Test Report

FCC ID: 2BA8X-JRW020MINI

Applicant:	Shenzhen Nito Power Source Technology Co., Ltd.
Address:	201-7, Building 2, Shihua Lixing Fengda Industrial Factory, No. 49 Wuhe Avenue South, Wuhe Community, Bantian Street, Longgang District, Shenzhen
Manufacturer:	Shenzhen Nito Power Source Technology Co., Ltd.
Address:	201-7, Building 2, Shihua Lixing Fengda Industrial Factory, No. 49 Wuhe Avenue South, Wuhe Community, Bantian Street, Longgang District, Shenzhen
EUT:	20W Mini Magnetic Wireless Power Bank
Trade Mark:	JOYROOM
Model Number:	JR-W020 Mini
Date of Receipt:	Apr. 28, 2024
Test Date:	Apr. 28, 2024 - May. 13, 2024
Date of Report:	May. 13, 2024
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

Prepared (Engineer):	Alisa Song
Reviewer (Supervisor):	Jack Bu
Approved (Manager):	Jade Yang

Instructions

1. This test report shall not be partially reproduced without the written consent of the laboratory.

2. The test results in this test report are only responsible for the samples submitted

3. This test report is invalid without the seal and signature of the laboratory.

4. This test report is invalid if transferred, altered, or tampered with in any form without authorization.

5. Any objection to this test report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

Contents

Test Result Certification	
Applicant:	Shenzhen Nito Power Source Technology Co., Ltd.
Address:	201-7, Building 2, Shihua Lixing Fengda Industrial Factory, No. 49 Wuhe Avenue South, Wuhe Community, Bantian Street, Longgang District, Shenzhen
Manufacturer:	Shenzhen Nito Power Source Technology Co., Ltd.
Address:	201-7, Building 2, Shihua Lixing Fengda Industrial Factory, No. 49 Wuhe Avenue South, Wuhe Community, Bantian Street, Longgang District, Shenzhen
Product description	
Product name:	20W Mini Magnetic Wireless Power Bank
Trademark:	JOYROOM
Model name:	JR-W020 Mini
Series Model:	N/A
Standards:	FCC CFR 47 PART 1, § 1.1310 FCC CFR 47 PART 2, § 2.1093
Test method:	KDB 680106 D01 Wireless Power Transfer v04
Date of Test	
Date of test:	Apr. 28, 2024 - May. 13, 2024
Test result:	Pass

1 General Description

1.1 Description of the EUT

Product name:	20W Mini Magnetic Wireless Power Bank
Model name:	JR-W020 Mini
Series Model:	N/A
Model difference:	N/A
Electrical rating:	Type-C Input: 5V/3A, 9V/2A Type-C Output: 5V/2.4A, 9V/2.22A, 12V/1.67A USB-A Output: 5V/2.4A, 9V/2A, 12V/1.5A Wireless charger Output: 15W Max. Multi-port Output: 5V/2.4A Max. Battery capacity: 5000mAH/3.7V/18.5Wh
Accessories:	Cable: USB-C to USB-C Cable 100cm
RF specification:	
Operation frequency:	115-205kHz
Modulation type:	MSK
Antenna type:	Coil

1.2 Description of test modes

All the test modes were carried out with the EUT in normal operation, the final test mode of the EUT was the worst test mode for emission test, which was shown in this report and defined as:

Mode1. Type-C Input+USB-A Output+Wireless charger Output Mode(Full Load, 1%/50%/99%)
Mode2. Type-C Input+USB-A Output+Wireless charger Output Mode(Half Load, 1%/50%/99%)
Mode3. Type-C Input+USB-A Output+Wireless charger Output Mode(No Load, 1%/50%/99%)
Mode4. Type-C Output+USB-A Output+Wireless charger Output Mode(Full Load, 1%/50%/99%)
Mode5. Type-C Output+USB-A Output+Wireless charger Output Mode(Half Load, 1%/50%/99%)
Mode6. Type-C Output+USB-A Output+Wireless charger Output Mode(No Load, 1%/50%/99%)
Mode7. Wireless charger Output Mode(Full Load, 1%/50%/99%)
Mode8. Wireless charger Output Mode(Half Load, 1%/50%/99%)
Mode9. Wireless charger Output Mode(No Load, 1%/50%/99%)
Mode10. Type-C Output Mode(Full Load, 1%/50%/99%)
Mode11. Type-C Output Mode(Half Load, 1%/50%/99%)
Mode12. Type-C Output Mode(No Load, 1%/50%/99%)
Mode13. USB-A Output Mode(Full Load, 1%/50%/99%)
Mode14. USB-A Output Mode(Half Load, 1%/50%/99%)
Mode15. USB-A Output Mode(No Load, 1%/50%/99%)

Note: 1. We have evaluated 1%, 50% and 99% battery charging mode, and the worst mode (99%) is showed in this report.

