Testing preparation of VZ22Q/VZ22M for 3GPP

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Document Revision History

Revision	Date	Description
01	2014-12-19	Initial Revision
02	2014-12-31	Update USAT section
03	2014-01-26	Update USAT section, Added FCC safety warning

Referenced Documents

	Revision	Date	Document Name	Document Title

FCC Warning

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

End Product Labeling

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: COFVZ22Q"

The grantee's FCC ID can be used only when all FCC compliance requirements are met.

This device is intended only for OEM integrators under the following conditions:

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users,

(2) The transmitter module may not be co-located with any other transmitter or antenna.

(3) To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile exposure condition must not exceed:

Standalone Condition:

- 10 dBi in 700 MHz Band
- 6 dBi in 1700 MHz Band

Assuming collocated with an ordinary WLAN/WiMax transmitter with 34 dBm average EIRP power

- 6.5 dBi in 700 MHz Band
- 6 dBi in 1700 MHz Band

Remark: This assumption is not valid if the output power of the collocated WLAN/ WiMax transmitter is higher than 34 dBm.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Testing preparation of VZ22Q/VZ22M device for 3GPP

General instructions

We assume that the device has been previously **screened**, and **flashed** in FFF mode.

Please follow the recommendation in the appendixB, if you want to upgrade to a new firmware.

1- Check that you have all the following elements before to start:
- VZ22Q board
- SequansD driver to install on the host PC
    - File format like Verizon_4.1.2.0-SFN-17924.exe, sqn_setup_4.1.2.0-SFN- 17924.exe)
- DM tool to install on the host PC for debug
    - File format like sqn_setup_4gdm_4.1.2.0-17545.exe
- 1 USB Cable to connect to the host PC
- Path loss of the internal small RF cable, present inside the box
    - Band 4 : 0.8 dB
    - Band 13: 0.3 dB
- PICS/PIXIT file (Mainly for LTE signaling testing)
-

If you have **checked and ticked all items**, you are ready to start the testing preparation.
If something is missing, please contact Sequans Communications for help.

2 – Install the Sequans driver and tools on the host PC if not done. (See Appendix C)
3 - Connect according to Appendix A (RF cable, USB cable, Sim insertion, …)
4 - Open the Windows device manager, you should see the device enumerated after few seconds, with following interfaces.
- USB/ECM network interface
- ACM port (for AT commands)

5 – Check if device configuration is correctly set for 3gpp conformance testing, using following commands using ACM COM port 115200-8-n-1 (Use Putty or Teraterm tools):
- AT+SQNCTM?
- AT+SQNAUTOCONNECT?
- You should read
    - > AT+SQNCTM?
    - > SQNCTM: **3gpp-conformance**
    - > AT+ SQNAUTOCONNECT?
    - > **1**

6 – If the configuration is not as expected, using following commands, to set the correct one:
- AT+SQNCTM=”3gpp-conformance”
- AT^RESET
    - Wait reboot completed
- AT+SQNAUTOCONNECT=**1,1**
- AT^RESET
    - Wait reboot completed

7 – Now the device is ready for testing
- To Power On or Power Off the device you can, depending of the tester automation or manual mode testing:
    - Send command AT+CFUN=1 or AT+CFUN=0

- Send command AT^RESET
- Power cycle by unplugging and Plugging the USB
- Power cycle by using tester power switching

3GPP TS 36.521-1 (LTE RF), 3GPP TS 36.521-3 (LTE RRM)

No Specific additional AT command and configuration are used for testing LTE RF/RRM, except the one described in the general instruction section.

3GPP TS 36.523-1 (LTE Signaling)

Specific AT command and configuration are used for testing LTE signaling

- The auto connection mode must be disabled by using **AT+ SQNAUTOCONNECT=0,1**
- Take care to use a recent PICS/PIXIT files on the tester system.
- To clean forbidden PLMN (optional):
- AT+CRSM=214,28539,0,0,12,FFFFFFFFFFFFFFFFFFFFFFFF
-

3GPP TS 36.124 (USAT)

Some dedicated configurations are required after board preparation for USAT testing:

1 - A specific operator mode: **verizon-conformance** by using **AT+SQNCTM** command.
2 - The **Cid 1** must be activated as the **default PDN** by using **AT+ IMSTESTMODE** command.
- Please note that the APN name supporting this Cid 1 is insignificant for the testing.

3 - The Cid 1 must be present or set in the APN provisioning list, by using **AT+VZWAPNE** command
- AT+VZWAPNE=1,1,"vzwims","IP","LTE","enabled",1

4 - A specific STK APN **TestGp.rs** name is required to be used to open connection for some test case, by using **AT+SQNSTKAPNE** command.
- Please check in **Appendix E**, the default APN to use per test case.

5 – Some USAT conformance tester (Like Comprion+R&S) use only IPV4 configuration. Please check for Anritsu +7 layer solution.
- Replace "**IP**" "by **IPv4v6"** in your configuration setting if required.

The following AT command setting must be applied for configuration, before to start the testing:

- AT+SQNCTM=" **verizon -conformance**"
- AT^RESET
  - Wait reboot completed
- AT+IMSTESTMODE=**1,1**
- AT^RESET
  - Wait reboot completed
- AT+SQNSTKAPNE="TestGp.rs","IP" or AT+SQNSTKAPNE="vzwims TestGp.rs","IP"
  - Please make sure to revert to correct one, before to start a new test case.

All the above settings are persistent after reboot.
You can check if the configuration is as expected with following commands:

- AT+SQNCTM?
- AT+IMSTESTMODE?
- AT+VZWAPNE?

6 - Depending on the activities from some Windows services on the laptop used as host, sporadic Uplink data may. It is recommended before to start the testing, to disable the **192.168.15.1** network adapter to stop data from laptop. The second 192.168.16.1 interface can be activated as debug port, if required to take some logging using Sequans DM tool.
Please check in **Appendix F** the mean to identify and disable this port.

