利尔达科技集团股份有限公司

LIERDA SCIENCE&TECHNOLOGY GROUP CO.,LTD

NB-IoT Wireless Data Terminal
User Manual

Version：01

Date：2017-12-28

ez NB-IoT EVK is a simplified tool for evaluating the performance of modules, enabling developers to learn about NB related command settings and quickly familiarizes with module performance.

Lierda NB Module Introduction

The Lierda NB-IoT module was developed based on the Huawei HiSilicon Boudica chipset, the world's leading narrowband IoT wireless communication module and it meets the frequency band requirements in the 3GPP standard. The module has distinct characteristics in terms of its small size, low power consumption, long transmission distance,and strong anti-interference ability. With this module,customers possess the flexibility and speed in the designing of the products.

Hardware Interface

2-way UART interface

1 ADC interface

1-way SIM/USIM card communication interface

1 antenna pin

Software Support System

3GPP TR 45.820 and Other AT Extension Instructions

Embedded UDP, IP, COAP and other network protocol stacks

Module Features

Module package: LCC and Stamp hole package (42 pins)

Transmission power: 23±2dBm

Communication speed: 100bps<bit rate<100kbps

Ultra-low power consumption: ≤5uA

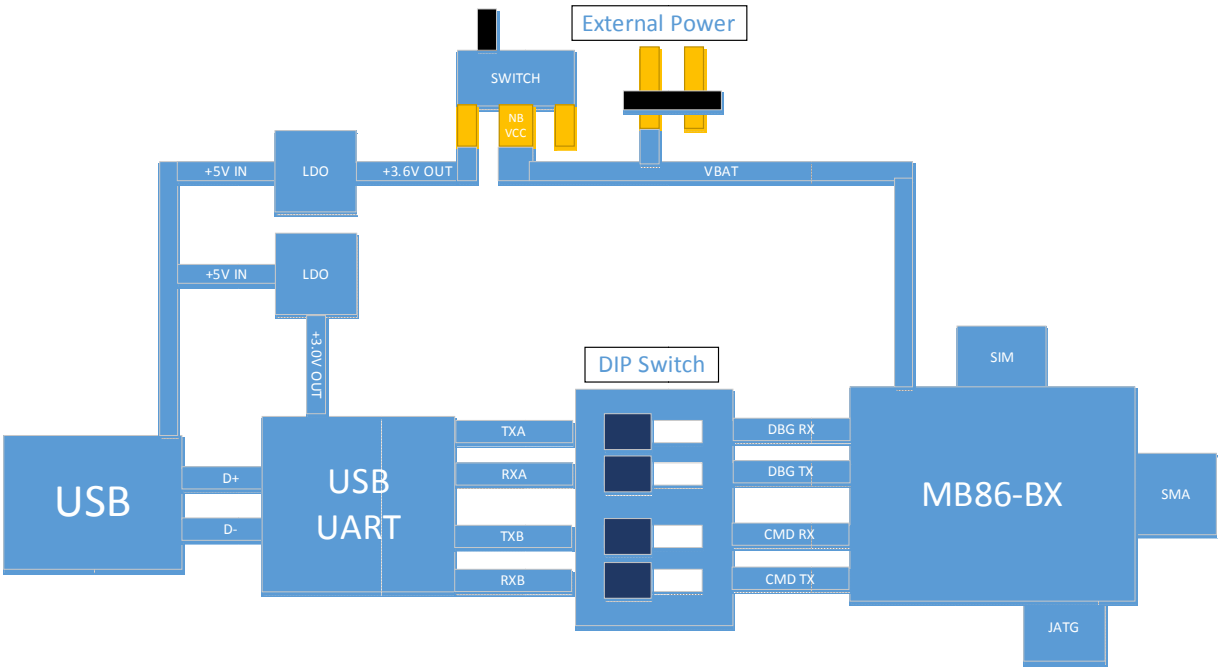
Operating voltage: VBAT 3.1~4.2V

Index

Modification History

No.	Revision Log	Author	Reviewer	Version	Modified Date
1	Initial Version	苏红飞	于海波	01	2017-12-28

