

FCC 47 CFR MPE REPORT

Guangdong Joy Intelligent Technology Co., Ltd

Robot vacuum cleaner

Model Number: L2050

Additional Model: L3050, L900, L-VCL0L1,L2090,Q6, L2080, S31, S30, Lxxxx

FCC ID: 2AV2K-L2050

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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

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11b	2412	15.13	32.584	15 ± 1	4	2.512
	2437	16.48	44.463	16 ± 1	4	2.512
	2462	15.95	39.355	15 ± 1	4	2.512
IEEE 802.11g	2412	17.97	62.661	17 ± 1	4	2.512
	2437	18.41	69.343	18 ± 1	4	2.512
	2462	18.10	64.565	18 ± 1	4	2.512
IEEE 802.11n HT20	2412	15.59	36.224	15 ± 1	4	2.512
	2437	16.39	43.551	16 ± 1	4	2.512
	2462	15.82	38.194	15 ± 1	4	2.512
IEEE 802.11n HT40	2422	16.33	42.954	16 ± 1	4	2.512
	2437	16.46	44.259	16 ± 1	4	2.512
	2452	15.94	39.264	15 ± 1	4	2.512

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)			
IEEE 802.11b	17	4	2.512	0.02504	1	Compiles
IEEE 802.11g	19	4	2.512	0.03969	1	Compiles
IEEE 802.11n HT20	17	4	2.512	0.02504	1	Compiles
IEEE 802.11n HT40	17	4	2.512	0.02504	1	Compiles

End of Test Report