MPE REPORT

Power Bank

MODEL No.: MC508

FCC ID: 2BN75-MC508

REPORT NO.:MAX250314110P01-R02

ISSUE DATE: Mar. 25, 2025

Prepared for

Union Suppo Battery (liaoning) Co., Ltd.

No.751,Anqian Road,Lishan Distict,Anshan,Liaoning,114051,China

Prepared by

MAXLAB Testing Co.,Ltd.

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TEST REPORT DESCRIPTION

Applicant	:	Union Suppo Battery (liaoning) Co., Ltd.
Address	:	No.751,Anqian Road,Lishan Distict,Anshan,Liaoning,114051,China
Manufacturer	:	Union Suppo Battery (liaoning) Co., Ltd.
Address	:	No.751,Anqian Road,Lishan Distict,Anshan,Liaoning,114051,China
EUT	:	Power Bank
Model Name	:	MC508
Trademark	:	ARKEEP

Measurement Procedure Used:

FCC Part 1(1.1310) and Part 2(2.1093)
KDB 680106 D01 Wireless Power Transfer v04

The device described above is tested by MAXLAB Testing Co.,Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and MAXLAB Testing Co.,Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of MAXLAB Testing Co.,Ltd.

Test Engineer: Cindy zheng

Engineer/ Cindy Zheng

Technical Manager:

RF Manager/ Vivian Jiang

1.SUMMARY OF TEST RESULT

EMISSION		
Description of Test Item	Standard & Limits	Results
MPE	FCC Part 1(1.1310) and Part 2(2.1093) KDB 680106 D01 Wireless Power Transfer v04	Pass
Note: N/A is an abbreviation for Not Applicable.		

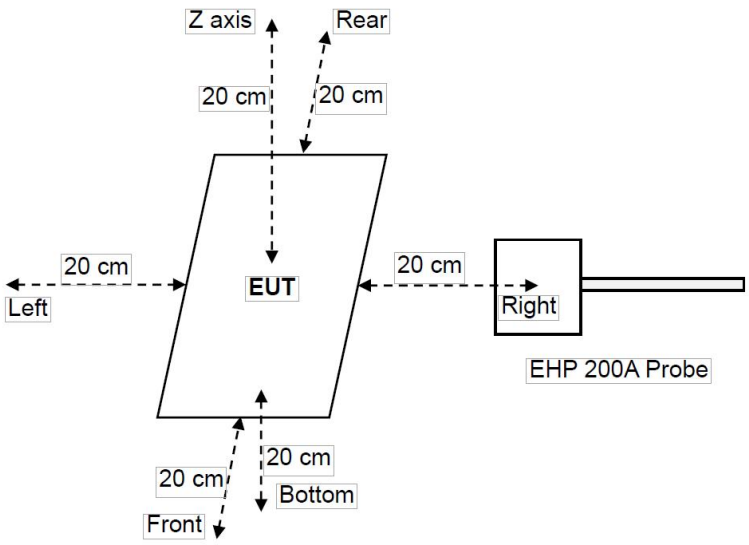
2.GENERAL INFORMATION

2.1.Description of Device (EUT)

