

1 Cover Page

FCC MPE REPORT

Application No.:	SHEM1604001569CR
Applicant:	Zhiwei Robotics Corp
FCC ID:	2AIDMLPDR0418

Equipment Under Test (EUT):

NOTE: 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 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:	Pass*

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



E&E Section Manager

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	<i>Eddy Zong</i>
		Print Name	
Clerk		Susie Liu	<i>Susie Liu</i>
		Print Name	
Reviewer		Parlam Zhan	<i>Parlam Zhan</i>
		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 WiFi: 2412MHz~2462MHz
Bluetooth Version:	BT4.0 dual mode
Modulation Technique:	BT: GFSK, π/4DQPSK, 8DPSK 802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Number of Channel:	BT (BLE): 40 BT (Classic) : 79 802.11 b/g/n(HT20): 11 802.11 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 ²)	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
$\pi/4$ DQPSK	2402	4.80	3.02
	2441	4.63	2.90
	2480	4.19	2.62
8DPSK	2402	5.03	3.18
	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	23.23	210.38
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) = $10^{\frac{Antenna gain in dBi}{10}}$
- 3) R = distance to the center of radiation of antenna (in meter) = 20cm
- 4) MPE limit = 1mW/cm²

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

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

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

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

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--