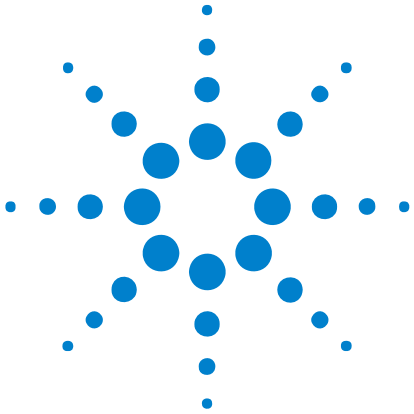

Agilent N5412B SAS-2 Electrical Compliance Test Application

Online Help

Agilent Technologies

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Manual Part Number

Version 01.10.0000

Edition

September 23, 2010

Available in electronic format only

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SAS-2 Electrical Compliance Test Application—At a Glance

The N5412B automated test application for SAS-2 (Serial Attached SCSI) provides a framework for using Agilent 90000 Series Infiniium oscilloscopes to perform compliance testing. The automated test application guides you through the process of identifying the test environment, selecting and configuring tests, making oscilloscope connections, running tests, and evaluating the test results.

To use the automated test application, see:

- Chapter 1, “Installing the SAS-2 Electrical Compliance Test Application,” starting on page 7
- Chapter 2, “Preparing to Take Measurements,” starting on page 11
- Chapter 3, “Using the Electrical Compliance Test Application,” starting on page 15

For advanced features, see:

- Chapter 4, “User Defined Add-Ins,” starting on page 57
- Chapter 5, “Controlling the Application via a Remote PC,” starting on page 63

See Also

For more information on performing SAS-2 compliance tests, see:

- "SAS-2 6Gbps Physical Layer Test Suite".
- "INCITS Technical Committee T10 web site".

For a printable version of this help file, see: *"Agilent N5412B SAS-2 Electrical Compliance Test Application Online Help"*.

Contents

1 Installing the SAS-2 Electrical Compliance Test Application

If you purchased the N5412B SAS-2 Electrical Compliance Test application separately from your oscilloscope, you need to install the software and license key.

Installing the Software

1. Make sure you have the required version of Infiniium oscilloscope software:
   a. See the compliance test application release notes for the required minimum version of software.
   b. To check the software version on the oscilloscope, choose **Help>About Infiniium...** from the main menu
2. Download the N5412B SAS-2 Electrical Compliance Test application from the Agilent website:
   a. Go to "http://www.agilent.com/find/scope-apps-sw", and navigate to the N5412B SAS-2 Electrical Compliance Test application software download.
   b. Then, follow the instructions to download and install the application software.

Installing the License Key

1. Request a license code from Agilent by following the instructions on the Entitlement Certificate.

   You will need the oscillocope's "Option ID Number", which you can find in the **Help>About Infiniium...** dialog.

2. After you receive your license code from Agilent, choose **Utilities>Install Option License...**.
3. In the Install Option License dialog, enter your license code and click **Install License**.
4. Click **OK** in the dialog that tells you to restart the Infiniium oscilloscope application software to complete the license installation.
5. Click **Close** to close the Install Option License dialog.
6. Choose **File>Exit**.
7. Restart the Infiniium oscilloscope application software to complete the license installation.

1 Installing the SAS-2 Electrical Compliance Test Application

2
Preparing to Take Measurements

Before running the automated tests, you need to acquire the required equipment and software, and you should calibrate the oscilloscope. After the oscilloscope has been calibrated, you are ready to start the SAS-2 Electrical Compliance Test application and perform measurements.

Required Equipment and Software

In order to run the SAS-2 Electrical Compliance Test application, you need the following equipment and software:

- The minimum version of Infiniium oscilloscope software described in the compliance test application's release notes.
- The equipment and software listed in the data sheet's "Ordering Information" section (see *"N5412B Serial Attached SCSI (SAS-2) Electrical Performance Validation and Compliance Software Data Sheet"*).

  Licenses are also required for these software options:

  - N5400A EZJIT Plus Jitter Analysis Software Option.
  - E2688A Serial Data Analysis/Mask Testing with Clock Recovery Software Option.
- Agilent also recommends using a second monitor (see page 75) to view the automated test application.
- Before performing tests, calibrate the oscilloscope (see page 13).

Calibrating the Oscilloscope

If you have not already calibrated the oscilloscope, see Appendix A, "Calibrating the Oscilloscope," starting on page 69.

NOTE If the ambient temperature changes more than 5 degrees Celsius from the calibration temperature, internal calibration should be performed again. The delta between the calibration temperature and the present operating temperature is shown in the **Utilities>Calibration** menu.

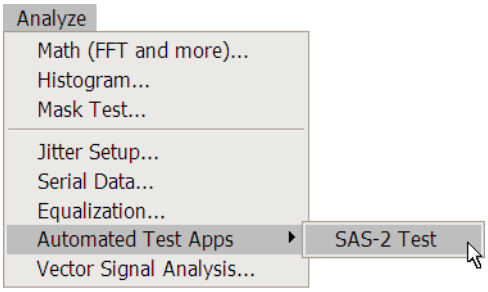
NOTE If you switch cables between channels or other oscilloscopes, it is necessary to perform cable and probe calibration again. Agilent recommends that, once calibration is performed, you label the cables with the channel for which they were calibrated.

3 Using the Electrical Compliance Test Application

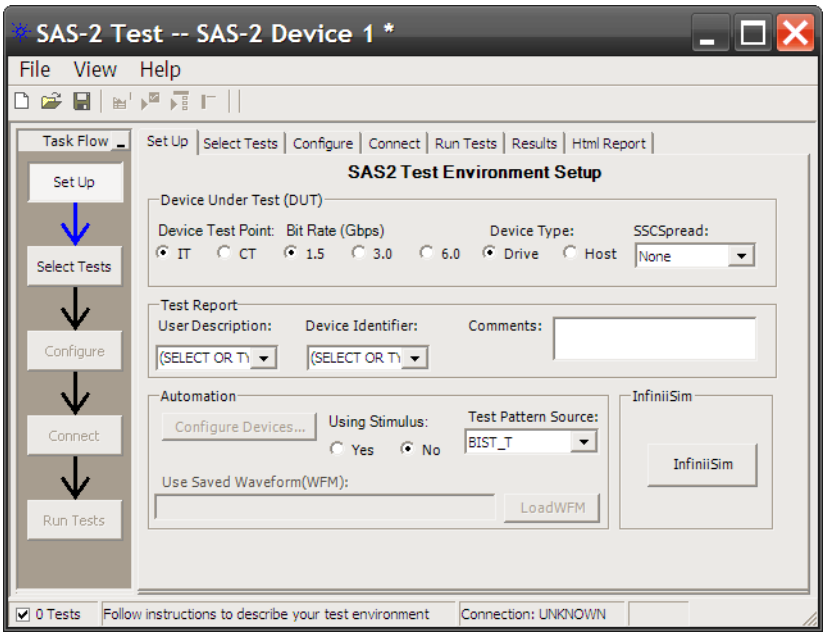
This chapter shows how to use the SAS-2 Electrical Compliance Test application.

Starting the SAS-2 Electrical Compliance Test Application

1 From the Infiniium oscilloscope's main menu, choose **Analyze>Automated Test Apps>SAS-2 Test**.



The SAS-2 Electrical Compliance Test application window appears.



NOTE If **SAS-2 Test** does not appear in the Automated Test Apps menu, the SAS-2 Electrical Compliance Test application has not been installed (see Chapter 1, "Installing the SAS-2 Electrical Compliance Test Application," starting on page 7).

The task flow pane and the tabs in the main pane, show the steps you take when running the automated tests:

Set Up	Lets you identify the test environment.
Select Tests	Lets you select the tests you want to run. The tests are organized hierarchically so you can select all tests in a group. After tests are run, status indicators show which tests have passed, failed, or not been run, and there are indicators for the test groups.
Configure	Lets you configure the test parameters (for example, stimulus frequency).
Connect	Shows you how to connect the oscilloscope to the device under test for the tests that are to be run.
Run Tests	Starts the automated tests. If the connections to the device under test need to be changed while multiple tests are running, the tests pause, show you how to change the connection, and wait for you to confirm that the connections have been changed before continuing.
Results	Contains more detailed information about the tests that have been run. You can change the thresholds at which marginal or critical warnings appear.
Html Report	Shows a compliance test report that can be printed.

See Also
- "To view/minimize the task flow pane" on page 17
- "To view/hide the toolbar" on page 18

Next
- "Creating or Opening a Test Project" on page 19

To view/minimize the task flow pane

- To toggle between a minimized and restored task flow pane, choose **View>Task Flow** from the menu.
- To minimize the task flow pane, click the minimize button in the pane.

- To restore a minimized task flow pane, click the **Task Flow** button in the pane.

To view/hide the toolbar

- To toggle between a hidden and visible toolbar, choose **View>Toolbar** from the menu.

Creating or Opening a Test Project

To create a new test project:

1 Choose **File>New Project...** from the menu.

A new, empty project, with all the default settings is created.

To open an existing test project:

1 Choose **File>Open Project...** from the menu.

2 In the Open dialog, browse to a test project directory and select the desired ".proj" file.

3 Click **Open**.

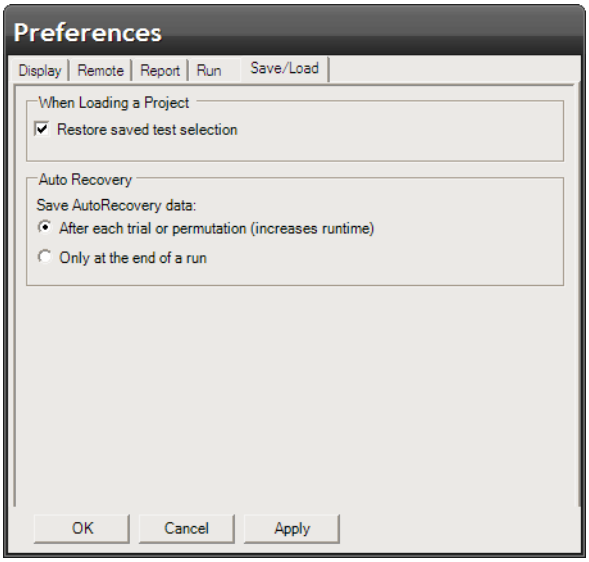
See Also
- "To set load preferences" on page 19

Next
- "Setting Up the Test Environment" on page 20

To set load preferences

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Save/Load** tab.

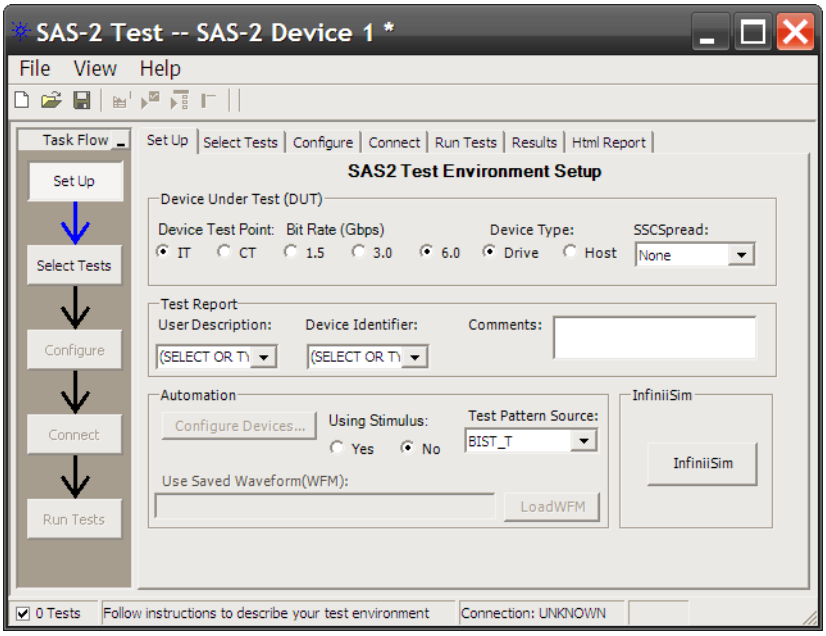


3 In the Save/Load tab, you can choose to restore saved test selections when loading a project.

4 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

Setting Up the Test Environment

1 Click the **Set Up** tab, or click the **Set Up** box in the Task Flow pane.



2 Select the appropriate **Device Test Point**:

- **IT**– Intra-Enclosure (in other words, internal). The signal is from a transmitter device as measured at probe points in a test load attached with an internal connector.
- **CT**– Inter-Enclosure (in other words, cabinet). The signal is from a transmitter device, as measured at probe points in a test load attached with an external connector.

