

# SIM7600G-H 4G DONGLE

## Overview

The important parameter we need to consider while working on SIM7600G-H is the default baud rate which is 115200. When I was working on Arduino through UART for sending messages, other baud rates were not going to work, to change that we needed Hardware control flow and Software control flow to be used.

Indication of LED must be understood before starting working on SIM7600G-H, which as PWR, STA, and NET stand for power supply, status, and network connection respectively, NET LED start blink once it's connected to the network.

## Objectives

1. 4G Network Connection
2. Sending and Receiving SMS
3. Answering Calls
4. GPS Positioning

## Set up Network for the Jetson Nano

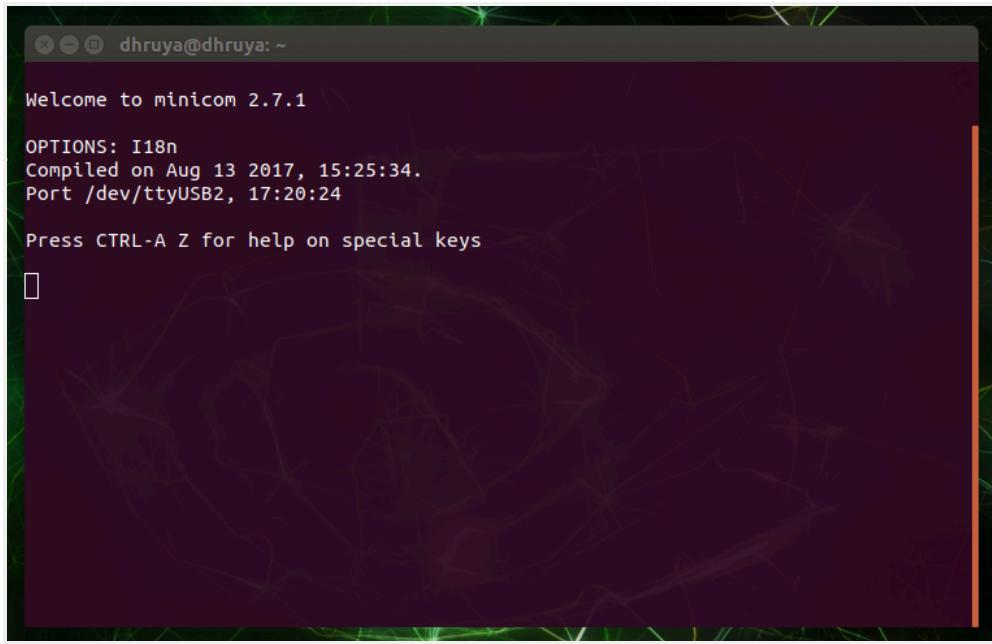
Before setup the network we can check whether AT Commands are working or not on the port through which the SIM7600G-H is connected, from Google I understood that for Jetson Nano /dev/ttyUSB2 and /dev/ttyUSB3 ports are used for UART communication, mostly /dev/ttyUSB2 is used. So we can check if our AT Command is responding or not through this port.

I started following the instruction given on the official site of Wareshare for SIM7600G-H, the first command to open minicom, which serial communication emulator terminal throw an error that *Command 'minicom' not found, but can be installed with sudo apt install minicom*, which was solved by just installing minicom in the system, and Installation process that follows

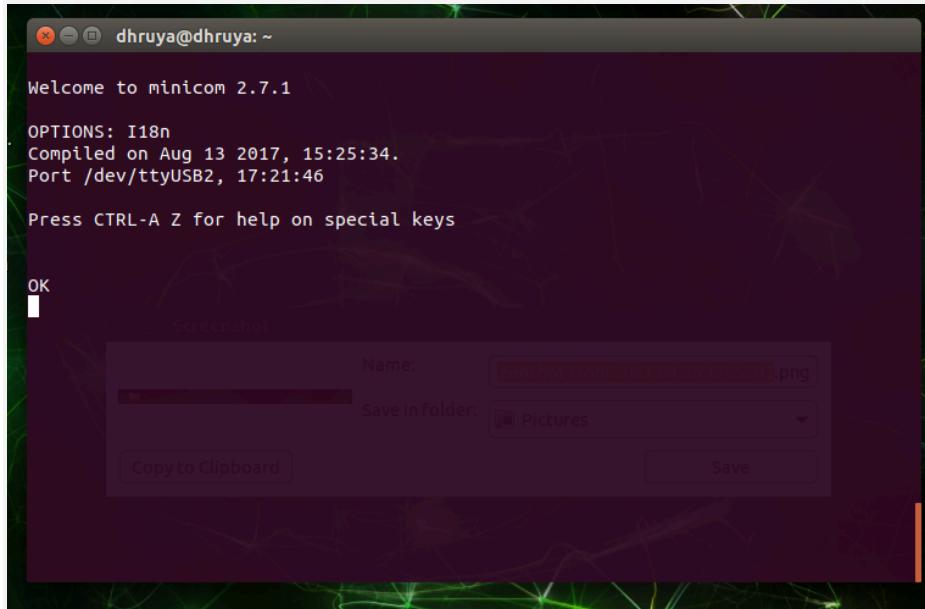
### Minicom Installation

1. Update the package: `$ sudo apt-get update`
2. Install minicom deb package: `$ sudo apt-get install minicom`

After installation is open the minicom and the terminal look like



Here I try to type at command but nothing is writing on the screen and the terminal pointer is just blinking at the same place, if you try what i did, simply type AT and hit enter and I found the like

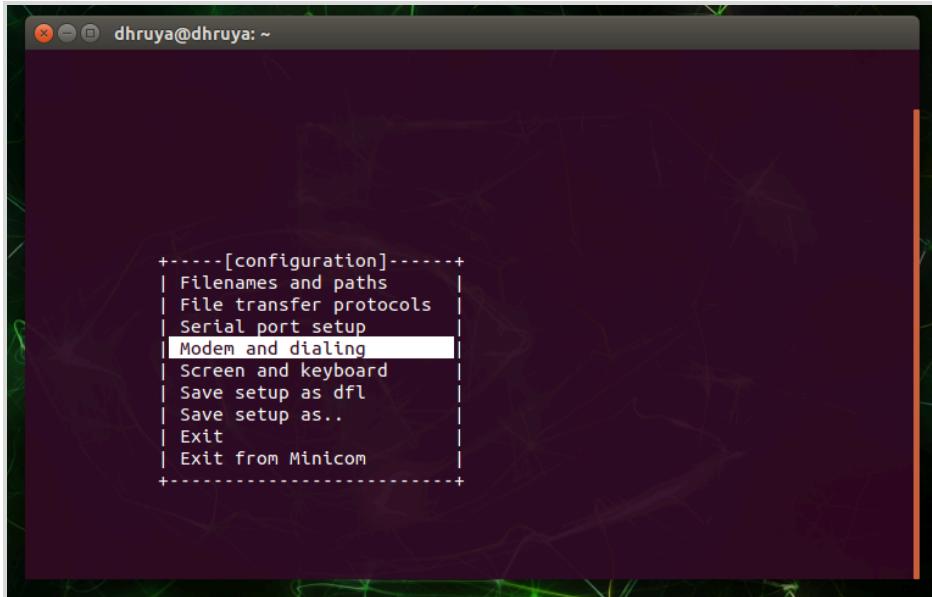


And this is what absolutely correct result is expected after giving AT command. The problem is that we cant see our command but we can see the response on the screen. And there is no instruction on the official document regarding this.

