verify No.513021813435

TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR23-SRF0218-B Page (1) of (14)	eurofins KCTL

1. Client

- Name : Kortek Corporation
- Address : (Songdo-dong)26,Venture-ro 24beon-gil, Yeonsu-gu, Incheon,Korea
- Date of Receipt : 2023-08-21

2. Use of Report : Certification

3. Name of Product / Model : Wireless Charger Module / PTM-530K

4. Manufacturer / Country of Origin : Powerlabs Co., Ltd. / Korea

5. FCC ID : QLL-PTM-530K

6. Date of Test : 2023-09-12 to 2024-01-04

7. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test method used : 47 CRF Part 1.1310

9. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Minki Kim (Signature)	Technical Manager Name : Heesu Ahn (Signature)

2024-02-05

Eurofins KCTL Co.,Ltd.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2023-10-18	Originally issued	-
2024-01-04	Updated	1, 3, 9, 11-14
2024-02-05	Updated	8, 14

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Note. The report No. KR23-SRF0218-A is superseded by the report No. KR23-SRF0218-B.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

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1. General information

Client	:	Kortek Corporation
Address	:	(Songdo-dong)26,Venture-ro 24beon-gil, Yeonsu-gu, Incheon,Korea
Manufacturer	:	Powerlabs Co., Ltd.
Address	:	# 1025, 220 Bugwang-ro, Bucheon-si, Gyeonggi-do, Korea
Laboratory	:	Eurofins KCTL Co.,Ltd.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Wireless Charger Module
Model	:	PTM-530K
Modulation technique	:	ASK
Frequency range	:	111 ~ 129 ㎑ (WPT)
Power source	:	DC 5 V
Antenna specification	:	Coil Loop Antenna
Software version	:	PTM530K_ver02
Hardware version	:	1.2
Test device serial No.	:	PTM-530K-A000001
Operation temperature	:	-30 ℃ ~ 45 ℃

2.1. Companion device information

Equipment	Manufacturer	Model	Serial No.
Smart Phone	SAMSUNG ELECTRONICS	SM-G998	N/A

2.2. Frequency/channel operations

This device contains the following capabilities:
WPT

Frequency (㎑)
111 ~ 129

Table 2.2.1. WPT System

2.3. Worst-Case configuration and mode

Test Case	Description
1	**Charging from EUT to Phone (<10% Power Charging, Fast charging mode)**
2	Charging from EUT to Phone (50~55% Power Charging, Fast charging mode)
3	Charging from EUT to Phone (90~95% Power Charging, Fast charging mode)

According to current client device's battery level, test results are different. Because the test result were worst when the battery level was below 10%, tests were performed when the battery level was below 10%.(Client device)

Test results of case 1 is worst, so this test report described test case 1.

2.4. Normal and extreme test conditions

- Ambient Conditions

Item	Temperature [℃]	Relative humidity [%]
Requirement for tests	15 to 35	20 to 75
Ambient Conditions	21	51

- Test Conditions

Test condition	Temperature [℃]	Voltage [V]
NTNV	21	DC 5

Note 1 : N:Normal T:Temperature V:Voltage

3. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Conducted RF power	0.9 dB	
E-Field	3 kHz ~ 10 MHz	1.0 %
H-Field	3 kHz ~ 10 MHz	1.3 %

4. RF Exposure
4.1. FCC Regulation

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC rules and Regulations.
The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1.
According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency Range (㎒)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [㎽/㎠]	Averaging Time [minute]
(A) Limits for Occupational / Controlled Exposure				
0.3 ~ 3.0	614	1.63	*100	6
3.0 ~ 30	1842/f	4.89/f	*900/f²	6
30 ~ 300	61.4	0.163	1.0	6
300 ~ 1 500	/	/	f/300	6
1 500 ~ 15 000	/	/	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/f²	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

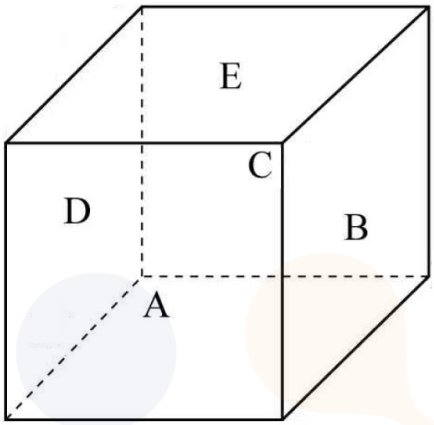
*f=frequency in ㎒, *= plane-wave equivalent power density*

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100 ㎑

4.2. Test Set-up

4.2.1. Isotropic Probe test setup

The measurement probe (EHP-200A) is a regular hexahedron and supports 3-axis (X, Y and Z) isotropic probe.



