RF Exposure Evaluation

Client Information:

Applicant:	Sariana LLC
Applicant Add.:	5482 Complex St Suite 110,San Diego/CA/92123San Diego, CA 92123 United States
Manufacturer:	Sariana LLC
Manufacturer Add.:	5482 Complex St Suite 110,San Diego/CA/92123San Diego, CA 92123 United States
Factory:	PYS High-Tech Co., Ltd
Factory Add.:	1F~12F, Block 9, Lianhua Industrial Zone, Longhua, Shenzhen, Guangdong 518109 CHINA

Product Information:

Product Name:	USB-C Magnetic Fast-Charging
Model No.:	ST-QCAWM
Brand Name:	N/A
FCC ID:	ZE9-STQCAWM
Applicable standards:	FCC CFR 47 PART 1, § 1.1310 KDB 680106 D01 Wireless Power Transfer v04

Prepared By:

Guangdong Asia Hongke Test Technology Limited

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Date of Receipt: Mar. 15, 2024 Date of Test: Mar. 15, 2024 ~ Mar. 18, 2024

Date of Issue: Mar. 18, 2024 Test Result: Pass

This device described above has been tested by Guangdong Asia Hongke Test Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Reviewed by: Sean She Sean She **Approved by:** Eder Zhan Eder Zhan

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Revision History

Revision	Issue Date	Revisions	Revised By
00	Mar. 18, 2024	Initial Issue	Eder Zhan

1 TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.1 Deviation from standard

None

1.2 Abnormalities from standard conditions

None

1.3 Test Location

Guangdong Asia Hongke Test Technology Limited
Address: B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Tel.: +86 0755-230967639 Fax.: +86 0755-230967639

2 GENERAL INFORMATION

EUT Name:	USB-C Magnetic Fast-Charging
Model No:	ST-QCAWM
Serial Model:	N/A
Test sample(s) ID:	AITSZ24031501001
Sample(s) Status:	Engineer sample
Operation frequency:	300kHz-350kHz
Modulation Technology:	FSK
Antenna Type:	loop coil Antenna
Antenna gain:	0dBi
Hardware version.:	N/A
Software version.:	N/A
Power supply:	Input: 110V -120V ~ 60Hz Wireless Output: 5W(MAX)
Model different:	N/A
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3. Measuring Standard

According to §1.1307(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 §2.1091 RF exposure is calculated. According KDB680106 D01: KDB 680106 D01 Wireless Power Transfer v04.

4. Requirements

According to the item 3 of KDB 680106 D01v04:

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

(1) Mobile Device and Portable Device Configurations

(2) Equipment Authorization Procedures for Devices Operating at Frequencies Below 4 MHz

(3) The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the top surface.

Limits

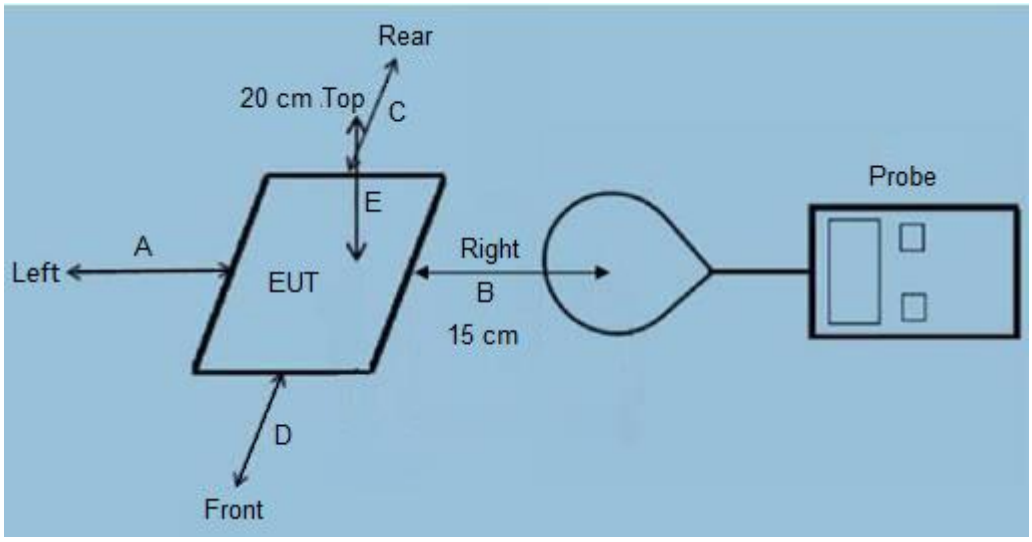
The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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).

