RF EXPOSURE REPORT

Report No.:	20230517G05337X-W4
Product Name:	LoRa Controller
Model No.:	UC501-915M, NC501-915M, UC501-9M, NC501-9M, UC502-915M, NC502-915M, UC502-9M, NC502-9M
FCC ID:	2AYHY-UC50XV3
Applicant:	Xiamen Milesight IoT Co., Ltd.
Address:	Building C09, Software Park Phase III, Xiamen 361024, Fujian, China
Dates of Testing:	05/29/2023 - 06/14/2023
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. **Tel:** 86 755 26627338 **Fax:** 86 755 26627238

Test Report

Product.....:	LoRa Controller
Brand Name.....:	Milesight
Trade Name .....:	Milesight
Applicant.....:	Xiamen Milesight IoT Co., Ltd.
Applicant Address.....:	Building C09, Software Park Phase III, Xiamen 361024, Fujian, China
Manufacturer.....:	Xiamen Milesight IoT Co., Ltd.
Manufacturer Address.....:	Building C09, Software Park Phase III, Xiamen 361024, Fujian, China
Test Standards.....:	47 CFR Part 2.1091
Test Result.....:	Pass

Tested by .....: 2023.06.19

Chuiwang Zhang, Test Engineer

Reviewed by.....: 2023.06.19

Chris You, Senior Engineer

Approved by.....: 2023.06.19

Yang Fan, Manager

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Change History		
Issue	Date	Reason for change
1.0	2023.06.19	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	LoRa Controller
Device Type	Fixed devices
Frequency Range	LoRaWAN: 902MHz~928MHz
Modulation Type	LoRa
Antenna Type	Internal Antenna External Antenna 1 External Antenna 2
Antenna Gain	Internal Antenna: 2.82dBi (Reference Antenna Report) External Antenna 1: 1.0dBi (Reference Antenna Report) External Antenna 2: 5.06dbi (Reference Antenna Report)

Note 1: Model:UC501-915M, NC501-915M, UC501-9M, NC501-9M, UC502-915M, NC502-915M, UC502-9M, NC502-9M have the same software, PCB board, electromagnetic emissions and electromagnetic compatibility characteristics. The only difference between the models is that some function devices paste or not paste.The below table show differences:

Model	PN	External LoRa antenna	Power Support	Other differences
UC501-915M, NC501-915M, UC501-9M, NC501-9M	×	×	Solar powered(6V, 1.7W) + 2*2550mAh Chargeable battery + 5~24 V_{DC}	Model Name
UC501-915M, NC501-915M, UC501-9M, NC501-9M	EA	√		
UC502-915M, NC502-915M, UC502-9M, NC502-9M	×	×	3*9000mAh Replaceable Li-$SoCl_2$ battery + 5~24V_{DC}	Model Name
UC502-915M, NC502-915M, UC502-9M, NC502-9M	EA	√		
Note: √: Paste; ×: Not paste; EA: External Antenna.				

1.2. EUT Description

EUT has been tested according to the following standards.

No.	Identity	Document Title
1	47 CFR Part 1	Practice and Procedure
2	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
3	KDB 447498 D01 General RF Exposure Guidance v06	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
4	OET Bulletin 65 Edition 97-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

1.3. Laboratory Facilities

FCC-Registration No.: 406086

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until April 19th, 2023.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun. 30th, 2023.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

1.4. Laboratory Location

Company Name:	CCIC Southern Testing Co., Ltd.
Address:	Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China

2. Technical Requirements Specification in CFR Title 47 Part 2.1091

2.1. Evaluation method

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).

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	< 6
3.0-30	1824/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
(ii) 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
Note: f = frequency in MHz. * = Plane-wave equivalent power density.				

2.2. Predication of MPE limit at a given distance

Refer to formulas on page 19 of OET Bulletin 65, Edition 97-01.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density (in appropriate units, e.g. mW/cm^2)

P = power input to the antenna (in appropriate units, e.g., mW)

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 (appropriate units, e.g., cm)

2.3. Evaluation Results

Worst-Case mode Conducted Output Power Results for LoRa

Operation Mode	Frequency (MHz)	Maximum Output power (dBm)	Max Tune up power (dBm)	Max Tune up power (mW)
LoRa-DTS	903.0	10.696	10±1	12.59
LoRa-DSS	920.3	10.680	10±1	12.59

Calculation results: Worst-Case mode

Operation Mode	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm2)	Power Density (mW/cm2)
LoRa-DTS	5.06	2.84	20	0.005	0.60
LoRa-DSS	5.06	2.84	20	0.005	0.60

2.4. Conclusion

According to the KDB 447498 D01 General RF Exposure Guidance v06 section 7.2 determine the device is exclusion from SAR test.

** END OF REPORT **