

Suzhou ShiRuizhuo Technology Co., Ltd.

MPE ASSESSMENT REPORT

Report Type:
FCC MPE assessment report

Model:
RRAR3MON, RRAR4MON

REPORT NUMBER:
2509B1059SHA-008

ISSUE DATE:
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DOCUMENT CONTROL NUMBER:
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FCC ID: 2BQXJ-RRAR3MON01

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

KDB447498 D01 General RF Exposure Guidance v06

FCC Part2.1091, FCC Part1.1307(b)

PREPARED BY:

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REVIEWED BY:

Reviewer
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Revision History

Report No.	Version	Description	Issued Date
2509B1059SHA-008	Rev. 01	Initial issue of report	Dec 2, 2025

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Robotic Lawn Mower
Type/Model/PMN/HVIN:	RRAR3MON, RRAR4MON
Description of EUT:	The EUT is Robotic Lawn Mower. The 2 models are fully same except for the battery and the battery charger. The EUT contains WIFI2.4G, WIFI5G, BLE, 4G and LORA functions. The worst data is listed in the report.
Rating:	Rated Input: RRAR3MON: 32VDC/3.2A, RRAR4MON: 32VDC/4A Charging Station: MHCR00RR Rated Input: 32VDC/3.75A/4.69A Rated Output: 32VDC/3.2A/4A, 5.2VDC/1A Battery Charger for RRAR3MON: TZAL01 Input: 100-240VAC 50/60Hz 2A, Output: 32VDC 3.75A 120W Battery Charger for RRAR4MON: TZAM01 Input: 100-240VAC 50/60Hz 2A, Output: 32VDC 4.69A 150.08W
EUT type:	☐ Table top ☒ Floor standing
Hardware Version:	g33833fe for WIFI module, M4 for LORA module
Software Version:	241c091M (master) for WIFI module, B039.01.02 for LORA module
Sample No.:	A250910-39-001
Sample received date:	Sep 18, 2025
Date of test:	Sep 18~Nov 7, 2025

1.2 Technical Specification

BLE

Frequency Range:	2402-2480MHz
Support Standards:	Bluetooth LE 5.4
Type of Modulation:	GFSK
Channel Number:	40
Data Rate:	1Mbps, 2Mbps
Channel Separation:	2MHz
Antenna Information:	1.23dBi, FPC antenna(Declared by manufacturer)

WIFI2.4G

Frequency Range:	2412MHz ~ 2462MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40, IEEE 802.11ax-HE20, IEEE 802.11ax-HE40

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Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax-HE20: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) IEEE 802.11ax-HE40: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Channel Number:	11 Channels for 802.11b, 802.11g, 802.11n(HT20) and 802.11ax(HE20) 7 Channels for 802.11n(HT40) and 802.11ax(HE40)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11n-HT40: Up to MCS7 IEEE 802.11ax-HE20: Up to MCS11 IEEE 802.11ax-HE40: Up to MCS11
Channel Separation:	5 MHz
Antenna Information:	1.23dBi, FPC antenna(Declared by manufacturer)

WIFI5G

Frequency Range:	5150 ~ 5250MHz(excluded Canada) 5250 ~ 5350MHz 5470 ~ 5725MHz 5725 ~ 5850MHz
Support Standards:	802.11a, 802.11n(HT20), 802.11n(HT40), 802.11ac(VHT20), 802.11ac(VHT40), 802.11ax(HE20), 802.11ax(HE40) , 802.11ax(HE80)
Type of Modulation:	802.11a, 802.11n, 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Channel Number:	For 5180 ~ 5240MHz band: Channel 36 - 48(excluded Canada) For 5260 ~ 5320MHz Band: Channel 52 - 64 For 5500 ~ 5700MHz Band: Channel 100 - 140 For 5745 ~ 5825MHz band: Channel 149 - 165
Antenna Information:	2.14dBi, FPC antenna(Declared by manufacturer)

LORA

Frequency Range:	902MHz ~ 928MHz
Support Standards:	LORA
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	CSS
Channel Number:	50
Channel Separation:	510kHz
Antenna Information:	0.80dBi, PCB antenna(Declared by manufacturer)

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4G

GSM Band:	GSM 850, PCS1900
UMTS Band:	Band 2, 4, 5
E-UTRA Band:	Band 2, 4, 5, 7, 12, 13, 25, 26, 38, 41, 66
Antenna Information:	Max 2.92dBi, PCB antenna(Declared by manufacturer)
For details, refer to FCC certified module reports: 2211RSU065-U1, 2211RSU065-U2, 2211RSU065-U3, 2211RSU065-U4 and ISED certified module reports: 2211RSU065-C1, 2211RSU065-C2, 2211RSU065-C3.	

1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 MPE Assessment

Test result: Pass

2.1 MPE Assessment Limit

Mobile device exposure for standalone operations:

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10 000	4 000/f	5 000/f	-
0,025-0,8 kHz	250/f	4/f	5/f	-
0,8-3 kHz	250/f	5	6,25	-
3-150 kHz	87	5	6,25	-
0,15-1 MHz	87	0,73/f	0,92/f	-
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	-
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375 f^{1/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Mobile device exposure for simultaneous transmission operations: **the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0**

2.2 Assessment Results

Power density (S) is calculated according to the formula:

$$S = PG / (4\pi R^2)$$

Where S = power density in mW/cm²

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 2509B1059SHA-001:

The maximum BLE EIRP = 6.74dBm = 4.72 mW;

Here R is chosen to be 20cm,

$$S = PG / (4\pi R^2) = 4.72 / (4 * 3.14 * 20 * 20) = 0.0009\text{mW/cm}^2$$

As we can see from the test report 2509B1059SHA-002:

The maximum WIFI2.4G EIRP = 22.14dBm = 163.68mW;

Here R is chosen to be 20cm,

$$S = PG / (4\pi R^2) = 163.68 / (4 * 3.14 * 20 * 20) = 0.0326\text{mW/cm}^2$$

As we can see from the test report 2509B1059SHA-003:

The maximum WIFI5G EIRP = 19.42dBm = 87.50mW;

Here R is chosen to be 20cm,

$$S = PG / (4\pi R^2) = 87.50 / (4 * 3.14 * 20 * 20) = 0.0174\text{mW/cm}^2$$

As we can see from the test report 2509B1059SHA-006:

The maximum LORA EIRP = 20.63dBm = 115.61mW;

Here R is chosen to be 20cm,

$$S = PG / (4\pi R^2) = 115.61 / (4 * 3.14 * 20 * 20) = 0.0230\text{mW/cm}^2$$

As we can see from the LTE modular report 2211RSU065-U1, 2211RSU065-U2, 2211RSU065-U3, 2211RSU065-U4:

The maximum LTE tune-up average conducted power = 26dBm, the max antenna gain is 2.92dBi, so max EIRP = 26+2.92=28.92dBm=779.83mW;

Here R is chosen to be 20cm,

$$S = PG / (4\pi R^2) = 779.83 / (4 * 3.14 * 20 * 20) = 0.1551\text{mW/cm}^2$$

Note: BLE, WIFI2.4G and WIFI5G can not be simultaneous transmitting.

so the maximum rate of MPE is $0.0326/1+0.0230/0.451+0.1551/0.412=0.4601 < 1$

Appendix I

Definition below must be outlined in the User Manual:

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.
To ensure compliance, operations at closer than this distance is not recommended.

***** END *****