2. All modes have been tested, and the report only shows the results of the worst mode1 and mode7.

1.3 Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support equipment list			
Description	Model	Serial No.	Manufacturer
XIAOMI Laptop Portable adapter(65W)	AD65G	/	XIAOMI
Mobile phone (Provide by test lab)	Galaxy S21 5G	/	SAMSUNG

2 Measurement uncertainty

Parameter	Expanded Uncertainty
Magnetic field measurement (9kHz~30MHz)	±7.8%
Electric field measurements (9kHz~30MHz)	±7.8%

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 Test facilities and accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen DL Testing Technology Co., Ltd.
Test site location:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
FCC Test Firm Registration Number:	854456
Designation Number:	CN1307
IC Registered No.:	27485
CAB ID.:	CN0118

4 List of test equipment

Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Electric and Magnetic Field Probe – Analyzer	Narda	EHP-200A	101166	June. 24, 2023	June. 25, 2024

5 Test result

5.1 Requirement

§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 as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of FCC part 2.1093 of this chapter.

Table 1 to §1.1310(e)(1) - 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)
(i) Limits for Occupational/Controlled Exposure				
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
1500-100000			5	<6
(ii) 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
1500-100000			1.0	<30

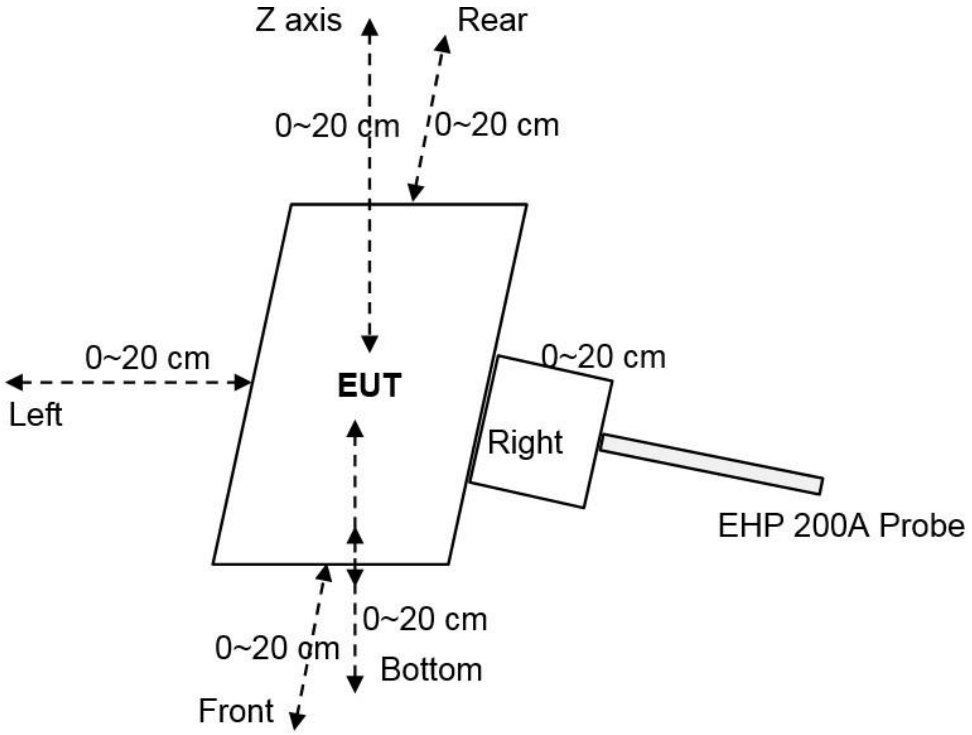
f = frequency in MHz
* = Plane-wave equivalent power density

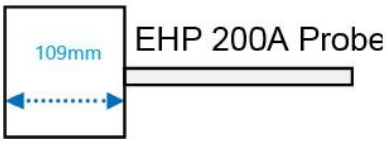
Note 1: Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

Note 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.2 Test setup

For portable exposure conditions:





Notes: The EHP 200A Probe has a diameter of 10.9cm and a radius of 5.45cm.

