

## **FCC 47 CFR MPE REPORT**

Microlab Electronics Co.,Ltd.

Bluetooth Speaker

Model Number: DS4

FCC ID: OR8-DS4

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Report Number: ESTE-R1605052

Date of Test : April 22 - May 16, 2016

Date of Report : May 17, 2016



## Maximum Permissible Exposure

### 1、 Applicable Standard

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.

#### (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   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 <sup>2</sup> )	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

### 2、 MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = E^2 / 377$$

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

$$Pd = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

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

### 3、Calculated Result and Limit

Mode	Freq. (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Max Target power (mW)	Antenna gain		Power Density (S) (mW /cm <sup>2</sup> )	Limited of Power Density (S) (mW /cm <sup>2</sup> )	Test Result
						(dBi)	(Linear)			
GFSK	2402	-1.762	0.667	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2441	0.795	1.201	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2480	1.995	1.583	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
$\pi/4$ -DQPSK	2402	-4.063	0.392	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2441	-0.954	0.803	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2480	0.593	1.146	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
8-DPSK	2402	-3.424	0.455	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2441	-0.513	0.889	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2480	1.019	1.264	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
BLE-GFSK	2402	3.190	2.084	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2440	3.970	2.495	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles
	2480	2.290	1.694	$-0.5 \pm 4.5$	2.512	0	1	<b>0.00050</b>	1	Compiles

Note: The Bluetooth BDR&EDR and Bluetooth BLE mode cannot Simultaneous transmissions.