


# RF EXPOSURE EVALUATION REPORT

**Application No.:** GZCR2109021041AT  
**Applicant:** TWELVE SOUTH, LLC  
**Address of Applicant:** 1503 KING ST STE201 Charleston, SC29405, USA, Minor Outlying Islands  
**Manufacturer:** Shenzhen Powerqi Technology Co., Ltd  
**Address of Manufacturer:** Room 201, 302, 401 of A4 Building, Block A, Fangxing Science and Technology Park, No. 13 of Baonan Road, Longgang Community, Longgang Street, Longgang District, Shenzhen City, China  
**Factory:** Shenzhen Powerqi Technology Co., Ltd  
**Address of Factory:** Room 201, 302, 401 of A4 Building, Block A, Fangxing Science and Technology Park, No. 13 of Baonan Road, Longgang Community, Longgang Street, Longgang District, Shenzhen City, China  
**Equipment Under Test (EUT):**  
**EUT Name:** PowerPic 2  
**Model No.:** 12-2019,12-2037 ♣  
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade Mark:** Twelve South  
**Standard(s) :** 47 CFR PART 1, Subpart I, Section 1.1310  
 47 CFR PART 2, Subpart J, Section 2.1091  
**Date of Receipt:** 2021-09-02  
**Date of Evaluation:** 2021-09-03 to 2021-09-06  
**Date of Issue:** 2021-09-08

<b>Evaluation Result:</b>	<b>Pass*</b>
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\* In the configuration evaluated, the EUT complied with the standards specified above.



Kobe Jian  
 EMC Laboratory Manager



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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2021-09-08		Original

<b>Authorized for issue by</b>			
			
		<hr/> <b>Curry Wu/Project Engineer</b>	
			
		<hr/> <b>Ricky Liu/Reviewer</b>	



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## 2 Evaluation Summary

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
RF Exposure	47 CFR PART 1, Subpart I, Section 1.1310	KDB 680106 D01 TCB Workshop Presentation November 2019 RF Exposure	CFR 47 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.

**Declaration of EUT Family Grouping:**

Model No.: 12-2019,12-2037

Only the model 12-2019 was tested. According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, only the model name and color of housing are different.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	Input: DC 9V/1.67A Output: 10W Max.
Cable(s):	150cm Unshielded
Antenna type:	Loop Antenna
Modulation type:	Load modulation
Operation frequency:	110.6KHz-146.6KHz
Remark:	The device contains two coils: vertical and horizontal. Both of them are involved in the tests and reported the worst case(vertical) only.

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
AC Adapter	SAMSUNG	EP-TA200	REF. No.SEA05K03A
Mobile Phone	Nexus	MRA58K	REF. No.SEA16P00
iPhone 8	Apple	A1863	REF. No.SEA16J00
SAMSUNG Galaxy S8	SAMSUNG	SM-G9500	REF. No.SEA16M01
E-loading	SGS	N/A	REF. No.SEA42A01

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
RF Exposure Evaluation	MF: 0.13dB, EF: 0.4dB



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## 5 Equipments Used during Test

RF Exposure					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
743 Compact 3m Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	EMC0525	2019-10-20	2022-10-19
Electric and Magnetic Field Analyzer	Narada	NBM-550	EMC2143	2020-01-07	2022-01-06
Probe	Narada	EHP-50F	EMC2143	2020-01-07	2022-01-06

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2021-07-08	2022-07-07
DMM	Fluke	73	EMC0007	2021-07-08	2022-07-07



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## 5.1 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.

## 5.2 Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **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.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **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.



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### 5.3 Deviation from Standards

None

### 5.4 Abnormalities from Standard Conditions

None



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## 6 Test Results

### 6.1 RF Exposure test

Test Requirement: 47 CFR PART 1, Subpart I, Section 1.1310

Measurement Distance: 15cm

Limit:

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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	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
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz  
 \*=Plane-wave equivalent power density  
 RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

According to IEEE C95.3:2002 section 5.5.1.1, The power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula

$$S = \frac{PG}{4\pi d^2}$$

*S* = power density (mW/cm<sup>2</sup>)  
*P* = the net power delivered to the antenna (mW)  
*G* = gain of the antenna in linear scale  
*d* = distance between observation point and center of the radiator (cm)



**6.1.1 E.U.T. Operation**

Operating Environment:

Temperature: 24.5 °C Humidity: 53.6% RH Atmospheric Pressure: 995 mbar

EUT Operation:

This device has been tested the worst status of full load and the device has been tested with load at zero charge, intermediate charge, and full charge.



