

TEST REPORT

Report No.: 8328EU012102W2

Applicant: Shenzhen Kuxiu Communication Co., Ltd.

Address: Room 301, Bldg. 8, Minle Ind. Zone, Minle Community, Minzhi Str., Longhua Dist., Shenzhen Guangdong, China

Product Name: Magnetic Solid-State Power Bank

Model No.: S2 (refer to clause 2.4)

Trademark: KU XIU

FCC ID: 2A698-S2

Test Standard(s): 47 CFR Part 1 Subpart I Section 1.1310
47 CFR Part 2, Subpart J, Section 2.1093

Date of Receipt: Mar. 21, 2025

Test Date: Mar. 21, 2025 – Mar. 31, 2025

Date of Issue: May 21, 2025

ISSUED BY:

SHENZHEN EU TESTING LABORATORY LIMITED



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Revision Record

Report Version	Issued Date	Description	Status
V0	May 21, 2025	Original	Valid





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2 General Information

2.1 Applicant Information

Applicant	Shenzhen Kuxiu Communication Co., Ltd.
Address	Room 301, Bldg. 8, Minle Ind. Zone, Minle Community, Minzhi Str., Longhua Dist., Shenzhen Guangdong, China

2.2 Manufacturer Information

Manufacturer	Shenzhen Kuxiu Communication Co., Ltd.
Address	Room 301, Bldg. 8, Minle Ind. Zone, Minle Community, Minzhi Str., Longhua Dist., Shenzhen Guangdong, China

2.3 Factory Information

Factory	Shenzhen Mofhie Wireless Charging Technology Co.,Ltd
Address	Room 1202, Building 4, Bangyan Green Valley Factory, No. 98, Zhihe Road, Dakang Community, Yuanshan Street, Longgang District, Shenzhen, China

2.4 General Description of E.U.T.

Product Name	Magnetic Solid-State Power Bank
Model No. Under Test	S2
List Model No.	S1, S3, S4, S5, S6
Description of Model differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in appearance colors and model name. (this information provided by the customer)
Rating(s)	Type-C Input: 5V---3A/9V---2A Type-C Output: 5V---3A/9V---2.2A Total output: 5V---2.1A Wireless Charging Output: 5W/7.5W/10W/15W Capacity: 3.8VDC, 5000mAh, 19Wh Rated capacity: 3000mAh(5V---2.1A)
Product Type	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Test Sample No.	-1/2(Normal Sample), -2/2(Engineering Sample)
Hardware Version	N/A
Software Version	N/A
Remark	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.5 Technical Information of E.U.T.

Network and Wireless Connectivity	Wireless Power Transfer (WPT)
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The requirement for the following technical information of the EUT was tested in this report:

Technology	WPT
Operating Frequency	110.1-205KHz 360KHz
Modulation Type	110.1-205KHz: FSK 360KHz: ASK
Antenna Type	Inductive Loop Coil Antenna
Antenna Gain(Peak)	0 dBi
Remark	The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant.



3 Test Summary

3.1 Test Standard

The tests were performed according to following standards:

No.	Identity	Document Title
1	47 CFR Part 1 Subpart I Section 1.1310	Radio frequency radiation exposure limits.
2	47 CFR Part 2, Subpart J, Section 2.1093	Radiofrequency radiation exposure evaluation: portable devices
3	KDB 680106 D01v04	RF exposure consideration for low power consumer wireless power transfer applications.

Remark:

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

3.2 Test Verdict

No.	Description	FCC Part No.	Verdict	Remark
1	RF Exposure Evaluation	FCC 1.1310 FCC 2.1093 KDB 680106 D01 Wireless Power Transfer v04	Pass	--

3.3 Test Laboratory

Test Laboratory	Shenzhen EU Testing Laboratory Limited
Address	101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Designation Number	CN1368
Test Firm Registration Number	952583



4 Test Configuration

4.1 Test Environment

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	30% to 60%		
Atmospheric Pressure	86 kPa to 106 kPa		
Temperature	NT (Normal Temperature)		+15°C to +35°C
Working Voltage of the EUT	NV (Normal Voltage)		3.8VDC

4.2 Test Equipment

Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Electric and Magnetic Field Probe - Analyzer	Narda	EHP-200A	EE-405	2025/02/14	2026/02/13

Electric and Magnetic Field Probe - Analyzer EHP-200A detailed parameters are as follows.

