MPE REPORT

Power Bank Magsafe Wireless Charger

MODEL No.: QC028

FCC ID: 2BBMY-QC028

REPORT NO.:NCT23043229E-2

ISSUE DATE: Nov. 14, 2023

Prepared for

Shenzhen Cager Digital Technology Co., Ltd

3F, 5F, 19#, Langkou Industrial Park, Langkou Community,
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Prepared by

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TEST REPORT DESCRIPTION

Applicant	:	Shenzhen Cager Digital Technology Co., Ltd
Address	:	3F, 5F, 19#, Langkou Industrial Park, Langkou Community, Dalang Street, Longhua District, Shenzhen
Manufacturer	:	Shenzhen Cager Digital Technology Co., Ltd
Address	:	3F, 5F, 19#, Langkou Industrial Park, Langkou Community, Dalang Street, Longhua District, Shenzhen
EUT	:	Magsafe Wireless Charging Power Bank
Model Name	:	QC028
Trademark	:	N/A

Measurement Procedure Used:

FCC Part 1(1.1310) and Part 2(2.1091)
680106 D01 RF Exposure Wireless Charging Apps v03r01

The device described above is tested by Shenzhen NCT Testing Technology 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 Shenzhen NCT Testing Technology 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 Shenzhen NCT Testing Technology Co., Ltd.

Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

Shenzhen NCT Testing Technology Co., Ltd. 2008

1. SUMMARY OF TEST RESULT

EMISSION		
Description of Test Item	Standard & Limits	Results
MPE	FCC Part 1(1.1310) and Part 2(2.1091) 680106 D01 RF Exposure Wireless Charging App v03r01	Pass
Note: N/A is an abbreviation for Not Applicable.		

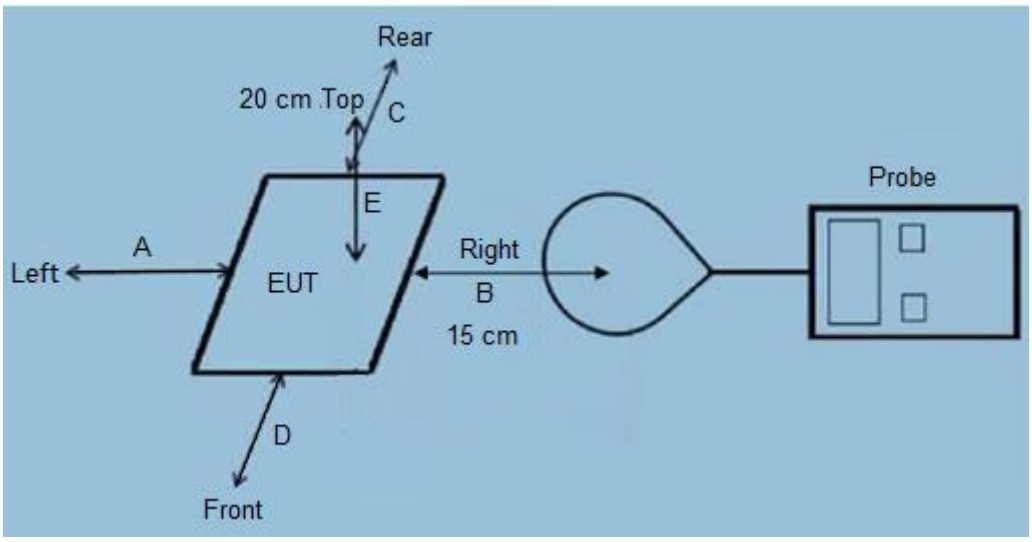
2. GENERAL INFORMATION

2.1. Description of Device (EUT)

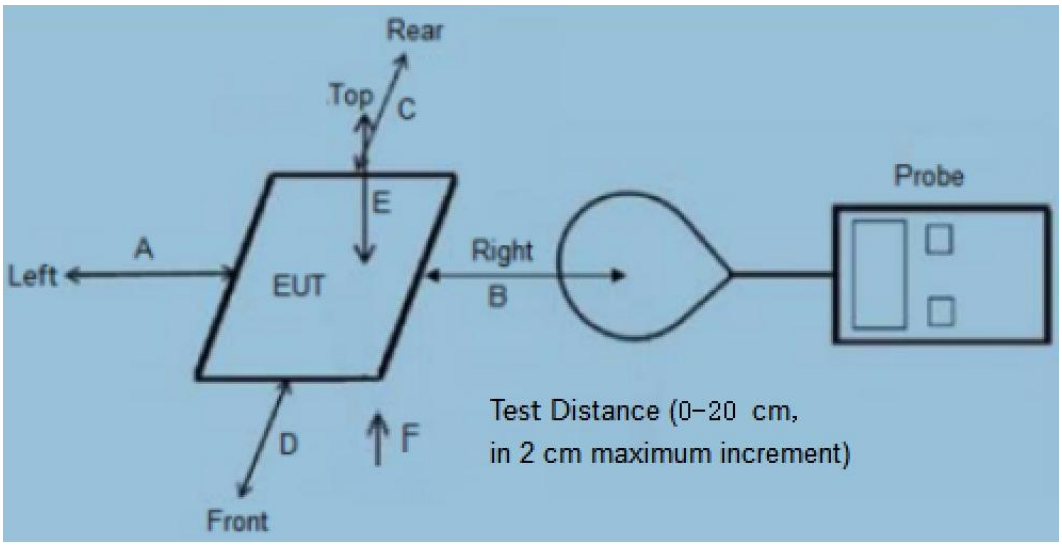
EUT	:	Magsafe Wireless Charging Power Bank with AC Charger
Model Number	:	QC028
Power Rating	:	Battery Capacity: 3.7V/10000mAh 37Wh 1. AC Charging Mode AC Inpt: AC 100V-240V, 47Hz-63Hz, 0.3A Max. Lightning Cabel/Type-c Cabel Output: 5V/2A USB-A/Type-c Output:5V/2A Total Output:5V/2A 2. Power Bank Charging Mode Type-C Input: 5V/2A; 9V/2A 18W Max USB-A/Type-C Cabel Output: 4.5V/5A; 5V/3A; 9V/2A; 12V/1.5A; 22.5W Max Lightning Cabel Output: 5V/2A; Wireless Charging Output : 5V/1A; 7.5V/1A; 9V/1.12A; 9V/1.68A 15W Max Total Output: 5V/2A
Operation Frequency for WPT	:	110-205KHz
Modulation	:	MSK
Antenna Type:	:	Coil Antenna
Date of Received	:	Nov.04, 2023
Date of Test	:	Nov.04, 2023 to Nov.14, 2023

2.2. Test Setup

For Mobile exposure conditions



For portable exposure conditions



2.3. Description of Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27
The certificate is valid until 2028.01.07
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L8251

Designation Number: CN1347
Test Firm Registration Number: 894804
Accredited by A2LA, June 14, 2023
The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018
The Conformity Assessment Body Identifier is CN0150
Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.
Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

2.4. Measurement Uncertainty

Parameter	**Uncertainty**
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

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(1Hz-400KHz)	Narda	EHP-200A	180ZX00634	2023.06.21	2024.06.20

