L506 EVB User Manual

Version： V1.0

Date： 2016-06-23

Shanghai Mobiletek Communication Ltd

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Version History

Date	Version	Description of change	Author
2016-06-23	V1.0	Initial	

Summary

This document is intended for products: L506 module EVB.

This document describes the hardware interface of the L506 module EVB, can help user to quickly understand L506 EVB interface specifications, electrical and mechanical details, with the help of this document users can use L506 module to design and set-up various types wireless terminals.

Intended audience

This document applicable to：

- Systems Design Engineer
- Structural Engineer
- Hardware Engineer
- Software Engineer
- Test Engineer

Introduction

This document contains 5 chapters, contents as below:

Chapter	Content
1 Abstract	Introduce L506 EVB basic technical SPEC.
2 Power Supply	Introduce L506 EVB power for the module.
3 Key Description	Introduce L506 EVB system control key
4 Application interface	Introduce L506 module and L506 EVB application interface
5 Accessory and Assembly	Introduce L506 EVB Accessory and assembly(hardware and software)

Contents

1 Abstract

L506 **Evaluation Board**（L506_EVB）Is specially designed for developing L506 module，To help developers to develop, debug, test L506 series 4 g LTE module. Below and mark shows L506 the main functions of the development board. In this article, we will in the subsequent chapters on the function of each part is described.

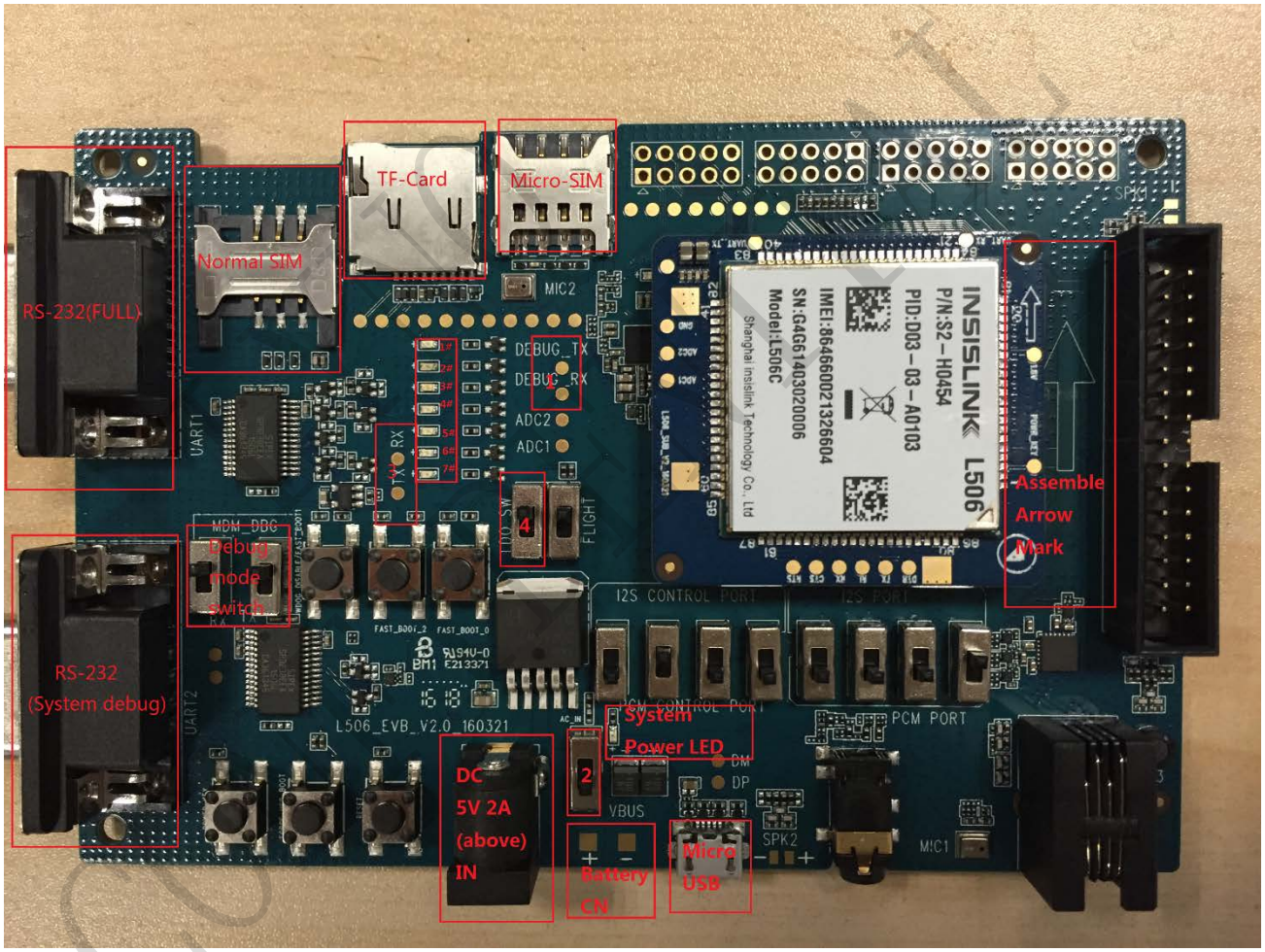


Figure 1: L506 EVB global graph

The above picture marked number corresponding description:

1. COEX UART and force USB download and FAST_BOOT configuration multiplex test point.
2. The power switch. This switch can switch the corresponding power input way, Choose an external power adapter or direct bonding wire by external input 3.8 V dc power supply.

3. For the system default print serial output information, The two test points for direct output m odule (TTL) without conversion.

4. A serial port module power supply switch. Through this switch, users can choose is direct hardware control switch power supply or software to control the serial port.

2 Power Supply

L506 development board provides two methods for power supply: External DC 5 V adapter and 3.8 V DC power supply directly. Through an external DC 5 V adapter power supply, the power supply voltage regulator on the development board piece of power supply will be converted to about 3.8 V, power supply for the module. This two ways can pass SW_5V switch to switch. If the battery welding plate through the welding line. Direct use of batteries, please will switch to BAT_IN file; When the system power supply power indicator light (leds) near the power supply switch will light up. As shown in the figure below:

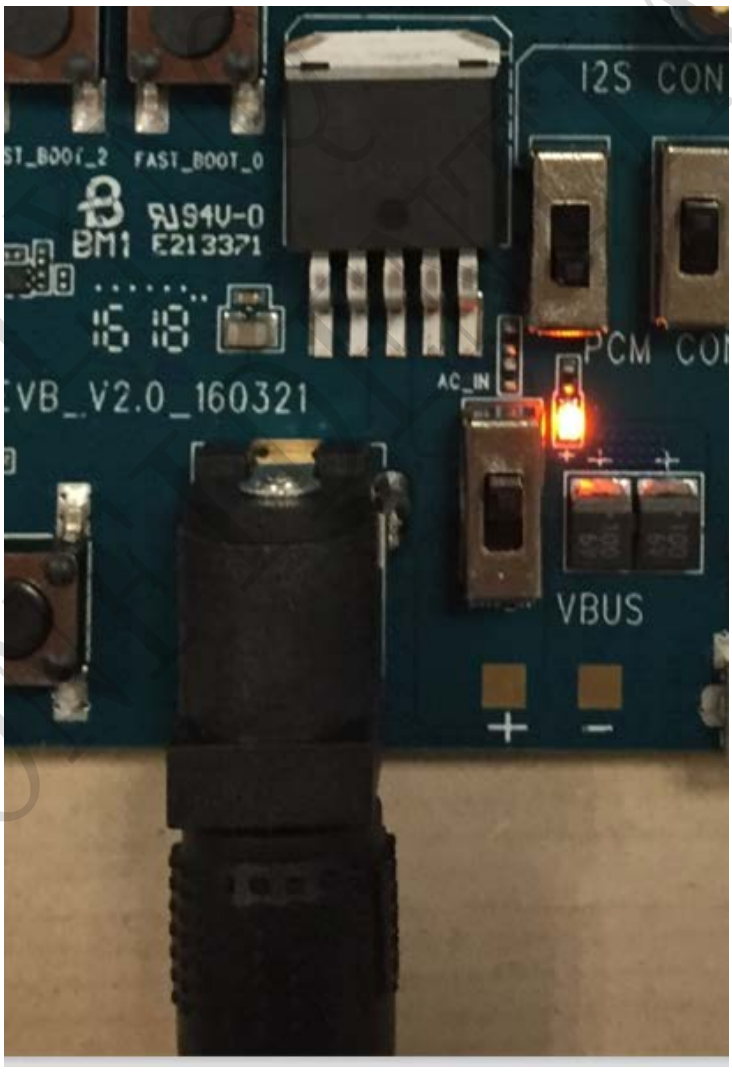


Figure 2: L506 development board power in Status (orange Power LED Light up)

