BM816 Coperation manual_V1.2

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Contents

1. Introduction 3
1.1 Purpose 3
1.2 General view 3
2. Brief Introduction 3
2.1 Necessary equipment 3
2.2 Feature 4
2.3 Parameter 4
2.4 System block diagram 6
2.5 RF Interface 6
3. Set up and Install 7
3.1The Construct of Hardware Environment 7
3.2 The Construct of Software Environment 13
4. Debugging and Testing 18
4.1 How to use USB cable to communicate 18
4.2 How to make data connection 19
4.3 How to make voice call out 22
4.4 How to check module information and SIM card status 23
4.5 How to set airplane mode 24
Additional testing, Part 15 Subpart B disclaimer 25
Compliance Information 25
FCC Caution: 25

1. Introduction

BM816 EVB use for testing the function and performance of BM816 module， and provide relevant assessment to help customer develop application.

1.1 Purpose

This document detailed describes the basic function of BM816 and point out the main feature is data transmission.

1.2 General view

Chapter 2, Main introduction the Development environment and list of equipment for BM816

Chapter 3, in detail describe the construct of software environment for BM816

Chapter 4, in detail describe the methods of data transmission and common business for BM816

2. Brief Introduction

BM816 EVB is development and evaluation board that for customer to test the performance and function of BM816 modul.This EVB board is module adapter PCBA board， it has USB interface, SIM card interface, MINI PCI-E port 3 ports.

2.1 Necessary equipment

The chart 1 detailed describe the necessary equipment for testing environment BM816.
Chart 1： EVB Kit List

Equipment	EVB kit whether or not Include	Description
EVB Board	Yes	Use for BM816test
USB Cable	Yes	Standard USB
Antenna	Yes	Antenna has two parts：1） diversity antenna and main antenna 2）antenna patch cord
BM816 Board	Not	
SIM/USIM	Not	Need a SIM/USIM Card have balance

2.2 Feature

- 3GPPnetwork mode
  FDD-LTE/HSPA+/HSUPA/HSDPA/UMTS/EDGE/GPRS/GSM
- Band Frequency
  LTE-FDD: B2/B4/B5/B12/B13/B17
  UMTS : B2/B4/B5
  GSM : B2/B5
- Transmit Power(Max)
  LTE-FDD/UMTS: class 3
  GSM B2: class 1
  GSM B5: class 4
  EDGE B2/B5: class E2
- Peak rate
  FDD-LTE: 150 Mbps DL, 50 Mbps UL
  DC-HSDPA：42Mbps DL
  HSUPA：5.76Mbps UL
  WCDMA: 384Kbps DL, 384Kbps UL
  EDGE: 296 Kbps DL, 236.8Kbps UL
  GPRS: 107 Kbps DL, 85.6Kbps UL
- Telecom Service
  SMS/PS/voice
- Consumption
  Shut-down Leakage current: ＜20μA
  Standby: ＜5mA
  Voice call: ＜300mA
  Data transfer: ＜800mA
- Qualcomm platform
  MDM9607(MDM9628)+WTR2965
- Package&Size
  LGA 35.8mm *37.8mm *2.8mm

2.3 Parameter

- Working Frequency

Working Frequency	B2: UL(1850-1910MHz), DL(1930-1990MHz) B4: UL(1710-1755MHz), DL(2110-2155MHz) B5: UL(824-849MHz), DL(869-894MHz) B12: UL(699-716MHz), DL(729-746MHz) B13: UL(777-787MHz), DL(746-756MHz) B17: UL(704-716MHz), DL(734-746MHz)

- Max Output Power

TX Max Power(dBm)	LTE	B2	24±1
		B4	23±2
		B5	23±2
		B12	22±2
		B13	22±1
		B17	23+1
	WCDMA	B2	23±1
		B4	23±2
		B5	22±2
	GSM	B2	29.0±1.0
		B5	32.0±1.0

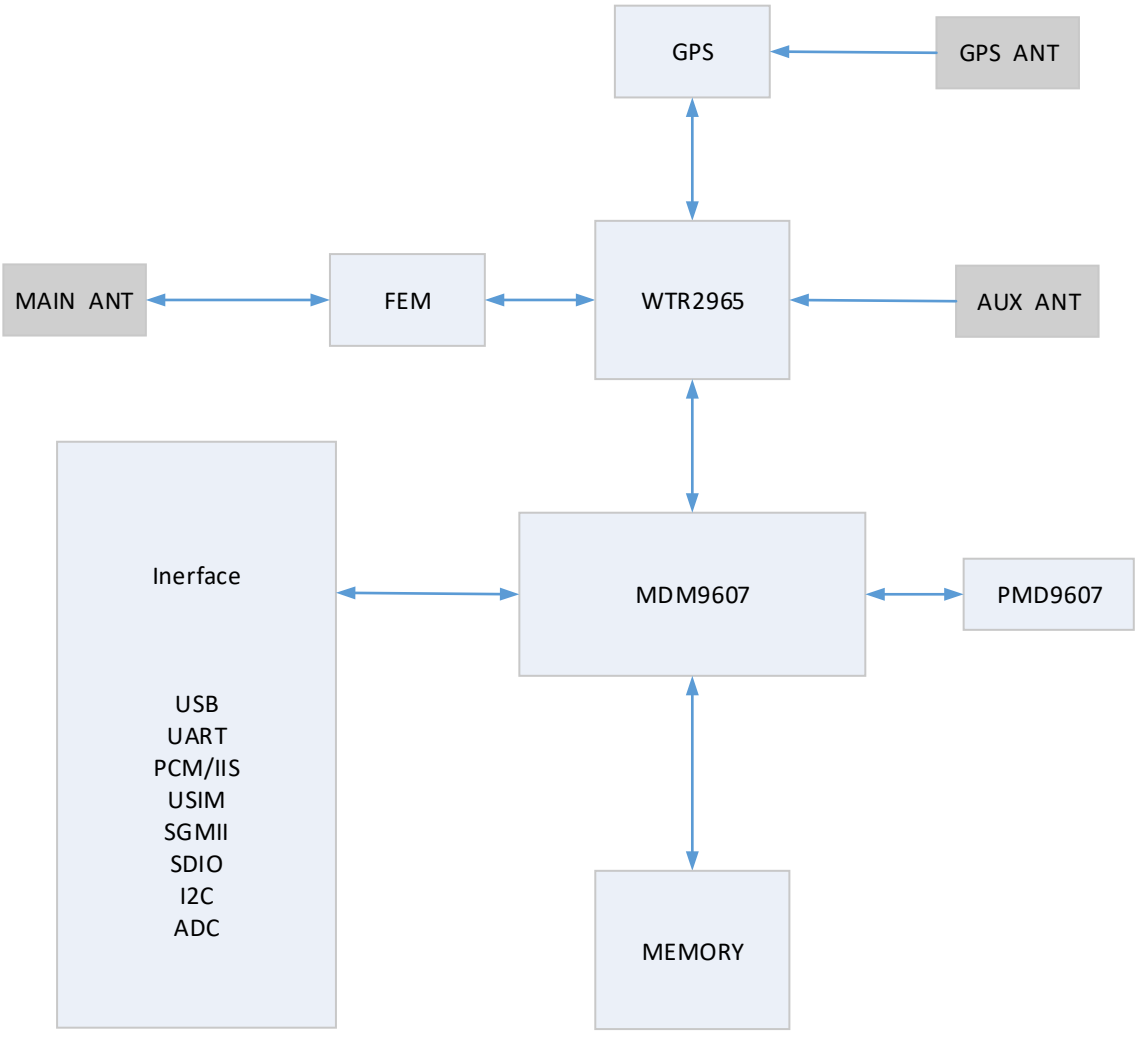
- Antenna Type
  External 2 Antenna：Main/DRX Antenna