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**6.1.2 Measurement Data**

**Output Voltage=DC 9V; The max output power =10W**

**Magnetic Field Emissions**

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
135 kHz	15	Side 1	0.0623	0.815
		Side 2	0.0579	0.815
		Side 3	0.0659	0.815
		Side 4	0.0556	0.815
		Top	0.0594	0.815

**Mobile phone has been charge at zero charge, intermediate charge, and full charge.**

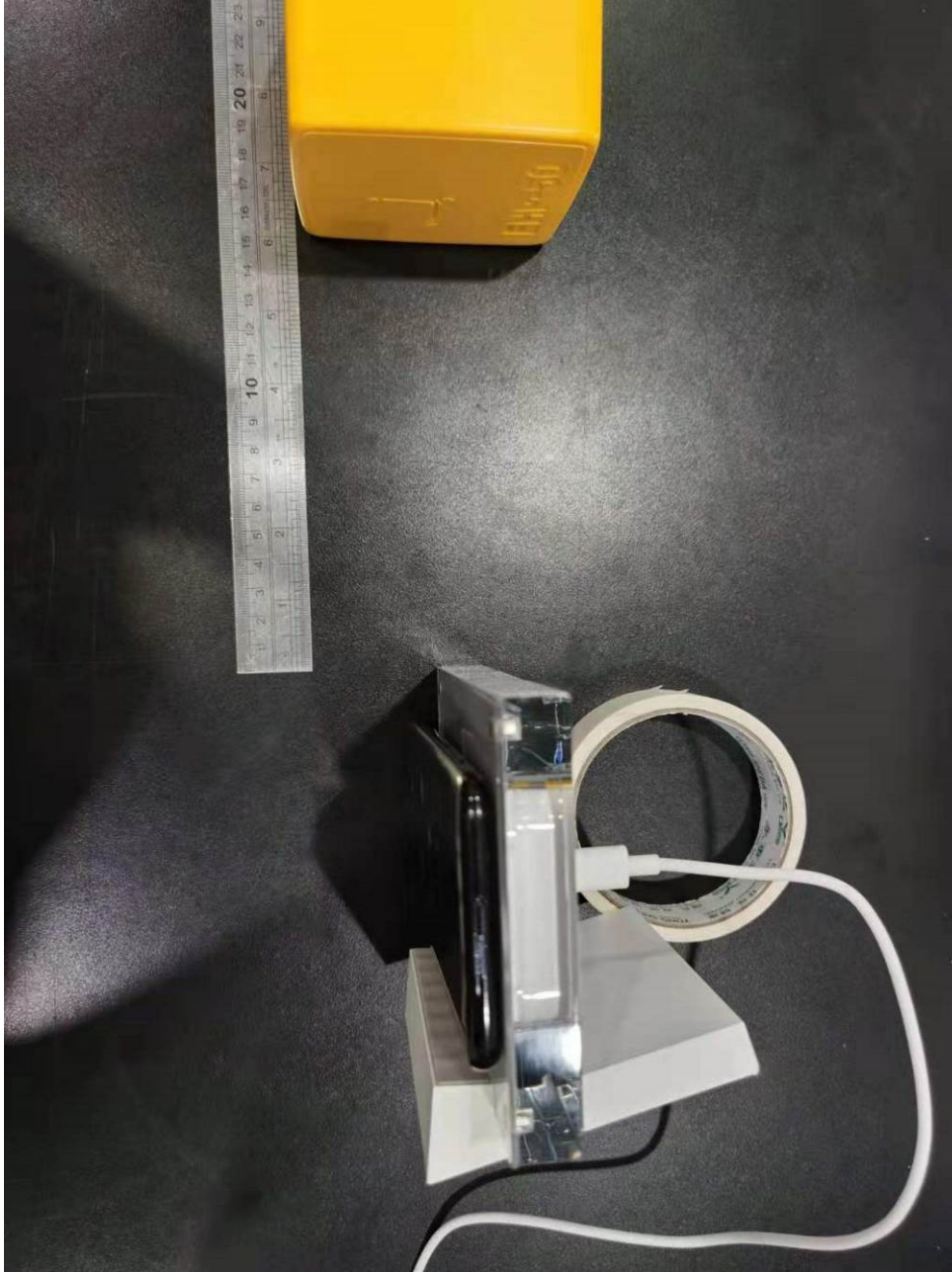
**Magnetic Field Emissions**

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50%Limit (A/m)
			zero charge	intermediate charge	full charge	
135 kHz	15	Side 1	0.0673	0.0579	0.0490	0.815
		Side 2	0.0643	0.0524	0.0470	0.815
		Side 3	0.0699	0.0590	0.0543	0.815
		Side 4	0.0600	0.0506	0.0428	0.815
		Top	0.0460	0.0523	0.0402	0.815



