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 touch panel Gateway
Model No.:	DSGW-040-7, DSGW-040-X(X:1~18)
FCC ID:	2AUXBDSGW-040-7
Applicable standards:	FCC CFR Title 47 Part 2 (§2.1091)
Date of sample receipt:	12 May, 2023
Date of Test:	13 May, to 26 Jun., 2023
Date of report issue:	27 Jun., 2023
Test Result:	PASS

Tested by:	Gasper Guo ***Test Engineer***	***Date:***	*27 Jun., 2023*
Reviewed by:	***Project Engineer***	***Date:***	*27 Jun., 2023*
Approved by:	***Manager***	***Date:***	*27 Jun., 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	*27 Jun., 2023*	*Original*

2 Contents

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
Factory:	Zhejiang dusun electron co., ltd
Address:	No.640 Feng Qing St, DeQing Zhejiang China

3.2 General Description of E.U.T.

Product Name:	Smart touch panel Gateway
Model No.:	DSGW-040-7, DSGW-040-X(X:1~18)
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz BLE: 2402MHz~2480MHz Zigbee: 2405MHz~2480MHz Z-WAVE: 908.4 MHz GSM850: 824.2 MHz - 848.8 MHz PCS1900: 1850.2 MHz - 1909.8 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
Modulation technology:	802.11b: DSSS, 802.11g/n: OFDM BLE: GFSK Zigbee: OQPSK Z-WAVE: GFSK GSM: GMSK, GPRS, EGPRS(LTE: QPSK, 16QAM
Antenna Type:	Internal Antenna
Antenna gain:	BLE/Zigbee: 0.2 dBi; 2.4G Wi-Fi:3.88 dBi; Z-wave: 0.39dBi; GSM850: 1.53 dBi
	PCS1900: 1.57 dBi; LTE band 2: 1.57 dBi; LTE band 4: 1.24 dBi
	LTE band 5: 1.53 dBi; LTE band 12: 4.41 dBi; LTE band 13: 3.96 dBi
	LTE band 25: 6.04 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
Z-WAVE mode	Keep the EUT in continuously transmitting in Z-WAVE mode
GSM mode	Keep the EUT in continuously transmitting in GSM850 / PCS1900mode
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 5 mode	Keep the EUT in continuously transmitting in LTE band 5 mode
EMTC LTE band 12 mode	Keep the EUT in continuously transmitting in LTE band 12 mode
EMTC LTE band 13 mode	Keep the EUT in continuously transmitting in LTE band 13 mode
EMTC LTE band 25 mode	Keep the EUT in continuously transmitting in LTE band 25 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 5 mode	Keep the EUT in continuously transmitting in LTE band 5 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
NB-IOT LTE band 25 mode	Keep the EUT in continuously transmitting in LTE band 25 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)	Verdict
2.4G Wi-Fi								
2462	18.09	64.417	3.88	2.44	20.00	0.0313	1.0	Pass
Z-WAVE								
908.4	0.65	1.162	0.39	1.10	20.00	0.0003	0.61	Pass
Zigbee								
2405	18.536	71.384	0.2	1.05	20.00	0.0149	1.0	Pass
BLE								
2480	7.889	6.150	0.2	1.05	20.00	0.0013	1.0	Pass
GSM								
PCS1900	20.97	125.026	1.57	1.44	20.00	0.0357	1.0	Pass
GSM850	23.97	249.459	1.53	1.42	20.00	0.0706	0.55	Pass
LTE EMTC								
Band 2	24.0	251.189	1.57	1.44	20.00	0.0717	1.0	Pass
Band 4	23.0	199.526	1.24	1.33	20.00	0.0528	1.0	Pass
Band 5	24.0	251.189	1.53	1.42	20.00	0.0711	0.55	Pass
Band 12	24.0	251.189	4.41	2.76	20.00	0.1380	0.47	Pass
Band 13	24.0	251.189	3.96	2.49	20.00	0.1244	0.52	Pass
Band 25	25.0	316.228	6.04	4.02	20.00	0.253	1.0	Pass
LTE NB-IOT								
Band 2	25.0	316.228	1.57	1.44	20.00	0.0903	1.0	Pass
Band 4	25.0	316.228	1.24	1.33	20.00	0.0837	1.0	Pass
Band 5	25.0	316.228	1.53	1.42	20.00	0.0895	0.55	Pass
Band 12	25.0	316.228	4.41	2.76	20.00	0.1737	0.47	Pass
Band 13	25.0	316.228	3.96	2.49	20.00	0.1566	0.52	Pass
Band 25	25.0	316.228	6.04	4.02	20.00	0.253	1.0	Pass

Note:

1. The GSM and LTE maximum output power reference report: R2007A0435-M1, FCC ID:XMR201707BG96, which is issued by TA Technology(Shanghai) Co., Ltd.

2. Just the worst case mode was shown in report.

Simultaneous transmission(Worse mode):

Mode	Ratio	Total Ratio	Limit	Verdict
NB-IOT: LTE Band 12	0.3696	0.4009	1.00	Pass
2.4G WIFI	0.0313			

4.4 Conclusion

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

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