

## FCC 47 CFR MPE REPORT

Shenzhen Proscenic Technology Co., Ltd

Robot Vacuum Cleaner

Model Number: LDS M7

FCC ID: 2ARZX-LDS-M7

|                          |                                                                       |
|--------------------------|-----------------------------------------------------------------------|
| Prepared for:            | Shenzhen Proscenic Technology Co., Ltd                                |
|                          | Room 502 Jinshun Bulding A block, No 287 Ruyi Road, Ailian Community, |
|                          | Longgang District, Shenzhen, China                                    |
|                          |                                                                       |
| Prepared By:             | EST Technology Co., Ltd.                                              |
|                          | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China   |
| Tel: 86-769-83081888-808 |                                                                       |

|                 |                         |
|-----------------|-------------------------|
| Report Number:  | ESTE-R1903021           |
| Date of Test:   | Mar. 02 ~ Mar. 06, 2019 |
| Date of Report: | Mar. 07, 2019           |



## Maximum Permissible Exposure

### 1、Applicable Standard

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.

#### (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 <sup>2</sup> ) | 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 <sup>2</sup> ) | 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

### 2、MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d \quad \text{Power Density: } P_d \text{ (W/m}^2\text{)} = E^2 / 377$$

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

$$P_d = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

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

**3、Conducted Power Result**

| Mode                    | Frequency<br>(MHz) | Peak output power<br>(dBm) | Peak output power<br>(mW) | Target<br>power<br>( dBm ) | Antenna gain |          |
|-------------------------|--------------------|----------------------------|---------------------------|----------------------------|--------------|----------|
|                         |                    |                            |                           |                            | (dBi)        | (Linear) |
| IEEE<br>802.11b         | 2412               | 11.53                      | 14.223                    | $11 \pm 1$                 | 1            | 1.259    |
|                         | 2437               | 10.64                      | 11.588                    | $10 \pm 1$                 | 1            | 1.259    |
|                         | 2462               | 8.85                       | 7.674                     | $8 \pm 1$                  | 1            | 1.259    |
| IEEE<br>802.11g         | 2412               | 5.88                       | 3.873                     | $5 \pm 1$                  | 1            | 1.259    |
|                         | 2437               | 4.57                       | 2.864                     | $4 \pm 1$                  | 1            | 1.259    |
|                         | 2462               | 2.63                       | 1.832                     | $2 \pm 1$                  | 1            | 1.259    |
| IEEE<br>802.11n<br>HT20 | 2412               | 6.05                       | 4.027                     | $6 \pm 1$                  | 1            | 1.259    |
|                         | 2437               | 3.92                       | 2.466                     | $3 \pm 1$                  | 1            | 1.259    |
|                         | 2462               | 1.92                       | 1.556                     | $1 \pm 1$                  | 1            | 1.259    |
| IEEE<br>802.11n<br>HT40 | 2422               | 4.35                       | 2.723                     | $4 \pm 1$                  | 1            | 1.259    |
|                         | 2437               | 3.43                       | 2.203                     | $3 \pm 1$                  | 1            | 1.259    |
|                         | 2452               | 2.15                       | 1.641                     | $2 \pm 1$                  | 1            | 1.259    |

**4、Calculated Result and Limit**

| Mode              | Target<br>power<br>( dBm ) | Antenna gain |          | Power<br>Density<br>(S)<br>(mW<br>/cm <sup>2</sup> ) | Limited<br>of<br>Power<br>Density<br>(S)<br>(mW<br>/cm <sup>2</sup> ) | Test<br>Result |
|-------------------|----------------------------|--------------|----------|------------------------------------------------------|-----------------------------------------------------------------------|----------------|
|                   |                            | (dBi)        | (Linear) |                                                      |                                                                       |                |
| IEEE 802.11b      | 12                         | 1            | 1.259    | <b>0.00397</b>                                       | 1                                                                     | Compiles       |
| IEEE 802.11g      | 6                          | 1            | 1.259    | <b>0.00100</b>                                       | 1                                                                     | Compiles       |
| IEEE 802.11n HT20 | 7                          | 1            | 1.259    | <b>0.00126</b>                                       | 1                                                                     | Compiles       |
| IEEE 802.11n HT40 | 5                          | 1            | 1.259    | <b>0.00079</b>                                       | 1                                                                     | Compiles       |