

# 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:** Waterproof Industrial Gateway

**Model No.:** DSGW-010

**FCC ID:** 2AUXBDSGW-010

**Applicable standards:** FCC CFR Title 47 Part 2 (§2.1091)

**Date of sample receipt:** 16 Nov., 2022

**Date of Test:** 17 Nov., 2022 to 27 Feb., 2023

**Date of report issue:** 27 Feb., 2023

**Test Result:** PASS

**Tested by:** \_\_\_\_\_

*Mike.OU*

Test Engineer

**Date:** \_\_\_\_\_

*27 Feb., 2023*

**Reviewed by:** \_\_\_\_\_

*Wenwen Zhang*  
Project Engineer

**Date:** \_\_\_\_\_

*27 Feb., 2023*

**Approved by:** \_\_\_\_\_

Manager

**Date:** \_\_\_\_\_

*27 Feb., 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.

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## 1 Version

Version No.	Date	Description
00	30 Dec., 2022	Original
01	27 Feb., 2023	Update page 7

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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:	Zhejiang Dusun Electron Co., Ltd.
Address:	NO.640 FengQing str., DeQing, ZheJiang, China

#### 3.2 General Description of E.U.T.

Product Name:	Waterproof Industrial Gateway
Model No.:	DSGW-010
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz BLE: 2402MHz~2480MHz ZIGBEE: 2405MHz~2480MHz LTE : 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 26: 814 MHz - 849 MHz
Modulation technology:	802.11b: DSSS, 802.11g/n: OFDM BLE: GFSK, ZIGBEE: OQPSK LTE: QPSK, 16QAM
Antenna Type:	External Antenna
Antenna gain:	BLE: 0.98 dBi; Wi-Fi: 3.68 dBi; ZIGBEE: 0.98 dBi;
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

#### 3.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
ZIGBEE mode	Keep the EUT in continuously transmitting in ZIGBEE mode
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI 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 26 mode	Keep the EUT in continuously transmitting in LTE band 26 mode

#### 3.4 Additions to, deviations, or exclusions from the method

No
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### 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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	Limits for General Population/ Uncontrolled Exposure (mW/cm <sup>2</sup> )
2.4G Wi-Fi							
2412	16.85	48.42	3.68	2.33	20.00	0.0121	1.0
BLE							
2402	8.888	7.74	0.98	1.25	20.00	0.0019	1.0
ZIGBEE							
2440	13.18	20.80	0.98	1.25	20.00	0.0052	1.0
LTE							
Band 2	23.87	243.78	4.09	10.21	20.00	0.1244	1.0
Band 4	22.40	173.78	5.17	13.55	20.00	0.1137	1.0
Band 5	23.81	240.44	2.20	1.66	20.00	0.0794	0.55
Band 12	23.40	218.78	-3.62	0.43	20.00	0.0189	0.47
Band 13	23.72	235.50	-1.11	0.77	20.00	0.0363	0.52
Band 26(Part22)	23.58	228.03	2.20	1.66	20.00	0.0753	0.54
Band 26(Part90S)	23.19	208.45	2.20	1.66	20.00	0.0688	0.54

**Simultaneous transmission(Worse mode):**

Mode	Ratio	Total Ratio	Limit
2.4G Wi-Fi	0.0121	0.1365	1.00
Band 2	0.1244		

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-----