



LTE CELLULAR CONNECTIVITY ON WINDOWS FOR BG95

LTE cellular connectivity on Windows operating system for BG95



Purpose of the Document

The purpose of this document is to explain how to setup and configure LTE cellular connectivity to the Internet on Windows operating system. This applies to LTE modems such as BG95, BG77, or Raspberry PI HAT.

Document History

Version	Author	Date	Description
A	5G HUB	02.28.2021	Initial Document

Table of Contents

Purpose of the Document	2
Document History	2
1 Introduction	4
2 Install LTE&GNSS Windows Driver	5
3 Using the USIM card.....	6
4 Getting the COM port for LTE modem.....	6
5 Setting the Access Point Name (APN)	7
6 Connecting Windows OS to the Internet	10
7 Troubleshooting.....	19

1 Introduction

This document describes how to use LTE modem for connectivity on Windows OS.

This document is applicable to all GSM, UMTS, LTE, and GNSS modules using BG95 or BG77 modems.

2 Install LTE&GNSS Windows Driver

On Windows Operating System (OS), install the following Windows driver for LTE&GNSS modem:
[5G-NB-IoT/Driver at master · 5ghub/5G-NB-IoT \(github.com\)](https://github.com/5G-NB-IoT/Driver)

Follow the following steps:

- 1- Insert a USIM card into the USIM card slot on the hardware board.
- 2- Connect a USB cable between the hardware board and the computer as in the following diagram
(Note: the hardware board is an example and other USB dongle or Raspberry PI HAT can be used. You can also use different antennas if needed)

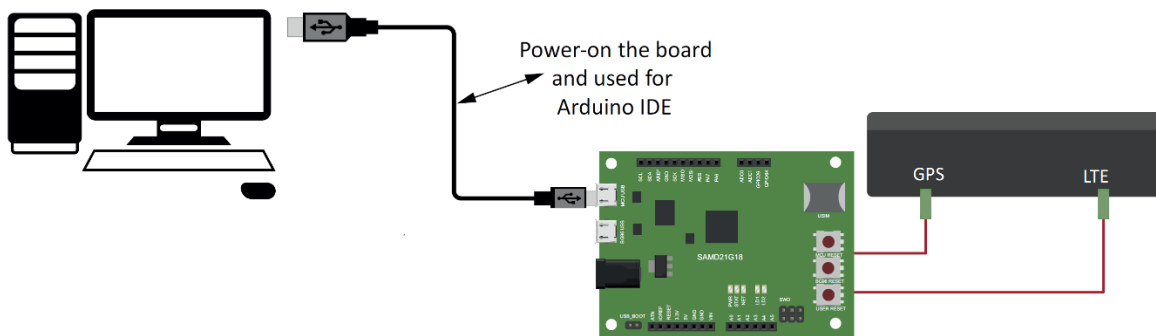


Figure 1: Setting up the hardware board.

- 3- You shall see the ports and modem in the Windows device manager as in this screenshot:

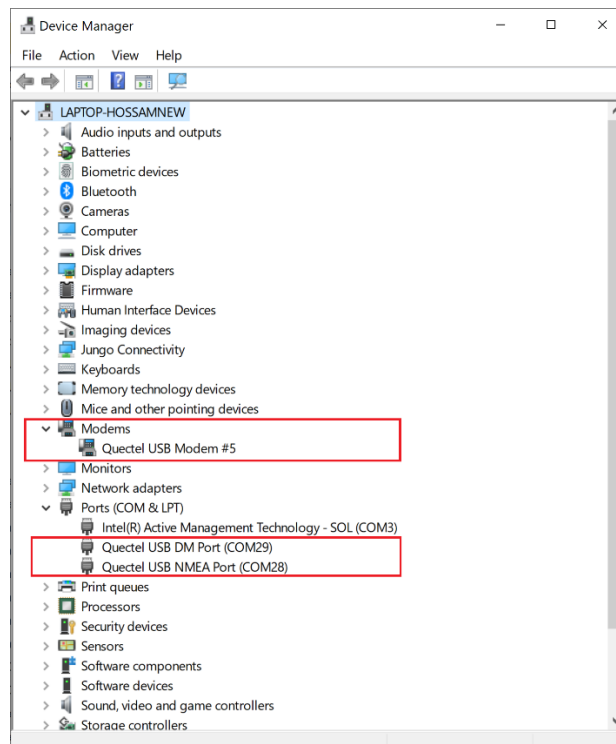


Figure 2: Windows device manager.

NOTE: It is very important to see the **USB modem** in the device manager as this is the driver that Windows OS uses to connect to the Internet and outside world.

3 Using the USIM card

To configure and use the USIM card, follow the following steps:

- 1- If you have the USIM card, it needs to be activated. If you are using the [5G HUB Global SIM](#) card, go to IoT Connector to start activating your SIM, monitor its usage, and start using it with the hardware boards and Raspberry PI HAT. The IoT connector is available here: [IoT Connector](#)
- 2- Insert the USM card into the USIM card slot on the hardware board.
- 3- Launch QCOM tool and connect to the LTE modem through the USB port. Follow instructions in this document for how to connect [QCOM tool](#) to the LTE modem.

4 Getting the COM port for LTE modem

To use the QCOM tool with LTE&GNSS modem, connect the computer USB port to the USB port on the hardware board and make sure all modem serial ports are enumerated in the Windows device manager as in figure below.

The serial ports below can be used for the following purposes:

- **USB Modem:** The USB modem interface is used for AT commands, data transmission, GNSS data and NMEA sentences output.
- **USB DM Port**
- **USB NMEA Port:** It is used for GNSS data and NMEA sentences output.

