RF Exposure Evaluation

Client Information:

Applicant:	Shenzhen Powerqi Technology Co.,Ltd.
Applicant add.:	Room 201, 302, 401 of A4 Building, Block A, Fangxing Science and Technology Park, No. 13 of Baonan Road, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Powerqi Technology Co.,Ltd.
Manufacturer add.:	Room 201, 302, 401 of A4 Building, Block A, Fangxing Science and Technology Park, No. 13 of Baonan Road, Longgang District, Shenzhen, China

Product Information:

Product Name:	3-in-1 Wireless Charger
Model No.:	LC99
Brand Name:	Powerqi
Test samples.:	AIT24042906001

FCC ID: 2AFP2-LC99

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

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

No.22,Jinqianling 3rd Street,Jitigang,Huangjiang,Dongguan,
Guangdong,China

Tel.: +86-769-8202 0499 Fax.: +86-769-8202 0495

Date of Receipt:	Apr. 29, 2024	Date of Test:	Apr. 29, 2024 ~ Mar. 11, 2024
Date of Issue:	Mar. 11, 2024	Test Result:	Pass

This device described above has been tested by Dongguan Yaxu (AiT) 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.

Rviewed by: Emiya Lin
Emiya Lin

Approved by: Simba Huang
Simaba Huang

DONGGUAN YAXU (AIT) TECHNOLOGY LIMITED TEST REPORT

1 CONTENTS

Revision History

Revision	Issue Date	Revisions	Revised By
00	Mar. 11, 2024	Initial Issue	Eder Zhan

2 TEST FACILITY

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

CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on April 18, 2022

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) 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.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) 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

Dongguan Yaxu (AiT) Technology Limited
Address: No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan, Guangdong, China
Tel.: +86-769-8202 0499
Fax.: +86-769-8202 0495

3 GENERAL INFORMATION

EUT Name:	3-in-1 Wireless Charger
Model No:	LC99
Serial Model:	N/A
Test sample(s) ID:	AIT24042906001
Sample(s) Status:	Engineer sample
Operation frequency:	Coil1: For Phone: 113kHz-205kHz Coil2: For Earphone: 113kHz-205kHz Coil3: Watch: 300kHz-350kHz
Modulation Technology:	ASK
Antenna Type:	Coil1/Coil2/Coil3: Loop coil Antenna
Antenna gain:	Coil1/Coil2/Coil3: 0dBi
Hardware version.:	V10
Software version.:	V1.0
Power supply:	Input: 5V⎓3A,9V⎓2.22A,12V⎓1.67A Phone Output: 5W/7.5W/10W MAX Earphone Output: 5W Watch Output: 3W
Model different:	N/A
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 §2.1091 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.

