TEST REPORT

Report No.:	BCTC2403657267-2E
Applicant:	Shenzhen usbangel Technology Limited
Product Name:	Multi-Function Power Bank
Test Model:	T31Pro
Tested Date:	2024-03-07 to 2024-03-15
Issued Date:	2024-03-15

Shenzhen BCTC Testing Co., Ltd.

FCC ID: 2AX87-T31PRO

Product Name:	Multi-Function Power Bank
Trademark:	N/A
Model/Type Reference:	T31Pro QP-1020MB
Prepared For:	Shenzhen usbangel Technology Limited
Address:	402, 502, 602, No.28 Hongyuan Road, Pingdong Community, Pingdi Sub-District. Longgang District. Shenzhen, PRC.
Manufacturer:	Shenzhen usbangel Technology Limited
Address:	402, 502, 602, No.28 Hongyuan Road, Pingdong Community, Pingdi Sub-District. Longgang District. Shenzhen, PRC.
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-03-07
Sample Tested Date:	2024-03-07 to 2024-03-15
Issue Date:	2024-03-15
Report No.:	BCTC2403657267-2E
Test Standards:	FCC CFR 47 part1, 1.1307(b), 1.1310 KDB 680106 D01 Wireless Power Transfer v04
Test Results:	PASS

Tested by:

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

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(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2403657267-2E	2024-03-15	Original	Valid

2. Product Information

2.1 Product Information

Model/Type reference:	T31Pro QP-1020MB
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
Hardware Version:	N/A
Software Version:	N/A
Product Description:	Multi-Function Power Bank
Operation Frequency:	110kHz-205kHz
Modulation:	ASK
Antenna installation:	loop coil antenna
Ratings:	As an Adapter: Input:100-240V~50/60Hz,0.5A Max Output1 USB-A: (5.0V⎓3.0A) 15.0W(Max) Output2 USB-C: (5.0V⎓3.0A) 15.0W(Max) Wireless Output: 5.0W(Max) Total Output:15.0W(Max) USB-A+USB-C: 5.0V⎓3.0A (15.0W Max) (USB-A+USB-C)+Wireless: 5.0V⎓3.0A(15.0W Max) As a Power Bank Input (USB-C):5.0V⎓3.0A, 9.0V⎓2.0A Output1(USB-C): 5.0V⎓3.0A, 9.0V⎓2.22A,12.0V⎓1.67A Output2(USB-A): 5.0V⎓3.0A, 9.0V⎓2.0A,12.0V⎓1.5A Wireless Output: 5.0W/7.5W/10.0W/15.0W(Max) USB-A+USB-C: 5.0V⎓3.0A (15.0W Max) (USB-A+USB-C)+Wireless: 5.0V⎓3.0A(15.0W Max) Total Output 20.0W(Max)

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	With a ferrite ring in mid Detachable
2.	--	--	BCTC	---	Yes	--

2.2 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	Adapter	---	---	---	Auxiliary
2.	Wireless charging load	---	---	---	Auxiliary

Notes:
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

2.3 Test Mode

AC Mode	Mode 1	Wireless Charging (Full load)
	Mode 2	Wireless Charging (Half load)
	Mode 3	Wireless Charging (Null load)
DC Mode	Mode 4	Wireless Charging (Full load)
	Mode 5	Wireless Charging (Half load)
	Mode 6	Wireless Charging (Null load)

Note: All test mode were tested and passed, only shows the worst case mode which were recorded in this report.

3. Test Facility And Test Instrument Used

3.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.
FCC Test Firm Registration Number: 712850
A2LA certificate registration number is: CN1212
ISED Registered No.: 23583
ISED CAB identifier: CN0017

3.2 Test Instrument Used

EMF Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Electromagnet -ic radiation tester	Wavecontrol	SMP160	19SN0980	May 15, 2023	May 14, 2024
Electromagnet -ic field probe	Wavecontrol	WP400-3	20WP120082	Sept. 26, 2023	Sept. 25, 2024
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

