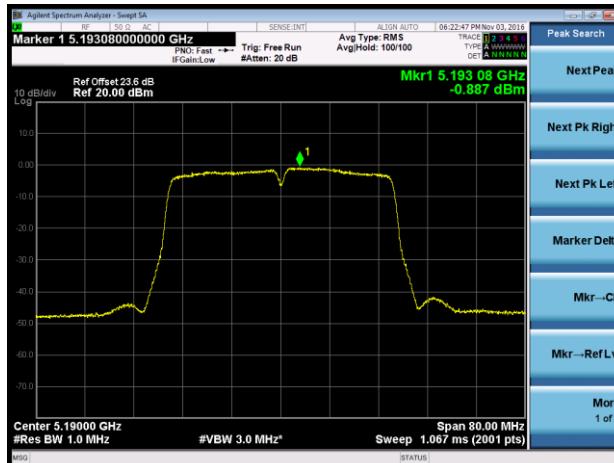
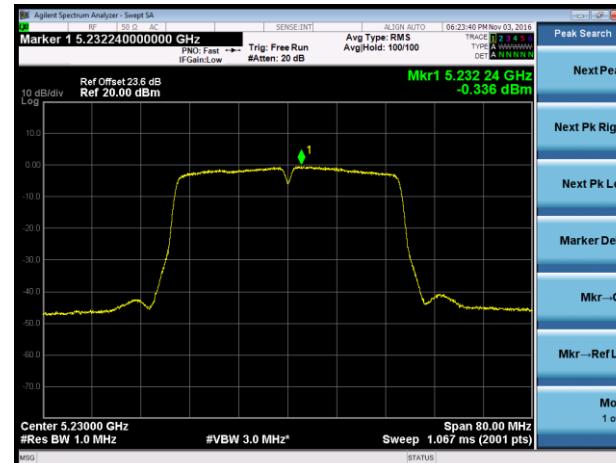


802.11ac-VHT40 Power Spectral Density - Ant 3 / Ant 0 + 1 + 2 + 3

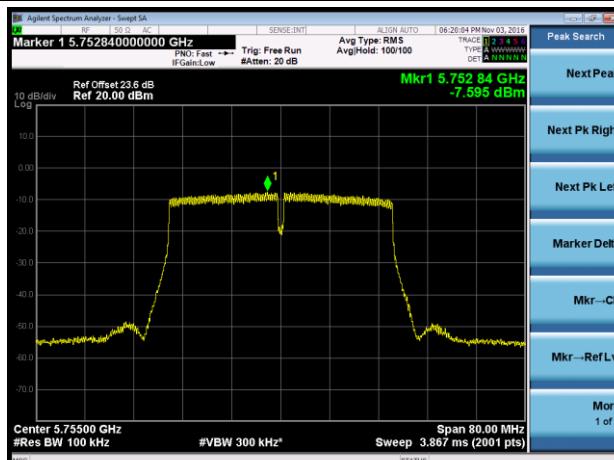
Channel 38 (5190MHz)



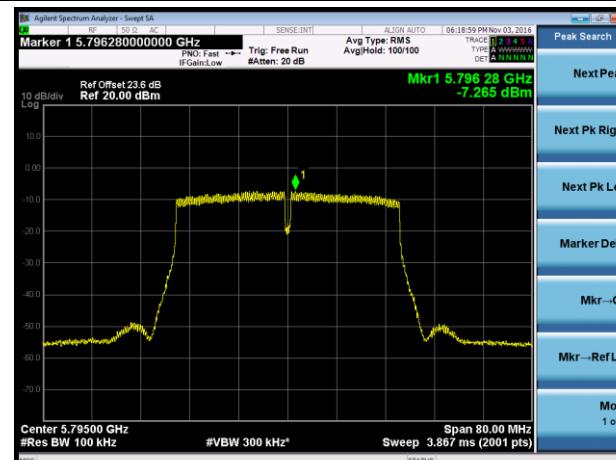
Channel 46 (5230MHz)

