





















26dB Bandwidth:

























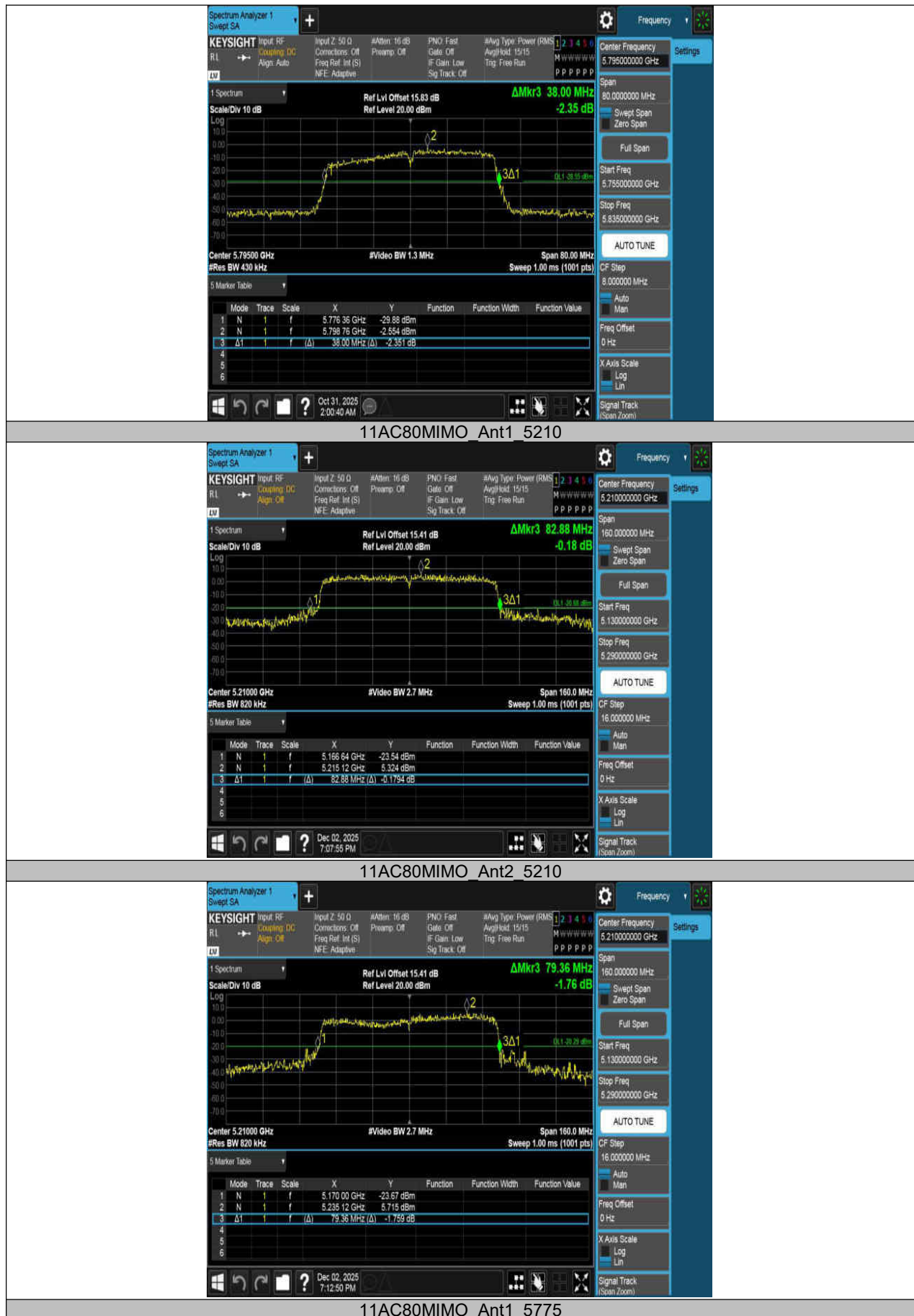














11AC80MIMO_Ant2_5775



6dB Bandwidth:

