freq C     3   1   f   4.659 6 GHz   50.674 dBm   Stop   50.674 dBm   Log   Log	0.1	\$ <sup>1</sup>		ر <u>م</u>			0L1 -27		Center F 13.265000000 (
Stop     Stop <th< td=""><td>D.1</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Start F 30.000000 I</td></th<>	D.1	2							Start F 30.000000 I
Res BW 100 kHz     #VBW 300 kHz     Sweep 2.530 s (10001 pts)     2.64700000       gr Model TRC SCL     X     Y     FUNCTION     FUNCTION WADTH     FUNCTION VALUE     Auto       1     1     f     5.821 6 GHz     -13.616 dBm     FUNCTION     FUNCTION WADTH     FUNCTION VALUE     Freq C       3     4     4     5     5     50.674 dBm     Freq C     Freq C       3     4     4     5     5     5     Freq C     Log     Log     Freq C	0.1								<b>Stop F</b> 26.50000000
1     N     1     f     5.821 6 GHz     -13.616 dBm       2     N     1     f     4.659 6 GHz     -50.674 dBm     Freq O       3     -     -     -     -     -     -     Freq O       4     -     -     -     -     -     -     -     -     Freq O       5     -	Res BW 100 kH		#VB		FUNCTION		2.530 s (10001	pts)	CF S 2.647000000 Auto
7 8 9 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 N 1 f 2 N 1 f 3 4 5	5.82		-13.616 dBm	1 Office room				Freq Of
	7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9								Scale T
	1 <b>E E</b>							<b>-</b>	og



#### 9.TRANSMISSION IN THE ABSENCE OF DATA

9.1 CONFORMANCE LIMIT

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

#### 9.2 TEST RESULTS

No non-compliance noted: Refer to the theory of operation.







### **10.Frequency Stability Measurement**

#### 10.1 LIMIT

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be  $\pm$  20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

#### **10.2 TEST PROCEDURES**

1. The transmitter output (antenna port) was connected to the spectrum analyzer.

2. EUT have transmitted absence of modulation signal and fixed channelize.

- 3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
- 4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
- 5. fc is declaring of channel frequency. Then the frequency error formula is  $(fc-f)/fc \times 106$  ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
- 6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
- 7. Extreme temperature is -20°C~50°C.

#### 10.3 TEST SETUP LAYOUT

EUT	SPECTRUM	
	ANALYZER	

#### **10.4 EUT OPERATION DURING TEST**

The EUT was programmed to be in continuously un-modulation transmitting mode.

#### 10.5 TEST RESULTS

Temperature :	<b>26</b> ℃	Relative Humidity :	54%	
Pressure :	1012 hPa	Test Voltage :	AC 120V/60Hz	
Test Mode :	ТХ			





