

TEST REPORT

Applicant: Jinan USR IOT Technology Limited

Address of Applicant: Floor 2, Wuzhou Scientific Research Building, No.1100
Shunfeng Street, Gaoxin District, Jinan, Shandong, China

Equipment Under Test (EUT)

Product Name: LoRa Converter

Model No.: USR-LG206, USR-LG201, USR-LG202, USR-LG203, USR-LG204, USR-LG205, USR-LG207, USR-LG208, USR-LG209

Applicable standards: EN 62311:2008

Date of sample receipt: 13 Aug., 2018

Date of Test: 13 Aug., to 12 Dec., 2018

Date of report issue: 17 Dec., 2018

Test Result: PASS*

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 1999/5/EC are considered.



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 CCIS 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	17 Dec., 2018	Original

Tested by:

Zora Lee

Date:

17 Dec., 2018

Test Engineer

Reviewed by:

Wimer Zhang

Date:

17 Dec., 2018

Project Engineer

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4 General Information

4.1 Client Information

Applicant:	Jinan USR IOT Technology Limited
Address:	Floor 2, Wuzhou Scientific Research Building, No.1100 Shunfeng Street, Gaoxin District, Jinan, Shandong, China
Manufacturer/Factory:	Jinan USR IOT Technology Limited
Address:	Floor 2, Wuzhou Scientific Research Building, No.1100 Shunfeng Street, Gaoxin District, Jinan, Shandong, China

4.2 General Description of E.U.T.

Product Name:	LoRa Gateway
Model No.:	USR-LG220, USR-LG210, USR-LG230, USR-LG240, USR-LG250, USR-LG260, USR-LG270, USR-LG280, USR-LG290
Hardware version:	V1.4
Software version:	V1.0.5
RFID Specification	
Modulation:	Lora
Antenna type:	External Antenna
Antenna Gain:	1.4 dBi
2.4G Wi-Fi Specification	
Operation Frequency:	2412MHz~2472MHz (802.11b/802.11g/802.11n(HT20)) 2422MHz~2462MHz (802.11n(HT40))
Channel number:	13 for 802.11b/802.11g/802.11n(HT20) 9 for 802.11n(HT40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	External Antenna
Antenna gain:	1 dBi (declare by Applicant)

4.3 Operating Modes

Operating mode	Detail description
Transmitting mode	Keep the TX unit in transmitting mode with modulation

4.4 Description of Support Units

N/A

4.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **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>

4.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282

Fax: +86-755-23116366

4.7 Test Instruments list

Conducted method:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
Vector Signal Generator	Agilent	N5182A	MY49060014	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
Signal Generator	R&S	SMR20	1008100050	03-07-2018	03-06-2019
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO12	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO54	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
Power Sensor	D.A.R.E	RPR3006W	17I00015SNO27	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
Power Sensor	D.A.R.E	RPR3006W	17I00015SNO28	11-10-2017	11-09-2018
				11-10-2018	11-09-2019
RF Switch Unit	Ascentest	AT890-RFB	N/A	N/A	N/A
Test Software	MWRFTEST	MTS 8310	Version: 2.0.0.0		

5 Technical Requirements Specification in EN 62311

5.1 General Description of Applied Standards

EN 62311 Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.

5.2 RF Exposure Evaluation

5.2.1 Limit

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\, f^{1/2}$	$0,0037\, f^{1/2}$	$0,0046\, f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.

5.2.2 Test method

The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement of the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

G = antenna gain relative to an isotropic antenna
 θ, ϕ = elevation and azimuth angles to point of investigation
 r = distance from observation point to the antenna

5.2.3 Measurement data (worst case):

Modulation	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	E Field Strength (V/m)	E Field Strength Limit (V/m)	Result
Maximum Emissions Level of RFID							
865 MHz	12.54	17.93	1.4	1.38	4.31	40.44	Pass
866 MHz	12.55	17.99	1.4	1.38	4.32	40.46	Pass
867 MHz	12.56	18.03	1.4	1.38	4.32	40.49	Pass
868 MHz	12.53	17.91	1.4	1.38	4.31	40.51	Pass
915.1MHz	12.40	17.38	1.4	1.38	4.29	41.59	Pass
Maximum Emissions Level of 2.4G Wi-Fi							
802.11b mode	16.87	48.64	1.0	1.26	6.78	61	Pass
802.11g mode	15.54	35.81	1.0	1.26	5.81	61	Pass
802.11n-HT20 mode	15.36	34.36	1.0	1.26	5.70	61	Pass
802.11n-HT40 mode	15.31	33.96	1.0	1.26	5.66	61	Pass

5.2.4 Conclusion

Meet the requirements of EN 62311:2008

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