

## SPECTRUM 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/Factory:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED

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

**Equipment Under Test (EUT)**

Product Name: Industrial 3G/4G Cellular RTU

Model No.: WL-RT600

**Applicable standards:** ETSI EN 301 908-1 V11.1.1 (2016-07)  
ETSI EN 301 908-2 V11.1.2 (2017-08)  
ETSI EN 301 908-13 V11.1.2 (2017-07)  
ETSI EN 301 511 V12.5.1 (2017-03)  
ETSI EN 300 487 V2.1.2 (2016-11)

**Date of sample receipt:** December 13, 2017

**Date of Test:** December 14-19, 2017

**Date of report issued:** December 20, 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 2014/50/EU are considered.



**Robinson Lo**

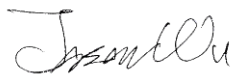
**Laboratory Manager**

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	December 20, 2017	Original

Prepared By:

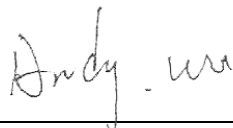


Date:

December 20, 2017

Project Engineer

Check By:



Date:

December 20, 2017

Reviewer

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## 4 Test Summary

<b>UTRA FDD (EN 301 908-1 V11.1.1/EN 301 908-2 V11.1.2)</b>				
<b>Test Item</b>	<b>Test Requirement</b>	<b>Test method</b>	<b>Limit/Severity</b>	<b>Result</b>
Radiated emissions	ETSI EN 301 908-1 Clause 4.2.2	ETSI EN 301 908-1 Clause 5.3.1	Table 4.2.2.2-1	Pass
<b>E-UTRA (EN 301 908-1 V11.1.1/EN 301 908-13 V11.1.2)</b>				
<b>Test Item</b>	<b>Test Requirement</b>	<b>Test method</b>	<b>Limit/Severity</b>	<b>Result</b>
Radiated emissions	ETSI EN 301 908-1 Clause 4.2.2	ETSI EN 301 908-1 Clause 5.3.1	Table 4.2.2.2-1	Pass
<b>GSM (EN 301 511)</b>				
<b>Test Item</b>	<b>Test Requirement</b>	<b>Test method</b>	<b>Limit/Severity</b>	<b>Result</b>
Radiated emissions	ETSI EN301 511 Clause 4.2.16& ETSI TS 151 010-1 Clause 12.2.1.5	ETSI TS 151 010-1 Clause 12.2.1.4	Table 12.7	Pass
<b>SES (EN 300 487 V2.1.2 )</b>				
<b>Test Item</b>	<b>Test Requirement</b>	<b>Test method</b>	<b>Limit/Severity</b>	<b>Result</b>
RF emission limits	ETSI EN 300 487 Clause 5	ETSI EN 300 487 Annex B	Table 1	Pass

*Remark:*

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Industrial 3G/4G Cellular RTU
Model No.:	WL-RT600
Operation Frequency:	GPRS+EDGE band : 850/900/1800/1900MHz WCDMA HSPS+ Band: 900 /2100MHz FDD LTE band: Band 1/3/7/8/20 TDD LTE band: Band 38/39/40/41 GPS:1575.42MHz
Modulation Type:	UTRA-FDD: QPSK, 16QAM E-UTRA: QPSK, 16QAM, 64QAM GSM/GPRS/EDGE: GFSK GPS: BPSK
Antenna Type:	SMA Antenna Connector
Antenna Gain:	2dBi
Power Supply:	AC Adapter Model No.:CW1201000EU Input: AC 100-240V, 50/60Hz, 0.4A Max Output: DC 12V, 1000mA

## 5.2 Description of Support Units

The EUT was test as an independent unit

## 5.3 Test Facility

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

- **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.

## 5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

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

Tel: 0755-27798480

Fax: 0755-27798960

## 5.5 Deviation from Standards

None

## 5.6 Other Information Requested by the Customer

None.

