Compliance Test Suite

Contents

Introduction

The Compliance Test Suite (CTS) is an application and framework which provides for the development and execution of compliance tests. The current version of the test suite provides InfiniBand testing based on the Compliance and Interoperability Working Group (CIWG) InfiniBand Test Specification.

While InfiniBand is the first test suite available, the CTS framework is designed to allow development and execution of tests from any technology.

System Requirements

CentOS 6.5 or newer, Mellanox OFED 3.2-2.0.0 or newer.

Installation

Before you install a new version of CTS, please make sure you uninstall older versions.

1. Issue the command `rpm -qa cts` to check if you have any packages of CTS installed.
2. Once you have the results to step (1) above, remove older versions with the command (assume the above command returned cts-0.0.55-1.x86_64.rpm)
    a. `rpm -e cts-0.0.55-1.x86_64`

After downloading the RPM, install it with the following command:

```
rpm -ivh cts-[version].x86_64.rpm
```

where “[version]” is the build version of the CTS RPM package you just downloaded. This command will install the binaries in /opt/compliance-test-suite.

Setup

CTS *must* be installed on a server with a Mellanox HCA – this device will be known as the Tester. Please connect the Device Under Test (DUT) directly to this Tester. The DUT can be an HCA or a switch.

To execute CTS, type the following command in a terminal:

```
/opt/compliance-test-suite/cts
```

Whenever you run CTS, it will automatically load the IBTA Test Library. This library first discovers the local Test Server HCA which it will use to initiate and respond to messages sent to and received from the DUT. CTS utilizes two different methods to retrieve DUT information depending on the DUT type.

HCA Discovery

If the DUT is an HCA, then CTS will attempt to retrieve device information as shown in Figure 1 via an SSH connection with the DUT server.

FIGURE 1 – DUT INFORMATION

For this reason, it is very important that the information you supply in the settings under DUT Server (Figure 4) is accurate.

Switch Discovery

If you are testing a switch, then the DUT Server information is not necessary. CTS will get the available DUT information through IB commands. In order for CTS to retrieve all DUT information from a switch you must fill out the Root Login on Tester field accurately. If you do not have this password you must enter the additional information manually before tests can be run.

If you switch devices, or, if for some reason, CTS has not automatically discovered the DUT, you can click on the **Query Device** button at the bottom left of the Device tab (see Figure 1).

When you start CTS and there is no link between the server where you are running CTS and the DUT, you will see something similar to the display in Figure 2.

