Protocol Logging and Analysis Software

(E7515A-L01)

For the E7515A UXM
Wireless Test Set

User's
Guide

KEYSIGHT
TECHNOLOGIES

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Manual Part Number

E7515-90011

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Platform Version 1.2.1.0

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1 Introduction

Welcome to the ***Protocol Logging and Analysis Software User's Guide*** for the Keysight E7515A UXM Wireless Test Set. The purpose of this guide is to provide you with installation instructions and user information for your logging and analysis software.

Latest Documentation

For the latest version of all documentation, please go to www.keysight.com/find/UXM-Manuals.

Latest Software Application Releases

For the latest release of all UXM related software, please go to http://www.keysight.com/find/softwaremanager.

2 System Architecture

The Protocol Logging and Analysis software (PLA) runs on PCs using the Microsoft (MS) Windows 7 operating system. It captures the protocol logging data from the UXM, then decodes the data into proper format and displays them in details to the users. The PLA software is connected to the UXM via a private Ethernet interface to capture message exchange of different layers. Figure 2-1 shows an example Protocol Logging and Analysis log.

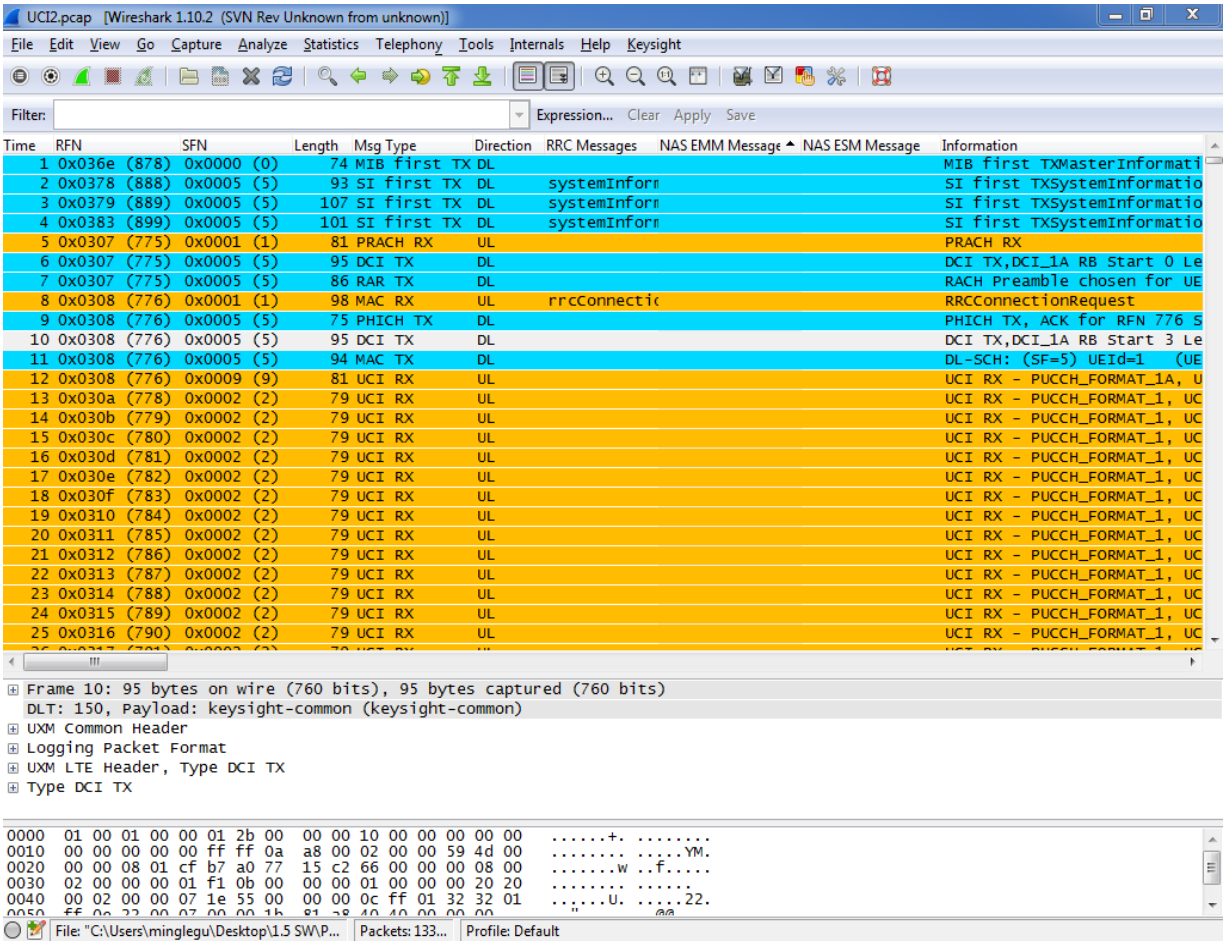


Figure 2-1: Example Protocol Logging and Analysis log

3 Installation and Setup

Installation Computer Minimum Requirements

Processing large amounts of time critical data is an inherent requirement of the logging function. A high performance desk-top style computer with expansion capacity for additional Network Interface Cards (NIC) or adaptors is recommended.

Minimum System Requirements	
Operating System	Computer running Windows 7
Communication with Test Set(s)	Ethernet
RAM (Memory)	128MB RAM (Minimum)
Processor	>2.5 GHz Intel Pentium® Quad core or equivalent
.NET Framework	Version 4.0 or later

NOTES:

1. Consideration for storage space should be given for storing logs and supporting documentation.
2. A clean installation of the Operating System is required to ensure freedom from Ad-ware, Spy-ware, updaters, and other processor resource consuming applications. For expected performance, Antivirus software should not be running.
3. Connecting the UXM and logging PC to a network is not recommended.

Downloading the Latest Version of Protocol Logging and Analysis Software

To ensure you have the latest version of the PLA software, go to the www.keysight.com/find/softwaremanager download site, locate the PLA software and save it to a location on your PC.

Locate the file on your PC and double-click the setup file to install the software. Follow the on-screen instructions to complete the installation.

NOTE	Always check the release notes for the latest information about any known issues and other important information about your product. Release notes are available for download from www.keysight.com/find/softwaremanager

Licensing

No license is required to install or run the PLA software. As it is based on the open source Wireshark network protocol analyzer software, PLA (and its source code) are available free of charge, per the terms of the GNU General Public License, version 2 (see www.keysight.com/find/UXM-PLA). You can install PLA software and compile its source code. However, if you want it to capture logging data from the UXM, the UXM must have an E7515A-L01 license installed. Without the logging license, the attempt to connect with the UXM is rejected. Logging data captured from a UXM with an E7515A-L01 license may then be analysed with any installed copy of PLA software.

