Wibotic, Inc.
RF Exposure Exhibit

SCOPE OF WORK
EMC TESTING – High Power System for Wireless Power Transfer,
Models: TR-1000-AC-ST / OC-1000-36-ST

REPORT NUMBER
106081003MPK-009

ISSUE DATE
May 29, 2025

REVISED DATE
N/A

PAGES
24

DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. December 2017 MPK

RF Exposure Exhibit

Report Number: 106081003MPK-009
Project Number: G106081003

Report Issue Date: May 29, 2025

Product Designation: **High Power System for Wireless Power Transfer**
Model Tested: **TR-1000-AC-ST / OC-1000-36-ST**

to

Standards: **47CFR 1.1310 RF radiation exposure limits and 47CFR 2.1091 RF radiation exposure evaluation**
FCC KDB 680106 D01 RF Exposure Wireless Charging App v03r01

for

Wibotic, Inc.

Tested by:
Intertek
1365 Adams Court
Menlo Park, CA 94025 USA

Client:
Wibotic, Inc.
9706 4th Ave NE, Suite 403
Seattle, WA 98115 USA

Report prepared by:

Kenneth Tutor
EMC Engineer

Report reviewed by:

Minh Ly
EMC Team Leader

Table of Contents

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	-
4	Description of Equipment Under Test and Variant Models	-
5	System Setup and Method	-
6	RF Exposure for Electric and Magnetic Field	Compliant
7	Revision History	-

3 Client Information

This EUT was tested at the request of:

Client: Wibotic, Inc.
9706 4th Ave NE, Suite 403
Seattle, WA 98115 USA

Contact: Patrick Vilbrandt
Telephone: (614) 330-7193
Email: Patrick.Vilbrandt@WiBotic.com

4 Description of Equipment Under Test and Variant Models

Equipment Under Test			
Type	**Model #**	**Quantity**	**S/N**
Transmitter Unit	TR-1000-AC-ST	1	2410300018
Onboard charger	OC-1000-36-ST	1	2409100016
		1	2410290028
Transmit Coil	TC-200-1000-SL	1	130-000067
Receive Coil	RC-150-1000-SL	1	140-000056

Receive Date:	February 12, 2025	**Test Started:**	May 20, 2025
Received Condition:	Good	**Test Completed:**	May 25, 2025
Type:	Production		

Description of Equipment Under Test (provided by client)
The TR-1000-AC-ST /OC-1000-36-ST is a high-power system for wireless charging of industrial vehicles such as robots, carts and lifts.

Equipment Under Test Power Configuration			
Rated Voltage	**Rated Current**	**Rated Frequency**	**Number of Phases**
100-230VAC	15A	50-60Hz	Single

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Normal mode: TR-1000-AC-ST / OC-1000-36-ST are setup to continuously charging at 1000W.

Variant Models:
The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

Not Applicable.

