



FCC 47 CFR MPE REPORT

Linkplay Technoiogy Inc

WiiM Sub Pro Smart Subwoofer

Model Number: SUB001

FCC ID: 2BABF-SUB001

Applicant:	Linkplay Technology Inc
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Maximum Permissible Exposure

1. Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. Limits for Maximum Permissible Exposure (MPE)

(a) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-10000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-10000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

1.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

2. Conducted Power Result

Mode	Frequency (MHz)	Antenna	Peak output power (dBm)	Peak output power (mW)
IEEE 802.11b	2412	ant 1	16.91	49.091
		ant 2	17.04	50.582
	2437	ant 1	17.39	54.828
		ant 2	17.06	50.816
	2462	ant 1	17.07	50.933
		ant 2	17.1	51.286
IEEE 802.11g	2412	ant 1	18.08	64.269
		ant 2	18.13	65.013
	2437	ant 1	18.36	68.549
		ant 2	18.24	66.681
	2462	ant 1	18.33	68.077
		ant 2	18.33	68.077
IEEE 802.11n HT20	2412	ant 1	17.92	61.944
		ant 2	18.07	64.121
	2437	ant 1	18.11	64.714
		ant 2	18.29	67.453
	2462	ant 1	18.28	67.298
		ant 2	18.35	68.391
IEEE 802.11ax HE20	2412	ant 1	19.1	81.283
		ant 2	19.14	82.035
	2437	ant 1	19.34	85.901
		ant 2	19.4	87.096
	2462	ant 1	19.27	84.528
		ant 2	19.33	85.704
IEEE 802.11a	5180	ant 1	15.73	37.411
		ant 2	15.58	36.141
	5200	ant 1	15.67	36.898
		ant 2	15.99	39.719
	5240	ant 1	14.62	28.973
		ant 2	15.13	32.584
	5260	ant 1	14.03	25.293
		ant 2	16.43	43.954
	5300	ant 1	15.23	33.343

			ant 2	15.11	32.434
		5320	ant 1	14.91	30.974
			ant 2	15.88	38.726
		5500	ant 1	17.46	55.719
			ant 2	17.3	53.703
		5580	ant 1	16.74	47.206
			ant 2	17.33	54.075
		5700	ant 1	17.55	56.885
			ant 2	16.81	47.973
		5745	ant 1	18.72	74.473
			ant 2	18.51	70.958
		5785	ant 1	18.31	67.764
			ant 2	18.7	74.131
		5825	ant 1	17.59	57.412
			ant 2	18	63.096
	IEEE 802.11n20	5180	ant 1	17.49	56.105
			ant 2	17.74	59.429
		5200	ant 1	17.96	62.517
			ant 2	18.12	64.863
		5240	ant 1	16.88	48.753
			ant 2	17.54	56.754
		5260	ant 1	16.47	44.361
			ant 2	17.35	54.325
		5300	ant 1	16.12	40.926
			ant 2	16.07	40.458
		5320	ant 1	15.76	37.670
			ant 2	15.95	39.355
		5500	ant 1	17.46	55.719
			ant 2	17.25	53.088
		5580	ant 1	16.75	47.315
			ant 2	17.13	51.642
		5700	ant 1	17.56	57.016
			ant 2	16.96	49.659
		5745	ant 1	18.97	78.886
			ant 2	18.78	75.509
		5785	ant 1	18.24	66.681
			ant 2	18.74	74.817
		5825	ant 1	17.67	58.479
			ant 2	18.02	63.387

