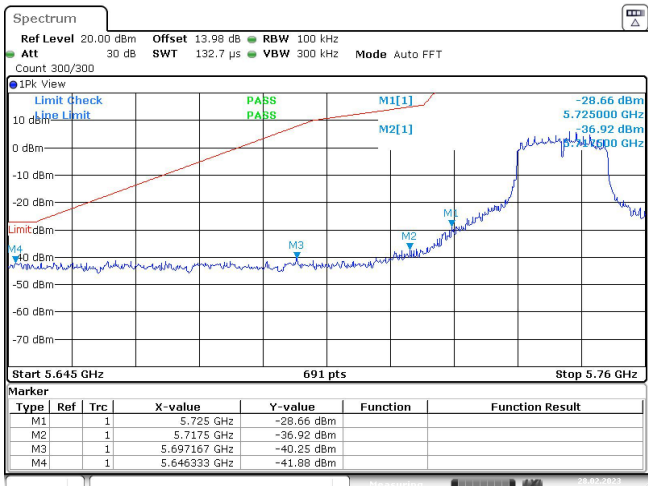
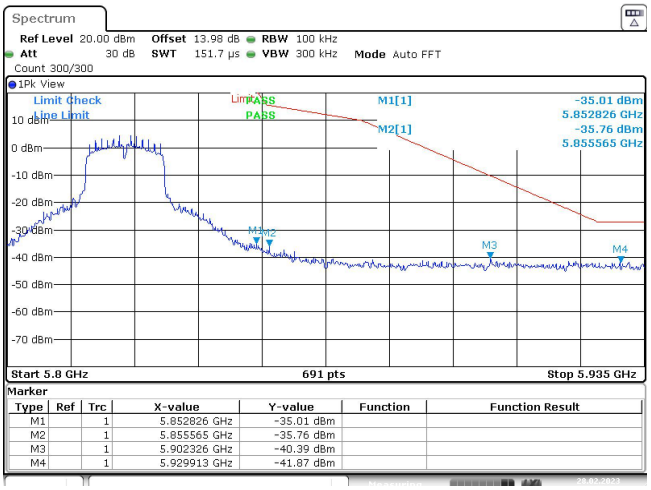
Band4

802.11a

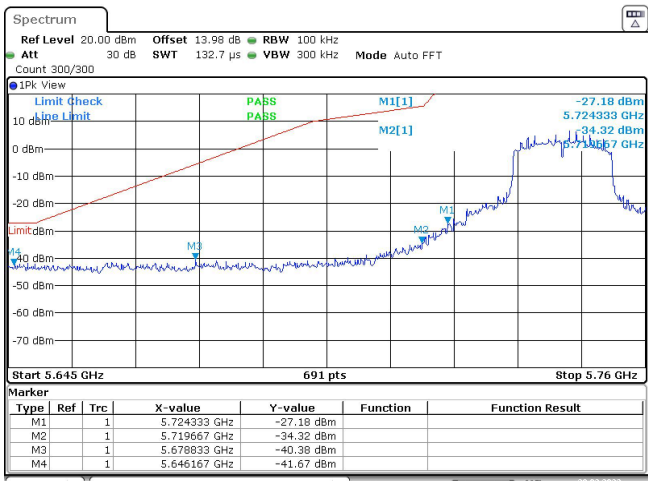


Low: 5745MHz

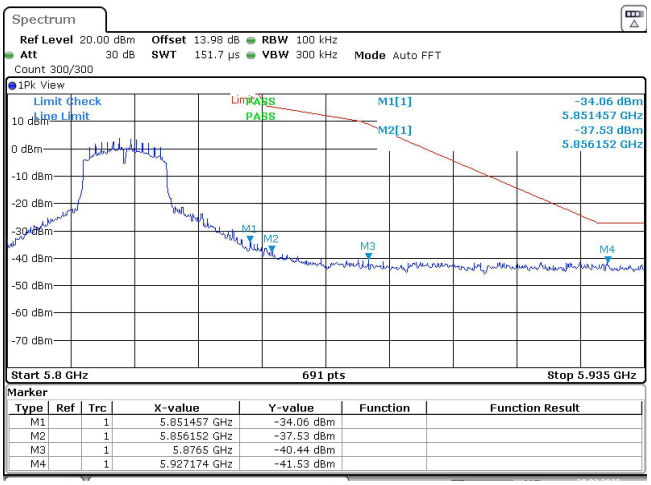


High: 5825MHz

802.11n(HT20)



