Neon - User Guide

Scope

This document, User Guide provides detailed information and testability of **Neon** Board.

This user guide can be used and rereferred by the user/operator with efficiency.

Block Diagram

The system level block diagram and detailed architecture is depicted below
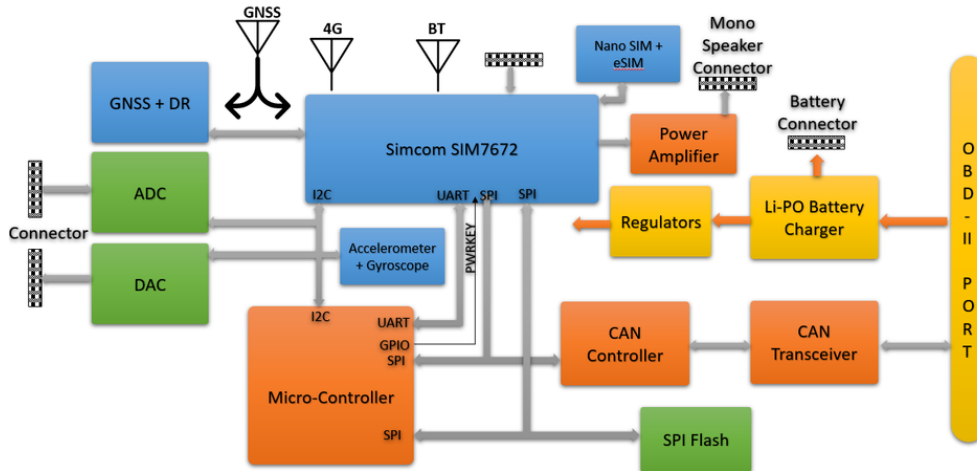
Product Block Diagram - Neon

Figure - 1 Neon - Block Diagram

System Interface

The system interface of **Neon** board is classified into two types.

a)   Hardware Interface

b)   Software Interface

Hardware Interface

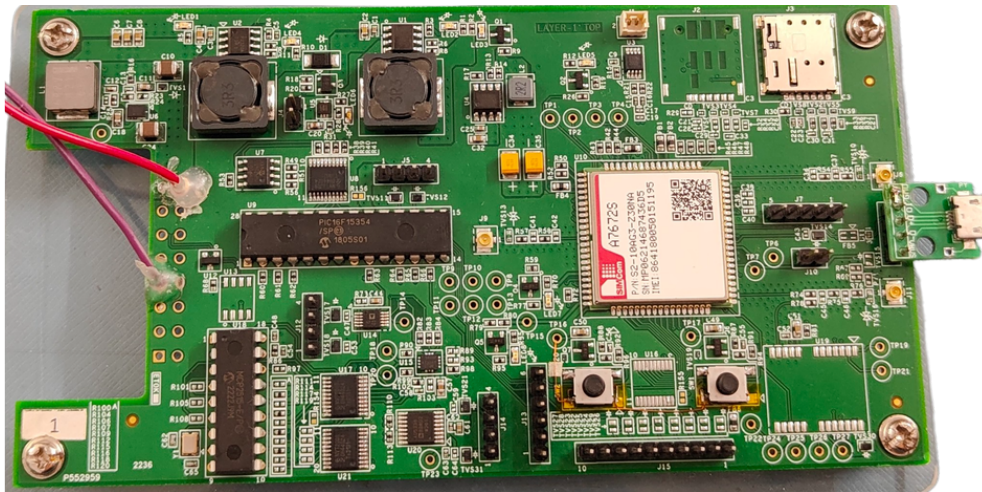This section provides detailed description of **Neon's** Hardware interface.

Figure - 2 Neon Hardware

Configuration / selection switch

We have a few configuration/selection switches on the Neon board.

