RF Exposure Evaluation Report

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address of Applicant:	A#801 Wantong center, Hangzhou, China
Equipment Under Test (EUT)	
Product Name:	Smart Gateway
Model No.:	DSGW-211
FCC ID:	2AUXBDSGW-211
Applicable standards:	FCC CFR Title 47 Part 2 (§2.1091)
Date of sample receipt:	26 Sep., 2022
Date of Test:	27 Sep., 2022 to 09 Mar., 2023
Date of report issue:	09 Mar., 2023
Test Result:	PASS

Tested by:	Mike ou ***Test Engineer***	***Date:***	*09 Mar., 2023*
Reviewed by:	Winner Zhang ***Project Engineer***	***Date:***	*09 Mar., 2023*
Approved by:	Jinnie Zheng ***Manager***	***Date:***	*09 Mar., 2023*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

1 Version

Version No.	Date	Description
00	*23 Feb., 2023*	*Original*
01	*09 Mar., 2023*	*Updated page 4/5/7.*

2 Contents

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3 General Information

3.1 Client Information

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China
Manufacturer:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China

3.2 General Description of E.U.T.

Product Name:	Smart Gateway		
Model No.:	DSGW-211		
Operation Frequency:	Zigbee: 2405MHz~2480MHz BLE: 2402MHz~2480MHz EnOcean: 902.8 MHz WCDMA band II: 1852.4 MHz - 1907.6 MHz WCDMA band IV: 1712.4 MHz - 1752.6 MHz WCDMA band V: 826.4 MHz - 846.6 MHz LTE band 2: 1850 MHz - 1910 MHz LTE band 4: 1710 MHz - 1755 MHz LTE band 5: 824 MHz - 849 MHz LTE band 12: 699 MHz - 716 MHz LTE band 13: 777 MHz - 787 MHz LTE band 25: 1850 MHz - 1915 MHz LTE band 26: 814 MHz - 849 MHz		
Modulation technology:	BLE: GFSK EnOcean: GFSK Zigbee: OQPSK WCDMA: QPSK,16QAM LTE: QPSK,16QAM		
Antenna Type:	EnOcean : External Antenna; BLE, ZigBee,WCDMA,LTE: Internal Antenna		
Antenna gain:	BLE: 3.65dBi; ZigBee: 0.5 dBi; EnOcean: 1.90 dBi		
	WCDMA	WCDMA band II:	0.82 dBi (declare by Applicant)
		WCDMA band IV:	2.29 dBi (declare by Applicant)
		WCDMA band V:	-0.11 dBi (declare by Applicant)
	LTE	LTE band 2:	0.82 dBi (declare by Applicant)
		LTE band 4:	2.29 dBi (declare by Applicant)
		LTE band 5:	-0.11 dBi (declare by Applicant)
		LTE band 12:	-0.95 dBi (declare by Applicant)
		LTE band 13:	2.06 dBi (declare by Applicant)
		LTE band 25:	0.82 dBi (declare by Applicant)
		LTE band 26:	2.02 dBi (declare by Applicant)
Test Sample Condition:	The test samples were provided in good working order with no visible defects.		

3.3 Operating Modes

Operating mode	Detail description
BLEmode	Keep the EUT in continuously transmitting in BLE mode
EnOcean mode	Keep the EUT in continuously transmitting in EnOcean mode
Zigbee mode	Keep the EUT in continuously transmitting in Zigbee mode
WCDMA band II mode	Keep the EUT in continuously transmitting in WCDMA band II mode
WCDMA band IV mode	Keep the EUT in continuously transmitting in WCDMA band IV mode
WCDMA band V mode	Keep the EUT in continuously transmitting in WCDMA band V mode
LTE band 2 mode	Keep the EUT in continuously transmitting in LTE band 2 mode
LTE band 4 mode	Keep the EUT in continuously transmitting in LTE band 4 mode
LTE band 5 mode	Keep the EUT in continuously transmitting in LTE band 5 mode
LTE band 12 mode	Keep the EUT in continuously transmitting in LTE band 12 mode
LTE band 13 mode	Keep the EUT in continuously transmitting in LTE band 13 mode
LTE band 25 mode	Keep the EUT in continuously transmitting in LTE band 25 mode
LTE band 26 mode	Keep the EUT in continuously transmitting in LTE band 26 mode

3.4 Additions to, deviations, or exclusions from the method

No

3.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

3.6 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

4 Technical Requirements Specification

4.1 Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) 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

4.2 Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

4.3 Result

Frequency (MHz)	Maximum Output power (dBm)	Maximum Output power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm^2)	Limits for General Population/ Uncontrolled Exposure (mW/cm^2)
BLE							
2402	16.254	42.209	3.65	2.32	20.00	0.019	1.0
ZigBee							
2440	18.368	60.912	0.5	1.12	20.00	0.014	1.0
EnOcean							
902.8	-0.0789	0.982	1.9	1.549	20.00	0.0003	0.60
WCDMA							
Band II	23.38	217.771	0.82	1.21	20.00	0.052	1.0
Band IV	23.57	227.510	2.29	1.69	20.00	0.077	1.0
Band V	20.86	121.899	-0.11	0.97	20.00	0.024	0.55
LTE							
Band 2	24.44	277.971	0.82	1.21	20.00	0.067	1.0
Band 4	24.31	269.774	2.29	1.69	20.00	0.091	1.0
Band 5	21.97	157.398	-0.11	0.97	20.00	0.031	0.55
Band 12	24.23	264.850	-0.95	0.80	20.00	0.042	0.47
Band 13	23.95	248.313	2.06	1.61	20.00	0.079	0.52
Band 25	24.00	251.189	0.82	1.21	20.00	0.060	1.0
Band 26 （Part 22）	24.03	252.930	-0.11	0.97	20.00	0.049	0.54
Band 26 (Part 90S)	24.10	257.040	-0.11	0.97	20.00	0.050	0.54

Simultaneous transmission(Worse mode):

Mode	Ratio	Total Ratio	Limit
BLE	0.019	0.171	1.0
EnOcean	0.0005		
LTE Band 13	0.152		

1. The WCDMA Output power and LTE Output power please refer to report R1907A0406-R1, R1907A0406-R2, R1907A0406-R3, R1907A0406-R4, R1907A0406-R5, R1907A0406-R6 FCC ID: XMR201909EG91NAX, which is issued by TA Technology (Shanghai) Co., Ltd.
2. Note: Just the worst case mode was shown in report.

4.4 Conclusion

The device is exempt from the SAR test and satisfies RF exposure evaluation.

------End of report------