11A_Ant1_5745



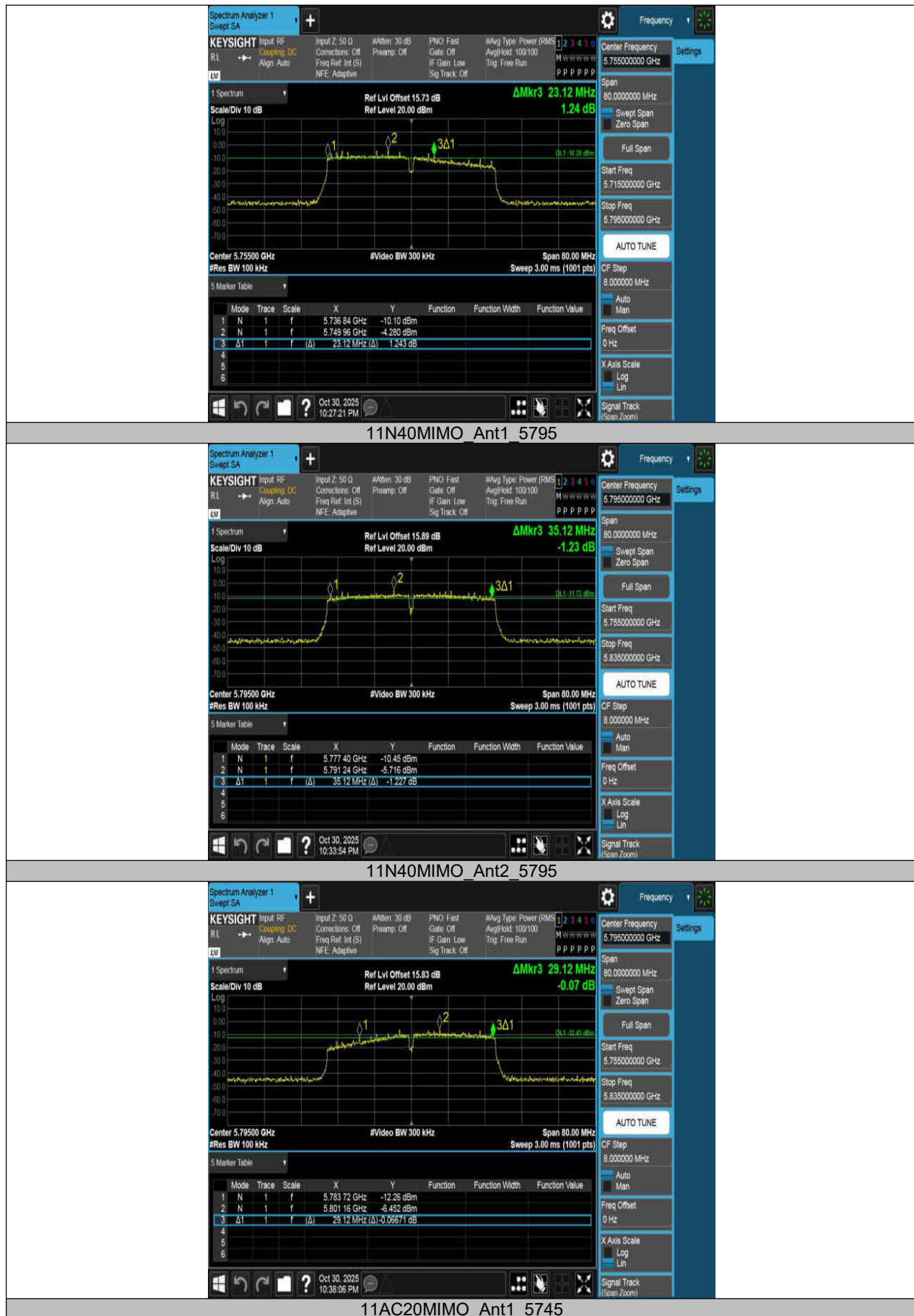
11A_Ant2_5745





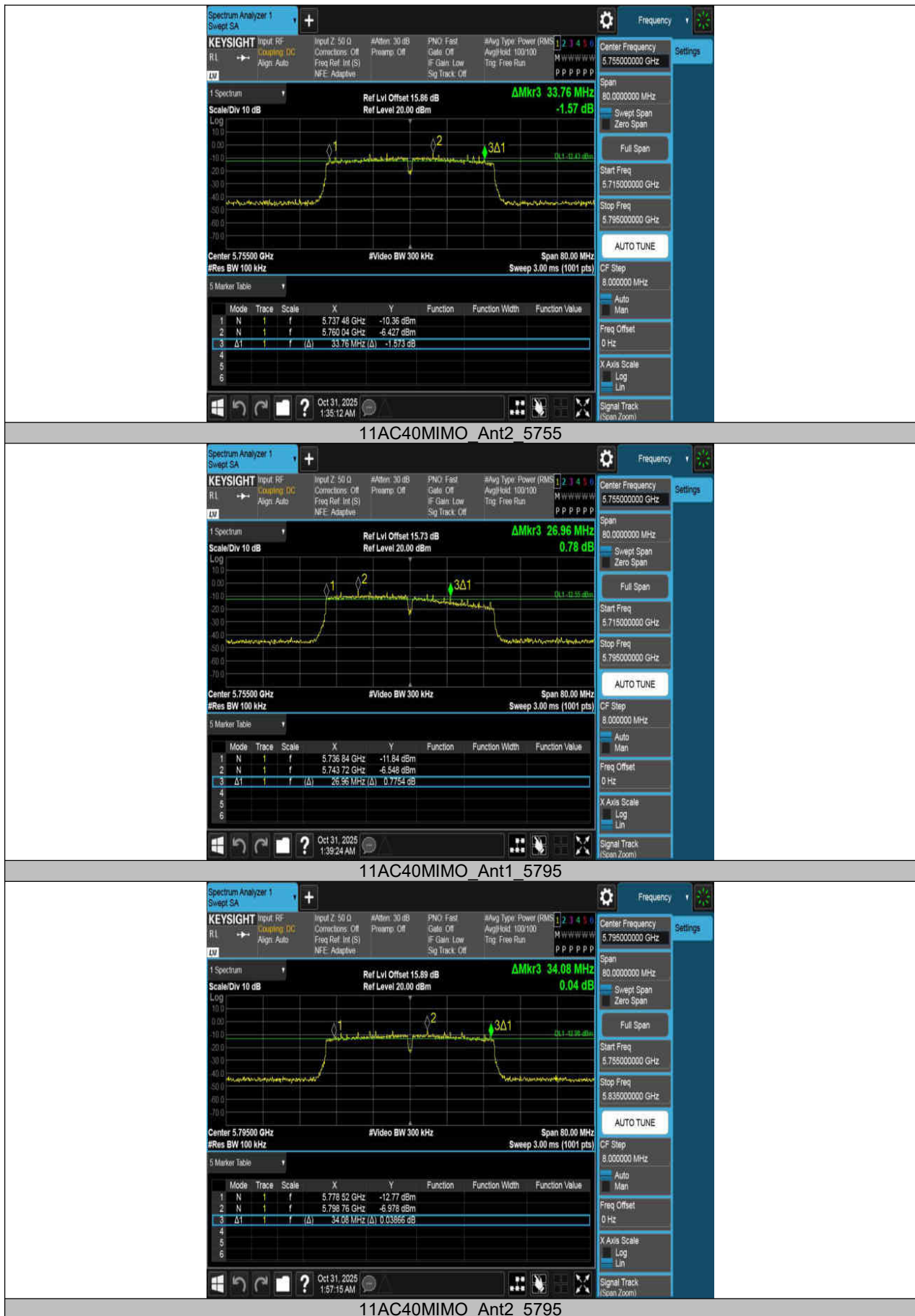














10. Maximum Output Power

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 and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 7.26 dBi. The Output Power limit is the above limits-(7.26-6)		