As shown in the below table, following are the major configuration/selection switches color coded to recognize their respective locations on the Neon board.

|	Connector / Key	Description
1	J16	**OBD -II Connector (J16)** This is a 16-pin connector, from External world PWR, Data and any analog /digital signals fed to our module through this connector. We are energizing the Neon module through pin-16 on this connector, pin 4 or pin 5 can be used as Ground(GND) Refer Figure - 3
2	J4	**Battery Connector (J4)** This is a 2-pin connector, we can connect battery module for charging and for powering on Neon module. PIN 1 Vcc and PIN 2 GND Refer Figure - 3
3	J8	**Module debug USB connector (J8)** From PC/LAPTOP user can interface with our module via Micro-USB interface. Refer Figure - 3
4	J3	**SIM Connector (J3)** We have a SIM slot on Neon module. It supports 4G LTE carrier network on this slot Refer Figure - 3
5	J6	**Bluetooth Antenna Connector (J6)** For effectively working with Bluetooth functionality we will attach a suitable antenna @J6 Refer Figure - 4
6	J9	**LTE Antenna Connector (J9)** For acquiring 4G LTE signal we need to connect a suitable antenna @J9 Refer Figure - 4
7	J11	**GPS Antenna Connector (J11)** For acquiring a proper GPS signal we need to connect a suitable antenna @J11 Refer Figure - 4
8	J1	**Mono Audio Output Connector (J1)** We need to connect a speaker @J1 to listen the audio output Refer Figure - 3
9	SW1	**Module RESET Button (SW1)** At any stage of operations when we need to reset the module, this button needs to be pressed. Refer Figure - 4
10	SW2	**Module PWR ON Button (SW2)** After programming the board, and energizing it, we need press & hold this key for 10 seconds, such that the Soft Module gets powered. Refer Figure - 4
11	U10	**SIMCOM Module (U10)** A7672s module is the key component of the Neon module which will initiate and ensure all the critical functionality.
12	LED7	**STATUS LED (LED7)** Will glow in GREEN indicating that the SIMCOM Module is Active.
13	LED5	**NETLIGHT LED (LED5)** Indicates network status, glows continuously in GREEN indicating network status activity.
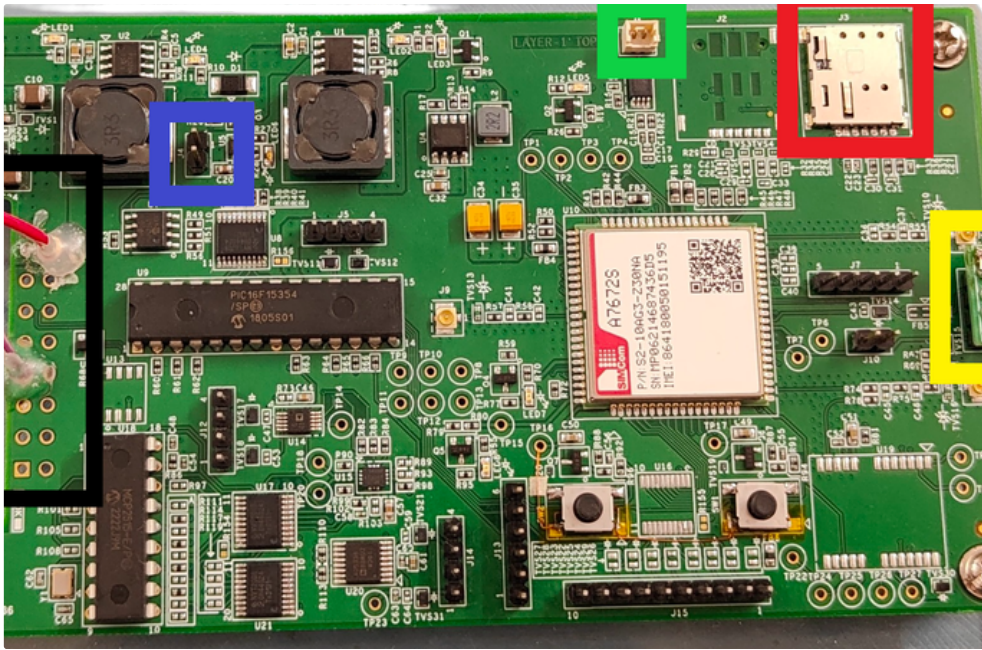
FIGURE - 3 Neon Key Components

