



RF Exposure Evaluation Report

1 Product Information

FCC ID:	2A4MT-WPB05
Product Name:	Power Bank
Model Number:	XDL-WPB05
Serial Model No.	ZHX-PB22, ZHX-PB23, XDL-WPB06, XDL-WPB07, XDL-WPB08, XDL-WPB09, XDL-WPB10
Model Difference	All the same except the model number.
Power Supply:	Capacity:1400mAh 3.7V 5.18Wh Input (USB-C): DC 5V 1A Wireless Output: 3W MAX
Frequency Range:	326.6 KHz
Antenna Type:	Coil Antenna
Hardware version	V1.0
Software version	V1.0
Accessories	Watch: CS01 Adapter: PD-014
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Portable Device



2 Evaluation Method

Per KDB 680106 D01v03r01 Section 3. RF Exposure Requirements;

- 1) Consumer wireless power transfer devices approved under Part 18 in some cases have to demonstrate compliance with RF exposure requirements. The potential for exposure must be assessed according to the operating configurations of the wireless system and the exposure conditions of users and bystanders. RF exposure must be evaluated with the client device(s) being charged by the primary at maximum output power. The RF exposure requirements must be determined in conjunction with the device operating characteristics, according to the mobile and portable exposure requirements in Section 2.1091 and Section 2.1093 of the rules. SAR and MPE limits do not cover the frequency range for wireless power transfer applications which operate below 100 kHz and 300 kHz respectively; therefore, RF exposure compliance needs to be determined with respect to 1.1307 (c) and (d) of the FCC rules.
- 2) Based on the design and implementation of the power transfer application, it must be clearly identified if mobile or portable RF exposure conditions apply. Devices that are installed to provide separation of at least 20 cm from users and bystanders may qualify for mobile exposure conditions. For some conditions where users and bystanders may be exposed at closer than 20 cm, section 2.1091(d) (4) of the rules may apply.
- 3) For devices designed for typical desktop applications, such as wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.
- 4) Portable exposure conditions from 100 kHz to 6 GHz are determined with respect to SAR requirements. Existing SAR systems and test procedures are generally intended for measurements above 100 MHz. While numerical modeling can be an alternative, the constraints of substantial computational resources at low frequencies could introduce further limitations. Under these circumstances, including operations below 100 kHz, the Commission may consider a combination of analytical analysis, field strength, radiated and conducted power measurements, in conjunction with some limited numerical modeling to assess compliance. Depending on the operating frequency, existing SAR and MPE measurement procedures may be adapted to evaluate wireless power transfer devices for compliance with respect to mobile or portable exposure conditions. If the grantee or its test lab have any questions regarding RF exposure evaluation they should contact the FCC Laboratory with sufficient system operating configuration details to determine if RF exposure evaluation is necessary and, if required, how to apply specific test procedures. Below 100 MHz, when SAR testing is required and the device is operating at close proximity to persons, information on device design, implementation, operating configurations, exposure conditions of users and bystanders are needed to determine the evaluation and testing requirements. In addition, the influence of nearby objects may also need consideration according to the wireless power transfer system implementation; for example, the effects of placing the device, its coils or radiating elements on or near metallic surfaces.
- 6) According to April 2022 TCB Workshop, "Large size" probes may prevent the measurement of E- and/or H-fields near the surface of the radiating structure (e.g., a WPT source coil). If the center of the probe sensing element is more than 5 mm from the probe outer edge, the field strengths need to be estimated for the positions that are not reachable (from the surface, in 2 cm increments).



3 Evaluation Limit

3.1 Refer evaluation method

ANSI C95.1 – 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

680106 D01 RF Exposure Wireless Charging Apps v03r01: RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

FCC CFR 47 part 15: Intentional Radiators

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	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/f ²	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/cm ²)	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/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

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.