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)	EIRP (dBm)	EIRP Limit (dBm)	Verdict
11A	Ant1	5180	13.09	0.40	13.49	≤23.98	17.19	---	PASS
	Ant2	5180	12.75	0.30	13.05	≤23.98	17.79	---	PASS
	Ant1	5200	12.09	0.42	12.51	≤23.98	16.21	---	PASS
	Ant2	5200	12.24	0.44	12.68	≤23.98	17.42	---	PASS
	Ant1	5240	13.33	0.38	13.71	≤23.98	17.41	---	PASS
	Ant2	5240	12.96	0.42	13.38	≤23.98	18.12	---	PASS
	Ant1	5745	12.16	0.26	12.42	≤30.00	16.12	---	PASS
	Ant2	5745	11.59	0.46	12.05	≤30.00	16.79	---	PASS
	Ant1	5785	11.85	0.38	12.23	≤30.00	15.93	---	PASS
	Ant2	5785	10.10	0.42	10.52	≤30.00	15.26	---	PASS

	Ant1	5825	11.93	0.40	12.33	≤30.00	16.03	---	PASS
	Ant2	5825	10.47	0.25	10.72	≤30.00	15.46	---	PASS
11N20MI MO	Ant1	5180	6.32	0.35	6.67	≤22.72	10.37	---	PASS
	Ant2	5180	6.93	0.37	7.30	≤22.72	12.04	---	PASS
	total	5180	---	---	10.01	≤22.72	14.30	---	PASS
	Ant1	5200	4.87	0.41	5.28	≤22.72	8.98	---	PASS
	Ant2	5200	7.33	0.37	7.70	≤22.72	12.44	---	PASS
	total	5200	---	---	9.67	≤22.72	14.06	---	PASS
	Ant1	5240	7.53	0.37	7.90	≤22.72	11.60	---	PASS
	Ant2	5240	7.58	0.26	7.84	≤22.72	12.58	---	PASS
	total	5240	---	---	10.88	≤22.72	15.13	---	PASS
	Ant1	5745	9.10	0.45	9.55	≤28.74	13.25	---	PASS
	Ant2	5745	8.46	0.39	8.85	≤28.74	13.59	---	PASS
	total	5745	---	---	12.22	≤28.74	16.43	---	PASS
	Ant1	5785	8.65	0.33	8.98	≤28.74	12.68	---	PASS
	Ant2	5785	6.89	0.30	7.19	≤28.74	11.93	---	PASS
	total	5785	---	---	11.19	≤28.74	15.33	---	PASS
	Ant1	5825	7.43	0.49	7.92	≤28.74	11.62	---	PASS
	Ant2	5825	7.88	0.43	8.31	≤28.74	13.05	---	PASS
	total	5825	---	---	11.13	≤28.74	15.40	---	PASS
11N40MI MO	Ant1	5190	7.55	0.52	8.07	≤22.72	11.77	---	PASS
	Ant2	5190	8.60	0.64	9.24	≤22.72	13.98	---	PASS
	total	5190	---	---	11.70	≤22.72	16.02	---	PASS
	Ant1	5230	7.98	0.72	8.70	≤22.72	12.40	---	PASS
	Ant2	5230	7.24	0.87	8.11	≤22.72	12.85	---	PASS
	total	5230	---	---	11.43	≤22.72	15.64	---	PASS
	Ant1	5755	9.04	0.68	9.72	≤28.74	13.42	---	PASS
	Ant2	5755	8.55	0.56	9.11	≤28.74	13.85	---	PASS
	total	5755	---	---	12.44	≤28.74	16.65	---	PASS
	Ant1	5795	8.66	0.80	9.46	≤28.74	13.16	---	PASS
11AC20M IMO	Ant2	5795	7.01	0.80	7.81	≤28.74	12.55	---	PASS
	total	5795	---	---	11.72	≤28.74	15.88	---	PASS
	Ant1	5180	6.98	0.45	7.43	≤22.72	11.13	---	PASS
	Ant2	5180	7.69	0.35	8.04	≤22.72	12.78	---	PASS
	total	5180	---	---	10.76	≤22.72	15.04	---	PASS
	Ant1	5200	6.61	0.43	7.04	≤22.72	10.74	---	PASS
	Ant2	5200	7.98	0.53	8.51	≤22.72	13.25	---	PASS
	total	5200	---	---	10.85	≤22.72	15.18	---	PASS
	Ant1	5240	7.58	0.53	8.11	≤22.72	11.81	---	PASS
	Ant2	5240	7.72	0.43	8.15	≤22.72	12.89	---	PASS
	total	5240	---	---	11.14	≤22.72	15.39	---	PASS
	Ant1	5745	7.94	0.39	8.33	≤28.74	12.03	---	PASS
	Ant2	5745	7.00	0.49	7.49	≤28.74	12.23	---	PASS
	total	5745	---	---	10.94	≤28.74	15.14	---	PASS
	Ant1	5785	7.44	0.45	7.89	≤28.74	11.59	---	PASS
	Ant2	5785	6.02	0.51	6.53	≤28.74	11.27	---	PASS
	total	5785	---	---	10.27	≤28.74	14.44	---	PASS
	Ant1	5825	6.42	0.53	6.95	≤28.74	10.65	---	PASS
11AC40M IMO	Ant2	5825	6.60	0.49	7.09	≤28.74	11.83	---	PASS
	total	5825	---	---	10.03	≤28.74	14.29	---	PASS
	Ant1	5190	7.22	1.01	8.23	≤22.72	11.93	---	PASS
	Ant2	5190	8.33	0.60	8.93	≤22.72	13.67	---	PASS
	total	5190	---	---	11.60	≤22.72	15.90	---	PASS
	Ant1	5230	7.14	0.52	7.66	≤22.72	11.36	---	PASS
	Ant2	5230	6.09	0.79	6.88	≤22.72	11.62	---	PASS
	total	5230	---	---	10.30	≤22.72	14.50	---	PASS
	Ant1	5755	7.34	0.67	8.01	≤28.74	11.71	---	PASS
	Ant2	5755	7.19	1.01	8.20	≤28.74	12.94	---	PASS
	total	5755	---	---	11.12	≤28.74	15.38	---	PASS
	Ant1	5795	6.87	0.98	7.85	≤28.74	11.55	---	PASS