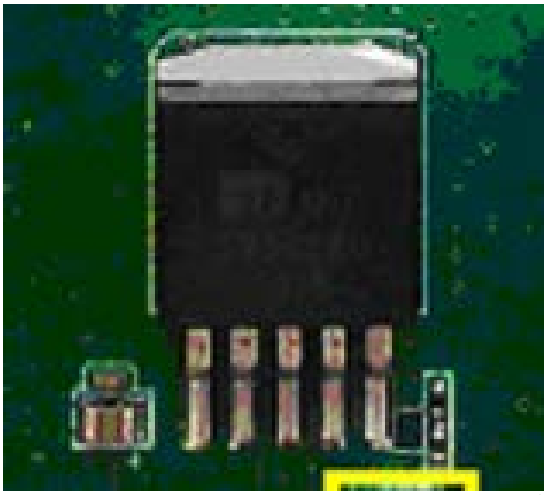
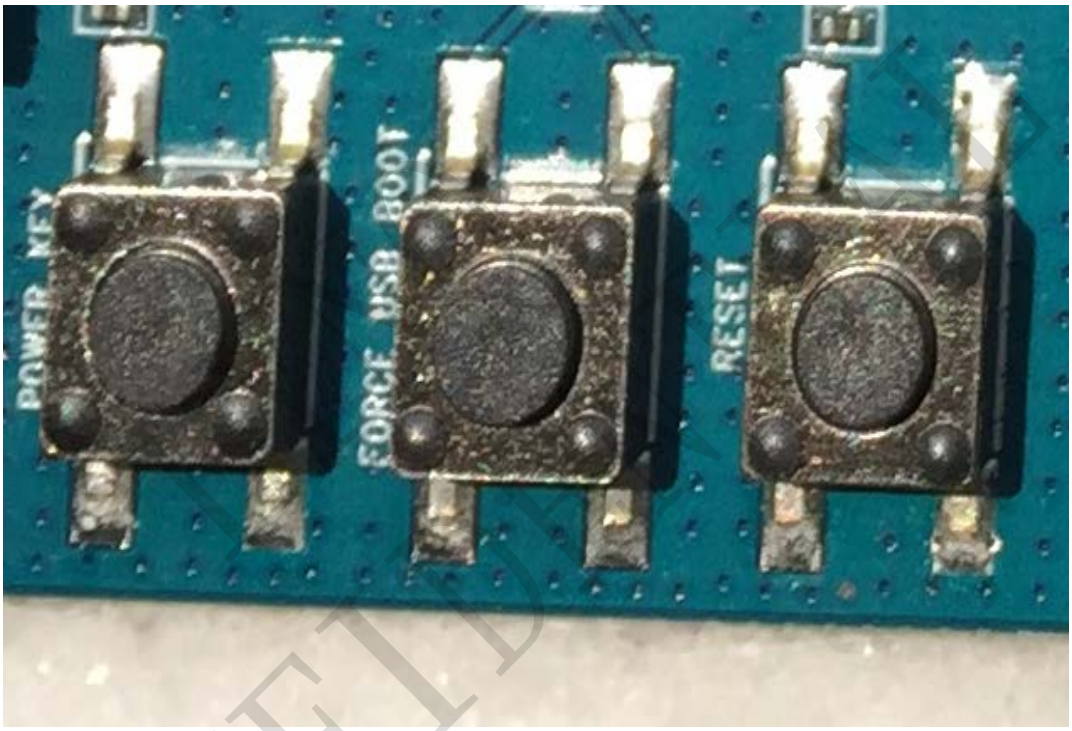


Figure 3: L506 development board DC input voltage stabilizer

3 Key Description

L506 development board with a total of six top pressure switch and 11 dial switch. Six top pressure for short press trigger control, 11 dial switch (single pole double throw) for the long time state toggle switch. The corresponding function on the L506 development board has a corresponding printing information, the function of the specific instructions are as follows:



3.1 Power on/off and force USB download key

When power supply for the EVB, the power indicator will light up. The lower left corner of the power button on the board, long press 8 seconds, can open the module. At the same time, if press the reset button for more than 1 seconds, then restart the module.

If you need the system software via USB download system program, need to click this button for 5 seconds above, make the system into force the USB download mode.

Figure 4： Power on/off reset and force USB download key

3.2 Watchdog enable and FAST_BOOT configuration

Watchdog enable pin（WDOG_DISABLE/FAST_BOOT1）is the system watchdog control, and it's also multiplex used for Fast boot1. FAST_BOOT to configure the system boot configuration register. Watchdog and FAST_BOOT keys should be used to select the startup mode of the system.

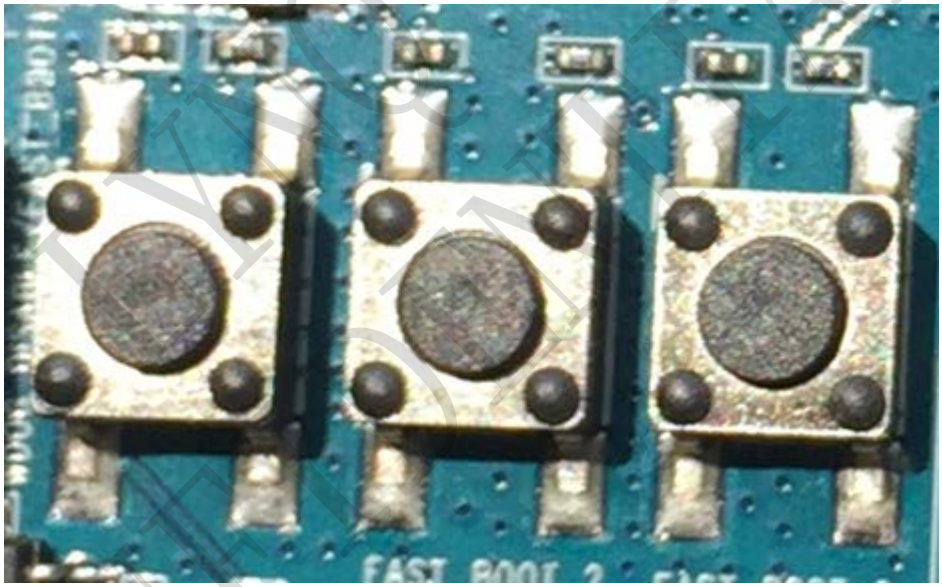


Figure 5： Watchdog/FAST_BOOT Configuration key

BOOT CONFIGURATION TABLE

BOOT_CONFIG[3:1]	BOOT OPTIONS
0b000	NAND→ USB
0b001	Only USB

Note: Default boot config (0b000) is NAND

3.3 PCM、I2S Channel Switch

L506 Module Support PCM and I2S(Multiplex)port, Therefore, on the EVB, In PCM mode need to all of switch (single pole double throw switch) dial to PCM file, If want to modulation I2S channel will need to switch to the I2S file. The printing information on the location development board has the express.

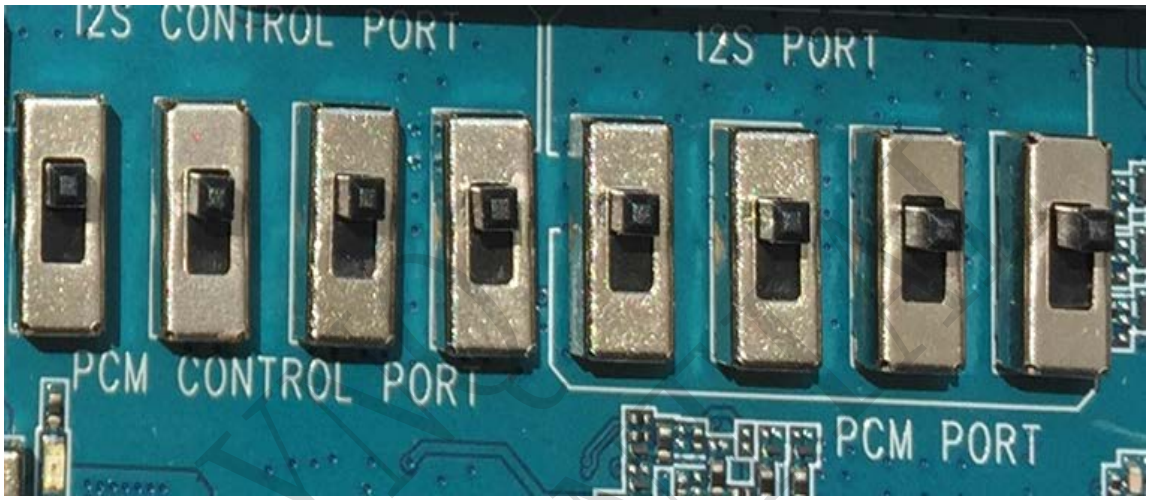


Figure 6： PCM/I2S channel Switch key

Note: The PCM/I2S and PCM/I2S control port need Switch at the same time when you tune corresponding function. L506 support the PCM interface by default

4 Application interface

4.1 UART Interface

L506 module UART interface is used for host and the L506 interaction. All of the interaction between the host and the module through the UART port, use AT commands to control module. L506 EVB has two sets of DB9 COM port, the signal pin keep the same with the L506 module. Which as the main serial RS232 serial interface can support a full 9 line. Another interface as the Debug port (when using debug port will need to switch to the Debug file switch), only for debugging. On the board, through a serial port level conversion chip SP3238, L506 COMS1.8 V level on the module converts standard RS232 level. User can use the corresponding L506 accessories DB9 connect the PC or the other host, for the L506 AT commands communication. Master serial port (temporarily not opened the functions) support hardware flow control for the AT command, data transmission, software upgrades, etc. The Debug port is mainly used for calibration RF radio frequency communication.

Note: About the serial port baud rate associated Settings, please refer to L506 software user manual.

Figure7: L506 RS232 (DB9) Port

Note: UART1 is the host and L506 AT command port, UART2 is L506 module default system debug log out port, when you use the UART2 debug port, please switch the dial the switch (debug mode switch) to debug mode channel. At this part please refer to the chapter 1 Abstract. And also if you needn't the RS232 Stand, the correspond 1.8V TTL is on the EVB board (silk print mark TX and RX, detail please refer to the chapter 1 Abstract).

4.2 SIM Card Interface

L506 support one dual voltage(1.8V/2.95V) SIM interface, but for the convenience of users, we have provided two SIM holder interface. it's standard SIM card slot and Micro SIM card slot. Each SIM slot automatic identification (correspond change the SIM support voltage) show as below figure:

Figure8:Standard SIM Slot

Figure 9: Micro SIM Slot

Note：Because L506 only support one SIM card port, so can't assemble two SIM card at the same time in your applications.

4.3 TF interface

L506 support a hot plug TF card port, the max storage can support to 32G.

