



Monarch Platform

Modules

DM Light Tool User Guide



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Table of Contents

| | |
|---|----|
| 1. Introduction | 4 |
| 2. Installation..... | 4 |
| 2.1. Supported Environments..... | 4 |
| 2.2. Installation on Windows..... | 4 |
| 2.3. Uninstall..... | 7 |
| 3. Overview of DM Light Tool | 8 |
| 3.1. Features | 8 |
| 3.2. Device Connection Interface..... | 10 |
| 3.3. User Interface..... | 11 |
| 3.3.1. Connect to the UE | 11 |
| 3.3.2. Recording | 14 |
| 3.4. DM Console..... | 20 |
| 4. Troubleshooting..... | 21 |
| 4.1. Serial/USB Connection Failure..... | 21 |
| 4.2. SIM Card is Not Ready..... | 22 |
| 4.3. Network Connection Failure | 24 |

1. Introduction

This application note describes the way to install the DM Light tool and its main features.

2. Installation

2.1. Supported Environments

The Sequans DM Tool can be run on any Windows platform:

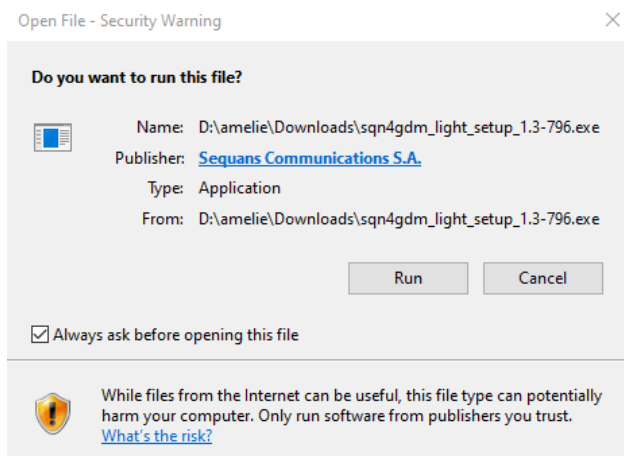
- Windows 7.
- Windows 8.x.
- Windows 10.

2.2. Installation on Windows

To install, launch the Windows installer `sqn4gdm_light_setup_<version>.exe`. It automatically installs Sequans DM Light Tool on the computer.

The details of the installation procedure are:

1. Launch the installer. Confirm the execution.

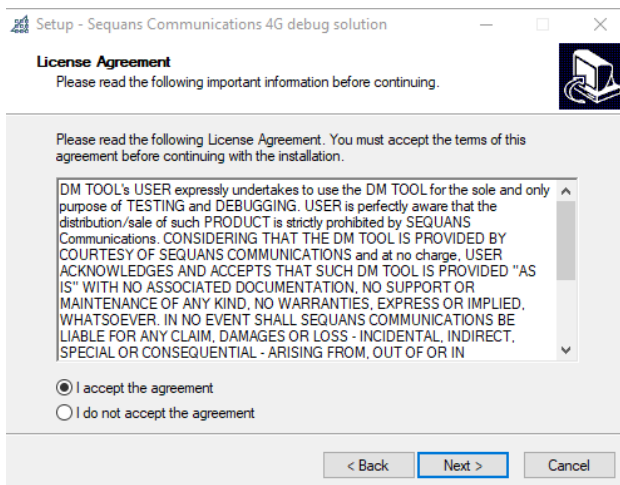


2. Confirm that you trust Sequans software to proceed with the installation.

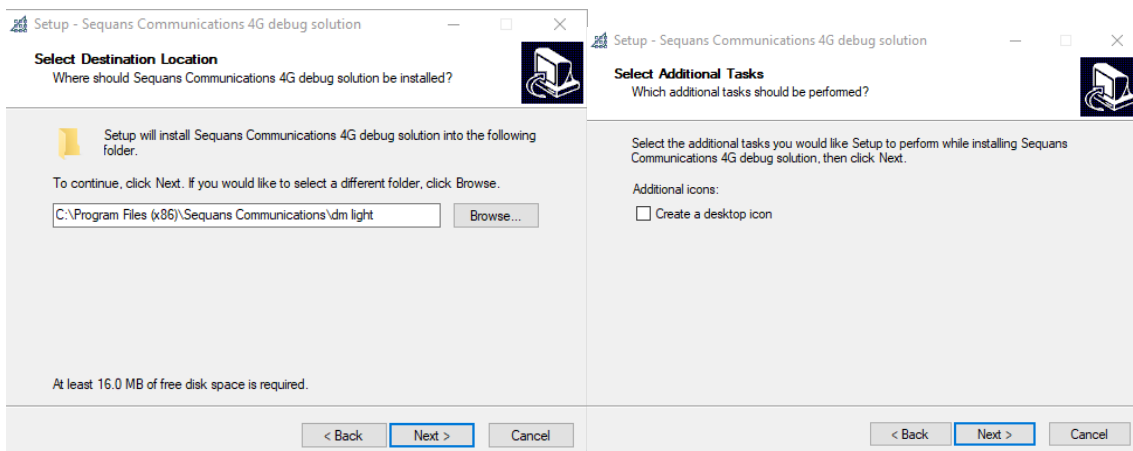
3. Execute the DM Light Tool installation.



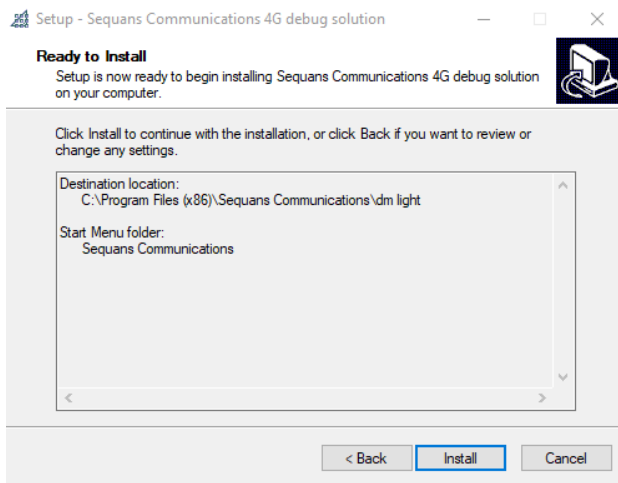
4. Accept the license agreement to proceed with the installation. Click the **Next** button.



