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:
2404B0243SHA-003

Issue Date:
May 28, 2024

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TEST REPORT

Report no.: 2404B0243SHA-003

Applicant:	Zhejiang Sunseeker Industrial Co., Ltd. 988 Jinde Road, Jiangdong Industrial Park, Jinhua, Zhejiang 321000, P.R.China
Manufacturer:	Zhejiang Sunseeker Industrial Co., Ltd. 988 Jinde Road, Jiangdong Industrial Park, Jinhua, Zhejiang 321000, P.R.China
Manufacturing site:	Zhejiang Sunseeker Industrial Co., Ltd. 988 Jinde Road, Jiangdong Industrial Park, Jinhua, Zhejiang 321000, P.R.China
FCC ID:	2BFD7X35-1

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 Scout Gong	Reviewer Eric Li

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Revision History

Report No.	Version	Description	Issued Date
2404B0243SHA-003	Rev. 01	Initial issue of report	May 28, 2024

TEST REPORT

1 General Information

1.1 Description of Equipment Under Test (EUT)

Product name:	Robotic Lawn Mower
Type/Model/PMN/HVIN:	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 technically 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.
Category of EUT:	Class B
EUT type:	☐ Tabletop ☒ Floor standing
Software Version:	-
Hardware Version:	-
Sample Identification No.:	0240306-05-004
Sample received date:	March 6, 2024
Date of test:	March 7, 2024, to May 27, 2024

1.2 Technical Specification

Wi-Fi:

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)
Operating Frequency:	2412MHz to 2462MHz for IEEE 802.11b/g/n(HT20)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20)
Channel Separation:	5 MHz
Antenna Information:	Copper tube antenna, External type, 2.37 dBi Gain

Bluetooth LE:

Frequency Band:	2402MHz ~ 2480MHz
Support Standards:	Bluetooth Low Energy
Type of Modulation:	GFSK
Channel Number:	40
Data Rate:	1Mbps
Channel Separation:	2MHz
Antenna Information:	Copper tube antenna, External type, 2.37 dBi Gain

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

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

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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

Cellular Module LE910C4-WWX: RI7LE910CXWWX

Cellular Protocol	Frequency Range (MHz)	Bandwidths (MHz)	Modulation Types	Antenna Information
GSM/GPRS	824.2 – 848.8	-	GMSK	Dipole Antenna Maximum Antenna Gain: 3.8 dBi
EDGE	824.2 – 848.8	-	8-PSK	
WCDMA	826.4 – 846.6	-	Spread Spectrum	
GSM/GPRS	1850.2 – 1909.8	-	GMSK	
EDGE	1850.2 – 1909.8	-	8-PSK	
WCDMA	1852.4 – 1907.6	-	Spread Spectrum	
LTE BAND 25/2	1850.7 -1914.3	1.4/3/5/10/15/20	QPSK / 16QAM	
LTE BAND 4	1710.7 - 1754.3	1.4/3/5/10/15/20	QPSK / 16QAM	
LTE BAND 26/5	824.7 - 848.3	1.4/3/5/10/15(B26)	QPSK / 16QAM	
LTE BAND 7	2502.5 - 2567.5	5/10/15/20	QPSK / 16QAM	
LTE BAND 8	898.2 - 899.8	1.4/3	QPSK / 16QAM	
LTE BAND 12	699.7 - 715.3	1.4/3/5/10	QPSK / 16QAM	
LTE BAND 13	779.5 - 784.5	5/10	QPSK / 16QAM	
LTE BAND 14	790.5 - 795.5	5/10	QPSK / 16QAM	
LTE BAND 26	814.7 - 823.3	1.4/3/5/10/15	QPSK / 16QAM	

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:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm2)	Averaging time (minutes)
Limits For General Population/Uncontrolled Exposure				
0.3 – 1.34	614	1.63	*(100)	30
1.34 – 30	824/f	2.19/f	*(180/f2)	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=Frequency in MHz; *Plane-wave equivalent power density.

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/cm^2
P = Radiated transmit power in mW
G = numeric gain of transmit antenna
R = distance (cm)

The power value of Wi-Fi / BLE are from the test report 2404B0243SHA-001 and 2404B0243SHA-002.
The power value of LoRa 1 modular refers to certificate of FCC ID: 2BDFV-A39.
The power value of LoRa 2 modular refers to certificate of FCC ID: 2BA39HX-DU1021D.
The power value of LoRa 3 modular refers to certificate of FCC ID: 2A92VQD302.
The power value of GSM/WCDMA/LTE modular refers to certificate of FCC ID: RI7LE910CXWWX.

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

Mode	Frequency band	ERP	Antenna Gain	R	S	Limits
	(MHz)	(dBm)	(dBi)	(cm)	(mW/cm^2)	(mW/cm^2)
Wi-Fi	2400.00 – 2483.50	16.53	2.37	20	0.0155	1.0000
BLE	2400.00 – 2483.50	6.82	2.37	20	0.0017	1.0000
LoRa 1	902.00 – 928.00	25.27	1.89	20	0.1036	1.0000
LoRa 2	903.00 – 927.00	13.01	2.00	20	0.0063	1.0000
LoRa 3	902.55 – 926.45	20.10	3.00	20	0.0406	1.0000
GSM/GPRS Cell	824.20 – 848.80	27.50	-2.90	20	0.0574	0.5490

Note: 1 mW/cm^2 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:
0.0155/1 + 0.0017/1 + 0.1036/1 + 0.0574/0.549 = 0.2251 < 1.0

For the device can support simultaneous transmission, according to 447498 D01 General RF Exposure Guidance v06.

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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**********