



# RF Exposure Evaluation Report

**Report No.** .....: **CTC20231856E02**

**FCC ID**.....: **2A6MS-K12PRO**

**Applicant**.....: **Shenzhen Zhichuang All Technology Co., Ltd**

**Address**.....: D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

**Manufacturer**.....: Shenzhen Zhichuang All Technology Co., Ltd

**Address**.....: D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

**Product Name**.....: **All-in-one power adapter**

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

**Model/Type reference**.....: K12 Pro

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

**Standard**.....: **47 CFR FCC Part 1.1307**  
**47 CFR FCC Part 1.1310**  
**KDB680106 D01**

**Date of receipt of test sample**...: Nov. 17, 2023

**Date of testing**.....: Nov. 17, 2023 to Dec. 15, 2023

**Date of issue**.....: Dec. 21, 2023

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

Compiled by: (Printed name+signature)	Jim Jiang	
Supervised by: (Printed name+signature)	Eric Zhang	
Approved by: (Printed name+signature)	Totti Zhao	

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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 Wireless Power Transfer v04](#): RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications.

[FCC CFR 47 Part 1.1307](#): Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

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

## 1.2. Report Version

Revised No.	Date of issue	Description
01	Dec. 21, 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:

##### **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.

##### **Industry Canada ( Registration No.: 9783A, CAB Identifier: CN0029 )**

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

##### **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	Uncertainty	Note
Electric Field Strength	100kHz ~ 30MHz	2.8 V/m	/
Magnetic Field Strength	100kHz ~ 30MHz	2.8 A/m	/

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:	20~25 °C
Relative Humidity:	50~55 %RH
Atmospheric Pressure:	101 kPa



## 2. GENERAL INFORMATION

### 2.1. Client Information

Applicant:	Shenzhen Zhichuang All Technology Co., Ltd
Address:	D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China
Manufacturer:	Shenzhen Zhichuang All Technology Co., Ltd
Address:	D401, Ganghong Complex Building, Building 2, No. 7, Xiangye Road, Xialilang Community, Nanwan Street, Longgang District, Shenzhen China

### 2.2. General Description of EUT

Product Name:	All-in-one power adapter
Trade Mark:	/
Model/Type reference:	K12 Pro
Listed Model(s):	/
Model Differences:	/
Power supply:	Adapter mode Input: 100-240V~ 50/60Hz 0.25A (Max) Type-C OUT: 5V==2A USB OUT: 5V==2A Type-C Line OUT: 5V==2A IPH Line OUT: 5V==2A Total OUT: 5V==2A Mobile power mode Polymer battery powered: 10000mAh/3.7V/37Wh Type-C Line OUT: 5V==2.1A IPH Line OUT: 5V==2.1A Total OUT: 5V==3A Type-C OUT: 5V==3A, 9V==2.22A, 12V==1.67A USB OUT: 5V==4.5A, 4.5V==5A, 5V==3A, 9V==2A, 12V==1.5A Type-C IN: 5V==2A, 9V==2A, 12V==1.5A (Max) Total power: 22.5W Wireless charging power: 5W/7.5W/10W/15W Max
Hardware version:	/
Software version:	/
<b>Wireless Charger</b>	
Frequency Range:	112kHz ~ 205kHz
Operation Frequency:	148kHz
Modulation Type:	ASK
Antenna Type:	Induction Coil
Exposure category:	General population/uncontrolled environment
Device Type:	Portable Device



## 2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
Intelligent wireless charging full function test module	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/

## 2.4. Description of Test Modes

As the function of the EUT, test mode selected to test as below to conform this standard.

Test mode	Description
1	Wireless charging (5V/1A)
2	Wireless charging (5V/1.5A)
3	Wireless charging (5V/2A)
4	Wireless charging (5V/3A)

Pre-scan above all test mode, Found below test mode which it was worse case mode, So only show the test data for worse case mode (Test mode 4) on the test report.

