



RF EXPOSURE EVALUATION

FCC ID:2A9Q9-M2139Q

Product Name:	10000mAh Magnetic Bracket Wireless Power Bank
Product Model No.:	M2139Q
Test Auxiliary:	AC/DC Adapter, Phone, Watch
Test Auxiliary Model No.:	HW-200200CP1, iPhone 12, iWatch S2
Operation Frequency:	ANT1: 110kHz ~ 205kHz ANT2: 330kHz ~ 360kHz
Modulation Type:	ASK
Antenna Type:	Loop Coil Antenna
Power Supply:	Type-C Input: 5V $\equiv$ 3A, 9V $\equiv$ 3A, 12V $\equiv$ 2.92A, 15V $\equiv$ 2.33A 20V $\equiv$ 1.75A Type-C Output 5V $\equiv$ 3A, 9V $\equiv$ 3A, 10V $\equiv$ 2.25A, 12V $\equiv$ 2.92A 15V $\equiv$ 2.33A. 20V $\equiv$ 1.75A, MAX 35W Type-C Cable Input: 5V $\equiv$ 3A, 9V $\equiv$ 3A, 12V $\equiv$ 2.92A, 15V $\equiv$ 2.33A 20V $\equiv$ 1.75A Type-C Cable Output 5V $\equiv$ 3A, 9V $\equiv$ 3A, 10V $\equiv$ 2.25A, 12V $\equiv$ 2.92A 15V $\equiv$ 2.33A. 20V $\equiv$ 1.75A, MAX 35W Wireless Output Phone: 5W/7.5W/10W/15W Wireless Output Watch: 2W
Battery Capacity:	DC 3.85V, 10000mAh, 38.5W
Transmitting Mode:	Keep the EUT in continuously wireless charging mode
Date of Test:	Dec. 25, 2024 to Jan. 03, 2025
Date of issue:	Jan. 03, 2025



a. EUT mode of adapter input + wireless charge output:

Test Modes:	Test Coil	Description:
Mode 1	ANT 1	AC/DC Adapter + EUT + Phone (Battery Status: <1%)
Mode 2		AC/DC Adapter + EUT + Phone (Battery Status: 50%)
Mode 3		AC/DC Adapter + EUT + Phone (Battery Status: >98%)
Mode 4	ANT 2	AC/DC Adapter + EUT + Watch (Battery Status: <1%)
Mode 5		AC/DC Adapter + EUT + Watch (Battery Status: 50%)
Mode 6		AC/DC Adapter + EUT + Watch (Battery Status: >98%)

b. EUT mode of wireless charge output:

Test Modes:	Test Coil	Description:
Mode 1a	ANT 1	EUT + Phone (Battery Status: <1%)
Mode 2a		EUT + Phone (Battery Status: 50%)
Mode 3a		EUT + Phone (Battery Status: >98%)
Mode 4a	ANT 2	EUT + Watch (Battery Status: <1%)
Mode 5a		EUT + Watch (Battery Status: 50%)
Mode 6a		EUT + Watch (Battery Status: >98%)

Note: Both a and b were tested, and only the test data for b was recorded.

The EUT cannot be charged both ANT 1 and ANT 2 during use.



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1 Measuring Standard

1.1 KDB 680106 D01 Wireless Power Transfer v04

1.2 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	H-filed	$\pm 0.93\text{dB}$
2	E-filed	$\pm 0.51\text{dB}$

2 Requirements

2.1 According to the item 5.2 of KDB 680106 D01v04:

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

a) The power transfer frequency is below 1 MHz.

Yes. The device operates in the frequency from ANT1 is 110kHz to 205kHz and ANT2 is 330kHz to 360kHz.

b) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.

Yes. The maximum output power of the primary coil is 15watts.

c) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact).

Yes. Client device is placed directly in contact with the transmitter.

d) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).

NO. The EUT is a portable wireless charger.

e) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures

Yes. The EUT coil is evaluated at maximum output power and the test results are less than 50% of the limit.

f) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well.

Yes, EUT has two coils, but both coils cannot work at the same time.



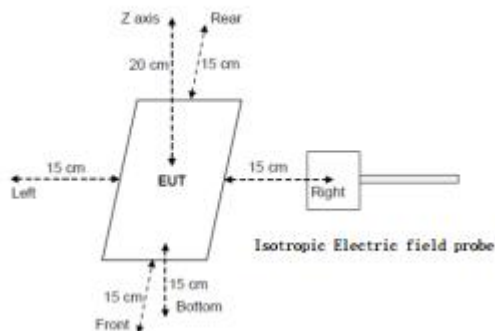
3 Method Of Measurement

3.1 Applicable Standard

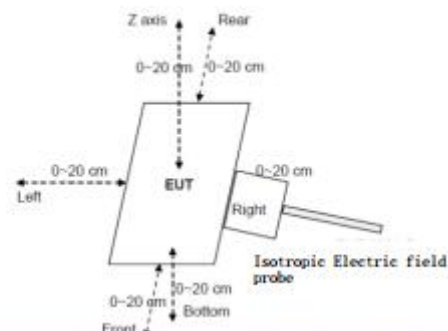
According to S1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. According to §1.1310 and §2.1093 RF exposure is calculated. According KDB 680106 D01 Wireless Power Transfer v04.

3.2 Block diagram of Test Setup

For mobile exposure conditions:



For portable exposure conditions:



Note: Measurements should be made from all sides and the top of the primary/client pair, with the 20 cm-0cm measured from the center of the top, and 20cm-0cm measured from the center of the rest.

