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Anite

ANITE S-CORE APPLICATION TESTING

GETTING STARTED GUIDE

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specialist
wireless testing
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To access the Anite Help Desk, and to download the latest software releases, please log in to myKeysight. On the myKeysight home page, in the Quick Links box, click the link for the Anite Help Desk, or click Keysight Software Manager for software downloads.

Document history

The following table lists the main changes to issues of this document.

Issue	Date	Summary of Changes
2.0	Feb 2016	Updated for GUI version 3.185 and above.
3.0	May 2016	Updated for WLAN Test Accelerator setup instructions.
4.0	Sep 2016	Minor updates.
5.0	May 2017	Added section VZW IMS registration test case information and S-CORE GUI configuration for single cell.

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1 INTRODUCTION

Anite S-CORE Application Testing offers LTE-IMS device application testing for Wi-Fi offload, VoLTE, RCS, Voice over Wi-Fi and other application and IMS based services.

The S-CORE is a stand-alone test platform with an integrated LTE-IMS radio and network subsystem and it includes an application test suite, a rich and fully-featured user interface and a wide portfolio of test case packages, enabling rapid operator acceptance and device certification.

1.1 Scope

This guide is designed to help you set up your S-CORE test platform and start running its test plan packages as quickly as possible.

1.2 Related documents

For more information about the S-CORE product, refer to the Anite S-CORE Operating Manual.

2 S-CORE TEST SYSTEM OVERVIEW

This section describes the units in the S-CORE test system.

Caution: Please refer to the **Safety Instructions** section in the Anite S-CORE Application Testing: Operating Guide before starting to connect the S-CORE.

2.1 S-CORE Connect

Front View

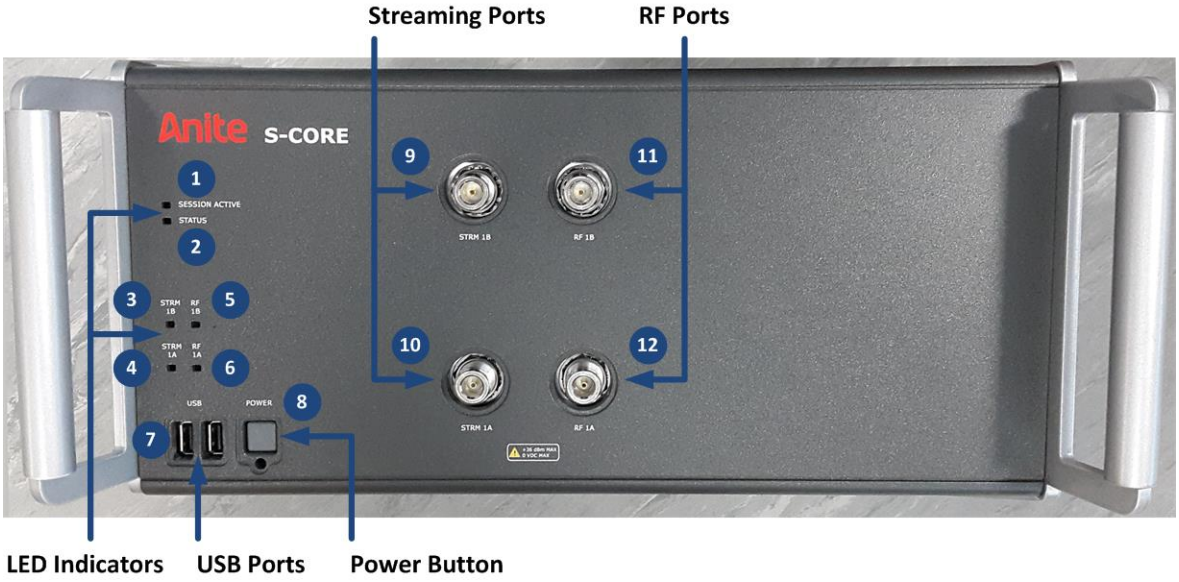


Table 1 Front view panel

LED Indicators	
1. Session Active LED Indicator	**LED green** – indicates that a session has been established with an external connection. The LED will be green as long as the session remains connected. **LED off** – indicates that no session has been established with the test system. **LED orange** — indicates that a session has been established with the test system and the session is locked.
2. Status LED Indicator	**LED green** – indicates that the test system is in the ready state and has no errors in the queue. **LED orange** – indicates that the error/event queue is not empty. **LED red** – indicates a serious fault in the test system.
3. Streaming port 1B LED Indicator	**LED orange** – indicates that the test system is in

LED Indicators	
4. Streaming port 1A LED Indicator	duplex (bi-directional). **LED red** – indicates that the test system is in output-only. **LED green** – indicates that test system is in input-only.
5. RF port 1B LED Indicator	
6. RF port 1A LED Indicator	
Others	
7. Two USB Ports	Reserved for field service use.
8. Power Button with LED Indicator	Power on/off switch: **LED off** – indicates that the test system has no power. **LED red** – indicates that the test system is in standby mode. **LED blinking green** – indicates that the test system is booting. **LED green** – indicates that the test system is on. Please wait few seconds before starting the S-CORE GUI.
Streaming Ports	
9. Streaming Port 1B	Provides uni-directional output RF connection to the DUT.
10. Streaming Port 1A	
RF Ports	
11. RF Port 1B – VSG/VSA Port	Provides input/output RF connection to DUT GSM, W-CDMA, LTE technologies and GPRS.
12. RF Port 1A – VSG/VSA Port	

S-CORE rear view

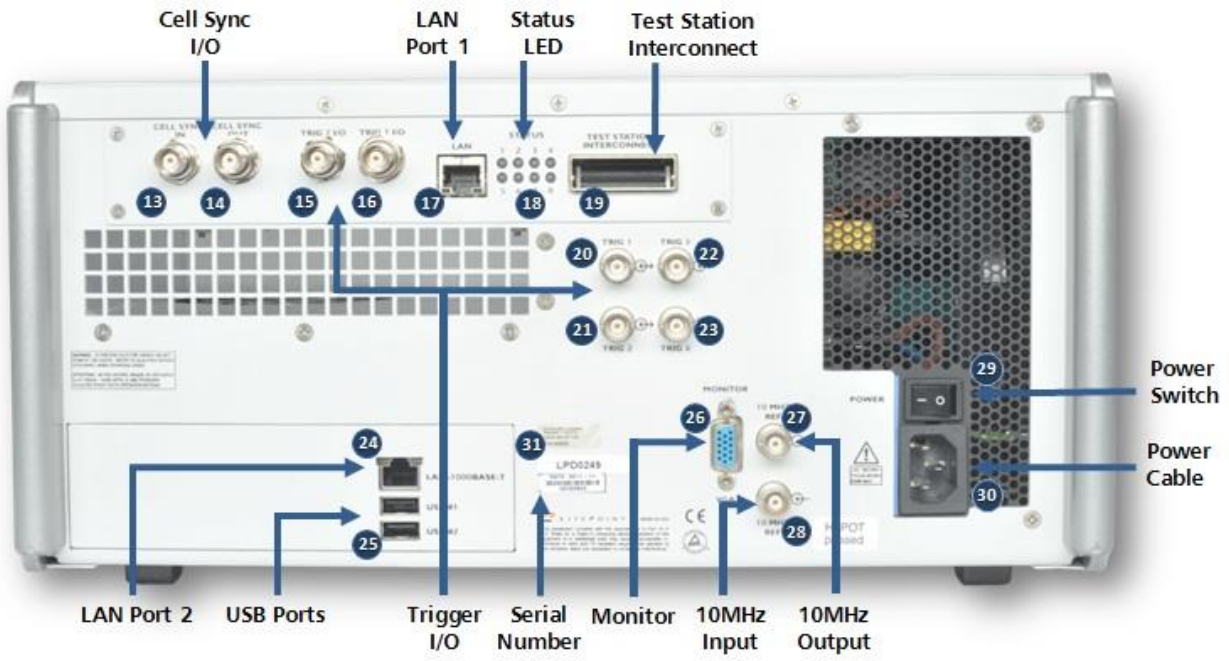


Table 2 Rear view panel

Cell Sync Ports	
13. Cell Sync Port In	For synchronisation of multiple S-CORE boxes.
14. Cell Sync Port Out	
Trigger Ports I/O	
15. Trigger 2 I/O	Provides connection for signal trigger input and signal trigger output.
16. Trigger 1 I/O	
LAN Ports	
17. LAN Port 1	RJ-45 connection type for connecting S-CORE test system with the TP-Link Router or WLAN Test Accelerator.
Others	
18. Status LEDs	Display which Radio Access Technologies are currently installed and being used.
19. Test Station Interconnect	For connecting multiple S-CORE test systems.
Trigger Ports I/O	
20. Trigger 1 I/O	Provides connection for trigger input #1
21. Trigger 2 I/O	Provides connection for trigger input #2
22. Trigger 3 I/O	Provides connection for marker output #1

Cell Sync Ports	
23. Trigger 4 I/O	Provides connection for marker output #2
LAN Ports	
24. LAN Port 2	RJ-45 connection type for connecting S-CORE test system with the TP-Link Router or WLAN Test Accelerator.
Others	
25. Two USB Ports	Used for connecting to the external devices
26. VGA Video Output	Video output for connecting monitor with S-CORE.
10MHz Reference Connectors	
27. 10MHz Reference Output	Provides 10MHz reference output connection.
28. 10MHz Reference Input	Provides 10MHz reference input connection.
Power Ports	
29. Power Switch	AC on/off switch.
30. Power Input	Used for connecting to the AC main power.
Others	
31. Serial Number	S-CORE Serial Number.

2.2 TP-Link Router

The delivery of the S-CORE test system may contain a TP-Link router, which is pre-configured with the correct settings and is ready to use.

Front View



Rear View

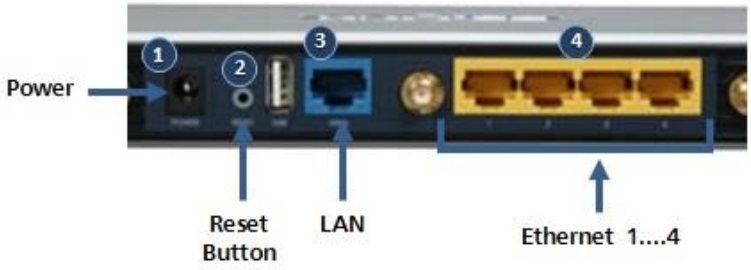


Table 3 TP-Link Router panel

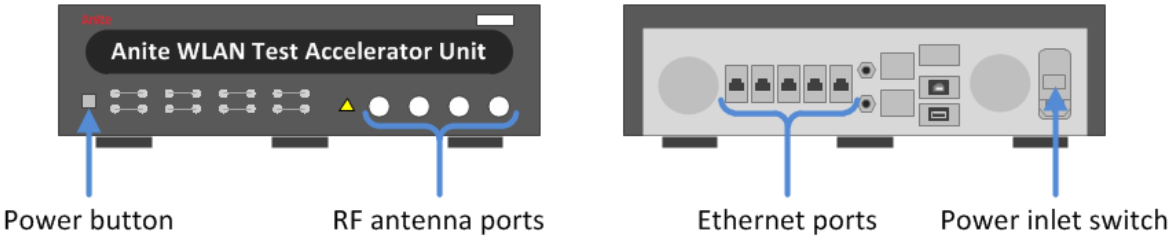
Button/Port	Description
1. Power	Used for connecting to the AC main power adapter.
2. Reset Button	Holding down this button for 5 to 10 seconds will reset the wireless router back to the default TP-Link factory settings. It is recommended to contact support team before resetting router.
3. LAN	RJ-45 connection type for connecting TP-Link router with LAN.
4. Ethernet 1 …. 4	RJ-45 connection type for connecting TP-Link router with the S-CORE and the user's PC.

The TP-Link router is delivered pre-configured (DHCP server enabled) to be used with the S-CORE. In most cases, it is unnecessary for the user to change the router configurations. You can change the IP Address of the TP-Link Router, as described in section A2.

2.3 Anite WLAN Test Accelerator

The delivery of the S-CORE test system may contain an Anite WLAN Test Accelerator, which is pre-configured with the correct settings and is ready to use.

Front and Rear view



The relevant buttons/ports on the Anite WLAN Test Accelerator are shown above and described in the following table.

Table 4 Anite WLAN Test Accelerator panels

Button/Port	Description
Power button	To power the unit into and out of standby mode. The button lights up when power is supplied to the unit. The colours denote the following modes: Orange light: The unit is in standby mode. Green light: The unit is in normal operating mode.
RF antenna ports	Convey antenna 1-4 (ANT 1 – ANT 4) RF signal to and from the device under test.
Ethernet ports	RJ-45 connection for connectivity to the S-CORE Connect unit and the Test System PC.
Power inlet switch	Switches the power to the unit. Switching this off isolates the unit from the mains supply.

2.4 Test System PC system requirements

The following table shows the system requirements for the Test System PC connected to the S-CORE test system.

Table 5 Test System PC requirements

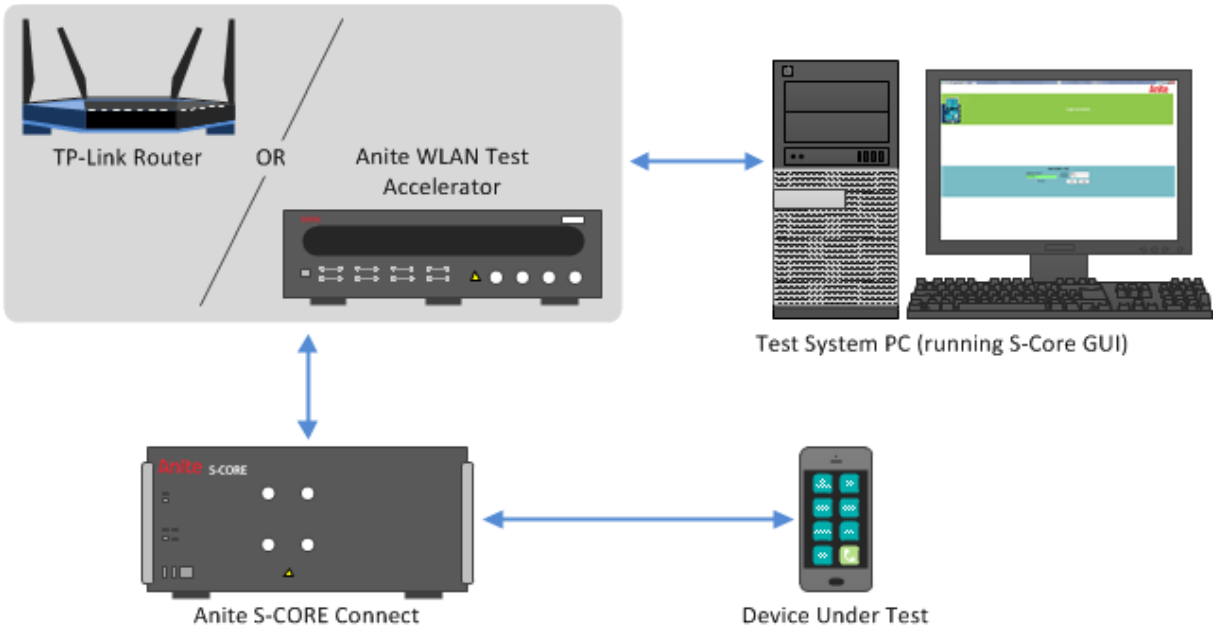
Item	Requirement
Adobe Flash Player	Version 10.3
Processor	Dual Core CPU
Recommended Speed	2.5GHz
Memory	2GB of RAM or higher
Available Hard Disk Space	500MB of available hard disk space (for storing wave files, capturing data or log files)
Screen Resolution	1024x768 resolution
LAN	100 Base-T LAN (1000 Base-T preferred)
Browser	Default browser installed
Operating System	Windows based system

3 GETTING STARTED

This section will help you set up the system and get it ready for testing including cabling the test system and installing the required software.