5. Select the installation folder, Start Menu folder and the icon creation on desktop.



6. Confirm the installation summary and proceed by clicking the Install button.



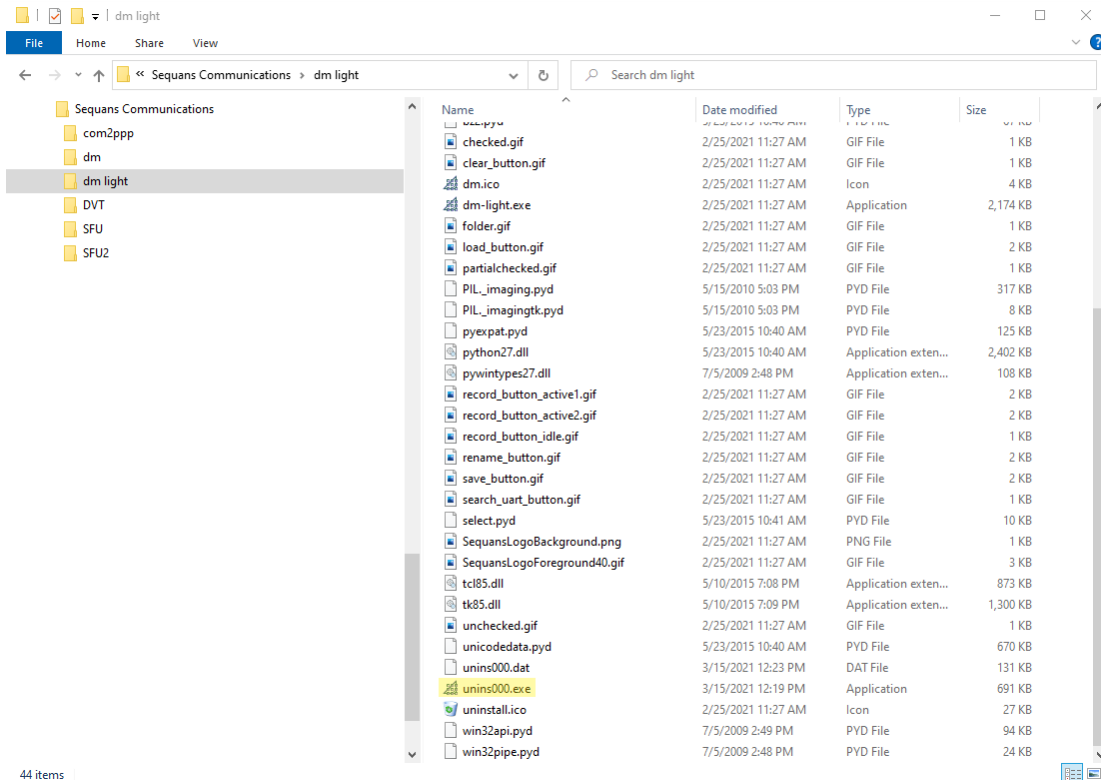
7. Click the Finish button to complete the installation process.



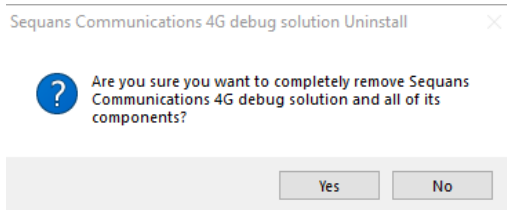
2.3. Uninstall

To uninstall, execute the following procedure:

1. Select Sequans Communications folder (or the folder name selected during the installation process).



2. Select Uninstall Debug and Monitoring tool



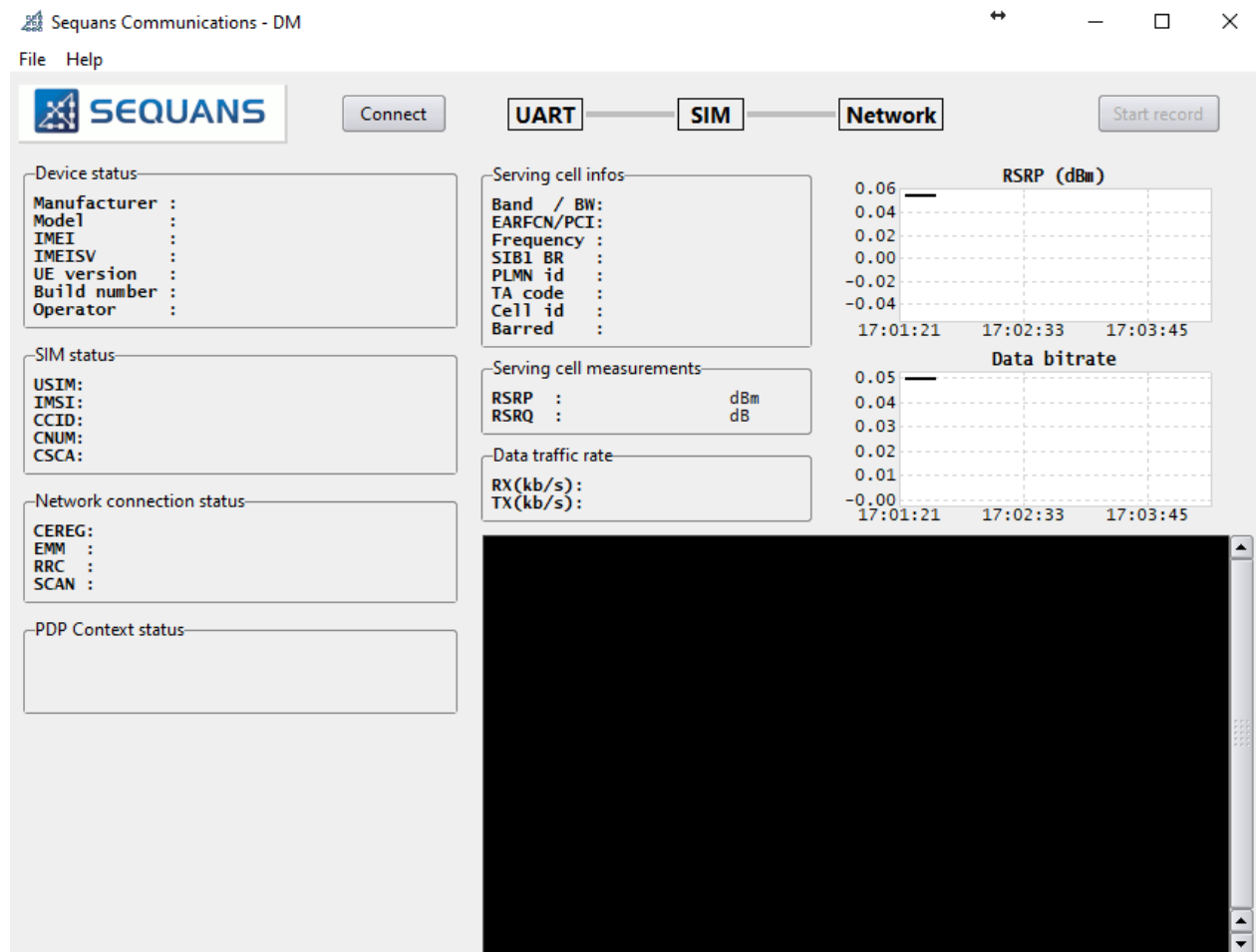
3. Overview of DM Light Tool

3.1. Features

The main features of the DM Light tool are:

- Live display of UE events in graphic or text type.
- Record events in a file with dm record config file(*.dmrec).

