A9500 USER MANUAL

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FCC Caution:

(1)Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.
(2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.
(3) This Transmitter must not be co-located or operating in conjunction with any other antenn a or transmitter.
(4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.
(5) the modules FCC ID is not visible when installed in the host, or
(6) if the host is marketed so that end users do not have straight forward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: Contains Transmitter Module FCC ID: XHZA9500 or Contains FCC ID: XHZA9500 must be used.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the condition that this device does not cause harmful interference.

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1. Overview

The EVB is designed to test the functionality and performance of the LongSung modules. It provides user to evaluate the related development of the module.

1.1. Purpose of the Document

The document takes A9500 as an example to explain the basic functions and main features of EVB, the setup of hardware and software environments and the implementation method of normal business on EVB.

1.2. Summary

The document is divided into the following sections:

- ✧ Chapter 1, mainly introduces the purpose of document, related information, revised records, interpretation of abbreviations;
- ✧ Chapter 2, describes the development environment of EVB equipment list;
- ✧ Chapter 3, a detailed description of the EVB hardware and software setup environment;
- ✧ Chapter 4, a detailed description of EVB normal business implementation method.

1.3. Related Documents

- ✧ A9500_SPEC
- ✧ A9500_ATC
- ✧ A9500_Hardware_User_Guide
- ✧ A9500_Reference_Circuit
- ✧ A9500_Application_Guide

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1.4. Document History

Table 1：Document history

Versions	Name	Published Date	Revised Description
V1.0	Mao Jinjian	2017-03-09	Apply to A9500
V1.1	Zhang Yaowen	2017-03-16	Apply to A9500
	Wangen Wei	2017-03-17	Modified
V1.2	Zhang Yaowen	2017-04-24	Modify the UART related content
	Wangen Wei	2017-04-25	Modified
V1.3	Zhang Yaowen	2017-05-04	Add connect methodofthe one key upgrade
V1.4	Zhang Yaowen	2017-05-24	Modify the method of power on/off

1.5. Abbreviations

Table 2：Abbreviations and description

Abbreviations	Description
BER	Bit Error Rate
EGPRS	Enhanced General Packet Radio Service
NB-IoT	Narrow Band-Internet Of Thing
eMTC	Extended Coverage-GSM
BTS	Base Transceiver Station
PCI	Peripheral Component Interconnect
CS	Circuit Switched (CS) domain
CSD	Circuit Switched Data
DCE	Data communication equipment
DTE	Data terminal equipment
DTR	Data Terminal Ready
EDGE	Enhanced Data rates for GSM Evolution
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FR	Frame Relay
GMSK	Gaussian Minimum Shift Keying
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service

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GSM	Global Standard for Mobile Communications
HR	Half Rate
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
HSPA	HSPA High-Speed Packet Access
IEC	International Electro-technical Commission
IMEI	International Mobile Equipment Identity
I/O	Input/Output
ISO	International Standards Organization
ITU	International Telecommunications Union
bps	bits per second
LED	Light Emitting Diode
M2M	Machine to machine
MO	Mobile Originated
MT	Mobile Terminated
NTC	Negative Temperature Coefficient
PC	Personal Computer
PCB	Printed Circuit Board
PCS	Personal Cellular System
PCI	Peripheral Component Interconnect
PCM	Pulse Code Modulation
PCS	Personal Communication System
PDU	Packet Data Unit
PPP	Point-to-point protocol
PS	Packet Switched
QPSK	Quadrate Phase Shift Keying
SIM	Subscriber Identity Module
TCP/IP	Transmission Control Protocol/ Internet Protocol
UART	Universal asynchronous receiver-transmitter
USIM	Universal Subscriber Identity Module
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
WCDMA	Wideband Code Division Multiple Access

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2. Introduction

The EVB board allows customers to test A9500 module development and evaluation of the performance and function. The EVB board includes the common interface board and module adapter board. The two PCBA boards mainly provide the power supply interface, USB interface, SIM card interface, RS232 interface, analog audio interface, PCM interface, power button, flight mode button, and reset button etc..

2.1. Required Equipment

The following table details the list of equipment required for the A9500 development environment. If not complete, please contact with LongSung company or its agents.

Table 3：EVB Kit list

Equipment	EVB Kit include or not	Description
EVB board	Include	EVB board is used to test and debug A9500 functions
USB cable	Include	Standard USB-A to Micro USB cable
Antenna	Include	The antenna consists of two parts: 1) antenna 2) antenna transit cable
A9500 module	Not Include	The set of develop boards supports the debug and develop on A9500 modules
DC Injector	Not Include	DC Injector Input：100-240V 50/60Hz Output：5V, 1A
Earphone wire	Not Include	If test the voice function, a headset that is compatible with EVB interface is needed.
RS232 cable	Not Include	DB9(male) to DB9（male） serial port direct connection
SIM/USIM card	Not Include	Need one SIM/USIM without arrears or a test SIM card
Drivers	Provide additionally	Drivers support on below OS： 1. Windows XP 2. Windows 2000 3. Windows Vista 32/64 bits 4. Windows 7/8/8.1/10 32/64 bits 5. Windows CE5/6 6. Windows Mobile 5.0/6.0 7. Linux/Android (Use system built-in driver, LongSung will provide the load method)

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3. Setup and Install

EVB include the hardware environment setup and software environment setup:

1) Hardware environment setup
   - ✧ How to insert SIM/USIM card;
   - ✧ How to connect module;
   - ✧ How to connect antenna;
   - ✧ How to connect USB cable;
   - ✧ How to power on;
   - ✧ How to power off.
2) Software environment setup
   - ✧ How to install the drivers;
   - ✧ How to upgrade the firmware version

3.1. Hardware environment setup

3.1.1. How to insert SIM/USIM card

Need prepare one SIM/USIM with arrears or one test SIM (Ex: Agilent 8960or Rohde&Schwarz CMU200 test SIMs）.

The steps to insert the SIM/USIM card:

1) Place the EVB face up and the SIM slot on the left side of the EVB board. As shown in the following figure:

Figure 1：EVB front view

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2) The SIM card circuit faces down; insert the slot according to the screen printing direction on the EVB board. As shown in the following figure:

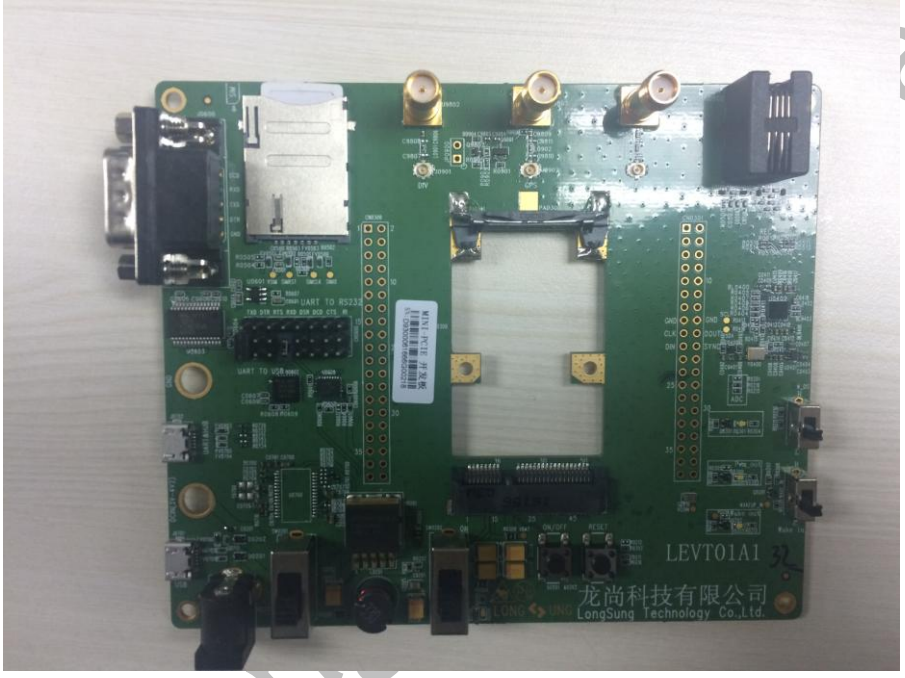

Figure 2：SIM card placement view

3.1.2. How to connect module

After insert the SIM card, connect the module onto the develop board:

1) Put the EVB face up and MiniPCIe connector is in the middle of the panel;

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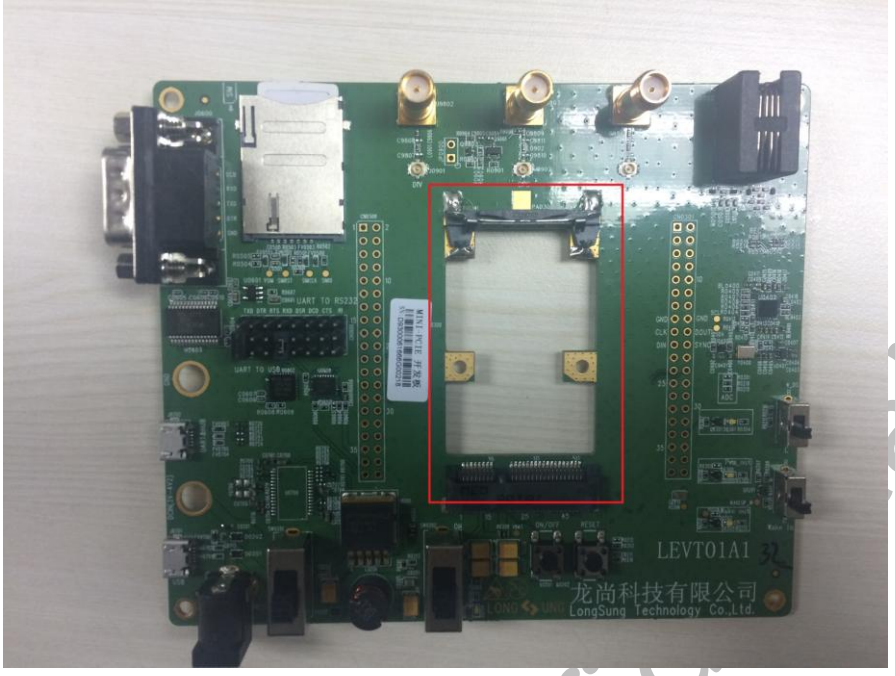

Figure 3：Mini-PCIe connector location view

2) Insert A9500 module into the connector on the EVB board and secure it. As shown in the following figure:

Figure 4：Module insert EVB view

3.1.3. How to connect antenna

After insert the SIM card and module, then connect the antenna:

1) The antenna interface is marked “MAIN” at the top right of the module, as shown in the following figure:

Figure 5：Front view of module

2) The RF transit cable is lightly buckled to the module connector. As shown in the following figure:

Figure 6：Antenna transit cable connection view

3) Tighten the antenna SMA connector and the RF transit cable SMA connector.