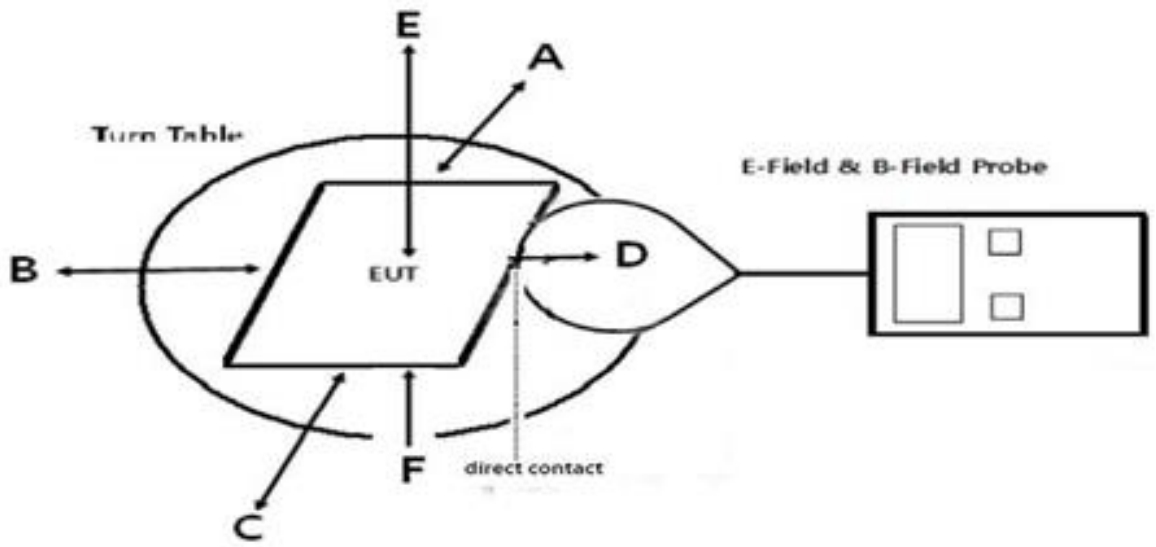
4. Method Of Measurement

4.1 Applicable Standard

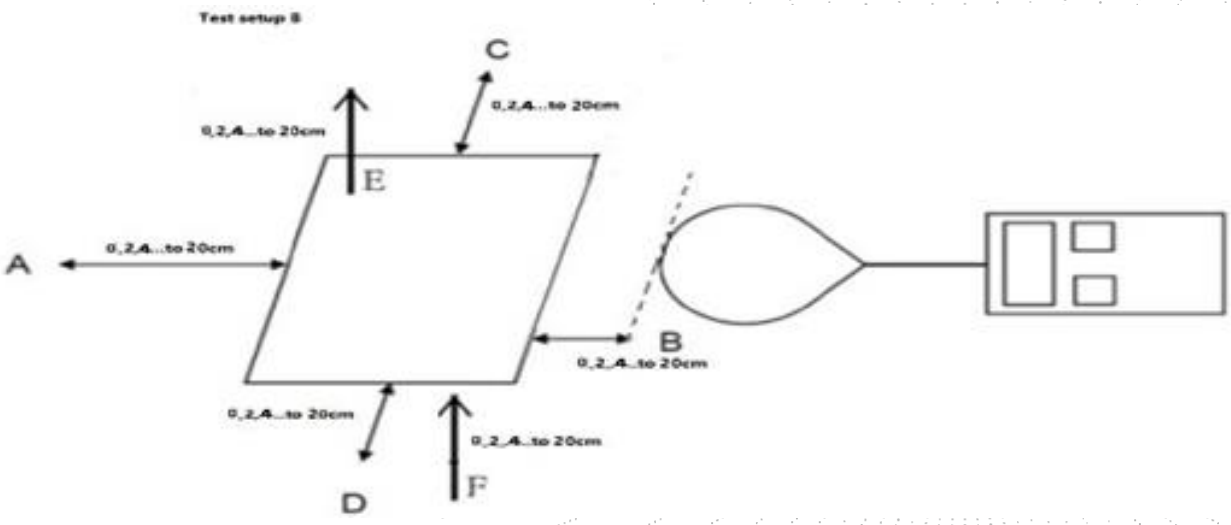
According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. According to §1.1310 and §2.1093 RF exposure is calculated. According KDB680106 D01v04: RF Exposure Wireless Charging Apps v04.