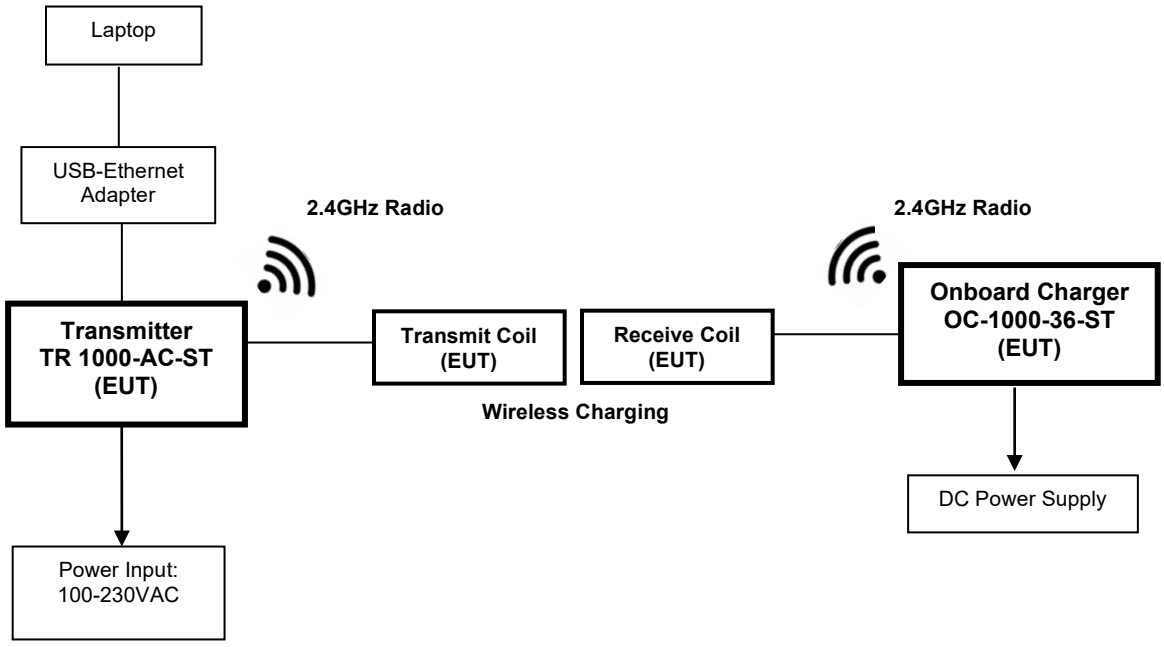
4 System Setup and Method

Support Equipment			
Type	**Manufacture**	**Quantity**	**P/N**
DC Power Supply	Keysight	1	N7953A
Laptop	Lenovo	1	PF-4M8TX5

4.1 Method:

Measurements were performed on all sides of the device and the worst result is recorded.
Measurement uncertainty is estimated 2.0 dB for the coverage factor of 2.

4.2 EUT Block Diagram:



5 RF Exposure for Electric and Magnetic Field

5.1 Performance Requirement(s)

Limits for General Population/Uncontrolled Exposure

The field strength limits are established FCC KDB 680106 D01 RF Exposure Wireless Charging App v03r01:

Frequency Range (MHz)	Electric Field (V/m rms) @ 15cm	Magnetic Field (A/m rms) @15cm	Power Density (mW/cm^2)	Reference Period (minutes)
1.34 to 30	824/f = 121.5339	2.19/f = 0.323009	*(180/f2) = 3.91573	<30

Note: f = 6.78

5.2 Method

Tests are performed in accordance with FCC KDB 680106 D01 RF Exposure Wireless Charging App v03r01 and Inquiry to FCC. See Appendix A for Inquiry details.

Test was performed with battery charge at 3 different levels: 5-10%, 45-55% and 85-95%. Client conforms to include 30cm as minimum safe distance for general public. This statement will be included in installation and User manuals. Hence, test was performed with probe at 30cm from the EUT sides and top, worst-case results are reported here. Bottom and backside of the EUT are not accessible as the unit is wall mounted and floor standing.

Electric Field
The WaveControl SMP2 Field Meter electric field probe with X, Y, Z field sensors was used.

Measurements were performed on at 30 cm from all accessible sides of the device and the worst result is recorded. Battery levels were at 5-10%, 45-55% and 85-95%.

Magnetic Field
The WaveControl SMP2 Field Meter measures electric and magnetic field strengths in the frequency range from 100 kHz up to 90GHz.

Measurements were performed on at 30 cm from all accessible sides of the device and the worst result is recorded. Battery levels were at 5-10%, 45-55% and 85-95%.

Test Site:

The test facility is located at 1365 Adams Court, Menlo Park CA 94025 USA. This test laboratory has been accredited by A2LA and registered with ISED, company number: 2042L. Test was performed in semi-anechoic RF Immunity test facility.

5.3 Test Equipment Used:

Description	Manufacturer	Model	Serial	Cal Date	Cal Due
EM Field Meter	Wavecontrol	SMP2	ITS 01980	09/09/2024	09/09/2025

5.4 Results:

The sample tested at 30 cm from EUT was found to Comply.

5.5 Electric Field Data:

EUT Location (worst-case)	Measured rms value (V/m rms) at 30 cm with battery charge at			Limit (V/m rms)	50% of the Limit (V/m rms)
	5-10%	45-55%	85-95%		
Transmitter Right	41.29	40.83	25.27	121.5339	60.76696
Transmitter Left	32.09	30.93	17.17	121.5339	60.76696
Transmitter Top	53.15	55.68	40.05	121.5339	60.76696
Transmitter Front	32.89	32.34	16.55	121.5339	60.76696
Receiver Front	39.17	38.74	20.61	121.5339	60.76696
Receiver Left	56.39	54.35	34.46	121.5339	60.76696
Receiver Top	58.79	61.54	35.08	121.5339	60.76696
Receiver Front	70.66	68.27	37.37	121.5339	60.76696

Notes:

1) Test was performed with the following parameters on the Keysight power supply to simulate the battery charge at 3 different levels: 5-10%, 45-55% and 85-95% as per manufacturer's instructions.