3.3 For mobile exposure conditions:

- The RF exposure test was performed in an echoic chamber
- E and H-field measurements should be made with the center of the probe at a distance of 15 cm surrounding the EUT and 20 cm above the top surface of the primary/client pair
- The highest emission level was recorded and compared with limit
- The EUT was measured according to the dictates of KDB 680106 D01v04

3.4 For portable exposure conditions:

- The RF exposure test was performed in an echoic chamber
- E and H-field measurements should be made with the probe at 0 cm for all side of the EUT.
- The highest emission level was recorded and compared with limit.

For portable exposure conditions:

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 10cm



3.5 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).				

3.6 Test Procedure:

- 1) The RF exposure test was performed on 360 degree turn table in an echoic chamber.
- 2) 20 cm-0cm measured from the center of the top, and 20cm-0cm measured from the center of the rest sides.
- 3) The turn table was rotated 360 degree to search of highest strength.
- 4) The highest emission level was recorded and compared with limit as soon as measurement of each points were completed.
- 5) The EUT were measured according to the dictates of KDB 680106 D01v04.

4 Test Instruments list

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Exposure Level Tester	Narda	ELT-400	180ZX10220	Sep. 29, 2024	Sep. 28, 2025
Magnetic field probe 100cm ²	Narda	ELT probe 100cm ²	M0675	Sep. 29, 2024	Sep. 28, 2025



5 Test Result

ANT1 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position BOTTOM (uT)
20	<1%	0.0181	0.0176	0.0174	0.0179	0.0173	0.0178
18	<1%	0.0243	0.0236	0.0233	0.0239	0.0231	0.0238
16	<1%	0.0334	0.0325	0.0320	0.0330	0.0318	0.0328
14	<1%	0.0476	0.0463	0.0456	0.0469	0.0453	0.0465
12	<1%	0.0704	0.0684	0.0674	0.0694	0.0669	0.0689
10	<1%	0.1089	0.1059	0.1044	0.1074	0.1036	0.1066
8	<1%	0.1768	0.1719	0.1695	0.1744	0.1683	0.1731
6	<1%	0.3000	0.2918	0.2875	0.2959	0.2855	0.2938

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position BOTTOM (A/m)	50% Limits (A/m)	Limits (A/m)
20	<1%	0.0145	0.0141	0.0139	0.0143	0.0138	0.0142	0.815	1.63
18	<1%	0.0194	0.0189	0.0186	0.0191	0.0185	0.0190	0.815	1.63
16	<1%	0.0267	0.0260	0.0256	0.0264	0.0254	0.0262	0.815	1.63
14	<1%	0.0381	0.0370	0.0365	0.0375	0.0362	0.0372	0.815	1.63
12	<1%	0.0563	0.0547	0.0539	0.0555	0.0535	0.0551	0.815	1.63
10	<1%	0.0871	0.0847	0.0835	0.0859	0.0829	0.0853	0.815	1.63
8	<1%	0.1414	0.1375	0.1356	0.1395	0.1346	0.1385	0.815	1.63
6	<1%	0.2400	0.2334	0.2300	0.2367	0.2284	0.2350	0.815	1.63



ANT2 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position BOTTOM (uT)
20	<1%	0.0111	0.0114	0.0116	0.0109	0.0110	0.0106
18	<1%	0.0149	0.0153	0.0155	0.0145	0.0148	0.0143
16	<1%	0.0205	0.0210	0.0214	0.0200	0.0203	0.0196
14	<1%	0.0291	0.0299	0.0305	0.0285	0.0289	0.0279
12	<1%	0.0431	0.0441	0.0451	0.0423	0.0426	0.0413
10	<1%	0.0668	0.0683	0.0698	0.0653	0.0660	0.0638
8	<1%	0.1085	0.1110	0.1134	0.1061	0.1073	0.1036
6	<1%	0.1841	0.1883	0.1924	0.1800	0.1820	0.1759

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position BOTTOM (A/m)	50% Limits (A/m)	Limits (A/m)
20	<1%	0.0089	0.0091	0.0093	0.0087	0.0088	0.0085	0.815	1.63
18	<1%	0.0119	0.0122	0.0124	0.0116	0.0118	0.0114	0.815	1.63
16	<1%	0.0164	0.0168	0.0171	0.0160	0.0162	0.0157	0.815	1.63
14	<1%	0.0233	0.0239	0.0244	0.0228	0.0231	0.0223	0.815	1.63
12	<1%	0.0345	0.0353	0.0361	0.0338	0.0341	0.0330	0.815	1.63
10	<1%	0.0534	0.0546	0.0558	0.0522	0.0528	0.0510	0.815	1.63
8	<1%	0.0868	0.0888	0.0907	0.0849	0.0858	0.0829	0.815	1.63
6	<1%	0.1473	0.1506	0.1539	0.1440	0.1456	0.1407	0.815	1.63



ANT1 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position Bottom (uT)
20	50%	0.0171	0.0169	0.0170	0.0173	0.0174	0.0175
18	50%	0.0229	0.0226	0.0228	0.0231	0.0233	0.0234
16	50%	0.0315	0.0311	0.0314	0.0318	0.0320	0.0323
14	50%	0.0449	0.0443	0.0446	0.0453	0.0456	0.0459
12	50%	0.0665	0.0655	0.0660	0.0669	0.0674	0.0679
10	50%	0.1028	0.1013	0.1020	0.1036	0.1044	0.1051
8	50%	0.1670	0.1646	0.1658	0.1683	0.1695	0.1706
6	50%	0.2834	0.2793	0.2814	0.2855	0.2875	0.2896

