



## CTC Laboratories, Inc.

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China  
Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.org.cn

# RF Exposure Evaluation Report

**Report No.** .....: **CTC20230075E02**

**FCC ID**.....: **2A93X-K700**

**Applicant**.....: **Shenzhen Tuwei Technology Co.,LTD.**

**Address**.....: A, Floor 2, No.3, Xialingpai New Industrial Zone, Dalang Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province

**Manufacturer**.....: Shenzhen Tuwei Technology Co.,LTD.

**Address**.....: A, Floor 2, No.3, Xialingpai New Industrial Zone, Dalang Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province

**Product Name**.....: **Power Bank**

**Trade Mark**.....: /

**Model/Type reference**.....: TW1005

**Listed Model(s)** .....: /

**Standard**.....: **47 CFR FCC Part 1**

**Date of receipt of test sample**...: July 1, 2023

**Date of testing**.....: July 1~9, 2023

**Date of issue**.....: July 9, 2023

**Result**.....: **PASS**

**Compiled by:**  
(Printed name+signature) Zoe Xie

**Supervised by:**  
(Printed name+signature) Miller Ma

**Approved by:**  
(Printed name+signature) Totti Zhao

*Zoe Xie*

*Miller Ma*

*Totti Zhao*

**Testing Laboratory Name**..... **CTC Laboratories, Inc.**

**Address**..... 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

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## 1. TEST SUMMARY

### 1.1. Test Standards

The tests were performed according to following standards:

[ANSI C95.1-1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB publication 680106 D01 RF Exposure Wireless Charging Apps v03](#): RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices

### 1.2. Report version

Revised No.	Date of issue	Description
01	July 9, 2023	Original



### 1.3. Test Facility

#### Address of the report laboratory

**CTC Laboratories, Inc.**

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

#### Laboratory accreditation

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

##### **CNAS-Lab Code: L5365**

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

##### **A2LA-Lab Cert. No.: 4340.01**

CTC Laboratories, Inc. EMC Laboratory 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.

##### **FCC (Registration No.: 951311, Designation Number CN1208)**

CTC Laboratories, Inc. EMC Laboratory 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. Registration 951311, Aug 26, 2017.

### 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 acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. 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.

Below is the best measurement capability for CTC Laboratories, Inc.



Test	Measurement Frequency Range	U (dB)
H-field requirements	100kHz ~ 1MHz	2.20dB
E-Field Strength	100kHz ~ 1MHz	2.20dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 1.5. Environmental conditions

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

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



## 2. GENERAL INFORMATION

### 2.1. Client Information

Applicant:	Shenzhen Tuwei Technology Co.,LTD.
Address:	A, Floor 2, No.3, Xialingpai New Industrial Zone, Dalang Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province
Manufacturer:	Shenzhen Tuwei Technology Co.,LTD.
Address:	A, Floor 2, No.3, Xialingpai New Industrial Zone, Dalang Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province

### 2.2. General Description of EUT

Product Name:	Power Bank
Marketing Name:	/
Model/Type reference:	TW1005
Listed Model(s):	/
Model Difference:	/
Power Supply:	5Vdc/3A, 9Vdc/2.2A, 12V1.67A from Type-C
Hardware version:	/
Software version:	/
Serial Number:	S01
<b>Wireless Charger</b>	
Frequency Range:	110kHz ~ 205kHz
Modulation Type:	ASK
Antenna Type:	Coil Antenna
Exposure category:	General population/uncontrolled environment
Device Type:	Mobile and Portable Device



## 2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
Phone	P40 PRO	---	HUAWEI
AC/DC Adapter	CD122	---	UGREEN
Cable Information			
Name	Shielded Type	Ferrite Core	Length
USB Cable	With	Without	1M

## 2.4. Description of Test Modes

Test mode	Wireless charging (5W)		Wireless charging (7.5W)		Wireless charging (10W)		Wireless charging (15W)	
	Mobile	Portable	Mobile	Portable	Mobile	Portable	Mobile	Portable
1	■							
2		■						
3			■					
4				■				
5					■			
6						■		
7							■	
8								■

Note: ■ is operation mode.