Section 1 Logical Block Diagram



Section 2 Specifications

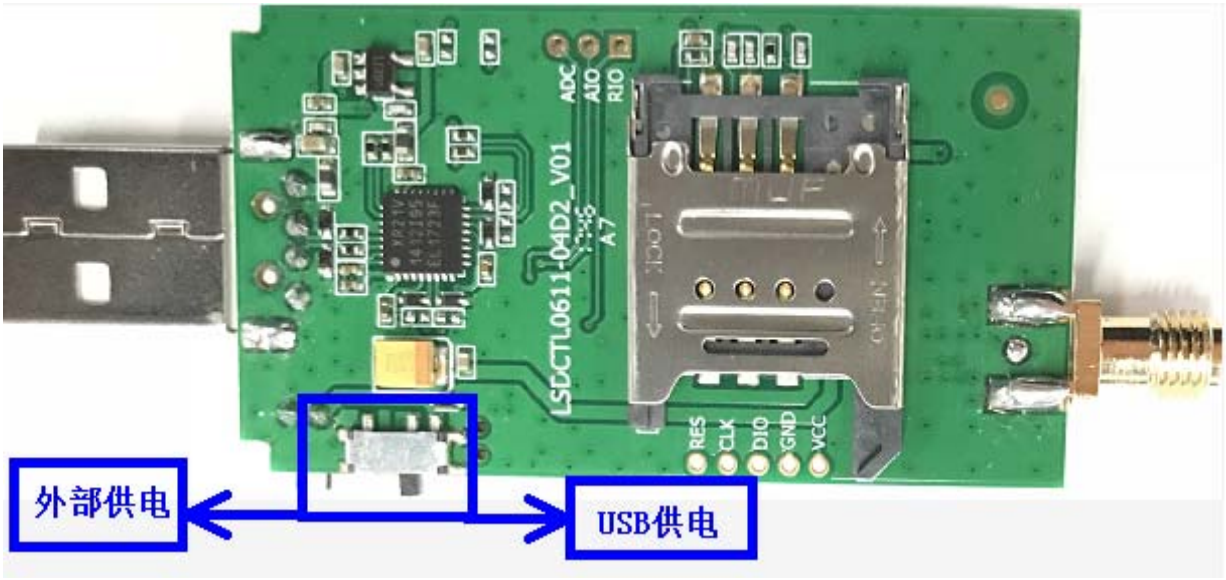
Table 2-1 Specifications @25℃

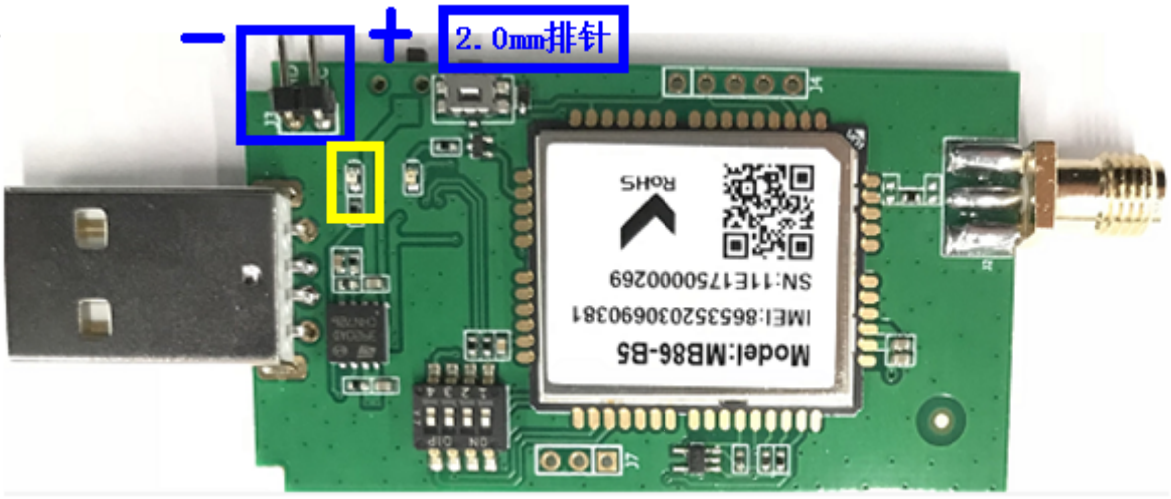
Main Parameters	Performance		Note
	Lowest	Highest	
USB supply voltage (V)	+4.75	+5.25	Typical 5.0V
External power supply voltage (V)	+3.1	+4.2	Typical 3.6V
Maximum RF output power (dBm)	21	+25	+23dBm
Sensitivity (dBm)		-128	
PSM current uA		+5	
Working temperature (°C)	-40	+85	
Storage temperature (°C)	-65	+125	

