TEST REPORT

Product Name	:	PowerBug
Brand Name	:	twelve south
Model	:	PBQ2-US
Series Model	:	N/A
FCC ID	:	2AREB-PBQ
Applicant	:	**TWELVE SOUTH,LLC**
Address	:	1503 KING ST STE201 Charleston, SC29405, USA
Manufacturer	:	**DongGuan RuiHeng Electronic Technology CO., LTD**
Address	:	Room 501, 3st Build, No. 5 Workshop, Changping Section Of Dongshen Road, Changping Town, 523560 Dongguan, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA
Standard(s)	:	FCC CFR 47 PART 1, § 1.1310 KDB 680106 D01 Wireless Power Transfer v04
Date of Receipt	:	Mar. 25, 2025
Date of Test	:	Mar. 26, 2025 ~ Apr. 14, 2025
Issued Date	:	Apr. 15, 2025

Issued By: **Guangdong Asia Hongke Test Technology Limited**
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Reviewed by: Leon Yi
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Approved by: Sean She
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Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.

Report Revise Record

Report Version	Issued Date	Notes
M1	Apr. 15, 2025	Initial Release

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1 GENGENERAL INFORMATION

1.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

1.2 General Description of EUT

Product Name:	PowerBug
Model/Type reference:	PBQ2-US
Serial Model:	N/A
Power Supply:	Input:100-240V~50/60Hz 1.0A Max qi2 Wireless output: 5.0V⎓3.0A, 9.0V⎓1.67A 15W Max USB-C Output:5.0V⎓3.0A,15W,9.0⎓3.0A 27W 15V⎓2.0A 30W,20.0V⎓1.75A,35W Max USB-C+qi2 Wireless Output: 20W+15W, 35W Max
Hardware version:	N/A
Software version:	N/A
Sample(s) Status:	AiTSZ-250325078-1(Normal sample) AiTSZ-250325078-2(Engineer sample)
Wireless Charger:	
Operation frequency:	110.1kHz-205kHz, 360KHz
Modulation Technology:	ASK
Antenna Type:	Loop coil Antenna
Antenna gain:	0dBi
Remark: The above DUT's information was declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.	

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited
B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified or accredited by the following organizations:
FCC-Registration No.: 251906 Designation Number: CN1376
Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165
The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01
Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Guangdong Asia Hongke Test Technology Limited’s quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Magnetic field expanded uncertainty	3KHz-10MHz	3.58dB	(1)
Elecric Field expanded uncertainty	3KHz-10MHz	2.41dB	(1)

The report uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of k=2 , providing a level of confidence of approximately 95%

2.1 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:
☒ Charging and communication mode

Test Modes:		
Mode 1	EUT + phone(Battery Status:< 1%)	Record
Mode 2	EUT + phone(Battery Status:< 50%)	Record
Mode 3	EUT + phone(Battery Status:< 99%)	Record
Mode 4	Stand-by mode.	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

2.2 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
Phone	OSCAL	PILOT2	/	Test lab	15W
Phone	Apple	IPhone 14	/	Test lab	MPP 15W
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

2.3 Equipment List for the Test

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Magnetic Amplitude and Gradient Probe System	SPEAG	MAGPy-8H3D+E3D V2 & MAGPy-DAS V2	3107 & 3097	2024.03.15	2026.03.14

3 TEST CONDITIONS AND RESULTS

3.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
According to §1.1310 and §2.1091 RF exposure is calculated.
According KDB 680106 D01 RF Exposure Wireless Charging App v04

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

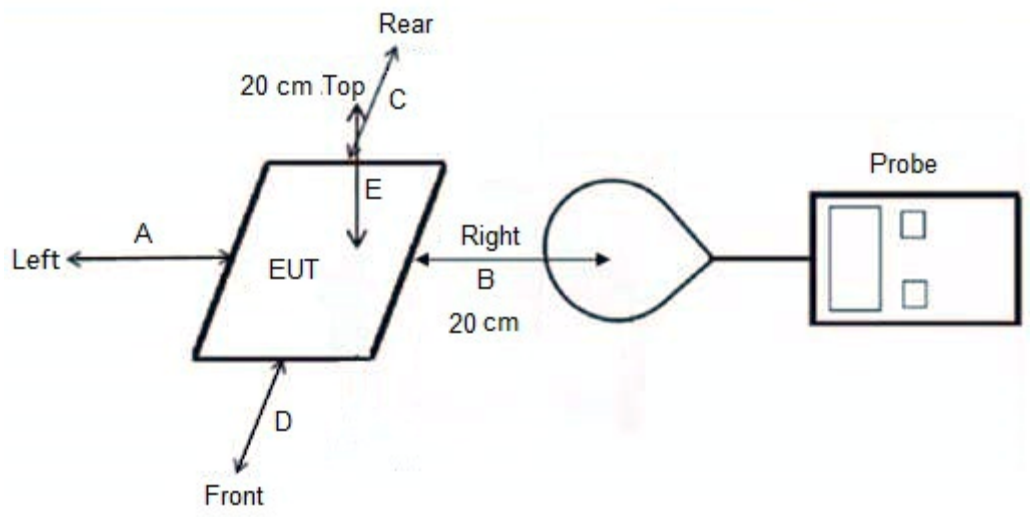
Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	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
*=Plane-wave equivalent power density

3.3 Test Setup



Note: A, B, C, D, E, F for six surfaces of the product.