5.3 Test Procedures

For portable exposure conditions:

a. The RF exposure test was performed in anechoic chamber.

b. Perform H-field measurements for each edge/top surface of the host/client pair at every 2 cm, starting from as close as possible out to 20 cm

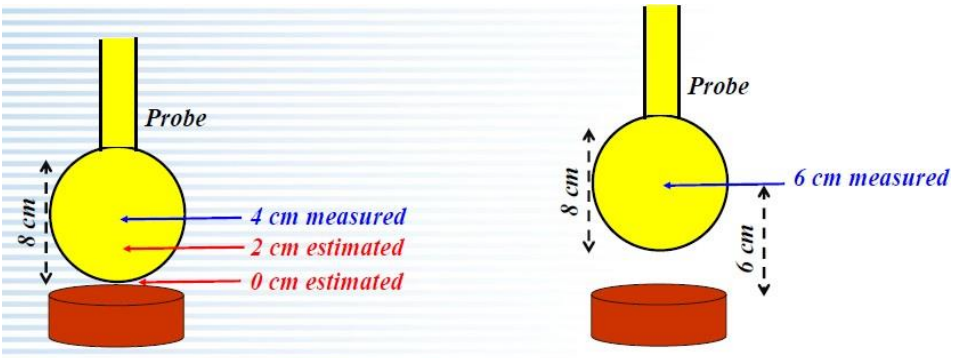
c. The highest emission level was recorded and compared with limit.

Notes: 1.The EUT was setted to transmit continuously with the Operating mode duty cycle of 100%.

2. The EUT is set to stand by mode and the duty cycle is 95%.

5.4 Test results
For portable exposure condition: Note:

(1). The portable test modes have covered the considerations of th e mobile test, only record the test data of the portable conditions in this report.
(2) Operating modes with client device (1 %, 50%, 99% battery status of client device) have been test, only show the data of worst case of 1% battery status of client device.
(3) 20-2cm is the actual test value, and 0 cm is the estimated value.
(4) Perform H-field/E-field measurements are taken along all three axes the device from 0cm~20cm in 2cm minimum increment for each edge surface of the host/client pair. If the center of the probe sensing element is more than 5mm from the probe outer edge, the field strengths need to be estimated for the positions that are not reachable.