The DM light tool is released with pre-defined dashboards. Below is the default one when using the UART to connect the DM light tool to the UE:



This dashboard contains the following:

- Status boxes:
 - Device status: shows the configuration of the device
 - Manufacturer: the manufacturer of the module
 - Model: the module's model
 - IMEI: International Mobile station Equipment Identity number
 - IMEISV : IMEI plus SVN version number
 - UE Version: to track the version of the LTE stack
 - Build number: to track the full SW build
 - Operator: the operator configured with SQNCTM command
 - SIM status
 - USIM: shows the status of the SIM returned by CPIN command
 - IMSI: International Mobile Subscriber Identity
 - ICCID: card identification number
 - CNUM: subscriber number
 - CSCA: the configured service center address for SMS service
 - Network connection status
 - CERE: shows the registration status of the device with the network
 - EMM (EPS Mobility Management): shows the network connectivity status, it is either registered or deregistered
 - RRC: shows the radio connectivity status to enodeB
 - SCAN: shows when a cell was found (CAMPED) or if scanning is on going (SCANNING)
 - PDP context status: shows the active PDP contexts and their types
 - Serving cell infos
 - Band/BW: Band number advertised in SIB1 and the cell DL bandwidth
 - EARFCN/PCI: Downlink E-UTRAN Absolute Radio Frequency Channel Number / Physical CID
 - Frequency (in MHz)
 - SIB1 BR: if this information is in the MIB, it means that the cell is CAT-M capable otherwise, the cell is not suitable for CAT-M
 - PLMN id
 - TA code: Tracking Area code
 - Cell id
 - Barred: shows if the cell is barred or not
 - Serving cell measurements
 - RSRP: Reference Signal Received Power in dBm
 - RSRQ: Reference Signal Received Quality in dB
 - Data traffic rate
 - RX (kb/s)
 - TX (kb/s)
- Graphs
 - RSRP graph display (in dBm)
 - UL and DL Data bitrate graph display
- Console:
 - AT console sniffer display will show the AT commands that are sent by the DM tool to retrieve all the above information

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- Buttons
 - `Connect` button.
 - `Start Record` button.
- State displays:
 - SOCKET or UART
 - SIM
 - Network

3.2. Device Connection Interface.

The DM light tool can connect to your Sequans product either through UART or through USB socket. The connection is configurable through the menu from the main window:

- Connect the UE through a serial port, by selecting the `Switch to UART mode`. This shall be used with Sequans Monarch and Monarch2 based products.



- Connect to the UE through a USB port, by selecting the `Switch to Socket mode`. This shall be used with Sequans' Calliope, Colibri, Cassiopeia based products. The tool will try to connect to 192.168.16.1 and 127.0.0.1 interfaces.

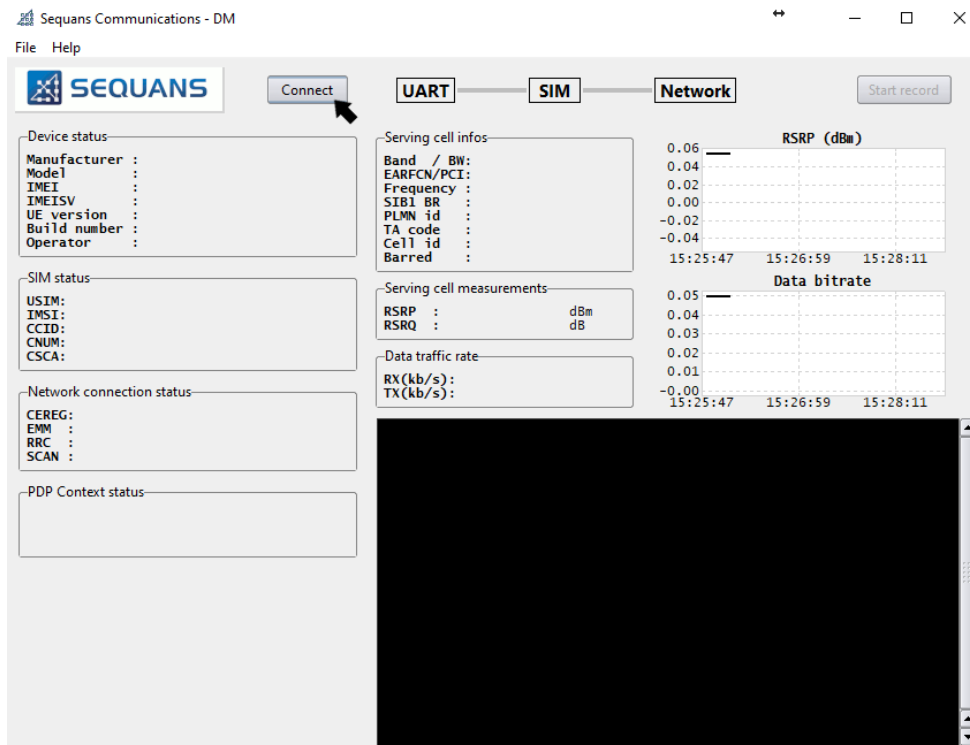


3.3. User Interface

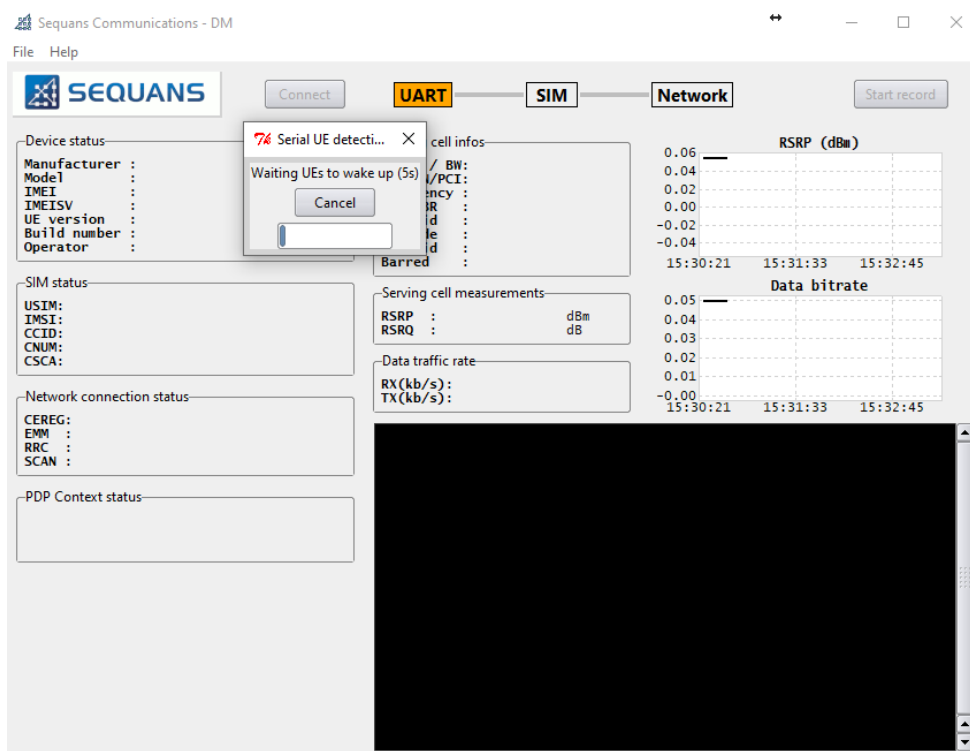
3.3.1. Connect to the UE

Plug your Sequans device to your laptop (through UART or USB) and click on the 'Connect' button. The DM light tool will start detecting the UE through the available UART/Socket interface and, once found, will connect to the UE automatically:

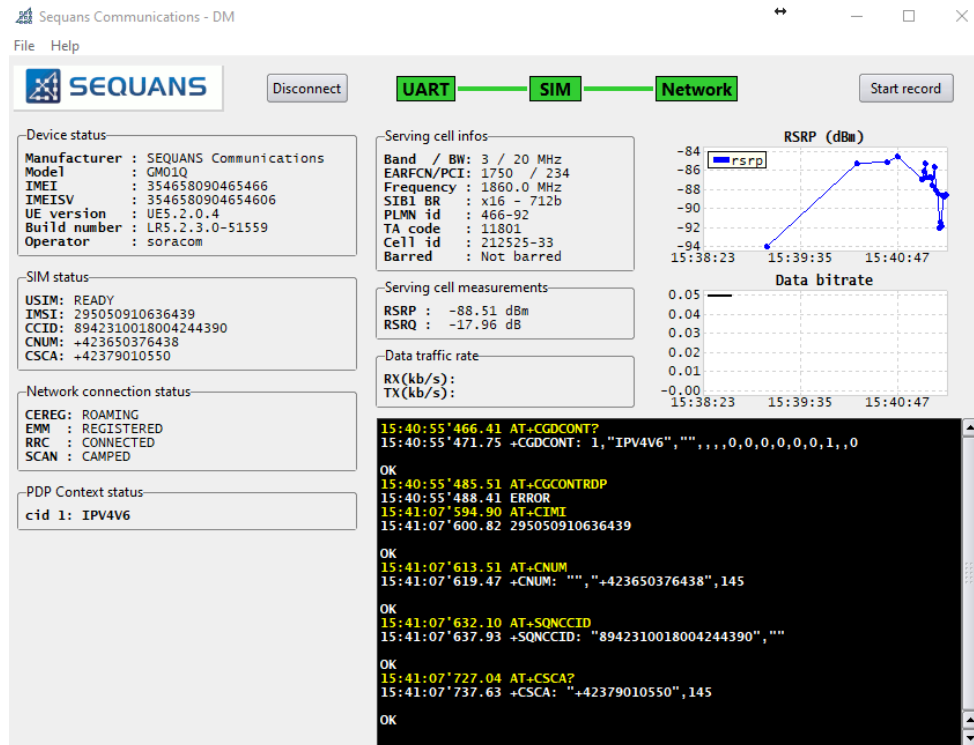
- Click on the 'Connect' button



- Detecting UE



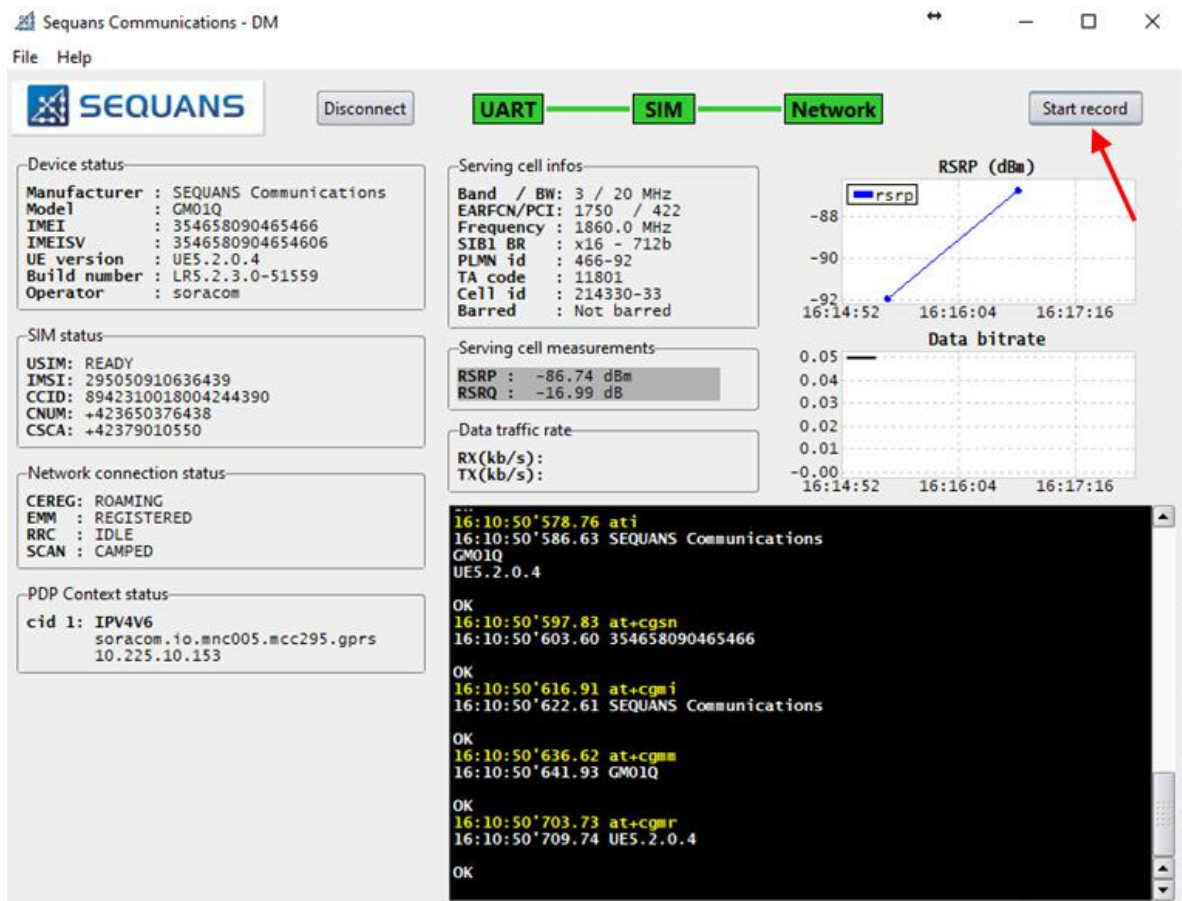
- Connected UE:
 - The UART state turns green once connected to the UE
 - The SIM state turns green once SIM card is ready
 - The network state turns green once the modem is attached to the network



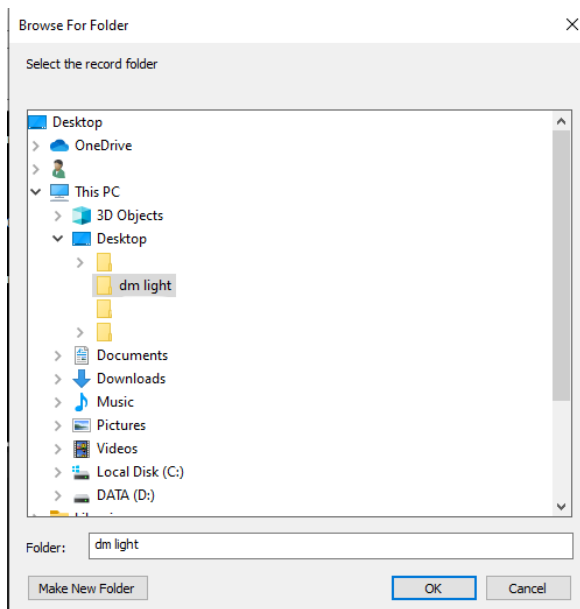
3.3.2. Recording

The DM light tool can record some configured events using the `Start Record` button. The created record file will have the .evt extension.