4. RF EXPOSURE

4.1. Measuring Standard

FCC Part 1(1.1310) and Part 2(2.1091)

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

1) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
2) The measurement probe was placed at test distance (15cm for A,B,C,D four sides and 20cm for E 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 were measured according to the dictates of 680106 D01 RF Exposure Wireless Charging Apps v03r01

For portable exposure conditions

5) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
6) he measurement probe was placed at test distance (0-20 cm,in 2 cm maximum increment) which is between the edge of the charger and the geometric center of probe.
7) 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.
8) The EUT were measured according to the dictates of 680106 D01 RF Exposure Wireless Charging Apps v03r01

4.4. Equipment Approval Considerations

Requirement for KDB Publication 680106 D01 RF Exposure Wireless Charging Apps v03r01

Condition Requirement	Yes / No	Answers
Power transfer frequency is less than 1 MHz.	Yes	The power transfer frequency is 110-205KHz.
Output power from each primary coil is less than or equal to 15 watts.	Yes	Output power is 15W Max.
The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Yes	The transfer system includes only single primary.
Client device is placed directly in contact with the transmitter.	Yes	Client device is placed directly in contact with the transmitter.
Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	No	Mobile exposure conditions and portable exposure conditions
The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Yes	Please refer to the result of Electric Field Emissions and Magnetic Field Emissions.

4.5. 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/f²	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/f²	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 FCC 680106 D01 RF Exposure Wireless Charging Apps v03r01 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.

Description of Support Unit

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Power Bank Magsafe Wireless Charger	N/A	QC028	N/A	EUT
E-2	Phone	Mi	Xiaomi 13 Ultra	N/A	Auxiliary

Test Mode:

Mode		Electric Quantity	Remark
1	AC Charging +Wireless Charging Output	1%	Pre-tested
2	AC Charging +Wireless Charging Output	50%	Pre-tested
3	AC Charging +Wireless Charging Output	99%	Pre-tested
4	Adapter+Type-C Input + Wireless Charging Output	1%	Pre-tested
5	Adapter+Type-C Input + Wireless Charging Output	50%	Pre-tested
6	Adapter+Type-C Input + Wireless Charging Output	99%	Pre-tested
7	Wireless Charging Output	1%	Recorded
8	Wireless Charging Output	50%	Recorded
9	Wireless Charging Output	99%	Recorded

4.6. Measuring Results

For Mobile exposure conditions

Test Mode: Mode 4

Electric Field Emissions			
Test Position	Measure Value (V/m)	Limit(V/m)	Distance(cm)
Top	0.232	614	20
Left	0.348	614	15
Right	0.332	614	15
Rear	0.225	614	15
Front	0.119	614	15
Magnetic Field Emissions			
Test Position	Measure Value (A/m)	Limit(A/m)	Distance(cm)
Top	0.0186	1.63	20
Left	0.0329	1.63	15
Right	0.0298	1.63	15
Rear	0.0317	1.63	15
Front	0.0295	1.63	15

Test Mode: Mode 5

Electric Field Emissions			
Test Position	Measure Value (V/m)	Limit(V/m)	Distance(cm)
Top	0.238	614	20
Left	0.343	614	15
Right	0.339	614	15
Rear	0.219	614	15
Front	0.227	614	15
Magnetic Field Emissions			
Test Position	Measure Value (A/m)	Limit(A/m)	Distance(cm)
Top	0.0195	1.63	20
Left	0.0363	1.63	15
Right	0.0323	1.63	15
Rear	0.0305	1.63	15
Front	0.0286	1.63	15

Test Mode: Mode 6

Electric Field Emissions			
Test Position	Measure Value (V/m)	Limit(V/m)	Distance(cm)
Top	0.209	614	20
Left	0.321	614	15
Right	0.313	614	15
Rear	0.206	614	15
Front	0.201	614	15
Magnetic Field Emissions			
Test Position	Measure Value (A/m)	Limit(A/m)	Distance(cm)
Top	0.0116	1.63	20
Left	0.0218	1.63	15
Right	0.0197	1.63	15
Rear	0.0203	1.63	15
Front	0.0155	1.63	15

For portable exposure conditions

Mode	measuring distance (cm)	Measured H-Field Strength Values (A/m)						FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
Mode 4	0	0.0533	0.0648	0.0638	0.0483	0.0644	0.0545	0.815	1.63
Mode 5	0	0.0555	0.0578	0.0541	0.0533	0.0575	0.0599	0.815	1.63
Mode 6	0	0.0498	0.0493	0.0568	0.0453	0.0627	0.0465	0.815	1.63
Mode 4	2	0.0628	0.0514	0.0586	0.0554	0.0621	0.0640	0.815	1.63
Mode 5	2	0.0647	0.0642	0.0633	0.0598	0.0513	0.0593	0.815	1.63
Mode 6	2	0.0636	0.0562	0.0598	0.0589	0.0489	0.0485	0.815	1.63
Mode 4	4	0.0648	0.0520	0.0618	0.0519	0.0602	0.0461	0.815	1.63
Mode 5	4	0.0635	0.0573	0.0618	0.0641	0.0639	0.0452	0.815	1.63
Mode 6	4	0.0487	0.0461	0.0485	0.0607	0.0457	0.0643	0.815	1.63
Mode 4	6	0.0559	0.0638	0.0645	0.0475	0.0481	0.0474	0.815	1.63
Mode 5	6	0.0516	0.0568	0.0598	0.0581	0.0510	0.0574	0.815	1.63
Mode 6	6	0.0603	0.0485	0.0633	0.0450	0.0457	0.0607	0.815	1.63
Mode 4	8	0.0427	0.0425	0.0436	0.0370	0.0361	0.0352	0.815	1.63
Mode 5	8	0.0374	0.0354	0.0441	0.0390	0.0402	0.0374	0.815	1.63
Mode 6	8	0.0357	0.0410	0.0357	0.0406	0.0392	0.0402	0.815	1.63