Pre-scan above all test modes and Battery level(1%,50%,99%),And found below test mode which it was worse case mode, So only show the test data for worse case mode (Test mode 8 and 99% battery level) on the test report.

## 2.5. Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Magnetic field meter	NARDA	ELT-400	/	Mar. 22, 2024

Note: The Cal. Interval was one year.



## 2.6. Equipment Approval Considerations

The EUT does comply with item 5.b of KDB 680106 D01v03 as follows table;

Requirements of KDB 680106 D01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 110.0 KHz - 205.0 KHz
Output power from each primary coil is less than or equal to 15 watts	Yes	The maximum output power of the primary coil is less than or equal to 15W.
The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Yes	The transfer system includes single coil that is able to detect receiver device.
Client device is placed directly in contact with the transmitter.	Yes	Client device is placed directly in contact with the transmitter.
Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	No	Mobile and portable exposure conditions
The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Yes	The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are less than 50% the MPE limit.

In all other cases, unless excluded above, an RF exposure evaluation report must be reviewed and accepted through a KDB or PBA inquiry to enable authorization of the equipment. When evaluation is required to show compliance; for example, using field strength, power density, SAR measurements or computational modeling etc., the specific authorization requirements will be determined based on the results of the RF exposure evaluation.





## 2.7. RF Exposure

### LIMIT

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation.

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.1-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500	/	/	f/300	6
1,500-100,000	/	/	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/cm <sup>2</sup> )	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.1-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	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

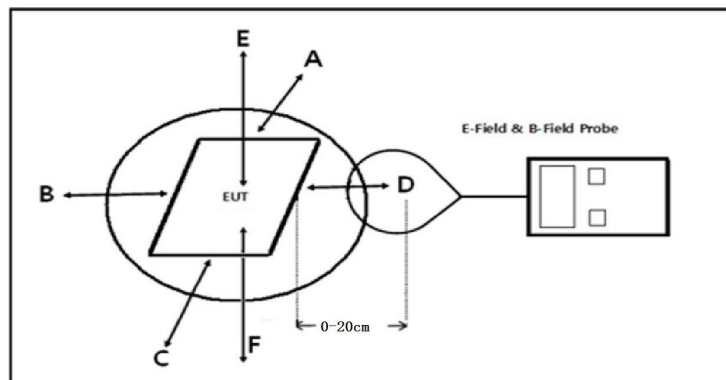
\*=Plane-wave equivalent power density

According to FCC KDB 680106 D01 Section 3. RF Exposure Requirements clause 3 the Emission-Limits in the frequency range from 100 KHz to 300 KHz should be assessed versus the limits at 300 KHz in Table 1 of CFR 47 – Section 1.310 as following (measured distance shall be 15cm from the center of the probe to the edge of the device):

	E-filed	H-filed	B-filed
Frequency	V/m	A/m	uT
0.1 MHz – 1.34 MHz	614	1.63	2.0
1.34 MHz – 30 MHz	824/f(=27.5 <sub>30MHz</sub> )	2.19/f(=0.073 <sub>30MHz</sub> )	--

A KDB inquire was required to determine/confirm the applicable limits below 100 KHz.

## TEST CONFIGURATION



## TEST PROCEDURE

For mobile RF exposure

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360d degree to search of highest strength.
- The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- The EUT were measured according to the dictates of KDB 680106D01v03.

For portable RF exposure

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance (0cm) which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360d degree to search of highest strength.
- The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E, F) were completed.
- Repeated measured (a) – (d) at measure distance 2 cm, 4cm, 6cm,8cm,10cm,1 2 cm, 14cm, 16cm,18cm and 20cm.
- The EUT were measured according to the dictates of KDB 680106D01v03.

## TEST MODE

Please refer to the clause 2.4.