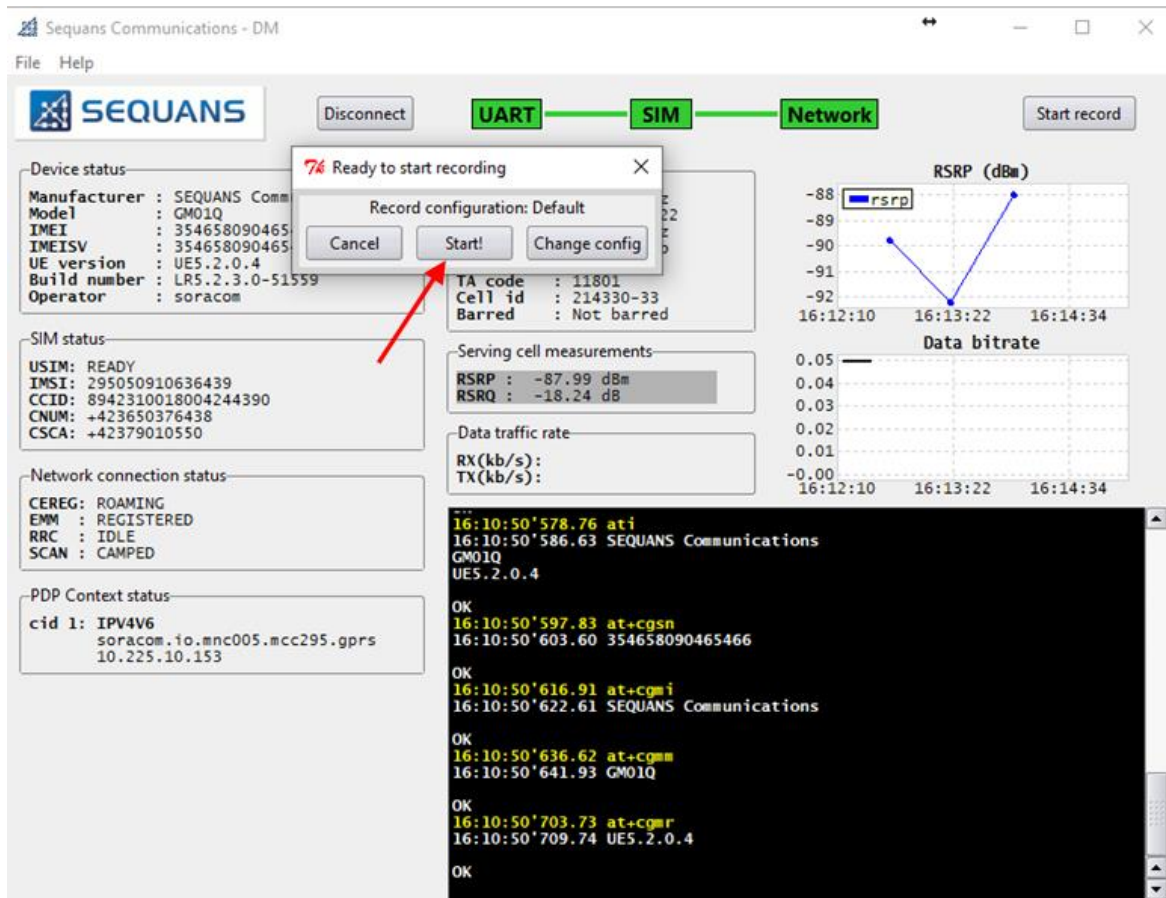
- Click `Start Record` button



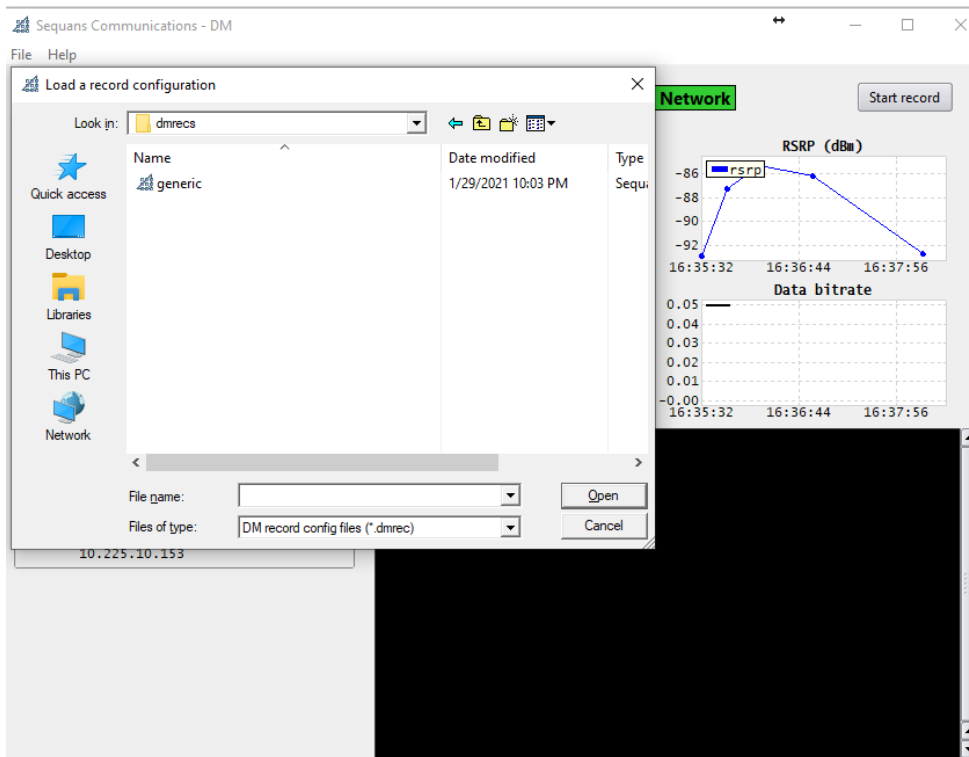
- Select the record folder to store the recorded file.