3.4 Measurement Procedure

a) The RF exposure test was performed on 360 degree turn table in anechoic chamber.

b) The measurement probe was placed at test distance (20 cm from all sides) which is between the edge of the charger and the geometric centre of probe.

c) The turn table was rotated 360d degree to search of highest strength.

d) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.

e) The EUT were measured according to the dictates of KDB 680106 D01 RF Exposure Wireless Charging App v04.

3.5 Test Result of E and H field Strength

MPE_Coil_Phone@110.1-205KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 1%	Top	0.91	0.25
20cm	＜ 1%	Left	0.84	0.18
20cm	＜ 1%	Right	0.77	0.15
20cm	＜ 1%	Front	0.68	0.13
20cm	＜ 1%	Rear	0.82	0.17
Limit			614	1.63
Margin Limit (%)			0.15%	15.34%

MPE_Coil_Phone@110.1-205KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	0.86	0.24
20cm	＜ 50%	Left	0.80	0.14
20cm	＜ 50%	Right	0.72	0.12
20cm	＜ 50%	Front	0.64	0.13
20cm	＜ 50%	Rear	0.79	0.12
Limit			614	1.63
Margin Limit (%)			0.14%	14.45%

MPE_Coil_Phone@110.1-205KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	0.82	0.17
20cm	＜ 99%	Left	0.78	0.11
20cm	＜ 99%	Right	0.70	0.09
20cm	＜ 99%	Front	0.59	0.12
20cm	＜ 99%	Rear	0.79	0.11
Limit			614	1.63
Margin Limit (%)			0.13%	10.54%

MPE_Coil_Phone@360KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 1%	Top	0.88	0.26
20cm	＜ 1%	Left	0.65	0.17
20cm	＜ 1%	Right	0.69	0.19
20cm	＜ 1%	Front	0.71	0.21
20cm	＜ 1%	Rear	0.64	0.15
Limit			614	1.63
Margin Limit (%)			0.14%	15.95%

MPE_Coil_Phone@360KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	0.87	0.25
20cm	＜ 50%	Left	0.61	0.14
20cm	＜ 50%	Right	0.65	0.17
20cm	＜ 50%	Front	0.67	0.21
20cm	＜ 50%	Rear	0.60	0.11
Limit			614	1.63
Margin Limit (%)			0.14%	15.25%

MPE_Coil_Phone@360KHz

Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	0.81	0.20
20cm	＜ 99%	Left	0.60	0.10
20cm	＜ 99%	Right	0.65	0.14
20cm	＜ 99%	Front	0.65	0.20
20cm	＜ 99%	Rear	0.58	0.07
Limit			614	1.63
Margin Limit (%)			0.13%	12.57%

3.6 Equipment Approval Considerations

The EUT does comply with KDB 680106 D01 as follow table.

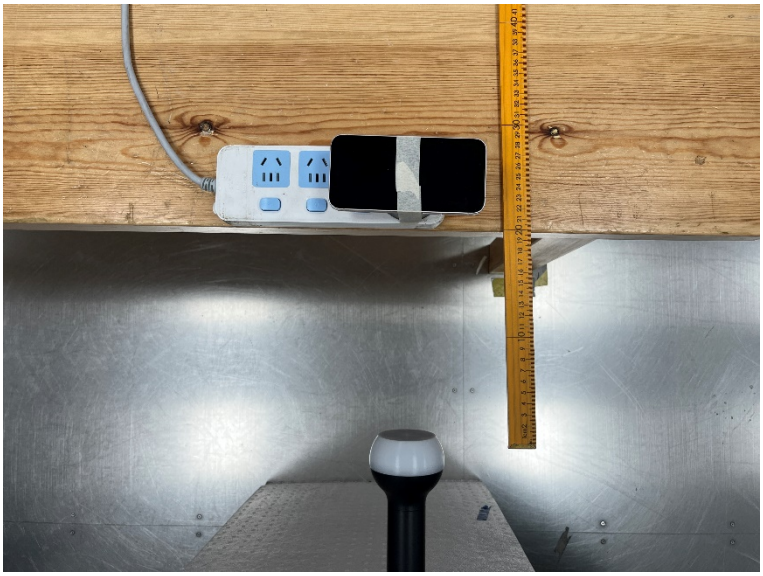
Requirements of KDB 680106 D01	Yes / No	Description
The power transfer frequency is below 1 MHz.	Yes	The device operate in the frequency range is below 1 MHz.
The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.	Yes	The maximum output power of the coil is 15W
A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)	Yes	Client device is placed directly in contact with the transmitter.
Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).	Yes	Mobile exposure conditions only.
The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit,	Yes	The E-field and H-field strengths at and beyond 20 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.
For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded.	Yes	The configure the system is fully loaded.