5.Test Setup



6.Test Procedure

1) The RF exposure test was performed in anechoic chamber.

2) The measurement probe was placed at test distance (15 cm from all sides and 20 cm from the 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,F) were completed.

4) The EUT was measured according to the dictates of KDB 680106 D01 Wireless Power Transfer v04.

Remark：The EUT's test position A, B, C, D,E and F is valid for the E and H field measurements.

7.Equipment Approval Considerations

The EUT does comply with KDB 680106 D01 as follow table.

Requirements of section 5 of KDB 680106 D01	Yes / No	Description
Mobile Device and Portable Device Configurations	Yes	Mobile Device
Equipment Authorization Procedures for Devices Operating at Frequencies Below 4 MHz	Yse	The device operate in the frequency range 300-350kHz
RF Exposure compliance may be ensured only for a minimum separation distance that is greater than 20 cm, while use conditions at smaller distances can still be considered unlikely.	Yes	The EUT H-field strengths at 15 cm surrounding the device and 20 cm above the top surface.

8.Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

Test Mode	Description	
Mode 1	AC Adapter + EUT + Watch wireless charging full function test module	Record
Note: 1. All test modes were pre-tested, but we only recorded the worst case in this report.		

9. Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	Watch wireless charging full function test module	YBZ	5W	N/A	N/A	N/A
2	Adapter	BEVIU	HNT-PD2000	N/A	N/A	N/A

10. Test Instruments list

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Magnetic Amplitude and Gradient Probe System	SPEAG	MAGPy-8H3D+E3D V2 & MAGPy-DAS V2	3107 & 3097	03.15.2024	03.14.2025

Parameter	Specs
PROBE DESIGN	
Diameter	60 mm
8 isotropic H-field sensors	concentric loops of 1 cm^2 arranged at the corner of a cube of 22 mm side length
1 isotropic E-field sensor	orthogonal dipole/monopole (arm length: 50 mm)
Measurement center	18.5 mm from the probe tip
Temperature range	0–40 °C
Dimensions	110 × 635 × 35 mm (MAGPy-8H3D+E3D V2 & MAGPy-DAS V2)
H-FIELD SPECIFICATION	
Frequency range	3 kHz–10 MHz
Measurement range	0.1–3200 A/m, 0.12 µT–4 mT
Gradient range	0–80 T/m/T
E-FIELD SPECIFICATION	
Frequency range	3 kHz–10 MHz
Measurement range	0.08–2000 V/m

11. Compliance Location: Center vs Tip-Surface of the Probe

The following information is from the equipment manual:

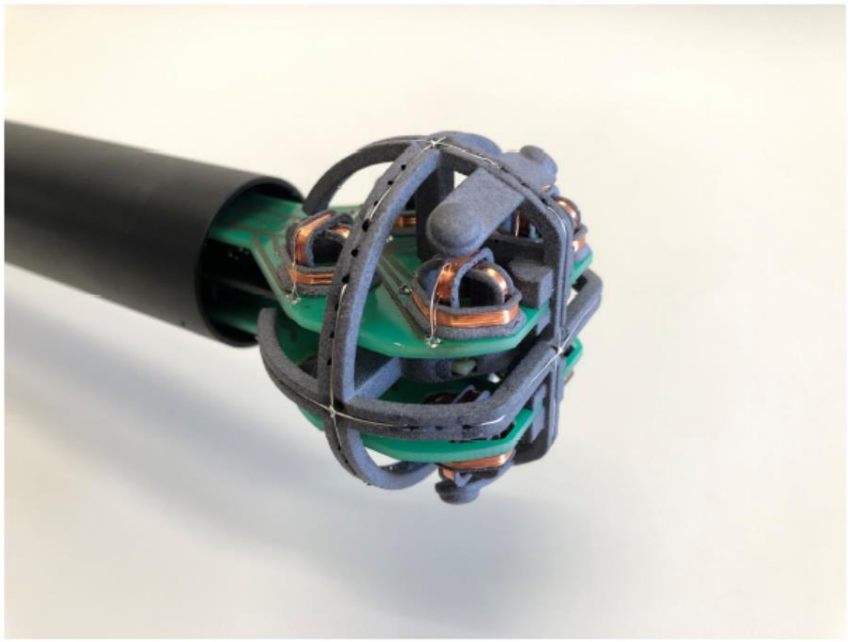


Figure 2.1: MAGPy-8H3D+E3D V2 probe, without the casing

In the MAGPy V2.0 implementation, the H-field is evaluated at the center of the probe (which is 18.5mm above the surface of its tip) and also at the surface of its tip.