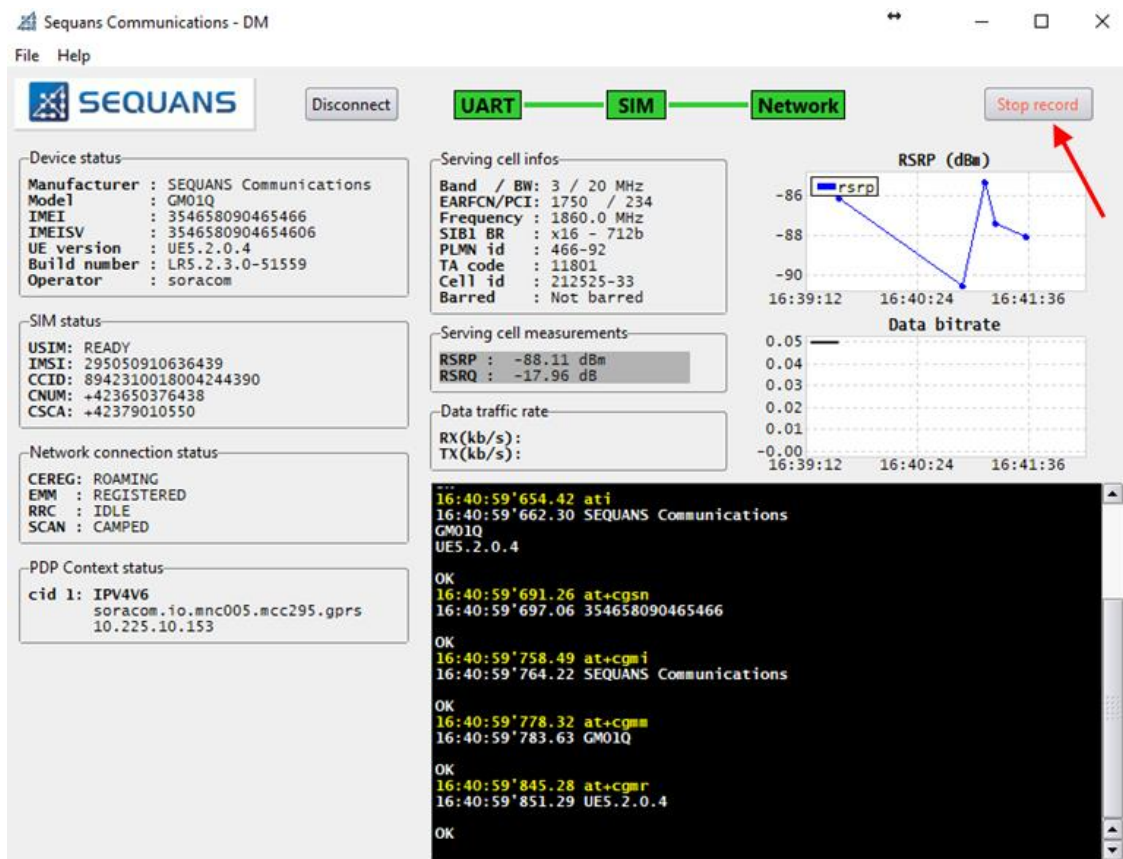
- In the 'Ready to start recording' popup window, click 'Start!' button to start recording with default configuration



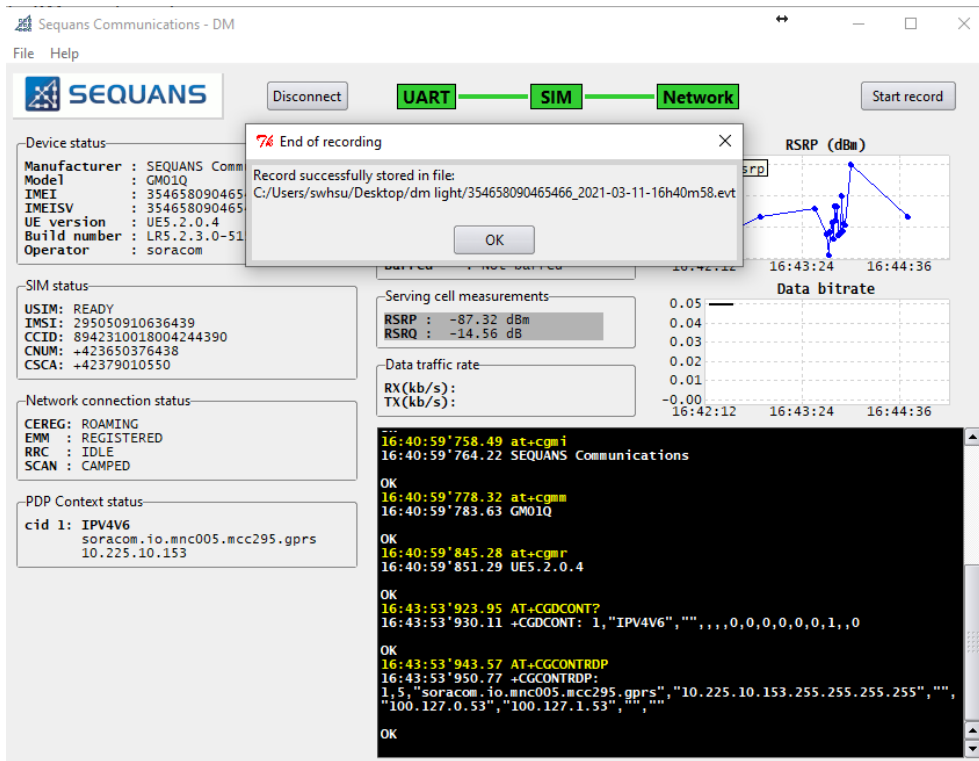
- Record configuration files (.dmrec) can be changed with the `Change config` button if your Sequans's support contact asks you to



- Record can be stopped with the `Stop record` button



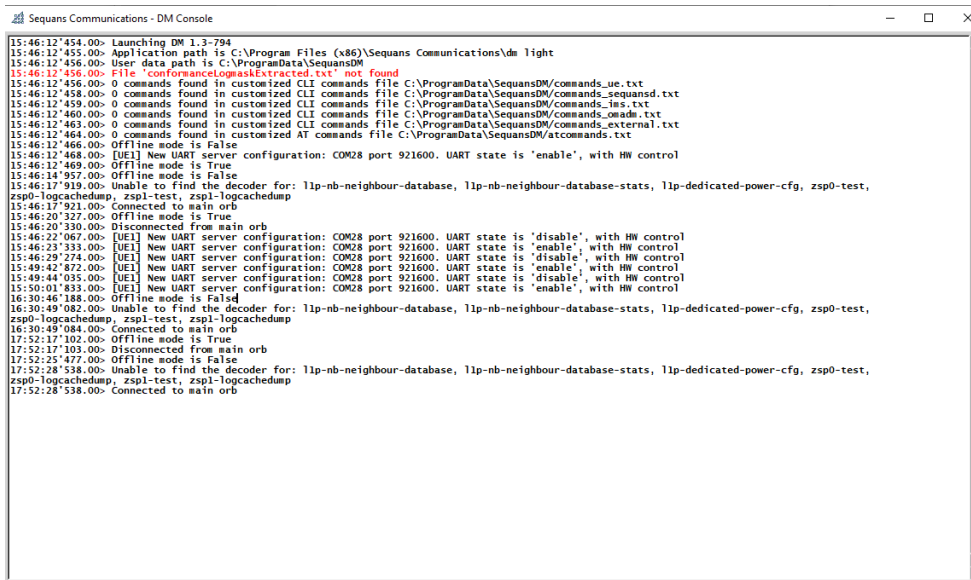
- The base name of the record file will contain the device IMEI and date-time suffixes



Once recorded, please send the .evt file to your Sequans support for analysis. The file cannot be read with the DM light tool.