Launch the Protocol Logging and Analysis Software

Start the PLA software from the Windows Start menu by selecting Start, All Programs, Keysight UXM, Protocol Logging and Analysis.

4 Menus for Protocol Logging and Analysis Software

The PLA software is presented in a single window. Some functions are available from the menu bar. Frequently used functions are duplicated in the tool bar.
The PLA software highly leverages the open source product Wireshark, a famous network packet analyzer. Based on the original functionalities of Wireshark, PLA software implements some extensions to make it specifically communicate with UXM. This extended function can be switched on/off on the PLA software via the setting **Plugin Enable**. When it's enabled (called the Keysight Mode), the software captures the logging data from the UXM yet the original capturing network data functionality of Wireshark is disabled. When it is disabled (called the Normal Mode), the functionality of PLA software is the same with the official Wireshark, but its ability to communicate with the UXM is disabled. The menu bar and tool bar of the software is nearly the same with the official version of Wireshark except for the extensions in the Keysight Mode, so you can refer to Wireshark User's Guide at http://www.wireshark.org/docs/wsug_html_chunked/ to get most of the functional specifications. This document focuses only on the extended functionality in the Keysight Mode.

The Keysight Menu Bar

The drop-down menu Keysight in the main menu bar directs you the extended functionality. Using your mouse to select the following menu options performs the described task:

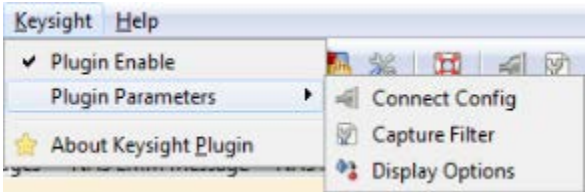


Figure 4-1: Keysight Menu Bar

The Plugin Enable Menu

The Plugin Enable menu switches the mode. When you click it, the mode status transfers either from Normal Mode to Keysight Mode or from Keysight Mode to Normal Mode.

The Plugin Parameters Menu

The Plugin Parameters menu contains an appending popup menu with three menu items: Connect Config, Capture Filter, and Display Options. In the normal mode, these three items are invisible. In the Keysight mode, the three items are used for setting parameters for the connection with UXM.

Top Level Menu Option	Drop-Down Menu Command	Task Performed
Plugin Parameters		
	Connect Config	Sets the connection parameters.
	Capture Filter	Sets the capture filter.
	Display Options	Sets the color rules and visibility.

The About Keysight Plugin Menu

The "About Keysight Plugin" menu shows you useful information about PLA software.

The Keysight Tool Bar

The PLA software tool bar provides quick access to frequently used functions. As in the menu, only the items useful in the current program state are available. The others are greyed out. For most tool bars, you can refer to Wireshark User's Guide at http://www.wireshark.org/docs/wsug_html_chunked/ for information. There are four specific tool bars in the Keysight Mode listed as below:

- The  icon duplicates the function of Connect Config.
- The  icon duplicates the function of Capture Filter.
- The  icon duplicates the function of Display Options.
- The  icon duplicates the function of About Keysight Plugin.

5 Using the Protocol Logging and Analysis Software

Setting Wireshark User Preferences

Before you start the log capturing, a few user preferences must be set inside the software to make it function correctly. However, if you are the default user, it is no necessary to follow the five steps below for they are default settings.

1. On PLA application, select **Edit**, **Preferences**. A pop-up box is displayed.
2. Select the **+** sign next to **Protocols** on the left-hand side menu and select **DLT-USER**. Then click on the **Encapsulations Table** as shown below.