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
20	50%	0.0137	0.0135	0.0136	0.0138	0.0139	0.0140	0.815	1.63
18	50%	0.0183	0.0181	0.0182	0.0185	0.0186	0.0187	0.815	1.63
16	50%	0.0252	0.0249	0.0251	0.0254	0.0256	0.0258	0.815	1.63
14	50%	0.0359	0.0354	0.0357	0.0362	0.0365	0.0367	0.815	1.63
12	50%	0.0532	0.0524	0.0528	0.0535	0.0539	0.0543	0.815	1.63
10	50%	0.0822	0.0810	0.0816	0.0829	0.0835	0.0841	0.815	1.63
8	50%	0.1336	0.1317	0.1326	0.1346	0.1356	0.1365	0.815	1.63
6	50%	0.2267	0.2234	0.2251	0.2284	0.2300	0.2317	0.815	1.63



ANT2 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position Bottom (uT)
20	50%	0.0103	0.0099	0.0098	0.0101	0.0104	0.0095
18	50%	0.0138	0.0133	0.0130	0.0135	0.0139	0.0128
16	50%	0.0189	0.0183	0.0180	0.0186	0.0191	0.0175
14	50%	0.0269	0.0259	0.0256	0.0265	0.0273	0.0249
12	50%	0.0398	0.0384	0.0379	0.0393	0.0403	0.0369
10	50%	0.0615	0.0593	0.0585	0.0608	0.0623	0.0570
8	50%	0.1000	0.0964	0.0951	0.0988	0.1013	0.0926
6	50%	0.1696	0.1634	0.1614	0.1676	0.1718	0.1573

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
20	50%	0.0082	0.0079	0.0078	0.0081	0.0083	0.0076	0.815	1.63
18	50%	0.0110	0.0106	0.0104	0.0108	0.0111	0.0102	0.815	1.63
16	50%	0.0151	0.0146	0.0144	0.0149	0.0153	0.0140	0.815	1.63
14	50%	0.0215	0.0207	0.0205	0.0212	0.0218	0.0199	0.815	1.63
12	50%	0.0318	0.0307	0.0303	0.0314	0.0322	0.0295	0.815	1.63
10	50%	0.0492	0.0474	0.0468	0.0486	0.0498	0.0456	0.815	1.63
8	50%	0.0800	0.0771	0.0761	0.0790	0.0810	0.0741	0.815	1.63
6	50%	0.1357	0.1307	0.1291	0.1341	0.1374	0.1258	0.815	1.63



ANT1 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position Bottom (uT)
20	>98%	0.0170	0.0168	0.0165	0.0159	0.0161	0.0155
18	>98%	0.0228	0.0224	0.0221	0.0213	0.0216	0.0208
16	>98%	0.0314	0.0309	0.0304	0.0293	0.0298	0.0285
14	>98%	0.0446	0.0439	0.0433	0.0416	0.0423	0.0406
12	>98%	0.0660	0.0650	0.0640	0.0616	0.0626	0.0601
10	>98%	0.1020	0.1005	0.0990	0.0953	0.0968	0.0930
8	>98%	0.1658	0.1634	0.1609	0.1549	0.1573	0.1511
6	>98%	0.2814	0.2773	0.2731	0.2628	0.2669	0.2565

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
20	>98%	0.0136	0.0134	0.0132	0.0127	0.0129	0.0124	0.815	1.63
18	>98%	0.0182	0.0179	0.0177	0.0170	0.0173	0.0166	0.815	1.63
16	>98%	0.0251	0.0247	0.0243	0.0234	0.0238	0.0228	0.815	1.63
14	>98%	0.0357	0.0351	0.0346	0.0333	0.0338	0.0325	0.815	1.63
12	>98%	0.0528	0.0520	0.0512	0.0493	0.0501	0.0481	0.815	1.63
10	>98%	0.0816	0.0804	0.0792	0.0762	0.0774	0.0744	0.815	1.63
8	>98%	0.1326	0.1307	0.1287	0.1239	0.1258	0.1209	0.815	1.63
6	>98%	0.2251	0.2218	0.2185	0.2102	0.2135	0.2052	0.815	1.63



ANT2 - H-Filed Strength at (distance from 6cm to 20cm at 2cm iteration) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (uT)	Position Right (uT)	Position Rear (uT)	Position Front (uT)	Position Top (uT)	Position Bottom (uT)
20	>98%	0.0089	0.0091	0.0086	0.0093	0.0085	0.0081
18	>98%	0.0119	0.0123	0.0115	0.0124	0.0114	0.0109
16	>98%	0.0164	0.0169	0.0159	0.0170	0.0156	0.0150
14	>98%	0.0233	0.0239	0.0226	0.0243	0.0223	0.0213
12	>98%	0.0344	0.0354	0.0335	0.0359	0.0330	0.0315
10	>98%	0.0533	0.0548	0.0518	0.0555	0.0510	0.0488
8	>98%	0.0865	0.0890	0.0841	0.0903	0.0829	0.0793
6	>98%	0.1469	0.1510	0.1428	0.1531	0.1406	0.1345

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
20	>98%	0.0071	0.0073	0.0069	0.0074	0.0068	0.0065	0.815	1.63
18	>98%	0.0095	0.0098	0.0092	0.0099	0.0091	0.0087	0.815	1.63
16	>98%	0.0131	0.0135	0.0127	0.0136	0.0125	0.0120	0.815	1.63
14	>98%	0.0186	0.0191	0.0181	0.0194	0.0178	0.0170	0.815	1.63
12	>98%	0.0275	0.0283	0.0268	0.0287	0.0264	0.0252	0.815	1.63
10	>98%	0.0426	0.0438	0.0414	0.0444	0.0408	0.0390	0.815	1.63
8	>98%	0.0692	0.0712	0.0673	0.0722	0.0663	0.0634	0.815	1.63
6	>98%	0.1175	0.1208	0.1142	0.1225	0.1125	0.1076	0.815	1.63