As highlighted **BLACK** in the above figure, **J16** is the OBD-II connector. Currently we are using it for power source only.
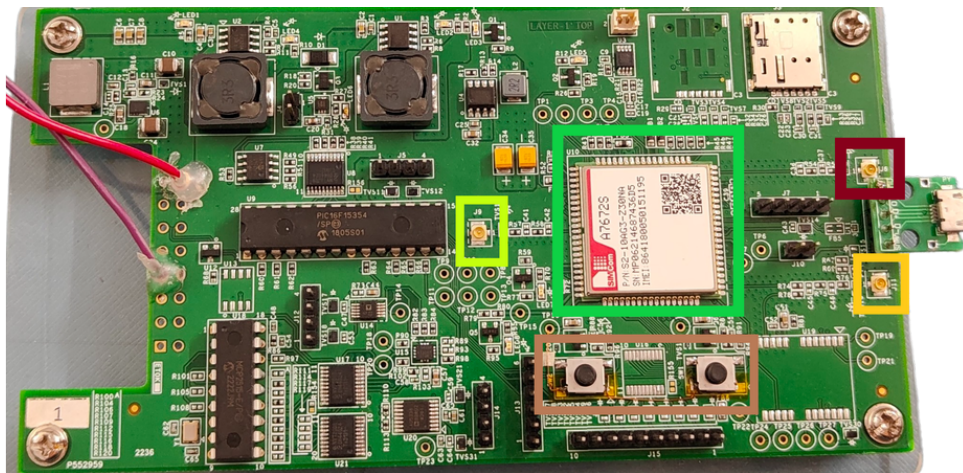

FIGURE - 4 Neon Key Components

Hardware Test Equipment / Tools

Following Hardware Test Equipment is required for testing the unit / modules

- Fully assembled **Neon** board
- 12v Power source
- Battery module for power back up and reuse.
- Micro USB cable for Debug port
- Antennas
- Digital Multi-meter
- Digital Oscilloscope

Software Interface

Tools Required

For flashing the image on **Neon** board and working with **Neon** board, we need the following installation on the PC/LAPTOP

- **A76XX_A79XX_MADL V1.07 Only for Update.exe** is known as **MADL** from SIMCom.
- Terminal Emulator SIMCom Serial Port Tool i.e **SIMComSPT_V3.5** mandatory or any (like Tera Term, XShell or any) for debug purpose and running commands

Note: Officially Flashing tool i.e **MADL** and Terminal emulator i.e SIMComSPT_V3.5 are available ONLY for Windows OS. So PC/LAPTOP must be having Windows OS for above purpose.

EUT Operation

EUT operations are highlighted as below

Board level visual inspection and Impedance Measurement

This preliminary check ensure that the Board can be powered ON.

Flashing Guide for the Neon board

For programming the **Neon** board, we need a Windows 10 PC/Laptop with **A76XX_A79XX_MADL V1.07 Only for Update.exe** is known as **MADL** from SIMCom and configured with the compatible USB driver configuration.

- Power OFF the **Neon** Module
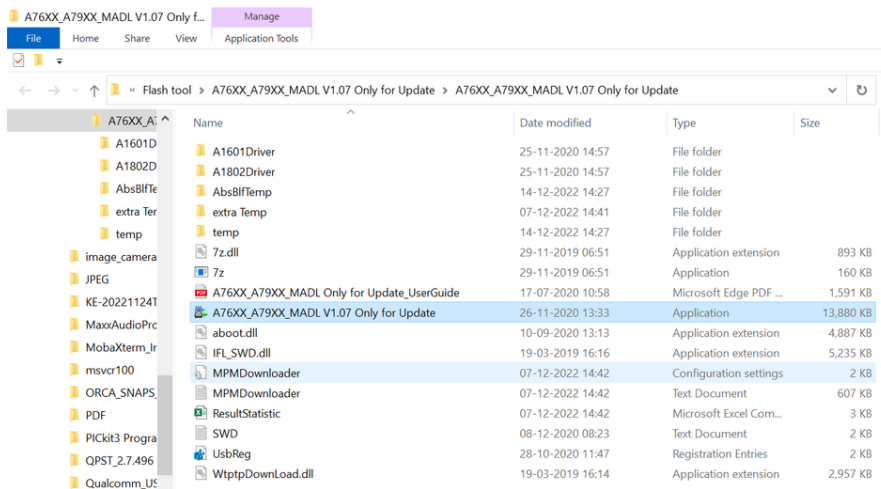- On Windows PC / LAPTOP preferably Windows 10, launch the flash tool