4.2 Block Diagram Of Test Setup

A:



B:



4.3 Limit

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
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 General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	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	30

4.4 Test procedure

1)The RF exposure test was performed in an echoic chamber;

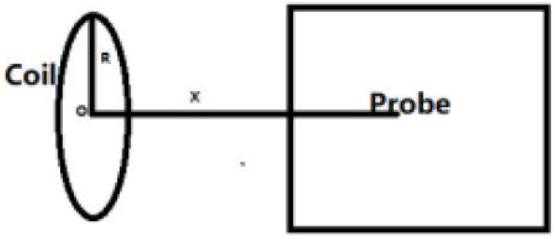
2)The measurement probe was placed at test distance 0cm to 20cm at 2cm iteration, i.e. at a distance of 0cm, 2cm, 4cm, ……. 20cm. Which is between the edge of the charger and the edge of of probe;

3)The highest emission leve laws recorded and compared with limit as soon as measurement of each points (A,B, C,D, E)were completed;

4)According to the requirements if KDB 680106 D01 v04, If the center of the probe sensing element is located more than 5 mm (The sensitive elements are located approximately 8 mm below the external surface specified in user manual of WP400-3) from the probe outer surface, the field strengths need to be estimated through modeling for those positions that are not reachable;

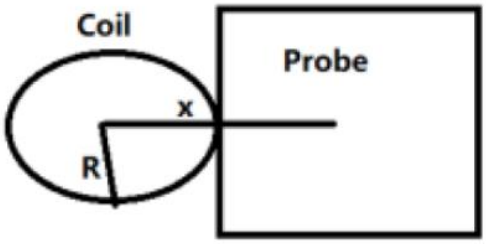
5)Use Biot-Savart Law, the value of 0 cm can be estimated through the results of 2 cm, according formula:

Top & Bottom Side:



$$B = \frac{\mu_0 * I * N * R^2}{2 * (R^2 + x^2)^{3/2}}$$

Front, left, right & rear Side:



$$B = \frac{\mu_0 * I * N}{2 * x}$$

Remark:

B: H-field(Unit:T)

u0: Space permeability=4*pi*10-7

R: Radius of radiated coil, according to the coil specification: R=0.02m

X: The distance from the sensing elements of the probe to the edge of the radiated coil (the dimensions of EUT and load are take into account) (Unit: m)

N: Turns of the radiated coil.

4.5 Equipment Approval Considerations

The EUT does comply with item 5(b) of KDB 680106 D01v04

1) Power transfer frequency is less than 1MHz
Yes, the device operate in the frequency range from 110-205kHz

2) Output power from each primary coil is less than or equal to 15 watts.
Yes, the maximum output power of the primary coil is 15W.

3) A client device providing the maximum permitted load is placed in physical contact with the transmitter.
Yes, client device is placed directly in contact with the transmitter.

4) Only § 2.1091-Mobile exposure conditions apply
No, the EUT is portable condition assessment

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.
Yes, Conform to

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.
Yes, confirm.

4.6 E and H field Strength

Portable: Test Mode 4 (the worst mode)
Transmitter battery level: 100%

H-Filed Strength at (distance from 0cm to 20cm at 2cm iteration) surrounding the EUT (A/m)

Test distance (cm)	Test Position A(uT)	Test Position B(uT)	Test Position C(uT)	Test Position D(uT)	Test Position E(uT)	Test Position F(uT)
2	0.1398	0.1041	0.0933	0.1165	0.0561	0.0569
4	0.0543	0.0325	0.0339	0.0380	0.0223	0.0216
6	0.0245	0.0143	0.0151	0.0199	0.0115	0.0118
8	0.0190	0.0085	0.0104	0.0149	0.0069	0.0080
10	0.0179	0.0073	0.0106	0.0147	0.0066	0.0079
12	0.0180	0.0086	0.0098	0.0137	0.0057	0.0082
14	0.0186	0.0080	0.0094	0.0141	0.0061	0.0078
16	0.0186	0.0081	0.0097	0.0142	0.0058	0.0081
18	0.0185	0.0083	0.0105	0.0145	0.0070	0.0073
20	0.0179	0.0086	0.0105	0.0140	0.0064	0.0081

Test distance (cm)	Test Position A(A/m)	Test Position B(A/m)	Test Position C(A/m)	Test Position D(A/m)	Test Position E(A/m)	Test Position F(A/m)	Limits (A/m)
2	0.1118	0.0833	0.0746	0.0932	0.0449	0.0455	1.63
4	0.0434	0.0260	0.0271	0.0304	0.0178	0.0173	1.63
6	0.0196	0.0114	0.0121	0.0159	0.0092	0.0094	1.63
8	0.0152	0.0068	0.0083	0.0119	0.0055	0.0064	1.63
10	0.0143	0.0058	0.0085	0.0118	0.0053	0.0063	1.63
12	0.0144	0.0069	0.0078	0.0110	0.0046	0.0066	1.63
14	0.0149	0.0064	0.0075	0.0113	0.0049	0.0062	1.63
16	0.0149	0.0065	0.0078	0.0114	0.0046	0.0065	1.63
18	0.0148	0.0066	0.0084	0.0116	0.0056	0.0058	1.63
20	0.0143	0.0069	0.0084	0.0112	0.0051	0.0065	1.63

