# TEST REPORT

Report Number: C21T00091-RF01-V02

| | |
|---|---|
| Applicant | Shanghai Sunmi Technology Co.,Ltd. |
| Product Name | Smart POS system |
| Model Name | T6900 |
| Brand Name | SUNMI |
| FCC ID | 2AH25T6900 |

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 2/22/24, ANSI/TIA-603-E, ANSI C63.26, KDB 971168 D01,KDB 412172 D01.

| | | | |
|---|---|---|---|
| Prepared by | 范宇航 | Reviewed by | 杨帆 |
| Approved by | | Issue Date | 2022-03-01 |

**Industrial Internet Innovation Center (Shanghai) Co., Ltd.**

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**Test Laboratory:**
Industrial Internet Innovation Center (Shanghai) Co., Ltd.
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## Revision Version

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| C21T00091-RF01-V00 | 00 | 2022-01-04 | Initial creation of test report |
| C21T00091-RF01-V01 | 01 | 2022-01-11 | Updated original report number |
| C21T00091-RF01-V02 | 02 | 2022-03-01 | Add the test requirement |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name | Industrial Internet Innovation Center (Shanghai) Co., Ltd. |
| Address | Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China |
| FCC Designation No. | CN1177 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature | 15℃~35℃ |
| Relative Humidity | 25%RH~75%RH |
| Supply Voltage | 120V/60Hz |

## 1.3. Project Information

| | |
|---|---|
| Project Leader | Wang WenWen |
| Testing Start Date | 2021-09-15 |
| Testing End Date | 2021-12-31 |

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name | Shanghai Sunmi Technology Co.,Ltd. |
| Address | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone | +86 18501703215 |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name | Shanghai Sunmi Technology Co., Ltd. |
| Address | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone | +86 18501703215 |

# 3. Equipment under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| Product Name | Smart POS system |
| Model name | T6900 |
| Supported Radio Technology and Bands | GSM850/GSM900/GSM1800/GSM1900<br>WCDMA Band I/V/VIII<br>LTE Band FDD1/3/5/7/8/20 TDD38/40/41<br>BT 4.2<br>WLAN 802.11b,g,n<br>WLAN 802.11a,n<br>NFC<br>GPS |
| Hardware Version | B1691_MAIN_PCB_V1.1 |
| Software Version | V1.0.2 |
| FCC ID | 2AH25T6900 |
| Extreme Temperature | 0℃~45℃ |
| Nominal Voltage | 7.60V |
| Extreme High Voltage | 8.70V |
| Extreme Low Voltage | 6.80V |

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of Receipt |
|---|---|---|---|---|
| N07 | N/A | B1691_MAIN_PCB_V1.1 | V1.0.2 | 2021-09-10 |
| N09 | N/A | B1691_MAIN_PCB_V1.1 | V1.0.2 | 2021-11-11 |

*EUT ID: is internally used to identify the test sample in the lab.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN/Remark |
|---|---|---|---|
| AE1 | RF cable | N/A | N/A |

*AE ID: is internally used to identify the test sample in the lab.

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 2 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS | 2020-10-01 |
| FCC Part 22 | PUBLIC MOBILE SERVICES | 2020-10-01 |
| FCC Part 24 | PERSONAL COMMUNICATIONS SERVICES | 2020-10-01 |
| ANSI-TIA-603-E | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2016 |
| ANSI C63.26 | American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio | 2015 |
| KDB 971168 D01 | Measurement Guidance for Certification of Licensed Digital Transmitters | v03r01 |
| KDB 412172 D01 | Guidelines For Determining The Effective Radiated Power (Erp) And Equivalent Isotropically Radiated Power (Eirp) Of An Rf Transmitting System | V01r01 |