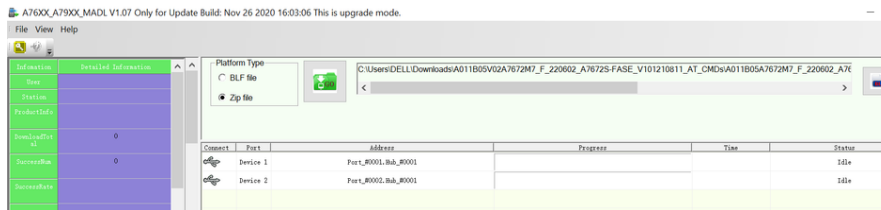**FIGURE - 5 Launch Flash Tool**

FIGURE - 6 Select .ZIP file

- After selecting the .zip file click on GO (Download button)
- Power ON the **Neon** module, wake up the module by pressing SW1
- Make sure download automatically starts and shows the progress on the flash tool
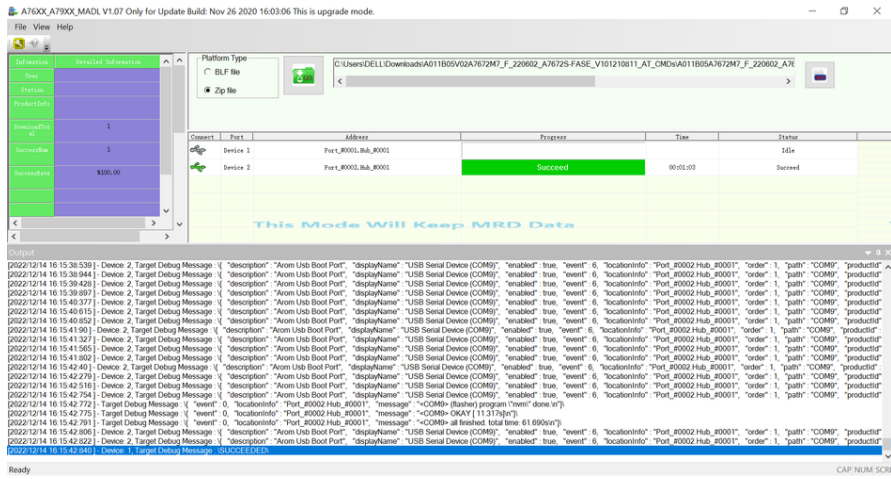
FIGURE -7 Download Success on Flashtool

- Wait till download success message

Once the download is successful, close the flash tool properly

Power OFF and Power ON the **Neon** device

Open Device Manager PC/LAPTOP

Make sure Neon device's USB ports are advertised in the Device Manager
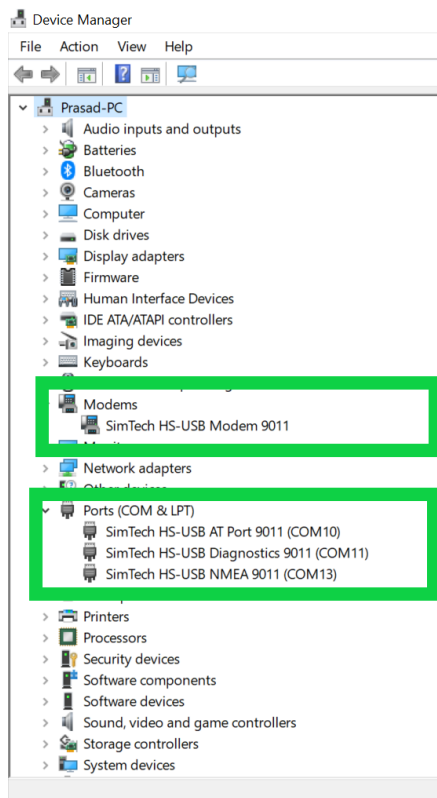
FIGURE - 8 Neon USB ports' enumeration on PC