3.1 Connecting the S-CORE Test System

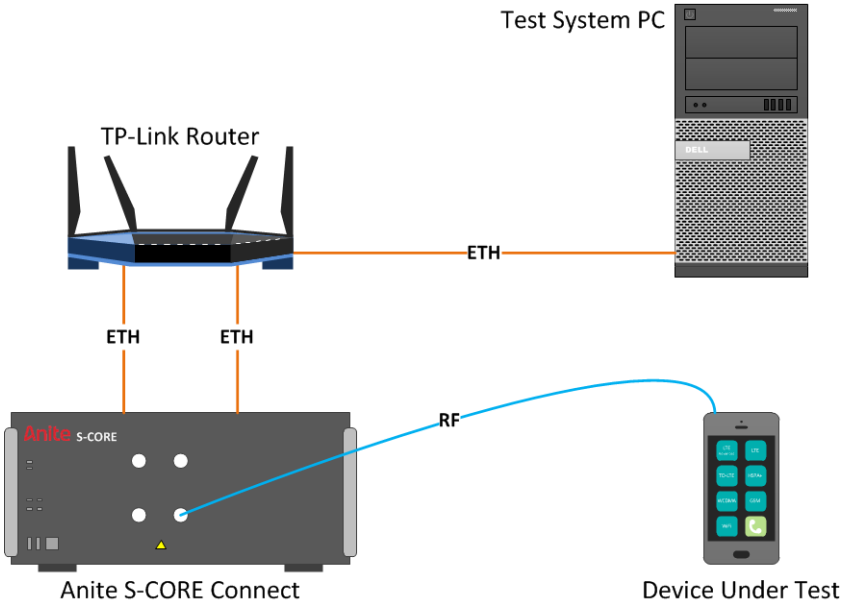
This section describes how to connect the S-CORE unit, Test System PC and WLAN Router (TP-Link Router or Anite WLAN Test Accelerator).



The S-CORE test system can be configured using either a TP-Link Router or an Anite WLAN Test Accelerator. When supplied by Anite, the TP-Link Router and WLAN Test Accelerator are preconfigured for use in the S-CORE test system.

The following sections describe how to cable the units in the S-CORE test system using a TP-Link router (section 3.1.1) or a WLAN Test Accelerator (section 3.1.2).

3.1.1 TP-Link Router Setup



Cabling Instructions

Connect the cables for the S-CORE test system using a pre-configured TP-Link router as follows:

1. Use an RF cable to connect the Device Under Test (or an Antenna Coupler) to the RF Port 1A (section 2.1 [12]) on the front of the S-CORE Connect unit.
2. Optionally, connect a VGA Cable to the back of the S-CORE unit (section 2.1 [26]) and into a monitor to display the S-CORE Monitor GUI, which is useful for troubleshooting. For more information, see section A1.
3. Connect one end of two LAN cables to the LAN Port 1 (section 2.1 [17]) and LAN Port 2 (section 2.1 [24]) connections on the back of the S-CORE unit, and connect the other ends of the LAN cables to Ethernet ports on the back of the TP-Link Router (section 2.2 [4]).

   Note: *It is important to connect both LAN cables before using the system.*
4. Connect a LAN cable from the Ethernet port [4] on the back of the TP-Link Router to the network card in the back of the Test System PC.
5. Connect the S-CORE to mains using a three-prong AC power cord and into a grounded power socket. The power input connector (type IEC 322) is located on the back of the unit (section 2.2 [30]).

   Note: *Once the power input connector is switched on, you must not remove the power cable or switch the power input connector to the off position when turning off the unit. Always use the power button on the front of the S-CORE Connect unit.*
6. Press the power button (section 2.1 [8]) on the front panel of the S-CORE to switch it on and the Power LED Indicator will start blinking green. This means that the system is booting up.

   When the system is up, the Power LED Indicator is green and the Status LED (section 2.1 [2]) will be green.

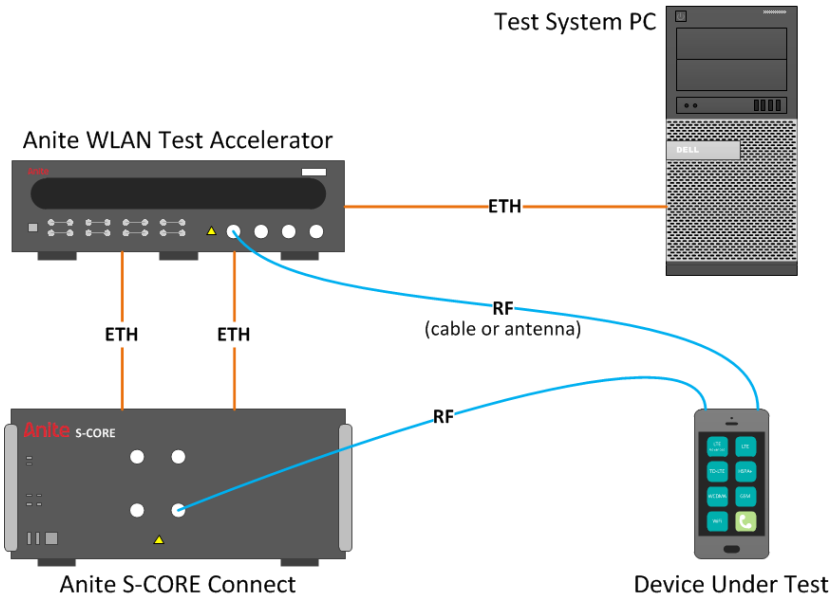
IP Address Configuration

Configure the LAN port of your PC to obtain IP Address automatically so that the IP Address of your PC will be assigned automatically by the DHCP server of the TP-Link Router as follows:

1. Display the network connections form Start > Control Panel > Network and Internet > Network Connections.
2. Right-click on the network connection for the TP-Link router and select **Properties**.
3. Select **Internet Protocol Version 4 (TCP/IPv4)** from the list of items used by the connection and click **Properties**.

4. Select Obtain an IP address automatically.
5. Click **OK** to confirm the changes.

3.1.2 WLAN Test Accelerator Setup



Cabling Instructions

Connect the cables for the S-CORE test system using an Anite WLAN Test Accelerator as follows:

1. Use an RF cable to connect the Device Under Test (or an Antenna Coupler) to RF Port 1A (section 2.1 [12]) on the front of the S-CORE Connect unit.
2. Optionally, connect a VGA Cable to the back of the S-CORE unit (section 2.1 [26]) and into a monitor to display the S-CORE Monitor GUI, which is useful for troubleshooting. For more information, see section A1.
3. Connect one end of two LAN cables to the LAN Port 1 (section 2.1 [17]) and LAN Port 2 (section 2.1 [24]) connections on the back of the S-CORE unit, and connect the other ends of the cables to Ethernet ports on the back of the Anite WLAN Test Accelerator (section 2.3).

   Note: *It is important to connect both LAN cables before using the system.*
4. Connect a LAN cable from the Ethernet port [4] on the back of the WLAN Test Accelerator to the network card in the back of the Test System PC.
5. Connect an RF cable with a Wi-Fi antenna on one end to the Ant 1 N-Type connector on the front of the Anite WLAN Test Accelerator unit. The antenna on one end should be positioned close to the UE or the coupler.
6. Connect the S-CORE to mains using a three-prong AC power cord and into a grounded power socket. The power input connector (type IEC 322) is located on the back of the unit (section 2.2 [30]).

   Note: *Once the power input connector is switched on, you must not remove the power cable or switch the power input connector to the off position when turning off the unit. Always use the power button on the front of the S-CORE Connect unit.*
7. Press the power button (section 2.1 [8]) on the front panel of the S-CORE to switch it on and the Power LED Indicator will start blinking green. This means that the system is booting up.

   When the system is up, the Power LED Indicator is green and the Status LED (section 2.1 [2]) will be green.

IP Address Configuration

Configure the LAN port of your PC to obtain IP Address automatically so that the IP Address of your PC will be assigned automatically by the DHCP server of the WLAN Test Accelerator as follows:

1. Display the network connections from **Start > Control Panel > Network and Internet > Network Connections**.
2. Right-click on the network connection for the WLAN Test Accelerator and select **Properties**.
3. Select **Internet Protocol Version 4 (TCP/IPv4)** from the list of items used by the connection and click **Properties**.
4. Select **Obtain an IP address automatically**.
5. Click **OK** to confirm the changes.

3.2 Protecting against malware attacks

Follow the instructions below to ensure that your PC is protected against possible malware attacks:

- Check that you are using the latest S-CORE software release from Keysight.
- Protect the test system PC as follows:
  - If Keysight provided the test system PC, it will have Windows 7 with the latest updates and patches installed.
  - If you are using your own test system PC, ensure that you have taken equivalent steps to protect against malware attacks.
- **Crucially, the only connection to any external network should be to the test system PC. This isolates the test system's network from any other networks and decreases the risk that equipment on a test system will be exposed to attacks such as WannaCry.**

3.3 Installing The S-CORE GUI

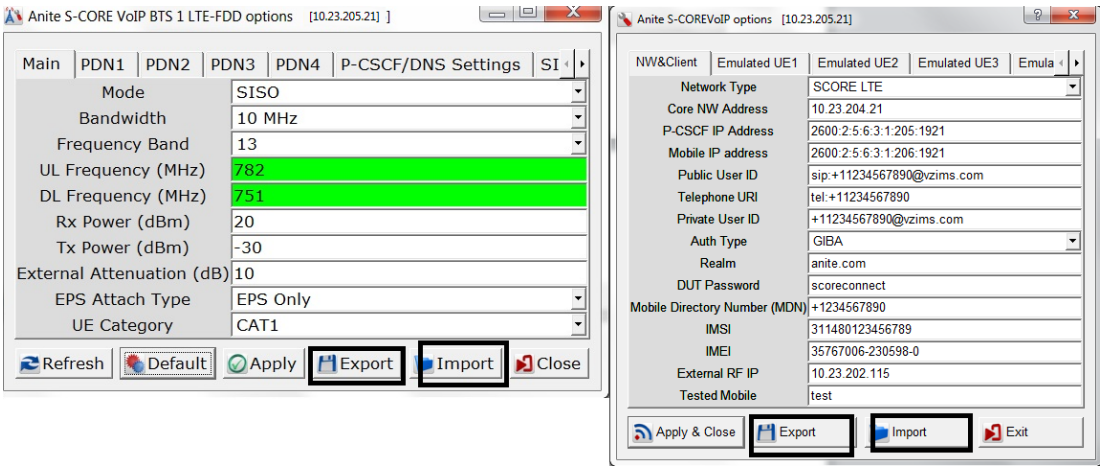
To install the S-CORE GUI on the Test System PC, follow the steps below:

1. Close all S-CORE related applications.
2. *(Optional)* Uninstall the previous version of the S-CORE GUI as follows:

   Note: *Uninstalling the previous version will delete any settings saved in the previous GUI. You can also choose to install the new version without uninstalling the previous version.*

   a. Start the previous S-Core GUI and log in.

   b. Export all the RF settings/Application option settings (e.g. VOIP, RCS application-related settings) by navigating to the application and selecting **Export** as shown below.



   c. Uninstall the previous version of the S-CORE GUI.

After you install the new version, you can then **Import** the settings exported from the previous S-Core GUI application.

3. Insert the GUI Installation DVD included in the delivery package into your computer's DVD drive and click on the S-CORE GUI setup program.

   Follow the on-screen instructions to install the GUI and update all the default files.

   Note: *It is strongly recommended to install the S-CORE GUI to a folder where the user has full control permissions.*

4. Once the GUI is installed, a shortcut will be created on your desktop.

5. Before logging in with the GUI, wait for five minutes from when the S-CORE has been powered ON. Logging in early will trigger the GUI to display an error message "connection refused". Should this occur, please wait for another minute and try to log in again.

   Once the GUI has been installed on your work station you can easily manage test campaigns, run tests and record results remotely.

Important notes:

- **Always** use the front panel Power Button (section 2.1 [8]) to restart the S-CORE test system.
- **Do not** switch off the S-CORE system using the power button on the rear of the unit.
- If you have an optional monitor connected to the S-CORE, **do not** use the Restart Instrument button available in the S-CORE Monitor GUI (see section A1).

Incorrect shutdown or restarting of the unit could lead to abrupt power loss, which may cause file system errors.

3.4 Updating software packages

Updating or installing new software packages can be performed in two different methods depending if the GUI is available or not. Below is a simple explanation of these two methods, for further assistance please refers to the *Anite S-CORE Application Testing: Operating Guide*.

To update S-CORE software packages, follow these simple steps which should be performed one package at a time:

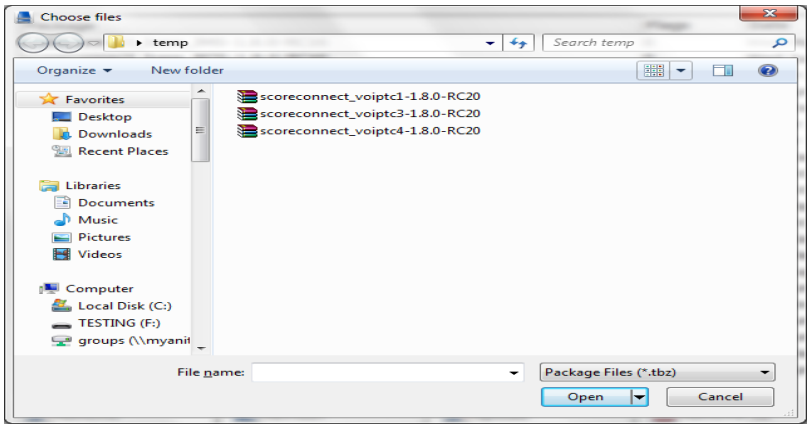
1. Download the latest packages from the Keysight Software Manager, which is accessible through myKeysight, and save on your local workstation.

2. If GUI is available please refer to **Step a**, if not please perform **Step b**.

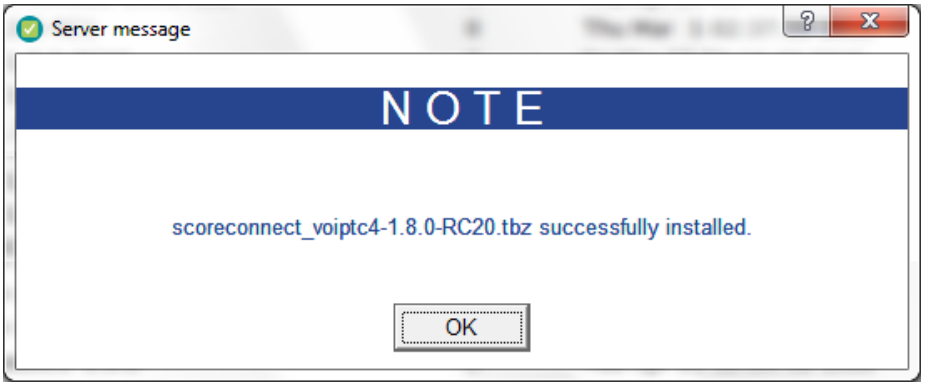
   a. **Using Package Manager**
   The Package Manager menu item could be accessed from the Tools menu, prompting the Package Manager window. Clicking on the Upload button opens the Choose Files window. Continue with Step 3.

   b. **Using GUI Login Screen**
   when installing software packages for the first time after installation of Application server or installing new license file when existing one is expired, open the S-CORE GUI, click on Install button (If Install button is not available, Hold the Alt key and press the **Login** button). The GUI will display a prompt; Clicking **Yes** will prompt the Choose Files window from where the user can select the packages to install. Refer to the next step. Clicking **No** will close the message box and cancel process.

3. From the Choose Files window select one of the packages downloaded, since every package should be installed separately. The latest version will automatically replace older packages.



4. The user will be notified with a pop-up message from the server (after first login when following Step b) when the package has been installed successfully.



5. After successful installation, repeat Step 2 for every package individually.

Notes:

- If the package version to be installed is the same as your current package version, a different installation procedure should be performed: first remove the currently installed package and then upload the other package. After successful installation of the package, you will be notified.
- Reboot the system after 3 minutes to make sure installation of packages is ready.

3.5 Installing the S-CORE External RF Controller

The Anite External RF Controller installs macros required by some scripts.