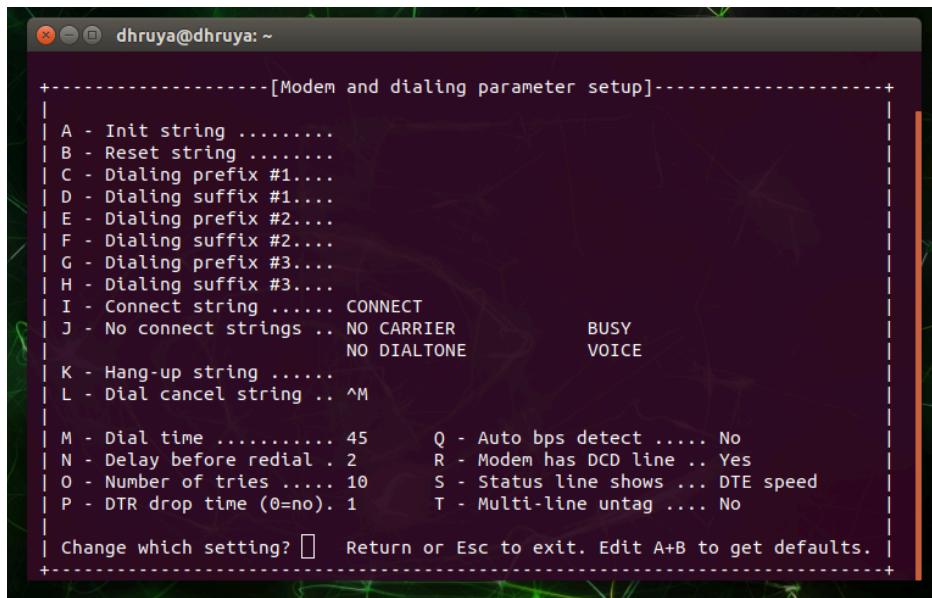
To solve this problem I set minicom through the instruction given in one git repo about the installation.

## Setting up minicom

1. Open Configuration Menu: `$ sudo minicom -s`

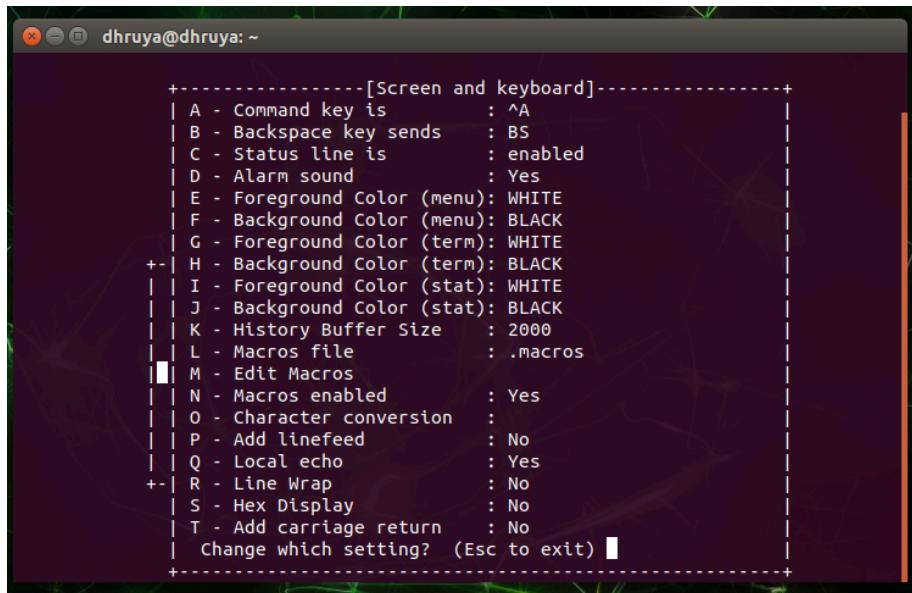


2. Go to *Modem and Dialing*
3. Remove "Dialing prefix", "Dialing suffix", and "Hang-up string" entries to match the following setting



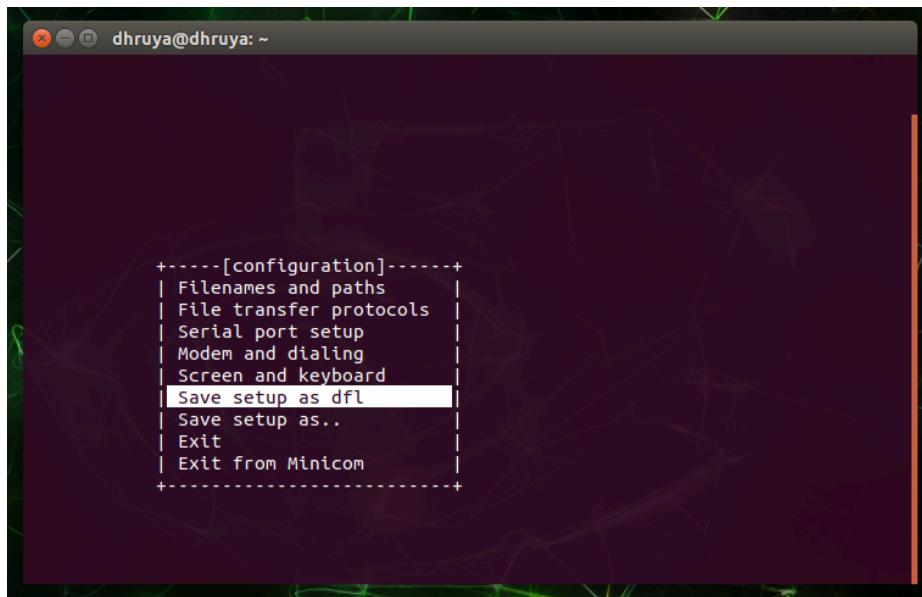
4. Escape to the *configuration* menu
5. Select *Screen and keyboard* and press enter

6. Press *q* to toggle *Local echo* to Yes



7. Escape to the *configuration* menu

8. Select *Save setup as dfl* and press enter



After doing this again a start to give AT command but the problem is the same, I am facing the same issue even doing the above step. And this is happening because local echo is disable, to enable that I follow the below steps:

- I. Press *ctrl+a* then *z* to bring up the options menu.
- II. Press *e* to enable echo
- III. *esc* to return to the console

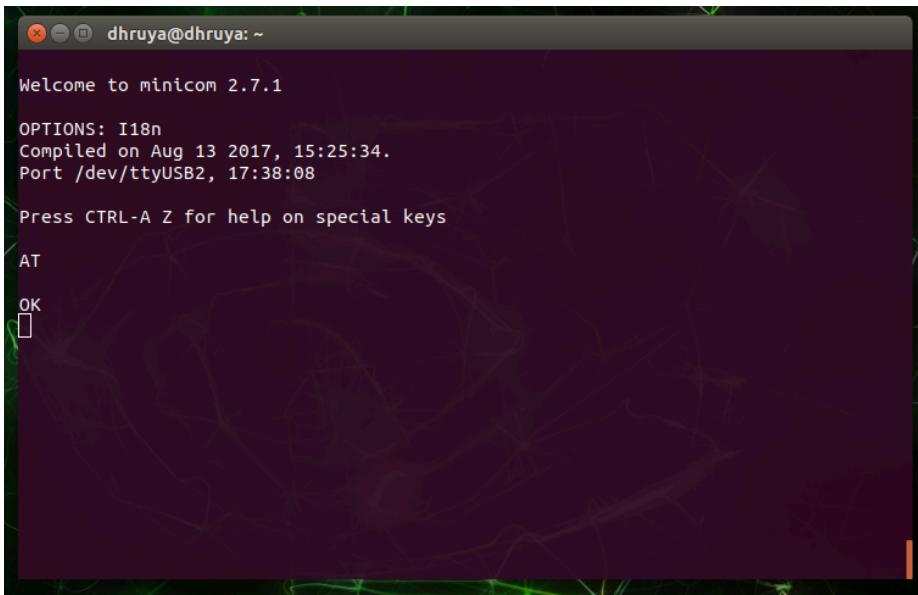
And the issue is resolved.

And this is something I have to do every time once I start minicom.