3 Select the appropriate **Bit Rate (Gbps)**which identifies a 1.5, 3.0, or 6.0 Gbps rate.

4 Select the appropriate **Device Type**which identifies a drive or host device.

5 Select the appropriate**SSCSpread**:

- **None** – for a device that does not support SSC (NRZ test only).
- **SAS-SASDown** – for SAS PHY that can turn on SASSASDown in addition to turning off SSC (SSC on and other NRZ test).
- **SAS-SASCenter** – for SAS PHY that can turn on SASSASCenter in addition to turning off SSC (SSC on and other NRZ test).
- **SAS-SATADown** – for expander PHY that can turn on SASSATADown in addition to turning off SSC (SSC on and other NRZ test).

6 Select or type the appropriate**Device Identifier** and**User Description**, and enter any desired**Comments**.

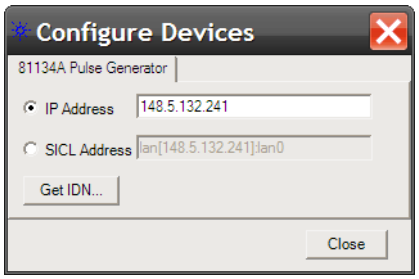
7 If an 81134A pulse pattern generator is required (for example, when the DUT is not able to transmit an OOB signal upon power up and a pulse generator is required to perform OOB signal simulation):

NOTE These steps assume the oscilloscope and pulse pattern generator are already networked so that the oscilloscope can remotely control the pulse pattern generator (over LAN, GPIB, etc.). For more information, see the instruments' documentation.

a Select **Yes** under "Using Stimulus".

b To enter the pulse pattern generator's network address, click **Configure Devices...**.

c In the Configure Devices dialog, enter the pulse pattern generator's IP Address or SICL Address.



d Click **Get IDN...** to verify the pulse pattern generator's network address.

e Click **OK** to close the verification message dialog.

f Click **Close** to close the Configure Devices dialog.

The automated test application will set up and control the pulse pattern generator over the network.

8 Select the appropriate **Test Pattern Source**:

- **BIST_T** — is a test mode that is partially automated for acquiring the test patterns for the **TX Spread Spectrum Clocking and TX NRZ Data Signaling Requirements** group, where during setup, all the test patterns of the selected waveforms are acquired before the actual tests are run. During the waveform acquisition setup:
  - First, put the device under test (DUT) into BIST-T (Transmit) mode.
  - The application will pop up a message box every time to ask you to command the DUT to output a required test pattern.
  - Before the application proceeds, it will set up a simple oscilloscope screen preview for you to confirm whether the DUT is in BIST-T mode .
- **BIST_L** — is a test mode that is fully automated for acquiring the test patterns for the **TX Spread Spectrum Clocking and TX NRZ Data Signaling Requirements** group, where during setup, all the test patterns of the selected waveforms are acquired before the actual tests are run. During the waveform acquisition setup:
  - First, put the device under test into (DUT) into BIST-L (Loopback) mode.
  - The application will set up a simple oscilloscope screen preview for you to confirm whether the DUT is in BIST-L mode.
  - The application will send the respective stimulus pattern for the DUT to echo back the correct pattern (without you having to send commands to the DUT).
  - Please note that there is no specification documentation on how the BIST-L test pattern source should be implemented, and it is experimental for the application at this stage. Some other setup tweaking like adjusting the stimulus data rate in the Config tab may be needed.
- **SavedWFM** — lets you run from saved waveform (WFM format) files for non-OOB tests, that is, tests in the **All Tests in TX Spread Spectrum Clocking and NRZ Data Signaling Requirements** group.

  When **SavedWFM** is selected, enter the saved waveform location in the **Use Saved Waveform(WFM)** or click **LoadWFM** to browse to the saved waveform location.

  When **SavedWFM** is selected, the **Using Stimulus** selection is ignored.

  See "Running Non-OOB Tests From a Saved Waveform" on page 23.

9 To specify the InfiniiSim settings, click **InfiniiSim**. Use the Configure InfiniiSim dialog to specify the desired settings.

For more information on InfiniiSim options and settings, see the Agilent Infiniium Oscilloscope application's main online help.

Next • "Selecting Tests" on page 25

Running Non-OOB Tests From a Saved Waveform

This feature allows the user to run from saved waveform (WFM format) files for non-OOB tests. See:

- "Peparing WFM Files" on page 23
- "Loading a WFM File and Running Tests" on page 23

Peparing WFM Files

How to prepare the WFM files:

1 Select the desired tests to be run.

2 For example:

- In the Set Up tab, select **Bit Rate** = **6.0 Gbps** and **SSCSpread** = **None**,
- In the Select Tests tab, select the **All Tests in TX Spread Spectrum Clocking and NRZ Data Signaling Requirements** test group.

3 Using the above selected tests matrix example, after all the tests run successfully, the WFM files generated would be:

- CM_CJTPAT_6.0_SSCOff_4E6_40E9.wfm
- DIFF_D30.3_6.0_SSCOff_4E6_40E9.wfm
- DIFF_HFTP_6.0_SSCOff_4E6_40E9.wfm
- DIFF_MFTP_6.0_SSCOff_4E6_40E9.wfm

4 These files are temporarily available at:

C:\Documents and Settings\All Users\Application Data\Agilent\Infiniium\Apps\SAS-2Test\Project\app\SaveWFMDir

until the current project becomes inactive.

5 Because .wfm files are saved with a project, save the project to a desired location. Later, you can find the saved waveforms at:

[PROJECT DIRECTORY]\app\SaveWFMDir

Loading a WFM File and Running Tests

How to load back the WFM files:

1 In the Set Up tab, under Test Pattern Source, select the **Saved WFM** option.

This can be done either with **Using Stimulus** = **Yes** or **No** — they achieve the same purpose.

2 When **Saved WFM** is selected, the **Load WFM** button is enabled.

3 Select the folder that stores the WFM files of the desired test to be run with the valid file name and data.

4 Using the above example, locate the WFM directory where all four files are located.

5 Then:

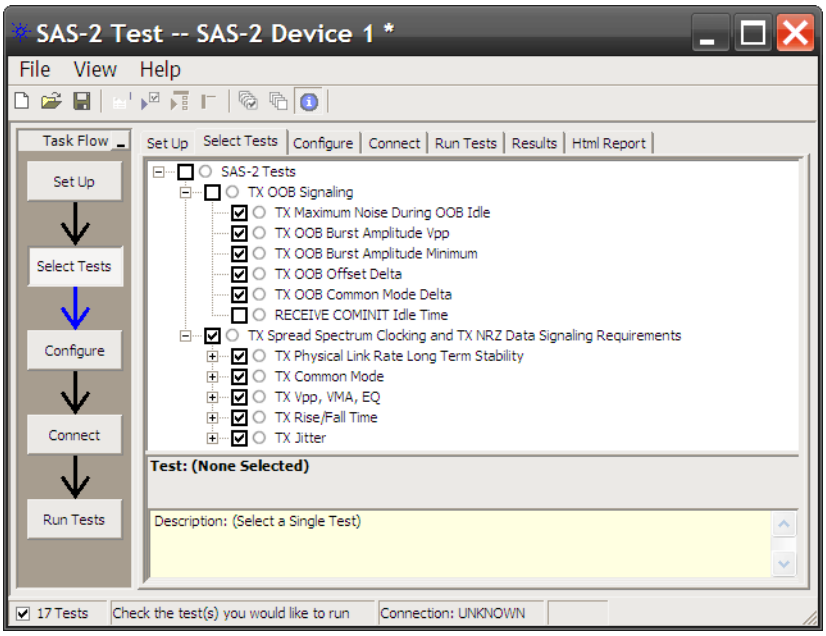
- In the Set Up tab, select **Bit Rate = 6.0 Gbps** and **SSCSpread = None**,
- In the Select Tests tab, select the **All Tests in TX Spread Spectrum Clocking and NRZ Data Signaling Requirements** test group.

Now, you can run the non-OOB tests using the saved waveforms.

Selecting Tests

1 Click the **Select Tests** tab, or click the **Select Tests** box in the Task Flow pane.

2 Check the tests you want to run.



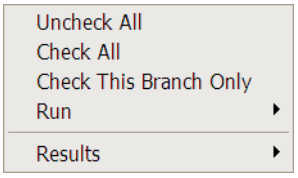
Some things to note:

- Checking a parent node/group will check all available sub-groups/tests.
- Unchecking a parent node/group will uncheck all sub-groups/tests.
- A parent node is checked if all subgroups are checked.
- A parent node is unchecked if ANY subgroup is unchecked.

NOTE If a test has a non-range limit of 0, that is, value < 0, then the test application will provide a nominal value. This nominal value produces a non-infinite margin and is used to declare the 100% margin point. The assigned nominal value can be viewed at the description pane.

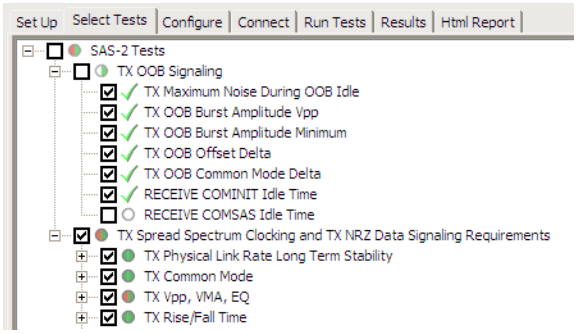
Using the Right-Click Pop-Up Menu

When you right-click in the test pane, it produces a pop-up menu containing some shortcuts for selecting and deselecting tests.



When Tests Have Already Been Run

If tests have already been run, you see their status in the Select Tests tab.



The marks have the following meanings:

✓	The test passed.
✗	The test failed.
○	The test has not been run, or no tests in the group have been run.
●	The test is currently running.
◑	Some tests in the group have run and passed.
◑	Some tests in the group have run and failed.
◑	Some tests in the group have passed and some have failed; not all of the tests have been run.
◑	Some tests in the group have passed and some have failed; all of the tests have run.
●	All tests in the group have run and passed.
●	All tests in the group have run and failed.

Next

- "Configuring Tests" on page 27

Configuring Tests

1 Click the **Configure** tab, or click the **Configure** box in the Task Flow pane.

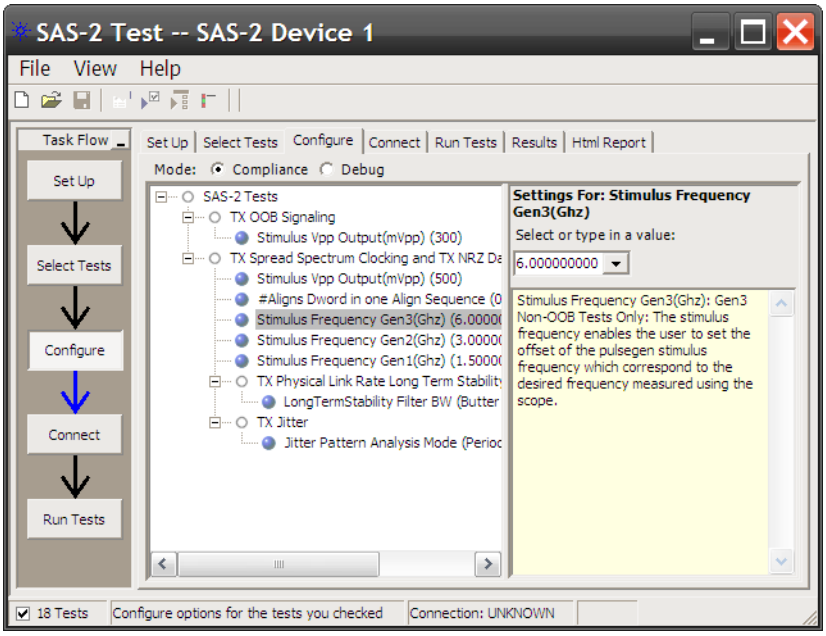
2 Select either **Compliance Mode** or **Debug Mode**.

- Compliance Mode — chooses the configuration options necessary to meet compliance.
- Debug Mode — lets you modify configuration options. This can be useful, for example, when investigating a test failure.

3 Select the bulleted item for the settings you want to configure; then, select or enter your settings.

A description of the selected configuration item appears in the lower, right part of the application window.

Note that you can also enter values in some of the drop-down selection fields. Entered values are checked for validity.



TIP A quick way to see the Debug Mode configuration option values that are used in the Compliance Mode is to switch from Compliance Mode to Debug Mode.

TIP A quick way to reset all configuration options is to switch from Debug Mode to Compliance Mode.

TIP A quick way to reset all configuration options and delete all test results is to create a new project (see page 19). The new project will have default configuration options.