Appendix A – Device Cabling

Please connect the device according to the following diagram:

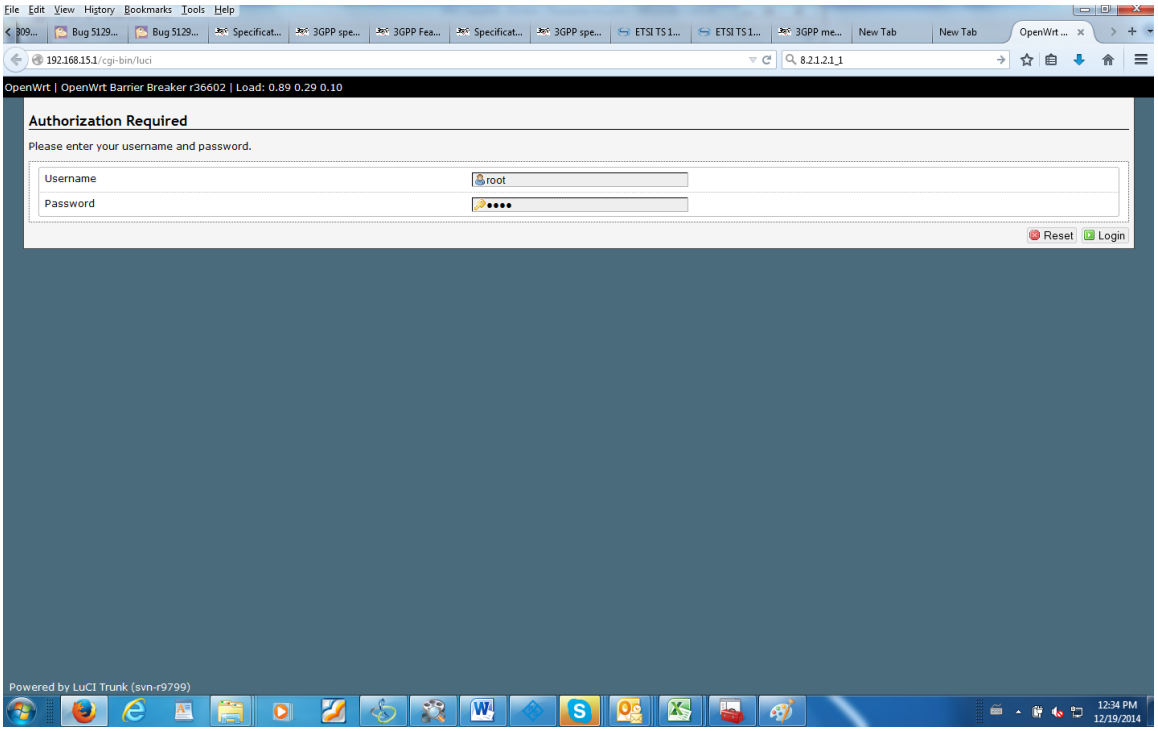
Appendix B – Firmware upgrade

In order to upgrade the firmware (FFF Mode), please, follow these steps:

1- Connect the device on a WINDOWS PC, and wait 1 min during the device enumeration.

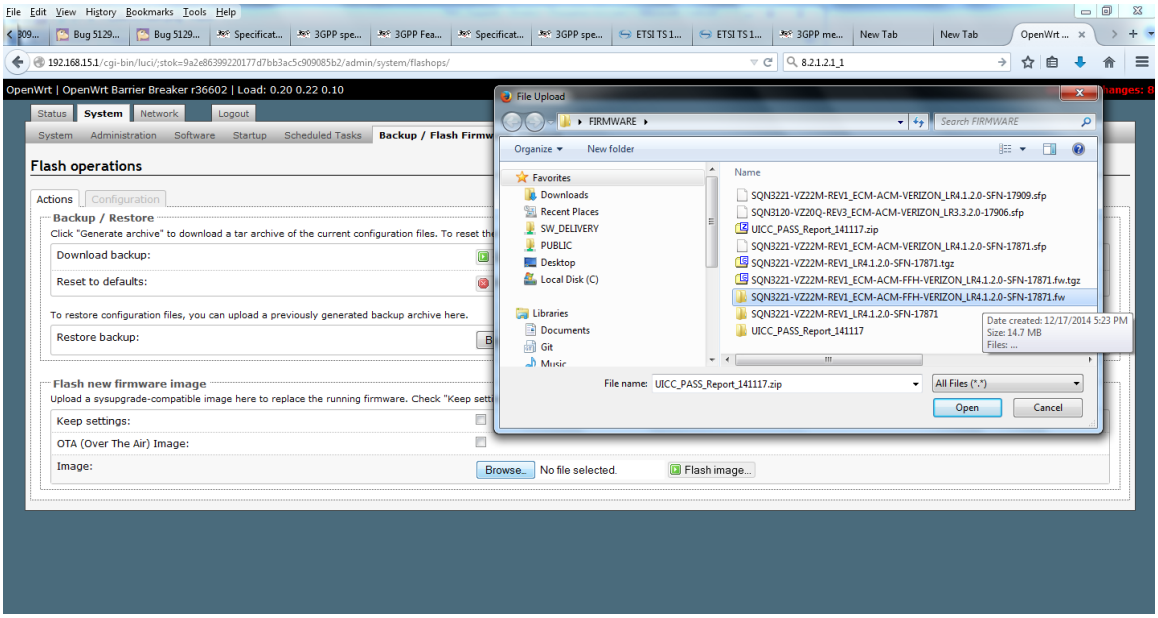
2- Open a web browser, and enter the URL http://192.168.15.1/

3- Enter the login “root”, and the password “root” in order to acces to the web ui

