TEST REPORT

Report No.:	8234EU011004W2
Applicant:	QUEST USA CORP
Address:	495 Flatbush Ave, Brooklyn, NY 11225, USA
Product Name:	Wireless Magnetic Power Bank
Model No.:	IJ10191-FB (refer to clause 2.4)
Trademark:	IJOY
FCC ID:	2AJQ7POWERBANK1
Test Standard(s):	47 CFR Part 1 Subpart I Section 1.1310 47 CFR Part 2, Subpart J, Section 2.1091
Date of Receipt:	Oct. 10, 2024
Test Date:	Oct. 10, 2024 – Oct. 17, 2024
Date of Issue:	Nov. 29, 2024

ISSUED BY:

SHENZHEN EU TESTING LABORATORY LIMITED

SHENZHEN EU TESTING LABORATORY LIMITED APPROVED

Prepared by:	**Reviewed and Approved by:**
Mikey Zhu/ Engineer	Sally Zhang/ Manager

Revision Record

Report Version	Issued Date	Description	Status
V0	Nov. 29, 2024	Original	Valid

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Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
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2 General Information

2.1 Applicant Information

Applicant	QUEST USA CORP
Address	495 Flatbush Ave, Brooklyn, NY 11225, USA

2.2 Manufacturer Information

Manufacturer	QUEST USA CORP China Office
Address	601 Bld1, Cloud Park, 233 Bulong Road, Longgang, Shenzhen, China 518112

2.3 Factory Information

Factory	QUEST USA CORP China Office
Address	601 Bld1, Cloud Park, 233 Bulong Road, Longgang, Shenzhen, China 518112

2.4 General Description of E.U.T.

Product Name	Wireless Magnetic Power Bank
Model No. Under Test	IJ10191-FB
List Model No.	IJ10192-FB, IJ10223-FB, IJAST201-FB, IJAST420-FB, IJ10377-FB, IJ10378-FB, IJ10379-FB, DS20627-KH
Description of Model differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in appearance color and model name. (this information provided by the customer)
Rating(s)	Rated Energy: 18.5Wh/3.7V Battery Capacity: 5000mAh Output Capacity: 3300mAh Input Voltage: 5V⎓2A Type-A Output Voltage: 5V⎓2A Wireless Charger Output: 5W
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Test Sample No.	-1/2(Normal Sample), -2/2(Engineering Sample)
Hardware Version	N/A
Software Version	N/A
Remark	1) The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant. 2) 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)

The requirement for the following technical information of the EUT was tested in this report:

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

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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 2.1091	Radiofrequency radiation exposure evaluation: mobile 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 2.1091 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℃ to +35℃
Working Voltage of the EUT	NV (Normal Voltage)	120 VAC, 60Hz

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	2024/02/15	2025/02/14

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
Enviromental 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 for Phone) + Empty Load	Record
TM2	Wireless Output (5W for Phone) + Half Load	
TM3	Wireless Output (5W for Phone) + Full Load	
TM4	Standby	
Note: 1. All the conditions have been tested. It is found that TM3 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%

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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

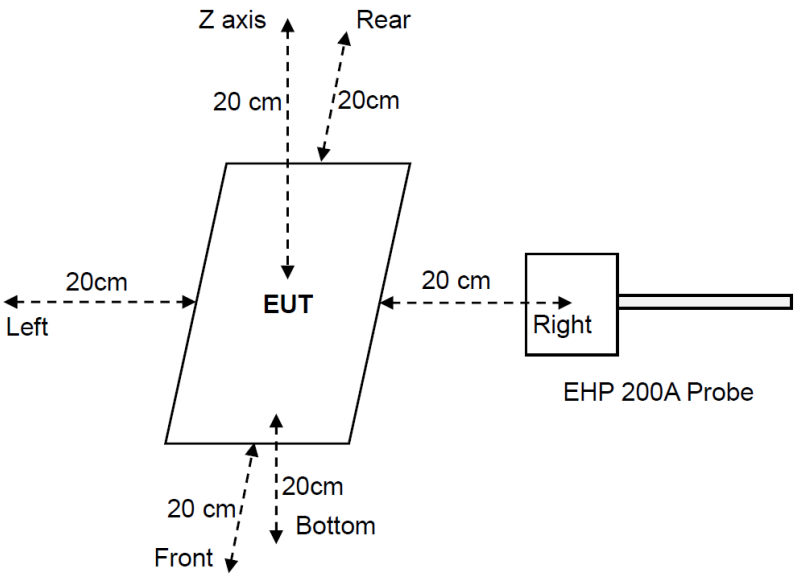
*f = frequency in MHz. * = Plane-wave equivalent power density.*

