

## 1 Cover Page

# RF Exposure Report

**Application No.:** SHEM2104002998CR  
**FCC ID:** 2AYIFRF320A  
**IC :** 26829-RF320A  
**Applicant:** Jiaxing Mogo Intelligent Technology Co., Ltd  
**Address of Applicant:** No.1-129, Zhenbei Road, Internet Town, Wuzhen Town, Tongxiang City, Jiaxing City, Zhejiang Province , China  
**Manufacturer:** Jiaxing Mogo Intelligent Technology Co., Ltd  
**Address of Manufacturer:** No.1-129, Zhenbei Road, Internet Town, Wuzhen Town, Tongxiang City, Jiaxing City, Zhejiang Province, China  
**Equipment Under Test (EUT):**  
**EUT Name:** Robotic Lawn Mower Charging Station  
**Model No.:** RF320A  
**Trade mark:** ROCKFIRE  
**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:** 2021-04-07  
**Date of Test:** 2021-05-07 to 2021-06-09  
**Date of Issue:** 2021-06-12

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

*Parlam Zhan*

Parlam 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	2021-06-12	/

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



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### 3 General Information

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

Power supply:	DC 30V by adapter Charging adapter: Model:GM95-310250-1FE Input:100-240V~50/60Hz 2.5A Output:31V 2.5A
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#### 3.2 Technical Specifications

##### BLE

Antenna Gain:	2.5dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
Channel Spacing:	2MHz
Modulation Type:	GFSK
Number of Channels:	40
Operation Frequency:	2402MHz to 2480MHz

##### 2.4G WiFi

Antenna Gain:	2.5dBi (Provided by manufacturer)
Antenna Type:	PIFA 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
Date Rate:	802.11b:1/2/5.5./11Mbps 802.11g:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7



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5G WiFi

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)	5180-5240	4
		802.11n(HT40)	5190-5230	2
	UNII Band III	802.11a/n(HT20)	5745-5825	5
		802.11n(HT40)	5755-5795	2
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)			
Date Rate:	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7			
Channel Spacing:	802.11a/n(HT20): 20MHz 802.11n(HT40): 40MHz			
Antenna Gain:	2.5dBi (Provided by manufacturer)			
Antenna Type:	PIFA Antenna			
S/N:	RF320AB8N1			
Firmware Version:	V1.1.0			

916MHz

Antenna Gain:	0dBi (Provided by manufacturer)
Antenna Type:	Integral Antenna
Modulation Type:	FSK
Number of Channels:	1
Operation Frequency	916MHz

### 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.

- **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

- **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

- **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  
Company Number: 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

### 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  $1.31 \times 10^{-2} f^{0.6834}$  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

For 5G device, the limit of worse case is 4.53W

For 916MHz device, the limit of worse case is 1.39W



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## 5 Measurement and Calculation

### 5.1 Maximum transmit power

BLE

The Power Data is based on the RF Test Report SHEM210400299801.

Test Mode	Test Channel	Power [dBm]		Power [mW]	
		1MHz	2MHz	1MHz	2MHz
BLE	2402	9.92	10.06	9.82	10.14
BLE	2440	10.12	10.49	10.28	<b>11.19</b>
BLE	2480	9.17	7.67	8.26	5.85

2.4GHz for FCC

The Power Data is based on the RF Test Report SHEM210400299802.

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11B	2412	Ant1	16.12	40.93
11B	2437	Ant1	16.71	46.88
11B	2462	Ant1	16.86	<b>48.53</b>
11G	2412	Ant1	12.53	17.91
11G	2437	Ant1	12.94	19.68
11G	2462	Ant1	13.04	20.14
11N20SISO	2412	Ant1	12.58	18.11
11N20SISO	2437	Ant1	12.74	18.79
11N20SISO	2462	Ant1	13.21	20.94
11N40SISO	2422	Ant1	12.81	19.10
11N40SISO	2437	Ant1	12.98	19.86
11N40SISO	2452	Ant1	12.95	19.72





5GHz for FCC:

The Power Data is based on the RF Test Report SHEM210400299803

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11A	5180	Ant1	15.70	37.15
11A	5220	Ant1	16.23	41.98
11A	5240	Ant1	16.39	<b>43.55</b>
11A	5745	Ant1	16.35	43.15
11A	5785	Ant1	14.91	30.97
11A	5825	Ant1	14.94	31.19
11N20	5180	Ant1	15.37	34.43
11N20	5220	Ant1	16.26	42.27
11N20	5240	Ant1	16.28	42.46
11N20	5745	Ant1	16.06	40.36
11N20	5785	Ant1	14.72	29.65
11N20	5825	Ant1	14.88	30.76
11N40	5190	Ant1	15.48	35.32
11N40	5230	Ant1	15.97	39.54
11N40	5755	Ant1	16.06	40.36
11N40	5795	Ant1	15.27	33.65

## 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 BLE

The max. antenna gain is 2.5 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
11.19	1.778	20	0.00396	1	Pass

For 2.4G WiFi



The max. antenna gain is 2.5 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
48.53	1.778	20	0.01717	1	Pass

For 5G WiFi

The max. antenna gain is 2.5 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
43.55	1.778	20	0.01541	1	Pass

The BT and the WiFi modules can simultaneous transmitting at frequency 2.4GHz band. But the maximum rate of MPE is  $0.017/1.0+0.004/1.0+0.015/1.0=0.036 \leq 1.0$ . according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.





For IC:

For BLE

$E.I.R.P. = P \cdot G = 0.011 \times 1.78 = 0.02W < 2.68W$

For 2.4GHz WiFi mode:

$E.I.R.P. = P \cdot G = 0.049 \times 1.78 = 0.09W < 2.68W$

For 916MHz:

$E.I.R.P. = 59.24 \text{dBuV/m} = 0.0003W < 1.39W$

For 5GHz WiFi mode:

$E.I.R.P. = P \cdot G = 0.044 \times 1.78 = 0.08W < 4.53W$

The BT and the WiFi modules can simultaneous transmitting, so the maximum rate of MPE is  $0.02/2.68 + 0.09/2.68 + 0.08/4.53 + 0.0003/1.39 = 0.06 \leq 1$ .

So the device is exclusion from SAR test

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



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