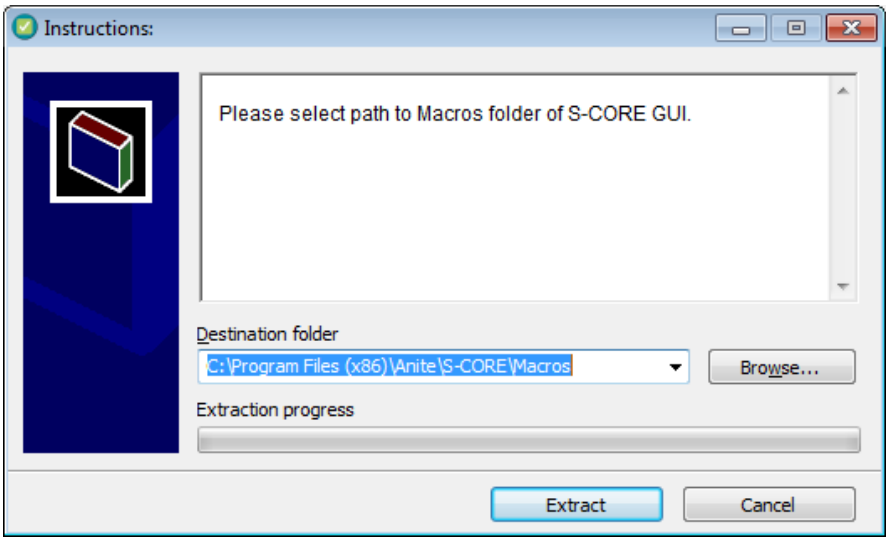
> ***Important note:*** *Before installing the S-CORE External RF Controller, ensure that the S-CORE GUI is installed as described in section 3.3.*

To install the S-CORE External RF Controller:

1. Download the **S-CORE External RF Controller** zip from the Keysight Software Manager, which is accessible through myKeysight, and save it on the Test System PC.
2. On Test System PC, extract the downloaded file and run the application:

   SCORE_External_RF_Controller_<version>.exe

   Where <version> is the version number of the application. The following dialog is displayed.



3. Click **Browse** to select the **Destination folder** to which the application extracts the required files. The location must be set to one of the following:

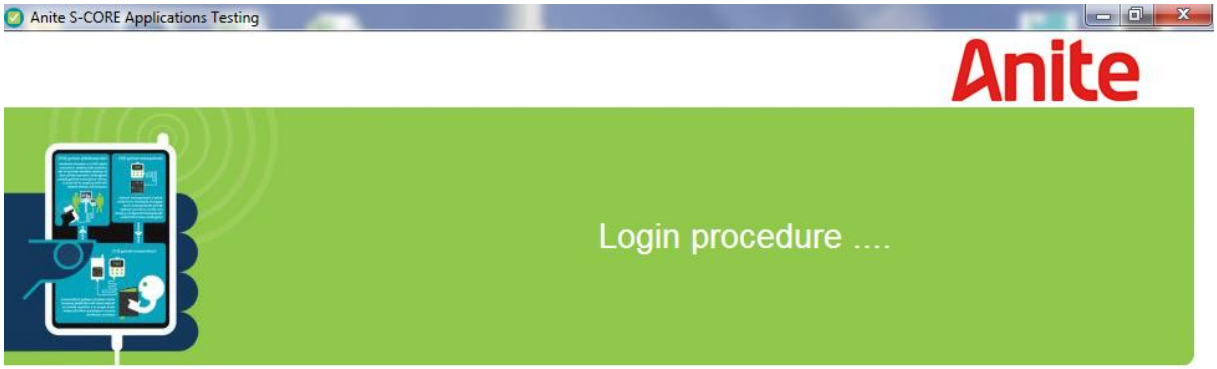
   C:\Program Files (x86)\Anite\S-CORE\Macros (for 64-bit Windows PCs)

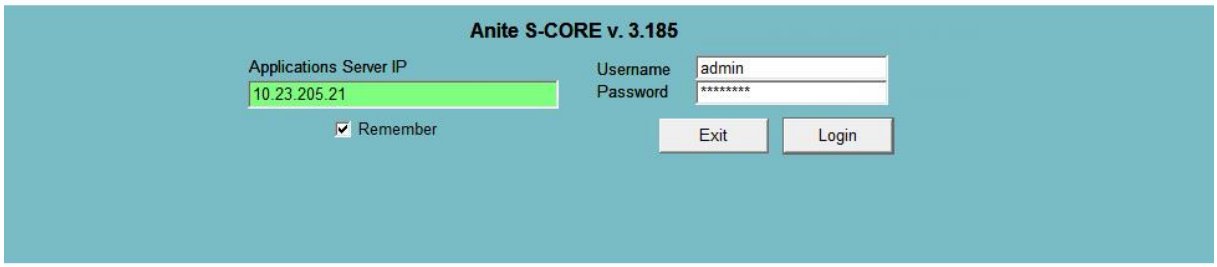
   C:\Program Files\Anite\S-CORE\Macros (for 32-bit Windows PCs)

4. Click **Extract** to extract the required files to the Macros folder.

4 START TESTING USING S-CORE

Double Click on the **"S-CORE GUI"** icon on the desktop and the following login screen will pop up:





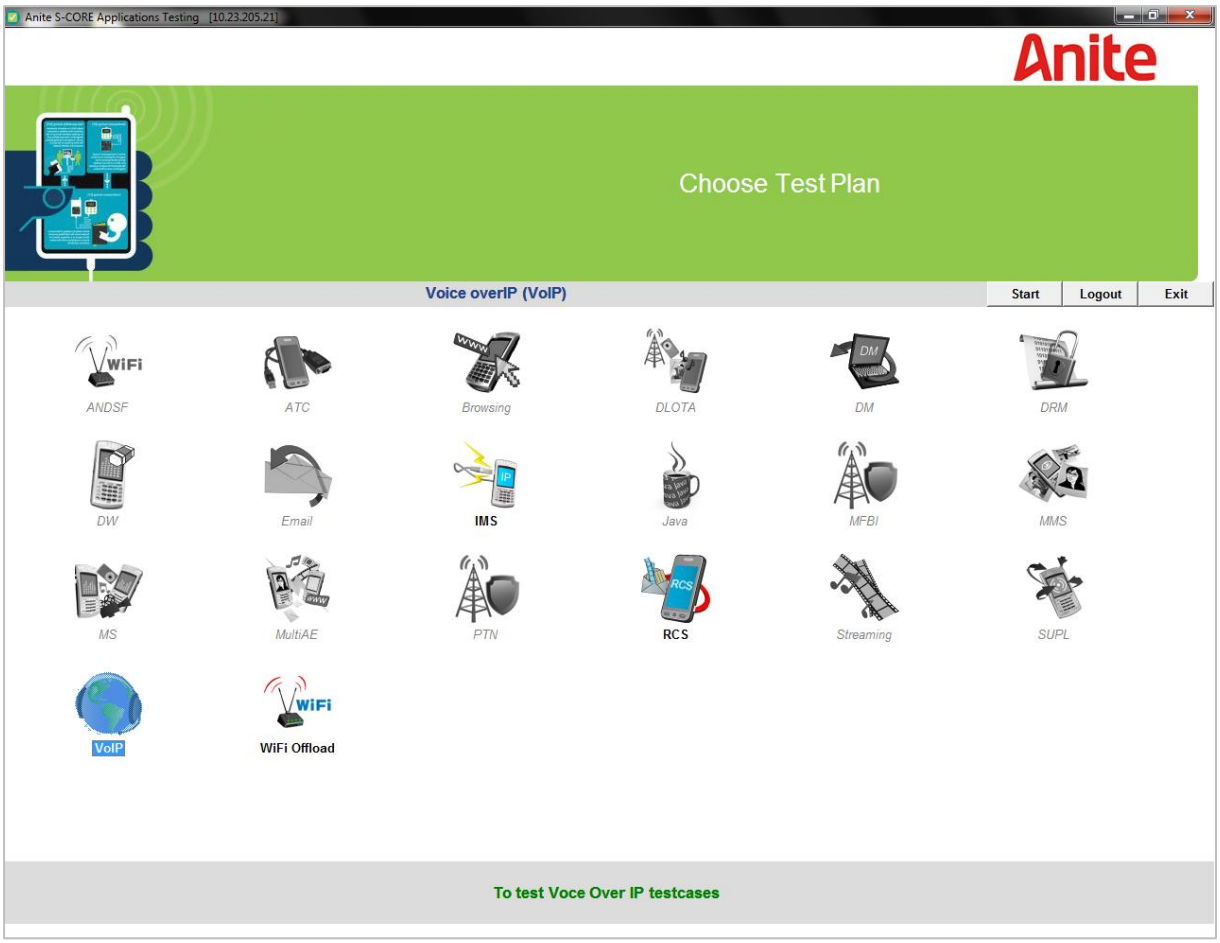
Enter the S-CORE Application Server IP address, username and password. The default Application Server IP Address, Username and Password are listed below:

IP Address: **10.23.205.xx (IP of your Application Server)**
Username: **admin**
Password: **Fen8Geng**

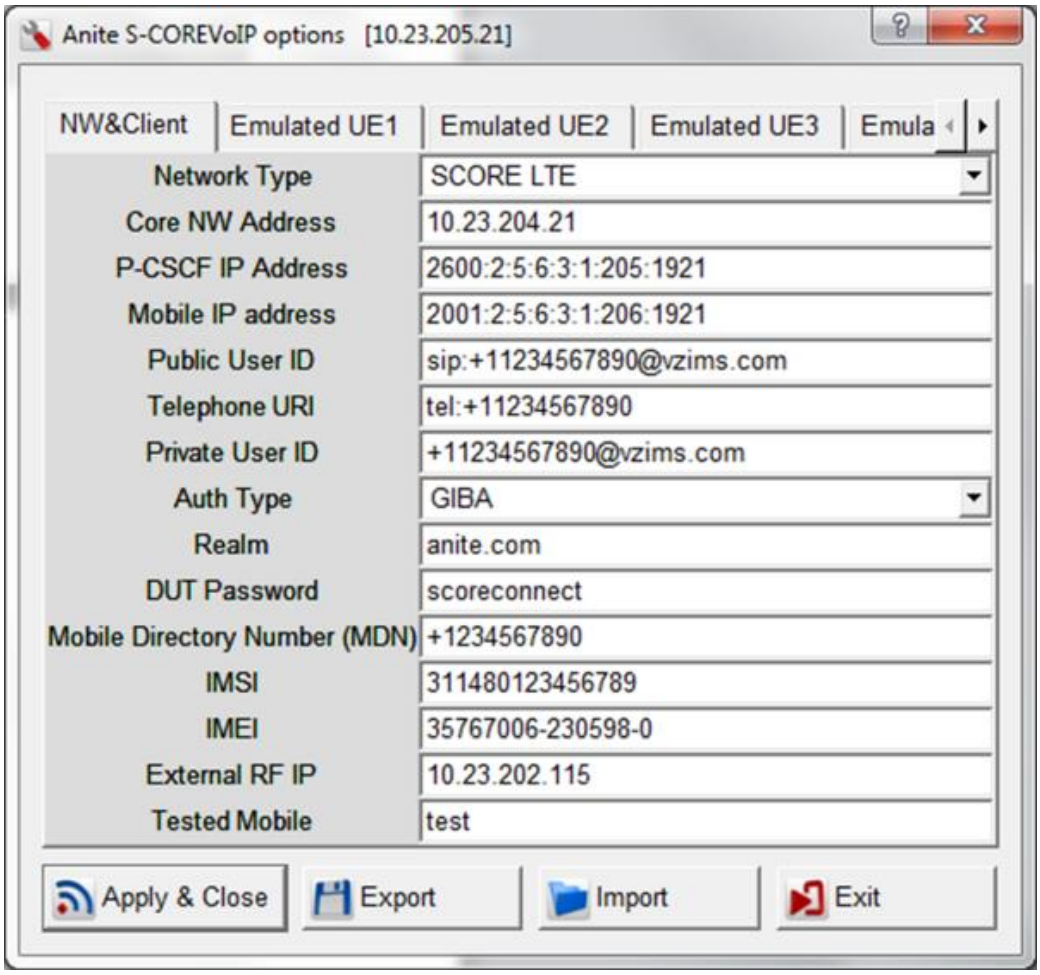
'xx' are the last two digits of the S-CORE serial number marked on the back panel *[31].*

For example, if the serial number marked on the back panel of the S-CORE is IQXS1921, the IP address would be 10.23.205.21.

Please refer to the **System Configuration** document for more information on your S-CORE configuration.

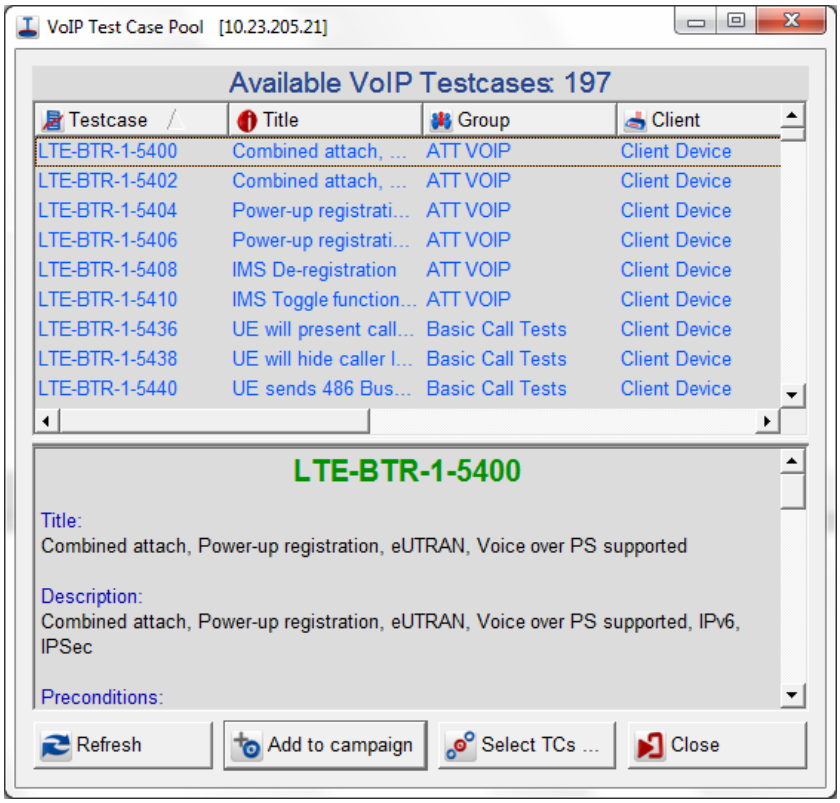


The applications available will be highlighted depending on the purchased packages. Select the application you wish to test by pressing the **"Start"** button by double clicking on the application icon.



