TCT 通测检测 TESTING CENTRE TECHNOLOGY

Test Report

Test Report No..... :	TCT230508E001	
Date of issue..... :	May 25, 2023	
Testing laboratory ..... :	Shenzhen TCT Testing Technology Co., Ltd.	
Testing location/ address:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name..... :	LINKCOM MANUFACTURING CO., LTD	
Address..... :	Building 1, No.21 Huanqi Avenue, Qishi Town Dongguan Guangdong Sheng China	
Manufacturer's name ... :	LINKCOM MANUFACTURING CO., LTD	
Address..... :	Building 1, No.21 Huanqi Avenue, Qishi Town Dongguan Guangdong Sheng China	
Standard(s) ..... :	ETSI EN 303 417 V1.1.1 (2017-09)	
Product Name..... :	wireless charging pad	
Trade Mark ..... :	N/A	
Model/Type reference..... :	OPP130, OPP002	
Rating(s)..... :	DC 5V(Adapter input AC 230 V/ 50 Hz)	
Date of receipt of test item ..... :	May 08, 2023	
Date (s) of performance of test..... :	May 08, 2023 - May 25, 2023	
Tested by (+signature) ... :	Rleo LIU	
Check by (+signature).... :	Beryl ZHAO	
Approved by (+signature):	Tomsin	

General disclaimer:

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Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

1. General Product Information

1.1. EUT description

Product Name.....:	wireless charging pad
Model/Type reference.....:	OPP130
Operation Frequency.....:	115.38kHz – 150.64kHz
Test Frequency.....:	137.60kHz
Modulation.....:	Load modulation
Operational Mode.....:	Mode 4: energy transmission
Antenna Type.....:	Inductive loop coil Antenna
Rating(s).....:	DC 5V(Adapter input AC 230 V/ 50 Hz)

1.2. Model(s) list

No.	Model No.	Tested with
1	OPP130	☒
Other models	OPP002	☐
Note: OPP130 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of OPP130 can represent the remaining models.		

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2. Test Result Summary

Radio Spectrum Matter (RSM) Part of Tx				
Test Item	**Test Requirement**	**Test Method**	**Limit/Severity**	**Result**
Permitted range of operating frequencies	Clause 4.3.2	Clause 6.6.2	Clause 4.3.2.3	PASS
Operating frequency ranges	Clause 4.3.3	Clause 6.6.2	Clause 4.3.3.3	PASS
H-field requirements	Clause 4.3.4	Clause 6.6.2	Clause 4.3.4.3	PASS
Transmitter spurious emissions	Clause 4.3.5	Clause 6.6.3	Clause 4.3.5.3	PASS
Transmitter out of band (OOB) emissions	Clause 4.3.6	Clause 6.6.3	Clause 4.3.6.3	PASS
WPT system unwanted conducted emissions	Clause 4.3.7	Clause 6.6.4	Clause 4.3.7.3	N/A

Radio Spectrum Matter (RSM) Part of Rx				
Test Item	**Test Requirement**	**Test Method**	**Limit/Severity**	**Result**
Receiver spurious emissions	Clause 4.4.1	Clause 6.3.2	Clause 4.4.1	PASS
Receiver blocking	Clause 4.4.2	Clause 6.3.2	Clause 4.4.2	N/A

Note:

1 PASS: Test item meets the requirement.

2. N/A: Test case does not apply to the test object.

3. The test result judgment is decided by the limit of test standard.

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3. General Information

3.1. Test environment and mode

Item	Normal condition
Temperature	+25ºC
Voltage	DC 5V(Adapter input AC 230 V/ 50 Hz)
Humidity	20%-95%
Atmospheric Pressure:	1008 mbar
Test Mode:	
Operational Mode	Mode 4: energy transmission

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Adapter	EP-TA200	R37M4PR3QD1SE3	/	SAMSUNG
Coil Load	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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3.3. Test Instruments List