Section 3 Hardware and Instruction Manual

1、Power Supply

The Dongle has a default to USB power of 5V, then it converts 5V to 3.0V to the serial chip power supply, after which it turns the 3.6V to the NB module power supply. The NB module can also be externally powered. As shown from the figure below, when one dials the switch to the left.The power supply of the module from USB to NB is disconnected. At this time, an external power supply can be used to directly supply power to the NB module. This method can be used to test the module's power current and its status.

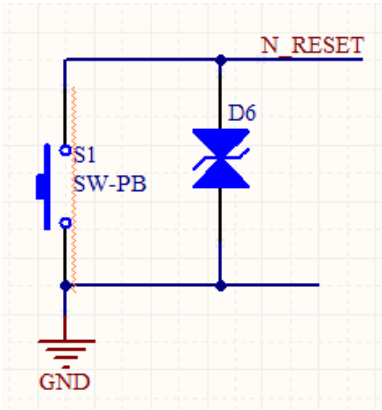




The illustrated LED is a USB 5V indicator.

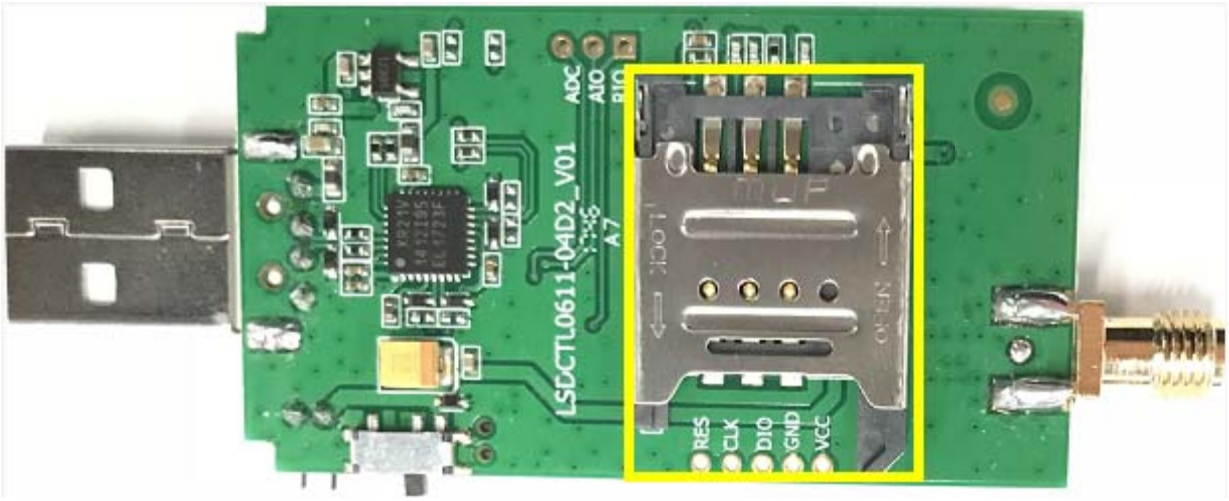
2、Resetting the circuit

The reset button on Dongle can be used for resetting the NB module with minimal power.