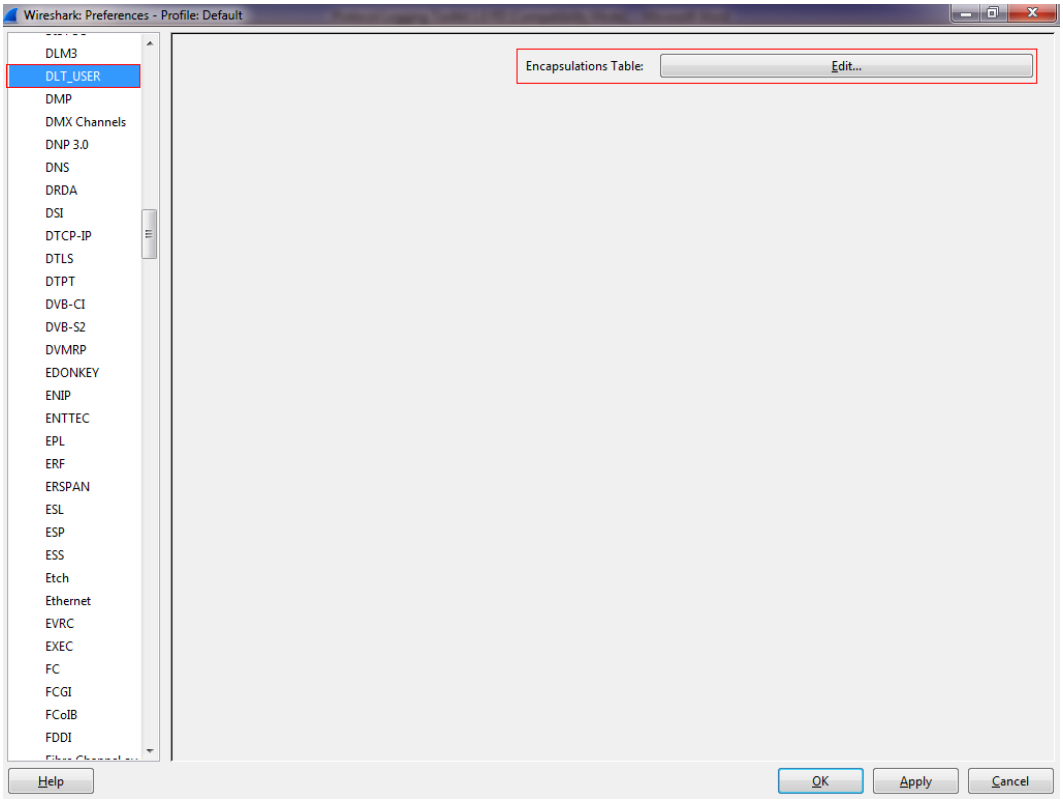


Figure 5-1: Encapsulations Table

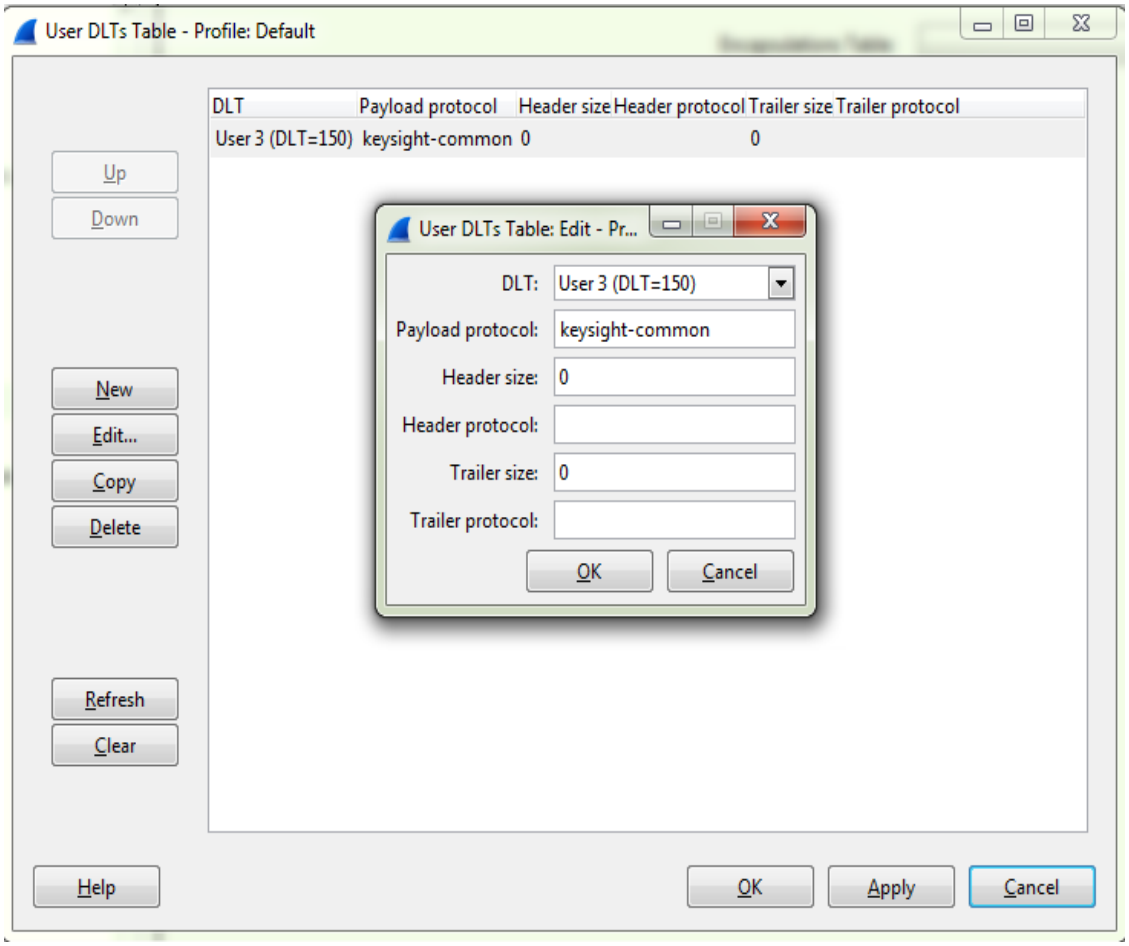


Figure 5-2: Setting Encapsulations Table

3. Inside the preferences for **MAC-LTE**, click on the **LCID ->DRB Mappings Table** as shown below.

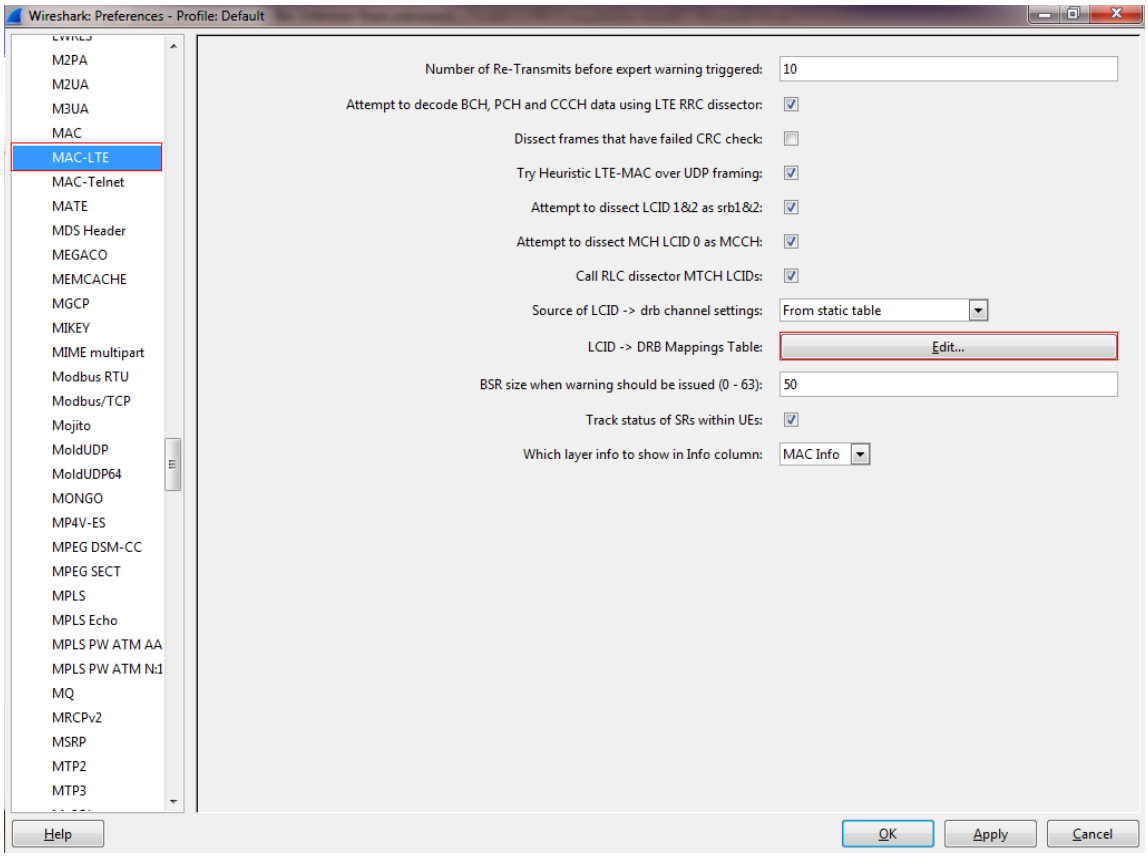


Figure 5-3: LCID -> DRB Mappings Table

The **LCID -> DRB Mappings Table** must be edited to match the radio bearer configuration inside your scenario file. The tool needs the mapping of logical channel identity (LCID) onto RLC mode of operation (AM, UM with sequence length 10 or UM with sequence length 5). For many scenario files, the settings below should suffice for **MAC-LTE**.