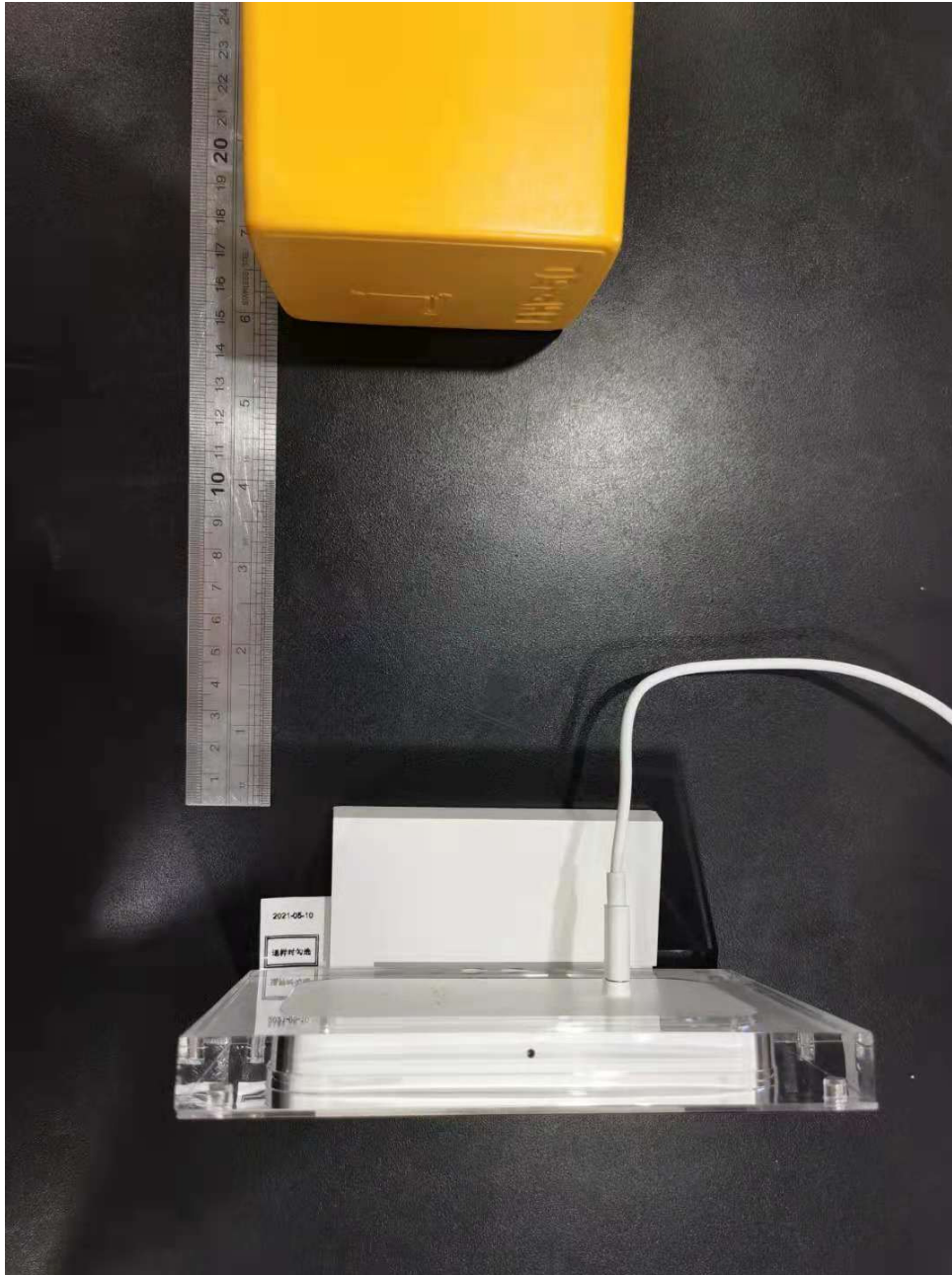
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