# 5. Test Summary

## 5.1. Summary of Test Results

| Measurement Items | Sub-clause | Verdict |
|---|---|---|
| Output Power | 2.1046/22.913(a)/24.232(c) | N/A |
| Peak-to-Average Ratio | 24.232(d) | N/A |
| 99%Occupied Bandwidth | 2.1049(h)(i)/ 22.917(b) | N/A |
| -26dB Emission Bandwidth | 22.917(b)/§24.238(b) | N/A |
| Band Edge at antenna terminals | 22.917(a)/24.238(a) | N/A |
| Frequency stability | 2.1055/24.235 | N/A |
| Conducted Spurious mission | 2.1053/22.917(a)/24.238(a) | N/A |
| Emission Limit | 2.1051/22.917/24.238/22.913/24.232 | P |

The following terms are used in the above table.

| | |
|---|---|
| P | Pass, the EUT complies with the essential requirements in the standard. |
| NM | Not measure, the test was not measured by 3IN. |
| N/A | Not applicable, the test was not applicable. |
| F | Fail, the EUT does not comply with the essential requirements in the standard. |

## 5.2. Statements

The T6900, manufactured by Shanghai Sunmi Technology Co., Ltd. is a variant product for testing.

This project is a variant project based on the original report I19D00121-SRD04-V00, we tested the worst mode of the original report, and the test data of the worst mode was recorded in the report. The main difference of EUT is as below：

| | Product NO. | The difference with initial certified product |
|---|---|---|
| Mainly Supply | N07 | 1. Add a back up CPU(model:MT8765V/WA)<br>2. Add a back up 27.12MHz Crystal for NFC(model:SX20Y027120BA1T)<br>3. Add a back up PCB supplier ZHIHAO<br>4. Change mcu from MH1902 BGA121 to MH1902T BGA121<br>5. Add a back up NFC chip FM17660<br>6. Add a back up LCD(model:LMFBH055100970)<br>7. Add a back up Camera (model:LH-XC-5035COM-B1691-V9.0)<br>8. Add a back up NFC antenna(model:SH19038IB100-6)<br>9. back up memory |
| Secondary Supply | N09 | 1. Add a back up CPU(model:MT8765V/WA)<br>2. Add a back up 27.12MHz Crystal for NFC(model:SX20Y027120BA1T)<br>3. Add a back up PCB supplier ZHIHAO<br>4. Change mcu from MH1902 BGA121 to MH1902T BGA121<br>5. Add a back up LCD(model:LMFBH055100970)<br>6. Add a back up Camera (model:LH-XC-5035COM-B1691-V9.0)<br>7. Add a back up NFC antenna(model:SH19038IB100-6)<br>8. back up memory |

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

# 6. Measurement Results

## 6.1. RADIATED

### 6.1.2 EMISSION LIMIT (§2.1051/§22.917§24.238)

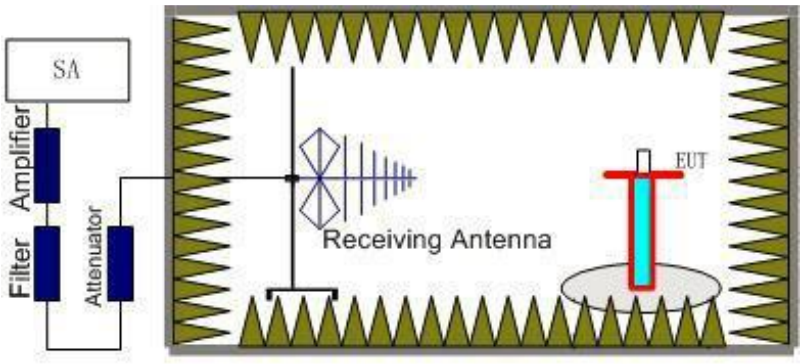
#### 6.1.2.1 GSM Measurement Method

The measurement procedures in TIA-603E-2016are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