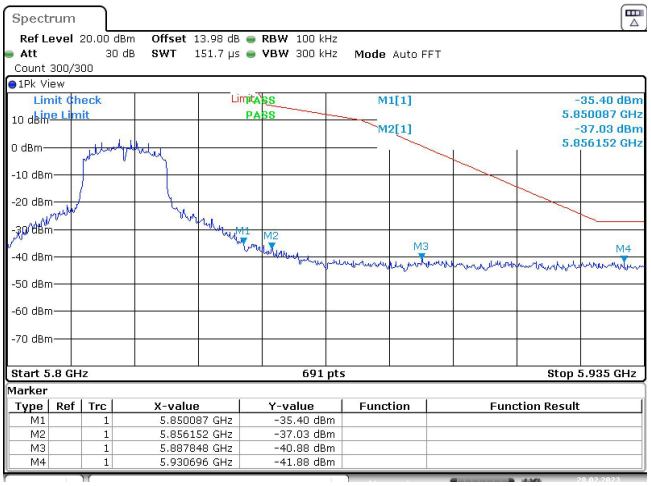
Low: 5745MHz



High: 5825MHz

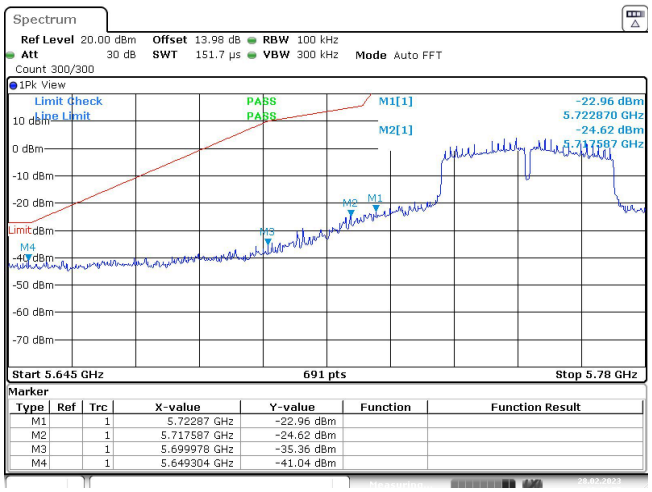
802.11ac(HT20)

Low: 5745MHz

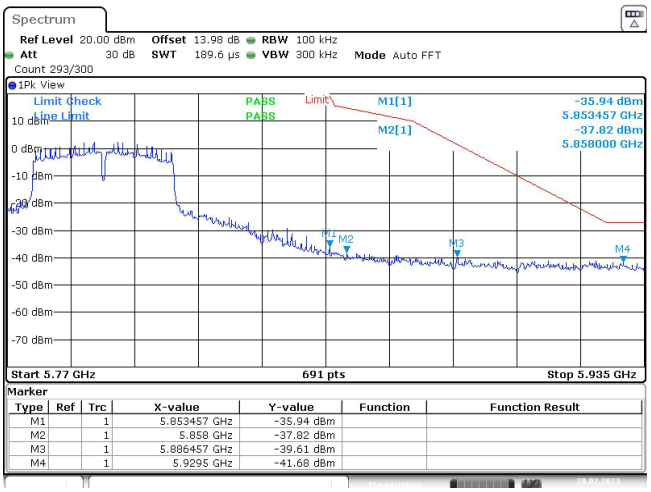


High: 5825MHz

802.11n(HT40)