## Testing

1. Open minicom: `$ sudo minicom -D /dev/ttyUSB2`
2. Enable Local echo
3. Enter AT Commands: `AT` and the following result will be displayed

Now it's working



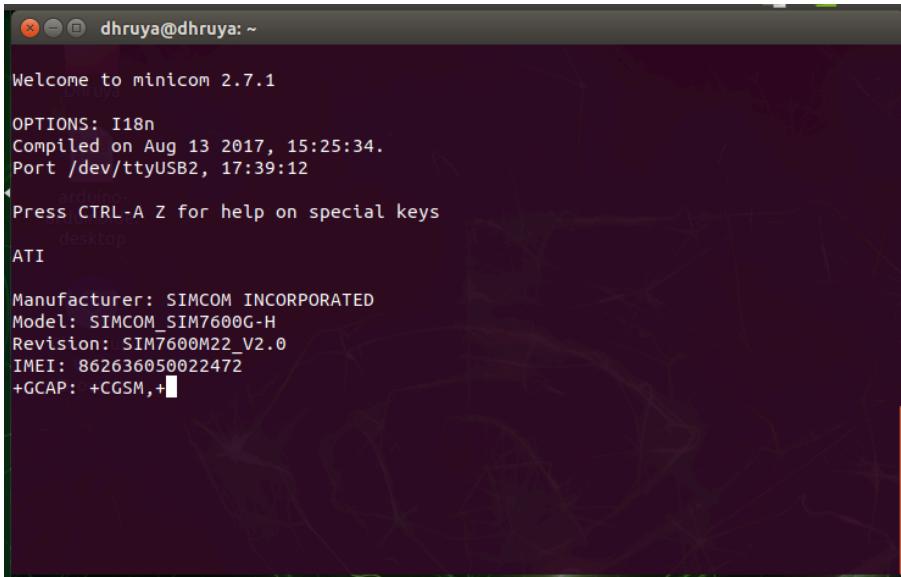
```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB2, 17:38:08

Press CTRL-A Z for help on special keys

AT
OK
```

I try many commands to get signal strength, battery status, manufacturing details which are working good, giving results as expected



```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB2, 17:39:12

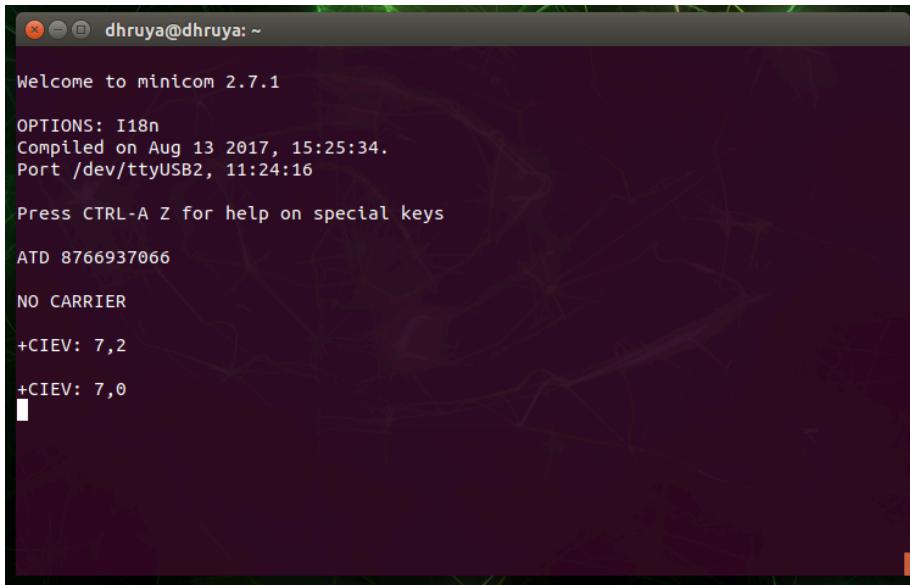
Press CTRL-A Z for help on special keys

ATI

Manufacturer: SIMCOM INCORPORATED
Model: SIMCOM_SIM7600G-H
Revision: SIM7600M22_V2.0
IMEI: 862636050022472
+GCAP: +CGSM,+C
```

But when I try to give the command for calling and sending the message, I end up with the same result as NO CARRIER, When I read about this error I come to know that this may

happen due to insufficient power supply to SIM7600G-H or SIM card not connected to GSM network, I try to change SIM card but the result is same.



```
Welcome to minicom 2.7.1
OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB2, 11:24:16
Press CTRL-A Z for help on special keys
ATD 8766937066
NO CARRIER
+CIEV: 7,2
+CIEV: 7,0
```

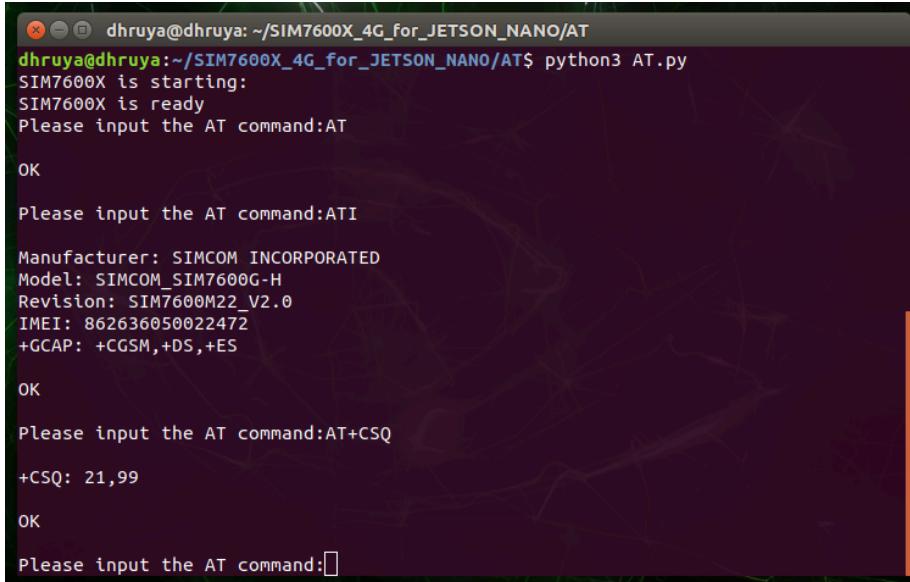
*This issue is yet not resolved.*

### Testing AT Commands with Python

I decided to do this using python code. For that I need to install a zip file in which all codes are given for AT command, SMS, Call, and also for GPS. To download that here are the steps that I follow

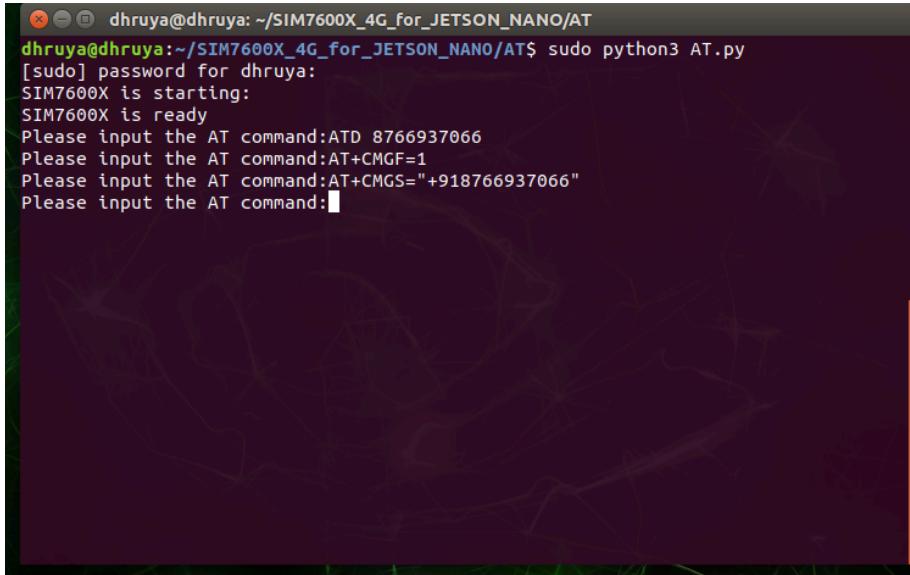
1. \$ sudo apt-get update
2. \$ sudo apt-get install p7zip python3-serial minicom Jetson.GPIO -y
3. \$ wget [https://www.waveshare.com/w/upload/9/9b/SIM7600X\\_4G\\_for\\_JETSON\\_NANO.7z](https://www.waveshare.com/w/upload/9/9b/SIM7600X_4G_for_JETSON_NANO.7z)
4. \$ p7zip --uncompress SIM7600X\_4G\_for\_JETSON\_NANO.7z
5. \$ cd SIM7600X\_4G\_for\_JETSON\_NANO/AT
6. \$ sudo python3 AT.py

