

RF Exposure Evaluation

Client Information:

Applicant: Ugreen Group Limited
Applicant add.: Ugreen Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China
Manufacturer: Ugreen Group Limited
Manufacturer add.: Ugreen Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China

Product Information:

Product Name: 2-in-1 Wireless Charger
Model No.: W704

Brand Name: **UGREEN**

Test samples.: AITSZ24043001001

FCC ID: 2AQI5-W704

Applicable standards: FCC CFR 47 PART 1, § 1.1310
KDB 680106 D01 Wireless Power Transfer v04

Prepared By:

Guangdong Asia Hongke Test Technology Limited

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Date of Receipt: Apr. 30, 2024 Date of Test: Apr. 30, 2024 ~ May 08, 2024

Date of Issue: May 08, 2024 Test Result: Pass

This device described above has been tested by Guangdong Asia Hongke Test Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

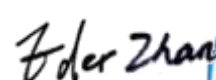
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Reviewed by:



Sean She

Approved by:



Eder Zhan



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Revision History

Revision	Issue Date	Revisions	Revised By
00	May 08, 2024	Initial Issue	Eder Zhan

2 TEST FACILITY

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

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited 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.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited 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.

2.1 Deviation from standard

None

2.2 Abnormalities from standard conditions

None

2.3 Test Location

Guangdong Asia Hongke Test Technology Limited

Address: B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Tel.: +86 0755-230967639 Fax.: +86 0755-230967639

3 GENERAL INFORMATION

EUT Name:	2-in-1 Wireless Charger
Model No:	W704
Serial Model:	CD257, 40119, 35566, 40119P, 40119X, 40119A, 40119B, 40119U, 40119JP, 40119ZD, 35566P, 35566X, 35566A, 35566B, 35566U, 35566JP, 35566ZD
Test sample(s) ID:	24043001001
Sample(s) Status:	Engineer sample
Operation frequency:	360kHz; 326. 5kHz & 1.778MHz
Modulation Technology:	MSK
Antenna Type:	Ant 1: Coil Antenna (For phone) 360kHz Ant 2: Coil Antenna (For watch) 326. 5kHz & 1.778MHz
Antenna gain:	0dBi
Hardware version.:	V7.1, A2
Software version.:	cs1E79
Power supply:	Input: 5.0V $\overline{\text{---}}$ 3.0A/ 9.0V $\overline{\text{---}}$ 3.0A Total Output Power:20.0W Max (iPhone: 15.0W, Apple Watch:5.0W)
Model different:	Different model names.
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4 TEST METHODOLOGY

4.1 Measuring 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 D01: KDB 680106 D01 Wireless Power Transfer v04.

4.2 Requirements

According to the item 3 of KDB 680106 D01v04:

Inductive wireless power transfer applications that meet all of the following requirements are excluded from submitting an RF exposure evaluation.

- (1) Mobile Device and Portable Device Configurations
- (2) Equipment Authorization Procedures for Devices Operating at Frequencies Below 4 MHz
- (3) The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the top surface.

4.3 Limits

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 1.1307(b)

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)
(A) Limits for Occupational/Controlled Exposures				
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
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6
(B) 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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

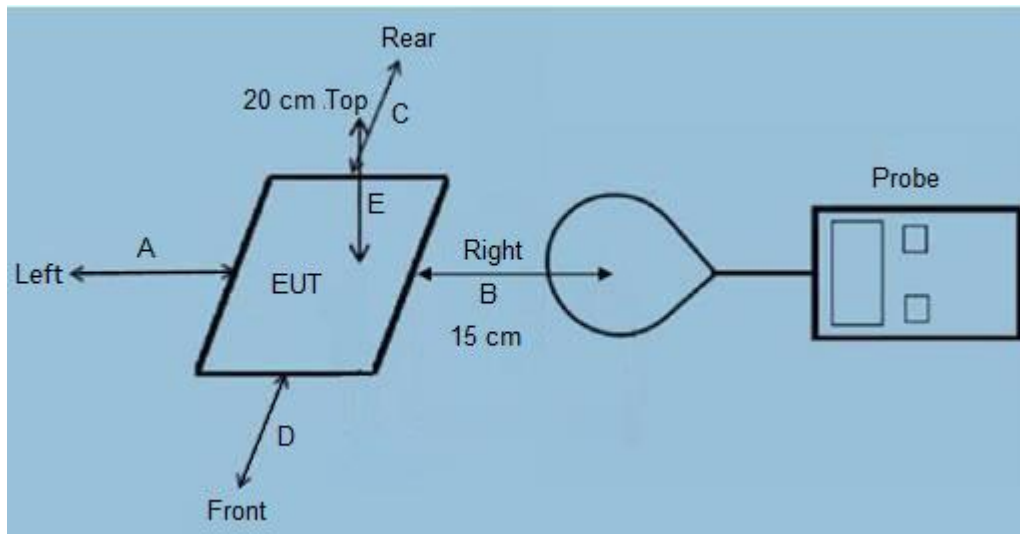
F=frequency in MHz
 F=Plane-wave equivalent power density
 RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Note 1: f = frequency in MHz; *Plane-wave equivalent power density