- Antenna Gain(Max)

Frequency（MHz）	Gain（DBi）
791	1.14
824	0.91
896	0.78
960	0.14
1710	1.70
1805	2.30
1880	3.25
1950	3.10
2150	2.28
2300	1.30
2400	1.78
2500	2.04
2690	0.94

- Working Voltage
  3.3~4.2V, TYP:3.6V
- Working Temperature
  -75~25℃, TYP：25℃
- Limit operating Temperature
  -40~-30℃, 75~85℃
- Storage Temperature
  -40~95

2.4 System block diagram



2.5 RF Interface

BM816 provide 2 RF connector, Main/Diversity Antenna. The customer antenna needs to be distributed on the periphery of the main board, and is connected with the antenna pad of the module through the 50ohm impedance microstrip line. line-losses between antenna and RF connector on module must follow indicator as below.

- B2/B4/B5/B12/B13/B17<1dBm

3. Set up and Install

EVB construct divide by hardware environment and software environment：

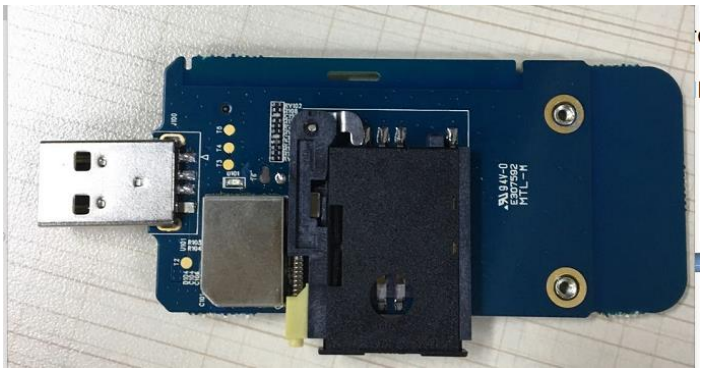
1) The Construct of Hardware Environment
   How put in or out SIM/USIM card
   How to link module
   How to link main antenna
   How to link diversity antenna
   How to link USB cable
   How to power on
   How to power off
2) The Construct of Software Environment How to install driver
   How to upgrade firmware

3.1The Construct of Hardware Environment

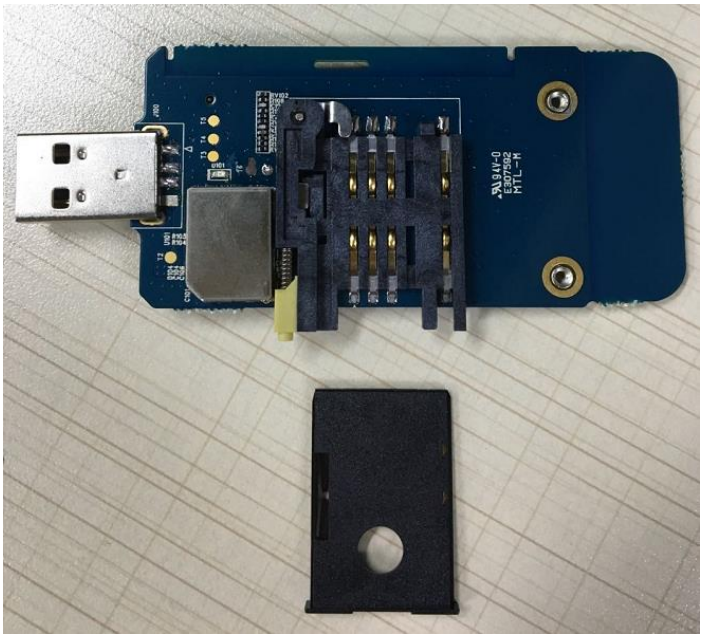
3.1.1. How put in or out SIM/USIM card

Need a SIM/USIM Card havebalance. The step for put in SIM/USIM:

1) Put EVB upwards, hold the yellow button, and pull out the SIM Card slot. See Picture 1 and 2.



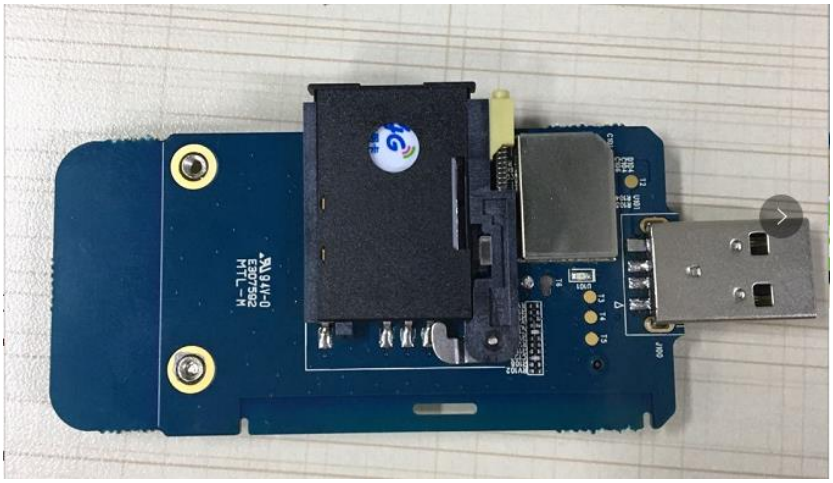
Picture 1



Picture 2

2) Put SIM Card into the slot, make sure SIM chip upwards, put into the SIM slot on EVB Boar. See Picture 3 and 4.

