

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-201

FCC ID: 2AUXBDSGW-201

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

Date of sample receipt: 13 Oct., 2022

Date of Test: 14 Oct., to 10 Nov., 2022

Date of report issue: 24 Nov., 2022

Test Result: PASS

Tested by:

Mike Ou

Date:

24 Nov., 2022

Reviewed by:

Wenwen Zhang

Date:

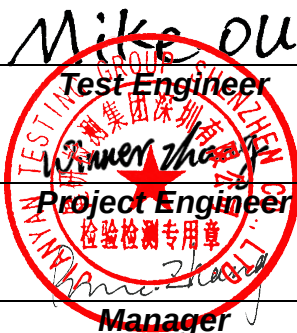
24 Nov., 2022

Approved by:

Wenwen Zhang

Date:

24 Nov., 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	11 Nov., 2022	Original
01	24 Nov., 2022	Updated page 4/8

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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-201		
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz Zigbee: 2405MHz~2480MHz BLE: 2402MHz~2480MHz Z-Wave: 908.4 MHz 5G Wi-Fi Band 1: 5150 MHz - 5250 MHz 5G Wi-Fi Band 4: 5725 MHz - 5850 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 7: Tx: 2500 MHz - 2570 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 LTE band 38: Tx: 2570 MHz - 2620 MHz LTE band 41: Tx: 2496 MHz - 2690 MHz		
Modulation technology:	2.4G Wi-Fi: 802.11b: DSSS, 802.11g/n: OFDM BLE: GFSK Z-Wave: GFSK Zigbee: OQPSK 5G Wi-Fi : IEEE 802.11a/802.11n: OFDM-BPSK, QPSK, 16QAM, 64QAM IEEE 802.11ac: OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM		
Antenna Type:	Internal Antenna		
Antenna gain:	2.4G Wi-Fi: ANT1/2: 2.63 dBi; BLE: 2 dBi; ZigBee: 0.5 dBi; Z-Wave: 3.15 dBi		
	5.8G Wi-Fi : ANT1/2: 4.86 dBi; 5.2G Wi-Fi :ANT1/2: 2.96 dBi		
	WCDMA	WCDMA band II:	4.30 dBi (declare by Applicant)
		WCDMA band IV:	2.90 dBi (declare by Applicant)
		WCDMA band V:	2.47 dBi (declare by Applicant)
	LTE	LTE band 2:	4.30 dBi (declare by Applicant)
		LTE band 4:	2.90 dBi (declare by Applicant)
		LTE band 5:	2.47 dBi (declare by Applicant)
		LTE band 7:	2.50 dBi (declare by Applicant)
		LTE band 12:	-0.47 dBi (declare by Applicant)
		LTE band 13:	0.48 dBi (declare by Applicant)

		LTE band 25:	4.30 dBi (declare by Applicant)
		LTE band 26:	2.47 dBi (declare by Applicant)
		LTE band 38:	0.96 dBi (declare by Applicant)
		LTE band 41:	2.50 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
BLE mode	Keep the EUT in continuously transmitting in BLE mode
Z-Wave mode	Keep the EUT in continuously transmitting in Z-Wave 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
5.2G WIFI mode	Keep the EUT in continuously transmitting in 5.2G WIFI mode
5.8G WIFI mode	Keep the EUT in continuously transmitting in 5.8G WIFI 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 7 mode	Keep the EUT in continuously transmitting in LTE band 7 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
LTE band 38 mode	Keep the EUT in continuously transmitting in LTE band 38 mode
LTE band 41 mode	Keep the EUT in continuously transmitting in LTE band 41 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	16.75	47.315	2.63	1.83	20.00	0.0172	1.0
BLE							
2402	9.389	8.688	2	1.58	20.00	0.0027	1.0
Zigbee							
2405	10.062	10.144	0.5	1.12	20.00	0.0023	1.0
5G Wi-Fi							
5190	13.891	24.496	2.96	1.98	20.00	0.0096	1.0
5825	13.94	24.774	4.86	3.06	20.00	0.0151	1.0
WCDMA							
Band II	23.88	244.343	4.30	2.39	20.00	0.1308	1.0
Band IV	23.82	240.991	2.90	1.95	20.00	0.0935	1.0
Band V	23.86	243.220	2.47	1.77	20.00	0.0855	0.55
LTE							
Band 2	24.64	291.072	4.30	2.69	20.00	0.1559	1.0
Band 4	24.91	309.742	2.90	1.95	20.00	0.1202	1.0
Band 5	24.00	251.189	2.47	2.10	20.00	0.0883	0.55
Band 7	23.87	243.781	2.50	1.78	20.00	0.0862	1.0
Band 12	24.30	269.153	-0.47	0.90	20.00	0.0481	0.47
Band 13	24.13	258.821	0.48	1.12	20.00	0.0575	0.52
Band 25	24.55	285.102	4.30	2.69	20.00	0.1527	1.0
Band 26(Part22)	24.07	255.270	2.47	1.77	20.00	0.0897	0.54
Band 26(Part90S)	24.94	311.889	2.47	1.77	20.00	0.1096	0.54
Band 38	23.89	244.906	0.96	1.25	20.00	0.0608	1.0
Band 41	23.91	246.037	2.50	1.78	20.00	0.0870	1.0

Simultaneous transmission(Worse mode):

Mode	Ratio	Total Ratio	Limit
2.4G Wi-Fi	0.0172	0.2202	1.00
Band 26(Part90S)	0.2030		

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-----