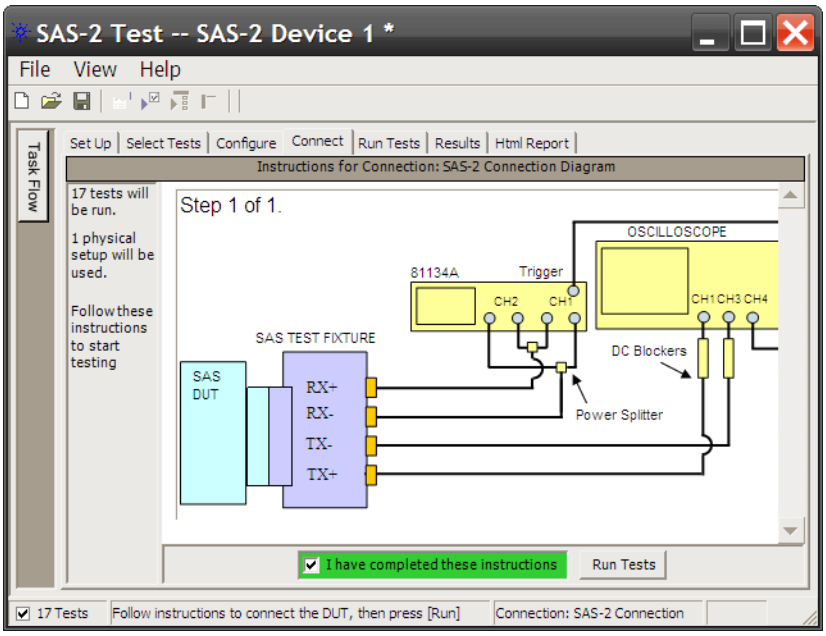
Next

- "Connecting the Oscilloscope to the DUT" on page 29

Connecting the Oscilloscope to the DUT

1 Click the **Connect** tab, or click the **Connect** box in the Task Flow pane.

2 Follow the displayed instructions for connecting the oscilloscope to the device under test.



3 When connections to the device under test have been made, check the **I have completed these instructions** box.

Next

- "Running Tests" on page 30

Running Tests

NOTE You should allow the oscilloscope to warm-up at least 30 minutes before running any measurement tests.

TIP It is a good idea to calibrate the oscilloscope at least once a year or when the Calibration ΔTemp is greater than ±5 °C. The Calibration ΔTemp is found in the **Help>About Infiniium...** menu on the Infiniium oscilloscope.

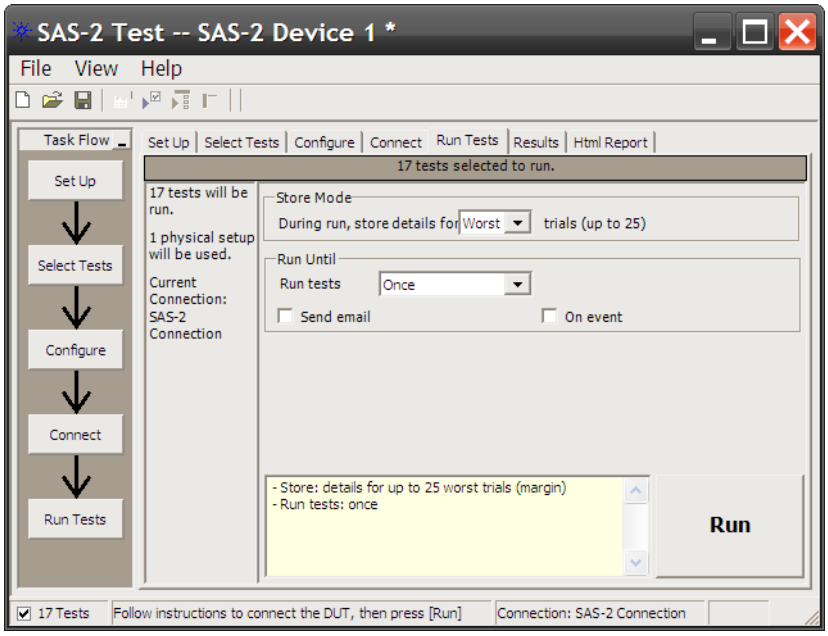
The Run Tests tab's settings let you run the selected tests once or multiple times. When you run tests multiple times, there are options for selecting which trials are stored and how long tests are run.

To run the selected tests once:

1 Start the test run.

There are several ways to run selected tests:

- Click **Run Tests** in the Task Flow pane.
- Click  in the toolbar.
- Select a branch in the Select Tests tab; then, click  in the toolbar.
- Select the Run Tests tab, make sure the **Once** "run until" option is selected, and click the big **Run** button.



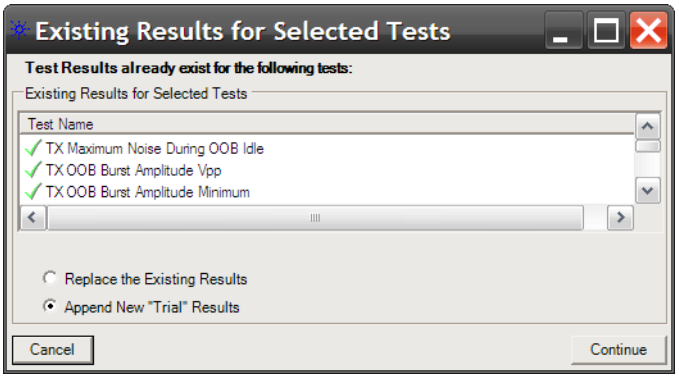
For more information on additional run options, see:

- "To select the "store mode"" on page 32
- "To run multiple times" on page 33
- "To send email on pauses or stops" on page 34
- "To pause or stop on events" on page 34
- "To specify the event" on page 35

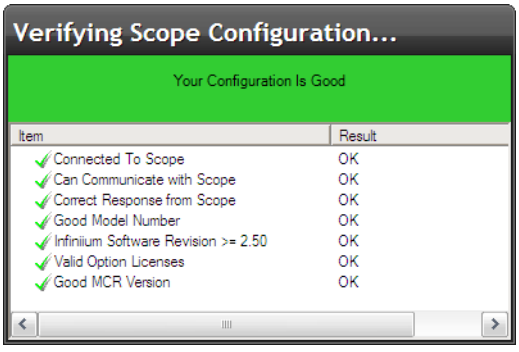
2 If there are existing test results, you are asked if you would like to keep them or re-test (delete) them.

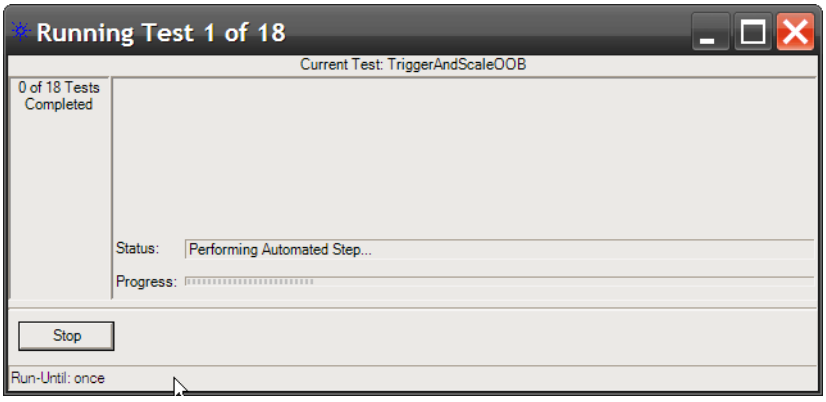
If you would like to keep the existing test results to compare against new results, select **Append New "Trial" Results**.

Select **Replace the Existing Results** if you would like to delete the existing test results.

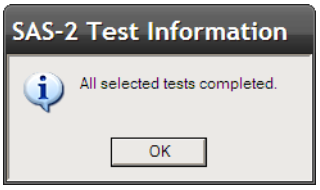


3 While the tests are running, status dialogs appear to inform you about the test progress.





4 When the tests are complete, click **OK**.



See Also
- "To set the display preferences" on page 36
- "To set the run preferences" on page 37

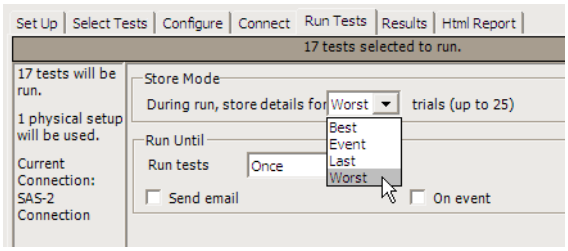
Next
- "Viewing Results" on page 39

To select the "store mode"

When running tests multiple times, you can select which trials are stored.

1 Select the Run Tests tab.

2 In the Store Mode area, select:



- **Best** — stores the results of the best N trials.
- **Event** — stores the results of N trials in which the event is detected. The event is determined in the Event area. See "To specify the event" on page 35.

- **Last** — stores the results of the last N trials.
- **Worst** — stores the results of the worst N trials.

Up to 25 trials can be stored.

If you change the Store Mode when test results exist, the existing results will be deleted.

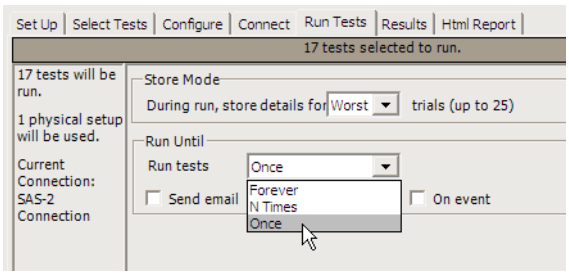
The Store Mode selection affects the trial display options in the Report tab of the Preference dialog. See "To set trial display preferences" on page 48.

To run multiple times

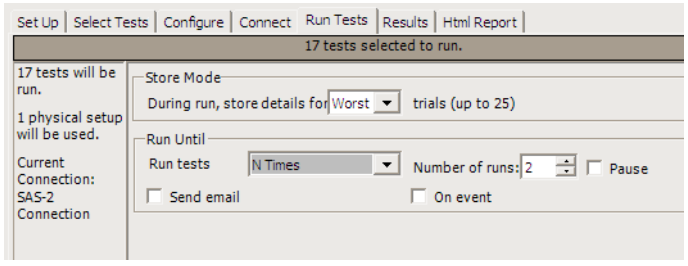
The "run until" option lets you specify whether tests are run once or multiple times.

1 Select the Run Tests tab.

2 In the Run Until area, select:



- **Forever** — runs the tests repeatedly until you click the **Cancel** button.
- **N Times** — runs the tests N times. When this option is selected, you can specify the number of runs and whether pauses occur between each run.



- **Once** — runs the tests only once. This is the default setting.

When multiple runs are selected, you can use the trial display options in the Report tab of the Preference dialog to specify how many trials are displayed in the test report. See "To set trial display preferences" on page 48.

To send email on pauses or stops

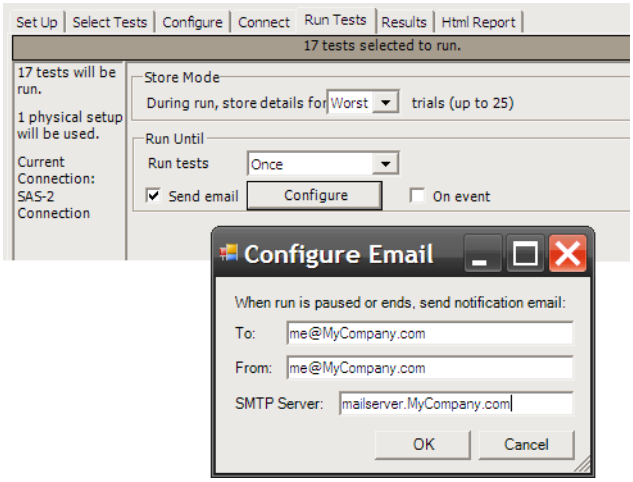
You can configure the test application to send email whenever a run pauses or ends.

1 Select the Run Tests tab.

2 In the Run Until area, check **Send email**.

3 Click **Configure**.

4 In the Configure Email dialog, enter your **To** and **From** email addresses and the hostname of the **SMTP Server**.



5 Click **OK**.

Pauses can occur between runs when running a specific number of times (see "To run multiple times" on page 33) or when pausing on an event (see "To pause or stop on events" on page 34).

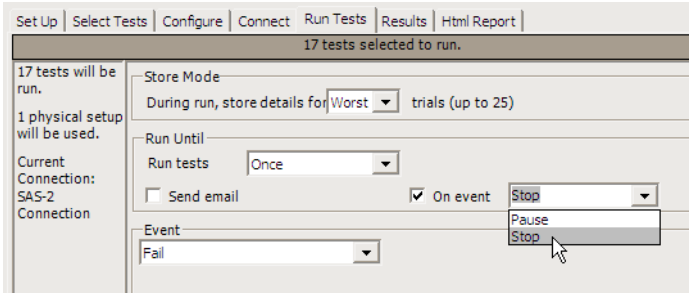
To pause or stop on events

You can set up test runs to pause or stop on events which are checked at the end of each test.