After running the code I try some basic command which was working good,



```
dhruya@dhruya: ~/SIM7600X_4G_for_JETSON_NANO/AT
dhruya@dhruya:~/SIM7600X_4G_for_JETSON_NANO/AT$ python3 AT.py
SIM7600X is starting:
SIM7600X is ready
Please input the AT command:AT
OK
Please input the AT command:ATI
Manufacturer: SIMCOM INCORPORATED
Model: SIMCOM_SIM7600G-H
Revision: SIM7600M22_V2.0
IMEI: 862636050022472
+GCAP: +CGSM,+DS,+ES
OK
Please input the AT command:AT+CSQ
+CSQ: 21,99
OK
Please input the AT command:[]
```

But same as minicom issue with AT commands for Calling and Sending messages the python code is not responding anything,



```
dhruya@dhruya: ~/SIM7600X_4G_for_JETSON_NANO/AT
dhruya@dhruya:~/SIM7600X_4G_for_JETSON_NANO/AT$ sudo python3 AT.py
[sudo] password for dhruya:
SIM7600X is starting:
SIM7600X is ready
Please input the AT command:ATD 8766937066
Please input the AT command:AT+CMGF=1
Please input the AT command:AT+CMGS="+918766937066"
Please input the AT command:[]
```

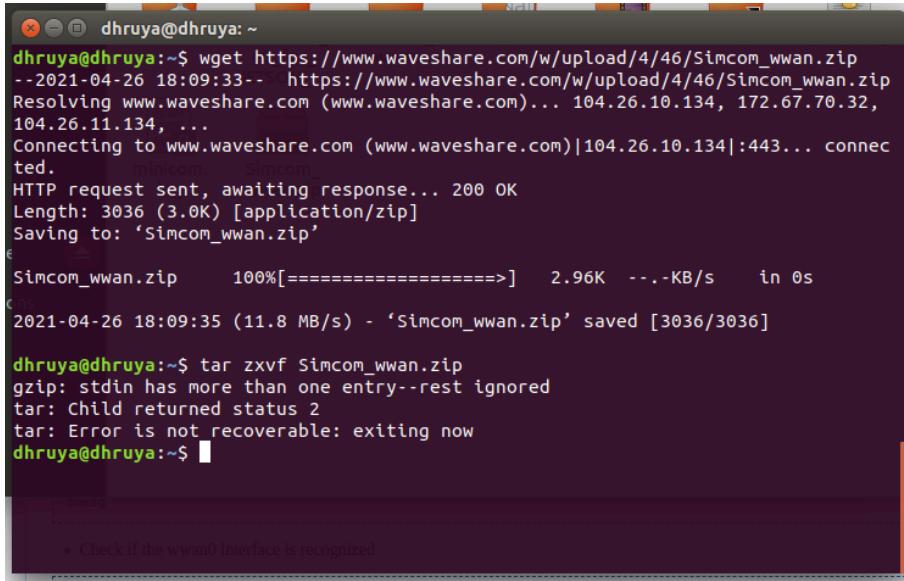
*This issue again was not resolved.*

# 4G Network Connection

## Installation of Driver

To set up the 4G connection in Jetson nano I followed the instructions from the official site to install the driver.

I started following the commands



```
dhruya@dhruya:~$ wget https://www.waveshare.com/w/upload/4/46/Simcom_wwan.zip
--2021-04-26 18:09:33-- https://www.waveshare.com/w/upload/4/46/Simcom_wwan.zip
Resolving www.waveshare.com (www.waveshare.com)... 104.26.10.134, 172.67.70.32,
104.26.11.134, ...
Connecting to www.waveshare.com (www.waveshare.com)|104.26.10.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3036 (3.0K) [application/zip]
Saving to: 'Simcom_wwan.zip'

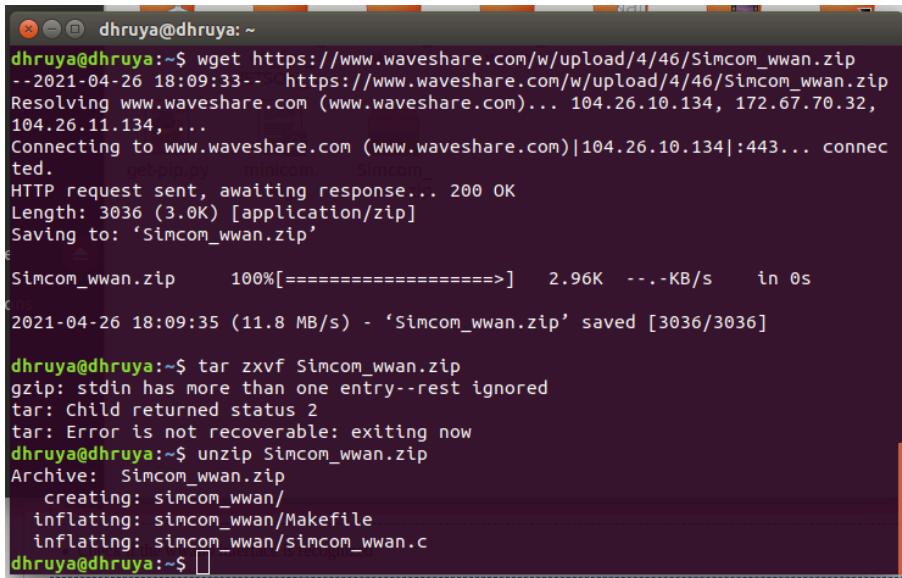
Simcom_wwan.zip      100%[=====] 2.96K  ---KB/s   in 0s

2021-04-26 18:09:35 (11.8 MB/s) - 'Simcom_wwan.zip' saved [3036/3036]

dhruya@dhruya:~$ tar zxvf Simcom_wwan.zip
gzip: stdin has more than one entry--rest ignored
tar: Child returned status 2
tar: Error is not recoverable: exiting now
dhruya@dhruya:~$
```

\* Check if the wwan0 interface is recognized

And this pretty strong forward zip file will not be going to unzip by tar, for that, I used unzip the package, and that's work



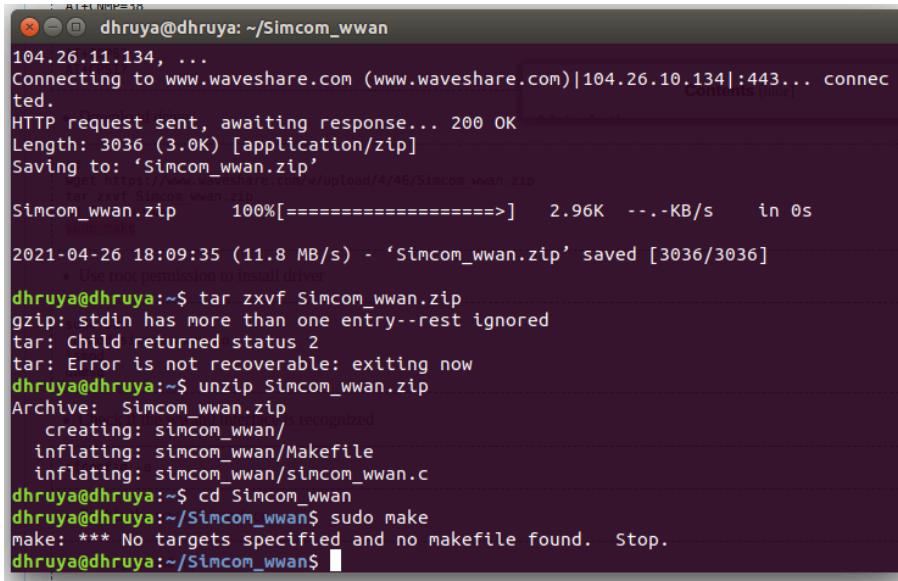
```
dhruya@dhruya:~$ wget https://www.waveshare.com/w/upload/4/46/Simcom_wwan.zip
--2021-04-26 18:09:33-- https://www.waveshare.com/w/upload/4/46/Simcom_wwan.zip
Resolving www.waveshare.com (www.waveshare.com)... 104.26.10.134, 172.67.70.32,
104.26.11.134, ...
Connecting to www.waveshare.com (www.waveshare.com)|104.26.10.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3036 (3.0K) [application/zip]
Saving to: 'Simcom_wwan.zip'

Simcom_wwan.zip      100%[=====] 2.96K  ---KB/s   in 0s

2021-04-26 18:09:35 (11.8 MB/s) - 'Simcom_wwan.zip' saved [3036/3036]

dhruya@dhruya:~$ tar zxvf Simcom_wwan.zip
gzip: stdin has more than one entry--rest ignored
tar: Child returned status 2
tar: Error is not recoverable: exiting now
dhruya@dhruya:~$ unzip Simcom_wwan.zip
Archive:  Simcom_wwan.zip
  creating: simcom_wwan/
  inflating: simcom_wwan/Makefile
  inflating: simcom_wwan/simcom_wwan.c
dhruya@dhruya:~$
```

Further, I get an error which is after giving the \$sudo make command which was not understandable to me. A Makefile named file is existed in the folder, still, this gives me errors no makefile found.