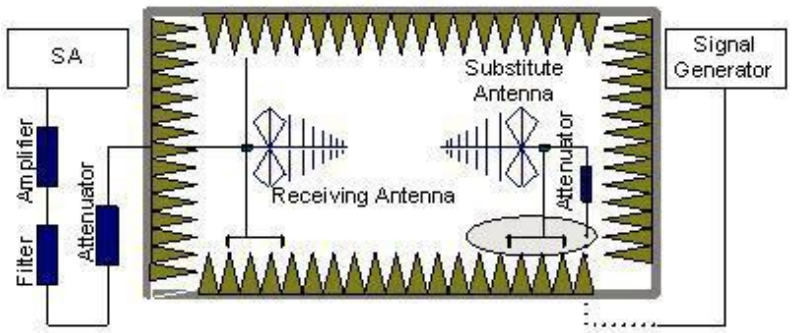
#### 6.1.2.2 The procedure of radiated spurious emissions is as follows:

1. Below 1 GHz ,EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Above 1 GHz ,EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna.EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10$^{th}$harmonic were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ($P_{pl}$) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ($G_a$) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss ($P_{pl}$) is the summation of the cable loss .

The measurement results are obtained as described below:

Power(EIRP)=$P_{Mea}$- $P_{pl}$+ $G_a$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

**6.1.2.3 Measurement Limit**

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**6.1.2.4 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

### 6.1.2.5 Measurement Results

**Measurements results:**

| Frequency | Channel | Frequency Range | Result |
|---|---|---|---|
| GSM850 | Low | 30MHz~10GHz | P |
| | Middle | 30MHz~10GHz | P |
| | High | 30MHz~10GHz | P |

**Mainly Supply**

**RSE-GSM850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1647.9 | -48.42 | 4.2 | 4.7 | -47.92 | -13 | V |
| 2567.1 | -41.14 | 5.4 | 5.6 | -40.94 | -13 | H |
| 3295.4 | -45.76 | 6.2 | 6.9 | -45.06 | -13 | V |
| 4120.4 | -45.98 | 7.0 | 8.6 | -44.38 | -13 | H |
| 6360.0 | -46.93 | 8.8 | 10.3 | -45.43 | -13 | V |
| 9067.7 | -41.6 | 10.5 | 12.6 | -39.5 | -13 | H |

**RSE-GSM850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1863.2 | -45.44 | 4.6 | 4.7 | -45.34 | -13 | H |
| 2509.3 | -39.23 | 5.4 | 5.6 | -39.03 | -13 | H |
| 3345.0 | -38.6 | 6.2 | 6.9 | -37.9 | -13 | H |
| 4183.8 | -46.34 | 7.0 | 8.9 | -44.44 | -13 | H |
| 5019.2 | -51.43 | 7.8 | 9.6 | -49.63 | -13 | H |
| 6084.6 | -48.22 | 8.7 | 10.2 | -46.72 | -13 | V |

**RSE-GSM850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1697.1 | -45.99 | 4.5 | 4.7 | -45.79 | -13 | H |
| 2559.6 | -42.09 | 5.4 | 5.6 | -41.89 | -13 | H |
| 3394.6 | -43.55 | 6.3 | 7.8 | -42.05 | -13 | H |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4243.8 | -46.65 | 7.1 | 8.9 | -44.85 | -13 | H |
| 5093.1 | -48.02 | 7.9 | 9.6 | -46.32 | -13 | V |
| 8487.7 | -45.24 | 10.3 | 12.6 | -42.94 | -13 | H |

**RSE-GPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1693.9 | -49.39 | 4.5 | 4.7 | -49.19 | -13 | V |
| 2578.9 | -42.29 | 5.5 | 5.6 | -42.19 | -13 | V |
| 3296.5 | -48.12 | 6.2 | 6.9 | -47.42 | -13 | H |
| 4359.2 | -49.37 | 7.2 | 8.9 | -47.67 | -13 | H |
| 5153.1 | -48.57 | 7.9 | 9.4 | -47.07 | -13 | V |
| 9067.7 | -45.36 | 10.5 | 12.6 | -43.26 | -13 | V |