Dynamic range	>80
SPAN	0 to FULL SPAN
RBW	1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz
Measurement range	> 94 dB
Calibration	internal E2PROM
Temperature error	0.02 dB/°C
Dimensions	92 x 92 x 109 mm
Weight	550 g
Preamplifier	selectable ON/OFF, 14dB
Units	V/m, A/m, uT, mW/cm2, W/m2
Internal battery	3.7 V - 5.55 Ah Li-Ion, rechargeable
Operation	> 12 hours
Recharging time	< 8 hours
External supply	10 to 15 Vdc, I = approx. 560 mA
Optical fiber connection	up to 40 m (USB-OC) up to 80 m (8053-OC)
Firmware updating	through the optical link via EHP200-TS
Self test	automatic at power on
Operating temperature	-10°C to +50°C
Storage temperature	-20°C to +70°C
Environmental protection	IP42



4.3 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned bellow was evaluated respectively.

No.	Description	Remark
TM1	Wireless Output (5W)	
TM2	Wireless Output (7.5W)	
TM3	Wireless Output (10W)	
TM4	Wireless Output (15W)	
TM5	Wireless Output (5W) + (7.5W)	
TM6	Wireless Output (5W) + (10W)	
TM7	Wireless Output (5W) + (15W)	
TM8	Wireless Output (5W) + (7.5W) + (10W) + (15W)	Record
TM9	Standby	

Note:

1. EUT supports empty load, half load, full load working at the same time, so the all conditions have been tested. It is found that TM8 full load is the worst mode, and the data in the report only reflects the worst mode.

4.4 Measurement Uncertainty

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

Test Item	Measurement Uncertainty
Magnetic field measurements(3kHz~10MHz)	±14.6%
Electric field measurements(3kHz~10MHz)	±17.3%



5 Test Methodology

5.1 Reference Evaluation Method

- ✧ ANSI C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz.
- ✧ FCC KDB publication 680106 D01 RF Exposure Wireless Charging Apps v04: RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications
- ✧ FCC CFR 47 Part 1.1310: Radiofrequency radiation exposure limits.
- ✧ FCC CFR 47 Part 2.1093: Radiofrequency radiation exposure evaluation: portable devices
- ✧ FCC CFR 47 Part 18.107: Industrial, Scientific, and Medical Equipment
- ✧ April 2024 TCBC Workshop: Part 18 Wireless Power Transfer Devices: Clarifications on KDB 680106v04 and ECR Processes.

5.2 Limit

According to FCC CFR 47 § 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
300-1,500			f/300	<6
1,500-100,000			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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

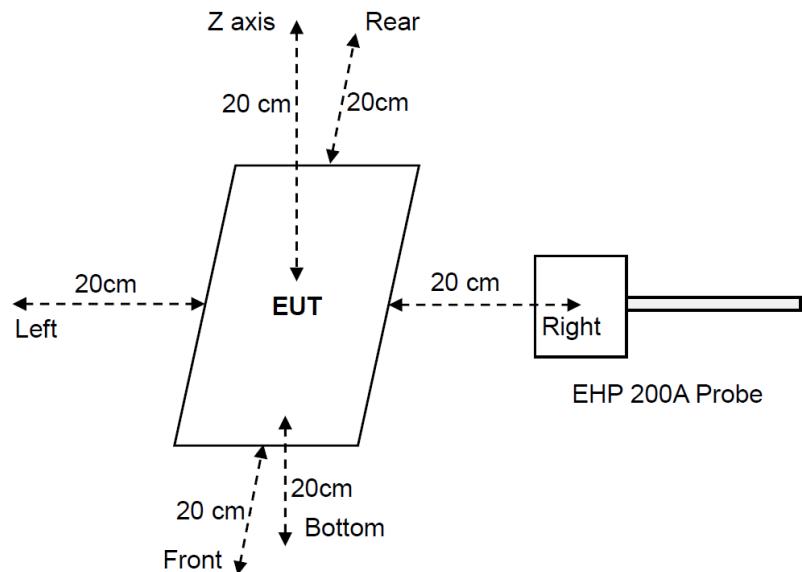
f = frequency in MHz. * = Plane-wave equivalent power density.