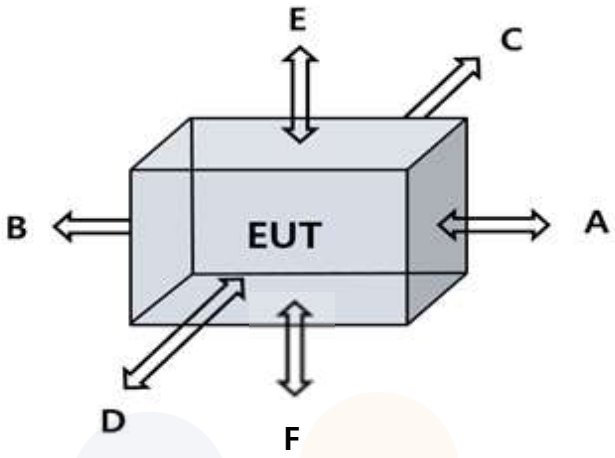
A: Front of measurement probe
B: Right of measurement probe
C: Rear of measurement probe
D: Left of measurement probe
E: Top of measurement probe
*Bottom of measurement probe is not used to measure RF exposure condition owing to connection with a stick.

At 0 cm distance, measurement isotropic probe was investigated by rotating the probe through various angles for one of the EUT's sides as below.

Measurement Point	**A**	**B**	**C**	**D**	**E**
Direction	Front	Right	Rear	Left	Top
Measurement Point	**A to B**	**B to C**	**C to D**	**D to A**	**N/A**
Direction	Front to Right	Right to Rear	Rear to Left	Left to Front	-
Measurement Point	**A to E**	**B to E**	**C to E**	**D to E**	**N/A**
Direction	Front to Top	Right to Top	Rear to Top	Left to Top	-

When the worst angle among all angles was found, RF exposure measurement should be adjusted from worst angle.

4.2.2. EUT test setup



1) Testing was performed with a calibrated field probe.
2) Measurement was performed on each side of the EUT as described per below table.
3) EUT and Tag distances were all verified at 0(Direct), 3, 6, and 9 mm.
   The worst condition is 6 mm.

A	B	C	D	E	F
Front	Rear	Right	Left	Top	Bottom

* F is not the product surface.

Measurement Probe	EHP-200A (Manufacturer: Narda)	
Measurement Method	TM1	Direct measurement [0 mm]
	TM2	Distance measurement [6 mm]
Measurement Distance	Surface of the EUT to the center of the probe.	

Equipment Approval Considerations item 5.b) of KDB 680106 D01 v03

a) Power transfer frequency is less than 1 ㎒.

► This device is operates at a frequency of 110 ㎑ ~ 129 ㎑

b) Output power from each primary coil is less than or equal to 15 watts.

► DC 5.0 V condition / Output power from each primary coil : 5 watts.

c) 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.

► The transfer system includes only single primary coils.

d) Client device is placed directly in contact with the transmitter.

► The client device is placed directly in contact with the transmitter.

e) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion)

► This device is mobile exposure condition.

f) The aggregate H-field strengths at 15㎝ surrounding the device and 20㎝ above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

► The EUT field strength levels < 50 % of the MPE limit 1.63 A/m
0.076 A/m (Max) < 0.815 A/m

4.3. Test configuration (Description of test mode)

Test case configuration is reported as below.

Test Case	Description
1	**Charging from EUT to Phone (<10% Power Charging, Fast charging mode)**
2	Charging from EUT to Phone (50~55% Power Charging, Fast charging mode)
3	Charging from EUT to Phone (90~95% Power Charging, Fast charging mode)

Test results of case 1 is worst, so this test report described test case 1.

4.4. Test result

4.4.1. Test mode: test result of rotating the probe through various angles Distance : 15㎝ surrounding the device and 20㎝ above the top surface.

