RF Exposure Evaluation Report

Product	:	PowerPack for MagSafe
Trade mark	:	Popsockets
Model/Type reference	:	P5000A
Serial Number	:	N/A
Report Number	:	EED32Q80305102
FCC ID	:	2ATTR-P5000A
Date of Issue	:	Apr. 28, 2024
Test Standards	:	47 CFR Part 1.1307 47 CFR Part 1.1310 47 CFR Part 2.1091(mobile devices) 47 CFR Part 2.1093(portable devices) KDB 447498 D04 Interim General RF Exposure Guidance v01 KDB 680106 D01 Wireless Power Transfer v04
Test result	:	PASS

Prepared for:

Popsockets LLC
1426 Pearl St, Ste 400, Boulder, CO 80302, USA

Prepared by:

Centre Testing International Group Co., Ltd.
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Approved by:	Aaron Ma	Date:	Apr. 28, 2024

Check No.: 6746130324

1 Version

Version No.	Date	Description
00	Apr. 28, 2024	Original

2 Contents

3 General Information

3.1 Client Information

Applicant:	Popsockets LLC
Address of Applicant:	1426 Pearl St, Ste 400, Boulder, CO 80302, USA
Manufacturer:	Popsockets LLC
Address of Manufacturer:	1426 Pearl St, Ste 400, Boulder, CO 80302, USA

3.2 General Description of EUT

Product Name:	PowerPack for MagSafe
Model No.(EUT):	P5000A
Trade Mark:	Popsockets

3.3 Product Specification subjective to this standard

Frequency Range:	111kHz-205kHz	
Center Frequency:	128kHz	
Modulation Type:	ASK	
Test Power Grade:	Default	
Test Software of EUT:	RF test	
Antenna Type:	Coil antenna	
Device type:	Desktop applications device	
Power Supply:	Input:	5V,2A
	Battery:	DC 3.85V
	Output:	5W/7.5W/10W/12W/15W
Sample Received Date:	Mar. 15, 2024	
Sample tested Date:	Mar. 15, 2024 to Apr. 07, 2024	

Remark:
Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

3.4 Test Environment and Mode

Operating Environment:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Test mode: Transmitting mode	
Mode a:	Wireless charging mode(Null load)(Connect to adapter)
Mode b:	Wireless charging mode(33.3% load)(Connect to adapter)
Mode c:	Wireless charging mode(66.7% load)(Connect to adapter)
Mode d:	Wireless charging mode(Half load)(Connect to adapter)
Mode e:	Wireless charging mode(Full load)(Connect to adapter)
Note: 1.Wireless output:5W,7.5W,10W,15W(maximum wireless output 15W during charging)	

3.5 Description of Support Units

The EUT has been tested with associated equipment below.

1） support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
Intelligent wireless charging full function test kit	YBZ	/	FCC ID and DOC	CTI

3.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

3.7 Deviation from Standards

None.

3.8 Abnormalities from Standard Conditions

None.

3.9 Other Information Requested by the Customer

None.

4 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-08-2023	06-07-2026
Electric and Magnetic field analyzer	Narda	EHP-200AC	180ZX11020	12-21-2023	12-20-2024
PC-1	HP	ZHAN200	--	--	--
EHP200-TS	Narda	--	Rel 1.95	07-28-2023	07-27-2024
Test software	Narda S.T.S./PMM	EHP200-TS	--	--	--
Steel Ruler	Wynn's	300mm	--	11-04-2021	11-03-2024

5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

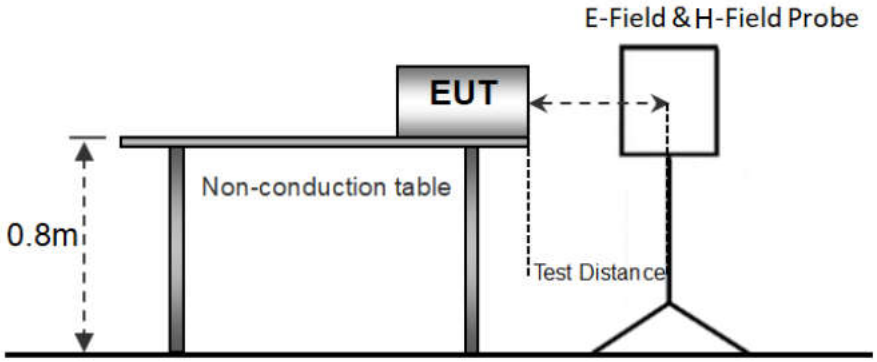
§ 1.1310 The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency(RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter.

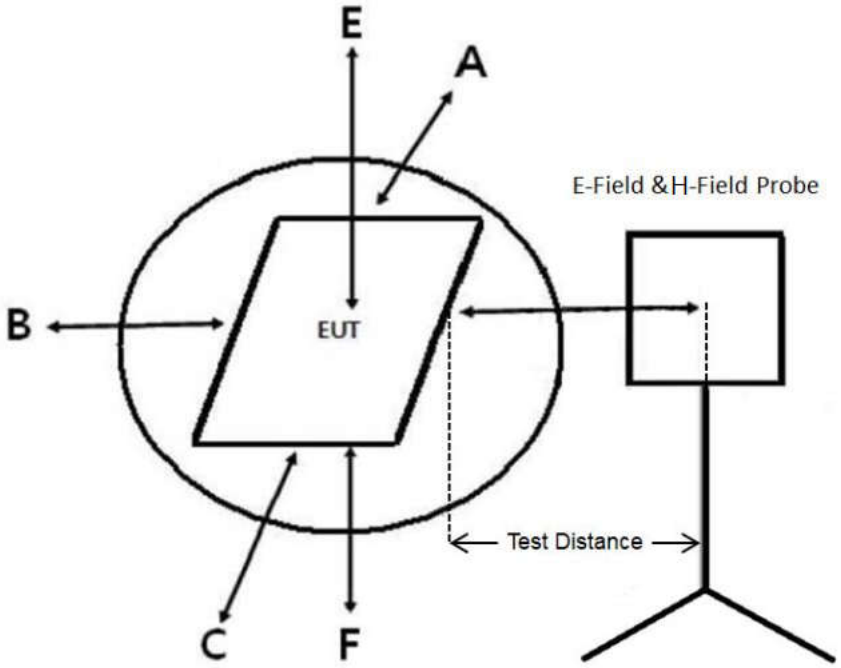
Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
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
300–1,500			f/300	<6
1,500–100,000			5	<6
(ii) 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
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