3.1.4. How to connect USB port

According to the following steps to connect the USB port:

1) Place the EVB board face up;

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2) The USB data cable B terminal is accessed to the J0701 interface on the lower left corner of the EVB board, as shown in the following figure:

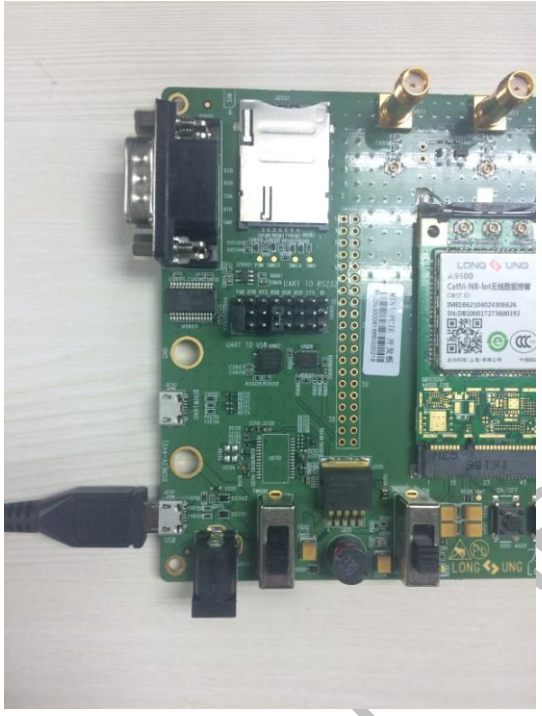

Figure 7：USB port connection view

3) Insert the USB data cable A terminal into the USB interface of the PC.

3.1.5. How to connect the UART port

According to following steps to connect the UART port:

1) Place the EVB board face up;
2) The USB data cable B terminal is accessed to the J0702 interface on the lower left corner of EVB board, as shown in the following figure:

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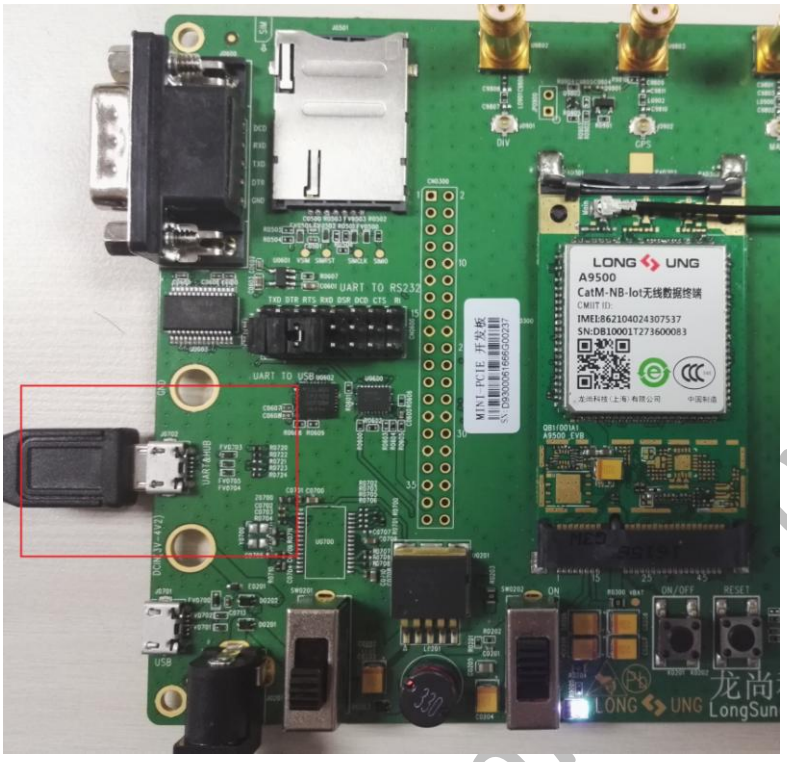

Figure 8：UART port connection view

3) Insert the USB data cable A terminal into the USB interface of the PC.

3.1.6. How to power on

A9500 only supports the boot up via pressing the power button

Cnnect the VBAT and press the power button to start the module. The position of power button is shown as below:

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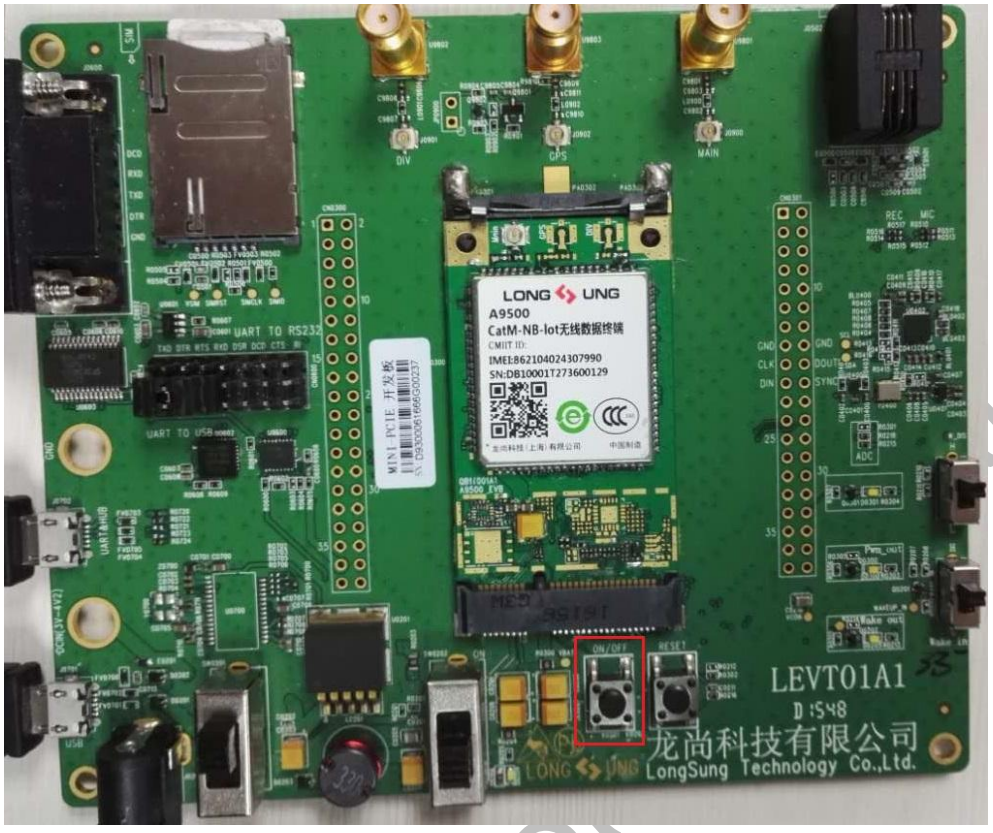

Figure 9：Power button position view

3.1.7. How to power off

A9500supports power off and AT command shutdown:
When the VBAT is powered down, the module shuts down;
Send AT$QCPWRDN, the module shuts down.

3.2 Software environment setup

3.2.1. How to install the drivers

1) The first time when USB data cable is connected to the PC and boot up the module, open the device management window to check that the USB modem driver is not installed:

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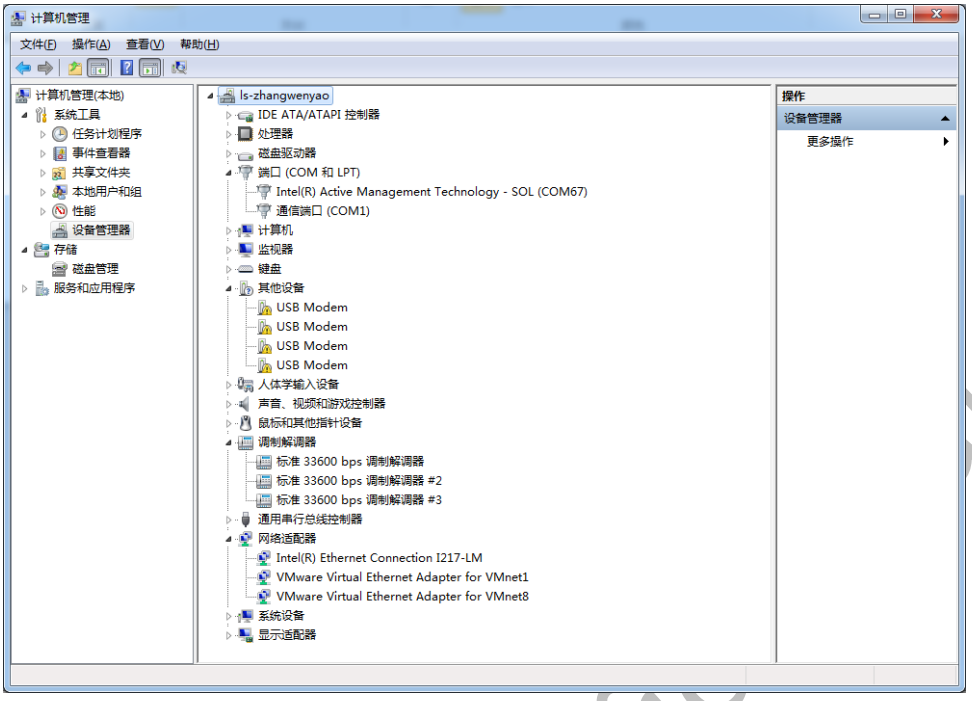

