



Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

RF Exposure-WPT

Report Reference No..... : CTA25050803504

FCC ID..... : 2A595YH-258

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Date of issue.....: Jul. 21, 2025

Testing Laboratory Name.....: Shenzhen CTA Testing Technology Co., Ltd.

Address.....: Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name.....: Dongguan Yihong Hardware Electronics Co., Ltd

Address.....: Room 1106 No.2, Shangheng Road, Chang'an Town, Dongguan

Test specification.....: FCC CFR 47 PART 1, § 1.1310

Standard.....: KDB 680106 D01 Wireless Power Transfer v04

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Test item description.....: Rader LED controller

Trade Mark.....: N/A

Manufacturer.....: Dongguan Yihong Hardware Electronics Co., Ltd

Model/Type reference.....: YH-258

Listed Models.....: YH-253, YH-255

Modulation Type.....: ASK

Operation Frequency.....: 110.0~205.0KHz

Rating.....: Input: DC 9V, 3A
Output USB-C: 5VDC 1.4A

Output USB-A: 5VDC 1.4A
Wireless Output: 5W/7.5W/10W/15W

Result.....: PASS

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TEST REPORT

Equipment under Test : Rader LED controller

Model /Type : YH-258

Serial Models : YH-253, YH-255

Model difference : PCB board, structure and internal of these model(s) are the same, So no additional models were tested

Applicant : **Dongguan Yihong Hardware Electronics Co., Ltd**

Address : Room1106 No.2, Shangheng Road, Chang'an Town, Dongguan

Manufacturer : **Dongguan Yihong Hardware Electronics Co., Ltd**

Address : Room1106 No.2, Shangheng Road, Chang'an Town, Dongguan

| | |
|---------------------|-------------|
| Test Result: | PASS |
|---------------------|-------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

[680106 D01 Wireless Power Transfer v04](#): EQUIPMENT AUTHORIZATION OF WIRELESS POWER TRANSFER DEVICES.

2 SUMMARY

2.1 General Remarks

| | | |
|--------------------------------|---|---------------|
| Date of receipt of test sample | : | May 08, 2025 |
| Testing commenced on | : | May 08, 2025 |
| Testing concluded on | : | Jul. 21, 2025 |

2.2 Product Description

| | |
|-----------------------|--|
| Product Name: | Rader LED controller |
| Model/Type reference: | YH-258 |
| Power supply: | Input: DC 9V, 3A Output USB-C:5VDC1.4A Output USB-A:5VDC1.4A Wireless Output: 5W/7.5W/10W/15W |
| Test samples ID: | CTA250508035-1# (Engineer sample), CTA250508035-2# (Normal sample) |
| Hardware version: | / |
| Software version: | / |
| Operation frequency: | 110.0~205.0KHz |
| Modulation type: | ASK |
| Antenna type: | Loop coil antenna |

2.3 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

☒ Charging and communication mode

| Test Modes: | | |
|-------------|-------------------|------------|
| Mode 1 | Wireless Charging | Recorded |
| Mode 2 | Standby | Pre-tested |

2.4 Special Accessories

The following is the EUT test of the auxiliary equipment provided by the laboratory:

| Description | Manufacturer | Model | Technical Parameters | Certificate | Provided by |
|-------------|--------------|--------------|--|-------------|-------------|
| Phone | / | iPhone 16pro | / | / | / |
| Adapter | / | / | Input: AC 100-240V 50/60Hz Output: DC 5V 3A, DC 9V 3A | / | / |

2.5 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,
Fuhai Street, Bao'an District, Shenzhen, China

3.2 Test Facility

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

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Statement of the measurement uncertainty

| Test | Measurement Uncertainty | Notes |
|---|-------------------------|-------|
| Magnetic field measurement (9kHz~30MHz) | $\pm 7.8 \%$ | (1) |
| Electric field measurements (9kHz~ 30MHz) | $\pm 7.8 \%$ | (1) |