Each port has its dedicated task and functionality (read/write commands) and further processing.
Connect Micro-USB cable from PC/LAPTOP to **Neon** module @J8
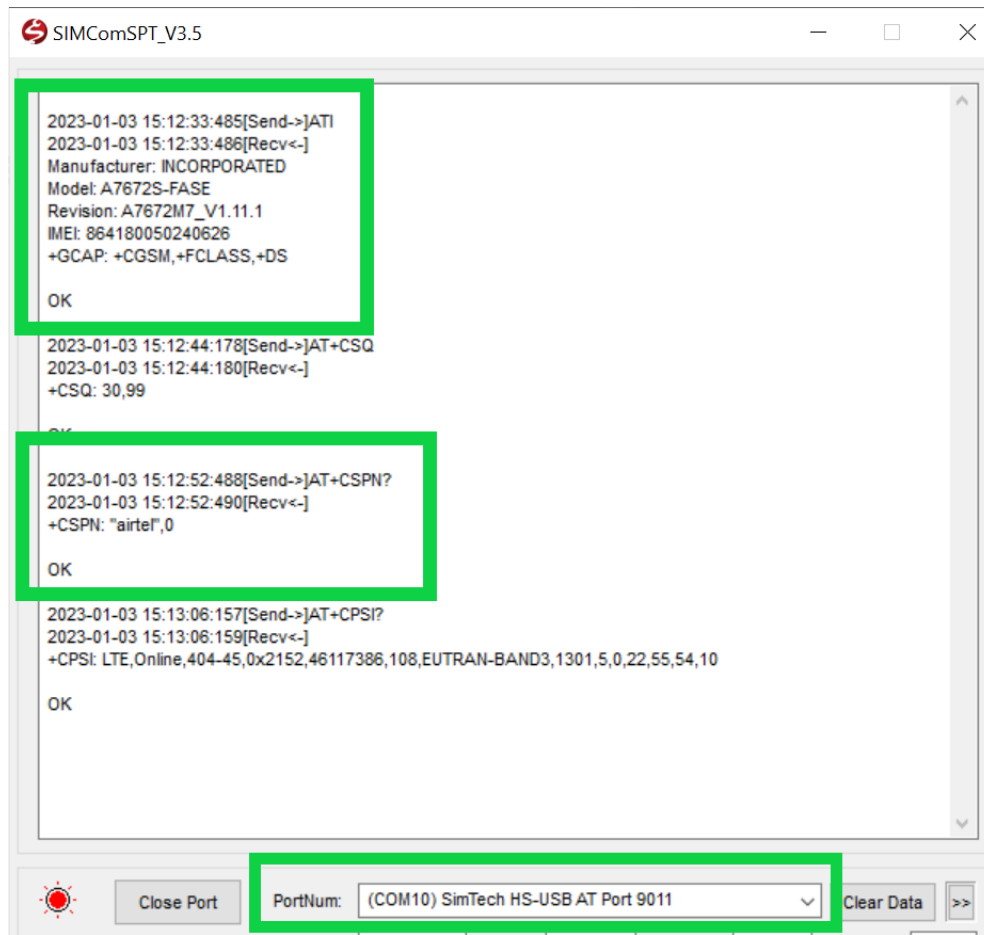
From PC / LAPTOP, Launch Debug Terminal i.e SIMComSPT_V3.5 on AT port

Here we can run all the supported AT commands and get the response from **Neon** board.

