Zhejiang Sunseeker Industrial Co., Ltd.

MPE ASSESSMENT REPORT

Report Type:
FCC Part §2.1091 and §1.1307(b) assessment report

Model:
RMX3000K20VU, RMX4000K20VU,
RMX6000K20VU, RMX8000K20VU,
RMX10000K20VU, RMX12000K20VU,
X7-3000, X7-4000, X7-6000,
X7-8000, X7-10000, X7-12000

REPORT NUMBER:
2312A0442SHA-003

ISSUE DATE:
April 16, 2024

DOCUMENT CONTROL NUMBER:
TTRFFCCMPE-01_V1 © 2018 Intertek

Intertek Testing Services Shanghai
Building No.86, 1198 Qinzhou Road (North)
Caohejing Development Zone
Shanghai 200233, China

Telephone: 86 21 6127 8200
www.intertek.com

Total Quality. Assured.

TEST REPORT

Report no.: 2312A0442SHA-003

Applicant	:	**Zhejiang Sunseeker Industrial Co., Ltd.** **988 Jinde Rd, Jiangdong Industrial Park, Jinhua, Zhejiang 321042, P.R.China**
Manufacturer	:	**Same as applicant**
Factory	:	**Zhejiang sunseeker industrial Co., Ltd.** **Jinde Road 988, Jiangdong Industrial Park, Jinhua, Zhejiang 321042, P.R.China**
FCC ID	:	**2BFD7X35**

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:	**REVIEWED BY:**
	
Project Engineer Eric Li	Reviewer Wakeyou Wang

Total Quality. Assured.

TEST REPORT

Revision History

Report No.	Version	Description	Issued Date
2312A0442SHA-003	Rev. 01	Initial issue of report	April 16, 2024

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Robotic lawn mower
Type/Model:	RMX3000K20VU, RMX4000K20VU, RMX6000K20VU, RMX8000K20VU, RMX10000K20VU, RMX12000K20VU, X7-3000, X7-4000, X7-6000, X7-8000, X7-10000, X7-12000
Description of EUT:	EUT is a Robotic lawn mower, there are nine models, all models are technical identical on mower unit except specific accessories used and declared working area by manufacturer. We tested RMX12000K20VU as representative and listed the worst results in this report.
Rating:	20 V d.c., Class III, IPX5 for mower unit, IPX4 for charging station. n0: 3000 /min, Cutting width 35cm.
EUT type:	☐ Table top ☒ Floor standing
Software Version:	/
Hardware Version:	/
Sample Identification No.:	0240306-05-003
Sample received date:	March 6, 2024
Date of test:	March 7, 2024 ~ March 22, 2024

1.2 Technical Specification

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
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)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20)
Channel Separation:	5 MHz
Antenna:	Copper tube antenna, gain is 2.29dBi

Frequency Band:	2402MHz to 2480MHz
Support Standards:	Bluetooth Low Energy
Type of Modulation:	GFSK
Channel Number:	40
Data Rate	1MHz
Channel Separation:	2MHz
Antenna Information:	Copper tube antenna, gain is 2.29dBi

Total Quality. Assured.

TEST REPORT

SRD

LoRa module 1: 2BDFV-A39

Operation Frequency:	902MHz to 928MHz
Type of Modulation:	LoRa
Channel Number:	26
Channel Separation:	1MHz
Antenna Information:	External antenna, 1.89dBi
Max output power:	25.272dBm

LoRa module 2: 2BA39HX-DU1021D

Frequency Band:	903MHz to 927MHz
Type of Modulation:	CSS
Channel Number:	49
Channel Separation:	500KHz
Antenna Information:	Dipole antenna, 2.0dBi
Max output power:	13.01dBm

LoRa module 3: 2A92VQD302

Operation Frequency:	902.55MHz to 926.45MHz
Type of Modulation:	CSS
Channel Number:	240
Channel Separation:	100KHz
Antenna Information:	Dipole antenna, 3.0dBi
Max output power:	20.1dBm

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
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 L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Member No: 3598 (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**

TEST REPORT

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/cm^2

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 2304B0632SHA-001, 2304B0632SHA-002:

The calculations in the table below use the highest gain of antenna for client EUT. These calculations represent worst case in terms of the exposure levels.

Mode	Frequency band	Max Power	Antenna Gain	R	S	Limits
	(MHz)	dBm	dBi	(cm)	(mW/cm2)	(mW/cm2)
WIFI	2412-2462	16.26	18.55	20	0.0143	1
BLE	2402-2480	7.38	2.29	20	0.0018	1
LoRa 1	902-928	25.272	1.89	20	0.1036	1
LoRa 2	903-927	13.01	2.0	20	0.0063	1
LoRa 3	902.55- 926.45	20.1	3.0	20	0.0406	1

Note: 1 mW/cm2 from 1.310 Table 1

This device exposure for simultaneous transmission operations: the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is
0.0143/1+0.0018/1+0.1036/1=0.1197≤ 1.0,
therefore, the MPE requirement is deemed to be satisfied without test.

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 **********