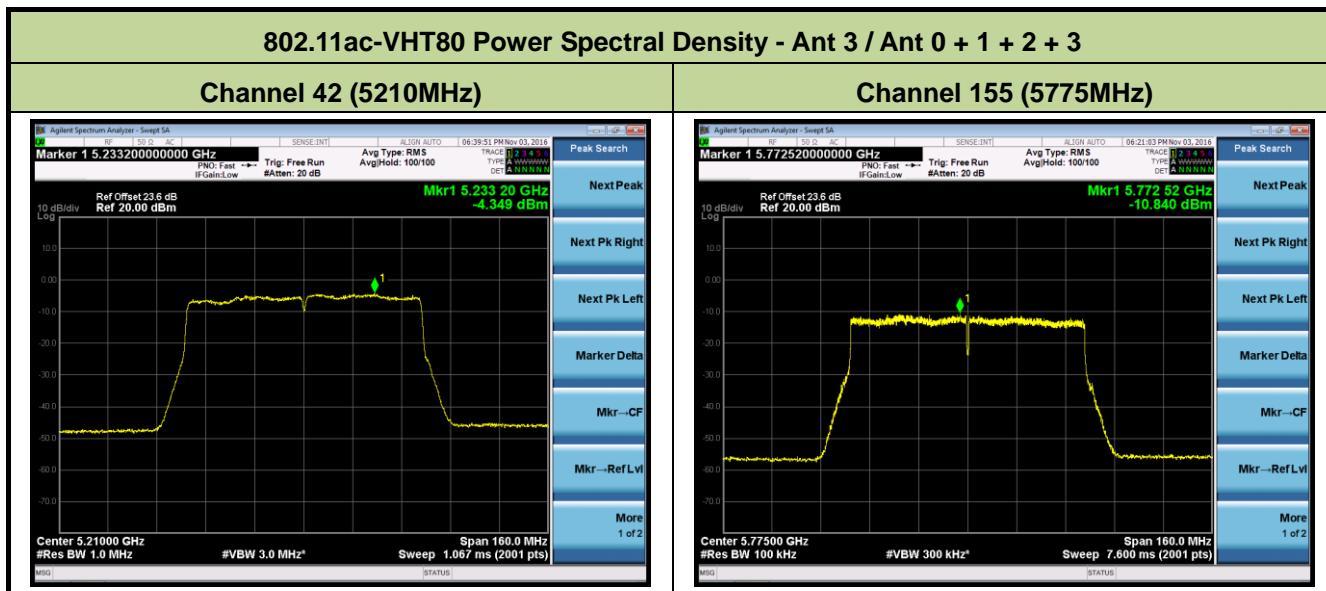


Channel 151 (5755MHz)



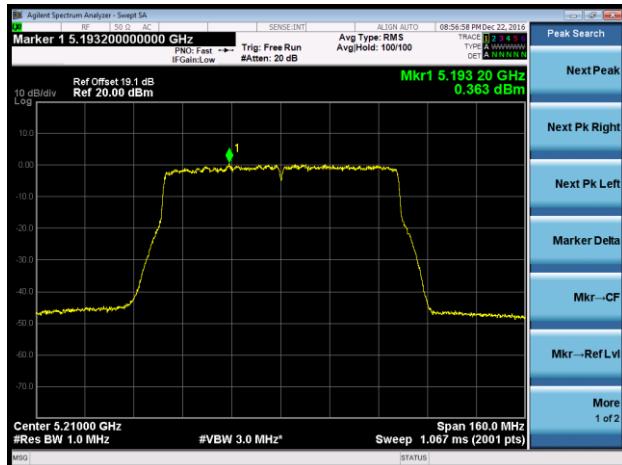
Channel 159 (5795MHz)





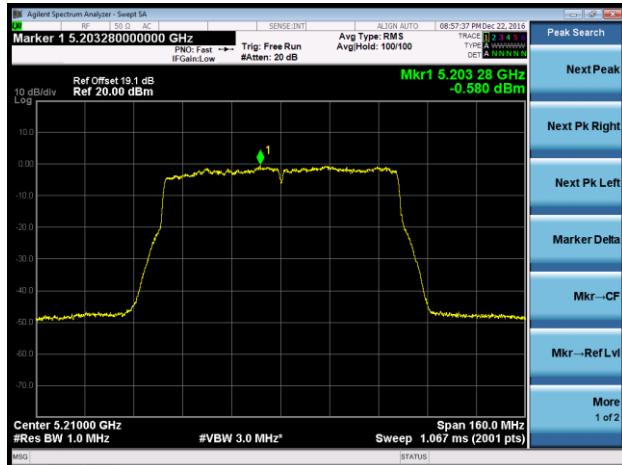
802.11ac-VHT 80 + 80 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3