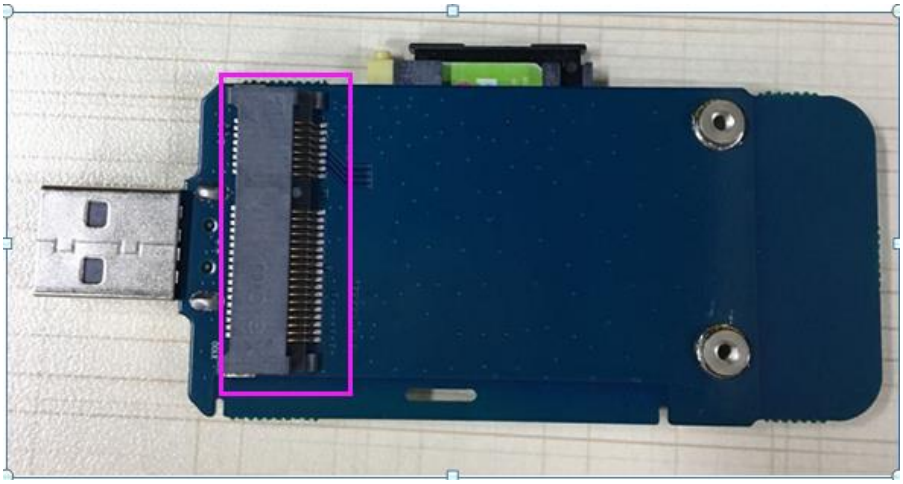
Picture 3



Picture 4

3.1.2. How to link module

Put module into development board after finish install SIM card:
1) Put EVB Board right side up, and put module into Mini PCI-E connector. See Picture 5、6 and 7.



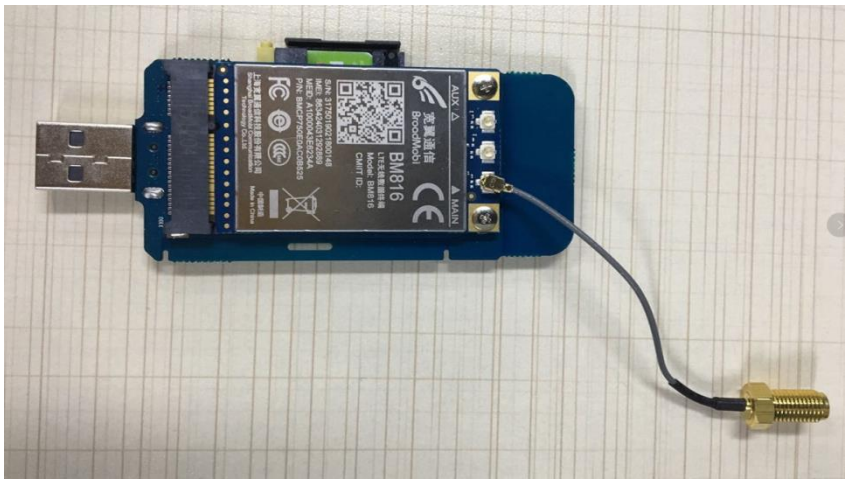
Picture 5

Picture 6

Picture 7

3.1.3. How to link main antenna Before the link antenna, need finish put in SIM card and Module.

1) Antenna interface located on top right of module.
2) Spike RF Patch cord into module connector smoothly. See Picture 8。



Picture 8
3) Tightening antenna SMA contact and RF patch cord SMA contact. See Picture 9。

Picture 9

3.1.4. How to link diversity antenna

Before link diversity antenna, need finish put SIM Card and module in, and link the main antenna

1) The antenna interface is located on the top left of module .

2) Spike RF Patch cord into module connector smoothly. See Picture 10.

Picture 10

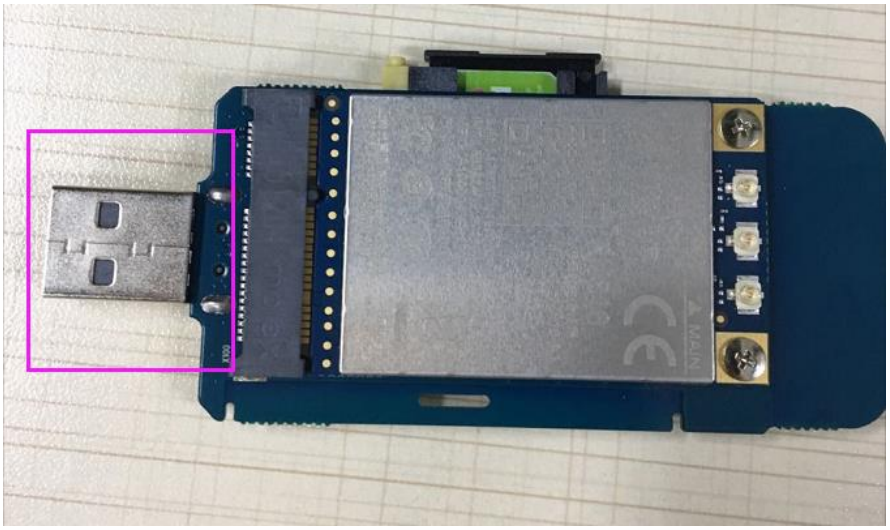
3) Tightening antenna SMA contact and RF patch cord SMA contact. See Picture 11

Picture 11

3.1.5. How to link USB cable

Follow the step to link USB cable: BM816

1)Put EVB Board into the USB interface of PC.See Picture12.



Picture12

3.1.6. How to power on

BM816 only support electrify power on, all need just put the USB cable into PC, and module will auto power on.

3.1.7. How to power off

BM816 support outage shutdown, module will shut down when VBAT blackout.

3.2 The Construct of Software Environment

3.2.1. How to install driver

1） First use USB cable to connect PC and module, power module on, Windows will popup new equipment window, choose“No, not this time”, then click”Next”

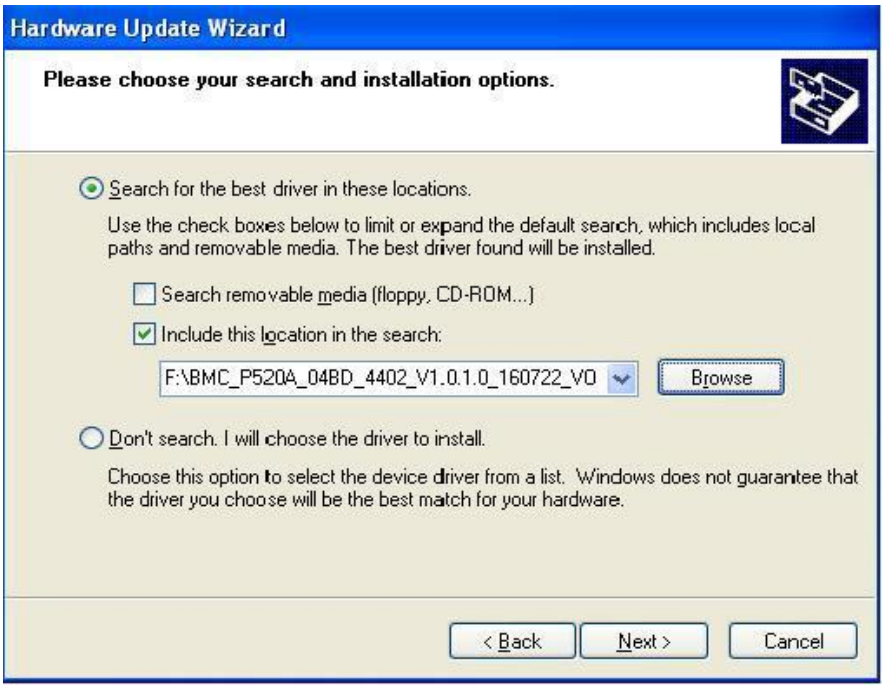
Picture 13: find new hardware

2） Choose “Install from a list or specific location (Advanced)”, click“Next”

