

## RF EXPOSURE REPORT

### FOR

|                             |   |                                                                                                                               |
|-----------------------------|---|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>            | : | Hangzhou TaRen Robotics Technology CO., LTD.                                                                                  |
| <b>Address</b>              | : | 3F JieLi Building JiChang Road Shangcheng<br>Hangzhou Zhejiang China                                                          |
| <b>Equipment under Test</b> | : | Commercial Floor Sweeper                                                                                                      |
| <b>Model No.</b>            | : | iMop                                                                                                                          |
| <b>Trade Mark</b>           | : | iTR                                                                                                                           |
| <b>FCC ID</b>               | : | 2ARKV-ITRSS120228                                                                                                             |
| <b>IC</b>                   | : | 28428-ITRSS120228                                                                                                             |
| <b>Manufacturer</b>         | : | JiaXing IT-Robotics Technology Co.,Ltd                                                                                        |
| <b>Address</b>              | : | Room 102, Building 13, NO.36 ChangSheng South<br>Road, Economic and Technological Development<br>Zone, Jiaxing Zhejiang China |

**Issued By: Dongguan Dongdian Testing Service Co., Ltd.**

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# REPORT

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## Test Report Declare

|                             |   |                                                                                                                         |
|-----------------------------|---|-------------------------------------------------------------------------------------------------------------------------|
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| <b>Address</b>              | : | 3F JieLi Building JiChang Road Shangcheng Hangzhou Zhejiang China                                                       |
| <b>Equipment under Test</b> | : | Commercial Floor Sweeper                                                                                                |
| <b>Model No.</b>            | : | iMop                                                                                                                    |
| <b>Trade mark</b>           | : | iTR                                                                                                                     |
| <b>Manufacturer</b>         | : | JiaXing IT-Robotics Technology Co.,Ltd                                                                                  |
| <b>Address</b>              | : | Room 102, Building 13, NO.36 ChangSheng South Road, Economic and Technological Development Zone, Jiaxing Zhejiang China |

**Standard Used:** KDB447498 D01 General RF Exposure Guidance v06

**We Declare:**

The equipment described above is assessed by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration assessed the equipment complied with the standards specified above. The assessed results are contained in this report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these assess.

**After evaluation, our opinion is that the equipment In Accordance with above standard.**

|                         |                    |                      |                               |
|-------------------------|--------------------|----------------------|-------------------------------|
| <b>Report No:</b>       | DDT-R22022208-2E03 |                      |                               |
| <b>Date of Receipt:</b> | Mar. 16, 2022      | <b>Date of Test:</b> | Mar. 16, 2022 ~ Apr. 08, 2022 |

**Prepared By:**

Sanvin Zheng

**Sanvin Zheng/Engineer**

**Approved By:**



**Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

## Revision History

| Rev. | Revisions     | Issue Date    | Revised By |
|------|---------------|---------------|------------|
| ---  | Initial issue | Apr. 08, 2022 |            |
|      |               |               |            |

## 1. General Information

### 1.1. Description of equipment

|                          |                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT* Name                | : Commercial Floor Sweeper                                                                                                                                        |
| Model Number             | : iMop                                                                                                                                                            |
| EUT function description | : Please reference user manual of this device                                                                                                                     |
| Power supply             | : DC powered by a power supply or a built-in 25.2V lithium battery.                                                                                               |
| Radio Technology         | : IEEE 802.11b/g/n                                                                                                                                                |
| Operation frequency      | : IEEE 802.11b: 2412 MHz - 2462 MHz<br>IEEE 802.11g: 2412 MHz - 2462 MHz<br>IEEE 802.11n HT20: 2412 MHz - 2462 MHz<br>IEEE 802.11n HT40: 2422 MHz - 2452 MHz      |
| Modulation               | : IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)                        |
| Transmitter rate         | : IEEE 802.11b: 1, 2, 5.5, 11 Mbps<br>IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE 802.11n HT20: up to 144.4 Mbps<br>IEEE 802.11n HT40: up to 300 Mbps |
| Antenna Gain             | : Antenna 1: 5.94 dBi<br>Antenna 2: 5.94 dBi                                                                                                                      |
| Serial Number            | : iTRSS 120220110004                                                                                                                                              |

Note: EUT is the abbreviation of equipment under test.

| Antenna information |           |           |      |
|---------------------|-----------|-----------|------|
|                     | Ant1 gain | Ant2 gain | MIMO |
| IEEE 802.11b        | 5.94      | 5.94      | /    |
| IEEE 802.11g        | 5.94      | 5.94      | /    |
| IEEE 802.11n HT20   | 5.94      | 5.94      | 8.95 |
| IEEE 802.11n HT40   | 5.94      | 5.94      | 8.95 |

### 1.2. Assess laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City,  
Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com).

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, G-20118

## 2. RF Exposure Evaluation

### 2.1. Requirement

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

Limits for General Population/Uncontrolled Exposure

(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 Time  E  <sup>2</sup> ,  H  <sup>2</sup> 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                                                                |
| 1500-100,000          |                                   |                                   | 1.0                                     | 30                                                                |

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

### 2.2. Calculation method

$$E(\text{V/m}) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } S(\text{mW/cm}^2) = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = Peak RF output power (mW)

**G** = EUT Antenna numeric gain (numeric)=

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

From the peak EUT RF output power, the minimum mobile separation distance, d= 0.2 m, as well as the gain of the used antenna, the RF power density can be obtained.

### 2.3. Estimation result

#### P3310 module

| Mode      | PK Output power (dBm) | Output power (mW) | Duty Cycle (%) | Antenna Gain (dBi) | Antenna Gain (linear) | MPE Values (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-----------|-----------------------|-------------------|----------------|--------------------|-----------------------|----------------------------------|---------------------------------|
| BT        | 8.65                  | 7.33              | 76.4           | 2.86               | 1.93                  | 0.00369                          | 1                               |
| BLE       | 5.26                  | 3.36              | 62.0           | 2.86               | 1.93                  | 0.00208                          | 1                               |
| 2.4G WIFI | 18.44                 | 69.82             | 98.7           | 2.86               | 1.93                  | 0.02721                          | 1                               |
| 5G WIFI   | 19.31                 | 85.31             | 93.5           | 5.49               | 3.54                  | 0.06423                          | 1                               |

Note: PK Output power includes the duty cycle factor.

#### MT7620A module

| Mode      | PK Output power (dBm) | Output power (mW) | Antenna Gain (dBi) | Antenna Gain (linear) | MPE Values (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-----------|-----------------------|-------------------|--------------------|-----------------------|----------------------------------|---------------------------------|
| 2.4G WIFI | 21.38                 | 137.4             | 5.94               | 3.93                  | 0.10742                          | 1                               |

Simultaneous:

2.4G WIFI (MT7620A) + BT (P3310) =  $0.10742/1 + 0.00369/1 = 0.11111 < 1$

2.4G WIFI (MT7620A) + BLE (P3310) =  $0.10742/1 + 0.00208/1 = 0.10950 < 1$

2.4G WIFI (MT7620A) + 2.4G WIFI (P3310) =  $0.10742/1 + 0.02721/1 = 0.13463 < 1$

2.4G WIFI (MT7620A) + 5G WIFI (P3310) =  $0.10742/1 + 0.06423/1 = 0.17165 < 1$

Note: The estimation distance is 20 cm

Conclusion: The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

**END OF REPORT**