The diagram shows a 3D rectangular prism labeled 'EUT'. The dimensions are: Length = 20 cm (Left to Right), Width = 20 cm (Front to Rear), and Height = 20 cm (Bottom to Top). The faces are labeled: Top, Bottom, Front, Rear, Left, and Right. Measurement points are indicated by arrows: 'A' points to the Left face, 'B' points to the Right face, 'C' points to the Top face, 'D' points to the Front face, 'E' points to the Bottom face, and 'F' points to the Rear face. A 'Probe' is shown on the right, connected to a circular component that is positioned to measure the Right face (B).

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Electromagnetic radiation frequency probe	Narda	EHP-200A	N-1114	Mar. 01, 2023	Feb. 29, 2024

- a) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- b) The 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.
- c) 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.
- d) The EUT were measured according to the dictates of 680106 D01 RF Exposure Wireless Charging Apps v03r01



7 Equipment Approval Considerations

The EUT does comply with item 5.2 of 680106 D01 RF Exposure Wireless Charging Apps v03r01 as follows table;

Requirements of 680106 D01 RF Exposure Wireless Charging Apps v03r01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 326.6KHz
Output power from each primary coil is less than 15 watts	Yes	The maximum output power of the primary coil is 3W Max.
The system may consist of more than one source primary coils, charging one or more clients. If more than one primary coil is present, the coil pairs may be powered on at the same time.	Yes	The transfer system includes single coil that is able to detect receiver device.
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	portable exposure conditions
The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the surface from all coils that by design can simultaneously transmit, and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit.	Yes	The EUT 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.

In all other cases, unless excluded above, an RF exposure evaluation report must be reviewed and accepted through a KDB or PBA inquiry to enable authorization of the equipment. When evaluation is required to show compliance; for example, using field strength, power density, SAR measurements or computational modeling etc., the specific authorization requirements will be determined based on the results of the RF exposure evaluation.



8 H field Strength

Test Modes:	Description	
Mode 1	EUT + Watch	Record
Mode 2	Charging	Pre-tested
Mode 3	Charging+EUT+Watch	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

Charging Battery Level	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		
1%	0	0.468	0.529	0.582	0.632	0.606	0.603	0.815	1.63
50%	0	0.599	0.503	0.575	0.507	0.572	0.519	0.815	1.63
99%	0	0.641	0.525	0.510	0.557	0.546	0.463	0.815	1.63
1%	2	0.495	0.625	0.497	0.540	0.562	0.599	0.815	1.63
50%	2	0.616	0.558	0.583	0.466	0.630	0.563	0.815	1.63
99%	2	0.496	0.567	0.563	0.621	0.513	0.634	0.815	1.63
1%	4	0.510	0.606	0.602	0.546	0.606	0.531	0.815	1.63
50%	4	0.484	0.513	0.568	0.454	0.463	0.477	0.815	1.63
99%	4	0.564	0.626	0.611	0.543	0.509	0.533	0.815	1.63
1%	6	0.607	0.564	0.496	0.527	0.474	0.570	0.815	1.63
50%	6	0.562	0.522	0.459	0.504	0.645	0.473	0.815	1.63
99%	6	0.630	0.641	0.515	0.520	0.613	0.552	0.815	1.63
1%	8	0.375	0.409	0.429	0.424	0.377	0.426	0.815	1.63
50%	8	0.368	0.408	0.430	0.432	0.396	0.426	0.815	1.63
99%	8	0.438	0.382	0.413	0.400	0.404	0.435	0.815	1.63