Note: A/m = uT/1.25

**ANT1 - H-Filed Strength at (distance from 4cm to 0cm) surrounding the EUT (A/m):**

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
4	<1%	0.3887	0.4001	0.3944	0.4057	0.3916	0.4029	0.815	1.63
4	50%	0.3887	0.3830	0.3859	0.3916	0.3944	0.3972	0.815	1.63
4	>98%	0.3859	0.3802	0.3745	0.3603	0.3660	0.3518	0.815	1.63
2	<1%	0.6100	0.6278	0.6189	0.6367	0.6144	0.6322	0.815	1.63
2	50%	0.6100	0.6011	0.6055	0.6144	0.6189	0.6233	0.815	1.63
2	>98%	0.6055	0.5966	0.5877	0.5654	0.5744	0.5521	0.815	1.63
0	<1%	0.7349	0.7563	0.7456	0.7671	0.7402	0.7617	0.815	1.63
0	50%	0.7349	0.7241	0.7295	0.7402	0.7456	0.7510	0.815	1.63
0	>98%	0.7295	0.7188	0.7081	0.6812	0.6920	0.6651	0.815	1.63

ANT2 - H-Filed Strength at (distance from 4cm to 0cm) surrounding the EUT (A/m):

distance (cm)	Battery Level:	Position Left (A/m)	Position Right (A/m)	Position Rear (A/m)	Position Front (A/m)	Position Top (A/m)	Position Bottom (A/m)	50% Limits (A/m)	Limits (A/m)
4	<1%	0.2525	0.2582	0.2639	0.2468	0.2497	0.2412	0.815	1.63
4	50%	0.2327	0.2242	0.2213	0.2298	0.2355	0.2156	0.815	1.63
4	>98%	0.2015	0.2071	0.1958	0.2100	0.1929	0.1844	0.815	1.63
2	<1%	0.3963	0.4052	0.4141	0.3874	0.3918	0.3785	0.815	1.63
2	50%	0.3651	0.3517	0.3473	0.3606	0.3695	0.3384	0.815	1.63
2	>98%	0.3161	0.3250	0.3072	0.3295	0.3028	0.2894	0.815	1.63
0	<1%	0.4774	0.4881	0.4989	0.4667	0.4720	0.4559	0.815	1.63
0	50%	0.4399	0.4238	0.4184	0.4345	0.4452	0.4077	0.815	1.63
0	>98%	0.3808	0.3916	0.3701	0.3969	0.3648	0.3487	0.815	1.63



Note: Biot-Savar law:

1. Magnetic field on the axis of a current-carrying circle coil:

$$B = \frac{\mu_0 I R^2}{2(R^2 + X^2)^{\frac{3}{2}}}$$

R is the coil outside diameter radius.

X is the distance from the test point to the center of the coil circle.

B is the magnetic magnetic field.

2. According to the KDB 680106, the model needs to be validated by probe measurements at the two points closest to the surface of the device, in 2cm increments, and if there is a 30% agreement between the model and the (E-field and/or h-field) probe measurements, the validation is considered sufficient.

3. We derived the field strengths at 10cm to 8cm and 8cm to 6cm, respectively, which are close to the actual test values, based on the field strength at 6 cm, the field strength at 4cm and 2cm and 0 cm can be deduced.

4. A table of error data between the assessed and measured values:

distance (cm)	Measurements (A/m)	distance (cm)	Assessed (A/m)	Error (%)	Limit (%)
10	0.0829	\	\	\	\
8	0.1342	10 to 8	0.1307	2.61	<30
6	0.2289	8 to 6	0.2218	3.10	<30



5. Calculation process:

		ANT1	ANT2
distance (cm)	Battery Level:	Position Left (A/m)	Position Left (A/m)
8	<1%	0.1414	0.0868
6	<1%	0.2400	0.1473
4	<1%	0.4114	0.2525
2	<1%	0.6456	0.3963
0	<1%	0.7778	0.4774

ANT1:

$$8\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.1414 * 2(0.055^2 + 0.08^2)^{\frac{3}{2}} = 0.000258809$$

$$\text{To 6cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000258809}{2(0.055^2+0.06^2)^{\frac{3}{2}}} = 0.2400$$

$$6\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.2400 * 2(0.055^2 + 0.06^2)^{\frac{3}{2}} = 0.000258809$$

$$\text{To 4cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000258809}{2(0.055^2+0.04^2)^{\frac{3}{2}}} = 0.4114$$

$$4\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.4114 * 2(0.055^2 + 0.04^2)^{\frac{3}{2}} = 0.000258809$$

$$\text{To 2cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000258809}{2(0.055^2+0.02^2)^{\frac{3}{2}}} = 0.6456$$

$$2\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.6456 * 2(0.055^2 + 0.02^2)^{\frac{3}{2}} = 0.000258809$$

$$\text{To 0cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000258809}{2(0.055^2+0^2)^{\frac{3}{2}}} = 0.7778$$

ANT2:

$$8\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.0868 * 2(0.055^2 + 0.08^2)^{\frac{3}{2}} = 0.000158855$$

$$\text{To 6cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000158855}{2(0.055^2+0.06^2)^{\frac{3}{2}}} = 0.1473$$

$$6\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.1473 * 2(0.055^2 + 0.06^2)^{\frac{3}{2}} = 0.000158855$$

$$\text{To 4cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000158855}{2(0.055^2+0.04^2)^{\frac{3}{2}}} = 0.2525$$

$$4\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.2525 * 2(0.055^2 + 0.04^2)^{\frac{3}{2}} = 0.000158855$$

$$\text{To 2cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000158855}{2(0.055^2+0.02^2)^{\frac{3}{2}}} = 0.3963$$

$$2\text{cm: } u_0IR^2 = B * 2(R^2 + X^2)^{\frac{3}{2}} = 0.3963 * 2(0.055^2 + 0.02^2)^{\frac{3}{2}} = 0.000158855$$

$$\text{To 0cm: } B = \frac{u_0IR^2}{2(R^2+X^2)^{\frac{3}{2}}} = \frac{0.000158855}{2(0.055^2+0^2)^{\frac{3}{2}}} = 0.4774$$