Channel 42 (5210MHz)



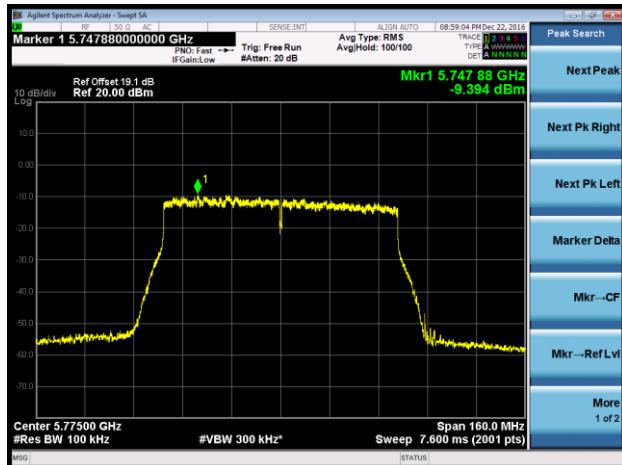
802.11ac-VHT 80 + 80 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 42 (5210MHz)



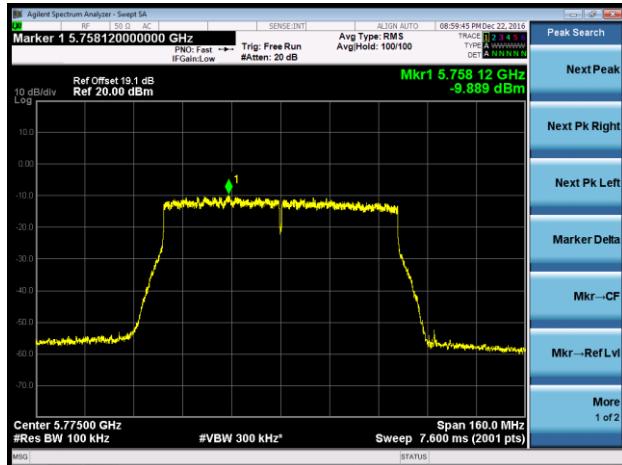
802.11ac-VHT 80 + 80 Power Spectral Density - Ant 2 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)



802.11ac-VHT 80 + 80 Power Spectral Density - Ant 3 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)



Power Spectral Density Measurement Limit of Galtronics Directional Antenna

Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)				CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm/MHz)				
	Ant 0	Ant 1	Ant 2	Ant 3		Ant 0	Ant 1	Ant 2	Ant 3	
5150 ~ 5250	8.39	8.16	8.39	8.16	14.30	14.61	14.84	14.61	14.84	8.70
Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)				CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm/500kHz)				Limit of MIMO (dBm/500kHz)
	Ant 0	Ant 1	Ant 2	Ant 3		Ant 0	Ant 1	Ant 2	Ant 3	
5725 ~ 5850	8.92	8.82	8.92	8.82	14.89	27.08	27.18	27.08	27.18	21.11

Product	US WI-FI AP 4X4 OD ext. antenna	Temperature	25°C
Test Engineer	Johnson Liao	Relative Humidity	50 ~ 58%
Test Site	SR2	Test Date	2016/12/20
Test Item	Power Spectral Density	Antenna Model No.	Galtronics Directional

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 0								
11a	6	36	5180	10.28	97.18	10.40	≤ 14.61	Pass
11a	6	44	5220	10.24	97.18	10.36	≤ 14.61	Pass
11a	6	48	5240	9.77	97.18	9.89	≤ 14.61	Pass
11n-HT20	6.5	36	5180	9.71	98.81	9.76	≤ 14.61	Pass
11n-HT20	6.5	44	5220	9.64	98.81	9.69	≤ 14.61	Pass
11n-HT20	6.5	48	5240	9.94	98.81	9.99	≤ 14.61	Pass
11n-HT40	13.5	38	5190	7.13	97.55	7.24	≤ 14.61	Pass
11n-HT40	13.5	46	5230	7.21	97.55	7.32	≤ 14.61	Pass
11ac-VHT20	6.5	36	5180	9.51	98.82	9.56	≤ 14.61	Pass
11ac-VHT20	6.5	44	5220	9.78	98.82	9.83	≤ 14.61	Pass
11ac-VHT20	6.5	48	5240	9.94	98.82	9.99	≤ 14.61	Pass
11ac-VHT40	13.5	38	5190	6.94	97.40	7.05	≤ 14.61	Pass
11ac-VHT40	13.5	46	5230	7.78	97.40	7.89	≤ 14.61	Pass
11ac-VHT80	29.3	42	5210	3.88	94.30	4.13	≤ 14.61	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + 10*log(1/duty cycle)