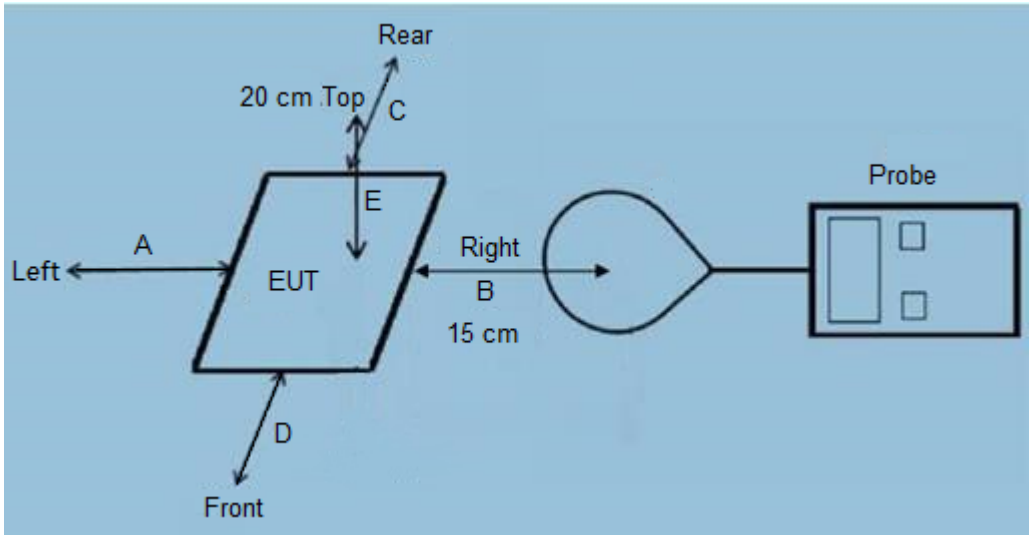
4.3 Limits

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
*=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).

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,F) 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,E and F 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	Yes	The device operate in the frequency range113-205KHz(for mobile phone & earphone) and 300-350KHz(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+ Earphone+ Watch	Record
Mode 2	AC Adapter + EUT + Mobile phone+ Earphone	Pre-tested
Mode 3	AC Adapter + EUT + Mobile phone+Watch	Pre-tested
Mode 4	AC Adapter + EUT + Earphone +Watch	Pre-tested
Mode 5	AC Adapter + EUT + Mobile phone	Pre-tested
Mode 6	AC Adapter + EUT + Earphone	Pre-tested
Mode 7	AC Adapter + EUT + Watch	Pre-tested
Mode 8	Test the EUT in idle mode.	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

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	Earphone	PocBuds	K6	N/A	N/A	N/A
3	Watch	Apple	S6	N/A	N/A	N/A
4	Adapter	Jiangxi Ji 'an Aohai Technology Co., LTD	CD127	N/A	N/A	N/A