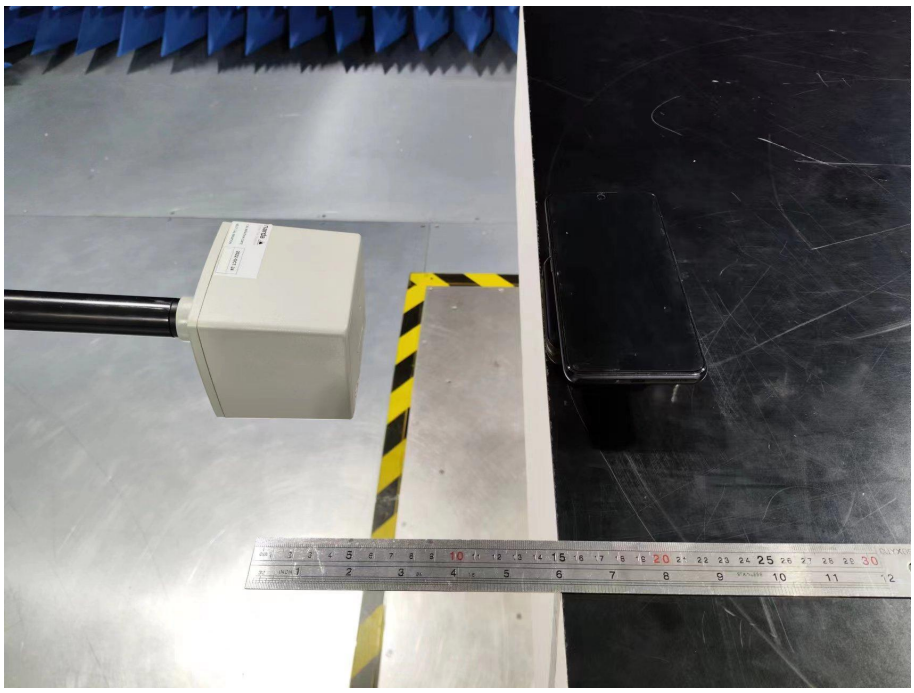
Mode	measuring distance (cm)	Measured H-Field Strength Values (A/m)						FCC E-Field Strength 50% Limits (A/m)	FCC E-Field Strength Limits (A/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
Mode 4	10	0.0446	0.0425	0.0443	0.0373	0.0416	0.0373	0.815	1.63
Mode 5	10	0.0399	0.0377	0.0394	0.0410	0.0426	0.0377	0.815	1.63
Mode 6	10	0.0350	0.0445	0.0351	0.0360	0.0376	0.0405	0.815	1.63
Mode 4	12	0.0427	0.0408	0.0421	0.0388	0.0359	0.0357	0.815	1.63
Mode 5	12	0.0440	0.0437	0.0398	0.0395	0.0360	0.0374	0.815	1.63
Mode 6	12	0.0365	0.0350	0.0364	0.0445	0.0356	0.0351	0.815	1.63
Mode 4	14	0.0348	0.0257	0.0338	0.0337	0.0348	0.0316	0.815	1.63
Mode 5	14	0.0293	0.0285	0.0301	0.0290	0.0275	0.0343	0.815	1.63
Mode 6	14	0.0331	0.0315	0.0293	0.0268	0.0285	0.0262	0.815	1.63
Mode 4	16	0.0294	0.0262	0.0287	0.0299	0.0250	0.0299	0.815	1.63
Mode 5	16	0.0285	0.0333	0.0292	0.0301	0.0320	0.0268	0.815	1.63
Mode 6	16	0.0329	0.0312	0.0343	0.0260	0.0290	0.0348	0.815	1.63
Mode 4	18	0.0191	0.0212	0.0241	0.0187	0.0170	0.0157	0.815	1.63
Mode 5	18	0.0161	0.0150	0.0175	0.0216	0.0170	0.0166	0.815	1.63
Mode 6	18	0.0217	0.0154	0.0194	0.0224	0.0210	0.0227	0.815	1.63
Mode 4	20	0.0223	0.0214	0.0154	0.0176	0.0184	0.0166	0.815	1.63
Mode 5	20	0.0234	0.0232	0.0208	0.0176	0.0169	0.0221	0.815	1.63
Mode 6	20	0.0183	0.0188	0.0213	0.0184	0.0214	0.0174	0.815	1.63

Mode	measuring distance (cm)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
Mode 4	0	0.2475	0.2275	0.2200	0.2438	0.2363	0.2475	307	614
Mode 5	0	0.2313	0.2400	0.2238	0.2313	0.2388	0.2275	307	614
Mode 6	0	0.2413	0.2363	0.2175	0.2313	0.2200	0.2213	307	614
Mode 4	2	0.2138	0.2488	0.2363	0.2388	0.2375	0.2425	307	614
Mode 5	2	0.2163	0.2213	0.2263	0.2350	0.2463	0.2238	307	614
Mode 6	2	0.2163	0.2450	0.2425	0.2163	0.2425	0.2200	307	614
Mode 4	4	0.2125	0.2225	0.2488	0.2150	0.2250	0.2213	307	614
Mode 5	4	0.2450	0.2138	0.2400	0.2213	0.2225	0.2200	307	614
Mode 6	4	0.2450	0.2150	0.2125	0.2275	0.2438	0.2288	307	614
Mode 4	6	0.2138	0.2263	0.2263	0.2238	0.2463	0.2463	307	614
Mode 5	6	0.2388	0.2163	0.2400	0.2213	0.2338	0.2175	307	614
Mode 6	6	0.2125	0.2450	0.2163	0.2200	0.2463	0.2175	307	614
Mode 4	8	0.2063	0.2063	0.2013	0.1900	0.1913	0.2100	307	614
Mode 5	8	0.2125	0.2088	0.1875	0.1925	0.1900	0.2038	307	614
Mode 6	8	0.1888	0.1950	0.2100	0.1963	0.1925	0.2000	307	614

Mode	measuring distance (cm)	Measured E-Field Strength Values (V/m)						FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
Mode 4	10	0.2025	0.1950	0.2050	0.2100	0.1900	0.2050	307	614
Mode 5	10	0.2075	0.2075	0.1975	0.1875	0.2025	0.2038	307	614
Mode 6	10	0.2025	0.1900	0.1938	0.2025	0.1913	0.1938	307	614
Mode 4	12	0.1938	0.1938	0.2088	0.2125	0.1913	0.2038	307	614
Mode 5	12	0.2063	0.2075	0.2038	0.1963	0.2025	0.2125	307	614
Mode 6	12	0.1888	0.2113	0.1925	0.2038	0.1925	0.1875	307	614
Mode 4	14	0.1875	0.1688	0.1863	0.1663	0.1863	0.1788	307	614
Mode 5	14	0.1775	0.1775	0.1825	0.1638	0.1813	0.1700	307	614
Mode 6	14	0.1825	0.1838	0.1700	0.1813	0.1863	0.1813	307	614
Mode 4	16	0.1850	0.1675	0.1700	0.1825	0.1763	0.1663	307	614
Mode 5	16	0.1813	0.1875	0.1875	0.1625	0.1688	0.1625	307	614
Mode 6	16	0.1675	0.1700	0.1838	0.1725	0.1775	0.1875	307	614
Mode 4	18	0.1263	0.1413	0.1350	0.1588	0.1250	0.1538	307	614
Mode 5	18	0.1625	0.1425	0.1250	0.1275	0.1363	0.1350	307	614
Mode 6	18	0.1575	0.1300	0.1325	0.1375	0.1275	0.1600	307	614
Mode 4	20	0.1525	0.1388	0.1450	0.1250	0.1488	0.1513	307	614
Mode 5	20	0.1613	0.1388	0.1425	0.1563	0.1600	0.1600	307	614
Mode 6	20	0.1400	0.1488	0.1513	0.1575	0.1288	0.1625	307	614

