

EMF TEST REPORT

Test Report No. : OT-233-RWD-016
Reception No. : 2301000214
Applicant : SEGI LIMITED
Address : Unit J2, 4/F, Block 1, Kinho Industrial Building, 14-24 Au Pui Wan Street, Shatin, New Territories, HONGKONG, China
Manufacturer : SEGI VIET NAM CO., LTD.
Address : Plot C2-2, Ba Thien II Industrial Park, Thien Ke Ward, Binh Xuyen District, Vinh Phuc Province, Vietnam
Type of Equipment : Keyless Entry System
FCC ID. : VA5JA1000-2WFMX
Model Name : ANT-2WFMX2
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : February 15, 2023
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SUMMARY

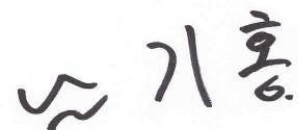
The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.209 and Section 15.231*

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

It is not a generally 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.





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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-233-RWD-016	March 16, 2023	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : SEGI LIMITED
 Address : Unit J2, 4/F, Block 1, Kinho Industrial Building, 14-24 Au Pui Wan Street, Shatin, New Territories, HONGKONG, China
 Contact Person : Youngil Chang / CEO
 Telephone No. : +852-2682-6432
 FCC ID : VA5JA1000-2WFMX
 Model Name : ANT-2WFMX2
 Serial Number : N/A
 Date : March 16, 2023

EQUIPMENT CLASS	DSC - Part 15, Security/Remote Control Transmitter
E.U.T. DESCRIPTION	Keyless Entry System
THIS REPORT CONCERNS	Original grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.209 and Section 15.231
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. 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.

2. GENERAL INFORMATION

2.1 Product Description

The SEGI LIMITED, Model: ANT-2WFMX2 (referred to as the EUT in this report) is a Transmitter that it controls locking and unlocking the door of a vehicle. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	433.92 MHz
RX FREQUENCY	433.92 MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>= 1 MHz)	12.8 MHz
DUTY CYCLE FACTOR	20.00 dB (Duty Cycle: 10.00 %)
ANTENNA TYPE	Helical Antenna
ANTEENA GAIN	-0.24 dBi
RATED SUPPLY VOLTAGE	DC 12.0 V

2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

3. EUT MODIFICATIONS

-. None

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 $f/1500 \text{ mW/cm}^2$ for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm^2 exposure is calculated as follows:

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

Where

S = Power density in mW/cm^2 , Z = Impedance of free space, 377Ω

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

Combining 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 $P (\text{mW}) = P (\text{W}) / 1 000$, $d (\text{cm}) = 0.01 * d (\text{m})$

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

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm^2

4.2 EUT Description

Operating Frequency Band	TX: 433.92 MHz
MAX. RF OUTPUT POWER	98.08 dB μ V/m
Antenna Gain	-0.24 dBi
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> SAR Exemption

4.3.1 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
433.92	FSK	2.58 ± 0.5	3.08	2.03	-0.24	0.946	0.39	0.000 38	1.00

According to above table, for 433.92 MHz, safe distance,

$$D = 0.282 * \sqrt{(2.03 * 0.946)/1.00} = 0.39 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 2.03 * 0.946 / (4 * \pi * 20^2) = 0.000 38$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

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