Note 2: For the applicable limit, see FCC 1.1310, 680106 D01 RF Exposure Wireless Charging Apps v03r01

Note 3: 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. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

4.4 Test Setup



4.5 Test Procedure

- 1) The RF exposure test was performed in anechoic chamber.
- 2) The measurement probe was placed at test distance (15 cm from all sides and 20 cm from the top) which is between the edge of the charger and the geometric center of probe.
- 3) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- 4) The EUT was measured according to the dictates of KDB 680106 D01 Wireless Power Transfer v04.

Remark: The EUT's test position A, B, C, D and E is valid for the E and H field measurements.

5 EQUIPMENT APPROVAL CONSIDERATIONS

The EUT does comply with KDB 680106 D01 as follow table.

Requirements of section 5 of KDB 680106 D01	Yes / No	Description
Mobile Device and Portable Device Configurations	Yes	Mobile Device
Equipment Authorization Procedures for Devices Operating at Frequencies Below 4 MHz	Yse	The device operate in the frequency range 360KHz (for mobile phone) and 326. 5kHz & 1.778MHz (for watch).
RF Exposure compliance may be ensured only for a minimum separation distance that is greater than 20 cm, while use conditions at smaller distances can still be considered unlikely.	Yes	The EUT H-field strengths at 15 cm surrounding the device and 20 cm above the top surface.

5.1 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

Test Mode	Description	
Mode 1	AC Adapter + EUT + Mobile phone + Watch	Record
Mode 2	AC Adapter + EUT + Mobile phone	Pre-test
Mode 3	AC Adapter + EUT + Watch	Pre-test
Mode 4	Test the EUT in idle mode.	Pre-test
Note: 1. All test modes were pre-tested, but we only recorded the worst case in this report. 2. Unfolded and folded mode were tested, but we only recorded the worst case.		

5.2 Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	Phone	Apple	iphone 14 Pro max	N/A	N/A	N/A
2	Watch	Apple	S6	N/A	N/A	N/A
3	Adapter	HNT	HNT-QC530	N/A	N/A	N/A

5.3 Test Instruments list

Test Equipment	Manufacturer	Model No.	SN.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Magnetic Amplitude and Gradient Probe System	SPEAG	MAGPy-8H3D+E3D V2 & MAGPy-DAS V2	3107 & 3097	03.15.2024	03.14.2025

Parameter	Specs
PROBE DESIGN	
Diameter	60 mm
8 isotropic <i>H</i> -field sensors	concentric loops of 1 cm ² arranged at the corner of a cube of 22 mm side length
1 isotropic <i>E</i> -field sensor	orthogonal dipole/monopole (arm length: 50 mm)
Measurement center	18.5 mm from the probe tip
Temperature range	0–40 °C
Dimensions	110 × 635 × 35 mm (MAGPy-8H3D+E3D V2 & MAGPy-DAS V2)
<i>H</i> -FIELD SPECIFICATION	
Frequency range	3 kHz–10 MHz
Measurement range	0.1–3200 A/m, 0.12 μT–4 mT
Gradient range	0–80 T/m/T
<i>E</i> -FIELD SPECIFICATION	
Frequency range	3 kHz–10 MHz
Measurement range	0.08–2000 V/m