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.

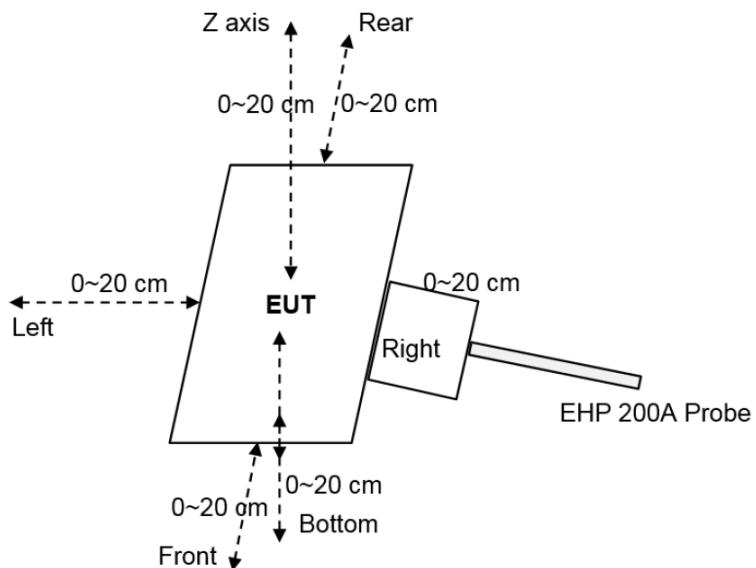
Note 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.3 Test Setup Diagram

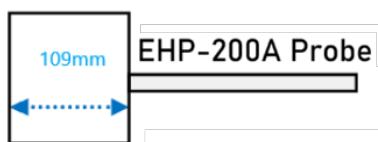
For Mobile Exposure Conditions:



For Portable Exposure Conditions:



- 1) The RF exposure test was performed in anechoic chamber.
- 2) The distance of the points (A, B, C, D, E, F) is 0,2,4,6,8,10,12,14,16,18,20cm.
- 3) The values tested by the probe are X, Y and Z on three axes perpendicular to the edge of the device. Top and bottom side coincident with the axis (Y) of the main coil.



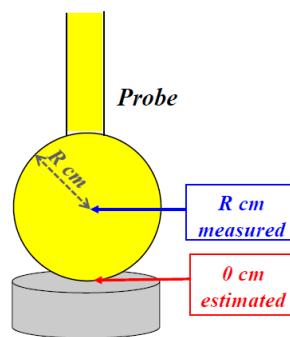
Note: The EHP-200A Probe has a diameter of 10.9cm and a radius of 5.45cm.

5.4 Measurement Procedure

For Portable Exposure Conditions:

- 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 tested, only show the data of worst case of 1% battery status of client device.
- 3) Test performed with all the radiating structures operating at maximum power at the same time.
- 4) E-field and H-field measurements are taken along all three axes the device from 0cm to 20cm in 2cm minimum increment for each edge surface of the host/client pair. If the center of the probe sensing elements is more than 5mm from the probe outer edge, the field strengths need to be estimated for the positions that are not reachable.
- 5) Validation of Field Estimates

a) If R is the probe radius and the probe tip is in contact with the coil, then the probe center is R cm from the coil surface as bellow picture:



b) The probe then is measuring the field correctly at R cm from the surface, and only estimating the field at the 0 cm point of contact with the coil surface.