Picture 14: choose the method for install driver

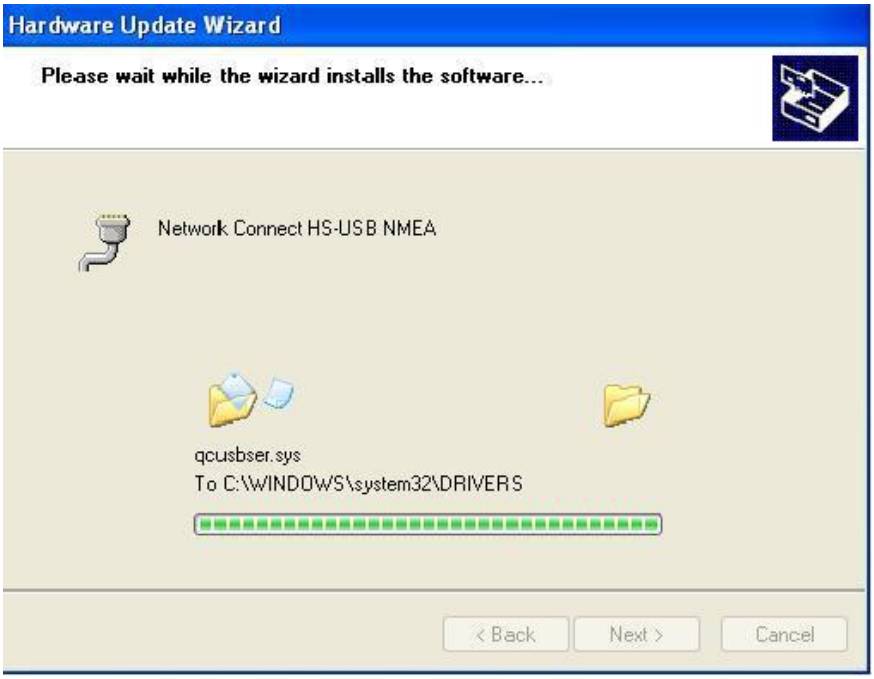
BM816 choose the path that driver file is located, and click “Yes”;

3） Click“Next”



Picture 15: Choose driver file path 2 in XP

4） The driver is installing

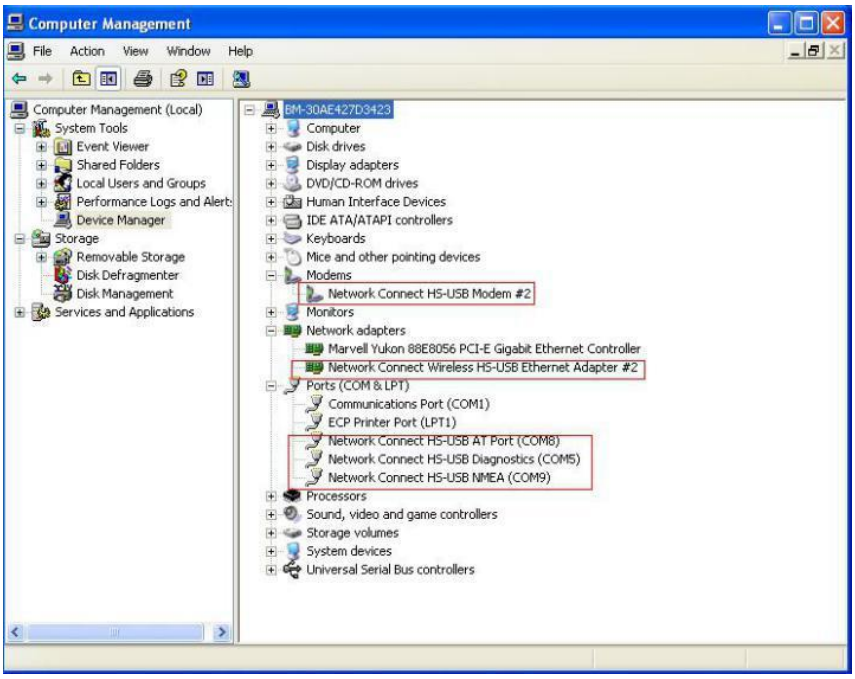


Picture 16: driver install

5） Wait for notes “Completing hardware Upgrade wizard”， click ” Finish ” finish the install.

Picture 17: Finish the driver install

6） Operation system will popup 4 new equipments, please repeat step 1 to 6. After finish install, you will see them in device manager. See below Picture 18.