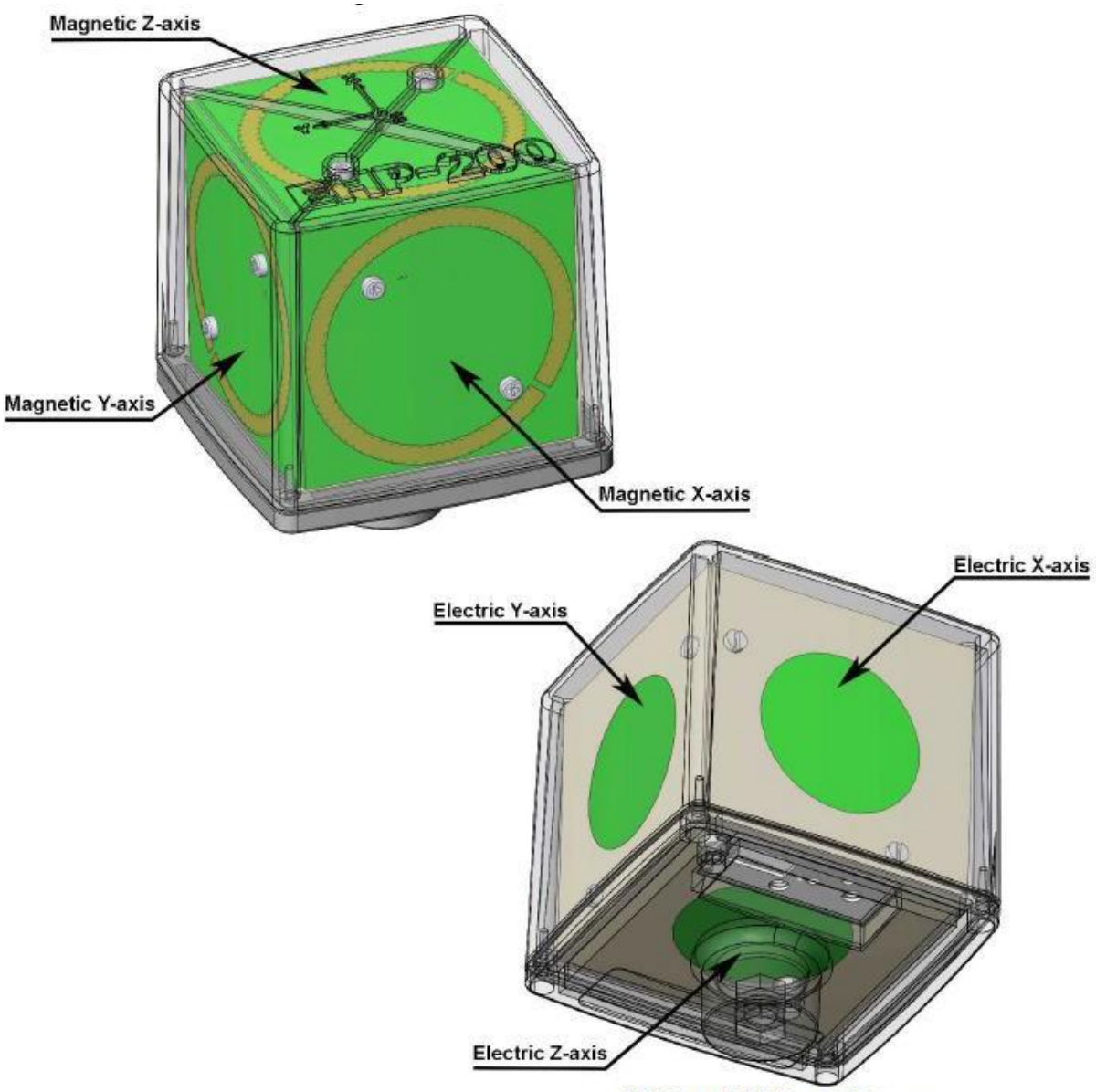


Example of probe measurements in points close to the device surface: estimates compared with measurements at 4 and 6 cm provide validation

According to Calibration information and specification about EHP-200A, The Probe EHP-200A's sensitive elements center are 8mm below the external surface, and the dimensions is 92x92x109mm. so the actual 0cm field strengths need to be estimated for the positions that are not reachable. The Extrapolated Value Calculation Method please below). And the result of test distance 2cm~20cm was measured value.

	Length	Width	Height
Probe	109mm	92mm	92mm

Note: EUT is a loop/coil emitting structure, so E-field not required. Just recorded the H-field value.



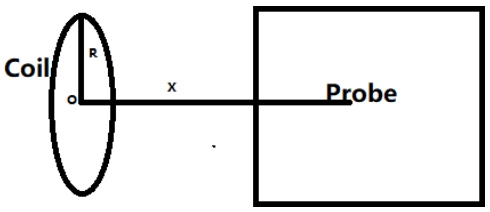
EHP-200A/EHP-200AC axes

The sensitive elements are located approximately 8 mm below the external surface

(5) Estimated method for portable RF Exposure condition:

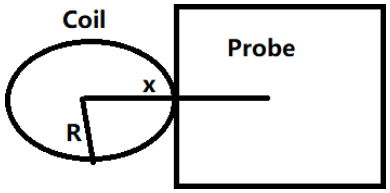
We use Biot-Savart formula theory to estimate the strength of the magnetic field that the measuring instrument cannot measure. According to Biot-Savart formula:

Top & Bottom Side:



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

Front, left, right & rear Side:



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

B: means H-field value;
μ_0 is space permeability; μ0=4π*10-7;
I：A current element passing through a coil；
R：means the Radius of coil(According to provided Antenna specification: We can get the minimum R=39/2=19.5mm=0.0195m);
Test Distance：The distance from the sensing element of the probe to the edge of the device surface.

x: means the center of the coil to the sensing elements of the probe. (For top & bottom side: x=test distance; For other side: x=test distance+R)

N: Number of turns, according to providing “Antenna specification” files: N=10.

(6) For validation purposes: If the value to show a **30% agreement** between the mode and the (E- and/or H-field) probe measurements for the two closest points to the device surface, and with 2cm increments. Then this extrapolation method is reasonable.

