

RF Exposure Evaluation Report

Applicant: Shenzhen Friendcom Technology Development Co., Ltd.

Address of Applicant: 5-6 Floor, Building 17, Guangqian Industrial Park, Xili, Nanshan District, Shenzhen, Guangdong Province, China

Equipment Under Test (EUT)

Product Name: LoRaWAN Module

Model No.: WSL05-A0

Trade mark: Friendcom

FCC ID: UU3FCWSL05-A0

Applicable standards: FCC CFR Title 47 Part 2 Subpart J Section 2.1091

Date of sample receipt: 02 Mar., 2021

Date of Test: 02 Mar., to 31 Mar., 2021

Date of report issue: 31 Mar., 2021

Test Result: PASS*

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	31 Mar., 2021	Original

Tested by: Yoyo Wu
Test Engineer

Date: 31 Mar., 2021

Reviewed by: Winner Zhang
Project Engineer

Date: 31 Mar., 2021

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4 General Information

4.1 Client Information

Applicant:	Shenzhen Friendcom Technology Development Co., Ltd.
Address:	5-6 Floor, Building 17, Guangqian Industrial Park, Xili, Nanshan District, Shenzhen, Guangdong Province, China
Manufacturer:	Shenzhen Friendcom Technology Development Co., Ltd.
Address:	5-6 Floor, Building 17, Guangqian Industrial Park, Xili, Nanshan District, Shenzhen, Guangdong Province, China
Factory:	Shenzhen Friendcom Technology Development Co., Ltd.
Address:	Building 20, Zhubaocheng industry park, 568 Huanchang North Road, Changping Town, Dongguan, Guangdong Province, China

4.2 General Description of E.U.T.

Product Name:	LoRaWAN Module
Model No.:	WSL05-A0
Operation Frequency:	902~928 MHz
Modulation type:	LoRaWAN
Modulation technology:	FHSS
Antenna Type:	Rod antenna
Antenna gain:	2.0 dBi
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Operating Modes

Operating mode	Detail description
LoRa mode	Keep the EUT in continuously transmitting in LoRa mode

4.4 Additions to, deviations, or exclusions from the method

No

4.5 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC - Designation No.: CN1211 JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551. ● ISED – CAB identifier.: CN0021 The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf
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4.6 Laboratory Location

<p>JianYan Testing Group Shenzhen Co., Ltd. Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com</p>
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5 Technical Requirements Specification in FCC CFR Title 47 Part 2.1091

5.1 Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

5.2 Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

5.3 Result

Frequency (MHz)	Maximum Output power (dBm)	Maximum Output power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm ²)	Limits for General Population/ Uncontrolled Exposure (mW/cm ²)
LoRa							
902.3	21.71	148.25	2.0	1.58	20.00	0.0467	0.60

Note: Just the worst case mode was shown in report.

5.4 Conclusion

The device is exempt from the RF exposure evaluation.

-----End of report-----