Note: A/m=uT/1.25

Using Biot-Savart Law, the value of 0cm can be estimated through the test results of 2cm:

Distance: 0cm

Test Position A(A/m)	Test Position B(A/m)	Test Position C(A/m)	Test Position D(A/m)	Test Position E(A/m)	Test Position F(A/m)	Limits (A/m)
0.8621	0.6423	0.5752	0.7187	0.1828	0.1853	1.63

Using Biot-Savart Law, the value of 2cm can be estimated through the test results of 4cm:

Distance: 2cm

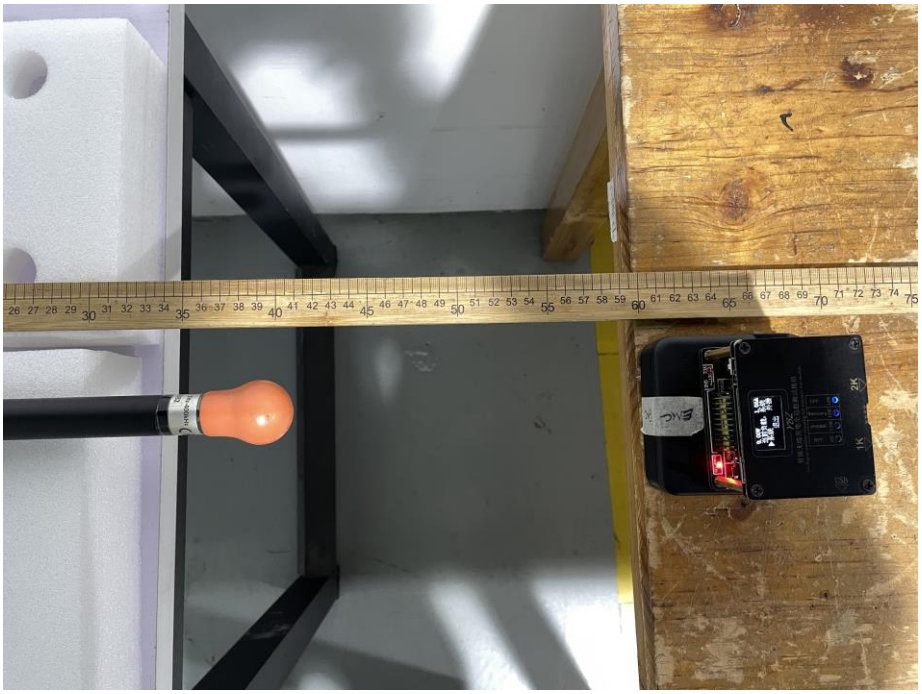
Test Position A(A/m)	Test Position B(A/m)	Test Position C(A/m)	Test Position D(A/m)	Test Position E(A/m)	Test Position F(A/m)	Limits (A/m)
0.1447	0.0867	0.0903	0.1013	0.0539	0.0524	1.63

