BC66&BC66-NA

PPP Application Note

NB-IoT Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2019-06-26	Jacobi RAO	Initial
1.1	2021-12-20	Jacobi RAO	1. Updated the description of port setting (Chapter 2.3). 2. Added route configuration (Chapter 3.4). 3. Added related AT commands (Chapter 4).

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1 Introduction

The Point-to-Point Protocol (PPP) is designed for simple links which transport packets between two ports. These links provide full-duplex simultaneous bi-directional operation, and are assumed to deliver packets in order. It is intended that PPP provides a common solution for easy connection of a wide variety of hosts, bridges and routers.

This document gives a brief introduction of how to use the PPP function on BC66/BC66-NA TE-B, including the steps/methods of the PDN activation mode, port setting and host configuration for PPP dial-up.

This document is applicable to the following Quectel NB-IoT modules.

- BC66
- BC66-NA

2 Preparation and Settings for PPP

This chapter introduces PPP dial-up operations based on BC66/BC66-NA TE-B. If customer devices are used instead of the TE-B, please make sure the interfaces/functions listed in ***Table 1*** are also available on customer devices. Otherwise, please contact Quectel Technical Supports for matters needing attention.

2.1. Preparation

1. Connect the BC66/BC66-NA TE-B to the host. Both USB interface and USB-UART interface should be connected.

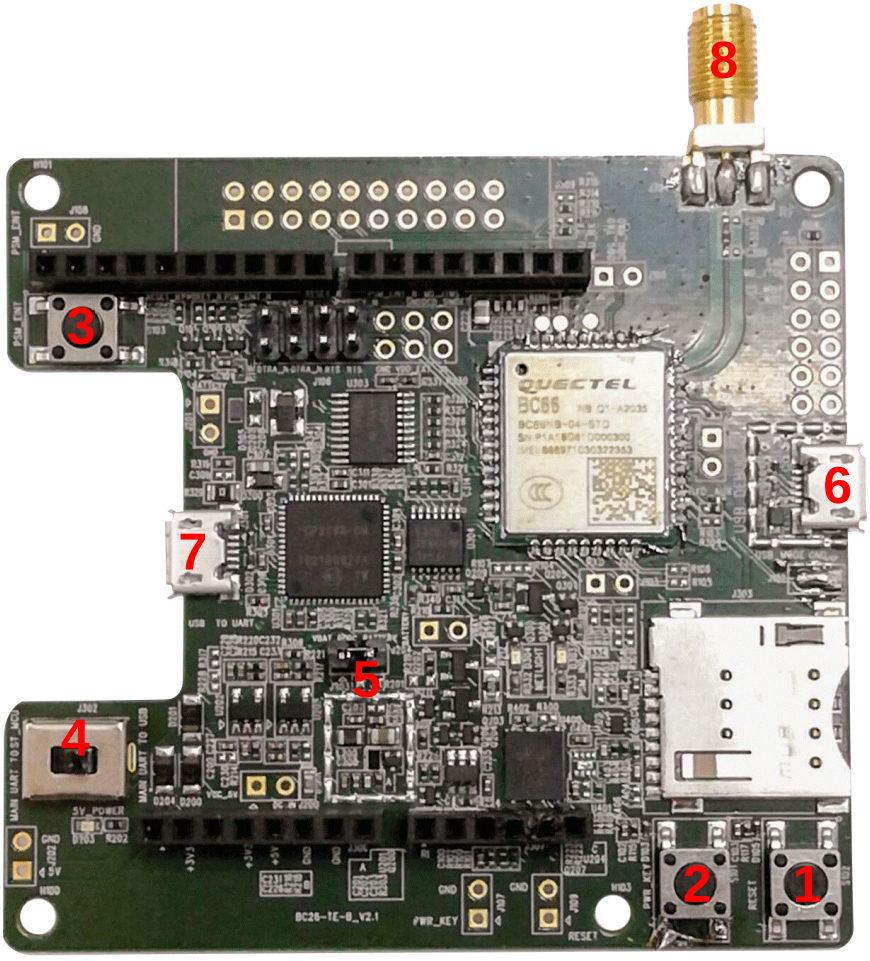

Figure 1: BC66 TE-B

Table 1: Key Interfaces of BC66 TE-B

SN	Interface	Description
1	Reset Button	Reset the module.
2	PWRKEY Button	Turn on the module.
3	PSM Wakeup Button	Wake up the module from deep sleep mode.
4	UART Switch	Used to select the communication object of main UART: "MAIN UART TO USB" or "MAIN UART TO MCU". Make sure the switch is switched to "MAIN UART TO USB".
5	Jumper	During PPP dial-up application, make sure the plug-in jumper is connected.
6	USB Interface	Simulated dual-interfaces: Modem port for GKI tracing and debug port for HSL tracing.
7	USB-UART Interface	Four simulated interfaces: ● Interface 0 for AT interaction. ● Interface 1 for HSL tracing. ● Interface 2 for GKI tracing. ● Interface 3 is reserved.
8	Antenna Interface	RF SMA connector for connection with an external antenna.

NOTE

1. BC66-NA TE-B has the same interface designs with BC66 TE-B. For more details of TE-B interfaces, see ***document [1]*** or ***document [2]***.
2. Before connecting the TE-B to PC, please install the UART/UART-USB driver first. For more details, please contact Quectel Technical Supports.

2. Use **AT+CGATT?** to check whether the module can successfully register to the EPS network. For more details about this command, see ***document [3]***

```
AT+CGATT?
+CGATT: 1

OK                          //Successfully registered to the EPS network.
```

2.2. PDN Activation Setting

Auto PDN activation is enabled by default. Before PPP dial-up connection establishment, please disable

auto PDN activation with **AT+QCFG="autopdn",0** when powering on the module. The command takes effect after reboot.

NOTES

1. Please use **AT+QCFG="autopdn",1** to enable auto PDN activation after PPP testing for normal module control.
2. **AT+QCFG** is supported in BC66NBR01A07/BC66NADAR01A01 or later versions. For more details of this command, see ***document [3]***.

2.3. Port Setting

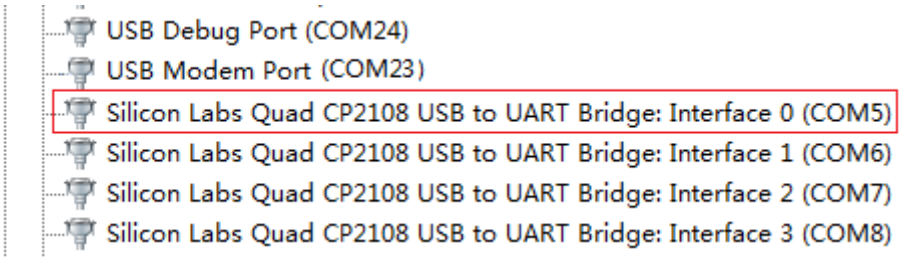

Figure 2: UART Ports in Device Management

Upon installing the current driver for BC66 or BC66-NA module in the host, 6 ports like above are shown. The default setting of the port is as below. During PPP testing, you need to set the port to the "Target Usage" by AT commands as below.

Table 2: Port Setting of BC66 TE-B

Port Name	Port ID	Default Usage	Target Usage	Control AT
MTK USB DEBUG PORT	5	NULL	HSL trace	**AT+EPORT=1,ULS,5**
MTK USB MODEM PORT	4	NULL	GKI trace	**AT+EPORT=1,EMMI,4**
INTERFACE 0	0	AT commands	AT commands	NULL
INTERFACE 1	1	GKI trace	NULL	NULL
INTERFACE 2	2	HSL trace	NULL	NULL
INTERFACE 3	3	NULL	NULL	NULL

The GKI log is output through the port 4, which is the modem port shown in the host with **AT+EPORT=1,EMMI,4**. The HSL log is output through the port 5, which is the debug port shown in the host with **AT+EPORT=1,ULS,5**.

These commands above take effect after reboot. **AT+EPORT=0** is used to query the current setting. For details about **AT+EPORT**, see ***Chapter 4.3.1***.

2.4. Reboot the Module

Reboot the module to make the settings above take effect.

3 PPP Dial-up Operation

3.1. Modem Configuration

3.1.1. Add a New Modem

If no **Standard 56000 bps Modem** has been installed, a new standard modem needs to be created.