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Test	Tes	Tes Measu red	S	ΔFrequency (MHz)						
Test Voltage	τe mp.	Freque ncy (MHz)	802.11a	802.11n HT20	802.11ac VHT20	802.11ax HE20	802.11a	802.11 n HT20	802.11 ac VHT20	802.11 ax HE20
		5745	5745.0347	5745.0332	5745.0363	5745.0318	-0.0347	-0.0332	-0.0363	-0.0318
132V		5785	5785.0321	5785.0314	5785.0335	5785.0362	-0.0321	-0.0314	-0.0335	-0.0362
	-20	5825	5825.0314	5825.0365	5825.0324	5825.0426	-0.0314	-0.0365	-0.0324	-0.0426
100	°C	5745	5745.0234	5745.0271	5745.0253	5745.0351	-0.0234	-0.0271	-0.0253	-0.0351
108V		5785	5785.0373	5785.0369	5785.0331	5785.0432	-0.0373	-0.0369	-0.0331	-0.0432
		5825	5825.0445	5825.0444	5825.0463	5825.0381	-0.0445	-0.0444	-0.0463	-0.0381
	25 ℃	5745	5745.0334	5745.0321	5745.0327	5745.0421	-0.0334	-0.0321	-0.0327	-0.0421
120V		5785	5785.0421	5785.0414	5785.0454	5785.0362	-0.0421	-0.0414	-0.0454	-0.0362
		5825	5825.0237	5825.0233	5825.0233	5825.0426	-0.0237	-0.0233	-0.0233	-0.0426
	50	5745	5745.0655	5745.0675	5745.0655	5745.0369	-0.0655	-0.0675	-0.0655	-0.0369
132V	°℃	5785	5785.0431	5785.0454	5785.0484	5785.0328	-0.0431	-0.0454	-0.0484	-0.0328
	C	5825	5825.0643	5825.0663	5825.0636	5825.0344	-0.0643	-0.0663	-0.0636	-0.0344
	50	5745	5745.0464	5745.0424	5745.0458	5745.0372	-0.0464	-0.0424	-0.0458	-0.0372
108V	50 ℃	5785	5785.0213	5785.0264	5785.0264	5785.0442	-0.0213	-0.0264	-0.0264	-0.0442
		5825	5825.0754	5825.0751	5825.0772	5825.0428	-0.0754	-0.0751	-0.0772	-0.0428

Test	Test Temp	Measur ed	Spectrum Frequency (MHz)			ΔFrequency (MHz)			
Voltage		Frequen cy (MHz)	802.11n HT40	802.11ac VHT40	802.11ax HE40	802.11n HT40	802.11ac VHT40	802.11ax HE40	
132V		5755	5755.0544	5755.0551	5755.0538	-0.0544	-0.0551	-0.0538	
132 V	20°C	5795	5795.0666	5795.0633	5795.0514	-0.0666	-0.0633	-0.0514	
108V	-20 C	5755	5755.0238	5755.0548	5755.0496	-0.0238	-0.0548	-0.0496	
1000		5795	5795.0476	5795.0444	5795.0427	-0.0476	-0.0444	-0.0427	
120V	25°C	5755	5755.0284	5755.0238	5755.0358	-0.0284	-0.0238	-0.0358	
1200	25 C	5795	5795.0533	5795.0557	5795.0368	-0.0533	-0.0557	-0.0368	
132V	50°C	5755	5755.0448	5755.0453	5755.0512	-0.0448	-0.0453	-0.0512	
132 V	50 C	5795	5795.0364	5795.0368	5795.0416	-0.0364	-0.0368	-0.0416	
108V	50°C	5755	5755.0323	5755.0322	5755.0682	-0.0323	-0.0322	-0.0682	
100 V	50 C	5795	5795.0437	5795.0434	5795.0745	-0.0437	-0.0434	-0.0745	



Test Voltage	Test Temp.	Measured Frequency	Spectrum Free	quency (MHz)	ΔFrequency (MHz)		
Voltage		(MHz)	802.11ac VHT80	802.11ax HE80	802.11ac VHT80	802.11ax HE80	
132V	-20°C	5775	5775.0142	5775.0136	-0.0142	-0.0136	
108V	-20 C	5775	5775.0338	5775.0285	-0.0338	-0.0285	
120V	25°C	5775	5775.0431	5775.0341	-0.0431	-0.0341	
132V	50°C	5775	5775.0244	5775.0186	-0.0244	-0.0186	
108V	50°C	5775	5775.0535	5775.0261	-0.0535	-0.0261	



### **11.ANTENNA REQUIREMENT**



# Standard requirement: FCC Part15 C Section 15.203

#### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### EUT Antenna:

The product has 2 antennas, The antenna is External Antenna, the best case gain of the antenna is 5.09 dBi@5G, reference to the appendix II for details.







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#### **12. TEST SETUP PHOTO**

Reference to the appendix I for details.

### **13. EUT CONSTRUCTIONAL DETAILS**

Reference to the appendix II for details.

**\*\*\*\*\*\* END OF REPORT \*\*\*\*\*** 



