

**Power Spectral Density Measurement Limit of FPMI2458-DP4RPSMA Antenna**

Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)				CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm/MHz)				Limit of MIMO (dBm/MHz)  Ant 0+1+2+3
	Ant 0	Ant 1	Ant 2	Ant 3		Ant 0	Ant 1	Ant 2	Ant 3	
5150 ~ 5250	5.79	5.57	5.89	5.05	11.60	17.00	17.00	17.00	17.00	11.40
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+1+2+3
	Ant 0	Ant 1	Ant 2	Ant 3		Ant 0	Ant 1	Ant 2	Ant 3	
5725 ~ 5850	5.24	5.09	6.73	5.62	11.71	30.00	30.00	29.27	30.00	24.29

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	2016/12/19
Test Item	Power Spectral Density	Antenna Model No.	FPMI2458-DP4RPSMA

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	2.83	97.18	2.95	≤ 17.00	Pass
11a	6	44	5220	3.02	97.18	3.15	≤ 17.00	Pass
11a	6	48	5240	3.47	97.18	3.59	≤ 17.00	Pass
11n-HT20	6.5	36	5180	2.63	98.81	2.69	≤ 17.00	Pass
11n-HT20	6.5	44	5220	3.26	98.81	3.31	≤ 17.00	Pass
11n-HT20	6.5	48	5240	3.14	98.81	3.20	≤ 17.00	Pass
11n-HT40	13.5	38	5190	2.59	97.55	2.64	≤ 17.00	Pass
11n-HT40	13.5	46	5230	2.83	97.55	2.88	≤ 17.00	Pass
11ac-VHT20	6.5	36	5180	3.35	98.82	3.40	≤ 17.00	Pass
11ac-VHT20	6.5	44	5220	0.03	98.82	0.15	≤ 17.00	Pass
11ac-VHT20	6.5	48	5240	0.25	98.82	0.37	≤ 17.00	Pass
11ac-VHT40	13.5	38	5190	-3.02	97.40	-2.76	≤ 17.00	Pass
11ac-VHT40	13.5	46	5230	2.83	97.40	2.95	≤ 17.00	Pass
11ac-VHT80	29.3	42	5210	3.02	94.30	3.15	≤ 17.00	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	5.09	97.18	5.22	≤ 17.00	Pass
11a	6	44	5220	5.48	97.18	5.61	≤ 17.00	Pass
11a	6	48	5240	5.07	97.18	5.19	≤ 17.00	Pass
11n-HT20	6.5	36	5180	4.26	98.81	4.31	≤ 17.00	Pass
11n-HT20	6.5	44	5220	4.73	98.81	4.78	≤ 17.00	Pass
11n-HT20	6.5	48	5240	5.56	98.81	5.61	≤ 17.00	Pass
11n-HT40	13.5	38	5190	2.01	97.55	2.12	≤ 17.00	Pass