**RSE-GPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1853.6 | -45.57 | 4.6 | 4.7 | -45.47 | -13 | H |
| 2218.9 | -43.39 | 5.0 | 5.1 | -43.29 | -13 | H |
| 3345.0 | -45.89 | 6.2 | 6.9 | -45.19 | -13 | V |
| 4277.3 | -49.56 | 7.1 | 8.9 | -47.76 | -13 | H |
| 5059.6 | -51.62 | 7.8 | 9.6 | -49.82 | -13 | H |
| 6036.9 | -49.32 | 8.6 | 10.2 | -47.72 | -13 | V |

**RSE-GPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1697.1 | -48.35 | 4.5 | 4.7 | -48.15 | -13 | H |
| 2546.8 | -42.58 | 5.4 | 5.6 | -42.38 | -13 | H |
| 3394.6 | -44.87 | 6.3 | 7.8 | -43.37 | -13 | H |
| 4243.8 | -51.17 | 7.1 | 8.9 | -49.37 | -13 | H |
| 5093.1 | -48.11 | 7.9 | 9.6 | -46.41 | -13 | V |
| 5943.5 | -50.82 | 8.5 | 10.2 | -49.12 | -13 | V |

**RSE-EGPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1674.6 | -49.36 | 4.5 | 4.7 | -49.16 | -13 | V |
| 2543.6 | -42.28 | 5.4 | 5.6 | -42.08 | -13 | V |
| 3295.4 | -48.67 | 6.2 | 6.9 | -47.97 | -13 | V |
| 4119.2 | -49.21 | 7.0 | 8.6 | -47.61 | -13 | H |
| 4954.6 | -52.02 | 7.7 | 9.6 | -50.12 | -13 | H |
| 5982.7 | -50.01 | 8.6 | 10.2 | -48.41 | -13 | H |

**RSE-EGPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1710.0 | -49.11 | 4.5 | 4.7 | -48.91 | -13 | V |
| 2557.5 | -42.43 | 5.4 | 5.6 | -42.23 | -13 | V |
| 3345.0 | -47.26 | 6.2 | 6.9 | -46.56 | -13 | V |
| 4183.8 | -50.72 | 7.0 | 8.9 | -48.82 | -13 | V |
| 4973.1 | -51.05 | 7.7 | 9.6 | -49.15 | -13 | H |
| 5957.3 | -50.07 | 8.5 | 10.2 | -48.37 | -13 | H |

**RSE-EGPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1698.2 | -47.77 | 4.5 | 4.7 | -47.57 | -13 | H |
| 2542.5 | -41.72 | 5.4 | 5.6 | -41.52 | -13 | H |
| 3394.6 | -47.79 | 6.3 | 7.8 | -46.29 | -13 | V |
| 4026.9 | -51.37 | 6.9 | 8.6 | -49.67 | -13 | H |
| 5093.1 | -48.23 | 7.9 | 9.6 | -46.53 | -13 | V |
| 5959.6 | -49.82 | 8.5 | 10.2 | -48.12 | -13 | V |

**Secondary Supply**

**RSE-GSM850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 2416.1 | -37.35 | 5.3 | 5.6 | -37.05 | -13 | H |
| 3296.5 | -40.29 | 6.2 | 6.9 | -39.59 | -13 | V |
| 4121.5 | -49.1 | 7.0 | 8.6 | -47.5 | -13 | V |
| 4785.0 | -49.71 | 7.6 | 9.0 | -48.31 | -13 | H |
| 5413.8 | -49.8 | 8.1 | 9.8 | -48.1 | -13 | H |
| 6120.0 | -48.86 | 8.7 | 10.2 | -47.36 | -13 | H |

**RSE-GSM850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1672.5 | -39.49 | 4.5 | 4.7 | -39.29 | -13 | V |
| 3346.2 | -40.59 | 6.2 | 6.9 | -39.89 | -13 | V |
| 4182.7 | -49.25 | 7.0 | 8.9 | -47.35 | -13 | V |
| 4767.7 | -49.8 | 7.5 | 9.0 | -48.3 | -13 | V |
| 5421.9 | -49.77 | 8.1 | 9.8 | -48.07 | -13 | V |
| 5855.8 | -50.78 | 8.4 | 10.2 | -48.98 | -13 | H |