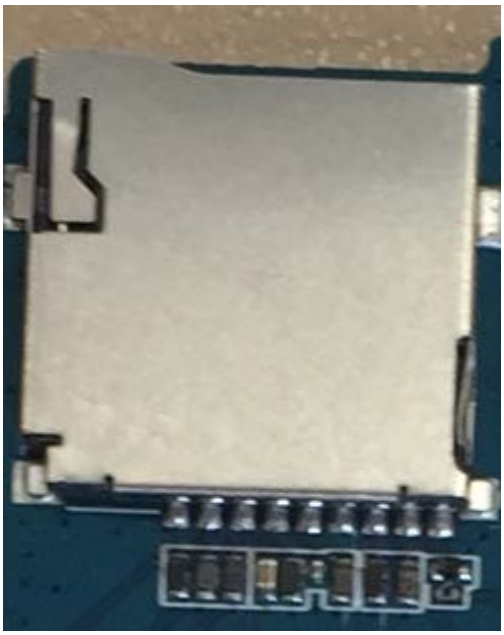


Figure 10: TF Card Slot

4.4 Antenna interface

Antenna interface is located in the switch board，and the switch board assemble on the EVB with board to board connector, load on the EVB board module, L506 provide three antenna interface, One circuit as the main antenna ports, connect directly to the antenna can use wireless capabilities, one antenna ports as reserved the diversity antenna ports, the third for the GPS antenna interface. RF antenna interface from the bonding pad, through the cable lines to connect to external antenna. As shown in the figure below:

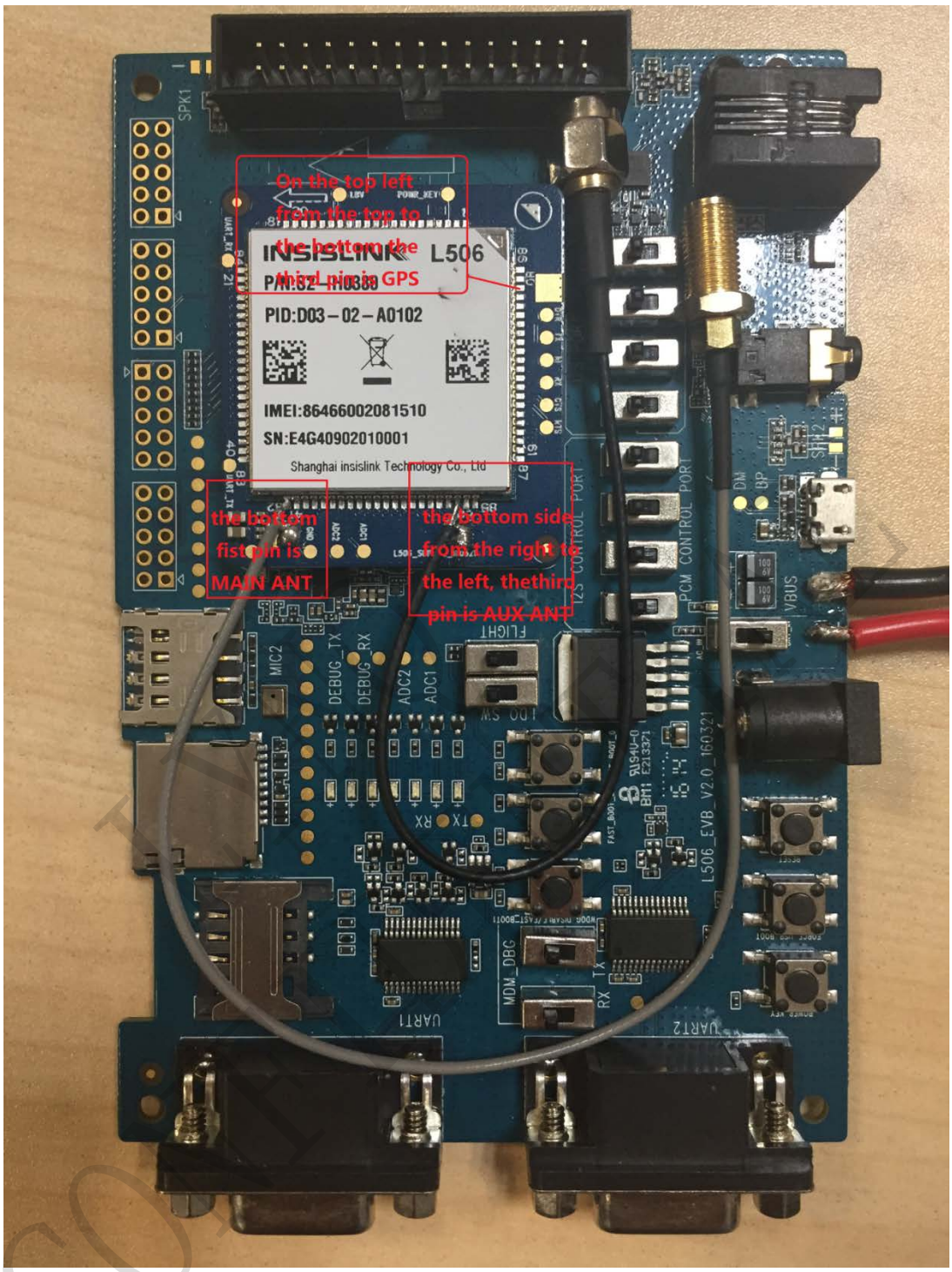
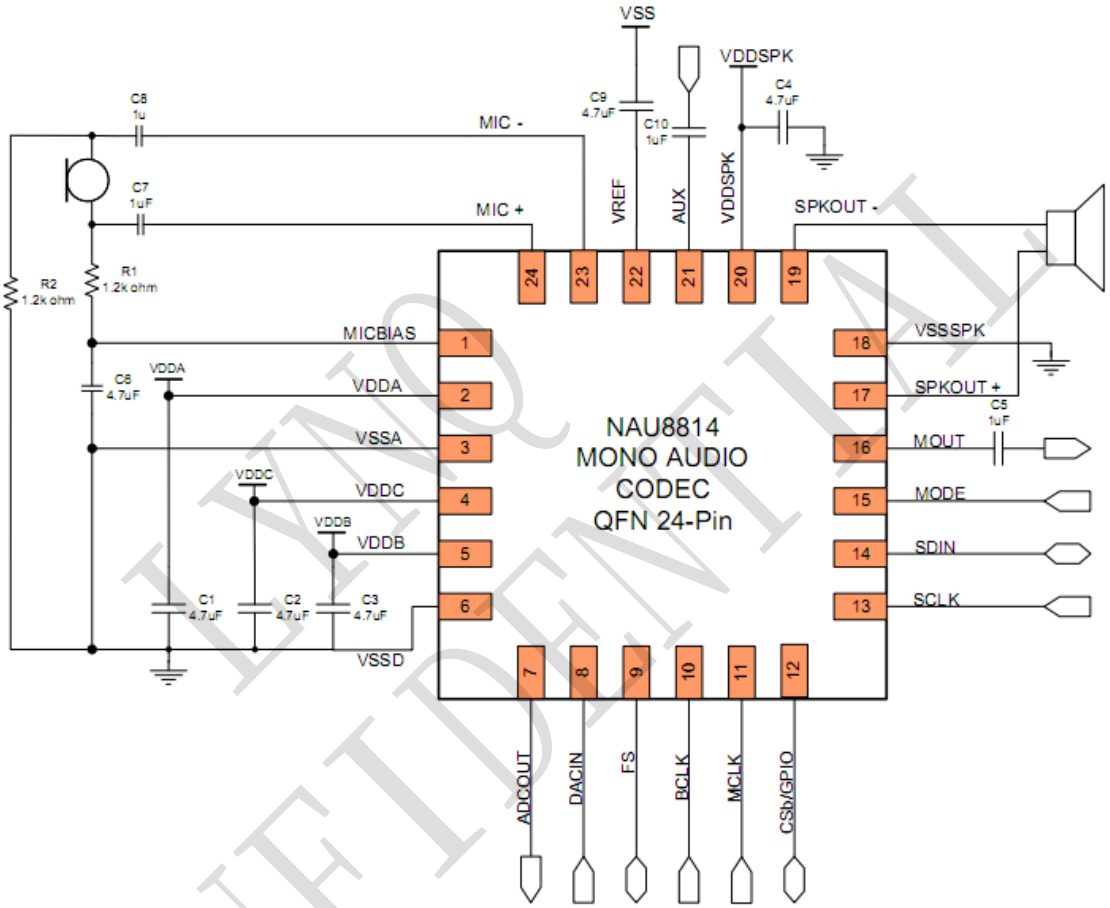


Figure 11: EVB and the assembled ANT location

4.5 Audio interface（TBD）

L506 module support one PCM port, and the codec solution is NAU8814, so all of the audio interface based on the codec chip. About the NAU8814 function show as below:

So base on this codec solution there are a pair differential ±MIC, a pair differential Speaker out.(detail please refer to the NAU8814 datasheet)



Note: Audio system is a very complicate system, it contains many factors, such as the sound chamber structure. Because in our EVB there is no sound chamber, so it only make sure the function is OK or not.

4.6 LED

Sits in the left side of the development board has seven lights, used to indicate different functional parts. The definition of each lamp such as table 1:

Item	Name	Descriptions
1#	GPIO_49	Open GPIO define by user
2#	NET_LIGHT	Module net status LED
3#	SPI_MOSI_BLSP2	SPI/GPIO Multiplex port
4#	SPI_MISO_BLSP2	SPI/GPIO Multiplex port
5#	SPI_CLK_BLSP2	SPI/GPIO Multiplex port
6#	ISINK	GPIO control external power for current sink
7#	STATUS	Module status identify LED

Table 1

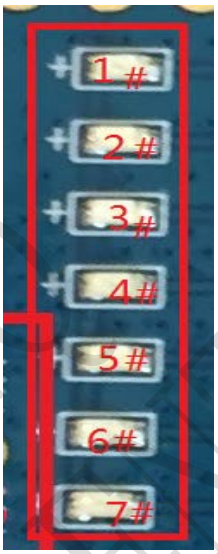


Figure 12: Module control LED

Note: Each lamp and toggle switch configuration and query，please refer to document the L506 software manual.

4.7 USB and the others

Beside the right battery development board solder set a micro USB connector, it used for download and force USB download.

