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.

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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)

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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, Bluetooth LE: 2 402 MHz ~ 2 480 MHz 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 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) ■ Mobile (> 20 cm separation) ☐ Others
Exposure Evaluation Applied	■ MPE ☐ SAR ☐ N/A

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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

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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		

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