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 1								
11a	6	36	5180	11.36	97.18	11.48	≤ 14.84	Pass
11a	6	44	5220	10.94	97.18	11.06	≤ 14.84	Pass
11a	6	48	5240	11.46	97.18	11.58	≤ 14.84	Pass
11n-HT20	6.5	36	5180	9.87	98.81	9.92	≤ 14.84	Pass
11n-HT20	6.5	44	5220	9.81	98.81	9.86	≤ 14.84	Pass
11n-HT20	6.5	48	5240	9.84	98.81	9.89	≤ 14.84	Pass
11n-HT40	13.5	38	5190	8.20	97.55	8.31	≤ 14.84	Pass
11n-HT40	13.5	46	5230	8.15	97.55	8.26	≤ 14.84	Pass
11ac-VHT20	6.5	36	5180	10.90	98.82	10.95	≤ 14.84	Pass
11ac-VHT20	6.5	44	5220	11.07	98.82	11.12	≤ 14.84	Pass
11ac-VHT20	6.5	48	5240	9.75	98.82	9.80	≤ 14.84	Pass
11ac-VHT40	13.5	38	5190	7.62	97.40	7.73	≤ 14.84	Pass
11ac-VHT40	13.5	46	5230	8.21	97.40	8.32	≤ 14.84	Pass
11ac-VHT80	29.3	42	5210	5.20	94.30	5.45	≤ 14.84	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + 10*log(1/duty cycle)

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 2								
11a	6	36	5180	9.80	97.18	9.92	≤ 14.61	Pass
11a	6	44	5220	10.32	97.18	10.44	≤ 14.61	Pass
11a	6	48	5240	10.26	97.18	10.38	≤ 14.61	Pass
11n-HT20	6.5	36	5180	11.37	98.81	11.42	≤ 14.61	Pass
11n-HT20	6.5	44	5220	11.32	98.81	11.37	≤ 14.61	Pass
11n-HT20	6.5	48	5240	11.67	98.81	11.72	≤ 14.61	Pass
11n-HT40	13.5	38	5190	7.21	97.55	7.32	≤ 14.61	Pass
11n-HT40	13.5	46	5230	7.17	97.55	7.28	≤ 14.61	Pass
11ac-VHT20	6.5	36	5180	10.63	98.82	10.68	≤ 14.61	Pass
11ac-VHT20	6.5	44	5220	10.42	98.82	10.47	≤ 14.61	Pass
11ac-VHT20	6.5	48	5240	10.57	98.82	10.62	≤ 14.61	Pass
11ac-VHT40	13.5	38	5190	7.51	97.40	7.62	≤ 14.61	Pass
11ac-VHT40	13.5	46	5230	7.51	97.40	7.62	≤ 14.61	Pass
11ac-VHT80	29.3	42	5210	4.33	94.30	4.58	≤ 14.61	Pass
Ant 3								
11a	6	36	5180	11.25	97.18	11.37	≤ 14.84	Pass
11a	6	44	5220	11.82	97.18	11.94	≤ 14.84	Pass
11a	6	48	5240	11.94	97.18	12.06	≤ 14.84	Pass
11n-HT20	6.5	36	5180	9.81	98.81	9.86	≤ 14.84	Pass
11n-HT20	6.5	44	5220	10.26	98.81	10.31	≤ 14.84	Pass
11n-HT20	6.5	48	5240	10.38	98.81	10.43	≤ 14.84	Pass
11n-HT40	13.5	38	5190	8.16	97.55	8.27	≤ 14.84	Pass
11n-HT40	13.5	46	5230	8.64	97.55	8.75	≤ 14.84	Pass
11ac-VHT20	6.5	36	5180	10.84	98.82	10.89	≤ 14.84	Pass
11ac-VHT20	6.5	44	5220	11.65	98.82	11.70	≤ 14.84	Pass
11ac-VHT20	6.5	48	5240	9.99	98.82	10.04	≤ 14.84	Pass
11ac-VHT40	13.5	38	5190	8.33	97.40	8.44	≤ 14.84	Pass
11ac-VHT40	13.5	46	5230	8.78	97.40	8.89	≤ 14.84	Pass
11ac-VHT80	29.3	42	5210	5.08	94.30	5.33	≤ 14.84	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + $10 \times \log(1/\text{duty cycle})$