	Ant2	5795	5.88	0.87	6.75	≤ 28.74	11.49	---	PASS
	total	5795	---	---	10.35	≤ 28.74	14.53	---	PASS
11AC80M IMO	Ant1	5210	5.83	1.88	7.71	≤ 22.72	11.41	---	PASS
	Ant2	5210	7.05	1.76	8.81	≤ 22.72	13.55	---	PASS
	total	5210	---	---	11.31	≤ 22.72	15.62	---	PASS
	Ant1	5775	6.57	1.57	8.14	≤ 28.74	11.84	---	PASS
	Ant2	5775	8.83	1.95	10.78	≤ 28.74	15.52	---	PASS
	total	5775	---	---	12.67	≤ 28.74	17.07	---	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 and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 7.26 dBi. The Power Spectral Density limit is the above limits-(7.26-6)	

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

- Measure the duty cycle D of the transmitter output signal as described in 12.2.
- Set span to encompass the entire 99% OBW of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.
- Do not use sweep triggering. Allow the sweep to "free run."
- 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.
- 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 MHz bandwidth, the following adjustments to the procedures apply:
 - Set RBW $\geq 1 / T$.
 - Set VBW $\geq [3 \times \text{RBW}]$.
 - Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Connect the UUT to the spectrum analyzer and use the following settings:

5150 MHz~5250 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal

Trace	Max hold
Sweep time	Auto

5725 MHz-5850 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Note:

1. For UNII-3, according to KdB publication 789033 D02 General U-NII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 1 MHz and VBW at 3 MHz if the spectrum analyzer does not have 500 kHz RBW.

