

# TEST REPORT

**Applicant:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED

**Address of Applicant:** 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China

**Manufacturer:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED

**Address of Manufacturer:** 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China

**Equipment Under Test (EUT)**

Product Name: Industrial Cellular Modem

Model No.: WL-R220

**Applicable standards:** EN 62311:2008

**Date of sample receipt:** June 27, 2017

**Date of Test:** June 28-July 04, 2017

**Date of report issue:** July 05, 2017

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

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 2014/53/EU are considered.



**Robinson Lo**  
**Laboratory Manager**



This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	July 05, 2017	Original

**Prepared By:**

*Edward Pan*

**Date:**

*July 05, 2017*

**Project Engineer**

**Check By:**

*Andy Wu*

**Date:**

*July 05, 2017*

**Reviewer**

## 3 Contents

	Page
1 COVER PAGE .....	1
2 VERSION .....	2
3 CONTENTS .....	3
4 GENERAL INFORMATION .....	4
4.1 GENERAL DESCRIPTION OF EUT .....	4
4.2 TEST FACILITY .....	5
4.3 TEST LOCATION .....	5
4.4 DESCRIPTION OF SUPPORT UNITS .....	5
4.5 DEVIATION FROM STANDARDS .....	5
4.6 ABNORMALITIES FROM STANDARD CONDITIONS .....	5
4.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER .....	5
5 TECHNICAL REQUIREMENTS SPECIFICATION IN EN 62311 .....	6

## 4 General Information

### 4.1 General Description of EUT

Product Name:	Industrial Cellular Router
Model No.:	WL-R220
Power Supply:	Adapter Model No.: TS-A018-120015EJ Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 12V, 1.5A
<b>WCDMA</b>	
Operation Frequency:	Band I:1920MHz~1980MHz Band VIII:880MHz~915MHz
Modulation Type:	WCDMA:QPSK HSDPA:QPSK, 16QAM HSUPA:QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	1.0dBi(WCDMA I), 1.0dBi(WCDMA VIII)
<b>LTE</b>	
Operation Frequency:	Band 1:1920MHz ~ 1980MHz Band 3:1710MHz ~ 1785MHz Band 7:2500MHz ~ 2570MHz Band 8: 880MHz ~ 915MHz Band 20:832MHz ~ 862MHz Band 38:2570MHz ~ 2620MHz Band 39:1880MHz ~ 1920MHz Band 40: 2300MHz ~ 2400MHz Band 41: 2496MHz ~ 2690MHz
Modulation Type:	QPSK, 16QAM, 64QAM
Antenna Type:	Integral Antenna
Antenna Gain:	1.0dBi(Band 1), 1.0dBi(Band 3), 1.0dBi(Band 7), 1.0dBi(Band 8), 1.0dBi(Band 20).
<b>WIFI</b>	
Operation Frequency:	2412MHz~2472MHz(802.11b/802.11g/802.11n(H20)) 2422MHz~2462MHz(802.11n(H40))
Channel Numbers:	13 for 802.11b/802.11g/802.11n(HT20) 9 for 802.11n(HT40)
Channel Separation:	5MHz
Modulation Type: (IEEE 802.11b)	Direct Sequence Spread Spectrum(DSSS)
Modulation Type: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	Integral Antenna
Antenna Gain:	1.0dBi (declare by Applicant)

## 4.2 Test Facility

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

## 4.3 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

## 4.4 Description of Support Units

The EUT has been tested as an independent unit.

## 4.5 Deviation from Standards

None.

## 4.6 Abnormalities from Standard Conditions

None.

## 4.7 Other Information Requested by the Customer

None.

