1 Cover Page

RF Exposure Evaluation Report

Application No.:	SHCR2201000104AT
FCC ID:	2AZLQ-ESP01
IC:	27189-ESP01
Applicant:	Keenon Robotics Co., Ltd.
Address of Applicant:	11F, Building 56, No. 1000, Jinhai Road, Pudong District, Shanghai, China
Manufacturer:	Keenon Robotics Co., Ltd.
Address of Manufacturer:	11F, Building 56, No. 1000, Jinhai Road, Pudong District, Shanghai, China
Factory:	WUJIANG LIANFENG ELECTRONICS CO., LTD
Address of Factory:	No.9 SIMING ROAD, WUJIANG ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE,SUZHOU CITY,JIANGSU PROVINCE,CHINA
Equipment Under Test (EUT):	
EUT Name:	Scheduling Module
Model No.:	ESP01
Standard(s) :	FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 Amendment 1 (February 2, 2021)
Date of Receipt:	2022-01-07
Date of Test:	2022-01-23 to 2022-02-15
Date of Issue:	2022-02-15
Test Result:	**Pass***

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

Parlam Zhan

Parlam Zhan
Laboratory Manager

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Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2022-02-15	/

Authorized for issue by:				
		Micheal Niu		
		Micheal Niu / Project Engineer		
		Parlam Zhan		
		Parlam Zhan / Reviewer		

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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 2.7-3.6V
Serial Number:	QLDD20220204001
Firmware Version:	V1.0

3.2 Technical Specifications

2.4GHz

Antenna Gain:	3dBi (Provided by manufacturer)
Antenna Type:	Dipole Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Data rate:	802.11b:1/2/5.5/11Mbps 802.11g:6/9/12/18/24/36/48/54Mbps 802.11n(HT20): MCS0~MCS7 802.11 n(HT40): MCS0~MCS7

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3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

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

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 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.

• A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC (Designation Number: CN1172)

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600,C-11707, T-11499, G-10216 respectively.

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4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to§1.1310, 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

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

• at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 4.49/$f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;

• at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10^{-2} $f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHCR220100010401

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11B	2412	Ant1	15.94	39.26
11B	2437	Ant1	16.03	40.09
11B	2462	Ant1	16.19	**41.59**
11G	2412	Ant1	15.53	35.73
11G	2437	Ant1	15.40	34.67
11G	2462	Ant1	15.52	35.65
11N20SISO	2412	Ant1	15.75	37.58
11N20SISO	2437	Ant1	15.68	36.98
11N20SISO	2462	Ant1	15.95	39.36
11N40SISO	2422	Ant1	15.33	34.12
11N40SISO	2437	Ant1	15.15	32.73
11N40SISO	2452	Ant1	15.17	32.89

5.2 MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

1) P (mW)
2) R = distance to the center of radiation of antenna (in meter) = 20cm
3) MPE limit = 1mW/cm²

For FCC:

For 2.4G WiFi

The max. antenna gain is		3	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
41.59	1.995	20	0.01651	1	Pass

For IC:

For 2.4GHz WiFi mode:

E.I.R.P.= P*G= 0.04159×1.995=0.083W<2.68W

So the device is exclusion from SAR test

--End of the Report--

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