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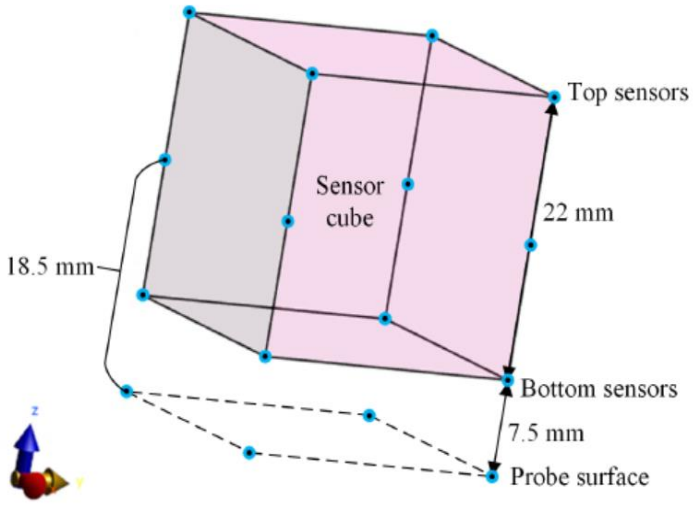


Figure 2.5: Extrapolation of the total H-field at the probe surface is made at each pair of sensors (i.e., bottom and top sensors) around the sensor cube

The total H-field at the tip-surface $H_{tip-surface}$ can be extrapolated using the total H-field measured at the top and bottom sensors (Figure 2.5), H_{top} and H_{bottom}, as well as the normalized H-field gradient G_n. The field extrapolation formula is a polynomial function of G_n ($\Delta d = 18.5$ mm) [7].

$$H_{tip-surface} = \frac{H_{bottom} + H_{top}}{2} \sum_{i=0}^{7} c_i \left(G_n \Delta d\right)^i \tag{1.6}$$

The polynomial coefficients c_i are given in Table 2.2. They have been determined from simulations of 70 coils covering normalized gradients up to 80 for the 97.5$^{\text{th}}$ percentile (Figure 2.6). This provides a conservative estimate of the total H-field at the tip-surface without large overestimation.

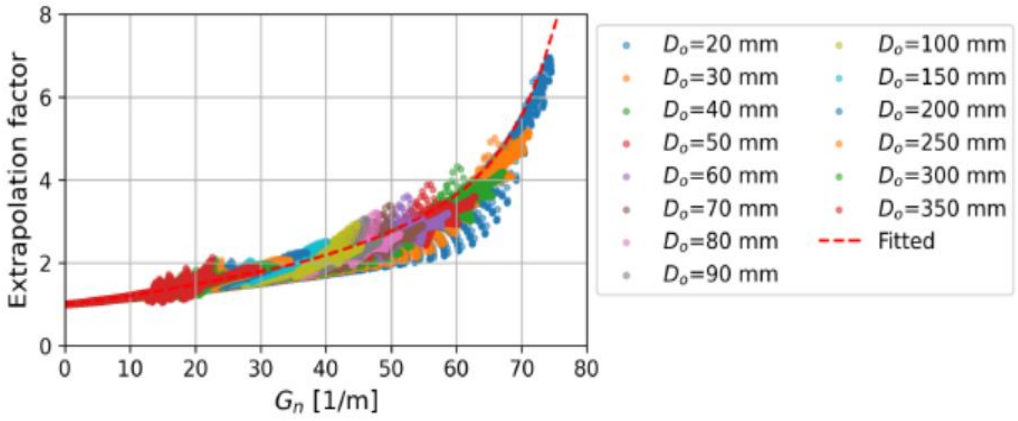


Figure 2.6: Extrapolation factors (i.e., ratios between the simulated results of $H_{tip-surface}$ and $\frac{H_{bottom}+H_{top}}{2}$) plotted as a function of the normalized H-field gradient. The data are from simulations of 70 coils with varying outer diameters D_o and filling ratios (0.1–0.9). The predication of the polynomial function $\sum_{i=0}^{7} c_i \left(G_n \Delta d\right)^i$ with coefficients fitted for 97.5th percentile (i.e., the red dashed line) is also shown.