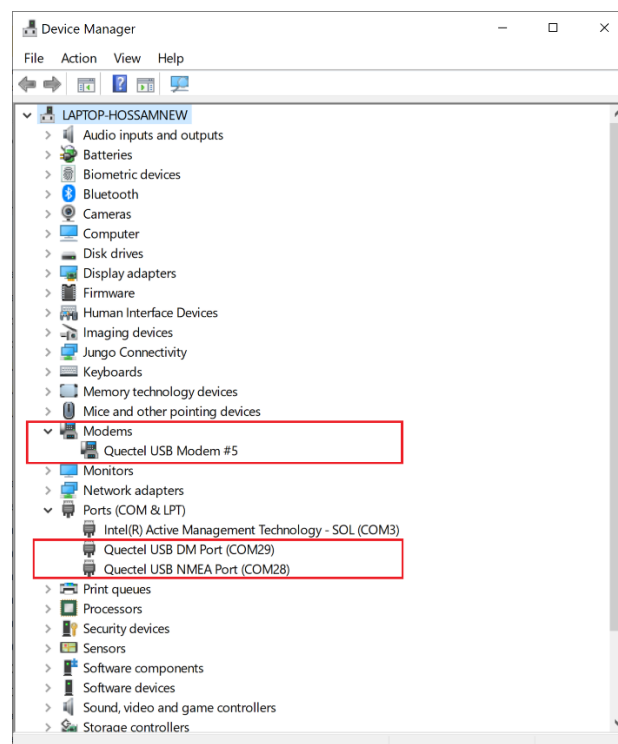


Figure 3: Windows device manager enumerated all serial ports of the modem.

Each serial port, as in Figure 3, shows the serial port number uses as in format **COMXX**. The **USB Modem** port is used configure and exchange AT commands with the LTE modem. You can find the COM port number of the USB modem by **right-click** on it, select **Properties**, then select **Modem**. You will find the port number displayed for this USB modem. It shows up as **COM27** in the figure below. You can use this port number in QCOM tool.

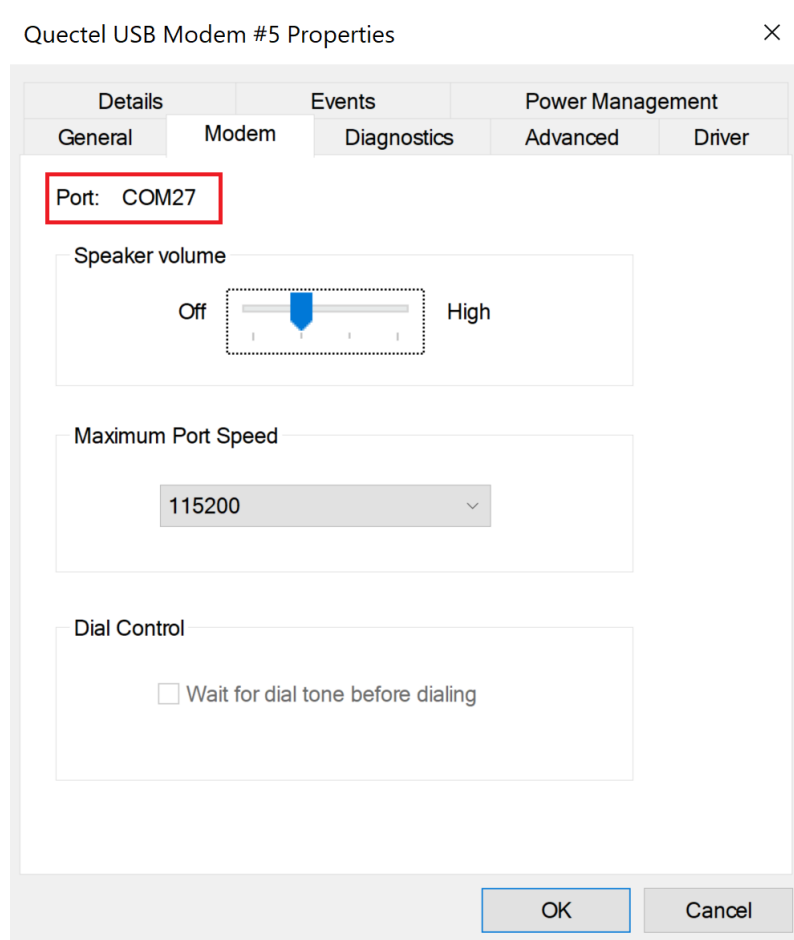


Figure 4: Port number for the USB modem.

5 Setting the Access Point Name (APN)

APN is the access point name of the mobile operator. Since LTE modem is a cellular device, it connects to mobile operator network. Each mobile operator network has different APN name. For example, AT&T uses the APN: **m2mNB16.com.attz**. Verizon, T-Mobile, or other mobile operators around the world uses different APN. For the first time to use the LTE modem, you need to set the APN as the factory default value of the APN name might be a different value.

If you are using the [5G HUB Global SIM](#) card, it uses the APN: **super**.

In the QCOM tool, use the following AT command to set the APN name:

```
AT+CGDCONT=1,"IP","super",
```

This AT command will set the APN name on the LTE modem for both IPv4 and IPv6.

To be able to connect to different mobile operators which has the best signal quality and best coverage, you can enable roaming capability on the LTE modem. The following AT command is used to enable roaming services:

AT+QCFG="roamservice",2

The following QCOM tool screenshot shows that it is connected to the hardware board over USB COM port number 27. After it connects, you can run the following AT commands, which configure the APN and roaming service on the LTE modem.

```
[2021-02-27_22:52:35:200] AT+CGDCONT=1,"IP","super"
[2021-02-27_22:52:35:200] OK
[2021-02-27_22:52:36:699] AT+QCFG="roamservice",2
[2021-02-27_22:52:36:699] OK
[2021-02-27_22:52:40:423] AT+CGDCONT?
[2021-02-27_22:52:40:423] +CGDCONT: 1,"IP","super","0.0.0.0",0,0,0,0
[2021-02-27_22:52:40:423] OK
```

