FCC 47 CFR MPE REPORT

ION Audio, LLC

Motorized Wireless Speaker with Solar Panel and Cupholders

Model Number: PARTY BOAT

FCC ID: 2AB3E-ISP120

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Report Number:	ESTE-R1912070
Date of Test:	Dec. 06~13, 2019
Date of Report:	Dec. 16, 2019

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.o	30

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

1.2. MPE Calculation Method

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

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）	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	0.30	1.072	0±1	-0.58	**0.875**
	2441	0.17	1.040	0±1	-0.58	**0.875**
	2480	-0.10	0.977	-1±1	-0.58	**0.875**
π/4-DQPSK	2402	1.10	1.288	1±1	-0.58	**0.875**
	2441	0.89	1.227	0±1	-0.58	**0.875**
	2480	0.59	1.146	0±1	-0.58	**0.875**
BLE	2402	0.29	1.069	0±1	-0.58	**0.875**
	2440	0.17	1.040	0±1	-0.58	**0.875**
	2480	-0.11	0.975	-1±1	-0.58	**0.875**

Antenna 2

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power（dBm）	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	0.34	1.081	0±1	2	**1.585**
	2441	0.43	1.104	0±1	2	**1.585**
	2480	0.43	1.104	0±1	2	**1.585**
π/4-DQPSK	2402	1.06	1.276	1±1	2	**1.585**
	2441	1.09	1.285	1±1	2	**1.585**
	2480	1.18	1.312	1±1	2	**1.585**
BLE	2402	0.07	1.016	0±1	2	**1.585**
	2440	0.50	1.122	0±1	2	**1.585**
	2480	0.79	1.199	0±1	2	**1.585**

3. Calculated Result and Limit

Antenna 1

Mode	Target power（dBm）	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
		(dBi)	(Linear)			
GFSK	1	-0.58	0.875	**0.00022**	1	Compiles
π/4-DQPSK	2	-0.58	0.875	**0.00028**	1	Compiles
BLE	1	-0.58	0.875	**0.00022**	1	Compiles

Antenna 2

Mode	Target power（dBm）	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
		(dBi)	(Linear)			
GFSK	1	2	1.585	**0.00040**	1	Compiles
π/4-DQPSK	2	2	1.585	**0.00050**	1	Compiles
BLE	1	2	1.585	**0.00040**	1	Compiles

Antenna 1+2

Mode	Power Density (S) (mW /cm2) Antenna 1	Power Density (S) (mW /cm2) Antenna 2	Power Density (S) (mW /cm2) Total	Limited of Power Density (S) (mW /cm2)	Test Result
GFSK	0.00022	0.00040	**0.00062**	1	Compiles
π /4-DQPSK	0.00028	0.00050	**0.00078**	1	Compiles
BLE	0.00022	0.00040	**0.00062**	1	Compiles

End of Test Report