3.4. DM Console

The DM Light tool's dashboard contains a console window where its logs are displayed. These are the logs of the DM tool itself, not the recorded traces. The goal is to keep track of the user actions on the tool.



```
Sequans Communications - DM Console
15:46:12'454.00: Launching DM 1.3-794
15:46:12'455.00: Application path is C:\Program Files (x86)\Sequans Communications\dm light
15:46:12'456.00: User data path is C:\ProgramData\SequansDM
15:46:12'456.00: File "conformance\logmaskextracted.txt" not found
15:46:12'456.00: 0 commands found in customized CLI commands file C:\ProgramData\SequansDM\commands_ue.txt
15:46:12'458.00: 0 commands found in customized CLI commands file C:\ProgramData\SequansDM\commands_sequansd.txt
15:46:12'459.00: 0 commands found in customized CLI commands file C:\ProgramData\SequansDM\commands_hls.txt
15:46:12'460.00: 0 commands found in customized CLI commands file C:\ProgramData\SequansDM\commands_onade.txt
15:46:12'463.00: 0 commands found in customized CLI commands file C:\ProgramData\SequansDM\commands_external.txt
15:46:12'464.00: 0 commands found in customized AT commands file C:\ProgramData\SequansDM\atcommands.txt
15:46:12'466.00: Offline mode is False
15:46:12'468.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'enable', with HW control
15:46:12'469.00: Offline mode is True
15:46:14'957.00: Offline mode is False
15:46:17'919.00: Unable to find the decoder for: l1p-nb-neighbour-database, l1p-nb-neighbour-database-stats, l1p-dedicated-power-cfg, zsp0-test, zsp0-logcachedump, zsp1-test, zsp1-logcachedump
15:46:17'921.00: Connected to main orb
15:46:20'327.00: Offline mode is True
15:46:20'330.00: Disconnected from main orb
15:46:22'067.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'disable', with HW control
15:46:23'333.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'enable', with HW control
15:46:29'274.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'disable', with HW control
15:49:42'872.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'enable', with HW control
15:49:44'035.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'disable', with HW control
15:50:01'833.00: [UE] New UART server configuration: COM28 port 921600. UART state is 'enable', with HW control
16:30:46'188.00: Offline mode is False
16:30:49'082.00: Unable to find the decoder for: l1p-nb-neighbour-database, l1p-nb-neighbour-database-stats, l1p-dedicated-power-cfg, zsp0-test, zsp0-logcachedump, zsp1-test, zsp1-logcachedump
16:30:49'084.00: Connected to main orb
17:52:17'102.00: Offline mode is True
17:52:17'103.00: Disconnected from main orb
17:52:25'477.00: Offline mode is False
17:52:28'538.00: Unable to find the decoder for: l1p-nb-neighbour-database, l1p-nb-neighbour-database-stats, l1p-dedicated-power-cfg, zsp0-test, zsp0-logcachedump, zsp1-test, zsp1-logcachedump
17:52:28'538.00: Connected to main orb
```

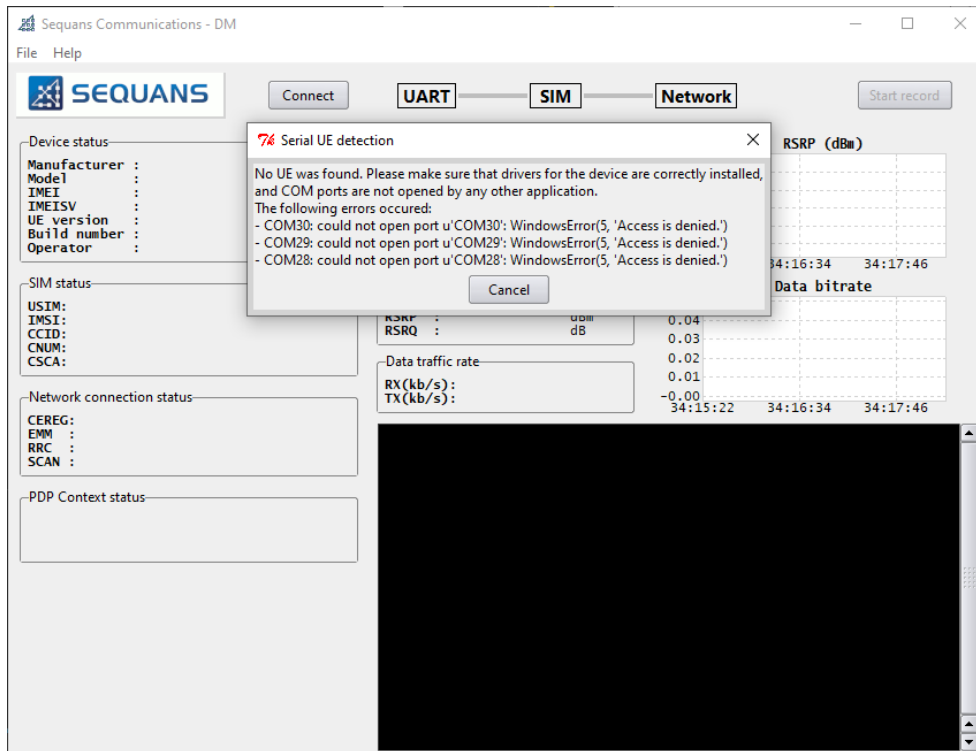
4. Troubleshooting

4.1. Serial/USB Connection Failure

If you are facing a UART or socket connection issue, make sure that the drivers were properly installed as explained in EVK user manual.

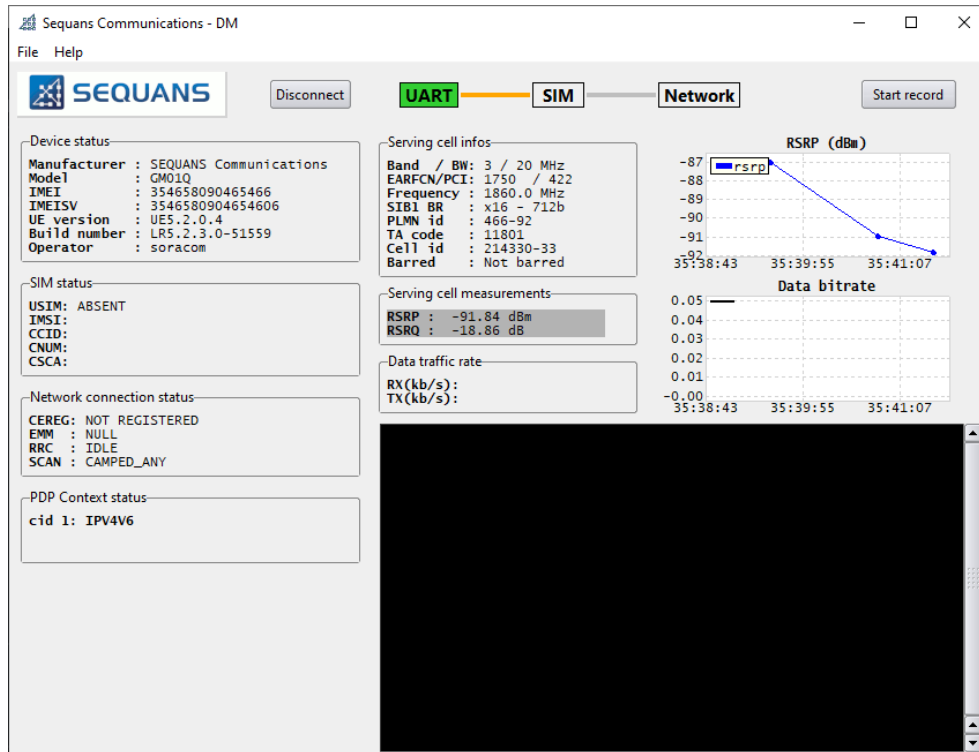
For socket connection, the DM will try to connect to 192.168.16.1 and 127.0.0.1 interfaces.

In case of UART connection, make sure that the serial port is not used by any other application such as TeraTerm or Putty for example. You will see the following figure for the serial ports are used by other applications.