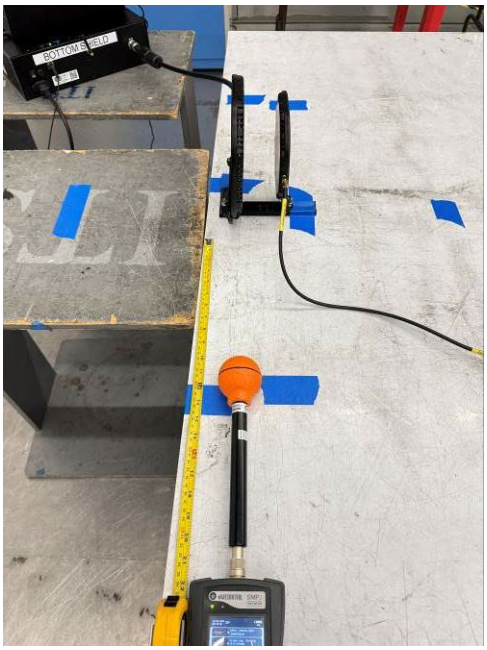
Battery Charge Level	Voltage Level on Keysight Power Supply
5-10%	48Vdc
45-55%	54Vdc
85-95%	57.5Vdc

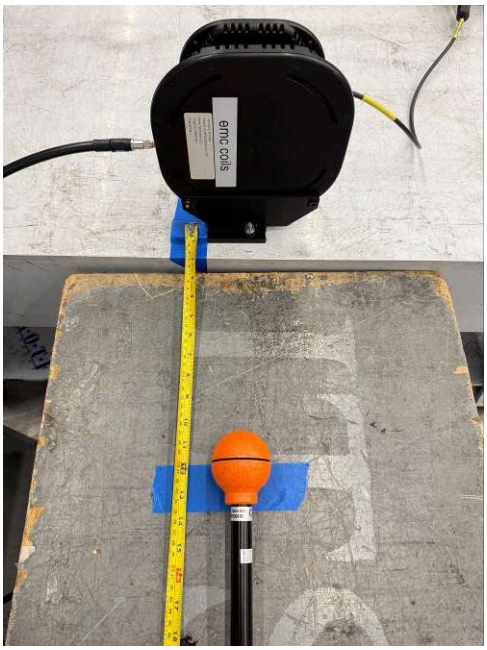
2) EUT coil separation can be from 0 to 7 cm. Coil separation was set at 7 cm because this yields worst case results based on our investigation.
3) Test was performed with probe at 30cm from the EUT sides and top, worst-case results are reported here. The values indicated above are rms values observed on the meter used for measurement. Bottom and backside of the EUT are not accessible as the unit is wall mounted and floor standing.

Test Result:	The **EUT COMPLIED** at 30cm Wibotic recommends a 30cm distance area marked around the charging station when the device is in use as per regulatory RF Exposure standards. Client conforms to include 30cm as minimum safe distance for general public. This statement will be included in installation and User manuals