1 Select the Run Tests tab.

2 In the Run Until area, check **On event**.

3 In the drop-down selection field that appears, select either:



- **Pause** — causes the run to pause when the event is detected.
- **Stop** — cause the run to stop when the event is detected.

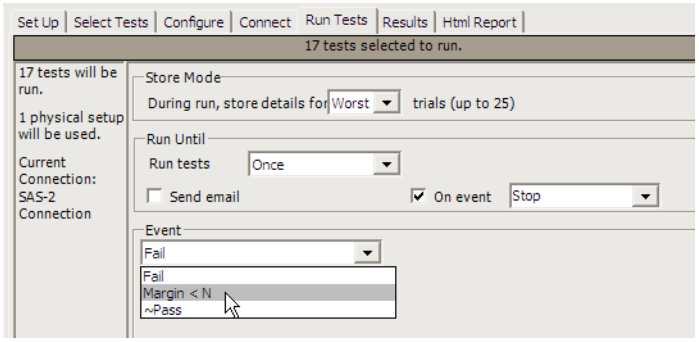
4 In the Event area, specify the type of event. See "To specify the event" on page 35.

Pauses or stops can be set up to automatically send email (see "To send email on pauses or stops" on page 34).

To specify the event

In the Store Mode area when you have selected Event (see "To select the "store mode"" on page 32) or in the Run Until area when you have selected to pause or stop on an event (see "To pause or stop on events" on page 34), the Event area appears so that you can specify the event.

1 In the Event area, select the type of event:



- **Fail** — causes the event to fire when a prerequisite test or selected test fails.
- **Margin < N** — causes the event to fire when a test generates a margin < specified. When this option is selected, enter the minimum required margin percentage.
- **Pass** — causes the event to fire when a test passes (excluding prerequisite tests).

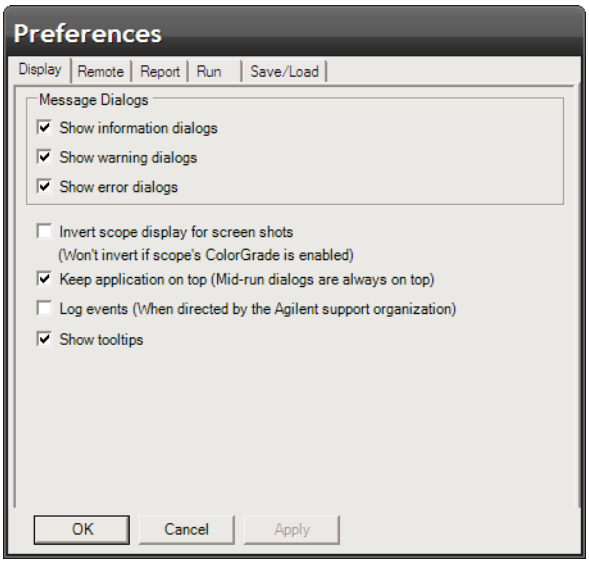
A tilde "~" character in the event selection drop-down shows that the event is unavailable. If you select an event type that is not available, a dialog tells you why. For example, the Pass condition is only available when the Store Mode is set to Best, Event, or Last. As such, the condition appears as ~Pass when the Store Mode is set to Worst.

To set the display preferences

Information, warning, and error conditions can occur while running tests. The display preferences let you choose whether message dialogs are shown. And, there are other display preferences that affect what happens as tests are run.

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Display** tab.



3 In the Display tab, you can choose to show the following types of message dialogs:

- Information dialogs.
- Warning dialogs.
- Error dialogs.

NOTE Messages that require you to make a choice, such as "OK/Cancel" and "Yes/No" are always enabled.

4 Also, you can choose to:

- **Invert scope display** — (white background) when the application captures the screen shots. Note that no inversion takes place is the oscilloscope's ColorGrade is enabled.
- **Keep application on top** — Always keep the application's main dialog on the top of the Infiniium application. Note that the mid-run dialogs are always displayed on the top.
- **Log events** — Use this option only when directed to by Agilent Support (Note that this option degrades the runtime performance).
- **Show tooltips** — By enabling this option, the tooltips appear as you move the pointer over various controls in the application.

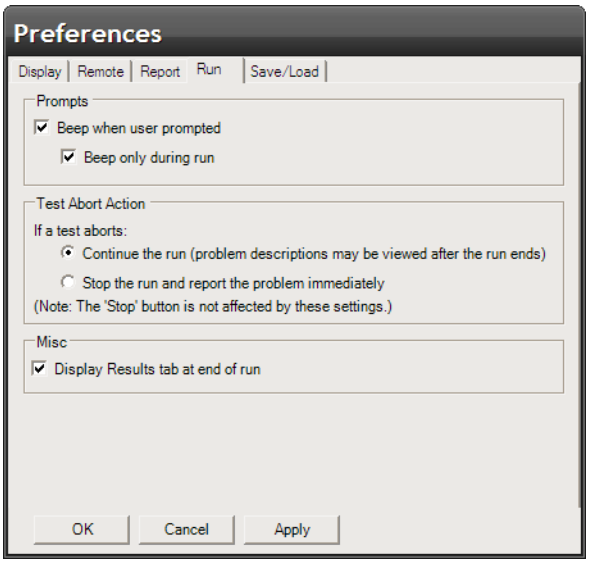
5 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

To set the run preferences

Information, warning, and error conditions can occur while running tests. The display preferences let you choose whether message dialogs are shown. And, there are other display preferences that affect what happens as tests are run.

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Run** tab.



3 In the Run tab, specify Prompts settings:

- **Beep when user prompted** — causes the oscilloscope to beep when there is prompt for user input.
- **Beep only during run** — specifies that beeps only occur during runs.

4 Specify Test Abort Action settings:

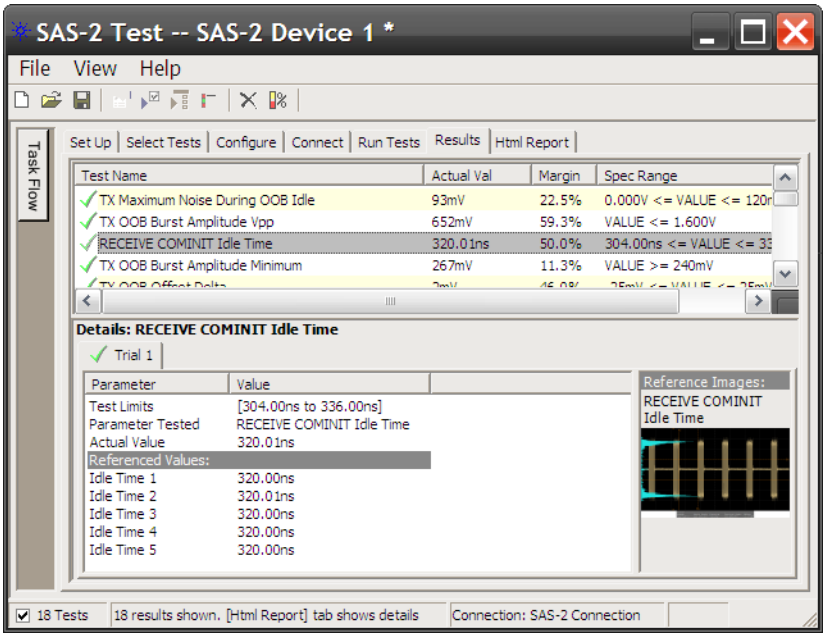
- **Continue the run** — causes tests to continue running after a test aborts. When this option is selected, you can view problem descriptions after the run ends.
- **Stop the run** — causes the run to stop after a test aborts, and the problem is reported immediately.

Note that these settings do not affect the **Stop** button.

5 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

Viewing Results

1 Click in the toolbar, or click the **Results** tab.



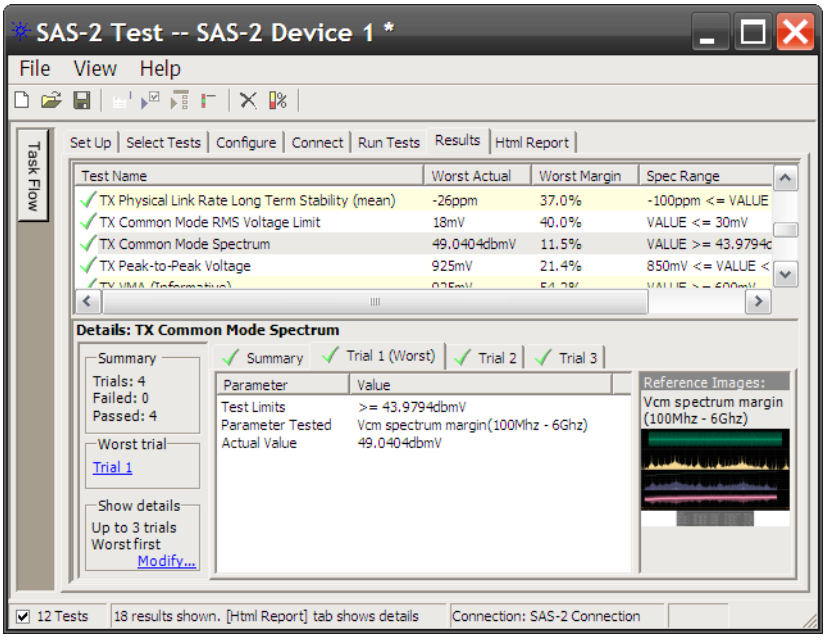
The Results tab contains three resizable panes for test results information. If you select one of the tests in the top pane, details and reference images (if any) are shown in the lower panes.

The summary of the test trial is displayed in the bottom left pane. It also shows the Worst Trial (depending on your settings in the **Store Mode** of the Run Tests tab).

The bottom right pane may have several tabs, depending on the selected **Report Preferences**. If more than one trial is selected, then the first tab will be the Summary tab. It shows the summary of all the test trials. A maximum of 25 trials can be displayed at any one time.

If the worst first is selected as the trial display option, the Worst Trial will be the next tab after the Summary tab, followed by other trials in the order of trial performance.

The reference images will appear in the bottom right pane for the selected trials. See "To show reference images and flash mask hits" on page 45 for more details on reference images.



TIP A quick way to reset all configuration options and delete all test results is to create a new project (see page 19). The new project will have default configuration options.

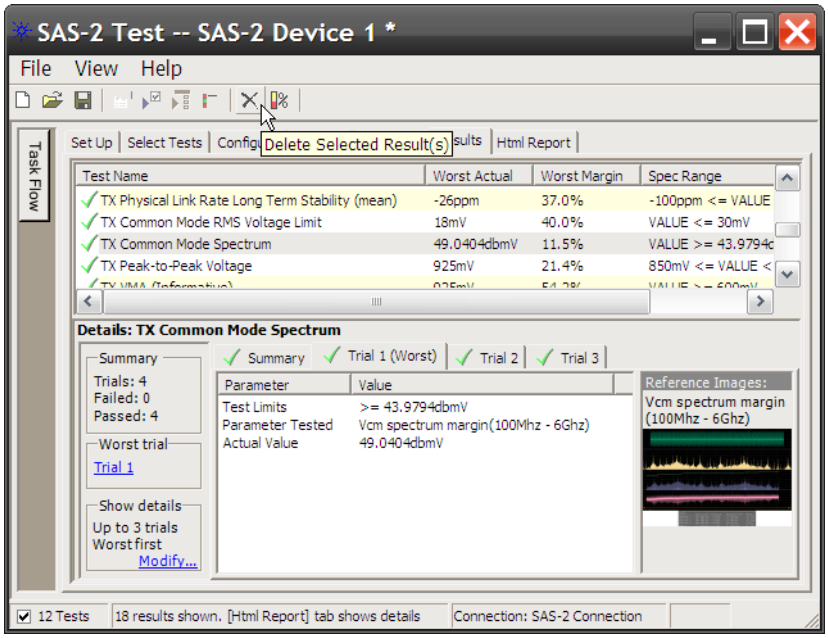
NOTE If a test has a non-range limit of 0, that is, value < 0, then the test application will provide a nominal value. This nominal value produces a non-infinite margin and is used to declare the 100% margin point. The assigned nominal value can be viewed at the description pane.