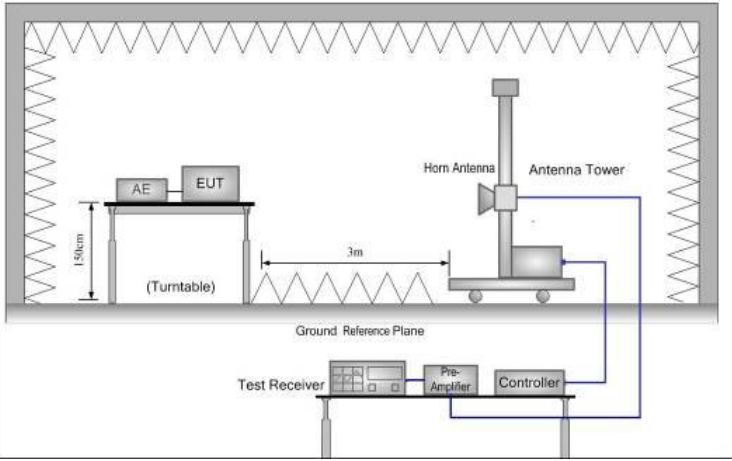
## 6 Test Instruments List

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 28 2017	June. 27 2018
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 28 2017	June. 27 2018
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June. 28 2017	June. 27 2018
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 28 2017	June. 27 2018
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 28 2017	June. 27 2018
9	Coaxial Cable	GTS	N/A	GTS211	June. 28 2017	June. 27 2018
10	Coaxial cable	GTS	N/A	GTS210	June. 28 2017	June. 27 2018
11	Coaxial Cable	GTS	N/A	GTS212	June. 28 2017	June. 27 2018
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 28 2017	June. 27 2018
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June. 28 2017	June. 27 2018
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 28 2017	June. 27 2018
15	Band filter	Amindeon	82346	GTS219	June. 28 2017	June. 27 2018
16	Constant temperature and humidity box	Oregon Scientific	BA-888	GTS248	June. 28 2017	June. 27 2018
17	D.C. Power Supply	Instek	PS-3030	GTS232	June. 28 2017	June. 27 2018
18	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	June. 28 2017	June. 27 2018
19	Baseband Signal Generator and Fading Simulator	Rohde & Schwarz	AMU200A	GTS632	June. 28 2017	June. 27 2018
20	Splitter	Agilent	11636B	GTS237	June. 28 2017	June. 27 2018
21	Signal Generator	Rohde & Schwarz	SML03	GTS236	June. 28 2017	June. 27 2018

## 6.1 Radiated Spurious emissions

Test Requirement:	UTRA FDD & E-UTRA: ETSI EN 301 908-1 Clause 4.2.2 GSM/GPRS/EDGE: ETSI TS 151 010-1 Clause 12.2.1.5 GPS: ETSI EN 300 487 Clause 5							
Test Method:	UTRA FDD & E-UTRA: ETSI EN 301 908-1 Clause 5.3.1 GSM/GPRS/EDGE: ETSI TS 151 010-1 Clause 12.2.1.4 GPS: ETSI EN 300 487 Annex B							
Receiver setup:	Below 1GHz :RBW=100KHz, VBW=30KHz, Detector= peak Above 1GHz :RBW=1MHz, VBW=3MHz,Detector=Peak							
Limit:	UTRA-FDD & E-UTRA & GSM							
	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>30MHz to 1000 MHz</td> <td>-36dBm</td> </tr> <tr> <td>1GHz to 12.75GHz</td> <td>-30dBm</td> </tr> </tbody> </table>		Frequency	Limit	30MHz to 1000 MHz	-36dBm	1GHz to 12.75GHz	-30dBm
	Frequency	Limit						
30MHz to 1000 MHz	-36dBm							
1GHz to 12.75GHz	-30dBm							
GPS								
	<table border="1"> <thead> <tr> <th>Frequency Range (MHz)</th> <th>EIRP limit (dBpW)</th> <th>Measurement bandwidth (kHz)</th> </tr> </thead> <tbody> <tr> <td>1559MHz-12750MHz</td> <td>43</td> <td>100</td> </tr> </tbody> </table>	Frequency Range (MHz)	EIRP limit (dBpW)	Measurement bandwidth (kHz)	1559MHz-12750MHz	43	100	
Frequency Range (MHz)	EIRP limit (dBpW)	Measurement bandwidth (kHz)						
1559MHz-12750MHz	43	100						
Test mode:	Kept UE in Transmitting mode							
Test Instruments:	See section 6.0							
Test Frequency range:	UTRA FDD & E-UTRA&GSM & WIFI&SES:30MHz to 12.75GHz							
Test setup:	Below 1GHz							
	Above 1GHz							



