

## 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 Router

Model No.: WL-G510

**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)

**Date of sample receipt:** July 27, 2018

**Date of Test:** July 28-August 05, 2018

**Date of report issued:** August 06, 2018

**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.

A circular stamp for GTS Global Testing Services Co., Ltd. with a signature over it. The stamp contains the text 'GTS GLOBAL TESTING SERVICES CO., LTD.' and '2016'.

**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          | August 06, 2018 | Original    |
|             |                 |             |
|             |                 |             |
|             |                 |             |
|             |                 |             |

Prepared By:

*Bill. Yuan*

Date:

August 06, 2018

Project Engineer

Check By:

*Andy. wa*

Date:

August 06, 2018

Reviewer

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## 4 Test Summary

| UTRA FDD (ETSI EN 301 908-1 V11.1.1/ ETSI EN 301 908-2 V11.1.2) |                                   |                                   |                 |        |
|---|-----------------------------------|-----------------------------------|-----------------|--------|
| Test Item   | Test Requirement                  | Test method                       | Limit/Severity  | Result |
| Radiated emissions  | ETSI EN 301 908-1<br>Clause 4.2.2 | ETSI EN 301 908-1<br>Clause 5.3.1 | Table 4.2.2.2-1 | Pass   |
| E-UTRA (ETSI EN 301 908-1 V11.1.1/ ETSI EN 301 908-13 V11.1.2)  |                                   |                                   |                 |        |
| Test Item   | Test Requirement                  | Test method                       | Limit/Severity  | Result |
| Radiated emissions  | ETSI EN 301 908-1<br>Clause 4.2.2 | ETSI EN 301 908-1<br>Clause 5.3.1 | Table 4.2.2.2-1 | 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 Router   |
| Model No.:           | WL-G510   |
| Operation Frequency: | WCDMA/HSDPA/HSUPA/HSPA: Band 1/2/5/8<br>FDD LTE: Band 1/2/3/5/7/8/20<br>TDD LTE: Band 38/39/40/41 |
| Modulation Type:     | WCDMA:QPSK<br>HSDPA/HSUPA/HSPA:QPSK, 16QAM<br>LTE: QPSK, 16QAM, 64QAM                             |
| Antenna Type:        | External Antenna  |
| Antenna Gain:        | Main Antenna: 5.00dBi (Max.), for TX/RX (LTE)<br>Aux Antenna: 5.00dBi(Max.), for TX/RX (LTE)      |
| Power Supply:        | Adapter:<br>Model: TS-A018-120015EJ<br>Input: AC 100-240V, 50/60Hz, 0.6A<br>Output: DC 12V, 1.5A  |

## 5.2 Test mode

|                   |   |
|-------------------|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode. |
| Receiving mode    | Keep the EUT in receiving mode.                 |

*Remark: We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:  
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.*

## 5.3 Description of Support Units

|       |
|-------|
| None. |
|-------|

## 5.4 Test Facility

|  |
|--|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"><li>● <b>FCC—Registration No.: 381383</b><br/>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 381383, January 08, 2018.</li><li>● <b>Industry Canada (IC) —Registration No.: 9079A-2</b><br/>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.</li></ul> |
|--|

## 5.5 Test Location

|  |
|--|
| All tests were performed at:   |
| Global United Technology Services Co., Ltd.<br>No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China<br>Tel: 0755-27798480<br>Fax: 0755-27798960 |