Figure 10：Find new hardware

2) Right click on the USB modem device and select to update the drivers:

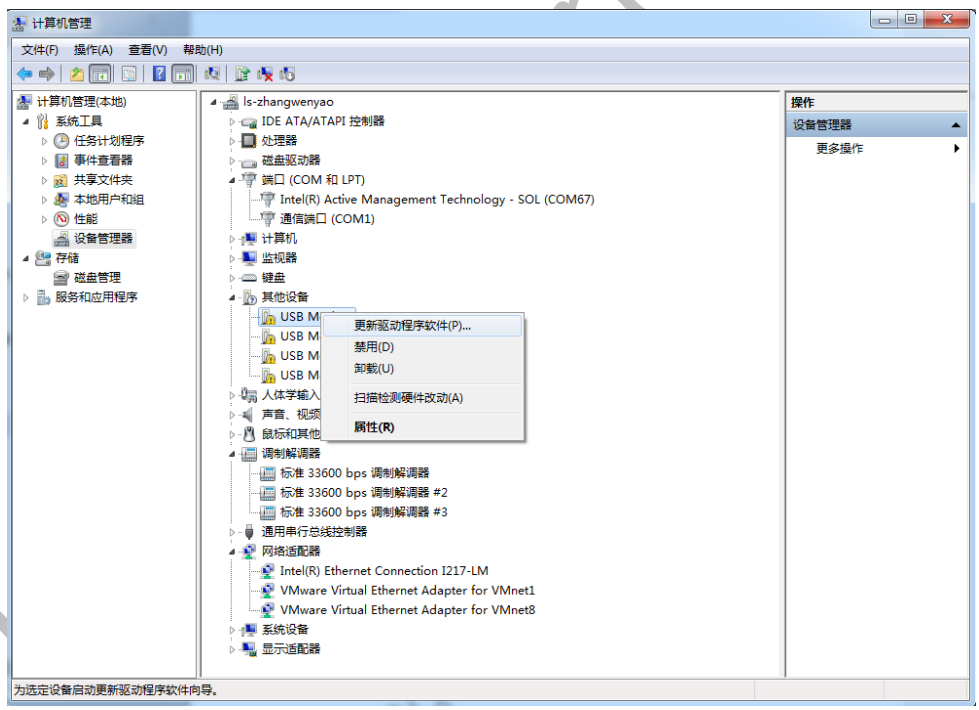

Figure 11：Update the drivers

3) Select “Browse the computer to find the driver software”:

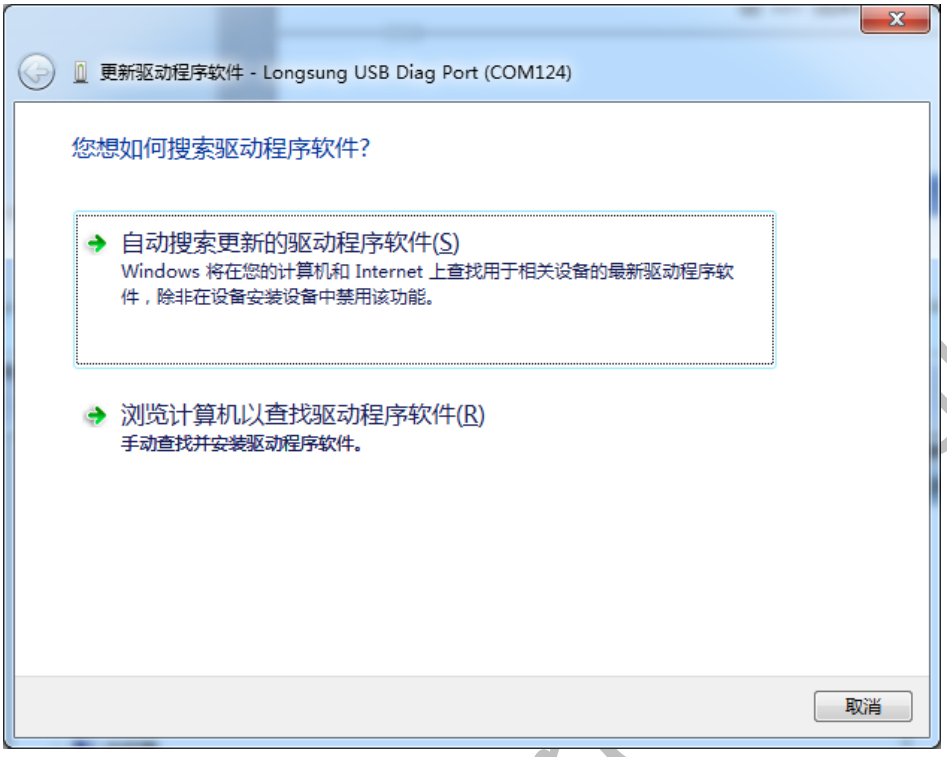

Figure 12：Install the drivers manually

4) Click on “browse”, select the A9500 driver and press “ok”:

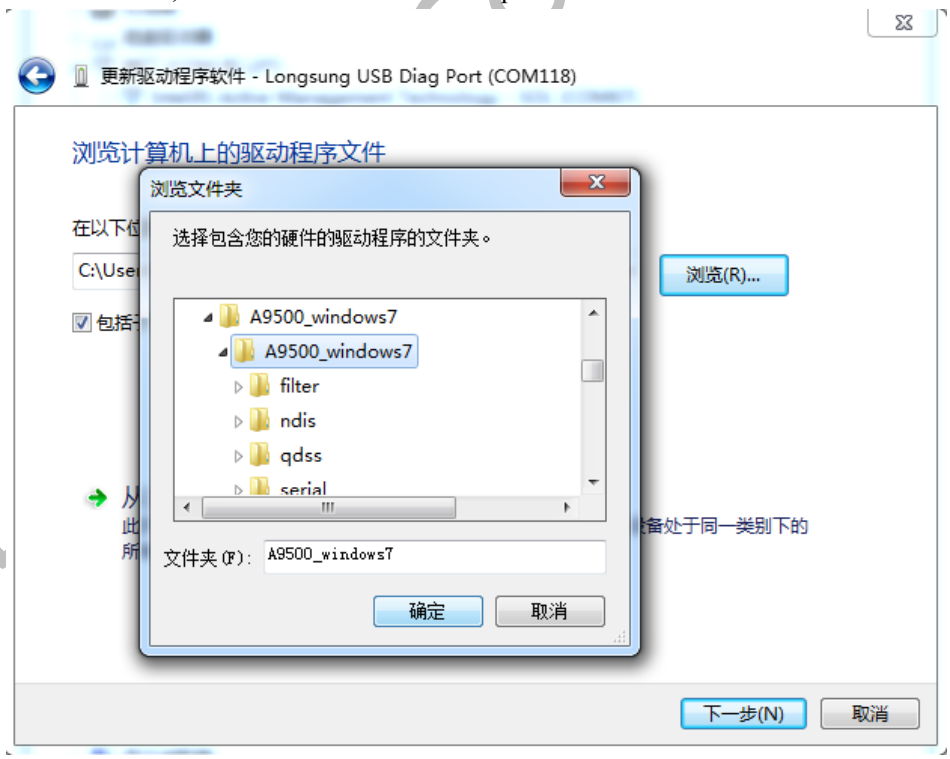

Figure 13：Select the driver path

5) Click on “next”:

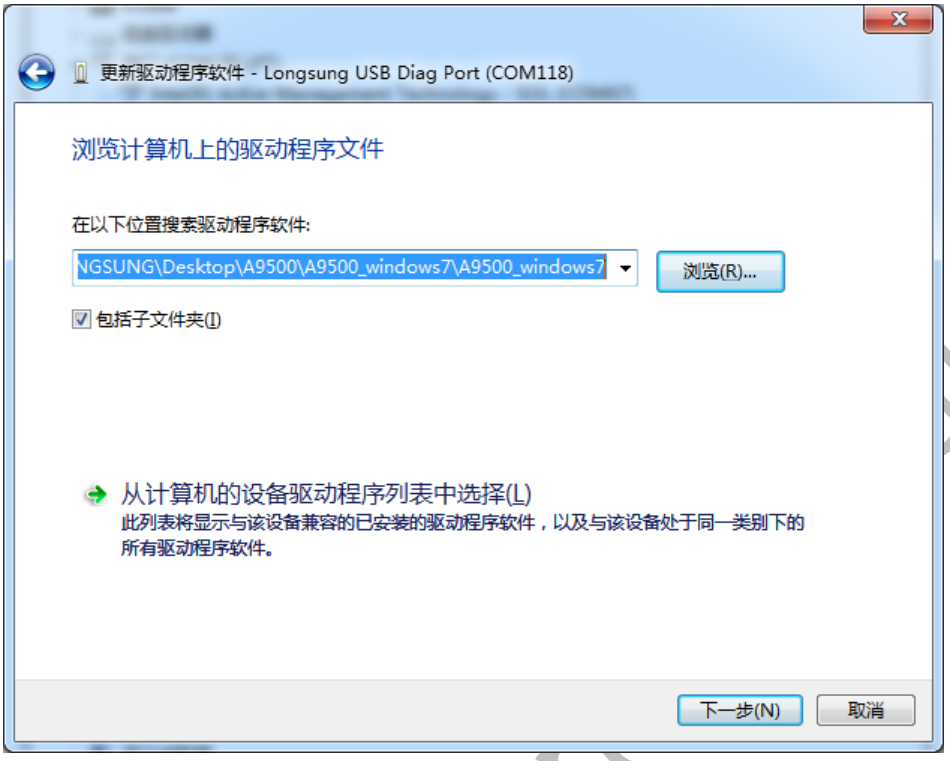

Figure 14：Select the drivers

6) Driver is installing:

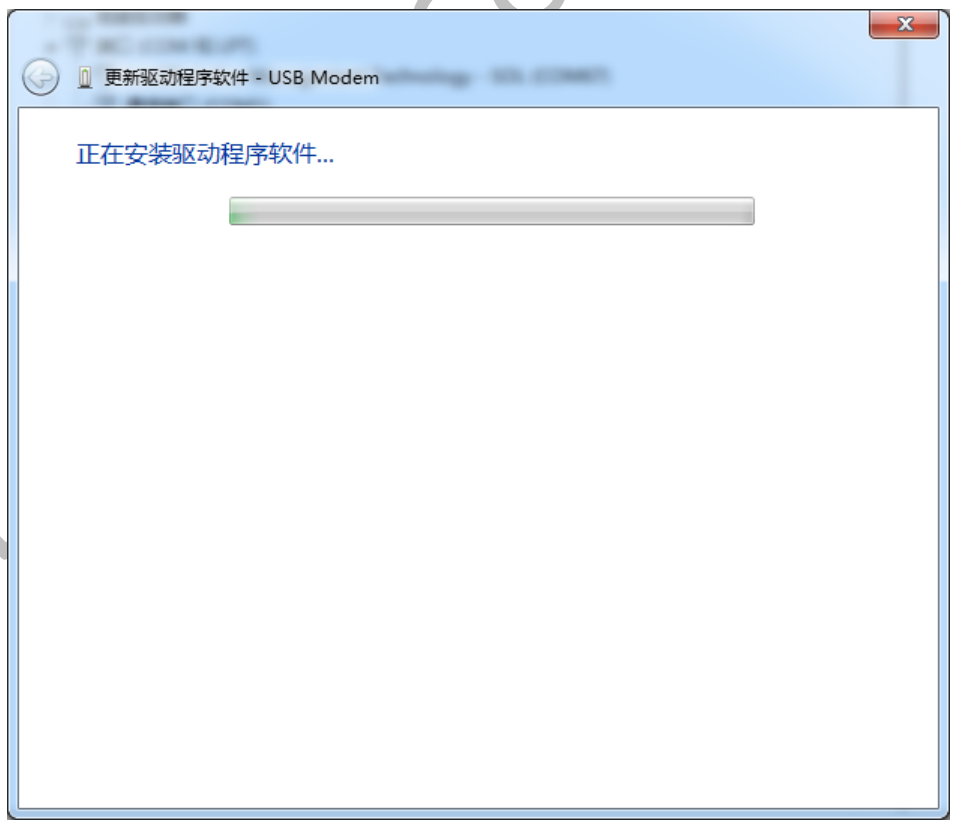

Figure 15：Driver is installing

7) When prompt “windows already update the device drivers successfully”, press “finished” to end the driver installation.

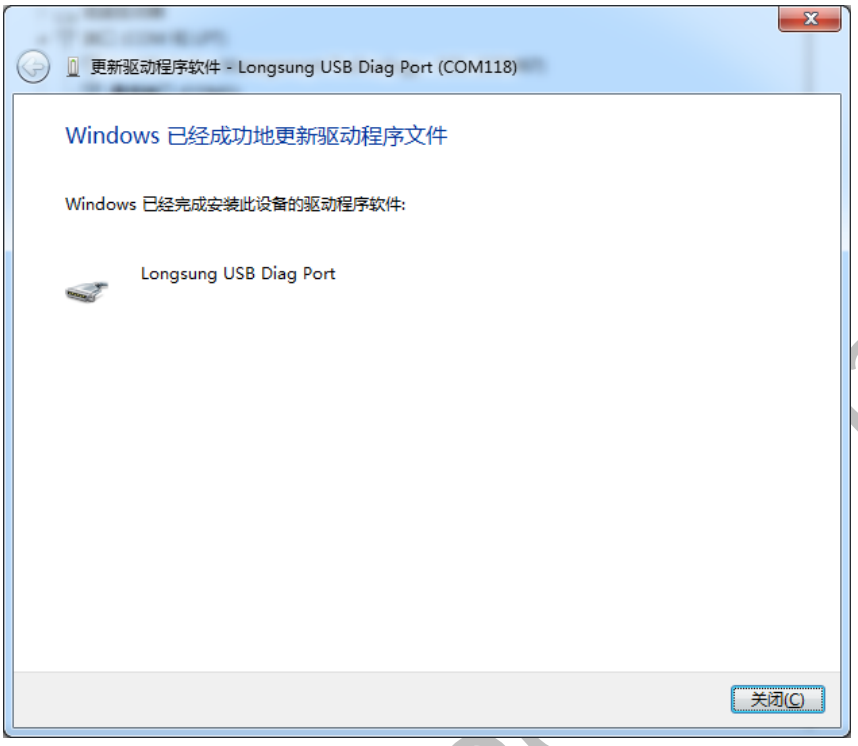

Figure 16：Driver install successfully

8) Repeat above 1-7 steps to update the other A9500 uninstalled USB modem drivers. A9500 corresponding ports will appear in the device manager after the driver updated successfully. As shown in the following figure:

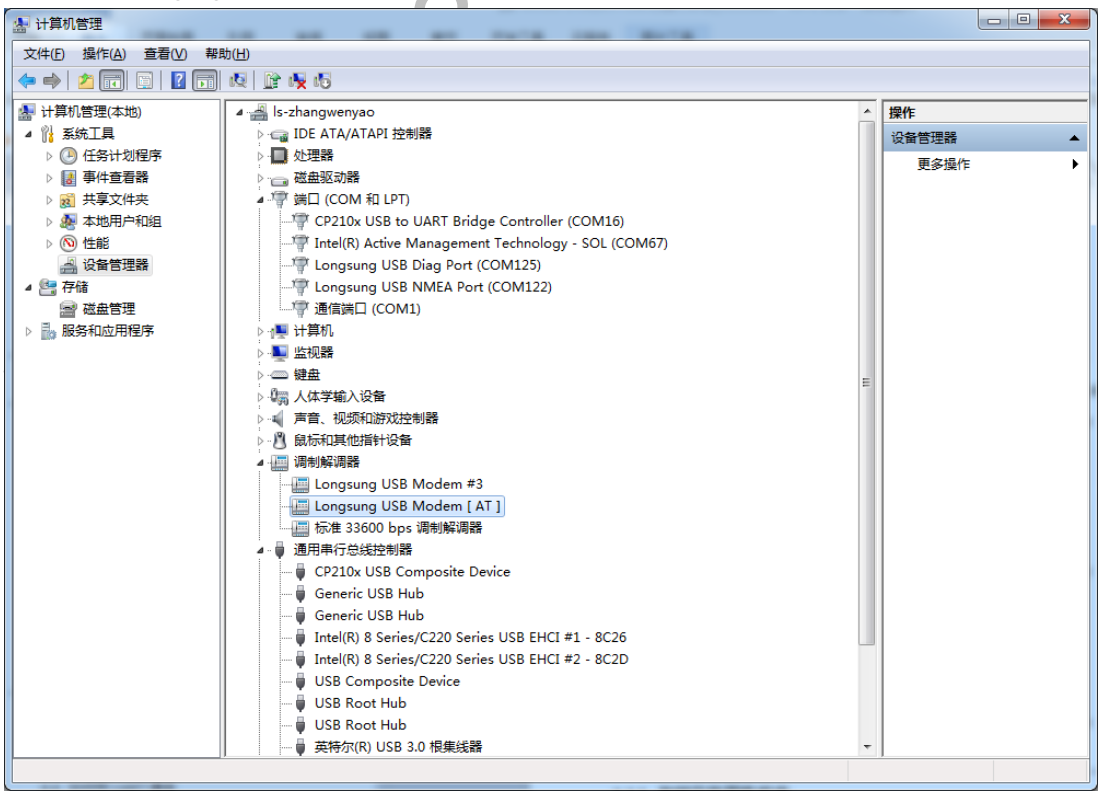

Figure 17：A9500 ports display in the device manager

3.2.2. How to update the firmware

A9500 provides the one key upgrade tool on windows. The firmware upgrade steps are as follows:

1) Connect the USB, UART ports with USB cable:

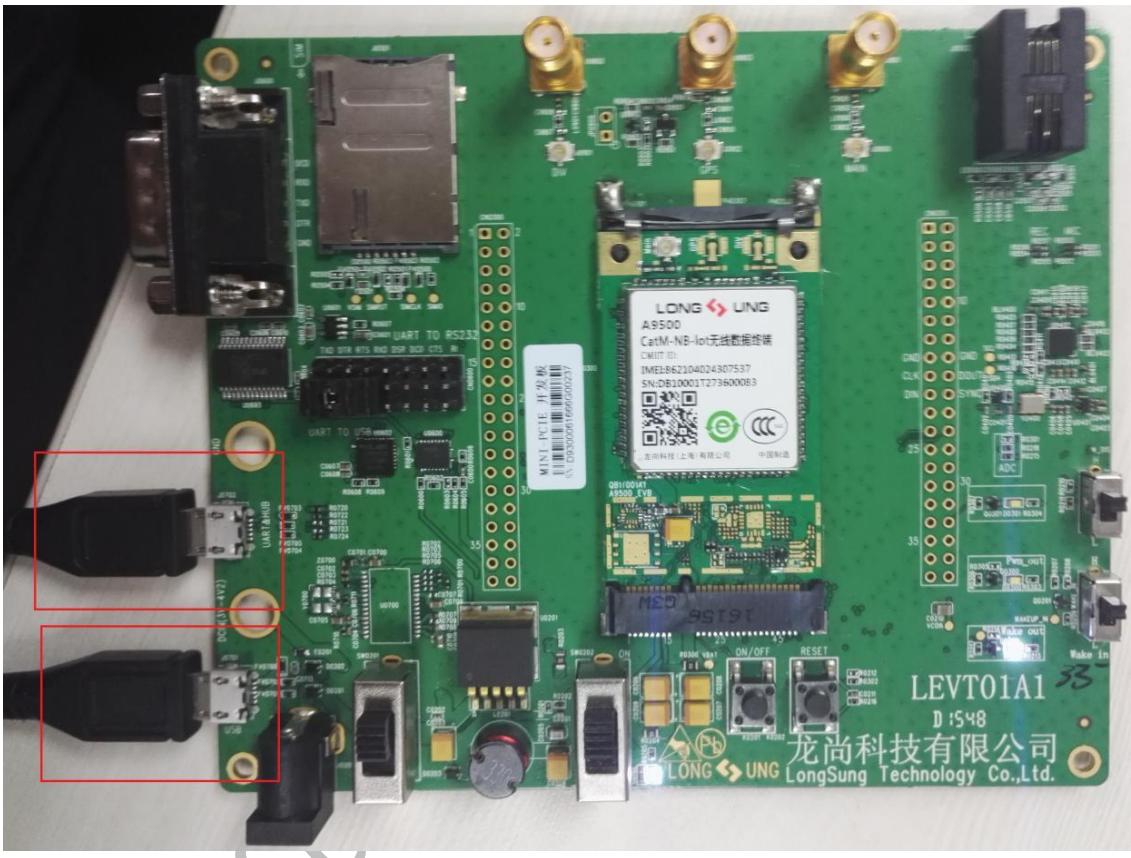

Figure 18：One key upgrade connection method

2) Power on and wait the ports appear in the device manager. As shown in the following figure:

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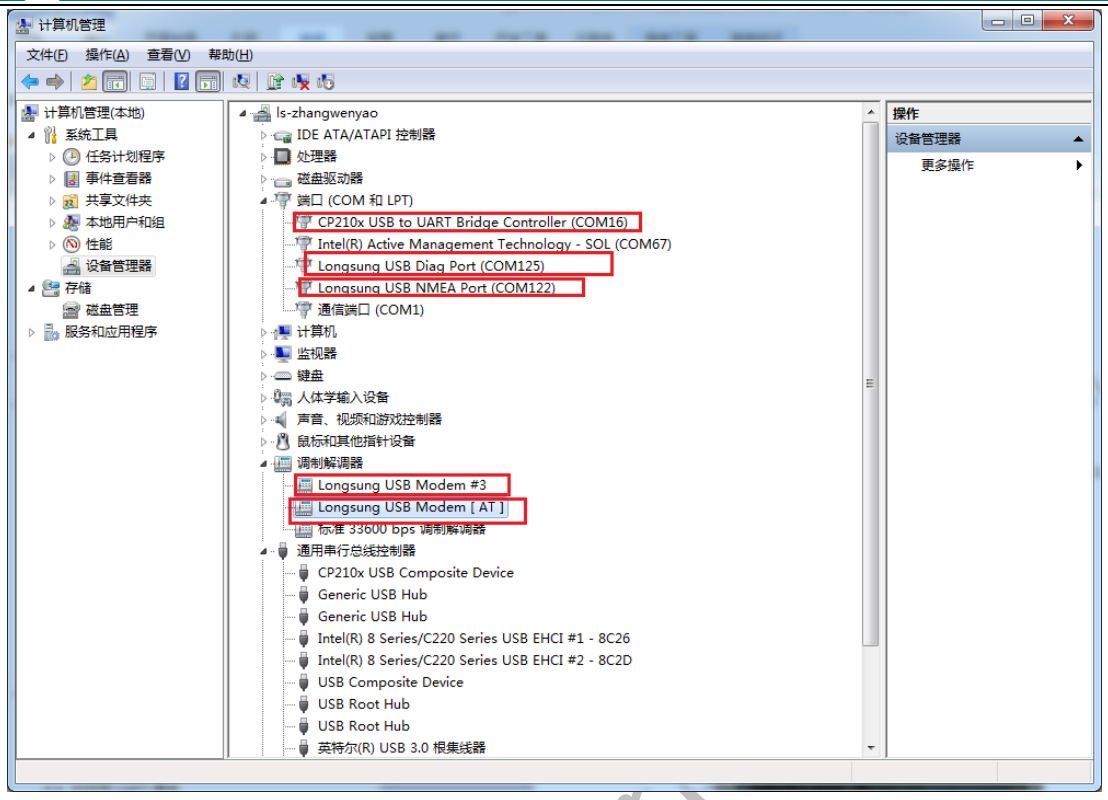

Figure 19：A9500 module display in the device manager

3) Double click on the A9500 firmware file, that is an executable file with the suffix as .exe;

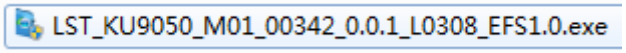

Figure 20：An example of firmware file

4) When it displays "Ready" in the popup window, click on "start" button to start the firmware upgrading:

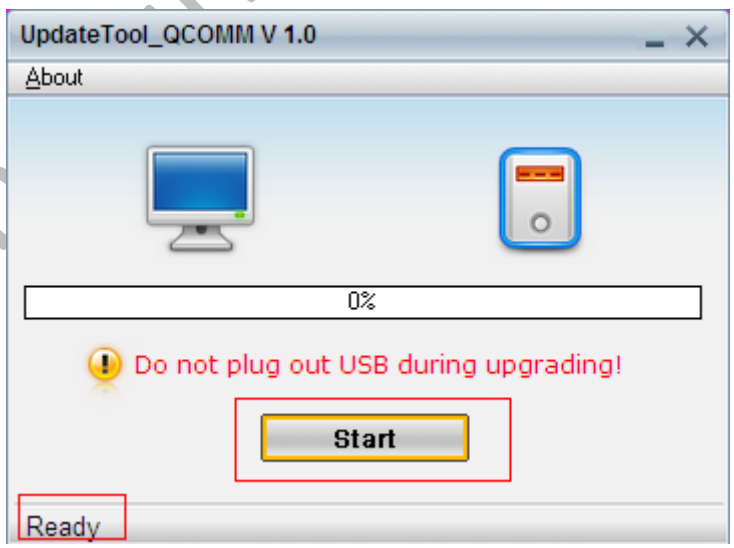

Figure 21：Firmware upgrading start window\

5) Module start the firmware upgrading;

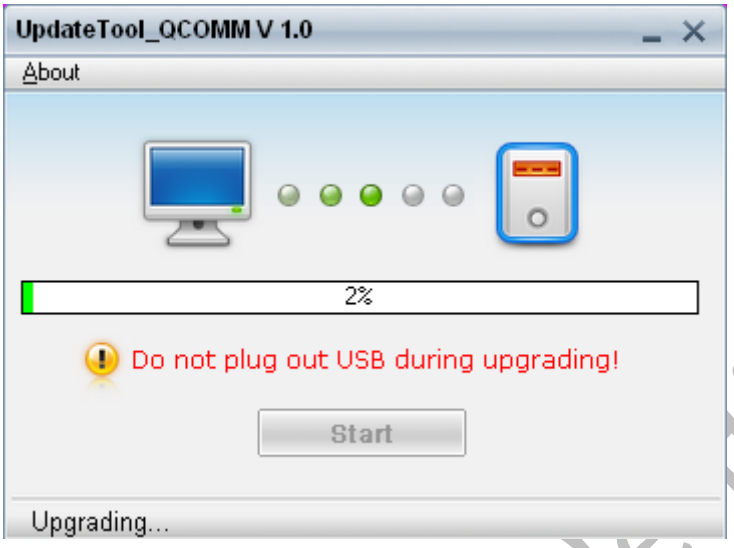

Figure 22：Firmware is upgrading

6) During upgrading, it cannot disconnect the power supply and the USB cable. Close the upgrade window when the upgrade window shows “Complete”. It takes about 2-3 minutes for the whole process.

Notice: During the upgrading, it cannot disconnect the USB cable and the power supply(need ensure the power supply stability), otherwise it will cause damage to module.

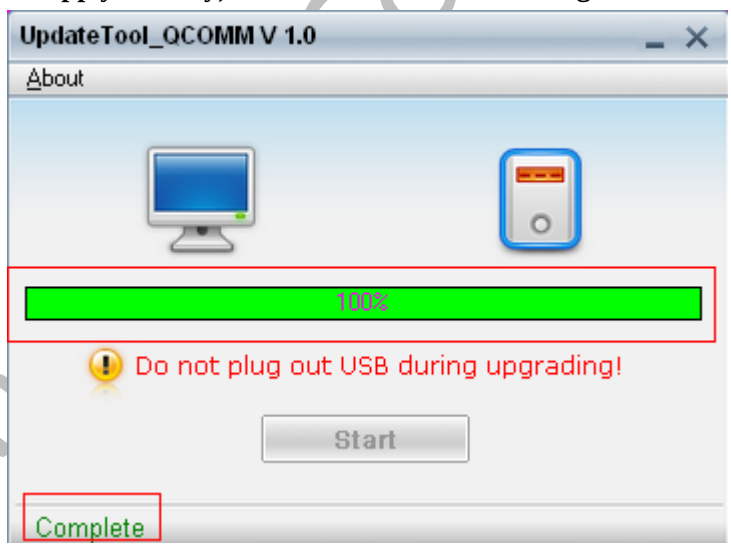

Figure 23：Finished on the firmware upgrading

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4. Test and Debug

The EVB board can be used for TCP/IP transport and internet connection; in addition to the USB communication, A9500 also supports UART mode communication. This chapter will describe these related functions.