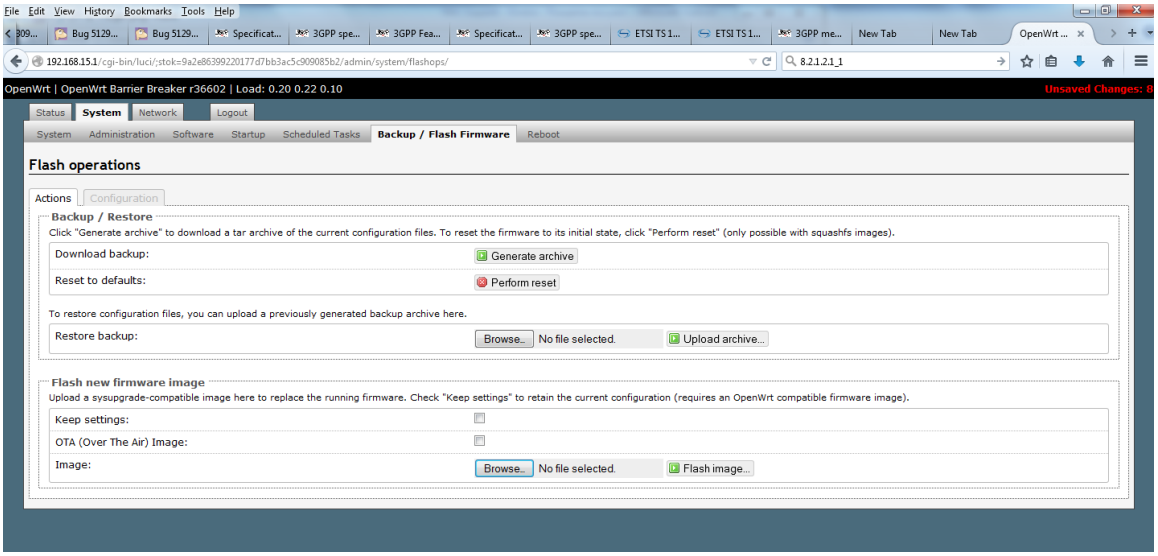


4- Click on “system” and on “backup/flash firmware”, and untick “Keep settings”

5- Click on “browse” and select the .sfp file to flash ‘for example SQN3221-VZ22M-REV1_ECM-ACM-VERIZON-REL9_LR4.1.2.0-SFN-17924.sfp)



6- Click on “Flash image”



7- A new page with checksum will appear 2 min after the clicking of “flash firmware”. Confirm the flash and wait for 2 min.

8- The target is now flash.

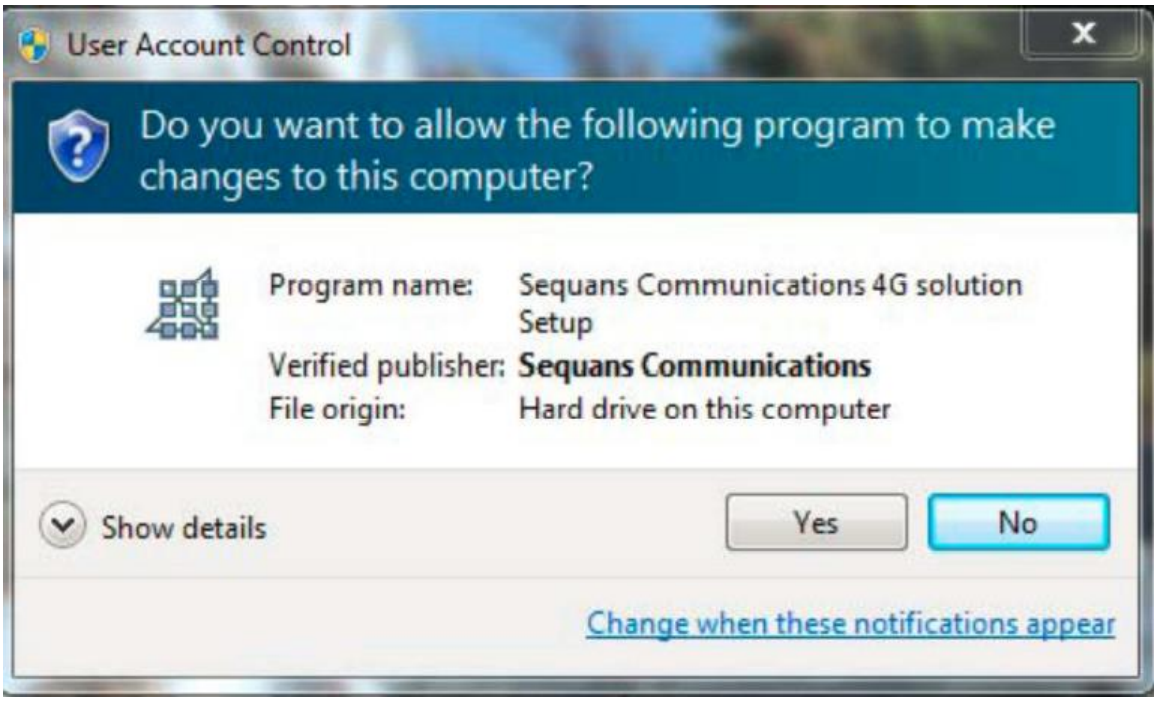
9- Configure the settings defined in the “general instruction” topic of this document

Appendix C – Sequans Driver installation

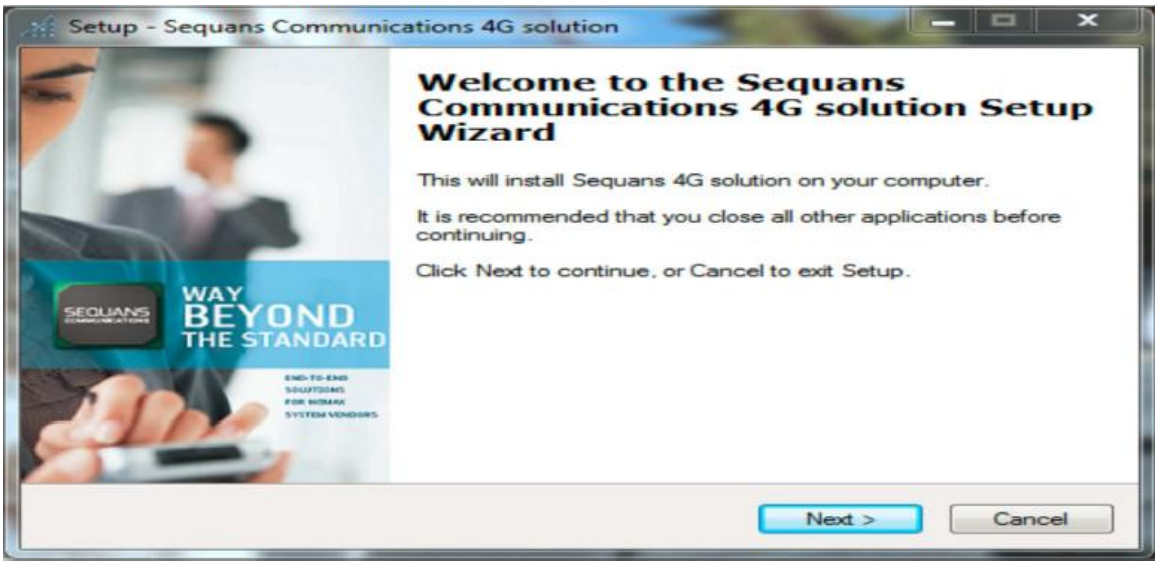
In order to install SEQUANS drivers (on WINDOWS PC), please, follow these steps:

1- · Make sure the device is unplugged and uninstall any previous versions of Sequans drivers on the test host device

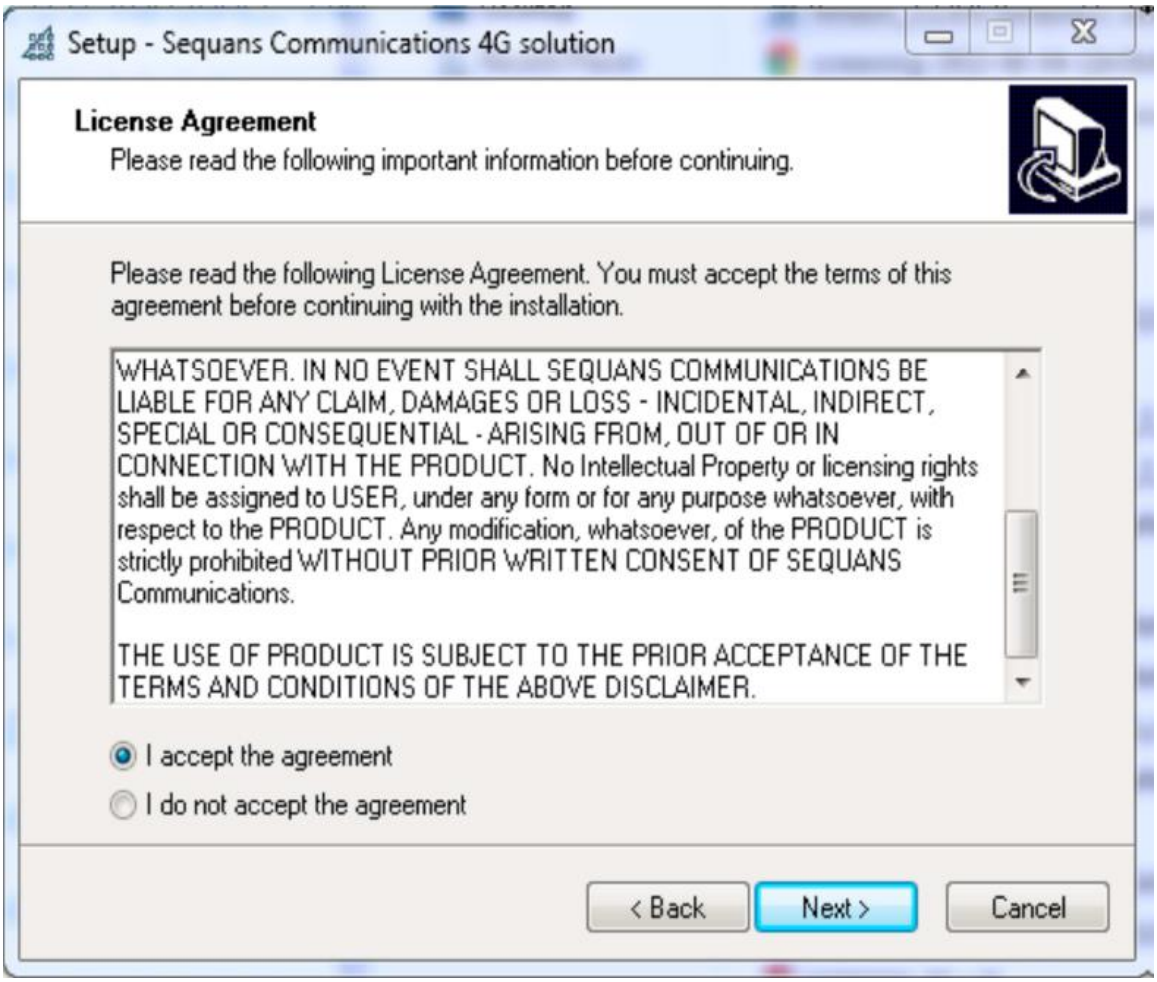
2- · Launch the executable file “Verizon_4.1.2.0-SFN-17924.exe” for the drivers and confirm its execution. Click Yes button to start the installation process