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.

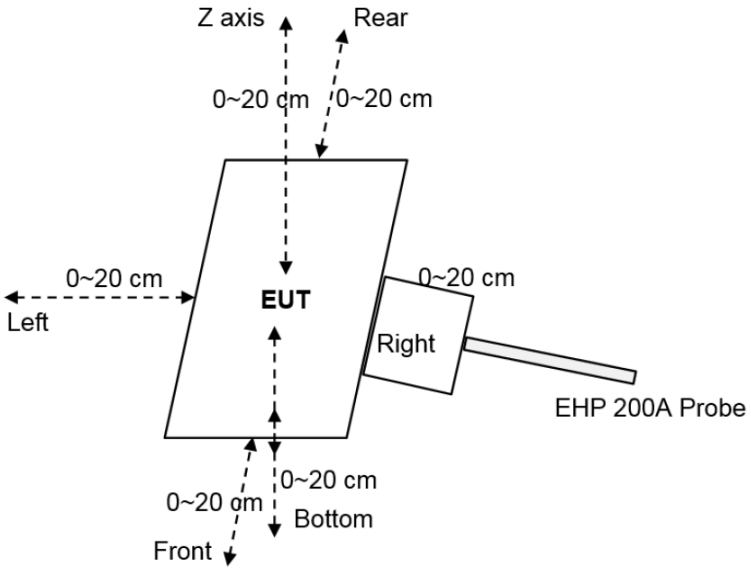
Note 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.3 Test Setup Diagram

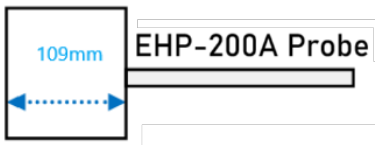
For Mobile Exposure Conditions:



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.

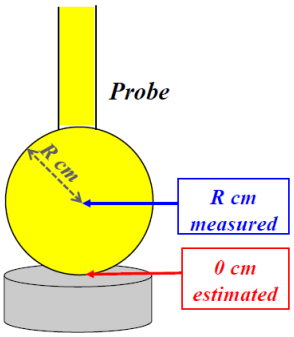
2) Operating modes with client device (1%, 50%, 99% battery status of client device), have been tested, only show the data of worst case of 1% battery status of client device.

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:



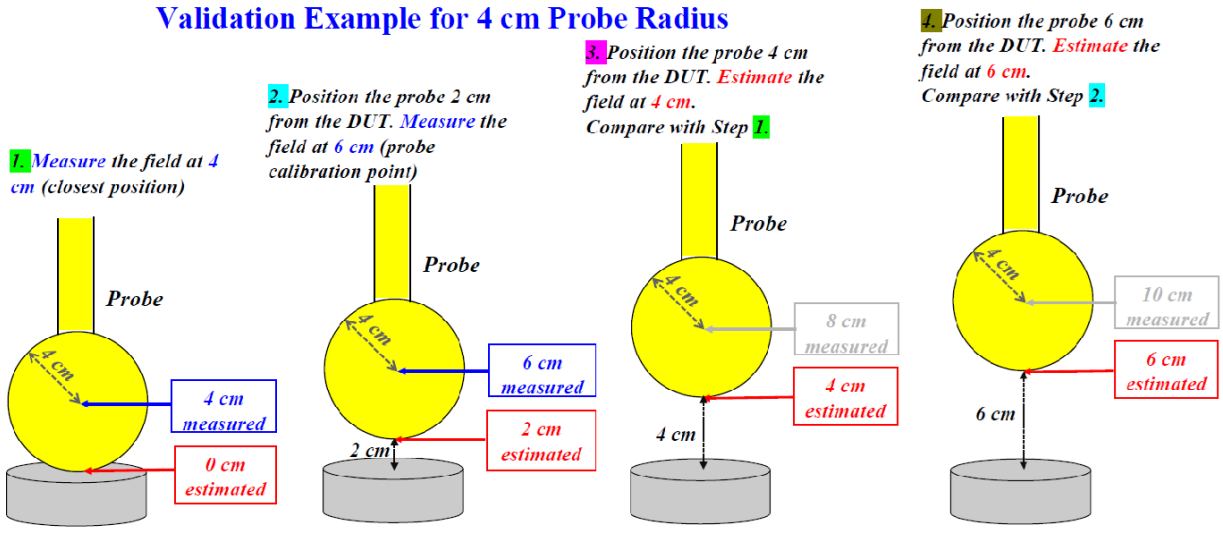
b) The probe then is measuring the field correctly at R cm from the surface, and only estimating the field at the 0 cm point of contact with the coil surface.

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.

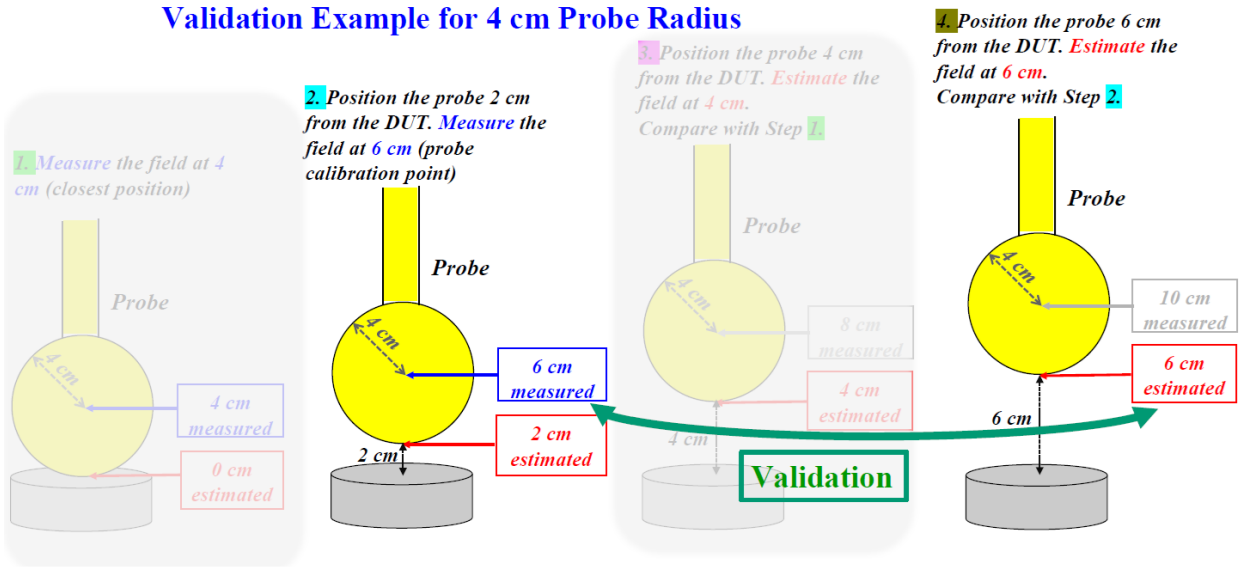
d) If there is only on estimated value, then a single validation point is sufficient.