5.6 Electric Field Setup Photographs:

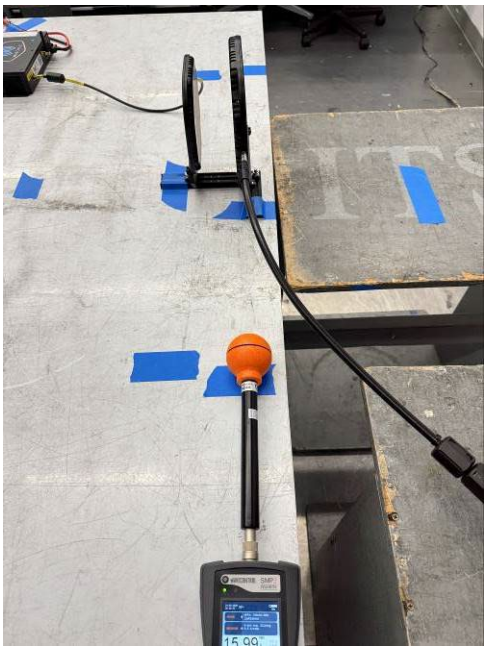
30cm Distance Markers Setup



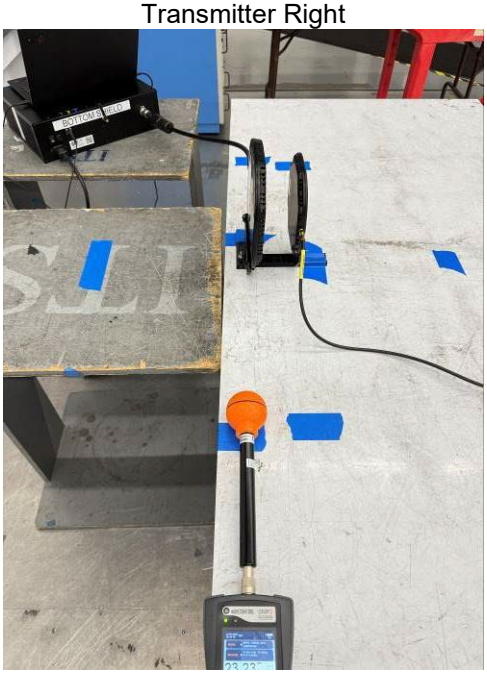


Electric Field Measurement

Transmitter Left

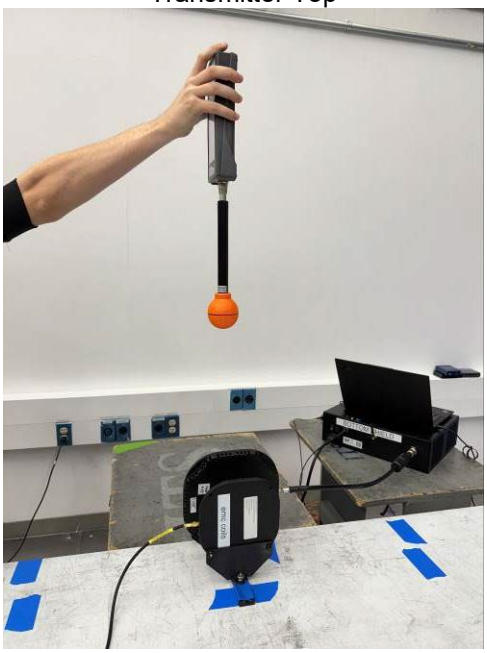


Transmitter Right



Transmitter Front

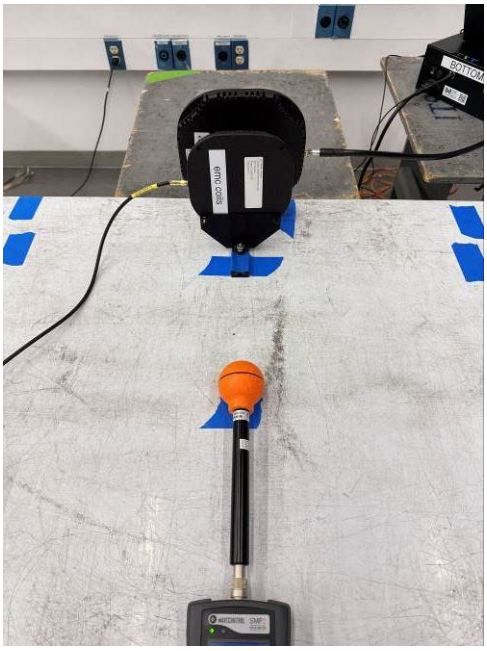
Transmitter Top



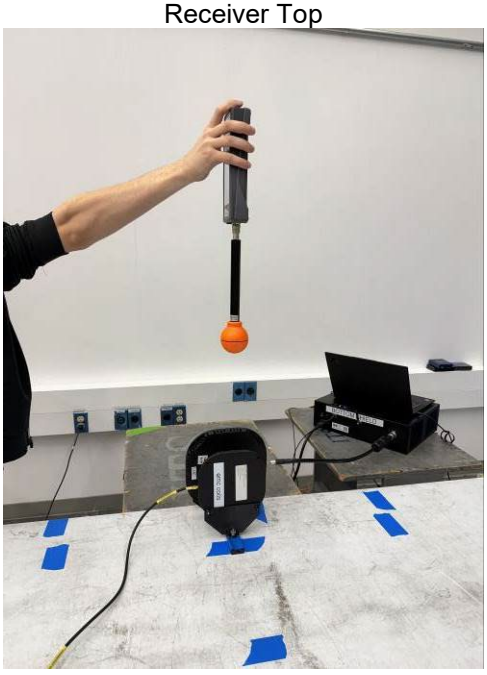
Receiver Left

Receiver Right

Receiver Front



Receiver Top



Magnetic Field Data:

EUT Location (worst-case)	Measured rms value (A/m rms) at 30 cm with battery charge at			Limit (A/m rms)	50% of the Limit (A/m rms)
	5-10%	45-55%	85-95%		
Transmitter Right	0.110	0.103	0.066	0.323009	0.161504
Transmitter Left	0.086	0.082	0.046	0.323009	0.161504
Transmitter Top	0.140	0.139	0.093	0.323009	0.161504
Transmitter Front	0.085	0.086	0.040	0.323009	0.161504
Receiver Right	0.102	0.101	0.055	0.323009	0.161504
Receiver Left	0.150	0.144	0.097	0.323009	0.161504
Receiver Top	0.151	0.156	0.109	0.323009	0.161504
Receiver Front	0.186	0.185	0.096	0.323009	0.161504

Notes:

1) Test was performed with the following parameters on the Keysight power supply to simulate the battery charge at 3 different levels: 5-10%, 45-55% and 85-95% (as shown below) as per manufacturer's instructions.

Battery Charge Level	Voltage Level on Keysight Power Supply
5-10%	48Vdc
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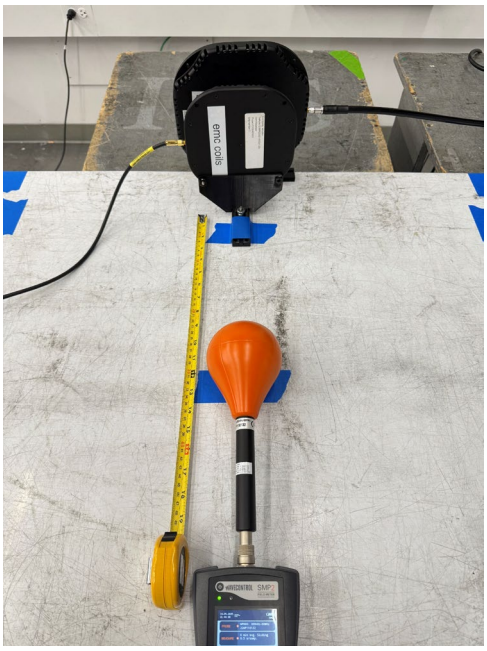
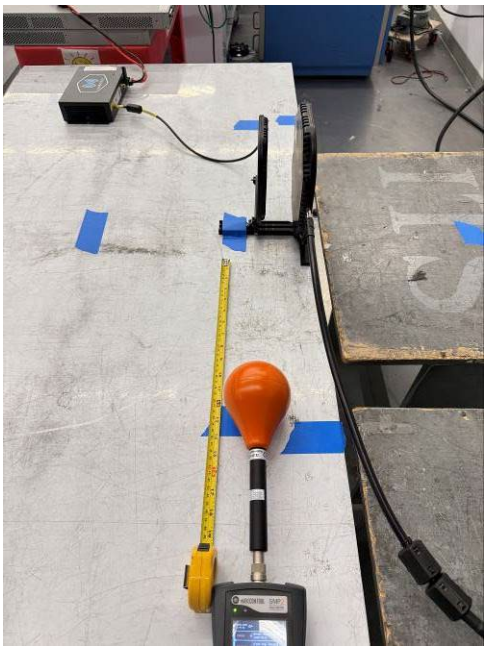
3) Test was performed with probe at 30cm from the EUT sides and top, worst-case results are reported here. The values indicated above are rms values observed on the meter used for measurement. Bottom and backside of the EUT are not accessible as the unit is wall mounted and floor standing.