4.1. How to use USB communication

1) Connect the EVB board to the PC with USB cable, and boot up the module;
2) Double click on the A9500’s LongSung USB Modem[AT] port in the device manager;

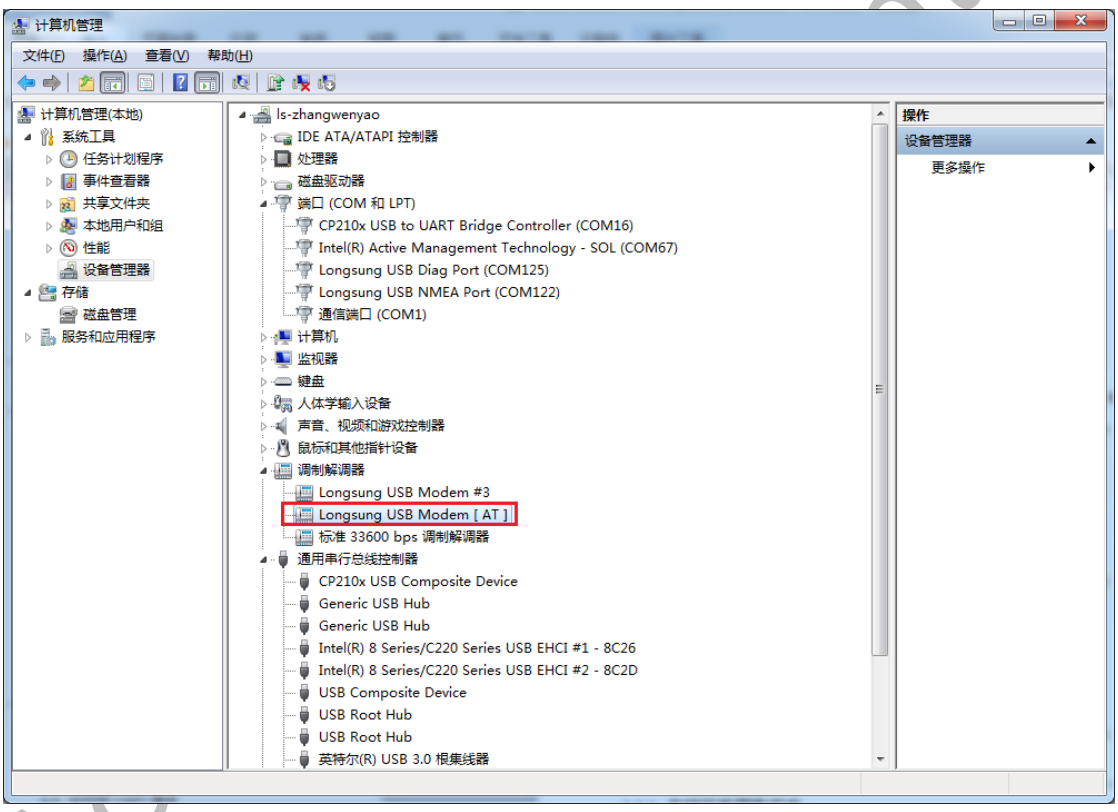

Figure 24：A9500 LongSung USB Modem[AT] port

3) Switch to the modem page and check the LongSung USB Modem[AT] port is COM11;

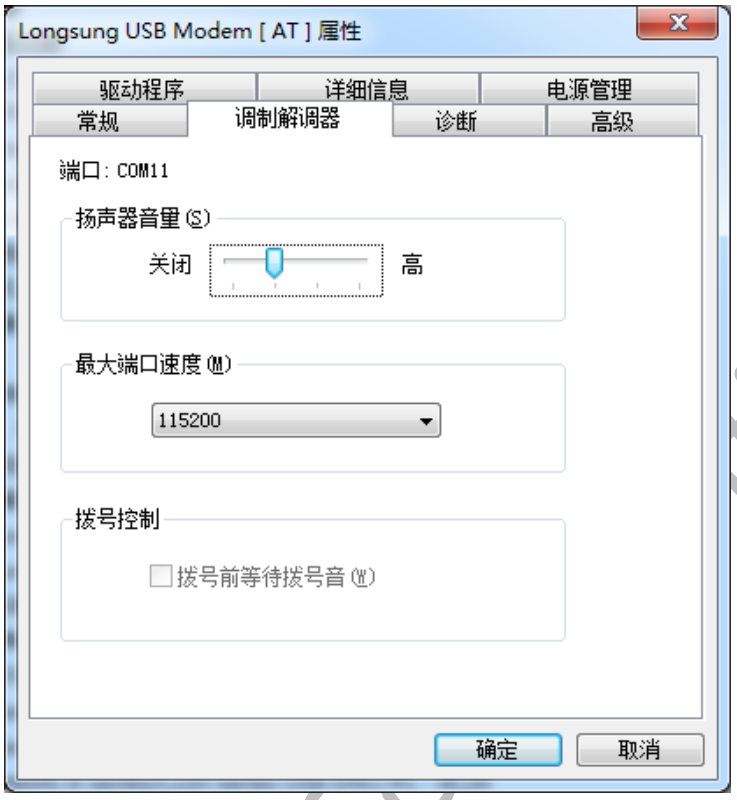

Figure 25：Check the port number

4) Open the serial port tool (ex: Windows hyper terminal);

Figure 26：New a hyper terminal

5) Select the COM port that is corresponding to the LongSung USB Modem[AT] port, example is COM11;

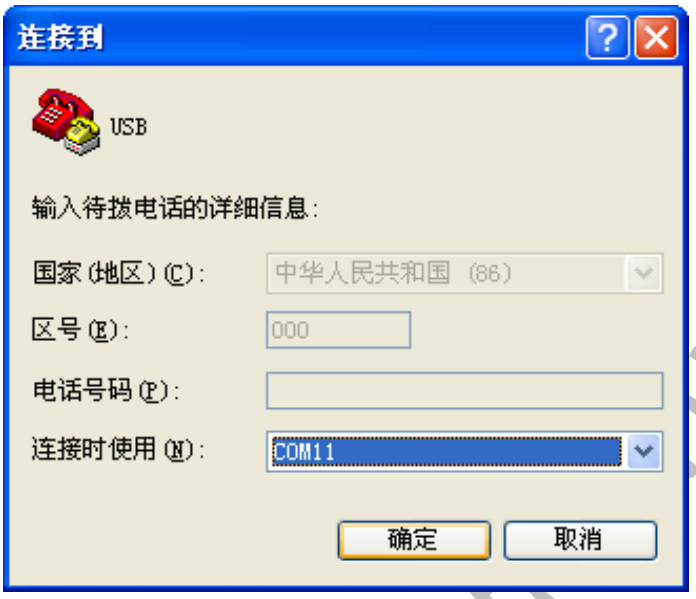

Figure 27：Select the port number

6) Select the baud rate as “115200” and data flow control as “none”, other options use the default values;

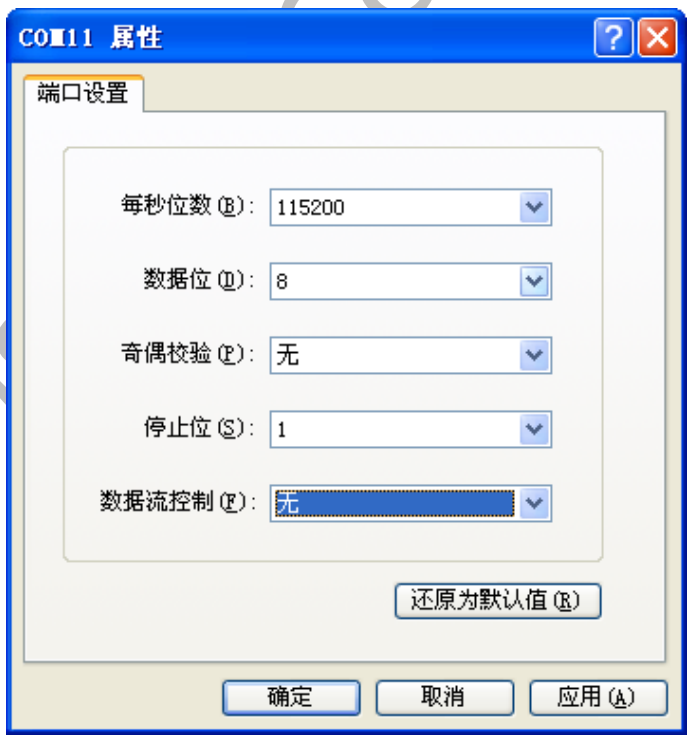

Figure 28：Configure the hyper terminal

7) The communication mode of PC and A9500 is AT command; you can send AT command to test if the communication is successful between the PC and A9500.

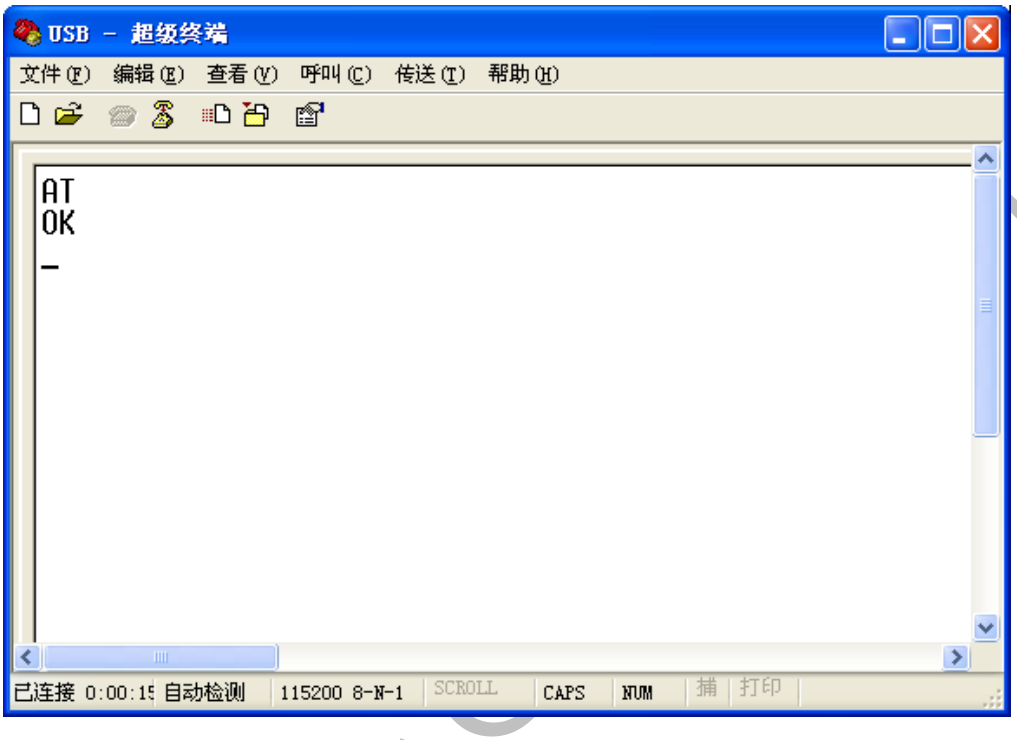

Figure 29：Use hyper terminal to send AT commands

4.2. How to do the data connection

1) Insert a SIM/USIM card that supports data into the EVB board. Ensure the antenna is properly connected and power on the module;
2) Send AT+CGDCONT=1,"IP","CMNET" in the hyper terminal; set the APN;

Notice: Different operators need to configure the different dialing parameters. You need to consult the local operators to get the APN and replace the "CMNET" field after get it.

