



1 Cover Page

RF Exposure Evaluation Report

Application No.: SHCR2201000137HS
FCC ID: 2A38I-39998L1
Applicant: SmartOS LLC
Address of Applicant: 100 Technology Drive Trumbull, CT 06511, USA
Manufacturer: Ningbo Rayonics Technology Co., Ltd.
Address of Manufacturer: 2nd Floor, West of Building 6, Lingyun Industrial Park, No, 1177 Lingyun Rd, National Hi-tech Zone, Ningbo, China
Factory: Ningbo Rayonics Technology Co., Ltd.
Address of Factory: 2nd Floor, West of Building 6, Lingyun Industrial Park, No, 1177 Lingyun Rd, National Hi-tech Zone, Ningbo, China
Equipment Under Test (EUT):
EUT Name: EntryReady Encoder Reader
Model No.: SE-AE-NE01
Add Model No.: SE-NE01, SE-AE-PP01, SE-LR-XXX, SE-LL
(1-2X means: Modules; 3X means: ID)
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2022-01-11
Date of Test: 2022-01-18 to 2022-01-24
Date of Issue: 2022-01-27

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

Parlam Zhan
Laboratory Manager





Revision Record			
Version	Description	Date	Remark
00	Original	2022-01-27	/

Authorized for issue by:			
		<i>Wade Zhang</i>	
		Wade Zhang / Project Engineer	
		<i>Parlam Zhan</i>	
		Parlam Zhan / Reviewer	



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Testing Center EMC Laboratory

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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 5V from Adapter (Adapter Model: FY0501000 Input: AC100-240V,50/60Hz Output: DC 5V 1A)
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3.2 Technical Specifications

BLE

Antenna Gain:	1dBi (Provided by manufacturer)
Antenna Type:	Ceramic Antenna
Bluetooth Version:	V5.0 LE
Data Rate:	1Mbps
Channel Spacing:	2MHz
Modulation Type:	GFSK
Number of Channels:	40
Operation Frequency:	2402MHz to 2480MHz

13.56MHz

Antenna Type	Integral Loop Antenna
Modulation Type	ASK
Number of Channels	1
Operation Frequency	13.56MHz

2.4G WiFi

Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Antenna Gain	2.07dBi (Provided by manufacturer)
Antenna Type	PCB 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





3.3 Test Location

All tests were performed at:

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

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 range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	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/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note: Limit for BLE is 1.0 mW/cm²

Note: Limit for 2.4G WiFi is 1.0 mW/cm²



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHCR220100013701, R011506375I

For 2.4G WiFi: it has been certificated , the FCC ID is“2ACSV-HF-A21-SMT”.

BLE

Test Mode	Test Channel	Power [dBm]	Power [mW]
BLE	2402	-3.09	0.49
BLE	2440	-3.26	0.47
BLE	2480	-3.79	0.42

2.4G WiFi

Test Mode	Test Channel	Power [dBm]	Power [mW]
11B	2412	16.91	49.09
11B	2437	17.03	50.47
11B	2462	17.29	53.58
11G	2412	14.63	29.04
11G	2437	14.77	29.99
11G	2462	14.48	28.05
11N20SISO	2412	14.18	26.18
11N20SISO	2437	14.17	26.12
11N20SISO	2462	14.30	26.92
11N40SISO	2422	16.38	43.45
11N40SISO	2437	16.33	42.95
11N40SISO	2452	16.56	45.29



5.2 MPE Calculation

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/cm²

For BLE:

The max. antenna gain is 1 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
0.49	1.259	20	0.00012	1	Pass

For 2.4G WiFi

The max. antenna gain is 2.07 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
53.58	1.611	20	0.01717	1	Pass

The BT and the WiFi modules can simultaneous transmitting at frequency 2.4GHz band. But the maximum rate of MPE is $0.00012/1.0+0.01717/1.0=0.017\leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

--End of the Report--