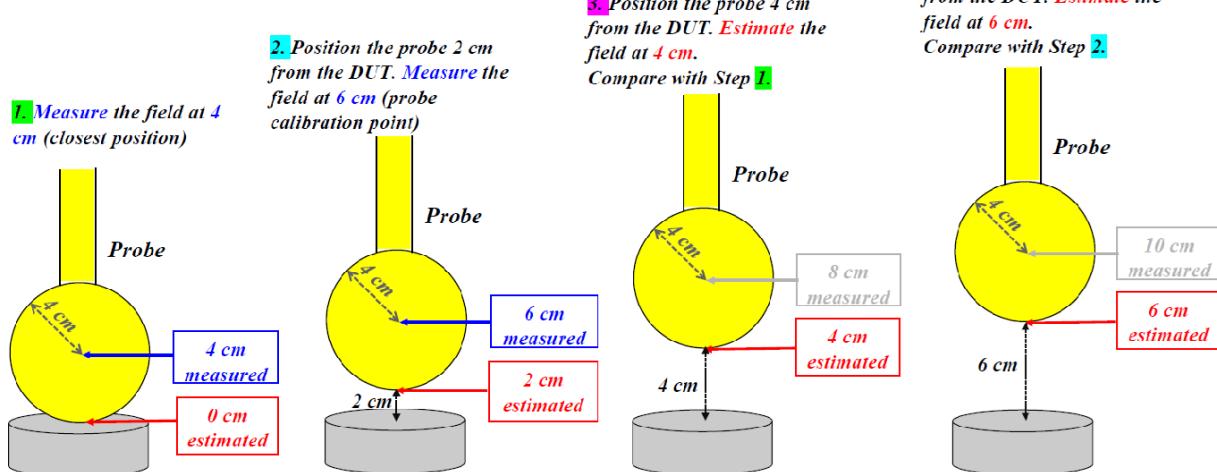
c) The validation requires showing that the model used to estimate the field provides data within 30% accuracy for at least the two, 2-cm-spaced closest points to where the estimates were made.

d) If there is only one estimated value, then a single validation point is sufficient.

e) Validation Example for 4 cm Probe Radius as following

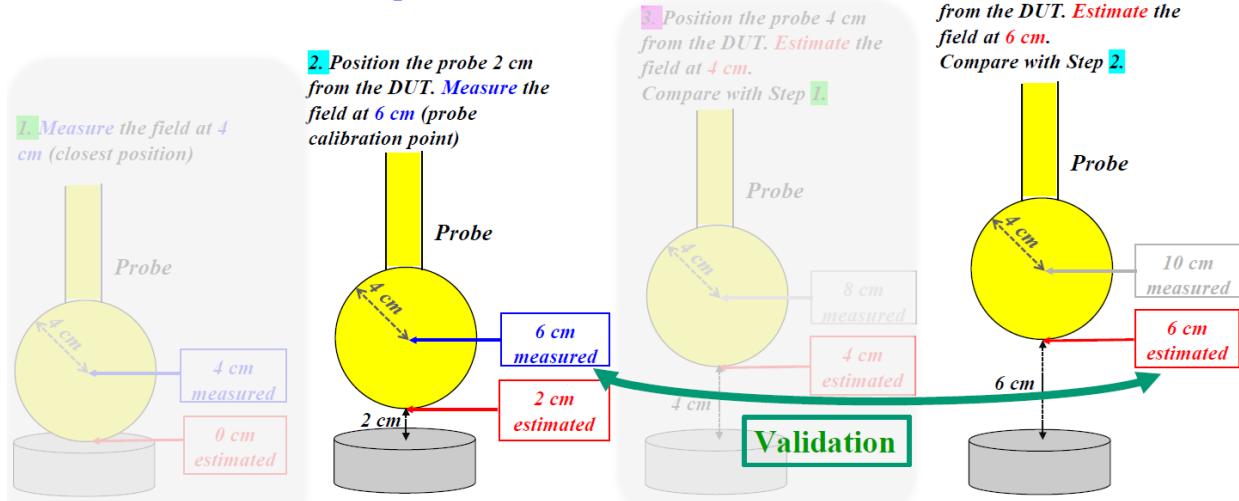
Step 1:

Validation Example for 4 cm Probe Radius



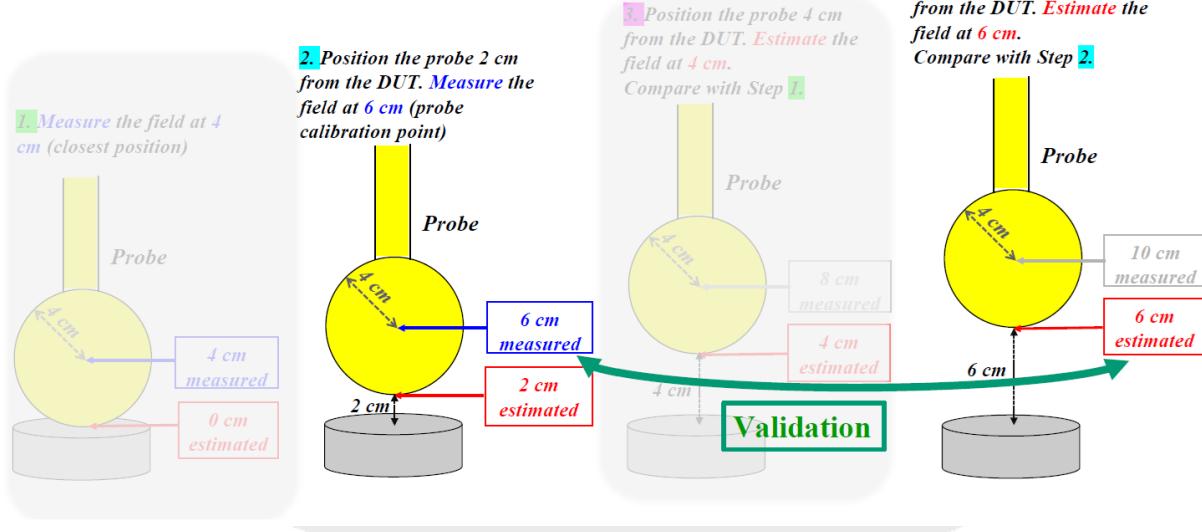
Step 2:

Validation Example for 4 cm Probe Radius



Step 3:

Validation Example for 4 cm Probe Radius

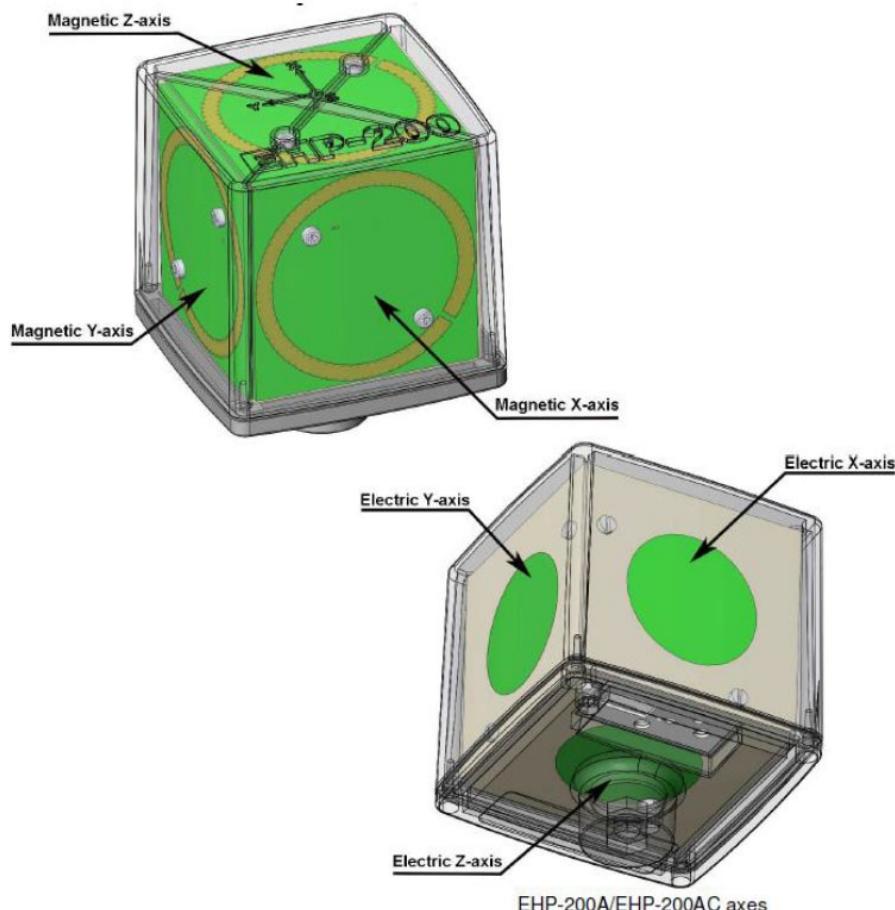


Description of the Validation Example for 4 cm Probe Radius

- Assume that $R=4$ cm. The field at 0 cm can only be estimated, but the field at 4 cm is measured exactly (at the center of the probe)
- Move the probe at 2 cm from the surface. The field at 2 cm can still only be estimated, but the field at 6 cm is measured exactly.
- Compare the estimate with the values at the same positions where the field was measured exactly (i.e. 4 cm and 6 cm)
- The difference between measurements and estimates needs to be no more than 30%.
- The validation of the estimates needs to be for the two closest points to the coil, but at least 2 cm apart (in this case they are). This is to avoid a validation at, say 2 cm and another on at 2.1cm, that is essentially a repetition.

6) According to Calibration information and specification about EHP-200A Probe, the probe's sensitive elements center are 8mm below the external surface, and the dimensions is 92*92*109mm, so the actual 0cm field strengths need to be estimated for the positions that are not reachable, only the result of test distance 2cm~20cm was measured value. The Extrapolated Value Calculation Method is described below.

	Length (mm)	Width (mm)	Height (mm)
	109	92	92

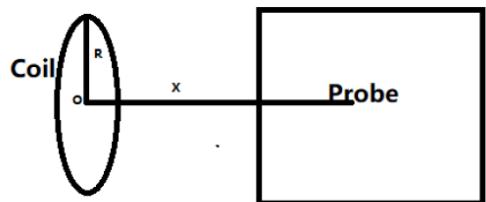


The sensitive elements are located approximately 8 mm below the external surface

Estimated method for portable RF Exposure condition:

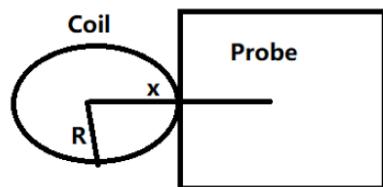
We use Biot-Savart formula theory to estimate the strength of the magnetic field that the measuring instrument cannot measure. According to Biot-Savart formula:

Top & Bottom Side:



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

Front, left, right & rear Side:



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

Where:

B: means H-field value.

μ_0 : space permeability; $\mu_0 = 4\pi \times 10^{-7}$:

I: A current element passing through a coil:

R: means the Radius of coil;