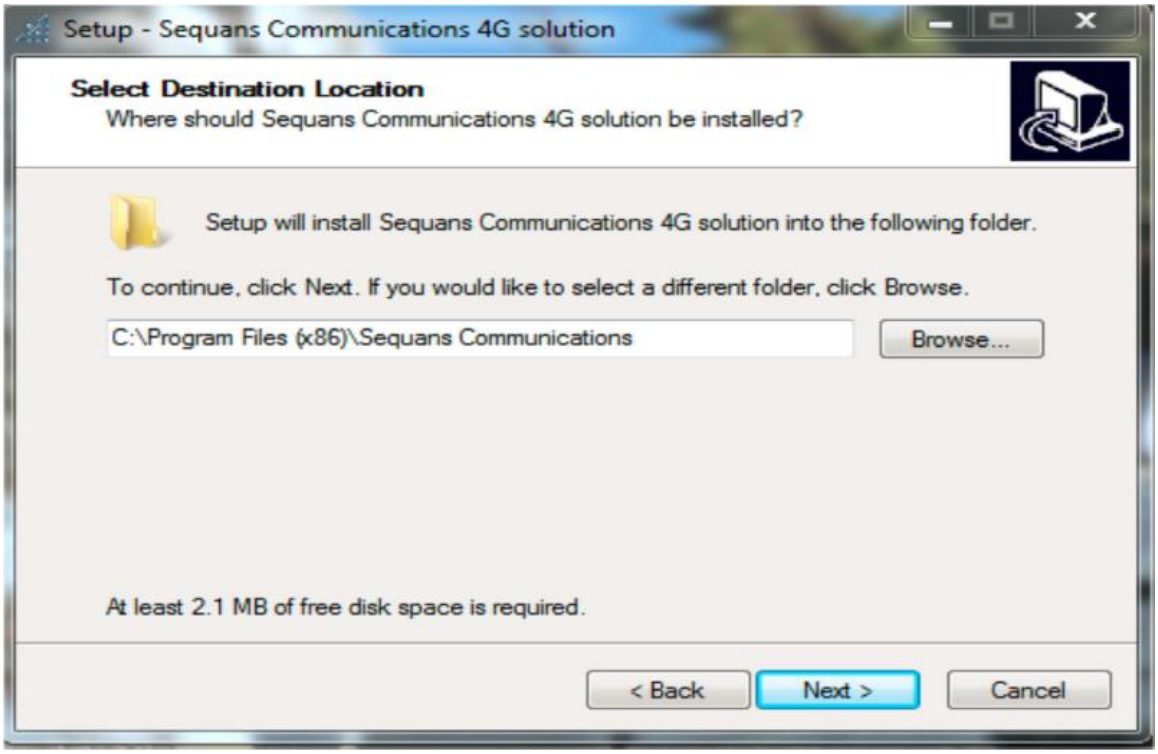
3- Click ***Next***



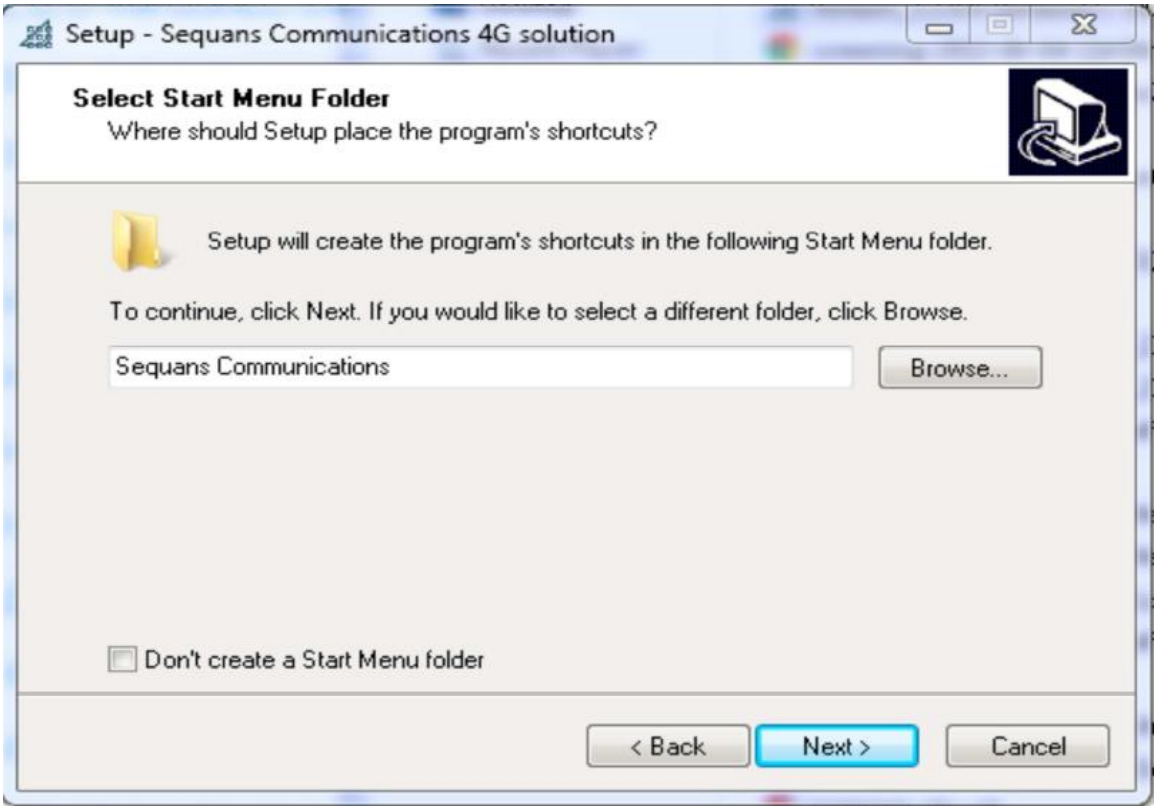
4- Read the Sequans License Agreement. Click “I accept” if you agree with the License terms and want to continue the installation



