1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Client Information

Applicant:	Shenzhen Free Dynamic Development Co., LTD.
Address of applicant:	402, Kingson Building, No.1 ChuangSheng Road, xili street, Nanshan District, shenzhen, China
Manufacturer:	Shenzhen Free Dynamic Development Co., LTD.
Address of manufacturer:	402, Kingson Building, No.1 ChuangSheng Road, xili street, Nanshan District, shenzhen, China

General Description of EUT	
Product Name:	Robotic vacuum cleaner
Trade Name:	/
Model No.:	R440
Adding Model(s):	R440W, R440B, R440L, R440Y, R440O, R440G, R440P, R440M
Rated Voltage:	Battery:DC14.8V
FCC ID:	2AT7J-R440
Battery Capacity:	3000mAh
Power Adapter Model:	Model NO: GQ -190060-AU INPUT: AC100-240V~ 50/60Hz 0.4A MAX OUTPUT: DC19V,600mA

Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model R440, but the circuit and the electronic construction do not change, declared by the manufacturer.

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n-HT20
Frequency Range:	2412-2462MHz for 802.11b/g/n-HT20
RF Output Power:	16.41dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 72.2Mbps
Quantity of Channels:	11 for 802.11b/g/n-HT20
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	0dBi

1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(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
1500-100000	/	/	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
1500-100000	/	/	1	30

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

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

WIFI

Maximum Tune-Up output power: <u>17 (dBm)</u>

Maximum peak output power at antenna input terminal: <u>50.12(mW)</u>

Prediction distance: <u>>20(cm)</u>

Prediction frequency: <u>2437 (MHz)</u>

Antenna gain: <u>0 (dBi)</u>

Directional gain (numeric gain): <u>1.0</u>

The worst case is power density at prediction frequency at 20cm: <u>0.0100(mw/cm^2)</u>

MPE limit for general population exposure at prediction frequency: <u>1 (mw/cm^2)</u>

Result: Pass