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

3.4 Equipments Used during the Test

| Test Equipment | Manufacturer | Model No. | Equipment No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|---|--------------|------------------------------|---------------|---------------------|-------------------------|
| Exposure Level Tester | Narda | ELT-400 | CTA-352 | 2025/5/18 | 2026/5/17 |
| Magnetic field probe 100cm ² | Narda | ELT probe 100cm ² | CTA-353 | 2025/5/18 | 2026/5/17 |

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4 Evaluation Method

Per KDB 680106 D01 Section 3. RF Exposure Requirements;

- 1) Wireless power transfer devices must comply with RF exposure requirements for all design configurations in which they can operate. At a minimum, RF exposure must be evaluated for the worst-case scenario, typically when the transmitter, while delivering energy to a client device, is operating at maximum output power. RF exposure compliance for equipment authorization must be determined following the guidance of KDB447498, which includes consideration of the different test requirements for *Mobile Device* and *Portable Device* exposure categories, as defined in §§ 2.1091 and 2.1093 of the Rules.
- 2) The RF exposure limits, as set forth in § 1.1310, do not cover the frequency range below 100 kHz for Specific Absorption Rate (SAR) and below 300 kHz for Maximum Permitted Exposure (MPE). In addition, present limitations of RF exposure evaluation systems prevent an accurate evaluation of SAR below 4 MHz. For these reasons, a specific MPE-based RF Exposure compliance procedure for devices operating in the aforementioned low-frequency ranges has been set in place. This procedure is applicable to Equipment Authorization of all RF devices, thus including, but not limited to, Part 18 and WPT devices. Accordingly, for § 2.1091-*Mobile* devices, the MPE limits between 100 kHz to 300 kHz are to be considered the same as those at 300 kHz in Table 1 of § 1.1310, that is, 614 V/m and 1.63 A/m, for the electric field and magnetic field, respectively. For § 2.1093-*Portable* devices below 4 MHz and down to 100 kHz, the MPE limits in § 1.1310 (with the 300 kHz limit applicable all the way down to 100 kHz) can be used for the purpose of equipment authorization in lieu of SAR evaluations.

Furthermore, consistent with FCC's equipment authorization RF exposure guidance, any device (both portable and mobile) operating at frequencies below 100 kHz is considered compliant for the purpose of equipment authorization when the external (unperturbed) temporal peak field strengths do not exceed the following reference levels:

83 V/m for the electric field strength (*E*) and 90 A/m for the magnetic field strength (*H*). These data may be provided through measurements and/or numerical simulations, and for all the positions in space relevant for any possible body exposure.

- 3) "Large size" probes may prevent the measurement of E- and/or H-fields near the surface of the radiating structure (e.g., a WPT source coil), as in the example shown in Figure 1.

If the center of the probe sensing element is located more than 5 mm from the probe outer surface, the field strengths need to be estimated through modeling for those positions that are not reachable. The estimates may be done either via numerical calculation, or via analytic model: e.g., approximated formulas for circular coils, dipoles, etc., may be acceptable if it is shown that the model is applicable for the design parameters considered. A typical example is the use of a quasi-static approximation formula for a low-frequency magnetic field source. These estimates shall include points spaced no more than 2 cm from each other. Thus, in the example of

Figure 1, at least the estimates at 0 cm² and 2 cm are required, while only one point would not be sufficient. In addition, the model needs to be validated through the probe measurements for the two closest points to the device surface, and with 2-cm increments, as indicated in Figure 1. In that example, the same model must also be applied to the 4 cm and 6 cm positions, and then compared with the measured data, for validation purposes. The validation is considered sufficient if a 30% agreement between the model and the (E- and/or H-field) probe measurements is demonstrated. If such a level of agreement cannot be shown, a more accurate model (and/or a smaller probe) shall be used.

