

EMF TEST REPORT

Test Report No. : OT-249-RWD-023
Reception No. : 2407002559
Applicant : GRITCIC Inc.
Address : #A501, 150, Yeongdeungpo-ro, Yeongdeungpo-gu, Seoul, South Korea
Manufacturer : GRITCIC Inc.
Address : #A501, 150, Yeongdeungpo-ro, Yeongdeungpo-gu, Seoul, South Korea
Type of Equipment : UWB Radar Sensor
FCC ID. : 2BKPS-IUDMA00
Model Name : IU-D-MA-0.0
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : August 09, 2024
Date of issue : September 06, 2024

SUMMARY

The equipment complies with the regulation; **FCC CFR 47 PART 1.1310 and PART 2.1091**

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.



Tested by
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CONTENTS

	PAGE
1. VERIFICATION OF COMPLIANCE	4
2. GENERAL INFORMATION	5
2.1 PRODUCT DESCRIPTION.....	5
2.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT.....	5
3. EUT MODIFICATIONS.....	5
4. MAXIMUM PERMISSIBLE EXPOSURE.....	6
4.1 RF EXPOSURE CALCULATION	6
4.2 EUT DESCRIPTION.....	6
4.3 CALCULATED MPE SAFE DISTANCE.....	7

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-249-RWD-023	September 06, 2024	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : GRITCIC Inc.

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Contact Person : Jungmoo Lee / Senior Engineer

Telephone No. : +82-10-8941-7418

FCC ID : 2BKPS-IUDMA00

Model Name : IU-D-MA-0.0

Brand Name : -

Serial Number : N/A

Date : September 06, 2024

EQUIPMENT CLASS	UWB – ULTRA WIDEBAND TRANSMITTER
E.U.T. DESCRIPTION	UWB Radar Sensor
THIS REPORT CONCERNS	Original Grant
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT	Certification
AUTHORIZATION REQUESTED	
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.

2. GENERAL INFORMATION

2.1 Product Description

The GRITCIC Inc., Model IU-D-MA-0.0 (referred to as the EUT in this report) is a UWB Radar Sensor. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	UWB Radar Sensor
Temperature Range	-20 °C ~ 80 °C
OPERATING FREQUENCY	7 850 MHz
MODULATION TYPE	BPSK
RF OUTPUT POWER	-43.57 dBm/MHz (Average) -18.29 dBm/50MHz (Peak)
ANTENNA TYPE	Array Antenna
ANTENNA GAIN	5.90 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	10 MHz

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 $P (\text{mW}) = P (\text{W}) / 1000$, $d (\text{cm}) = 0.01 * d (\text{m})$

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

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

Kind of EUT	UWB Radar Sensor
Device Category	<input type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input checked="" type="checkbox"/> Others
Exposure	<input checked="" type="checkbox"/> MPE
Evaluation Applied	<input type="checkbox"/> SAR <input type="checkbox"/> N/A

4.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Target Power W/tolerance (dBm)	Max tune up power		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(mW)			
7 850.00	-43.57 ± 1.0	-42.57	0.000 06	0.002 1	0.000 000 01	1

$$E.I.R.P(dBm) = 51.63 - 95.2 = -43.57 \text{ dBm}$$

According to above table, for 7 850 MHz, safe distance,

$$D = 0.282 * \sqrt{(0.000 06)/1.00} = 0.002 1 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 0.000 06 / (4 * \pi * 20^2) = 0.000 000 01$$

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