NOTE	Changing scenario files may require that you change these preference settings because they are retained when you close and re-open *the* software.

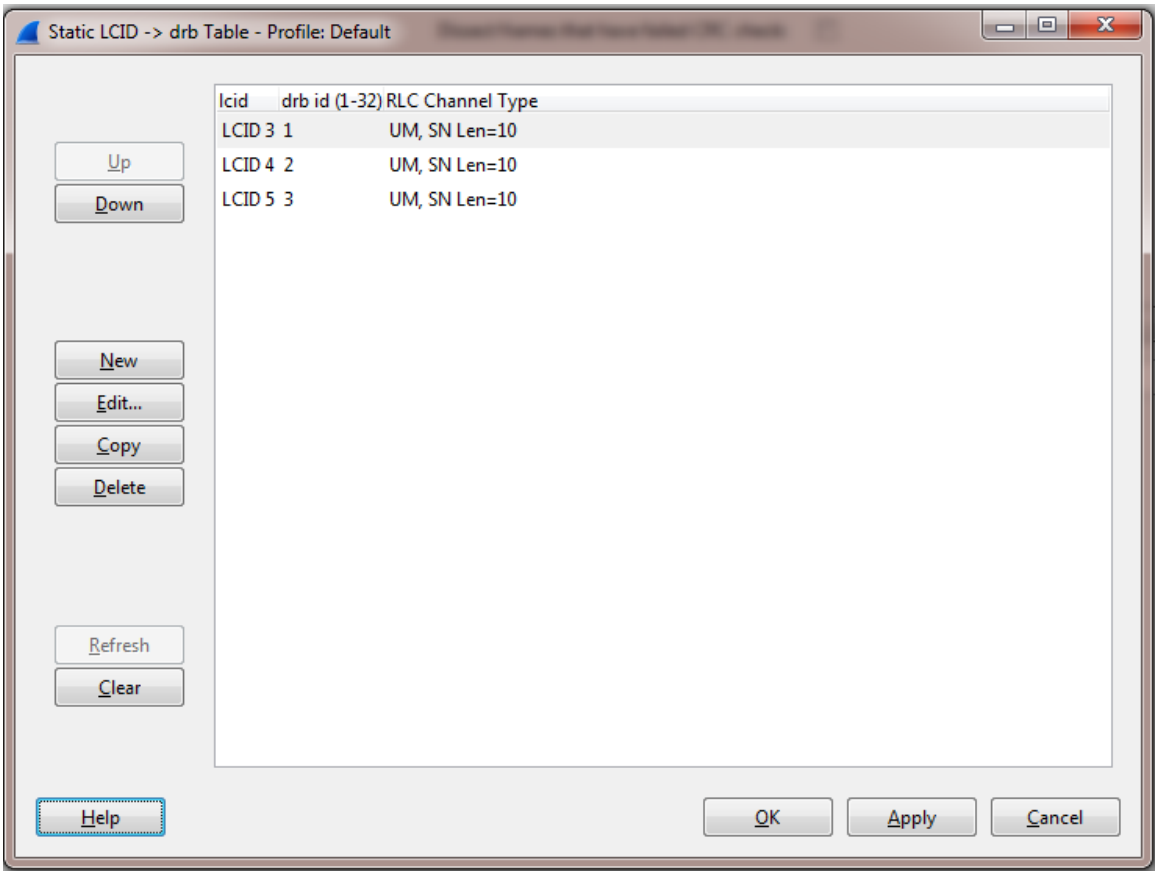


Figure 5-4: Static LCID -> drb Table – Profile Default

4. Inside the preferences for **RLC-LTE**, set the **Call PDCP Dissector for DRB PDUs** to '12 bit SN' (the most commonly used option – if your scenario file uses smaller SN length for PDCP, select this). This passes the contents of RLC PDUs to the PDCP layer for analysis.

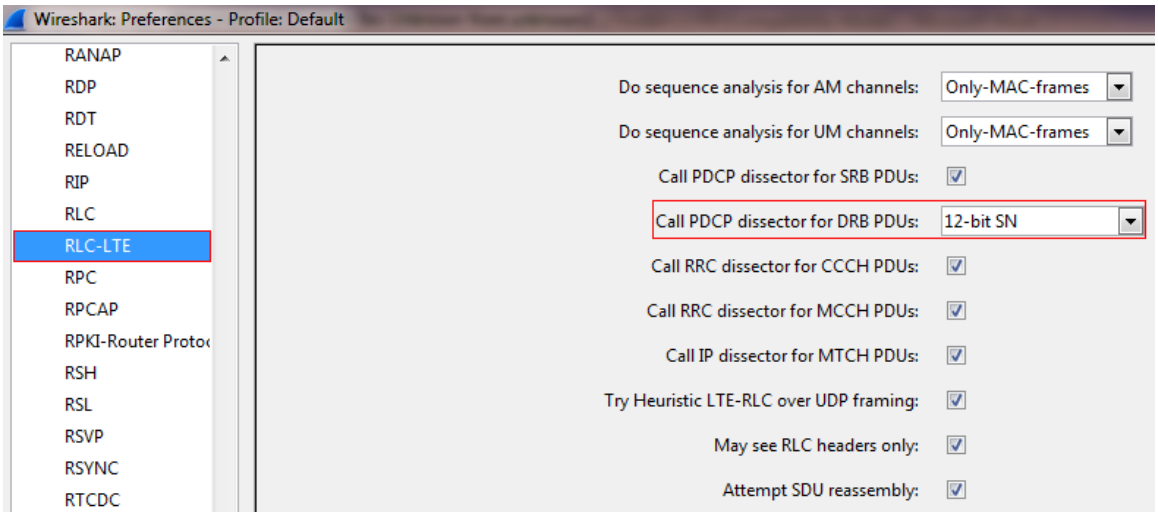


Figure 5-5: Wireshark Preferences – RLC-LTE

5. Inside the preferences for **PDCP-LTE**, select the checkbox labelled **Show Uncompressed User-Plane data as IP**. This sends the contents of PDCP PDUs to the IP layer for decode.