AT Commands

As explained above, AT commands be run on the designated AT port

Basic AT commands and the response are given below

SIMComSPT_V3.5

```
2023-01-03 15:12:33:485[Send->]ATI
2023-01-03 15:12:33:486[Recv<-]
Manufacturer: INCORPORATED
Model: A7672S-FASE
Revision: A7672M7_V1.11.1
IMEI: 864180050240626
+GCAP: +CGSM,+FCLASS,+DS

OK

2023-01-03 15:12:44:178[Send->]AT+CSQ
2023-01-03 15:12:44:180[Recv<-]
+CSQ: 30,99



2023-01-03 15:12:52:488[Send->]AT+CSPN?
2023-01-03 15:12:52:490[Recv<-]
+CSPN: "airtel",0

OK

2023-01-03 15:13:06:157[Send->]AT+CPSI?
2023-01-03 15:13:06:159[Recv<-]
+CPSI: LTE,Online,404-45,0x2152,46117386,108,EUTRAN-BAND3,1301,5,0,22,55,54,10

OK
```

Close Port   PortNum: (COM10) SimTech HS-USB AT Port 9011   Clear Data   >>
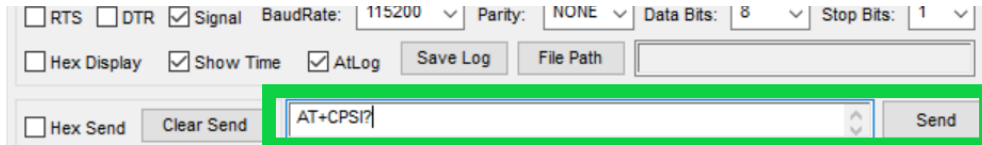
FIGURE - 9 Neon AT Port

As shown in the above figure, launch the SIMComSPT_V3.5 terminal emulator on the windows PC

Select appropriate PortNum which is have AT port 9011, Click on Open Port

Now we are ready to send the AT commands and see the response above.

 For each command OK response should come then only we can confirm that execution is successful

	AT Command	Description	Output
1	ATI	Firmware information of the SIMCOM module	Manufacturer: INCORPORATED Model: A7672S-FASE Revision: A7672M7_V1.11.1 IMEI: 864180050240626 +GCAP: +CGSM,+FCLASS,+DS OK
2	AT+CSPN?	Service provider name	+CSPN: "airtel",0 OK
3	AT+CSQ	Query the Signal quality	+CSQ: 30,99 OK
4	AT+CPSI?	Inquiring System information	+CPSI: LTE,Online,404-45,0x2152,46117386,108,EUTRAN-BAND3,1301,5,0,22,55,54,10 OK
5	AT+CFUN?	Check the Phone functionality	+CFUN: 1 OK

AT commands for Call Control (Phone number calling and control)