Radiated Emission				
Name	**Model No.**	**Manufacturer**	**Date of Cal.**	**Due Date**
EMI Test Receiver	ESIB7	R&S	Jul. 04, 2022	Jul. 03, 2023
Spectrum Analyzer	FSQ40	R&S	Jul. 04, 2022	Jul. 03, 2023
Pre-amplifier	8447D	HP	Jul. 04, 2022	Jul. 03, 2023
Broadband Antenna	VULB9163	Schwarzbeck	Jul. 06, 2022	Jul. 05, 2024
Coaxial cable	RC-18G-N-M	SKET	Feb. 25, 2022	Feb. 24, 2024
Coaxial cable	RC_40G-K-M	SKET	Feb. 25, 2022	Feb. 24, 2024
Loop antenna	FMZB1519B	Schwarzbeck	Jun. 12, 2022	Jun. 11, 2024
Spectrum Analyzer	N9020A	Agilent	Jul. 05, 2022	Jul. 04, 2023
DC Power Supply	KR3005K	Kingrang	Jul. 05, 2022	Jul. 04, 2023

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4. Facilities and Accreditations

4.1. Facilities

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

- FCC - Registration No.: 645098

  SHENZHEN TONGCE TESTING LAB

  Designation Number: CN1205

  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

  SHENZHEN TONGCE TESTING LAB

  CAB identifier: CN0031

  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

Shenzhen TCT Testing Technology Co., Ltd.

Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB
7	Temperature	± 0.1°C
8	Humidity	± 1.0%

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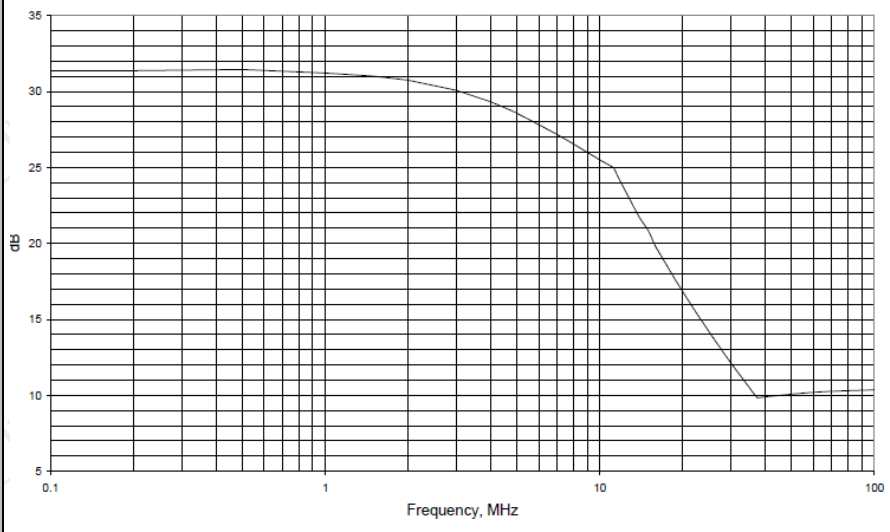
5. Transmitter Requirement