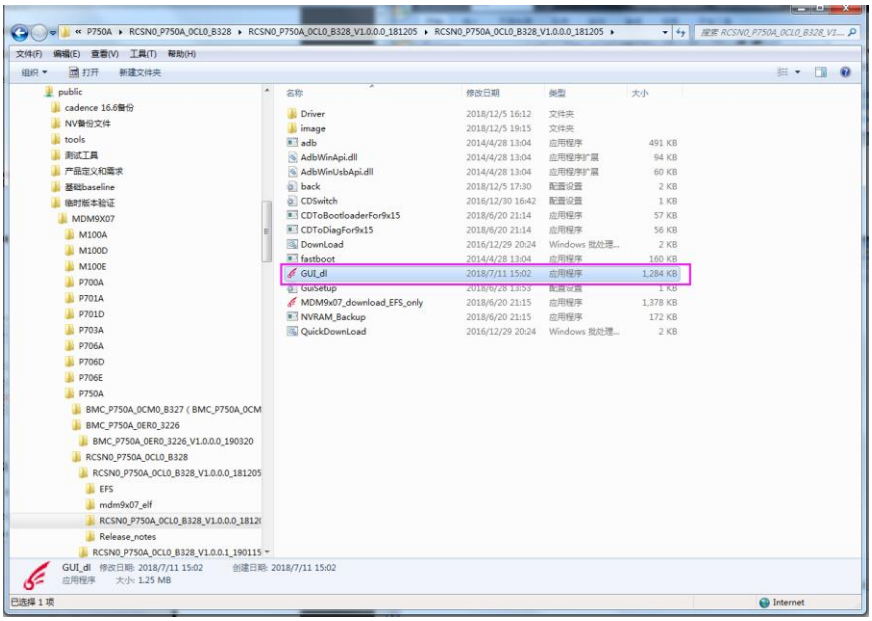


Picture 18: module appear in device manager

3.2.2. How to upgrade firmware

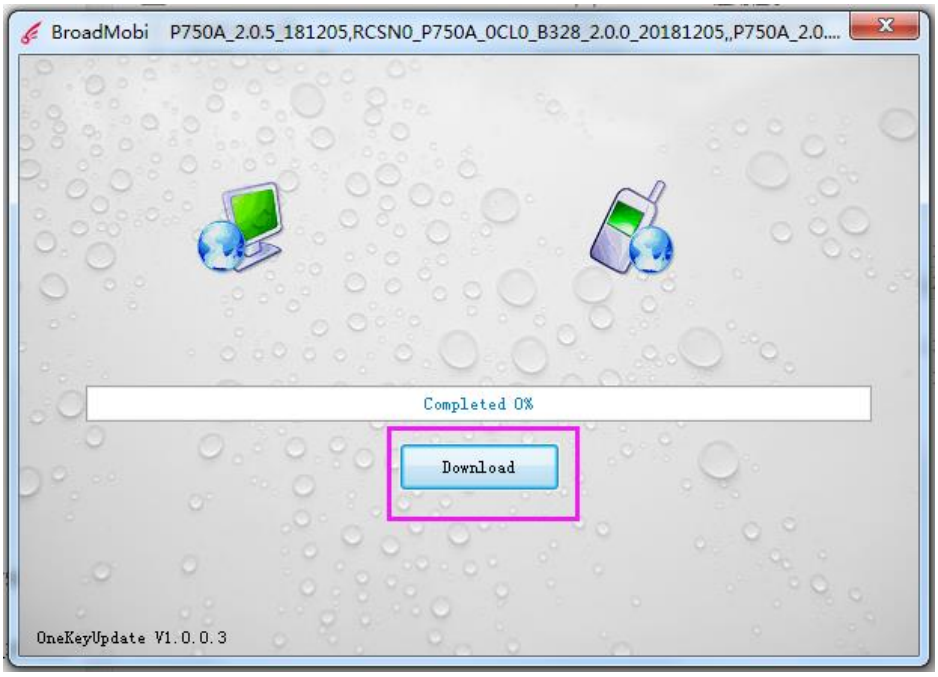
BM816 provide 1key upgrade tool for Windows, step of upgrade firmware:

1） Use USB cable to connect PC and BM816, double-click “GUI_dl”when the device manager recognize com port. See Picture 19：



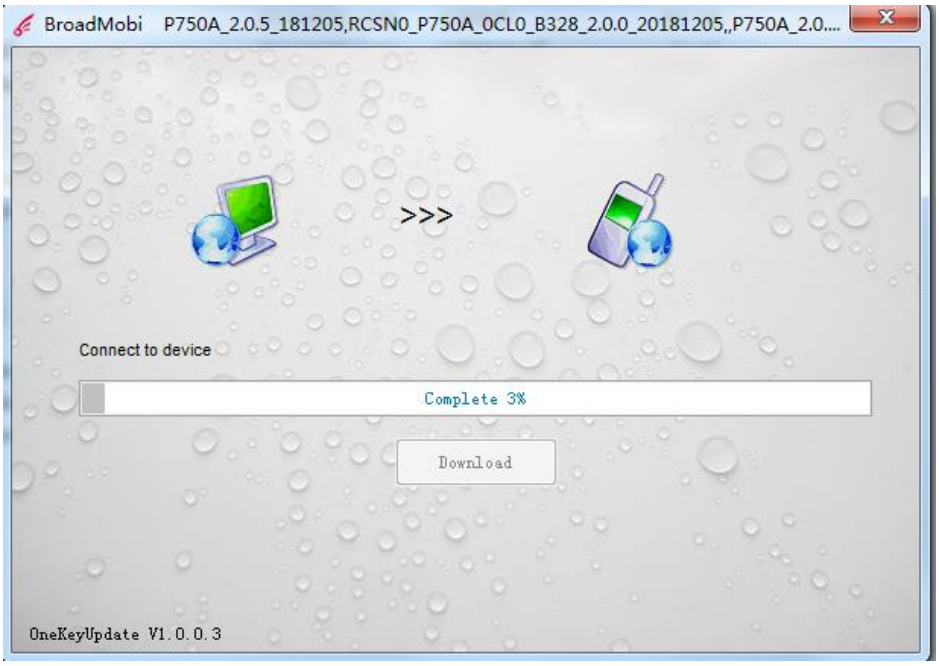
Picture 19: the window of firmware upgrades 1

2） Follow the note to press “Download”, start to upgrade. See Picture 20



Picture 20: Firmware is upgrading

3） There is note “Success to upgrade” when it all finished.



Picture 21: Finish firmware upgrade

4） Do not remove USB cable from PC during the upgrade process, whole process cost 2-3 minutes.

Warning：Cannot outage during upgrade process, please make sure stabilization power supply, otherwise will damage module.

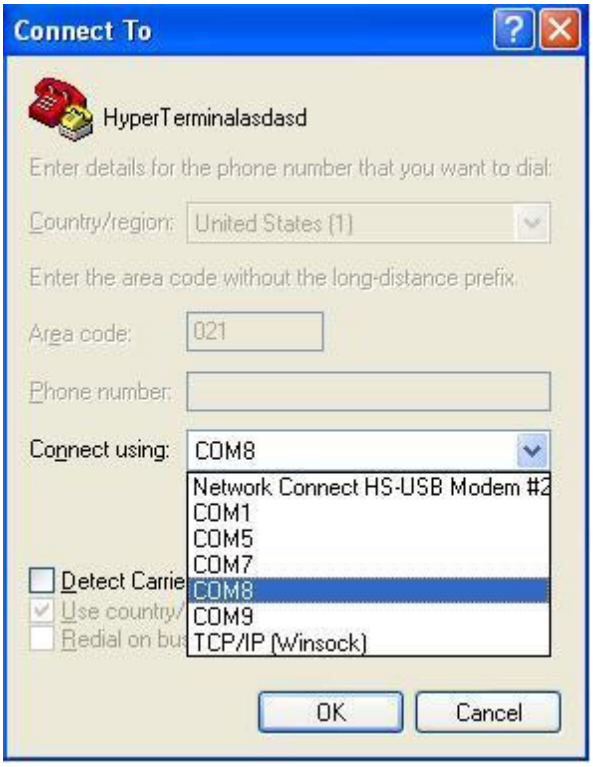
Warning：Cannot outage during upgrade process, please make sure stabilization power supply, otherwise will damage module.