Charging Battery Level	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		
1%	10	0.420	0.411	0.387	0.381	0.368	0.394	0.815	1.63
50%	10	0.415	0.373	0.359	0.381	0.372	0.395	0.815	1.63
99%	10	0.394	0.378	0.386	0.450	0.353	0.374	0.815	1.63
1%	12	0.449	0.426	0.396	0.402	0.448	0.364	0.815	1.63
50%	12	0.405	0.364	0.417	0.420	0.449	0.443	0.815	1.63
99%	12	0.405	0.431	0.435	0.405	0.406	0.421	0.815	1.63
1%	14	0.340	0.259	0.286	0.263	0.335	0.297	0.815	1.63
50%	14	0.273	0.315	0.307	0.253	0.291	0.277	0.815	1.63
99%	14	0.334	0.313	0.267	0.266	0.348	0.344	0.815	1.63
1%	16	0.275	0.285	0.271	0.278	0.294	0.273	0.815	1.63
50%	16	0.276	0.267	0.283	0.290	0.266	0.336	0.815	1.63
99%	16	0.320	0.346	0.344	0.265	0.330	0.310	0.815	1.63
1%	18	0.239	0.166	0.183	0.206	0.196	0.158	0.815	1.63
50%	18	0.170	0.191	0.236	0.208	0.216	0.221	0.815	1.63
99%	18	0.194	0.212	0.243	0.232	0.188	0.165	0.815	1.63
1%	20	0.208	0.180	0.190	0.211	0.240	0.167	0.815	1.63
50%	20	0.246	0.203	0.151	0.234	0.195	0.160	0.815	1.63
99%	20	0.217	0.210	0.193	0.189	0.223	0.231	0.815	1.63



Charging Battery Level	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		
1%	0	175	178	172	192	193	173	307	614
50%	0	182	182	197	178	178	170	307	614
99%	0	195	172	187	188	183	177	307	614
1%	2	187	175	182	184	175	174	307	614
50%	2	180	179	186	186	199	176	307	614
99%	2	191	180	172	193	184	181	307	614
1%	4	170	198	171	197	196	176	307	614
50%	4	187	185	195	170	179	191	307	614
99%	4	192	181	170	181	192	183	307	614
1%	6	170	192	193	180	189	183	307	614
50%	6	172	182	194	198	186	199	307	614
99%	6	183	187	171	193	198	195	307	614
1%	8	168	151	157	158	164	151	307	614
50%	8	153	150	167	159	158	170	307	614
99%	8	164	166	153	151	152	153	307	614



Charging Battery Level	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		
1%	10	156	155	155	154	150	168	307	614
50%	10	155	169	164	164	157	160	307	614
99%	10	157	165	153	152	166	162	307	614
1%	12	161	161	157	157	163	168	307	614
50%	12	158	155	161	158	151	151	307	614
99%	12	154	161	158	162	166	153	307	614
1%	14	144	131	138	147	130	147	307	614
50%	14	135	140	137	144	141	147	307	614
99%	14	149	132	141	135	147	135	307	614
1%	16	131	137	147	145	139	132	307	614
50%	16	135	132	144	141	138	136	307	614
99%	16	138	141	145	145	133	132	307	614
1%	18	128	110	123	107	105	127	307	614
50%	18	101	108	114	104	106	115	307	614
99%	18	103	111	125	123	126	109	307	614
1%	20	101	130	101	129	100	100	307	614
50%	20	119	104	129	115	130	105	307	614
99%	20	125	120	125	100	128	109	307	614



9 Test Set-up Photo

Test Position A (0cm)