	
<p>Test procedure:</p>	<p>Substitution method was performed to determine the actual ERP emission levels of the EUT.</p> <p>The following test procedure as below:</p> <p>1&gt;.Below 1GHz test procedure:</p> <ol style="list-style-type: none"> <li>1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.</li> <li>2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.</li> <li>3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.</li> <li>4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.</li> <li>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.</li> <li>6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.</li> <li>7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.</li> <li>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.</li> </ol>

	<p>9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:  <math display="block">\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}</math>           where:            Pg is the generator output power into the substitution antenna.            2&gt;.Above 1GHz test procedure:            Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height.</p>
Measurement Record:	Uncertainty: $\pm 6\text{dB}$

**Measurement Data(worst case):**

**UTRA-FDD:**

**Band I**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
246.36	Vertical	-65.57	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
680.10	V	-68.97		
4100.00	V	-39.74		
5865.00	V	-41.14		
7868.00	V	-37.82		
100.22	Horizontal	-56.10		
740.29	H	-67.39		
4100.00	H	-47.72		
5865.00	H	-44.08		
7868.00	H	-40.09		

**Band VIII**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
300.44	Vertical	-61.22	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
510.39	V	-65.70		
4414.00	V	-37.92		
6179.00	V	-39.24		
8182.00	V	-37.76		
120.55	Horizontal	-53.15		
657.45	H	-64.25		
4414.00	H	-38.91		
6179.00	H	-40.41		
8182.00	H	-38.85		

**E-UTRA:  
Band 1**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
140.69	Vertical	-63.99	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
668.21	V	-68.98		
4280.00	V	-42.14		
6420.00	V	-40.81		
8560.00	V	-43.50		
97.88	Horizontal	-66.10		
415.30	H	-69.53		
4280.00	H	-40.08		
6420.00	H	-42.89		
8560.00	H	-43.22		

**Band 3**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
170.49	Vertical	-67.19	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
749.31	V	-71.59		
3494.00	V	-41.58		
6988.00	V	-45.52		
10482.00	V	-42.00		
340.11	Horizontal	-58.68		
702.59	H	-70.24		
3494.00	H	-49.98		
6988.00	H	-47.83		
10482.00	H	-43.80		

**Band 7**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
241.78	Vertical	-64.63	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
630.00	V	-67.44		
5070.00	V	-41.71		
7605.00	V	-42.14		
10140.00	V	-42.58		
88.47	Horizontal	-55.46		
699.32	H	-68.73		
5070.00	H	-40.62		
7605.00	H	-42.68		
10140.00	H	-42.49		

**Band 8**

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
179.47	Vertical	-67.50	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
329.68	V	-70.62		
1760.00	V	-41.42		
2640.00	V	-45.64		
3520.00	V	-42.05		
297.35	Horizontal	-59.12		
799.68	H	-70.94		
1760.00	H	-49.58		
2640.00	H	-45.76		
3520.00	H	-43.26		

## Band 20

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
279.40	Vertical	-66.28	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
369.55	V	-71.34		
1694.00	V	-43.41		
2541.00	V	-42.89		
4235.00	V	-44.68		
104.22	Horizontal	-68.07		
699.95	H	-71.06		
1694.00	H	-42.58		
2541.00	H	-43.86		
4235.00	H	-43.53		