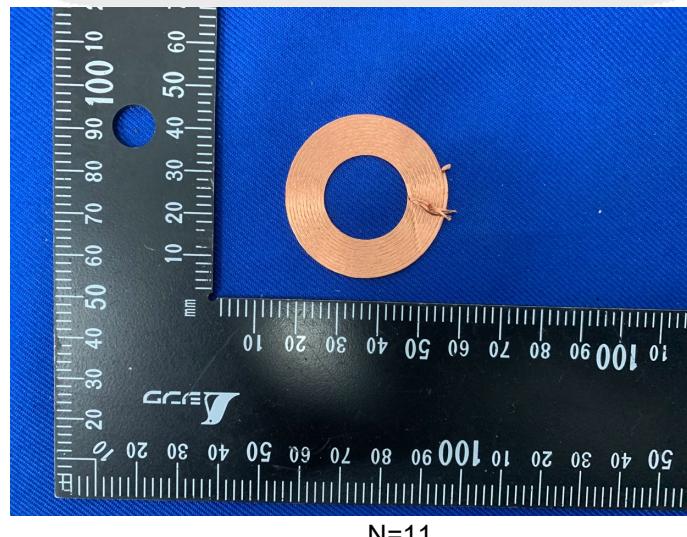
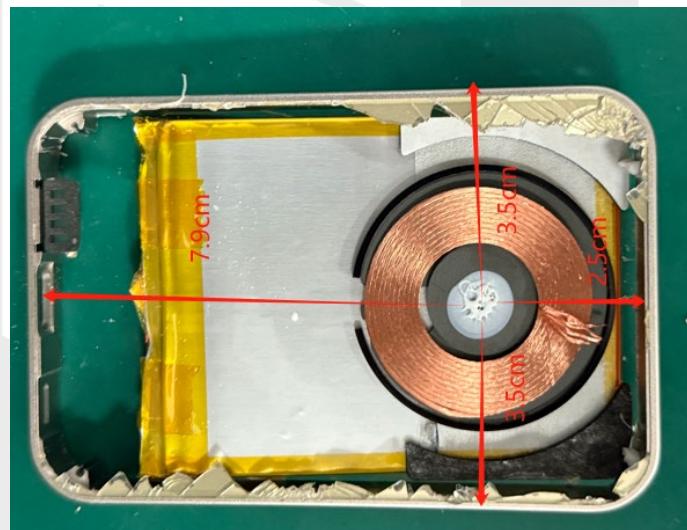
Test Distance: The distance from the sensing element of the probe to the edge of the device surface

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.

The conditions of EUT:



**For validation purposes:**

If the value to show a **30% agreement** between the model 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.

Validation:**H-Field Magnetic Field Emissions**

Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
2cm(estimated) (A/m)	0.2290	0.2520	0.2347	0.2280	0.1970	0.1912	
2cm(measured) (A/m)	0.2451	0.2689	0.261	0.2584	0.2123	0.2234	
Agreement (%)	6.79	6.49	10.61	12.50	7.48	15.53	Compliance within 30%

E-Field Magnetic Field Emissions

Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
2cm(estimated) (V/m)	35.045	34.62	35.99	33.042	32.204	33.113	
2cm(measured) (V/m)	38.765	38.72	39.575	38.005	37.321	36.284	
Agreement (%)	10.08	11.18	9.49	13.97	14.72	9.14	Compliance within 30%

H-Field Magnetic Field Emissions

Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
4cm(estimated) (A/m)	0.2970	0.2567	0.1873	0.1930	0.1744	0.1578	
4cm(measured) (A/m)	0.3325	0.2859	0.2012	0.2141	0.1987	0.1849	
Agreement (%)	11.28	10.76	7.16	10.37	13.03	15.82	Compliance within 30%

E-Field Magnetic Field Emissions

Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
4cm(estimated) (V/m)	34.880	35.541	34.457	33.486	34.293	34.732	
4cm(measured) (V/m)	38.235	39.430	37.348	36.099	38.337	39.124	
Agreement (%)	9.18	10.37	8.05	7.51	11.14	11.89	Compliance within 30%

Note:

1. The percent ratio of agreement is the difference between the estimated and measured values divided by the average of the estimated and measured values.
2. EUT is a loop/coil emitting structure, so E-field not required. Just record the H-field value.



5.5 Evaluation Result

Test Condition: Test Mode 8 operating with client device (1% battery status of client device)

Distance (cm)	H-Field Results (A/m)						Limit (A/m)	Conclusion
	Top	Bottom	Left	Right	Front	Back		
0	0.6693	0.2831	0.2602	0.3008	0.2020	0.3608	1.63	Compliance
2	0.4451	0.8376	0.3114	0.2754	0.1862	0.3003	1.63	Compliance
4	0.2690	0.4631	0.2786	0.2592	0.1856	0.2642	1.63	Compliance
6	0.2673	0.4037	0.2029	0.2267	0.1482	0.2894	1.63	Compliance
8	0.1677	0.3621	0.1305	0.1329	0.1488	0.1769	1.63	Compliance
10	0.1786	0.3212	0.1181	0.1230	0.0871	0.1390	1.63	Compliance
12	0.1613	0.2983	0.0909	0.0890	0.0675	0.1122	1.63	Compliance
14	0.1536	0.2951	0.0692	0.0859	0.0544	0.1054	1.63	Compliance
16	0.1505	0.2755	0.0634	0.0710	0.0426	0.0817	1.63	Compliance
18	0.1420	0.2442	0.0540	0.0550	0.0298	0.0668	1.63	Compliance
20	0.1403	0.2370	0.0438	0.0452	0.0231	0.0579	1.63	Compliance