## 5.6 Deviation from Standards

|       |
|-------|
| None. |
|-------|

## 5.7 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. 27 2018       | June. 26 2019           |
| 4                  | BiConiLog Antenna                   | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June. 27 2018       | June. 26 2019           |
| 5                  | Double -ridged waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D                 | GTS208        | June. 27 2018       | June. 26 2019           |
| 6                  | Horn Antenna                        | ETS-LINDGREN                   | 3160                        | GTS217        | June. 27 2018       | June. 26 2019           |
| 7                  | EMI Test Software                   | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 8                  | Coaxial Cable                       | GTS                            | N/A                         | GTS213        | June. 27 2018       | June. 26 2019           |
| 9                  | Coaxial Cable                       | GTS                            | N/A                         | GTS211        | June. 27 2018       | June. 26 2019           |
| 10                 | Coaxial cable                       | GTS                            | N/A                         | GTS210        | June. 27 2018       | June. 26 2019           |
| 11                 | Coaxial Cable                       | GTS                            | N/A                         | GTS212        | June. 27 2018       | June. 26 2019           |
| 12                 | Amplifier(100kHz-3GHz)              | HP                             | 8347A                       | GTS204        | June. 27 2018       | June. 26 2019           |
| 13                 | Amplifier(2GHz-20GHz)               | HP                             | 84722A                      | GTS206        | June. 27 2018       | June. 26 2019           |
| 14                 | Amplifier (18-26GHz)                | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June. 27 2018       | June. 26 2019           |
| 15                 | Band filter                         | Amindeon                       | 82346                       | GTS219        | June. 27 2018       | June. 26 2019           |
| 16                 | Power Meter                         | Anritsu                        | ML2495A                     | GTS540        | June. 27 2018       | June. 26 2019           |
| 17                 | Power Sensor                        | Anritsu                        | MA2411B                     | GTS541        | June. 27 2018       | June. 26 2019           |
| 18                 | Wideband Radio Communication Tester | Rohde & Schwarz                | CMW500                      | GTS575        | June. 27 2018       | June. 26 2019           |
| 19                 | Splitter                            | Agilent                        | 11636B                      | GTS237        | June. 27 2018       | June. 26 2019           |
| 20                 | Loop Antenna                        | ZHINAN                         | ZN30900A                    | GTS534        | June. 27 2018       | June. 26 2019           |

## 7 Radiated Spurious emissions

| Test Requirement:     | ETSI EN 301 908-1 Clause 4.2.2  |           |       |                   |        |                  |        |
|-----------------------|---|-----------|-------|-------------------|--------|------------------|--------|
| Test Method:          | ETSI EN 301 908-1 Clause 5.3.1  |           |       |                   |        |                  |        |
| Receiver setup:       | Below 1GHz :RBW=100KHz, VBW=30KHz, Detector= peak<br>Above 1GHz :RBW=1MHz, VBW=3MHz,Detector=Peak   |           |       |                   |        |                  |        |
| Limit:                | UTRA-FDD & E-UTRA   |           |       |                   |        |                  |        |
|                       | <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  |           |       |                   |        |                  |        |
| Test mode:            | Kept UE in Transmitting mode  |           |       |                   |        |                  |        |
| Test Instruments:     | See section 6.0   |           |       |                   |        |                  |        |
| Test Frequency range: | 30MHz to 12.75GHz   |           |       |                   |        |                  |        |
| Test setup:           | <p>Below 1GHz</p>   |           |       |                   |        |                  |        |
|                       | <p>Above 1GHz</p>   |           |       |                   |        |                  |        |
| Test procedure:       | <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> <li>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:<br/> <math display="block">\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dB)}</math>                     where:<br/>                     Pg is the generator output power into the substitution antenna.<br/>                     2&gt;.Above 1GHz test procedure:<br/>                     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.</li> </ol> |
| Measurement Record: | Uncertainty: ± 6dB  |

**Measurement Data (worst case):**

**UTRA-FDD:**

**Band I**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 179.34          | Vertical          | -66.29     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 374.99          | V                 | -69.77     |  |             |
| 4100.00         | V                 | -40.48     |  |             |
| 5865.00         | V                 | -42.86     |  |             |
| 7868.00         | V                 | -39.86     |  |             |
| 170.56          | Horizontal        | -56.84     |  |             |
| 410.14          | H                 | -68.82     |  |             |
| 4100.00         | H                 | -47.08     |  |             |
| 5865.00         | H                 | -44.38     |  |             |
| 7868.00         | H                 | -39.74     |  |             |

**Band VIII**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 164.52          | Vertical          | -62.11     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 315.02          | V                 | -65.41     |  |             |
| 4414.00         | V                 | -38.38     |  |             |
| 6179.00         | V                 | -38.60     |  |             |
| 8182.00         | V                 | -37.78     |  |             |
| 71.40           | Horizontal        | -52.78     |  |             |
| 532.30          | H                 | -64.68     |  |             |
| 4414.00         | H                 | -37.74     |  |             |
| 6179.00         | H                 | -38.52     |  |             |
| 8182.00         | H                 | -36.74     |  |             |