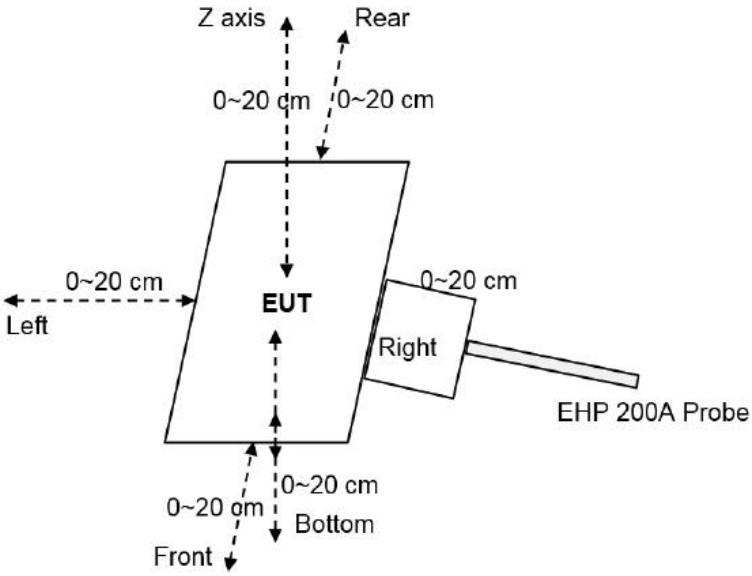
EUT	:	Power Bank
Model Number	:	MC508
Difference	:	N/A
Power Rating	:	Battery Energy: 19.25Wh(3.85V/5000mAh) Rated Capacity: 2750mAh(5V⎓3A) Type-C Input: 5V⎓3A 9V⎓2A Type-C Output: 5V⎓3A 9V⎓2.22A 12V⎓1.67A Wireless Output: 5W/7.5W/10W/15W(MAX) Max Output Power: 20W
Operation Frequency for WPT	:	111-205 KHz
Modulation	:	MSK
Antenna Type:	:	Coil Antenna
Date of Received	:	Mar. 13, 2025
Date of Test	:	Mar. 13, 2025 to Mar. 18, 2025

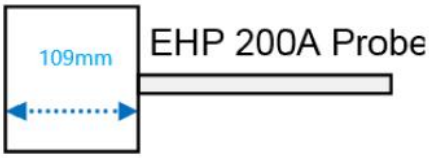
2.2.Test Setup

For mobile exposure conditions:



For portable exposure conditions:





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

2.3.Description of Test Facility

Site Description

EMC Lab.:	FCC-Registration No:562200 Designation Number: CN1338 MAXLAB Testing Co., Ltd.has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. A2LA-Lab Cert.No:4707.01 MAXLAB Testing Co, Ltd.has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement. Industry Canada Registration Number.Is:11093A CAB identifier: CN0019 The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.
Name of Firm:	MAXLAB Testing Co, Ltd.
Site Location:	1/F, Building B, Xinshidai GR Park, Shiyan Street, Bao'an District, Shenzhen, Guangdong, 518052, People's Republic of China

2.4.Measurement Uncertainty

Parameter	Uncertainty
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Electric Field Emissions(0.3-3.0MHz)	±0.08V/m
Magnetic Field Emissions(0.3-3.0MHz)	±0.02A/m
uT	±0.01

3.MEASURING DEVICE AND TEST EQUIPMENT

3.1.For MPE Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	Exposure Level Tester(9kHz-30MHz)	Narda	EHP-200A	180ZX00634	2024.06.18	2025.06.17

4.RF EXPOSURE

4.1.Measuring Standard

FCC Part 1(1.1310) and Part 2(2.1093)

4.2.Requiments

Three different categories of transmitters are defined by the FCC in OET Bulletin 65. These categories are fixed installation, mobile, and portable and are defined as follows: o Fixed Installations: fixed location means that the device, including its antenna, is physically secured at a permanent location and is not able to be easily moved to another location. Additionally, distance to humans from the antenna is maintained to at least 2 meters. o Mobile Devices: a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located, such as a wireless modem operating in a laptop computer, are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 47 CFR §2.1091. o Portable Devices: a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. Portable device requirements are found in Section 2.1093 of the FCC's Rules (47 CFR§2.1093). The FCC also categorizes the use of the device as based upon the user's awareness and ability to exercise control over his or her exposure. The two categories defined are Occupational/ Controlled Exposure and General Population/Uncontrolled Exposure. These two categories are defined as follows: Occupational/Controlled Exposure: In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks. General Population/Uncontrolled Exposure: The general population / uncontrolled exposure limits are applicable to 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 made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