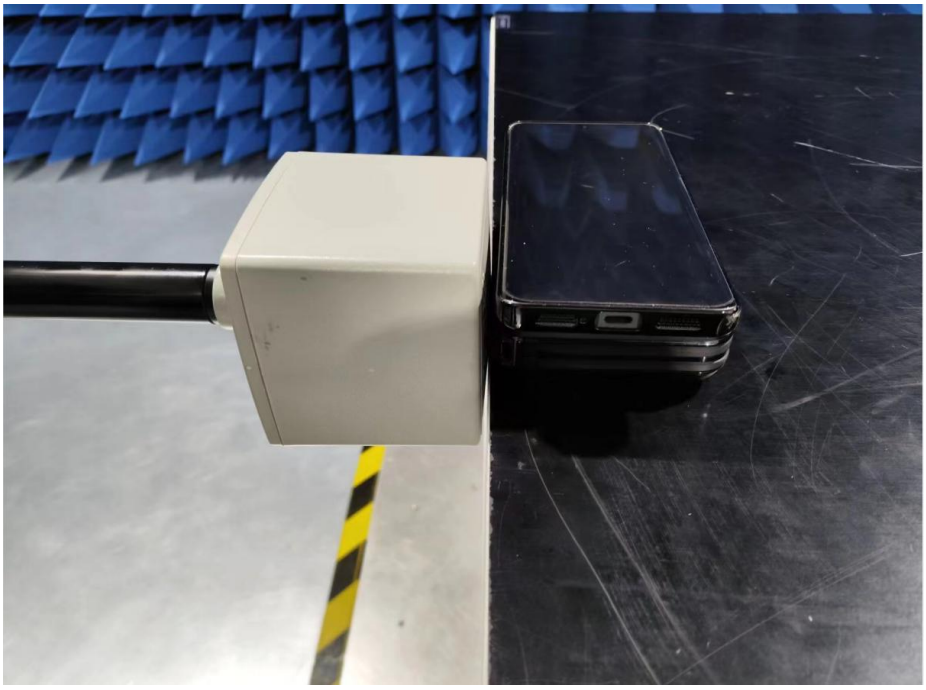
5. PHOTOGRAPHS OF TEST SETUP

For Mobile exposure conditions

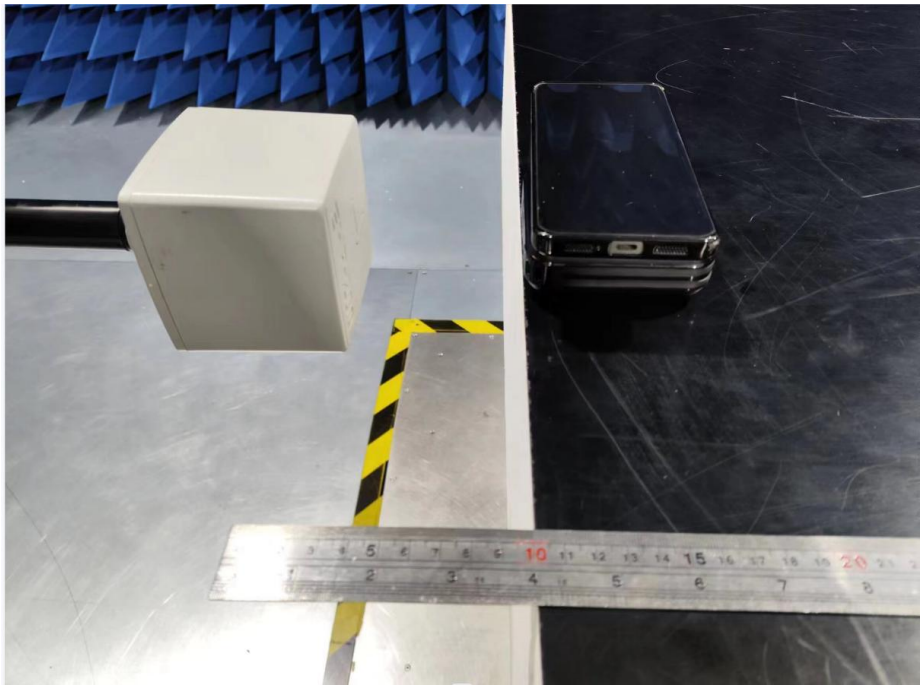


For portable exposure conditions

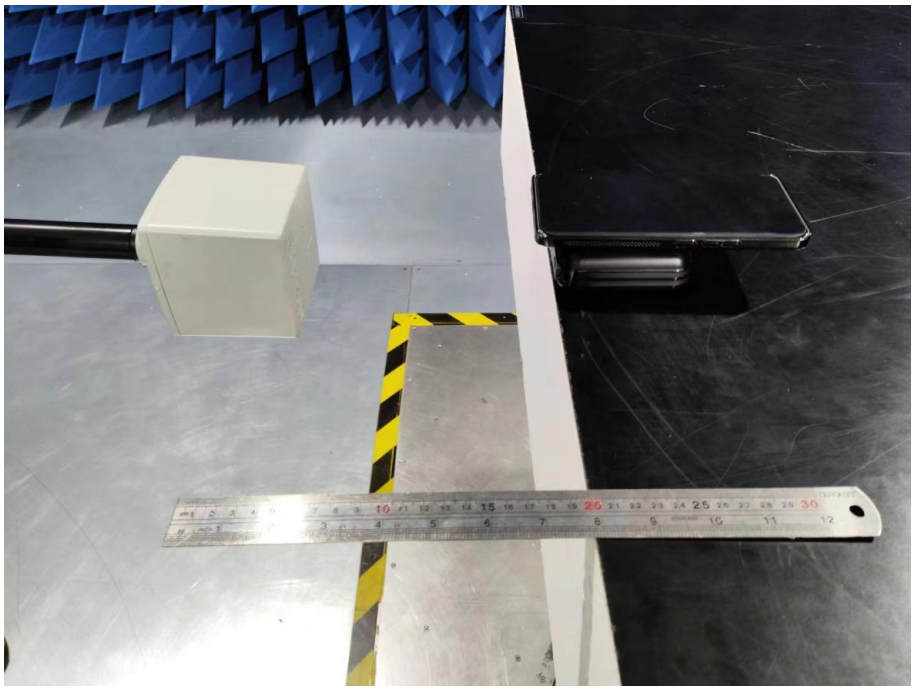
Test Position A（0cm）