## 2.5. Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Magnetic Amplitude and Gradient Probe System	Schmid & Partner Engineering AG	MAGPy-8H3D+E3D V2	3061	Apr. 12, 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 112.0 kHz - 205.0 kHz
Output power from each primary coil is less than 15 watts	Yes	The maximum output power of the primary coil is less than 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	This device is portable
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

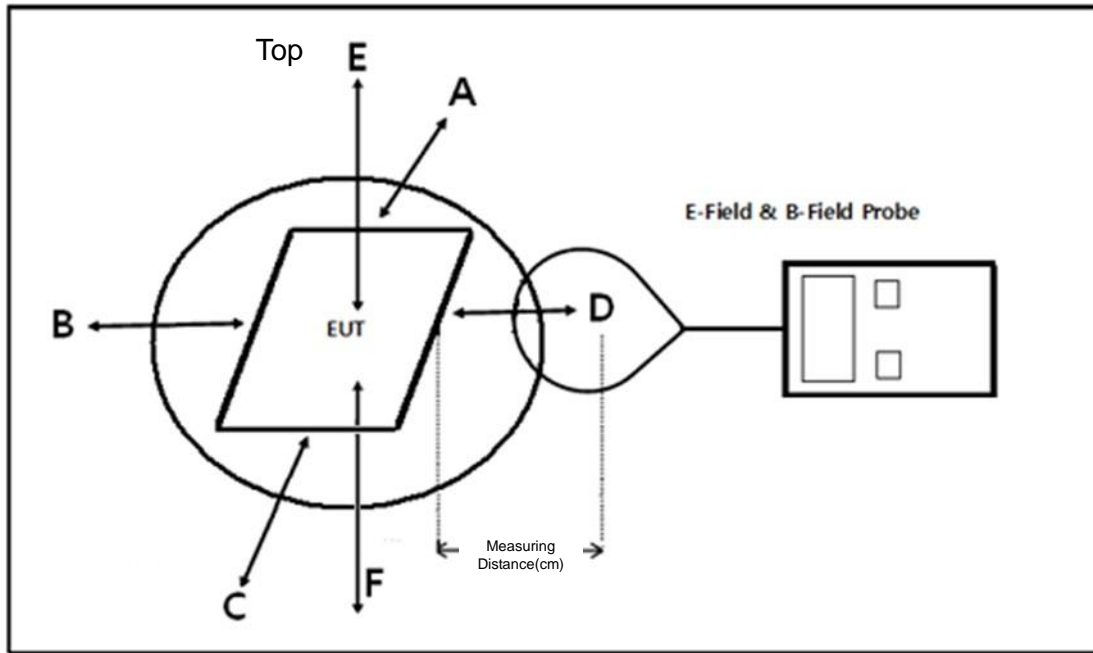
\*=Plane-wave equivalent power density

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

- A. The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- B. The measurement probe was placed at test distance (0-20cm) which is between the edge of the charger and the geometric center of probe.
- C. The turn table was rotated 360 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, F) were completed.
- E. The EUT were measured according to the dictates of KDB 680106D01v04.

## TEST MODE

Please refer to the clause 2.4.

## TEST RESULTS



H-field strengths levels should less than 50% of MPE limit.

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	0	A	0.6116	0.6103	0.6129	0.815
		B	0.6015	0.6018	0.6021	0.815
		C	0.5870	0.5862	0.5894	0.815
		D	0.6054	0.6044	0.6060	0.815
		E	0.6285	0.6258	0.6261	0.815
		F	0.6225	0.6200	0.6214	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	2	A	0.5787	0.5780	0.5796	0.815
		B	0.5725	0.5701	0.5736	0.815
		C	0.5452	0.5428	0.5440	0.815
		D	0.5689	0.5676	0.5698	0.815
		E	0.5820	0.5832	0.5844	0.815
		F	0.5818	0.5801	0.5823	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	4	A	0.5244	0.5247	0.5258	0.815
		B	0.5230	0.5220	0.5241	0.815
		C	0.5024	0.5011	0.5032	0.815
		D	0.5148	0.5124	0.5156	0.815
		E	0.5419	0.5405	0.5425	0.815
		F	0.5434	0.5428	0.5430	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	6	A	0.4739	0.4725	0.4755	0.815
		B	0.4812	0.4830	0.4827	0.815
		C	0.4628	0.4615	0.4630	0.815
		D	0.4787	0.4769	0.4772	0.815
		E	0.5027	0.5011	0.5008	0.815
		F	0.5033	0.5020	0.5012	0.815



Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	8	A	0.4282	0.4290	0.4299	0.815
		B	0.4321	0.4318	0.4332	0.815
		C	0.4252	0.4244	0.4366	0.815
		D	0.4335	0.4349	0.4357	0.815
		E	0.4420	0.4435	0.4422	0.815
		F	0.4458	0.4462	0.4468	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	10	A	0.3841	0.3824	0.3855	0.815
		B	0.3957	0.3968	0.3961	0.815
		C	0.3795	0.3790	0.3776	0.815
		D	0.3887	0.3865	0.3877	0.815
		E	0.4034	0.4025	0.4019	0.815
		F	0.4056	0.4047	0.4040	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	15	A	0.3235	0.3221	0.3243	0.815
		B	0.3320	0.3308	0.3331	0.815
		C	0.3152	0.3145	0.3130	0.815
		D	0.3264	0.3257	0.3252	0.815
		E	0.3512	0.3508	0.3515	0.815
		F	0.3447	0.3450	0.3439	0.815

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50% Limit (A/m)
			10% charge	50% charge	90% charge	
118.5	20	E	0.2540	0.2533	0.2524	0.815



E-field strengths levels should less than 50% of MPE limit.

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	0	A	85.406	85.341	85.358	307
		B	85.528	85.312	85.465	307
		C	84.649	84.874	84.757	307
		D	85.611	85.590	85.468	307
		E	90.215	90.301	90.199	307
		F	92.214	92.230	92.183	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	2	A	83.631	83.619	83.587	307
		B	83.787	83.790	83.761	307
		C	82.540	82.464	82.420	307
		D	83.241	83.300	83.258	307
		E	87.636	87.651	87.599	307
		F	89.360	89.287	89.202	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	4	A	79.292	79.303	79.258	307
		B	79.564	79.597	79.542	307
		C	78.354	78.454	78.403	307
		D	78.985	78.940	78.875	307
		E	82.524	82.592	82.483	307
		F	83.890	83.912	83.798	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	6	A	76.645	76.520	76.628	307
		B	77.021	76.994	77.002	307
		C	75.992	75.978	75.921	307
		D	76.315	76.275	76.336	307
		E	79.868	79.785	79.910	307
		F	80.135	80.087	80.146	307



Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	8	A	72.424	72.380	72.456	307
		B	72.937	72.885	72.903	307
		C	71.176	71.200	71.218	307
		D	72.351	72.401	72.387	307
		E	76.435	76.580	76.394	307
		F	77.138	77.075	77.155	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	10	A	68.554	68.469	68.516	307
		B	67.697	67.712	67.720	307
		C	67.242	67.323	67.341	307
		D	68.375	68.460	68.408	307
		E	72.361	72.425	72.394	307
		F	73.212	73.287	73.175	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	15	A	62.359	62.405	62.378	307
		B	61.654	61.587	61.537	307
		C	61.896	61.870	61.905	307
		D	62.287	62.314	62.248	307
		E	65.325	65.288	65.270	307
		F	65.714	65.680	65.734	307

Operation frequency(kHz)	Test Distance (cm)	Test Position	Probe Measure Result(V/m)			50% Limit (V/m)
			10% charge	50% charge	90% charge	
118.5	20	E	54.221	54.308	54.277	307

Note: The test data meets the limit requirements. Test result: Pass.

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