1. Click "**Start**" → "**Control Panel**" → "**Phone and Modem**", as shown in the following figure.

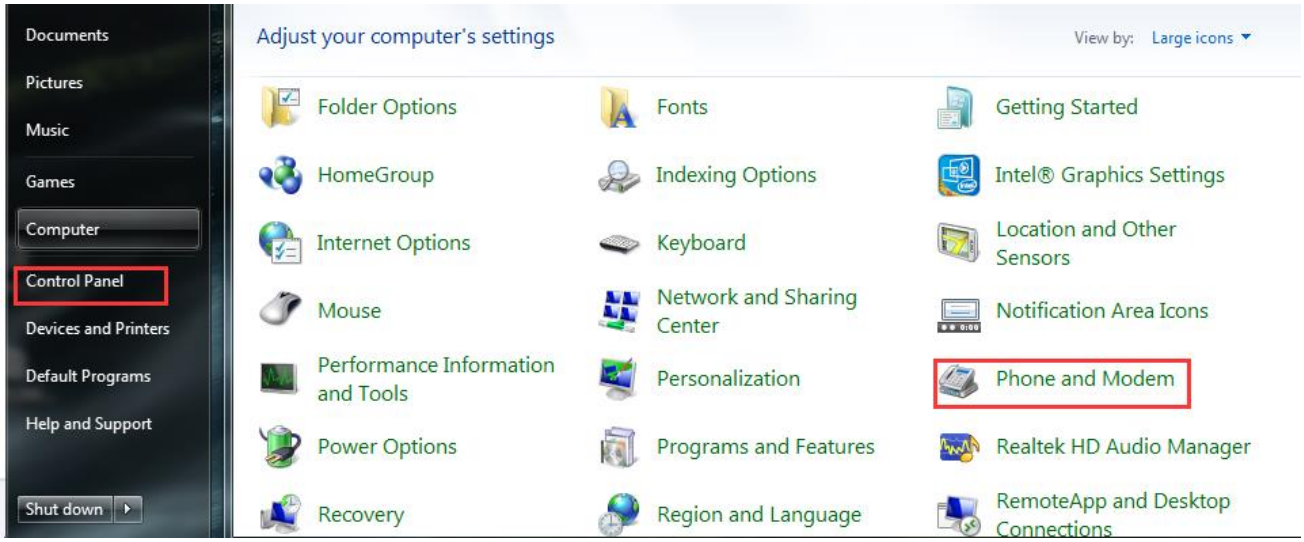

Figure 3: Setting Option of Phone and Modem

2. Double click "**Phone and Modem**", and select "**Modems**" → "**Add…**", as shown in the following figure.

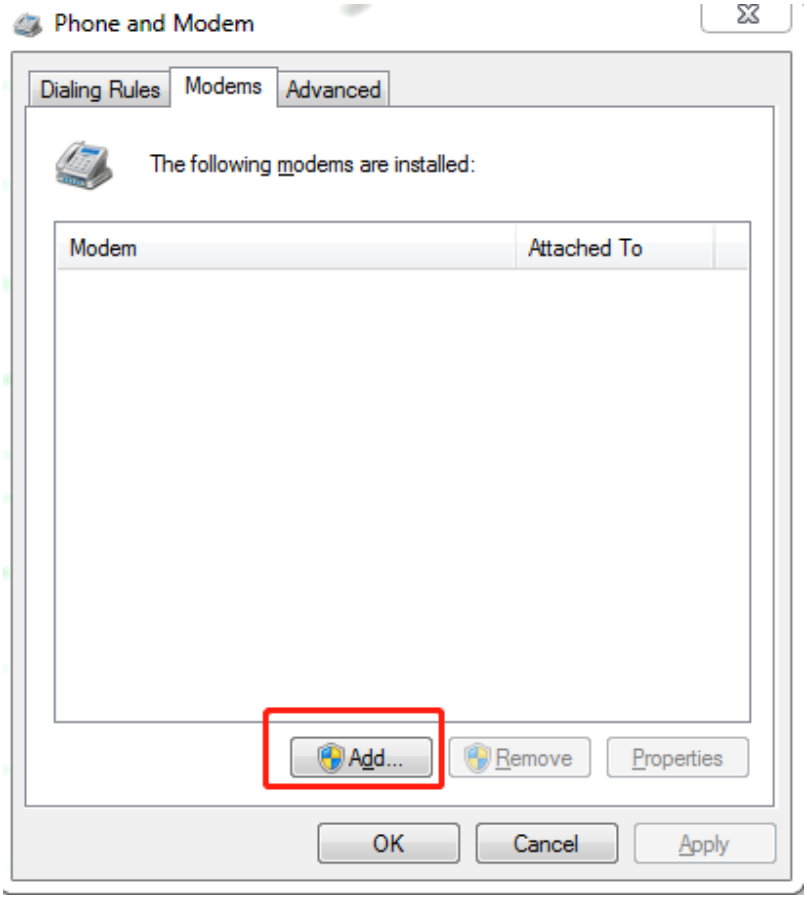

Figure 4: Add a New Modem

3. Check the item "**Don't detect my modem; I will select it from a list**" and click "**Next**" to add a new modem.

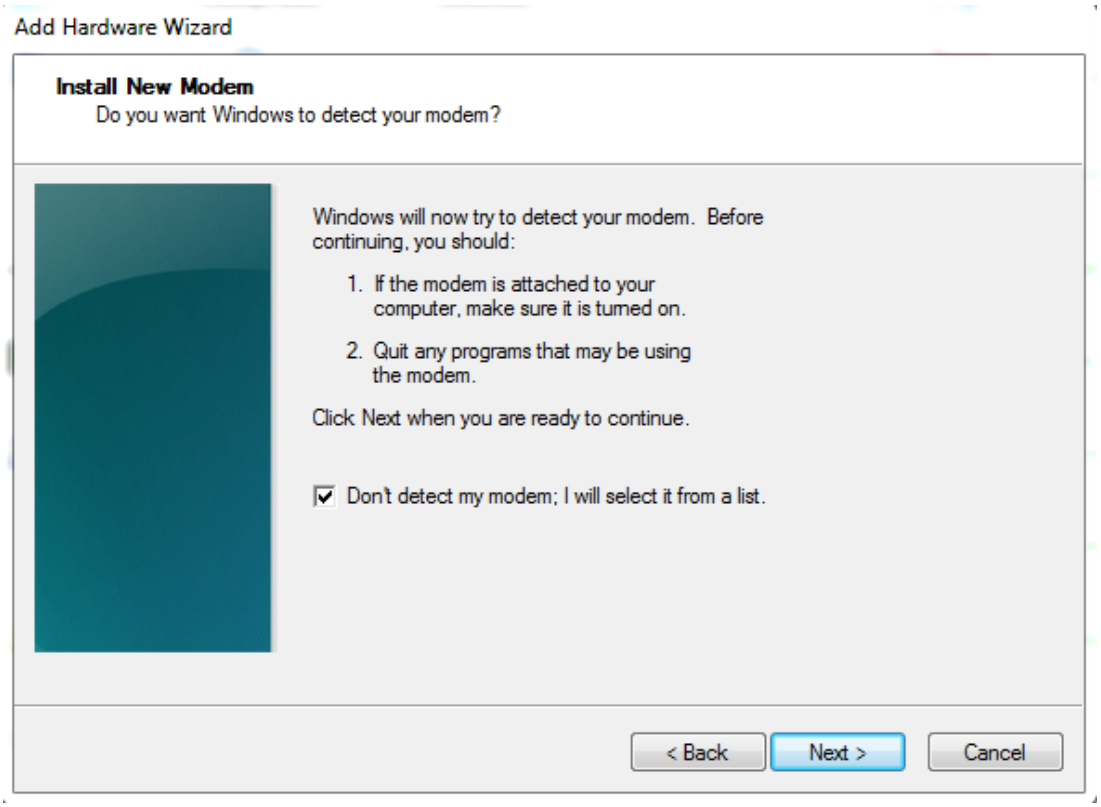

Figure 5: Install a New Modem

4. Install the new modem according to the instructions on the screen: select "**Standard 56000 bps Modem**" and a port ("**COM5**", AT port) which will be installed; click "**Next**" button, until the configuration is finished. Refer to the following three figures for details.