2. The value measured with RBW=300kHz is to be added with $10\log(500\text{kHz}/300\text{kHz})$ which is 2.2dB. For example, if the measured value is +30 dBm using RBW=300kHz (that is +30 dBm/300kHz), then the converted value will be +32.2 dBm/1MHz.

3. Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

11.4. Test Result

TestMode	Antenna	Freq (MHz)	Raw Data (dBm/M Hz)	DC Factor	Result (dBm/M Hz)	Limit (dBm/MHz)	EIRP PSD (dBm/M Hz)	EIRP PSD Limit (dBm/M Hz)	Verdict
11A	Ant1	5180	2.61	0.40	3.01	≤ 11.00	6.71	---	PASS
	Ant2	5180	2.14	0.30	2.44	≤ 11.00	7.18	---	PASS
	Ant1	5200	1.56	0.42	1.98	≤ 11.00	5.68	---	PASS
	Ant2	5200	1.84	0.44	2.28	≤ 11.00	7.02	---	PASS
	Ant1	5240	2.76	0.38	3.14	≤ 11.00	6.84	---	PASS
	Ant2	5240	2.37	0.42	2.79	≤ 11.00	7.53	---	PASS
11N20MIM O	Ant1	5180	-4.24	0.35	-3.89	≤ 9.74	-0.19	---	PASS
	Ant2	5180	-3.87	0.37	-3.50	≤ 9.74	1.24	---	PASS
	total	5180	---	---	-0.68	≤ 9.74	3.59	---	PASS
	Ant1	5200	-4.65	0.41	-4.24	≤ 9.74	-0.54	---	PASS
	Ant2	5200	-3.33	0.37	-2.96	≤ 9.74	1.78	---	PASS
	total	5200	---	---	-0.54	≤ 9.74	3.78	---	PASS
	Ant1	5240	-2.9	0.37	-2.53	≤ 9.74	1.17	---	PASS
	Ant2	5240	-2.63	0.26	-2.37	≤ 9.74	2.37	---	PASS
	total	5240	---	---	0.56	≤ 9.74	4.82	---	PASS
11N40MIM O	Ant1	5190	-6.16	0.52	-5.64	≤ 9.74	-1.94	---	PASS
	Ant2	5190	-4.89	0.64	-4.25	≤ 9.74	0.49	---	PASS
	total	5190	---	---	-1.88	≤ 9.74	2.45	---	PASS
	Ant1	5230	-5.73	0.72	-5.01	≤ 9.74	-1.31	---	PASS
	Ant2	5230	-5.1	0.87	-4.23	≤ 9.74	0.51	---	PASS
	total	5230	---	---	-1.59	≤ 9.74	2.70	---	PASS
11AC20MI MO	Ant1	5180	-3.71	0.45	-3.26	≤ 9.74	0.44	---	PASS
	Ant2	5180	-2.88	0.35	-2.53	≤ 9.74	2.21	---	PASS
	total	5180	---	---	0.13	≤ 9.74	4.42	---	PASS
	Ant1	5200	-3.99	0.43	-3.56	≤ 9.74	0.14	---	PASS
	Ant2	5200	-2.42	0.53	-1.89	≤ 9.74	2.85	---	PASS
	total	5200	---	---	0.37	≤ 9.74	4.71	---	PASS
	Ant1	5240	-2.68	0.53	-2.15	≤ 9.74	1.55	---	PASS
	Ant2	5240	-2.77	0.43	-2.34	≤ 9.74	2.40	---	PASS

	total	5240	---	---	0.77	≤9.74	5.01	---	PASS
11AC40MI MO	Ant1	5190	-7.05	1.01	-6.04	≤9.74	-2.34	---	PASS
	Ant2	5190	-5.16	0.60	-4.56	≤9.74	0.18	---	PASS
	total	5190	---	---	-2.23	≤9.74	2.11	---	PASS
	Ant1	5230	-6.1	0.52	-5.58	≤9.74	-1.88	---	PASS
	Ant2	5230	-6.26	0.79	-5.47	≤9.74	-0.73	---	PASS
	total	5230	---	---	-2.51	≤9.74	1.74	---	PASS
11AC80MI MO	Ant1	5210	-11.16	1.88	-9.28	≤9.74	-5.58	---	PASS
	Ant2	5210	-8.13	1.76	-6.37	≤9.74	-1.63	---	PASS
	total	5210	---	---	-4.58	≤9.74	-0.16	---	PASS

