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# TEST REPORT

**Eurofins KCTL Co.,Ltd.**
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eurofins | KCTL

**1. Client**

- Name : BH EVS Co.,Ltd.
- Address : 208,209,210,211,212, 2F, 5, Magokjungang 8-ro 5-gil, Gangseo-gu, Seoul, 00794 Republic of Korea
- Date of Receipt : 2022-09-01

**2. Use of Report** : Certification

**3. Name of Product / Model** : Wireless Power Charger / WCGMM00N3C8

**4. Manufacturer / Country of Origin** : BH EVS Co.,Ltd. / Korea

**5. FCC ID** : 2A6WXWCGMM00N3C8

**6. Date of Test** : 2022-09-13 to 2022-12-23

**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<br>Name : Jungwon Seo (Signature) | Technical Manager<br>Name : Heesu Ahn (Signature) |

2023-02-06

**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 |
|---|---|---|
| 2022-11-30 | Originally issued | - |
| 2022-12-26 | Updated | 6, 10, 11 |
| 2022-12-28 | Updated | 11 |
| 2023-01-04 | Updated | 7 |
| 2023-01-06 | Modified the software version | 4 |
| 2023-02-03 | Updated | 11 |

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Note. The report No. KR22-SRF0202-D is superseded by the report No. KR22-SRF0202-E.

## 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 | : | BH EVS Co.,Ltd. |
| Address | : | 208,209,210,211,212, 2F, 5, Magokjungang 8-ro 5-gil, Gangseo-gu, Seoul, 00794 Republic of Korea |
| Manufacturer | : | BH EVS Co.,Ltd. |
| Address | : | 208,209,210,211,212, 2F, 5, Magokjungang 8-ro 5-gil, Gangseo-gu, Seoul, 00794 Republic of 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 Power Charger |
| Model | : | WCGMM00N3C8 |
| Modulation technique | : | ASK |
| Frequency range | : | 128 ㎑ |
| Power source | : | DC 14 V |
| Antenna specification | : | Coil Antenna |
| Software version | : | 1.01 |
| Hardware version | : | 1.3 |
| Test device serial No. | : | N/A |
| Operation temperature | : | -10 ℃ ~ 50 ℃ |

## 2.1. Accessory information

| Equipment | Manufacturer | Model | Serial No. | FCC ID |
|---|---|---|---|---|
| Phone | Samsung Electronics Co., Ltd. | SM-F711N | R5CR80LXPBL | - |

## 2.2. Frequency/channel operations

This device contains the following capabilities:
WPT

| Frequency (㎑) |
|---|
| 127.87 |

Table 2.2.1. WPT

## 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 ㏈ | |
| E-Field | 3 ㎑ ~ 10 ㎒ | 1.0 % |
| H-Field | 3 ㎑ ~ 10 ㎒ | 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/f$^2$ | 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/f$^2$ | 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 ㎑

According to IEEE C95.3:2002 section 5.5.1.1, The power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula

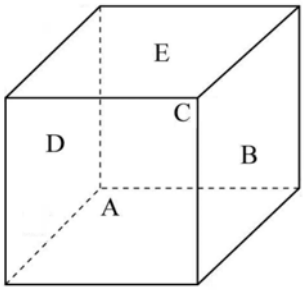
$$S = \frac{PG}{4\pi d^2}$$

S = power density (mW/cm2 )
P = the net power delivered to the antenna (mW)
G = gain of the antenna in linear scale
d = distance between observation point and center of the radiator (cm)

## 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.



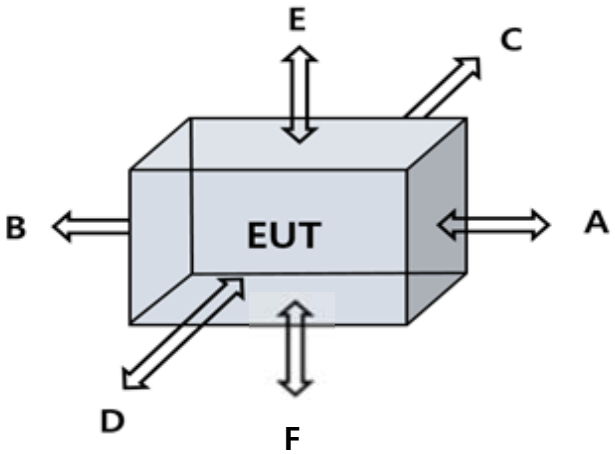

A: Front of measurement probe
B: Right of measurement probe
C: Rear of measurement probe
D: Left of measurement probe
E: Top of measurement probe
*Bottom of measurement probe is not used to measure RF exposure condition owing to connection with a stick.

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

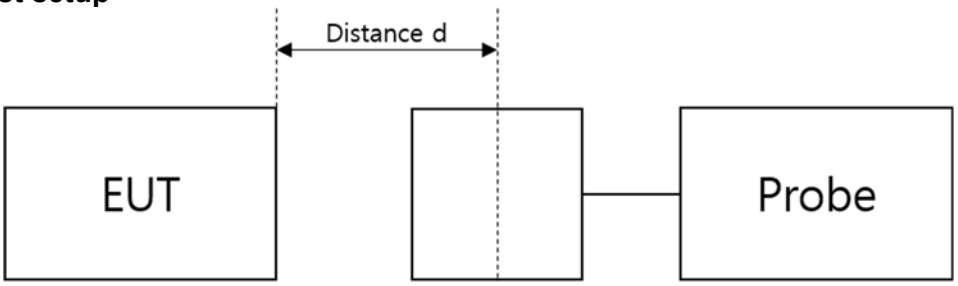



1) Testing was performed with a calibrated field probe.
2) Measurement was performed on each side of the EUT as described per below table.

