EMF TEST REPORT

Test Report No. : **OT-245-RWD-029**

Reception No. : **2405001576**

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 : **NFC Module**

FCC ID : **2BBSQ-E02WR01**

Model Name : **E02WR01**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **7 pages (including this page)**

Date of Incoming : **April 03, 2024**

Date of Issuing : **May 27, 2024**

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
Dong-Yeon, Han / 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-245-RWD-029	May 27, 2024	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-E02WR01

Model Name : E02WR01

Brand Name : -

Serial Number : N/A

Date : May 27, 2024

DEVICE TYPE	DXX – Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	NFC Module
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 E02WR01 (referred to as the EUT in this report) is a NFC Module. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	NFC Module
OPERATING FREQUENCY	13.56 MHz
MODULATION TYPE	ASK
ANTENNA TYPE	PCB Antenna
POWER REQUIREMENT	DC 5.0 V
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1 MHz)	13.56 MHz, 16 MHz, 27.12 MHz

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	NFC Module
MAX. RF OUTPUT POWER	73.35 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

Frequency (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	-21.85 ± 0.5	-21.80	0.006 6	-	-	0.022 9	0.000 001 3	0.98

E.I.R.P[dBm] = Field strength (dBμV/m)-95.2= 73.35 dBμV/m – 95.2 = -21.85 dBm

Limit = $(180/f^2)$ =$(180/13.56^2)$ = 0.98(mW/cm²)

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

D = 0.282 * $\sqrt{(0.006\ 6 * 1)/1.00}$ = 0.022 9 cm.

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

$S = P * G / (4\pi * R^2) = 0.006\ 6 * 1 / (4 * \pi * 20\text{^}2) = 0.000\ 001\ 3$

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