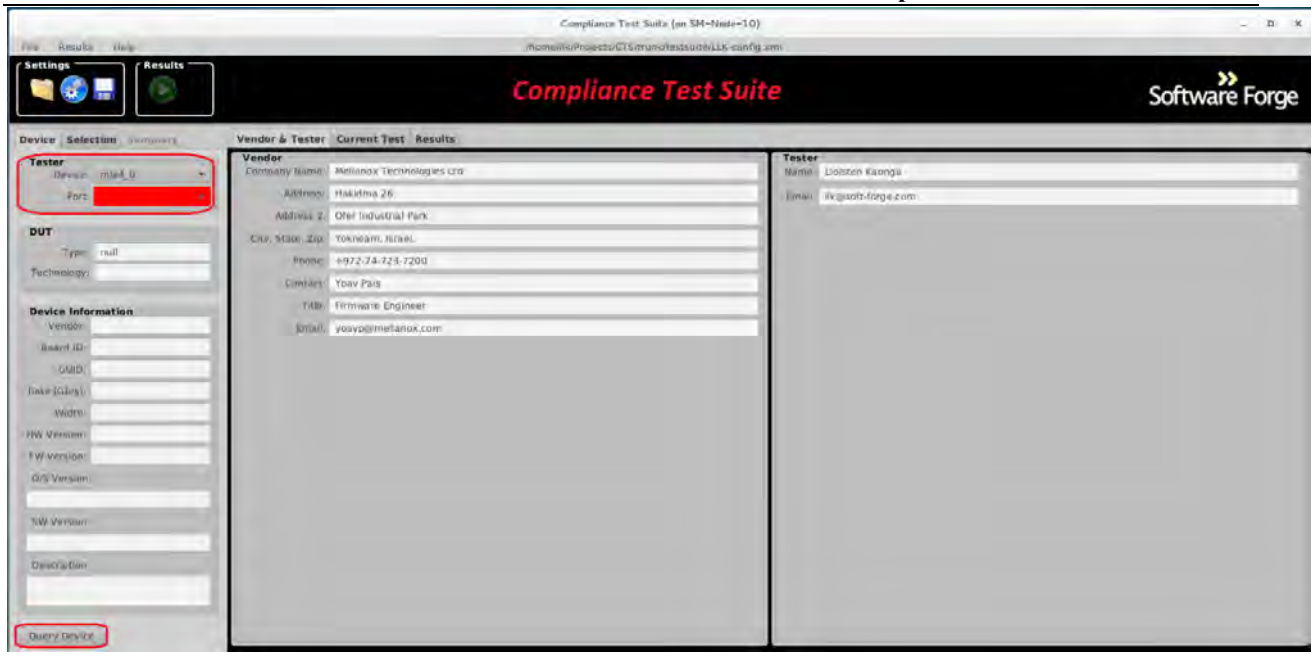

FIGURE 2 – NO LINK TO DUT

If you see this image, please double check that there is a link between the tester and the DUT and click the Query Device button. You may need to close CTS and restart it after you have established a link between the tester and the DUT.

Settings

Open up the settings by clicking on the blue settings gear icon or select **File➔Settings** from the menu (Figure 3).

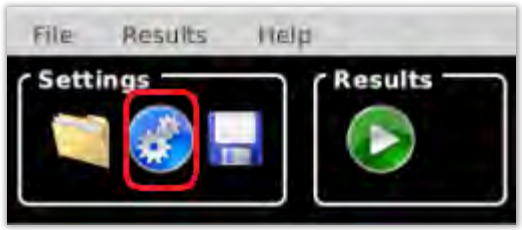

FIGURE 3 – OPEN SETTINGS BUTTON

You should then see the following dialog box (Figure 4) which shows the default logging selections.