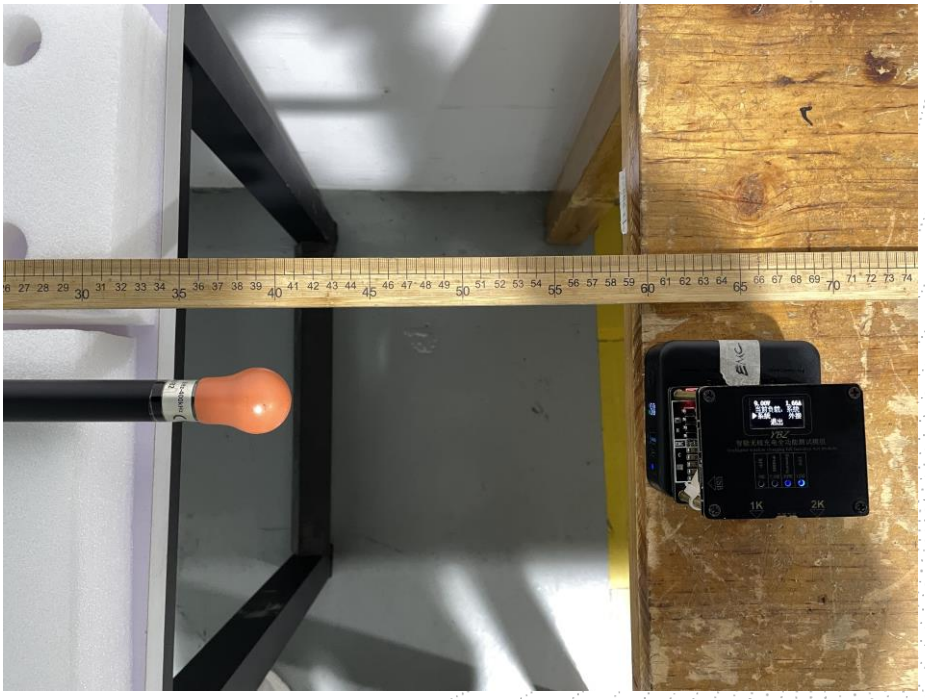
Agreement Ratio
Distance: 2cm

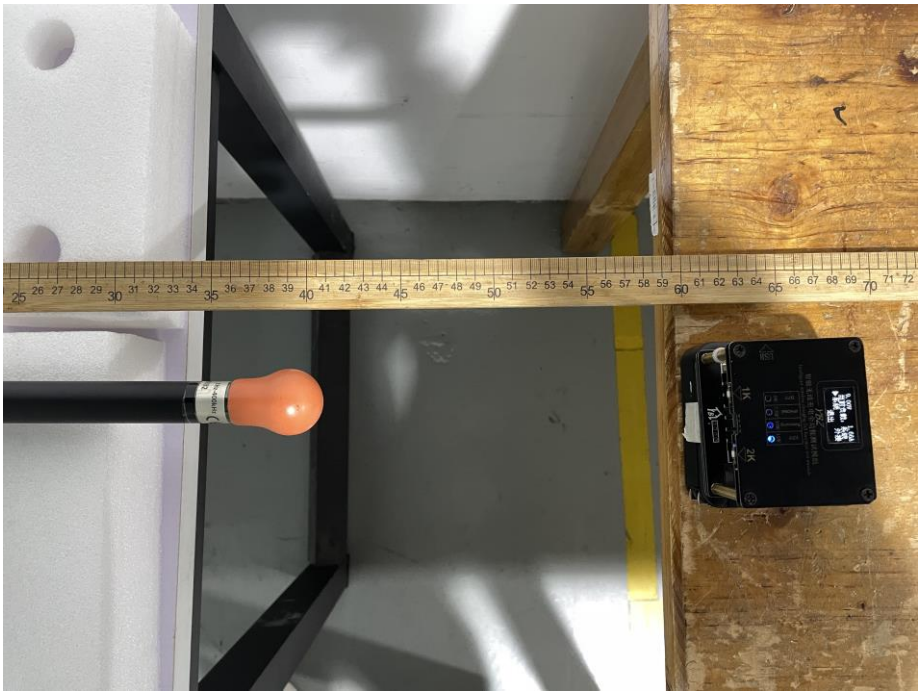
Test Position	Test Position A(A/m)	Test Position B(A/m)	Test Position C(A/m)	Test Position D(A/m)	Test Position E(A/m)	Test Position F(A/m)
Measure Value (A/m)	0.1118	0.0833	0.0746	0.0932	0.0449	0.0455
Valuation(A/m)	0.1447	0.0867	0.0903	0.1013	0.0539	0.0524
Agreement ratio	25.64	3.97	19.08	8.37	18.29	14.14
Limits	30%	30%	30%	30%	30%	30%
Test result	Pass	Pass	Pass	Pass	Pass	Pass

