



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-092

Trade mark: N/A

FCC ID: 2AUXBDSGW-092

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

Date of sample receipt: 09 Sep., 2022

Date of Test: 10 Sep., to 29 Sep., 2022

Date of report issue: 30 Sep., 2022

Test Result: PASS

Tested by:

Mike DU
Test Engineer

Date:

30 Sep., 2022

Reviewed by:

Wenwen Zhang
Project Engineer

Date:

30 Sep., 2022

Approved by:

Wenwen Zhang
Manager

Date:

30 Sep., 2022

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 Sep., 2022	Original

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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-092			
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz			
	BLE: 2402MHz~2480MHz			
	EMTC:	LTE band 2:	1850 MHz - 1910 MHz	
		LTE band 4:	1710 MHz - 1755 MHz	
		LTE band 12:	699 MHz - 716 MHz	
		LTE band 13:	777 MHz - 787 MHz	
	NB-IOT:	LTE band 2:	1850 MHz - 1910 MHz	
		LTE band 4:	1710 MHz - 1755 MHz	
LTE band 12:		699 MHz - 716 MHz		
LTE band 13:		777 MHz - 787 MHz		
Modulation technology:	802.11b: DSSS, 802.11a/g/n: OFDM BLE: GFSK, Bluetooth EDR: $\pi/4$ -DQPSK, 8DPSK EMTC/ NB-IOT: <input checked="" type="checkbox"/> QPSK <input checked="" type="checkbox"/> 16QAM			
Antenna Type:	Internal Antenna			
Antenna gain:	BLE: 1.9 dBi;		2.4G Wi-Fi: 1.9 dBi	
	EMTC:	LTE band 2: 2.68 dBi	LTE band 4: 1.56 dBi	
		LTE band 12: -0.87 dBi	LTE band 13: 1.93 dBi	
	NB-IOT:	LTE band 2: 2.68 dBi	LTE band 4: 1.56 dBi	
LTE band 12: -0.87 dBi		LTE band 13: 1.93 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
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI mode
EMTC:LTE Band 2 mode	Keep the EUT in continuously transmitting in LTE Band 2 mode
EMTC:LTE Band 4 mode	Keep the EUT in continuously transmitting in LTE Band 4 mode
EMTC:LTE Band 12 mode	Keep the EUT in continuously transmitting in LTE Band 12 mode
EMTC:LTE Band13 mode	Keep the EUT in continuously transmitting in LTE Band 13 mode
NB- IOT :LTE Band 2 mode	Keep the EUT in continuously transmitting in LTE Band 2 mode
NB- IOT :LTE Band 4 mode	Keep the EUT in continuously transmitting in LTE Band 4 mode
NB- IOT :LTE Band 12 mode	Keep the EUT in continuously transmitting in LTE Band 12 mode
NB- IOT :LTE Band 13 mode	Keep the EUT in continuously transmitting in LTE Band 13 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)
2.4G Wi-Fi							
2412	18.27	67.143	1.9	1.55	20.00	0.021	1.0
BLE							
2402	6.791	4.776	1.9	1.55	20.00	0.001	1.0
EMTC:LTE							
Band 2	23.87	243.781	2.68	1.85	20.00	0.090	1.0
Band 4	22.40	173.780	1.56	1.43	20.00	0.049	1.0
Band 12	23.40	218.776	-0.87	0.82	20.00	0.036	0.47
Band 13	23.81	240.436	1.93	1.56	20.00	0.075	0.52
NB-IOT: LTE							
Band 2	22.98	198.609	2.68	1.85	20.00	0.073	1.0
Band 4	23.46	221.820	1.56	1.43	20.00	0.063	1.0
Band 12	23.13	205.589	-0.87	0.82	20.00	0.034	0.47
Band 13	23.56	226.986	1.93	1.56`	20.00	0.070	0.52

Simultaneous transmission(Worse mode):

ANT No.	Mode	Ratio	Total Ratio	Limit
Main ANT	2.4G Wi-Fi	0.021	0.247	1.00
	BLE	0.001		
Secondary ANT	EMTC:LTE Band 2	0.090		
	NB-IOT:LTE Band 13	0.135		

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-----