

FCC 47 CFR MPE REPORT

AUDIO PRO AB

MULTICONNECTED WIRELESS LOUDSPEAKER

Model Number: A10 MkII

FCC ID: 2AGNC-A10MKII

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

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)
GFSK	2402	4.29	2.6853	4±1
	2441	4.58	2.8708	4±1
	2480	5.30	3.3884	5±1
8-DPSK	2402	1.29	1.3459	1±1
	2441	1.65	1.4622	1±1
	2480	2.13	1.6331	2±1
GFSK 1M	2402	4.40	2.7542	4±1
	2440	5.02	3.1769	5±1
	2480	5.42	3.4834	5±1
IEEE 802.11b	2412	17.32	53.9511	17±1
	2437	17.50	56.2341	17±1
	2462	17.51	56.3638	17±1
IEEE 802.11g	2412	21.76	149.9685	21±1
	2437	21.84	152.7566	21±1
	2462	22.08	161.4359	22±1
IEEE 802.11n HT20 (2.4G)	2412	19.94	98.6279	19±1
	2437	20.12	102.8016	20±1
	2462	20.09	102.0939	20±1
IEEE 802.11a	5180	14.441	27.8035	14±1
	5200	14.644	29.1340	14±1
	5240	14.683	29.3968	14±1
	5260	14.868	30.6761	14±1
	5300	14.560	28.5759	14±1
	5320	14.343	27.1832	14±1
	5500	12.976	19.8427	12±1
	5580	13.470	22.2331	13±1
	5700	13.547	22.6308	13±1
	5745	13.604	22.9298	13±1
	5785	13.113	20.4786	13±1
5825	12.966	19.7970	12±1	

IEEE 802.11n HT20 (5G)	5180	11.873	15.3922	11 ± 1
	5200	10.326	10.7795	10 ± 1
	5240	10.531	11.3006	10 ± 1
	5260	14.496	28.1579	14 ± 1
	5300	12.144	16.3832	12 ± 1
	5320	11.857	15.3356	11 ± 1
	5500	12.698	18.6123	12 ± 1
	5580	11.477	14.0508	11 ± 1
	5700	11.291	13.4617	11 ± 1
	5745	13.254	21.1544	13 ± 1
	5785	12.791	19.0152	12 ± 1
	5825	12.704	18.6380	12 ± 1
	IEEE 802.11ac VHT20	5180	11.795	15.1182
5200		11.991	15.8161	11 ± 1
5240		10.896	12.2914	10 ± 1
5260		14.413	27.6249	14 ± 1
5300		12.013	15.8964	12 ± 1
5320		11.843	15.2862	11 ± 1
5500		12.726	18.7327	12 ± 1
5580		11.287	13.4493	11 ± 1
5700		11.372	13.7151	11 ± 1
5745		13.234	21.0572	13 ± 1
5785		12.754	18.8538	12 ± 1
5825		12.626	18.3063	12 ± 1
IEEE 802.11n HT40 (5G)	5190	13.579	22.7982	13 ± 1
	5230	13.812	24.0547	13 ± 1
	5270	13.824	24.1213	13 ± 1
	5310	13.663	23.2434	13 ± 1
	5510	12.050	16.0325	12 ± 1
	5590	12.515	17.8443	12 ± 1
	5670	12.778	18.9583	12 ± 1
	5755	12.772	18.9322	12 ± 1
	5795	12.276	16.8888	12 ± 1

IEEE 802.11ac VHT40	5190	13.562	22.7091	13±1
	5230	13.801	23.9939	13±1
	5270	13.835	24.1824	13±1
	5310	13.693	23.4045	13±1
	5510	12.029	15.9551	12±1
	5590	12.476	17.6848	12±1
	5670	12.752	18.8452	12±1
	5755	12.543	17.9597	12±1
	5795	12.293	16.9551	12±1
IEEE 802.11ac VHT80	5210	10.892	12.2800	10±1
	5290	10.351	10.8418	10±1
	5530	9.435	8.7801	9±1
	5610	9.904	9.7814	9±1
	5775	9.458	8.8267	9±1

3. Calculated Result and Limit

Bluetooth

Antenna	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	2480	6	2	1.585	0.0013	1	Complies

WLAN 2.4G

Antenna	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	2462	23	2	1.585	0.0629	1	Complies

WLAN 5G

Antenna	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	5260	15	2	1.585	0.0100	1	Complies

Bluetooth+ WLAN

MAX Power Density (S) (mW/cm ²) Bluetooth	MAX Power Density (S) (mW/cm ²) WiFi	Total Ratio	Limit Ratio	Test Result
0.0013	0.0629	0.0642	1	Complies

End of Test Report