IEEE 802.11ac VHT20	5180	ant 1	17.84	60.814
		ant 2	17.86	61.094
	5200	ant 1	18.1	64.565
		ant 2	18.26	66.988
	5240	ant 1	16.88	48.753
		ant 2	17.52	56.494
	5260	ant 1	16.79	47.753
		ant 2	17.34	54.200
	5300	ant 1	16.22	41.879
		ant 2	16.19	41.591
	5320	ant 1	15.71	37.239
		ant 2	15.95	39.355
	5500	ant 1	17.43	55.335
		ant 2	17.17	52.119
	5580	ant 1	16.78	47.643
		ant 2	17.47	55.847
	5700	ant 1	17.34	54.200
		ant 2	16.7	46.774
	5745	ant 1	18.8	75.858
		ant 2	18.54	71.450
	5785	ant 1	18.3	67.608
		ant 2	18.56	71.779
	5825	ant 1	17.5	56.234
		ant 2	18.02	63.387
IEEE 802.11ax HE20	5180	ant 1	18.79	75.683
		ant 2	18.68	73.790
	5200	ant 1	19	79.433
		ant 2	19.12	81.658
	5240	ant 1	18.17	65.615
		ant 2	18.56	71.779
	5260	ant 1	17.7	58.884
		ant 2	18.54	71.450
	5300	ant 1	17.3	53.703
		ant 2	17.24	52.966
	5320	ant 1	17.02	50.350
		ant 2	17.23	52.845
	5500	ant 1	18.73	74.645
		ant 2	18.47	70.307
	5580	ant 1	18.02	63.387

IEEE 802.11n HT40	5700	ant 2	18.49	70.632
		ant 1	18.78	75.509
	5745	ant 2	17.99	62.951
		ant 1	17.99	62.951
	5785	ant 2	17.7	58.884
		ant 1	17.25	53.088
	5825	ant 2	17.7	58.884
		ant 1	16.57	45.394
		ant 2	16.99	50.003
		ant 1	18.21	66.222
	5190	ant 2	18.18	65.766
		ant 1	17.49	56.105
	5230	ant 2	17.97	62.661
		ant 1	16.19	41.591
IEEE 802.11ac VHT40	5270	ant 2	16.89	48.865
		ant 1	15.53	35.727
	5310	ant 2	15.68	36.983
		ant 1	17.29	53.580
	5510	ant 2	16.94	49.431
		ant 1	17.15	51.880
	5550	ant 2	17.13	51.642
		ant 1	16.61	45.814
	5670	ant 2	16.64	46.132
		ant 1	18.52	71.121
	5755	ant 2	18.54	71.450
		ant 1	17.97	62.661
	5795	ant 2	18.28	67.298
		ant 1	17.94	62.230
IEEE 802.11ac VHT40	5190	ant 2	18.06	63.973
		ant 1	17.28	53.456
	5230	ant 2	17.82	60.534
		ant 1	16.07	40.458
	5270	ant 2	16.76	47.424
		ant 1	15.81	38.107
	5310	ant 2	15.75	37.584
		ant 1	17.22	52.723
	5510	ant 2	17.07	50.933
		ant 1	17.13	51.642
	5590	ant 2	17.1	51.286
		ant 1		

	5670	ant 1	16.59	45.604
		ant 2	16.52	44.875
	5755	ant 1	18.68	73.790
		ant 2	18.5	70.795
	5795	ant 1	17.86	61.094
		ant 2	18.32	67.920
IEEE 802.11ax HE40	5190	ant 1	16.81	47.973
		ant 2	17.04	50.582
	5230	ant 1	16.21	41.783
		ant 2	16.78	47.643
	5270	ant 1	14.73	29.717
		ant 2	15.32	34.041
	5310	ant 1	14.24	26.546
		ant 2	14.25	26.607
	5510	ant 1	18.45	69.984
		ant 2	18.14	65.163
	5590	ant 1	18.17	65.615
		ant 2	18.21	66.222
	5670	ant 1	17.71	59.020
		ant 2	17.65	58.210
	5755	ant 1	16.96	49.659
		ant 2	17.11	51.404
	5795	ant 1	16.52	44.875
		ant 2	16.65	46.238
IEEE 802.11ac VHT80	5210	ant 1	18.16	65.464
		ant 2	18.57	71.945
	5290	ant 1	16.35	43.152
		ant 2	16.44	44.055
	5530	ant 1	17.68	58.614
		ant 2	17.58	57.280
	5610	ant 1	16.7	46.774
		ant 2	16.75	47.315
	5775	ant 1	18.1	64.565
		ant 2	18.2	66.069
IEEE 802.11ax HE80	5210	ant 1	17.04	50.582
		ant 2	17.16	52.000
	5290	ant 1	14.79	30.130
		ant 2	15.02	31.769
	5530	ant 1	16.07	40.458