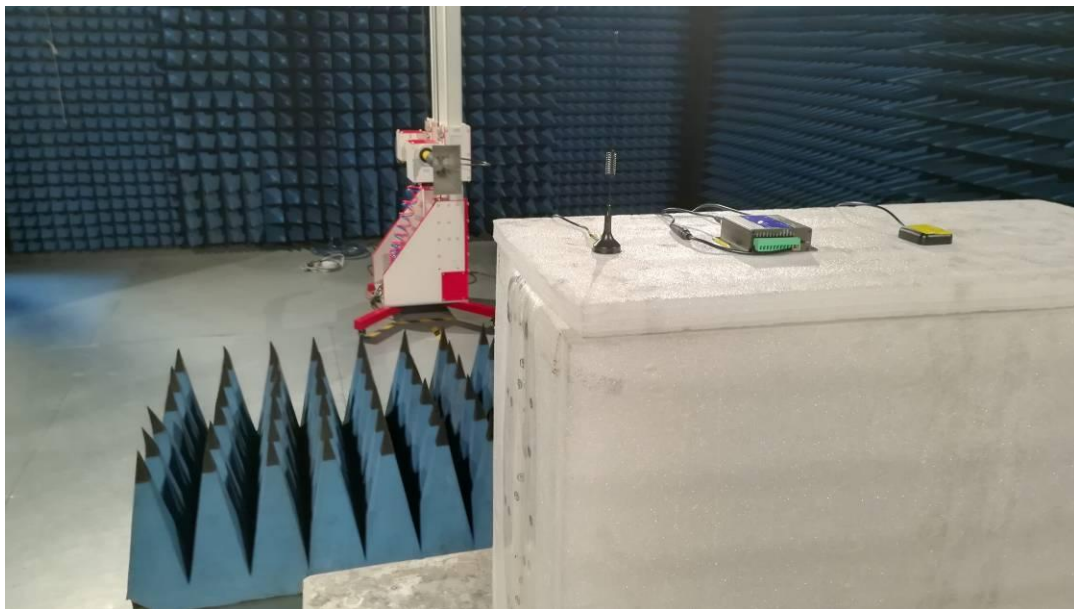
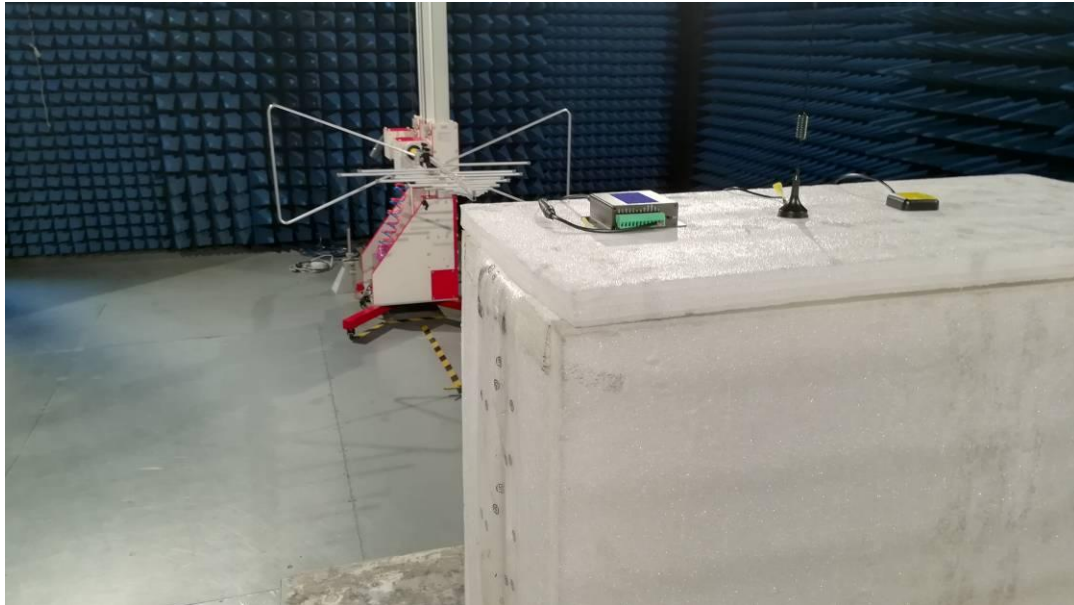
## GSM

Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
89.66	Vertical	-69.39	-36 dBm below 1GHz,  -30 dBm above 1GHz.	Pass
741.10	V	-75.10		
1760.18	V	-42.97		
2730.00	V	-47.88		
3510.00	V	-45.20		
240.55	Horizontal	-58.37		
750.95	H	-73.10		
1760.19	H	-51.20		
2620.00	H	-47.15		
3460.00	H	-45.15		

## GPS

Frequency (MHz)	Spurious Emission		EIRP limit (dBpW)	Test Result
	polarization	Level(dBpW)		
1575.42	Vertical	40.15	43dBpW	Pass
1575.42	Horizontal	38.98		

## 7 Test Setup Photo



## 8 EUT Constructional Details

Reference to the test report No. GTS201712000042E01

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