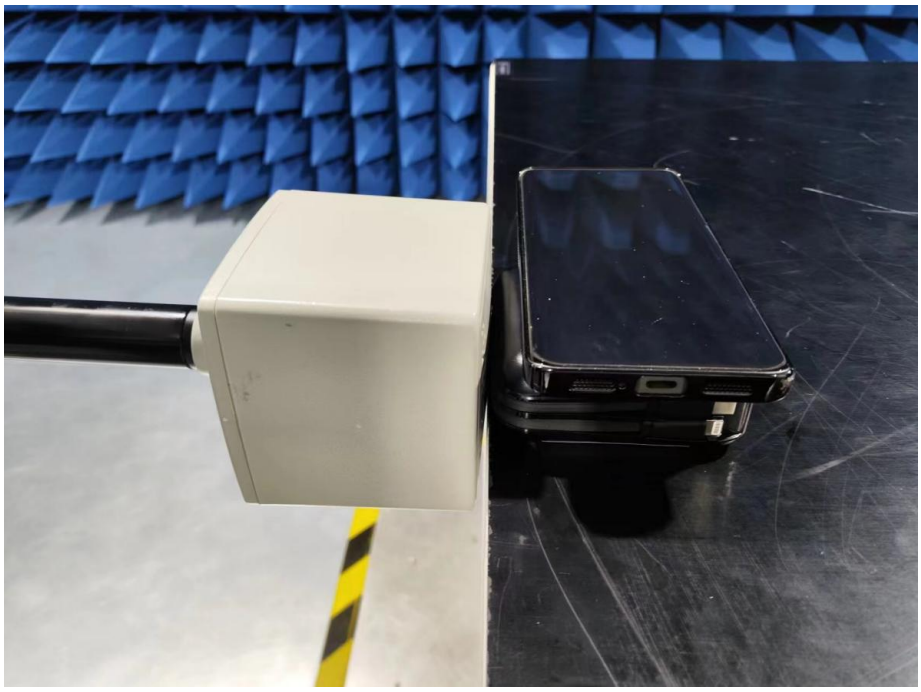
Test Position A（10cm）



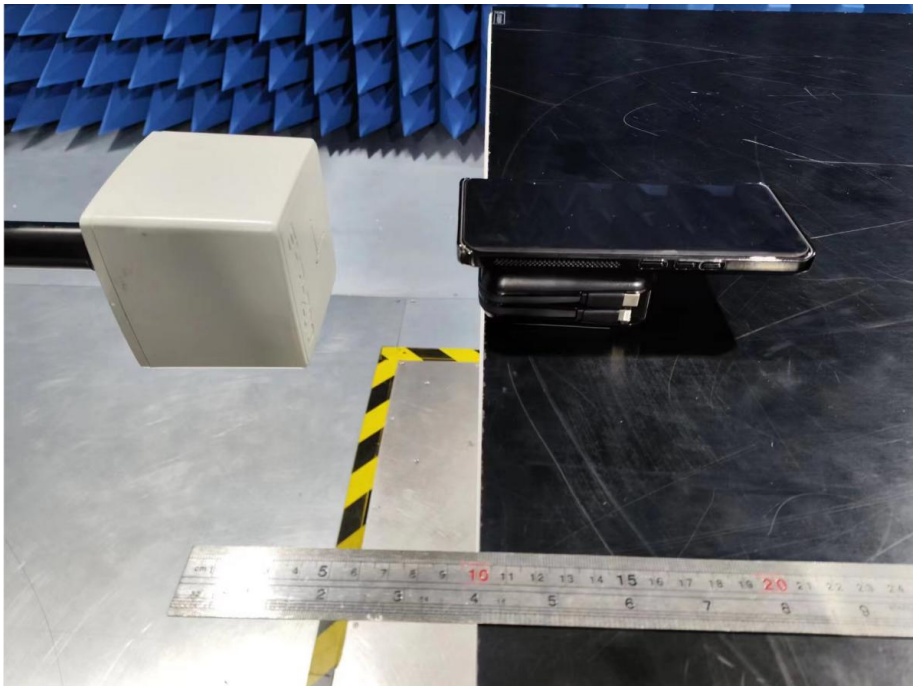
Test Position A（20cm）



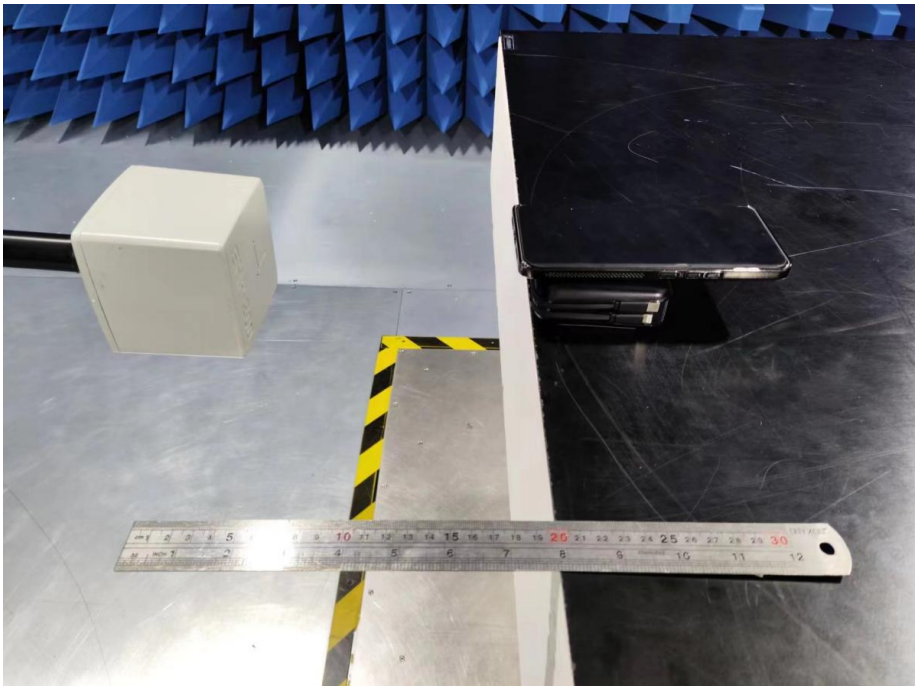
Test Position B（0cm）



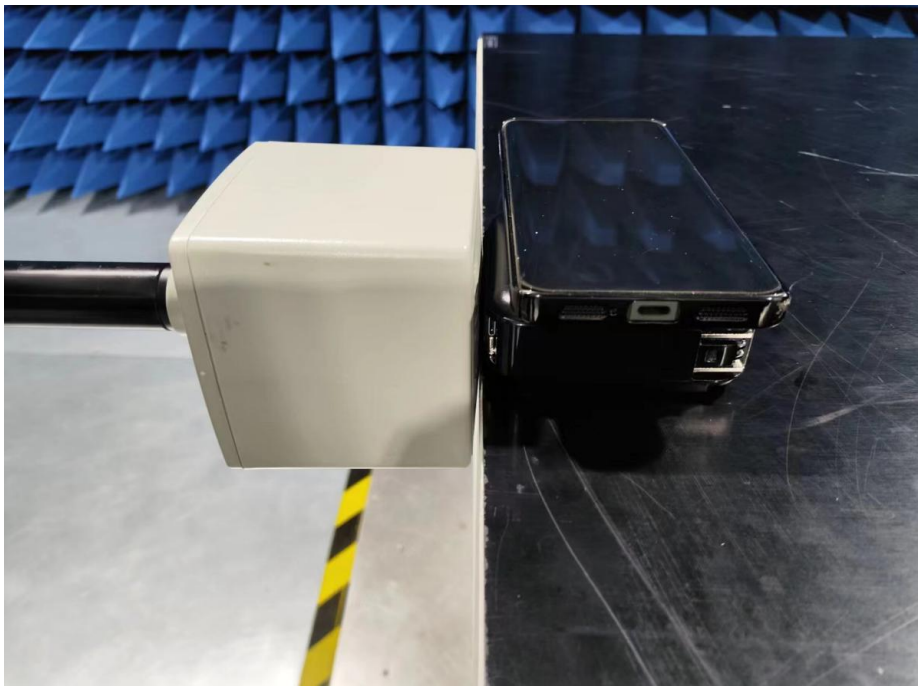