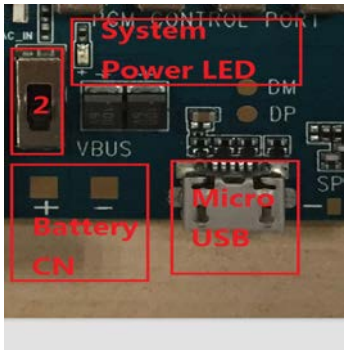
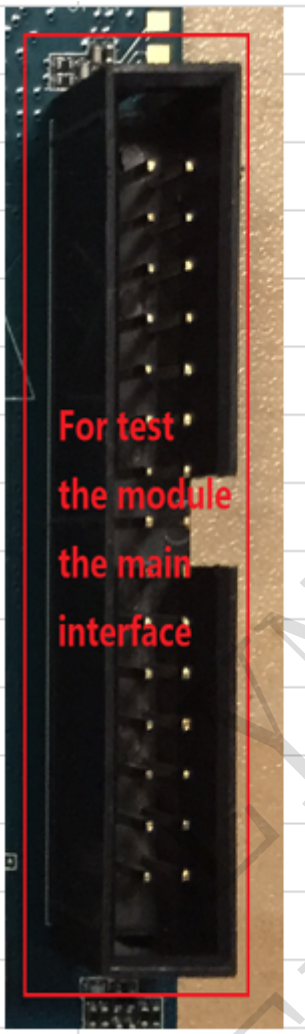


Figure 13: USB interface

Development board reserved 1 groups of external connection pin interface, used for debugging the peripheral devices and production test purpose. The corresponding interface definition and physical objects as shown in the figure below:



1 VPH_PWR	30 COEX3
2 VPH_PWR	29 GND
3 VPH_PWR	28 COEX_UART_RX/FORCE_USB
4 GND	27 COEX_UART_TX/BOOT_CON
5 NC	26 GND
6 NC	25 MPP6_ADC2
7 SIM_detect	24 MPP4_ADC1
8 GND	23 NC
9 SIM_POWER	22 NC
10 SIM_RESET	21 NC
11 SIM_CLOCK	20 PMD_RESIN_N
12 SIM_DATA	19 PHONE_ON_N
13 GND	18 GND
14 ANT_SWITCH1	17 ISINK
15 ANT_SWITCH0	16 STATUS

Figure 14：For Test Module Main Interface

In addition, for the convenience of users, we also can all use the module to the interface of the derivation, using 2.54 mm spacing standard dupont line can be connected. Interface is located in the development board above the upper right corner, specific interface function as shown in the figure below:

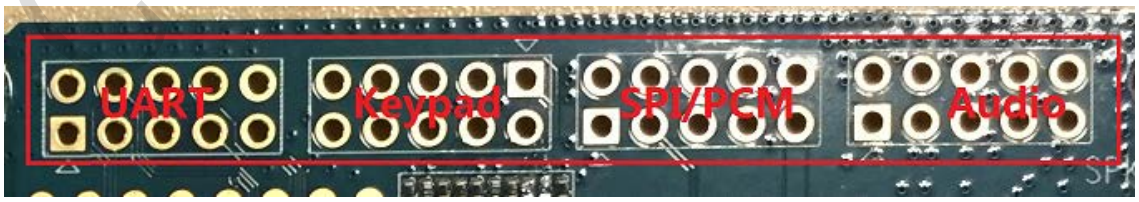


Figure 15：Function interface

UART				
2 LED_RED	4 UART_RX	6 UART_CTS_N	8 UART_RTS_N	10 GND
1 UART_DTR	3 UART_TX	5 UART_DCD	7 UART_RI	9 VPH_PWR

Keypad				
9 KBR4	7 KBR3	5 KBR2	3 KBR1	1 KBR0
10 KBC4	8 KBC3	6 KBC2	4 KBC1	2 KBC0

SPI/PCM				
2 SPI_CLK_BLSP2	4 SPI_MISO_BLSP2	6 SPI_MOSI_BLSP2	8 SPI_CS_N_BLSP2	10 GND
1 PCM_CLK	3 PCM_IN	5 PCM_OUT	7 PCM_SYNC	9 VPH_PWR

Audio				
2 EAR_OUT_N	4 EAR_OUT_P	6 GND	8 SPK_OUT_P1	10 SPK_OUT_N1
1 MIC1_P	3 MIC1_N	5 GND	7 MIC1_IN_P	9 MIC1_IN_M

Table 2

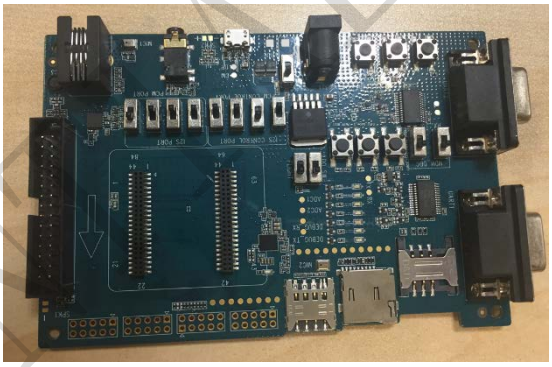
Note: the above figure and above table are the corresponding relations between form and practice.

5 Accessories and Assembly

5.1 EVB Assembly

EVB board parts altogether consists of four parts: 1) the EVB board substrate, 2) module board, 3) module loading board connection EVB board substrate connection column and nuts, 4) EVB board pillar base plate and screw

L506 module and loading board



EVB

column and nut

Pillar and the screw

Figure 16： EVB Assemble

5.2 EVB Accessory

L506 development board will provide the corresponding accessories, when unpacking the case, please check the accessories are complete. Under normal circumstances, A complete set of equipment should include power adapter (A) DC power supply line, Micro USB cable (B), (C) rod antenna, (D) RF cable line. As shown in the figure below:

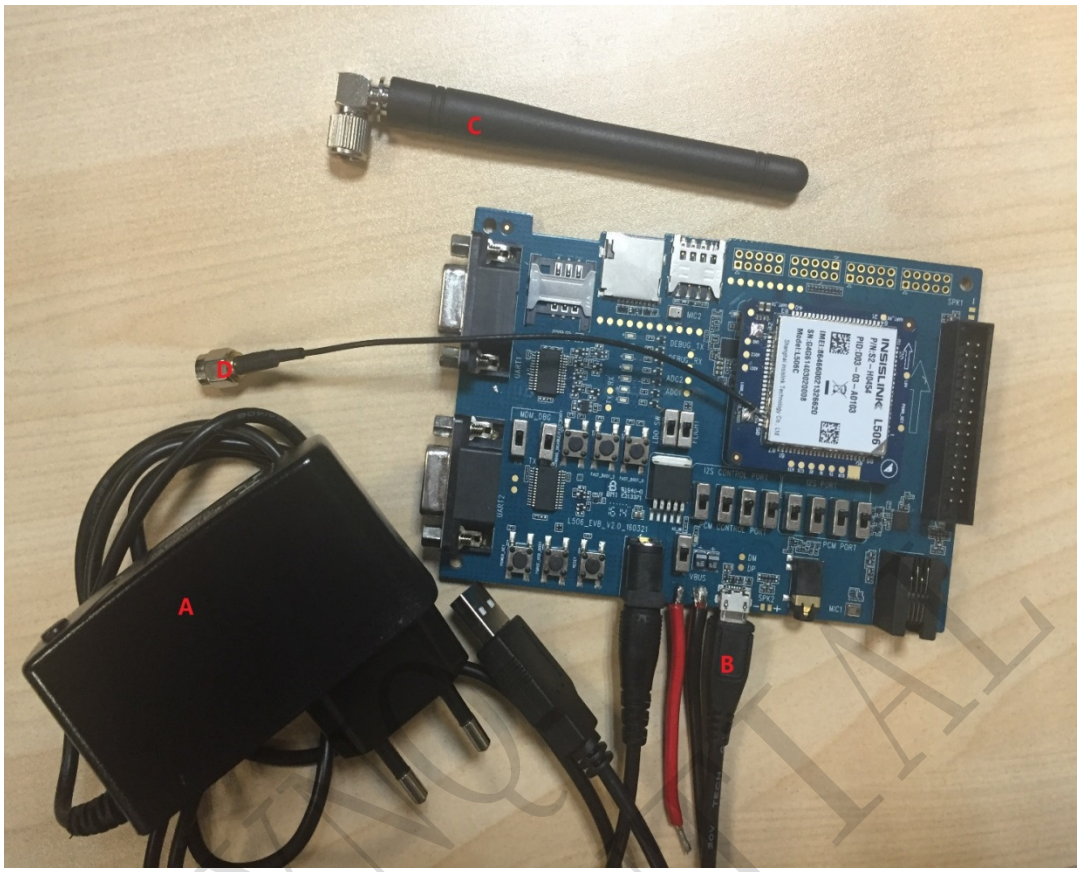
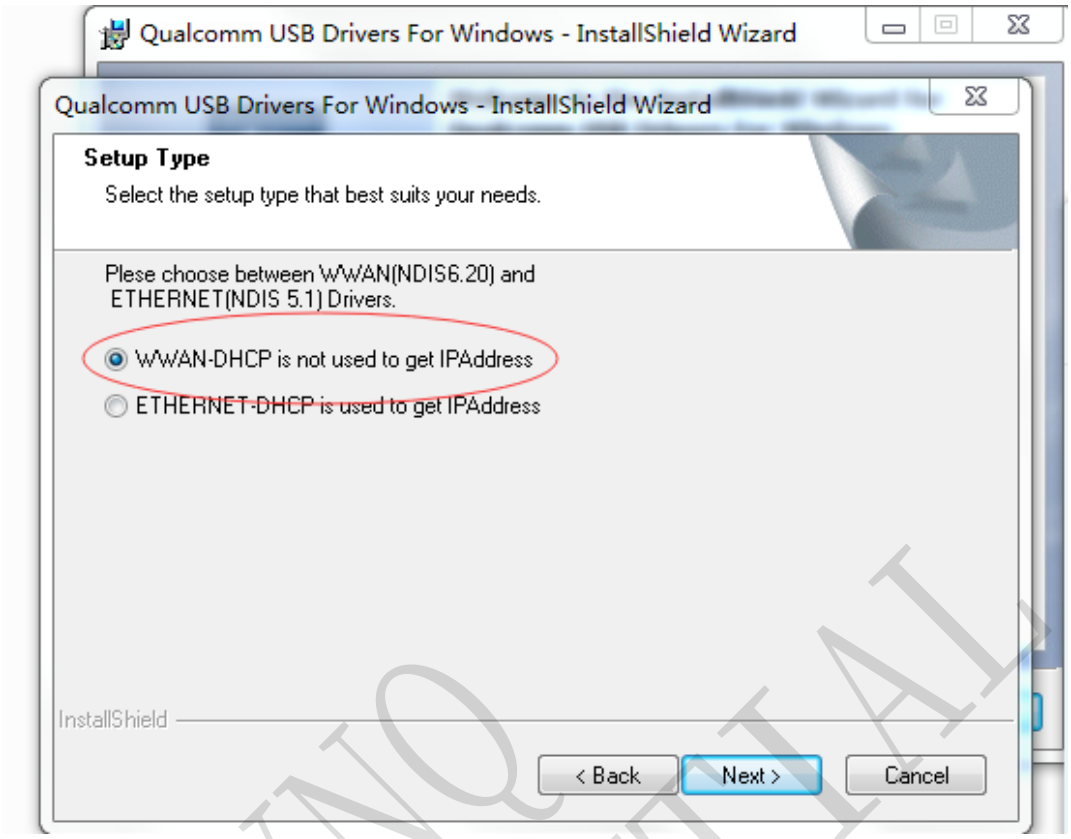