**E-UTRA:  
Band 1**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 115.67          | Vertical          | -65.23     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 521.26          | V                 | -70.17     |  |             |
| 4280.00         | V                 | -42.09     |  |             |
| 6420.00         | V                 | -41.52     |  |             |
| 8560.00         | V                 | -43.22     |  |             |
| 30.42           | Horizontal        | -66.50     |  |             |
| 742.19          | H                 | -69.38     |  |             |
| 4280.00         | H                 | -40.83     |  |             |
| 6420.00         | H                 | -42.01     |  |             |
| 8560.00         | H                 | -41.58     |  |             |

**Band 3**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 134.50          | Vertical          | -69.29     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 554.03          | V                 | -72.34     |  |             |
| 3494.00         | V                 | -43.10     |  |             |
| 6988.00         | V                 | -46.26     |  |             |
| 10482.00        | V                 | -43.47     |  |             |
| 128.72          | Horizontal        | -59.30     |  |             |
| 566.25          | H                 | -71.94     |  |             |
| 3494.00         | H                 | -49.98     |  |             |
| 6988.00         | H                 | -47.00     |  |             |
| 10482.00        | H                 | -43.02     |  |             |

**Band 5**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 193.28          | Vertical          | -64.96     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 538.53          | V                 | -67.98     |  |             |
| 5161.35         | V                 | -40.19     |  |             |
| 7739.47         | V                 | -42.96     |  |             |
| 10317.59        | V                 | -40.25     |  |             |
| 224.51          | Horizontal        | -55.62     |  |             |
| 595.03          | H                 | -67.44     |  |             |
| 5201.95         | H                 | -46.65     |  |             |
| 7780.07         | H                 | -43.89     |  |             |
| 10358.19        | H                 | -39.92     |  |             |

**Band 7**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 188.17          | Vertical          | -68.38     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 525.30          | V                 | -71.56     |  |             |
| 5140.00         | V                 | -42.30     |  |             |
| 7710.00         | V                 | -45.22     |  |             |
| 10280.00        | V                 | -42.37     |  |             |
| 178.80          | Horizontal        | -58.55     |  |             |
| 541.20          | H                 | -70.99     |  |             |
| 5140.00         | H                 | -49.10     |  |             |
| 7710.00         | H                 | -46.20     |  |             |
| 10280.00        | H                 | -42.02     |  |             |

**Band 8**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 171.98          | Vertical          | -65.77     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 412.17          | V                 | -68.54     |  |             |
| 1830.00         | V                 | -41.57     |  |             |
| 2745.00         | V                 | -42.73     |  |             |
| 3660.00         | V                 | -42.18     |  |             |
| 77.09           | Horizontal        | -55.77     |  |             |
| 619.37          | H                 | -68.48     |  |             |
| 1830.00         | H                 | -41.27     |  |             |
| 2745.00         | H                 | -41.71     |  |             |
| 3660.00         | H                 | -40.74     |  |             |

**Band 20**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 161.22          | Vertical          | -65.49     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 424.96          | V                 | -70.39     |  |             |
| 1724.00         | V                 | -42.31     |  |             |
| 2586.00         | V                 | -41.81     |  |             |
| 3448.00         | V                 | -43.53     |  |             |
| 73.27           | Horizontal        | -66.71     |  |             |
| 637.43          | H                 | -69.65     |  |             |
| 1724.00         | H                 | -41.08     |  |             |
| 2586.00         | H                 | -42.23     |  |             |
| 3448.00         | H                 | -41.87     |  |             |