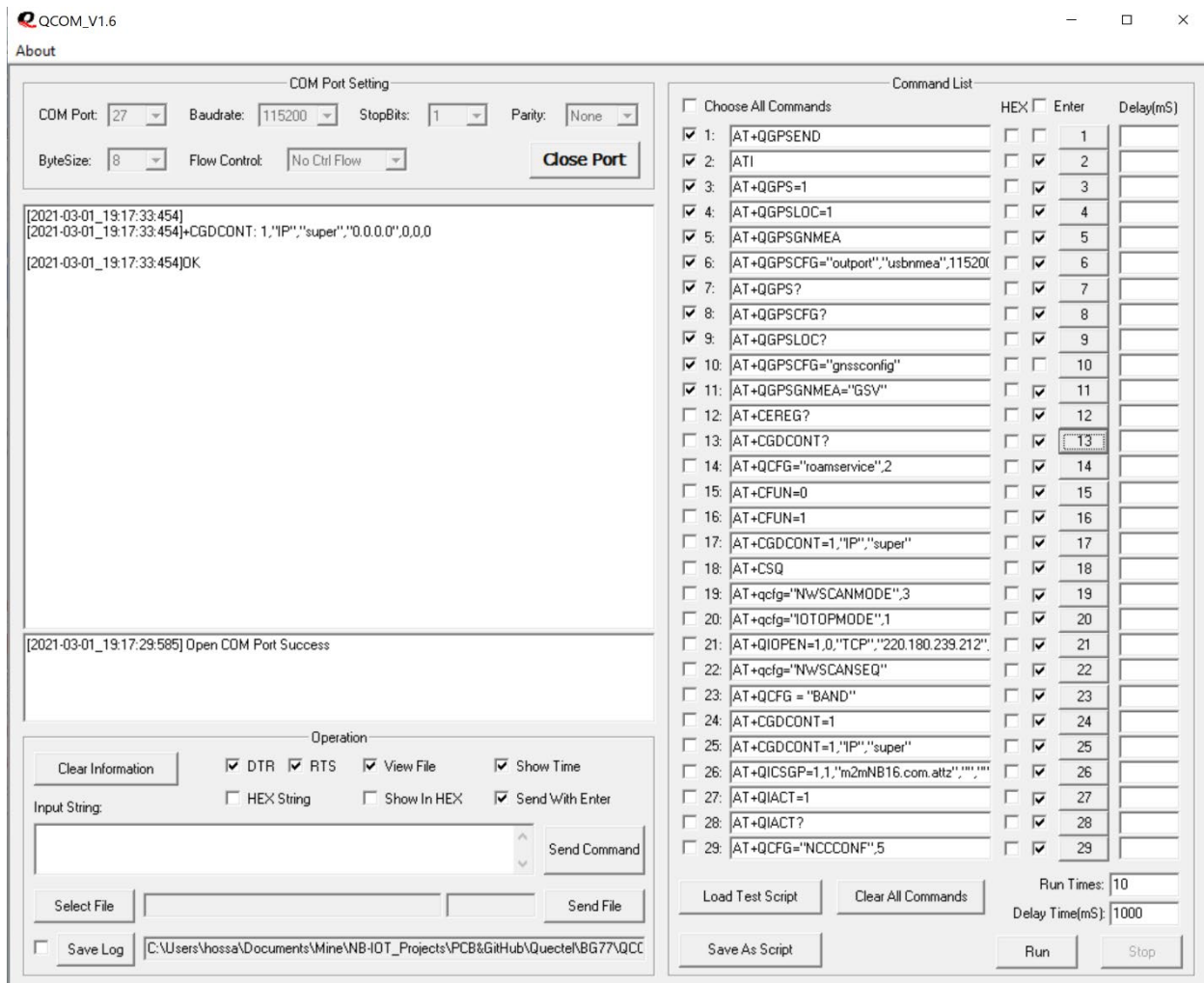


Figure 5: QCOM tool to configure APN.

You can query the APN stored on the LTE modem by running the following command which shows the APN is now set to **super** for IPv4 or IPv6

```
[2021-02-27_22:52:40:423] AT+CGDCONT?
[2021-02-27_22:52:40:423]+CGDCONT: 1,"IP","super","0.0.0.0",0,0,0,0
[2021-02-27_22:52:40:423]OK
```

Once the two steps above are completed through the QCOM tool, restart the LTE modem by unplugging the USB cable and plug it again.

Now, you can check the network registration of the LTE modem. Run the following AT command as in the screenshot below:

```
[2021-02-27_22:58:35:692]AT+CEREG?
```