5.1. Radiated H-field requirement

5.1.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>EN 303 417clause 4.3.4</td></tr>
<tr><td>Test Method:</td><td>EN 303 417clause 6.2.2</td></tr>
<tr><td>Receiver Setup</td><td>
Table 3: H-field limits
<table>
<tr><th>Frequency range [MHz]</th><th>H-field strength limit [dBµA/m at 10 m]</th><th>Comments</th></tr>
<tr><td>0,019 ≤ f < 0,021</td><td>72</td><td></td></tr>
<tr><td>0,059 ≤ f < 0,061</td><td>69,1 descending 10 dB/dec above 0,059 MHz</td><td>See note 1</td></tr>
<tr><td>0,079 ≤ f < 0,090</td><td>67,8 descending 10 dB/dec above 0,079 MHz</td><td>See note 2</td></tr>
<tr><td>0,100 ≤ f < 0,119</td><td>42</td><td></td></tr>
<tr><td>0,119 ≤ f < 0,135</td><td>66 descending 10 dB/dec above 0,119 MHz</td><td>See note 1</td></tr>
<tr><td>0,135 ≤ f < 0,140</td><td>42</td><td></td></tr>
<tr><td>0,140 ≤ f < 0,1485</td><td>37,7</td><td></td></tr>
<tr><td>0,1485 ≤ f < 0,30</td><td>-5</td><td></td></tr>
<tr><td>6,765 ≤ f < 6,795</td><td>42</td><td></td></tr>
<tr><td colspan="3">NOTE 1: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz and 129,1 kHz ± 500 Hz.
NOTE 2: At the time of preparation of the present document the feasibility of increased limits for high power wireless power transmission systems to charge vehicles [i.4] was prepared. New specific requirements for such systems (e.g. higher H-field emission limits in the 79 - 90 kHz band) will be reflected within a future revision of the present document.</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
The H-field limit in dBµA/m at 3 m, H_{3m}, is determined by the following equation:
$H_{3m} = H_{10m} + C_3$
where:
H_{10m} is the H-field limit in dBµA/m at 10 m distance according to the present document; and
C_3 is a conversion factor in dB determined from figure H.2.


H_{10m} =42 dBµA/m@10m; C_3=31.5dB
</td></tr>
<tr><td>Test Procedure:</td><td>Refer to EN 303 417clause 6.2.2</td></tr>
<tr><td>Test Instrument:</td><td>Reference to Item 3.3 for details</td></tr>
<tr><td>Test Mode:</td><td>Reference to Item 3.1 for details</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

5.1.2. Test Result

Frequency of Max. Emission Level	Measuring Bandwidth	H-field Level	Limit in Table 4
137.60kHz	2.21kHz	10.5dBμA/m	42.0dBμA/m@10m

Remark: **1. When the device is in working mode, rotated about all 3 axis (X, Y & Z) to obtain worst position, the emissions worst-case (Z axis) are shown in Test Results of the following pages.**
2.The frequency point is selected at maximum power.

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5.2. Operating Frequency range

5.2.1. Test Specification

Test Requirement:	EN 303 417clause 4.3.3
Test Method:	EN 303 417clause 6.2.2
Limit:	100kHz-300kHz
Test Procedure:	Refer to EN 303 417clause 6.2.2
Test Instrument:	Reference to Item 3.3 for details
Test Mode:	Reference to Item 3.1 for details
Test Result:	PASS

5.2.2. Test Result

Bandwidth Measured (kHz)		**Limit (kHz)**	
Lowest frequency	Highest frequency	**Lower**	**Higher**
115.38	150.64	100	300

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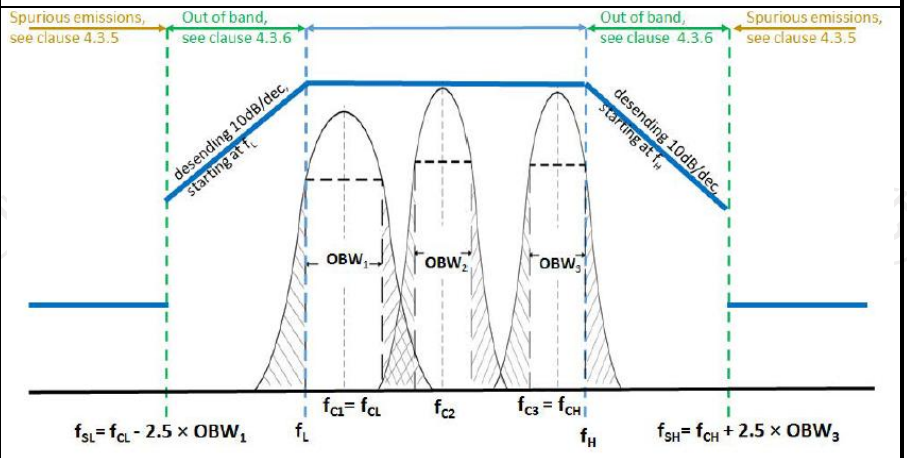
5.3.Transmitter out of band (OOB) emissions

