# EMF TEST REPORT

**Test Report No.** : **OT-239-RWD-004**

**Reception No.** : **2305001584**

**Applicant** : **EVAR Corp.**

**Address** : **42, Changeop-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, Korea**

**Manufacturer** : **EVAR Corp.**

**Address** : **42, Changeop-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, Korea**

**Type of Equipment** : **AC EV Charging Station**

**FCC ID** : **2BBSQ-EV7NU**

**Model Name** : **ELA007C03**

**Multiple Model Name** : **N/A**

**Serial number** : **N/A**

**Total page of Report** : **8 pages (including this page)**

**Date of Incoming** : **May 22, 2023**

**Date of Issuing** : **September 05, 2023**

## SUMMARY

The equipment complies with the requirements of ***FCC CFR 47 § 1.1307***

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

**This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.**

| Tested by | Reviewed by | Approved by |
|---|---|---|
| Yun-Bok, Wi / Prj. Engineer | Tae-Ho, Kim / Chief Engineer | Jae-Ho, Lee / Chief Engineer |
| ONETECH Corp. | ONETECH Corp. | ONETECH Corp. |

 

**ONETECH Corp.**: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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**ONETECH Corp.**: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

## Revision History

| Rev. No. | Issue Report No. | Issued Date | Revisions | Section Affected |
|---|---|---|---|---|
| 0 | OT-239-RWD-004 | September 05, 2023 | Initial Release | All |
| | | | | |
| | | | | |



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# 1. VERIFICATION OF COMPLIANCE

Applicant : EVAR Corp.

Address : 42, Changeop-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, Korea

Contact Person : Kijae, Kim

Telephone No. : +82-31-759-5646

FCC ID : 2BBSQ-EV7NU

Model Name : ELA007C03

Brand Name : -

Serial Number : N/A

Date : September 05, 2023

| | |
|---|---|
| DEVICE TYPE | DXX – Low Power Communication Device Transmitter |
| E.U.T. DESCRIPTION | AC EV Charging Station |
| THIS REPORT CONCERNS | Original Grant |
| MEASUREMENT PROCEDURES | KDB 447498 D01 Interim General RF Exposure Guidance v06 |
| TYPE OF EQUIPMENT TESTED | Pre-Production |
| KIND OF EQUIPMENT AUTHORIZATION REQUESTED | Certification |
| MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE | None |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

 

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# 2. GENERAL INFORMATION

## 2.1 Product Description

The EVAR Corp., Model ELA007C03 (referred to as the EUT in this report) is a AC EV Charging Station. The product specification described herein was obtained from product data sheet or user's manual.

| | |
|---|---|
| DEVICE TYPE | AC EV Charging Station |
| TRANSMITTING FREQUENCY | 13.560 75 MHz,<br>Bluetooth LE: 2 402 MHz ~ 2 480 MHz<br>WLAN: 2 412 MHz ~ 2 462 MHz |
| MODULATION | ASK |
| ANTENNA TYPE | PCB Antenna |
| LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz) | 32.768 kHz, 64 MHz |
| RATED SUPPLY VOLTAGE | Input: AC 240 V, 32 A, 60 Hz<br>Output: AC 208 V ~ AC 240 V, 32 A, 50/60Hz, 7.7 kW |

## 2.2 Model Differences

-. None

# 3. EUT MODIFICATIONS

-. None

 

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# 4. MAXIMUM PERMISSIBLE EXPOSURE

## 4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $180/f^2$ mW/cm² for the frequency range between 1.34 MHz and 30 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric filed strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30 * P * G) / (377 * 10 S)}$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 0.01 * d (m)

$d = 0.282 * \sqrt{(P * G) / S}$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

## 4.2 EUT Description

| | |
|---|---|
| Kind of EUT | AC EV Charging Station |
| MAX. RF OUTPUT POWER | 78.56 dBμV/m |
| Device Category | ☐ Portable (< 20 cm separation)<br>■ Mobile (> 20 cm separation)<br>☐ Others |
| Exposure Evaluation Applied | ■ MPE<br>☐ SAR<br>☐ N/A |

## 4.3 Calculated MPE Safe Distance

**Calculated MPE Safe Distance(13.56 MHz RFID)**

| Frequecny (MHz) | Operating Mode | Target Power W/tolerance (dBm) | Max tune up power | | Antenna Gain | | Safe Distance (cm) | Power Density (mW/cm²) @ 20 cm Separation | Limit (mW/cm²) |
|---|---|---|---|---|---|---|---|---|---|
| | | | (dBm) | (mW) | Log | Linear | | | |
| 13.56 | RFID | -16.64 ± 0.5 | -16.14 | 0.03 | - | - | 0.04 | 0.000 1 | 0.97 |

E.I.R.P[dBm] = Field strength (dBμV/m)-95.2= 78.56 dBμV/m – 95.2 = -16.64 dBm

Limit = $(180/f^2)$ =$(180/13.56^2)$ = 0.97 (mW/cm²)

According to above table, for 13.56 MHz, safe distance,

D = 0.282 * $\sqrt{(0.03 * 1)/1.00} = 0.04$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 0.03 * 1 / (4 * \pi * 20\text{^}2) = 0.000\ 1$$

Where:

S = Power Density,

P = Radiated Power (Field strength (dBμV/m)-95.2)

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

**Calculated MPE Safe Distance(WLAN 2.4G & BLUETOOTH LE)**

| Frequecny (MHz) | Operating Mode | Max power | | Antenna Gain | | Safe Distance (cm) | Power Density (mW/cm²) @ 20 cm Separation | Limit (mW/cm²) |
|---|---|---|---|---|---|---|---|---|
| | | (dBm) | (mW) | Log | Linear | | | |
| 2 400 ~ 2 483.5 | 802.11b | 26.0 | 398.1 | 3.40 | 2.19 | 8.32 | 0.173 4 | 1.00 |
| | 802.11g | 25.5 | 354.8 | | | 7.86 | 0.154 5 | 1.00 |
| | 802.11n_HT20 | 25.5 | 354.8 | | | 7.86 | 0.154 5 | 1.00 |
| | 802.11n_HT40 | 26.0 | 398.1 | | | 8.32 | 0.173 4 | 1.00 |
| | Bluetooth LE | 8.0 | 6.3 | 3.60 | 2.29 | 1.07 | 0.002 9 | 1.00 |

**DATA for Intermodulation Transmit**

According to above equation, the following result was obtained.

| Simultaneous Transmission | Operating Mode | Power Density (mW/cm²) | Sum Ratios | Limit |
|---|---|---|---|---|
| WLAN 2.4G + Bluetooth LE + 13.56 MHz (RFID) | 802.11b | 0.173 4 | 0.176 4 | 1.00 |
| | Bluetooth LE | 0.002 9 | | |
| | 13.56 MHz (RFID) | 0.000 1 | | |