

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-191-RWD-015

AGR No. : A18DA-006

Applicant : ImGATE, Inc.
Address : B-404, 25 Pangyo-ro 256beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do 13487
South Korea

Manufacturer : ImGATE, Inc.
Address : B-404, 25 Pangyo-ro 256beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do 13487
South Korea

Type of Equipment : IG720

FCC ID. : 2AM9GIG720

Model Name : IG720

Multiple Model Name : IG700, IG701

Serial number : N/A

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

Date of Incoming : December 06, 2018

Date of issue : January 08, 2019

SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*

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

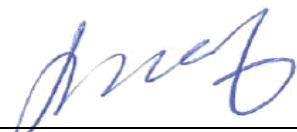
It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Jae-Ho Lee / Chief Engineer
ONETECH Corp.

Approved by:



Keun-Young, Choi / Vice President
ONETECH Corp.

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
OT-191-RWD-015	January 08, 2019	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : ImGATE, Inc.
 Address : B-404, 25 Pangyo-ro 256beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do 13487 South Korea
 Contact Person : YoungJae Im / HW Team Leader
 Telephone No. : +82-31-696-0499
 FCC ID : 2AM9GIG720
 Model Name : IG720
 Serial Number : N/A
 Date : January 08, 2019

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	IG720
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 15.247
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 ImGATE, Inc., Model IG720 (referred to as the EUT in this report) is a IG720. Product specification information described herein was obtained from product data sheet or user’s manual.

Device Type	IG720	
Operating Frequency	BLE	2 402 MHz ~ 2 480 MHz
	NFC	13.562 7 MHz
RF Output Power	BLE	-3.49 dBm
Number of Channel	BLE	40 Channels
	NFC	1 Channel
Modulation Type	BLE	GFSK
	NFC	ASK
Antenna Type	BLE	PCB Antenna
	NFC	PCB Loop antenna
Antenna Gain	BLE	0.11 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	16 MHz, 27.12 MHz	
Rated Supply Voltage	DC 6.0 V	

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

-. The following lists consist of the added models and their differences.

Model Name	Differences	Tested
IG720	Basic Model.	<input checked="" type="checkbox"/>
IG700	This model is identical to the basic model except MOTIS and color.	<input type="checkbox"/>
IG701		

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

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 $f/1500$ mW/cm² for the frequency range between 300 MHz and 1 500 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:

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

Where

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

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/cm²

4.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear		
2 402 ~ 2 480	BLE (GFSK)	-3.99 ± 0.5	-3.49	0.45	0.11	1.026	0.000 091	1.00



Tested by: Ha-Ram, Lee / Assistant Manager