



# SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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Report No.: SHEM160400156904  
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## 1 Cover Page

# FCC MPE REPORT

|   |  |
|---|--|
| Application No.:  | SHEM1604001569CR   |
| Applicant:  | Zhiwei Robotics Corp   |
| FCC ID:   | 2AIDMLPDFR0418   |
| <b>Equipment Under Test (EUT):</b><br><b>NOTE:</b> The following sample(s) submitted was/were identified on behalf of the client as |  |
| Product Name:   | LattePanda   |
| Model No.(EUT):   | DFR0418  |
| Standards:  | FCC Rules 47 CFR §2.1091<br>KDB447498 D01 General RF Exposure Guidance v06 |
| Date of Receipt:  | 2016-04-06   |
| Date of Test:   | 2016-05-10 to 2016-05-26   |
| Date of Issue:  | 2016-06-30   |
| Test Result:  | <b>Pass*</b>   |

\* In the configuration tested, the EUT complied with the standards specified above.



**SGS-CSTC (Shanghai) Co., Ltd.**



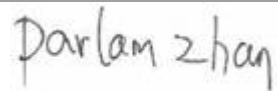
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Version

| Revision Record |         |            |          |          |
|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
| 00              | /       | 2016-06-30 | /        | Original |
|                 |         |            |          |          |
|                 |         |            |          |          |
|                 |         |            |          |          |
|                 |         |            |          |          |

|                          |  |             |  |   |
|--------------------------|--|-------------|--|---|
| Authorized for issue by: |  |             |  |   |
| Engineer                 |  | Eddy Zong   |  |  |
|                          |  | Print Name  |  |   |
| Clerk                    |  | Susie Liu   |  |  |
|                          |  | Print Name  |  |   |
| Reviewer                 |  | Parlam Zhan |  |  |
|                          |  | Print Name  |  |   |

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## 4 General Information

### 4.1 Client Information

|                          |  |
|--------------------------|--|
| Applicant:               | Zhiwei Robotics Corp   |
| Address of Applicant:    | Room 615,Building Y1,112 liangxiu road, Pudong, Shanghai Municipality 201203 China       |
| Manufacturer:            | Zhiwei Robotics Corp   |
| Address of Manufacturer: | Room 615,Building Y1,112 liangxiu road, Pudong, Shanghai Municipality 201203 China       |
| Factory:                 | Weibu Information Inc.   |
| Address of Factory:      | 3 Building, Changyuan New Material Harbor, Hi-tech Park, Nanshan District, Shenzhen, PRC |

### 4.2 General Description of E.U.T.

|                      |   |
|----------------------|---|
| Product Description: | Fixed Product with 2.4GHz band WIFI and BT function |
| Brand Name:          | lattepanda  |
| Rated Input:         | DC 5.0V 2A  |
| Test Voltage:        | AC 120V 60Hz for adapter                            |

### 4.3 Details of E.U.T.

|                       |   |
|-----------------------|---|
| Operation Frequency:  | BT: 2402MHz~2480MHz<br>WiFi: 2412MHz~2462MHz  |
| Bluetooth Version:    | BT4.0 dual mode   |
| Modulation Technique: | BT: GFSK, $\pi/4$ DQPSK, 8DPSK<br>802.11b: DSSS(CCK, DQPSK, DBPSK)<br>802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK) |
| Number of Channel:    | BT (BLE): 40<br>BT (Classic) : 79<br>802.11 b/g/n(HT20): 11<br>802.11 n(HT40): 7                                |
| Antenna Type          | PIFA  |
| Antenna Gain          | 0.5dBi  |

#### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

No.588 West Jindu Road, Songjiang District, Shanghai, China.201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

#### 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively. Date of Expiry: 2017-11-16.

## 5 Test Standards and Limits

According to §1.1310 Radiofrequency radiation exposure limits:

The limit for general population/uncontrolled exposures

| Frequency     | Power density(mW/cm <sup>2</sup> ) | Averaging time(minutes) |
|---------------|------------------------------------|-------------------------|
| 300MHz~1.5GHz | f/1500                             | 30                      |
| 1.5GHz~100GHz | 1.0                                | 30                      |