Now let us see few commands for Call Control

|	AT Command	Description	Output
1	ATD+919886740211;	Mobile originated call to dial a number (**9886740211**) from Neon	+CGEV: NW ACT 8,10 +CLCC: 1,0,2,0,0,"+919886740211",145,"" +CLCC: 1,0,3,0,0,"+919886740211",145,"" OK
2	**ATA**	Answer incoming call	VOICE CALL: BEGIN +CLCC: 1,1,0,0,0,"+919886740211",145,"" OK
3	**ATS0=4**	Automatically answer incoming call after 2 rings	ats0=4 OK ats0? 004 OK
4	**AT+CHUP**	Hang-up / disconnect the incoming or outgoing call	+CGEV: NW DEACT 8,10 NO CARRIER +CLCC: 1,0,6,0,0,"+919886740211",145,"" VOICE CALL: END: 000226 OK
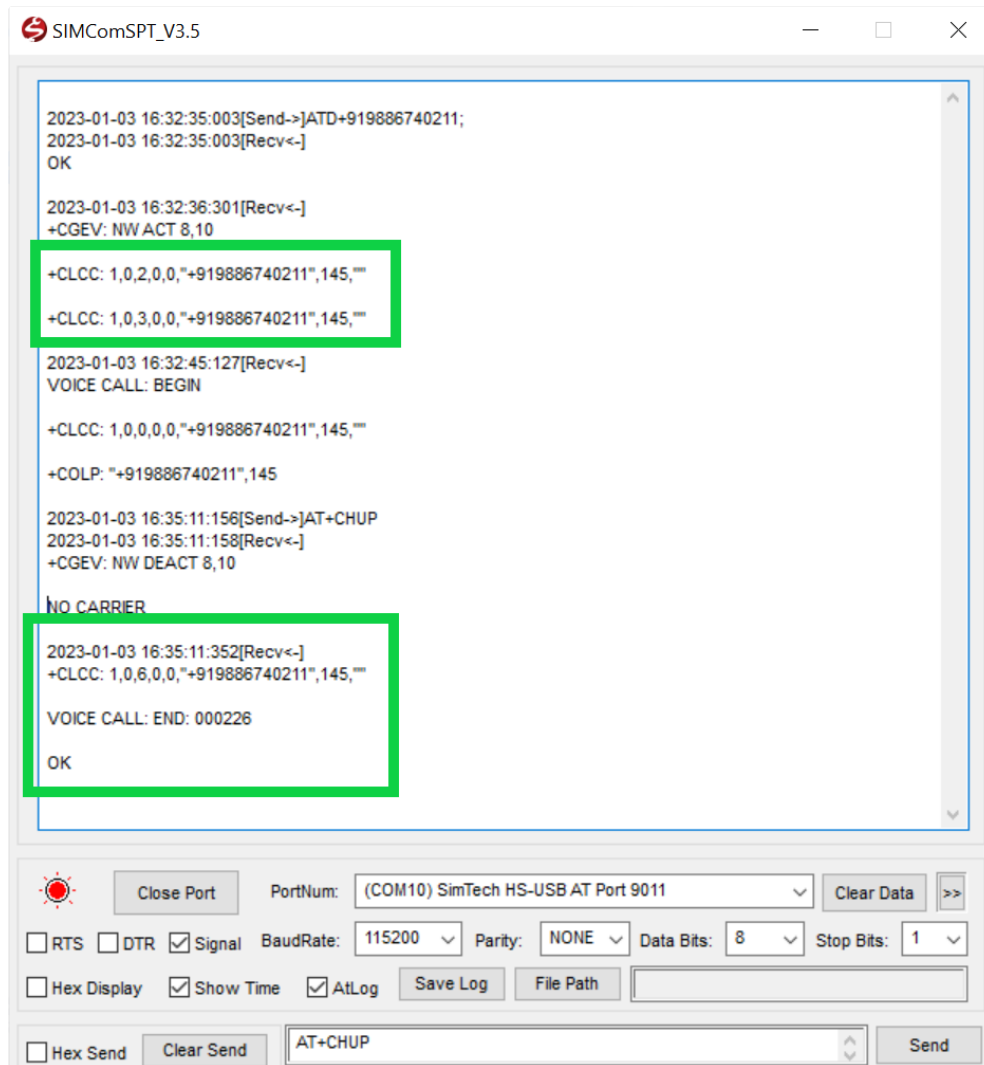
FIGURE - 10 CALL Control using AT Commands

As shown in the above figure, we are able to dial a number from **Neon** module and disconnect the call also

AT commands for Messaging and Control (SMS read/write/list and delete)

Now let us see few commands for Messaging and Control

	AT Command	Description	Output
1	**AT+CMGW="+919886740211"**	Initiate message writing to a number **9886740211**	Wait for message input and after messaging done press CTRL+Z to save the message Hello How are you? 2023-01-04 16:32:30:252[Recv<-] 2023-01-04 16:32:36:721[Recv<-] +CMGW: 6 OK
2	AT+CMSS=6	Send the above message SMS to the number **9886740211** with **cmss** 6	AT+CMSS=6 2023-01-04 16:32:50:961[Recv<-] 2023-01-04 16:32:51:703[Recv<-] +CMSS: 37 OK
3	**AT+CMGR=1**	Read the first message(SMS)	+CMGR: "STO SENT","+917095804070","" Hello Guys!!! Welcome to **Neon** #10 OK
4	**AT+CMGR=2**	Read the second message(SMS)	+CMGR: "REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much