5.4 Test Result

Test Mode 1_MPE_Coil 1_Phone

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 1%	Top	10.16	0.58
15cm	< 1%	Top	10.19	0.63
15cm	< 1%	Left	10.31	0.53
15cm	< 1%	Right	10.19	0.72
15cm	< 1%	Front	10.23	0.49
15cm	< 1%	Rear	10.28	0.70
Limit			614	1.63
Margin Limit (%)			1.68%	44.17%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 50%	Top	9.68	0.47
15cm	< 50%	Top	8.82	0.52
15cm	< 50%	Left	9.23	0.55
15cm	< 50%	Right	9.61	0.43
15cm	< 50%	Front	9.42	0.53
15cm	< 50%	Rear	9.60	0.48
Limit			614	1.63
Margin Limit (%)			1.58%	33.74%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 99%	Top	9.25	0.35
15cm	< 99%	Top	8.30	0.27
15cm	< 99%	Left	9.00	0.41
15cm	< 99%	Right	8.50	0.48
15cm	< 99%	Front	8.82	0.34
15cm	< 99%	Rear	8.74	0.26
Limit			614	1.63
Margin Limit (%)			1.51%	29.45%

Test Mode 1_MPE_Coil 2_Watch_326.5kHz

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 1%	Top	9.78	0.55
15cm	< 1%	Bottom	9.79	0.63
15cm	< 1%	Left	10.07	0.37
15cm	< 1%	Right	9.88	0.55
15cm	< 1%	Front	9.83	0.49
15cm	< 1%	Rear	9.73	0.49
Limit			614	1.63
Margin Limit (%)			1.64%	38.65%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 50%	Top	9.19	0.39
15cm	< 50%	Bottom	8.31	0.45
15cm	< 50%	Left	8.71	0.35
15cm	< 50%	Right	8.66	0.41
15cm	< 50%	Front	8.72	0.28
15cm	< 50%	Rear	8.99	0.33
Limit			614	1.63
Margin Limit (%)			1.50%	27.61%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 99%	Top	8.93	0.32
15cm	< 99%	Bottom	7.98	0.35
15cm	< 99%	Left	8.80	0.33
15cm	< 99%	Right	8.73	0.36
15cm	< 99%	Front	8.39	0.45
15cm	< 99%	Rear	8.49	0.41
Limit			614	1.63
Margin Limit (%)			1.45%	27.61%

Test Mode 1_MPE_Coil 2_Watch_1.778MHz

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 1%	Top	10.54	0.65
15cm	< 1%	Bottom	10.37	0.52
15cm	< 1%	Left	10.17	0.60
15cm	< 1%	Right	9.92	0.45
15cm	< 1%	Front	10.08	0.60
15cm	< 1%	Rear	9.60	0.25
Limit			614	1.63
Margin Limit (%)			1.72%	39.88%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 50%	Top	9.40	0.34
15cm	< 50%	Bottom	8.19	0.36
15cm	< 50%	Left	9.02	0.15
15cm	< 50%	Right	8.04	0.21
15cm	< 50%	Front	8.56	0.12
15cm	< 50%	Rear	7.78	0.20
Limit			614	1.63
Margin Limit (%)			1.53%	22.09%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	< 99%	Top	8.94	0.23
15cm	< 99%	Bottom	8.35	0.36
15cm	< 99%	Left	8.79	0.13
15cm	< 99%	Right	8.13	0.16
15cm	< 99%	Front	8.36	0.10
15cm	< 99%	Rear	7.73	0.12
Limit			614	1.63
Margin Limit (%)			1.46%	22.09%

Note: All test modes were pre-tested, but we only recorded the worst case in this report.

MPE-based total exposure ratio (Worst case):

Case1:

E-field:

$$\text{Coil 1_360kHz} + \text{Coil 2_326.5kHz} = 0.0168 + 0.0164 = 0.0332 < 1$$

H-field:

$$\text{Coil 1_360kHz} + \text{Coil 2_326.5kHz} = 0.4417 + 0.3865 = 0.8282 < 1$$

Case2:

E-field:

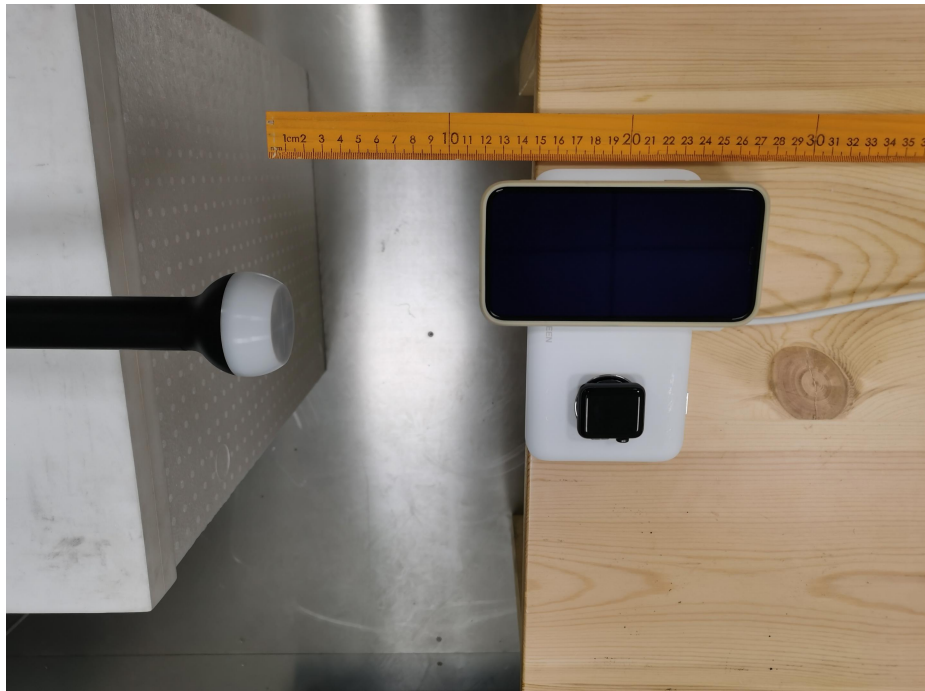
$$\text{Coil 1_360kHz} + \text{Coil 2_1.778MHz} = 0.0168 + 0.0172 = 0.0340 < 1$$

H-field:

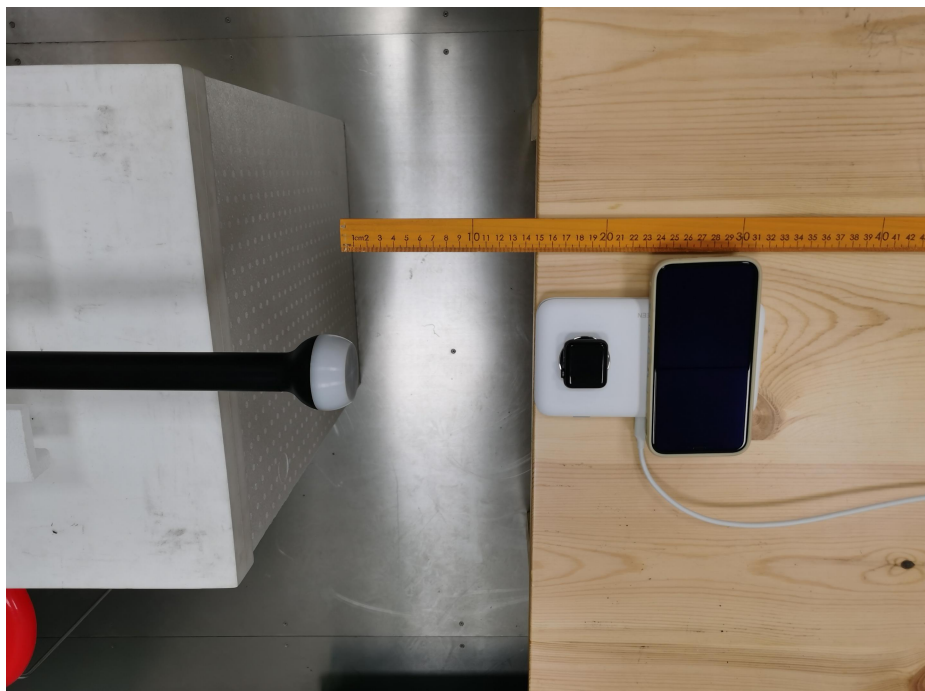
$$\text{Coil 1_360kHz} + \text{Coil 2_1.778MHz} = 0.4417 + 0.3988 = 0.8405 < 1$$

