



CTC Laboratories, Inc.

2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.com.cn

RF Exposure Evaluation Report

Report No.: **CTC20192113E07**

FCC ID.....: **XRH-NPE107**

Applicant.....: **North Pole Engineering**

Address.....: 221 North First Street, Suite 310 Minneapolis, MN 55401, United States

Manufacturer.....: North Pole Engineering

Address.....: 221 North First Street, Suite 310 Minneapolis, MN 55401, United States

Product Name.....: **AWE Charger**

Trade Mark.....: N/A

Model/Type reference.....: AWE01

Listed Model(s): OTbeat Link Charging Case

Standard.....: **47 CFR FCC Part 1**

Date of receipt of test sample...: Oct. 24, 2019

Date of testing.....: Oct. 25, 2019 to Nov. 12, 2019

Date of issue.....: Nov. 13, 2019

Result.....: **PASS**

Compiled by:
(Printed name+signature) Terry Su

Terry Su

Supervised by:
(Printed name+signature) Miller Ma

Miller Ma

Approved by:
(Printed name+signature) Walter Chen

Walter Chen

Testing Laboratory Name **CTC Laboratories, Inc.**

Address..... 2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

This test report may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CTC. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to CTC within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit. The test report merely correspond to the test sample.



Table of Contents

Page

1. TEST SUMMARY	3
1.1. TEST STANDARDS.....	3
1.2. REPORT VERSION.....	3
1.3. TEST FACILITY	4
1.4. ENVIRONMENTAL CONDITIONS	4
2. GENERAL INFORMATION	5
2.1. CLIENT INFORMATION	5
2.2. GENERAL DESCRIPTION OF EUT	5
2.3. ACCESSORY EQUIPMENT INFORMATION	6
2.4. DESCRIPTION OF TEST MODES	6
2.5. MEASUREMENT INSTRUMENTS LIST	6
2.6. RF EXPOSURE.....	7
3. EUT TEST PHOTOS	10



1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[ANSI C95.1-1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB publication 680106 D01 RF Exposure Wireless Charging Apps v03](#): 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

1.2. Report version

Revised No.	Date of issue	Description
01	Nov. 13, 2019	Original



1.3. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

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

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory 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.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory 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. Registration 951311, Aug 26, 2017.

1.4. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity	55 %
Air Pressure	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	North Pole Engineering
Address:	221 North First Street, Suite 310 Minneapolis, MN 55401, United States
Manufacturer:	North Pole Engineering
Address:	221 North First Street, Suite 310 Minneapolis, MN 55401, United States

2.2. General Description of EUT

Product Name:	AWE Charger
Marketing Name:	N/A
Model/Type reference:	AWEC01
Listed Model(s):	OTbeat Link Charging Case
Model Difference:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name.
Power supply:	5Vdc from External adapter 3.7Vdc from 230mAh Li-ion Battery
Hardware version:	N/A
Software version:	N/A
Wireless Charger	
Frequency Range:	760kHz~840kHz
Operation Frequency:	800kHz
Modulation Type:	Continuous Wave
Antenna Type:	Coil Antenna
Exposure category:	General population/uncontrolled environment
EUT Type:	Production Unit
Device Type:	Mobile Device



2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
AWE	AWE01	---	North Pole Engineering
AC/DC Adapter	PSA05F-050QAL6	PJ23006448A1	PHIHONG
Cable Information			
Name	Shielded Type	Ferrite Core	Length
USB Cable	YES	NO	2M

2.4. Description of Test Modes

Test Modes:		
TM1	Charge (5V/1A) + EUT + AWE (Battery Status: <1%)	Record
TM2	Charge (5V/1A) + EUT + AWE (Battery Status: <50%)	Pre-tested
TM3	Charge (5V/1A) + EUT + AWE (Battery Status: 100%)	Pre-tested

2.5. Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Exposure Level Tester	Narda	ELT-400	N-0751	Dec. 28, 2019
2	B-Field Probe	Narda	ELT-400	M-1578	Dec. 28, 2019
3	Field probe	ETS	HI-6005	00089587	Dec. 28, 2019

Note: The Cal. Interval was one year.



2.6. RF Exposure

LIMIT

According to FCC 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.