**RSE-GSM850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1697.1 | -34.55 | 4.5 | 4.7 | -34.35 | -13 | V |
| 2460.0 | -35.61 | 5.4 | 5.6 | -35.41 | -13 | H |
| 3394.6 | -38.17 | 6.3 | 7.8 | -36.67 | -13 | V |
| 4245.0 | -48.89 | 7.1 | 8.9 | -47.09 | -13 | V |
| 5093.1 | -45.5 | 7.9 | 9.6 | -43.8 | -13 | V |
| 5942.3 | -48.72 | 8.5 | 10.2 | -47.02 | -13 | V |

**RSE-GPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1728.2 | -45.38 | 4.5 | 4.7 | -45.18 | -13 | H |
| 2418.2 | -33.88 | 5.3 | 5.6 | -33.58 | -13 | V |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3295.4 | -45.43 | 6.2 | 6.9 | -44.73 | -13 | V |
| 3855.0 | -49.94 | 6.7 | 7.9 | -48.74 | -13 | H |
| 4464.2 | -48.95 | 7.3 | 8.7 | -47.55 | -13 | H |
| 5190.0 | -48.17 | 8.0 | 9.4 | -46.77 | -13 | H |

**RSE-GPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1711.1 | -45.96 | 4.5 | 4.7 | -45.76 | -13 | V |
| 2410.7 | -30.5 | 5.3 | 5.6 | -30.2 | -13 | H |
| 3346.2 | -42.21 | 6.2 | 6.9 | -41.51 | -13 | V |
| 3957.7 | -50.2 | 6.8 | 8.6 | -48.4 | -13 | H |
| 4655.8 | -50.09 | 7.5 | 9.0 | -48.59 | -13 | H |
| 5215.4 | -47.35 | 8.0 | 9.4 | -45.95 | -13 | H |

**RSE-GPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1697.1 | -44.32 | 4.5 | 4.7 | -44.12 | -13 | H |
| 2411.8 | -31.74 | 5.3 | 5.6 | -31.44 | -13 | H |
| 3394.6 | -44.76 | 6.3 | 7.8 | -43.26 | -13 | V |
| 3866.5 | -49.89 | 6.7 | 7.9 | -48.69 | -13 | V |
| 4351.2 | -50.5 | 7.2 | 8.9 | -48.8 | -13 | H |
| 5093.1 | -48.72 | 7.9 | 9.6 | -47.02 | -13 | V |

**RSE-EGPRS850-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1648.9 | -40.2 | 4.2 | 4.7 | -39.7 | -13 | V |
| 2553.2 | -40.55 | 5.4 | 5.6 | -40.35 | -13 | V |
| 3296.5 | -42.58 | 6.2 | 6.9 | -41.88 | -13 | H |
| 4120.4 | -45.3 | 7.0 | 8.6 | -43.7 | -13 | V |
| 4946.5 | -50.47 | 7.7 | 9.6 | -48.57 | -13 | V |
| 9066.2 | -44.61 | 10.5 | 12.6 | -42.51 | -13 | H |

**RSE-EGPRS850-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1673.6 | -33.62 | 4.5 | 4.7 | -33.42 | -13 | V |
| 2510.4 | -35.72 | 5.4 | 5.6 | -35.52 | -13 | V |
| 3345.0 | -32.36 | 6.2 | 6.9 | -31.66 | -13 | H |
| 4182.7 | -47.67 | 7.0 | 8.9 | -45.77 | -13 | H |
| 5855.8 | -47.38 | 8.4 | 10.2 | -45.58 | -13 | V |
| 8367.7 | -46.48 | 10.1 | 12.4 | -44.18 | -13 | V |

**RSE-EGPRS850-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 1696.1 | -31.12 | 4.5 | 4.7 | -30.92 | -13 | V |
| 2546.8 | -29.03 | 5.4 | 5.6 | -28.83 | -13 | V |
| 3394.6 | -33 | 6.3 | 7.8 | -31.5 | -13 | H |
| 4243.8 | -45.42 | 7.1 | 8.9 | -43.62 | -13 | V |
| 5941.2 | -46.87 | 8.5 | 10.2 | -45.17 | -13 | H |
| 8486.2 | -45.72 | 10.3 | 12.6 | -43.42 | -13 | V |

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

### 6.1.3 WCDMA Measurement Method

The measurements procedures in TIA-603E-2016 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917.