5.3.1. Test Specification

Test Requirement:	EN 303 417clause 4.3.6
Test Method:	EN 303 417clause 6.2.3
Limit:	 Figure 5: Out of band and spurious domain of a multi - frequency system (during one WPT system cycle time)
Test Procedure:	Refer to EN 303 417clause 6.2.3
Test Instrument:	Reference to Item 3.3 for details
Test Mode:	Reference to Item 3.1 for details
Test Result:	PASS

5.3.2. Test Result

Frequency range (KHz)		Emission Level (dbuA/m)	Limit (dbuA/m)	Result
f_{SL}	108.75	25.45	32.55	Pass
f_L	115.38	28.53	32.81	Pass
f_H	150.64	28.53	32.81	Pass
f_{SH}	157.27	25.66	32.62	Pass

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5.4.Spurious Emission

5.4.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>EN 303 417clause 4.3.5 & clause 4.4.1</td></tr>
<tr><td>Test Method:</td><td>EN 303 417clause 6.2.3</td></tr>
<tr><td>Limit:</td><td>Frequencies <30 MHz
Table 4
<table>
<tr><th>State (see note)</th><th>Frequency 9 kHz ≤ f < 10 MHz</th><th>Frequency 10 MHz ≤ f < 30 MHz</th></tr>
<tr><td>Operating</td><td>27 dBµA/m at 9 kHz descending 10 dB/dec</td><td>-3,5 dBµA/m</td></tr>
<tr><td>Standby</td><td>5,5 dBµA/m at 9 kHz descending 10 dB/dec</td><td>-25 dBµA/m</td></tr>
<tr><td colspan="3">NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.</td></tr>
</table>
Frequencies≥30 MHz
Table 5
<table>
<tr><th>State (see note)</th><th>47 MHz to 74 MHz
87,5 MHz to 118 MHz
174 MHz to 230 MHz
470 MHz to 790 MHz</th><th>Other frequencies between 30 MHz to 1 000 MHz</th></tr>
<tr><td>Operating</td><td>4 nW</td><td>250 nW</td></tr>
<tr><td>Standby</td><td>2 nW</td><td>2 nW</td></tr>
<tr><td colspan="3">NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.</td></tr>
</table></td></tr>
<tr><td>Test Procedure:</td><td>Refer to clause 6.2.3</td></tr>
<tr><td>Test Instrument:</td><td>Reference to Item 3.3 for details</td></tr>
<tr><td>Test Mode:</td><td>Reference to Item 3.1 for details</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
<tr><td>Remark</td><td>The standby mode is too lower than the limit, so not show in this report.</td></tr>
</table>

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5.4.2. Test Result

operation mode				
Maximum Frequency MHz	Spurious Emission position and Level		Limit	Over Limit
	Polarization	dBm	dBm	dBm
55.36	V	-80.40	-54	-26.40
173.180	V	-77.02	-36	-41.02
188.110	V	-72.32	-54	-18.32
196.750	V	-72.57	-54	-18.57
208.580	V	-69.43	-54	-15.43
55.36	H	-79.12	-54	-25.12
173.180	H	-77.85	-36	-41.85
188.110	H	-69.91	-54	-15.91
196.750	H	-80.43	-54	-26.43
208.580	H	-71.06	-54	-17.06

Note: 1. The standby mode is too lower than the limit, so not show in this report.
2. The frequency below 30MHz is too lower than the limit, so not show in this report.

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6. Receiver Requirement

6.1. Receiver Blocking

6.1.1. Test Specification

Test result:	This requirement applies to all WPT systems operation in Mode 1, Mode 2 and Mode 3, so Not applicable.