Test Mode	Antenna	Freq (MHz)	Raw Data (dBm/300K Hz)	DC Factor	RBW Factor	Result (dBm/500KHz)	Limit (dBm/500K Hz)	Verdict
11A	Ant1	5745	-3.44	0.26	2.22	-0.96	≤30.00	PASS
	Ant2	5745	-3.86	0.46	2.22	-1.18	≤30.00	PASS
	Ant1	5785	-3.55	0.38	2.22	-0.95	≤30.00	PASS
	Ant2	5785	-5.36	0.42	2.22	-2.72	≤30.00	PASS
	Ant1	5825	-3.63	0.40	2.22	-1.01	≤30.00	PASS
	Ant2	5825	-4.93	0.25	2.22	-2.46	≤30.00	PASS
11N20MIM O	Ant1	5745	-6.35	0.45	2.22	-3.68	≤28.74	PASS
	Ant2	5745	-7.2	0.39	2.22	-4.59	≤28.74	PASS
	total	5745	---	---	---	3.01	≤28.74	PASS
	Ant1	5785	-6.94	0.33	2.22	-4.39	≤28.74	PASS
	Ant2	5785	-8.52	0.30	2.22	-6.00	≤28.74	PASS
	total	5785	---	---	---	3.01	≤28.74	PASS
	Ant1	5825	-8.26	0.49	2.22	-5.55	≤28.74	PASS
	Ant2	5825	-7.55	0.43	2.22	-4.90	≤28.74	PASS
11N40MIM O	total	5825	---	---	---	3.01	≤28.74	PASS
	Ant1	5755	-9.42	0.68	2.22	-6.52	≤28.74	PASS
	Ant2	5755	-9.31	0.56	2.22	-6.53	≤28.74	PASS
	total	5755	---	---	---	3.01	≤28.74	PASS
	Ant1	5795	-10.12	0.80	2.22	-7.10	≤28.74	PASS
	Ant2	5795	-10.11	0.80	2.22	-7.09	≤28.74	PASS
11AC20MI MO	total	5795	---	---	---	3.01	≤28.74	PASS
	Ant1	5745	-7.86	0.39	2.22	-5.25	≤28.74	PASS
	Ant2	5745	-8.27	0.49	2.22	-5.56	≤28.74	PASS
	total	5745	---	---	---	3.01	≤28.74	PASS
	Ant1	5785	-7.92	0.45	2.22	-5.25	≤28.74	PASS
	Ant2	5785	-9.33	0.51	2.22	-6.60	≤28.74	PASS
	total	5785	---	---	---	3.01	≤28.74	PASS
	Ant1	5825	-8.82	0.53	2.22	-6.07	≤28.74	PASS
11AC40MI MO	Ant2	5825	-8.76	0.49	2.22	-6.05	≤28.74	PASS
	total	5825	---	---	---	3.01	≤28.74	PASS
	Ant1	5755	-10.46	0.67	2.22	-7.57	≤28.74	PASS
	Ant2	5755	-11.06	1.01	2.22	-7.83	≤28.74	PASS
	total	5755	---	---	---	3.01	≤28.74	PASS
	Ant1	5795	-11.45	0.98	2.22	-8.25	≤28.74	PASS
11AC80MI MO	Ant2	5795	-11.64	0.87	2.22	-8.55	≤28.74	PASS
	total	5795	---	---	---	3.01	≤28.74	PASS
	Ant1	5775	-14.77	1.57	2.22	-10.98	≤28.74	PASS
	Ant2	5775	-11.34	1.95	2.22	-7.17	≤28.74	PASS
11AC80MI MO	total	5775	---	---	---	3.01	≤28.74	PASS

Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

11.5. Original Test Data

11A_Ant1_5180

