



FCC 47 CFR MPE REPORT

ION Audio, LLC

BATTERY-POWERED PORTABLE SPEAKER SYSTEM WITH
MULTI-CHANNEL MIXER AND FM RADIO

Model Number: TROUPER™ 100

Additional Model: iPA173, iPA173*****, TROUPER*****,
 (“*” can be “a-z”, “A-Z”, “0-9”, blank, “-”, “+” or any character, symbol, alphanumeric)

FCC ID: 2AB3E-IPA173

Applicant:	ION Audio, LLC
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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)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	10.26	10.617
	2441	7.49	5.610
	2480	4.68	2.938
$\pi/4$ -DQPSK	2402	10.29	10.691
	2441	7.53	5.662
	2480	4.65	2.917
8-DPSK	2402	10.27	10.641
	2441	7.52	5.649
	2480	4.65	2.917
BLE	2402	10.09	10.209
	2440	7.34	5.420
	2480	4.37	2.735

3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
				(dBi)	(Linear)			
GFSK	10.26	10±1	11	2.81	1.910	0.00478	1	Complies
$\pi/4$ -DQPSK	10.29	10±1	11	2.81	1.910	0.00478	1	Complies
8-DPSK	10.27	10±1	11	2.81	1.910	0.00478	1	Complies
BLE	10.09	10±1	11	2.81	1.910	0.00478	1	Complies

End of Test Report