## 5 Technical Requirements Specification in EN 62311

Test Requirement:	EN 62311																																																												
Test Method:	EN 62311																																																												
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.																																																												
Limit:	<p>According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.</p> <p style="text-align: center;">Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Frequency range</th> <th style="text-align: center;">E-field strength (V/m)</th> <th style="text-align: center;">H-field strength (A/m)</th> <th style="text-align: center;">B-field (μT)</th> <th style="text-align: center;">Equivalent plane wave power density <math>S_{eq}</math> (W/m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0-1 Hz</td> <td style="text-align: center;">—</td> <td style="text-align: center;"><math>3,2 \times 10^4</math></td> <td style="text-align: center;"><math>4 \times 10^4</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-8 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;"><math>3,2 \times 10^4 f^2</math></td> <td style="text-align: center;"><math>4 \times 10^4 f^2</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>8-25 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;"><math>4 000/f</math></td> <td style="text-align: center;"><math>5 000/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,025-0,8 kHz</td> <td style="text-align: center;"><math>250/f</math></td> <td style="text-align: center;"><math>4/f</math></td> <td style="text-align: center;"><math>5/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,8-3 kHz</td> <td style="text-align: center;"><math>250/f</math></td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>3-150 kHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,15-1 MHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-10 MHz</td> <td style="text-align: center;"><math>87 f^{0,2}</math></td> <td style="text-align: center;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>10-400 MHz</td> <td style="text-align: center;">28</td> <td style="text-align: center;">0,073</td> <td style="text-align: center;">0,092</td> <td style="text-align: center;">2</td> </tr> <tr> <td>400-2 000 MHz</td> <td style="text-align: center;"><math>1,375 f^{0,2}</math></td> <td style="text-align: center;"><math>0,0037 f^{0,2}</math></td> <td style="text-align: center;"><math>0,0046 f^{0,2}</math></td> <td style="text-align: center;"><math>f/200</math></td> </tr> <tr> <td>2-300 GHz</td> <td style="text-align: center;">61</td> <td style="text-align: center;">0,16</td> <td style="text-align: center;">0,20</td> <td style="text-align: center;">10</td> </tr> </tbody> </table> <p>Notes:</p> <p>1. <math>f</math> as indicated in the frequency range column.</p>	Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )	0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—	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	$87 f^{0,2}$	$0,73/f$	$0,92/f$	—	10-400 MHz	28	0,073	0,092	2	400-2 000 MHz	$1,375 f^{0,2}$	$0,0037 f^{0,2}$	$0,0046 f^{0,2}$	$f/200$	2-300 GHz	61	0,16	0,20	10
Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )																																																									
0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—																																																									
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	$87 f^{0,2}$	$0,73/f$	$0,92/f$	—																																																									
10-400 MHz	28	0,073	0,092	2																																																									
400-2 000 MHz	$1,375 f^{0,2}$	$0,0037 f^{0,2}$	$0,0046 f^{0,2}$	$f/200$																																																									
2-300 GHz	61	0,16	0,20	10																																																									
Test method:	<p>According to the Far field calculation formula:</p> <p style="text-align: center;"><b>Far Field Calculation Formula</b></p> $E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$ <p><math>G</math> = antenna gain relative to an isotropic antenna  <math>\theta, \phi</math> = elevation and azimuth angles to point of investigation  <math>r</math> = distance from observation point to the antenna</p> <p>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.</p>																																																												
Result:	Pass																																																												

**Measurement Data:**

Mode	Frequency Band(MHz)	Maximum Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	E Field Strength Limit (V/m)	Result
WiFi	2412~2472	16.52	44.87	5.80	61.00	Pass
GSM 900	880~915	32.16	1644.372	39.420	40.26	Pass
DCS 1800	1710~1785	29	794.328	27.398	56.12	Pass
WCDMA Band 1	1920~1980	24	251.189	15.407	59.46	Pass
WCDMA Band 8	880~915	24	251.189	15.407	40.26	Pass
LTE Band 38	2570~2620	24	251.189	15.407	61.00	Pass
LTE Band 20	832~862	24	251.189	15.407	39.14	Pass

-----End-----