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3) Control panel \ network and internet \ network and shared center, select to new a network connection;

Figure 30：Configure a new network connection

4) Click on “LongSung USB Modem[AT]” modem;

Figure 31：Select modem

5) Input *99***1# in the dial number, click on “connect”;

Figure 32：Input the dial number

6) Trying on the Internet connection;

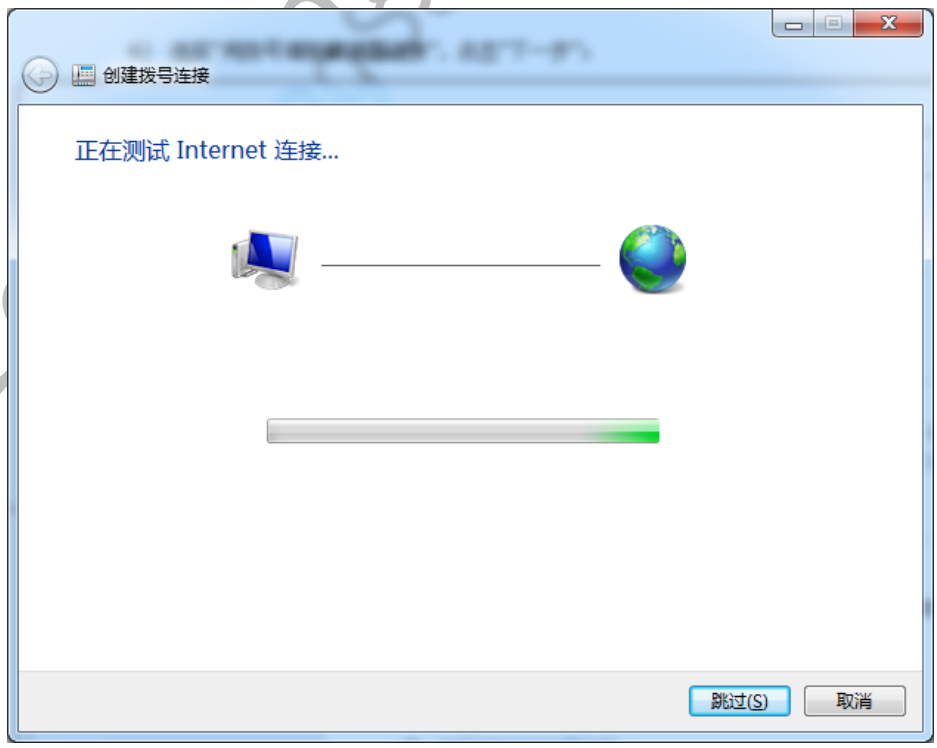

Figure 33：Network connecting

7) Connected to the internet successfully;

Figure 34：Network connection successfully

4.3. How to connect the external power supply

In addition to the power supply with USB cable, EVB can also connect to an external power supply. The connection method is shown as below:

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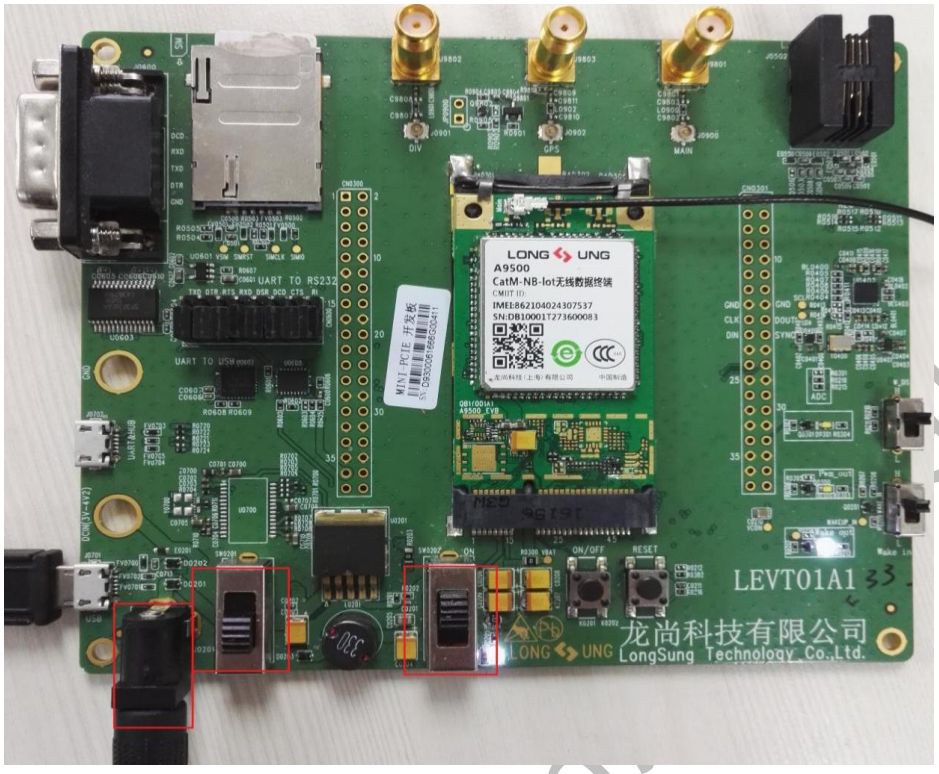

Figure 35：External power supply connection view

4.4. How to use UART communication

In addition to the USB communication, A9500 also supports the UART communication. The connection method is shown as below”

1) Jump the jumper cap of CN0600 to UART TO USB;

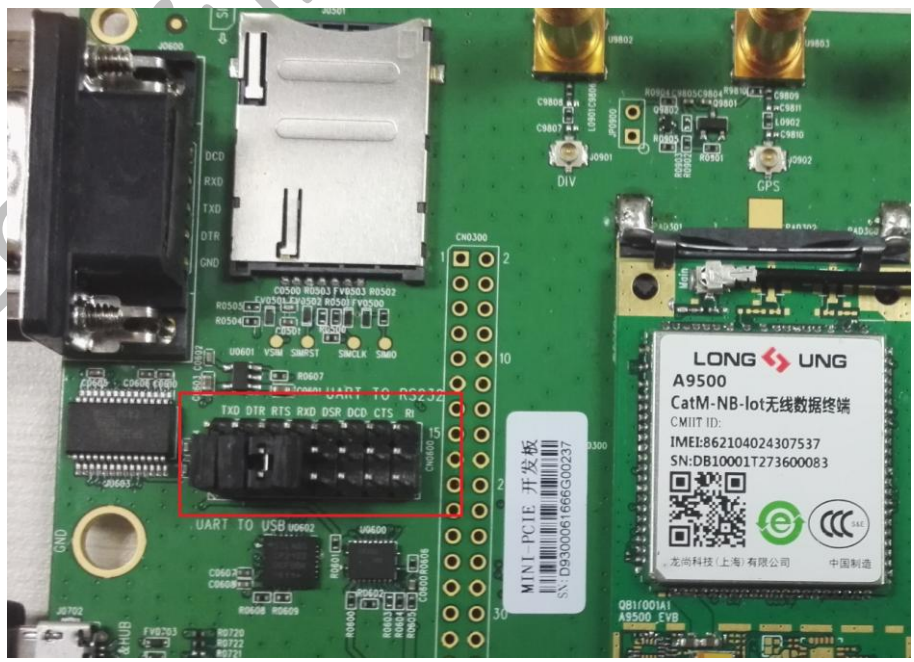

Figure 36：UART jumper cap configure

2) Connect the USB cable to the J0702 interface of the EVB board;

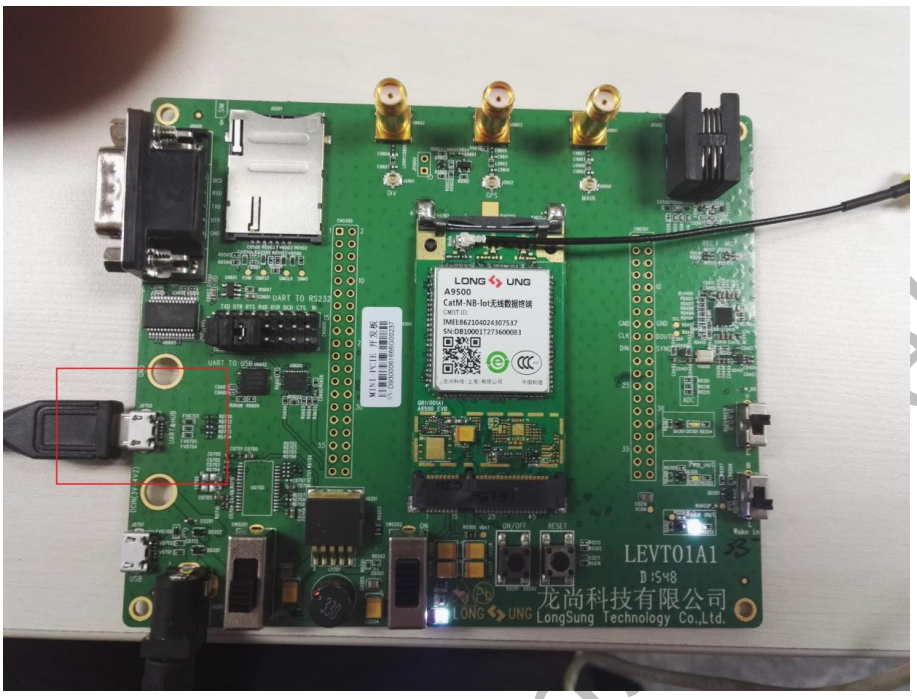

Figure 37：UART data cable connection view

3) Check the UART port is COM1;