See Also
- "To delete trials from the results" on page 40
- "To show reference images and flash mask hits" on page 45
- "To change margin thresholds" on page 46
- "To change the test display order" on page 47
- "To set trial display preferences" on page 48

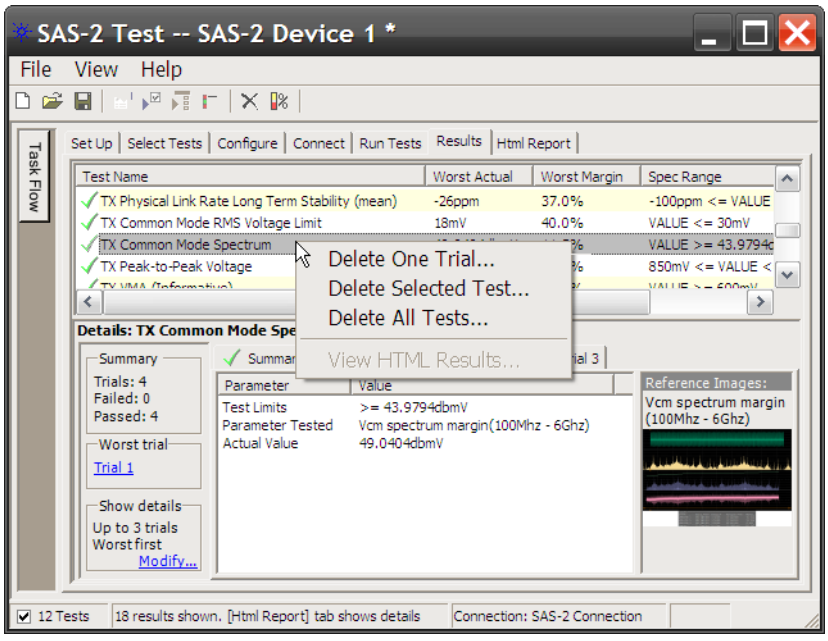
Next
- "Viewing/Exporting/Printing the Report" on page 50

To delete trials from the results

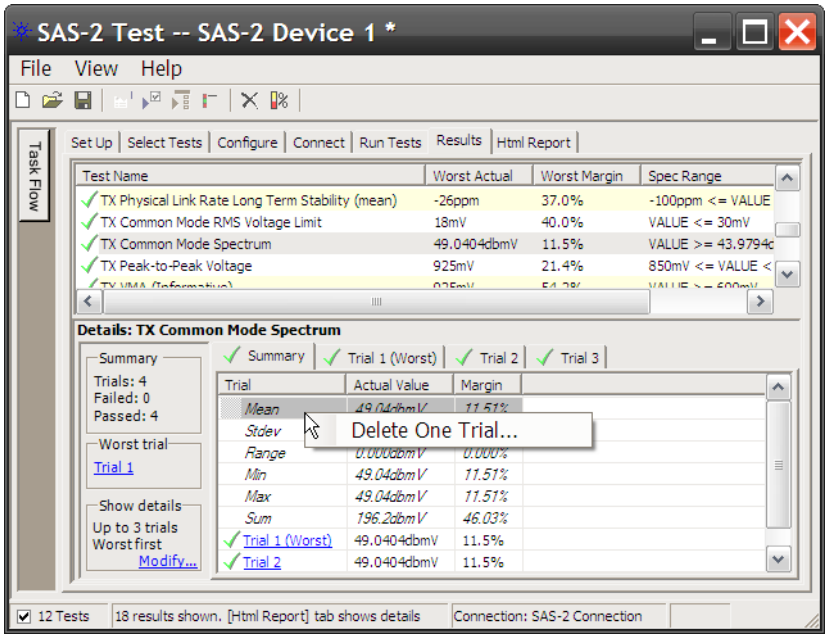
1 In the Results tab, choose one of these ways to delete a trial:
   - While a test result entry (at upper pane) or trial tab (at lower pane) has input focus, either click on the toolbar 'delete' button or press the delete key on the keyboard OR:



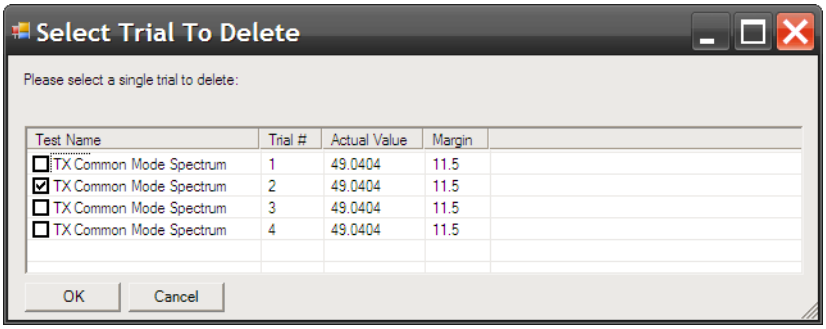
- Another option is to right-click at a test result (at upper pane) and select a trial or test to delete OR:



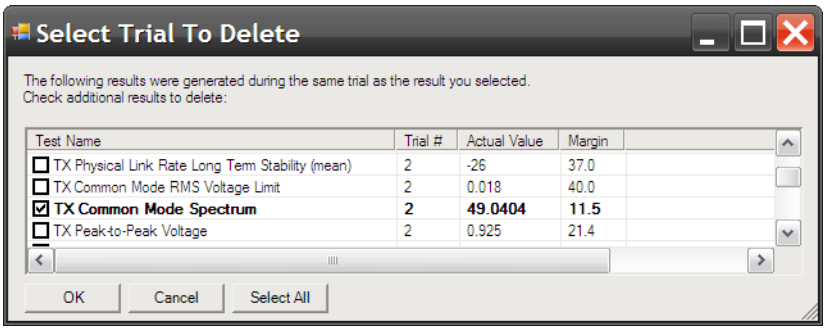
- Right-click inside the display area of trial summary tab (at the lower pane):



2 Select the trial to delete:

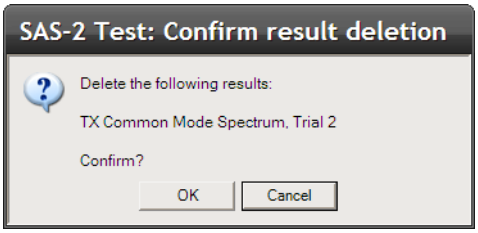


3 If other tests have results that were generated during the same trial run as the trial you are deleting, you will be asked if you wish to delete these tests at the same time.

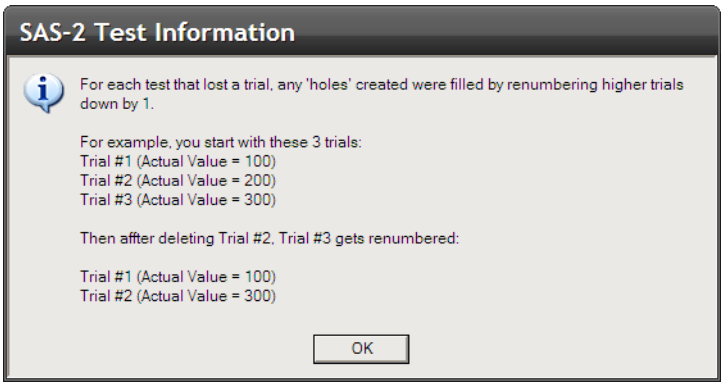


NOTE The trial numbers of the affected results may not match. The application presents you with those results that were generated during the same run. You can decide to delete those other trials as well.

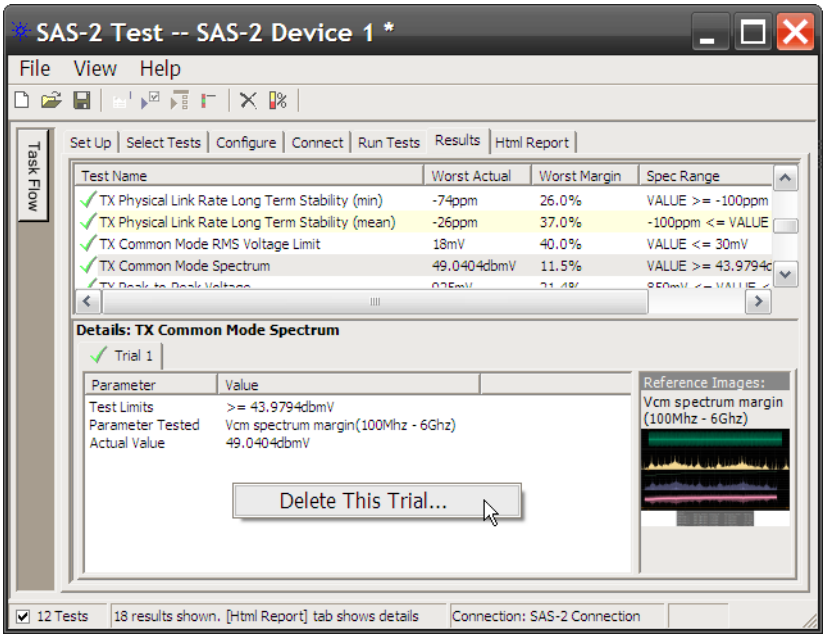
4 Once you have selected the trials to delete and clicked **OK**, you get a confirmation dialog:

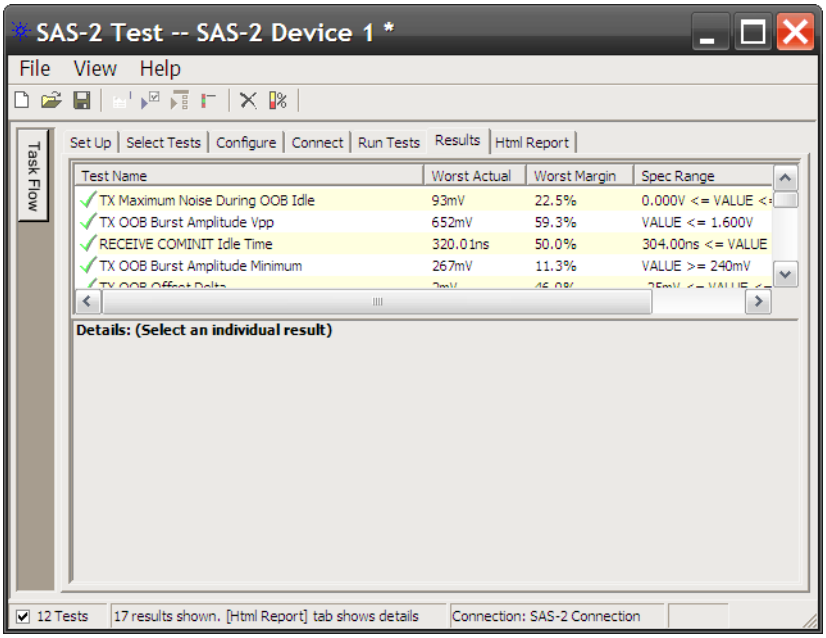


5 The remaining trials are renumbered downwards to fill in the hole left by the deleted trial:



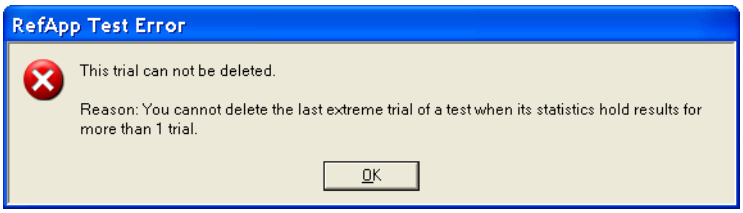
6 If you delete the last remaining trial of a test, the entire test results are removed:





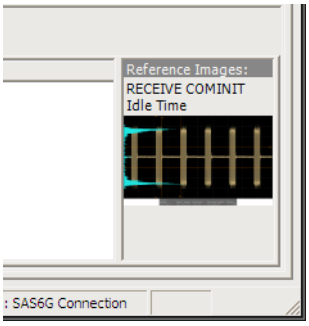
NOTE: There are two situations in which you are not allowed to delete a trial:

- Case 1: The trial you attempt to delete is the last remaining extreme trial but not the last remaining trial. In the SAS-2 Electrical Compliance Test application, the maximum number of trials displayed is 25. For example:
  - **a** Let's assume N is 25 (the maximum number of trials displayed).
  - **b** You have run more than N trials of a test.
  - **c** Now, you can delete up to N-1, where all these tests are displayed in the individual result tabs. You will not be able to delete the last remaining test displayed in the individual result tab or other non-displayed tests; however, you can delete the entire test.
- Case 2: The trial you attempt to delete is associated with a trial defined in Case 1.