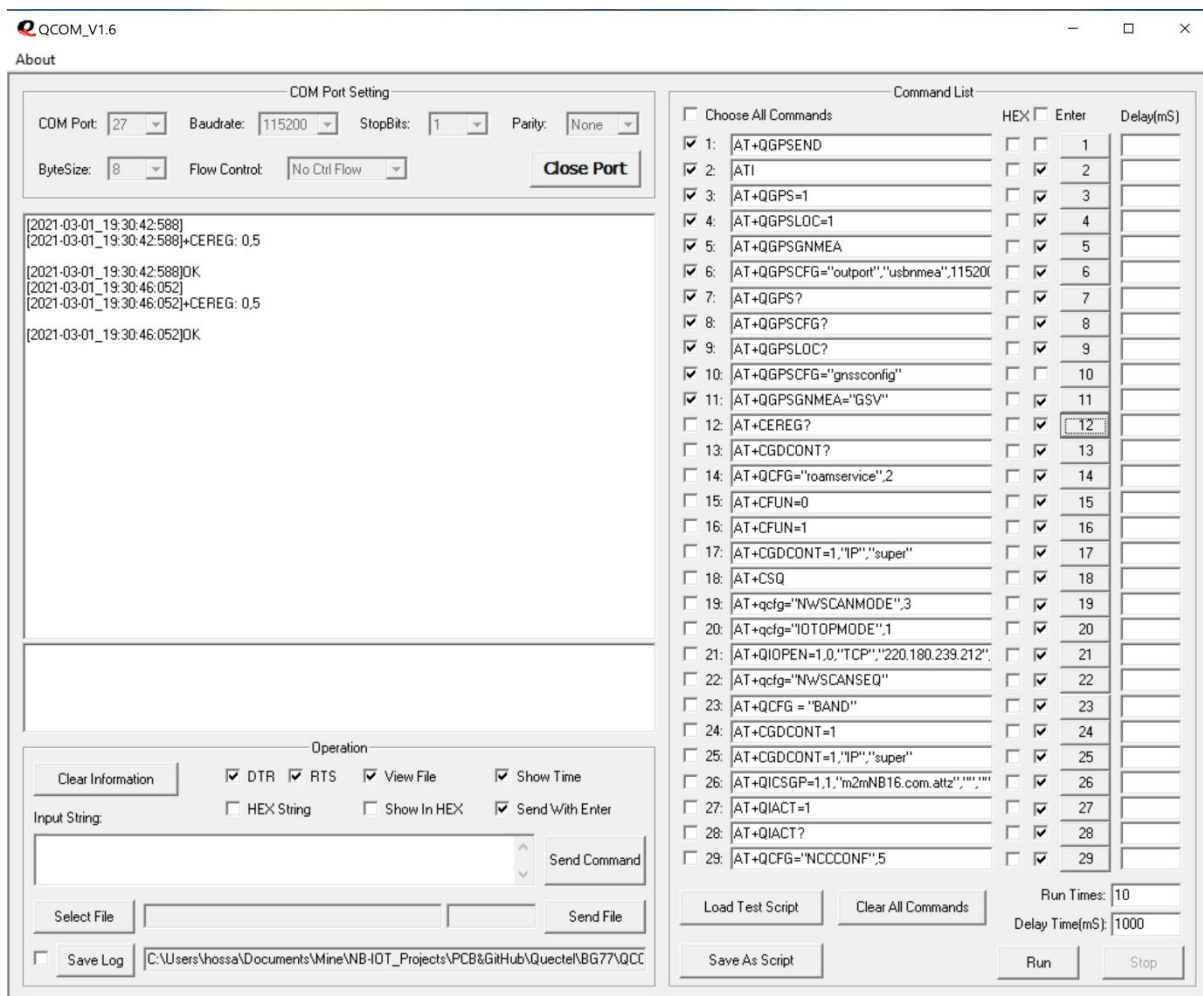


Figure 6: QCOM tool to check network registration with mobile operator.

The LTE modem shall register on the mobile operator network and you shall see the following response. The AT+CEREG command shall return either the value of 1 or 5 as below.

```
[2021-02-27_22:58:35:692]AT+CEREG?
[2021-02-27_22:58:35:692]+CEREG: 0,5
[2021-02-27_22:58:35:692]OK
```

The value returned by the AT+CEREG command shall be interpreted according to the following values:

Value	Meaning
0	Not registered. MT is not currently searching an operator to register to.
1	Registered, home network
2	Not registered, but MT is currently trying to attach or searching an operator to register to.
3	Registration denied
4	Unknown
5	Registered, roaming

If the value returned is either 1 or 5, it means the LTE modem is configured correctly and register on the mobile operator network successfully. You are now ready to connect to the Internet through Windows OS.

Please note that the above configuration needs to be done only once. After that, when you plug the USB cable and connect the PC to the hardware board again, Windows OS detects it as a LTE modem and connects automatically to the Internet and outside world.

6 Connecting Windows OS to the Internet

In order to use the LTE modem as a connectivity device on Windows OS, follow the steps below:

Open the **Control panel -> Network and Internet - > Network Sharing Center**. And choose “Set up a new connection or network”.

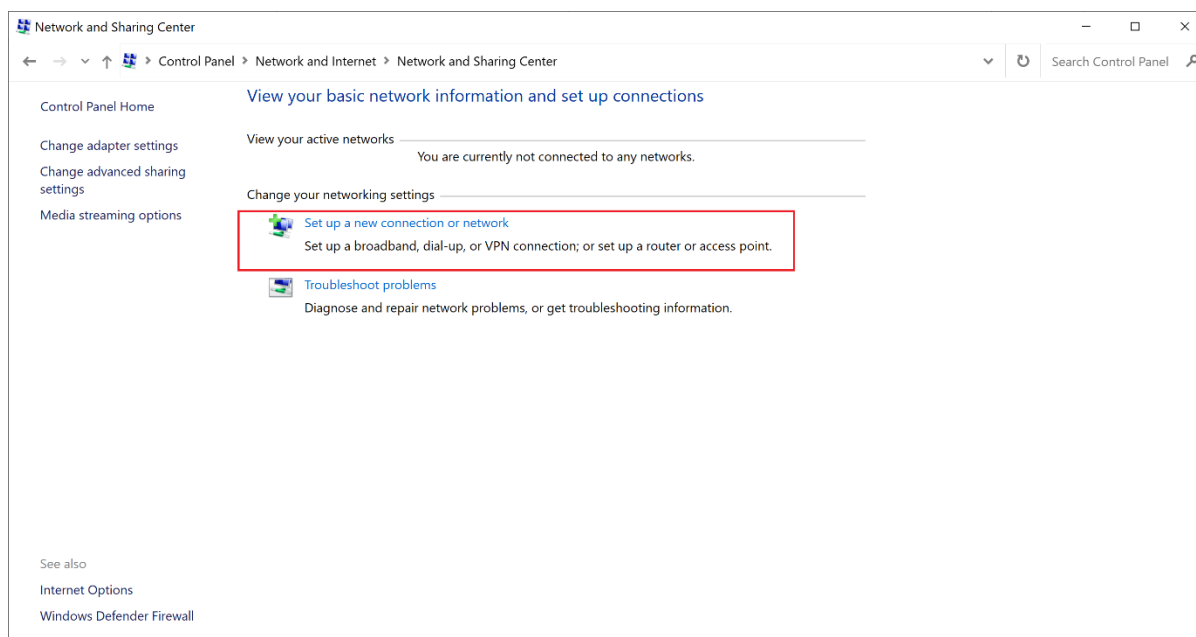


Figure 7: setting up a new connection.

