



# TEST REPORT

**No. I17D00195-MPE01**

***For***

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

**Production : eMTC/NB-IoT/EGPRS Cellular Module**

**Model Name : A9500**

**FCC ID: XHZA9500**

**Hardware Version: QB1MX10A3**

**Software Version: QB10001\_2.0.001**

**Issued date: 2017-09-14**

**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
I17D00195-MPE01	00	2017-09-01	Initial creation of test report
I17D00195-MPE01	01	2017-09-07	Second creation of test report
I17D00195-MPE01	02	2017-09-14	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:	Yu Anlu
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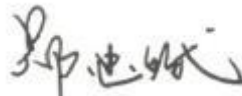
### 1.3. Signature



Yan Hang  
(Prepared this test report)



Fu Erliang  
(Reviewed this test report)



Zheng Zhongbin  
Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: LongSung Technology (Shanghai) Co.,Ltd.  
Address /Post: Room 606, Block B, Bldg. 1, No. 3000 Longdong Avenue.,  
Zhangjiang Hi-Tech Park, Pudong District, Shanghai, P.R. China  
Telephone: 021-50809688-669

### **2.2. Manufacturer Information**

Company Name: LongSung Technology (Shanghai) Co.,Ltd.  
Address /Post: Room 606, Block B, Bldg. 1, No. 3000 Longdong Avenue.,  
Zhangjiang Hi-Tech Park, Pudong District, Shanghai, P.R. China  
Telephone: 021-50809688-669

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

#### 3.1. About EUT

EUT Description	eMTC/NB-IoT/EGPRS Cellular Module
Model name	A9500
GSM Frequency Band	GSM850
LTE Frequency Band	NB-IoT LTE Band5/ CAT-M LTE Band5
Antenna Type	External Antenna
FCC ID:	XHZA9500

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

EUT ID*	SN or IMEI	HW Version	SW Version:	Date of receipt
N06	N/A	QB1MX10A3	QB10001_2.0.001	2017-08-02

\*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
AE1	RF cable	N/A	N/A	N/A
AE2	Dummy Battery	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, Oct 1,2011

Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices, Nov. 14, 2016

### 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 [V/m]	Magnetic Field Strength [A/m]	Power Density (S) [mW/cm <sup>2</sup> ]	Averaging Times  E  <sup>2</sup> ,  H  <sup>2</sup> or S [minutes]
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 [V/m]	Magnetic Field Strength [A/m]	Power Density (S) [mW/cm <sup>2</sup> ]	Averaging Times  E  <sup>2</sup> ,  H  <sup>2</sup> or S [minutes]
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	Highest Power Output(dBm)	Antenna Gain(dBi)
GSM850	27.3	0
NB-IoT LTE Band5	24.4	0
CAT-M LTE Band5	24.4	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.

$$\text{Given } S = \frac{P \times G}{4\pi d^2} \quad \text{Equation 1}$$

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 – 848.8 MHz; as per the original test report the highest power is 537.03mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P \times G \times \text{Duty Cycle} / (4 \pi R^2) = 537.03 \times 1 \times 1 / (4 \pi \times 20^2) = 0.107 \text{mW/cm}^2$$

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:

$$\text{MPE limit} = F/1500 = 824.2/1500 = 0.549 \text{mW/cm}^2$$

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.



#### 5.4. Result of NB-IoT 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 275.42mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 * \pi * R^2) = 275.42 * 1 * 1 / (4 * \pi * 20^2) = 0.055 \text{ mW/cm}^2$$

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:

$$\text{MPE limit} = F / 1500 = 824 / 1500 = 0.549 \text{ mW/cm}^2$$

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.

#### 5.5. Result of CAT-M 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 275.42 mW,. The maximum gain is 0dBi(numeric gain 1).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 * \pi * R^2) = 275.42 * 1 * 1 / (4 * \pi * 20^2) = 0.0218 \text{ mW/cm}^2$$

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:

$$\text{MPE limit} = F / 1500 = 824 / 1500 = 0.549 \text{ mW/cm}^2$$

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.

**Note:  $\pi=3.1416$**

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

\*\*\*\*\***End The Report**\*\*\*\*\*