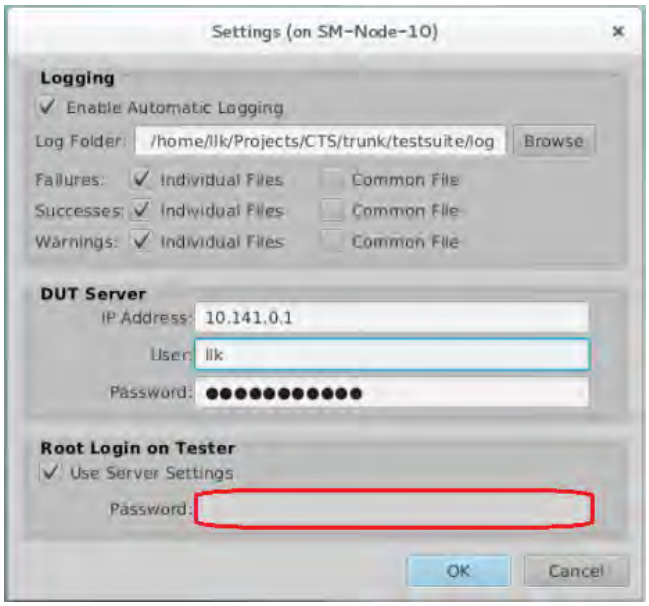

FIGURE 4 – SETTINGS WINDOW

1. **Enable Automatic Logging** CTS will automatically log the test results if this option is selected. Both raw text and HTML log files will be generated.
2. **Log Folder** Specify the location of the base folder where the logs will be written. The logs will be saved to device-specific locations based on the **Device Information** under the **Device** tab.
3. **Failures, Successes, and Warnings** Select which log files should be created on test failure, success, or warning. Check **Individual Files** to log tests with this result in their own separate file. Select **Common File** to include the test results in a single common file. **Please Note:** if you execute many tests all at once, they will all appear in this common file. If you selected both **Individual Files** and **Common File**, then CTS will save individual test logs and a single log file containing all the tests you selected to execute. In the example shown in Figure 4, test passes, failures and warnings will be logged to individual files and there will be no common file. NAs and canceled tests will always automatically be logged to individual files, and to a common file if it exists. Note that common files are only applicable to plain text logs and not HTML logs. By default, failures, successes and warning results are logged to individual files.
4. **DUT Server** Specify the IP Address, User and Password of the remote DUT server. This is valid only when the DUT is an HCA. This information is used to perform an SSH connection to the server to obtain information about the DUT during device query.
5. **Root Login on Tester** Specify the root password here. This is required when the DUT is a switch. Specifying the password allows CTS to retrieve all DUT information.

Test Execution

Once the DUT has been discovered click the **Selection** tab to choose which tests you wish to run. Only the tests applicable to the device type (HCA or Switch) will be available. Information on the current selected test is visible on the "Current Test" tab.

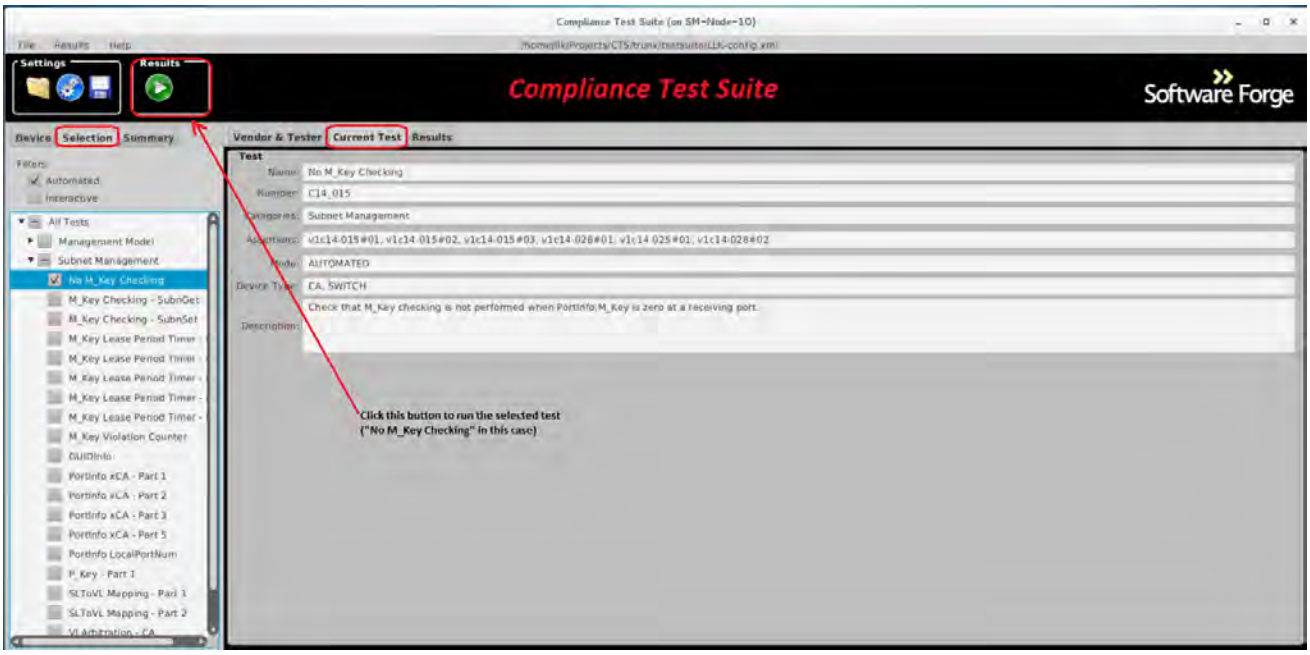

FIGURE 5 – RUN BUTTON

Click the **green** run button or select *Results*➔*Run Tests* from the menu to begin test execution. The **Results** tab will be displayed and show the current status and log of the running test. If there are any failures, you can navigate to those failures in the log by using the *Next* and *Previous* buttons at the top of the **Results** tab (see HTML Log Navigation). You can select and run any number of tests from the **Selection** tab.