4. Debugging and Testing

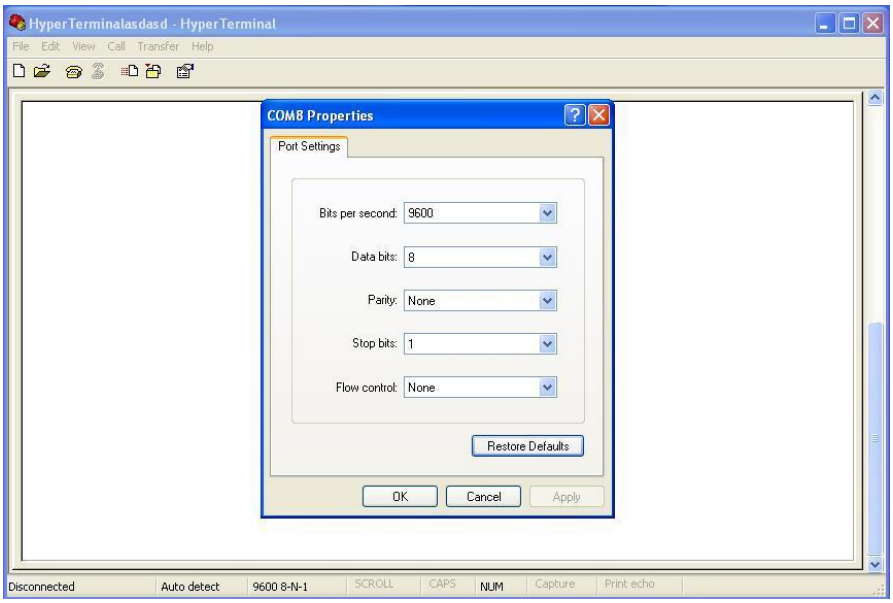
The EVB through USB to communicate， can use for phone call, connect internet, this chapter will discuss in detail.

4.1 How to use USB cable to communicate

1） The communication methods for PC and BM816 is AT command，to test whether PC successfully communicate BM816 by sending AT command.
2） Open HyperTerminal, choose AT port.

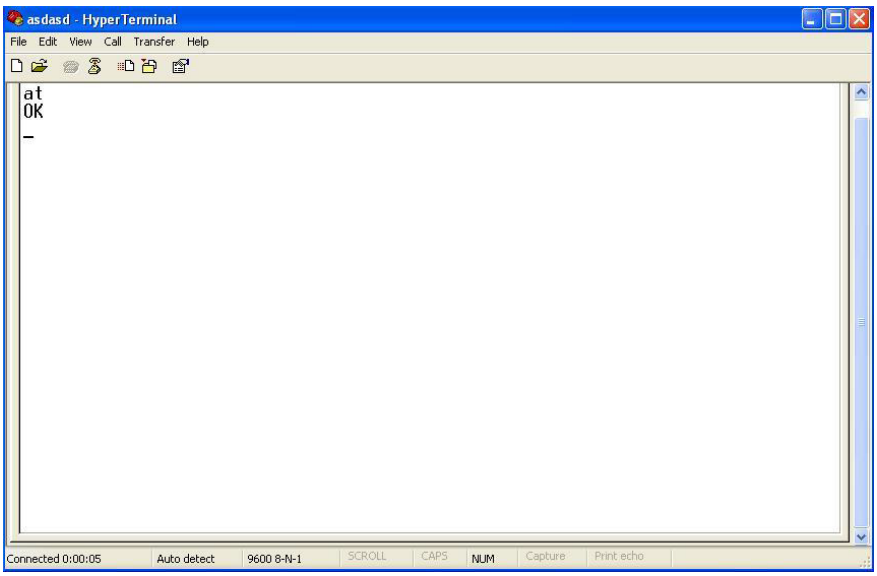


Picture 22: Choose the port for HyperTerminal
3） Choose baud rate 9600, choose none for flow control, other setting default. See Picture 23



Picture 23: ConfigurationHyperTerminal

4） Sending AT， check it is or isn’tcommunicated. See Picture 24



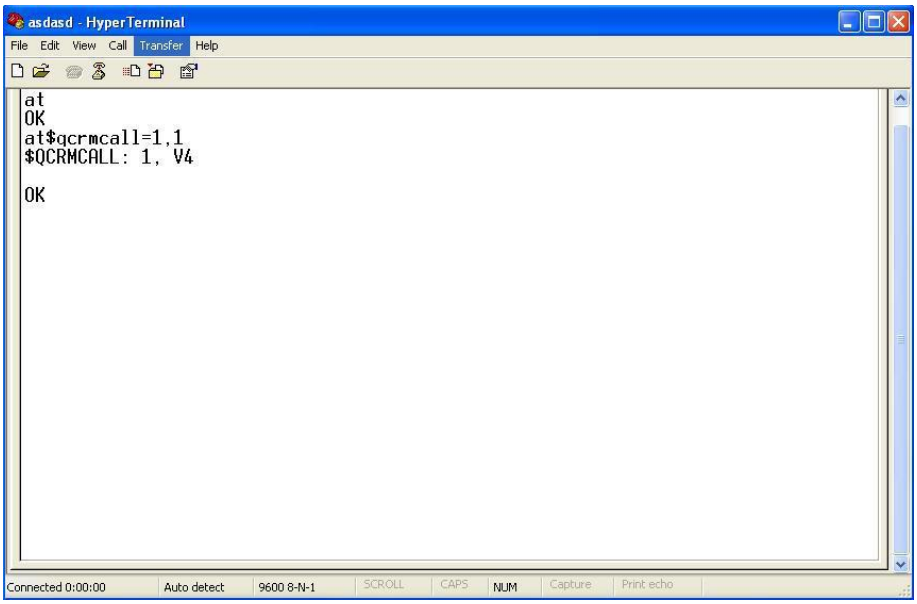
Picture 24: UsingHyperTerminal sending at

4.2 How to make data connection

Put SIM/USIM card that support data traffic into EVB board, connect antenna right, though USB cable to connect PC and power on module.

1) through NDIS to dial.

a) type “at$qcrmcall=1,1”, create network connection.