## TEST RESULTS

E-Field Strength at 15cm from the edges surrounding the EUT

Test mode	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)					FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
8	0.130	39.208	39.2457	37.8508	37.6246	51.5359	307.0	614.0



## H-Field Strength at 15cm from the edges surrounding the EUT

Test mode	Frequency Range (MHz)	Measured H-Field Strength Values(A/m)						FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Unit	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
8	0.130	uT	0.13	0.1301	0.1255	0.1247	0.1709	/	/
		A/m	0.104	0.1041	0.1004	0.0998	0.1367	0.815	1.63

## H-Field Strength at 20cm from the top surface of the EUT

Test mode	Frequency Range (MHz)	Measured H-Field Strength Values(A/m)		FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Unit	Test Position F		
8	0.130	uT	0.2132	/	/
		A/m	0.1706	0.815	1.63

## E-Field Strength at 0-20 cm from the edges surrounding the EUT

Test mode	Measured Distance(cm)	Measured E-Field Strength Values (V/m)							FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
		Unit	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
8	0	V/m	98.9248	98.3216	97.7184	98.9248	98.6232	98.02	307	614
	2		90.7816	92.8928	93.1944	91.6864	91.988	90.7816		
	4		85.956	85.6544	85.6544	86.2576	86.5592	85.6544		
	6		76.908	77.8128	76.6064	76.0032	77.8128	78.1144		
	8		71.7808	69.368	70.5744	72.0824	70.2728	69.9712		
	10		65.7488	65.7488	64.5424	65.4472	65.1456	63.6376		
	12		57.6056	59.7168	58.5104	60.0184	57.9072	46.748		
	14		53.6848	51.272	52.78	51.5736	53.3832	53.0816		
	16		46.748	47.6528	47.6528	46.1448	47.9544	47.3512		
	18		37.7	38.3032	38.9064	38.6048	37.3984	38.0016		
	20		25.636	27.4456	18.6992	28.652	25.9376	24.4296		



## H-Field Strength at 0-20 cm from the edges surrounding the EUT

Test mode	Measured Distance(cm)	Measured H-Field Strength Values(A/m)							FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Unit	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
8	0	uT	0.328	0.326	0.324	0.328	0.327	0.325	/	/
		A/m	0.262	0.261	0.259	0.262	0.262	0.260	0.815	1.63
	2	uT	0.301	0.308	0.309	0.304	0.305	0.301	/	/
		A/m	0.241	0.246	0.247	0.243	0.244	0.241	0.815	1.63
	4	uT	0.285	0.284	0.284	0.286	0.287	0.284	/	/
		A/m	0.228	0.227	0.227	0.229	0.230	0.227	0.815	1.63
	6	uT	0.255	0.258	0.254	0.252	0.258	0.259	/	/
		A/m	0.204	0.206	0.203	0.202	0.206	0.207	0.815	1.63
	8	uT	0.238	0.230	0.234	0.239	0.233	0.232	/	/
		A/m	0.190	0.184	0.187	0.191	0.186	0.186	0.815	1.63
	10	uT	0.218	0.218	0.214	0.217	0.216	0.211	/	/
		A/m	0.174	0.174	0.171	0.174	0.173	0.169	0.815	1.63
	12	uT	0.191	0.198	0.194	0.199	0.192	0.155	/	/
		A/m	0.153	0.158	0.155	0.159	0.154	0.124	0.815	1.63
	14	uT	0.178	0.170	0.175	0.171	0.177	0.176	/	/
		A/m	0.142	0.136	0.140	0.137	0.142	0.141	0.815	1.63
	16	uT	0.155	0.158	0.158	0.153	0.159	0.157	/	/
		A/m	0.124	0.126	0.126	0.122	0.127	0.126	0.815	1.63
	18	uT	0.125	0.127	0.129	0.128	0.124	0.126	/	/
		A/m	0.100	0.102	0.103	0.102	0.099	0.101	0.815	1.63
	20	uT	0.085	0.091	0.062	0.095	0.086	0.081	/	/
		A/m	0.068	0.073	0.050	0.076	0.069	0.065	0.815	1.63

Note:

1.  $A/m = uT/1.25$
2.  $V/m = A/m * 377$

\*\*\*\*\*THE END\*\*\*\*\*