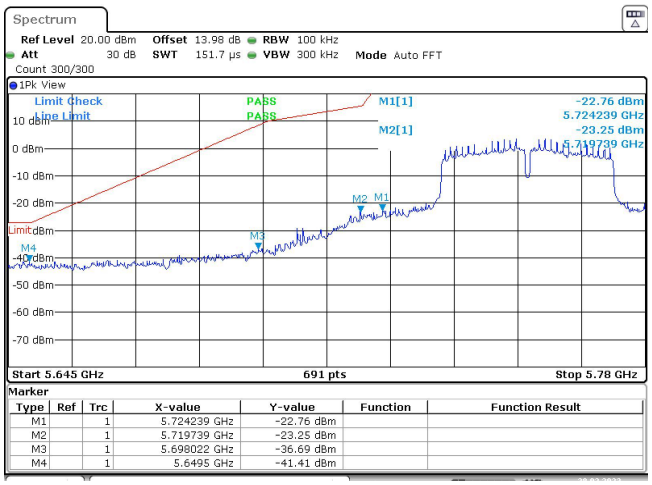


Low: 5755MHz

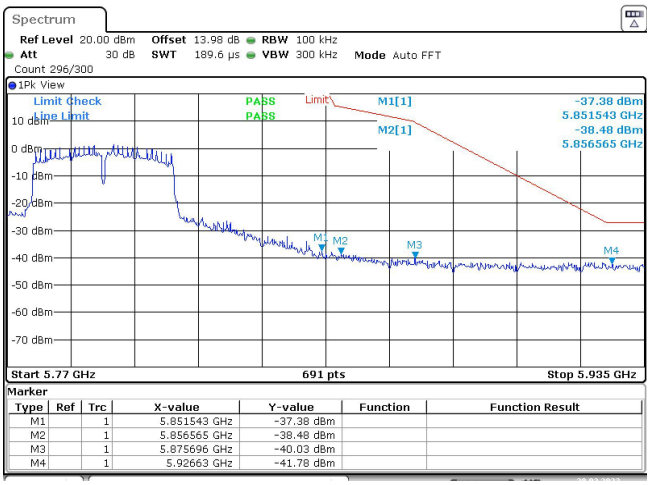


High: 5795MHz

802.11ac(HT40)



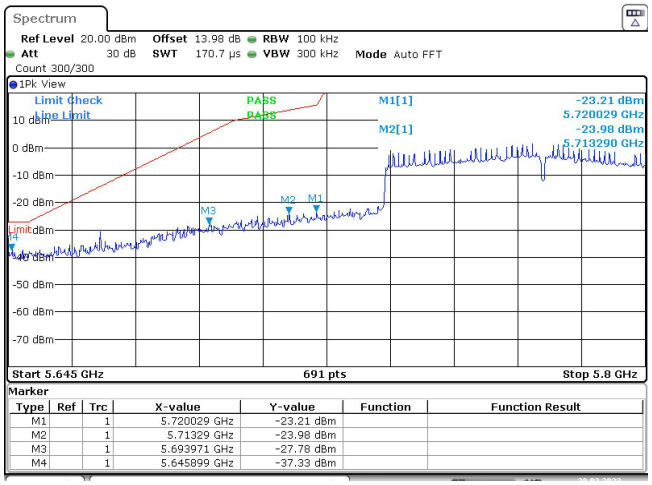
Low: 5755MHz



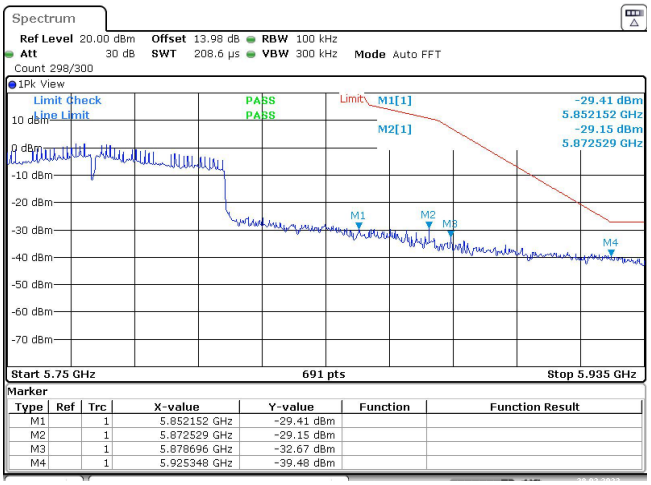
High: 5795MHz

802.11ac(HT80)