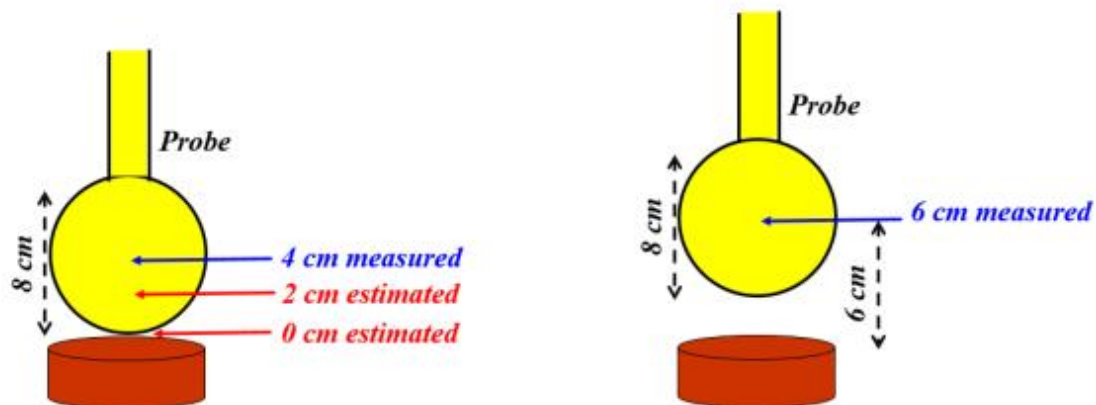


Figure 1. Example of probe (in yellow) measurements in points close to the WPT device (in red/brown). The probe radius is 4 cm, thus the closest point to the device where the field can be measured is at 4 cm from the surface (this example assumes that the probe calibration refers to the center of the sensing element structure, in this case a sphere of 4 cm radius). Data at 0 cm and 2 cm must be estimated through a model, and then the same model must be validated via comparison with the actual measurements at 4 cm and 6 cm, where the probe center can be positioned and collect valid data.

- 4) Part 18 Wireless Power Transfer up to One-Meter Distance. This section applies only to WPT transmitters that, by design, can provide power to a load located at a distance no greater than one meter. This distance shall be measured between the closest points between the transmitter and the receiver enclosure surfaces. For instance, two coils positioned as in Figure 2-a may be operated and considered under the provisions of this section, because both receivers are within one-meter distance from the transmitter. However, the case in Figure 2-b cannot be considered in the same way, and it is treated according to the prescription of Section 5.3.

For WPT designs with more than one radiating structure the distance to the load shall be considered as in Figure 3, thus measured between the receiver and the closest transmitting structure.

