

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

Test Report No. : OT-206-RWD-086
AGR No. : A205A-265
Applicant : ZTACOM Co.,Ltd
Address : 103-510, KT Daeduk 2 Research Center, 70, Yuseong-daero-1689beon-gil, Yuseong-gu, Daejeon, 34047, South Korea
Manufacturer : ZTACOM Co.,Ltd
Address : 103-510, KT Daeduk 2 Research Center, 70, Yuseong-daero-1689beon-gil, Yuseong-gu, Daejeon, 34047, South Korea
Type of Equipment : GPS Tracker & Messenger
FCC ID. : 2AUFQZLC-100U
Model Name : ZLC-100U
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : June 17, 2020
Date of issue : June 30, 2020

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:


 Tae-Ho, Kim / Senior Manager
 ONETECH Corp.

Approved by:


 Ki-Hong, Nam / General Manager
 ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-206-RWD-086	June 30, 2020	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : ZTACOM Co.,Ltd

Address : 103-510, KT Daeduk 2 Research Center, 70, Yuseong-daero-1689beon-gil, Yuseong-gu, Daejeon, 34047, South Korea

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FCC ID : 2AUFQZLC-100U

Model Name : ZLC-100U

Brand Name : -

Serial Number : N/A

Date : June 30, 2020

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	GPS Tracker & Messenger
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 558074 D01 15.247 Meas Guidance v05r02
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 ZTACOM Co.,Ltd, Model ZLC-100U (referred to as the EUT in this report) is an GPS Tracker & Messenger, Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	GPS Tracker & Messenger	
Temperature Range	-20 °C ~ +60 °C	
Rated Supply Voltage	DC 3.7 V	
OPERATING FREQUENCY	LoRa	903 MHz ~ 914.2 MHz
	Bluetooth LE	2 402 MHz ~ 2 480 MHz
MODULATION TYPE	LoRa	CSS
	Bluetooth LE	GFSK
RF OUTPUT POWER	LoRa	11.32 dBm
	Bluetooth LE	-2.47 dBm
NUMBER OF CHANNEL	LoRa	8 Channel
	Bluetooth LE	40 Channel
ANTENNA TYPE	LoRa : FPCB Antenna Bluetooth LE : PCB Antenna	
ANTENNA GAIN	LoRa : -2.0 dBi Bluetooth : 1.0 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32 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 $f/1500$ 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 (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

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



Tested by: Hyung-Kwon, Oh / Assistant Manager

4.2 Test Result for Bluetooth LE

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 3$$

$$= (0.63/5) \times \sqrt{2.402} = 0.20$$

Mode	Frequency (MHz)	Target Power W/tolerance (dBm)	Max tune up power (dBm)	Max tune up power (mW)	Separation distance (mm)	RF exposure
Bluetooth LE	2 402.00	-3.0 ± 1.0	-2.00	0.63	5.00	0.20

Conclusion:

SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.



Tested by: Hyung-Kwon, Oh / Assistant Manager