Test Setup photo

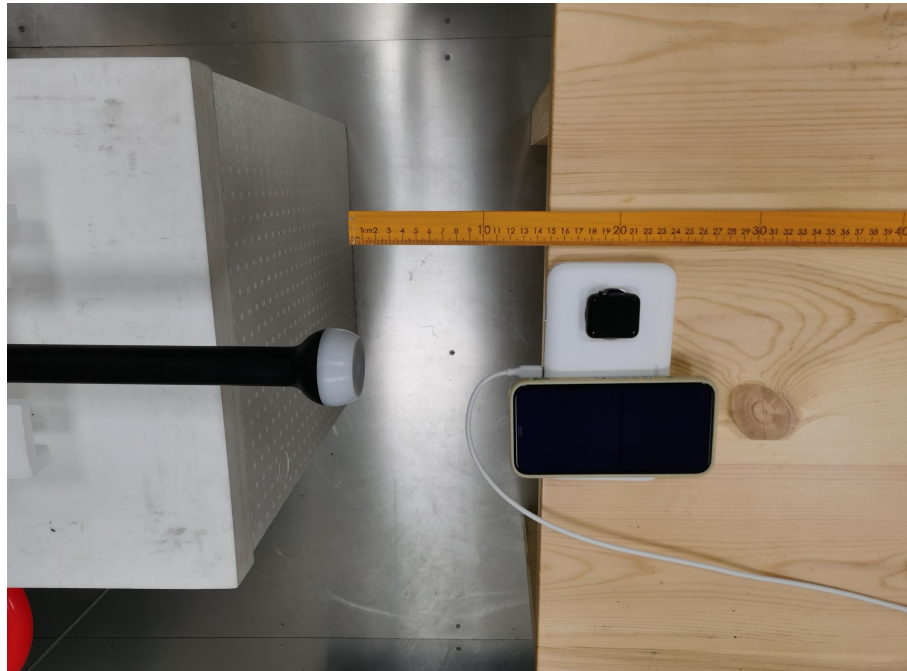
Front



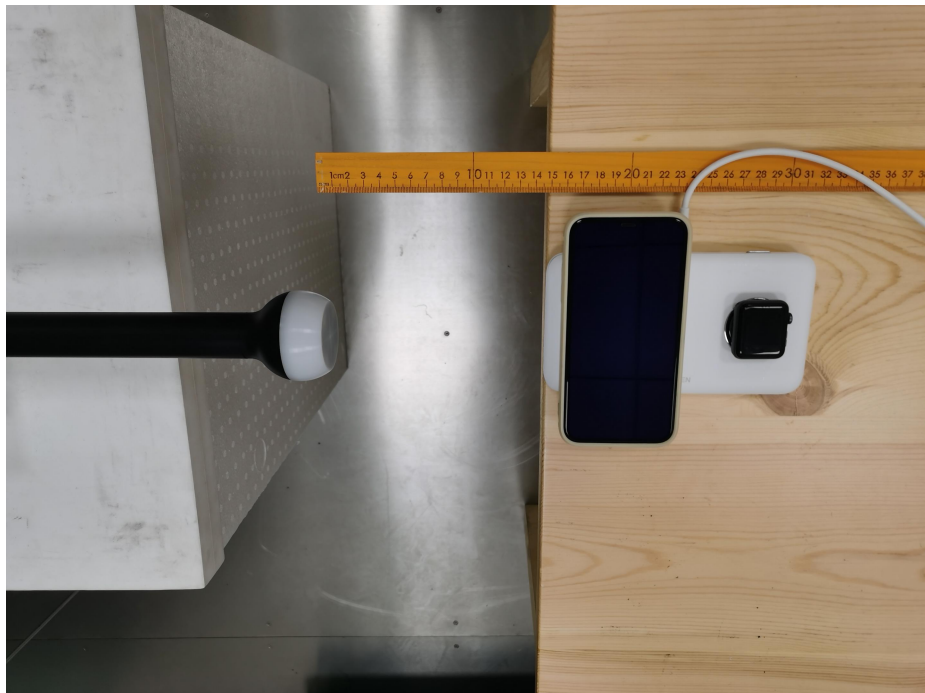
Left