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/ MHz)	Ant 1 PSD (dBm/ MHz)	Ant 2 PSD (dBm/ MHz)	Ant 3 PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 0 + 1 + 2 + 3											
11a	6	36	5180	2.42	1.84	1.97	2.13	97.18	8.24	≤ 8.70	Pass
11a	6	44	5220	2.26	1.79	1.93	2.13	97.18	8.17	≤ 8.70	Pass
11a	6	48	5240	2.41	2.23	1.84	2.20	97.18	8.32	≤ 8.70	Pass
11n-HT20	13	36	5180	2.31	2.46	2.16	2.05	98.81	8.32	≤ 8.70	Pass
11n-HT20	13	44	5220	2.70	2.14	2.09	2.40	98.81	8.41	≤ 8.70	Pass
11n-HT20	13	48	5240	2.62	2.58	1.51	1.75	98.81	8.21	≤ 8.70	Pass
11n-HT40	27	38	5190	1.06	0.88	0.54	0.91	97.55	6.98	≤ 8.70	Pass
11n-HT40	27	46	5230	1.36	0.99	0.83	1.08	97.55	7.20	≤ 8.70	Pass
11ac-VHT20	13	36	5180	2.48	2.18	1.66	2.09	98.82	8.18	≤ 8.70	Pass
11ac-VHT20	13	44	5220	2.61	2.36	2.27	2.29	98.82	8.45	≤ 8.70	Pass
11ac-VHT20	13	48	5240	2.42	2.46	2.03	1.95	98.82	8.29	≤ 8.70	Pass
11ac-VHT40	27	38	5190	1.37	0.82	0.47	0.69	97.40	6.98	≤ 8.70	Pass
11ac-VHT40	27	46	5230	1.46	0.85	0.73	0.73	97.40	7.09	≤ 8.70	Pass
11ac-VHT80	58.6	42	5210	-2.24	-2.63	-2.26	-2.78	94.30	3.81	≤ 8.70	Pass

Note: Total PSD (dBm/MHz) = $10^{\log\{10^{(Ant 0 PSD/10)} + 10^{(Ant 1 PSD/10)} + 10^{(Ant 2 PSD/10)} + 10^{(Ant 3 PSD/10)}\}} + 10^{\log(1/duty cycle)}$

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/ MHz)	Ant 1 PSD (dBm/ MHz)	Ant 2 PSD (dBm/ MHz)	Ant 3 PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 0 + 1 + 2 + 3											
11ac-VHT80+80	58.6	42	5210	-0.07	-0.36	--	--	94.30	3.05	≤ 11.71	Pass

Note: Total PSD (dBm/MHz) = $10^{\log\{10^{(Ant 0 PSD/10)} + 10^{(Ant 1 PSD/10)}\}} + 10^{\log(1/duty cycle)}$