Test Position B（10cm）



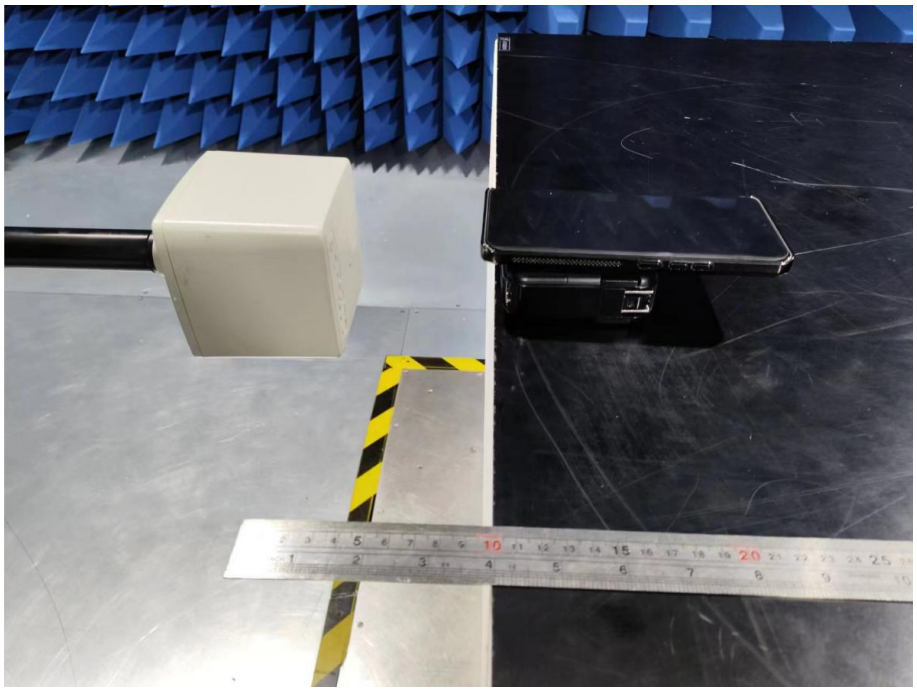
Test Position B（20cm）



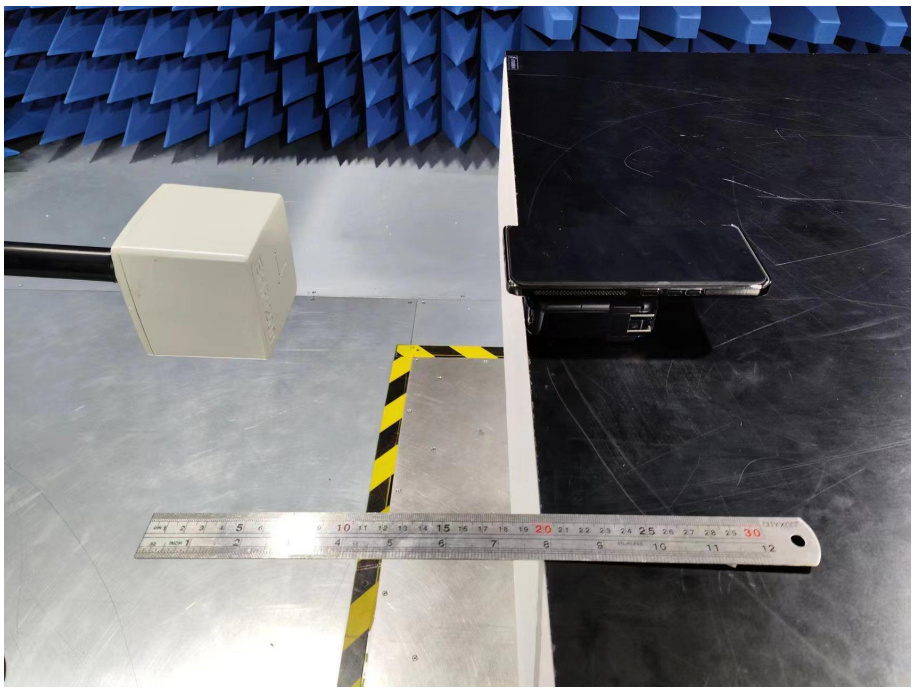
Test Position C（0cm）



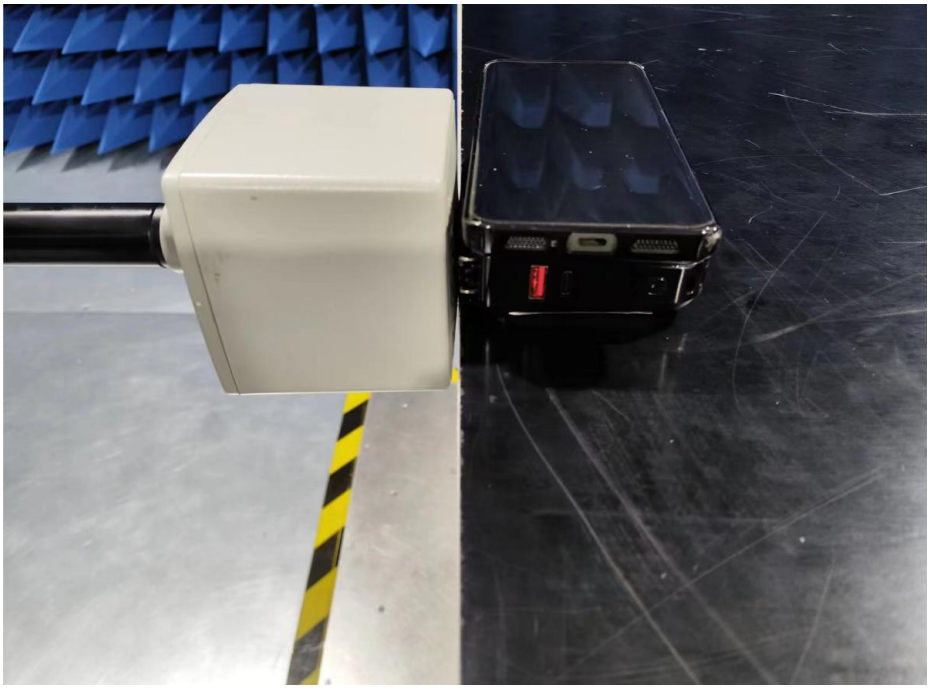
Test Position C（10cm）



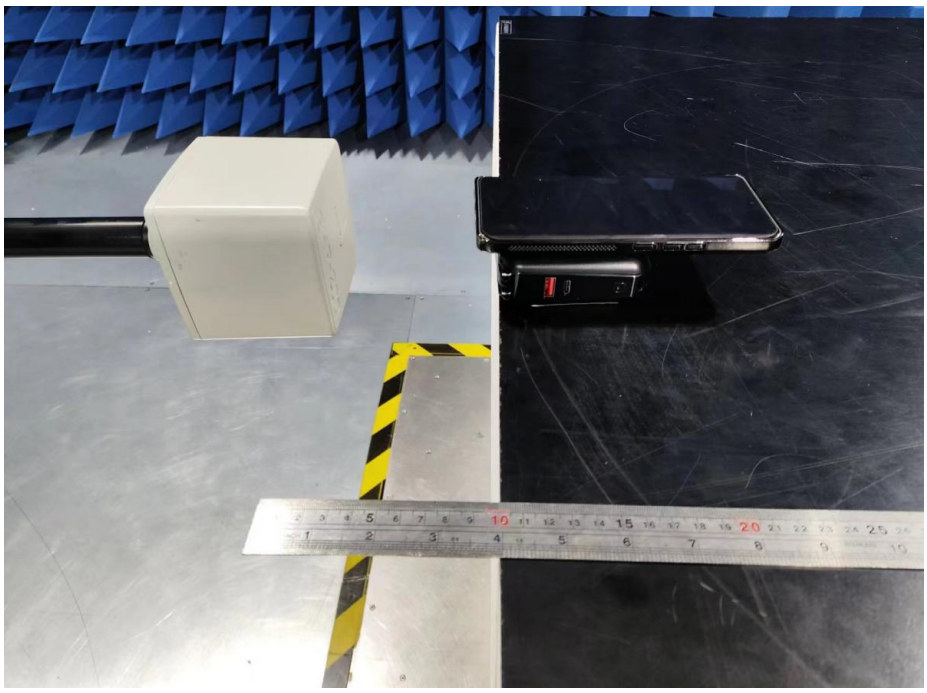