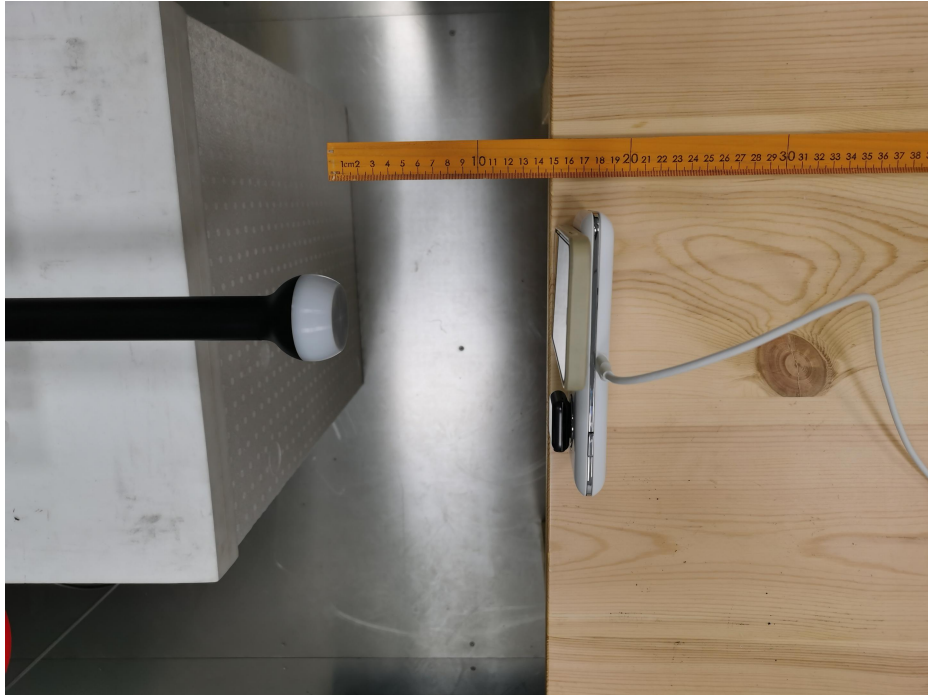
Rear



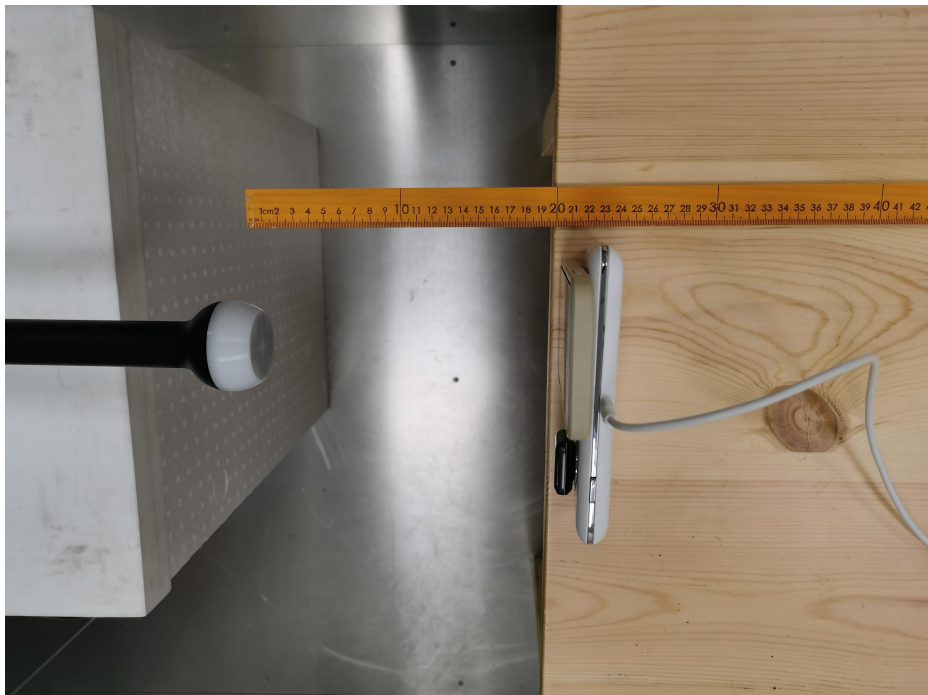
Right



Top-15cm



Top-20cm



End of report