Note: The **Device Information** section under the **Device** tab must be complete *before* you can run the tests. Without this information, CTS will not allow you to proceed and run the tests. You will see the following dialog box shown in Figure 6 instead.

FIGURE 6 – MISSING DUT INFORMATION WARNING

While tests are running, the **Summary** tab will display the test status as *Running*. During test execution, the test status may change to *Sleeping* to indicate that the test is waiting for a period of time as indicated by the most recent log message in the result tab. Once the test completes, the status will change to **Pass**/**Fail**/**NA**/**Warning** depending on the final test result. The **Results** tab will display the HTML test log (Figure 7). Notice that the **Results** tab displays device, vendor and tester information at the top of the page above the log information.

HTML Log Navigation

The HTML log for an executed test will be displayed in the **Results** tab and will also be saved to disk if individual logs have been enabled in the settings window. The HTML logs have three components: the blue header bar at the top of the page, the test/device/vendor/tester information tables, and the log table.

The log table is paginated and so only a certain number of log messages will be displayed per page. You can navigate between log pages using the controls at the bottom of the HTML page as shown at the bottom of Figure 9. You can also configure the number of log messages displayed per page using the drop down menu above the log table shown on the left in Figure 7.

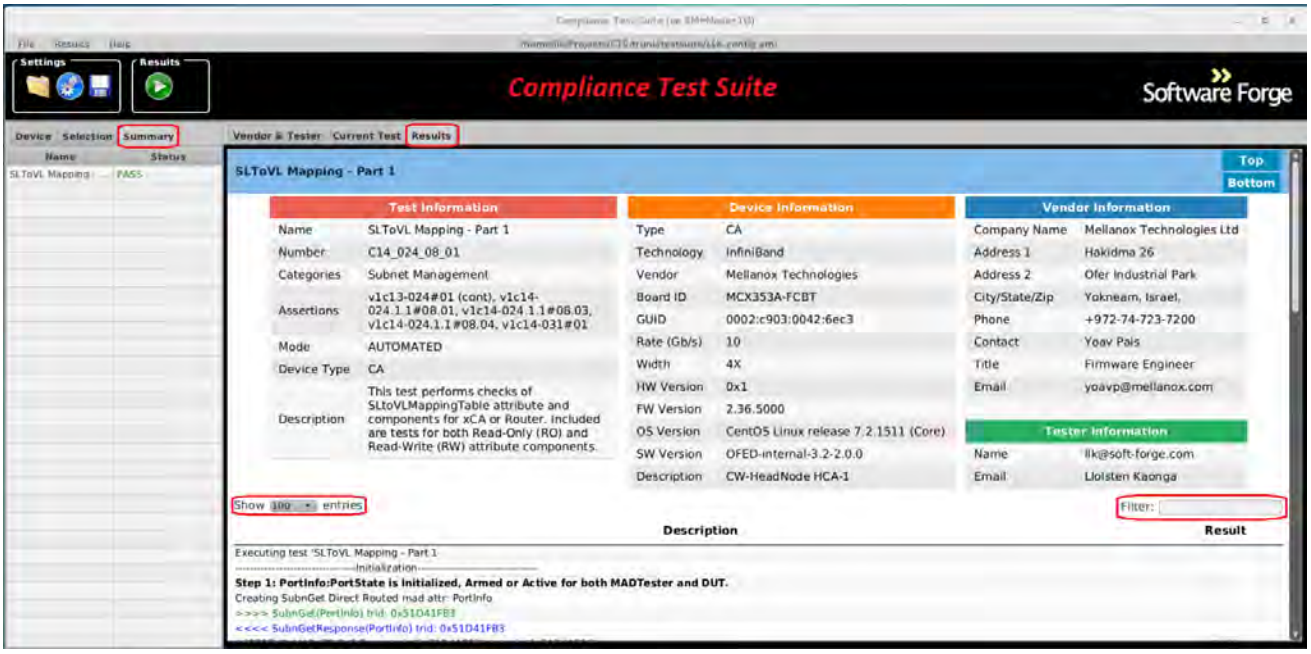

FIGURE 7 – HTML LOG CONTROLS

You can filter for keywords in the log table by typing into the filter text box above the log table as shown in the bottom right of Figure 7. For example, you can type *ASSERT* into the text box to only show the log messages for assertions.

The *Top/Bottom* buttons on the right side of the blue header bar and shown in the top right corner of Figure 7 can be used to navigate to the top or bottom of the HTML page.

If a test fails, the failure navigation controls will be displayed in the center of the blue header bar as shown in Figure 8. The controls will display the total number of failures in the test. The *Previous/Next* buttons can be used to navigate to failures within the log table. In Figure 8, there is one failure in test C14_017_01. Using the *Previous/Next* buttons shows that the assertion which checks the MKey Violations count is incorrect. The test expected **0x01** but the DUT returned **0x21**.