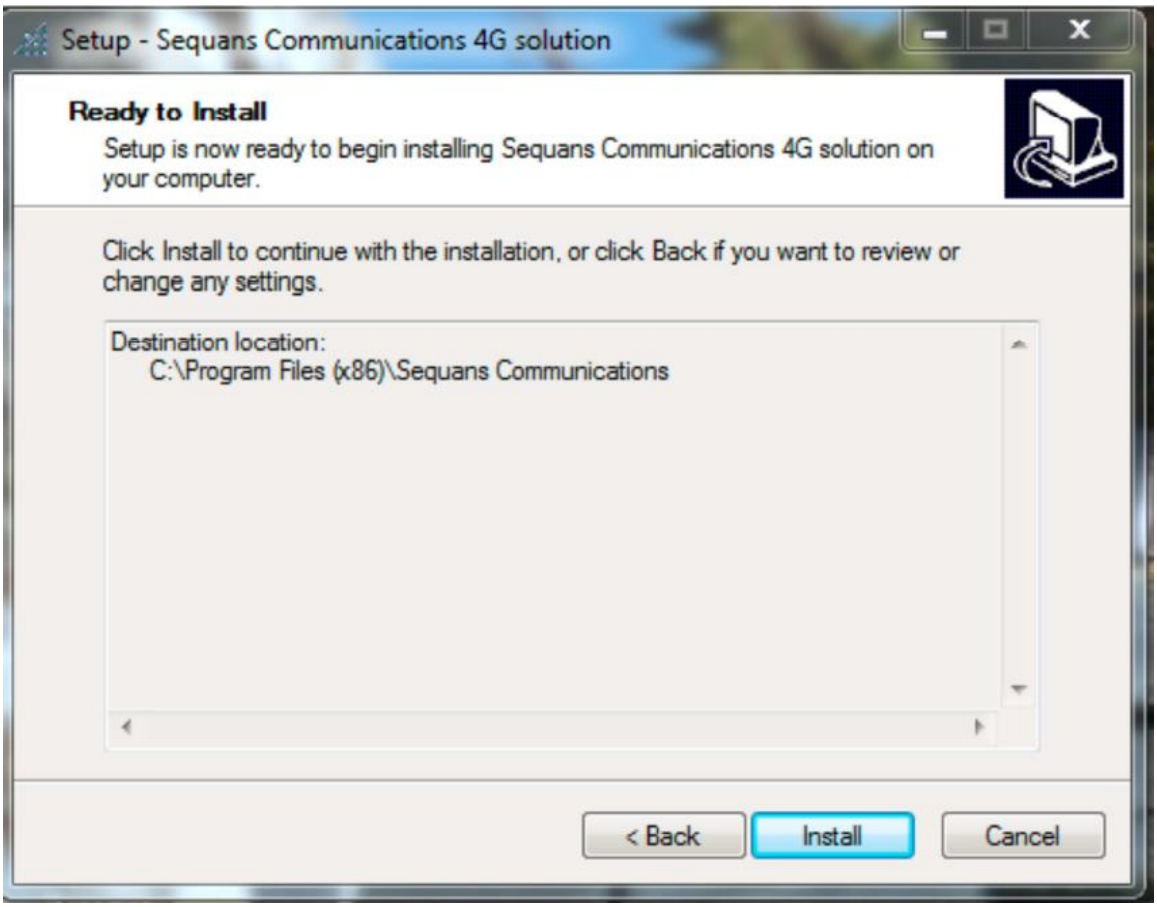
5- Select the installation directory. The default directory can be changed by clicking the Browse button. Click Next when the appropriate directory is selected



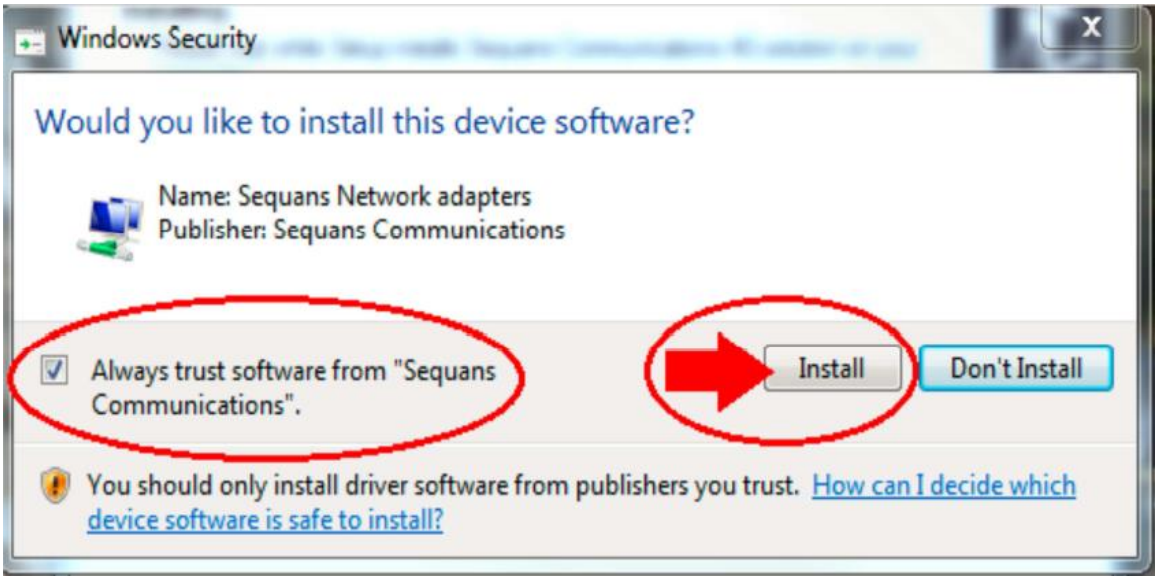
6- Select the Start Menu folder name. The default folder can be changed by clicking the **Browse** button. Click **Next** when the appropriate folder is selected