Note: The percent ratio of agreement is the difference between the estimated and measured values divided by the average of the estimated and measured values.

Validation:

Magnetic Field Emissions							
Test Distance(cm)	Top	Left	Right	Rear	Front	Bottom	Conclusion
	Unit: Agreement (%); H-field (A/m)						
Agreement -2cm	18.64	26.13	28.44	25.26	15.25	15.96	Compliance (Within 30%)
2cm(estimated)	0.4573	0.1160	0.1243	0.0886	0.1122	0.2728	
2cm(measured)	0.3428	0.0863	0.0925	0.0719	0.1037	0.2609	

Magnetic Field Emissions							
Test Distance(cm)	Top	Left	Right	Rear	Front	Bottom	Conclusion
	Unit: Agreement (%); H-field (A/m)						
Agreement -2cm	16.86	18.44	23.66	11.15	27.63	26.74	Compliance (Within 30%)
4cm(estimated)	0.1163	0.0555	0.5090	0.0556	0.0414	0.0866	
4cm(measured)	0.1008	0.1049	0.0964	0.0468	0.0238	0.1038	

Test condition 1: Mode1 operating mode with client device (1 % battery status of client device) -estimated value: 0cm

Estimated value for H-Filed Strength at 0 cm from the edges surrounding the EUT (A/m)

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	1.1393	1.63	73.11%
	Left	0.5544		
	Right	0.5943		
	Front	0.5537		
	Rear	0.2429		
	Bottom	1.2462		

Test condition 2: Mode1 operating mode with client device (1 % battery status of client device) - Test distance: 2cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.3543	1.63	21.48%
	Left	0.1265		
	Right	0.1356		
	Front	0.1237		
	Rear	0.1145		
	Bottom	0.2863		

Test condition 3: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 4cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.1155	1.63	6.81%
	Left	0.0433		
	Right	0.0464		
	Front	0.0415		
	Rear	0.0486		
	Bottom	0.0868		

Test condition 4: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 6cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0416	1.63	6.27%
	Left	0.0265		
	Right	0.0243		
	Front	0.0264		
	Rear	0.0251		
	Bottom	0.0366		

Test condition 5: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 8cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0455	1.63	5.76%
	Left	0.0256		
	Right	0.0217		
	Front	0.0136		
	Rear	0.013		
	Bottom	0.0364		

Test condition 6: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 10cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0456	1.63	5.17%
	Left	0.0235		
	Right	0.0218		
	Front	0.0133		
	Rear	0.0154		
	Bottom	0.0336		

Test condition 7: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 12cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0313	1.63	4.74%
	Left	0.0135		
	Right	0.0156		
	Front	0.0138		
	Rear	0.0154		
	Bottom	0.0233		

Test condition 8: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 14cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0345	1.63	4.50%
	Left	0.0136		
	Right	0.0117		
	Front	0.0134		
	Rear	0.0146		
	Bottom	0.0239		

Test condition 9: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 16cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0355	1.63	4.11%
	Left	0.0136		
	Right	0.0144		
	Front	0.0133		
	Rear	0.0148		
	Bottom	0.0233		