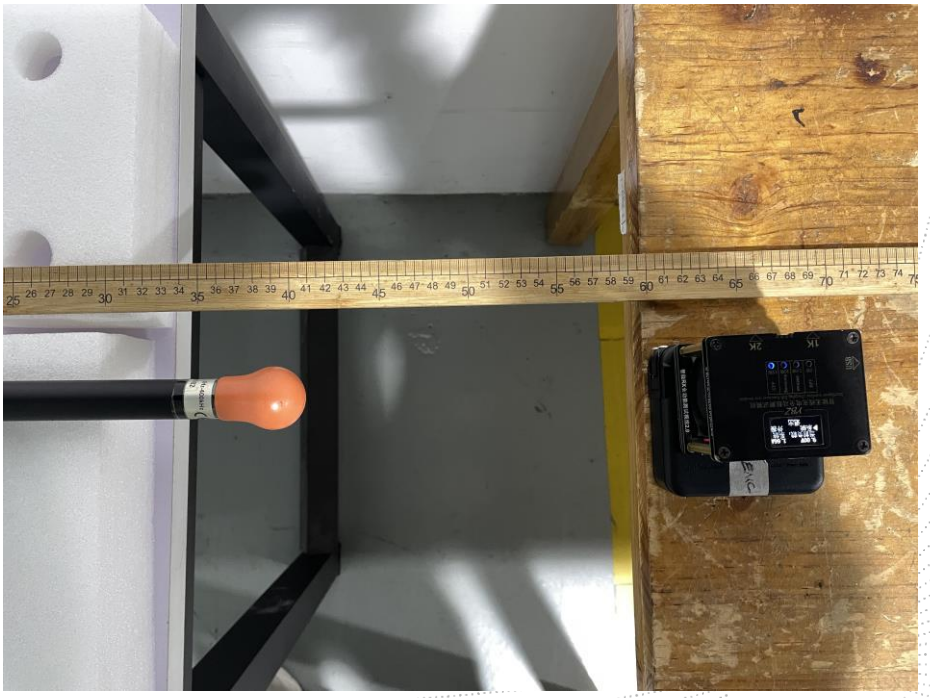
5. Photographs Of Test Set-Up

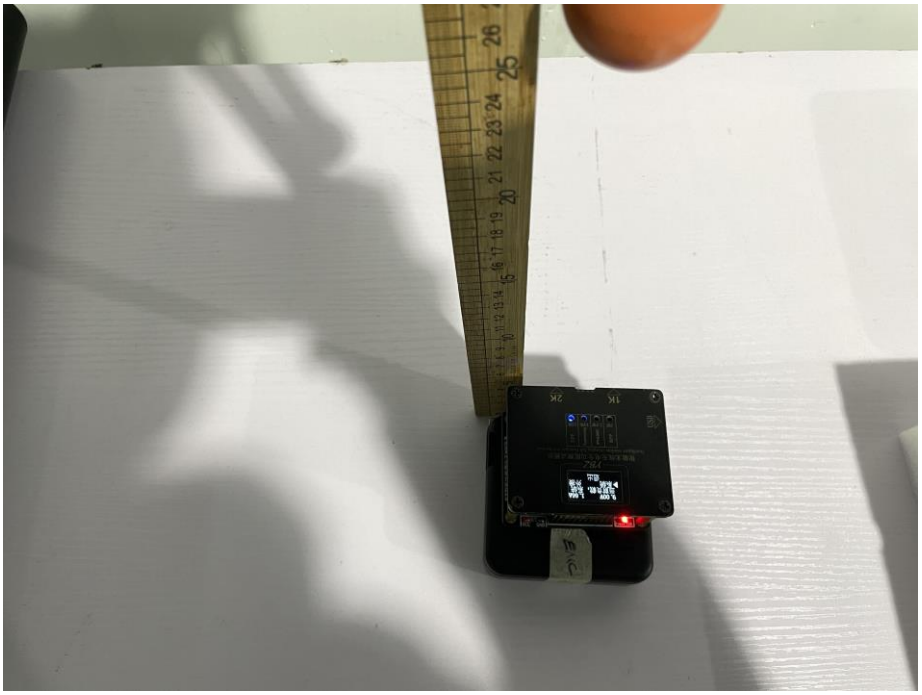
20CM



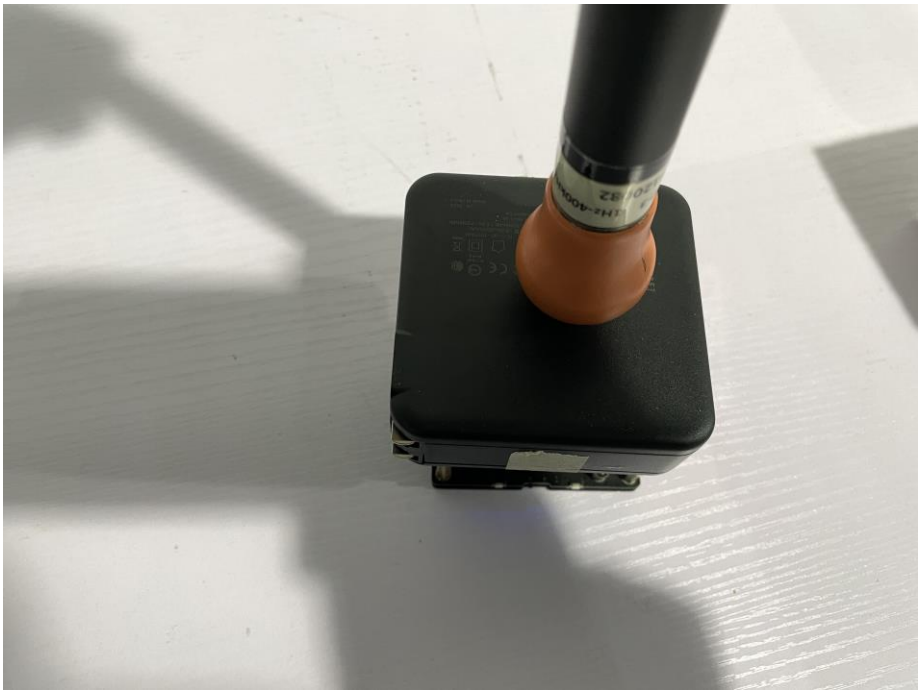


