

## FCC 47 CFR MPE REPORT

AlphaTheta Corporation

Professional portable DJ speaker system

Model Number: WAVE-EIGHT

FCC ID: 2AM73-WAVEEIGHT

Applicant:	AlphaTheta Corporation
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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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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

BT

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	4.32	2.704
	2441	4.52	2.831
	2480	4.68	2.938
$\pi/4$ -DQPSK	2402	6.43	4.395
	2441	6.46	4.426
	2480	6.60	4.571
8-DPSK	2402	7.10	5.129
	2441	7.00	5.012
	2480	7.16	5.200

2.4G DTS

Mode	Frequency (MHz)	Antenna	Peak output power (dBm)	Peak output power (mW)
TX	2402	ant 1	7.28	5.3456
	2441	ant 1	6.21	4.1783
	2480	ant 1	5.80	3.8019
TX	2402	ant 2	7.56	5.7016
	2441	ant 2	6.60	4.5709
	2480	ant 2	5.87	3.8637

### 3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW/cm <sup>2</sup> )	Limited of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
				(dBi)	(Linear)			
<b>2.4G Band</b>								
GFSK	4.68	4±1	5	4.37	2.735	0.00172	1	Complies
π/4-DQPSK	6.60	6±1	7	4.37	2.735	0.00273	1	Complies
8-DPSK	7.16	7±1	8	4.37	2.735	0.00343	1	Complies
2.4G DTS	7.56	7±1	8	5.28	3.373	0.00423	1	Complies

MAX Power Density (S) (mW/cm <sup>2</sup> ) Bluetooth	MAX Power Density (S) (mW/cm <sup>2</sup> ) 2.4G DTS	Total Ratio	Limit Ratio	Test Result
0.00343	0.00423	0.00766	1	Complies

**End of Test Report**