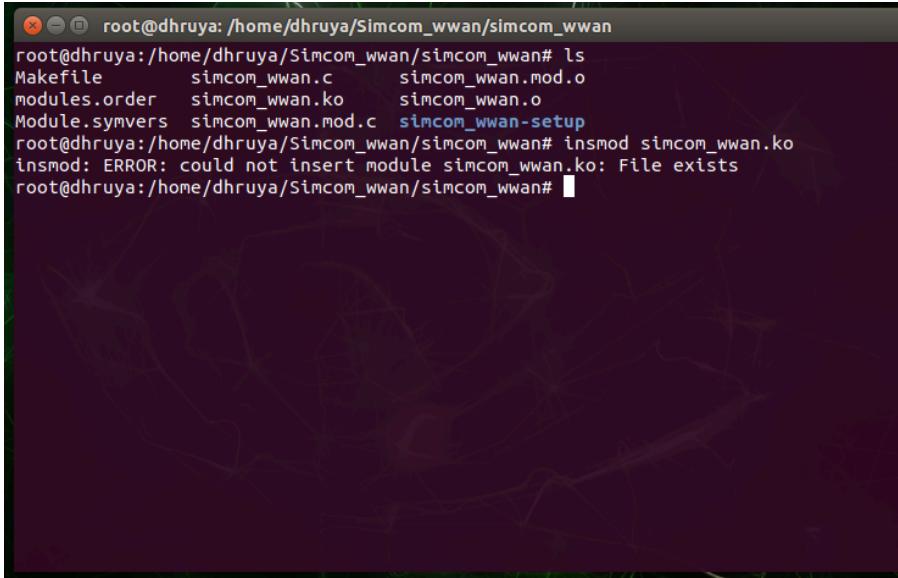
```
dhruya@dhruya: ~/Simcom_wwan
104.26.11.134, ...
Connecting to www.waveshare.com (www.waveshare.com)|104.26.10.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3036 (3.0K) [application/zip]
Saving to: 'Simcom_wwan.zip'

[download] 100%[=====] 2.96K --.-KB/s   in 0s

2021-04-26 18:09:35 (11.8 MB/s) - 'Simcom_wwan.zip' saved [3036/3036]

Use root permission to install driver
dhruya@dhruya:~$ tar zxvf Simcom_wwan.zip
gzip: stdin has more than one entry--rest ignored
tar: Child returned status 2
tar: Error is not recoverable: exiting now
dhruya@dhruya:~$ unzip Simcom_wwan.zip
Archive: Simcom_wwan.zip
  creating: simcom_wwan/
  inflating: simcom_wwan/Makefile
  inflating: simcom_wwan/simcom_wwan.c
dhruya@dhruya:~$ cd Simcom_wwan
dhruya@dhruya:~/Simcom_wwan$ sudo make
make: *** No targets specified and no makefile found. Stop.
dhruya@dhruya:~/Simcom_wwan$
```

But this command creates many files in the directory, So I ignore the above error and follow further steps, which again throws me an error.



```
root@dhruya: /home/dhruya/Simcom_wwan/simcom_wwan
root@dhruya:/home/dhruya/Simcom_wwan/simcom_wwan# ls
Makefile      simcom_wwan.c      simcom_wwan.mod.o
modules.order  simcom_wwan.ko    simcom_wwan.o
Module.symvers simcom_wwan.mod.c simcom_wwan-setup
root@dhruya:/home/dhruya/Simcom_wwan/simcom_wwan# insmod simcom_wwan.ko
insmod: ERROR: could not insert module simcom_wwan.ko: File exists
root@dhruya:/home/dhruya/Simcom_wwan/simcom_wwan#
```

At this stage, I stop and try to find a solution on Google. I found another process to install the driver, then I deleted the folder and downloaded files, and started to follow new steps.

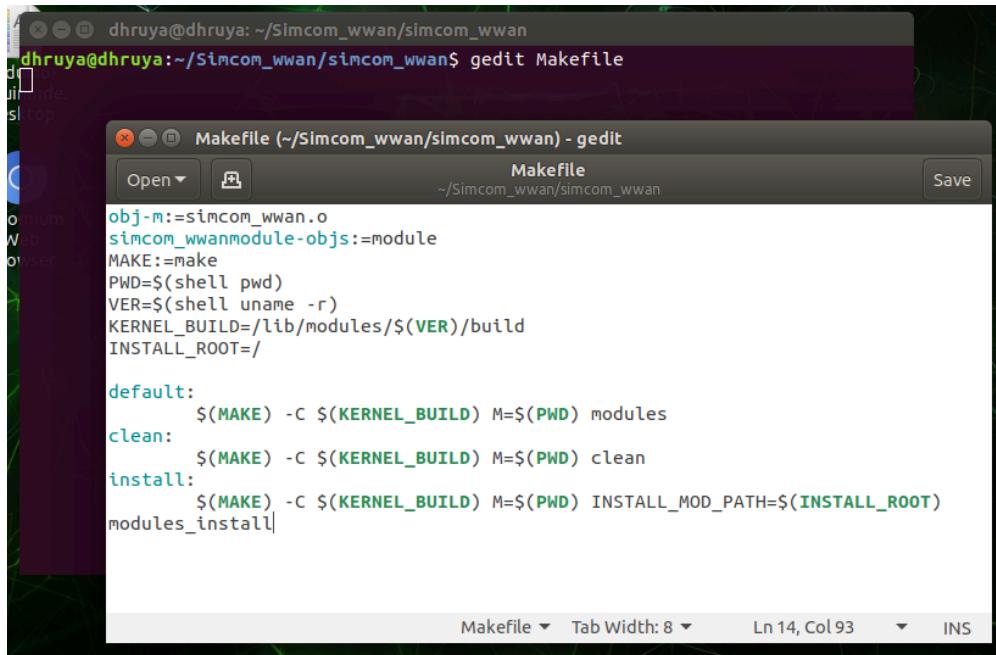
The following step is going to download the driver.