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 0									
11a	6	149	5745	3.66	97.18	6.99	10.77	≤ 27.08	Pass
11a	6	157	5785	3.40	97.18	6.99	10.52	≤ 27.08	Pass
11a	6	165	5825	3.22	97.18	6.99	10.34	≤ 27.08	Pass
11n-HT20	6.5	149	5745	2.91	98.81	6.99	9.95	≤ 27.08	Pass
11n-HT20	6.5	157	5785	3.04	98.81	6.99	10.08	≤ 27.08	Pass
11n-HT20	6.5	165	5825	2.89	98.81	6.99	9.93	≤ 27.08	Pass
11n-HT40	13.5	151	5755	-0.01	97.55	6.99	7.09	≤ 27.08	Pass
11n-HT40	13.5	159	5795	0.31	97.55	6.99	7.41	≤ 27.08	Pass
11ac-VHT20	6.5	149	5745	2.78	98.82	6.99	9.82	≤ 27.08	Pass
11ac-VHT20	6.5	157	5785	2.92	98.82	6.99	9.96	≤ 27.08	Pass
11ac-VHT20	6.5	165	5825	3.16	98.82	6.99	10.20	≤ 27.08	Pass
11ac-VHT40	13.5	151	5755	0.43	97.40	6.99	7.53	≤ 27.08	Pass
11ac-VHT40	13.5	159	5795	0.19	97.40	6.99	7.30	≤ 27.08	Pass
11ac-VHT80	29.3	155	5775	-3.27	94.30	6.99	3.98	≤ 27.08	Pass
Ant 1									
11a	6	149	5745	3.16	97.18	6.99	10.28	≤ 27.18	Pass
11a	6	157	5785	3.23	97.18	6.99	10.34	≤ 27.18	Pass
11a	6	165	5825	2.75	97.18	6.99	9.86	≤ 27.18	Pass
11n-HT20	6.5	149	5745	2.29	98.81	6.99	9.34	≤ 27.18	Pass
11n-HT20	6.5	157	5785	2.51	98.81	6.99	9.55	≤ 27.18	Pass
11n-HT20	6.5	165	5825	2.17	98.81	6.99	9.22	≤ 27.18	Pass
11n-HT40	13.5	151	5755	-0.24	97.55	6.99	6.86	≤ 27.18	Pass
11n-HT40	13.5	159	5795	-0.35	97.55	6.99	6.75	≤ 27.18	Pass
11ac-VHT20	6.5	149	5745	3.06	98.82	6.99	10.10	≤ 27.18	Pass
11ac-VHT20	6.5	157	5785	2.38	98.82	6.99	9.42	≤ 27.18	Pass
11ac-VHT20	6.5	165	5825	2.67	98.82	6.99	9.71	≤ 27.18	Pass
11ac-VHT40	13.5	151	5755	-0.64	97.40	6.99	6.47	≤ 27.18	Pass
11ac-VHT40	13.5	159	5795	-0.39	97.40	6.99	6.72	≤ 27.18	Pass
11ac-VHT80	29.3	155	5775	-3.83	94.30	6.99	3.42	≤ 27.18	Pass

Note: Total PSD (dBm/500kHz) = Ant PSD (dBm/100kHz) + $10 \log(1/\text{duty cycle})$ + Constant Factor.

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 2									
11a	6	149	5745	3.22	97.18	6.99	10.34	≤ 27.08	Pass
11a	6	157	5785	2.85	97.18	6.99	9.97	≤ 27.08	Pass
11a	6	165	5825	2.04	97.18	6.99	9.16	≤ 27.08	Pass
11n-HT20	6.5	149	5745	2.64	98.81	6.99	9.69	≤ 27.08	Pass
11n-HT20	6.5	157	5785	2.61	98.81	6.99	9.65	≤ 27.08	Pass
11n-HT20	6.5	165	5825	2.12	98.81	6.99	9.16	≤ 27.08	Pass
11n-HT40	13.5	151	5755	0.34	97.55	6.99	7.44	≤ 27.08	Pass
11n-HT40	13.5	159	5795	-0.29	97.55	6.99	6.81	≤ 27.08	Pass
11ac-VHT20	6.5	149	5745	3.02	98.82	6.99	10.06	≤ 27.08	Pass
11ac-VHT20	6.5	157	5785	2.62	98.82	6.99	9.66	≤ 27.08	Pass
11ac-VHT20	6.5	165	5825	2.10	98.82	6.99	9.14	≤ 27.08	Pass
11ac-VHT40	13.5	151	5755	0.13	97.40	6.99	7.24	≤ 27.08	Pass
11ac-VHT40	13.5	159	5795	-0.46	97.40	6.99	6.65	≤ 27.08	Pass
11ac-VHT80	29.3	155	5775	-3.23	94.30	6.99	4.02	≤ 27.08	Pass
Ant 3									
11a	6	149	5745	3.09	97.18	6.99	10.20	≤ 27.18	Pass
11a	6	157	5785	2.65	97.18	6.99	9.77	≤ 27.18	Pass
11a	6	165	5825	2.72	97.18	6.99	9.84	≤ 27.18	Pass
11n-HT20	6.5	149	5745	2.92	98.81	6.99	9.96	≤ 27.18	Pass
11n-HT20	6.5	157	5785	3.01	98.81	6.99	10.05	≤ 27.18	Pass
11n-HT20	6.5	165	5825	1.90	98.81	6.99	8.94	≤ 27.18	Pass
11n-HT40	13.5	151	5755	-0.25	97.55	6.99	6.85	≤ 27.18	Pass
11n-HT40	13.5	159	5795	-0.66	97.55	6.99	6.44	≤ 27.18	Pass
11ac-VHT20	6.5	149	5745	2.87	98.82	6.99	9.91	≤ 27.18	Pass
11ac-VHT20	6.5	157	5785	2.71	98.82	6.99	9.75	≤ 27.18	Pass
11ac-VHT20	6.5	165	5825	2.21	98.82	6.99	9.25	≤ 27.18	Pass
11ac-VHT40	13.5	151	5755	-0.53	97.40	6.99	6.57	≤ 27.18	Pass
11ac-VHT40	13.5	159	5795	-0.83	97.40	6.99	6.28	≤ 27.18	Pass
11ac-VHT80	29.3	155	5775	-4.12	94.30	6.99	3.13	≤ 27.18	Pass

