

3.7 Radiated emission

3.7.1 Limit

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.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

The provisions of §15.205 apply to intentional radiators operating under this section.

3.7.2 Test method

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

3. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold

4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

5. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 3MHz, Detector = RMS for AV value, while maintaining all of the other instrument settings.

3.7.3 Test Result

Remark:

If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

$E(\text{dB}\mu\text{V/m}) = \text{EIRP}(\text{dBm}) + 95.2 = 68.2\text{dB}\mu\text{V/m}$, for $\text{EIRP}(\text{dBm}) = -27\text{dBm}$

802.11a: 5180MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.36	68.2	PK	
5150	H	46.58	68.2	PK	
10360	V	50.27	68.2	PK	
10360	H	51.39	68.2	PK	
15540	V	51.24	68.2	PK	
15540	H	50.14	68.2	PK	
802.11a: 5200MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
10400	V	51.34	68.2	PK	
10400	H	50.12	68.2	PK	
15600	V	50.76	68.2	PK	
15600	H	49.38	68.2	PK	
802.11a: 5240MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Pass
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	
366.82	H	35.4	43.5	QP	
5350	V	45.86	68.2	PK	
5350	H	46.87	68.2	PK	
10480	V	51.39	68.2	PK	
10480	H	50.72	68.2	PK	
15720	V	49.32	68.2	PK	
15720	H	50.59	68.2	PK	

802.11a: 5180MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.87	68.2	PK	
5150	H	46.36	68.2	PK	
10360	V	49.64	68.2	PK	
10360	H	48.75	68.2	PK	
15540	V	50.55	68.2	PK	
15540	H	51.51	68.2	PK	
802.11a: 5200MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
10400	V	50.73	68.2	PK	
10400	H	51.55	68.2	PK	
15600	V	49.64	68.2	PK	
15600	H	48.85	68.2	PK	
802.11a: 5240MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5350	V	46.44	68.2	PK	
5350	H	46.91	68.2	PK	
10480	V	50.78	68.2	PK	
10480	H	51.26	68.2	PK	
15720	V	49.64	68.2	PK	
15720	H	50.17	68.2	PK	

802.11ac20: 5180MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.28	68.2	PK	
5150	H	46.59	68.2	PK	
10360	V	50.36	68.2	PK	
10360	H	49.64	68.2	PK	
15540	V	50.53	68.2	PK	
15540	H	51.17	68.2	PK	
802.11ac20: 5200MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
10400	V	50.89	68.2	PK	
10400	H	50.62	68.2	PK	
15600	V	49.39	68.2	PK	
15600	H	50.67	68.2	PK	
802.11ac20: 5240MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5350	V	46.27	68.2	PK	
5350	H	47.36	68.2	PK	
10480	V	50.61	68.2	PK	
10480	H	51.12	68.2	PK	
15720	V	49.54	68.2	PK	
15720	H	51.33	68.2	PK	

802.11n20: 5180MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.53	68.2	PK	
5150	H	46.76	68.2	PK	
10360	V	50.6	68.2	PK	
10360	H	51.95	68.2	PK	
15540	V	50.78	68.2	PK	
15540	H	50.53	68.2	PK	
802.11n20: 5200MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
10400	V	50.14	68.2	PK	
10400	H	50.87	68.2	PK	
15600	V	49.58	68.2	PK	
15600	H	51.1	68.2	PK	
802.11n20: 5240MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5350	V	46.56	68.2	PK	
5350	H	47.55	68.2	PK	
10480	V	49.89	68.2	PK	
10480	H	50.4	68.2	PK	
15720	V	49.9	68.2	PK	
15720	H	51.67	68.2	PK	

802.11ac40: 5190MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.31	68.2	PK	
5150	H	46.28	68.2	PK	
10380	V	51.34	68.2	PK	
10380	H	50.46	68.2	PK	
15570	V	49.57	68.2	PK	
15570	H	50.34	68.2	PK	
802.11ac40: 5230MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5350	V	46.42	68.2	PK	
5350	H	47.23	68.2	PK	
10460	V	51.13	68.2	PK	
10460	H	52.22	68.2	PK	
15690	V	49.34	68.2	PK	
15690	H	50.18	68.2	PK	

802.11n40: 5190MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.24	68.2	PK	
5150	H	46.57	68.2	PK	
10380	V	49.68	68.2	PK	
10380	H	50.81	68.2	PK	
15570	V	49.85	68.2	PK	
15570	H	50.71	68.2	PK	

802.11n40: 5230MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5350	V	45.58	68.2	PK	
5350	H	47.19	68.2	PK	
10460	V	50.52	68.2	PK	
10460	H	50.58	68.2	PK	
15690	V	49.68	68.2	PK	
15690	H	50.51	68.2	PK	

802.11ac80: 5210MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5150	V	45.23	68.2	PK	
5150	H	46.07	68.2	PK	
10420	V	50.43	68.2	PK	
10420	H	49.37	68.2	PK	
15630	V	48.64	68.2	PK	
15630	H	49.52	68.2	PK	
5350	V	46.48	68.2	PK	
5350	H	47.26	68.2	PK	