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

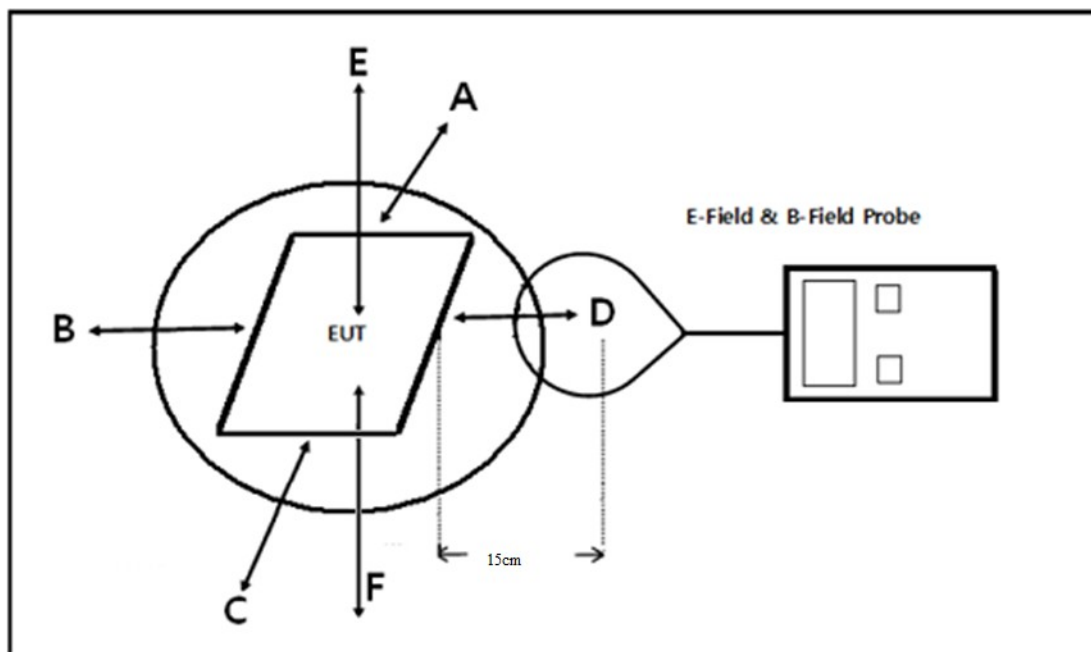
*=Plane-wave equivalent power density

According to FCC KDB 680106 D01 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 – Section 1.310 as following (measured distance shall be 15cm from the center of the probe to the edge of the device):

	E-filed	H-filed	B-filed
Frequency	V/m	A/m	uT
0.3 MHz – 1.34 MHz	614	1.63	2.0
1.34 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.

TEST CONFIGURATION



TEST PROCEDURE

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance (15cm) which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360 degree to search of highest strength.
- 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.
- The EUT were measured according to the dictates of KDB 680106D01v03.

TEST MODE

Please refer to the clause 2.4.

TEST RESULTS

E-Field Strength at 15cm from the edges surrounding the EUT

Charging Battery Level	Frequency Range (MHz)	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%	0.8	1.41	1.25	1.44	1.50	1.48	1.51	307.0	614.0
50%	0.8	1.11	1.18	1.20	1.51	1.31	1.41	307.0	614.0
99%	0.8	0.96	0.95	1.05	1.11	1.13	1.04	307.0	614.0



H-Field Strength at 15cm from the edges surrounding the EUT

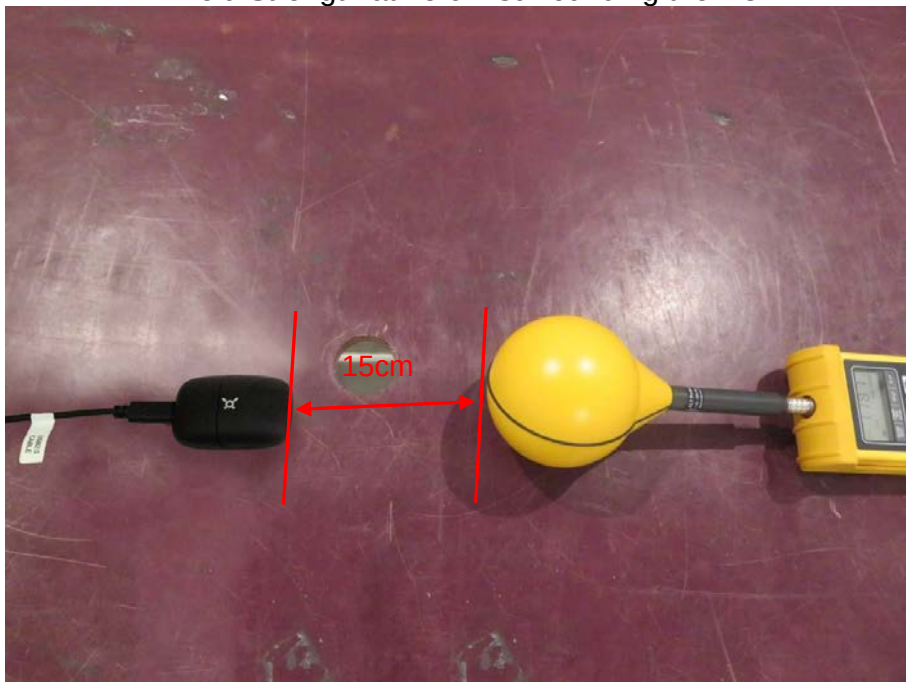
Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)						FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F		
1%	0.8	0.082	0.081	0.091	0.102	0.092	0.102	0.815	1.63
50%	0.8	0.075	0.084	0.086	0.099	0.088	0.094	0.815	1.63
99%	0.8	0.052	0.057	0.061	0.064	0.048	0.054	0.815	1.63

H-Field Strength at 20cm from the top surface of the EUT

Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)	FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
		Test Position E		
1%	0.8	0.084	0.815	1.63
50%	0.8	0.062	0.815	1.63
99%	0.8	0.053	0.815	1.63

3. EUT TEST PHOTOS

H-Field Strength at 15 cm surrounding the EUT



E-Field Strength at 15 cm surrounding the EUT



*****THE END*****