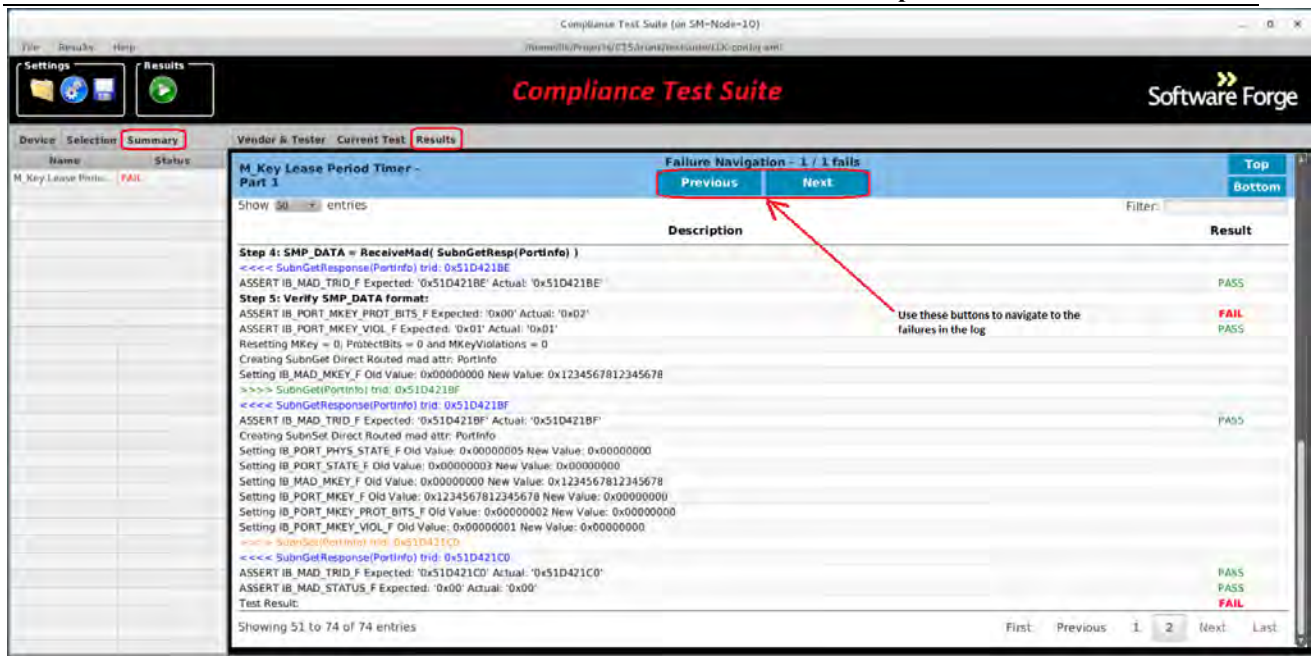

FIGURE 8 – HTML LOG FAILURE NAVIGATION

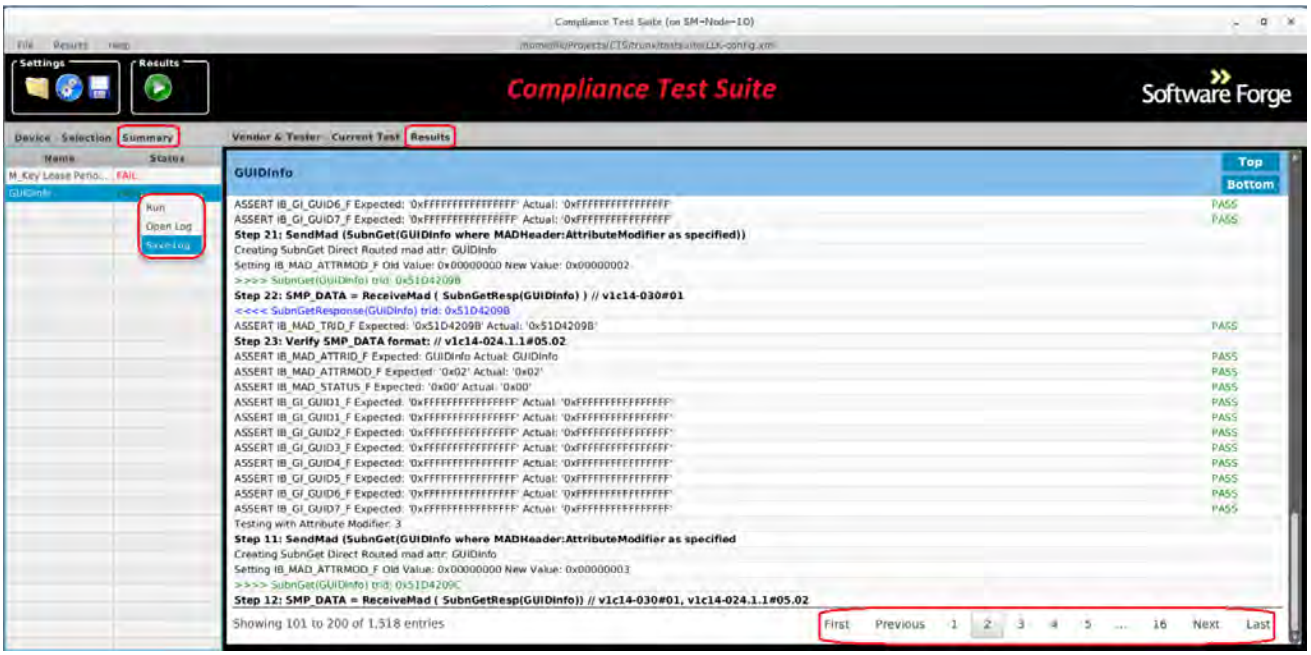

FIGURE 9 – HTML LOG PAGE NAVIGATION

After test execution has completed for all tests, you can click on a test in the summary page to display the HTML log for that test in the **Results** tab. You can save the log file of an executed test to a custom location by right clicking the test in the summary page and selecting *Save Log*. This functionality can be especially useful if you did not enable saving individual log files for a test result but would like to save the log file for a test which finished with that result after execution. In that same right click context menu, you can select the *Run* item to run the selected test and only that test. You can also open the selected test's log in an external browser by clicking the *Open Log* item.

As shown in Figure 10, you can either reload a results page or save it to a new html file by right clicking in the highlighted region and selecting the appropriate menu item.

