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RF Exposure Evaluation Report

Report No. CTC20221749E07

FCC ID 2A76QTW220

Applicant Shenzhen Ntmer Technology Co., Ltd.

Address 2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China

Manufacturer Shenzhen Ntmer Technology Co., Ltd.

Address 2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China

Product Name Portable Computer

Trade Mark Robo&Kala

Model/Type reference TW220

Listed Model(s) /

Standard 47 CFR FCC Part 1

Date of receipt of test sample Sep. 28, 2022

Date of testing Sep. 29, 2022 ~ Nov. 10, 2022

Date of issue Nov. 11, 2022

Result PASS

Compiled by:

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Testing Laboratory Name CTC Laboratories, Inc.

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

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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. 11, 2022	Original



1.3. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

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

Laboratory accreditation

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

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. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test	Measurement Frequency Range	U (dB)
H-field requirements	100kHz ~ 1MHz	2.20dB
E-Field Strength	100kHz ~ 1MHz	2.20dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.5. Environmental conditions

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

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



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Ntmer Technology Co., Ltd.
Address:	2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Ntmer Technology Co., Ltd.
Address:	2109, Hivac Building, NO.2, Keji South 8th Road, High Tech Zone Community, Yuehai Subdistrict, Nanshan District, Shenzhen, China

2.2. General Description of EUT

Product Name:	Portable Computer
Trade Mark:	Robo&Kala
Model/Type reference:	TW220
Listed Model(s):	/
Power supply:	DC Voltage supplied from AC/DC Adapter 7.74Vdc from 5250mAh Li-ion Battery
Adapter 1 model:	KS65C-GaNC1-CU Input: 100-240V~ 50/60Hz 1.5A Max Output: 5Vdc/3A, 9Vdc/3A, 12Vdc/3A, 15Vdc/3A, 20Vdc/3.25A
Adapter 2 model:	PA-1650-67 Input: 100-240V~ 50/60Hz 1.6A Output: 5Vdc/3A, 9Vdc/3A, 12Vdc/3A, 15Vdc/3A, 20Vdc/3.25A
Hardware version:	V2.0
Software version:	N1-SW-9800
Wireless Charger	
Frequency Range:	100kHz ~ 148kHz
Operation Frequency:	146kHz
Modulation Type:	ASK
Antenna Type:	Induction Coil
Exposure category:	General population/uncontrolled environment
Device Type:	Portable Device



2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
Smart Pen	TP20	---	Robo&Kala
/	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/

2.4. Description of Test Modes

Test mode	Wireless charging (5V/0.36A)
1	■

Note: ■ is operation mode.

2.5. Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Field Meter	Wavecontrol	SMP600	20SN1117	Apr. 25, 2023
2	Probe	Wavecontrol	WP400-3	21WP120528	Apr. 25, 2023

Note: The Cal. Interval was one year.



2.6. Equipment Approval Considerations

The EUT does comply with item 5.b of KDB 680106 D01v03 as follows table;

Requirements of KDB 680106 D01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 110.0 KHz - 205.0 KHz
Output power from each primary coil is less than 15 watts	Yes	The maximum output power of the primary coil is less than 10W.
The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	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	This device is portable
The aggregate 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.	Yes	The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are less than 50% 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.



2.7. 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				
0.1-3.0	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				
0.1-1.34	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