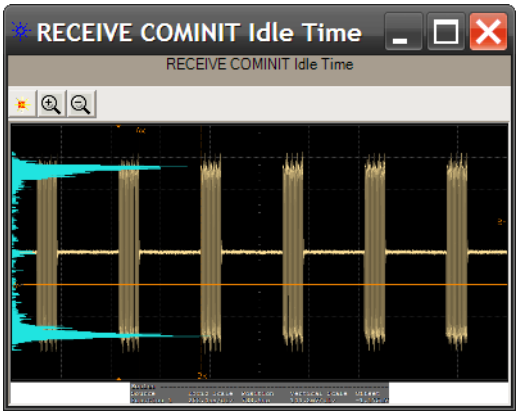


To show reference images and flash mask hits

1 In the Results tab, click on an image in the **Reference Images** pane.

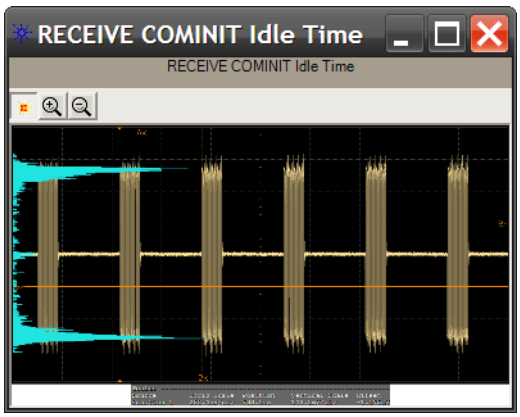


This opens the reference image dialog.



In the reference image dialog, you can:

- Click the flash red pixels button to highlight the points of failure.



- Click the zoom in or zoom out buttons to resize the dialog.

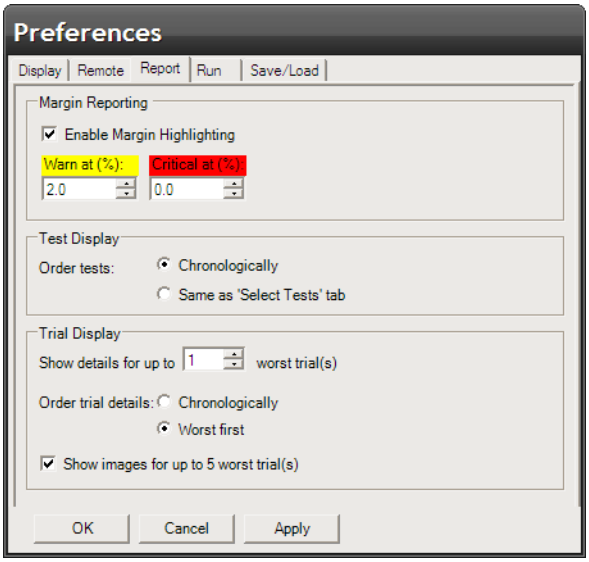
2 Click the close button to close the # Mask Failures dialog.

To change margin thresholds

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

Or, when viewing the Results tab, click in the toolbar.

2 In the Preferences dialog, select the **Report** tab.



3 In the **Margin Reporting** area, you can:

- Enable or disable margin highlighting.
- Change the percent of margin at which to give warnings or critical failures.

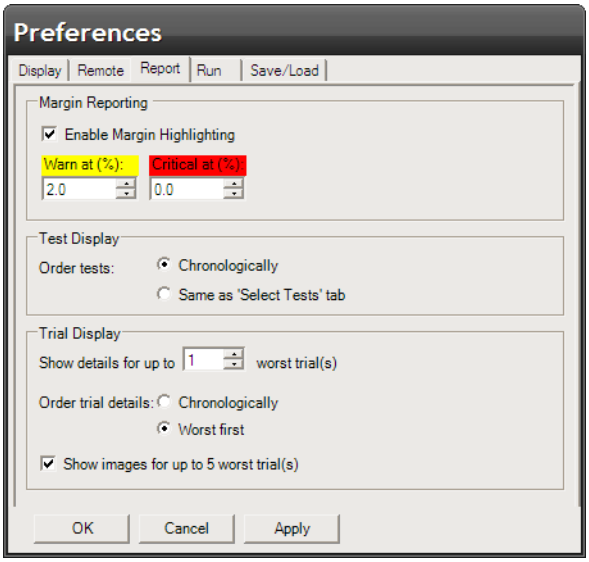
4 Click **OK** to save your changes and close the Preferences dialog.

To change the test display order

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

Or, when viewing the Results tab, click  in the toolbar.

2 In the Preferences dialog, select the **Report** tab.



3 In the **Test Display** area, you can:

- Order tests chronologically or use the same ordering as in the Select Tests tab.

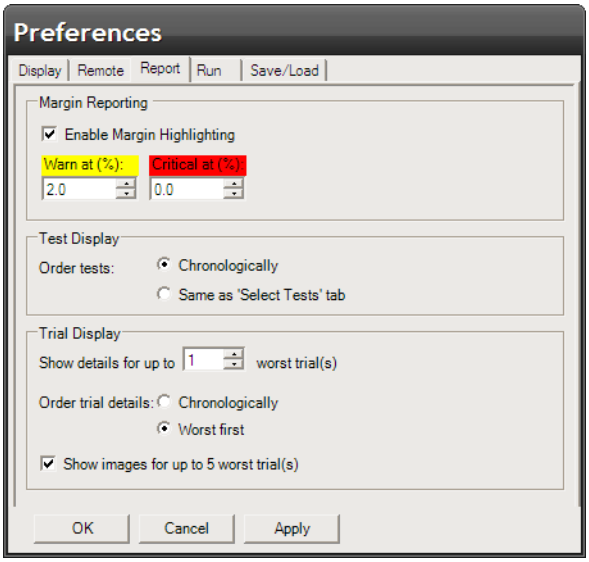
4 Click **OK** to save your changes and close the Preferences dialog.

To set trial display preferences

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

Or, when viewing the Results tab, click  in the toolbar.

2 In the Preferences dialog, select the **Report** tab.



3 In the **Trial Display** area, you can:

- Select the maximum number of trials, up to 25, whose details are displayed at one time.
- Order trial details chronologically or by "best", "worst", or "last" trial first.
- Specify whether screens captured during the run are displayed in the Results tab.

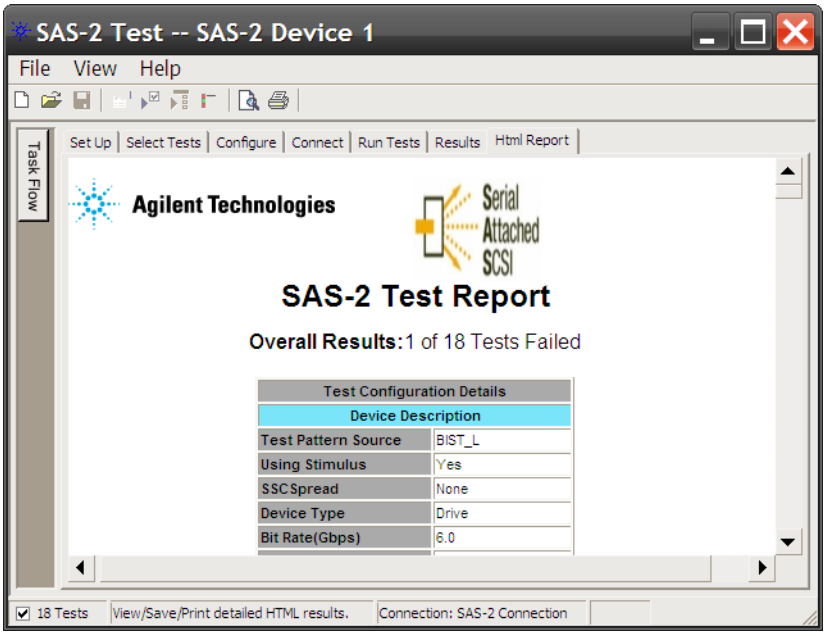
Note that the "worst", "best", or "last" trials depends on the "store mode" setting in the Run Tests tab. See "To select the "store mode"" on page 32.

4 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

NOTE These settings only affect the viewing of results and not their capture. Therefore, a change can be made to either before or after running the tests.

Viewing/Exporting/Printing the Report

- To view the HTML test report, click the **Html Report** tab.



See Also
- "To export the report" on page 50
- "To print the report" on page 53

Next
- "Saving Test Projects" on page 54

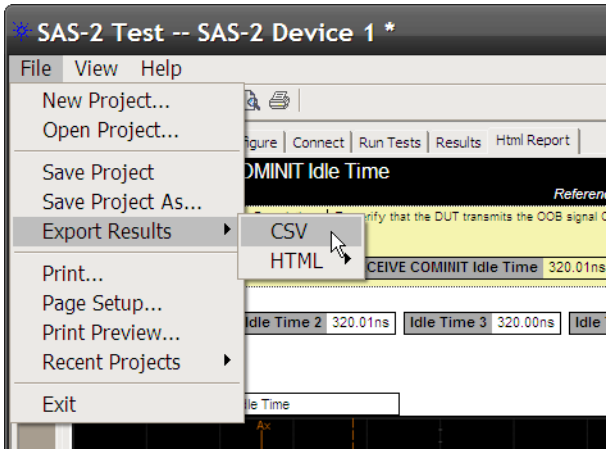
To export the report

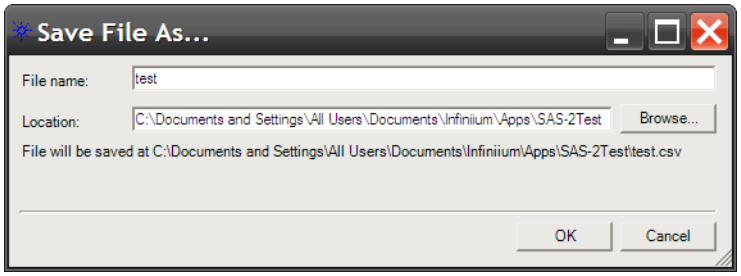
1 From the SAS-2 Electrical Compliance Test application's menu, choose **File>Export Results>** from the menu.

There are two options for exporting the HTML test report: CSV or HTML.

To export results in CSV (comma-separated values) format

Select the CSV option to export the results as a comma-separated list of values.

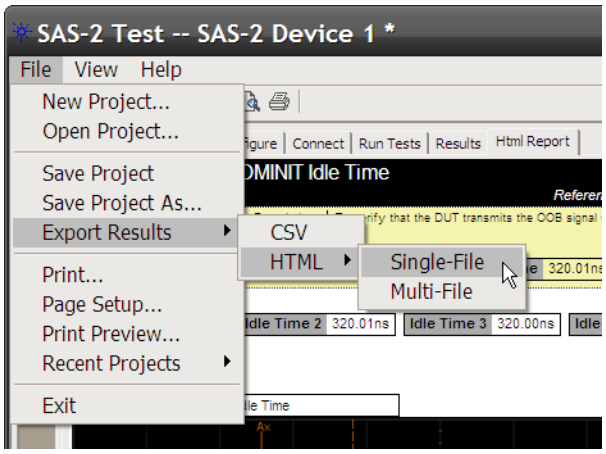




The data format is shown in the first line of the exported *.csv file.

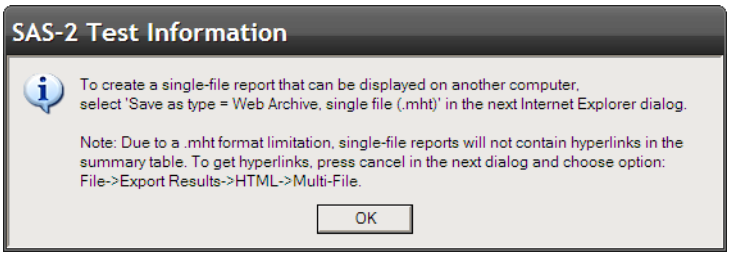
```
Test ID, Test Name, Measured Item, Trial 1 Value
30101,"TX Maximum Noise During OOB Idle",Test Load,"TCTF Test Load"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 1 ,"0.087"
30101,"TX Maximum Noise During OOB Idle",Actual Value,"0.093"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 2 ,"0.087"
30101,"TX Maximum Noise During OOB Idle",Margin,"22.5"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 3 ,"0.085"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 4 ,"0.093"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 5 ,"0.09"
30101,"TX Maximum Noise During OOB Idle",MaxNoiseDuringOOBIdle 4(mV),"(See image)"
30101,"TX Maximum Noise During OOB Idle",OOB Type,"COMINIT"
30201,"TX OOB Burst Amplitude Vpp",Test Load,"TCTF Test Load"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 1 ,"0.647"
30201,"TX OOB Burst Amplitude Vpp",Actual Value,"0.652"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 2 ,"0.646"
30201,"TX OOB Burst Amplitude Vpp",Margin,"59.3"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 3 ,"0.652"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 4 ,"0.651"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 5 ,"0.646"
30201,"TX OOB Burst Amplitude Vpp",OOBBurstAmplitudeVpp 6 ,"0.647"
30201,"TX OOB Burst Amplitude Vpp",OOBburstAmplitudeVpp 3(mV),"(See image)"
```

To export the report in HTML format



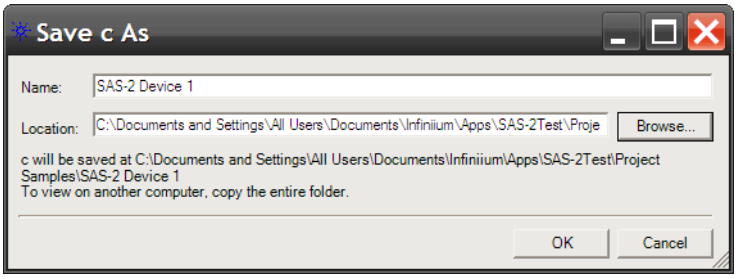
There are two options for exporting HTML format test reports:

- **Single-File** — To save a single-file report, use the "save as" type "Web Archive, single file (.mht)".