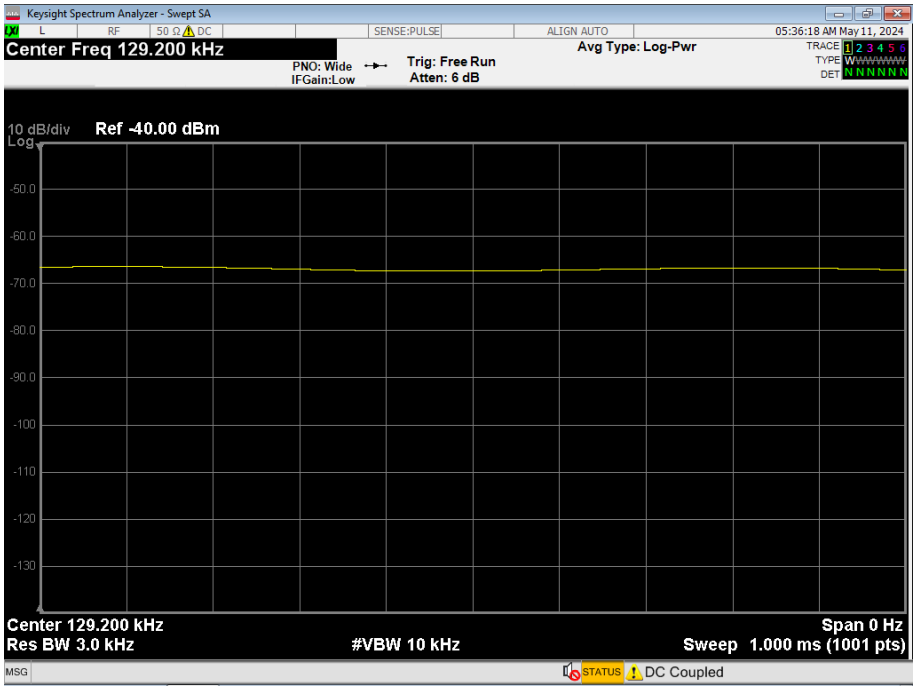
5.3 Test Instruments list

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

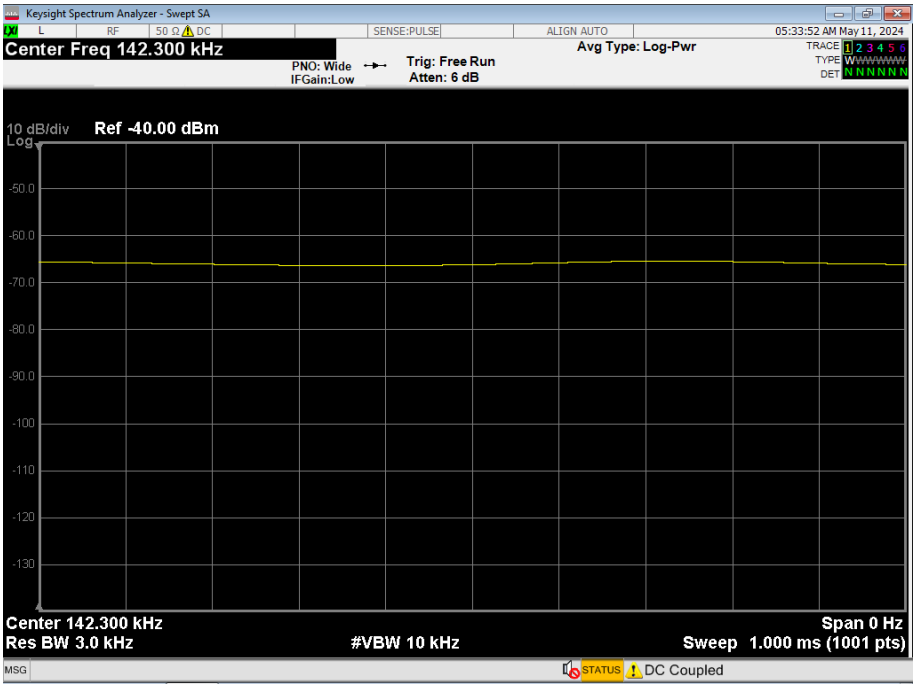
5.4 Duty Cycle:

Mode	ON Time(ms)	Period(ms)	Duty Cycle(%)
Phone Operating(113kHz-205kHz)	/	/	100
Earphone Operating(113kHz-205kHz)	/	/	100
Watch Operating(300kHz-350kHz)	/	/	100