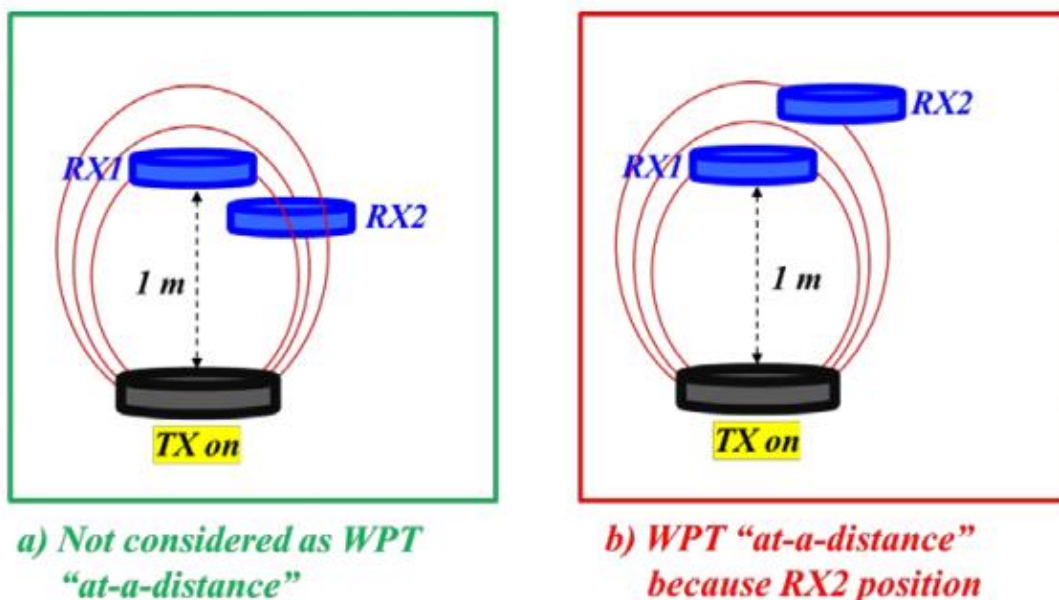


Figure 2-a) For multiple-receiver systems (here shown with two receivers, indicated with RX1 and RX2) the one-meter distance limit must apply for all the receivers that are engaged in the charging process. b) The WPT system is considered "at-a-distance" because it can function when the RX2 is further away than one meter from the transmitter.

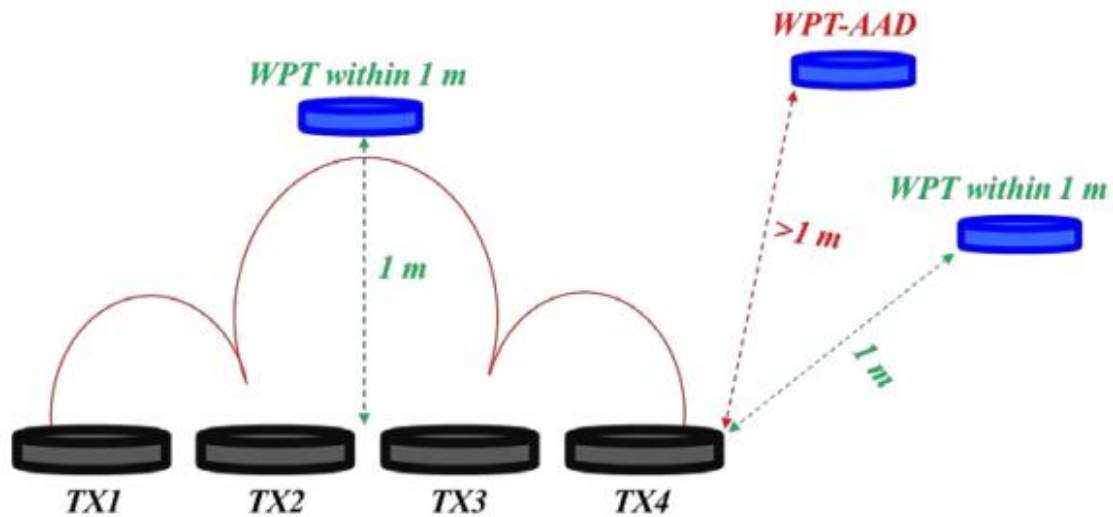


Figure 3. For multiple-coil transmitter systems, the one-meter distance limit is measured from the closest coil edge. A WPT within one meter operates with loads configured as those labeled in green font, if a load can be powered beyond one meter (in red), then it shall be considered “at-a-distance”

There might be situations where the WPT RF emissions are limited enough that even operations in a “crowded” environment, where many similar WPT devices are present, do not pose significant EMC and RF exposure concerns. In this scenario, and for devices operating within a one-meter distance from the receiver, as defined above, a manufacturer will not have to submit an “Equipment Compliance Review” KDB, and receive FCC concurrence before proceeding with equipment authorization. This exception to the requirement of submitting the ECR to obtain FCC concurrence only applies when all the following criteria (1) through (6) are met:

- (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.

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

5 Test limit

5.1 Requirement

§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 as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of FCC part 2.1093 of this chapter.