Test Position C（20cm）



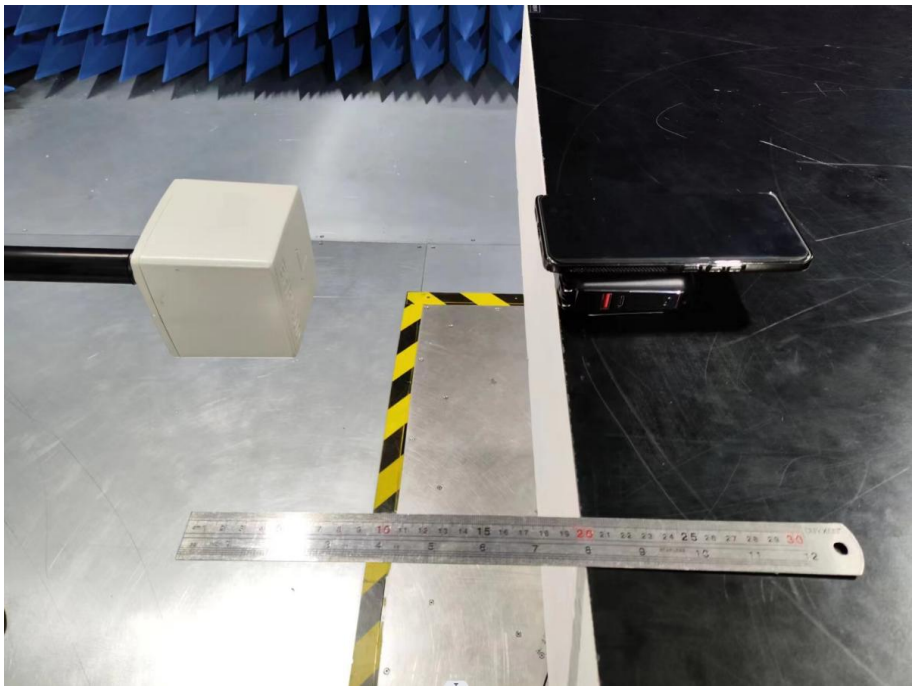
Test Position D（0cm）



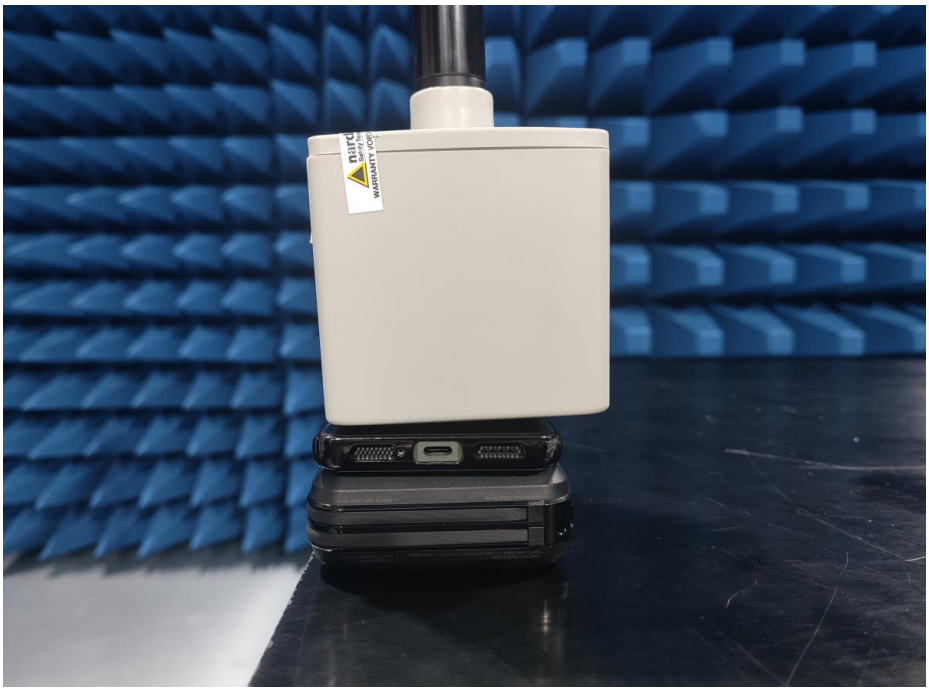
Test Position D（10cm）



Test Position D（20cm）

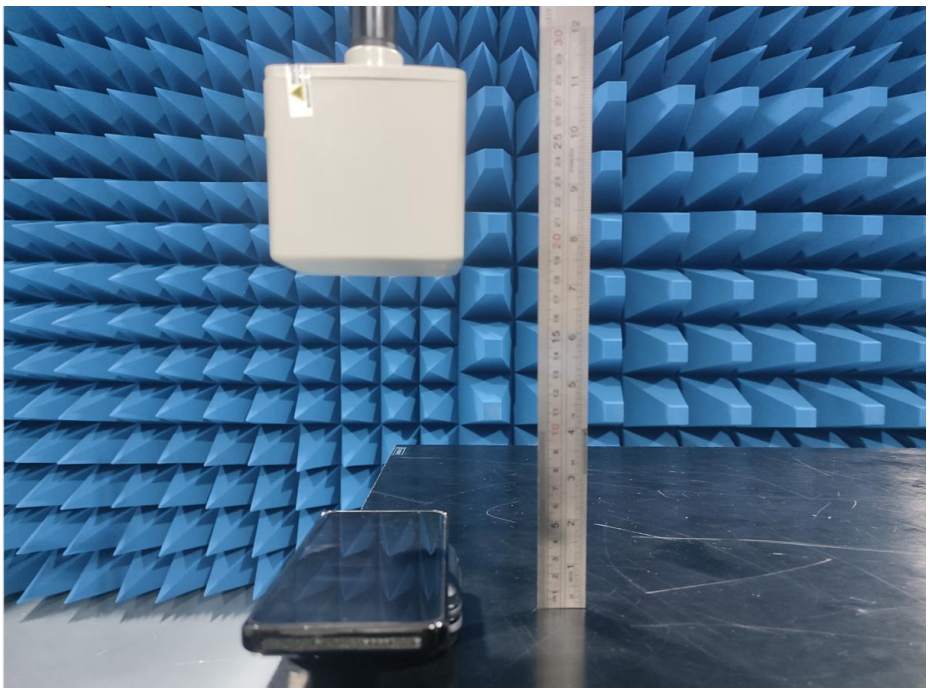


Test Position E（0cm）