The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II.

**The procedure of radiated spurious emissions is the same like GSM.**

#### 6.1.3.1 Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

#### 6.1.3.2 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band II. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band II into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

#### 6.1.3.3 Measurement Results Table

| Frequency | Channel | Frequency Range | Result |
|---|---|---|---|
| **WCDMA Band II** | Low | 30MHz~20GHz | P |
| | Middle | 30MHz~20GHz | P |
| | High | 30MHz~20GHz | P |

**RSE-WCDMA BAND II-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3706.4 | -57.66 | 6.6 | 7.9 | -56.36 | -13 | H |
| 5662.4 | -61.56 | 8.3 | 10.2 | -59.66 | -13 | V |
| 7410.0 | -56.27 | 9.7 | 11.6 | -54.37 | -13 | H |
| 8578.0 | -60.4 | 10.3 | 12.6 | -58.1 | -13 | H |
| 11123.6 | -53.58 | 12.1 | 12.3 | -53.38 | -13 | V |
| 12962.1 | -52.45 | 13.2 | 12.3 | -53.35 | -13 | H |

**RSE-WCDMA BAND II-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3762.0 | -56.49 | 6.6 | 7.9 | -55.19 | -13 | V |
| 5494.8 | -60.68 | 8.2 | 9.8 | -59.08 | -13 | H |
| 7520.4 | -56.38 | 9.7 | 11.6 | -54.48 | -13 | H |
| 9407.2 | -57.53 | 10.7 | 12.7 | -55.53 | -13 | H |
| 11090.3 | -53.9 | 12.1 | 12.3 | -53.7 | -13 | V |
| 13167.9 | -53.3 | 13.0 | 12.3 | -54 | -13 | H |

**RSE-WCDMA BAND II-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3813.2 | -52.16 | 6.7 | 7.9 | -50.96 | -13 | H |
| 5542.0 | -60.53 | 8.2 | 9.8 | -58.93 | -13 | V |
| 7630.4 | -55.14 | 9.7 | 11.8 | -53.04 | -13 | H |
| 9229.2 | -57.92 | 10.5 | 12.6 | -55.82 | -13 | V |
| 11209.0 | -53.93 | 12.1 | 12.3 | -53.73 | -13 | V |
| 13345.4 | -50.78 | 13.6 | 12.3 | -52.08 | -13 | H |

**Secondary Supply**

**RSE-WCDMA BAND II-L**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3707.2 | -52.87 | 6.6 | 7.9 | -51.57 | -13 | V |
| 5556.4 | -54.57 | 8.2 | 9.8 | -52.97 | -13 | V |
| 7409.6 | -50.61 | 9.7 | 11.6 | -48.71 | -13 | H |
| 9258.0 | -54.69 | 10.7 | 12.7 | -52.69 | -13 | H |
| 11108.8 | -50.22 | 12.1 | 12.3 | -50.02 | -13 | V |
| 12972.6 | -42.89 | 13.2 | 12.3 | -43.79 | -13 | H |

**RSE-WCDMA BAND II-M**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3761.6 | -53.72 | 6.6 | 7.9 | -52.42 | -13 | V |
| 5640.4 | -54.04 | 8.3 | 10.2 | -52.14 | -13 | V |
| 7520.0 | -50.29 | 9.7 | 11.6 | -48.39 | -13 | H |
| 9399.6 | -56.73 | 10.7 | 12.7 | -54.73 | -13 | H |
| 11285.6 | -50.08 | 12.1 | 12.3 | -49.88 | -13 | V |
| 13164.8 | -41.32 | 13.0 | 12.3 | -42.02 | -13 | H |

