

**1 Cover Page**

# RF Exposure Report

**Application No.:** SHEM2009007379CR  
**FCC ID:** 2ARYN-LUCY  
**Applicant:** Shenzhen Trifo Technology Co.,Ltd.  
**Address of Applicant:** Room 201, Building A, No.1, Qianwan Road 1, Qianhai Shenzhen-Hong Kong Cooperation Zone, Shenzhen, China  
**Manufacturer:** Shenzhen Trifo Technology Co.,Ltd.  
**Address of Manufacturer:** Room 201, Building A, No.1, Qianwan Road 1, Qianhai Shenzhen-Hong Kong Cooperation Zone, Shenzhen, China  
**Factory:** Flextronics computing (Suzhou) Co., Ltd  
**Address of Factory:** No.1 Guanpu Road, Guoxiang Street, WuZhong District, Suzhou, Jiangsu, China  
**Equipment Under Test (EUT):**  
**EUT Name:** AI Home Robot  
**Model No.:** LUC-S  
**Add Model No.:** LUC-P  
**Trade mark:** TRIFO  
**Standard(s) :** FCC Rules 47 CFR §2.1091  
 KDB447498 D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2020-09-02  
**Date of Test:** 2020-09-09 to 2020-09-29  
**Date of Issue:** 2021-04-28

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

*Parlan Zhan*

Parlan Zhan  
E&E Section Manager

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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

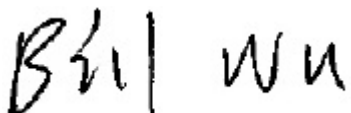
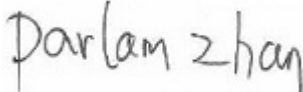


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Revision Record			
Version	Description	Date	Remark
00	Original	2021-04-28	/

<b>Authorized for issue by:</b>			
			
		_____	
		<b>Bill Wu / Project Engineer</b>	
			
		_____	
		<b>Parlam Zhan /Reviewer</b>	



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2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS .....	3
3 GENERAL INFORMATION.....	4
3.1 GENERAL DESCRIPTION OF E.U.T. ....	4
3.2 TECHNICAL SPECIFICATIONS .....	4
3.3 TEST LOCATION .....	7
3.4 TEST FACILITY.....	7
4 TEST STANDARDS AND LIMITS .....	8
4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS: .....	8
5 MEASUREMENT AND CALCULATION .....	8
5.1 MAXIMUM TRANSMIT POWER .....	8
5.2 MPE CALCULATION .....	11



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### 3 General Information

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

Power supply:	DC 14.4V 5200mAh rechargeable battery Charging adapter: Model: S040QU2000200 Input:100-240V~50/60Hz Output:20V 2000mA
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#### 3.2 Technical Specifications

##### 2.4G WiFi:

Antenna Gain:	Antenna 1: 2.5dBi Antenna 2: 2.5dBi Directional gain: 5.5dBi (Provided by manufacturer)
Antenna Type:	Antenna 1: PIFA Antenna Antenna 2: PIFA Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Date Rate:	802.11b:1/2/5.5./11Mbps 802.11g:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7
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



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**5G WiFi:**

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(HT20)	5260-5320	4
		802.11n(HT40)/ac(HT40)	5270-5310	2
		802.11ac(HT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(HT20)	5500-5700	11
		802.11n(HT40)/ac(HT40)	5510-5670	5
		802.11ac(HT80)	5530~5610	2
	UNII Band III	802.11a/n(HT20)/ac(HT20)	5745-5825	5
		802.11n(HT40)/ac(HT40)	5755-5795	2
		802.11ac(HT80)	5775	1
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Date Rate:	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7 802.11ac:VHT MCS0-MCS7			
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz			
Antenna Gain:	Antenna 1: 3dBi Antenna 1: 3dBi Directional gain: 6dBi (Provided by manufacturer)			
Antenna Type:	Antenna 1: PIFA Antenna Antenna 2: PIFA Antenna			
TPC Function:	Not support			
DFS Function:	Slaver without radar detection			