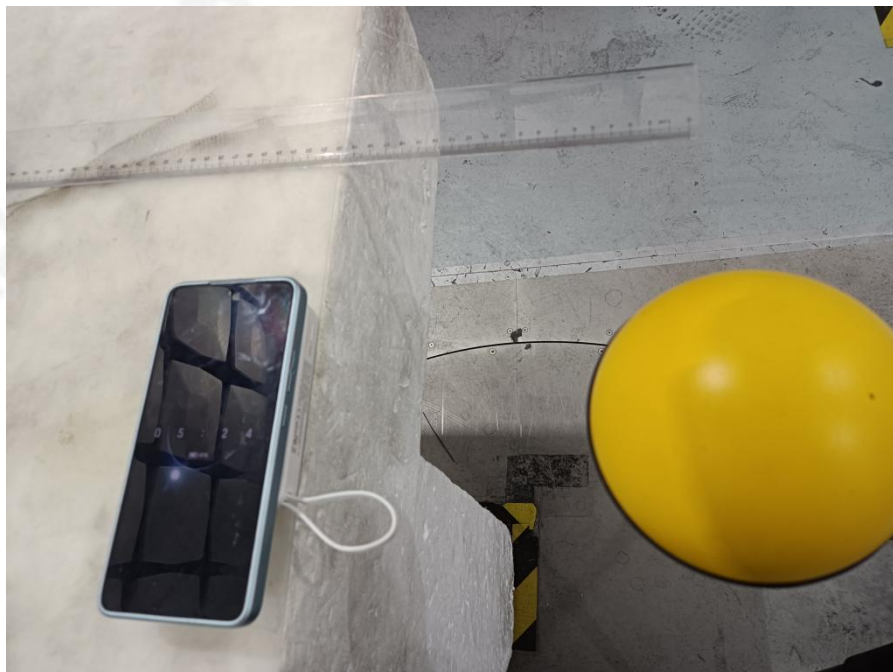


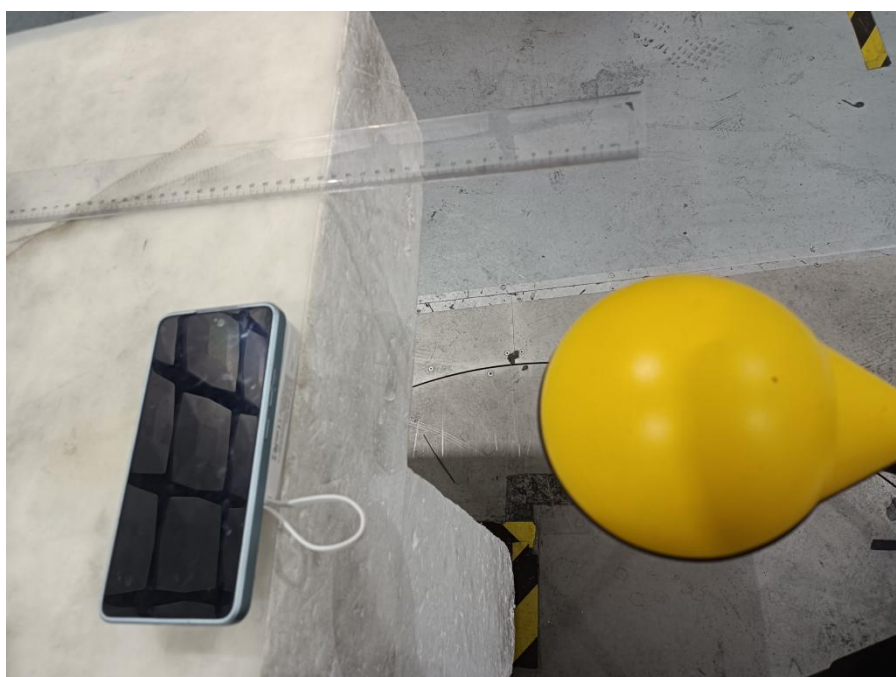
6 Test Set-up Photo

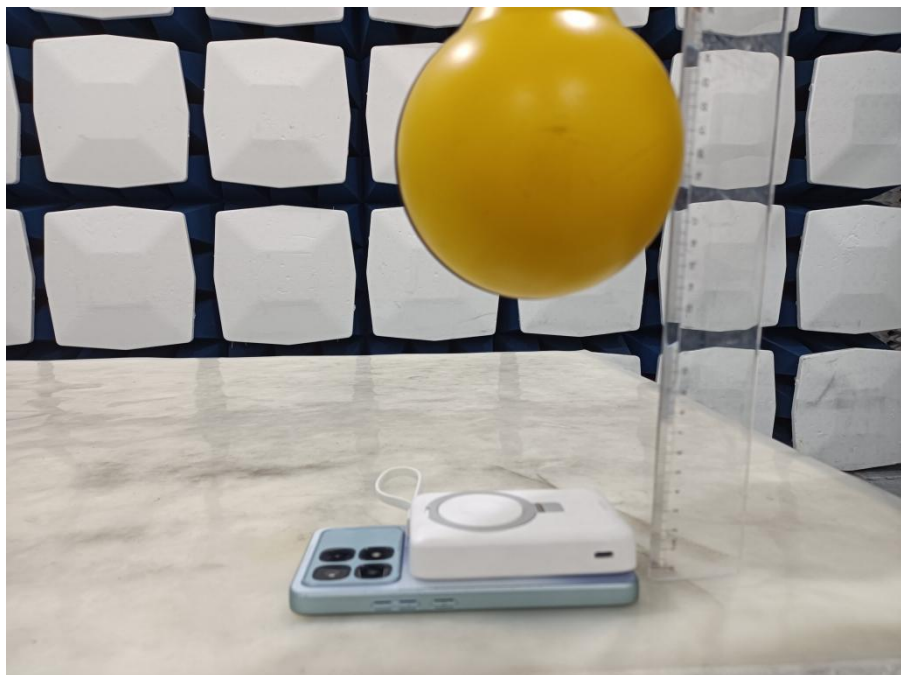
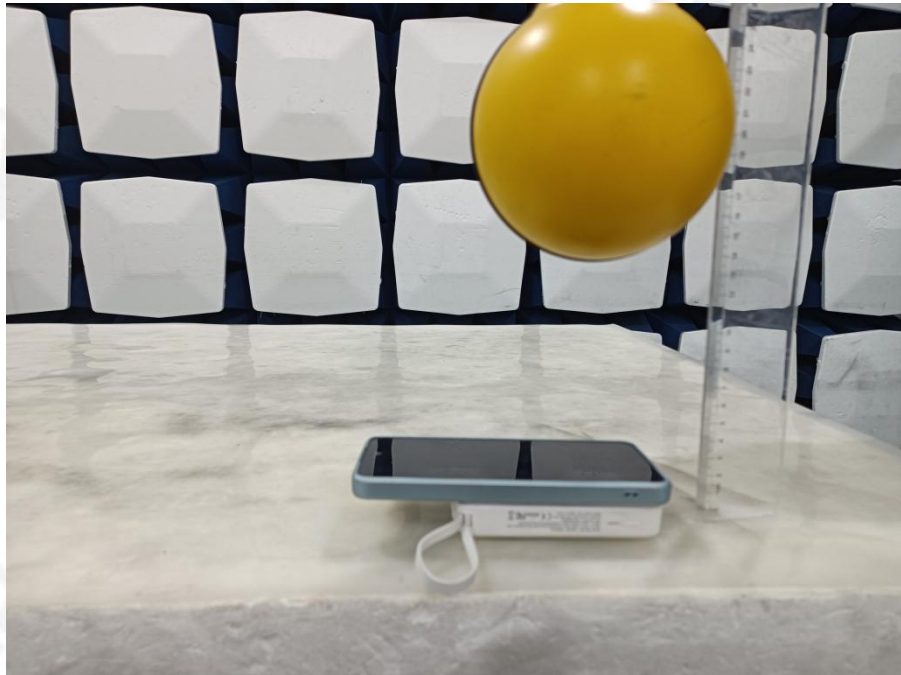