e) Validation Example for 4 cm Probe Radius as following

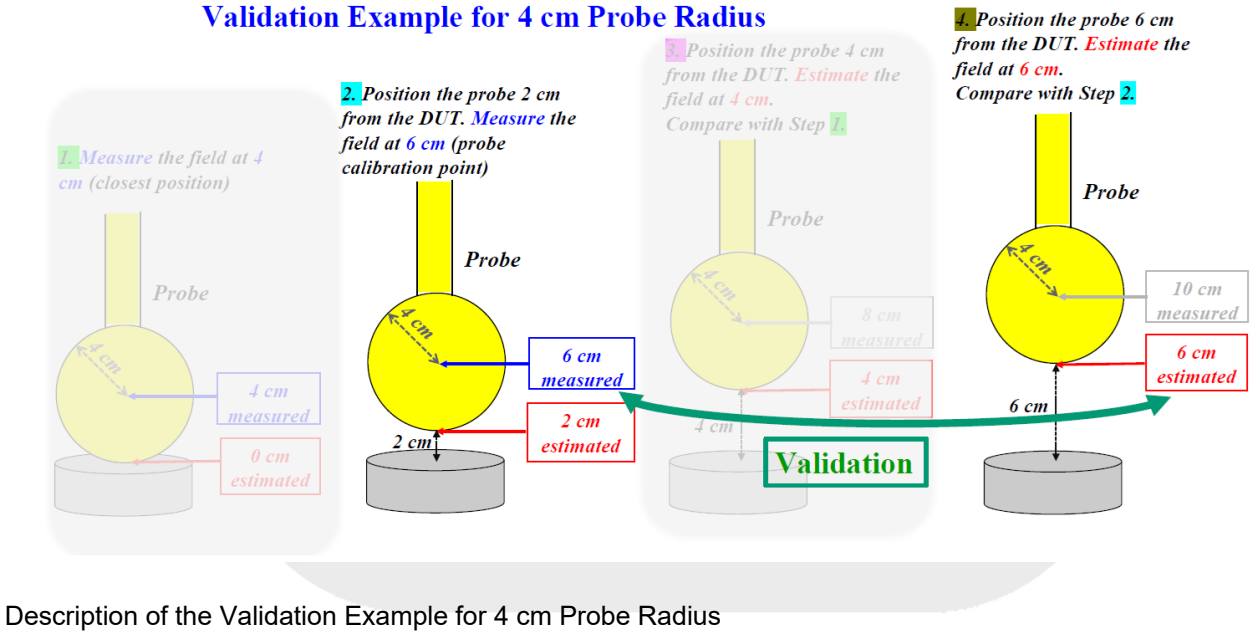
Step 1:



Step 2:



Step 3:

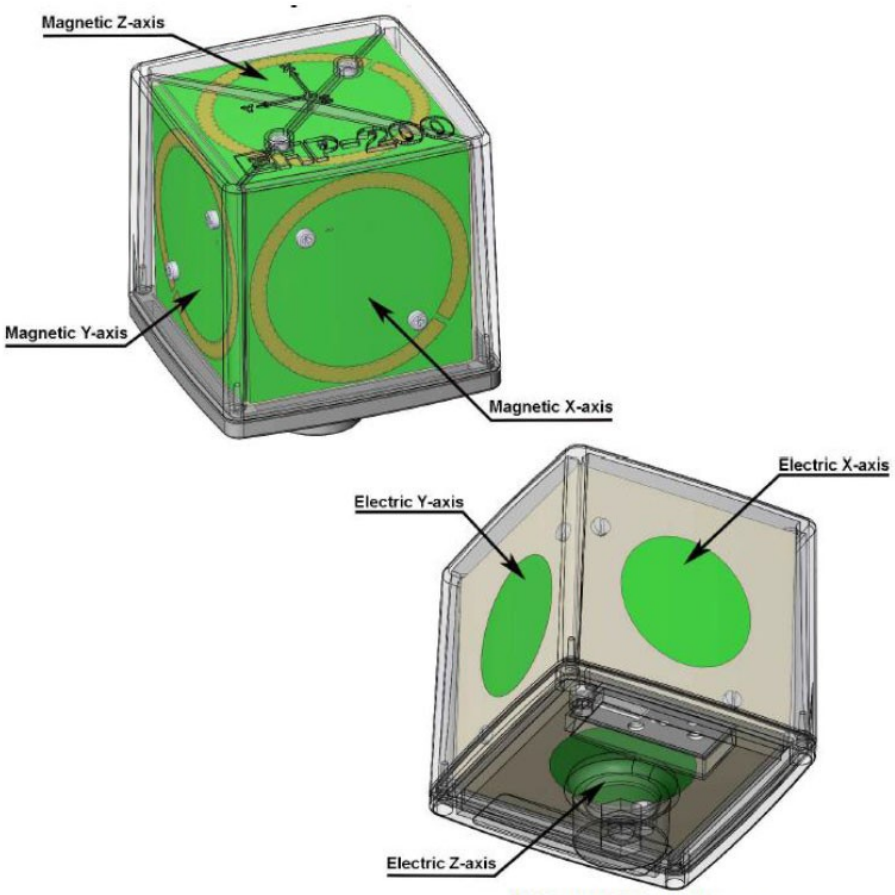


Description of the Validation Example for 4 cm Probe Radius

- 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



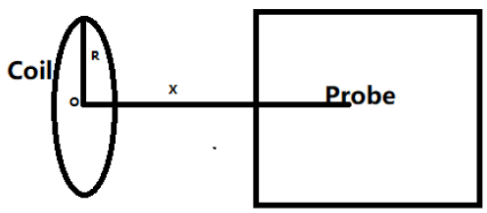
EHP-200A/EHP-200AC axes

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

Estimated method for portable RF Exposure condition:

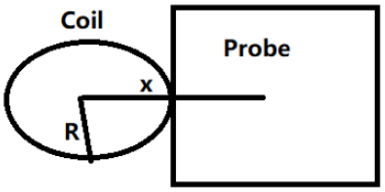
We use Biot-Savart formula theory to estimate the strength of the magnetic field that the measuring instrument cannot measure. According to Biot-Savart formula:

Top & Bottom Side:



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

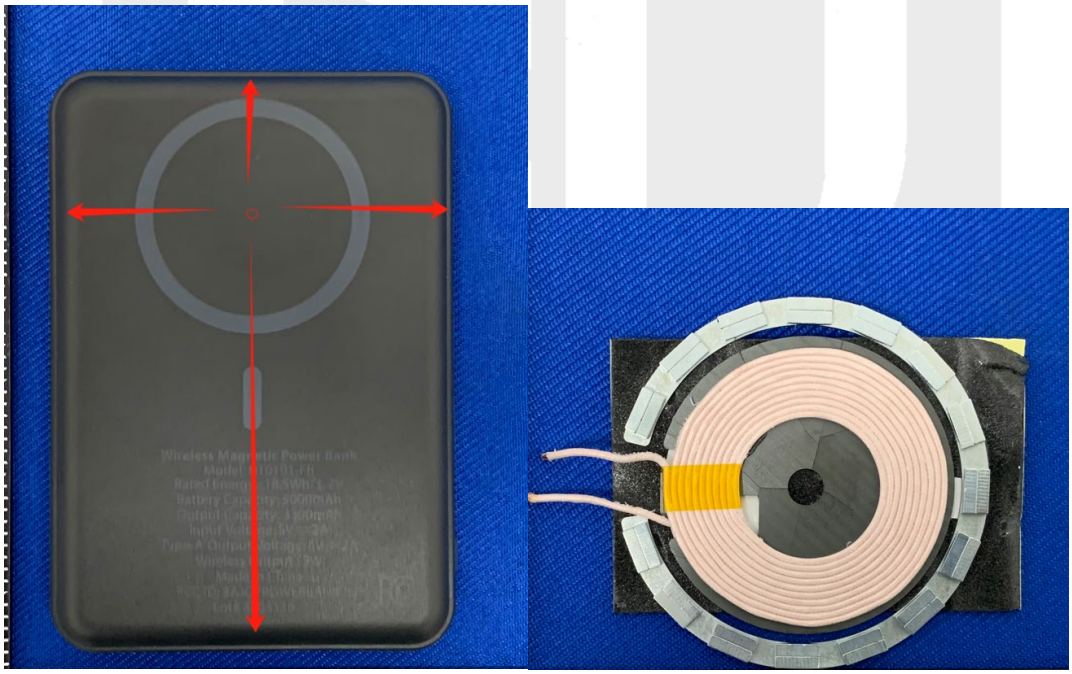
Front, left, right & rear Side:



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

Where:
B: means H-field value.
μ_0: space permeability; u0=4π*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:



N=10

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:

Magnetic Field Emissions							
Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
2cm(estimated) (A/m)	0.3359	0.2743	0.2877	0.1183	0.4821	0.3754	Compliance within 30%
2cm(measured) (A/m)	0.4051	0.3100	0.3162	0.1209	0.5878	0.4446	
Agreement (%)	18.68	12.22	9.44	2.17	19.76	16.88	

Magnetic Field Emissions							
Test Distance (cm)	Top	Bottom	Front	Rear	Left	Right	Conclusion
4cm(estimated) (A/m)	0.2119	0.2048	0.1193	0.1099	0.2706	0.2051	Compliance within 30%
4cm(measured) (A/m)	0.2303	0.2274	0.1254	0.1145	0.3242	0.2504	
Agreement (%)	8.32	10.46	4.99	4.10	18.02	19.89	

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 1 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	0.6479	0.4711	0.6084	0.1529	0.6901	0.6102	1.63	Compliance
2	0.4051	0.3100	0.3162	0.1209	0.5878	0.4446	1.63	Compliance
4	0.2303	0.2274	0.1254	0.1145	0.3242	0.2504	1.63	Compliance
6	0.1650	0.1807	0.1001	0.1062	0.2234	0.1047	1.63	Compliance
8	0.1639	0.1743	0.0872	0.0911	0.1431	0.0726	1.63	Compliance
10	0.1626	0.1655	0.0832	0.0742	0.0512	0.0498	1.63	Compliance
12	0.1614	0.1605	0.0744	0.0735	0.0476	0.0358	1.63	Compliance
14	0.1610	0.1580	0.0691	0.0664	0.0423	0.0372	1.63	Compliance
16	0.1603	0.1576	0.0682	0.0639	0.0191	0.0202	1.63	Compliance
18	0.1539	0.15511	0.0573	0.0551	0.0173	0.0154	1.63	Compliance
20	0.1418	0.1446	0.0423	0.0462	0.0098	0.0084	1.63	Compliance