## 6 Measurement and Calculation

### 6.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM160400156901 & SHEM160400156902 & SHEM160400156903.

**For BT 4.0:**

| Test mode | Channel | Peak Power (dBm) | Peak Power (mW) |
|-----------|---------|------------------|-----------------|
| GFSK      | 2402    | 0.09             | 1.02            |
|           | 2440    | -0.03            | 0.99            |
|           | 2480    | -0.39            | 0.91            |

**For BT 2.1+EDR/3.0+HS:**

| Test Mode | Test Frequency (MHz) | Output Power (dBm) | Reading Power (mW) |
|-----------|----------------------|--------------------|--------------------|
| GFSK      | 2402                 | 3.47               | 2.22               |
|           | 2441                 | 3.16               | 2.07               |
|           | 2480                 | 2.80               | 1.91               |
| π/4DQPSK  | 2402                 | 4.80               | 3.02               |
|           | 2441                 | 4.63               | 2.90               |
|           | 2480                 | 4.19               | 2.62               |
| 8DPSK     | 2402                 | <b>5.03</b>        | <b>3.18</b>        |
|           | 2441                 | 4.88               | 3.08               |
|           | 2480                 | 4.48               | 2.81               |

**For WiFi:**

| Test mode      | Test Frequency (MHz) | Output Power (dBm) | Output Power (mW) |
|----------------|----------------------|--------------------|-------------------|
| 802.11b        | 2412                 | 19.27              | 84.53             |
|                | 2437                 | 18.57              | 71.94             |
|                | 2462                 | 19.53              | 89.74             |
| 802.11g        | 2412                 | 23.11              | 204.64            |
|                | 2437                 | 22.21              | 166.34            |
|                | 2462                 | <b>23.23</b>       | <b>210.38</b>     |
| 802.11 n(HT20) | 2412                 | 23.00              | 199.53            |
|                | 2437                 | 21.98              | 157.76            |
|                | 2462                 | 23.09              | 203.70            |
| 802.11 n(HT40) | 2422                 | 21.32              | 135.52            |
|                | 2437                 | 21.55              | 142.89            |
|                | 2452                 | 21.20              | 131.83            |

## 6.2 MPE Calculation

According to the formula  $S = \frac{PG}{4R^2\pi}$ , we can calculate S which is MPE.

Note:

- 1)  $P$  (Watts) = Power Input to antenna =  $10^{\frac{dBm}{10}} / 1000$
- 2)  $G$  (Antenna gain in numeric) =  $10^{(Antenna\ gain\ in\ dBi / 10)}$
- 3)  $R$  = distance to the center of radiation of antenna (in meter) = 20cm
- 4) MPE limit = 1mW/cm<sup>2</sup>

For BT:

The Max Conducted Peak Output Power is 3.18mW in middle channel of 8DPSK;

The best case gain of the antenna is 0.5dBi. 0.5dB logarithmic terms convert to numeric result is nearly 1.12

$$\text{So, } S = \frac{PG}{4R^2\pi} = \frac{0.93 \times 1.58}{4 \times 400 \times 3.14} = 0.0007 \text{ mW/cm}^2$$

For DTS:

The Max Conducted Peak Output Power is 210.38mW in highest channel;

The best case gain of the antenna is 0.5dBi. 0.5dB logarithmic terms convert to numeric result is nearly 1.12

$$\text{So, } S = \frac{PG}{4R^2\pi} = \frac{52.36 \times 1.41}{4 \times 400 \times 3.14} = 0.0469 \text{ mW/cm}^2$$

The BT and the DTS modules can't simultaneous transmitting at frequency 2.4GHz band, according to the KDB447498 section 7.1 determine the device is exclusion from SAR test.

## 7 EUT Constructional Details

Refer to the < DFR0418\_External Photos > & < DFR0418\_Internal Photos>.

**--End of the Report--**