Probe	Length	Width	Radius
	11cm	11cm	5.5cm

Test distance: 20cm

ANT1:

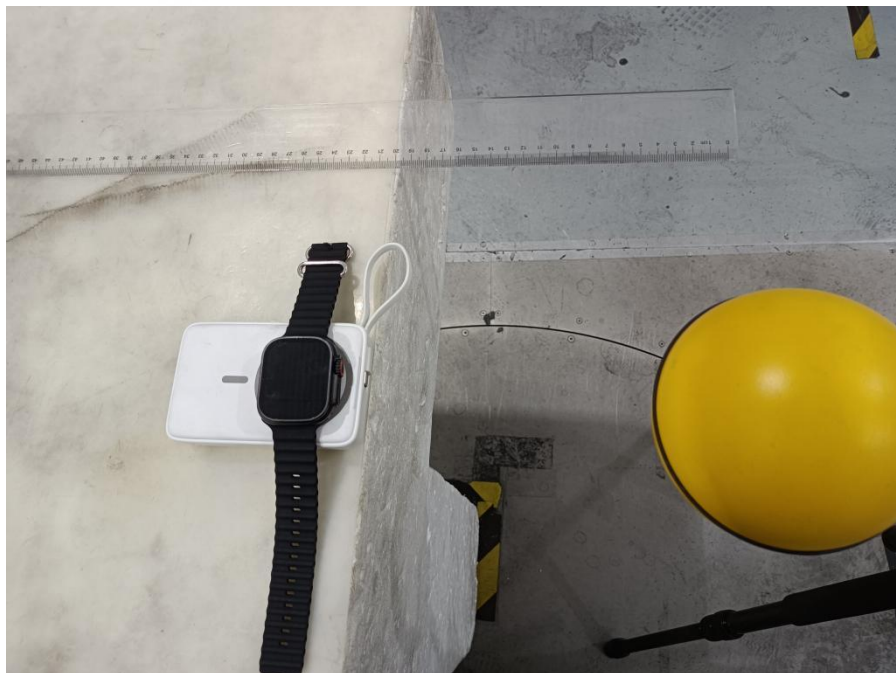
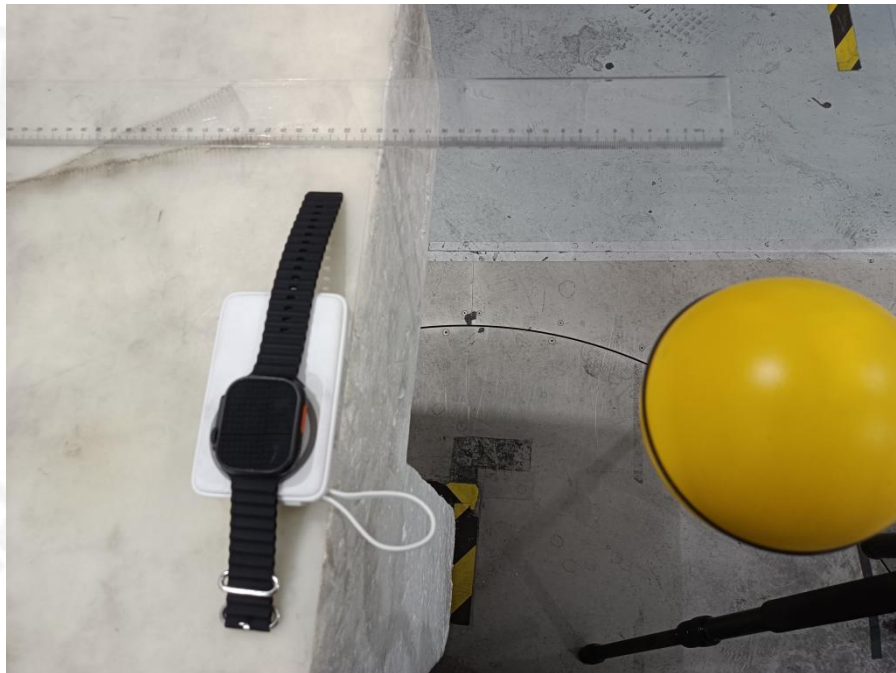