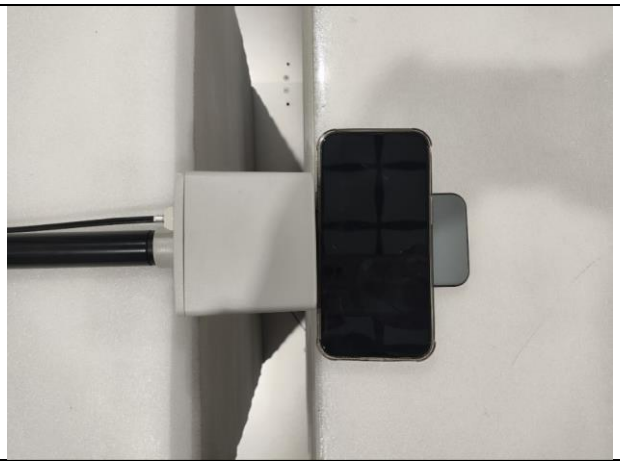
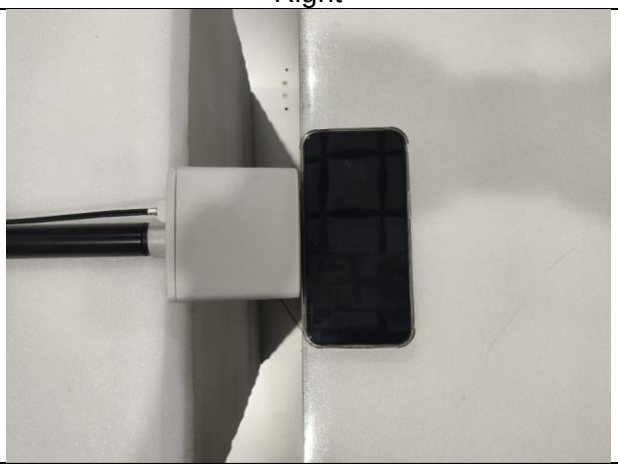
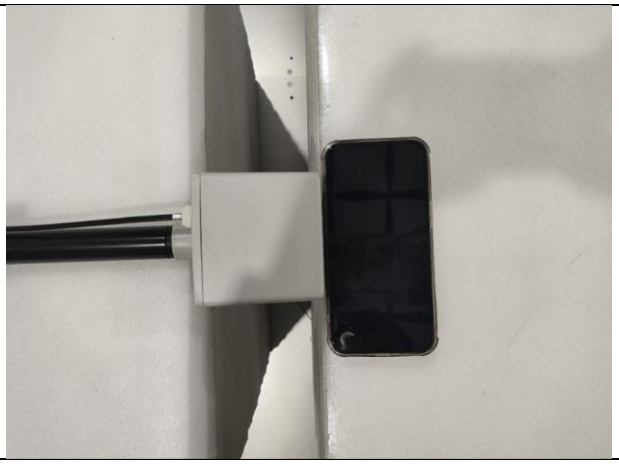
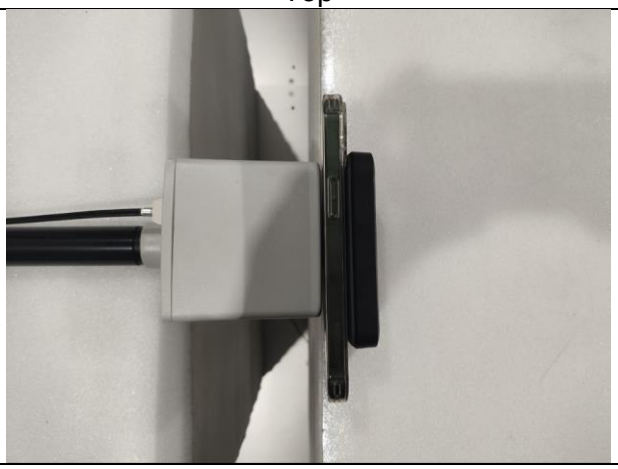
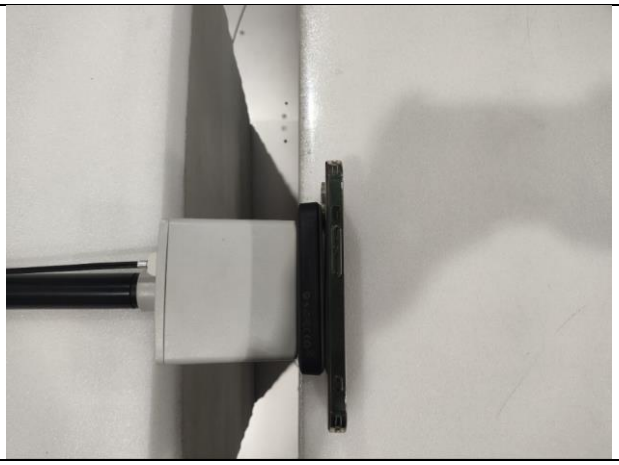
Test condition 10: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 18cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0345	1.63	4.07%
	Left	0.0136		
	Right	0.0147		
	Front	0.0134		
	Rear	0.0126		
	Bottom	0.0235		

Test condition 11: Mode1 operating mode with client device (1 % battery status of client device) - Test distance 20cm

Antenna	Probe Position	H–field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.0316	1.63	3.83%
	Left	0.0138		
	Right	0.0154		
	Front	0.0136		
	Rear	0.0142		
	Bottom	0.0253		

Photographs of the Test Setup

Portable exposure conditions(0cm)	
Front	Left
	
Right	Rear
	
Top	Below
	

Photographs of the EUT

See the Appendix - EUT Photos.

----End of Report----