11N40MIMO_Ant1_5795

11N40MIMO_Ant2_5795

6dB Bandwidth:

11A_Ant1_5745

11A_Ant2_5745

11A_Ant1_5785

11A_Ant2_5785

11A_Ant2_5825

11N20MIMO_Ant1_5745

11N20MIMO_Ant2_5745

11N20MIMO_Ant1_5785

11N20MIMO_Ant2_5785

11N20MIMO_Ant1_5825

11N20MIMO_Ant2_5825

11N40MIMO_Ant1_5755

11N40MIMO_Ant2_5755

11N40MIMO_Ant1_5795

11N40MIMO_Ant2_5795

10. Maximum Output Power

10.1. Block Diagram of Test Setup

Same as section 8.1

10.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	☐ Outdoor Access Point: 1 W (30 dBm)	5150-5250
	☐ Indoor Access Point: 1 W (30 dBm)	
	☐ Fixed Point-To-Point Access Points: 1 W (30 dBm)	
	☒ Client Devices: 250 mW (24 dBm)	
	Shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.	5250-5350 5470-5725
	Shall not exceed 1 Watt (30 dBm).	5725-5850
Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Maximum Output Power limit is the above limits-(8.64-6)		

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Test Item	Limit	Frequency Range (MHz)
Conducted Output Power or e.i.r.p.	The maximum e.i.r.p. shall not exceed 200 mW (23 dBm) or 10 + 10 log10B, dBm, whichever power is less. B is the 99 % emission bandwidth in megahertz.	5150-5250
	a. The maximum conducted output power shall not exceed 250 mW (24 dBm) or 11 + 10 log10B dBm, whichever is less. b. The maximum e.i.r.p. shall not exceed 1.0 W (30 dBm) or 17 + 10 log10B dBm, whichever is less. B is the 99 % emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.	5250-5350
		5250-5350 5470-5600 5650-5725
	Shall not exceed 1 Watt (30 dBm). The e.i.r.p. shall not exceed 4 W	5725-5850
Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Maximum Output Power limit is the above limits-(8.64-6)		

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

10.3. Test Procedure

Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

(1) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:

a) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.

b) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.

c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(2) If the transmitter does not transmit continuously, measure the duty cycle D of the transmitter output signal as described in 12.2.

(3) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.

(4) Correct the measurement in dBm by adding [10 log (1 / D)], where D is the duty cycle {e.g., [10 log (1 / 0.25)], if the duty cycle is 25%}