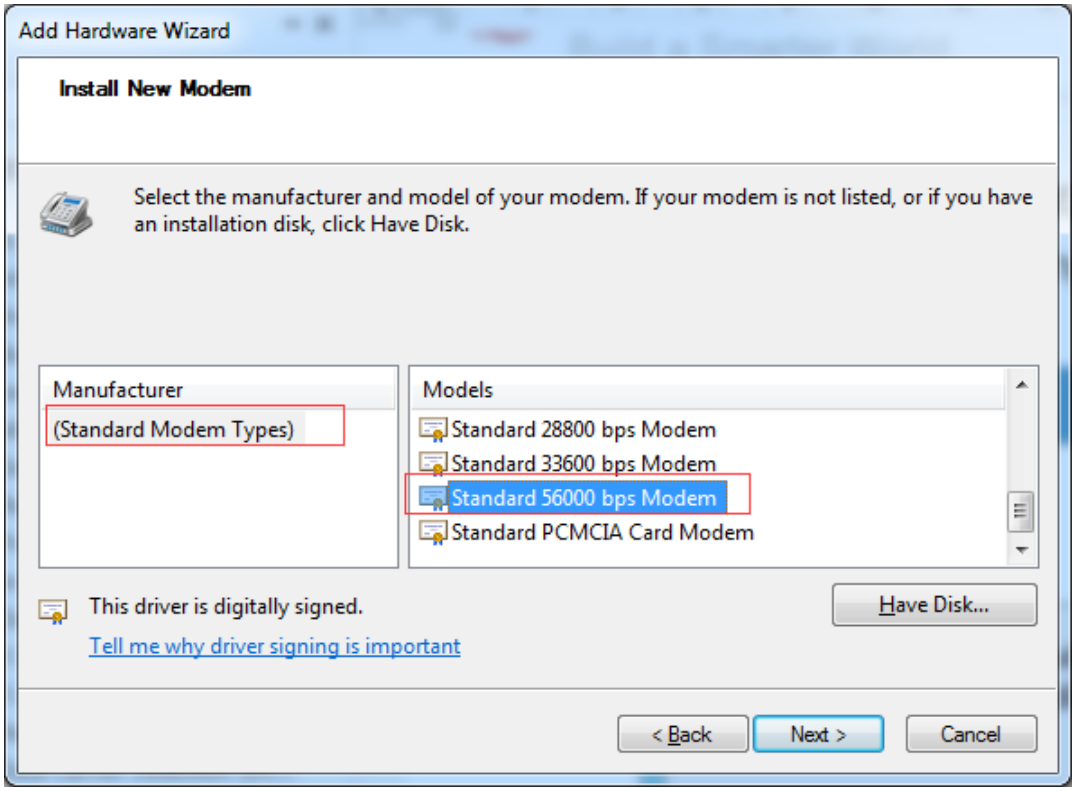

Figure 6: Select a Model of the Modem

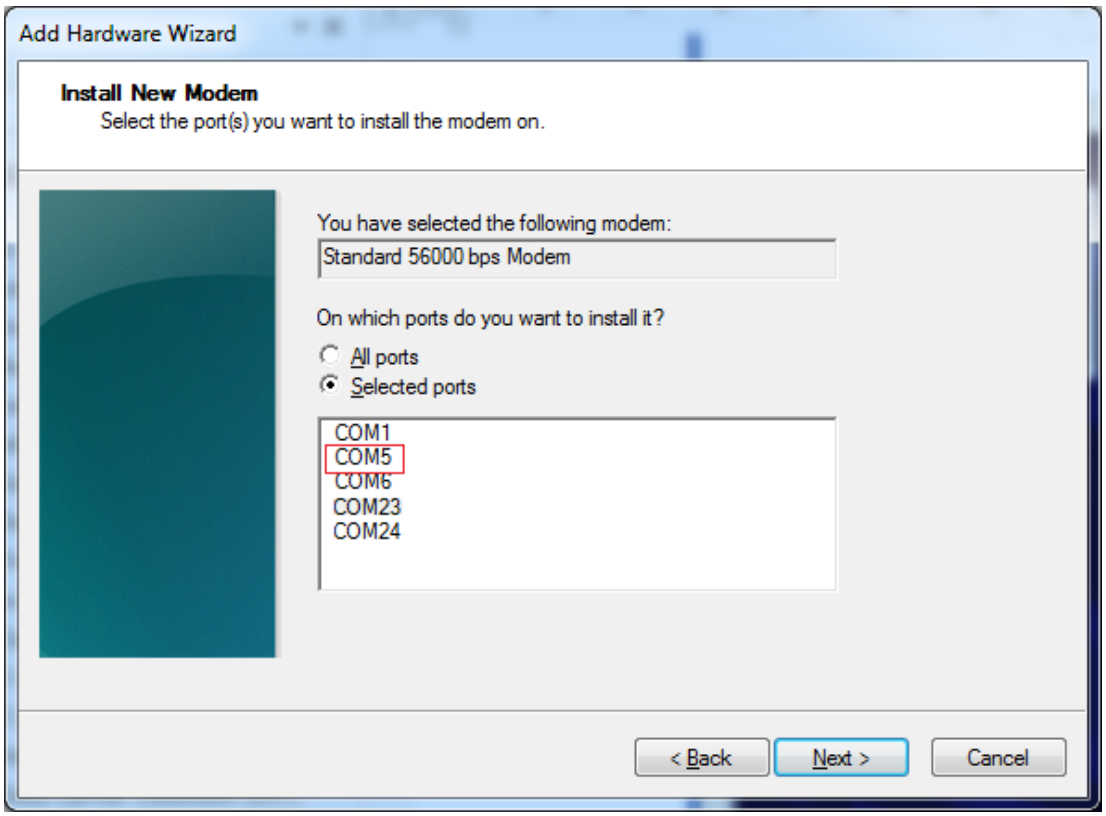

Figure 7: Select a Port to Install the Modem

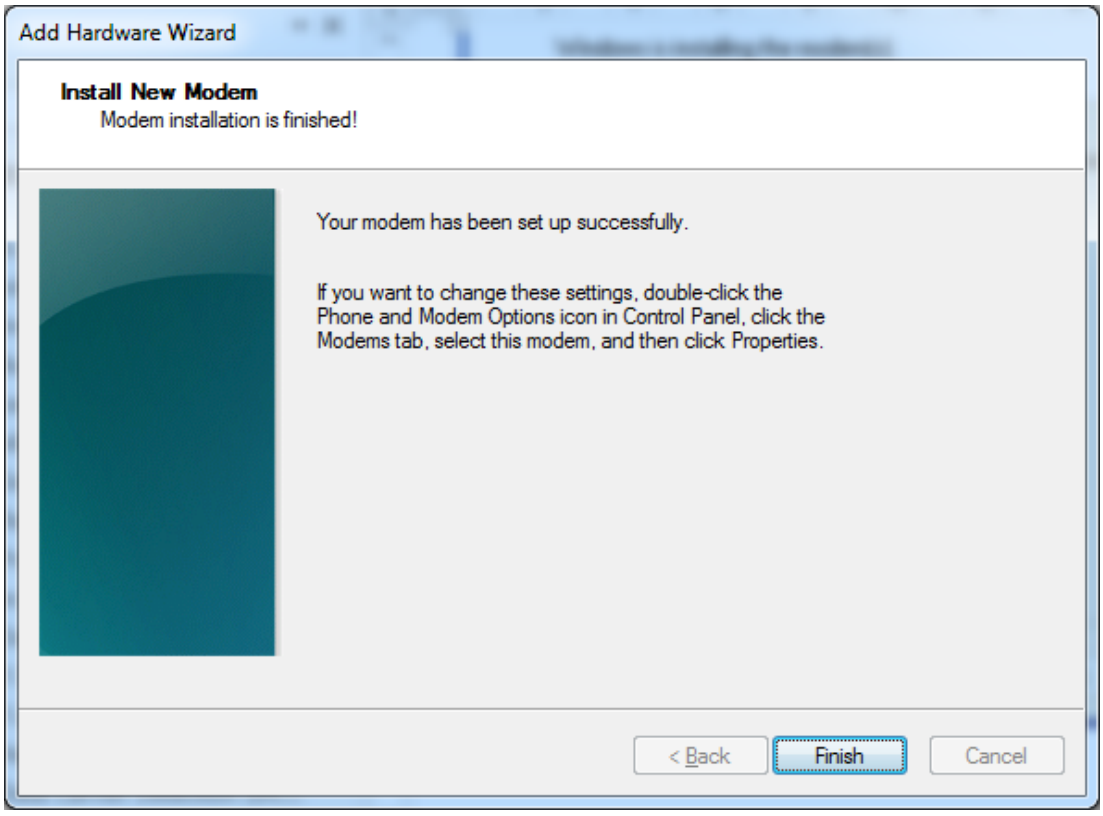

Figure 8: Set Up the Modem Successfully

3.1.2. Configure the Modem Driver

1. Select the "**Standard 56000 bps Modem**" which has been installed; click "**Properties**" button.

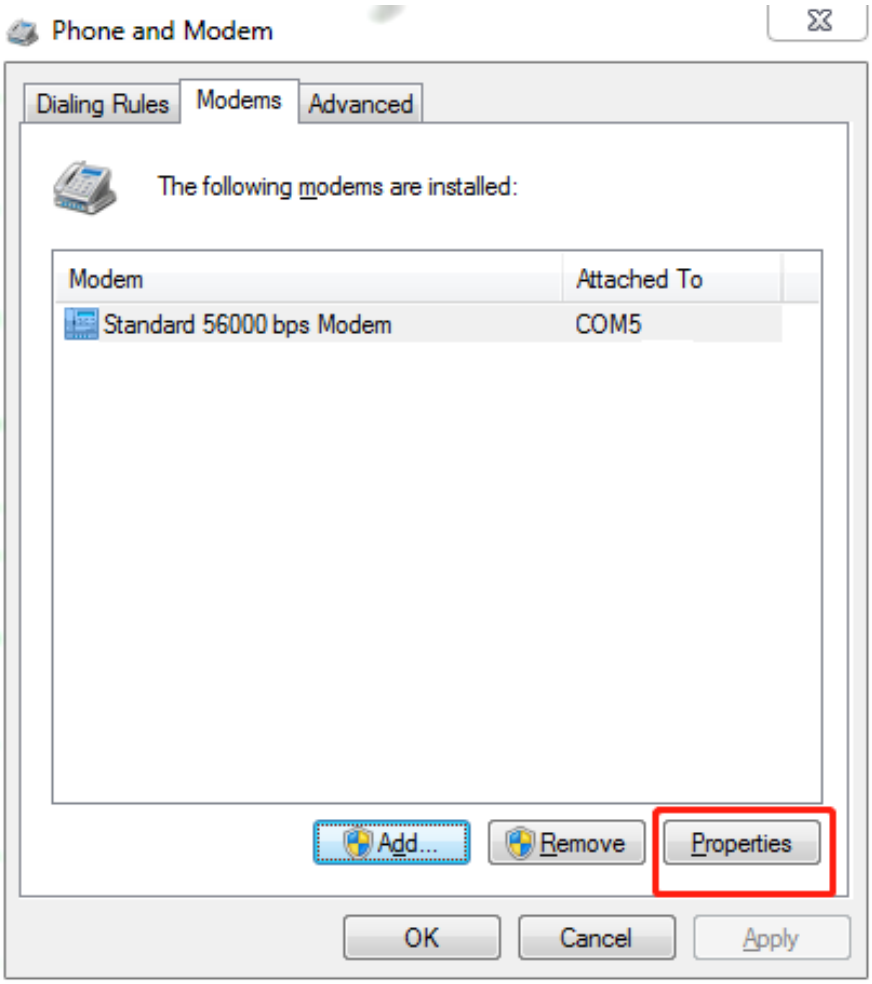

Figure 9: Select Modems Option

2. Click "**Modem**" to turn off "**Speaker volume**", select "**115200**" (default value) for "**Maximum Port Speed**" and uncheck "**Wait for dial tone before dialling**" in "**Dial Control**" field.