NOTE Single-file reports will not contain hyperlinks in the summary table (due to a .mht format limitation). If you want these hyperlinks, use the multi-file format.

- **Multi-File** — If your report is large and you would like to use links within the report, select the **HTML>Multi-File** option. Selecting the multi-file option exports the results as a set of separate image and HTML files. It creates a folder with the specified name that may be copied to any computer.



To view the exported report, open the HTML file stored in the folder.

To print the report

- To preview the HTML test report printout, click or choose **File>Print Preview...** from the menu.
- To print the HTML test report, click or choose **File>Print...** from the menu.

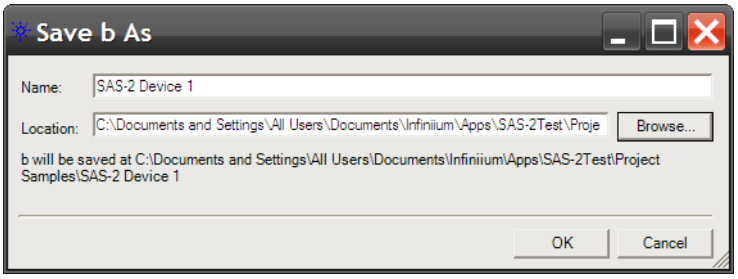
Saving Test Projects

To save test settings and results to the current project directory:

1 Choose **File>Save Project** from the menu.

To save test settings and results to a new project directory:

1 Choose **File>Save Project As...** from the menu.



2 In the Save Project As... dialog, enter the device name and location.

Project files will be saved in a directory whose name is the device name.

3 Click **OK**.

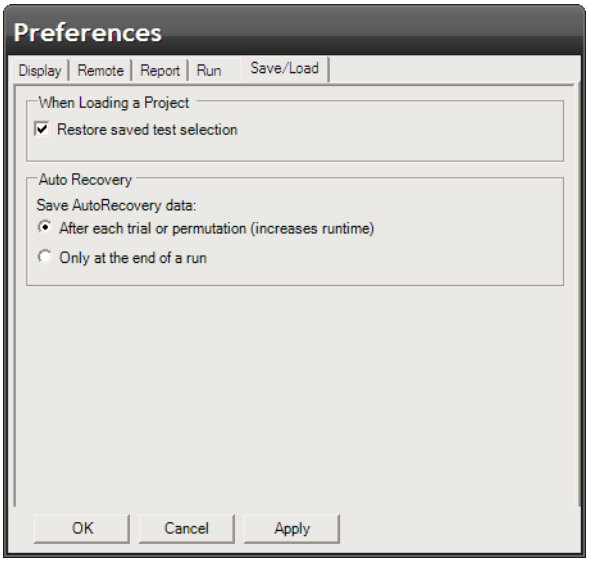
See Also

- "To set AutoRecovery preferences" on page 54

To set AutoRecovery preferences

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Save/Load** tab.



3 In the **AutoRecovery** area, you can choose:

- To auto-save results after each trial or permutation even if the entire multi-trial is not completed. This option enables full recovery.
- To auto-save results only upon the completion of the entire multi-trial.

4 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

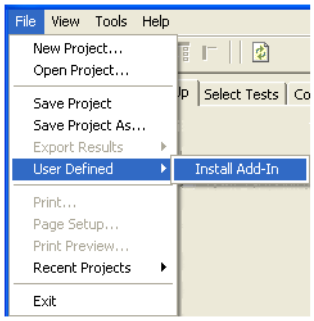
4
User Defined Add-Ins

If there are measurements you would like the compliance test application to make that are not currently included in its test list, you can use Agilent's N5467A User Defined Application (UDA) tool to design and deploy an "add-in", or package of tests that can be imported into existing compliance applications. Please see the UDA documentation for how to create an add-in.

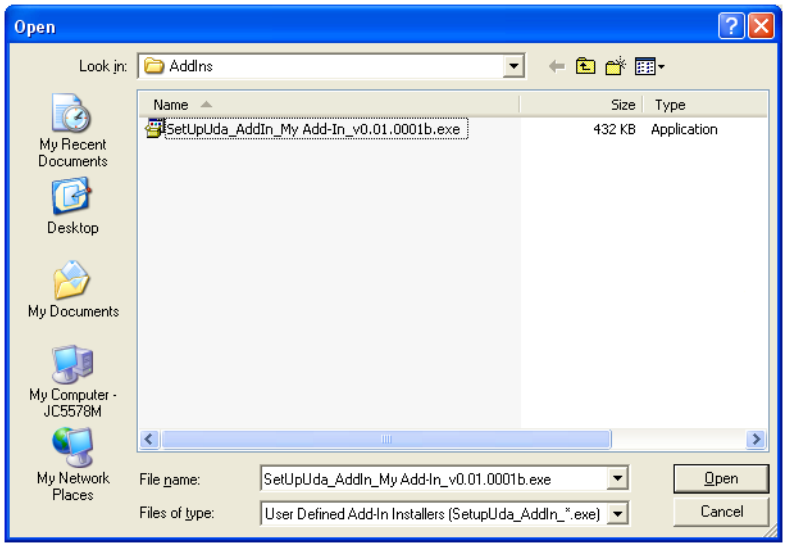
To install an add-in

To install an add-in:

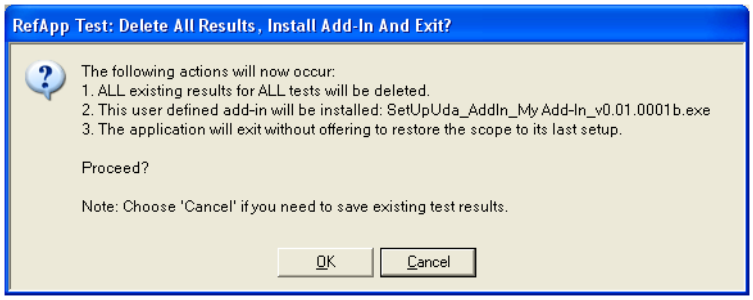
1 Use the **File** menu:



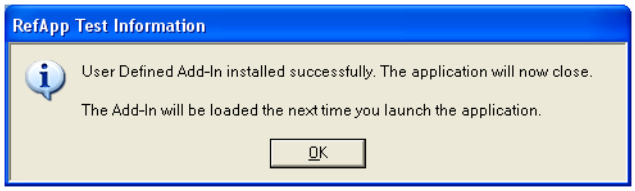
You will be prompted for the location of the add-in's installer (created by the N5467A UDA tool):



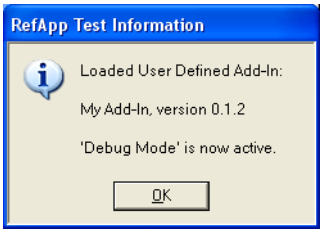
and then reminded that the application will need to restart to complete the installation:



CAUTION If your project has unsaved test results, choose **Cancel** and save the project before retrying.

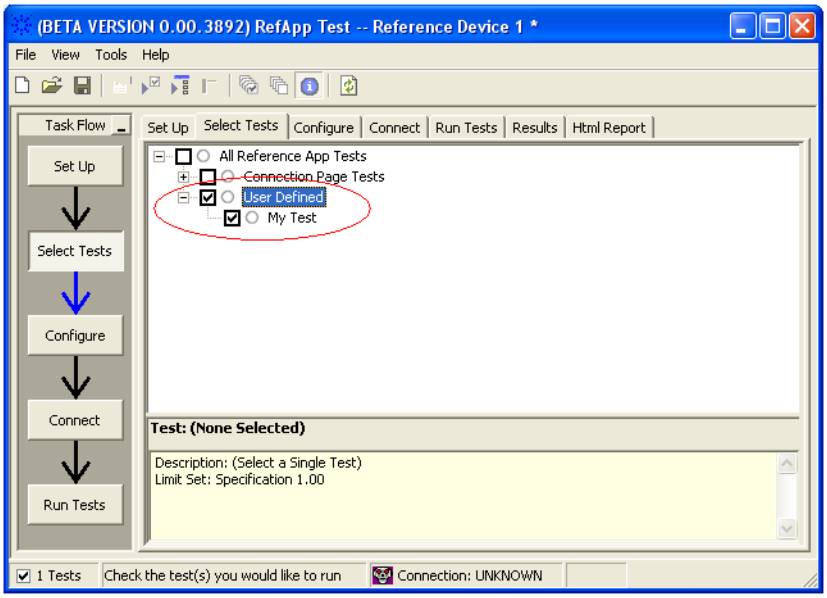


Restart the application, and you will receive a notice that there is an active add-in:



Add-in tests are only visible in Debug Mode, so when there is an active add-in installed, the compliance application will start up in this mode.

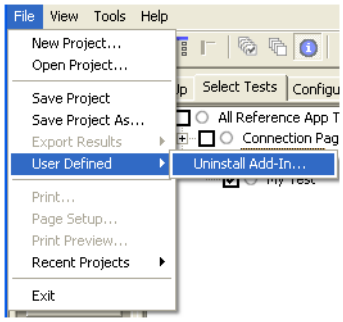
Add-in tests are displayed in their own test group on the **Select Tests** tab:


(BETA VERSION 0.00.3892) RefApp Test -- Reference Device 1 *
File View Tools Help
Task Flow
Set Up
Select Tests
Configure
Connect
Run Tests
Set Up
Select Tests
Configure
Connect
Run Tests
Results
Html Report
All Reference App Tests
Connection Page Tests
User Defined
My Test
Test: (None Selected)
Description: (Select a Single Test)
Limit Set: Specification 1.00
1 Tests
Check the test(s) you would like to run
Connection: UNKNOWN

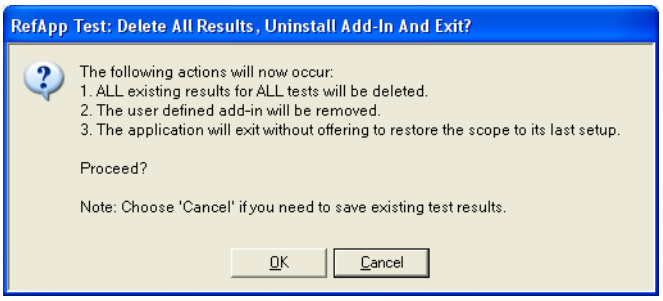
To remove an add-in

To remove an add-in:

1 Use the **File** menu:



You will be reminded that the application will need to restart to complete the installation:



CAUTION If your project has unsaved test results, choose **Cancel** and save the project before retrying.

5 Controlling the Application via a Remote PC

If the oscilloscope has the **App Remote** license option installed (for the N5452A remote interface), the SAS-2 Electrical Compliance Test application's Preference dialog will have a **Remote** tab for enabling the remote interface and setting remote options.

The N5452A remote interface lets you control Infiniium compliance applications from a remote PC. It comes with ready to run executables, but it also lets you create custom programs using a .NET 2.0 programming language or the National Instruments' LabVIEW 8.5 graphical programming environment.

With the remote interface, you can:

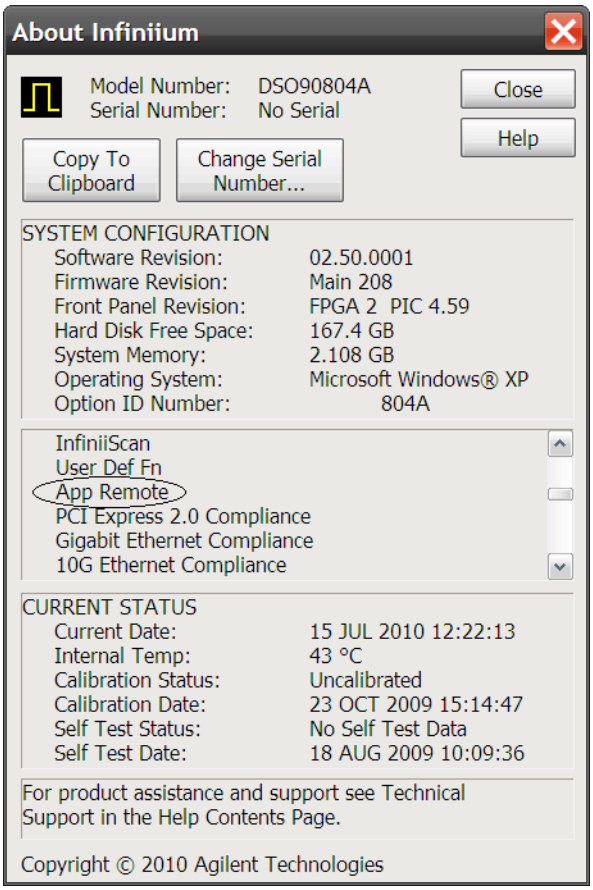
- Launch and close applications.
- Configure options.
- Run tests.
- Obtain results.
- Control when and where dialogs are displayed.
- Save and load projects.