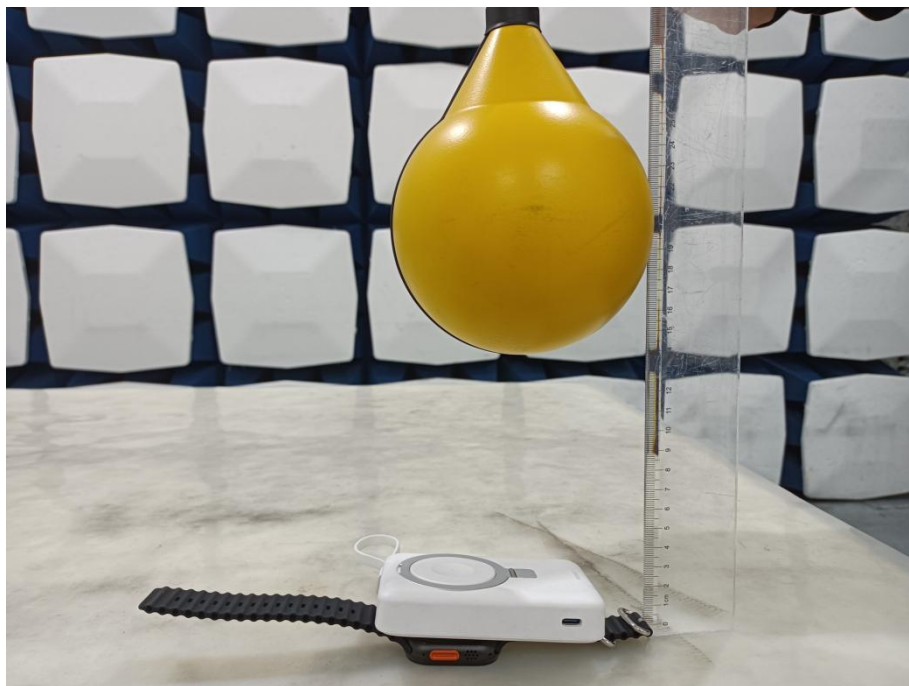




ANT2:



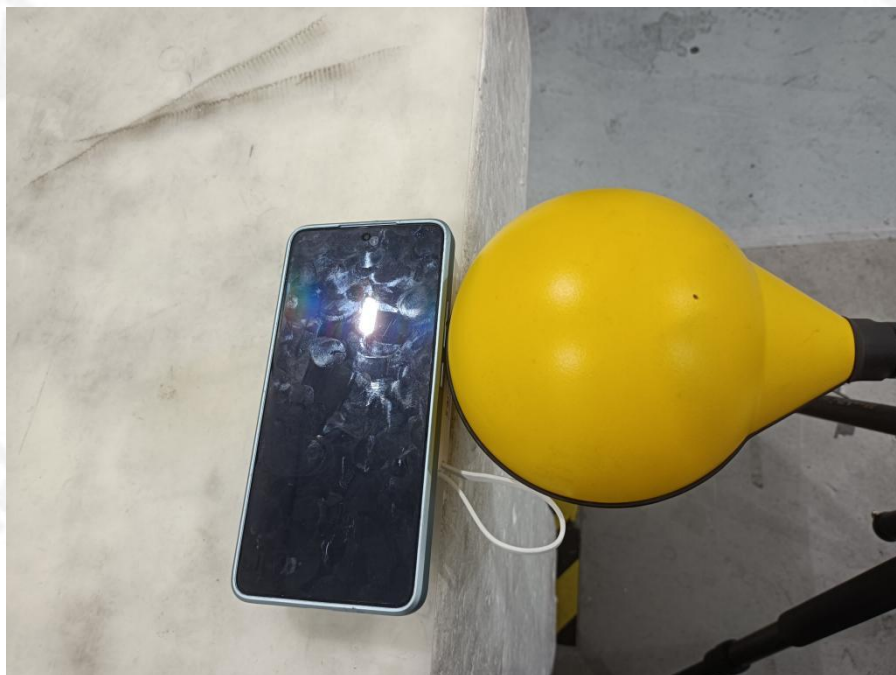


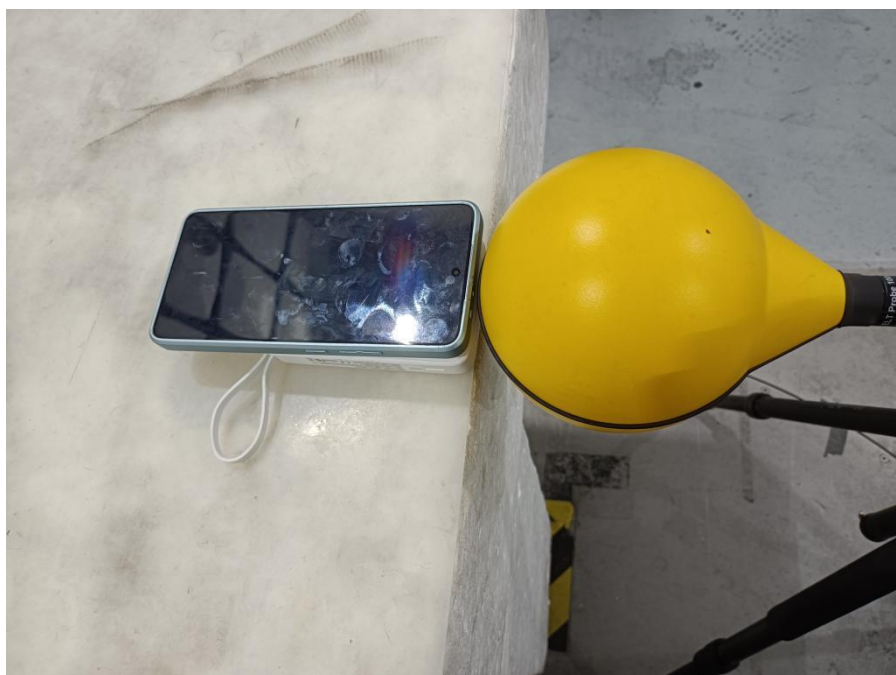
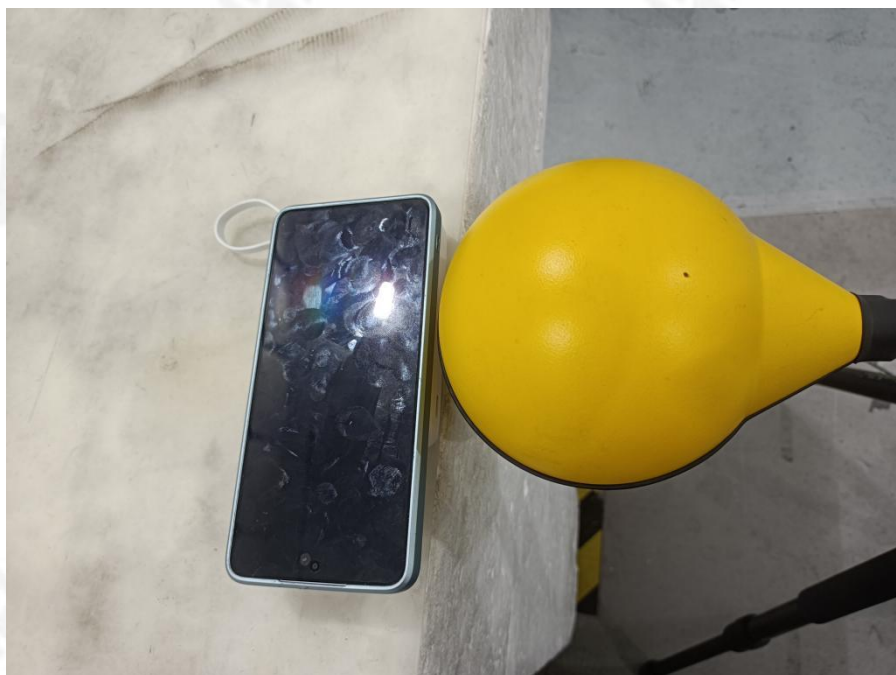


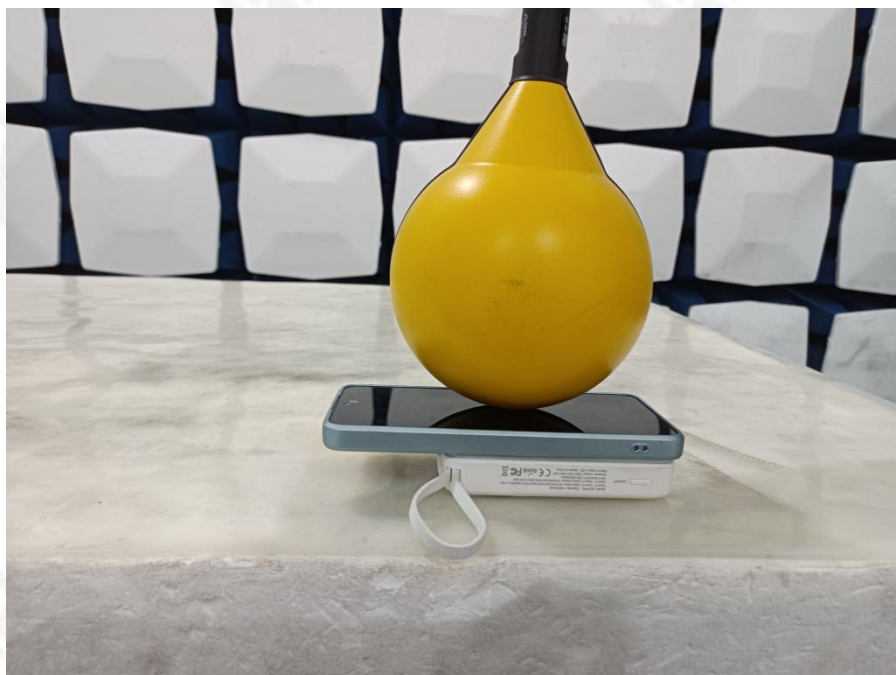


Test distance: 6cm

ANT1:









ANT2:







***** END OF REPORT *****