3、SIM Card Circuit

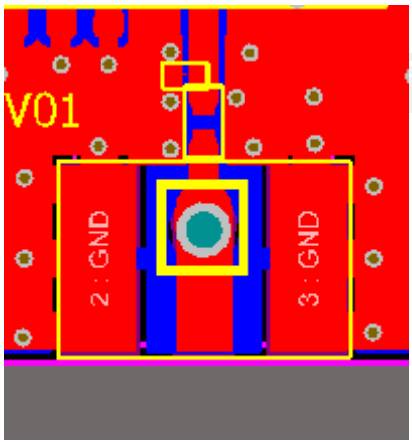
The SIM card on Dongle only supports 3.0V system with the cover of the card slot being a flip type, and the card slot is compatible with large cards.



4、Antenna

The Dongle antenna interface is defaulted to the SMA head (female), where users can directly stick on the antenna externally;

At the same time, through-holes are reserved in this location for users to identify the spring antenna.

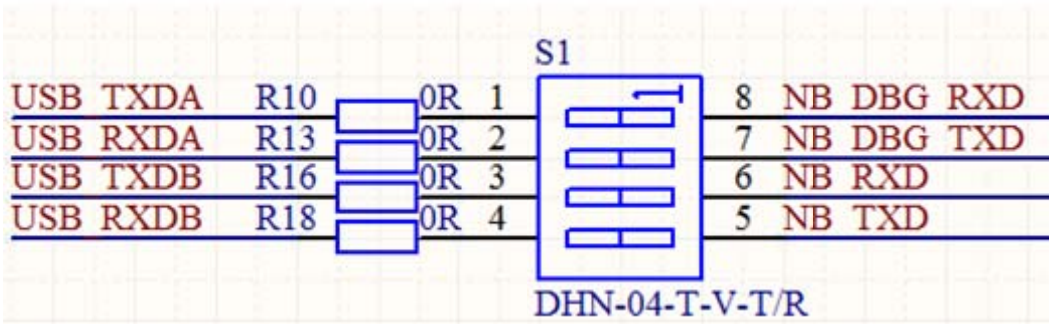


5、Serial Ports

The NB module has two serial ports with NB_TXD and NB_RXD being the main serial ports. It is mainly used to send the AT command configuration module and upgrade the firmware. The NB_DBG_TXD and NB_DBG_RXD are DBG serial ports are used to record the working log of the module. The two serial ports are the default serial chip connection; When the thin code switch is dialed to the other end, the serial port of the module is disconnected from the serial port. At this time, the external MCU operation module can be connected through the J5 through hole. The distance between the through holes is 2.0mm. For the through

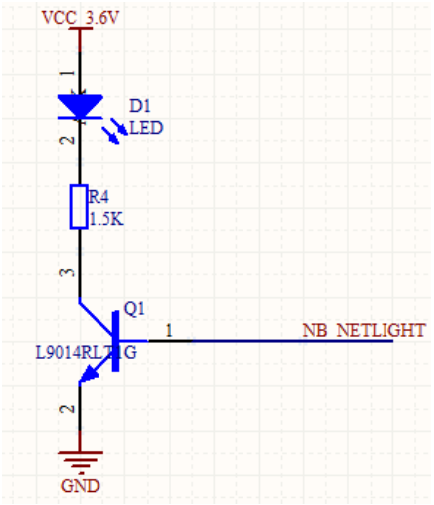
hole definition please refer to the BOT surface screen printing.

When connected to a computer, the computer recognizes two serial ports. chB corresponds to the main serial port, and chA corresponds to the DBG serial port. When the serial communication is ongoing.you need to set the baud rate to 9600.