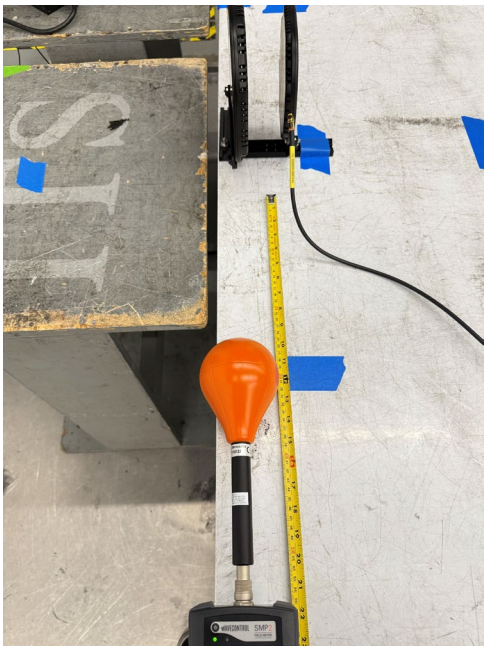
Test Result:	The **EUT COMPLIED** at 30cm Wibotic recommends a distance of 30cm distance area marked around the charging station when the device is in use as per regulatory RF Exposure standards. Client conforms to include 30cm as minimum safe distance for general public. This statement will be included in installation and User manuals