			ant 2	15.93	39.174
		5610	ant 1	15.23	33.343
			ant 2	15.27	33.651
		5775	ant 1	16.36	43.251
			ant 2	16.4	43.652
IEEE 802.11ax HE20	5955	ant 1	7.13	5.164	
		ant 2	5.59	3.622	
	6175	ant 1	7.04	5.058	
		ant 2	6.01	3.990	
	6415	ant 1	7.58	5.728	
		ant 2	4.86	3.062	
IEEE 802.11ax HE40	5965	ant 1	10.08	10.186	
		ant 2	8.4	6.918	
	6165	ant 1	8.55	7.161	
		ant 2	7.54	5.675	
	6405	ant 1	10.07	10.162	
		ant 2	8.63	7.295	
IEEE 802.11ax HE80	5985	ant 1	12.24	16.749	
		ant 2	10.79	11.995	
	6145	ant 1	11.87	15.382	
		ant 2	10.35	10.839	
	6385	ant 1	13.09	20.370	
		ant 2	11.63	14.555	

3. Calculated Result and Limit

The Worst Mode	Antenna	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
					(dBi)	(Linear)			
2.4G Band									
IEEE 802.11b	ant 1	17.39	17 ±1	18	2.2	1.660	0.0208	1	Complies
	ant 2	17.1	17 ±1	18	2.7	1.862	0.0234	1	Complies
IEEE 802.11g	ant 1	18.36	18 ±1	19	2.2	1.660	0.0262	1	Complies
	ant 2	18.33	18 ±1	19	2.7	1.862	0.0294	1	Complies
IEEE 802.11n HT20	ant 1	18.28	18 ±1	19	2.2	1.660	0.0262	1	Complies
	ant 2	18.35	18±1	19	2.7	1.862	0.0294	1	Complies
IEEE 802.11n HT40	ant 1	19.34	19 ±1	20	2.2	1.660	0.0330	1	Complies
	ant 2	19.4	19 ±1	20	2.7	1.862	0.0370	1	Complies
IEEE802.11ax HE20	ant 1	17.39	17 ±1	18	2.2	1.660	0.0208	1	Complies
	ant 2	17.1	17 ±1	18	2.7	1.862	0.0234	1	Complies
5G Band									
IEEE 802.11a	ant 1	18.72	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.7	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE 802.11n HT20	ant 1	18.97	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.78	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE802.11ac VHT20	ant 1	18.8	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.56	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE802.11ax HE20	ant 1	19	19 ±1	20	2.7	1.8621	0.0370	1	Complies
	ant 2	19.12	19 ±1	20	2.1	1.6218	0.0323	1	Complies
IEEE 802.11n HT40	ant 1	18.52	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.54	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE 802.11ac VHT40	ant 1	18.68	18±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.5	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE802.11ax HE40	ant 1	18.45	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.21	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE 802.11ac VHT80	ant 1	18.16	18 ±1	19	2.7	1.8621	0.0294	1	Complies
	ant 2	18.57	18 ±1	19	2.1	1.6218	0.0256	1	Complies
IEEE802.11ax HE80	ant 1	17.04	17 ±1	18	2.7	1.8621	0.0234	1	Complies
	ant 2	17.16	17 ±1	18	2.1	1.6218	0.0204	1	Complies

6G Band									
IEEE802.11ax HE20	ant 1	7.58	7 ±1	8	2.5	1.7783	0.0022	1	Complies
	ant 2	6.01	6±1	7	3.2	2.0893	0.0021	1	Complies
IEEE802.11ax HE40	ant 1	10.08	10 ±1	11	2.5	1.7783	0.0045	1	Complies
	ant 2	8.63	8 ±1	9	3.2	2.0893	0.0033	1	Complies
IEEE802.11ax HE80	ant 1	13.09	13 ±1	14	2.5	1.7783	0.0089	1	Complies
	ant 2	11.63	11 ±1	12	3.2	2.0893	0.0066	1	Complies

Note: The product only supports SISO transmission mode and does not support MIMO transmission mode.

End of Test Report