Test Condition: Test Mode 8 operating with client device (1% battery status of client device)

Distance (cm)	E-Field Results (V/m)						Limit (V/m)	Conclusion
	Top	Bottom	Left	Right	Front	Back		
0	5.913	5.468	5.200	5.985	6.114	6.383	614	Compliance
2	5.786	3.581	5.558	3.615	5.556	3.247	614	Compliance
4	3.001	3.146	6.245	5.914	6.662	2.377	614	Compliance
6	3.667	2.501	4.302	4.349	2.224	3.574	614	Compliance
8	6.576	3.849	2.976	3.284	5.666	3.130	614	Compliance
10	2.945	2.556	4.859	6.780	2.319	3.355	614	Compliance
12	3.990	5.234	6.102	3.521	6.699	4.945	614	Compliance
14	5.543	4.498	3.726	5.609	3.749	4.991	614	Compliance
16	4.897	3.243	5.624	3.304	4.390	2.486	614	Compliance
18	2.145	5.639	5.046	3.648	3.739	2.238	614	Compliance
20	2.593	3.768	5.082	2.904	2.398	4.856	614	Compliance

ANNEX A TEST SETUP PHOTOS

PHOTO 1

Test Position: Top

Distance: 0cm

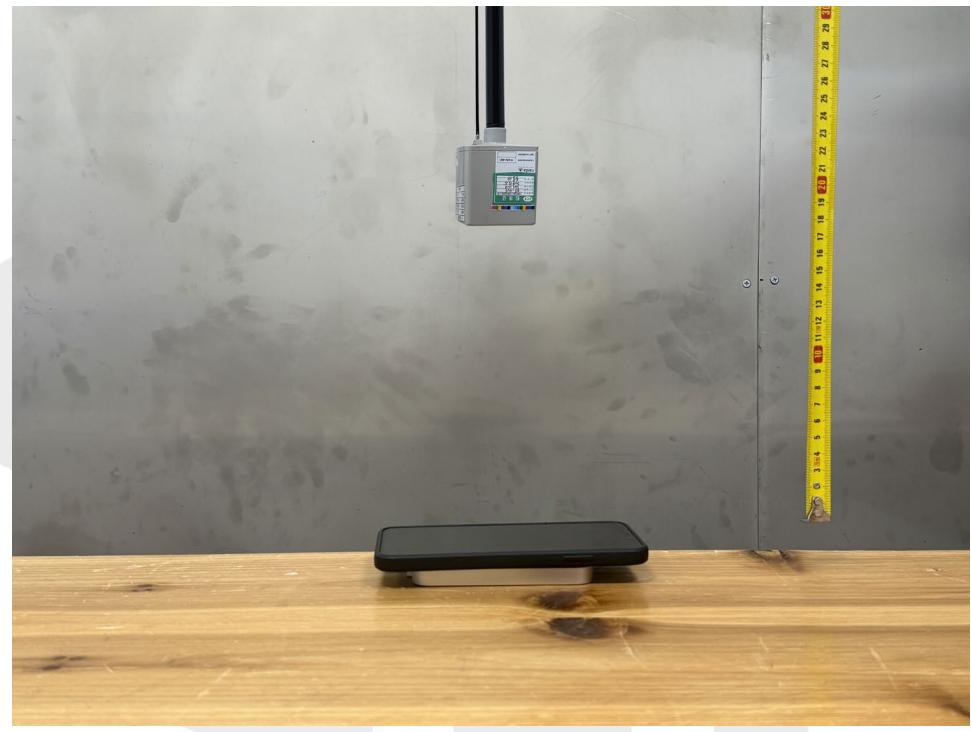


PHOTO 2



PHOTO 3



STATEMENT

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