Select **Connect to the Internet**

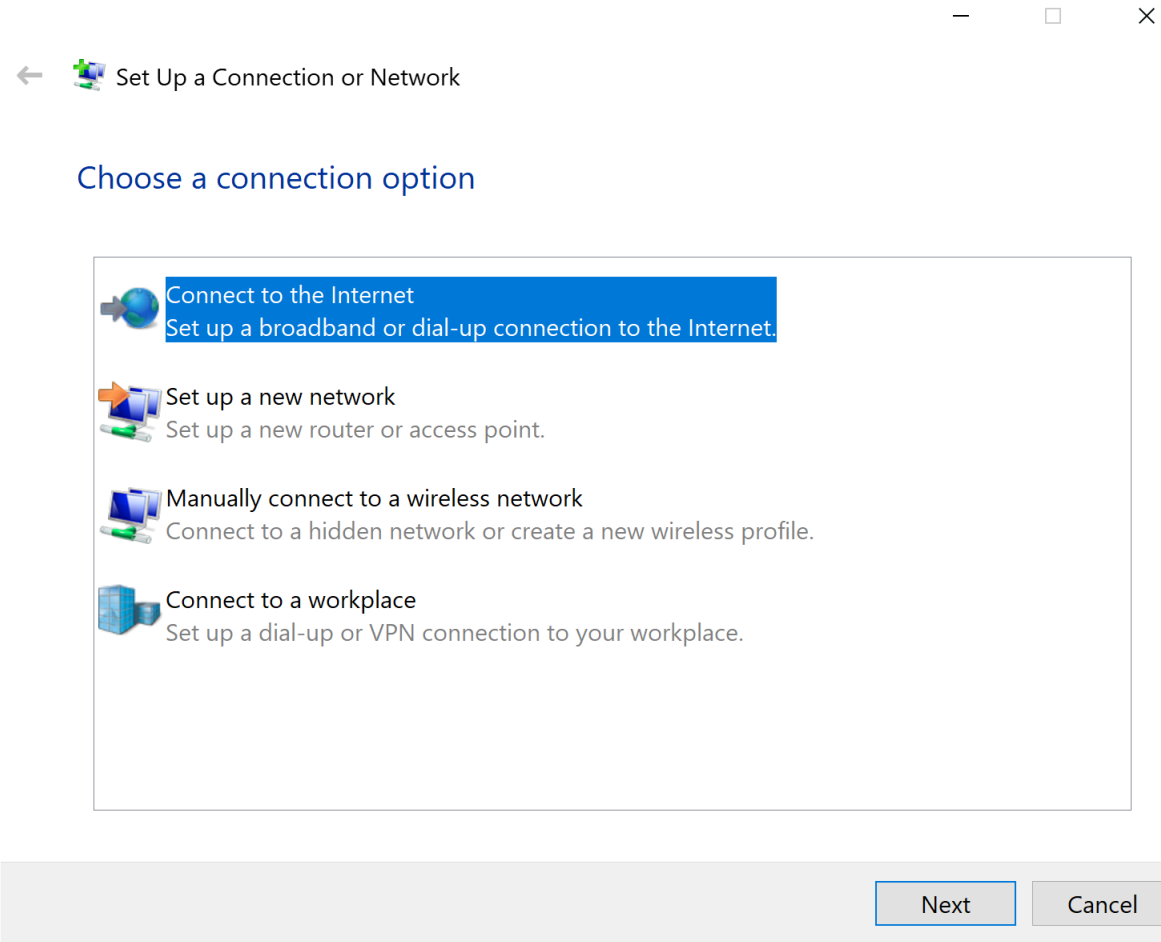


Figure 8: Setting up dial-up connection.