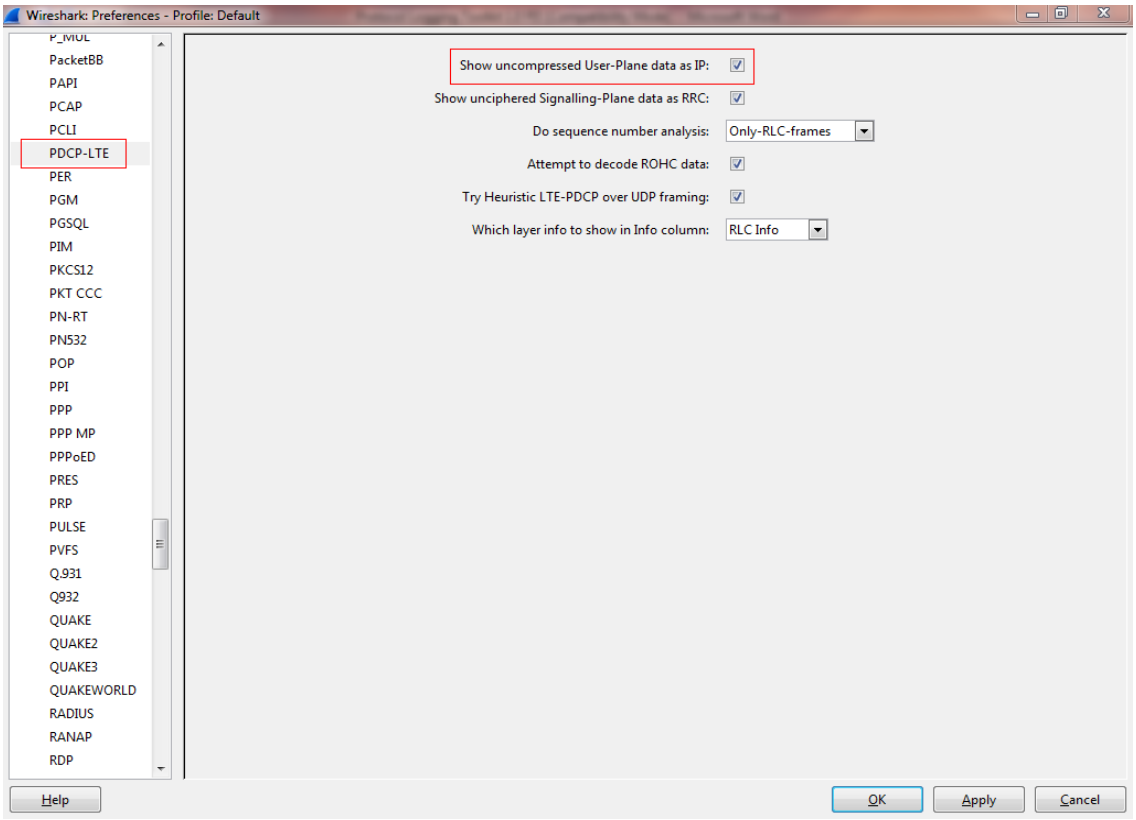


Figure 5-6: Wireshark Preferences – PDCP-LTE

Notes

1. If RLC PDUs are segmented, it is possible for *Wireshark* to re-assemble and then decode the PDCP PDUs (and therefore the IP packets inside) in version 1.10 and later. Make sure you enable sequence analysis as 'Only-MAC-frames' in the RLC-LTE configuration, as shown below.

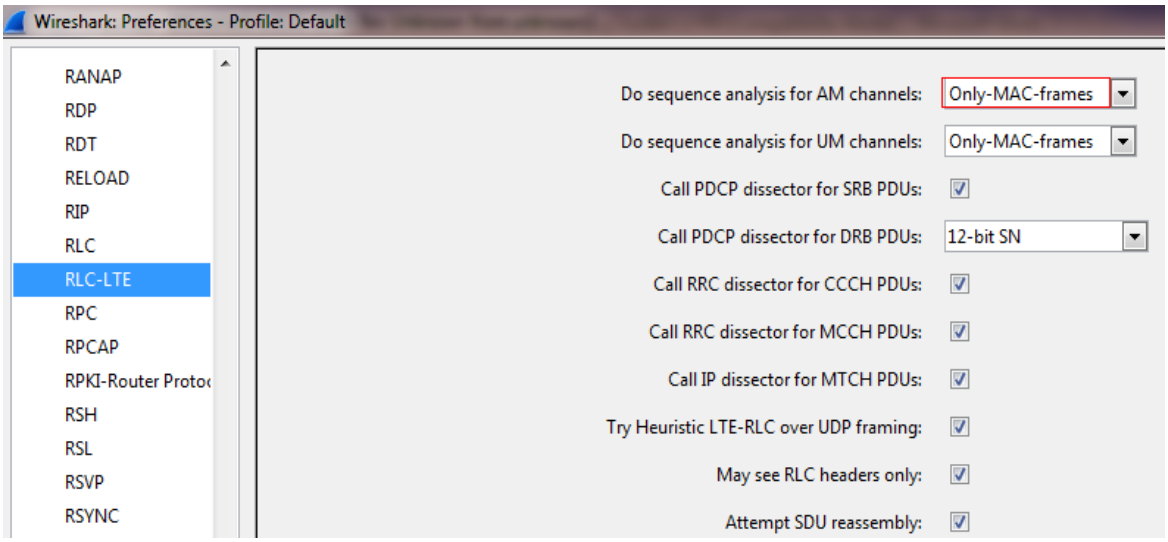


Figure 5-7: Wireshark Preferences – RLC-LTE

Tips

- Ensure that you have the correct plug-in: 32 or 64 bit.
- Verify that you have the correct version of DLL for the version of *Wireshark* you are using.
- Verify that you located the plug-in in the correct location.
- Verify that there are not duplicate copies of the plug-in. Using different names, does not prevent problems with start-up. *Wireshark* crashes halfway through the start-up process, if you have multiple copies of the dll on your PC even though they have different names.
- Verify that the shortcut points to the *Wireshark* .exe location.