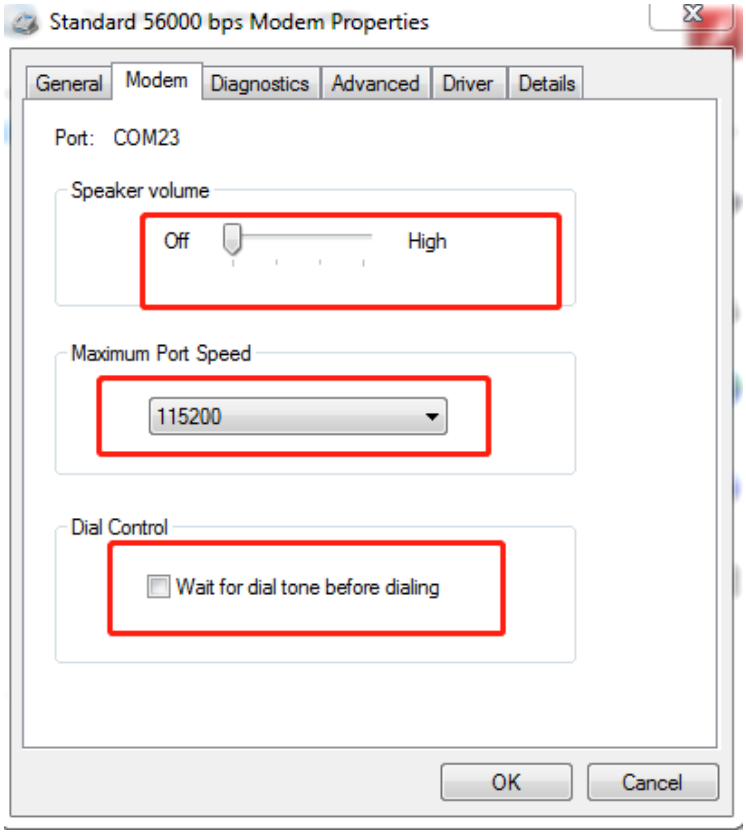

Figure 10: Set Modem Properties

For Window 10 or later operating systems, click "**Change settings**" in the "**General**" tab first as shown below, and then make the above changes in "**Modem**" tab.

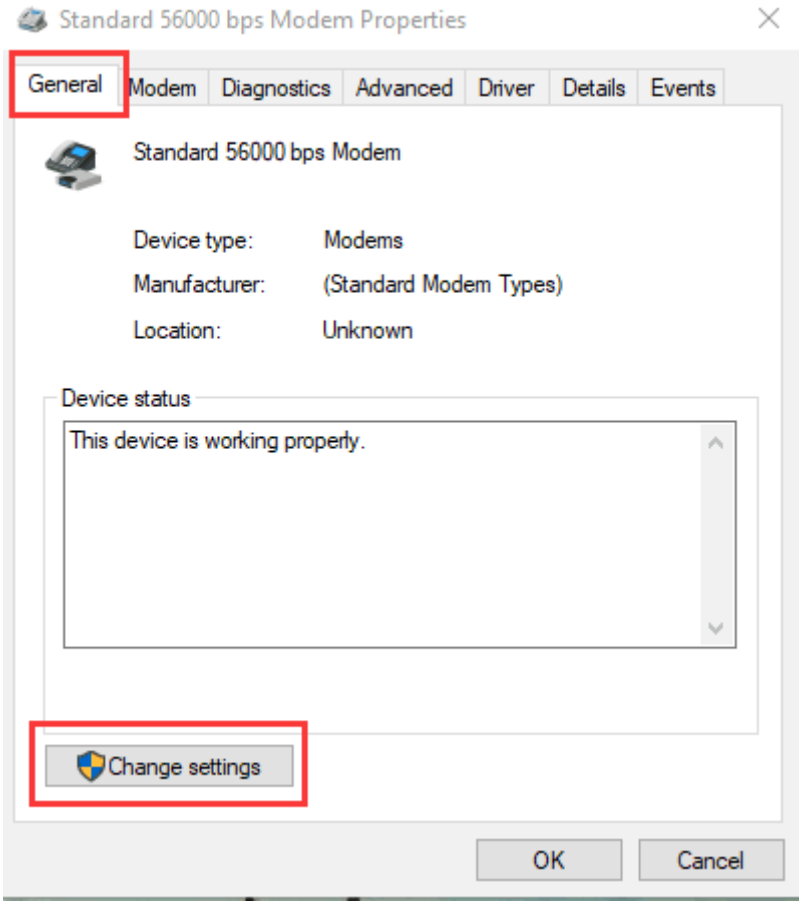

Figure 11: Change Settings in Window 10 or Later OS

3. Click "**Advanced**" to configure "**Extra Settings**"; and then input **AT+CGDCONT=1,"IP","CTNB"** command; click "**Change Default Preferences…**", select "**None**" for "**Flow control**", then click "**OK**", as illustrated below.

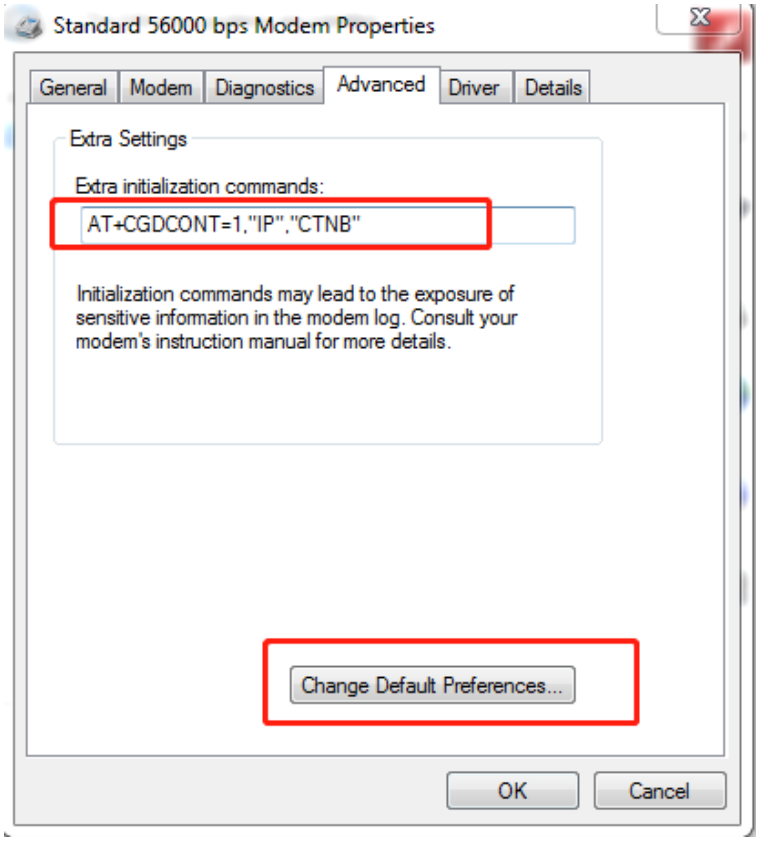

Figure 12: Set APN

NOTE

In the example above, the setting predefines a PDP context where PDP context ID is 1, PDP type is IP and APN is CTNB. CTNB is the APN for the network provider China Telecom and it should be replaced with the value provided by customers' actual network provider. For more details of **AT+CGDCONT**, see ***document [3]***.