802.11ac(HT80)



5775MHz



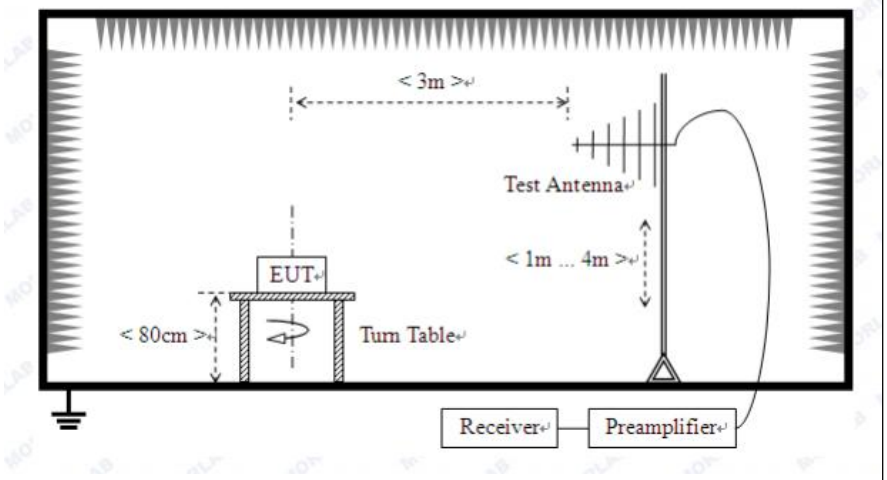
5775MHz

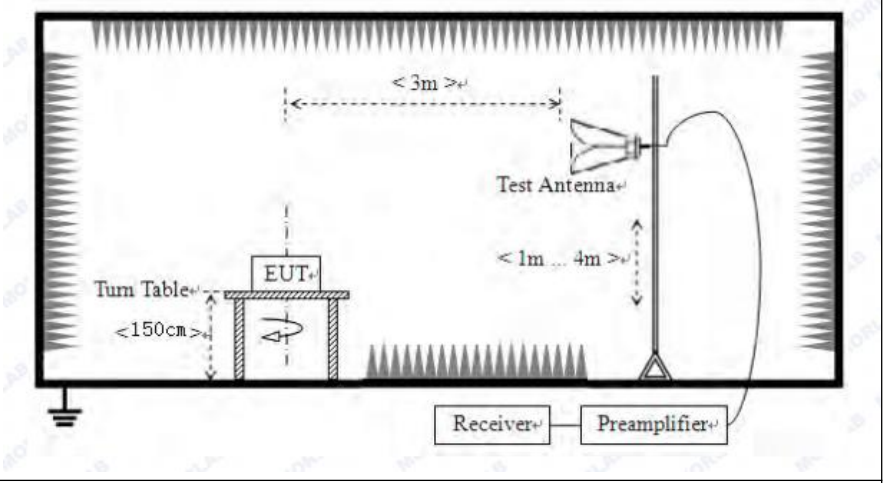
4.7 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>74.0</td><td>Peak Value</td></tr>
<tr><td>54.0</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:

1>.Below 1GHz test procedure:
1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height 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.
4. 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 rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

2>.Above 1GHz test procedure:
1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.
2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.
3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
</td></tr>
</table>

	4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.
Test setup:	Below 1GHz  Above 1GHz