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Selected Test Channel for 802.11a/n(HT20)/ac(HT20)		
Band	Channel	Frequency
U-NII Band I	The lowest channel (CH36)	5180MHz
	The middle channel (CH40)	5200MHz
	The highest channel (CH48)	5240MHz
U-NII Band II-A	The lowest channel (CH52)	5260MHz
	The middle channel (CH60)	5300MHz
	The highest channel (CH64)	5320MHz
U-NII Band II-C	The lowest channel (CH100)	5500MHz
	The middle channel (CH120)	5600MHz
	The highest channel (CH140)	5700MHz
U-NII Band III	The lowest channel (CH149)	5745MHz
	The middle channel (CH157)	5785MHz
	The highest channel (CH165)	5825MHz

Selected Test Channel for 802.11n(HT40)/ac(HT40)		
Band	Channel	Frequency
U-NII Band I	The lowest channel (CH38)	5190MHz
	The highest channel (CH46)	5230MHz
U-NII Band II-A	The lowest channel (CH54)	5270MHz
	The highest channel (CH62)	5310MHz
U-NII Band II-C	The lowest channel (CH102)	5510MHz
	The middle channel (CH118)	5590MHz
	The highest channel (CH134)	5670MHz
U-NII Band III	The lowest channel (CH151)	5755MHz
	The highest channel (CH159)	5795MHz

Selected Test Channel for 802.11ac(HT80)		
Band	Channel	Frequency
U-NII Band I	One channel (CH42)	5210MHz
U-NII Band II-A	One channel (CH58)	5290MHz
U-NII Band II-C	The lowest channel (CH106)	5530MHz
	The middle channel (CH122)	5610MHz
U-NII Band III	One channel (CH155)	5775MHz



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### 3.3 Test Location

All tests were performed at:

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

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai,

China Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

### 3.4 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 17025:2017 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.

• **NVLAP (LAB CODE: 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

• **FCC (Designation Number: CN5033)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory. Test Firm Registration Number: 479755.

• **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. ISED#: 8617A.

• **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-13868, C-14336, T-12221, G-10830 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 <sup>2</sup> )	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

## 5 Measurement and Calculation

### 5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM200900737902-2.4GHz.

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11B	2412	16.89	17.89	NA	48.87	<b>61.52</b>	N/A
11B	2437	17.33	17.73	NA	54.08	59.29	N/A
11B	2462	17.86	17.67	NA	61.09	58.48	N/A
11G	2412	17.92	17.48	NA	61.94	55.98	N/A
11G	2437	18.29	17.38	NA	<b>67.45</b>	54.70	N/A
11G	2462	17.49	17.19	NA	56.10	52.36	N/A
11N20SISO	2412	14.54	15.96	18.32	28.44	39.45	67.92
11N20SISO	2437	14.93	15.87	18.44	31.12	38.64	69.82
11N20SISO	2462	15.01	15.51	18.28	31.70	35.56	67.30
11N40SISO	2422	14.20	15.53	17.93	26.30	35.73	62.09
11N40SISO	2437	14.64	15.60	18.16	29.11	36.31	65.46
11N40SISO	2452	15.13	15.79	18.48	32.58	37.93	<b>70.47</b>



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Report No.: SHEM200900737905

Page: 9 of 11

The Power Data is based on the RF Test Report SHEM200900737903-5GHz.