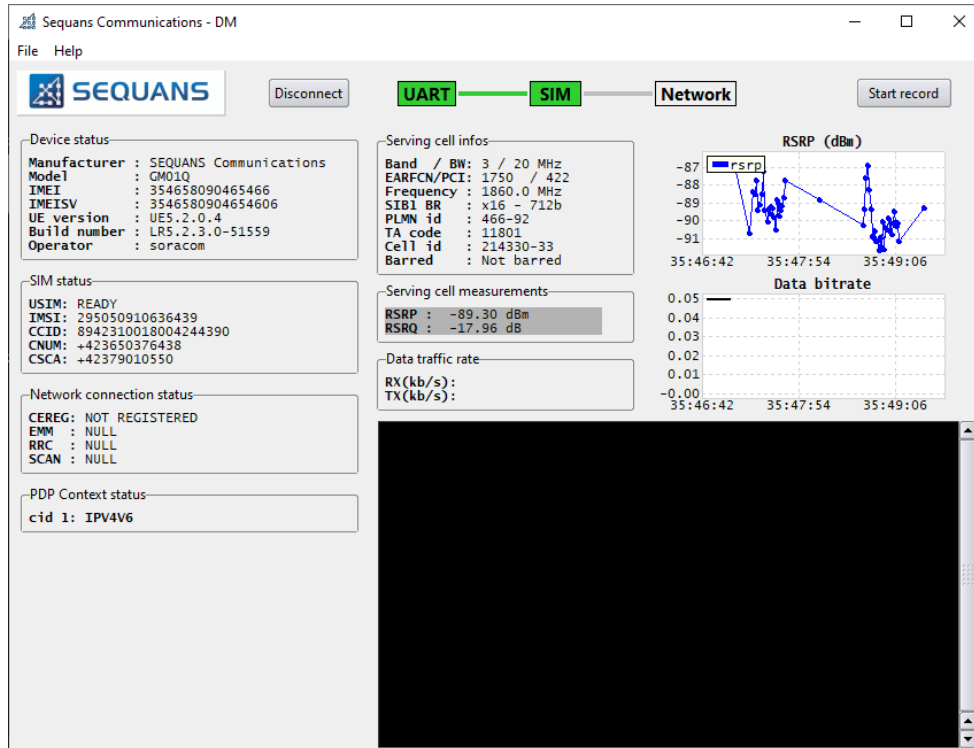
4.2. SIM Card is Not Ready

After sending AT+CFUN=1 or AT+CFUN=4, if you see the line between **UART** and **SIM** states turning orange and the SIM status showing USIM is **ABSENT** such as in the picture below, make sure the SIM card is correctly inserted and that the electrical interface of the SIM is compatible with the module (1.8V or 3.3V).



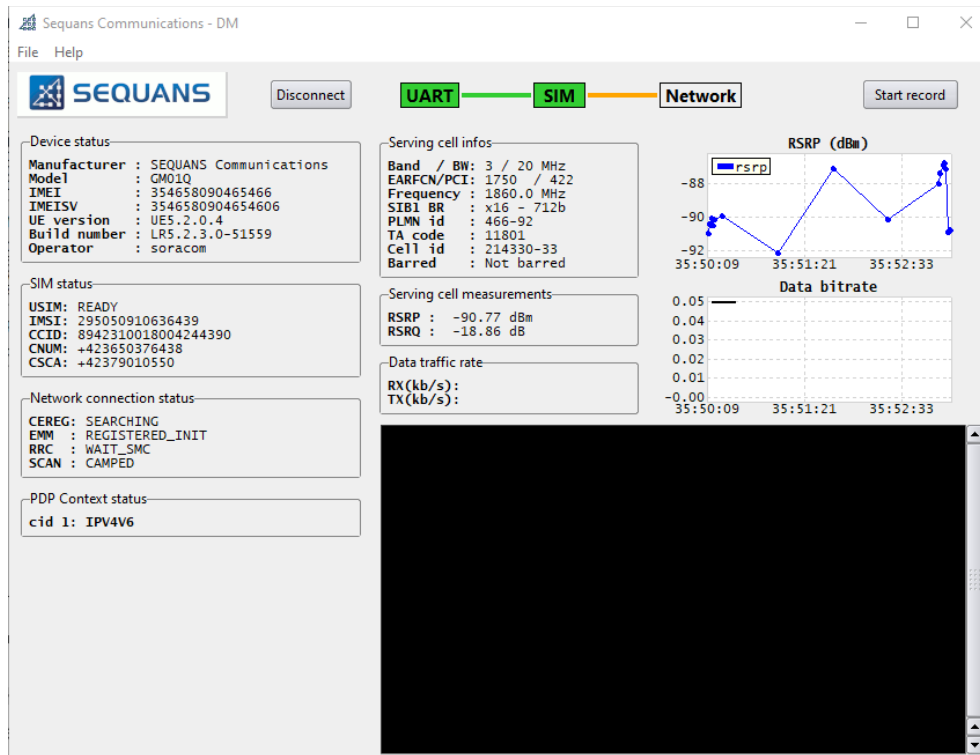
If the SIM status shows that the PIN is locked, enter the PIN code with AT+CPIN command and unlock it with the PUK code is needed.

When the SIM is ready, you should see the line between **UART** and **SIM** states turning green. The **SIM** state will turn green as well. SIM status shows the SIM card information.



4.3. Network Connection Failure

After sending **AT+CFUN=1**, the UE will start scanning the bands that you configured with the **AT+SQNBANDSEL** command. The Network connection status, Serving cell infos and Serving cell measurements cells will show the LTE EMM and RRC states as well as the detected cell information while UE scans and attaches to the network. You should see the line between **SIM** and **Network** turning orange while UE is trying to attach to the network and changing to green when the UE is attached to the network.



Many things could go wrong when trying to connect the UE to the network.

1. Check that the antenna is well connected to the board
2. Check that the received signal strength (**RSRP**) and quality (**RSRQ**) is good enough. If not moving the setup to another location may help. Typical values for RSRP and RSRQ depending of the RF conditions are the following:

| RF condition | RSRP range | RSRQ range |
|--------------|----------------------------|------------------------|
| Poor | RSRP < -120 dBm | RSRQ < -18 dB |
| Fair | -120 dBm < RSRP < -100 dBm | -18 dB < RSRQ < -14 dB |
| Good | -100 dBm < RSRP < -80 dBm | -14 dB < RSRQ < -10 dB |
| Excellent | -80 dBm < RSRP | -10 dB < RSRQ < -3 dB |

3. Check that the configured bands match the operator supported bands. You can follow in the Serving cell infos the band of the cell being scanned, its earfcn and the PLMN used.

4. Check the Network connection status while the UE attempts to attach to the network. **SCAN**, **RRC** and **EMM** status are displayed. Once **SCAN** state changes to **CAMPED** and **EMM** state changes to **REGISTERED**, the UE is registered to network. If you see that the UE gets rejected from the network, this may be due to an invalid, expired or not yet activated SIM card.
5. If the operator you are trying to connect to requests specified PDN configuration, you should use **AT+CGDCONT** to configure it. **PDP Context status** shows the registered network APN and IP address.
6. When UE sending or receiving data, the **Data traffic rate** cell and **Data bitrate** graph show the instant data rate. If you do not see any traffic being displayed check that your connection to the network and especially the RRC state.