Enter application specific settings as required in application option window. E.g. VOIP Options:

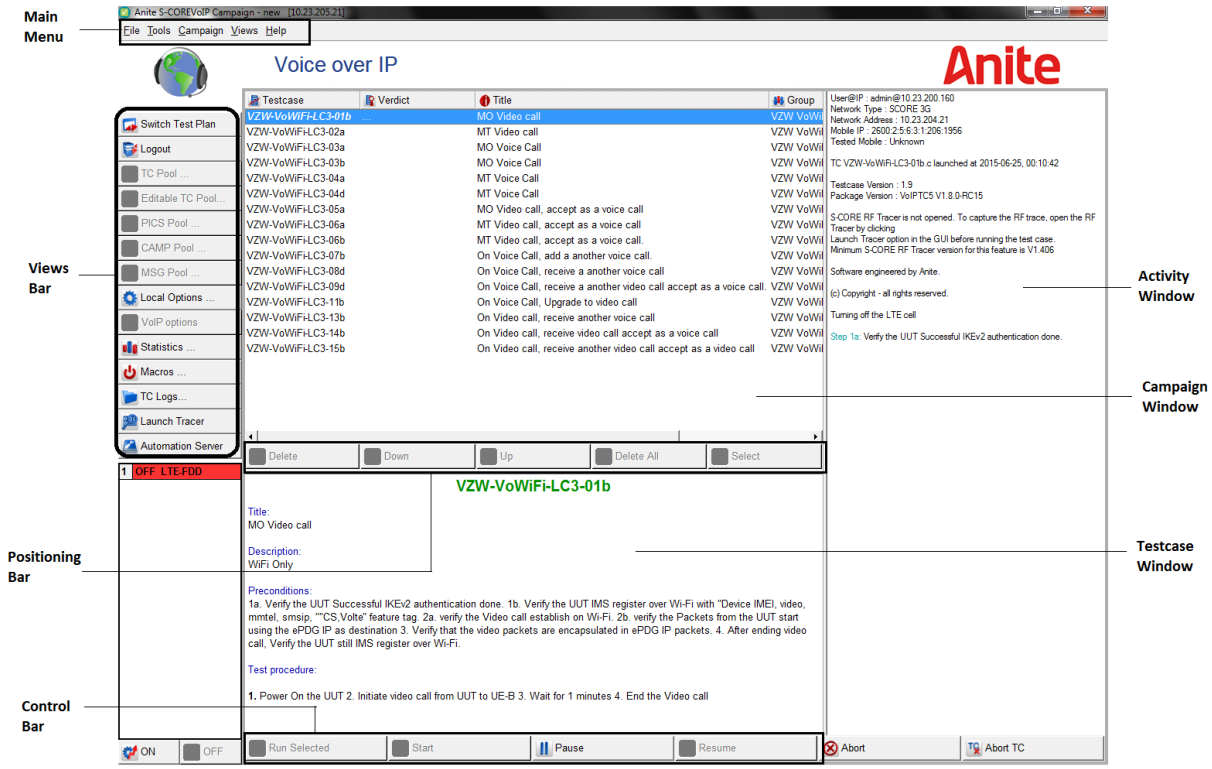
Network Type: **SCORE LTE**
Core Network Address: **10.23.204.xx (IP of signalling card)**
P-CSCF IP Address: **2600:2:5:6:3:1:205:xxxx**
Mobile IP Address: **2001:2:5:6:3:1:206:xxxx**



In this next step, select the test case you wish to run from the list indicated as shown in this screen shot then click on the **Add to campaign** button.

Click on **Close** to go to the next screen.

In the main S-CORE GUI, user can switch on the RAT (GERAN, WCDMA or LTE). Refer to the next chapter for the RAT handling. If the selected RAT is in the mode ON, power on the DUT and wait until the DUT camps on the RAT.



To start running test cases, perform the following steps:

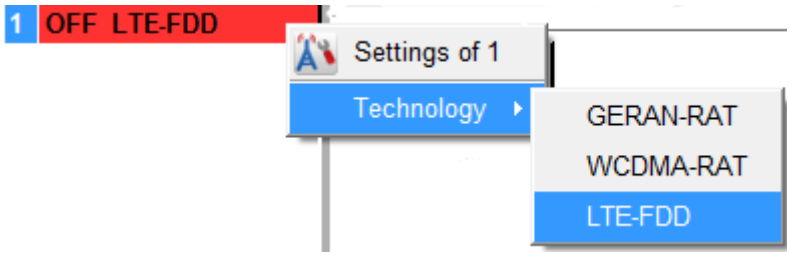
1. Ensure you have selected and activated the correct PICS/EICS as follows:
   a. Select **PICS Pool** from the menu, which displays the PICS Pool window.
   b. On the PICS Pool window, select the PICS file to use and click **Set Active PICS**.
   c. Click **Close** to close the dialog.
2. Select the required test cases to run, then click on the **Start** button to begin running test cases.

   The activity window on the right side of the S-CORE GUI will give you real-time reports and instructions as the test case progresses.

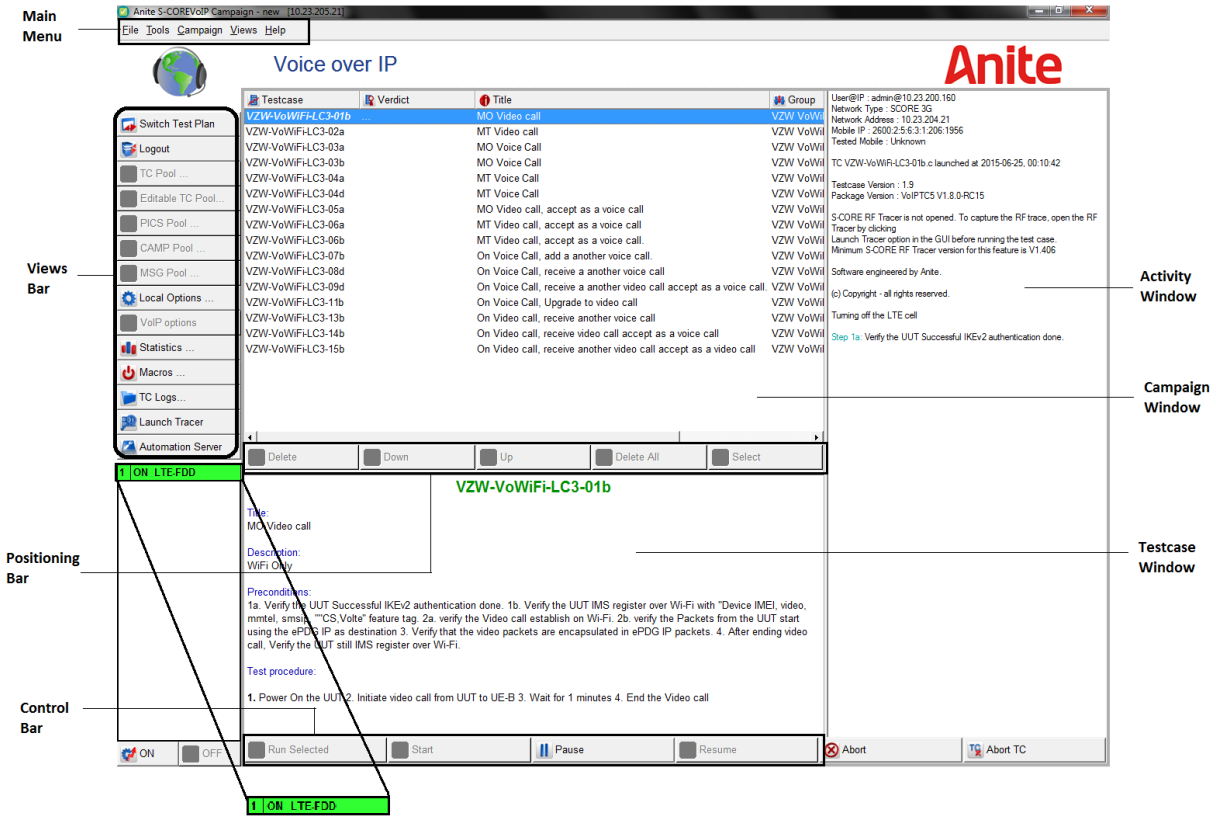
   Press the power button [8] at the front panel of the S-CORE to shut down the whole system.

5 CONTROLLING RADIO ACCESS TECHNOLOGIES FROM THE GUI

The three RATs available on the S-CORE (GERAN, LTE-FDD and WCDMA) can easily be controlled from the S-CORE GUI. They can be found exactly under the Views Bar by right clicking on RAT and then under Technology.



All installed RATs will be listed, with the currently used RAT being marked as ON.

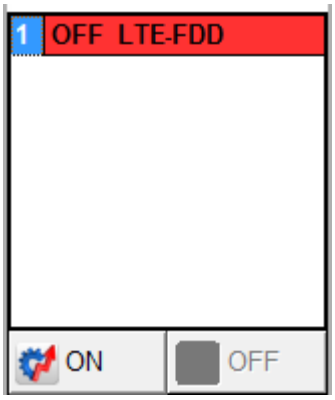


5.1 Switch ON/OFF RAT

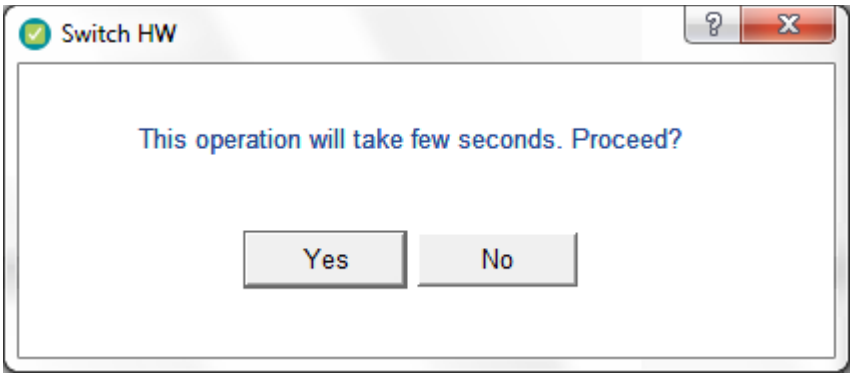
To switch ON a particular RAT:

1. Click on the 

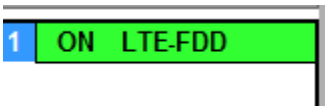
button.



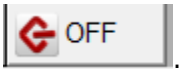
The S-Core GUI displays a prompt (shown below) asking you whether to proceed with the switching of the hardware.



2. Clicking 'Yes' to start loading the selected RAT.
3. Wait until the mode indicator turns to green and status is changed to ON.



The RAT is now ready for use.

To switch OFF a particular RAT, click on the OFF button 

.

5.2 RF sub-system setup

The test system needs setting up for the expected RF Power levels. This setup should be as accurate as possible.

The most important parameters are the **Rx Power** and **External Attenuation**, which can be measured using external measurement equipment or can be set up carefully using the tips below. The **Tx Power** should also be set up for good radio conditions.

Note: *When no measurement equipment is available use the information in the following sections to properly set up the system.*

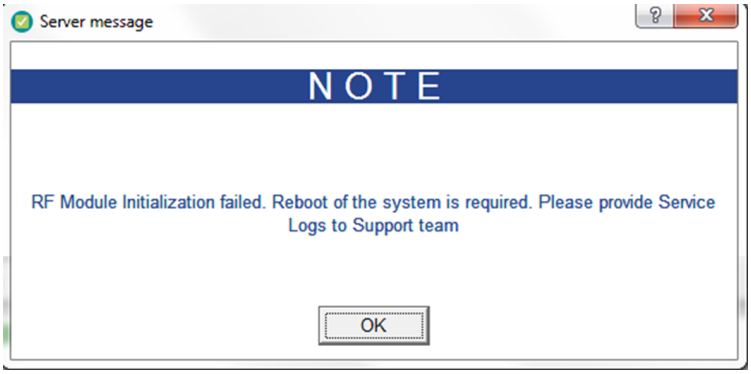
Settings for each RAT can also be adjusted through the GUI by right mouse clicking on that particular RAT and choosing Settings option.

For future reference, the RF settings for each RAT (GERAN-RAT, LTE-FDD, WCDMA-RAT) can be exported to a file using the **Export** button, and these exported files can be imported using the **Import** button.

Note: *After importing or changing the RF settings, always click* ***Apply*** *before switching on the RF cell.*

The following sections display the Settings Options Windows for the three available RATs (GERAN, WCDMA and LTE).

Note: *Specifying an RF value that is too low can lead to a Layer 1 system error (shown below), which requires the S-CORE unit to be re-booted. In this case, increase the Rx Power or decrease the external attenuation in steps of 1dBm until the S-CORE unit does not generate any Layer 1 system errors.*

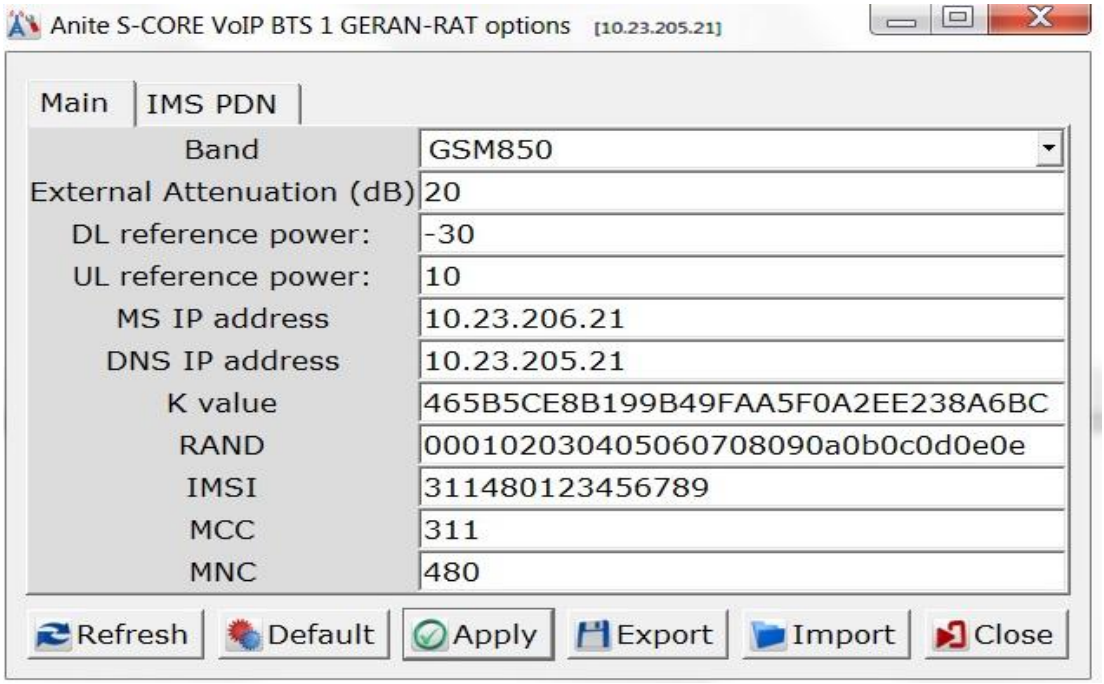


5.2.1 GERAN-RAT

To change the cell settings for GERAN-RAT, right click on the cell and then select Settings of GERAN-RAT.



Main tab



Important settings needed for testing:

Table 6 GERAN settings

Setting	Description
Band	Band under test
External Attenuation (dB)/Path Loss	The External Attenuation is the assumed path loss used for the setup in the uplink and downlink directions. When using conducted testing, a typical value for the external attenuation is 7dB, and this value depends on the cable length/quality and how many RF combiners/splitters and used. When using antenna couplers, the external attenuation depends on the equipment and the UE's antenna characteristics. We recommend using 15dB as a good starting point.
DL Reference Power	Downlink reference power. Lower default values when connecting directly DUT with the S-CORE. When setting the downlink reference power, use a value for a good radio connection. We recommend -30dBm as a plausible value to achieve ideal radio conditions.
UL Reference Power	Uplink reference power. Use the power class of the UE to help determine the UL reference power. A good starting point would be 12 dBm.
MS IP address	IP for mobile, it should be configured in the same subnet as the S-CORE. For more information, see the *Anite S-CORE Application Testing: System Configuration Guide*.
DNS IP address	User can configure the Application Server IP as DNS IP if the system operates in local standalone test environment.
K value, IMSI	Information of test SIM card. Refer to the System Configuration Document.
RAND	16 bytes random number for the authentication.
MCC, MNC	Mobile Country Code and Mobile Network Code that RAT will broadcast.