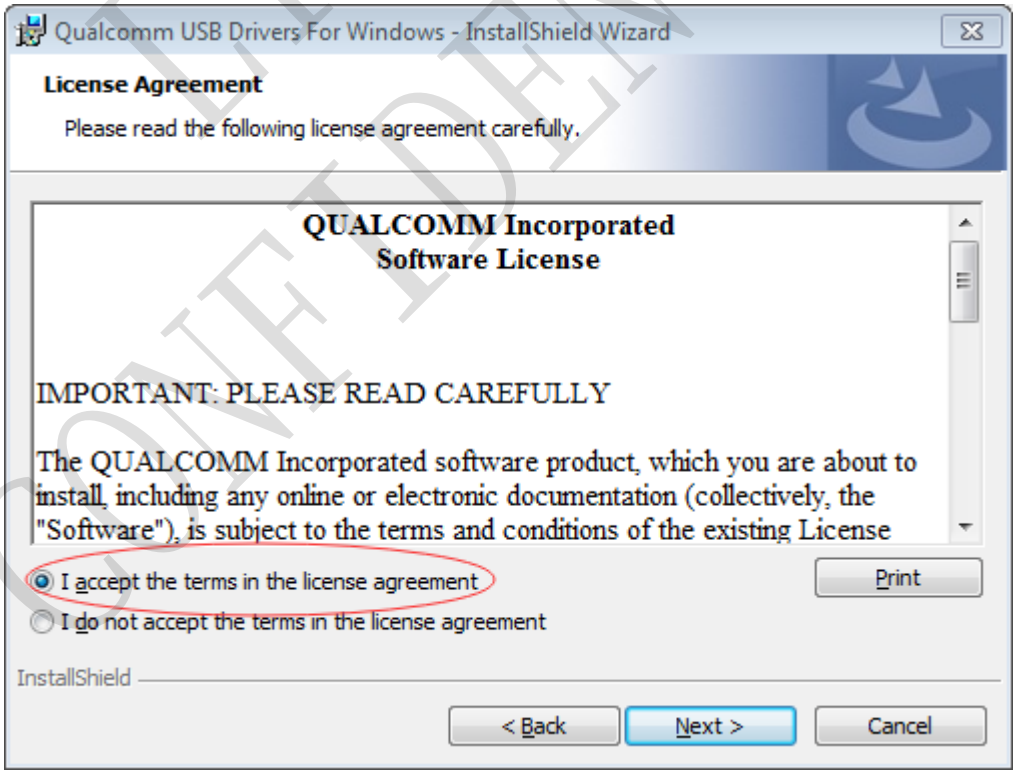
Figure 17：Accessories and the connection diagram

5.3 Driver install

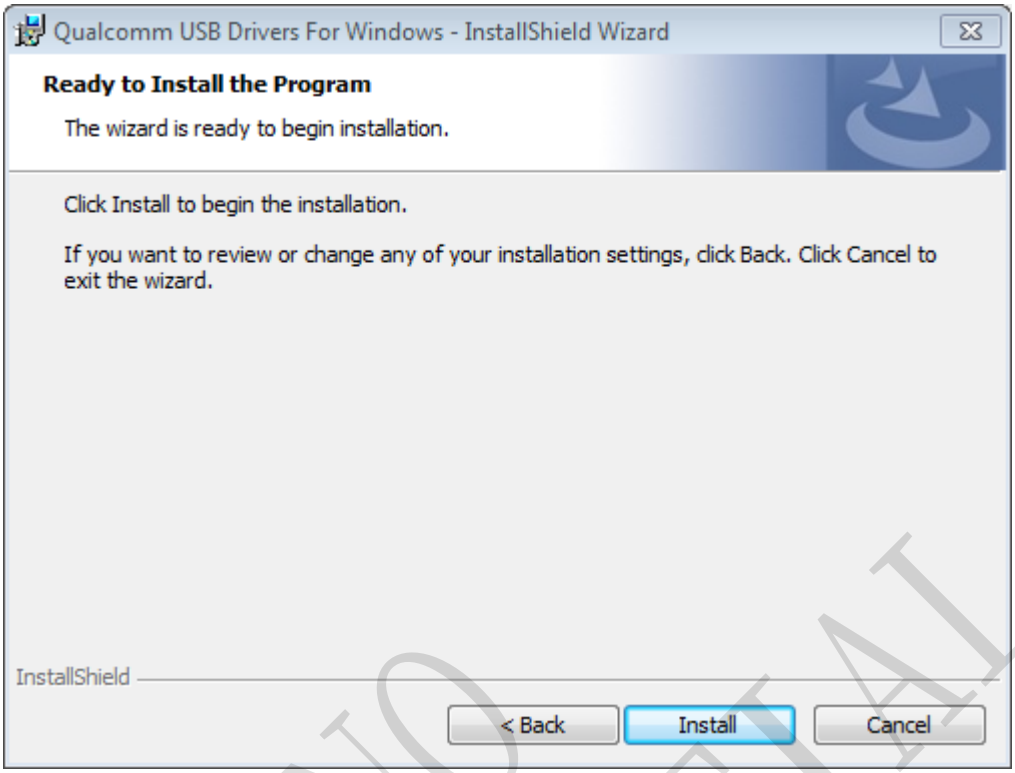
Unzip file: QUD.WIN.1.1 Installer_10037.3.zip and click setup.exe to install driver

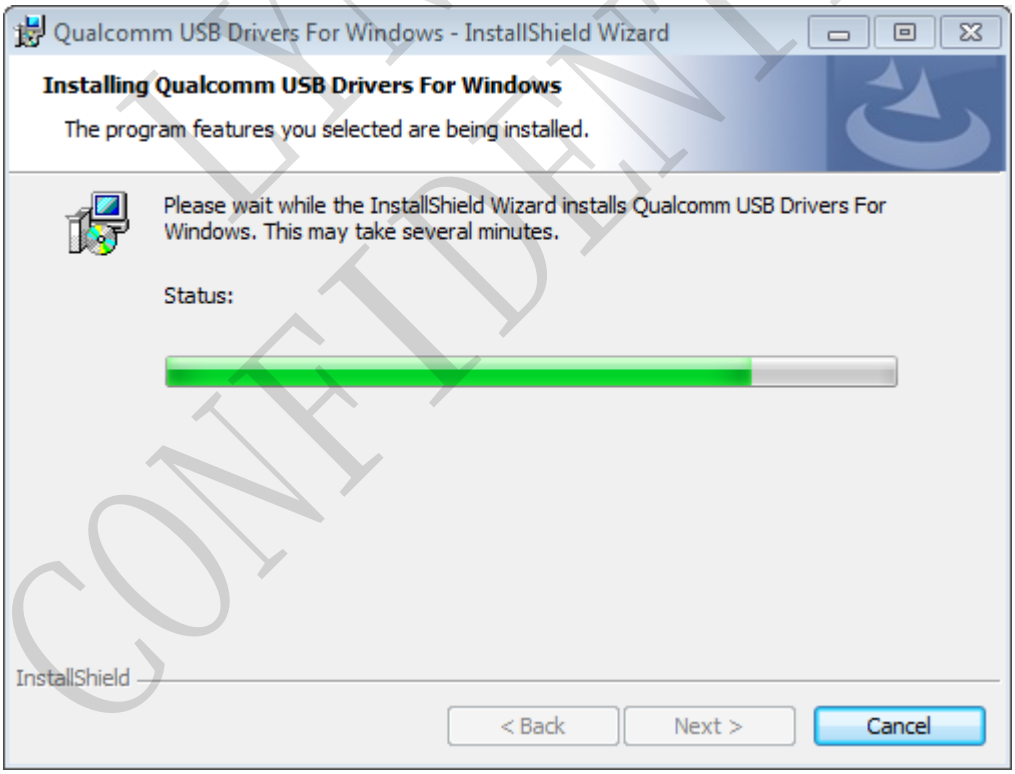


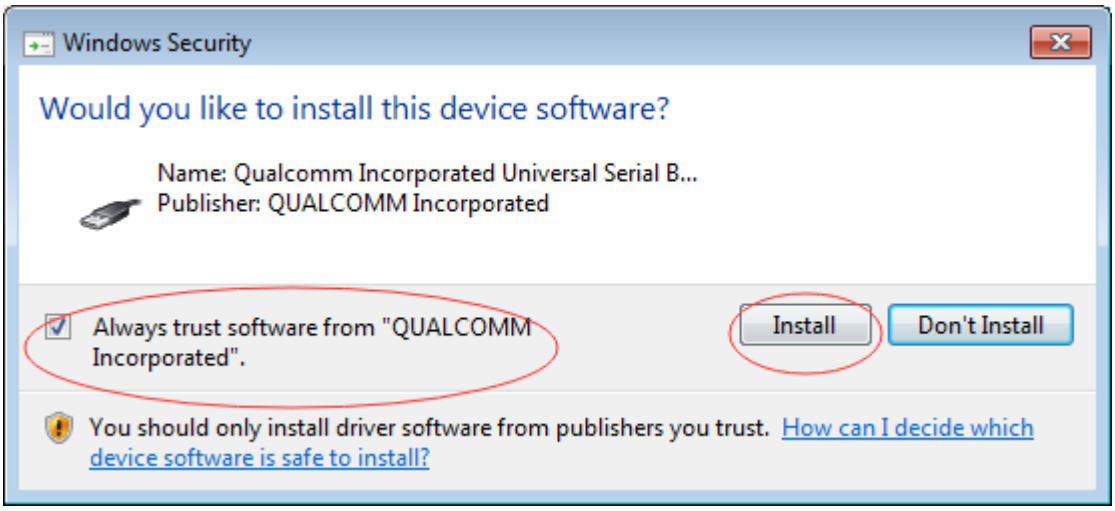
Select “WWAN-DHCP is not used to get IPAddress”, then Next