Coefficient	Value
c_0	1.00
c_1	1.00
c_2	-1.01
c_3	15.9
c_4	-50.8
c_5	74.7
c_6	-51.4
c_7	13.7

Table 2.2: Coefficients of the polynomial function for the H-field extrapolation to the tip-surface of the probe, determined with 0.975 quantile regression (i.e., the 97.5$^{\text{th}}$ percentile)

12. Test Result

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 1%	Top	15.44	0.64
15cm	＜ 1%	Top	15.57	0.65
15cm	＜ 1%	Left	15.14	0.66
15cm	＜ 1%	Right	15.42	0.61
15cm	＜ 1%	Front	15.23	0.56
15cm	＜ 1%	Rear	15.67	0.61
Limit			614	1.63
Margin Limit (%)			2.55%	40.49%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 50%	Top	14.28	0.57
15cm	＜ 50%	Top	13.43	0.57
15cm	＜ 50%	Left	13.76	0.69
15cm	＜ 50%	Right	14.03	0.61
15cm	＜ 50%	Front	13.83	0.55
15cm	＜ 50%	Rear	13.79	0.66
Limit			614	1.63
Margin Limit (%)			2.33%	42.33%

MPE				
Test distance	Battery levels	Probe from EUT Side	E-field (V/m)	H-field (A/m)
20cm	＜ 99%	Top	13.75	0.53
15cm	＜ 99%	Top	12.83	0.48
15cm	＜ 99%	Left	13.25	0.45
15cm	＜ 99%	Right	12.91	0.68
15cm	＜ 99%	Front	13.59	0.58
15cm	＜ 99%	Rear	13.11	0.45
Limit			614	1.63
Margin Limit (%)			2.24%	41.72%

Note: All test modes were pre-tested, but we only recorded the worst case in this report.

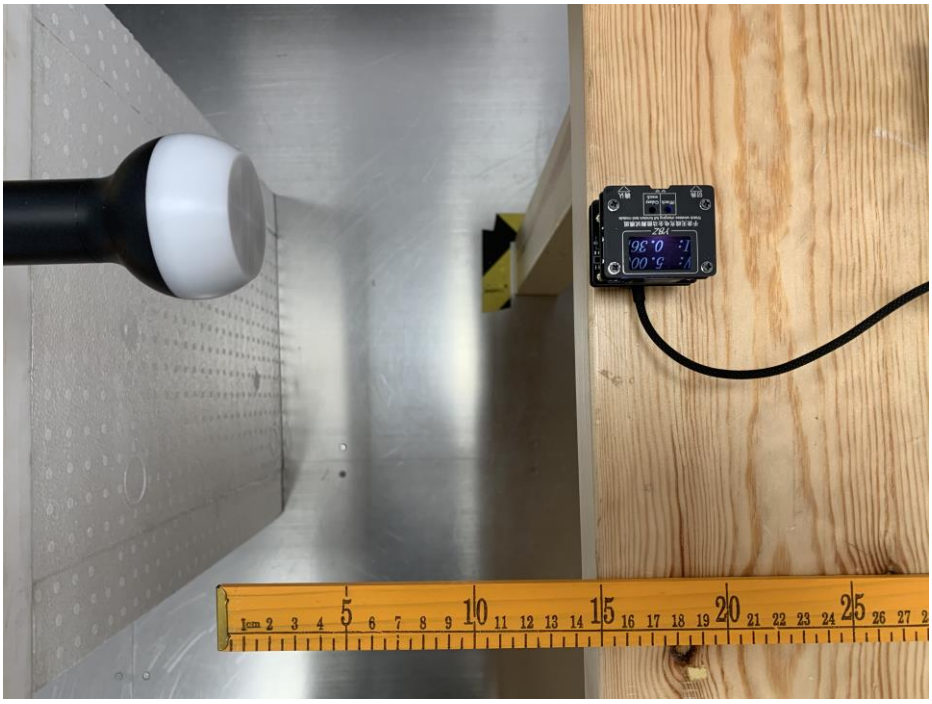
13. Test Setup photo

Front

Left

Rear

Right



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End of report