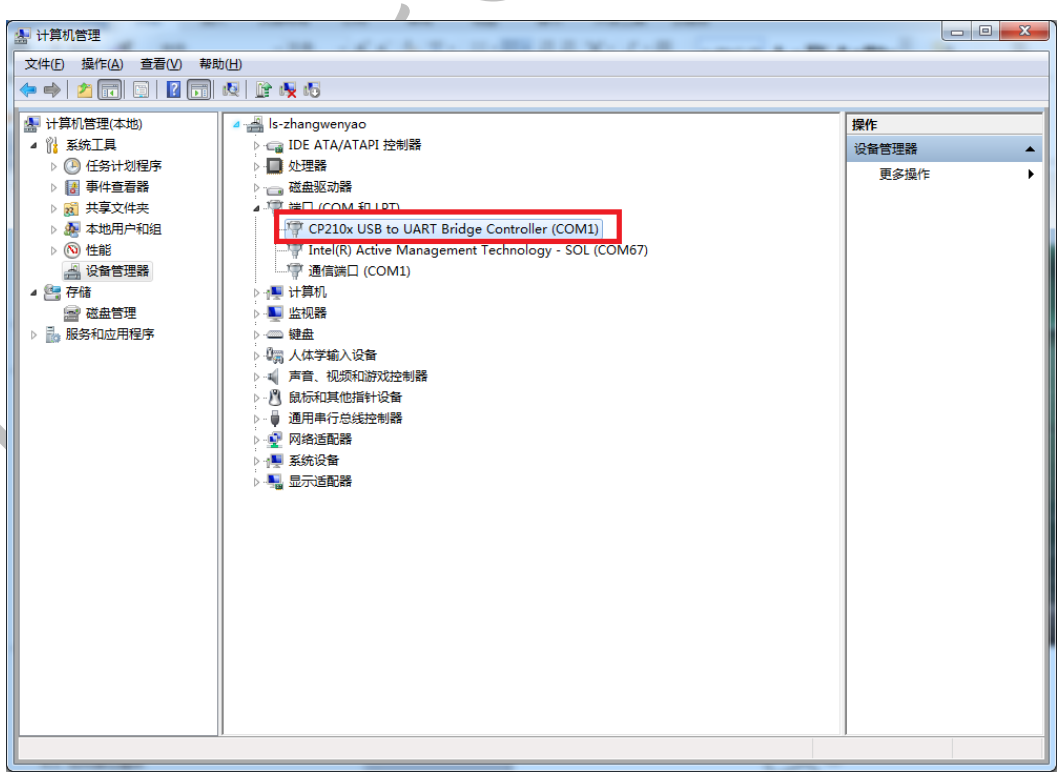

Figure 38：Check the UART port

4) Open the serial port tool;

Figure 39：New a hyper termial

5) Select the port, example is COM1;

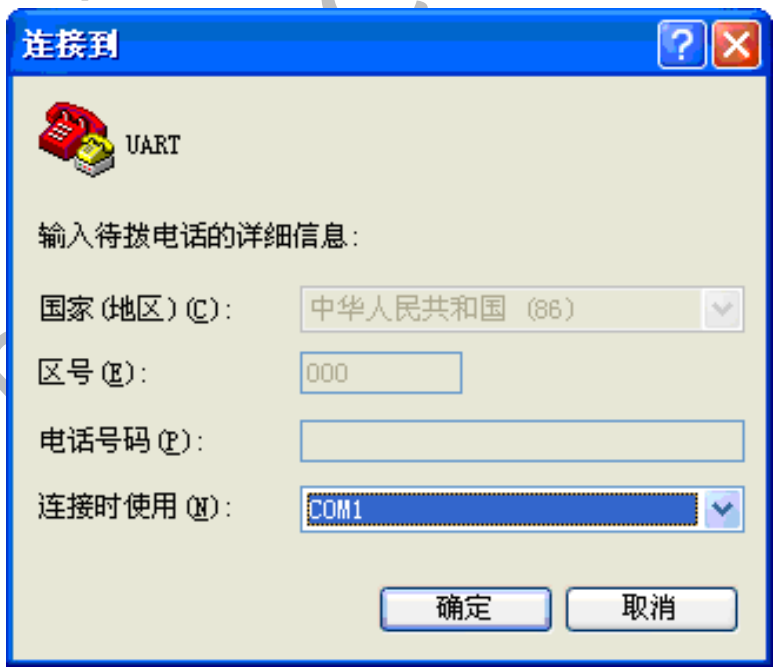

Figure 40：Configure the hyper terminal - 1

6) Select the baud rate as “115200” and data flow control as “none”, other options use the default values;

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Figure 41：Configure the hyper terminal - 2

7) It can do the communication via the UART cable.

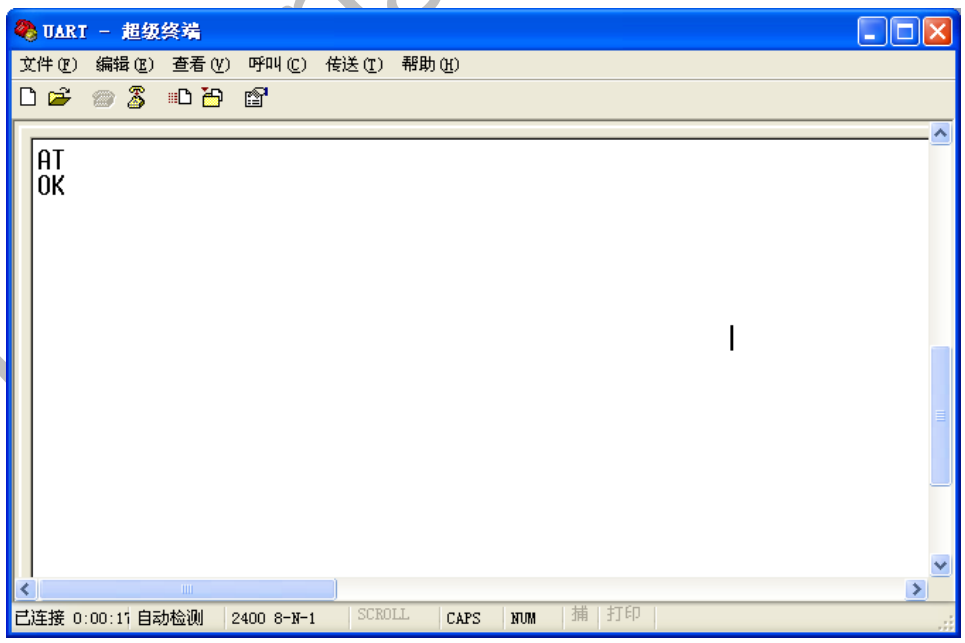

Figure 42：Send AT commands in the hyper terminal

4.5. How to reset the module

The A9500 reset is divided into two methods:

1) Hardware reset

Directly press on the K0202 key of the EVB board, it can do the hardware reset.

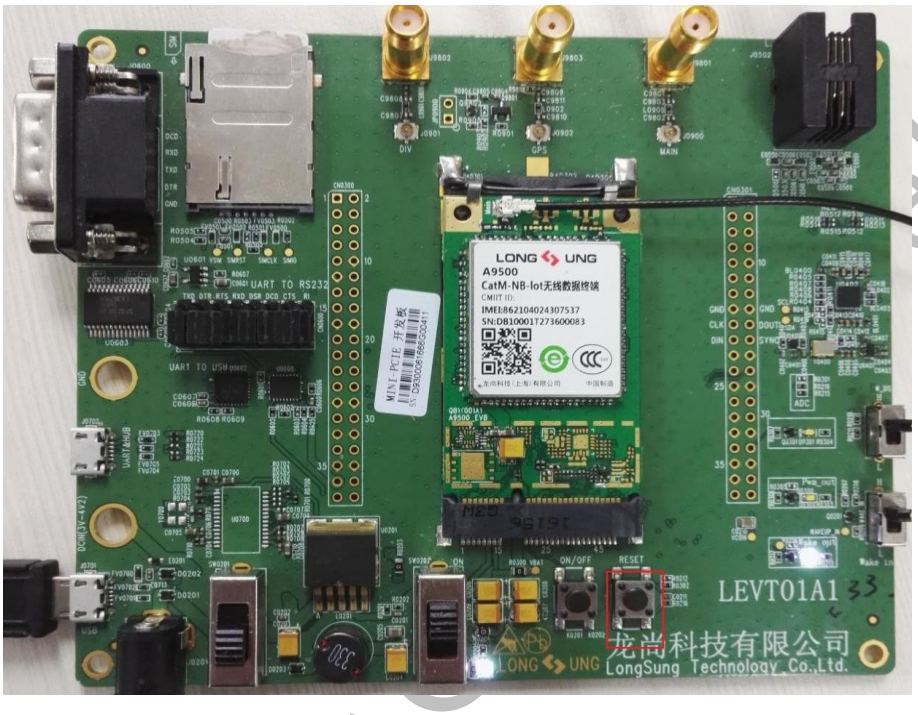

Figure 43：Reset key position view

2) Software reset

Send AT+RESET in the serial port tool via USB or UART port, it can do A9500 software reset.

4.6. How to enter into the flight mode

There has AT command to let A9500enter into the flight mode.

Send AT+CFUN=4 to let module enter into the flight mode, and send AT+CFUN=1 to let module back to the full mode.

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