Capturing a log

Select **Keysight**, **Plugin Enable** to switch to the Keysight Mode. When the Keysight Mode is enabled, the **Plugin Parameters** is visible in the popup menu. Click **Connect Config** button (or select **Plugin Parameters, Connect Config**) and enter the Hostname or IP address of the UXM to which you wish to connect in the pop-up window. If the connection is successful, the "**Connect**" button will change to "**Disconnect**" and the "**Logging**" button will become active.

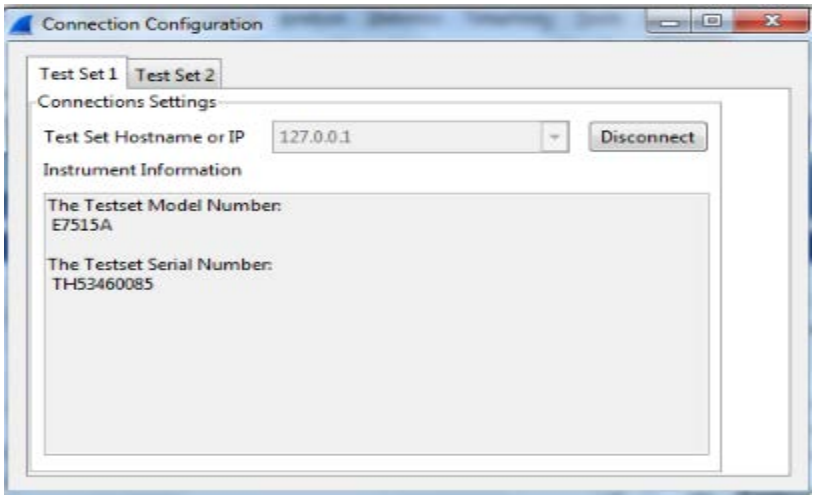
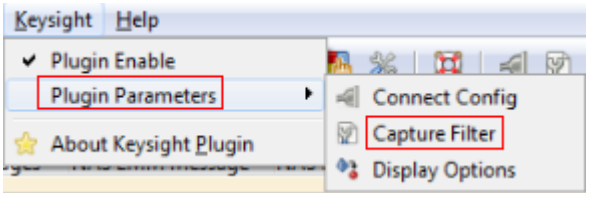


Figure 5-8: Connection Configuration Window

Select **Keysight**, **Capture Filter** to choose which kinds of logging data you want to be filtered out and captured.



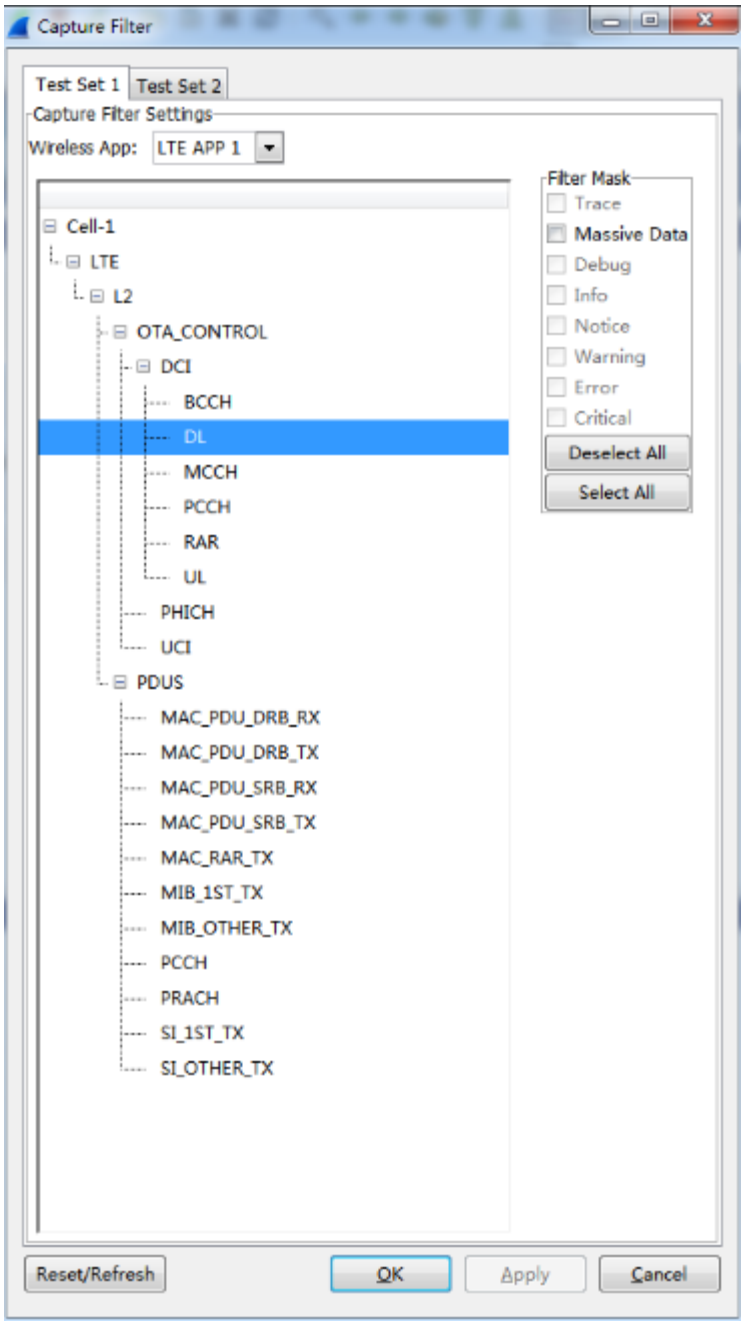
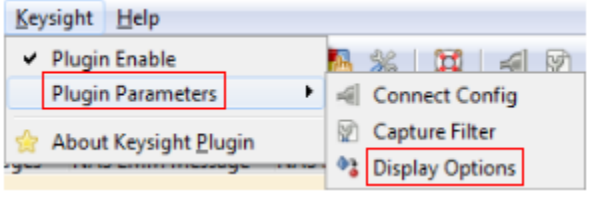


Figure 5-9: Setting the Capture Filter

Click **Display Options** button  (or select **Plugin Parameters, Display Options**) to configure the color rules.