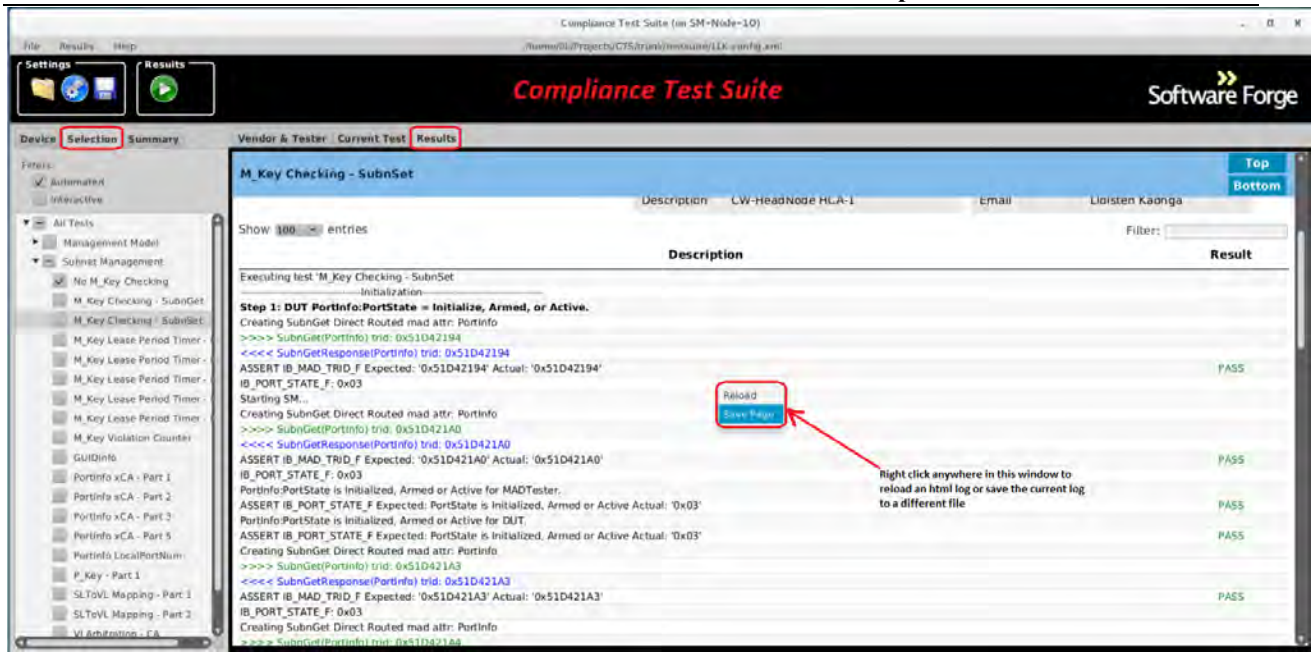

FIGURE 10 – RELOADING/SAVING HTML LOGS

Known Issues

1. CTS may function while connected to multiple DUTs. It is reccomended that when performing compliance testing you connect to only one DUT at a time and that the DUT is not connected to any other device. If you experience unexpected behavior during device query then you should restart the openibd drivers and simplify your IB fabric.
2. Device information for HCAs is gathered from two sources: directly from the connected DUT and from the DUT's host server via an SSH connection. To avoid displaying incorrect information, please make sure that the Tester HCA is connected directly to the DUT and that the SSH settings are set correctly for the DUT host server.
3. Device information automatically queried from switches is currently limited to device type, board ID, GUID, rate, width, and node description. Missing data can be added by manually typing into the associated text fields in the device information section of the device tab.
4. Device query returns the PSID of a DUT and posts that data to the Board ID field. If this PSID is listed in the device_lookup.xml file then the Board ID field will be updated with the model information of that DUT instead of the PSID.
5. You may see unusual DUT behavior such as the DUT not linking or CTS DUT discovery failing to display complete DUT information, etc. Rebooting the DUT may help cure this.