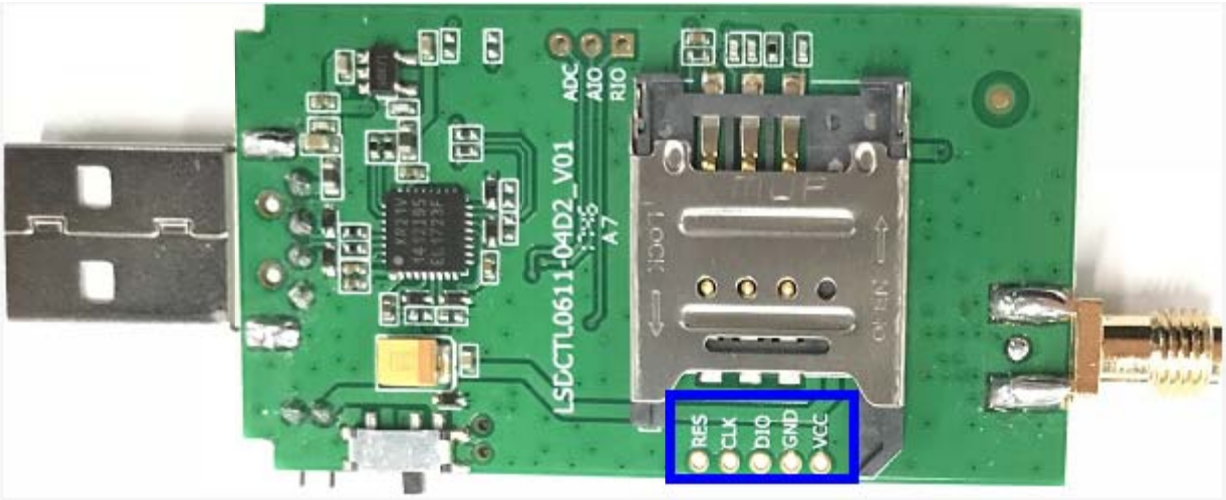
6、Network Status Indicator

The illustrated LED indicates the module networking status.



7、JATG Programming Port

Dongle reserved the JATG programming port for the NB module to write firmware (module firmware must support serial writing, but not necessarily support JATG programming). This is a 2.0mm pitch hole.