IMS PDN tab

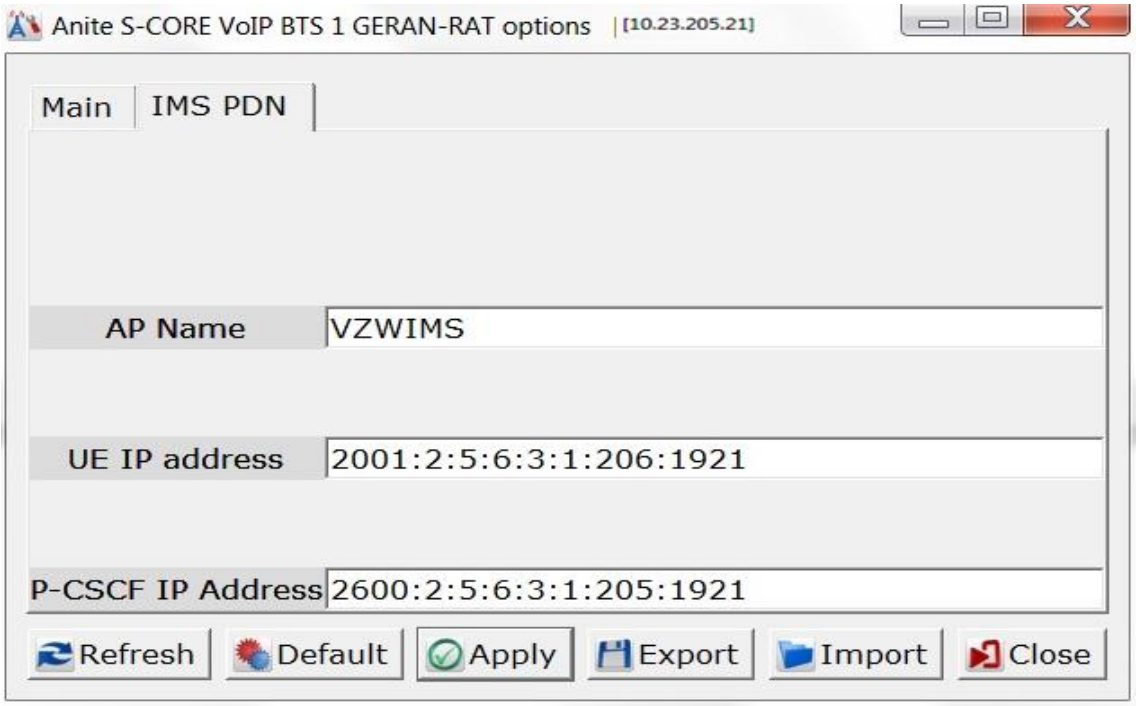


Table 7 IMS PDN settings

Setting	Description
UE IP Address	IP for mobile. For more information, see the *Anite S-CORE Application Testing: System Configuration Guide*.
P-CSCF IP Address	Application Server IP Address. Refer to the System Configuration Document.

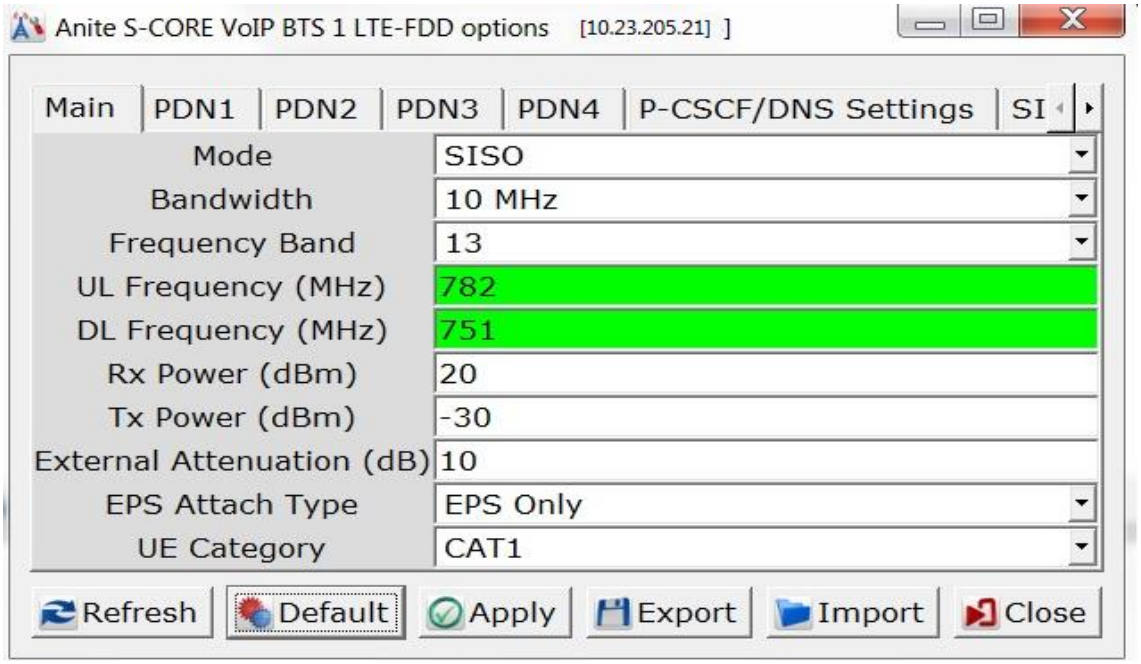
For detailed information about the settings, please refer to the *Anite S-CORE Application Testing: Operating Guide*. After changing the settings or starting test cases for the first time after logging in to the S-CORE GUI, first click on **Apply** and then **Switch on** the cell.

5.2.2 LTE-FDD

To change the cell settings for LTE-FDD, right click on the cell and then select Settings of LTE-FDD.



Main tab



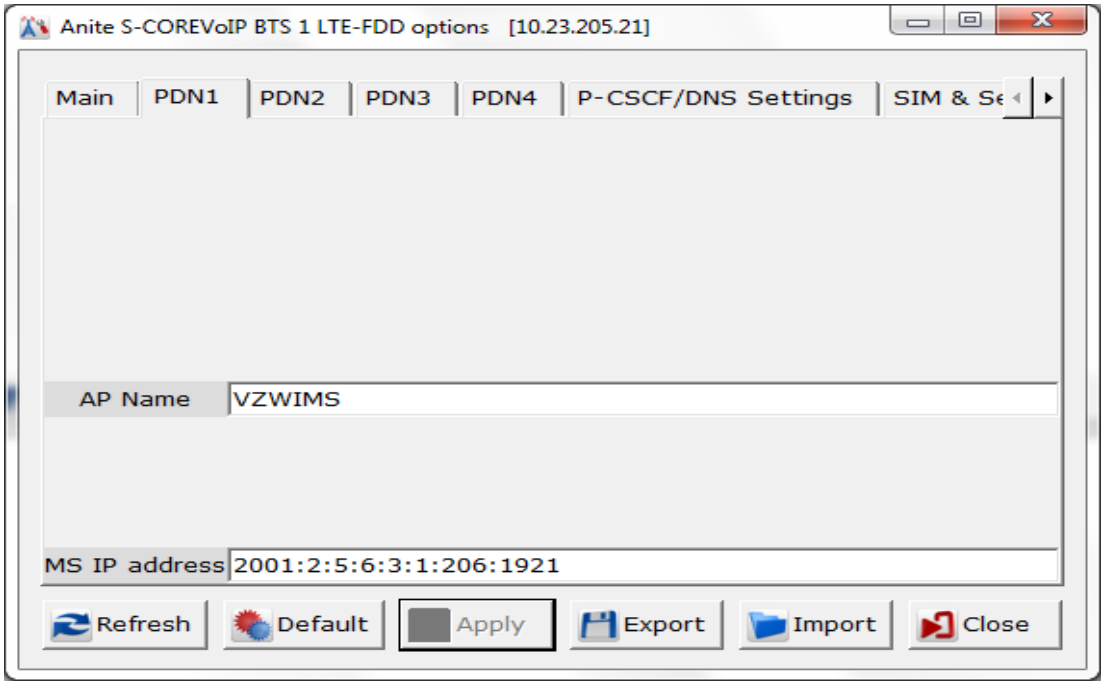
Important settings needed for testing:

Table 8 LTE-FDD settings

Setting	Description
Mode	The mode that LTE RAT operates, e.g. SISO, MIMO.
Bandwidth	The bandwidth that LTE RAT operates, e.g. 10MHz.
Frequency Band	The LTE band number.
UL Frequency, DL Frequency	Values adjust automatically depending on Frequency band chosen. By default, Mid-Range values are used.
RX Power	Set the value of the Expected Receive Power Level taking the following into consideration: • The coupler or direct connection being used. • The power class of the device under test. A good starting point would be 25 dBM (according to 3GPP TS 36.101, a class 3 UE should be set to 23dBm ±2dB). • The Rx Power should be set to the maximum possible power level, and it is better to specify a slightly higher value for the Rx Power. Specifying a value that is too low can lead to a Layer 1 system error, which requires the S-CORE unit to be re-booted. In this case, increase the Rx Power in steps of 1dBm until the S-CORE unit does not generate any Layer 1 system errors.
TX Power	Set the value of the Transmit Power Level depending on the coupler or direct connection being used. When setting the Tx Power, use a value for a good radio connection. We recommend -40dBm as a plausible value to achieve ideal radio conditions.
External Attenuation (Path	The External Attenuation is the assumed path loss used for the setup in the uplink and downlink directions.

Setting	Description
Loss)	When using conducted testing, a typical value for the external attenuation is 7dB, and this value depends on the cable length/quality and how many RF combiners/splitters and used. When using antenna couplers, the external attenuation depends on the equipment and the UE's antenna characteristics. We recommend using 15dB as a good starting point. It is generally better to specify an external attenuation that is slightly too low rather than too high. Specifying a value that is too high can lead to a Layer 1 system error, which requires the S-CORE unit to be re-booted.
EPS Attach Type	Based on the UE capability and test requirements, select the EPS attach type in this option: • **EPS Only** • **Combined Attach**
UE Category	Select the supported UE category to **1** or **4**.

PDN1 tab

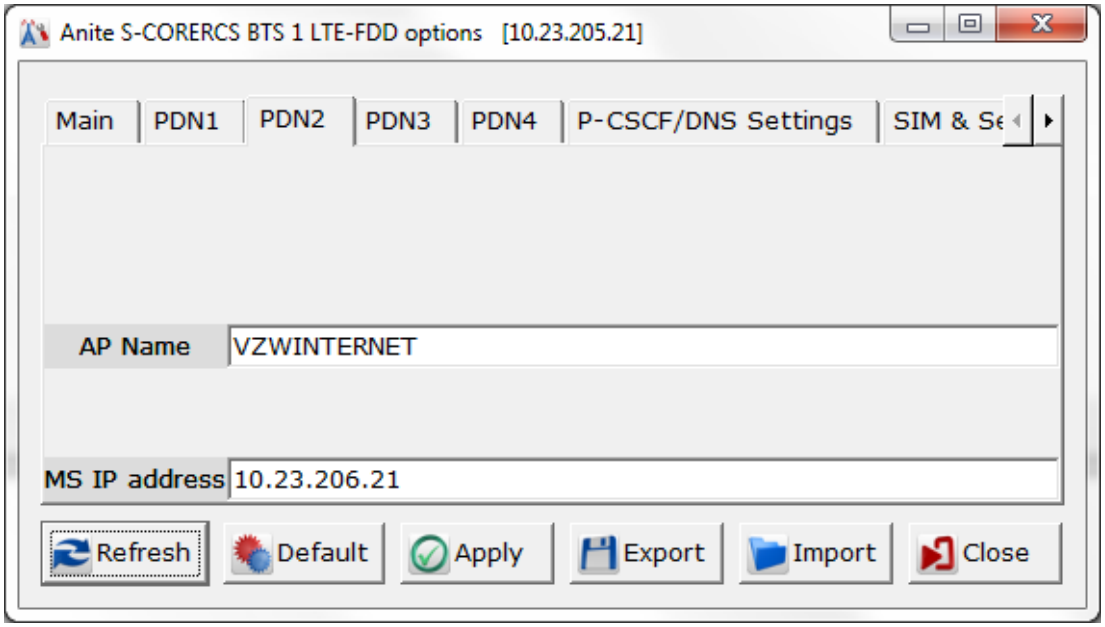


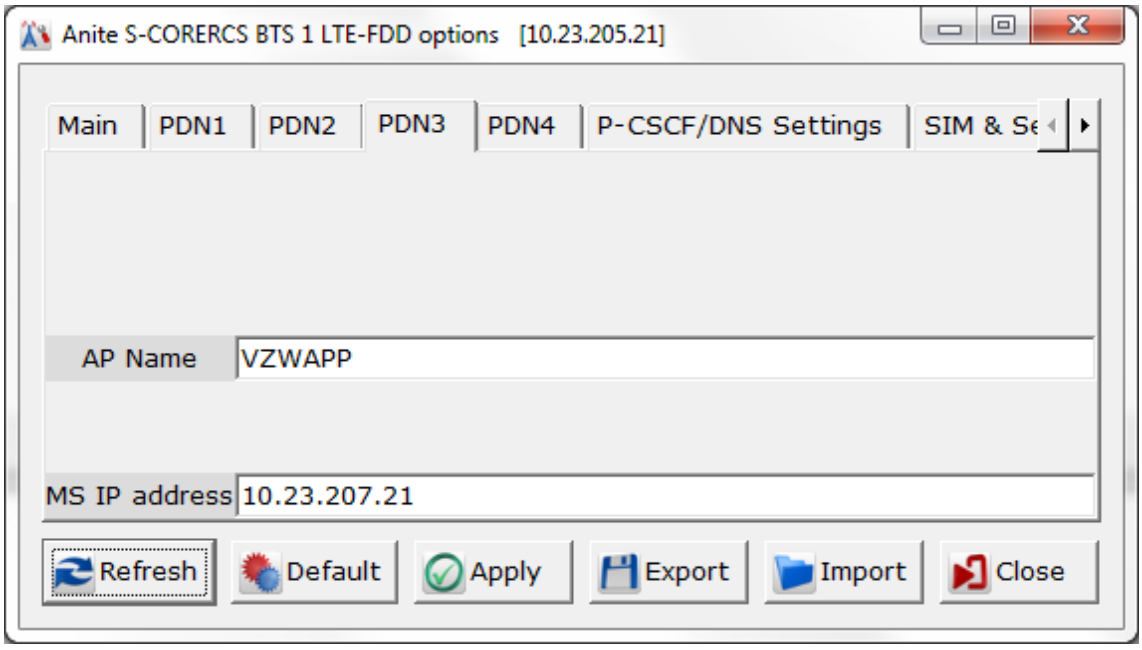
Important settings needed for testing:

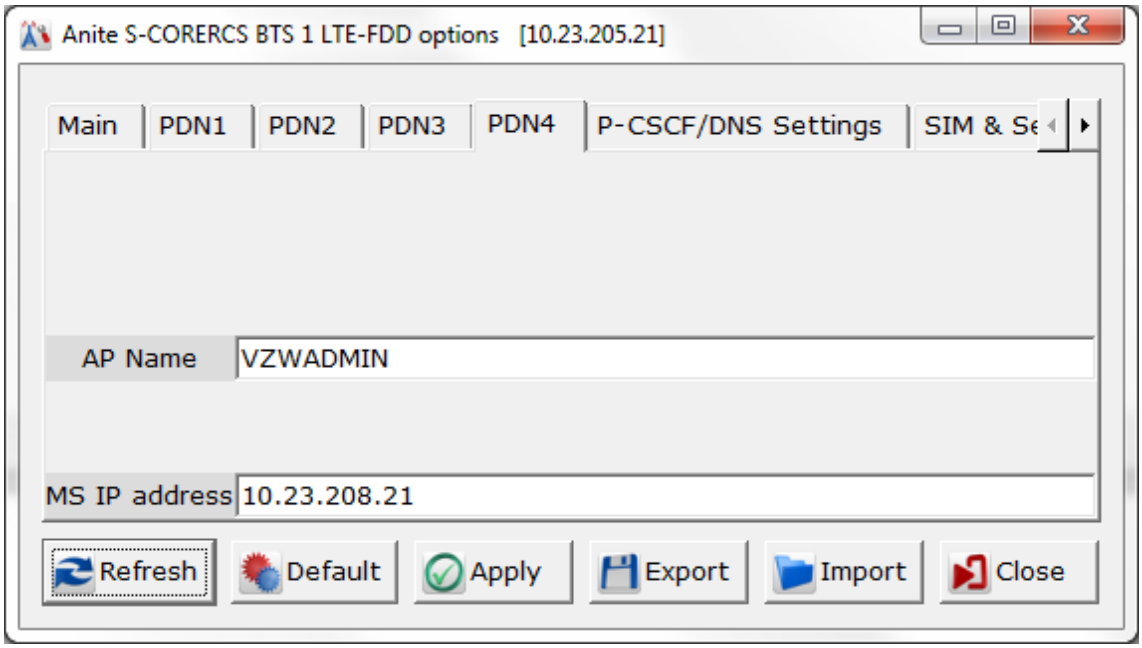
Table 9 PDN1 settings

Setting	Description
MS IP Address	IPv6 for mobile. For more information, see the *Anite S-CORE Application Testing: System Configuration Guide*.
AP Name	Please set the Access point name for the first PDN request from the device. In the above example the first PDN request is for the PDN VZWIMS