11n-HT40	13.5	46	5230	2.35	97.55	2.46	≤ 17.00	Pass
11ac-VHT20	6.5	36	5180	4.39	98.82	4.44	≤ 17.00	Pass
11ac-VHT20	6.5	44	5220	4.88	98.82	4.93	≤ 17.00	Pass
11ac-VHT20	6.5	48	5240	5.71	98.82	5.76	≤ 17.00	Pass
11ac-VHT40	13.5	38	5190	2.12	97.40	2.23	≤ 17.00	Pass
11ac-VHT40	13.5	46	5230	2.35	97.40	2.46	≤ 17.00	Pass
11ac-VHT80	29.3	42	5210	-0.71	94.30	-0.46	≤ 17.00	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	2.38	97.18	2.51	≤ 17.00	Pass
11a	6	44	5220	2.86	97.18	2.99	≤ 17.00	Pass
11a	6	48	5240	2.83	97.18	2.95	≤ 17.00	Pass
11n-HT20	6.5	36	5180	2.14	98.81	2.20	≤ 17.00	Pass
11n-HT20	6.5	44	5220	2.22	98.81	2.27	≤ 17.00	Pass
11n-HT20	6.5	48	5240	2.35	98.81	2.40	≤ 17.00	Pass
11n-HT40	13.5	38	5190	0.53	97.55	0.64	≤ 17.00	Pass
11n-HT40	13.5	46	5230	-0.35	97.55	-0.24	≤ 17.00	Pass
11ac-VHT20	6.5	36	5180	2.12	98.82	2.17	≤ 17.00	Pass
11ac-VHT20	6.5	44	5220	2.67	98.82	2.72	≤ 17.00	Pass
11ac-VHT20	6.5	48	5240	3.02	98.82	3.07	≤ 17.00	Pass
11ac-VHT40	13.5	38	5190	-0.57	97.40	-0.46	≤ 17.00	Pass
11ac-VHT40	13.5	46	5230	-0.52	97.40	-0.41	≤ 17.00	Pass
11ac-VHT80	29.3	42	5210	-2.27	94.30	-2.02	≤ 17.00	Pass
Ant 3								
11a	6	36	5180	3.30	97.18	3.42	≤ 17.00	Pass
11a	6	44	5220	3.38	97.18	3.50	≤ 17.00	Pass
11a	6	48	5240	3.47	97.18	3.59	≤ 17.00	Pass
11n-HT20	6.5	36	5180	2.81	98.81	2.86	≤ 17.00	Pass
11n-HT20	6.5	44	5220	3.35	98.81	3.40	≤ 17.00	Pass
11n-HT20	6.5	48	5240	4.02	98.81	4.07	≤ 17.00	Pass
11n-HT40	13.5	38	5190	0.17	97.55	0.28	≤ 17.00	Pass
11n-HT40	13.5	46	5230	0.19	97.55	0.30	≤ 17.00	Pass
11ac-VHT20	6.5	36	5180	2.73	98.82	2.78	≤ 17.00	Pass
11ac-VHT20	6.5	44	5220	3.26	98.82	3.31	≤ 17.00	Pass
11ac-VHT20	6.5	48	5240	3.24	98.82	3.30	≤ 17.00	Pass
11ac-VHT40	13.5	38	5190	0.23	97.40	0.35	≤ 17.00	Pass
11ac-VHT40	13.5	46	5230	0.32	97.40	0.43	≤ 17.00	Pass
11ac-VHT80	29.3	42	5210	-2.66	94.30	-2.41	≤ 17.00	Pass