10.4. Test Result

Test Mode	Ant.	Freq. (MHz)	Channel Power (dBm)	DC Factor (dBm)	Result (dBm)	Limit (dBm)	Gain(dBi)	EIRP (dBm)	EIRP Limit (dBm)	Verdict
11A	Ant1	5180	1.93	0.16	2.09	23.98	5.63	7.72	22.20	PASS
	Ant2	5180	1.84	0.13	1.97	23.98	5.63	7.6	22.20	PASS
	Ant1	5200	2.19	0.16	2.35	23.98	5.63	7.98	22.18	PASS
	Ant2	5200	2.09	0.13	2.22	23.98	5.63	7.85	22.20	PASS
	Ant1	5240	2.20	0.13	2.33	23.98	5.63	7.96	22.21	PASS
	Ant2	5240	2.60	0.13	2.73	23.98	5.63	8.36	22.21	PASS
	Ant1	5260	2.20	0.13	2.33	23.18	5.63	7.96	29.18	PASS
	Ant2	5260	3.50	0.16	3.66	23.18	5.63	9.29	29.18	PASS
	Ant1	5280	1.98	0.13	2.11	23.21	5.63	7.74	29.21	PASS
	Ant2	5280	2.91	0.13	3.04	23.21	5.63	8.67	29.21	PASS
	Ant1	5320	4.38	0.13	4.51	23.22	5.63	10.14	29.22	PASS
	Ant2	5320	5.13	0.16	5.29	23.19	5.63	10.92	29.19	PASS
	Ant1	5500	5.42	0.16	5.58	23.21	5.63	11.21	29.21	PASS
	Ant2	5500	5.93	0.16	6.09	23.20	5.63	11.72	29.20	PASS
	Ant1	5580	3.62	0.16	3.78	23.21	5.63	9.41	29.21	PASS
	Ant2	5580	4.57	0.13	4.70	23.22	5.63	10.33	29.22	PASS
	Ant1	5700	1.69	0.16	1.85	23.18	5.63	7.48	29.18	PASS
	Ant2	5700	0.88	0.16	1.04	23.20	5.63	6.67	29.20	PASS
	Ant1	5720_UNII-2C	1.64	0.16	1.80	22.28	5.63	7.43	28.28	PASS
	Ant2	5720_UNII-2C	0.71	0.16	0.87	22.26	5.63	6.5	28.26	PASS
	Ant1	5720_UNII-3	-4.98	0.16	-4.82	30.00	5.63	0.81	---	PASS
	Ant2	5720_UNII-3	-6.00	0.16	-5.84	30.00	5.63	-0.21	---	PASS
	Ant1	5745	2.77	0.13	2.90	30.00	5.63	8.53	---	PASS
	Ant2	5745	1.54	0.16	1.70	30.00	5.63	7.33	---	PASS
	Ant1	5785	3.34	0.16	3.50	30.00	5.63	9.13	---	PASS
	Ant2	5785	2.30	0.13	2.43	30.00	5.63	8.06	---	PASS
	Ant1	5825	2.58	0.16	2.74	30.00	5.63	8.37	---	PASS
	Ant2	5825	2.24	0.13	2.37	30.00	5.63	8	---	PASS
11N20MIMO	Ant1	5180	0.61	0.17	0.78	23.98	5.63	6.41	22.55	PASS
	Ant2	5180	0.59	0.13	0.72	23.98	5.63	6.35	22.49	PASS
	total	5180	---	---	3.76	21.34	5.63	9.39	22.49	PASS
	Ant1	5200	1.33	0.17	1.50	23.98	5.63	7.13	22.49	PASS
	Ant2	5200	1.18	0.13	1.31	23.98	5.63	6.94	22.48	PASS
	total	5200	---	---	4.42	21.34	5.63	10.05	22.48	PASS
	Ant1	5240	1.46	0.13	1.59	23.98	5.63	7.22	22.49	PASS
	Ant2	5240	1.14	0.13	1.27	23.98	5.63	6.9	22.48	PASS
	total	5240	---	---	4.44	21.34	5.63	10.07	22.48	PASS
	Ant1	5260	3.06	0.13	3.19	23.46	5.63	8.82	29.46	PASS
	Ant2	5260	3.47	0.17	3.64	23.46	5.63	9.27	29.46	PASS
	total	5260	---	---	6.43	20.82	5.63	12.06	29.46	PASS
	Ant1	5280	1.93	0.13	2.06	23.51	5.63	7.69	29.51	PASS
	Ant2	5280	3.36	0.17	3.53	23.51	5.63	9.16	29.51	PASS
	total	5280	---	---	5.87	20.87	5.63	11.5	29.51	PASS
	Ant1	5320	4.16	0.17	4.33	23.49	5.63	9.96	29.49	PASS
	Ant2	5320	5.23	0.17	5.40	23.5	5.63	11.03	29.50	PASS
	total	5320	---	---	7.91	20.86	5.63	13.54	29.50	PASS
	Ant1	5500	5.26	0.13	5.39	23.5	5.63	11.02	29.50	PASS
	Ant2	5500	6.02	0.13	6.15	23.5	5.63	11.78	29.50	PASS
	total	5500	---	---	8.80	20.86	5.63	14.43	29.50	PASS
	Ant1	5580	3.77	0.17	3.94	23.49	5.63	9.57	29.49	PASS