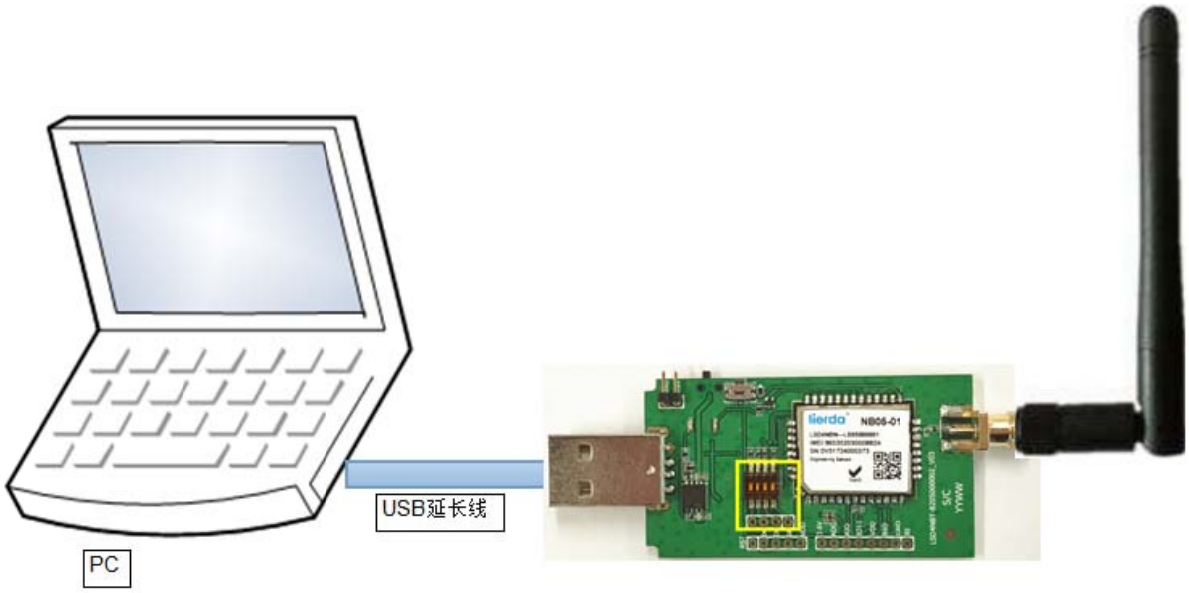


8、Power Test Considerations

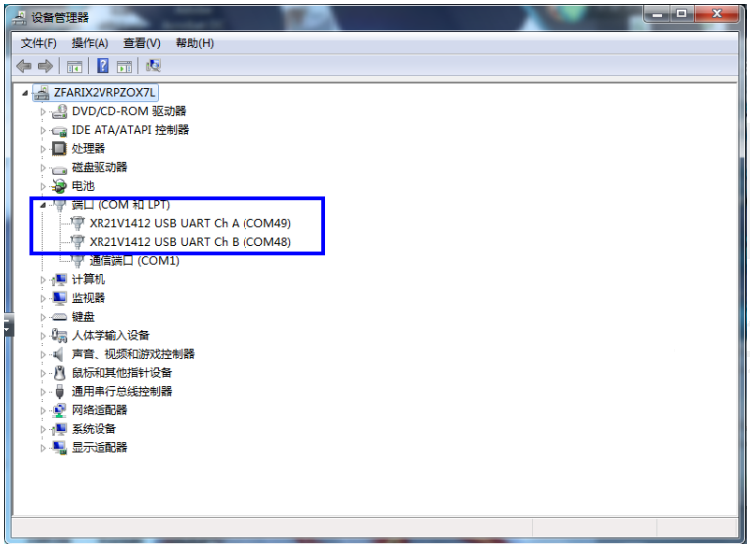
When testing the power consumption of the NB module, the thin code switch of the control power supply can be thinned to the external power supply (see section 3.1 for details). If the USB power supply is used, the thin code switch on/off serial port is to be maintained as it is, without moving the position (raised part close to the letter); if the USB is not powered, you need to move all the thin code switches serial port to the other side (the raised part near the digital edge) in order to place the NB module through the serial port to charge the serial chip, resulting in high power consumption for NB.

Section 4 Connecting to PC and Operating NB

As shown in the figure below, connect the dongle to the PC via the USB extension cable. The PC will usually install the driver automatically. If the PC fails to install the driver, please install the driver file in the package (XRUSB-Windows-DriversOnly-Vers2.2.0.0).