**RSE-WCDMA BAND II-H**

| Frequency (MHz) | PMea (dBm) | Pcl (dBm) | Ga (dBd) | Peak ERP (dBm) | Limit （dBm） | Polarization |
|---|---|---|---|---|---|---|
| 3813.6 | -50.39 | 6.7 | 7.9 | -49.19 | -13 | H |
| 5723.6 | -51.09 | 8.5 | 10.2 | -49.39 | -13 | V |
| 7635.2 | -49.74 | 9.7 | 11.8 | -47.64 | -13 | V |
| 9355.6 | -57.22 | 10.7 | 12.7 | -55.22 | -13 | H |
| 11451.8 | -49.2 | 12.3 | 12.3 | -49.2 | -13 | V |
| 13361.1 | -34.78 | 13.7 | 12.3 | -36.18 | -13 | H |

**Note: the EUT was displayed in several different direction, the worst cases were shown.**

# 7. Test Equipment List

Radiated Emission Test System

| Item | Equipment Name | Type | Serial Number | Manufacturer | Cal. Date | Cal. Interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | CMW500 | 104178 | R&S | 2021-05-10 | 1 year |
| 2 | Test Receiver | ESU40 | 100307 | R&S | 2021-05-10 | 1 year |
| 3 | TRILOG Antenna | VULB9163 | VULB9163-515 | Schwarzbeck | 2020-02-28 | 2 years |
| 4 | Double Ridged Guide Antenna | ETS-3117 | 135890 | ETS | 2020-02-28 | 2 years |
| 5 | 2-Line V-Network | ENV216 | 101380 | R&S | 2021-05-10 | 1 year |
| 6 | RF Signal Generator | SMF100A | 102314 | R&S | 2021-05-10 | 1 year |
| 7 | Amplifier | SCU08 | 10146 | R&S | 2021-05-10 | 1 year |
| 8 | EMI Test Software | EMC32 V9.15.00 | N/A | R&S | N/A | N/A |

## Anechoic chamber

Fully anechoic chamber by ETS

## Annex A: Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents. The detailed measurement uncertainty is defined in 3IN documents.

| Measurement Items | Range | Confidence Level | Calculated Uncertainty |
|---|---|---|---|
| Peak Output Power-Conducted | 2412MHz-2462MHz | 95% | 0.544dB |
| Peak Power Spectral Density | 2412MHz-2462MHz | 95% | 0.502dB |
| Occupied 6dB Bandwidth | 2412MHz-2462MHz | 95% | 69.26kHz |
| Band Edges-Conducted | 2412MHz-2462MHz | 95% | 0.544dB |
| Conducted Emission | 30MHz-2GHz | 95% | 0.90dB |
| Conducted Emission | 2GHz-3.6GHz | 95% | 0.88dB |
| Conducted Emission | 3.6GHz-8GHz | 95% | 0.96dB |
| Conducted Emission | 8GHz-20GHz | 95% | 0.94dB |
| Conducted Emission | 20GHz-22GHz | 95% | 0.88dB |
| Conducted Emission | 22GHz-26GHz | 95% | 0.86dB |
| Transmitter Spurious Emission-Radiated | 9KHz-30MHz | 95% | 5.66dB |
| Transmitter Spurious Emission-Radiated | 30MHz-1000MHz | 95% | 4.98dB |
| Transmitter Spurious Emission-Radiated | 1000MHz -18000MHz | 95% | 5.06dB |
| Transmitter Spurious Emission-Radiated | 18000MHz -40000MHz | 95% | 5.20dB |
| AC Power line Conducted Emission | 0.15MHz-30MHz | 95% | 3.66 dB |

## Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

*Shanghai, People's Republic of China*

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

**********END OF REPORT**********