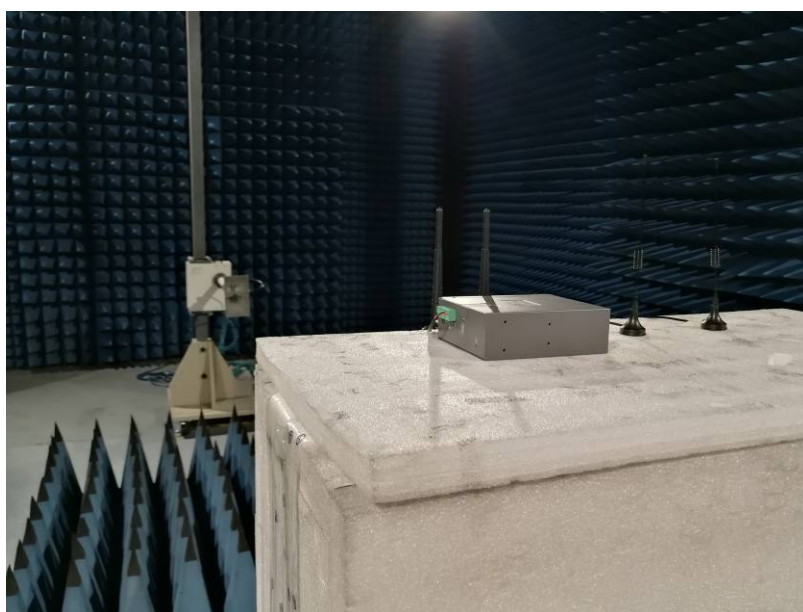
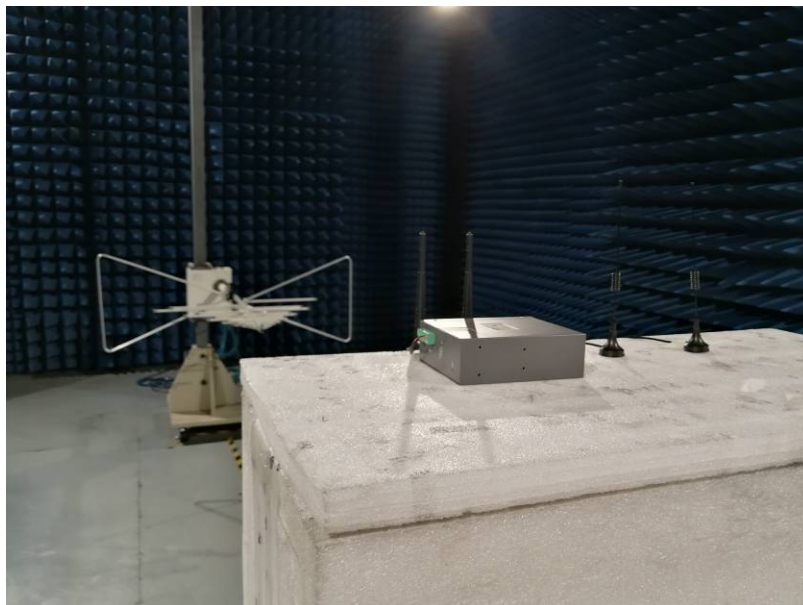
**Band 38**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 163.77          | Vertical          | -65.23     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 497.61          | V                 | -70.17     |  |             |
| 5240.00         | V                 | -42.09     |  |             |
| 7860.00         | V                 | -41.52     |  |             |
| 10480.00        | V                 | -43.22     |  |             |
| 71.76           | Horizontal        | -66.50     |  |             |
| 712.58          | H                 | -69.38     |  |             |
| 5240.00         | H                 | -40.83     |  |             |
| 7860.00         | H                 | -42.01     |  |             |
| 10480.00        | H                 | -41.58     |  |             |

**Band 40**

| Frequency (MHz) | Spurious Emission |            | Limit (dBm)  | Test Result |
|-----------------|-------------------|------------|--|-------------|
|                 | polarization      | Level(dBm) |  |             |
| 133.79          | Vertical          | -65.02     | -36 dBm<br>below 1GHz,<br><br>-30 dBm<br>above 1GHz. | Pass        |
| 446.51          | V                 | -69.99     |  |             |
| 4700.00         | V                 | -41.90     |  |             |
| 7050.00         | V                 | -41.28     |  |             |
| 9400.00         | V                 | -42.97     |  |             |
| 45.05           | Horizontal        | -66.33     |  |             |
| 658.28          | H                 | -69.17     |  |             |
| 4700.00         | H                 | -40.63     |  |             |
| 7050.00         | H                 | -41.82     |  |             |
| 9400.00         | H                 | -41.36     |  |             |

## 8 Test Setup Photo



## 9 EUT Constructional Details

Reference to the test report No. GTS201807000209E01

-----End-----