	Ant2	5580	4.82	0.17	4.99	23.51	5.63	10.62	29.51	PASS
	total	5580	---	---	7.51	20.87	5.63	13.14	29.51	PASS
	Ant1	5700	1.29	0.13	1.42	23.49	5.63	7.05	29.49	PASS
	Ant2	5700	1.19	0.17	1.36	23.52	5.63	6.99	29.52	PASS
	total	5700	---	---	4.40	20.88	5.63	10.03	29.52	PASS
	Ant1	5720_UNII-2C	0.81	0.13	0.94	22.43	5.63	6.57	28.43	PASS
	Ant2	5720_UNII-2C	0.89	0.17	1.06	22.43	5.63	6.69	28.43	PASS
	total	5720_UNII-2C	---	---	4.01	19.79	5.63	9.64	28.43	PASS
	Ant1	5720_UNII-3	-4.86	0.13	-4.73	30.00	5.63	0.9	---	PASS
	Ant2	5720_UNII-3	-6.75	0.17	-6.58	30.00	5.63	-0.95	---	PASS
	total	5720_UNII-3	---	---	-2.55	27.46	5.63	3.08	---	PASS
	Ant1	5745	2.12	0.17	2.29	30.00	5.63	7.92	---	PASS
	Ant2	5745	1.70	0.17	1.87	30.00	5.63	7.5	---	PASS
	total	5745	---	---	5.10	27.46	5.63	10.73	---	PASS
	Ant1	5785	3.48	0.13	3.61	30.00	5.63	9.24	---	PASS
	Ant2	5785	2.66	0.17	2.83	30.00	5.63	8.46	---	PASS
	total	5785	---	---	6.25	27.46	5.63	11.88	---	PASS
	Ant1	5825	2.31	0.17	2.48	30.00	5.63	8.11	---	PASS
	Ant2	5825	2.57	0.17	2.74	30.00	5.63	8.37	---	PASS
	total	5825	---	---	5.62	27.46	5.63	11.25	---	PASS
11N40MIMO	Ant1	5190	1.98	0.27	2.25	23.98	5.63	7.88	23.01	PASS
	Ant2	5190	1.59	0.20	1.79	23.98	5.63	7.42	23.01	PASS
	total	5190	---	---	5.04	21.44	5.63	10.67	21.00	PASS
	Ant1	5230	2.40	0.27	2.67	23.98	5.63	8.3	23.01	PASS
	Ant2	5230	2.64	0.27	2.91	23.98	5.63	8.54	23.01	PASS
	total	5230	---	---	5.80	21.44	5.63	11.43	21.00	PASS
	Ant1	5270	2.64	0.20	2.84	23.98	5.63	8.47	30.00	PASS
	Ant2	5270	3.37	0.27	3.64	23.98	5.63	9.27	30.00	PASS
	total	5270	---	---	6.27	21.44	5.63	11.9	30.00	PASS
	Ant1	5310	5.01	0.20	5.21	23.98	5.63	10.84	30.00	PASS
	Ant2	5310	6.09	0.27	6.36	23.98	5.63	11.99	30.00	PASS
	total	5310	---	---	8.83	21.44	5.63	14.46	30.00	PASS
	Ant1	5510	7.93	0.20	8.13	23.98	5.63	13.76	30.00	PASS
	Ant2	5510	8.62	0.20	8.82	23.98	5.63	14.45	30.00	PASS
	total	5510	---	---	11.50	21.44	5.63	17.13	30.00	PASS
	Ant1	5550	4.51	0.27	4.78	23.98	5.63	10.41	30.00	PASS
	Ant2	5550	5.31	0.27	5.58	23.98	5.63	11.21	30.00	PASS
	total	5550	---	---	8.21	21.44	5.63	13.84	30.00	PASS
	Ant1	5670	1.68	0.27	1.95	23.98	5.63	7.58	30.00	PASS
	Ant2	5670	1.75	0.27	2.02	23.98	5.63	7.65	30.00	PASS
	total	5670	---	---	5.00	21.44	5.63	10.63	30.00	PASS
	Ant1	5710_UNII-2C	2.58	0.27	2.85	23.98	5.63	8.48	30.00	PASS
	Ant2	5710_UNII-2C	2.33	0.27	2.60	23.98	5.63	8.23	30.00	PASS
	total	5710_UNII-2C	---	---	5.74	21.44	5.63	11.37	30.00	PASS
	Ant1	5710_UNII-3	-8.58	0.27	-8.31	30.00	5.63	-2.68	---	PASS
	Ant2	5710_UNII-3	-10.24	0.27	-9.97	30.00	5.63	-4.34	---	PASS
	total	5710_UNII-3	---	---	-6.05	27.46	5.63	-0.42	---	PASS
	Ant1	5755	3.01	0.20	3.21	30.00	5.63	8.84	---	PASS
	Ant2	5755	2.29	0.20	2.49	30.00	5.63	8.12	---	PASS
	total	5755	---	---	5.88	27.46	5.63	11.51	---	PASS
	Ant1	5795	3.53	0.20	3.73	30.00	5.63	9.36	---	PASS
	Ant2	5795	3.09	0.20	3.29	30.00	5.63	8.92	---	PASS
	total	5795	---	---	6.53	27.46	5.63	12.16	---	PASS

Note: The EIRP = Channel Power + DC factor + Ant. Gain

11. Power Spectral Density

11.1. Block Diagram of Test Setup

Same as section 8.1

11.2. Limits

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	☐ Outdoor Access Point: 17 dBm/MHz ☐ Indoor Access Point: 17 dBm/MHz ☐ Fixed Point-To-Point Access Points: 17 dBm/MHz ☒ Client Devices: 11 dBm/MHz	5150-5250
	11 dBm/MHz	5250-5350 5470-5725
	30 dBm/500 kHz	5725-5850
Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Power Spectral Density limit is the above limits-(8.64-6)		

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Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.	5150-5250
	The power spectral density shall not exceed 11 dBm inany 1.0 MHz band.	5250-5350 5470-5600 5650-5725
	30 dBm/500 kHz	5725-5850
Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Power Spectral Density limit is the above limits-(8.64-6)		

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.3. Test Procedure

a) Measure the duty cycle D of the transmitter output signal as described in 12.2.

b) Set span to encompass the entire 99% OBW of the signal.

c) Set RBW = 1 MHz.

d) Set VBW ≥ 3 MHz.

e) Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)

f) Sweep time = auto.

g) Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.

h) Do not use sweep triggering. Allow the sweep to “free run.”

i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.then add [10 log (1 / D)], where D is the duty cycle, to the peak of the spectrum.

j) The procedure in item a) through item i) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.85 This requirement also permits use of resolution bandwidths less than 1 MHz “provided that the measured power is integrated to show the total power over the measurement bandwidth” (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHzbandwidth, the following adjustments to the procedures apply:

1) Set RBW ≥ 1 / T.