1. \$ mkdir Simcom\_wwan
2. \$ cd Simcom\_wwan
3. \$ wget [https://www.waveshare.com/w/upload/4/46/Simcom\\_wwan.zip](https://www.waveshare.com/w/upload/4/46/Simcom_wwan.zip)

#### 4. \$ unzip Simcom\_wwan.zip

While downloading I didn't face any problem, as this is the same in the above steps also, But after downloading the drive on the official site they are given proper documentation for installation of it And this is mentioned in this process for that I follow the same step as below

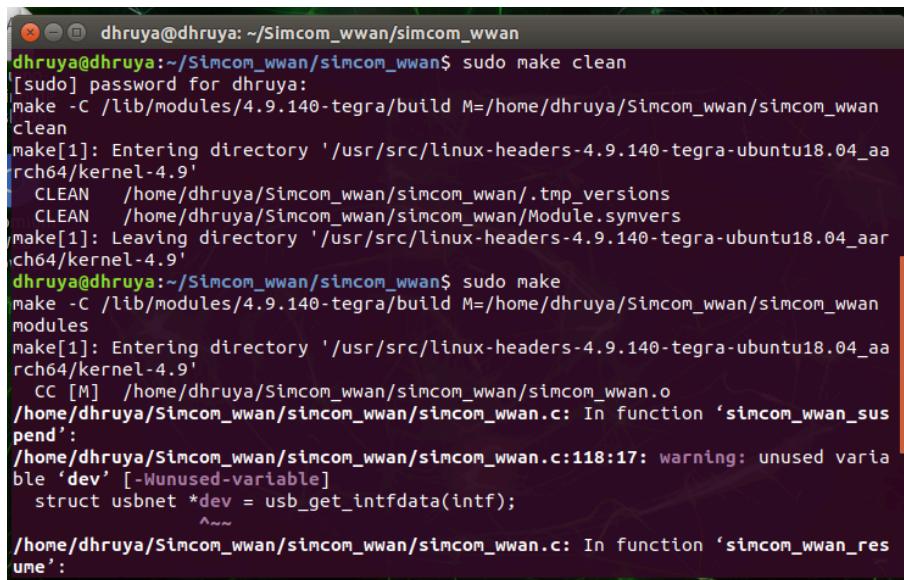
First, we need to modify that MakeFile after modification it will look like



```
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ gedit Makefile
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ gedit Makefile
obj-m:=simcom_wwan.o
simcom_wwanmodule-objs:=module
MAKE:=make
PWD=$(shell pwd)
VER=$(shell uname -r)
KERNEL_BUILD=/lib/modules/$(VER)/build
INSTALL_ROOT=/
default: $(MAKE) -C $(KERNEL_BUILD) M=$(PWD) modules
clean: $(MAKE) -C $(KERNEL_BUILD) M=$(PWD) clean
install: $(MAKE) -C $(KERNEL_BUILD) M=$(PWD) INSTALL_MOD_PATH=$(INSTALL_ROOT)
modules_install

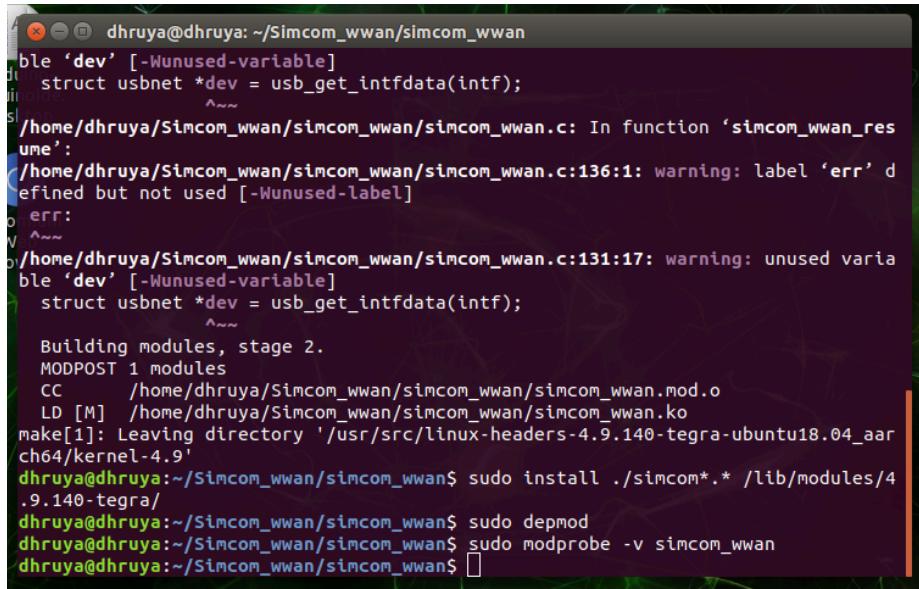
Makefile Tab Width: 8 Ln 14, Col 93 INS
```

The \$sudo make command gave me some warning but it's fine as it created the file that we need for the further process



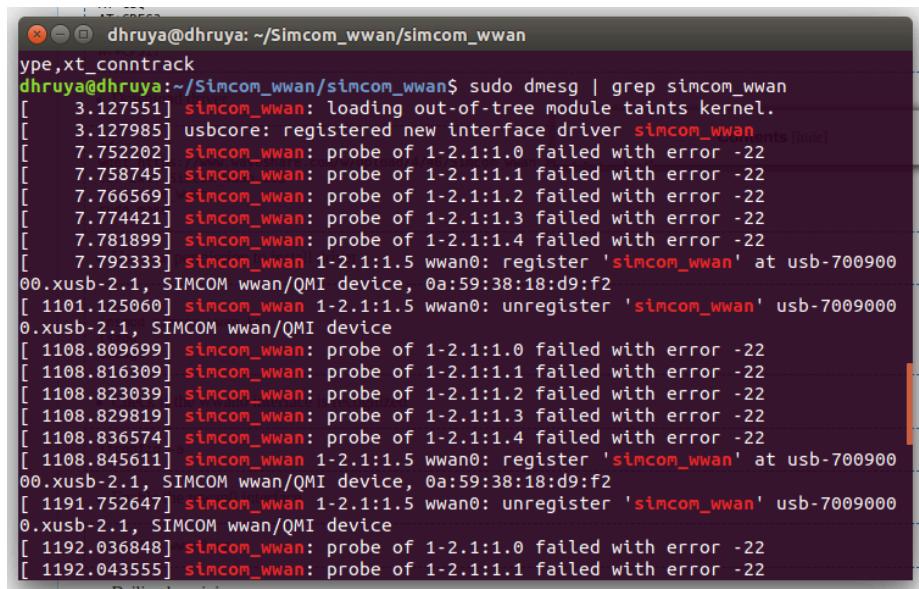
```
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo make clean
[sudo] password for dhruya:
make -C /lib/modules/4.9.140-tegra/build M=/home/dhruya/Simcom_wwan/simcom_wwan
clean
make[1]: Entering directory '/usr/src/linux-headers-4.9.140-tegra-ubuntu18.04_aa
rch64/kernel-4.9'
  CLEAN  /home/dhruya/Simcom_wwan/simcom_wwan/.tmp_versions
  CLEAN  /home/dhruya/Simcom_wwan/simcom_wwan/Module.symvers
make[1]: Leaving directory '/usr/src/linux-headers-4.9.140-tegra-ubuntu18.04_aa
rch64/kernel-4.9'
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo make
make -C /lib/modules/4.9.140-tegra/build M=/home/dhruya/Simcom_wwan/simcom_wwan
modules
make[1]: Entering directory '/usr/src/linux-headers-4.9.140-tegra-ubuntu18.04_aa
rch64/kernel-4.9'
  CC [M]  /home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.o
/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c: In function 'simcom_wwan_sus
pend':
/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c:118:17: warning: unused varia
ble 'dev' [-Wunused-variable]
    struct usbnet *dev = usb_get_intfdata(intf);
    ^
/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c: In function 'simcom_wwan_res
ume':
```

I follow the next steps which are working even after the above error



```
dhruya@dhruya: ~/Simcom_wwan/simcom_wwan
ble 'dev' [-Wunused-variable]
    struct usbnet *dev = usb_get_intfdata(intf);
    ^
/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c: In function 'simcom_wwan_res
ume':
/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c:136:1: warning: label 'err' d
efined but not used [-Wunused-label]
o err:
o ^
V
o/home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.c:131:17: warning: unused varia
ble 'dev' [-Wunused-variable]
    struct usbnet *dev = usb_get_intfdata(intf);
    ^
Building modules, stage 2.
MODPOST 1 modules
CC      /home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.mod.o
LD [M]  /home/dhruya/Simcom_wwan/simcom_wwan/simcom_wwan.ko
make[1]: Leaving directory '/usr/src/linux-headers-4.9.140-tegra-ubuntu18.04_aar
ch64/kernel-4.9'
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo insmod ./simcom*.ko /lib/modules/4
.9.140-tegra/
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo depmod
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo modprobe -v simcom_wwan
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$
```