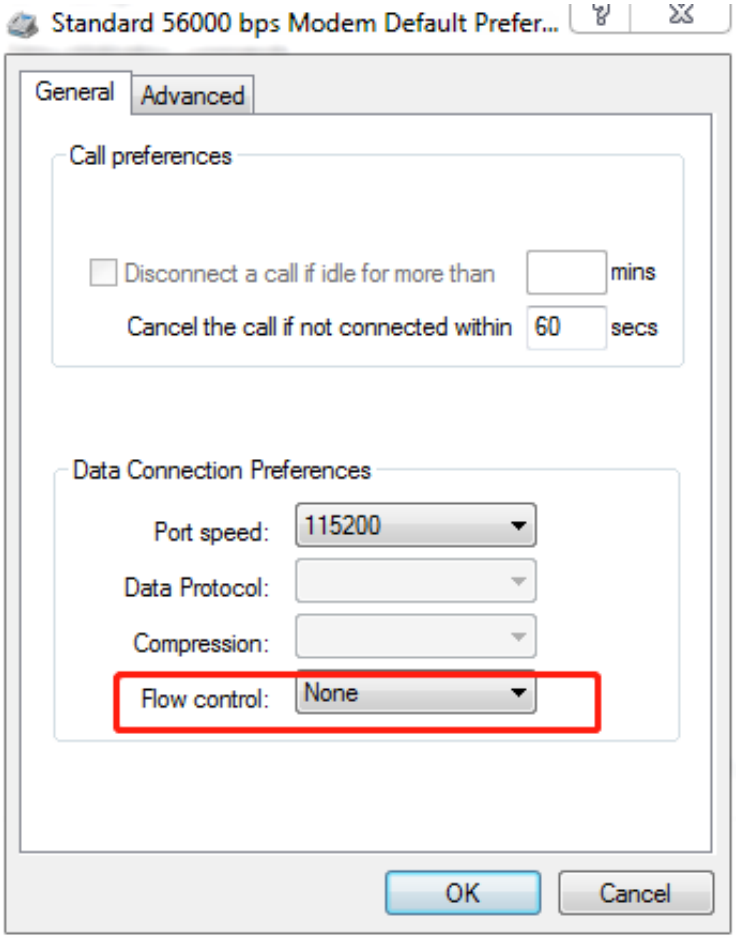

Figure 13: Change Modem Default Preferences

3.2. Dial-up Network Configuration

3.2.1. Create a New Connection

1. Open "**Control Panel**" and double click "**Network and Sharing Center**", and then click "**Set up a new connection or network**", as illustrated below.

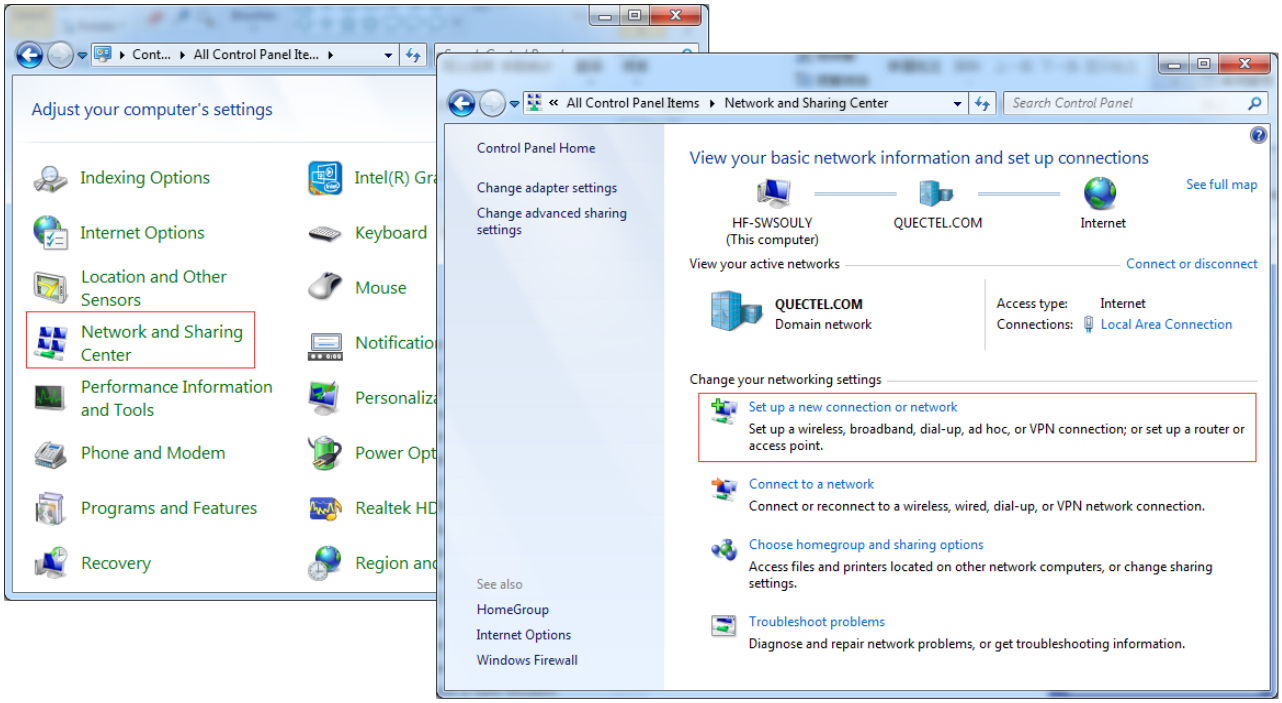

Figure 14: Set up a New Connection or Network

3.2.2. Configure the Connection

1. Select "**Set up a dial-up connection**" in "**Set Up a Connection or Network**".

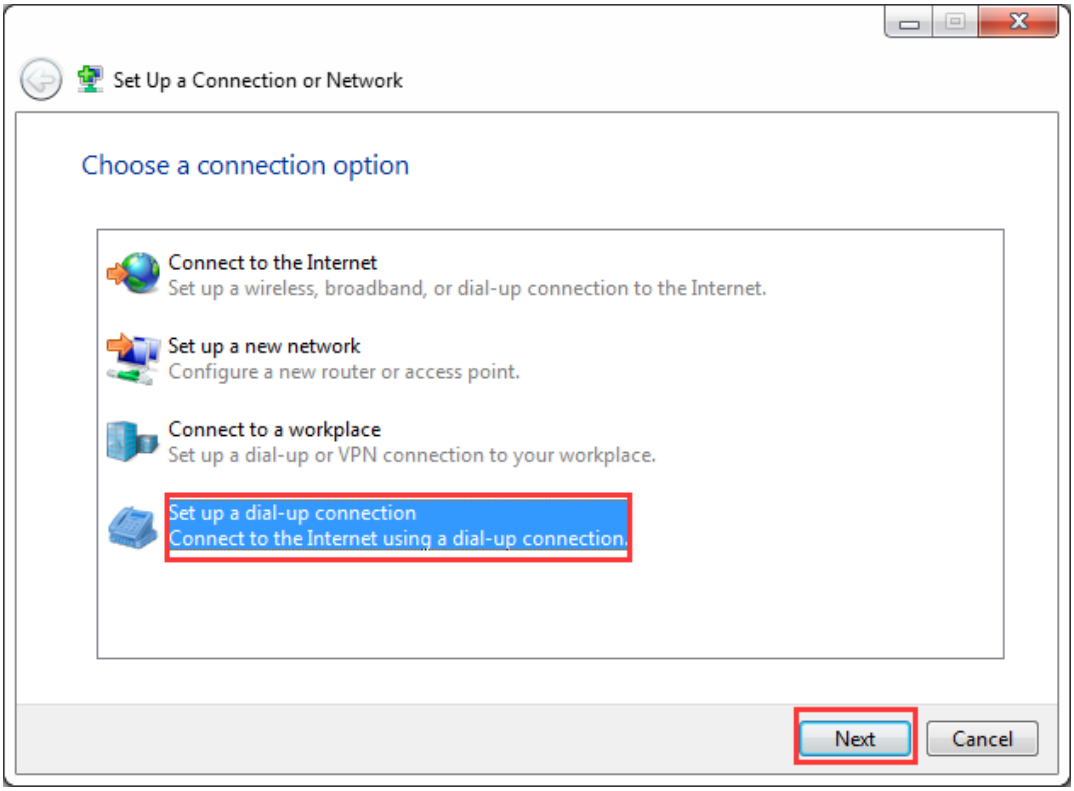

Figure 15: Set up a Dial-up Connection

2. Fill "**Dial-up phone number**" with string "***99#**", "**Connection name**" with a proper name ("**MT2625 TE-B**" as an example in this document), and then click "**Connect**".

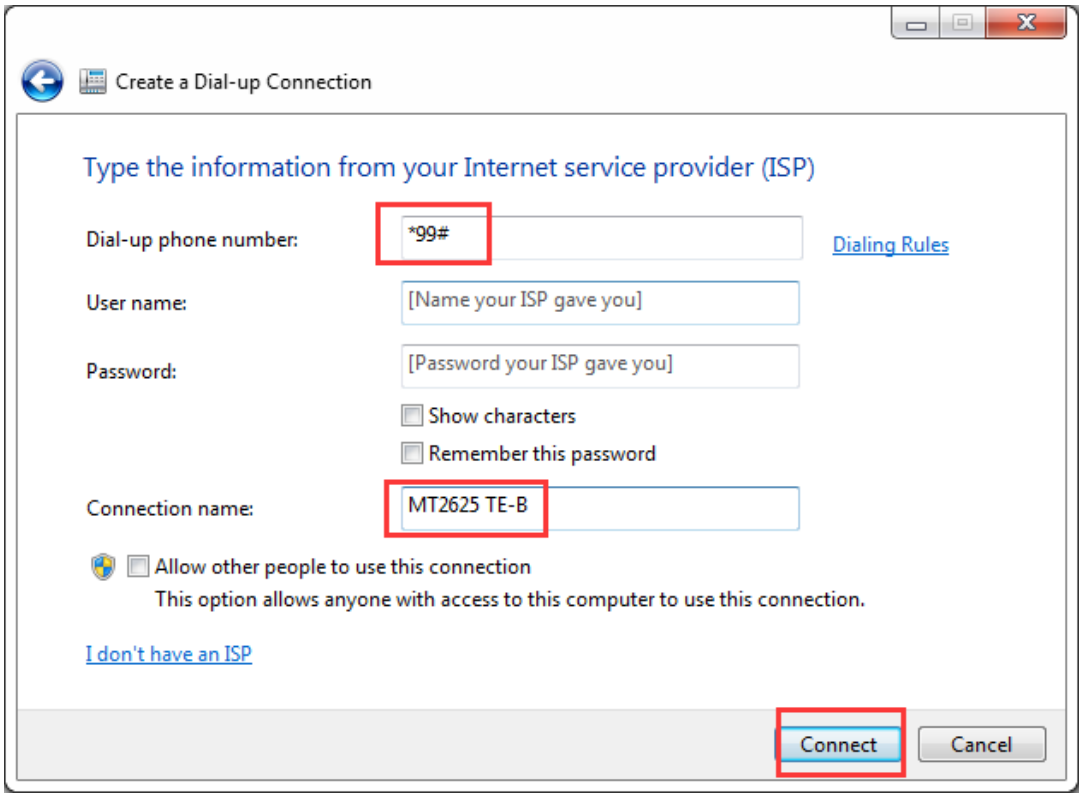

Figure 16: Type the Information for Creating a Dial-up Connection

3. If all above settings are correct, skip this step. Otherwise click "**Set up the connection anyway**", as illustrated below.