PDN2 – PDN4 tab





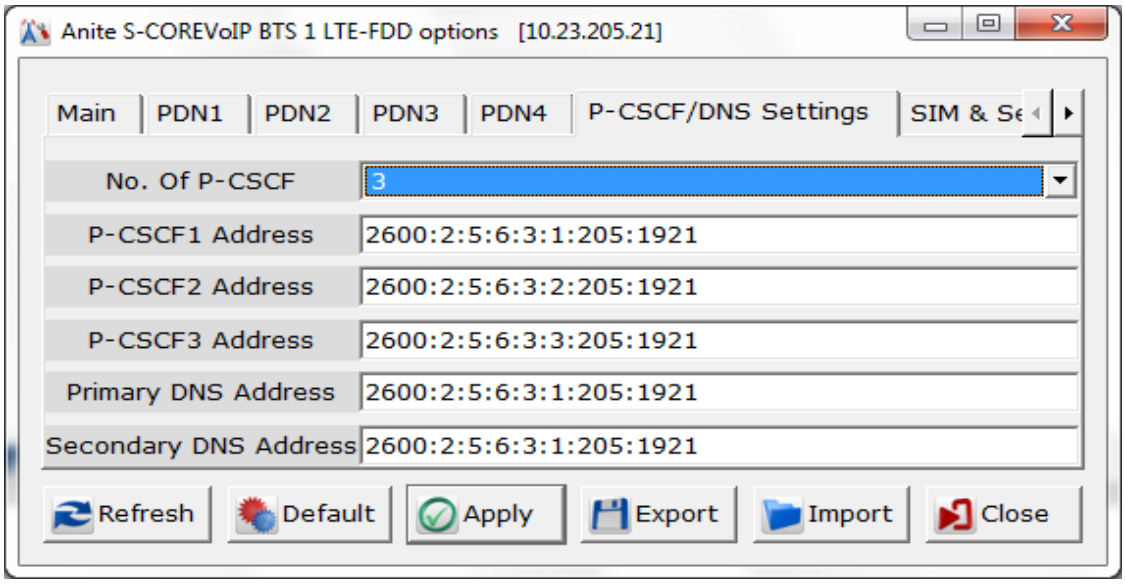


Important settings needed for testing:

Table 10 PDN2 – PDN4 settings

Setting	Description
MS IP Address	IP for mobile, it should be configured in the same subnet as the S-CORE. For more information, see the *Anite S-CORE Application Testing: System Configuration Guide*.
AP Name	Please set the Access point name for the PDN requests from the device.

P-CSCF/DNS tab



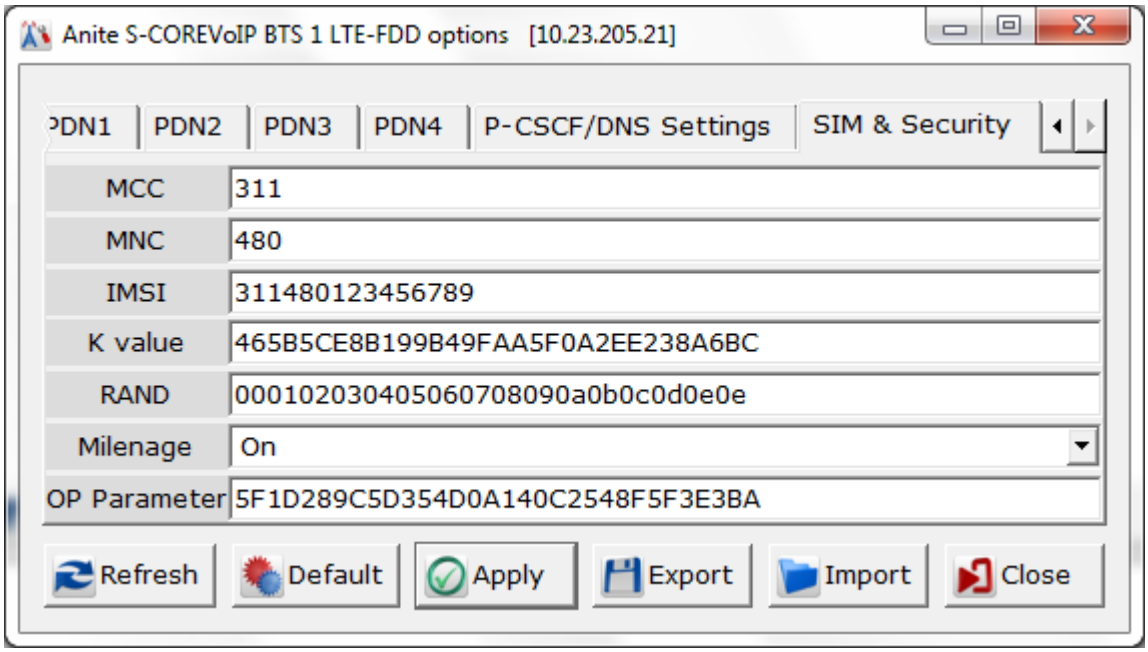
Perform the following on the P-CSCF/DNS tab:

1. Select the number of P-CSCF addresses that the UE requires for the test cases.

2. Set the values of the P-CSCF addresses using the IP address of the Application Server, and using the serial number of the S-CORE unit as the final four digits (1921 above).

For more detailed information about the options, refer to the S-CORE Connect Operating Manual.

SIM & Security tab



Important settings needed for testing:

Table 11 SIM & Security settings

Setting	Description
MCC, MNC	Mobile Country Code and Mobile Network Code that RAT will broadcast.
K value, IMSI	Information of test SIM card. Refer to the System Configuration Document.
RAND	16 bytes random number for the authentication.
Milenage	Default Value - Off

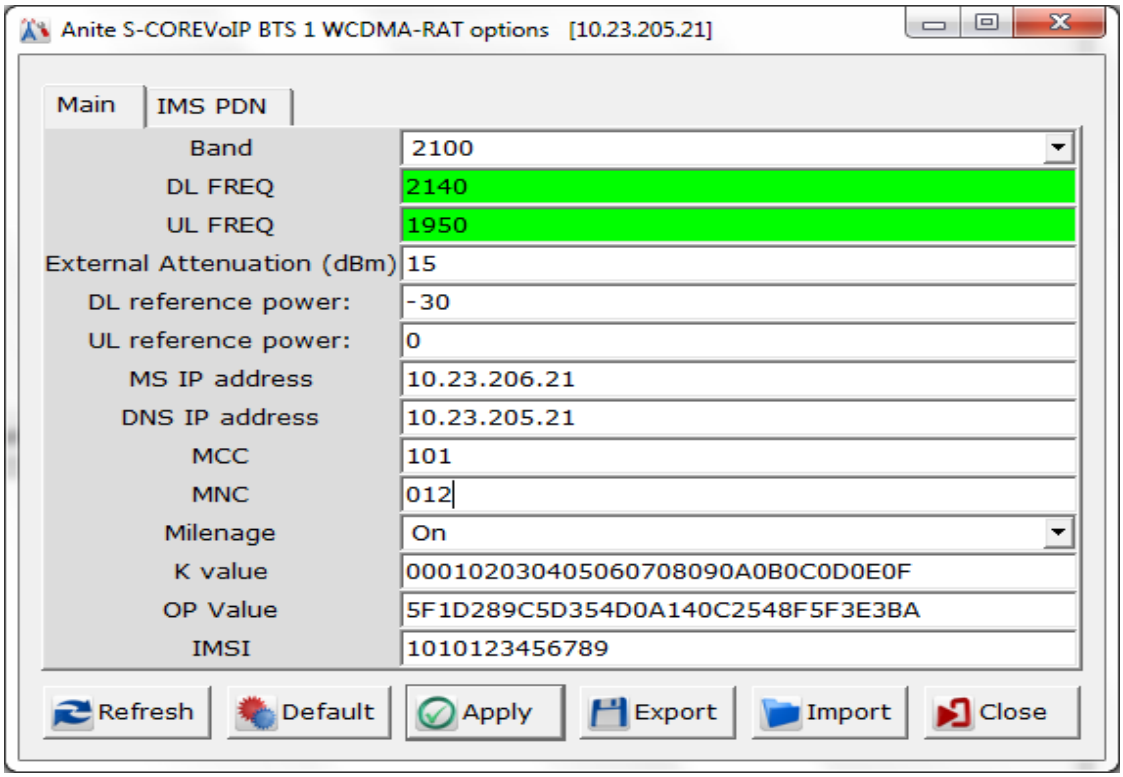
For detailed information about the settings, please refer to the *Anite S-CORE Application Testing: Operating Guide*.

After changing the settings or starting test cases for the first time after logging in to the S-CORE GUI, first click on **Apply** and then **Switch on** the cell.

5.2.3 WCDMA-RAT

To change the cell settings for WCDMA-RAT, right click on the cell and then select **Settings of WCDMA-RAT**.





Important settings needed for testing:

Table 12 WCDMA settings

Setting	Description
Band	Band under test.
Path Loss	Default values for 3G; 15dBm if Antenna Coupler is used, 7dBm if DUT if directly connected with S-CORE.
DL, UL ARFCN	Downlink / Uplink Absolute Radio Frequency Channel Number
DL Reference Power	Downlink reference power. Lower default values when connecting directly to Device Under Test.
UL Reference Power	Uplink reference power.
MS IP address	IP for mobile, it should be configured in the same subnet as the S-CORE.
DNS IP address	User can configure the S-CORE IP as DNS IP if the system operates in local standalone test environment.
K value, IMSI	Information of test SIM card. Refer to the System Configuration Document.

For detailed information about the settings, please refer to the *Anite S-CORE Application Testing: Operating Guide*. After changing the settings or starting test cases for the first time after logging in to the S-CORE GUI, first click on **Apply** and then **Switch on** the cell.

6 VZW IMS REGISTRATION & RETRY MULTICELL TEST CASES

This section is only relevant to customers that wish to test VZW Multicell test cases (e.g. IMS Registration multicell test cases Test cases 2.27_Test1,2 and 3).

The VZW Multicell test cases require a multicell RF stack package which you download from Keysight Software Manager as described below.

6.1 Backup LTE cell settings from single cell RF stack

Before installing the multicell RF stack package, backup the existing LTE cell settings of the single cell RF stack as follows:

1. Log in to the S-CORE GUI.
2. Right click on LTE Cell and select **Settings of 1**.
3. Click **Export** and save the settings to a file which can later be imported.

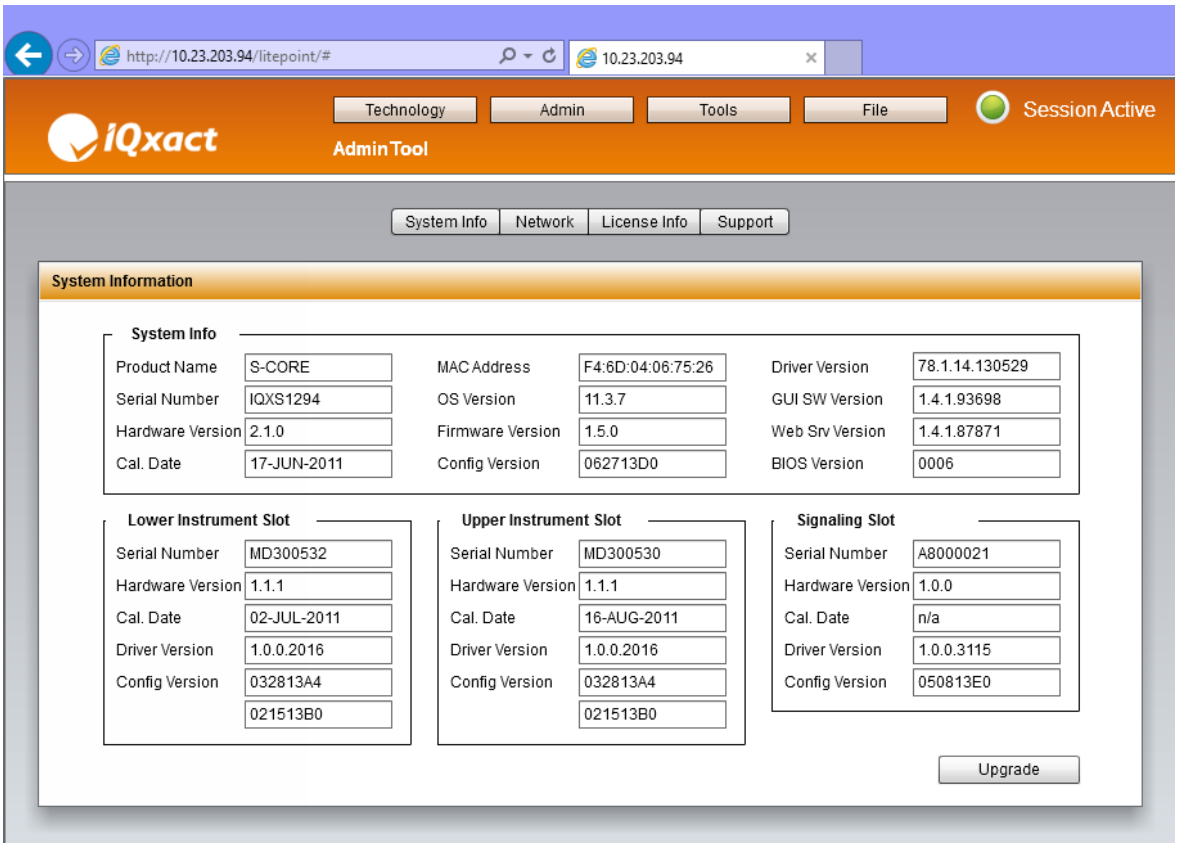
6.2 Installing multicell RF stack package

Install the multicell RF stack package as follows:

1. Download the multicell RF stack package as follows:
   a. In a browser, log in to the Keysight Software Manager, available at http://www.keysight.com/my.
   b. Under S-CORE Product, select the Base Application <version>.
   c. Download the S-CORE RF Package and save it to your PC.
2. Ensure that the S-CORE unit is switched on.
3. In a browser window, type the following URL:

   http://10.23.203.xx/litepoint

   Where **xx** is the IP address of the S-Core unit.



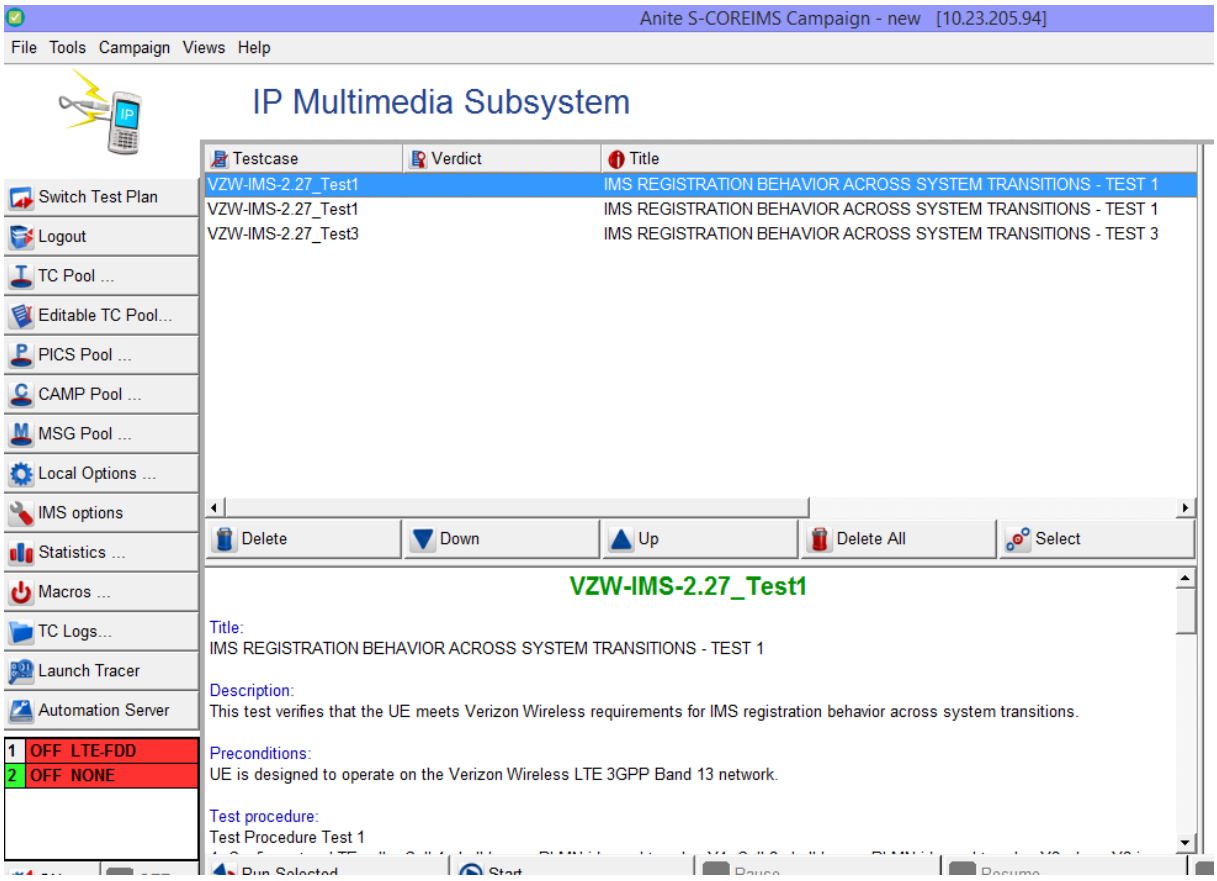
4. Click **Upgrade** to display the Instrument Upgrade screen (below).