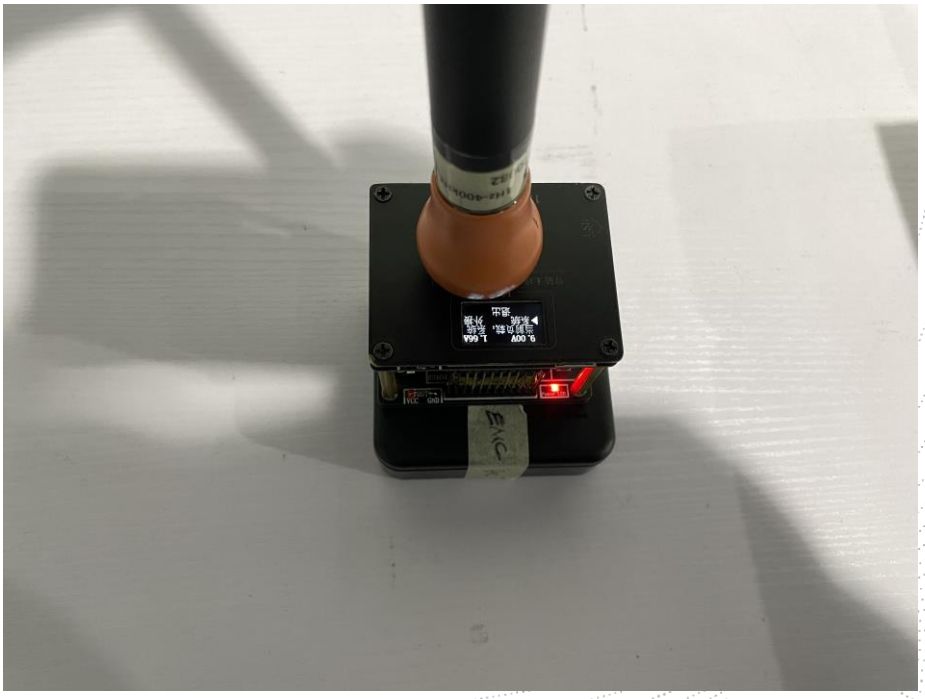


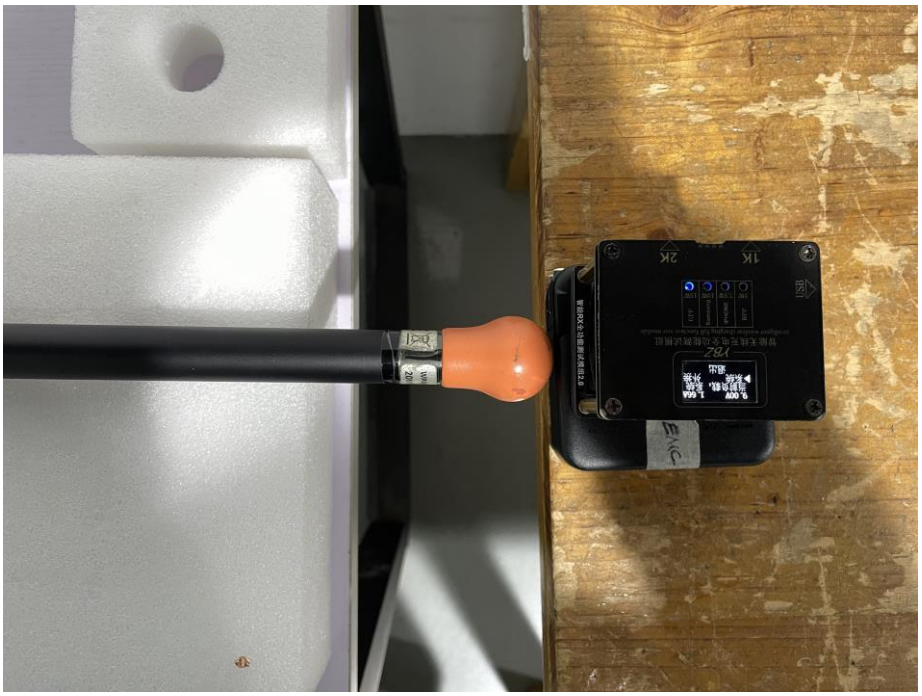


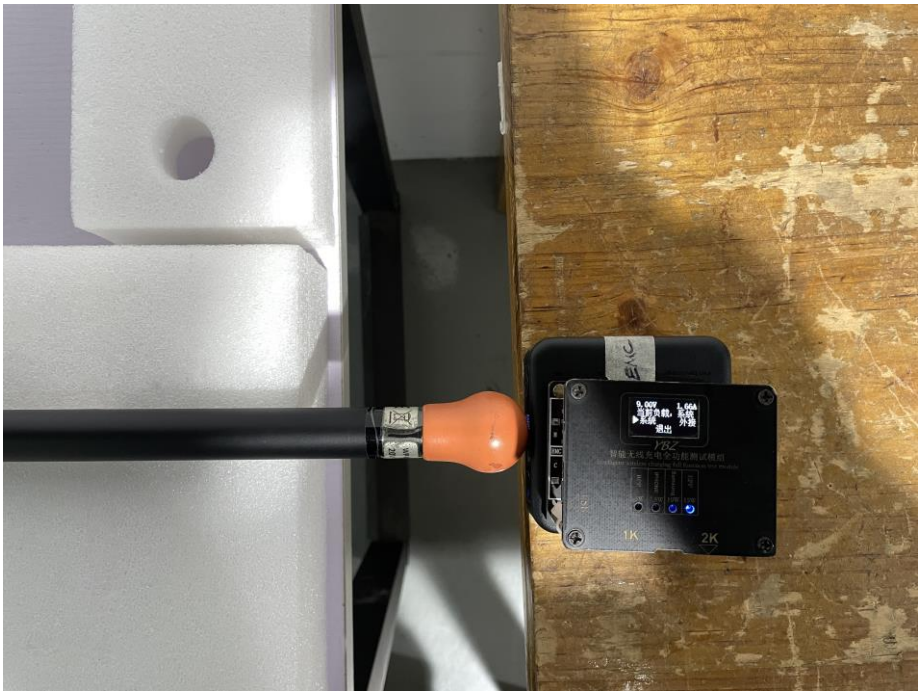


0CM








1K
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