Note: Total PSD (dBm/500kHz) = Ant 2 PSD (dBm/100kHz) + 10*log(1/duty cycle) + Constant Factor.

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/100kHz)	Ant 1 PSD (dBm/100kHz)	Ant 2 PSD (dBm/100kHz)	Ant 3 PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 0 + 1 + 2 + 3												
11a	6	149	5745	-4.03	-3.94	-3.98	-4.08	97.18	6.99	9.13	≤ 21.11	Pass
11a	6	157	5785	-3.37	-3.83	-3.43	-4.22	97.18	6.99	9.43	≤ 21.11	Pass
11a	6	165	5825	-2.66	-3.67	-3.90	-3.99	97.18	6.99	9.62	≤ 21.11	Pass
11n-HT20	13	149	5745	-4.36	-4.66	-4.68	-4.66	98.81	6.99	8.48	≤ 21.11	Pass
11n-HT20	13	157	5785	-3.52	-4.14	-4.00	-4.09	98.81	6.99	9.13	≤ 21.11	Pass
11n-HT20	13	165	5825	-3.34	-4.17	-4.16	-3.96	98.81	6.99	9.17	≤ 21.11	Pass
11n-HT40	27	151	5755	-6.67	-6.82	-6.64	-7.11	97.55	6.99	6.31	≤ 21.11	Pass
11n-HT40	27	159	5795	-6.24	-5.82	-6.35	-7.09	97.55	6.99	6.77	≤ 21.11	Pass
11ac-VHT20	13	149	5745	-3.86	-4.16	-3.87	-4.07	98.82	6.99	9.07	≤ 21.11	Pass
11ac-VHT20	13	157	5785	-3.84	-4.20	-4.09	-4.31	98.82	6.99	8.96	≤ 21.11	Pass
11ac-VHT20	13	165	5825	-3.11	-3.69	-4.17	-3.74	98.82	6.99	9.40	≤ 21.11	Pass
11ac-VHT40	27	151	5755	-6.73	-7.08	-6.79	-6.92	97.40	6.99	6.25	≤ 21.11	Pass
11ac-VHT40	27	159	5795	-6.76	-7.24	-7.06	-7.34	97.40	6.99	6.03	≤ 21.11	Pass
11ac-VHT80	58.6	155	5775	-10.01	-10.68	-10.66	-9.98	94.30	6.99	2.94	≤ 21.11	Pass

Note: Total PSD (dBm/500kHz) = $10^{\log\{10^{(\text{Ant 0 PSD/10})} + 10^{(\text{Ant 1 PSD/10})} + 10^{(\text{Ant 2 PSD/10})} + 10^{(\text{Ant 3 PSD/10})}\}} + 10^{\log(1/\text{duty cycle})} + \text{Constant Factor}$.

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/100kHz)	Ant 1 PSD (dBm/100kHz)	Ant 2 PSD (dBm/100kHz)	Ant 3 PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 0 + 1 + 2 + 3												
11ac-VHT80+80	58.6	155	5775	--	--	-10.27	-10.90	94.30	6.99	-0.32	≤ 24.12	Pass

Note: Total PSD (dBm/MHz) = $10^{\log\{10^{(\text{Ant 2 PSD/10})} + 10^{(\text{Ant 3 PSD/10})}\}} + 10^{\log(1/\text{duty cycle})} + \text{Constant Factor}$

