


RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2304000408HS
Applicant: Balboa Water Group, LLC
Address of Applicant: 3030 Airway Avenue, Suite B, Costa Mesa, CA 92626, USA
Manufacturer: Power World Machinery Equipment Co., Ltd.
Address of Manufacturer: No 24, The fourth industrial zone, HouTing Street, ShaJing Town, BaoAn District, ShenZhen China.
Factory: Shenzhen Power World New Energy Technology Co., Ltd.
Address of Factory: Floor NO.1 and 2, NO.32, Luxi 2nd Road, Liaobu Town, Dongguan City, Guangdong, China.

Equipment Under Test (EUT):
EUT Name: SPA HEAT PUMP
Model No.: C8ZII-120V
Trade Mark: 

Standard(s) : KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2023-04-24
Date of Evaluation: 2023-05-09 to 2023-06-08
Date of Issue: 2023-08-17

Evaluation Result:	Pass*
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* In the configuration evaluated, the EUT complied with the standards specified above.



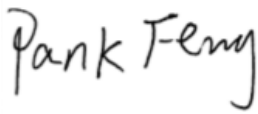
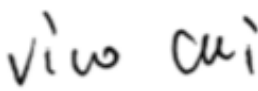
Ricky Liu
Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR230400040803	2023-08-17	Original

Authorized for issue by:			
			
		<hr/> Pank Feng/Project Engineer	
			
		<hr/> Vico Cui/Reviewer	



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2 Evaluation Summary

Item	Standard	Method	Requirement	Result
RF Exposure	KDB447498D01 General RF Exposure Guidance v06	KDB447498D01 General RF Exposure Guidance v06	47 CFR Part 1.1310	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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4 General Information

4.1 Details of E.U.T.

Power supply: AC 120V 60Hz
 Cable(s): AC mains cable: 3 wires about 1.0m unshielded (provided by lab)
 For 2.4G Wi-Fi
 Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz
 Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
 Number of Channels: 802.11b/g/n(HT20):11
 Channel Spacing: 5MHz
 Antenna Gain: 2.5dBi
 Antenna Type: Integral Antenna
 Test Software Version AmebaZ2_mptool_1V3
 Power Setting: 70(15 dBm)
 Antenna Number: 1
 For BLE
 Operation Frequency: 2402MHz to 2480MHz
 Bluetooth Version: V4.2 LE
 Modulation Type: GFSK
 Number of Channels: 40
 Channel Spacing: 2MHz
 Antenna Gain: 2.5dBi
 Antenna Type: Integral Antenna
 Test Software Version AmebaZ2_mptool_1V3
 Power Setting: OX2a(0.90 dBm)
 Antenna Number: 1
 Series No.: M1

4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
 Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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4.3 Facility

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

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



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5 Technical Requirements Specification

5.1 General Description of Applied Standards

KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.2 RF Exposure Evaluation

5.2.1 Limit & Test Method

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

F= Frequency in MHz

Friis Formula

$$P_d = (P_{out} * G) / (4 * P_i * R^2)$$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

P_i = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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5.2.2 Conclusion

Normal use condition for
 Distance between antenna and body: 20cm declared by applicant
 Antenna Gain: 2.5 dBi

For Bluetooth BLE

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2402	2.500	0.84	1.213	0.00060	1	Complies
2440	2.500	0.83	1.211	0.00060	1	Complies
2480	2.500	0.48	1.117	0.00056	1	Complies

For 2.4 GHz Wi-Fi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
11B						
2412	2.500	14.42	27.669	0.01376	1	Complies
2442	2.500	14.66	29.242	0.01454	1	Complies
2462	2.500	14.50	28.184	0.01402	1	Complies
11G						
2412	2.500	17.00	50.119	0.02493	1	Complies
2442	2.500	16.98	49.888	0.02481	1	Complies
2462	2.500	16.02	39.994	0.01989	1	Complies
11N20						
2412	2.500	15.01	31.696	0.01576	1	Complies
2442	2.500	14.80	30.200	0.01502	1	Complies
2462	2.500	14.29	26.853	0.01336	1	Complies

The Bluetooth and Wi-Fi can be transmitted together, the result is

$$0.0006/1 + 0.02493/1 = 0.02553 < 1.0$$

So SAR report is not required.

Note: Refer to report No. GZCR230400040802 for EUT test Max Conducted Peak Output Power value.



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6 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2304000408HS

- End of the Report -



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