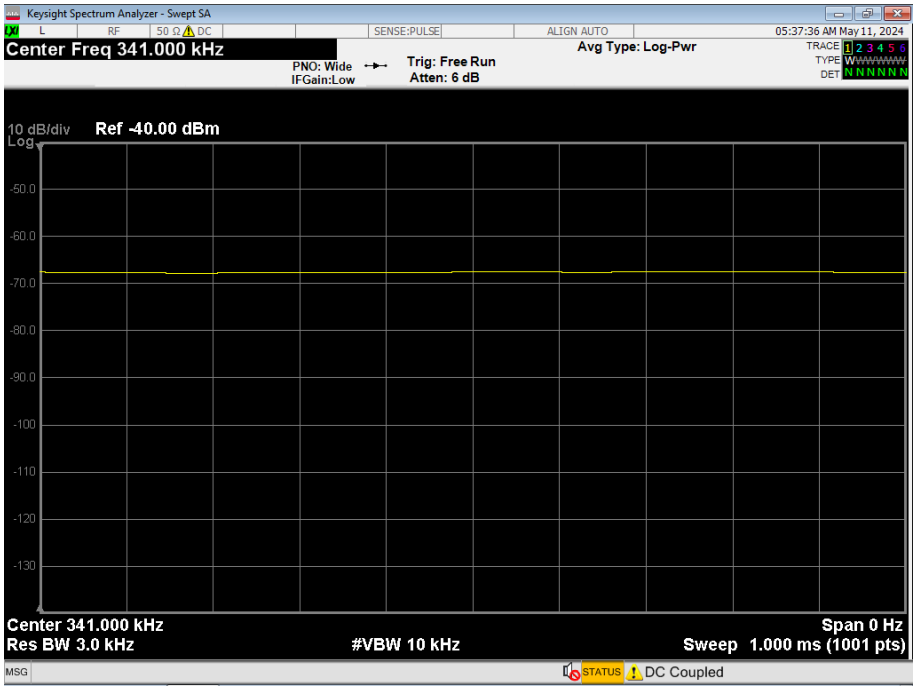
Phone



Earphone


Keysight Spectrum Analyzer - Swept SA
Center Freq 142.300 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 6 dB
Avg Type: Log-Pwr
05:33:52 AM May 11, 2024
10 dB/div
Log
Ref -40.00 dBm
-50.0
-60.0
-70.0
-80.0
-90.0
-100
-110
-120
-130
Center 142.300 kHz
Res BW 3.0 kHz
#VBW 10 kHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
STATUS
DC Coupled

Watch


Keysight Spectrum Analyzer - Swept SA
L
RF
50 Ω DC
SENSE:PULSE
ALIGN AUTO
05:37:36 AM May 11, 2024
Center Freq 341.000 kHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 6 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWW
DET N N N N N
10 dB/div
Log
Ref -40.00 dBm
-50.0
-60.0
-70.0
-80.0
-90.0
-100
-110
-120
-130
Center 341.000 kHz
Res BW 3.0 kHz
#VBW 10 kHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
MSG
STATUS
DC Coupled

5.5 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	18.83	0.51
15cm	＜ 1%	Top	18.79	0.51
15cm	＜ 1%	Left	19.03	0.47
15cm	＜ 1%	Right	18.50	0.37
15cm	＜ 1%	Front	18.76	0.59
15cm	＜ 1%	Rear	18.49	0.50
Limit			614	1.63
Margin Limit (%)			3.10%	36.20%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	17.72	0.43
15cm	＜ 50%	Top	16.77	0.56
15cm	＜ 50%	Left	16.98	0.51
15cm	＜ 50%	Right	17.19	0.49
15cm	＜ 50%	Front	17.05	0.53
15cm	＜ 50%	Rear	17.38	0.60
Limit			614	1.63
Margin Limit (%)			2.89%	36.81%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	17.09	0.41
15cm	＜ 99%	Top	16.07	0.49
15cm	＜ 99%	Left	16.90	0.48
15cm	＜ 99%	Right	16.70	0.30
15cm	＜ 99%	Front	16.60	0.31
15cm	＜ 99%	Rear	16.65	0.41
Limit			614	1.63
Margin Limit (%)			2.78%	30.06%

Test Mode 1_MPE_Coil 2_ Earphone

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 1%	Top	15.77	0.45
15cm	＜ 1%	Top	15.58	0.36
15cm	＜ 1%	Left	15.90	0.52
15cm	＜ 1%	Right	16.19	0.53
15cm	＜ 1%	Front	15.81	0.38
15cm	＜ 1%	Rear	15.38	0.49
Limit			614	1.63
Margin Limit (%)			2.64%	32.52%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	15.05	0.46
15cm	＜ 50%	Top	14.15	0.44
15cm	＜ 50%	Left	14.71	0.48
15cm	＜ 50%	Right	14.66	0.46
15cm	＜ 50%	Front	14.69	0.46
15cm	＜ 50%	Rear	14.80	0.53
Limit			614	1.63
Margin Limit (%)			2.45%	32.52%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	14.46	0.44
15cm	＜ 99%	Top	13.50	0.54
15cm	＜ 99%	Left	14.21	0.39
15cm	＜ 99%	Right	14.16	0.46
15cm	＜ 99%	Front	13.87	0.36
15cm	＜ 99%	Rear	13.77	0.35
Limit			614	1.63
Margin Limit (%)			2.36%	33.13%

