FCC Test Report

Applicant	:	**Shenzhen Black Snail Technology Co., Ltd.**
Address	:	**Rm 709, 7F, Bldg 5, Jianjin Industrial Park, Fukang Community, Longhua St, Longhua Dist, Shenzhen China**
Product Name	:	**Wireless Charger**
Report Date	:	**Oct. 23, 2024**

Shenzhen Anbotek Compliance Laboratory Limited

Contents

1. General Information 5
1.1. Client Information 5
1.2. Description of Device (EUT) 5
1.3. Auxiliary Equipment Used During Test 6
1.4. Description of Test Modes 6
1.5. Test Equipment List 7
1.6. Measurement Uncertainty 7
1.7. Description of Test Facility 8
1.8. Disclaimer 8
2. Measurement and Result 9
2.1. Requirements 9
2.2. Test Setup 10
2.3. Test Procedure 11
2.4. Test Result 11
APPENDIX I -- TEST SETUP PHOTOGRAPH 14
APPENDIX II -- EXTERNAL PHOTOGRAPH 14
APPENDIX III -- INTERNAL PHOTOGRAPH 14

TEST REPORT

Applicant	:	Shenzhen Black Snail Technology Co., Ltd.
Manufacturer	:	Mangrove Technology (Shenzhen) Co.,Ltd
Product Name	:	Wireless Charger
Model No.	:	Cyber009
Trade Mark	:	NANAMI
Rating(s)	:	Input: 5V⎓ 3A, 9V⎓ 3A, 12V⎓ 2.5A Output for Mobile Phone: 5W/7.5W/10W/15W Max Output for Earphone: 5W Max Output for Watch: 5W Max

Test Standard(s)	:	**FCC Part 1.1310, 1.1307(b)**
Test Method(s)	:	**KDB 680106 D01 Wireless Power Transfer v04**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 1.1307 & KDB680106 D01 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	Aug. 15, 2024
Date of Test	Aug. 15, 2024 to Oct. 17, 2024
Prepared By	Cecilia Chen (Cecilia Chen)
Approved & Authorized Signer	KingKong Jin (KingKong Jin)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Oct. 23, 2024

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Black Snail Technology Co., Ltd.
Address	:	Rm 709, 7F, Bldg 5, Jianjin Industrial Park, Fukang Community, Longhua St, Longhua Dist, Shenzhen China
Manufacturer	:	Mangrove Technology (Shenzhen) Co.,Ltd
Address	:	4 Floor, B Building, Huamingcheng Industry Park, Matian Street, Guangming District, Shenzhen city, Guangdong province, China
Factory	:	Mangrove Technology (Shenzhen) Co.,Ltd
Address	:	4 Floor, B Building, Huamingcheng Industry Park, Matian Street, Guangming District, Shenzhen city, Guangdong province, China

1.2. Description of Device (EUT)

Product Name	:	Wireless Charger
Model No.	:	Cyber009
Trade Mark	:	NANAMI
Test Power Supply	:	AC 120V/60Hz for Adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	Manufacturer: Shenzhen ABP Technology Co.,Ltd. Model: PD0302UC-0301 Input: 100-240V~, 50/60Hz, 0.8A Max. Output: 5.0V⎓ 3.0A, 9.0V⎓ 3.0A, 12.0V⎓ 2.5A, 15.0V⎓ 2.0A, 20.0V⎓ 1.5A (30.0W Max.)
RF Specification		
Operation Frequency	:	Mobile Phone: 112-360kHz Earphone: 112-205kHz Watch: 1.778MHz
Modulation Type	:	ASK
Antenna Type	:	Inductive loop coil Antenna
Remark: 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
Wireless Charging Load	BAECOAR	/	/
Wireless Charging Load	BAECOAR	/	/
Full-function watch wireless charging test stand	Shenzhen Hancai Microelectronics Co., Ltd.	HC-RX-20231001	/

1.4. Description of Test Modes

Pretest Modes	Descriptions
TM1	Adapter+WPT Mode (Mobile Phone (load 15W)+Watch (load 5W)+Earphone (load 5W))
TM2	Adapter+WPT Mode (Mobile Phone (load 10W)+Watch (load 5W)+Earphone (load 5W))
TM3	Adapter+WPT Mode (Mobile Phone (load 7.5W)+Watch (load 5W)+Earphone (load 5W))
TM4	Adapter+WPT Mode (Mobile Phone (load 5W)+Watch (load 5W)+Earphone (load 5W))
TM5	Adapter+WPT Mode (Mobile Phone (load 15W)+Watch (load 5W))
TM6	Adapter+WPT Mode (Mobile Phone (load 10W)+Watch (load 5W))
TM7	Adapter+WPT Mode (Mobile Phone (load 7.5W)+Watch (load 5W))
TM8	Adapter+WPT Mode (Mobile Phone (load 5W)+Watch (load 5W))
TM9	Adapter+WPT Mode (Mobile Phone (load 15W)+Earphone (load 5W))
TM10	Adapter+WPT Mode (Mobile Phone (load 10W)+Earphone (load 5W))
TM11	Adapter+WPT Mode (Mobile Phone (load 7.5W)+Earphone (load 5W))
TM12	Adapter+WPT Mode (Mobile Phone (load 5W)+Earphone (load 5W))
TM13	Adapter+WPT Mode (Watch (load 5W)+Earphone (load 5W))
TM14	Adapter+WPT Mode (Mobile Phone (load 15W))
TM15	Adapter+WPT Mode (Mobile Phone (load 10W))
TM16	Adapter+WPT Mode (Mobile Phone (load 7.5W))
TM17	Adapter+WPT Mode (Mobile Phone (load 5W))
TM18	Adapter+WPT Mode (Watch (load 5W))
TM19	Adapter+WPT Mode (Earphone (load 5W))
TM20	Standby Mode
Note: 1%, 50%, and 99% load cases were pre-tested for all modes, but we only recorded the worst case in this report.	