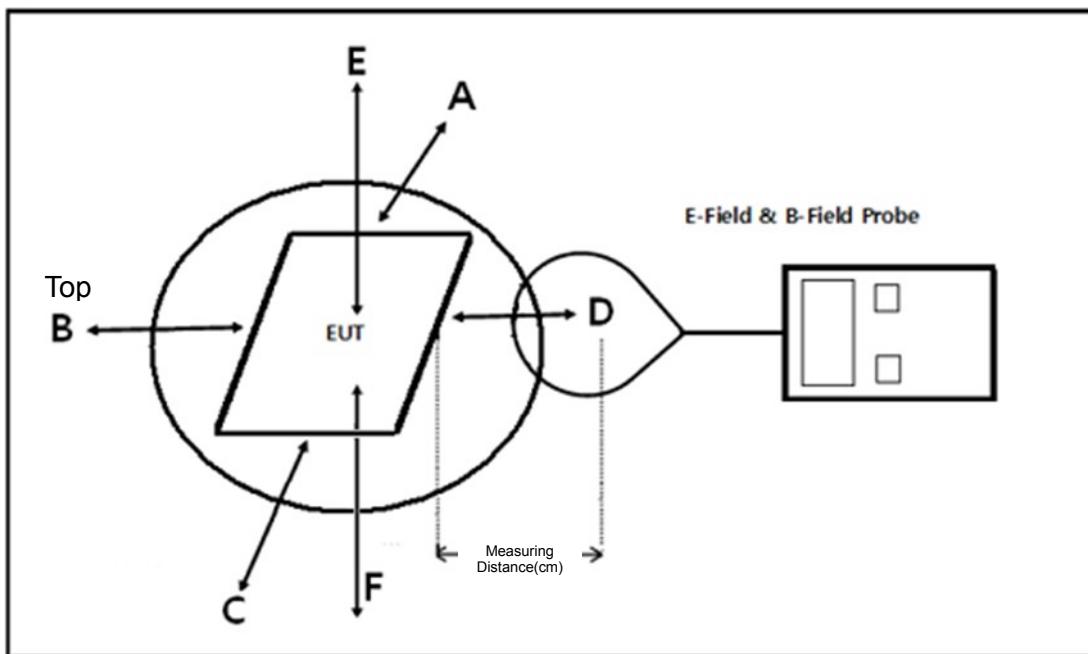
*=Plane-wave equivalent power density

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
0.1 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

- A. The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- B. The measurement probe was placed at test distance (0-15cm) which is between the edge of the charger and the geometric center of probe.
- C. The turn table was rotated 360 degree to search of highest strength.
- D. The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, D, E, F) were completed.
- E. The EUT were measured according to the dictates of KDB 680106D01v03.

TEST MODE

Please refer to the clause 2.4.

TEST RESULTS

Note: The EUT length has exceeded 15cm, The C-plane can be exempted.



Test mode	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 D	Test Position E	Test Position F		
1	0	10.60	10.90	10.20	13.10	9.31	307.0	614.0
1	2	9.70	9.84	9.66	8.32	7.96	307.0	614.0
1	4	9.55	9.72	9.53	7.96	7.92	307.0	614.0
1	6	9.52	9.70	9.50	7.89	7.87	307.0	614.0
1	8	9.21	9.70	9.38	7.86	7.86	307.0	614.0
1	10	9.12	9.64	9.23	7.85	7.85	307.0	614.0
1	12	9.02	9.64	9.21	7.84	7.85	307.0	614.0
1	14	8.98	9.62	9.20	7.84	7.84	307.0	614.0
1	15	8.90	9.61	9.07	7.82	7.84	307.0	614.0

Test mode	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 D	Test Position E	Test Position F		
1	0	0.12	0.42	0.17	0.30	0.63	0.815	1.63
1	2	0.50	0.23	0.14	0.14	0.62	0.815	1.63
1	4	0.26	0.17	0.13	0.73	0.31	0.815	1.63
1	6	0.19	0.14	0.13	0.37	0.17	0.815	1.63
1	8	0.15	0.13	0.13	0.22	0.14	0.815	1.63
1	10	0.13	0.13	0.12	0.15	0.13	0.815	1.63
1	12	0.12	0.12	0.12	0.14	0.12	0.815	1.63
1	14	0.12	0.12	0.12	0.13	0.12	0.815	1.63
1	15	0.12	0.12	0.12	0.12	0.12	0.815	1.63



Test mode	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 E		
1	20	0.12	0.815	1.63

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