4.3.Test configuration

For mobile exposure conditions:

a. The RF exposure test was performed in an echoic chamber.
b. E and H-field measurements should be made with the center of the probe at a distance of 20 cm above all the surface of the primary/client pair
c. The highest emission level was recorded and compared with limit.
d. The EUT was measured according to the dictates of KDB680106 D01 Wireless Power Transfer v04

For portable exposure conditions:
a. The RF exposure test was performed in an echoic 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.TCB
d. The EUT was measured according to the dictates of KDB680106 D01 Wireless Power Transfer v04

4.4.Limits

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
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
300-1,500	/	/	f/300	6
1,500-100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
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
300-1,500	/	/	f/1500	30
1,500-100,000	/	/	1.0	30

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

According to KDB680106 D01 Wireless Power Transfer v04 Section 3. RF Exposure Requirements clause 3 the Emission-Limits in the frequency range from 100 KHz to 300 KHz should be assessed versus the limits at 300 KHz in Table 1 of CFR 47 – Section1.310 as following (measured distance shall be 15cm from the center of the probe to the edge of the device):

	E-Field	*/*	B-Field
Frequency	V/m	A/m	uT
0.3 MHz – 3.0 MHz	614	1.613	2.0
3.0 MHz – 30 MHz	824/f (=27.5_{30MHz})	2.19/f (=0.073_{30MHz})	--

A KDB inquire was required to determine/confirm the applicable limits below 100 KHz.

4.5.Test Modes:

Mode	Description	Remark
1	EUT + Phone(15W)	5%
2		50%
3		95%
4	EUT + Phone(10W)	5%
5		50%
6		95%
7	EUT + Phone(7.5W)	5%
8		50%
9		95%
10	EUT + Phone(5W)	5%
11		50%
12		95%
Remark: All the modes have tested and recorded the worst mode (mode 1-5% electricity) in the report		

4.6.Description of Support Unit

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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Power Bank	N/A	MC508	N/A	EUT
E-2	Mobile phone	SAMSUNG	S24	N/A	Auxiliary
E-3	SuperCharge	HUAWEI	HW-200500C02	N/A	Auxiliary

4.7.Measuring Results

Portable exposure conditions

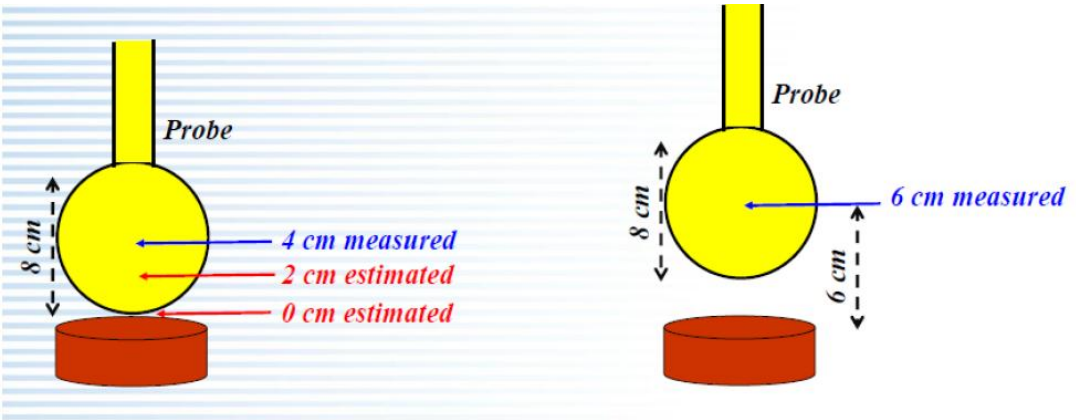
Note:

(1). The portable test modes have covered the considerations of the 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 2cmminimum 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.