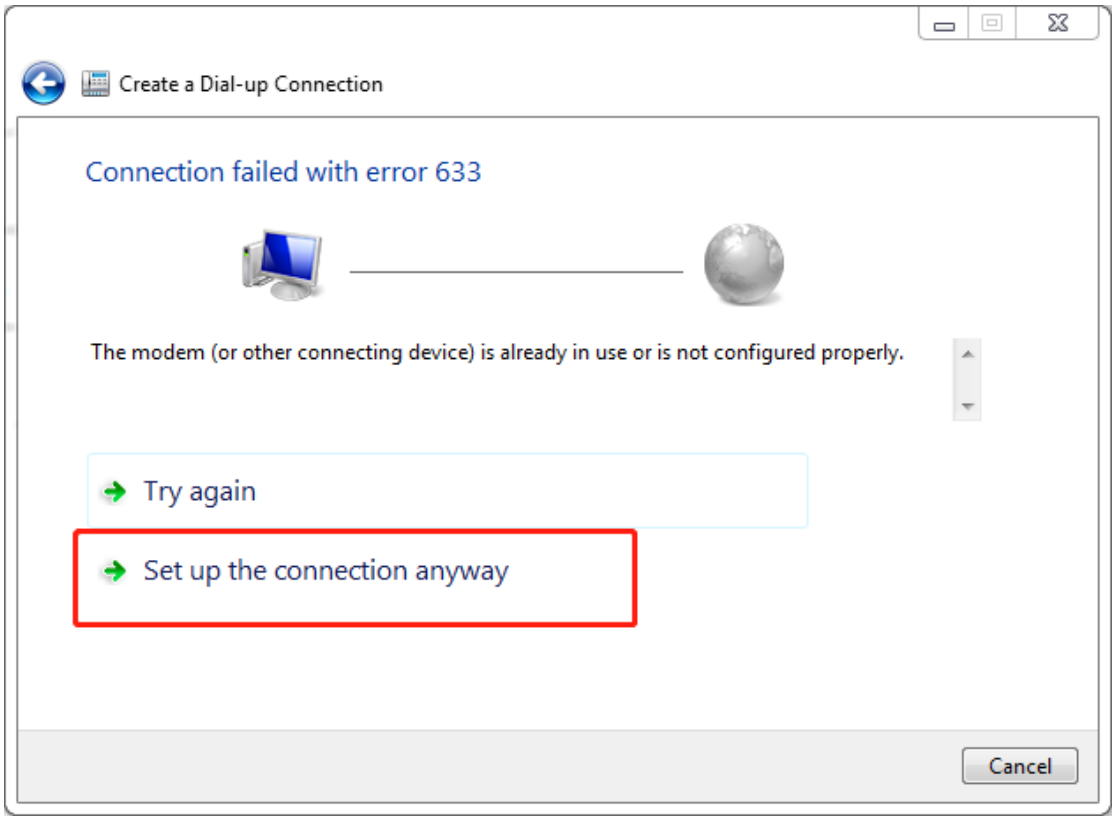

Figure 17: Configure the Connection

3.2.3. Configure the Dial-up Tool

1. Go to "**Change adapter settings**" in "**Network and Sharing Centre**".

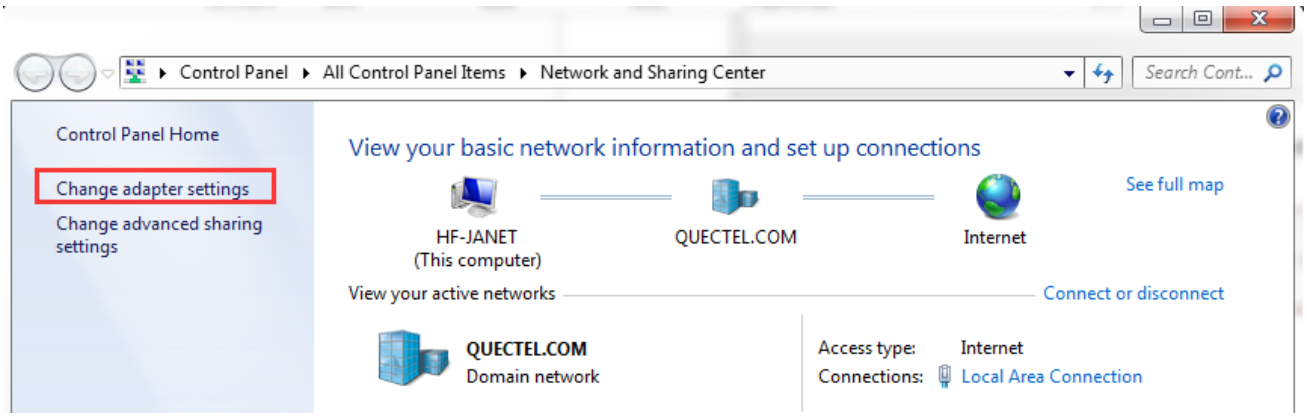

Figure 18: Change Adapter Settings

2. Find the newly created connection and double click it.

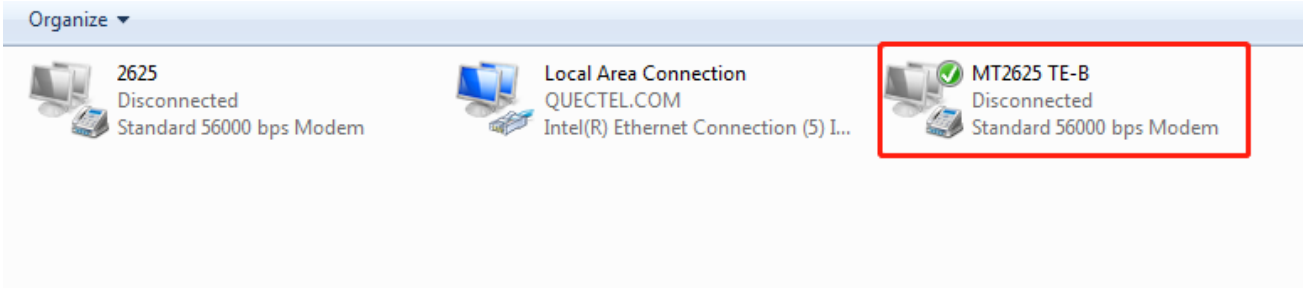

Figure 19: Double Click the Newly Created Connection

3. Click "**Properties**" button from the popup window.

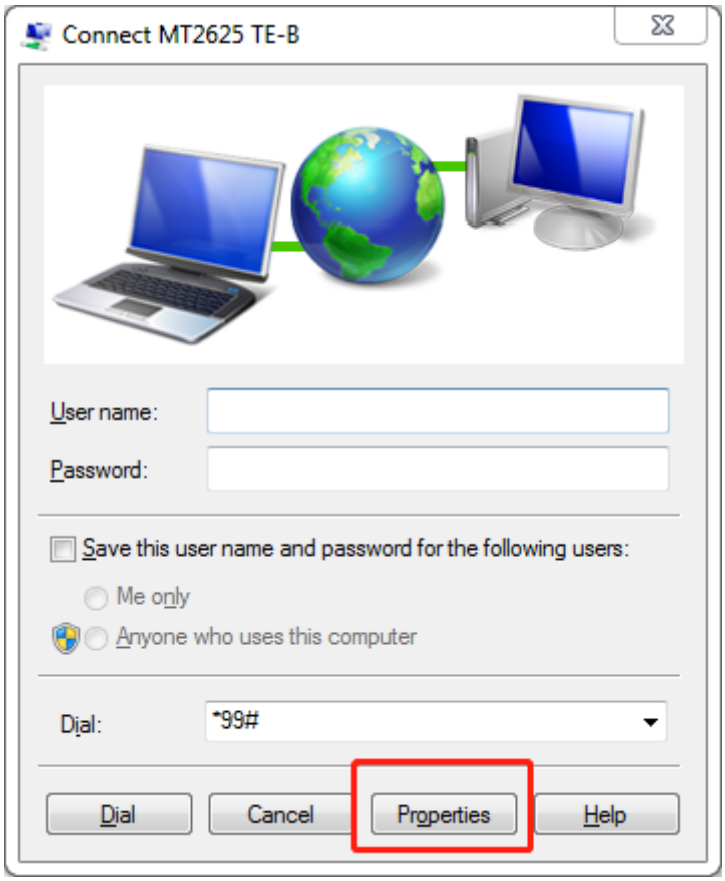

Figure 20: Select Connection Properties

4. Go to "**General**" tab and click "**Configure...**", select "**115200**" as "**Maximum speed (bps)**"; uncheck all items in "**Hardware features**", uncheck "**Enable modem speaker**" and then click "**OK**".