1.5. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Electric and Magnetic field Analyzer	NARDA	EHP-200A	180ZX10202	Oct. 15, 2024	1 Year

1.6. Measurement Uncertainty

Magnetic Field Reading(A/m)	:	+/-0.04282(A/m)
Electric Field Reading(V/m)	:	+/-0.03679(V/m)
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

1.7. Description of Test Facility

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

FCC-Registration No.: 434132

Shenzhen Anbotek Compliance Laboratory Limited, 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 No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

1.8. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Measurement and Result

2.1. Requirements

According to the item 5.2 Part 18 Wireless Power Transfer up to One-Meter Distance 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) The power transfer frequency is below 1 MHz.

(2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.

(3) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)

(4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).

(5) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.

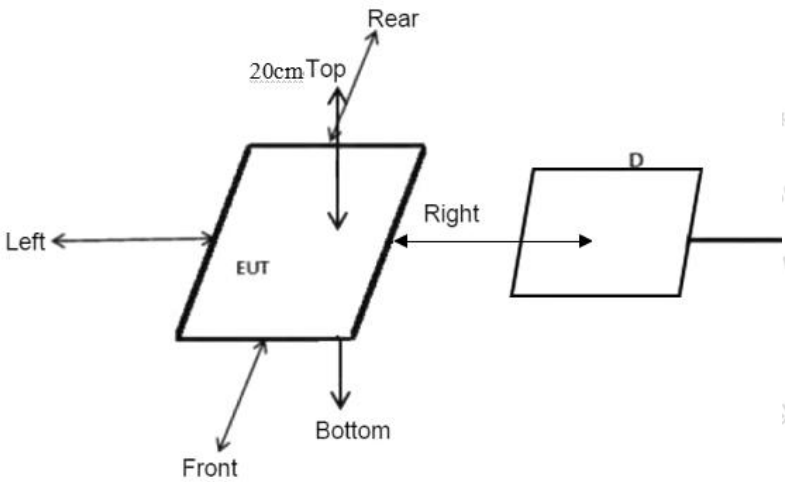
(6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.

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).

2.2. Test Setup



Note: Measurements should be made at 20 cm surrounding the EUT and 20cm above the top surface of the EUT.

2.3. Test Procedure

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

2) The measurement probe was placed at required test distance 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) were completed.(A is the right, B is the back, C is the left, D is the front, and E is the top.)

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

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

2.4. Test Result

2.4.1. Equipment Approval Considerations item 5.2 Part 18 Wireless Power Transfer up to One-Meter Distance of KDB 680106 D01 v04.

(1) The power transfer frequency is below 1 MHz.

- The device operate in the frequency range :

Mobile Phone: 112-360kHz
Earphone: 112-205kHz
Watch: 1.778MHz.

(2) The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.

- The maximum output power of the primary coil is 15W.

(3) A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)

- The surfaces of the transmitter and client device enclosures is in physical contact.

(4) Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).

- The EUT is a Mobile exposure conditions

(5) The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.

- Conducted the measurement with the required distance and the test results please refer to the section 2.4.

(6) For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.

- The EUT is the three-coil radiation structure..

2.4.2. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

Temperature:	23 °C	Humidity:	51 %	Atmospheric Pressure:	101 kPa

E-Field Strength at 20 cm surrounding the EUT and 20cm above the top surface of the EUT

Test Mode	Frequency Range (kHz)	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Reference Limit (V/m)	Limits Test (V/m)
TM1	112-360	3.286	3.536	2.986	3.036	3.186	307	614
TM2	112-360	1.412	1.512	1.562	1.612	1.462	307	614
TM3	112-360	0.852	0.877	0.842	0.857	0.872	307	614
TM13	112-360	0.239	0.239	0.289	0.289	0.239	307	614
TM7	1778	3.300	3.550	3.000	3.050	3.200	307	614
TM8	1778	1.587	1.687	1.737	1.787	1.637	307	614
TM9	1778	1.408	1.433	1.398	1.413	1.428	307	614
TM13	1778	0.273	0.273	0.323	0.323	0.273	307	614

H-Field Strength at 20 cm surrounding the EUT and 20cm above the top surface of the EUT

Test Mode	Frequency Range (kHz)	Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Reference Limit (A/m)	Limits Test (A/m)
TM1	112-360	0.657	0.707	0.597	0.607	0.637	0.815	1.63
TM2	112-360	0.282	0.302	0.312	0.322	0.292	0.815	1.63
TM3	112-360	0.170	0.175	0.168	0.171	0.174	0.815	1.63
TM13	112-360	0.048	0.048	0.058	0.058	0.048	0.815	1.63
TM7	1778	0.660	0.710	0.600	0.610	0.640	0.815	1.63
TM8	1778	0.317	0.337	0.347	0.357	0.327	0.815	1.63
TM9	1778	0.282	0.287	0.280	0.283	0.286	0.815	1.63
TM13	1778	0.055	0.055	0.065	0.065	0.055	0.815	1.63

Note: All modes has been tested,only the worst data(TM1: Adapter+WPT Mode (Mobile Phone (load 15W) 1%+Watch (load 5W) 1%+Earphone (load 5W) 1%); TM1: Adapter+WPT Mode (Mobile Phone (load 15W) 50%+Watch (load 5W) 50%+Earphone (load 5W) 50%); TM1: Adapter+WPT Mode (Mobile Phone (load 15W) 99%+Watch (load 5W) 99%+Earphone (load 5W) 99%)) was recorded in the report.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_MPE

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

---------- End of Report ----------