|			OK
5	**AT+CMGD=5**	Delete the 5th message in SMS store (with CMGR=5)	AT+CMGD=5 OK
6	**AT+CMGL="ALL"**	List all messages (SMS) on the device.	at+cmgl="all" +CMGL: 1,"STO SENT","+917095804070","" Hello Guys!!! Welcome to Neon #10 +CMGL: 2,"REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much +CMGL: 3,"REC READ","+917095804070","","23/01/04,15:19:57+20" Cool +CMGL: 4,"STO UNSENT","+919886740211","" Hello Again from Neon #10 +CMGL: 6,"STO SENT","+919886740211","" Hello How are you? +CMGL: 7,"REC READ","+919886740211","","23/01/04,16:33:03+20" Fine, thank you OK
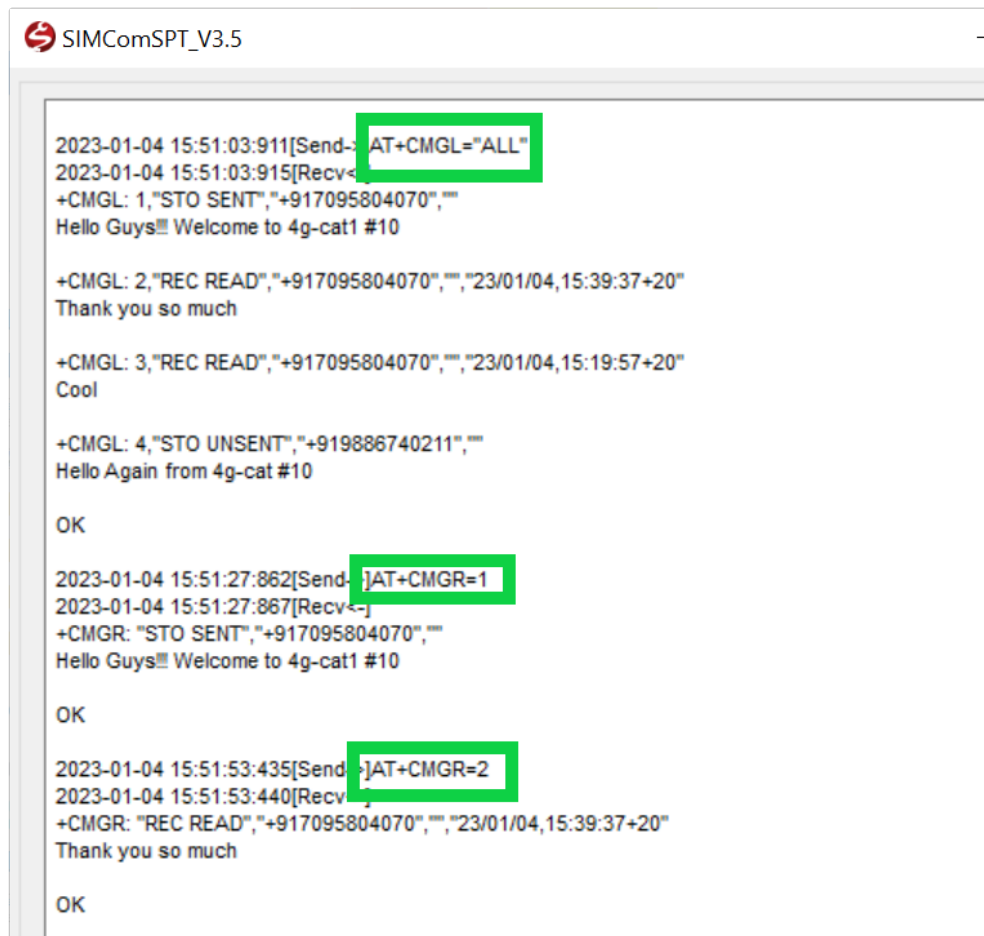
FIGURE - 11 SMS control using AT Command