Choose **Dial-up**

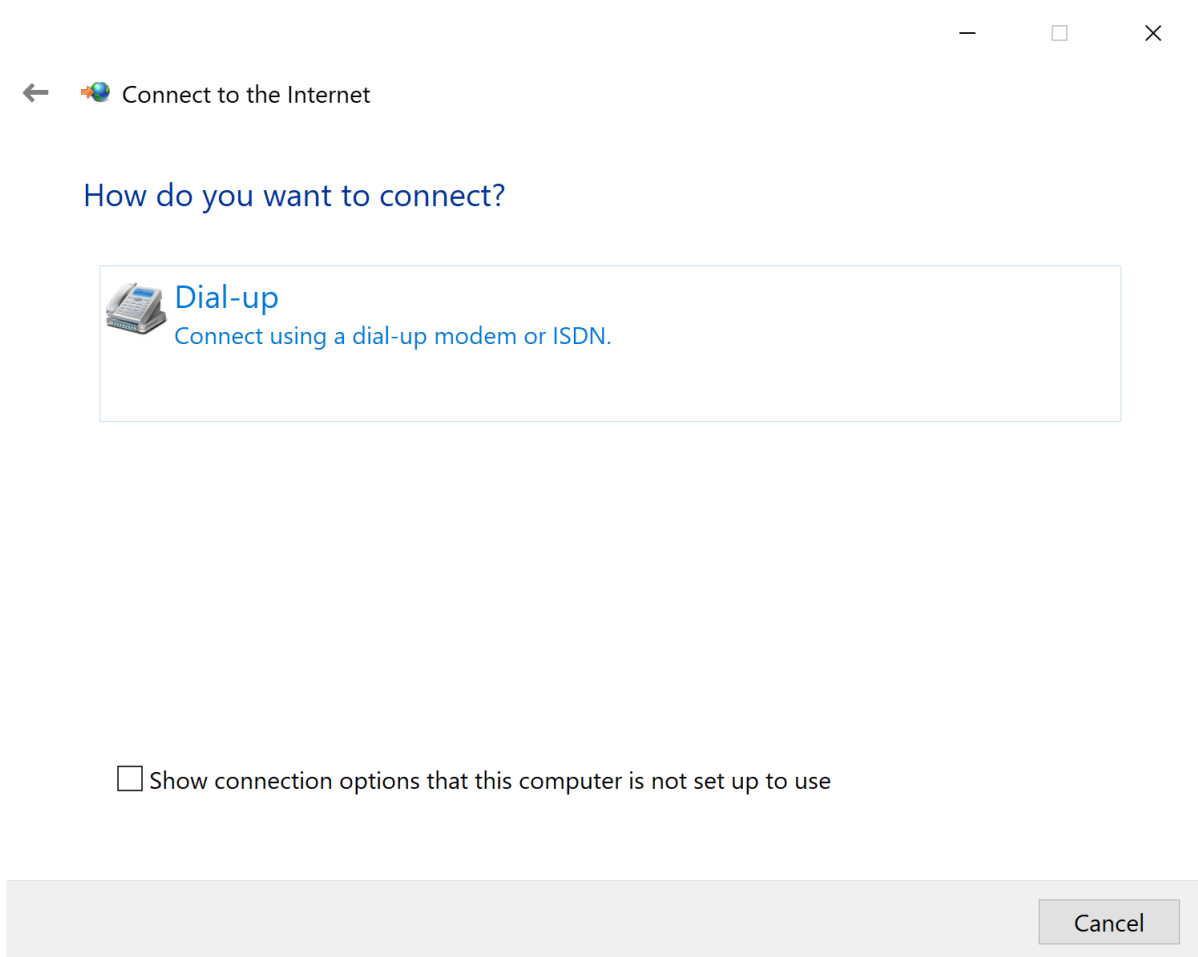


Figure 9: Dial-up connection.

Enter ***99#** and click **Connect**. You can name the connection as **BG95 Dial-up connection**. You shall see the Windows and LTE modem start to register on mobile operator network and eventually be connected to the Internet.

← Connect to the Internet

Type the information from your Internet service provider (ISP)

Dial-up phone number: [Dialing Rules](#)

User name:

Password:

Show characters

Remember this password

Connection name:

Allow other people to use this connection
This option allows anyone with access to this computer to use this connection.

[I don't have an ISP](#)

Figure 10: Dial-up connection configuration.

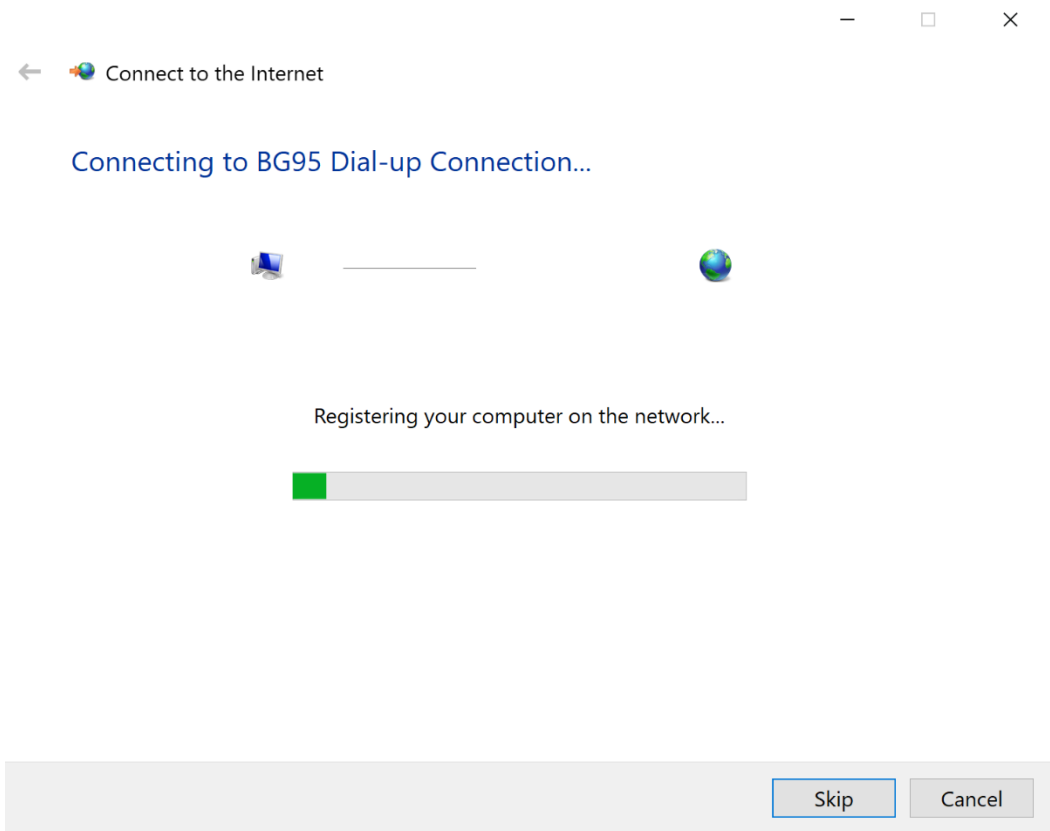


Figure 11: Dial-up connection is registering with mobile operator network.

On Windows OS, launch the Task bar, you shall see the dial-up connection is in **Connecting** state where the LTE modem is connecting to the mobile operator network.