802.11a: 5745MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.14	68.2	PK	
5725	H	46.31	68.2	PK	
11490	V	52.92	68.2	PK	
11490	H	57.21	68.2	PK	
17235	V	50.96	68.2	PK	
17235	H	51.89	68.2	PK	
802.11a: 5785MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
11570	V	50.17	68.2	PK	
11570	H	51.81	68.2	PK	
17355	V	48.01	68.2	PK	
17355	H	49.02	68.2	PK	
802.11a: 5825MHz (ANT1)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	46.63	68.2	PK	
5850	H	47.32	68.2	PK	
11650	V	50.14	68.2	PK	
11650	H	51.53	68.2	PK	
17475	V	49.04	68.2	PK	
17475	H	50.34	68.2	PK	

802.11a: 5745MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	44.53	68.2	PK	
5725	H	46.24	68.2	PK	
11490	V	50.23	68.2	PK	
11490	H	51.59	68.2	PK	
17235	V	50.34	68.2	PK	
17235	H	51.32	68.2	PK	
802.11a: 5785MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
11570	V	49.73	68.2	PK	
11570	H	50.29	68.2	PK	
17355	V	48.04	68.2	PK	
17355	H	49.43	68.2	PK	
802.11a: 5825MHz (ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	45.97	68.2	PK	
5850	H	46.61	68.2	PK	
11650	V	50.72	68.2	PK	
11650	H	50.92	68.2	PK	
17475	V	48.58	68.2	PK	
17475	H	49.87	68.2	PK	

802.11ac20: 5745MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.46	68.2	PK	
5725	H	46.51	68.2	PK	
11490	V	50.34	68.2	PK	
11490	H	51.78	68.2	PK	
17235	V	49.52	68.2	PK	
17235	H	50.33	68.2	PK	
802.11ac20: 5785MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
11570	V	50.12	68.2	PK	
11570	H	49.32	68.2	PK	
17355	V	49.34	68.2	PK	
17355	H	50.46	68.2	PK	
802.11ac20: 5825MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	46.59	68.2	PK	
5850	H	47.58	68.2	PK	
11650	V	50.27	68.2	PK	
11650	H	50.08	68.2	PK	
17475	V	49.76	68.2	PK	
17475	H	50.64	68.2	PK	

802.11n20: 5745MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.75	68.2	PK	
5725	H	46.49	68.2	PK	
11490	V	51.62	68.2	PK	
11490	H	50.06	68.2	PK	
17235	V	49.88	68.2	PK	
17235	H	50.67	68.2	PK	
802.11n20: 5785MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
11570	V	50.39	68.2	PK	
11570	H	51.53	68.2	PK	
17355	V	49.77	68.2	PK	
17355	H	50.74	68.2	PK	
802.11n20: 5825MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	46.87	68.2	PK	
5850	H	47.73	68.2	PK	
11650	V	50.52	68.2	PK	
11650	H	50.42	68.2	PK	
17475	V	50.14	68.2	PK	
17475	H	51.06	68.2	PK	

802.11ac40: 5755MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.53	68.2	PK	
5725	H	46.62	68.2	PK	
11510	V	50.49	68.2	PK	
11510	H	49.58	68.2	PK	
17265	V	49.67	68.2	PK	
17265	H	50.46	68.2	PK	
802.11ac40: 5795MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	45.61	68.2	PK	
5850	H	46.75	68.2	PK	
11590	V	49.43	68.2	PK	
11590	H	48.59	68.2	PK	
17385	V	49.55	68.2	PK	
17385	H	50.43	68.2	PK	

802.11n40: 5755MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.42	68.2	PK	
5725	H	46.99	68.2	PK	
11510	V	50.85	68.2	PK	
11510	H	49.93	68.2	PK	
17265	V	50.04	68.2	PK	
17265	H	50.75	68.2	PK	

802.11n40: 5795MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5850	V	45.97	68.2	PK	
5850	H	47.09	68.2	PK	
11590	V	50.76	68.2	PK	
11590	H	48.93	68.2	PK	
17385	V	49.91	68.2	PK	
17385	H	50.93	68.2	PK	

802.11ac80: 5775MHz(ANT1+ANT2)					
Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
366.82	V	30.1	43.5	QP	Pass
366.82	H	35.4	43.5	QP	
5725	V	45.13	68.2	PK	
5725	H	46.21	68.2	PK	
11550	V	50.67	68.2	PK	
11550	H	51.49	68.2	PK	
17325	V	48.73	68.2	PK	
17325	H	49.64	68.2	PK	
5850	V	46.23	68.2	PK	
5850	H	46.82	68.2	PK	

3.8 Frequency stability

3.8.1 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 users manual.

3.8.2 Test method

Test Procedures for Temperature Variation:

- 1, The EUT was set up in the thermal chamber and connected with the base station.
- 2, With power off, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 3, With power off, the temperature was raised in 10°C set up to 50°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

- 1, The EUT was placed in a temperature chamber at 25±5°C and connected with the base station.
- 2, Reduce the primary supply voltage to the battery operating end point.
- 3, measure the carrier frequency error.

3.8.3 Test Result

TX: 5180MHz

Temperature (°C)	Voltage (V _{AC})	Test Result (MHz)	Deviation (ppm)
0	120	5180.023015	4.443
10		5180.022948	4.43
20		5180.023478	4.532
30		5180.023078	4.455
40		5180.024481	4.726
25	138	5180.022648	4.372
25	102	5180.022481	4.34

TX: 5745MHz

Temperature (°C)	Voltage (V _{AC})	Test Result (Hz)	Deviation (ppm)
0	120	5745.026133	4.549
10		5745.024954	4.344
20		5745.02743	4.775
30		5745.024903	4.335
40		5745.027218	4.738
25	138	5745.025048	4.36
25	102	5745.026045	4.534

----END OF REPORT----