5.7 Magnetic Field Setup Photographs:

30cm Distance Markers Setup

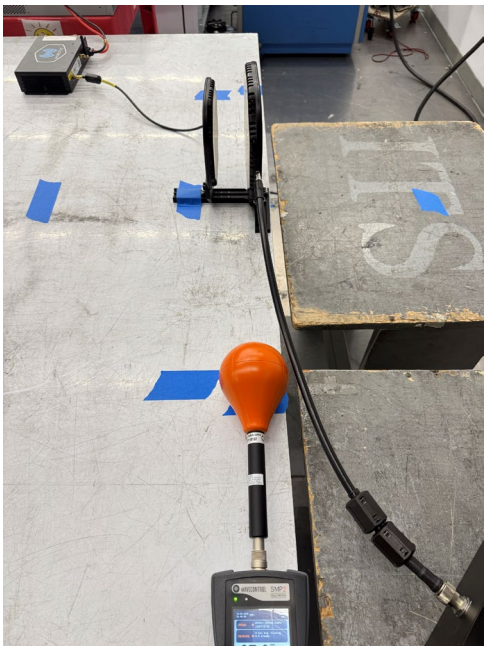




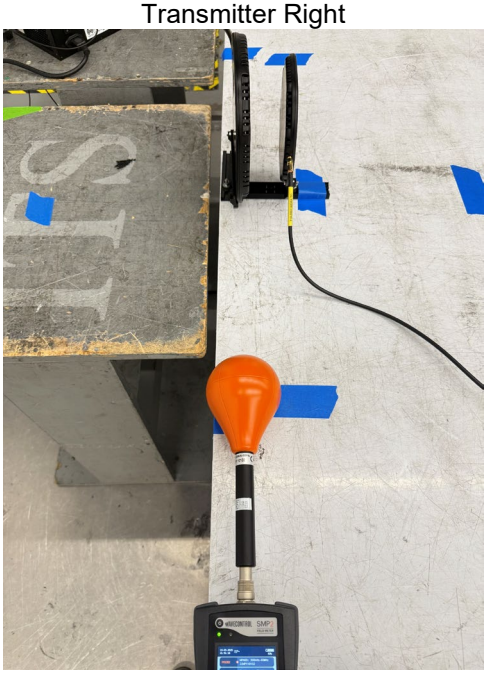


Magnetic Field Measurement

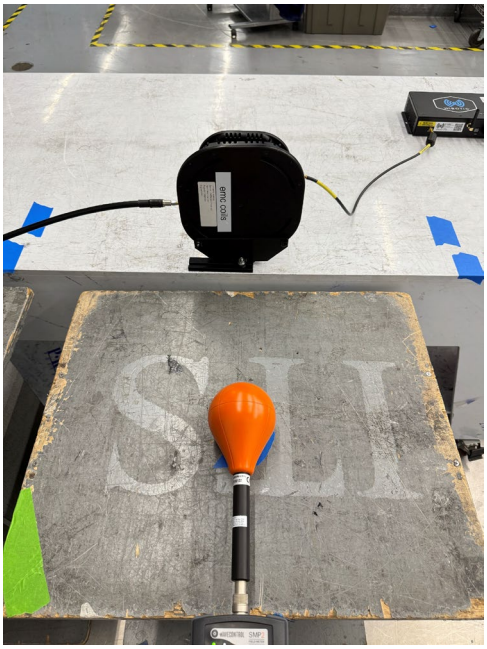
Transmitter Left



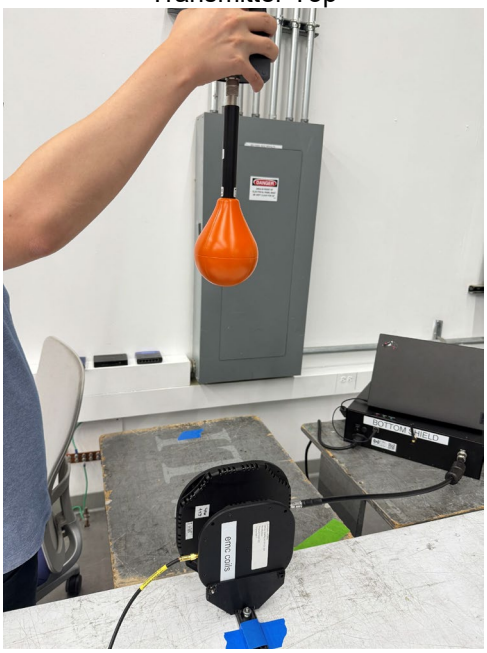
Transmitter Right



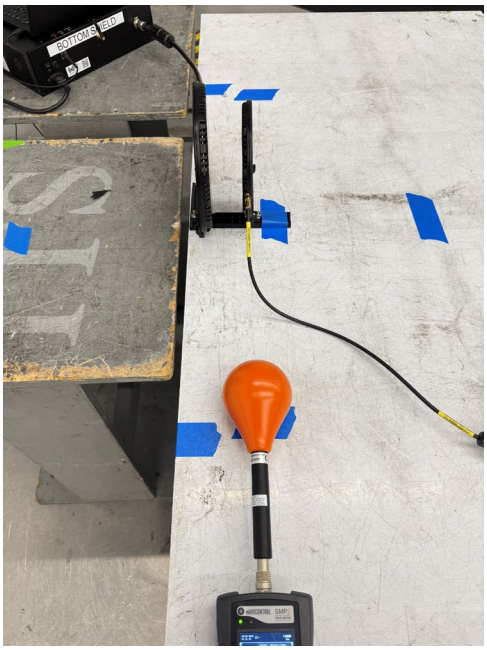
Transmitter Front



Transmitter Top

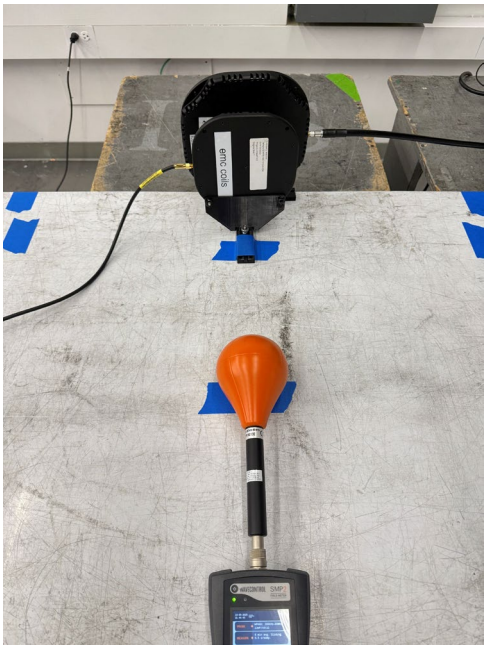


Receiver Left



Receiver Right

Receiver Front



Receiver Top

Test Personnel:	Kenneth Tutor	Test Date:	05/20/2025
Product Standard:	FCC KDB 680106 D01	Limit Applied:	
Input Voltage:	120V AC	Ambient Temperature:	22.2 ºC
Pretest Verification w/ Ambient Signals or		Relative Humidity:	46.9 %
		Atmospheric Pressure:	30.0 inHg
BB Source:	N/A		

Deviations, Additions, or Exclusions: None

6 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	May 29, 2025	106081003MPK-009	KT	ML	Initial Release

7 *Appendix A*

Inquiry to FCC and Guidance

Inquiry on 03/24/2025 :

Inquiry:

Dear FCC official,

We are submitting this inquiry for a new wireless power & battery charging product that delivers up to 1000W using a wireless charging frequency of 6.78MHz. We have previously certified similar products that deliver up to 300W at this same frequency. Recent testing has shown that the new 1000W product has lower conducted and radiated emissions than the original 300W product due to improvements we've made to many aspects of the new product.

NOTE: WiBotic submitted a very similar inquiry in March 2022 for our 300W product. This inquiry largely contains the same questions and is designed to provide guidance to Intertek, our NRTL testing partner for this product.