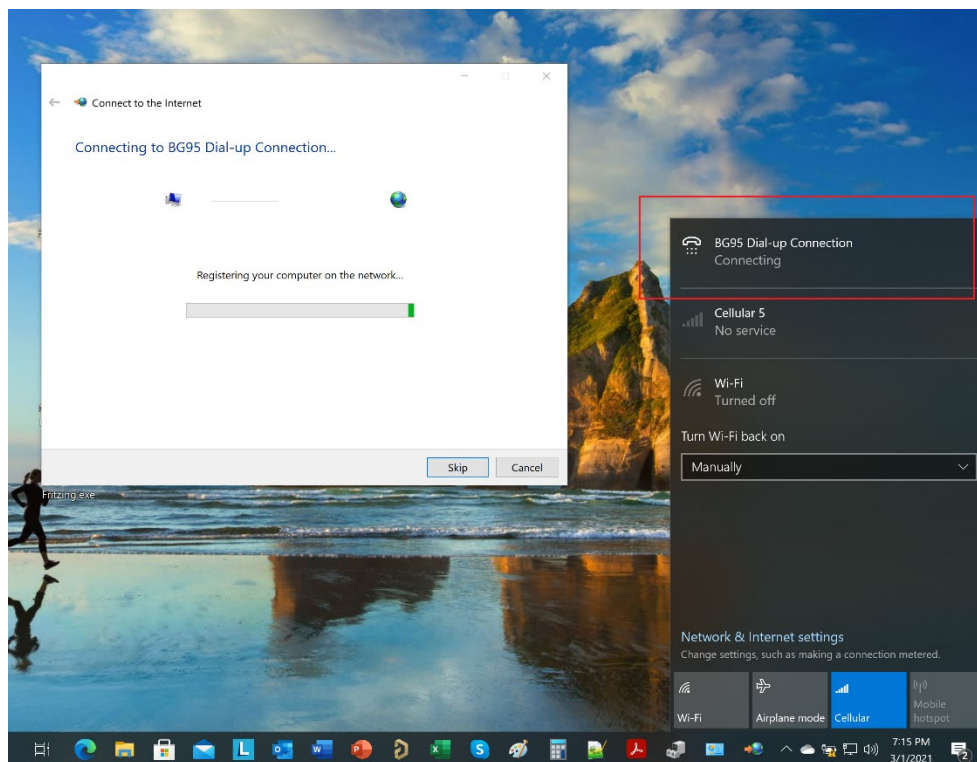


Figure 12: Dial-up connection is connecting to the Internet.

After the dial-up connection is connected and registered, it starts to test the connection.

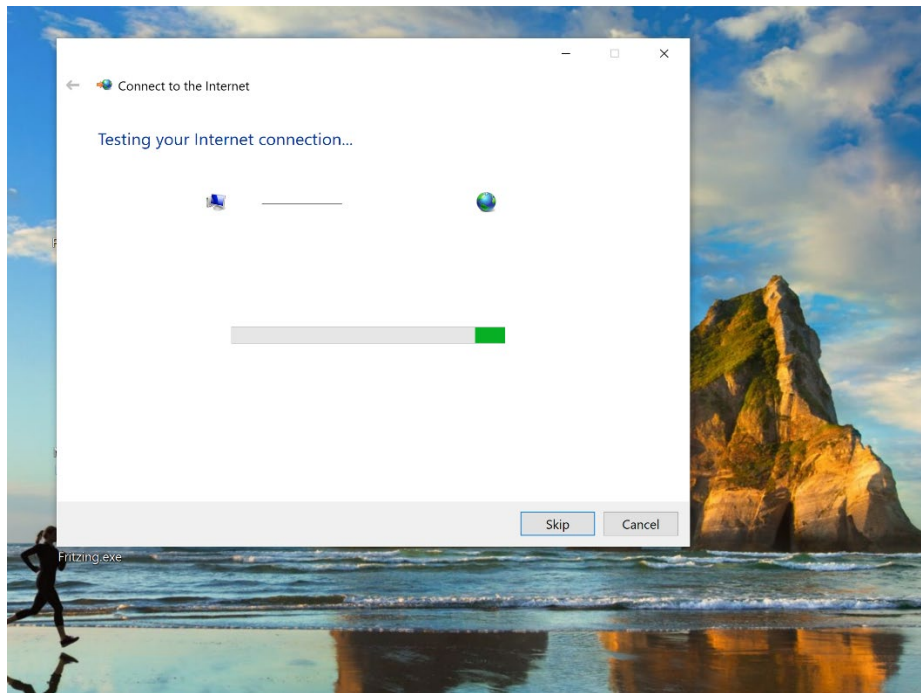


Figure 13: Dial-up connection is testing the connection.

Finally, the LTE modem connects to the mobile operator network.