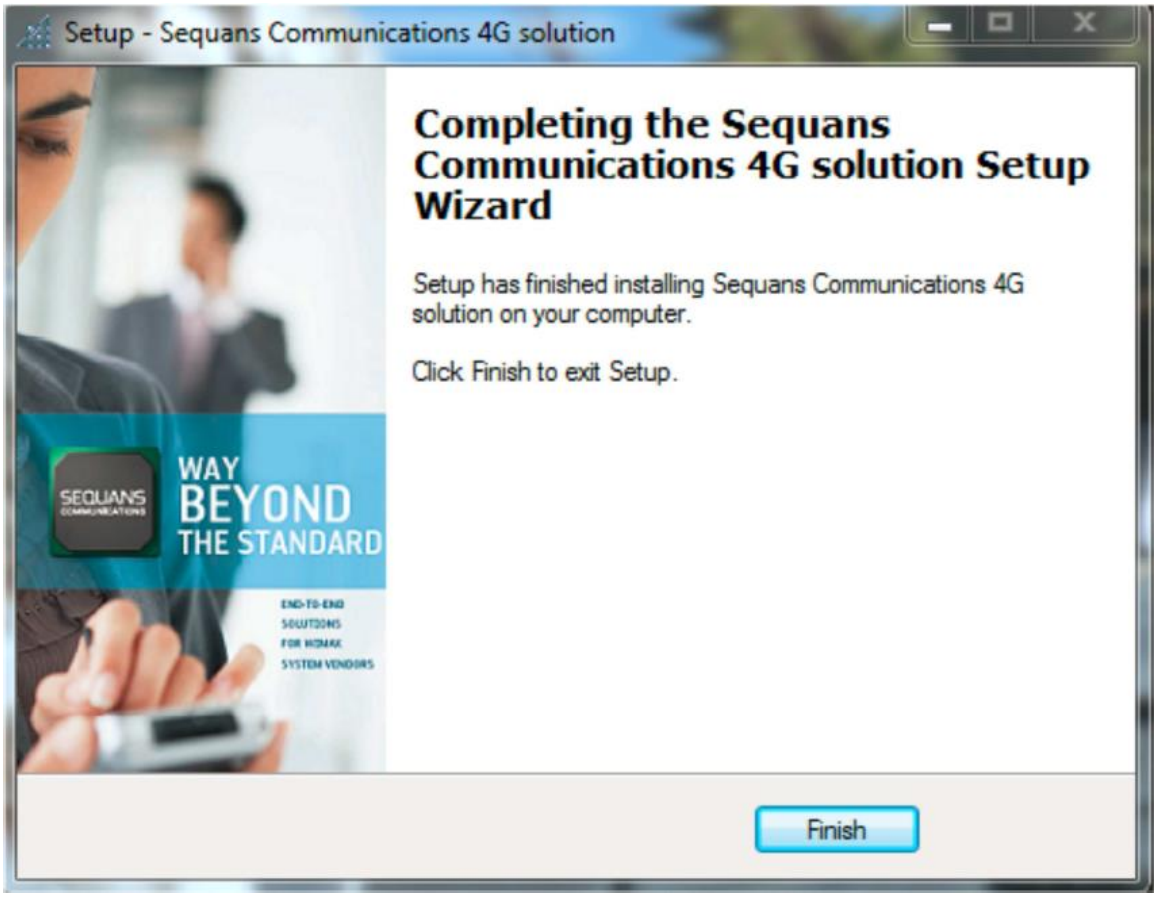
7- Verify the installation directory and click **Install** if no change is required. You can update the installation directory by clicking the **Back** button at this stage



8- Check the box to proceed with the installation process



9- Click **Finish** to complete the installation process


Setup - Sequans Communications 4G solution
Completing the Sequans Communications 4G solution Setup Wizard
Setup has finished installing Sequans Communications 4G solution on your computer.
Click Finish to exit Setup.
SEQUANS
WAY
BEYOND
THE STANDARD
Finish

Appendix D – Tester configurations

If possible, we recommend using the below tester configurations for 3GPP conformance, since those setups are used by Sequans for pre-testing:

3GPP TS36.523-1

- Anite9000 + CT v33.0

3GPP TS36.521-1

- R&S TS8980 Contest v11.0 - RF v3.21
- Anritsu ME7873L MCTS v2.18

3GPP TS36.521-1

- R&S TS-RRM Contest v11.0 - RRM v5.71
- Anritsu ME7873L MCTS v2.18

3GPP TS 31.121

- COMPRION IT3 + R&S CMW500 (preferred)
- COMPRION IT3 + Anritsu MD8475A

ETSI TS 102 230

- COMPRION IT3.

3GPP TS 31.124

- COMPRION IT3 + R&S CMW500 (preferred)
- COMPRION IT3 + Anritsu MD8475A

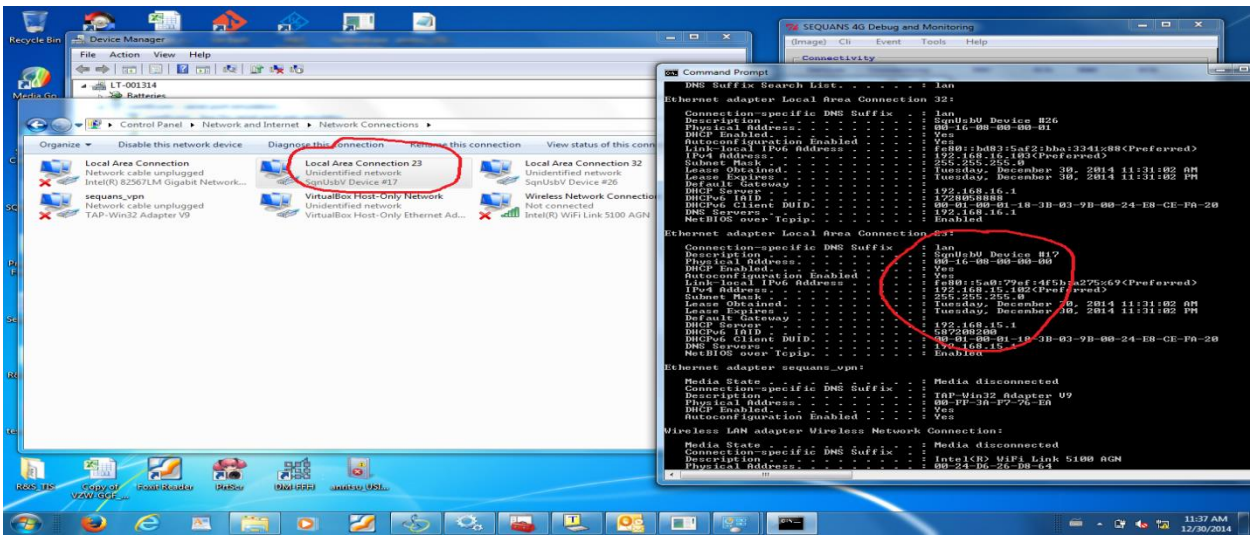
Appendix E – Usat default APN Setting Per TC

The **AT+SQNSTKAPNE** command must be used, to set the APN to open connection as required per Test Case.