Select “I accept the terms in the license agreement”, then Next

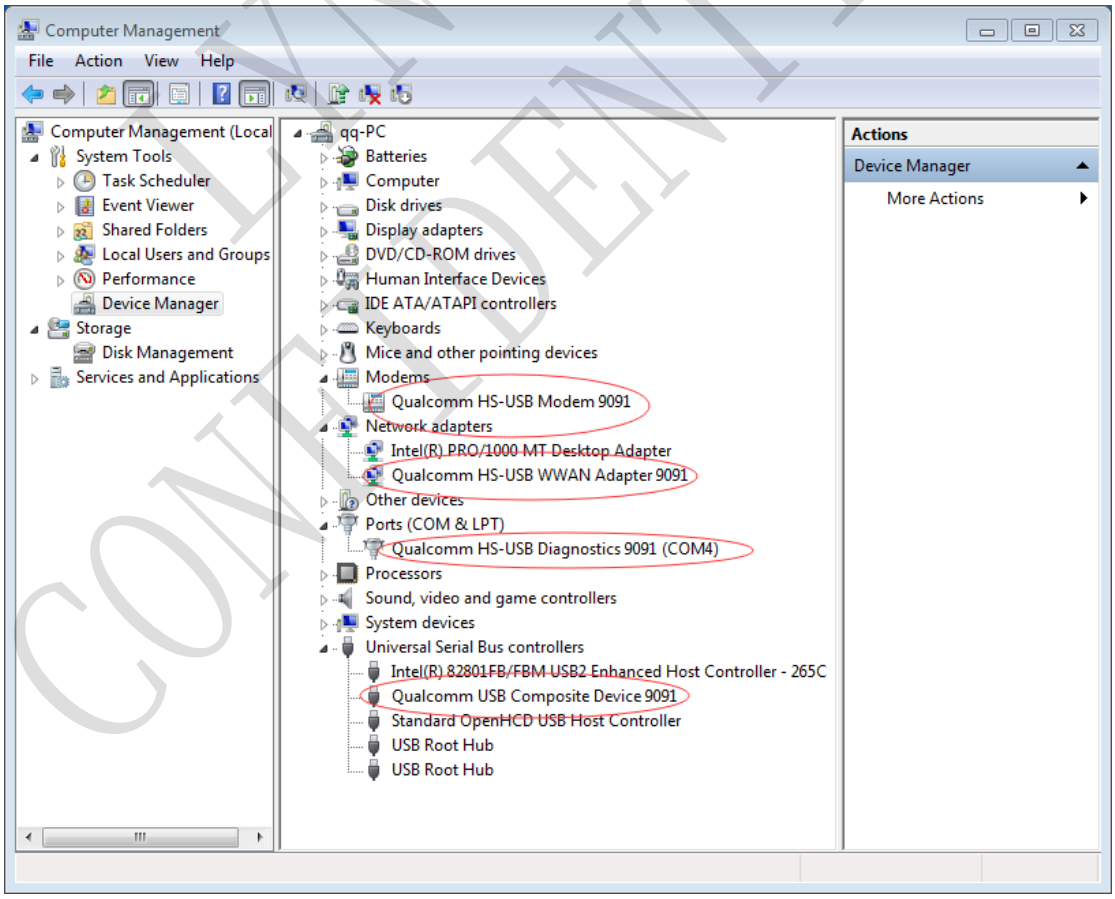






Check “Always trust software from “QUALCOMM” Incorporated”, then Install

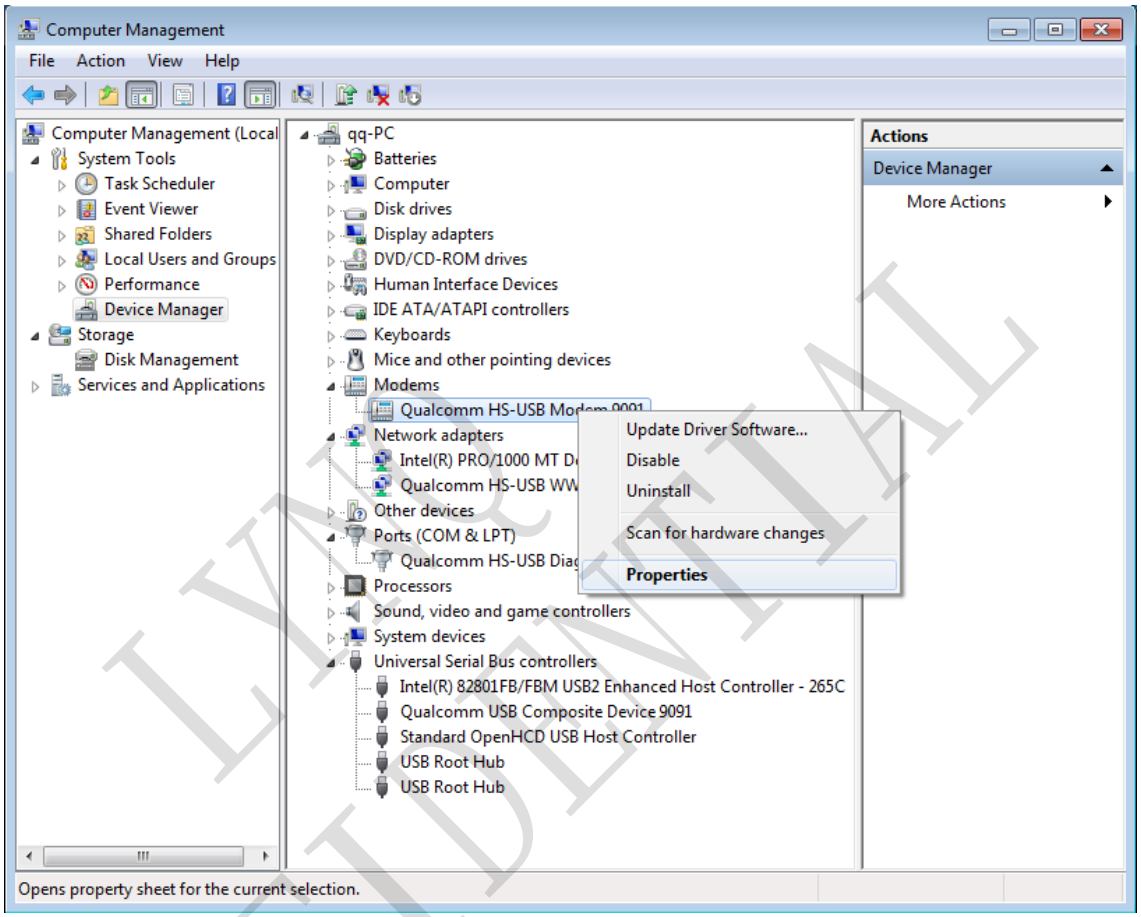
Power on the L506 module and connect USB cable, Drivers have been installed successfully if the Device Manager panel display the following:



5.4 Dial configuration

Please refer to the following steps to complete third dial-up configuration.
The testing card is china mobile SIM

1. Open win->Computer(right click) ->Properties->Device Manager



2. On Advance TAB, type AT+CGDCONT=1,”IP”,”CMNET” and save it

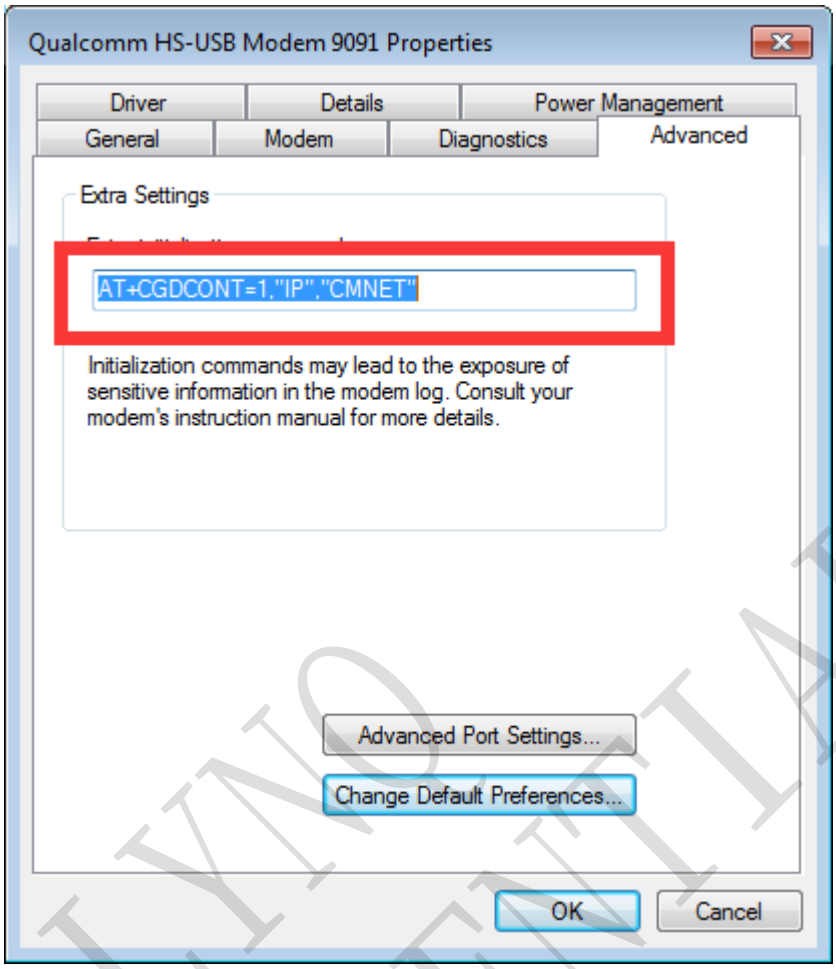
NOTES:

The third argument for APN, defined by operators.