Picture 25: using HyperTerminal to send AT command to NDIS dial

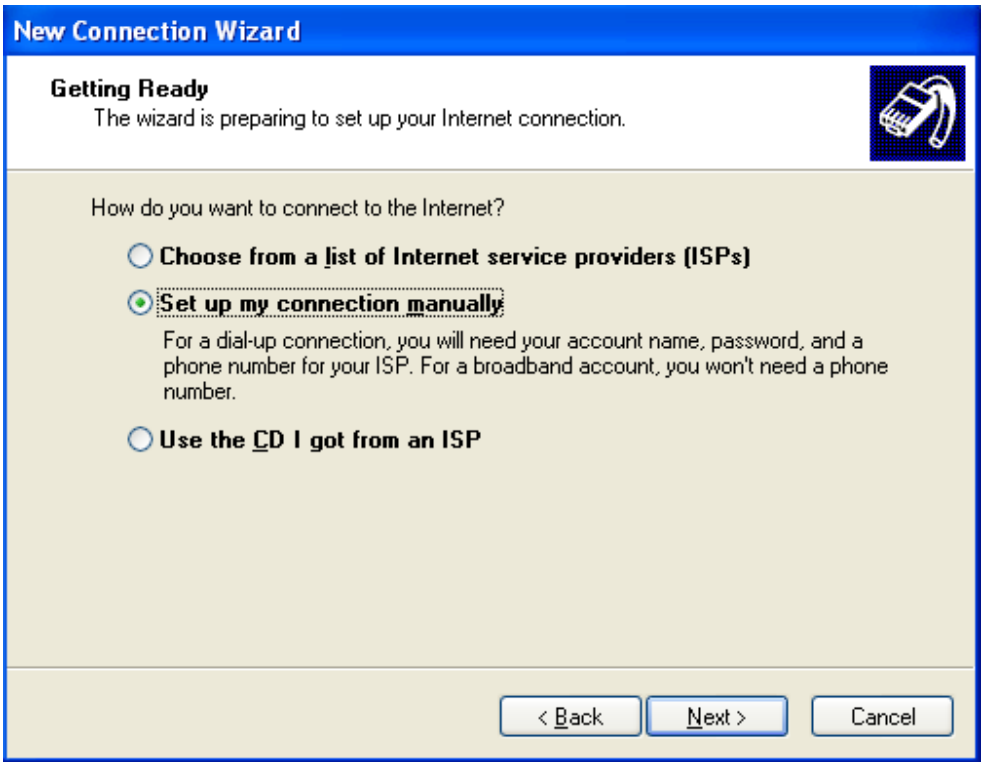
b) Type“at$qcrmcall=0,1” , to disconnect Network connection.

2）through MODEM to dial

A）open Network Connections to choose to connect Internet and click “Next”

Picture 26: Choose Network Connection

B） Choose ”Set up my Connection manually”, click “Next”



Picture 27: Create new Network connection

C) Choose "Connect using a dial-up modem"

Picture 28： Choose Modem to Dial

D） type the number u want to dial, the user and password need according different carriers. For example, the user and password for

China Union 3G and 4G is empty (not type any character) the number is *99#, then

choose “连接 Connect”.

Picture 29：Configuration Network Connection

E）there is a note after Network Connection is successful.

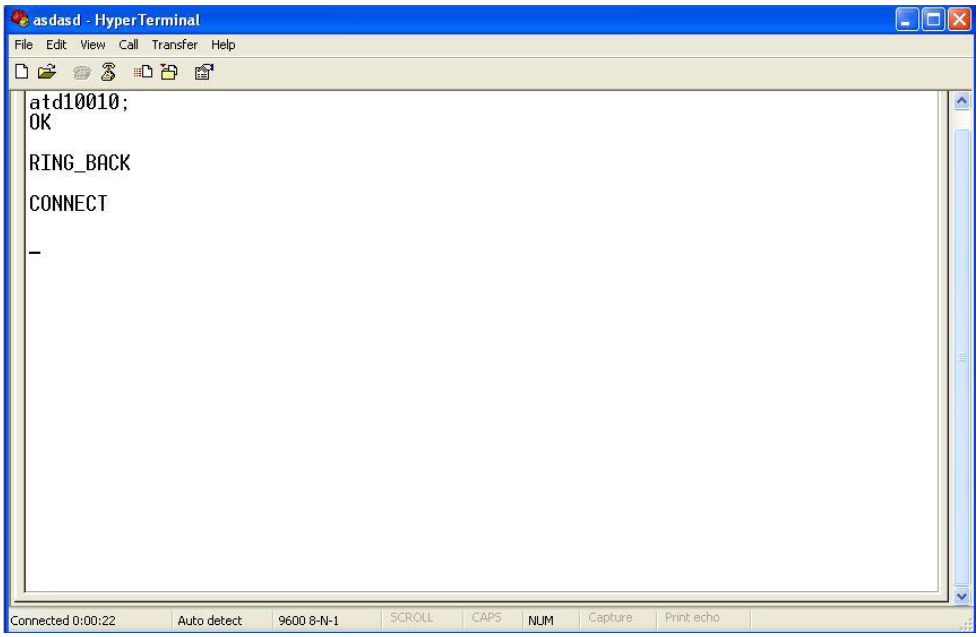
Picture 30：Dial success

4.3 How to make voice call out

A. Put SIM/USIM card which support voice service into EVB board.

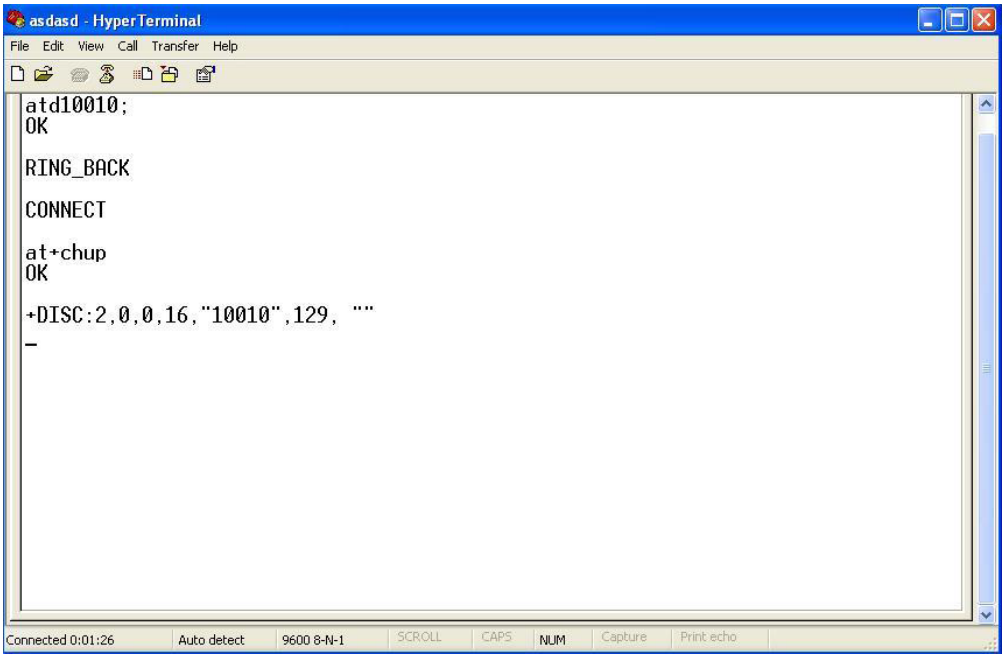
B. Open the HyperTerminal, configuration same as Picture 19 and 20.