Test Mode 1_MPE_Coil 3_ Watch

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 1%	Top	13.28	0.43
15cm	＜ 1%	Top	13.66	0.39
15cm	＜ 1%	Left	13.01	0.38
15cm	＜ 1%	Right	13.08	0.44
15cm	＜ 1%	Front	13.41	0.43
15cm	＜ 1%	Rear	13.34	0.45
Limit			614	1.63
Margin Limit (%)			2.22%	27.61%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	12.30	0.29
15cm	＜ 50%	Top	11.33	0.20
15cm	＜ 50%	Left	12.01	0.30
15cm	＜ 50%	Right	11.69	0.31
15cm	＜ 50%	Front	11.86	0.25
15cm	＜ 50%	Rear	11.57	0.29
Limit			614	1.63
Margin Limit (%)			2.00%	19.02%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	11.73	0.18
15cm	＜ 99%	Top	10.73	0.14
15cm	＜ 99%	Left	10.98	0.28
15cm	＜ 99%	Right	11.15	0.13
15cm	＜ 99%	Front	10.92	0.29
15cm	＜ 99%	Rear	11.38	0.18
Limit			614	1.63
Margin Limit (%)			1.91%	17.79%

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

Total exposure

MPE-based total exposure ratio (Worst case):

E-field:

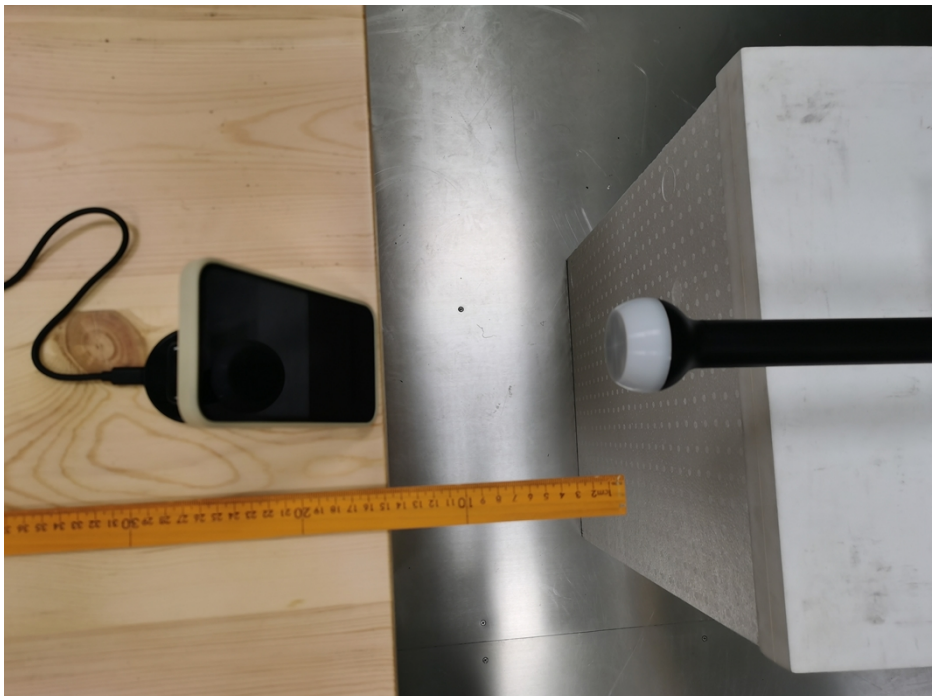
Coil 1+Coil 2+Coil 3 = 0.0310 + 0.0264 + 0.0222 = 0.0796 < 1

H-field:

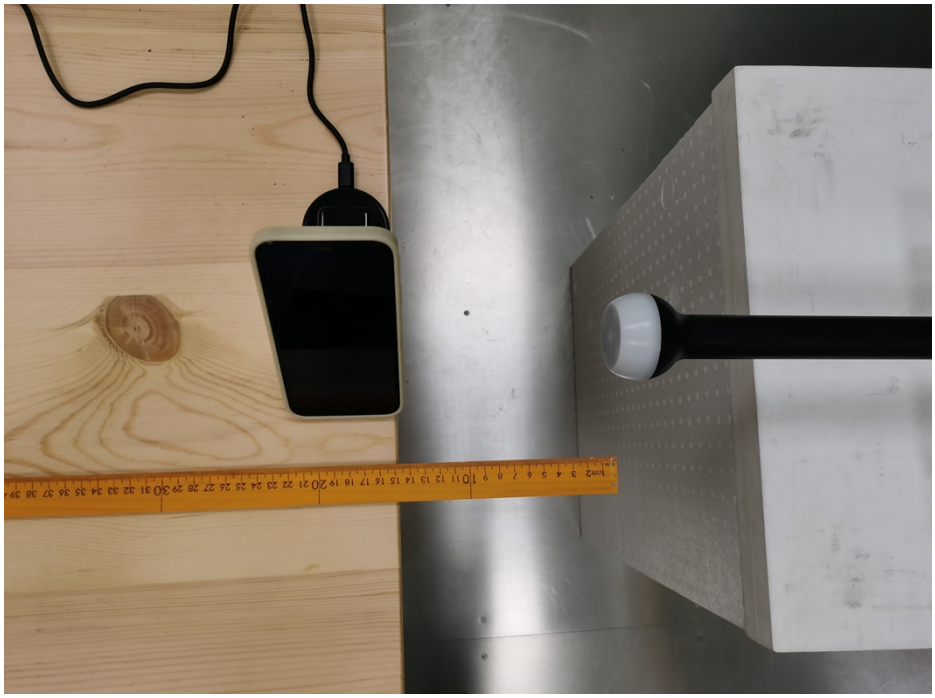
Coil 1+Coil 2+Coil 3 = 0.3681 + 0.3313 + 0.2761 = 0.9755 < 1