5.1.2 Test Procedure





a. The measurement probe was placed at test distance(15 cm for A,B,C,D,F and 20 cm for E) which is between the edge of the charger and the geometric center of probe.
b. The highest emission level was recorded at the measurement points(A, B, C, D, E, F).
c. The EUT was measured according to the distance of KDB 680106 D01 Wireless Power Transfer v04.

5.1.3 Equipment approval considerations

The EUT does comply with section 5.2 of KDB 680106 D01 Wireless Power Transfer v04.
(1) The power transfer frequency is below 1 MHz.
--Yes,the device operate in the frequency range 111kHz-205kHz.

(2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.
--Yes,the maximum output power for each primary coil is 15W.

(3) 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.

(4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).
--Yes.

(5) 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, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.
--Yes, the EUT H-field strengths levels are less than 50% of MPE limit.

(6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.
--This product has only one radiating structure.

5.1.4 RF Exposure Evaluation

5.1.4.1 Field strengths Evaluation

1.According to April 27,2022 TCB Workshop, for portable devices that do not physically attach to phone, desktop WPT testing guidance from FCC KDB 680106 D01 Wireless Power Transfer v04 is applied.
2.The equipment under test was placed on a wooden desk inside of shield room. The isotropic field probe was used to measure the field strength for 6 EUT surfaces. The detailed setup photo please refer to Appendix A.
3.Per FCC KDB 680106 D01 Wireless Power Transfer v04 and April 27,2022 TCB Workshop, For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. And aggregate H-field strengths and E-field strengths from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.
4.According to the KDB 680106 D01 Wireless Power Transfer v04, we tested at 20cm, 22cm and 24cm distance, and only the worst case of 20cm test data was recorded in the report.

Test data:

Mode a						
Test position	Test distance (cm)	Electric Field Strength (V/m)	50% Limit (V/m)	Magnetic Field Strength (A/m)	50%Limit (A/m)	Result
Front	20	0.3257	307	0.1780	0.815	Pass
Top	20	0.3825	307	0.1832	0.815	Pass
Left	20	0.4554	307	0.1578	0.815	Pass
Right	20	0.5784	307	0.2458	0.815	Pass
Rear	20	0.3255	307	0.2577	0.815	Pass
Bottom	20	0.2855	307	0.1890	0.815	Pass

Mode b						
Test position	Test distance (cm)	Electric Field Strength (V/m)	50% Limit (V/m)	Magnetic Field Strength (A/m)	50%Limit (A/m)	Result
Front	20	1.5248	307	0.1875	0.815	Pass
Top	20	1.5972	307	0.1553	0.815	Pass
Left	20	0.8763	307	0.1875	0.815	Pass
Right	20	2.5406	307	0.2597	0.815	Pass
Rear	20	1.1231	307	0.1829	0.815	Pass
Bottom	20	1.1524	307	0.2029	0.815	Pass

Mode d						
Test position	Test distance (cm)	Electric Field Strength (V/m)	50% Limit (V/m)	Magnetic Field Strength (A/m)	50%Limit (A/m)	Result
Front	20	2.5424	307	0.1524	0.815	Pass
Top	20	0.8421	307	0.2257	0.815	Pass
Left	20	0.9574	307	0.1855	0.815	Pass
Right	20	1.8522	307	0.1523	0.815	Pass
Rear	20	1.0114	307	0.1556	0.815	Pass
Bottom	20	1.0114	307	0.1556	0.815	Pass

Mode c						
Test position	Test distance (cm)	Electric Field Strength (V/m)	50% Limit (V/m)	Magnetic Field Strength (A/m)	50%Limit (A/m)	Result
Front	20	2.5772	307	0.3858	0.815	Pass
Top	20	1.7641	307	0.2516	0.815	Pass
Left	20	1.1563	307	0.1467	0.815	Pass
Right	20	2.5312	307	0.2053	0.815	Pass
Rear	20	1.2534	307	0.5575	0.815	Pass
Bottom	20	1.055	307	0.5004	0.815	Pass

Mode e						
Test position	Test distance (cm)	Electric Field Strength (V/m)	50% Limit (V/m)	Magnetic Field Strength (A/m)	50%Limit (A/m)	Result
Front	20	2.9885	307	0.2527	0.815	Pass
Top	20	1.4982	307	0.3556	0.815	Pass
Left	20	1.4554	307	0.2057	0.815	Pass
Right	20	3.2400	307	0.2755	0.815	Pass
Rear	20	1.7855	307	0.2577	0.815	Pass
Bottom	20	1.8722	307	0.1978	0.815	Pass

Conclusions:

From the measurement data obtained, the tested sample was considered to have complied with the requirements for the relevant §1.1310 Radio frequency radiation exposure limits and KDB 680106 D01 Wireless Power Transfer v04.