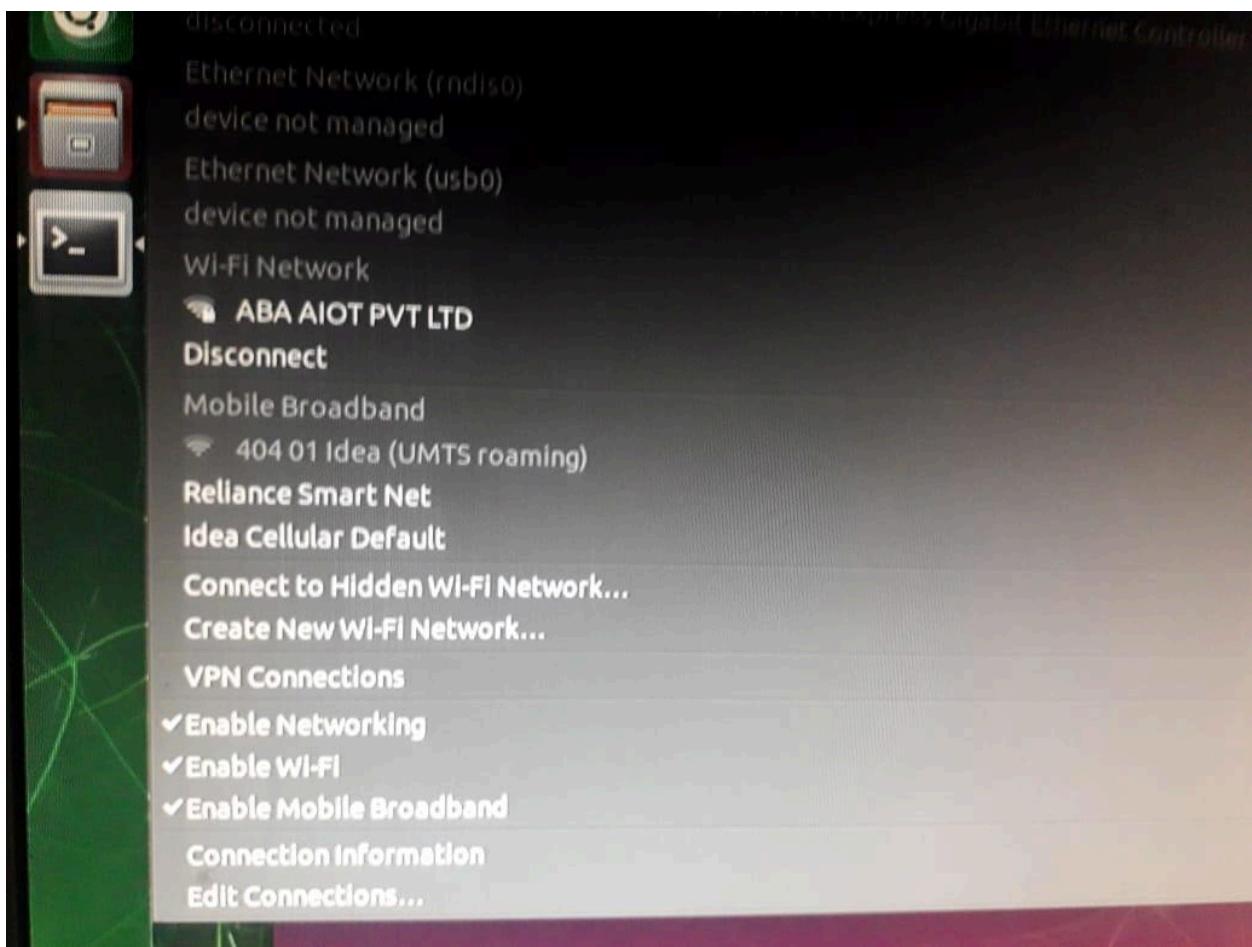
\$sudo dmesg | grep simcom\_wwan giving me an error like this



```
dhruya@dhruya:~/Simcom_wwan/simcom_wwan
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ sudo dmesg | grep simcom_wwan
[ 3.127551] simcom_wwan: loading out-of-tree module taints kernel.
[ 3.127985] usbcore: registered new interface driver simcom_wwan
[ 7.752202] simcom_wwan: probe of 1-2.1:1.0 failed with error -22
[ 7.758745] simcom_wwan: probe of 1-2.1:1.1 failed with error -22
[ 7.766569] simcom_wwan: probe of 1-2.1:1.2 failed with error -22
[ 7.774421] simcom_wwan: probe of 1-2.1:1.3 failed with error -22
[ 7.781899] simcom_wwan: probe of 1-2.1:1.4 failed with error -22
[ 7.792333] simcom_wwan 1-2.1:1.5 wwan0: register 'simcom_wwan' at usb-700900
00.xusb-2.1, SIMCOM wwan/QMI device, 0a:59:38:18:d9:f2
[ 1101.125060] simcom_wwan 1-2.1:1.5 wwan0: unregister 'simcom_wwan' usb-700900
0.xusb-2.1, SIMCOM wwan/QMI device
[ 1108.809699] simcom_wwan: probe of 1-2.1:1.0 failed with error -22
[ 1108.816309] simcom_wwan: probe of 1-2.1:1.1 failed with error -22
[ 1108.823039] simcom_wwan: probe of 1-2.1:1.2 failed with error -22
[ 1108.829819] simcom_wwan: probe of 1-2.1:1.3 failed with error -22
[ 1108.836574] simcom_wwan: probe of 1-2.1:1.4 failed with error -22
[ 1108.845611] simcom_wwan 1-2.1:1.5 wwan0: register 'simcom_wwan' at usb-700900
00.xusb-2.1, SIMCOM wwan/QMI device, 0a:59:38:18:d9:f2
[ 1191.752647] simcom_wwan 1-2.1:1.5 wwan0: unregister 'simcom_wwan' usb-700900
0.xusb-2.1, SIMCOM wwan/QMI device
[ 1192.036848] simcom_wwan: probe of 1-2.1:1.0 failed with error -22
[ 1192.043555] simcom_wwan: probe of 1-2.1:1.1 failed with error -22
```

I contacted them about this with SIM7600G-H support, and they replied that this error indicates an invalid argument, which I don't understand.

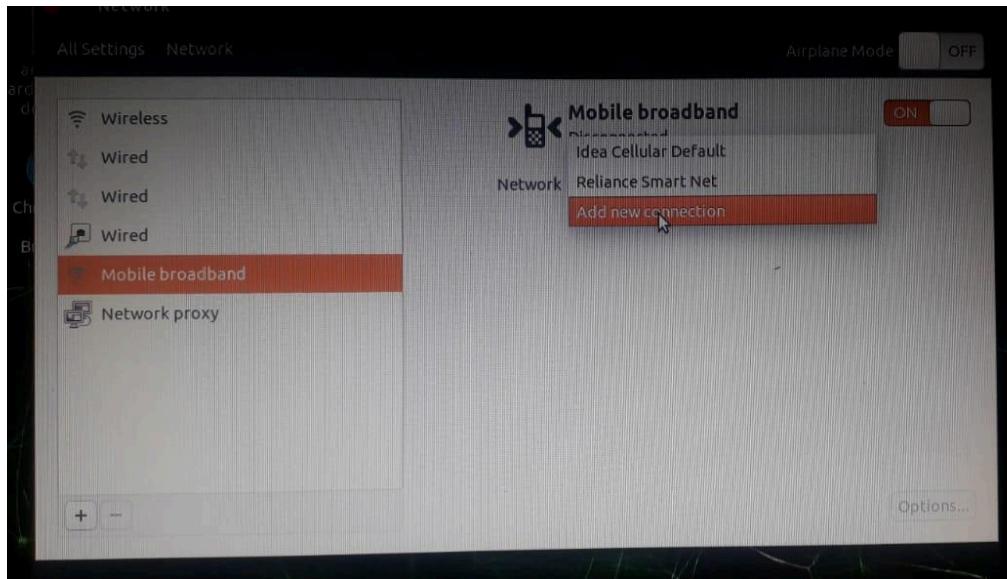
But in this, it shows a new interface driver registered, and I think that's actually what we want. I tried to connect Jetson Nano with Mobile Broadband, I turned on this from the settings panel, and in Mobile Broadband Connection I found my Idea network in that but it is in disable mode, I can't select it.