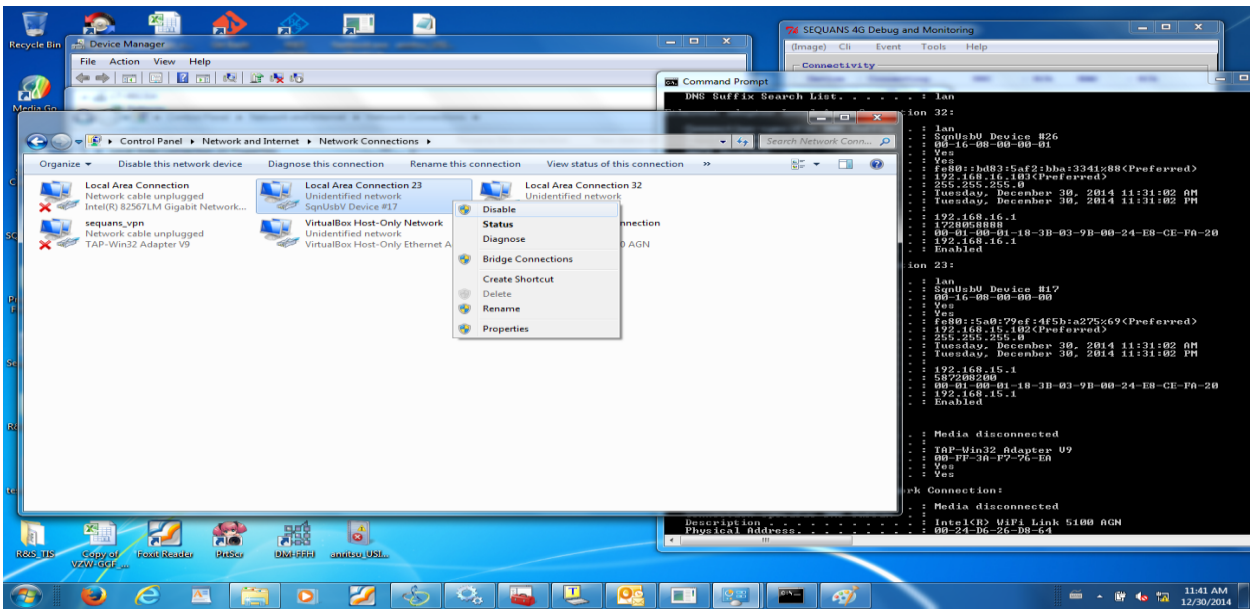
TC	Description	Default STK APN
27.22.4.27.6/1	OPEN CHANNEL Immediate link establishment, E-UTRAN, bearer type '02'	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.27.6/2	OPEN CHANNEL Immediate link establishment, E-UTRAN, bearer type '0B'	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.27.6/3	OPEN CHANNEL Immediate link establishment, E-UTRAN, bearer type '02', with Network Access Name, with alpha identifier	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.27.6/5	OPEN CHANNEL Immediate link establishment, E-UTRAN, bearer type '03', default EPS bearer	AT+SQNSTKAPNE=" TestGp.rs ","IP",1
27.22.4.28.3/1	CLOSE CHANNEL Default EPS bearer, successful	AT+SQNSTKAPNE=" TestGp.rs ","IP",1
27.22.4.28.3/2	CLOSE CHANNEL EPS bearer with APN different from default APN, successful	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.29.1/2	RECEIVE DATA Already opened channel - EUTRAN, APN different from default	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.30.3/1	SEND DATA Immediate mode - E-UTRAN, Default EPS bearer	AT+SQNSTKAPNE=" TestGp.rs ","IP",1
27.22.4.30.3/2	SEND DATA Store mode - E-UTRAN, APN different from default APN	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.31.1/4	GET CHANNEL STATUS EPS bearer with APN different from default APN	AT+SQNSTKAPNE="TestGp.rs","IP",1
27.22.4.31.1/5	GET CHANNEL STATUS EPS bearer with APN different from default APN, after a link dropped	AT+SQNSTKAPNE="TestGp.rs","IP",1

Appendix F – Deactivation of 192.168.15.1 Port

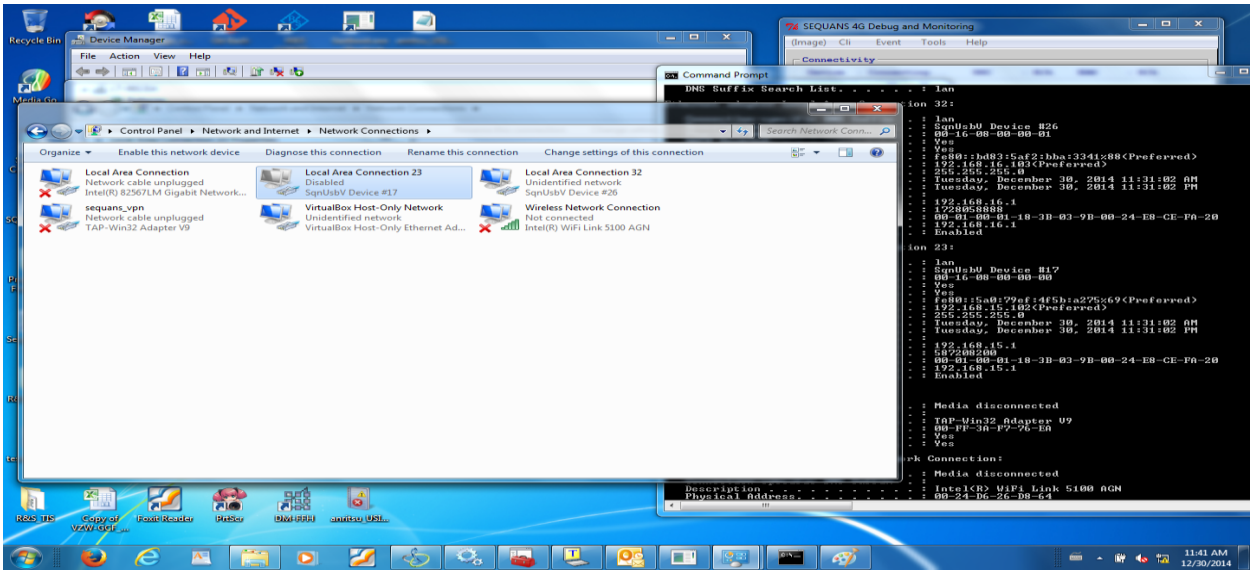
To avoid Uplink data pollution, and prevent unexpected RRC connection requedtst during the testing , it is recommended to disable the 192.168.15.1 port through the Windows Network Adapter panel (Check below screenshot).



1 – Use ipconfig/all command to identify the interface 192.168.15.1



2 – Right click on the interface to disable



3 – The 192.168.15.1 interface is now disabled