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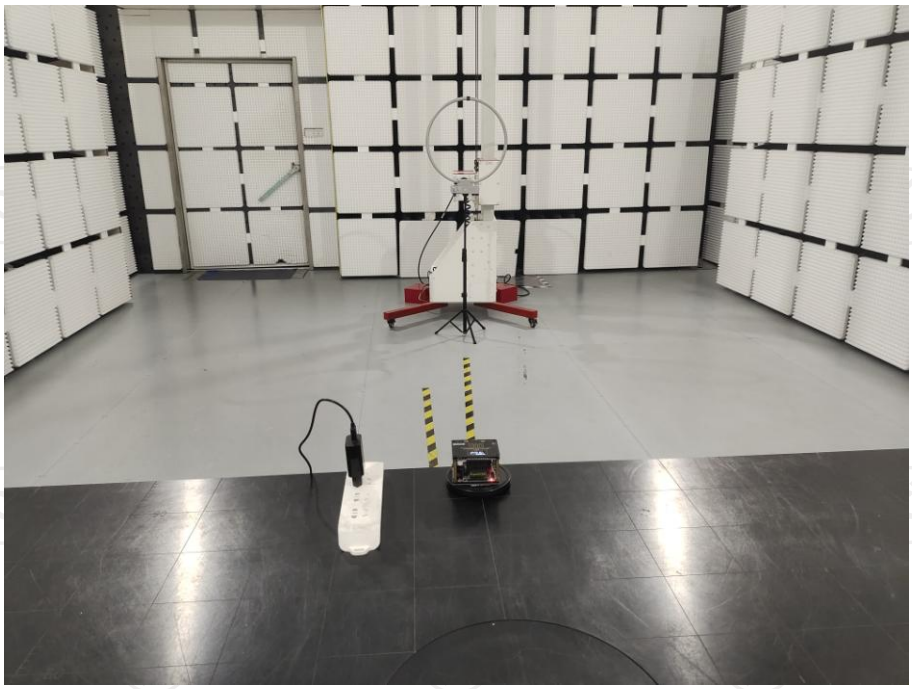
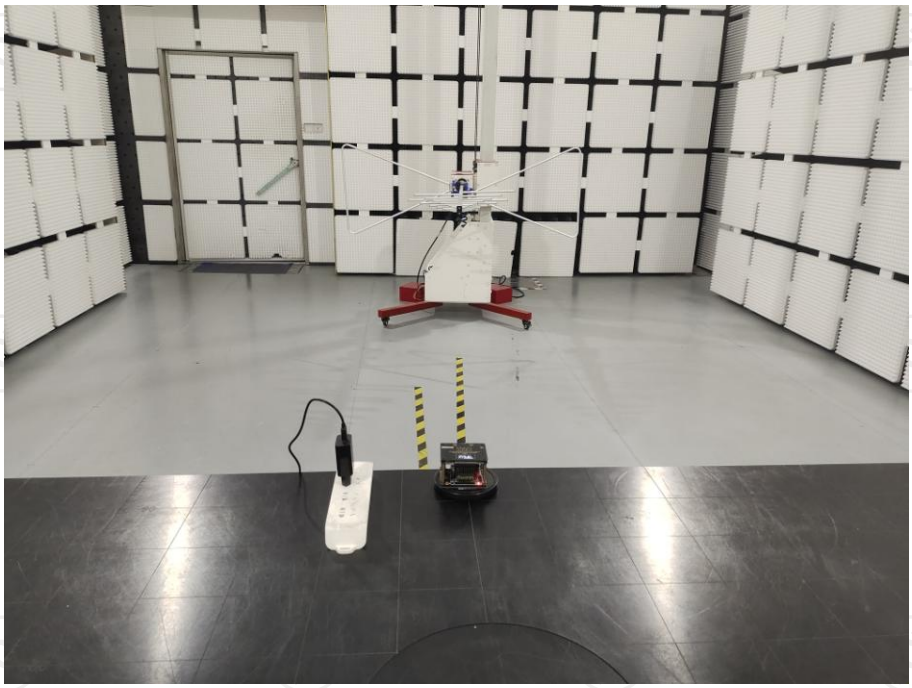
7. Photographs of Test Configuration

Radiated Emission





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8. Photographs of EUT

Refer to the test report No. TCT230508E002

*****END OF REPORT*****

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