C. The AT command for dial phone call is “ATDXXX;”. For example, we make a call to 10010, type “ATD10010;”



Picture 31：Using HyperTerminal dial number

D. The AT Command for Hang up is “AT+CHUP”.



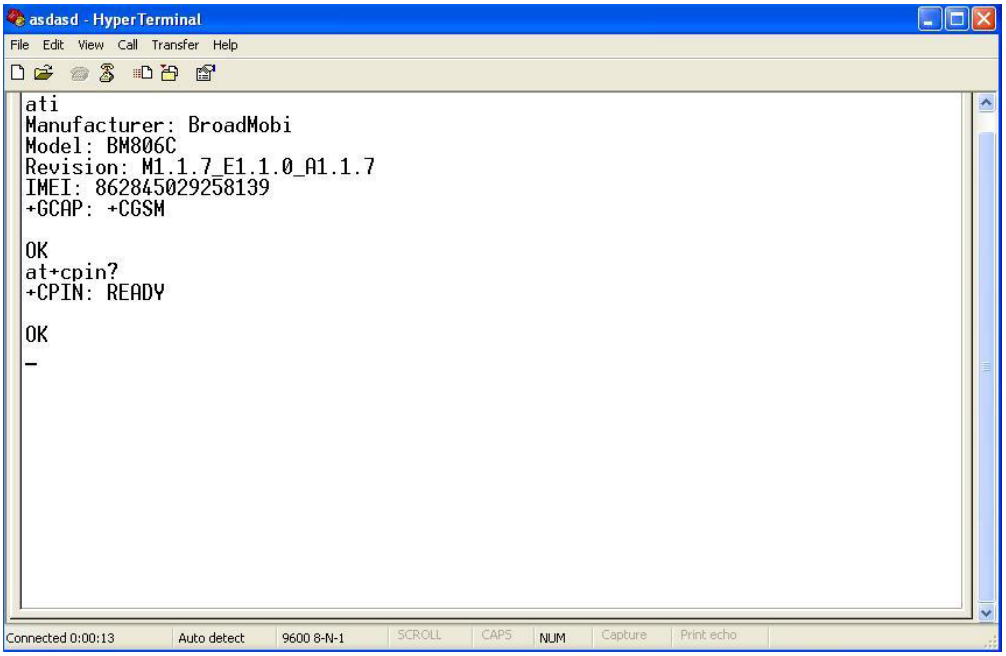
Picture 32：Hand up phone call

4.4 How to check module information and SIM card status

A. Put SIM/USIM Card which supports voice service into EVB board.

a) Open the HyperTerminal, configuration same as Picture 19 and 20.

B. Type “ATI”, shows module information; type “AT+CPIN?” shows SIM Card Status.

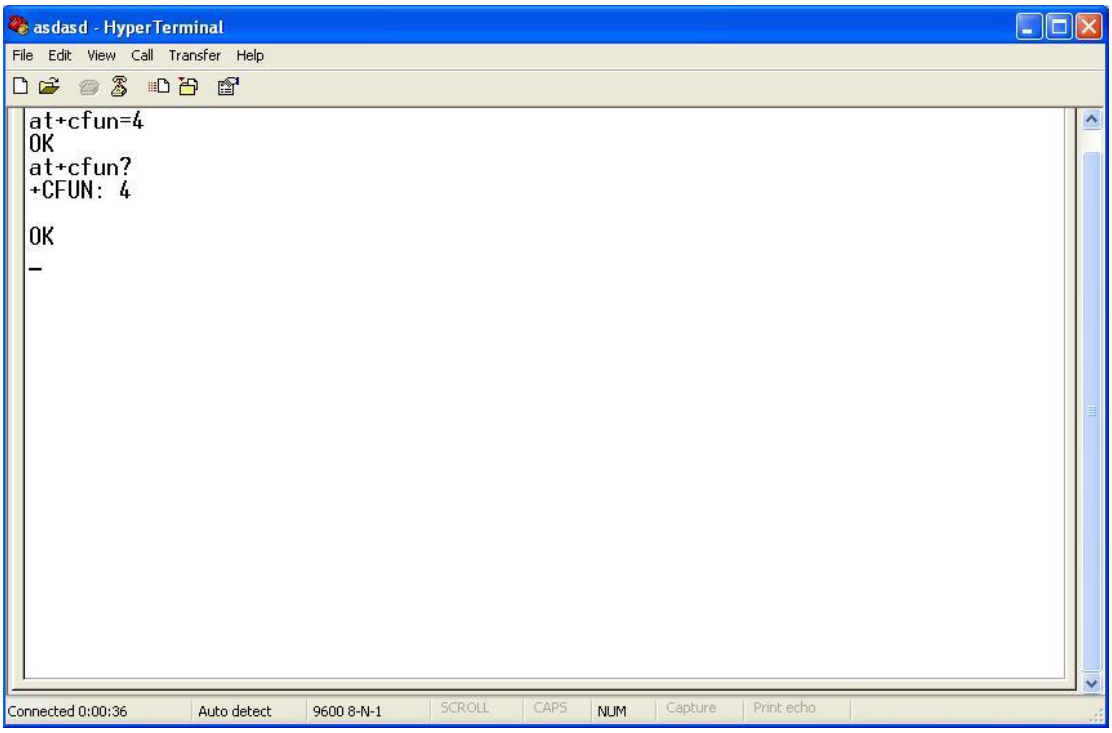


Picture 33：Show module information and SIM Status

Warning：SIM Card shows “Ready” indicate SIM status is normal, if it shows other, it means unmoral, please make sure your SIM is whether or not valid, or has pin.

4.5 How to set airplane mode

A. Type ATCommad“AT+CFUN=4”, enter into airpalne mode. （at+cfun=1 is normal mode；at+cfun=0 turn off RF, SIM card cannot register ；default is equal 1；at+cfun？shows current status）



Picture 34 ：Setting airplane mode

Compliance Information

FCC Compliance Statement: This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

Additional testing, Part 15 Subpart B disclaimer

The module only complies with the FCC CFR 47 Parts 2, 22, 24, 27. If the module is installed in the host device, the host manufacturer is responsible for the compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. For example, if the host manufacturer markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the host manufacturer shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

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 20 cm 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 antenna or transmitter.
(4) the modules FCC ID is not visible when installed in the host, or(5) 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: 2AON8-BM816.