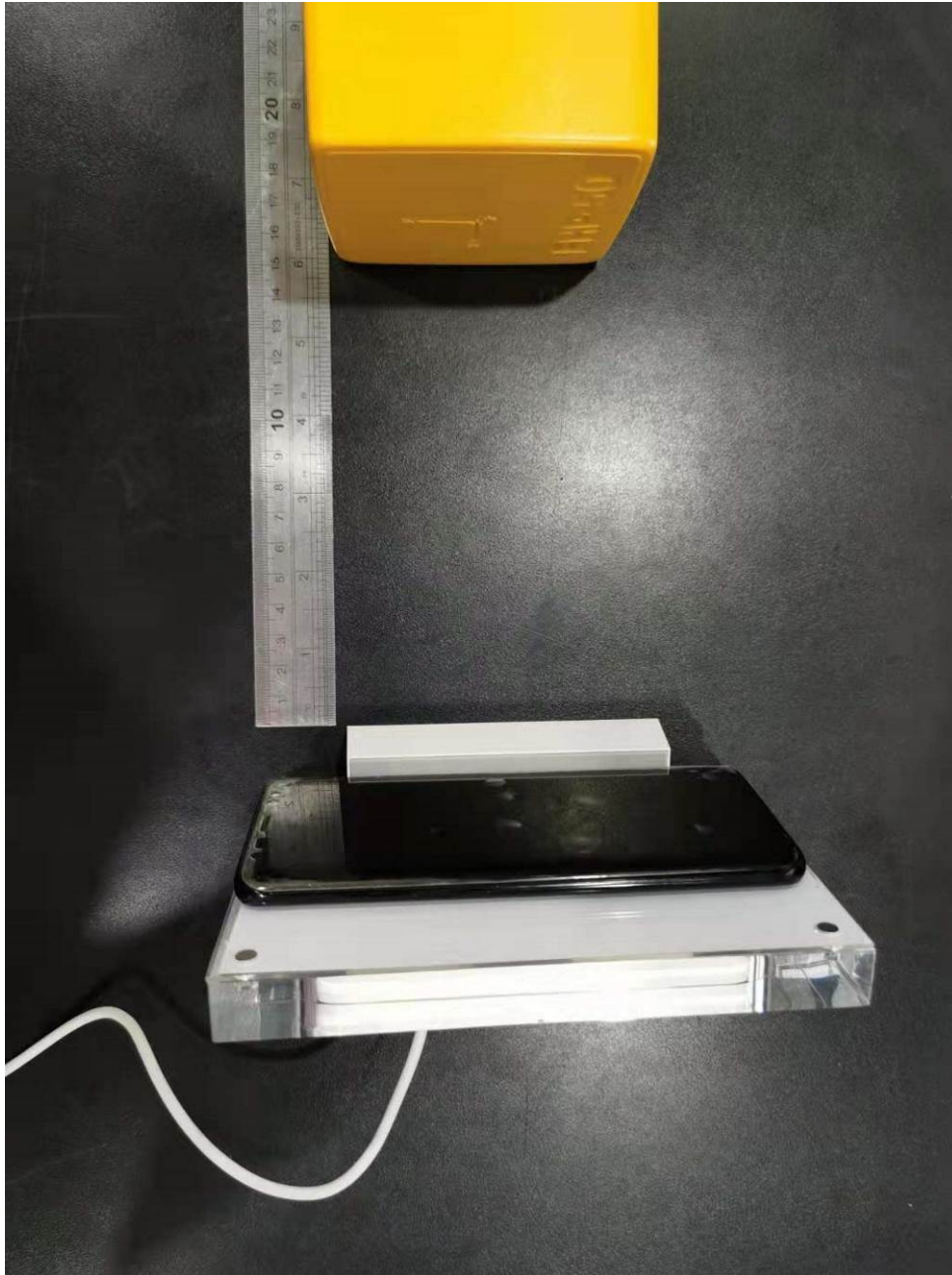
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