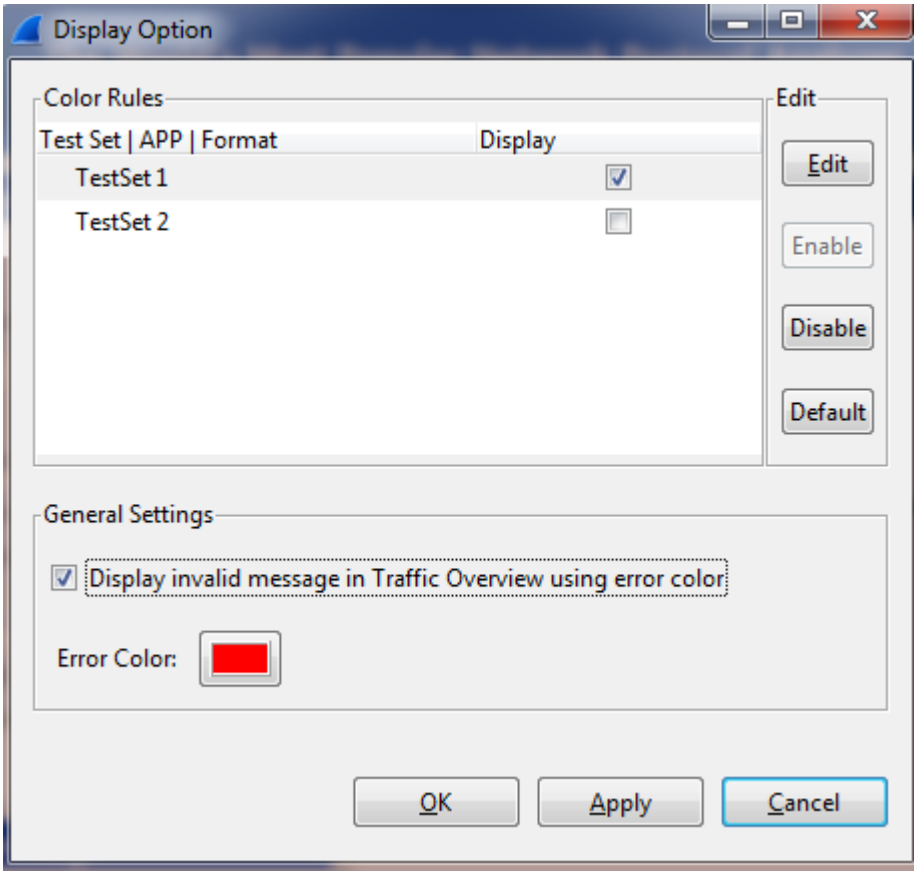


Figure 5-10: Display Options Window

Click the **Edit** button to setup the color rules for the selected test set.

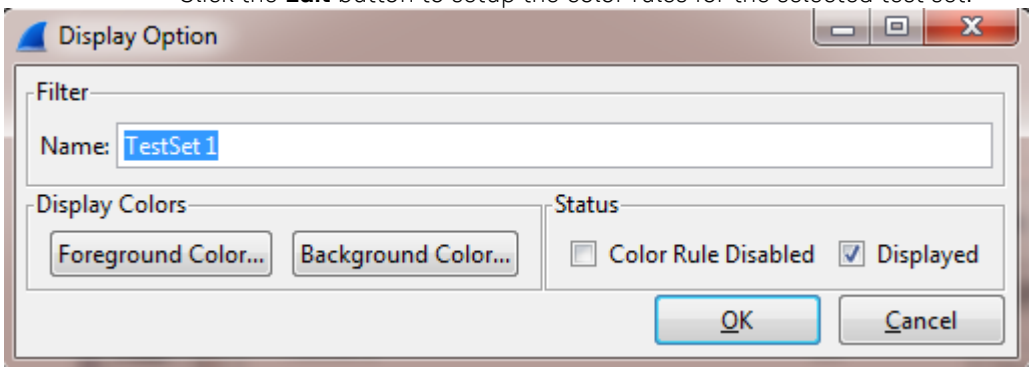


Figure 5-11: Configuring the Display Options

After establishing connection and setting Capture Filter and Display Options, you can click **Start a new live capture** button (or select **Capture, Start**) to start capturing the logging data. During the real-time capture, you can click the **Stop the running live capture** button to stop the currently running live capture process.