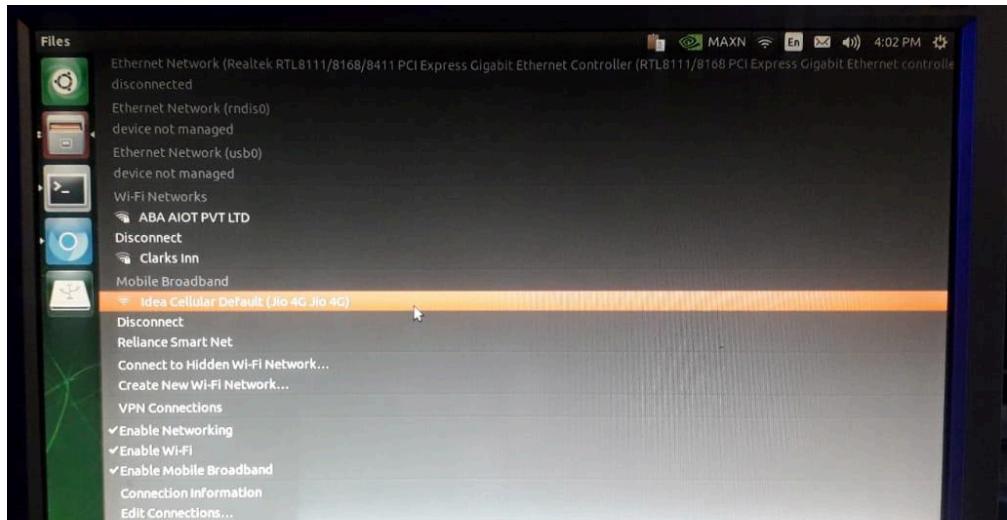
Also in the network manager devices list the GSM module is detected but shows the status as disconnected

```
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ nmcli d
d| DEVICE  TYPE      STATE   CONNECTION
d| wlan0    wifi     connected ABA AIOT PVT LTD
d| docker0   bridge   connected docker0
d| ttyUSB2   gsm     disconnected --
d| eth0     ethernet  unavailable --
d| l4tbr0   bridge   unmanaged --
d| dummy0   dummy    unmanaged --
d| rndis0   ethernet unmanaged --
d| usb0    ethernet unmanaged --
d| lo      loopback unmanaged --
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$
```

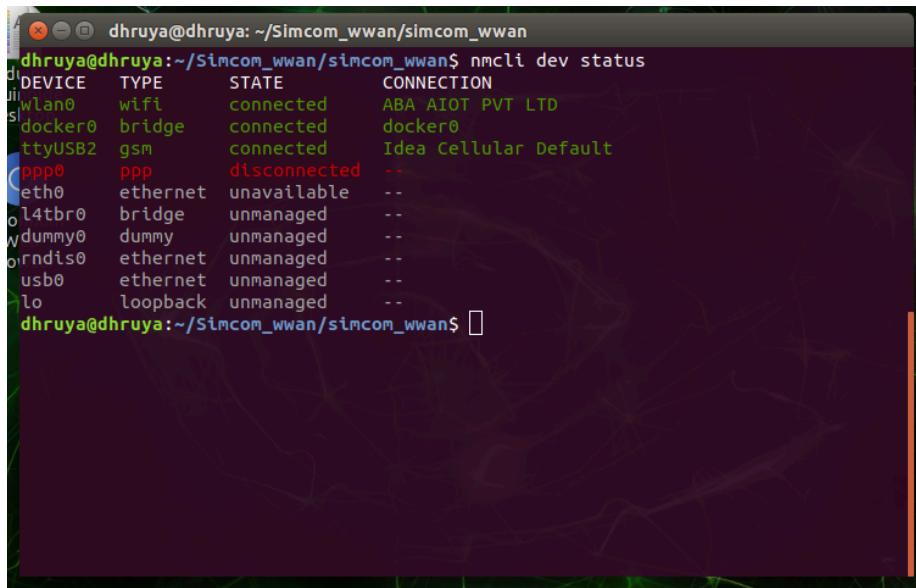
I think the driver is installed, but there is a problem with the connection with the mobile broadband connection. I got setting and created a new mobile broadband connection.



Still facing the same issue but this time mobile broadband connected again and disconnected. This may happen because the SIM card didn't have the 4G plan, I switched the SIM card with the JIO card. I connected with the network

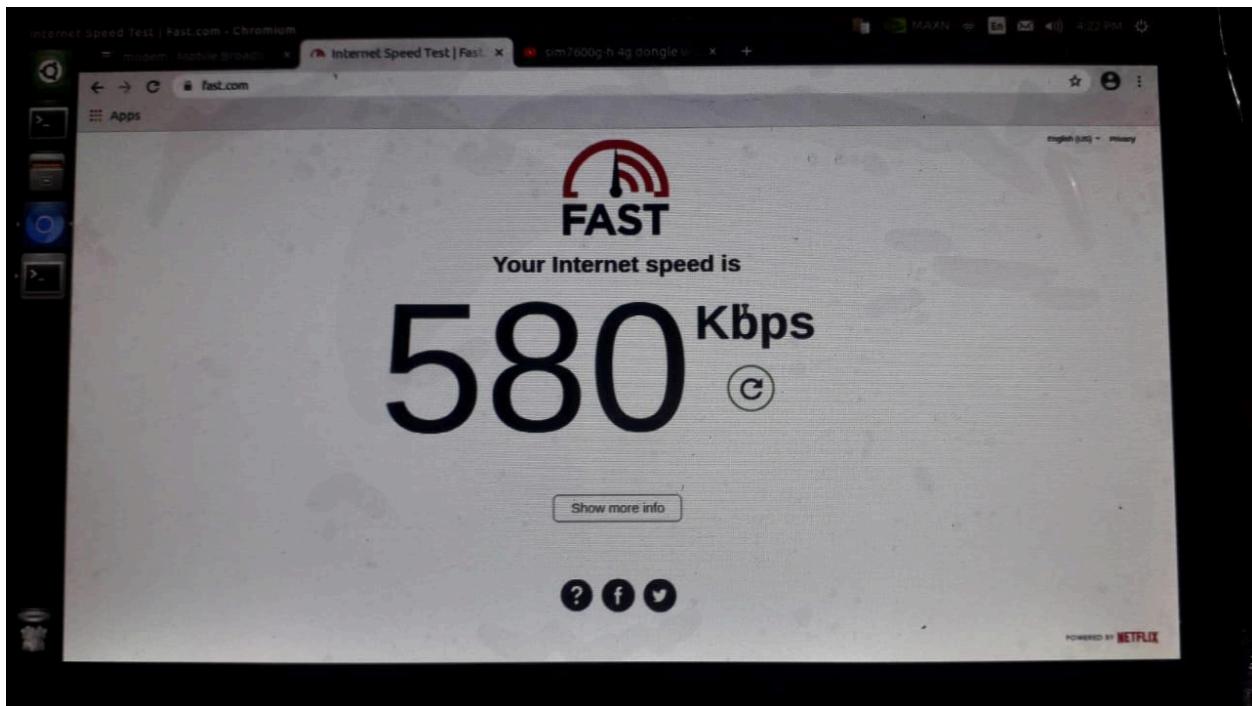


Also, the connection showing in Network Manager Devries and I check the Internet speed which is also working well.



```
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$ nmcli dev status
DEVICE  TYPE      STATE       CONNECTION
wlan0    wifi      connected   ABA AIOT PVT LTD
docker0  bridge    connected   docker0
ttyUSB2  gsm       connected   Idea Cellular Default
ppp0    ppp       disconnected -
eth0    ethernet  unavailable -
l4tbro  bridge    unmanaged   -
dummy0  dummy     unmanaged   -
rndis0  ethernet  unmanaged   -
usb0    ethernet  unmanaged   -
lo     loopback  unmanaged   -
dhruya@dhruya:~/Simcom_wwan/simcom_wwan$
```

### Internet Speed Test



## **Conclusion**

The documentation for SIM7600GG-H on the official site is not good for the installation process which has too many shortcuts used which can not be understood by noob and there for Windows and Ubuntu I tried also giving me error which was not solved by me.

Doing google at every point is the best way to solve the errors

## **Results**

4G Network Connection is successfully done in Jetson Nano