- Result : TM1

- E-field measurement results (Sides of probe)

Frequency [kHz]	E-field Measurement [V/m]					Limits [V/m]
	Probe rotation					
	A	B	C	D	E	
113.0	0.667 9	**1.021 6**	0.979 9	0.688 4	0.627 7	614.00

- H-field measurement results (Sides of probe)

Frequency [kHz]	H-field Measurement [A/m]					Limits [A/m]
	Probe rotation					
	A	B	C	D	E	
113.0	**0.392 5**	0.136 4	0.125 2	0.222 0	0.333 1	1.63

- E-field measurement results (Rotation of probe)

Frequency [kHz]	E-field Measurement [V/m]								Limits [V/m]
	Probe rotation								
	A to E	B to E	C to E	D to E	A to B	B to C	C to D	D to A	
113.0	0.704 0	**0.956 8**	0.554 9	0.347 3	0.860 8	0.786 2	0.931 6	0.741 8	614.00

- H-field measurement results (Rotation of probe)

Frequency [kHz]	H-field Measurement [A/m]								Limits [A/m]
	Probe rotation								
	A to E	B to E	C to E	D to E	A to B	B to C	C to D	D to A	
113.0	0.111 7	0.082 0	0.257 5	**0.275 3**	0.166 2	0.146 2	0.189 4	0.232 3	1.63

Note:

- Worst position of isotropic probe: E-field = B-side, H-field = A-side.

- Result : TM2

- E-field measurement results (Sides of probe)

Frequency [kHz]	E-field Measurement [V/m]					Limits [V/m]
	Probe rotation					
	A	B	C	D	E	
113.0	1.370 5	**2.892 5**	2.848 9	1.566 1	1.607 6	614.00

- H-field measurement results (Sides of probe)

Frequency [kHz]	H-field Measurement [A/m]					Limits [A/m]
	Probe rotation					
	A	B	C	D	E	
113.0	**0.082 3**	0.043 5	0.038 5	0.067 7	0.071 7	1.63

- E-field measurement results (Rotation of probe)

Frequency [kHz]	E-field Measurement [V/m]								Limits [V/m]
	Probe rotation								
	A to E	B to E	C to E	D to E	A to B	B to C	C to D	D to A	
113.0	2.185 3	**2.260 7**	1.847 6	1.320 7	1.818 2	1.914 0	1.880 5	1.340 6	614.00

- H-field measurement results (Rotation of probe)

Frequency [kHz]	H-field Measurement [A/m]								Limits [A/m]
	Probe rotation								
	A to E	B to E	C to E	D to E	A to B	B to C	C to D	D to A	
113.0	**0.050 2**	0.049 3	0.045 2	0.041 2	0.047 3	0.042 6	0.049 4	0.037 8	1.63

Note:

- Worst position of isotropic probe: E-field = B-side, H-field = A-side.

4.4.2. Test mode: Test result of EUT's sides about the distance
Distance : 15㎝ surrounding the device and 20㎝ above the top surface.

- Result : TM1

- E-field measurement results

Distance [㎝]	Frequency [㎒]	E-field Measurement [V/m]						Limits [V/m]
		EUT sides						
		A	B	C	D	E	F	
15(~10%)	130.0	1.055 6	1.342 2	1.341 3	1.503 3	**3.478 0**	0.651 6	614.00

- H-field measurement results

Distance [㎝]	Frequency [㎒]	E-field Measurement [A/m]						Limits [A/m]
		EUT sides						
		A	B	C	D	E	F	
15(~10%)	130.0	0.026 6	0.024 3	0.028 8	**0.033 7**	0.111 3	0.045 9	1.63

Note:
- Above RF exposure measurement was performed considering worst position (E-field : E-side, H-field : D-side) of isotropic probe.

- Result : TM2

- E-field measurement results

Distance [㎝]	Frequency [㎒]	E-field Measurement [V/m]						Limits [V/m]
		EUT sides						
		A	B	C	D	E	F	
15(~10%)	130.0	3.180 9	**3.710 7**	3.004 4	2.543 7	3.288 6	2.483 0	614.00

- H-field measurement results

Distance [㎝]	Frequency [㎒]	E-field Measurement [A/m]						Limits [A/m]
		EUT sides						
		A	B	C	D	E	F	
15(~10%)	130.0	0.044 9	0.043 5	0.037 1	**0.056 7**	0.044 3	0.135 8	1.63

Note:
- Above RF exposure measurement was performed considering worst position (E-field : B-side, H-field : D-side) of isotropic probe.

5. Measurement Equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
E&H Field Probe	narda	EHP-200A	170WX81015	25.01.30

End of test report