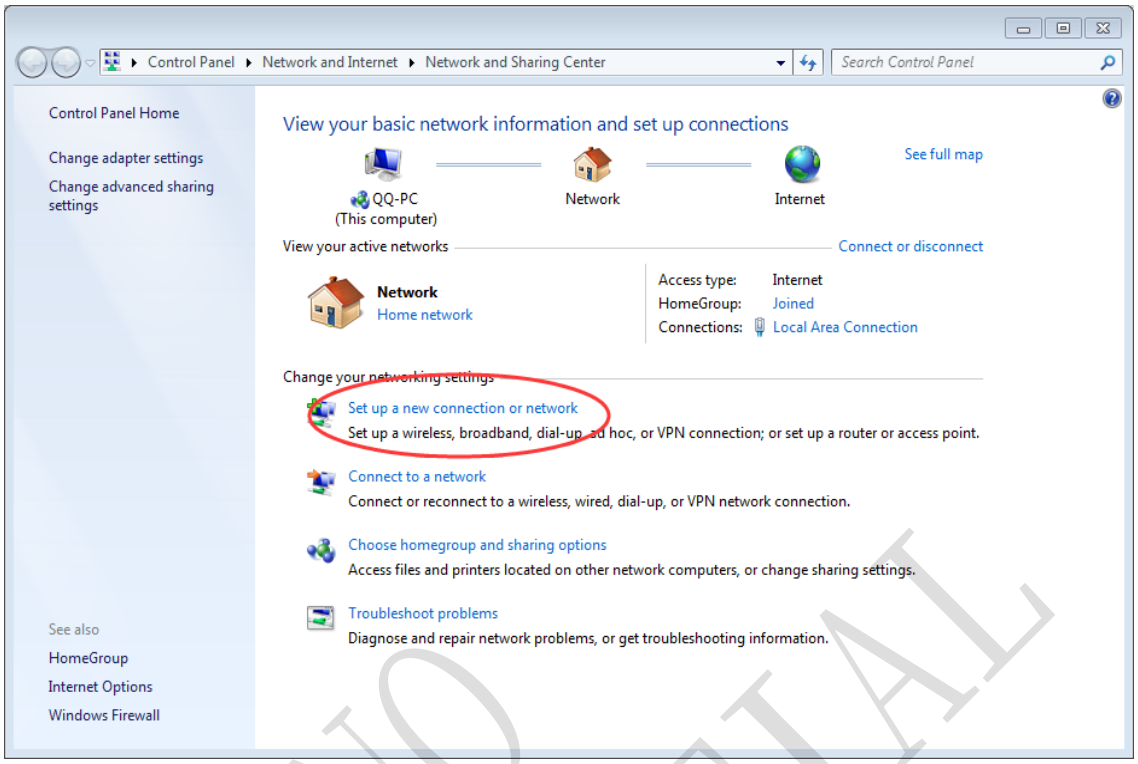
China unicom 2g network: uninet

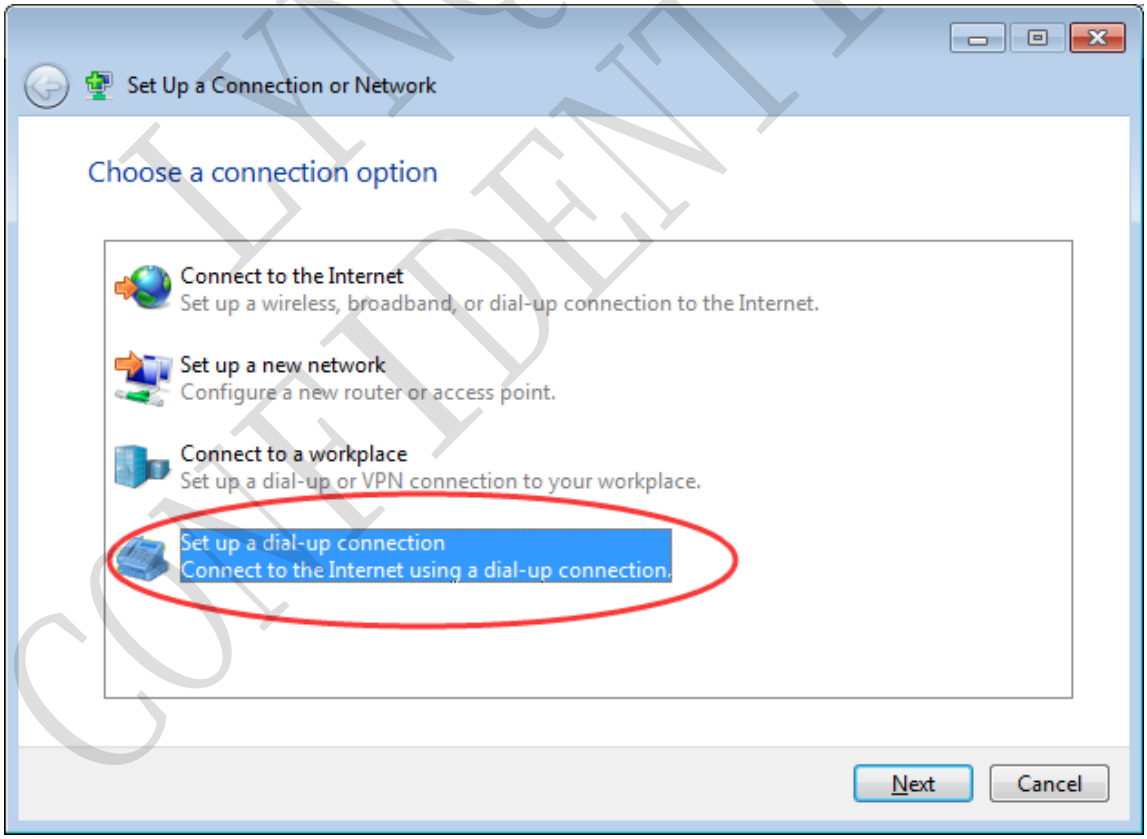
China unicom 3g network: 3gnet

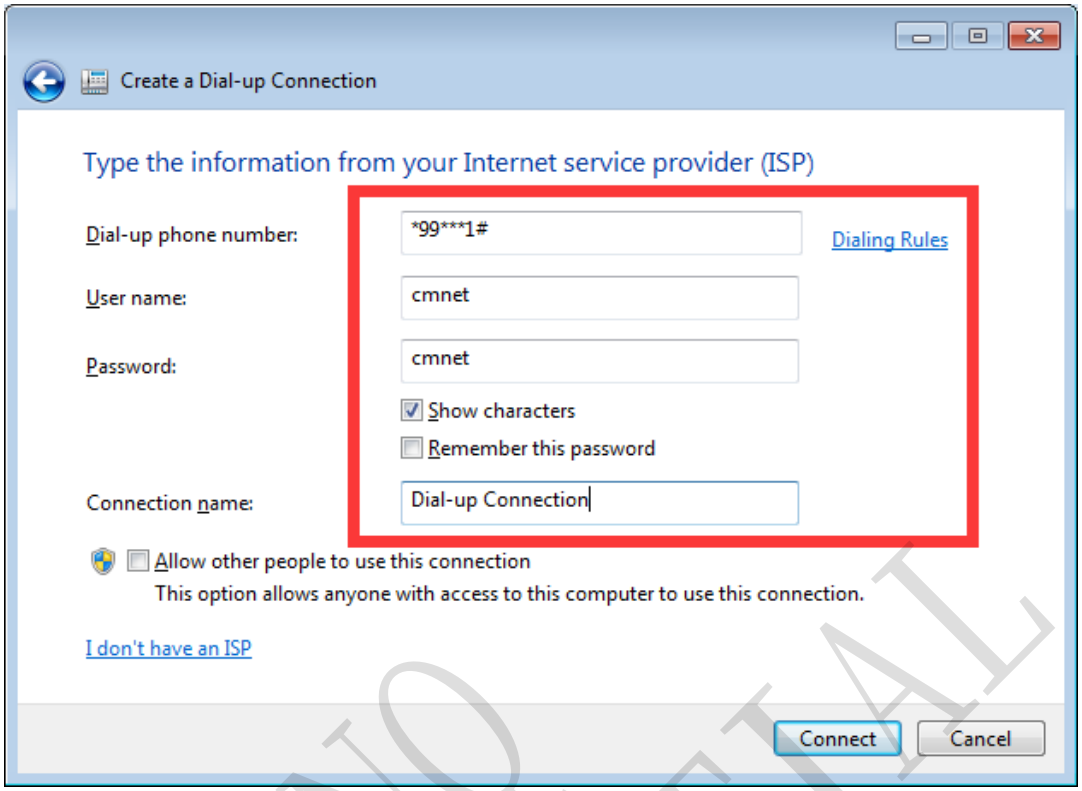
China mobile: cmnet or cmwap



3. Open Network and Sharing Center, then set up a new connection or network





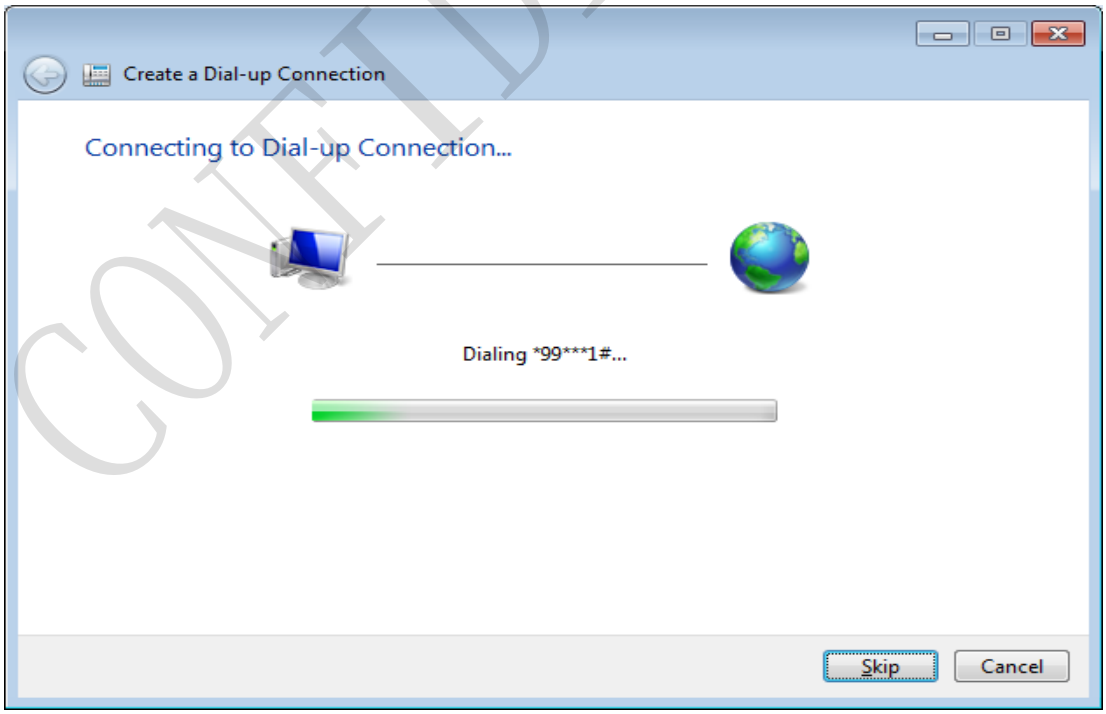