	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
33.82	48.11	11.25	0.59	30.08	29.87	40	-10.48	Vertical
55.25	41.66	11.93	0.81	29.96	24.44	40	-15.55	Vertical
121.08	46.35	9.4	1.36	29.57	27.54	43.5	-15.88	Vertical
172.20	42.73	8.5	1.7	29.31	23.62	43.5	-19.65	Vertical
440.57	37.21	16.29	3.05	29.41	27.14	46	-18.63	Vertical
860.36	33.13	21.83	4.69	29.14	30.51	46	-15.93	Vertical
64.45	36.39	8.73	0.9	29.89	16.13	40	-24.09	Horizontal
100.05	33.77	11.73	1.19	29.7	16.99	43.5	-26.00	Horizontal
270.09	45.44	12.53	2.22	29.79	30.40	46	-15.24	Horizontal
351.37	36.40	14.5	2.62	29.73	23.79	46	-22.14	Horizontal
628.24	35.85	19.43	3.83	29.27	29.84	46	-15.76	Horizontal
955.58	40.63	22.54	5.06	29.1	39.13	46	-6.36	Horizontal

Above 1GHz:

802.11a(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.72	28.54	11.25	14.62	32.65	21.76	74	-52.24	Vertical
15540.55	30.86	11.93	17.66	34.46	25.99	74	-48.01	Vertical
10360.69	32.12	9.4	14.62	32.65	23.49	74	-50.51	Horizontal
15540.12	32.32	8.5	17.66	34.46	24.02	74	-49.98	Horizontal

802.11a(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.55	28.24	16.29	14.62	32.65	26.50	74	-47.50	Vertical
15540.78	30.77	21.83	17.66	34.46	35.80	74	-38.20	Vertical
10360.78	32.58	8.73	14.62	32.65	23.28	74	-50.72	Horizontal
15540.40	31.46	11.73	17.66	34.46	26.39	74	-47.61	Horizontal

802.11a(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.49	28.94	11.25	14.62	32.65	22.16	74	-51.84	Vertical
15540.27	30.65	11.93	17.66	34.46	25.78	74	-48.22	Vertical
10360.47	32.70	9.4	14.62	32.65	24.07	74	-49.93	Horizontal
15540.96	32.11	8.5	17.66	34.46	23.81	74	-50.19	Horizontal

802.11n(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	28.50	11.25	14.62	32.65	21.72	74	-52.28	Vertical
15540.36	30.39	11.93	17.66	34.46	25.52	74	-48.48	Vertical
10360.39	32.83	9.4	14.62	32.65	24.20	74	-49.80	Horizontal
15540.64	31.80	8.5	17.66	34.46	23.50	74	-50.50	Horizontal

802.11n(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.92	28.25	16.29	14.62	32.65	26.51	74	-47.49	Vertical
15540.76	30.89	21.83	17.66	34.46	35.92	74	-38.08	Vertical
10360.32	32.12	8.73	14.62	32.65	22.82	74	-51.18	Horizontal
15540.71	32.08	11.73	17.66	34.46	27.01	74	-46.99	Horizontal

802.11n(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.05	28.92	11.25	14.62	32.65	22.14	74	-51.86	Vertical
15540.91	30.68	11.93	17.66	34.46	25.81	74	-48.19	Vertical
10360.49	32.26	9.4	14.62	32.65	23.63	74	-50.37	Horizontal
15540.52	31.74	8.5	17.66	34.46	23.44	74	-50.56	Horizontal

802.11ac(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.85	28.93	11.25	14.62	32.65	22.15	74	-51.85	Vertical
15540.26	31.13	11.93	17.66	34.46	26.26	74	-47.74	Vertical
10360.17	32.99	9.4	14.62	32.65	24.36	74	-49.64	Horizontal
15540.80	31.53	8.5	17.66	34.46	23.23	74	-50.77	Horizontal

802.11ac(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.88	28.86	16.29	14.62	32.65	27.12	74	-46.88	Vertical
15540.34	30.88	21.83	17.66	34.46	35.91	74	-38.09	Vertical
10360.63	32.59	8.73	14.62	32.65	23.29	74	-50.71	Horizontal
15540.23	31.57	11.73	17.66	34.46	26.50	74	-47.50	Horizontal