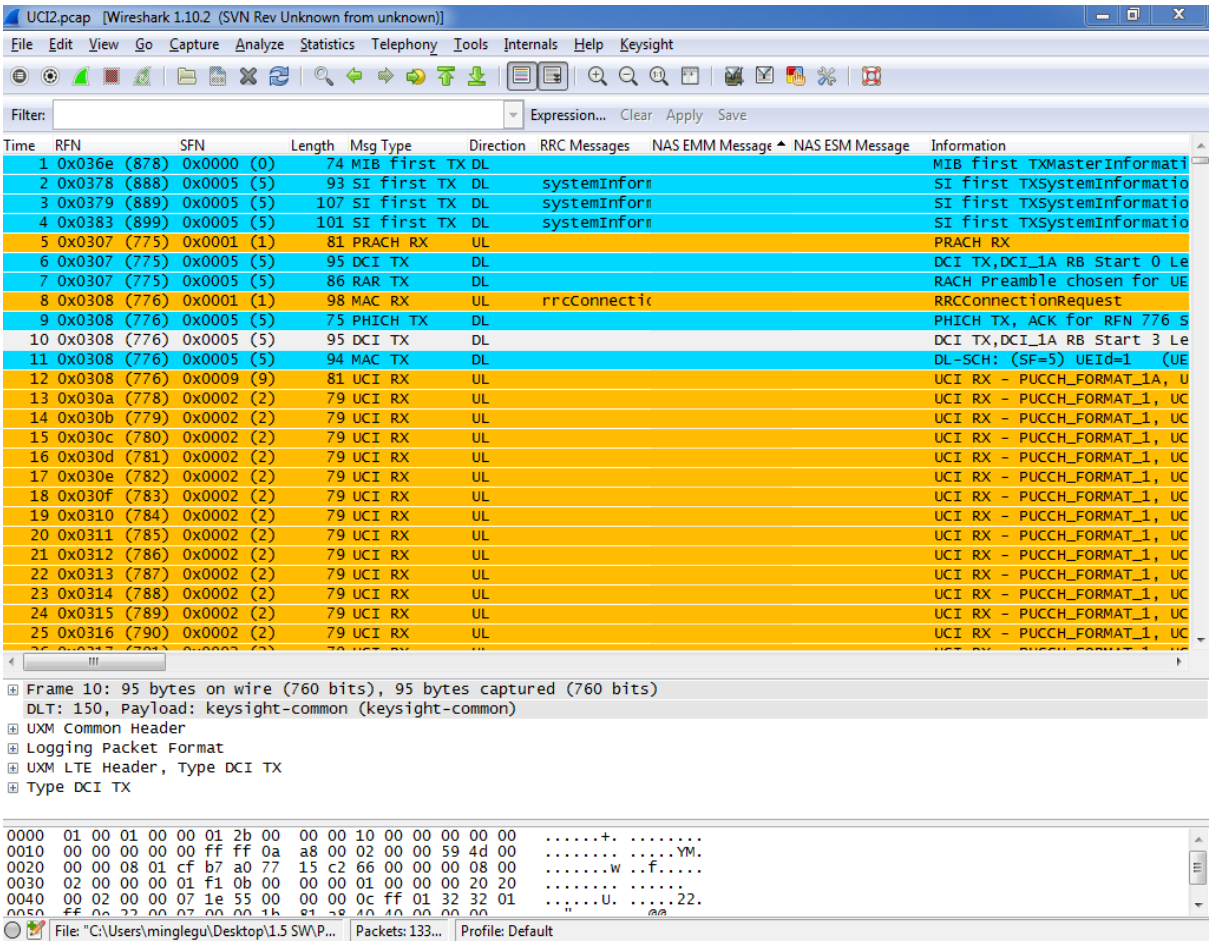


Figure 5-12: Real-time Capture Data

Replaying previously recorded logs

With the PLA software, you can load and replay saved capture files. If the software is connected to an E7515A UXM, you must first select the **Disconnect** key in order to load previously-recorded message logs. When no active connection with an E7515A exists, you can select **File, Open** option to load previously-recorded log files.

Or you can start a new application to see the previously captured files.

NOTE	When replaying a previously-recorded message log, only the views that were open when the log was recorded are displayed.

6 Using the API to control the Protocol Logging and Analysis software remotely

A remote control API is provided that enables you to control the PLA software from any programs you write. You can control the application from the same PC on which the PLA is running or from a separate PC.

Downloading and installing the API

The application programming interface for the PLA software can be downloaded from www.keysight.com/find/softwaremanager. The API download package contains the DLL and header file. Please read the PLA software release notes for the latest product information.

API Commands

The followings are the PLA software API commands:

■ **PLA_Initialize** (pla_filename_t)
It initializes the application.

■ **PLA_Close** (void)
It closes the application.

■ **PLA_ConnectTestSet** (pla_whichsource_t, pla_net_t)
It connects to the test set specified.

■ **PLA_DisconnectTestSet** (pla_whichsource_t)
It disconnects from the test set specified.

■ **PLA_QueryTestSetState** (pla_whichsource_t)

It queries the test set state.

■ **PLA_LoadTestSetCaptureFilter** (pla_whichsource_t, pla_filename_t)

It loads the test set filter file previously saved via Capture Filers dialog box.

■ **PLA_QueryLoadCaptureFilterState** (pla_whichsource_t)

It queries the load capture filter state.

■ **PLA_SaveLog** (pla_filename_t)
It saves the logged data to the .pcap file specified.

■ **PLA_QuerySaveLogResult** (void)

It queries the saved log result.

■ **PLA_StartLogging** (void)

It starts the logging of the connected test set.

■ **PLA_StopLogging** (void)
It stops the logging of the connected test set.

■ **PLA_QueryCaptureState** (void)
It queries the capture state.

API Error Codes

The table below describes the possible error codes returned by the PLA software API.

Error Code	Description
0	API function call successfully received
-1	Timeout occurred during operation
-2	Unknown error occurred during operation
-3	File not found
-4	The application is in the wrong state for the operation being requested.
-5	Connection to test set terminated
-6	Not connected.
-7	Connection attempt rejected for unknown reason
-9	Invalid IP Address. It cannot connect to the test set
-10	Internet Browser is offline. It cannot connect to the test set
-11	Fail to initialize
-12	Cannot stop logging, logging not started
-13	Cannot start logging, logging started already
-20	Invalid Test Application ID Specified
-21	Invalid Source number specified (valid are 1, 2)
-22	Invalid arguments passed to function

Example program

The following shows an example remote capture logging session.

```
typedef const char* pla_dir_t;
typedef const char * pla_filename_t ;
typedef const char * pla_net_t ;
typedef int pla_res_t;
typedef int pla_whichsource_t;
typedef char * pla_stringBuffer_t;
typedef int pla_settingsFlags_t;  /* Test Set Settings to set */

#ifdef __cplusplus
extern "C" {
#endif /* __cplusplus */
    pla_res_t __stdcall PLA_Initialize(pla_filename_t);
    pla_res_t __stdcall PLA_Close(void);

    pla_res_t __stdcall PLA_ConnectTestSet(pla_whichsource_t, pla_net_t);
    pla_res_t __stdcall PLA_DisconnectTestSet(pla_whichsource_t);
    pla_res_t __stdcall PLA_QueryTestSetState(pla_whichsource_t);

    pla_res_t __stdcall PLA_LoadTestSetCaptureFilter(pla_whichsource_t,
    pla_filename_t);
    pla_res_t __stdcall PLA_QueryLoadCaptureFilterState(pla_whichsource_t);
```

```
    pla_res_t __stdcall PLA_SaveLog(pla_filename_t);
    pla_res_t __stdcall PLA_QuerySaveLogResult(void);

    pla_res_t __stdcall PLA_StartLogging(void);
    pla_res_t __stdcall PLA_StopLogging(void);
    pla_res_t __stdcall PLA_QueryCaptureState(void);
#ifdef __cplusplus
}
#endif /* __cplusplus */
```

7 Service and Support

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Locations for Keysight Technologies

Online assistance: http://www.keysight.com/find/assist
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