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

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
<b>Ant 0 + 1 + 2 + 3</b>											
11a	6	36	5180	-2.50	-3.12	-3.39	-3.22	97.18	3.10	≤ 11.40	Pass
11a	6	44	5220	-1.88	-2.36	-2.93	-2.78	97.18	3.68	≤ 11.40	Pass
11a	6	48	5240	-2.03	-2.63	-3.15	-3.01	97.18	3.46	≤ 11.40	Pass
11n-HT20	13	36	5180	-2.54	-2.84	-3.02	-2.64	98.81	3.32	≤ 11.40	Pass
11n-HT20	13	44	5220	-2.35	-3.12	-3.02	-2.41	98.81	3.36	≤ 11.40	Pass
11n-HT20	13	48	5240	-1.98	-2.73	-2.49	-2.56	98.81	3.64	≤ 11.40	Pass
11n-HT40	27	38	5190	-5.43	-6.07	-5.94	-6.02	97.55	0.27	≤ 11.40	Pass
11n-HT40	27	46	5230	-4.44	-5.85	-5.28	-5.70	97.55	0.85	≤ 11.40	Pass
11ac-VHT20	13	36	5180	-2.42	-2.56	-2.73	-2.52	98.82	3.52	≤ 11.40	Pass
11ac-VHT20	13	44	5220	-2.36	-3.19	-3.04	-2.43	98.82	3.33	≤ 11.40	Pass
11ac-VHT20	13	48	5240	-2.05	-2.65	-2.50	-2.44	98.82	3.67	≤ 11.40	Pass
11ac-VHT40	27	38	5190	-5.47	-6.02	-5.96	-5.98	97.40	0.28	≤ 11.40	Pass
11ac-VHT40	27	46	5230	-4.94	-5.69	-5.32	-5.42	97.40	0.80	≤ 11.40	Pass
11ac-VHT80	58.6	42	5210	-7.55	-7.99	-7.88	-8.26	94.30	-1.64	≤ 11.40	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
<b>Ant 0 + 1 + 2 + 3</b>											
11ac-VHT80+80	58.6	42	5210	-4.83	-5.33	--	--	94.30	-1.81	≤ 14.31	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	3.55	97.18	6.99	10.67	≤ 30.00	Pass
11a	6	157	5785	3.20	97.18	6.99	10.32	≤ 30.00	Pass
11a	6	165	5825	2.76	97.18	6.99	9.87	≤ 30.00	Pass
11n-HT20	6.5	149	5745	2.86	98.81	6.99	9.90	≤ 30.00	Pass
11n-HT20	6.5	157	5785	2.68	98.81	6.99	9.72	≤ 30.00	Pass
11n-HT20	6.5	165	5825	2.19	98.81	6.99	9.23	≤ 30.00	Pass
11n-HT40	13.5	151	5755	0.12	97.55	6.99	7.22	≤ 30.00	Pass
11n-HT40	13.5	159	5795	0.09	97.55	6.99	7.19	≤ 30.00	Pass
11ac-VHT20	6.5	149	5745	3.14	98.82	6.99	10.18	≤ 30.00	Pass
11ac-VHT20	6.5	157	5785	2.72	98.82	6.99	9.76	≤ 30.00	Pass
11ac-VHT20	6.5	165	5825	2.06	98.82	6.99	9.10	≤ 30.00	Pass
11ac-VHT40	13.5	151	5755	0.12	97.40	6.99	7.23	≤ 30.00	Pass
11ac-VHT40	13.5	159	5795	-0.29	97.40	6.99	6.82	≤ 30.00	Pass
11ac-VHT80	29.3	155	5775	-3.28	94.30	6.99	3.96	≤ 30.00	Pass
Ant 1									
11a	6	149	5745	3.63	97.18	6.99	10.75	≤ 30.00	Pass
11a	6	157	5785	3.47	97.18	6.99	10.58	≤ 30.00	Pass
11a	6	165	5825	2.92	97.18	6.99	10.03	≤ 30.00	Pass
11n-HT20	6.5	149	5745	3.81	98.81	6.99	10.86	≤ 30.00	Pass
11n-HT20	6.5	157	5785	2.55	98.81	6.99	9.59	≤ 30.00	Pass
11n-HT20	6.5	165	5825	2.14	98.81	6.99	9.18	≤ 30.00	Pass
11n-HT40	13.5	151	5755	0.53	97.55	6.99	7.63	≤ 30.00	Pass
11n-HT40	13.5	159	5795	-0.17	97.55	6.99	6.93	≤ 30.00	Pass
11ac-VHT20	6.5	149	5745	3.63	98.82	6.99	10.67	≤ 30.00	Pass
11ac-VHT20	6.5	157	5785	2.85	98.82	6.99	9.89	≤ 30.00	Pass
11ac-VHT20	6.5	165	5825	1.96	98.82	6.99	9.00	≤ 30.00	Pass
11ac-VHT40	13.5	151	5755	0.61	97.40	6.99	7.72	≤ 30.00	Pass
11ac-VHT40	13.5	159	5795	-0.03	97.40	6.99	7.08	≤ 30.00	Pass
11ac-VHT80	29.3	155	5775	-2.99	94.30	6.99	4.26	≤ 30.00	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	3.75	97.18	6.99	10.86	≤ 29.27	Pass
