FCC 47 CFR MPE REPORT

Shenzhen KingChuang Smart Navi Technology Co., Ltd.

Robot Vacuum Cleaner

Model Number: SDL70

Additional Model: SDL70A, SDL70B, S5, S5 PRO, AC9500 Ultra

FCC ID: 2BA3G-SL70

Applicant:	Shenzhen KingChuang Smart Navi Technology Co., Ltd.
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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.o	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

1.2. MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: Pd (W/m^2) = $\frac{E^2}{377}$

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)
GFSK	2402	-0.97	0.800
	2441	-1.94	0.640
	2480	-2.59	0.551
π/4-DQPSK	2402	-0.11	0.975
	2441	-0.85	0.822
	2480	-1.64	0.685
8-DPSK	2402	2.78	1.897
	2441	1.76	1.500
	2480	1.09	1.285
BLE 1M	2402	-2.87	0.516
	2440	-3.74	0.423
	2480	-4.77	0.333
IEEE 802.11b	2412	11.79	15.101
	2437	10.84	12.134
	2462	10.88	12.246
IEEE 802.11g	2412	16.49	44.566
	2437	16	39.811
	2462	16.15	41.210
IEEE 802.11n HT20	2412	16.47	44.361
	2437	15.94	39.264
	2462	16.01	39.902
IEEE 802.11n HT40	2422	16.28	42.462
	2437	16.14	41.115
	2452	16.16	41.305

3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX 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								
GFSK	-0.97	0±1	1	3.15	2.065	0.00052	1	Complies
π/4-DQPSK	-0.11	0±1	1	3.15	2.065	0.00052	1	Complies
8-DPSK	2.78	2±1	3	3.15	2.065	0.00082	1	Complies
BLE	-2.87	-2±1	-1	3.15	2.065	0.00033	1	Complies
IEEE 802.11b	11.79	11±1	12	3.15	2.065	0.00651	1	Complies
IEEE 802.11g	16.49	16±1	17	3.15	2.065	0.02059	1	Complies
IEEE 802.11n HT20	16.47	16±1	17	3.15	2.065	0.02059	1	Complies
IEEE 802.11n HT40	16.28	16±1	17	3.15	2.065	0.02059	1	Complies

End of Test Report