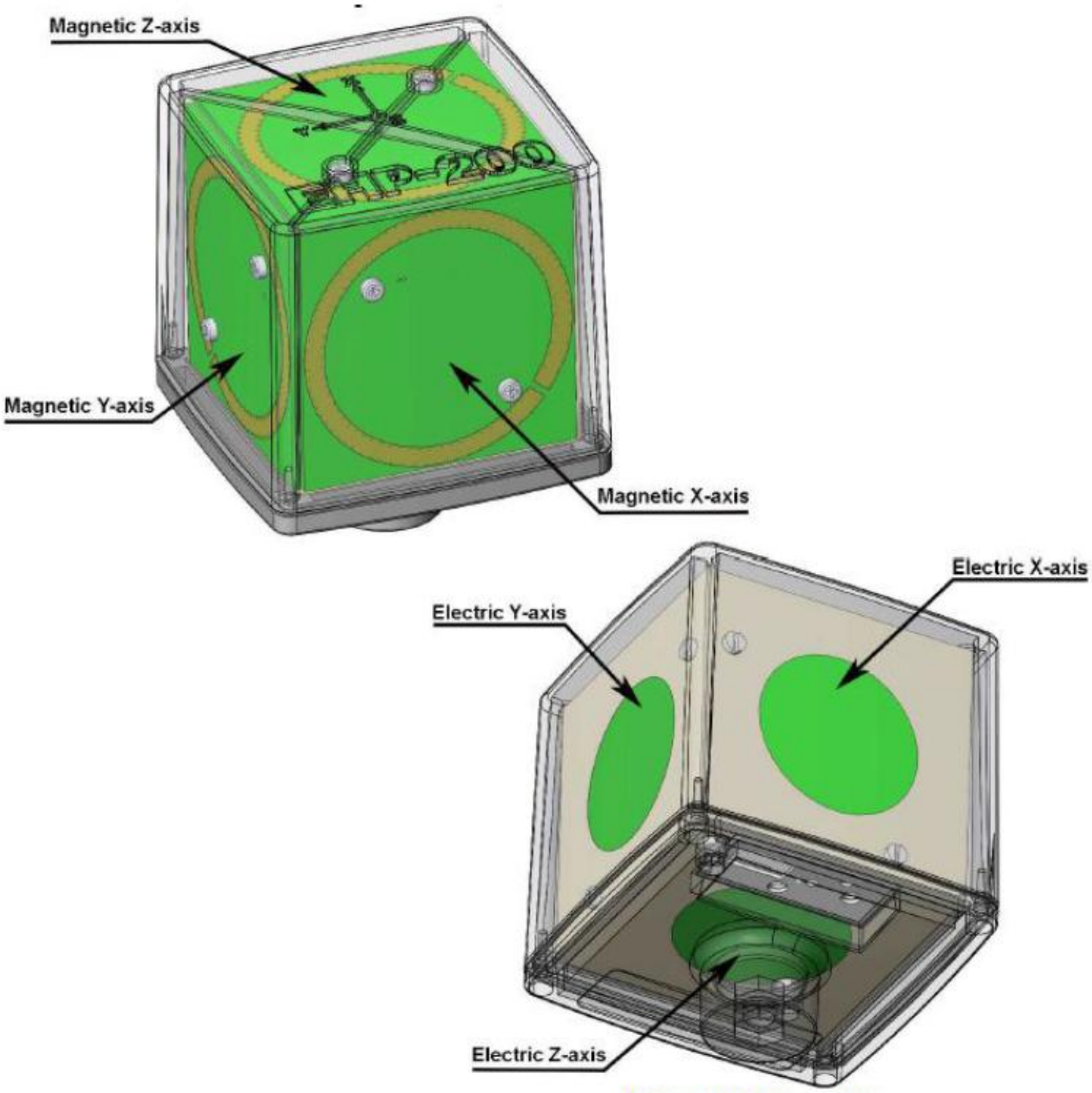


Example of probe measurements in points close to the device surface: estimates compared with measurements at 4 and 6 cm provide validation

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 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.