1.1 Test Setup photo

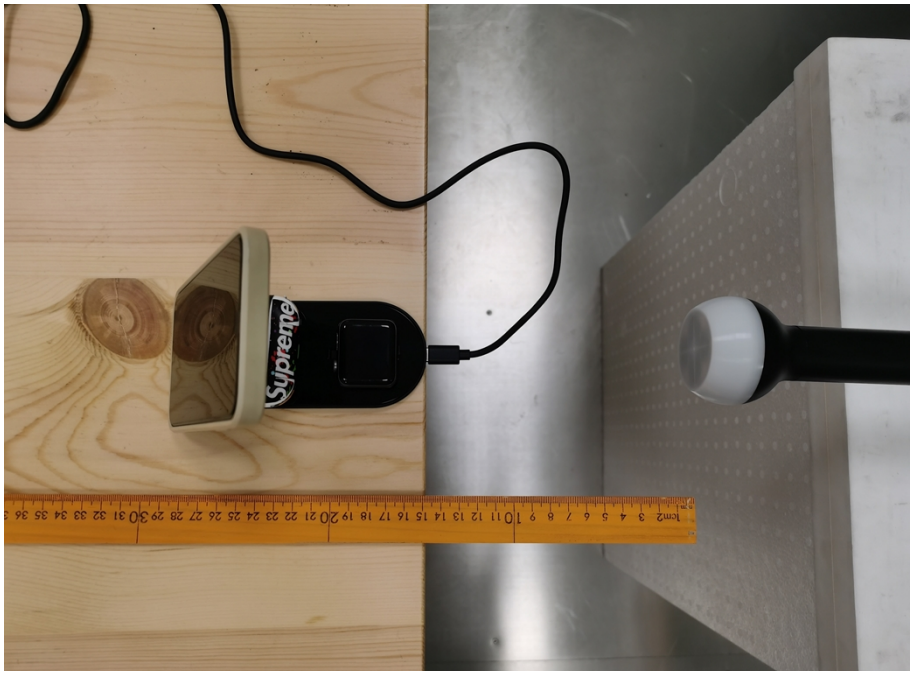
Front



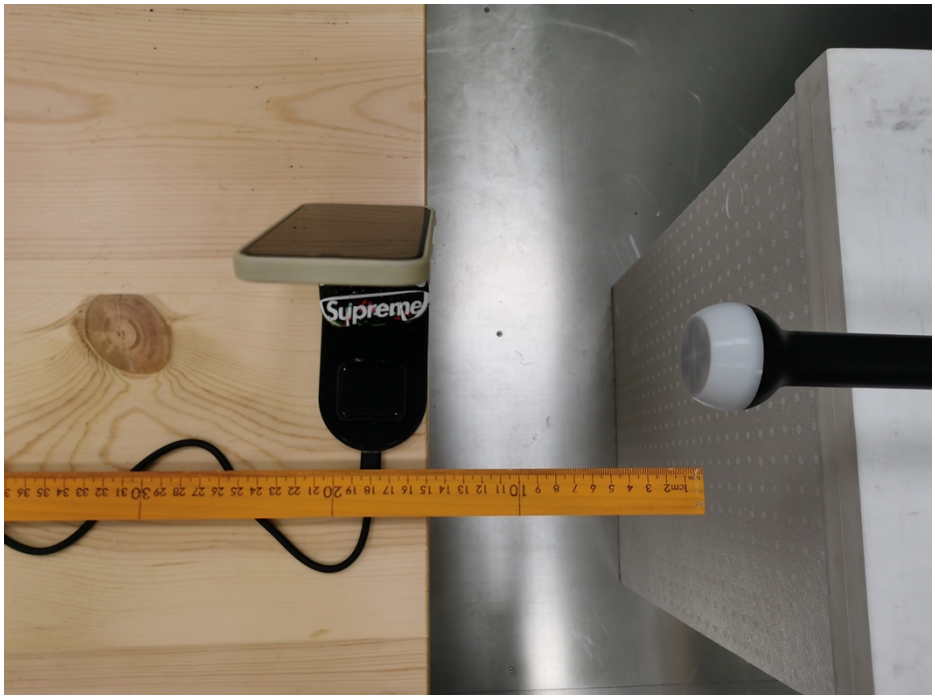
Left



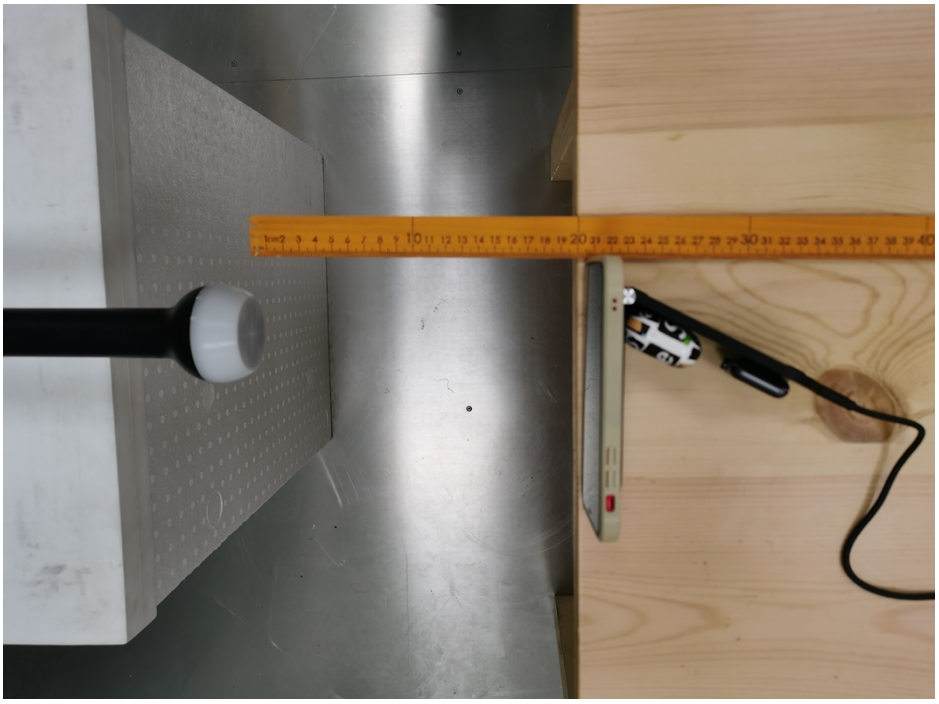
Rear



Right



Top



End of report