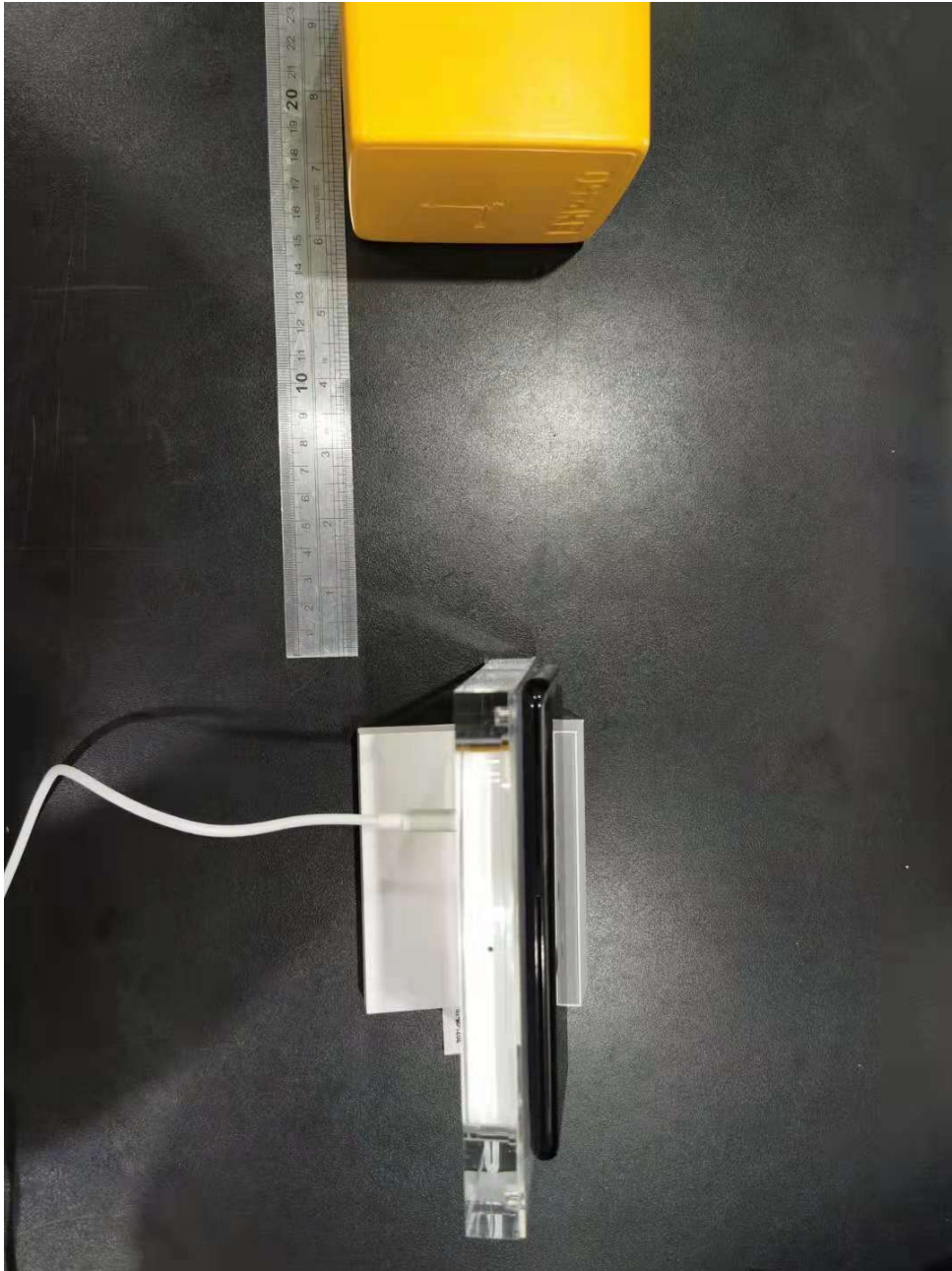
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