802.11ac(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.32	29.04	11.25	14.62	32.65	22.26	74	-51.74	Vertical
15540.27	30.27	11.93	17.66	34.46	25.40	74	-48.60	Vertical
10360.25	32.41	9.4	14.62	32.65	23.78	74	-50.22	Horizontal
15540.80	32.23	8.5	17.66	34.46	23.93	74	-50.07	Horizontal

802.11n(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.37	28.67	16.29	14.62	32.65	26.93	74	-47.07	Vertical
15540.15	31.11	21.83	17.66	34.46	36.14	74	-37.86	Vertical
10360.68	32.48	8.73	14.62	32.65	23.18	74	-50.82	Horizontal
15540.57	31.85	11.73	17.66	34.46	26.78	74	-47.22	Horizontal

802.11n(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.17	28.54	11.25	14.62	32.65	21.76	74	-52.24	Vertical
15540.90	30.69	11.93	17.66	34.46	25.82	74	-48.18	Vertical
10360.13	32.97	9.4	14.62	32.65	24.34	74	-49.66	Horizontal
15540.15	32.13	8.5	17.66	34.46	23.83	74	-50.17	Horizontal

802.11ac(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.63	29.09	16.29	14.62	32.65	27.35	74	-46.65	Vertical
15540.09	30.42	21.83	17.66	34.46	35.45	74	-38.55	Vertical
10360.11	32.38	8.73	14.62	32.65	23.08	74	-50.92	Horizontal
15540.01	32.37	11.73	17.66	34.46	27.30	74	-46.70	Horizontal

802.11ac(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.84	28.17	11.25	14.62	32.65	21.39	74	-52.61	Vertical
15540.73	30.25	11.93	17.66	34.46	25.38	74	-48.62	Vertical
10360.87	32.28	9.4	14.62	32.65	23.65	74	-50.35	Horizontal
15540.09	31.70	8.5	17.66	34.46	23.40	74	-50.60	Horizontal

802.11ac(HT80) 5210MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.31	29.07	16.29	14.62	32.65	27.33	74	-46.67	Vertical
15540.81	31.19	21.83	17.66	34.46	36.22	74	-37.78	Vertical
10360.97	32.12	8.73	14.62	32.65	22.82	74	-51.18	Horizontal
15540.80	32.12	11.73	17.66	34.46	27.05	74	-46.95	Horizontal

Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn’t be performed.

4. This Report only show the test plots of the worst case (U-NII-1).

4.8 Frequency stability

Test limit	Manufacturers 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.
Test results:	Pass

Measurement Data:

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
Band 1 (5150-5250 MHz)	DC 3.61V	5179.992	8	5239.989	11
	DC 3.70V	5179.990	10	5239.991	9
	DC 4.18V	5179.982	18	5239.982	18
Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
Band 4 (5725-5850 MHz)	DC 3.61V	5744.990	10	5824.987	13
	DC 3.70V	5744.989	11	5824.987	13
	DC 4.18V	5744.986	14	5824.984	16

Mode	Temperature (℃)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
Band 1 (5150-5250 MHz)	-20℃	5179.989	11	5239.987	13
	-10℃	5179.990	10	5239.991	9
	-5℃	5179.985	15	5239.987	13
	0℃	5179.986	14	5239.990	10
	+10℃	5179.986	14	5239.990	10
	+20℃	5179.990	10	5239.987	13
	+30℃	5179.992	8	5239.992	8
	+40℃	5179.986	14	5239.986	14
	+50℃	5179.992	8	5239.987	13
Mode	Temperature (℃)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
Band 4 (5725-5850 MHz)	-20℃	5744.987	13	5824.992	8
	-10℃	5744.990	10	5824.989	11
	-5℃	5744.987	13	5824.983	17
	0℃	5744.991	9	5824.987	13
	+10℃	5744.989	11	5824.989	11
	+20℃	5744.987	13	5824.989	11
	+30℃	5744.987	13	5824.986	14
	+40℃	5744.989	11	5824.990	10
	+50℃	5744.989	11	5824.992	8

--------END OF REPORT-------