# TEST REPORT

## No. I17D00232-SAR01

### *For*

**Client :** **LongSung Technology (Shanghai) Co.,Ltd.**

**Production :** **LTE module**

**Model Name :** **U9507A**

**FCC ID:** **XHZU9507A**

**Hardware Version:** **A4**

**Software Version:** **QB40007.1.0_MX11**

**Issued date:** **2017-11-24**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

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**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| I17D00232-MPE01 | 00 | 2017-11-17 | Initial creation of test report |
| I17D00232-SAR01 | 01 | 2017-11-23 | Second creation of test report |
| I17D00232-SAR01 | 02 | 2017-11-24 | Third creation of test report |

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# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications |
| Address: | 7-8F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code: | 200001 |
| Telephone: | (+86)-021-63843300 |
| Fax: | (+86)-021-63843301 |
| FCC Registration NO.: | 489729 |

## 1.2. Project Data

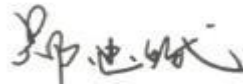| | |
|---|---|
| Project Leader: | Hong Yan |

## 1.3. Signature

**Yan Hang**
**(Prepared this test report)**

**Fu Erliang**
**(Reviewed this test report)**

**Zheng Zhongbin**
**(Approved this test report)**

## 2. Client Information

### 2.1. Applicant Information

| | |
|---|---|
| Company Name: | LongSung Technology (Shanghai) Co.,Ltd. |
| Address /Post: | Bldg.5,299 BiSheng Rd,Zhangjiang Hi-Tech Park Pudong,Shanghai,China |
| Telephone: | 021-50809688-669 |

### 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | LongSung Technology (Shanghai) Co.,Ltd. |
| Address /Post: | Bldg.5,299 BiSheng Rd,Zhangjiang Hi-Tech Park Pudong,Shanghai,China |
| Telephone: | 021-50809688-669 |

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

### 3.1. About EUT

| EUT Description | LTE module |
|---|---|
| Model name | U9507A |
| GSM Frequency Band | GSM850/GSM1900 |
| WCDMA Frequency Band | WCDMA Band2/4/5 |
| LTE Frequency Band | LTE Band2/4/5/12/13/17/28 |
| Antenna Type | External Antenna |
| FCC ID: | XHZU9507A |

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

| EUT ID* | SN or IMEI | HW Version | SW Version: | Date of receipt |
|---|---|---|---|---|
| N12 | 865865030000657 | A4 | QB40007.1.0_MX11 | 2017.10.18 |

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

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

| AE ID* | Description | Model | SN | Manufacturer |
|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A |

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

# 4. Reference Documents

## 4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.
FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
Section 1.1310   Radiofrequency radiation exposure limits

## 4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

| Frequency Range [MHz] | Electric Field Strength (E) [V/m] | Magnetic Field Strength (H) [A/m] | Power Density (S) [mW/cm2] | Averaging Times \|E\|2, \|H\|2 or S [miniutes] |
|---|---|---|---|---|
| 0.3 – 3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0 – 30 | 1824/f | 4.89/f | (900/f)* | 6 |
| 30 – 300 | 61.4 | 0.163 | 1.0 | 6 |
| 300 – 1500 | -- | -- | F/300 | 6 |
| 1500 - 100000 | -- | -- | 5 | 6 |

Limits for General Population / Uncontrolled Exposure

| Frequency Range [MHz] | Electric Field Strength (E) [V/m] | Magnetic Field Strength (H) [A/m] | Power Density (S) [mW/cm2] | Averaging Times \|E\|2, \|H\|2 or S [miniutes] |
|---|---|---|---|---|
| 0.3 – 1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34 – 30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30 – 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300 – 1500 | -- | -- | F/1500 | 30 |
| 1500 - 100000 | -- | -- | 1.0 | 30 |