ANNEX A TEST SETUP PHOTOS

PHOTO 1

Test Position: Top
Distance: 0cm

PHOTO 2

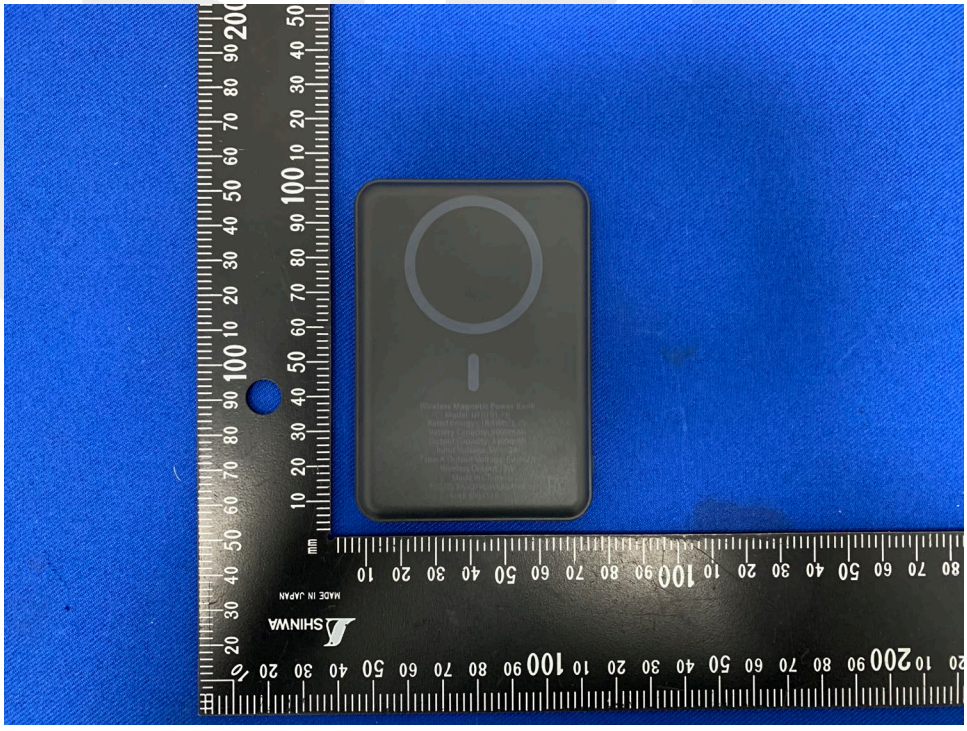
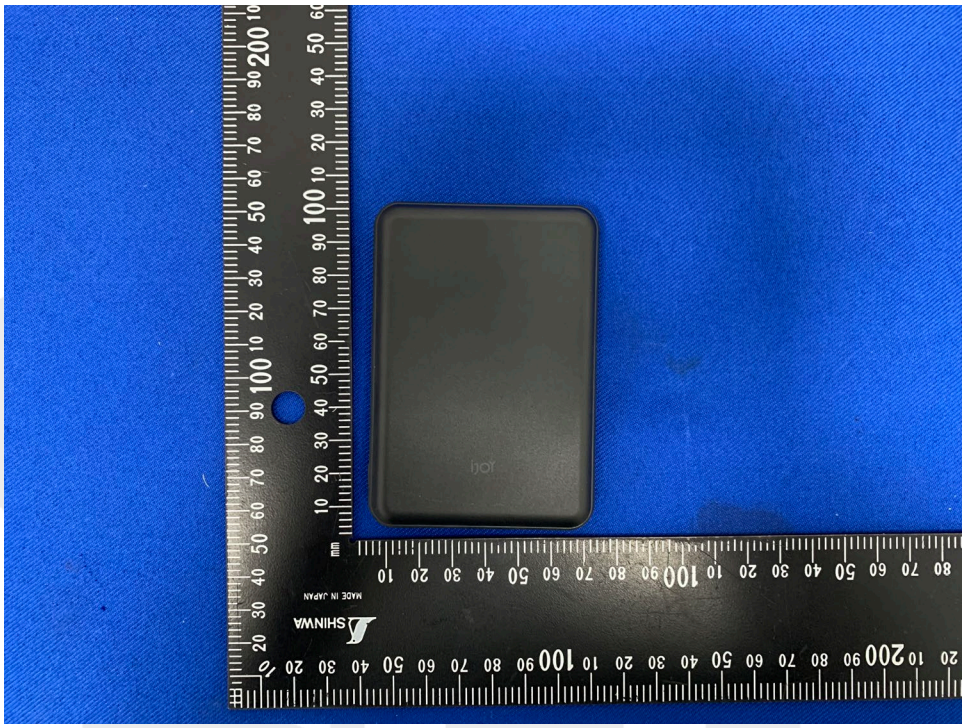


PHOTO 3	

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