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11A	5180	10.96	10.02	NA	12.47	10.05	N/A
11A	5220	10.55	10.10	NA	11.35	10.23	N/A
11A	5240	8.84	9.35	NA	7.66	8.61	N/A
11A	5260	9.36	9.72	NA	8.63	9.38	N/A
11A	5280	9.61	9.58	NA	9.14	9.08	N/A
11A	5320	10.39	10.73	NA	10.94	11.83	N/A
11A	5500	12.60	14.97	NA	18.20	31.41	N/A
11A	5600	13.15	15.08	NA	20.65	32.21	N/A
11A	5700	13.98	15.34	NA	25.00	34.20	N/A
11A	5745	14.38	14.37	NA	27.42	27.35	N/A
11A	5785	15.14	14.29	NA	<b>32.66</b>	26.85	N/A
11A	5825	15.02	13.84	NA	31.77	24.21	N/A
11N20	5180	14.98	13.64	13.58	31.48	23.12	22.80
11N20	5220	11.29	9.70	14.36	13.46	9.33	27.29
11N20	5240	11.98	10.61	14.24	15.78	11.51	26.55
11N20	5260	10.50	11.85	13.76	11.22	15.31	23.77
11N20	5280	10.10	11.32	15.18	10.23	13.55	32.96
11N20	5320	11.49	12.76	14.14	14.09	18.88	25.94
11N20	5500	10.41	11.74	17.37	10.99	14.93	<b>54.58</b>
11N20	5600	12.90	15.45	17.06	19.50	<b>35.08</b>	50.82
11N20	5700	12.95	14.93	16.27	19.72	31.12	42.36
11N20	5745	11.92	14.28	15.76	15.56	26.79	37.67
11N20	5785	12.28	13.18	15.85	16.90	20.80	38.46
11N20	5825	12.79	12.89	15.33	6.53	19.01	34.12
11N40	5190	12.83	11.73	15.23	19.19	14.89	33.34
11N40	5230	13.03	11.23	15.89	20.09	13.27	38.82
11N40	5270	13.36	12.34	15.79	21.68	17.14	37.93
11N40	5310	12.53	13.02	15.38	17.91	20.04	34.51
11N40	5510	12.17	12.56	15.59	16.48	18.03	36.22
11N40	5590	12.25	12.88	15.85	16.79	19.41	38.46
11N40	5670	11.56	13.82	15.45	14.32	24.10	35.08
11N40	5755	11.04	13.49	16.98	12.71	22.34	49.89



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Report No.: SHEM200900737905  
Page: 10 of 11

11N40	5795	12.81	14.89	16.88	19.10	30.83	48.75
11AC20	5180	13.38	14.31	16.73	21.78	26.98	47.10
11AC20	5220	14.11	13.30	16.86	25.76	21.38	48.53
11AC20	5240	14.13	13.55	14.65	25.88	22.65	29.17
11AC20	5260	11.44	11.84	15.10	13.93	15.28	32.36
11AC20	5280	12.08	12.10	13.79	16.14	16.22	23.93
11AC20	5320	10.52	11.03	13.47	11.27	12.68	22.23
11AC20	5500	10.31	10.60	15.07	10.74	11.48	32.14
11AC20	5600	11.88	12.24	14.57	15.42	16.75	28.64
11AC20	5700	10.77	12.23	15.46	11.94	16.71	35.16
11AC20	5745	10.68	13.70	16.34	11.69	23.44	43.05
11AC20	5785	12.36	14.13	16.21	17.22	25.88	41.78
11AC20	5825	12.27	13.96	15.60	16.87	24.89	36.31
11AC40	5190	12.47	12.70	16.31	17.66	18.62	42.76
11AC40	5230	13.76	12.79	15.77	23.77	19.01	37.76
11AC40	5270	13.46	11.92	16.07	22.18	15.56	40.46
11AC40	5310	13.75	12.24	15.33	23.71	16.75	34.12
11AC40	5510	12.22	12.42	15.36	16.67	17.46	34.36
11AC40	5590	11.48	13.08	15.40	14.06	20.32	34.67
11AC40	5670	11.77	12.94	15.43	15.03	19.68	34.91
11AC40	5755	11.56	13.13	16.32	14.32	20.56	42.85
11AC40	5795	11.71	14.48	15.74	14.83	28.05	37.50
11AC80	5210	11.31	13.80	16.65	13.52	23.99	46.24
11AC80	5290	12.64	14.45	16.68	18.37	27.86	46.56
11AC80	5530	13.29	14.01	14.89	21.33	25.18	30.83
11AC80	5610	12.15	11.60	16.56	16.41	14.45	45.29
11AC80	5775	14.20	12.79	15.64	26.30	19.01	36.64



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## 5.2 MPE Calculation

For FCC:

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/cm<sup>2</sup>

For 2.4G WiFi:

The max. antenna gain is 5.5 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
70.47	3.548	20	0.04974	1	Pass

For 5G WiFi:

The max. antenna gain is 6 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
54.58	3.981	20	0.04323	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is  $0.050/1.0+0.043/1.0=0.093 \leq 1.0$ . according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

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



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