

FCC 47 CFR MPE REPORT

Murata Manufacturing Co., Ltd

Wireless Speaker

Model Number: Beosound Balance

FCC ID: VPYLB1VA

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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

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Mode	Frequency (MHz)	Rated Power (dBm)	Rated Power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
BDR+EDR	2402-2480	10.98	12.531	10 ± 1	2.66	1.845
BLE	2402-2480	0.76	1.191	0 ± 1	2.66	1.845

2.4G WIFI

Mode	Frequency (MHz)	Rated Power (dBm)	Rated Power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11b/g/n _HT20	2412-2462	18.94	78.343	18 ± 1	4.99	3.155

5G WIFI

Mode	Frequency (MHz)	Rated Power (dBm)	Rated Power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11a	5150-5250	15.97	39.537	15 ± 1	2.91	1.954
	5250-5350	15.99	39.719	15 ± 1	2.91	1.954
	5470-5725	15.84	38.371	15 ± 1	2.91	1.954
	5725-5850	15.97	39.537	15 ± 1	2.91	1.954
IEEE 802.11n HT20	5150-5250	13.74	23.659	13 ± 1	5.85	3.846
	5250-5350	18.93	78.163	18 ± 1	5.85	3.846
	5470-5725	18.65	73.282	18 ± 1	5.85	3.846
	5725-5850	18.90	77.625	18 ± 1	5.85	3.846
IEEE 802.11n HT40	5150-5250	14.01	25.177	14 ± 1	5.85	3.846
	5250-5350	17.89	61.518	17 ± 1	5.85	3.846
	5470-5725	17.90	61.660	17 ± 1	5.85	3.846
	5725-5850	17.96	62.517	17 ± 1	5.85	3.846
IEEE 802.11ac VHT80	5150-5250	10.62	11.535	10 ± 1	5.85	3.846
	5250-5350	13.45	22.131	13 ± 1	5.85	3.846
	5470-5725	17.88	61.376	17 ± 1	5.85	3.846
	5725-5850	15.82	38.194	15 ± 1	5.85	3.846

3. Calculated Result and Limit

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
BDR+EDR	11	2.66	1.845	0.00462	1	Compiles
BLE	1	2.66	1.845	0.00046	1	Compiles
2.4G WIFI	19	4.99	3.155	0.04986	1	Compiles
5G WIFI	19	5.85	3.846	0.06077	1	Compiles

Note: 2.4 and 5GHz bands are share an antenna, Can't both the 2.4 and 5 GHz bands operate simultaneously.

End of Test Report