Table 1 to §1.1310(e)(1) - 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) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (i) 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 |
| 300-1500 | / | / | f/300 | <6 |
| 1500-100000 | / | / | 5 | <6 |
| (ii) 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 |
| 1500-100000 | / | / | 1.0 | <30 |

f = frequency in MHz

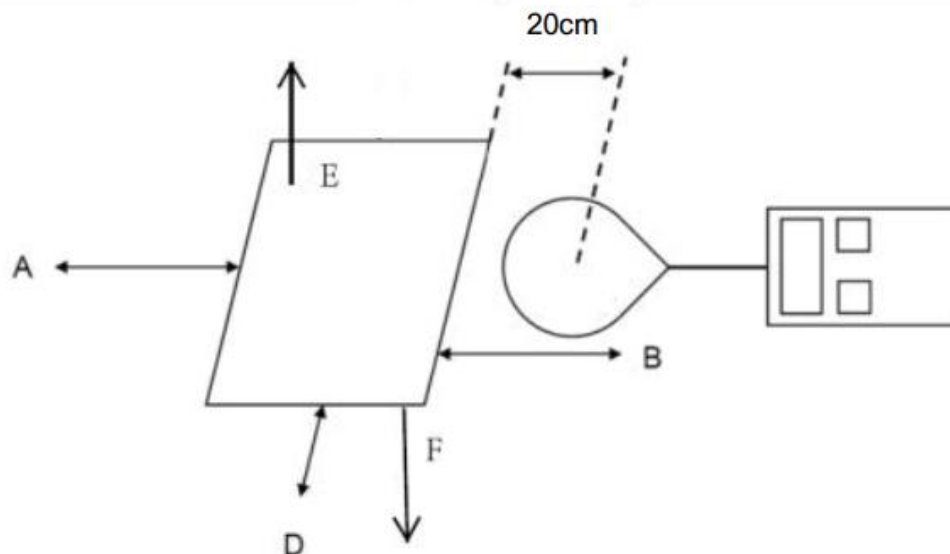
* = Plane-wave equivalent power density

Note 1: Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

Note 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.2 Test setup

For mobile exposure conditions:



Note: The distance of the points A/B/C/D/E is 20cm.

5.3 Test Procedures

For mobile exposure conditions:

- The RF exposure test was performed in anechoic chamber.
- E and H-field measurements should be made with the center of the probe at a distance of 20 cm surrounding the primary/client pair.
- The highest emission level was recorded and compared with limit.
- The EUT was measured according to the KDB 680106 D01 Wireless Power Transfer v04.

5.4 Equipment Approval Considerations of KDB 680106 D01v04

| Requirements of KDB 680106 D01 | Yes / No | Description |
|--|----------|---|
| Power transfer frequency is less than 1 MHz | Yes | The device operates in the frequency range 110.0~205KHz |
| The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts. | Yes | The maximum output power of the primary coil is 15W. |
| 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) | Yes | Client device is placed directly in contact with the transmitter. |
| Only § 2.1091- Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions). | Yes | Mobile exposure conditions only |
| 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. | Yes | The EUT 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. |
| 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 | Yes | Only one radiating structure and tested at maximum Output Power |

There might be situations where the WPT RF emissions are limited enough that even operations in a “crowded” environment, where many similar WPT devices are present, do not pose significant EMC and RF exposure concerns. In this scenario, and for devices operating within a one-meter distance from the receiver, as defined above, a manufacturer will not have to submit an “Equipment Compliance Review” KDB, and receive FCC concurrence before proceeding with equipment authorization. This exception to the requirement of submitting the ECR to obtain FCC concurrence only applies when all the following criteria (1) through (6) are met.