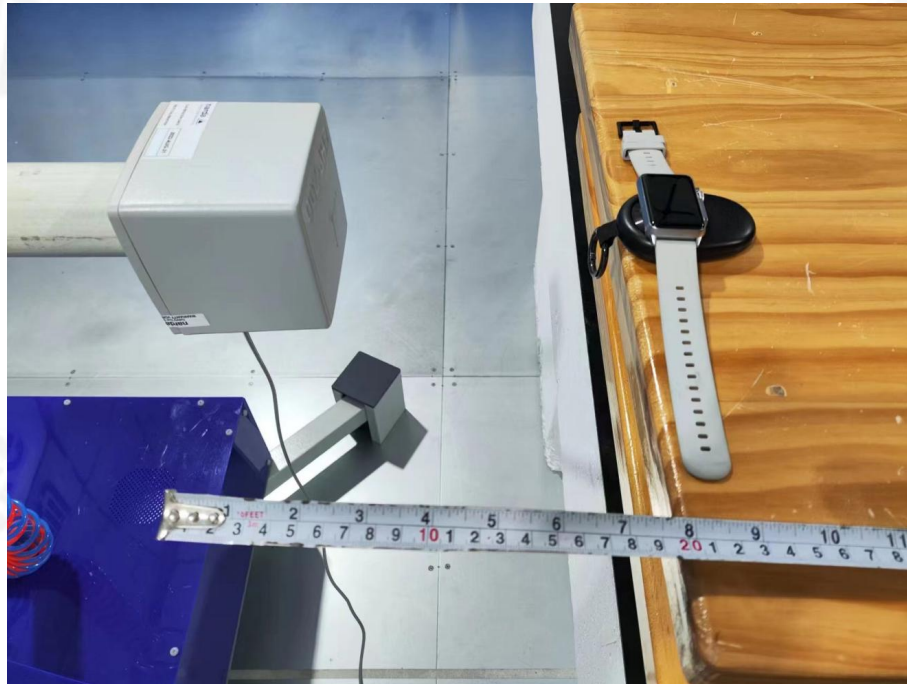


Test Position A (10cm)





Test Position A (20cm)

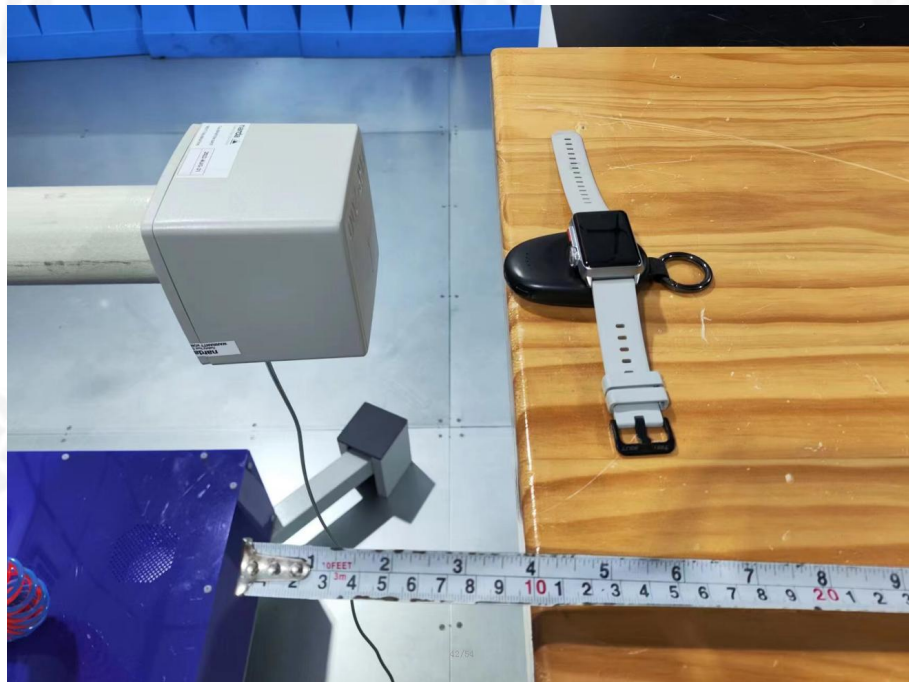


Test Position B (0cm)





Test Position B (10cm)



Test Position B (20cm)





Test Position C (0cm)