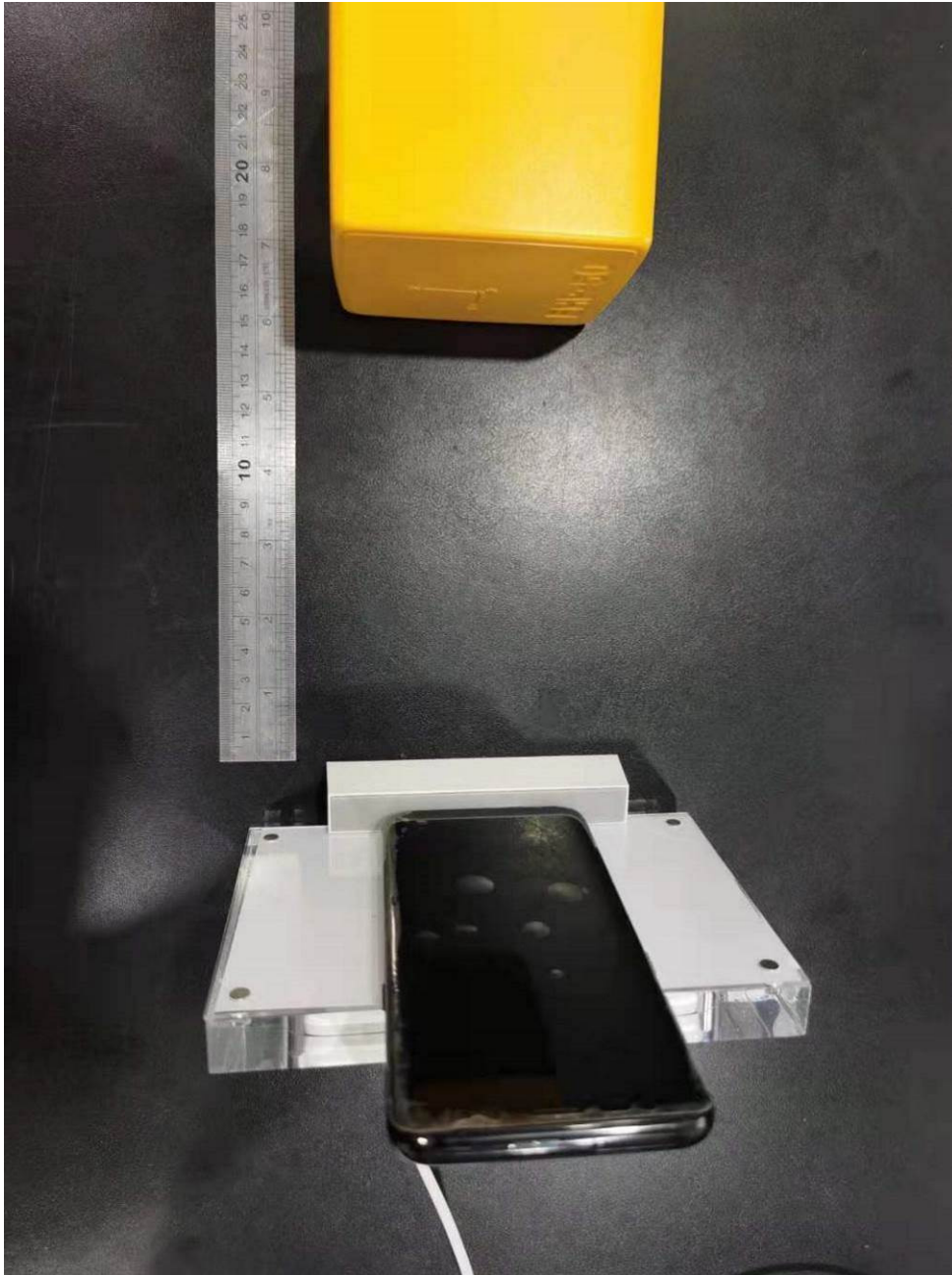
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