Probe	Length	Width	Height
	109mm	92mm	92mm

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

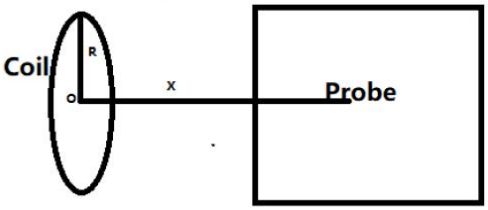


EHP-200A/EHP-200AC axes

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

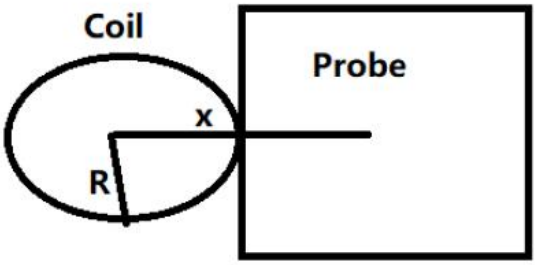
Estimated method for portable RF Exposure condition:
We use Biot-Savart formula theory to estimate the strength of the magnetic field that the measuring instrument cannot measure. According to Biot-Savart formula:

Top & Bottom Side:



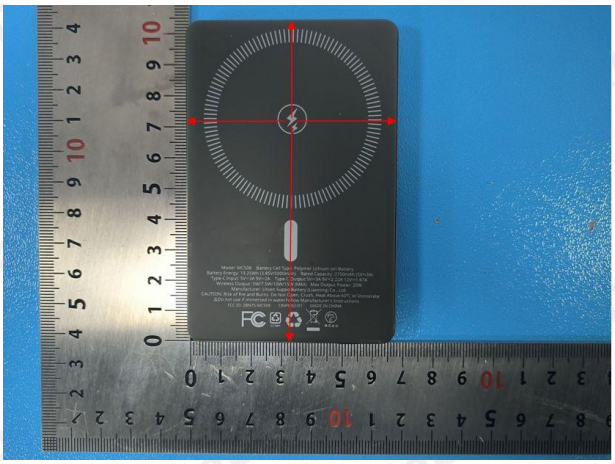
$$B = \frac{\mu_0 * I * N * R^2}{2 * (R^2 + x^2)^{3/2}}$$

Front, left, right & rear Side:



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

B: means H-field value.
Uo is space permeability; u0=4T*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=38.5/2=19.25mm=0.01925m);
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. Foiother side: x=test distance+R)
N: Number of turns, according to providing “Antenna specification” files: N=10



Transmitter to top:2.2±0.5mm
Transmitter to Bottom:6.3±0.5mm
Transmitter to Left:33±0.5mm
Transmitter to Right:33±0.5mm
Transmitter to Front:32±0.5mm
Transmitter to Rear:70±0.5mm

6) For validation purposes: If the value to show a 30% agreement between the mode and the (E- and/or H-field) probemeasurements 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:

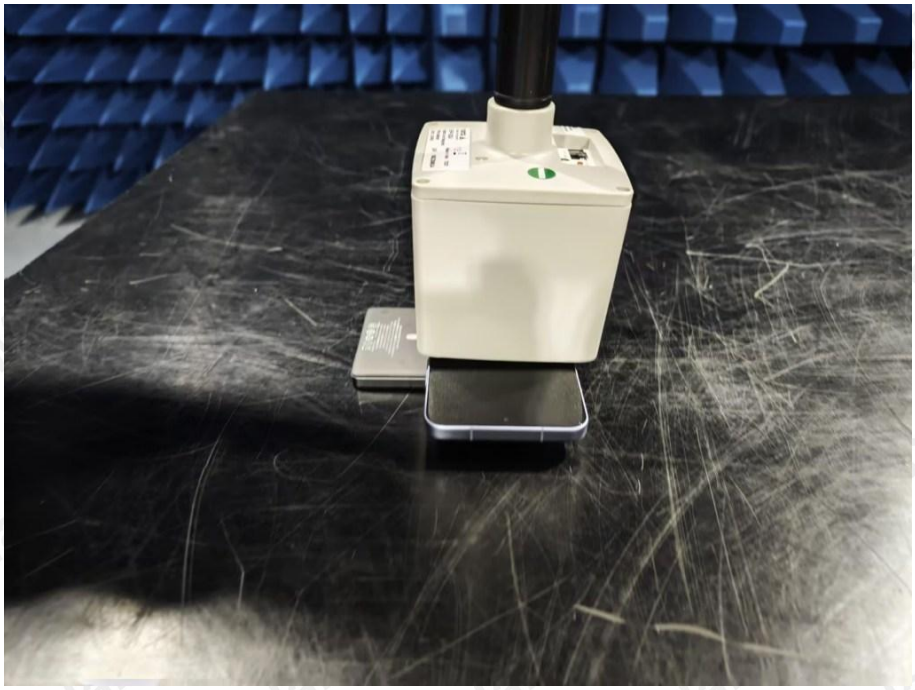
Magnetic Field Emissions							
Test Distance(cm)	Top	Left	Right	Front	Rear	Bottom	Conclusion
	Unit: Agreement (%); H-field (A/m)						
Agreement-2cm	23.85	21.41	22.03	22.13	23.76	24.73	Compliance (Within 30%)
2cm(estimated)	0.2961	0.1665	0.1648	0.128	0.129	0.2585	
2cm(measured)	0.233	0.1343	0.1321	0.1025	0.1016	0.2016	

Magnetic Field Emissions							
Test Distance(cm)	Top	Left	Right	Front	Rear	Bottom	Conclusion
	Unit: Agreement (%); H-field (A/m)						
Agreement-2cm	12.92	11.12	14.34	13.53	14.36	14.66	Compliance (Within 30%)
4cm(estimated)	0.0824	0.0541	0.0553	0.0426	0.0433	0.0732	
4cm(measured)	0.0724	0.0484	0.0479	0.0372	0.0375	0.0632	

For portable exposure conditions

Mode	measuring distance (cm)	Measured H-Field Strength Values (A/m)						FCC H-Field Strength Limits (A/m)	Max. Percentage (%)
		Test Position A(Top)	Test Position B(Left)	Test Position C(Right)	Test Position D(Front)	Test Position E(Rear)	Test Position F(Bottom)		
Mode 1	0	0.6987	1.1384	1.1198	0.8689	0.8612	0.6045	1.63	69.84
Mode 1	2	0.2330	0.1343	0.1321	0.1025	0.1016	0.2016	1.63	14.29
Mode 1	4	0.0724	0.0484	0.0479	0.0372	0.0375	0.0632	1.63	4.44
Mode 1	6	0.0288	0.0226	0.0231	0.0178	0.0181	0.0256	1.63	1.77
Mode 1	8	0.0271	0.0208	0.0215	0.0156	0.0161	0.0238	1.63	1.66
Mode 1	10	0.0256	0.0199	0.0203	0.0138	0.0138	0.0213	1.63	1.57
Mode 1	12	0.0243	0.0181	0.0186	0.0123	0.0119	0.0206	1.63	1.49
Mode 1	14	0.0226	0.0166	0.0178	0.0111	0.0108	0.0189	1.63	1.39
Mode 1	16	0.0211	0.0148	0.0146	0.0098	0.0092	0.0178	1.63	1.29
Mode 1	18	0.0199	0.0136	0.0132	0.0079	0.0087	0.0166	1.63	1.22
Mode 1	20	0.0162	0.0122	0.0126	0.0066	0.0069	0.0149	1.63	0.99

5.PHOTOGRAPHS OF TEST SETUP

Portable exposure conditions

Test Position A（2cm）