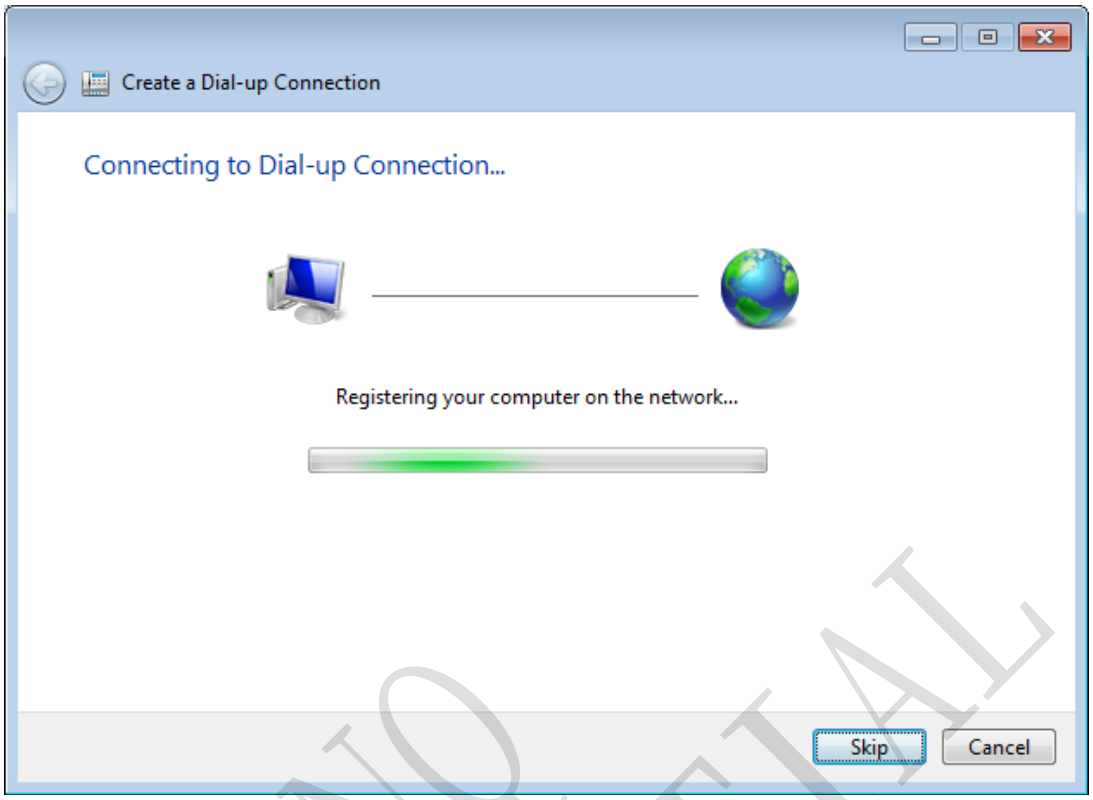
Type Dial-up phone number, User name, Password, then Connect

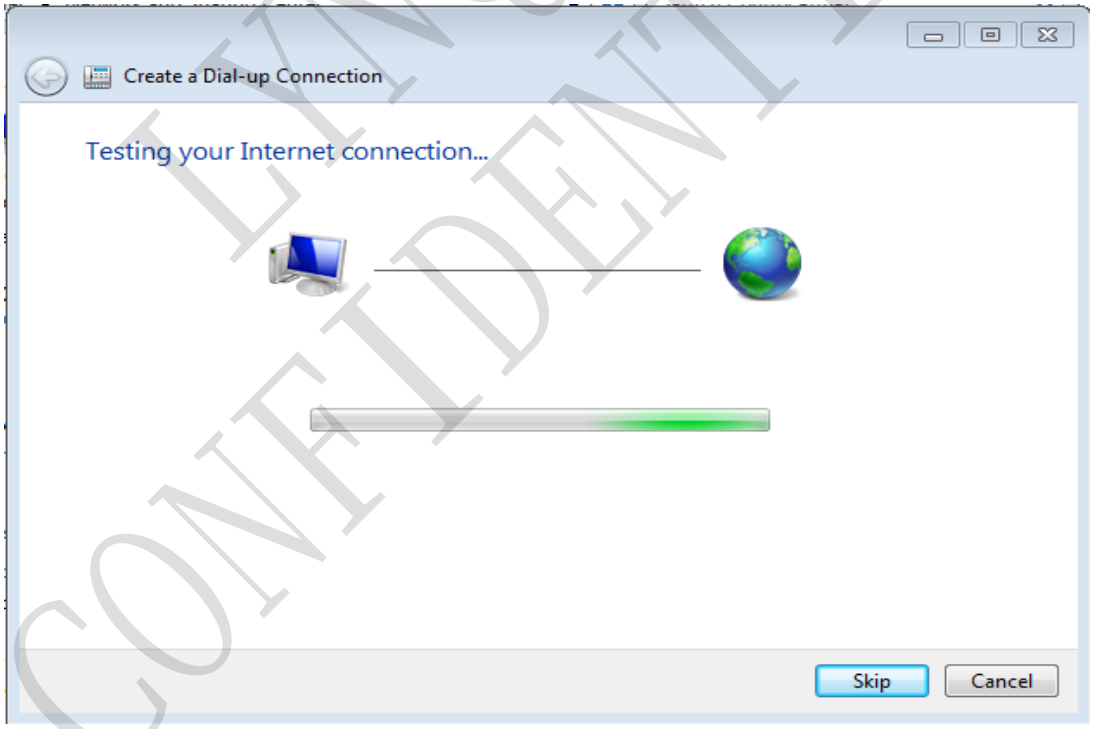
NOTES:

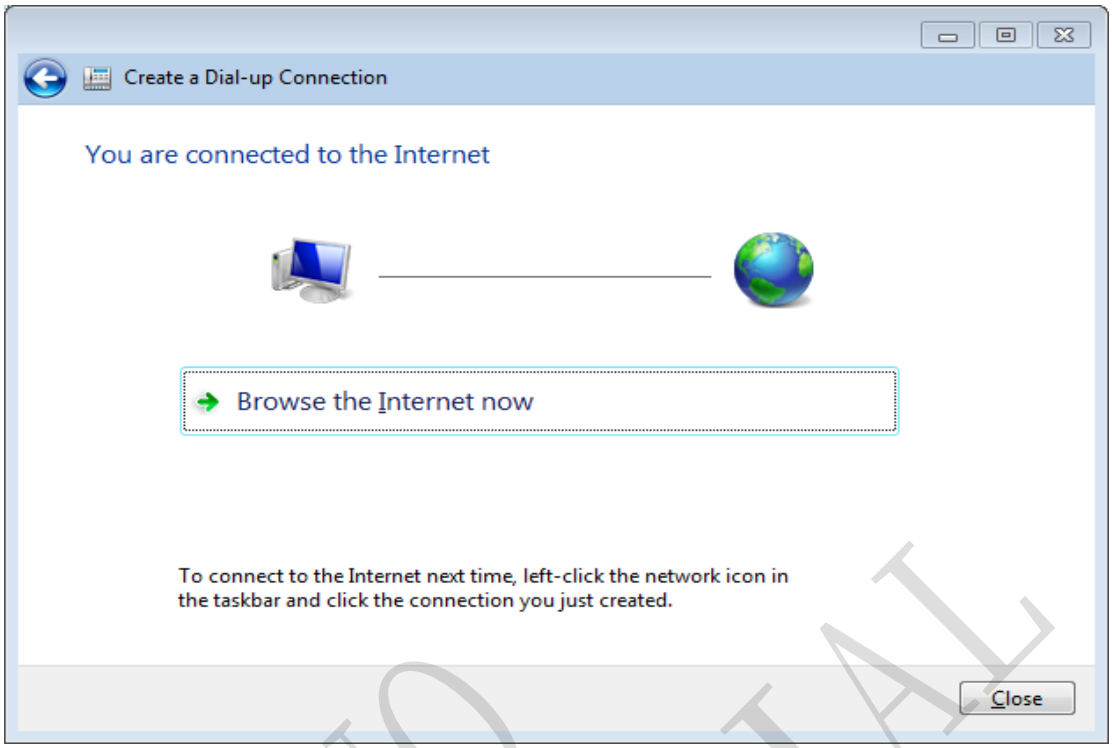
*99***1# cmnet cmnet just for china mobile

Please consult the operators to obtain information before connect









Connected to the network successfully