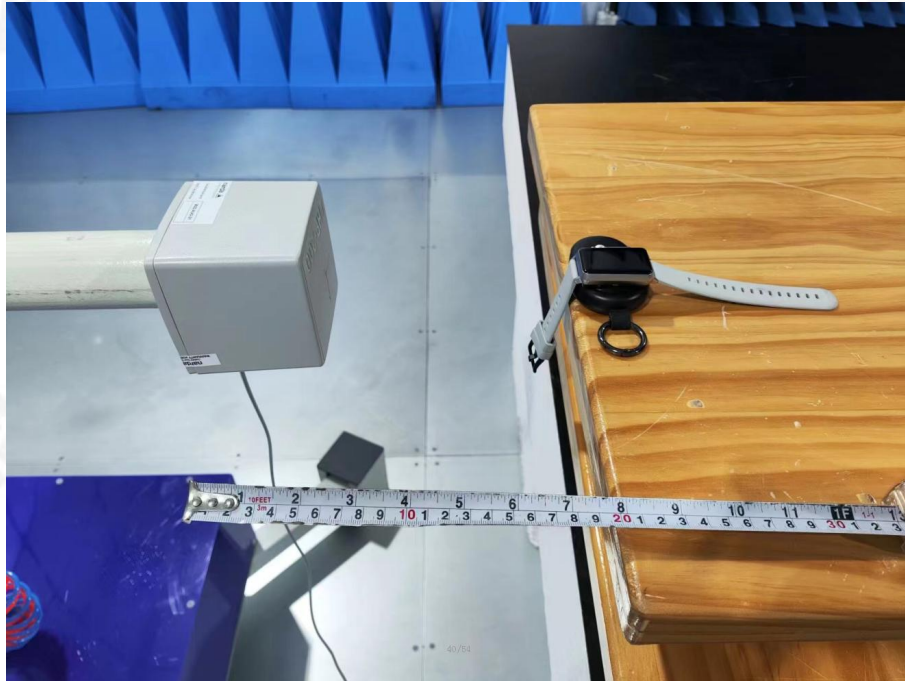


Test Position C (10cm)





Test Position C (20cm)



Test Position D (0cm)

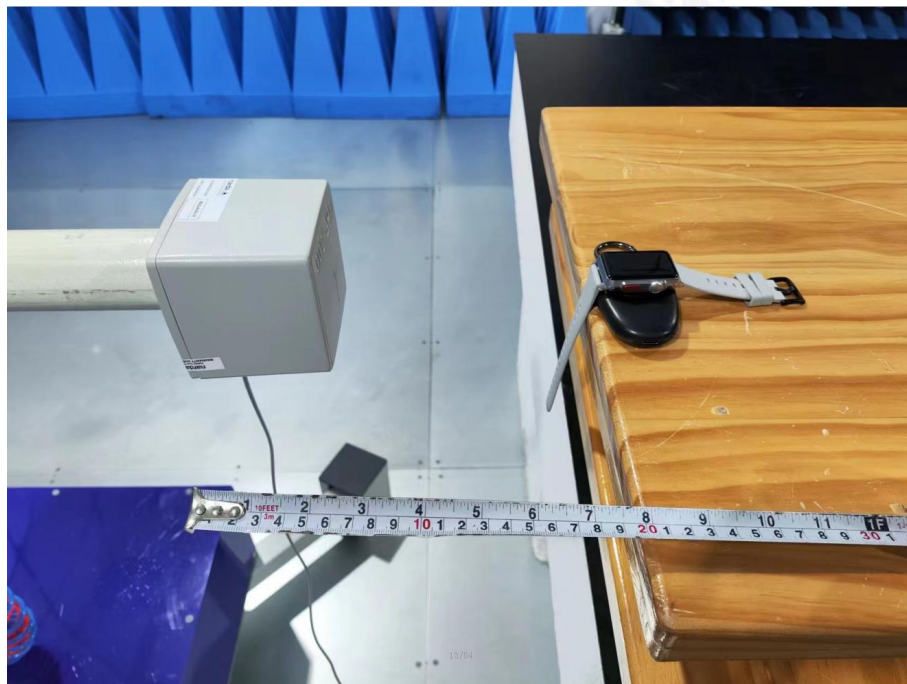




Test Position D (10cm)



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)





10 Conclusion

A minimum safety distance of 0 cm to the antenna is required when the device is charging a smart phone for portable exposure and 20 cm to the antenna for mobile exposure. The detected emissions are below the limitations according FCC 680106 D01 RF Exposure Wireless Charging Apps v03r01 and confirmed by the FCC according to KDB Inquire.

The distance from the center of the probe to the edge is 4mm. Please see the below picture.