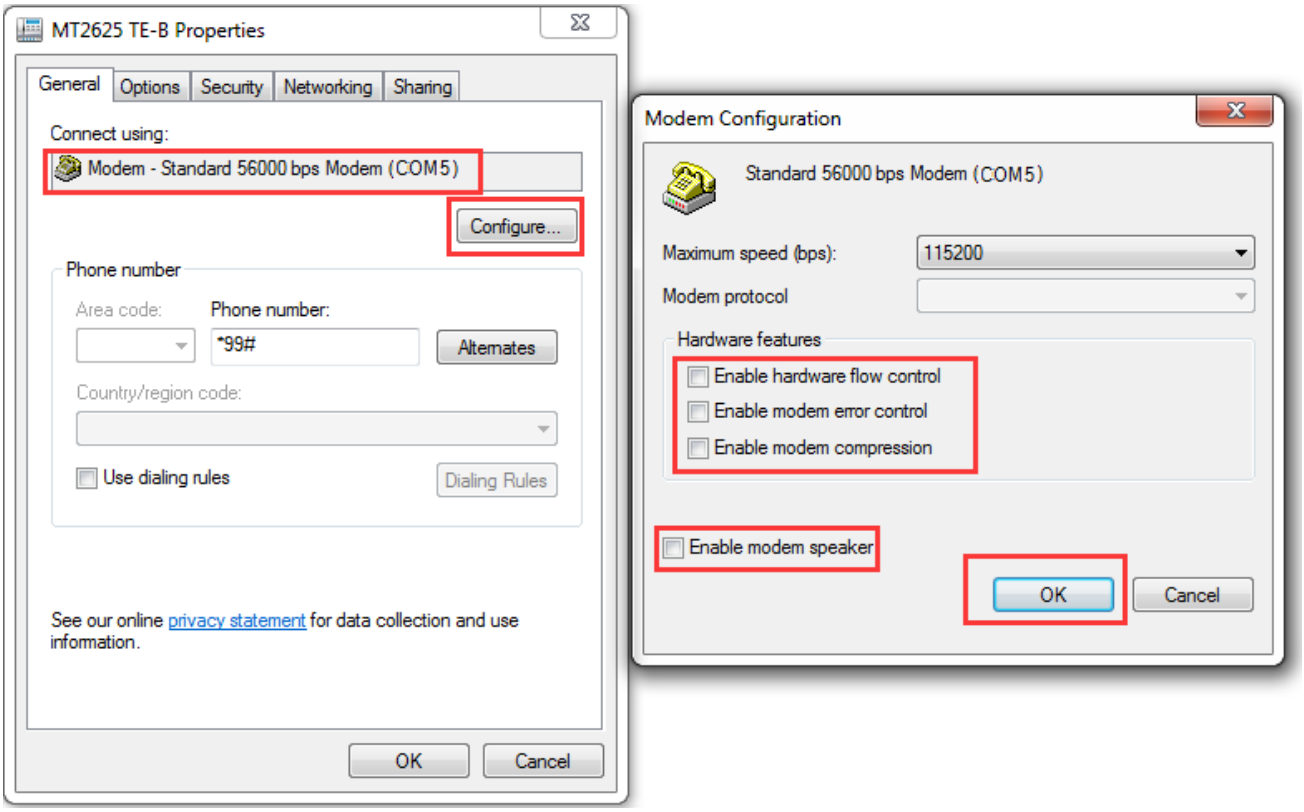

Figure 21: General Settings for Modem Configuration

5. Go to "**Options**" tab and click "**PPP Settings…**", uncheck all items in the pop-up box of PPP settings.

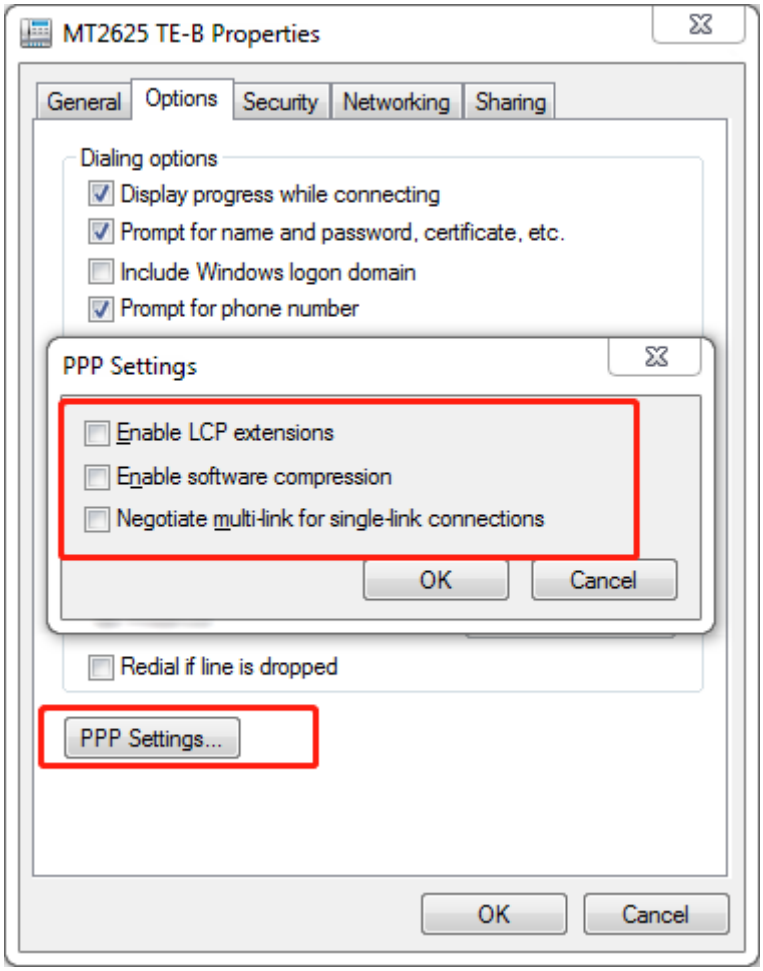

Figure 22: PPP Settings for Connection Properties

6. Go to "**Security**" tab, uncheck the item of CHAP and MS-CHAP v2 under the tab "**Allow these protocols**".

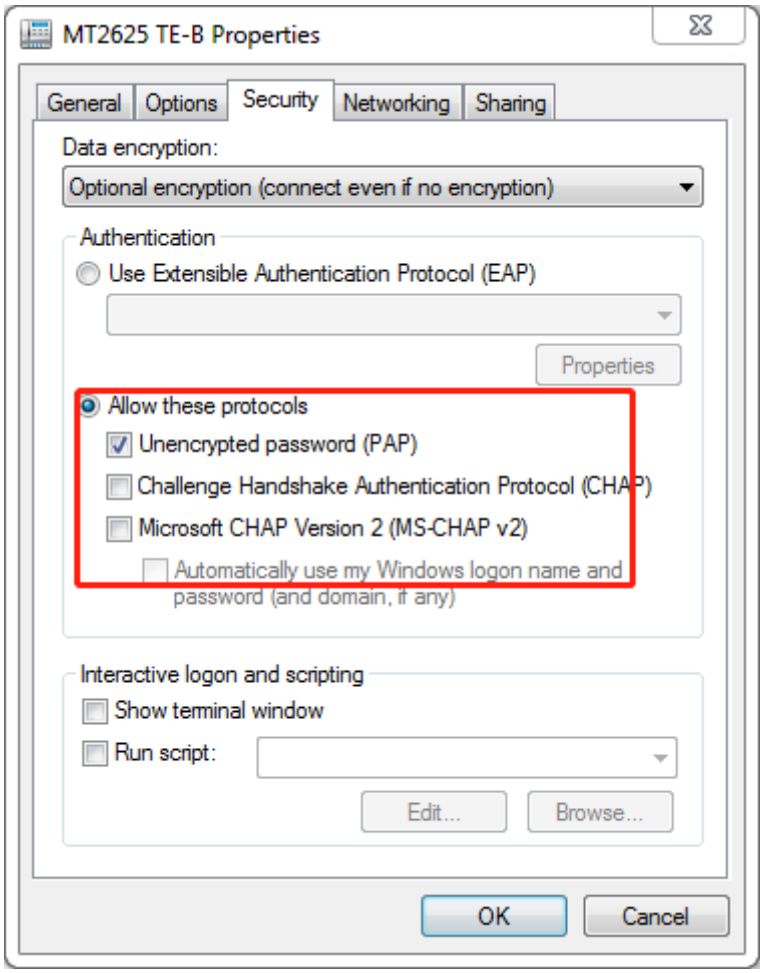

Figure 23: Security Settings for Connection Properties

7. Go to "**Networking**" tab, uncheck the item "**Internet Protocol Version 6 (TCP/IPv6)**". Click "**OK**" button to finish the configuration. Refer to the following figure for details.