3.7 Conclusion

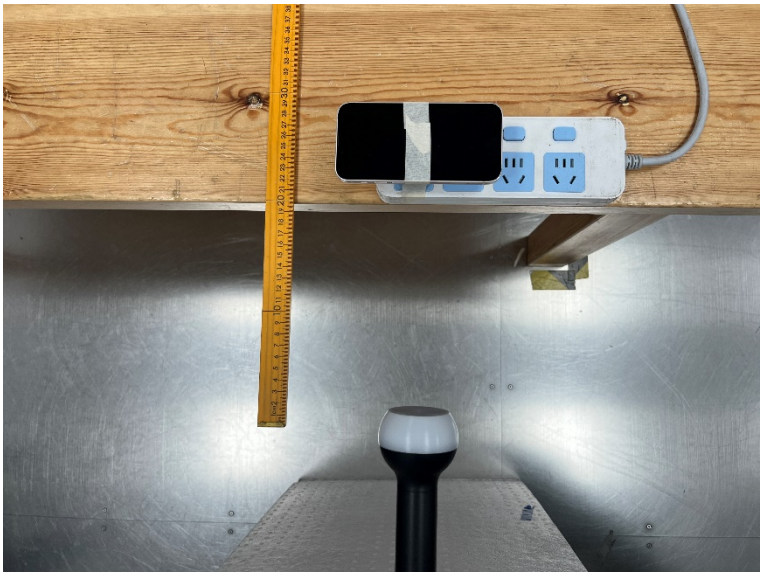
The detected emissions with a distance of 20cm surrounding the device are below the FCC E-Field Strength & H-Field Strength limits; and comply with the requirements of FCC KDB 680106 D01.

4 Test Setup Photographs of EUT

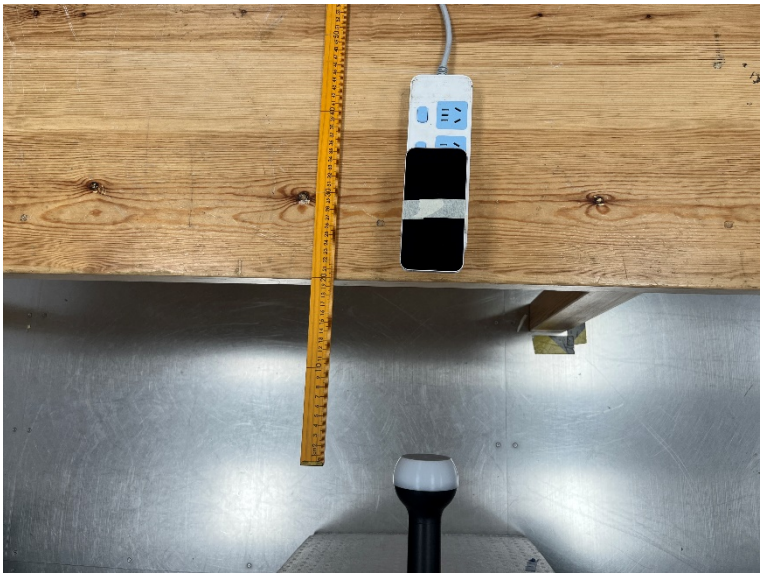
20cm Front



20cm Rear

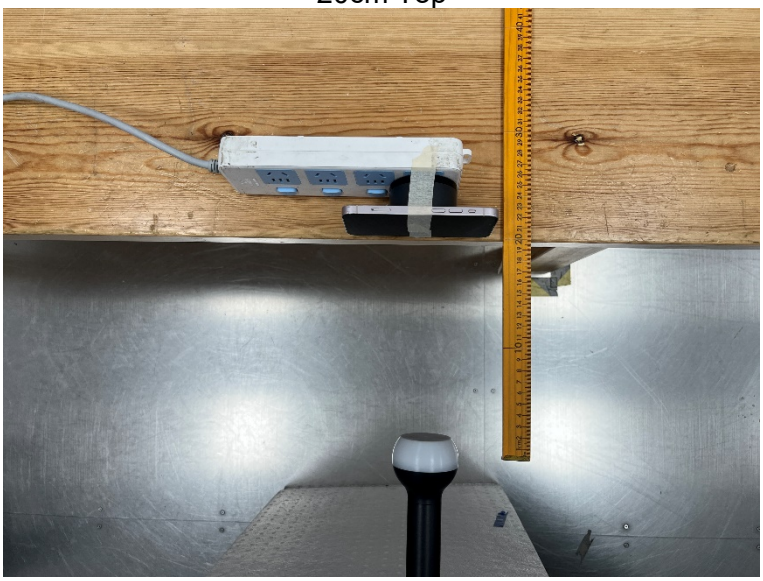


20cm Left



20cm Right

20cm Top



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