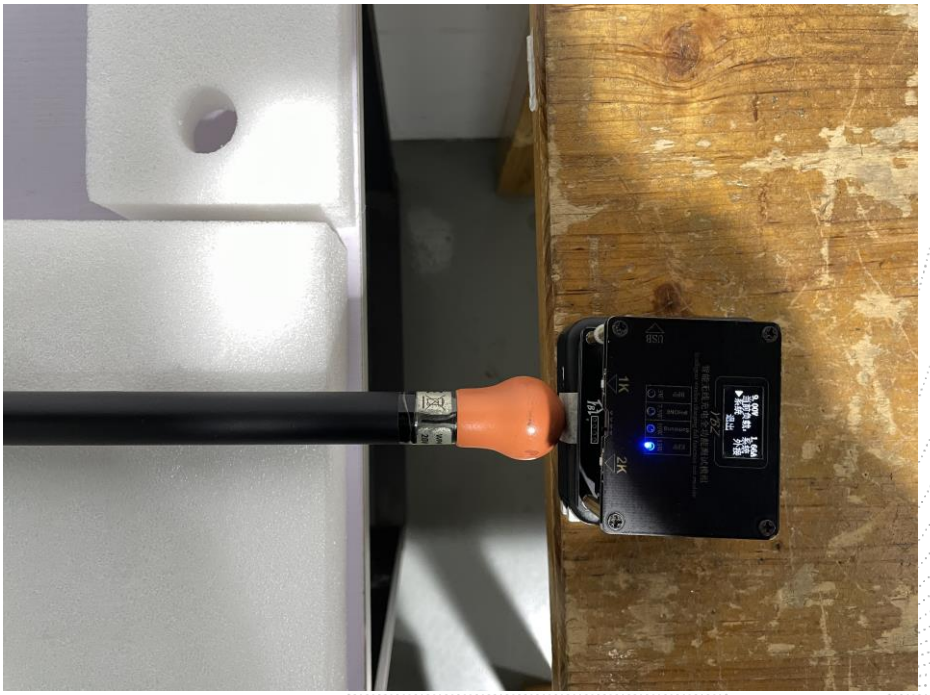
1K
2K

STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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