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

## 5. Test Results

### 5.1. RF Power Output

| Frequency Band | Max power(dBm) | Highest Frame-Averaged Output Power (dBm) | Antenna Gain(dBi) |
|---|---|---|---|
| GSM850 | 32.5 | 23.47 | 0 |
| GSM1900 | 30.0 | 20.97 | 0 |
| WCDMA Band II | 23.0 | 23.0 | 0 |
| WCDMA Band IV | 23.0 | 23.0 | 0 |
| WCDMA Band V | 23.0 | 23.0 | 0 |
| LTE Bnad2 | 22.0 | 22.0 | 0 |
| LTE Bnad4 | 22.5 | 22.5 | 0 |
| LTE Bnad5 | 22.0 | 22.0 | 0 |
| LTE Bnad12 | 23.5 | 23.5 | 0 |
| LTE Bnad13 | 23.0 | 23.0 | 0 |
| LTE Bnad17 | 23.5 | 23.5 | 0 |

### 5.2. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

Given $\qquad S = \dfrac{P \times G}{4 \Pi d^2}$ $\qquad$ *Equation 1*

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

## 5.3. Result of GSM850

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 824.2-848.8MHz; as per the original test report the highest power is 222.33mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=222.33*1/(4* $\pi$ *20$^2$)=0.044mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = F/1500=824.2/1500=0.549 mW/cm2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.4. Result of GSM1900

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 1850.2-1909.8MHz; as per the original test report the highest power is 125.03mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=125.03*1/(4* $\pi$ *20$^2$)=0.025mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.5. Result of WCDMA Band II

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 1852.4-1907.6 MHz; as per the original test report the highest power is 199.53mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=$P*G/(4\pi R^2)$=199.53*1/(4*$\pi$*$20^2$)=0.04 mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.6. Result of WCDMA Band IV

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 1710-1755 MHz; as per the original test report the highest power is 199.53mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=$P*G/(4\pi R^2)$=199.53*1/(4*$\pi$*$20^2$)=0.04mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.7.  Result of WCDMA Band V

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 826.4-846.6MHz; as per the original test report the highest power is 199.53mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=199.53*1/(4* $\pi$ *20$^2$)=0.04 mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = F/1500=826.4/1500=0.551 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.8.  Result of LTE Band2

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 1850 – 1910 MHz; as per the original test report the highest power is 158.49mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=158.49*1/(4* $\pi$ *20$^2$)=0.032 mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.9. Result of LTE Band4

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 1710 – 1755 MHz; as per the original test report the highest power is 177.83mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=177.83*1/(4* $\pi$ *20$^2$)=0.035 mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = 1 mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.10. Result of LTE Band5

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 824 – 849 MHz; as per the original test report the highest power is 158.49mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=158.49*1/(4* $\pi$ *20$^2$)=0.032 mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = F/1500=824/1500=0.549 mW/cm2

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.11. Result of LTE Band12

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 698 – 716 MHz; as per the original test report the highest power is 223.87mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P*G/(4 \pi R^2) = 223.87*1/(4* \pi *20^2) = 0.045 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = F/1500 = 698/1500 = 0.465 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.12. Result of LTE Band13

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 777 – 787 MHz; as per the original test report the highest power is 199.53mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P*G/(4 \pi R^2) = 199.53*1/(4* \pi *20^2) = 0.04 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = F/1500 = 777/1500 = 0.518 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

## 5.13. Result of LTE Band17

**Test Results:** MPE Limit Calculation: the EUT's operating frequencies @ 704 – 716 MHz; as per the original test report the highest power is 223.87mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

Power Density=P*G /(4 $\pi$ R$^2$)=223.87*1/(4* $\pi$ *20$^2$)=0.045mW/cm$^2$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

MPE limit = F/1500=704/1500=0.469mW/cm$^2$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

**Note: π=3.1416**

So the product is under the MPE limits. All is pass.

**\*\*\*\*\*\*\*\*\*\*End OF Report\*\*\*\*\*\*\*\*\*\***