5. Click Browse and select the S-CORE RF Stack Packager executable file downloaded in step 1 (above).
6. Click **Start Install** to install the package.

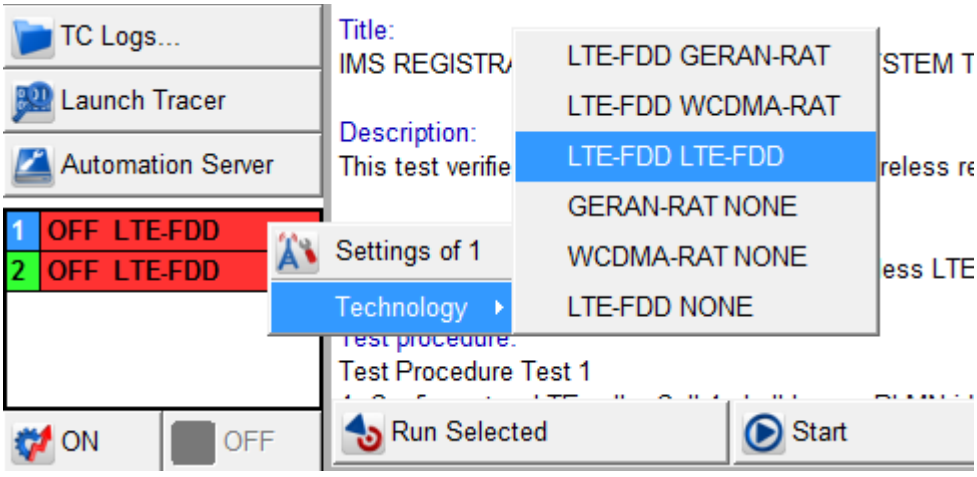
6.3 Configuring S-Core GUI for multicell

After installing RF package, log in to S-CORE GUI. Now two cell options (Cell1 and Cell 2) can be seen in S-Core GUI



To configure and enable the LTE cells:

1. Right click on the first cell and select Technology > LTE-FDD LTE-FDD (as shown below).



2. Right click on the second cell and select Technology > LTE-FDD LTE-FDD.

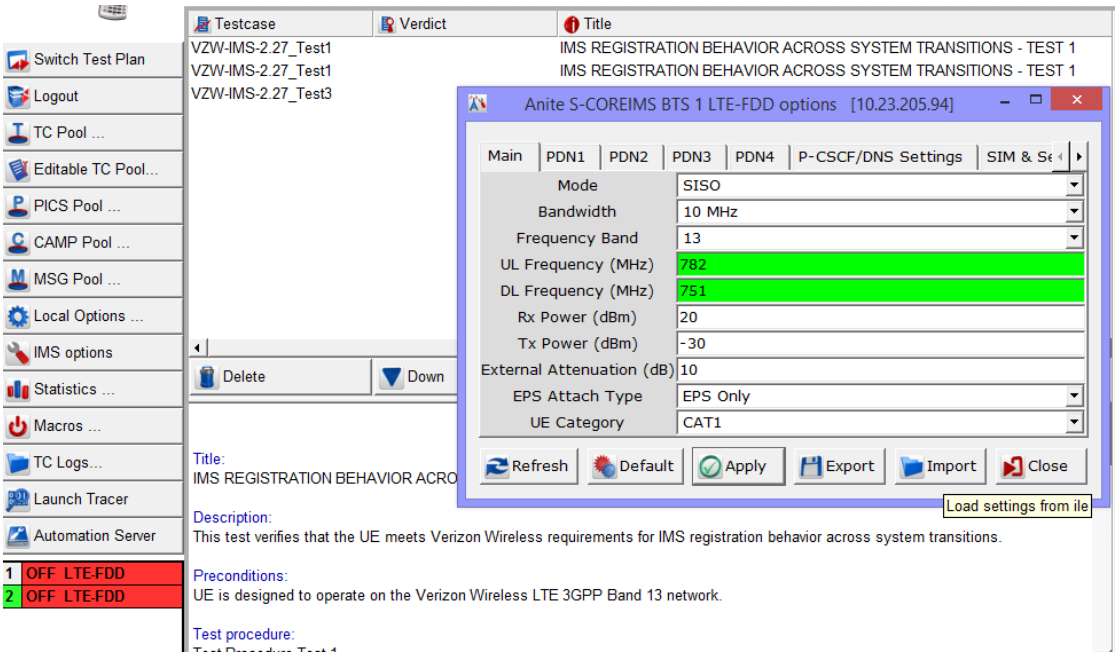
   Both cells are now configured for LTE

3. Right click on the first cell and select **Settings of 1**.

4. Copy the sample Cell 1 settings embedded in this document (below) to a local directory.

Sample_Settings_Cell1.settings

5. Import the sample file in the S-CORE GUI, and modify the following settings
   - The serial number of the S-Core unit.
   - Uplink and downlink power levels.
   - Path losses

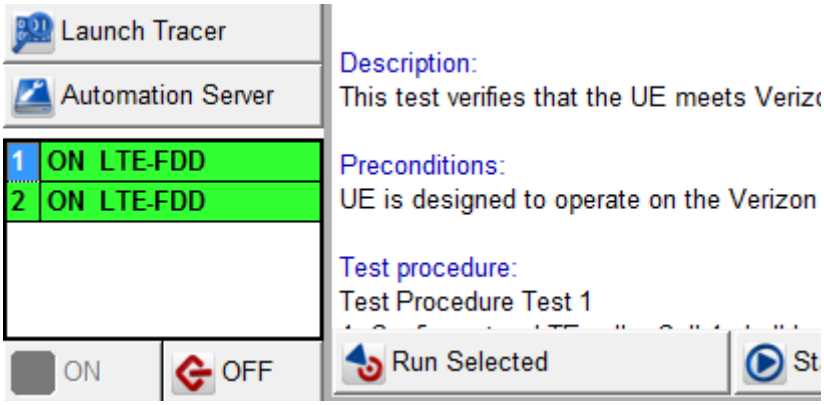


6. When complete, click **Apply**.
7. Repeat steps 3 to 6 for the second cell using the sample Cell 2 settings embedded in this document (below)

Sample_Settings_Cell2.settings

Both LTE cells are now configured.

8. Press "ON" to turn on both LTE cells.



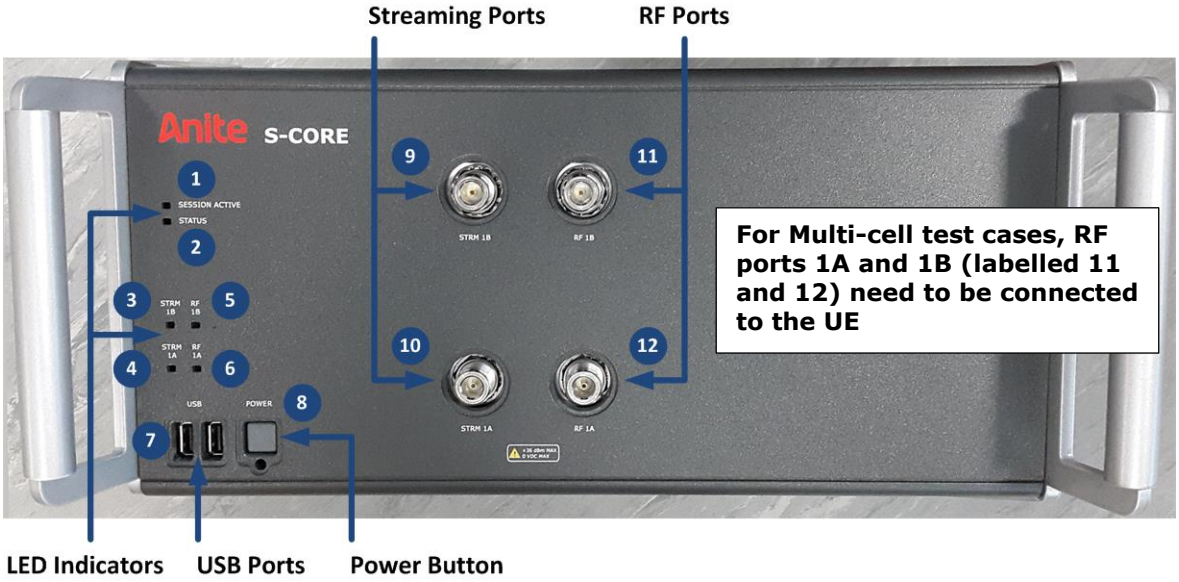
6.4 Limitations for multicell RF stack

Currently, it is limitation in RF multicell stack that both cells should be turned on together at the same time. For multicell test-cases, it has been mentioned in the specification to turn off the cell 1 and turn it on later in the test case. For this, cell RF power is reduced to very minimum value and will be increased when required in the test case to turn on the cell.

Also, cell settings which are exported using single cell RF stack cannot be imported directly for cell settings in multicell RF stack. They need to be updated manually.

6.5 RF connection for multicell test cases

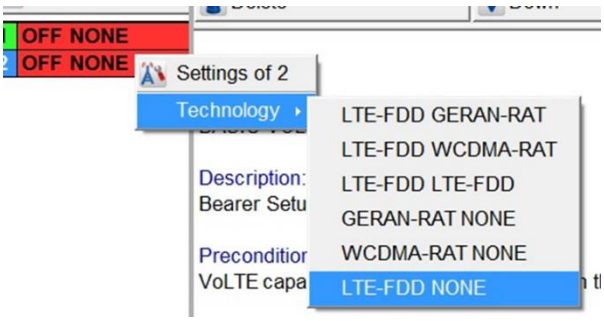
Connect both RF output (1A and 1B) from front panel of S-CORE to UE while running Multicell test cases.



6.6 Configuring S-CORE GUI for single cell

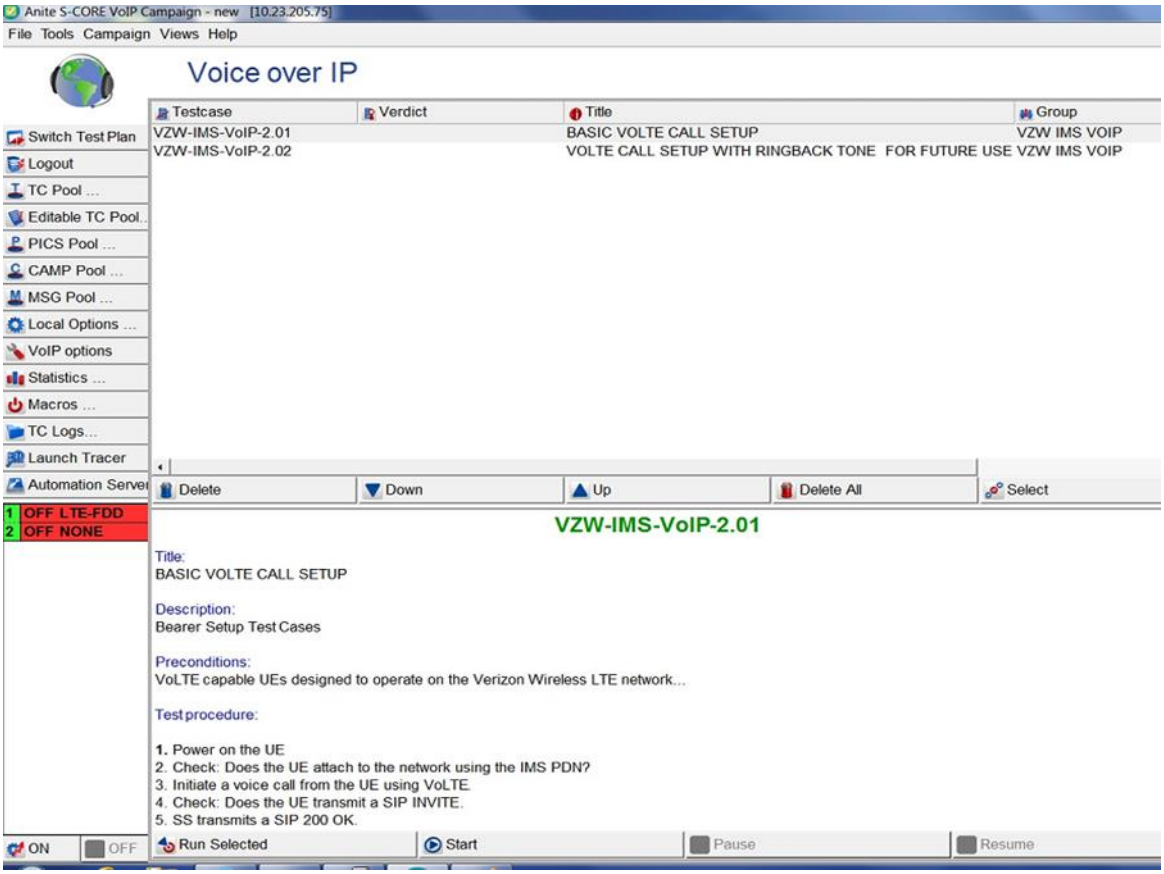
If you have installed the Multi-cell RF stack package (as described in 6.2), you can also use the S-CORE in a single cell configuration as described below.

1. Depending on the RF technoloy required, on the left-hand menu of the S-CORE GUI, right-click on the cells that are not required, select **Technology** and select the **NONE** option for the RAT as shown below:



2. Repeat for all cells except for the one that is required for testing.

For example, to select a single LTE-FDD cell, select NONE for other cells as shown below:



3. Apply the changes to the cell before switching it on as follows:
   a. Right-click on the RF cell and click **Settings**. to display the RF settings dialog.
   b. Click **Apply** to save the changes.
4. Start the RF cell manually as described below:
   a. Right-click on the RF cell and click **Settings**.
   b. Click **Switch On**.