11a	6	157	5785	3.16	97.18	6.99	10.27	≤ 29.27	Pass
11a	6	165	5825	2.78	97.18	6.99	9.90	≤ 29.27	Pass
11n-HT20	6.5	149	5745	3.35	98.81	6.99	10.39	≤ 29.27	Pass
11n-HT20	6.5	157	5785	2.97	98.81	6.99	10.01	≤ 29.27	Pass
11n-HT20	6.5	165	5825	2.79	98.81	6.99	9.83	≤ 29.27	Pass
11n-HT40	13.5	151	5755	0.45	97.55	6.99	7.55	≤ 29.27	Pass
11n-HT40	13.5	159	5795	0.68	97.55	6.99	7.78	≤ 29.27	Pass
11ac-VHT20	6.5	149	5745	3.24	98.82	6.99	10.28	≤ 29.27	Pass
11ac-VHT20	6.5	157	5785	2.85	98.82	6.99	9.90	≤ 29.27	Pass
11ac-VHT20	6.5	165	5825	2.27	98.82	6.99	9.31	≤ 29.27	Pass
11ac-VHT40	13.5	151	5755	0.37	97.40	6.99	7.47	≤ 29.27	Pass
11ac-VHT40	13.5	159	5795	0.24	97.40	6.99	7.34	≤ 29.27	Pass
11ac-VHT80	29.3	155	5775	-2.80	94.30	6.99	4.44	≤ 29.27	Pass
Ant 3									
11a	6	149	5745	3.20	97.18	6.99	10.32	≤ 30.00	Pass
11a	6	157	5785	2.90	97.18	6.99	10.01	≤ 30.00	Pass
11a	6	165	5825	2.27	97.18	6.99	9.38	≤ 30.00	Pass
11n-HT20	6.5	149	5745	3.05	98.81	6.99	10.09	≤ 30.00	Pass
11n-HT20	6.5	157	5785	2.35	98.81	6.99	9.39	≤ 30.00	Pass
11n-HT20	6.5	165	5825	2.26	98.81	6.99	9.30	≤ 30.00	Pass
11n-HT40	13.5	151	5755	0.18	97.55	6.99	7.28	≤ 30.00	Pass
11n-HT40	13.5	159	5795	-0.81	97.55	6.99	6.29	≤ 30.00	Pass
11ac-VHT20	6.5	149	5745	2.55	98.82	6.99	9.59	≤ 30.00	Pass
11ac-VHT20	6.5	157	5785	2.11	98.82	6.99	9.15	≤ 30.00	Pass
11ac-VHT20	6.5	165	5825	1.79	98.82	6.99	8.83	≤ 30.00	Pass
11ac-VHT40	13.5	151	5755	0.29	97.40	6.99	7.39	≤ 30.00	Pass
11ac-VHT40	13.5	159	5795	-0.22	97.40	6.99	6.89	≤ 30.00	Pass
11ac-VHT80	29.3	155	5775	-3.15	94.30	6.99	4.10	≤ 30.00	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)	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	-1.66	-1.94	-1.94	-1.51	97.18	6.99	11.38	≤ 24.29	Pass
11a	6	157	5785	-1.49	-2.30	-1.88	-2.18	97.18	6.99	11.18	≤ 24.29	Pass
11a	6	165	5825	-1.87	-2.38	-1.75	-2.44	97.18	6.99	11.04	≤ 24.29	Pass
11n-HT20	13	149	5745	-2.29	-2.16	-1.76	-1.76	98.81	6.99	11.08	≤ 24.29	Pass
11n-HT20	13	157	5785	-1.83	-1.80	-1.76	-1.64	98.81	6.99	11.31	≤ 24.29	Pass
11n-HT20	13	165	5825	-1.93	-1.91	-1.97	-2.10	98.81	6.99	11.09	≤ 24.29	Pass
11n-HT40	27	151	5755	-4.81	-5.11	-4.94	-5.32	97.55	6.99	8.08	≤ 24.29	Pass
11n-HT40	27	159	5795	-5.09	-4.96	-4.73	-4.73	97.55	6.99	8.24	≤ 24.29	Pass
11ac-VHT20	13	149	5745	-1.75	-2.16	-1.92	-2.25	98.82	6.99	11.05	≤ 24.29	Pass
11ac-VHT20	13	157	5785	-1.90	-1.74	-1.52	-1.60	98.82	6.99	11.37	≤ 24.29	Pass
11ac-VHT20	13	165	5825	-2.56	-2.69	-2.35	-2.81	98.82	6.99	10.46	≤ 24.29	Pass
11ac-VHT40	27	151	5755	-5.20	-5.14	4.70	-5.50	97.40	6.99	12.95	≤ 24.29	Pass
11ac-VHT40	27	159	5795	-4.90	-5.18	-4.82	-5.50	97.40	6.99	8.03	≤ 24.29	Pass
11ac-VHT80	58.6	155	5775	-7.75	-7.54	-8.03	-8.29	94.30	6.99	5.37	≤ 24.29	Pass

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

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	--	--	-14.40	-14.54	94.30	6.99	-4.21	≤ 26.80	Pass

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



