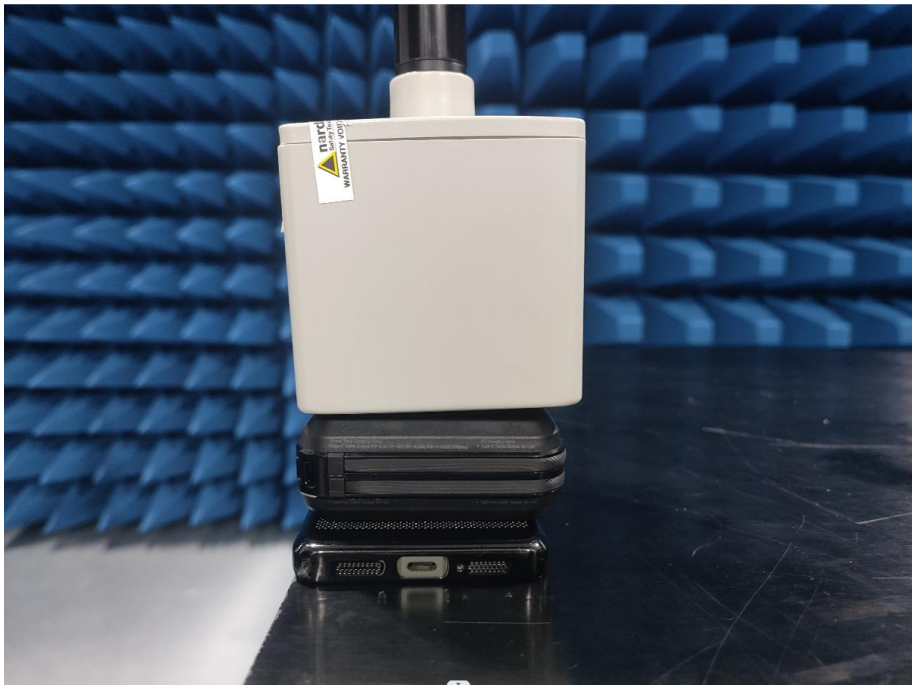


Test Position E（10cm）

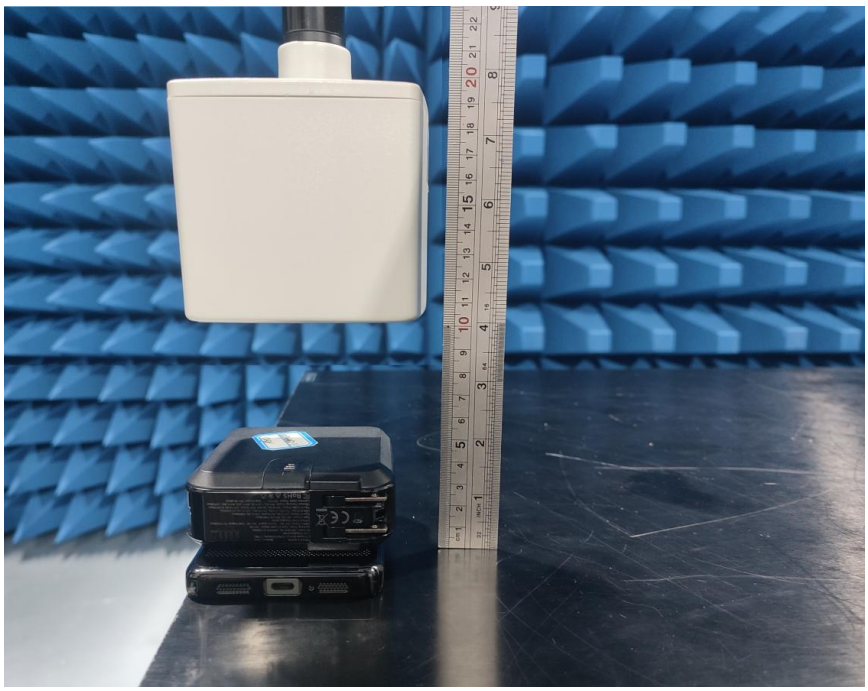
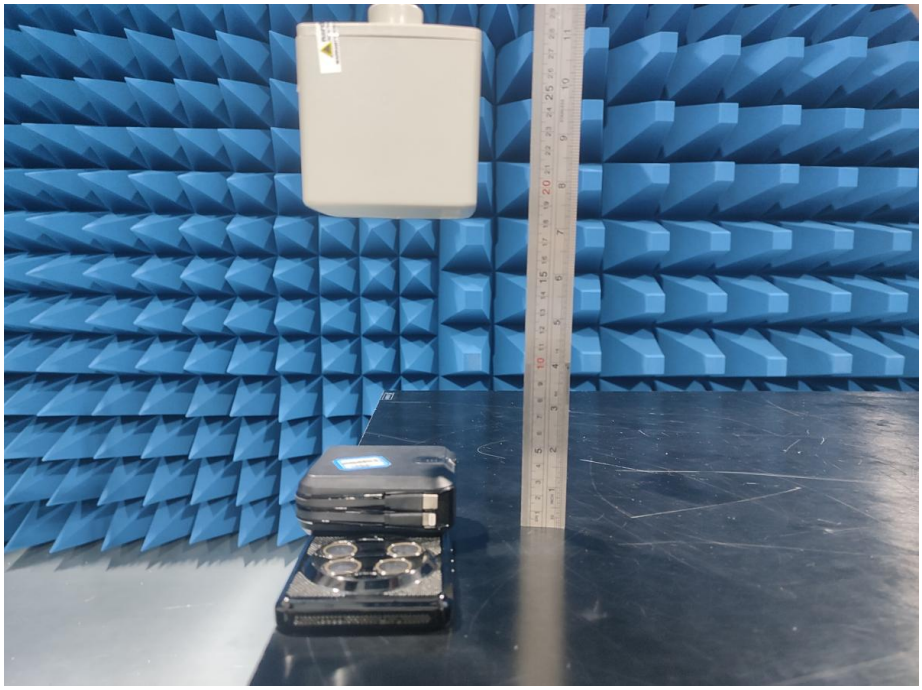
Test Position E（20cm）



Test Position F（0cm）



Test Position F（10cm）



Test Position F（20cm）