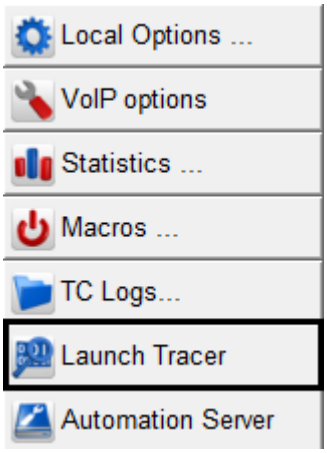
Note: *VoWiFi test cases start the RF cells automatically.*

7 RADIO LAYER LOGGING

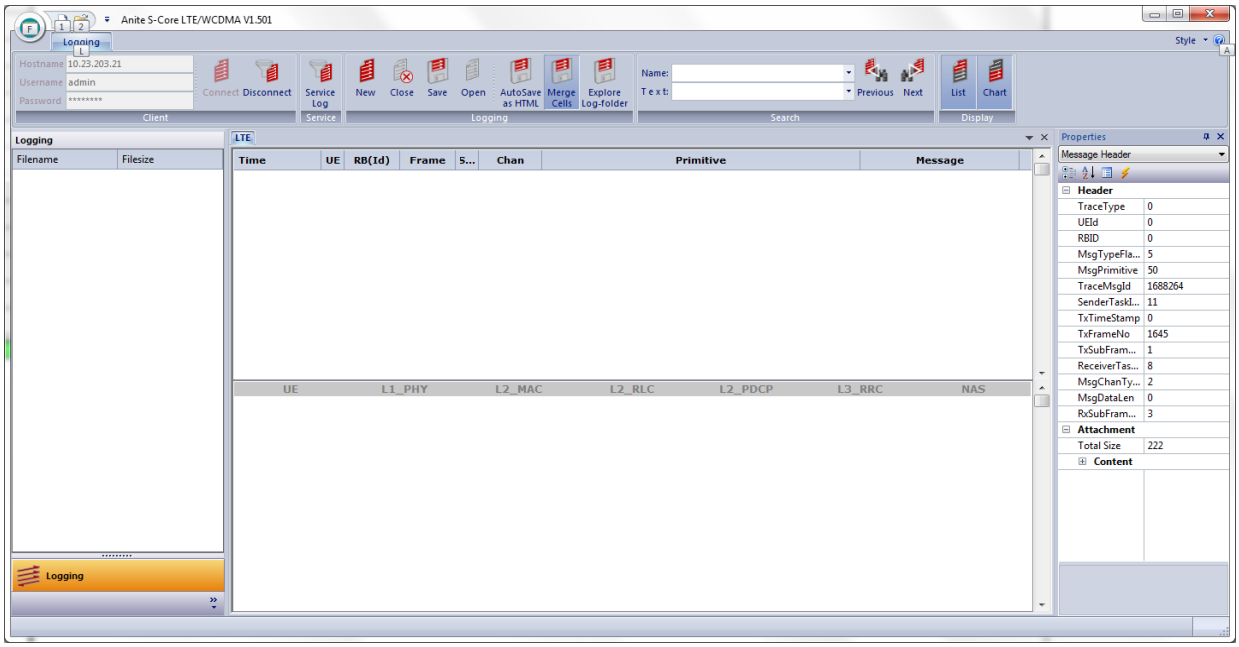
You can trace the radio layer message exchange related to the test run.

7.1 Starting radio layer tracing

To start radio layer tracing, click on the Launch Tracer button on the toolbar.



This will open a separate logging window which traces the lower layer messages.



You will be able to view the message exchange in two views, one as simple 'list view' and the other 'sequence chart view' showing message exchange between different layers.

When you select a message, you can view the detailed decoded message contents and the message dump on the right-hand pane.

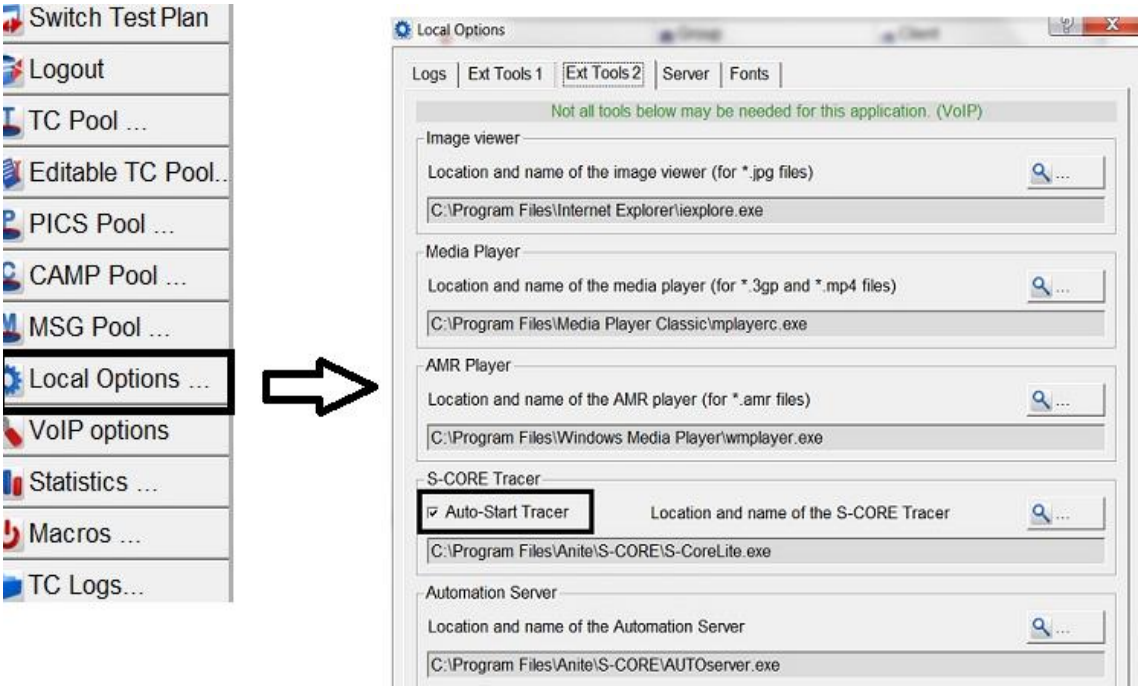
You can stop the tracing by clicking the **Close** button in the logging window (above).

7.2 Enabling automatic RF tracing

It is recommend that user select the automatic start tracer option, so that RF tracing will start automatically with start of test case and RF logs saved with test case logs in same folder.

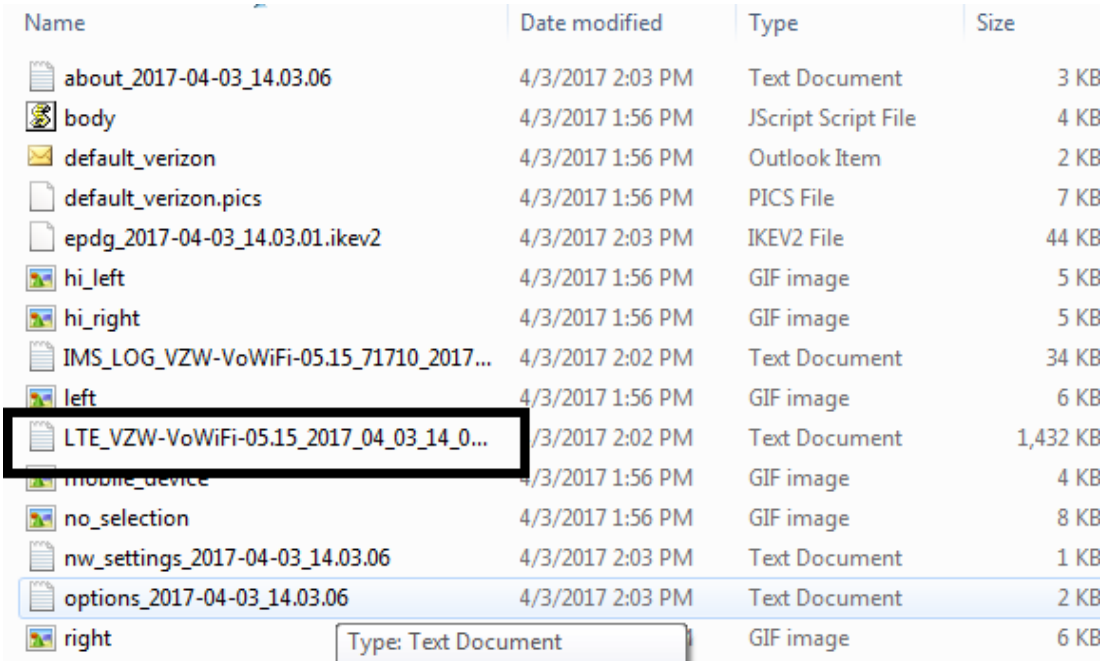
To enable automatic RF tracing:

1. Click on **Local Options**.
2. Display the **Ext Tools2** tab.
3. Select the **Auto-Start Tracer** checkbox as shown below.



7.3 Dispaying RF logs

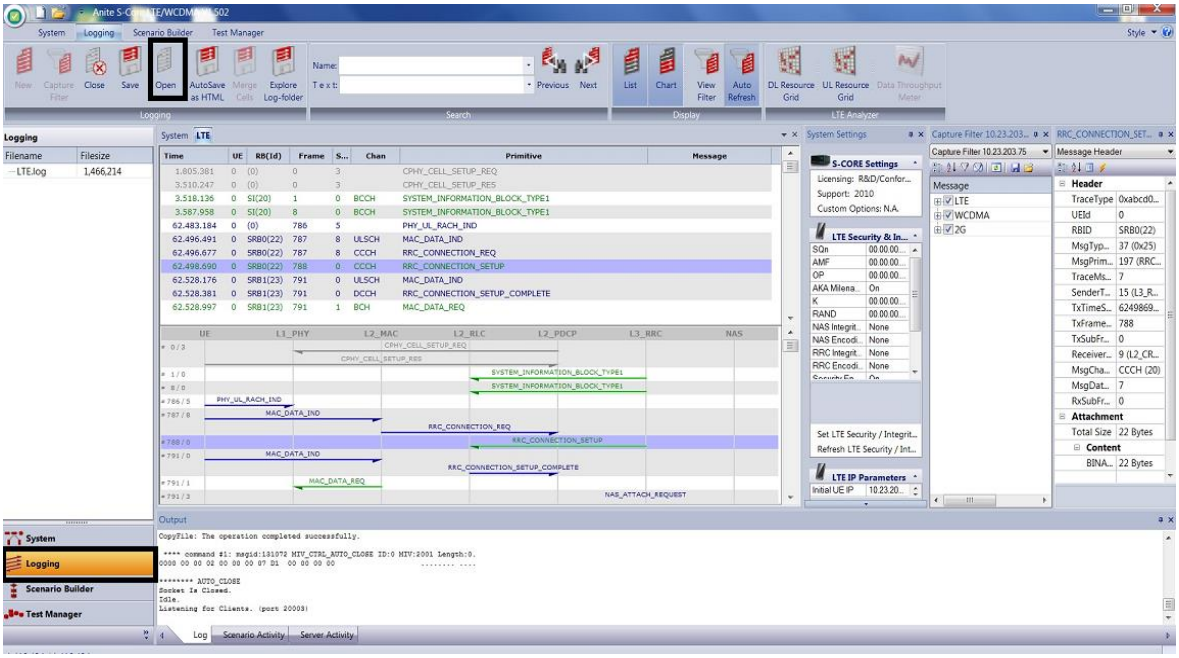
Once the test case finishes, you can open the directory containing the RF logs by clicking TC Logs from the S-CORE GUI menu. The following image shows the RF log file in an example results folder.



You can also view saved RF logs as follows:

1. Display the RF Tracer by selecting to the **Logging** tab.
2. Click **Open** from the menu, then select the RF log file (displayed in above example: LTE_VZW-VoWiFi-05.15_2017_04_03_14_02_59).

   The log is then displayed in the window as shown below.

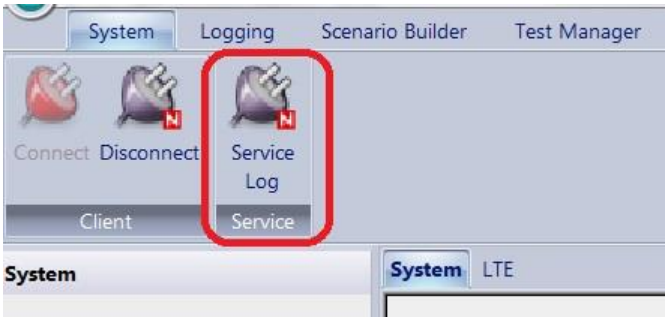


7.4 Collecting Service Logs

Service logs are used by Customer Support for analysis when you experience RF issues during test cases.

At the end of any test cases where you experience RF issues:

1. Click on the System tab, then click Service Log from the menu.



2. Save the log to a local directory and send the service logs to Customer Support.

APP A APPENDIX

A1 S-CORE Monitor GUI

The following GUI is displayed on the monitor connected with the S-CORE. Using the monitor is optional. It is required only when troubleshooting is needed.



A2 Changing TP-Link Router IP Address

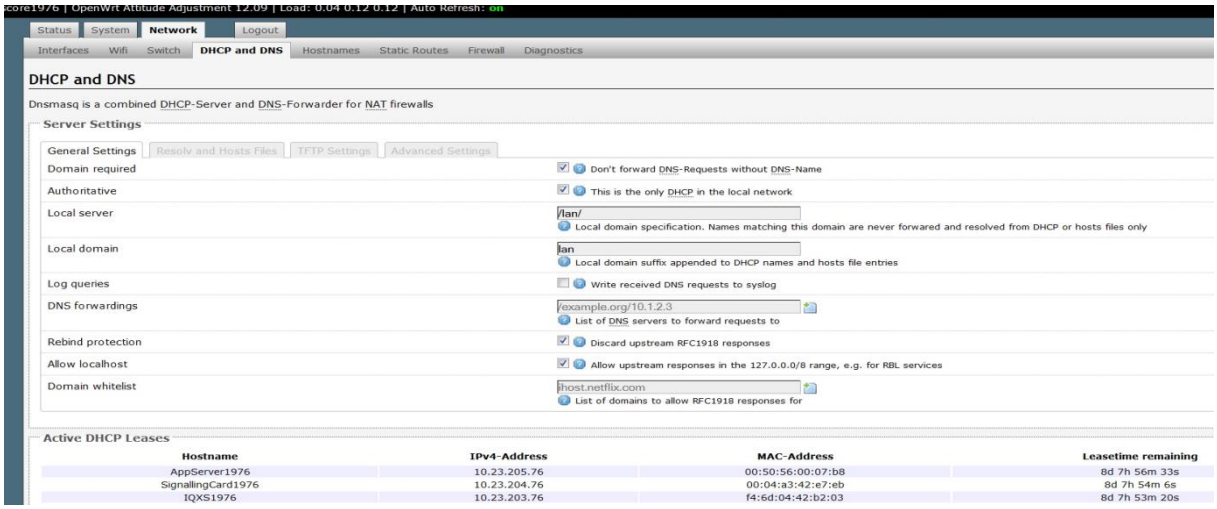
To change the TP-Link router IP address:

1. Load a browser and type in **10.23.201.100** into the address bar.

   The browser prompts you to enter a username and password.

2. Specify the default username and password:
   - Username: **root**
   - Password: **root**
3. Once logged in, click on the **Network** tab, then the **DHCP and DNS** sub-tab from the menu.
4. Scroll down and click on **Static Leases**.
5. Modify each of the listed IP Addresses as required.

Here is a configuration example:



Example shown below (should be preconfigured

MAC Address	Reserved IP Address	Remark
F4-6D-04-42-B2-03	10.23.203.76	IP of S-CORE
00-04-A3-42-E7-EB	10.23.204.76	IP of Signalling Card
00-50-56-00-07-B8	10.23.205.76	IP of Application Server

Note: *The above details are listed in this manual as guidelines. The MAC Addresses and IP Addresses vary according to the system being delivered.*

APP B GLOSSARY

ARFCN – Absolute Radio Frequency Channel Number
DHCP – Dynamic Host Configuration Protocol
DL – Downlink
DNS – Domain Name System
DUT – Device Under Test
EPS – Evolved Packet System
FDD – Frequency Division Duplexing
GERAN - GSM EDGE Radio Access Network
GPRS – General Packet Radio Service
GSM - Global System for Mobile Communications
GUI – Graphical User Interface
I/O – Input / Output
IMSI – International Mobile Subscriber Identity
IP – Internet Protocol
LAN – Local Area Network
LED – Light Emitting Diode
LTE – Long Term Evolution
MAC – Media Access Control
MCC – Mobile Country Code
MNC – Mobile Network Code
MS – Mobile Station
P-CSCF – Proxy-Call Session Control Function
PC – Personal Computer
RAND – Random
RAT – Radio Access Technology
RF – Radio Frequency
Rx – Expected Receive
Tx – Transmit
UL – Uplink
USB – Universal Serial Bus
VGA – Video Graphics Array
WCDMA - Wideband Code Division Multiple Access

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