5.5 E and H field Strength

| Test Modes | | |
|---|--|--------|
| Mode 1 | AC/DC Adapter(5V) + EUT + Mobile phone (Battery Status: <1%) | Record |
| Mode 2 | AC/DC Adapter (5V)+ EUT + Mobile phone (Battery Status: <50%) | Record |
| Mode 3 | AC/DC Adapter (5V) + EUT + Mobile phone (Battery Status: 100%) | Record |
| Note: All test modes were pre-tested, but we only recorded the worst case in this report. | | |

5.6 Test results

Field Strength at 15 cm from the edges surrounding the EUT and 15cm from the top surface of the EUT

| Load mode | Frequency Range (kHz) | Field Strength | Measured Field Strength Values | | | | | 50% Limits | Limits |
|-----------|-----------------------|----------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|------------|--------|
| | | | Test Position A | Test Position B | Test Position C | Test Position D | Test Position E | | |
| Mode 1 | 110.0~205.0 | uT | 0.124 | 0.137 | 0.135 | 0.127 | 0.148 | -- | -- |
| Mode 1 | 110.0~205.0 | A/m | 0.099 | 0.109 | 0.108 | 0.102 | 0.118 | 0.815 | 1.63 |
| Mode 1 | 110.0~205.0 | V/m | 37.228 | 41.129 | 40.661 | 38.293 | 44.441 | 307.0 | 614.0 |
| Mode 2 | 110.0~205.0 | uT | 0.127 | 0.132 | 0.145 | 0.134 | 0.145 | -- | -- |
| Mode 2 | 110.0~205.0 | A/m | 0.102 | 0.106 | 0.116 | 0.107 | 0.116 | 0.815 | 1.63 |
| Mode 2 | 110.0~205.0 | V/m | 38.156 | 39.761 | 43.565 | 40.210 | 43.586 | 307.0 | 614.0 |
| Mode 3 | 110.0~205.0 | uT | 0.121 | 0.138 | 0.136 | 0.125 | 0.142 | -- | -- |
| Mode 3 | 110.0~205.0 | A/m | 0.097 | 0.110 | 0.108 | 0.100 | 0.114 | 0.815 | 1.63 |
| Mode 3 | 110.0~205.0 | V/m | 36.469 | 41.469 | 40.744 | 37.580 | 42.785 | 307.0 | 614.0 |

Field Strength at 20 cm from the edges surrounding the EUT and 20cm from the top surface of the EUT

| Load mode | Frequency Range (kHz) | Field Strength | Measured Field Strength Values | 50% Limits | Limits |
|-----------|-----------------------|----------------|--------------------------------|------------|--------|
| | | | Test Position E | | |
| Mode 1 | 110.0~205.0 | uT | 0.142 | -- | -- |
| Mode 1 | 110.0~205.0 | A/m | 0.114 | 0.815 | 1.63 |
| Mode 1 | 110.0~205.0 | V/m | 42.759 | 307 | 614 |
| Mode 2 | 110.0~205.0 | uT | 0.142 | -- | -- |
| Mode 2 | 110.0~205.0 | A/m | 0.113 | 0.815 | 1.63 |
| Mode 2 | 110.0~205.0 | V/m | 42.614 | 307 | 614 |
| Mode 3 | 110.0~205.0 | uT | 0.140 | -- | -- |
| Mode 3 | 110.0~205.0 | A/m | 0.112 | 0.815 | 1.63 |
| Mode 3 | 110.0~205.0 | V/m | 42.215 | 307 | 614 |

Note: $V/m = 10(((20 \lg(A/m \cdot 10^6) + 51.5) - 120)/20)$

Note: $A/m = uT/1.25$

5.7 Conclusion

A minimum safety distance of 20 cm to the antenna is required when the device is charging a smart phone for mobile exposure. The detected emissions are below the limitations according FCC KDB 680106 and confirmed by the FCC according to KDB Inquire..

Shenzhen CTA Testing Technology Co., Ltd.

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6 Photographs of the Test Setup



***** End of Report *****