INQUIRY:

To our knowledge, this type of device requires KDB inquiry and are not covered by KDB 680106. This inquiry is about RF exposure requirements. Here are some details about the product:

1.Power transfer frequency: 6.78MHz

2.Transmitter coil: 5 turn,
200mm outer diameter

3.Receiver coil: 3 turn,
150mm outer diameter

4.Maximum current into
transmitter unit: 48V, 30A (the unit uses an off-the-shelf switch mode AC-DC power supply, MN: Artesyn LCM1500-48T, as the power source for the transmitter unit)

5.The device is typically
mounted on the wall for charging industrial devices, such as robots.

6.The maximum power transfer
distance is 7cm

7.The minimum power transfer
distance is 0mm (coil enclosures touching)

8.The power transfer coils
ONLY transfer power. There is no data transfer through the power transfer antennas.

In the attached document, please see a diagram of the device setup during our testing in the 10m Chamber. We are working with Intertek on all of the relevant FCC certifications (Part 15, Part 18, etc.) for radiated emissions above 30MHz, radiated emissions below 30MHz, and conducted emissions.

We have the following questions:

1.Should we apply MPE limits
of Table 1 to 1.1310(e)(1) ? limits for Maximum Permissible Exposure
(MPE): 1.34MHz ? 30MHz, 824/f V/m, 2.19/f A/m

2.Can we measure RMS values
of H field and E fields on all sides of the unit and apply above
limits at 15cm on all sides and 20cm from top of the unit as per the
FCC presentation from the TCB workshop in April 2020?

3.We propose to perform E
and H field strength measurements to demonstrate compliance.
Measurements shall be made from all sides and the top of the
primary/client pair, with the 15cm measured from the center of the
probes to the edge of the device.

Please let us know if this test method is acceptable to FCC.
Wireless power transfer functions will be processed as Suppliers
Declaration of Conformity after approval.

Attached is a report from our 300W product. Please see pages 10-18
for photos of the experimental measurement setup for exposure testing.
Please see pages 20-26 for a copy of our correspondence with the FCC
in 2022 regarding exposure limits.

The attached documents also contain a diagram of our 1000W product.
It performs functionally equivalent to our 300W product, and operates
in the same modes as that product. The only differences are
highlighted above.

FCC response on 04/18/2025

Thanks for patience while review of this inquiry was coming up among queue.

Firstly a high level remark is that this inquiry and proposed testing seems entirely based on OET Lab WPT devices guidance from before 2023. Generally the most recent guidance documents and information available at the time of equipment authorization (SDoC or FCC ID certification) must used.

For convenience, the applicable KDB Pub. 680106 D01 v04 (2023-10) is attached hereunder, as well as supplemental info in FCC-TCB conference presentations since 2023-10 (each also available at public fcc.gov webpages).

We recommend and request please update proposed test plan accordingly, then include it in reply hereunder; along with questions if any, re-posed / re-phrased where appropriate.

---Reply from Customer on 04/29/2025

Hello,

Thank you very muchfor your response.
We have reviewed the more current documentation you providedincluding 680106 D01v4 and the associated slide presentations. Theinitial portion of our original email below is still accurate with respect toour product?s description and specification. Based upon that documentation, ourproduct fits into the description for a Mobile wireless power product and weunderstand the general testing requirements.

We would now like todescribe the typical operation of our product and receive approval for the ?MinimumRF Exposure Compliance Distance?for our testing.

Our product is usedin commercial and industrial environments for charging relatively largebattery-powered, and fully autonomous, devices such as mobile robots and floorscrubbers. In the worst case, a human may manually push a battery powereddevice in front of our charging station, but given the size of the vehicle andthe amount of time it takes to charge a large battery, the person will notremain at that location during wireless power transmission andany portionof the human?s body would be at least 12? (30cm) away from the transmitter coilenclosure during active power transmission. This is also listed in ourdocumentation for the product.

Given the typicaloperation of our product above, we are requesting FCC approval for MPE tests tobe performed at a 30cm distance from the transmitter coil enclosure. Testreports will of course clearly reference this distance and WiBotic will includereferences to the 30cm minimum User Separation Distance in our User Guide andall other relevant documentation. Such documentation will be madeavailable to FCC for review if desired.

Please provide aresponse to this request, or send further questions, at your earliestconvenience.

FCC response on 05/09/2025

The proposed approach seems consistent with OET ECR guidance. You may proceed towards equipment authorization for the device.

END OF REPORT