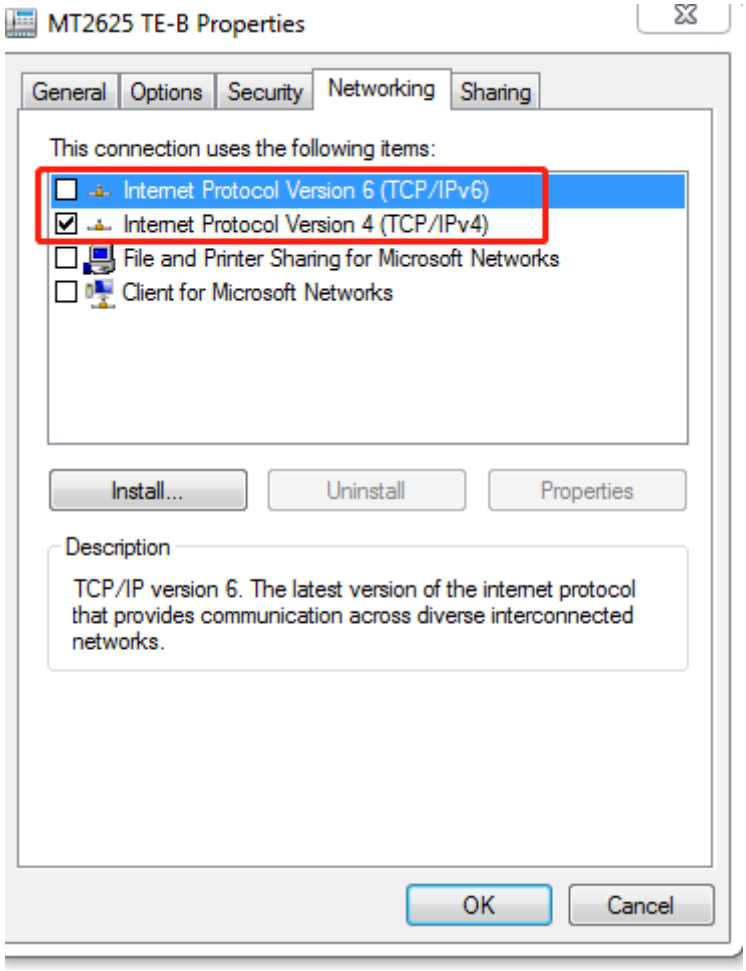

Figure 24: Networking Settings for Connection Properties

3.3. Establish the Dial-up Connection

Repeat **Step 1** and **Step 2** in ***Chapter 3.2.3*** to find the newly created connection ("**MT2625 TE-B**"). Double click "**MT2625 TE-B**" and then click "**Dial**" to establish the dial-up connection. Please refer to the following figure for details.

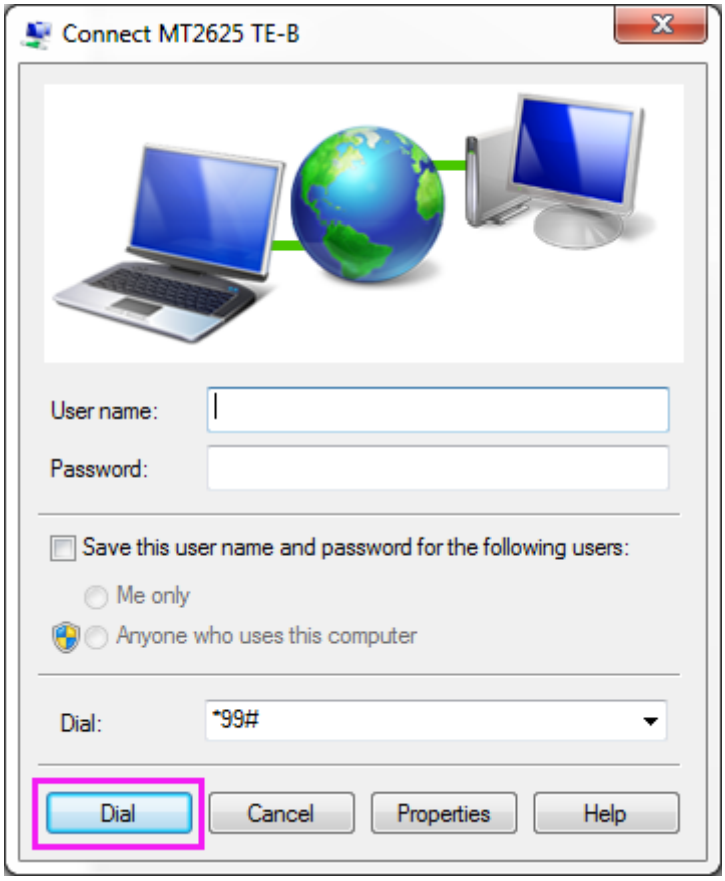

Figure 25: Establish the Dial-up Connection

3.4. Route Configuration

After completing steps above, PPP can work well. Many applications on the host send data by PPP, which affects some specific applications. To ensure a valid test, you need to configure the route before testing.

3.4.1. Query IP Address

Query the IP address with **AT+CGPADDR** on AT tool, or with **ipconfig** in Windows CMD on the host. For details of **AT+CGPADDR**, see ***document [3]***.

3.4.2. Delete All Default Routes

Upon a successful PPP connection, input the command below on the Windows CMD IMMEDIATELY to delete all default routes, disabling data transmission by PPP.

```
Route delete 0.0.0.0
```

3.4.3. Add Target Routes

After deleting the routes, add a target route into the route list to enable the target service. The format is: **route add <target address> mask <mask address> <local address>**, as shown below.

```
route add 220.180.239.212 mask 255.255.255.255 100.82.48.224
```

4 Related AT Command

4.1. AT Command Introduction

4.1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals to its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

4.1.2. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

Table 3: Types of AT Commands

Command Type	Syntax	Description
Test Command	**AT+<cmd>=?**	Test the existence of corresponding Write Command and return information about the type, value, or range of its parameter.
Read Command	**AT+<cmd>?**	Check the current parameter value of a corresponding Write Command.
Write Command	**AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]**	Set user-definable parameter value.
Execution Command	**AT+<cmd>**	Return a specific information parameter or perform a specific action.

4.2. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about the use of the AT commands introduced herein. The examples, however, should not be taken as Quectel's recommendation or suggestions about how you should design a program flow or what status you should set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there exists a correlation among these examples, or that they should be executed in a given sequence.

4.3. AT Command Description

4.3.1. AT+EPORT Configure and Query Serial Port

AT+EPORT Configure and Query Serial Port	
Write Command Query the current setting. **AT+EPORT=0**	Response **+EPORT: <owner_name>=<portID>** **[…]** **OK** If there is any error: **ERROR**
Write Command Configure the function of serial port. **AT+EPORT=1,<owner_name>,<portID>**	Response **OK** If there is any error: **ERROR**
Write Command Configure the baudrate of serial port. **AT+EPORT=3,<portID>,<baudrate>**	Response **OK** If there is any error: **ERROR**
Write Command Query the baudrate of serial port. **AT+EPORT=4**	Response **+EPORT: 0** **baudrate=<baudrate>** **+EPORT: 1** **baudrate=<baudrate>** **+EPORT: 2** **baudrate=<baudrate>** **+EPORT: 3**

	baudrate=<baudrate> **+EPORT: 4** **none** **+EPORT: 5** **none** **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristic	The command takes effect after the module is rebooted. The configurations will be saved automatically.

Parameter

<owner_name>	String type. Function of port. EMMI GKI Log Port ULS HSL Log Port
<portID>	Integer type. Port ID. 0 UART port0 1 UART port1 2 UART port2 3 UART port3 4 USB1 5 USB2 If **<owner_name>** is EMMI, the default port is UART port1. If **<owner_name>** is ULS, the default port is UART port2.
<baudrate>	Integer type. Baudrate of the specified port. Default value: 9 (115200 bps). It is only valid when **<portID>**=0/1/2/3 and the baudrate can be configured. When **<portID>**=4/5, **AT+EPORT=4** returns **none**. At this time, the baudrate cannot be configured and it is fixed at 12 (921600 bps). 5 9600 bps 9 115200 bps 12 921600 bps 14 1500000 bps 13 3000000 bps

Example

```
AT+EPORT=4
+EPORT: 0
```

```
baudrate=9
+EPORT: 1
baudrate=12
+EPORT: 2
baudrate=12
+EPORT: 3
baudrate=9
+EPORT: 4
none
+EPORT: 5
none

OK
```

5 Appendix References

Table 4: Related Documents

Document Name
[1] Quectel_BC66-TE-B_User_Guide
[2] Quectel_BC66-NA-TE-B_User_Guide
[3] Quectel_BC66&BC66-NA_AT_Commands_Manual

Table 5: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
EPS	Evolved Packet System
IP	Internet Protocol
PDN	Public Data Network
PDP	Packet Data Protocol
PPP	Point-to-Point Protocol
PSM	Power Saving Mode
RF	Radio Frequency
SMA	SubMiniature Version A
TCP/IP	Transmission Control Protocol/Internet Protocol
UART	Universal Asynchronous Receiver/Transmitter
ULS	Unified Logging System
USB	Universal Serial Bus