

FCC 47 CFR MPE REPORT

SHENZHEN MODERN BUSINESS TRADING CO.,LTD.

Robotic Vacuum Cleaner

Model Number: D30

Additional Model: D30Max

FCC ID: 2AUTI-DKR30

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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

Antenna 0

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
BLE	2402	4.26	2.6669	4 ± 2	2.5	1.778
	2440	4.44	2.7797	4 ± 2	2.5	1.778
	2480	4.36	2.7290	4 ± 2	2.5	1.778
IEEE 802.11b	2412	18.27	67.143	18 ± 2	2.5	1.778
	2437	18.26	66.988	18 ± 2	2.5	1.778
	2462	18.38	68.865	18 ± 2	2.5	1.778
IEEE 802.11g	2412	19.59	90.991	19 ± 2	2.5	1.778
	2437	19.95	98.855	19 ± 2	2.5	1.778
	2462	20.14	103.276	20 ± 2	2.5	1.778
IEEE 802.11n HT20	2412	19.83	96.161	19 ± 2	2.5	1.778
	2437	20.29	106.905	20 ± 2	2.5	1.778
	2462	20.43	110.408	20 ± 2	2.5	1.778

3. Calculated Result and Limit

Antenna 0

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
2.4G Band						
BLE	6	2.5	1.778	0.0014	1	Complies
IEEE 802.11b	20	2.5	1.778	0.03538	1	Complies
IEEE 802.11g	22	2.5	1.778	0.05607	1	Complies
IEEE 802.11n HT20	22	2.5	1.778	0.05607	1	Complies

End of Test Report