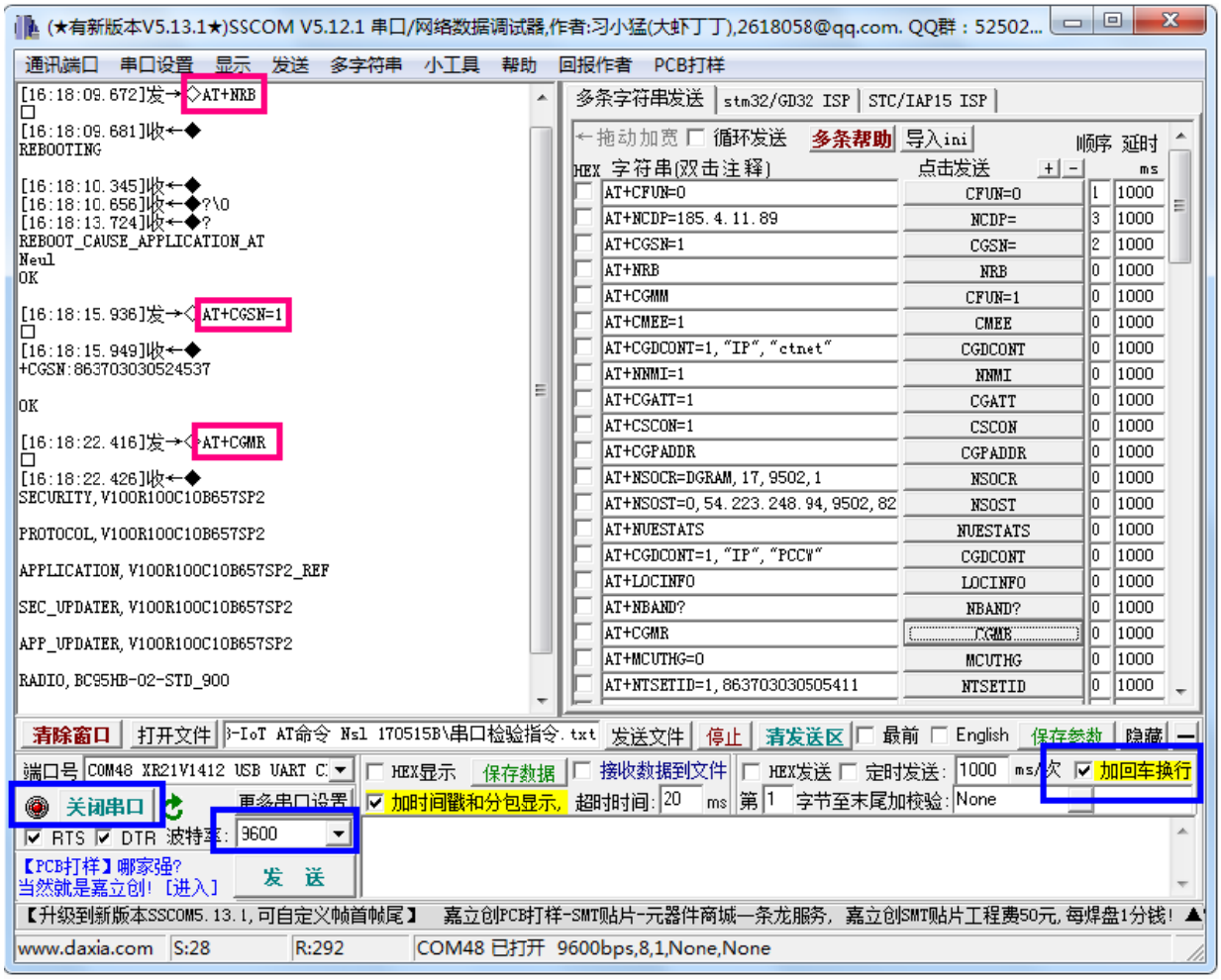


After the driver is successfully installed, the PC will display two serial ports.



Open the serial port file, click on the corresponding serial port of ChB, set the baud rate to 9600, and check the blue box content.

Complete the pink command. If the serial port reply is similar to the image below, it means that the dongle has been successfully connected.



Section 5 Common Issues

1、The serial port is not recognized

The driver is not installed successfully. Please try to install the official driver in the package (XRUSB-Windows-DriversOnly-Vers2.2.0.0).

2、No reply after sending the AT command shown in Chapter 4 without reply

Check if NB power switch is turned on (see 3.1);

Check whether the NB serial port is connected (see 3.5).

3、PSM current more than twenty milliamperes

Check if the USB is powered or if the serial port code switch is disconnected (see 3.9 for details).

FCC Label: The FCC ID is on the front of the device. It is easily visible.

The device FCC ID is 2AOFDMB86-B5.

A label with the following statements must be attached to the host end product:

This device contains FCC ID: 2AOFDMB86-B5.

The manual provides guidance to the host manufacturer will be included in the documentation that will be provided to the OEM.

The module is limited to installation in mobile or fixed applications.

The separate approval is required for all other operating configurations, including portable configurations and different antenna configurations.

The OEM integrators are responsible for ensuring that the end-user has no manual or instructions to remove or install module.

Module grantee (the party responsible for the module grant) shall provide guidance to the host manufacturer for ensuring compliance with the Part 15 Subpart B requirements.

The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with the Part 15 Subpart B requirements, the host manufacturer is required to show compliance with the Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions) with the Radio essential requirements. The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in the Part 15 Subpart B or emissions are complaint with the Radio aspects.

To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:

- NB-IOT Band5: <2dBi

FCC RF Exposure Requirements

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter and must be installed to provide a separation distance of at least 20cm from all persons.

FCC Regulations

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1)

This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Advice to Users

1、Users are welcomed to use the products of Lierda Technology Co., Ltd. Please read this notice before using our products; if you have already began using the product, it shows that you have read and accepted this notice.

2、Lierda Technology Co., Ltd. reserves the right to interpret and revise the information provided by the company and is subject to change without prior notice.

Prepared by：Lierda Technology Co., Ltd

December 2017