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

| | |
|---|---|
| **Measurement Probe** | EHP-200A (Manufacturer: Narda) |
| **Measurement Method** | Direct measurement |
| **Measurement Distance** | Surface of the EUT to the center of the probe. |

### 4.2.3 EMF test setup




H-Field Probe : Narda EHP-200A Probe 92 $cm^2$ (3$cm^2$ for d < 6 cm)

**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 127.87 ㎑.

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

► DC 14.0 V condition / Output power from each primary coil : 15 watts(Maximum output power)

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 and secondary 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 portable 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
0.092 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<br>(<10% Power Charging, Normal charging mode) |
| 2 | Charging from EUT to Phone<br>(50~55% Power Charging, Normal charging mode) |
| 3 | Charging from EUT to Phone<br>(90~95% Power Charging, Normal charging mode) |
| **4** | **Charging from EUT to Phone<br>(<10% Power Charging, Fast charging mode)** |
| 5 | Charging from EUT to Phone<br>(50~55% Power Charging, Fast charging mode) |
| 6 | Charging from EUT to Phone<br>(90~95% Power Charging, Fast charging mode) |

Test results of case 4 is worst, so this test report described test case 4.

## 4.4. Test result

### 4.4.1. Test mode: test result of rotating the probe through various angles

**Middle**

- H-field measurement results (Sides of probe)

| Frequency [MHz] | H-field Measurement [A/m] | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|
| | Probe rotation | | | | | | |
| | A | B | C | D | E | F | |
| 0.128 | 0.209 | 0.173 | 0.152 | 0.085 | 1.353 | 0.128 | 1.63 |

- H-field measurement results (Rotation of probe)

| Frequency [MHz] | E-field Measurement [A/m] | | | | | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance 2 [cm] | Distance 4 [cm] | Distance 6 [cm] | Distance 8 [cm] | Distance 10 [cm] | Distance 12 [cm] | Distance 14 [cm] | Distance 16 [cm] | Distance 18 [cm] | Distance 20 [cm] | |
| 0.128 | 0.524* | 0.292* | 0.595 | 0.203 | 0.137 | 0.105 | 0.070 | 0.060 | 0.048 | 0.037 | 1.63 |

**Note:**

- Worst Case: E-side.
- * : Measured with 3cm$^2$ probe

**Left**

- H-field measurement results (Sides of probe)

| Frequency [MHz] | H-field Measurement [A/m] | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|
| | Probe rotation | | | | | | |
| | A | B | C | D | E | F | |
| 0.128 | 0.962 | 0.765 | 0.253 | 0.420 | 1.261 | 0.863 | 1.63 |

- H-field measurement results (Rotation of probe)

| Frequency [MHz] | E-field Measurement [A/m] | | | | | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance 2 [cm] | Distance 4 [cm] | Distance 6 [cm] | Distance 8 [cm] | Distance 10 [cm] | Distance 12 [cm] | Distance 14 [cm] | Distance 16 [cm] | Distance 18 [cm] | Distance 20 [cm] | |
| 0.128 | 4.10* | 2.25* | 0.519 | 0.415 | 0.342 | 0.255 | 0.198 | 0.126 | 0.109 | 0.069 | 1.63 |

**Note:**

- Worst Case: E-side.
- * : Measured with 3cm$^2$ probe

**Right**

- H-field measurement results (Sides of probe)

| Frequency [MHz] | H-field Measurement [A/m] | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|
| | Probe rotation | | | | | | |
| | A | B | C | D | E | F | |
| 0.128 | 0.640 | 0.515 | 0.138 | 0.170 | 1.318 | 0.748 | 1.63 |

- H-field measurement results (Rotation of probe)

| Frequency [MHz] | E-field Measurement [A/m] | | | | | | | | | | Limits [A/m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance 2 [cm] | Distance 4 [cm] | Distance 6 [cm] | Distance 8 [cm] | Distance 10 [cm] | Distance 12 [cm] | Distance 14 [cm] | Distance 16 [cm] | Distance 18 [cm] | Distance 20 [cm] | |
| 0.128 | 4.08* | 2.14* | 0.633 | 0.564 | 0.327 | 0.209 | 0.156 | 0.114 | 0.095 | 0.080 | 1.63 |

**Note:**

- Worst Case: E-side.
- * : Measured with 3cm$^2$ probe

### 4.4.2. Conclusion

The H-field data shown in this report show that the vehicle Installed wireless charger system is compliant with the MPE limits for charging mobile phone at a distance of over 6cm by declaration of manufacturer.

## 5. Measurement Equipment

| Equipment Name | Manufacturer | Model No. | Serial No. | Next Cal. Date |
|---|---|---|---|---|
| E&H Field Probe | narda | EHP-200A | 170WX81015 | 23.02.11 |
| MAGNETIC FIELD TESTER | HIOKI | FT3470-50 | 171129500 | 23.08.23 |
| DC Power Supply | AGILENT | E3632A | KR73001026 | 23.03.28 |

**End of test report**