

FCC 47 CFR MPE REPORT

AUDIO PRO AB

MULTIROOM WIFI PLAYER

Model Number: LINK2

FCC ID: 2AGNC-LINK2

Applicant:	AUDIO PRO AB
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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

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

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

Antenna 1

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)
GFSK	2402	4.16	2.61	4±1
	2441	4.77	3.00	5±1
	2480	5.47	3.52	5±1
8-DPSK	2402	0.85	1.22	1±1
	2441	1.64	1.46	2±1
	2480	2.10	1.62	2±1
BLE	2402	3.57	2.28	4±1
	2440	3.92	2.47	4±1
	2480	4.31	2.70	4±1
IEEE 802.11b	2412	15.96	39.45	16±1
	2437	16.18	41.50	16±1
	2462	16.29	42.56	16±1
IEEE 802.11g	2412	21.09	128.53	21±1
	2437	21.23	132.74	21±1
	2462	21.46	139.96	21±1
IEEE 802.11n HT20 (2.4G)	2412	21.00	125.89	21±1
	2437	21.12	129.42	21±1
	2462	21.33	135.83	21±1
IEEE 802.11a	5180	17.202	52.505	17±1
	5200	17.617	57.770	18±1
	5240	18.051	63.841	18±1
	5745	17.021	50.362	17±1
	5785	16.080	40.551	16±1
	5825	16.012	39.921	16±1
IEEE 802.11n HT20 (5G)	5180	12.097	16.207	12±1
	5200	12.496	17.766	12±1
	5240	13.095	20.394	13±1
	5745	12.214	16.649	12±1
	5785	11.260	13.366	11±1
	5825	11.038	12.700	11±1

IEEE 802.11ac VHT20	5180	12.061	16.073	12±1
	5200	12.541	17.951	13±1
	5240	12.917	19.575	13±1
	5745	12.138	16.361	12±1
	5785	11.204	13.195	11±1
	5825	10.947	12.437	11±1
IEEE 802.11n HT40 (5G)	5190	13.454	22.151	13±1
	5230	14.294	26.878	14±1
	5755	13.296	21.360	13±1
	5795	12.384	17.314	12±1
IEEE 802.11ac VHT40	5190	13.458	22.172	13±1
	5230	14.437	27.778	14±1
	5755	9.475	8.861	9±1
	5795	12.433	17.511	12±1
IEEE 802.11ac VHT80	5210	11.075	12.809	11±1
	5775	9.599	9.118	10±1

Antenna 2

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)
IEEE 802.11b	2412	15.75	37.584	16±1
	2437	15.78	37.844	16±1
	2462	16.06	40.365	16±1
IEEE 802.11g	2412	20.92	123.595	21±1
	2437	20.99	125.603	21±1
	2462	21.12	129.420	21±1
IEEE 802.11n HT20 (2.4G)	2412	20.63	115.611	21±1
	2437	20.91	123.310	21±1
	2462	20.79	119.950	21±1
IEEE 802.11a	5180	16.646	46.196	17±1
	5200	17.141	51.773	17±1
	5240	18.131	65.028	18±1
	5745	16.777	47.610	17±1
	5785	15.626	36.526	16±1
	5825	15.294	33.838	15±1
IEEE 802.11n HT20 (5G)	5180	11.525	14.207	12±1
	5200	11.974	15.754	12±1
	5240	12.831	19.191	13±1
	5745	11.786	15.087	12±1
	5785	10.704	11.760	11±1
	5825	10.471	11.146	10±1
IEEE 802.11ac VHT20	5180	11.382	13.747	11±1
	5200	11.886	15.438	12±1
	5240	12.889	19.449	13±1
	5745	11.694	14.771	12±1
	5785	10.730	11.830	11±1
	5825	10.431	11.043	10±1
IEEE 802.11n HT40 (5G)	5190	12.678	18.527	13±1
	5230	13.852	24.277	14±1
	5755	12.680	18.535	13±1
	5795	11.595	14.438	12±1

IEEE 802.11ac VHT40	5190	12.763	18.893	13±1
	5230	13.764	23.790	14±1
	5755	12.681	18.540	13±1
	5795	11.574	14.368	12±1
IEEE 802.11ac VHT80	5210	10.687	11.714	11±1
	5775	9.274	8.461	9±1

3. Calculated Result and Limit

Bluetooth

Antenna	Worst Mode	Channel	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
				(dBi)	(Linear)			
1	GFSK	2480	6	2	1.585	0.00126	1	Complies

WLAN 2.4G SISO

Antenna	Worst Mode	Channel	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
				(dBi)	(Linear)			
1	IEEE 802.11g	2462	22	2	1.585	0.04997	1	Complies
2	IEEE 802.11g	2462	22	2	1.585	0.04997	1	Complies

WLAN 2.4G MIMO

Worst Mode	Channel	Target power (dBm)	Target power (dBm)	Power Density (S) (mW/cm ²)	Power Density (S) (mW/cm ²)	Total Ratio	Limit Ratio	Test Result
		Antenna 1	Antenna 2	Antenna 1	Antenna 2			
IEEE 802.11n HT20	2462	22	22	0.04997	0.04997	0.09994	1	Complies

WLAN 5G SISO

Antenna	Worst Mode	Channel	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
				(dBi)	(Linear)			
1	IEEE 802.11a	5240	19	2	1.585	0.02505	1	Complies
2	IEEE 802.11a	5240	19	2	1.585	0.02505	1	Complies

WLAN 5G MIMO

Worst Mode	Channel	Target power (dBm)	Target power (dBm)	Power Density (S) (mW/cm ²)	Power Density (S) (mW/cm ²)	Total Ratio	Limit Ratio	Test Result
		Antenna 1	Antenna 2	Antenna 1	Antenna 2			
IEEE 802.11n HT40	5230	15	15	0.00997	0.00997	0.01994	1	Complies

Bluetooth+ WLAN

MAX Power Density (S) (mW/cm ²) Bluetooth	MAX Power Density (S) (mW/cm ²) Ratio WiFi	Total Ratio	Limit Ratio	Test Result
0.00126	0.09994	0.10120	1	Complies

Note: 1. only the worst case was recorded.

2. 2.4G wifi & 5G wifi can't transmit simutaneously.

End of Test Report