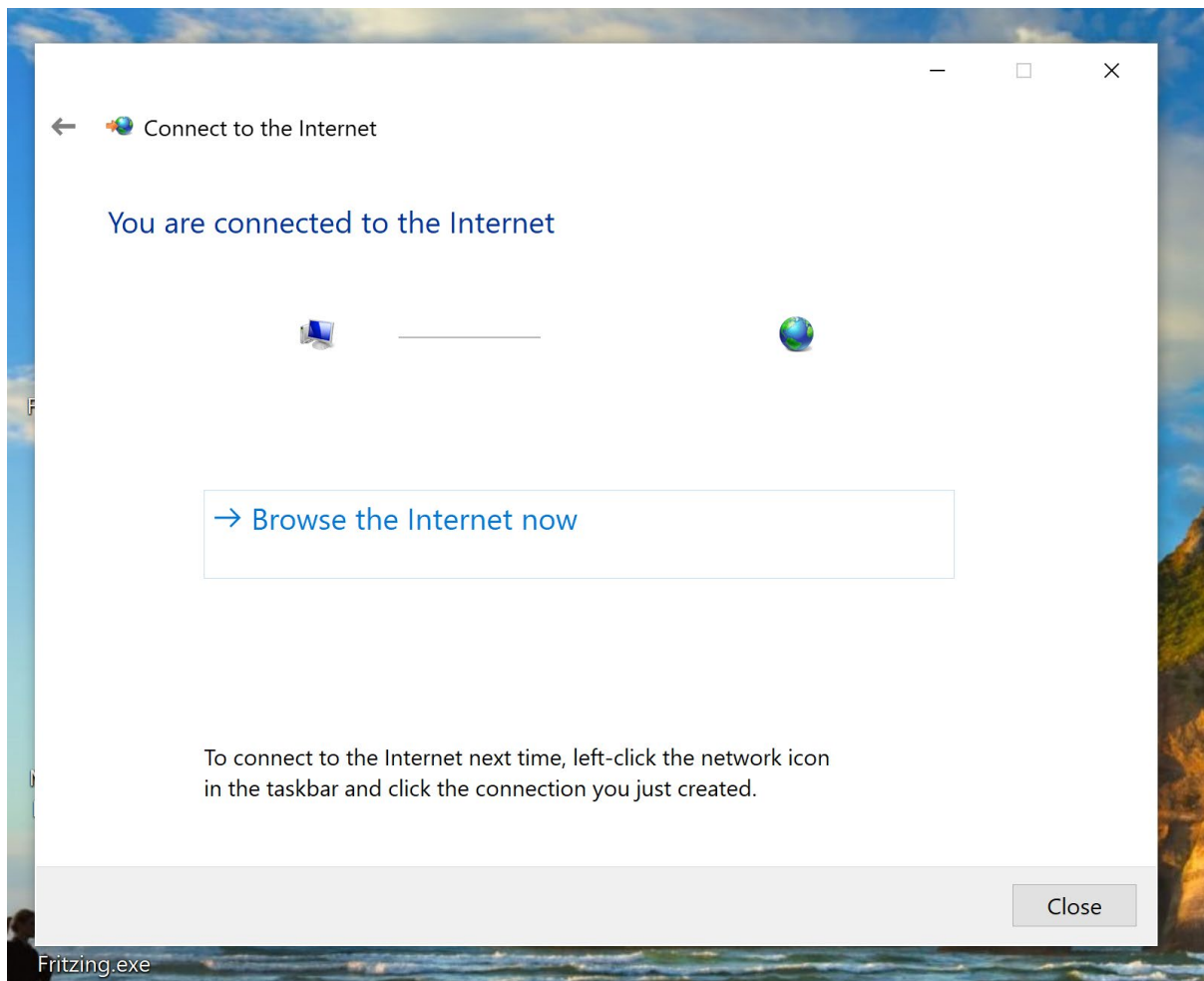


Figure 14: Dial-up connection is connected to the Internet.

On Windows OS, launch the Task bar, you shall see the dial-up connection is now in **Connected** state where the LTE modem is now connected to the mobile operator network.

By now, you have successfully connected to the Internet through the LTE modem. You can start browsing the Internet, checking, and using Email clients, download and uploads files, and have fully connectivity to the Internet and outside world.

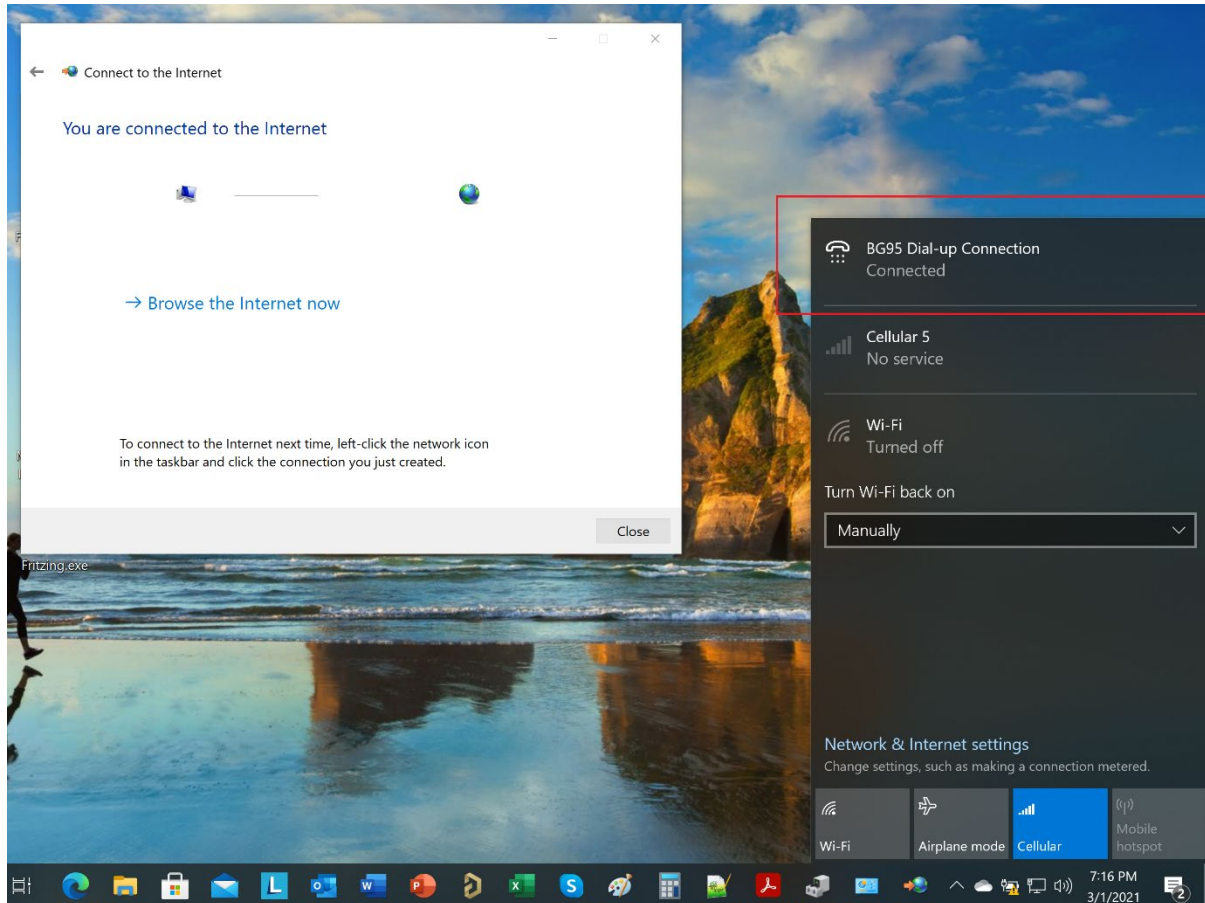


Figure 15: LTE modem connected to the Internet.

7 Troubleshooting

Sometimes the LTE modem is configured with different APN or multiple APNs. To delete these APNs from the LTE modem, issue the following AT command:

```
AT+CGDCONT=1  
AT+CGDCONT=2  
AT+CGDCONT=3
```