For more information on the remote interface, see the "N5452A Remote Interface for Infiniium Compliance Applications" on the Agilent web site.

To check for the App Remote license

1 From the Infiniium oscilloscope's main menu, choose **Help>About Infiniium**.

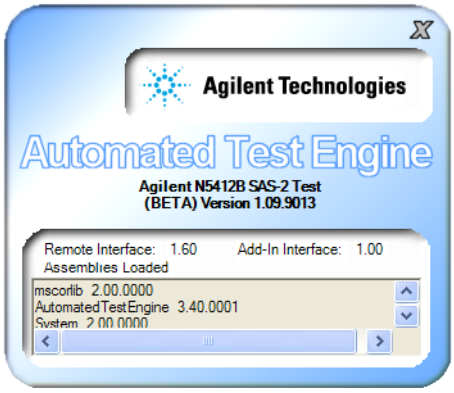
2 In the license list, check for the **App Remote** license as shown below.



To identify the remote interface version

1 From the SAS-2 Electrical Compliance Test application's menu, choose **Help>About...**.

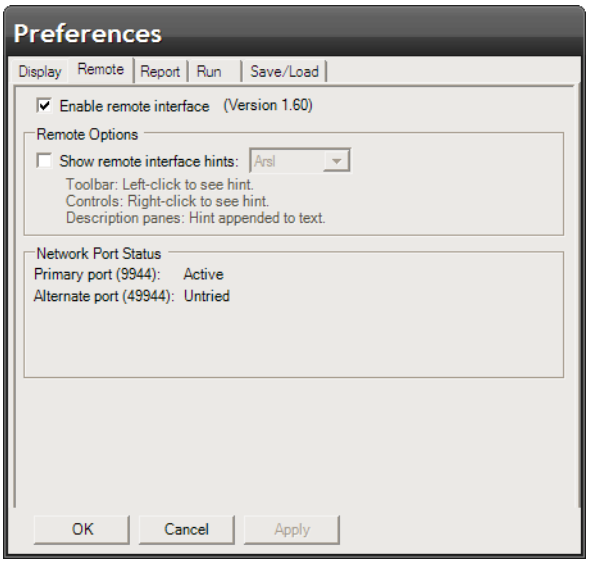
2 In the About dialog, the remote interface version is listed above other version information.



To enable the remote interface

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Remote** tab.



3 Check the **Enable remote interface** option if you need to access the application remotely.

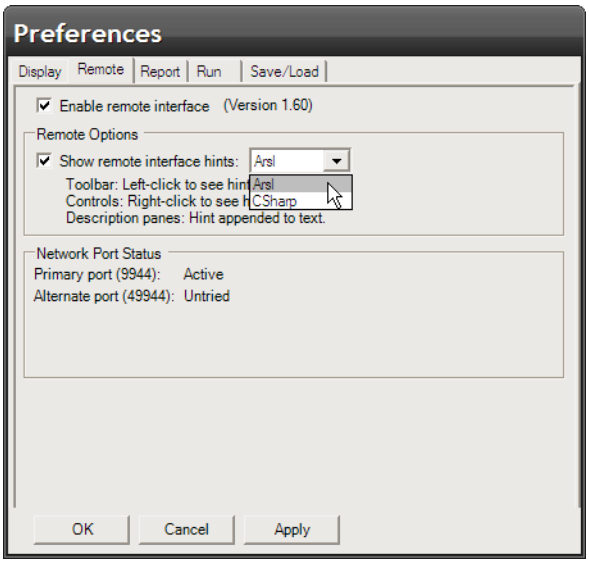
If you are performing the tests with the application's user interface and want to ensure no remote users accidentally interfere with you, disable the remote interface by un-checking this option.

4 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

To enable remote interface hints

1 From the SAS-2 Electrical Compliance Test application's menu, choose **View>Preferences...**.

2 In the Preferences dialog, select the **Remote** tab.



3 In the remote options area, check **Show remote interface hints**.

When this option is checked:

- You can select the remote programming language described in the tips.
- Tooltips related to the remote interface commands appear when you click the toolbar.
- Various controls in the tabs will have a context menu item added as "Remote interface hint...".
- The **Select Tests** and **Configure** tabs will display a remote hint in their description panes at the bottom of the screen, when an item is selected.

4 Click **Apply** to save the changes and click **OK** to close the Preferences dialog.

A
Calibrating the Oscilloscope

This section describes oscilloscope calibration procedures.

Channel-to-Channel De-skew

This procedure ensures that the timing skew errors between channel 1 and channel 3 are minimized. In addition to the required equipment, you need:

- SMA T-adapter.
- Additional BNC to SMA male adapter (two precision 3.5 mm BNC to SMA male adapters are provided with the oscilloscope).

To perform the channel-to-channel de-skew:

1 Connect the Channel 1 and Channel 3 SMA cables to the oscilloscope's Aux Out:

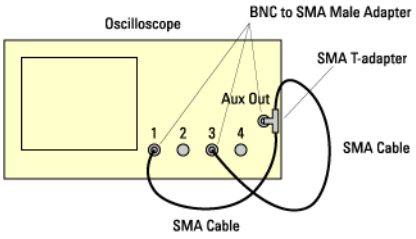
   a Leave the RG-316 cables and SMA adapters on Channel 1 and Channel 3.

   b Install a BNC to SMA male adapter on the oscilloscope Aux Out.

   c Connect the middle branch of the SMA T-adapter to the SMA adapter on the Aux Out BNC.

   d Connect the far end of the cable from the Channel 1 SMA adapter, to one branch of the SMA T-adapter on the Aux Out.

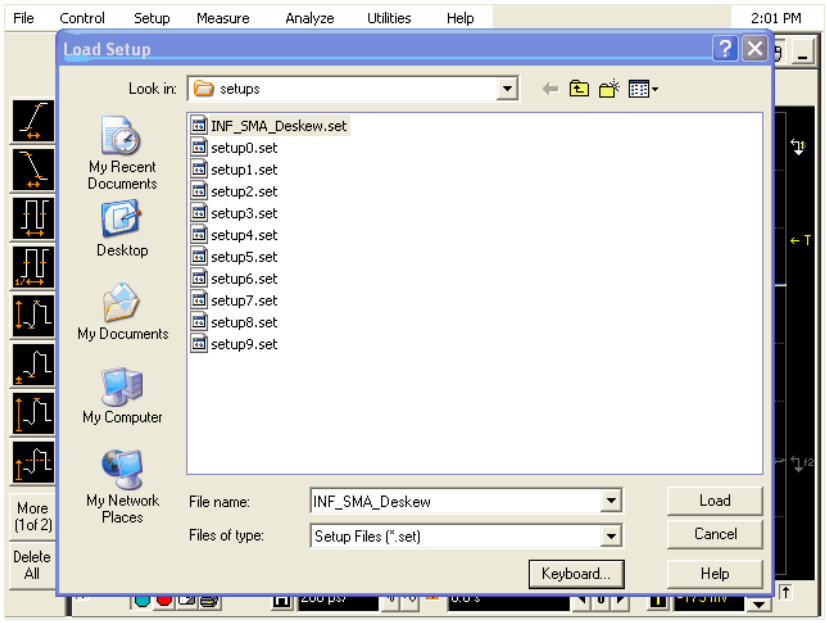
   e Connect the far end of the cable from the Channel 3 SMA adapter, to the other branch of the SMA T-adapter on the Aux Out.



2 Set up the oscilloscope:

   a From the oscilloscope's main menu, choose **File>Load>Setup...**.

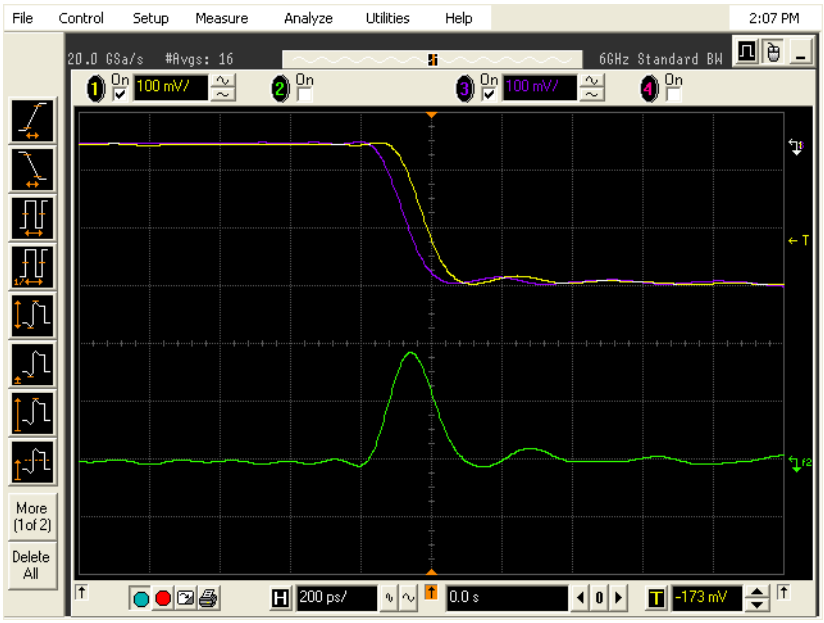
   b In the Load Setup dialog, select the "INF_SMA_Deskew.set" setup file, and click **Load**.



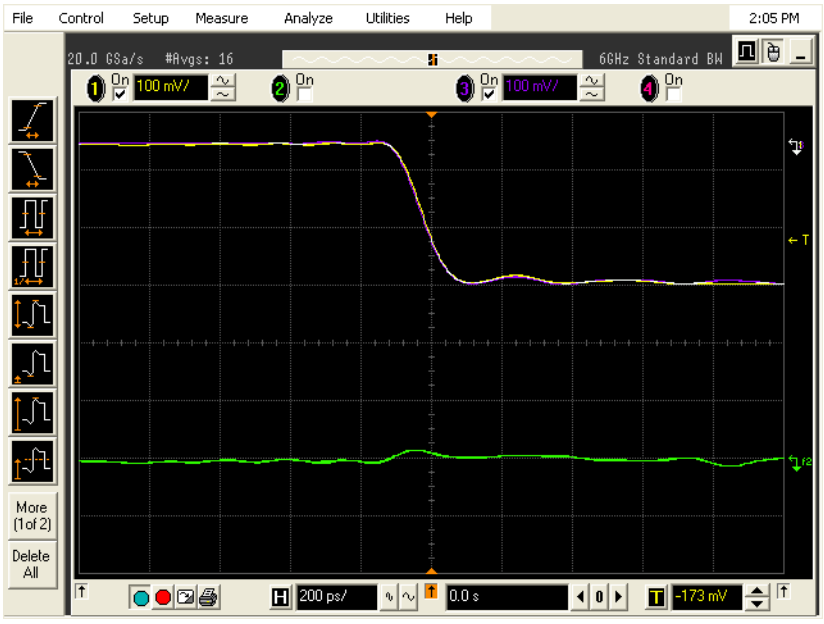
If the setup file is not available, it can be created by following the instructions in "INF_SMA_Deskew.set Setup File Details" on page 73.

3 Observe the channel-to-channel skew.

The oscilloscope display should look similar to the picture below. A falling edge of the square wave is shown in a 200 ps/div horizontal scale. The upper portion of the screen shows channel 1 (yellow trace) and channel 3 (purple trace) superimposed on one another. The lower portion of the screen is the differential signal (green trace) of channel 1 minus channel 3. The top two traces provide for visual inspection of relative time skew between the two channels. The bottom trace provides for visual presentation of unwanted differential mode signal resulted from relative channel skew (and to a much lesser extent from other inevitable channel mismatch parameters like gain and non-linearity). The picture below is an example of exaggerated skew between channel 1 and channel 3, measured to be about 50 ps with the cursor.



The following picture shows the desired effect of no skew between the cables. Note that the channel 1 (yellow trace), channel 3 (purple trace) traces overlap, and the differential signal (green trace) is flat. If this is not the case, then perform the following steps to reduce the skew between channels 1 and 3.

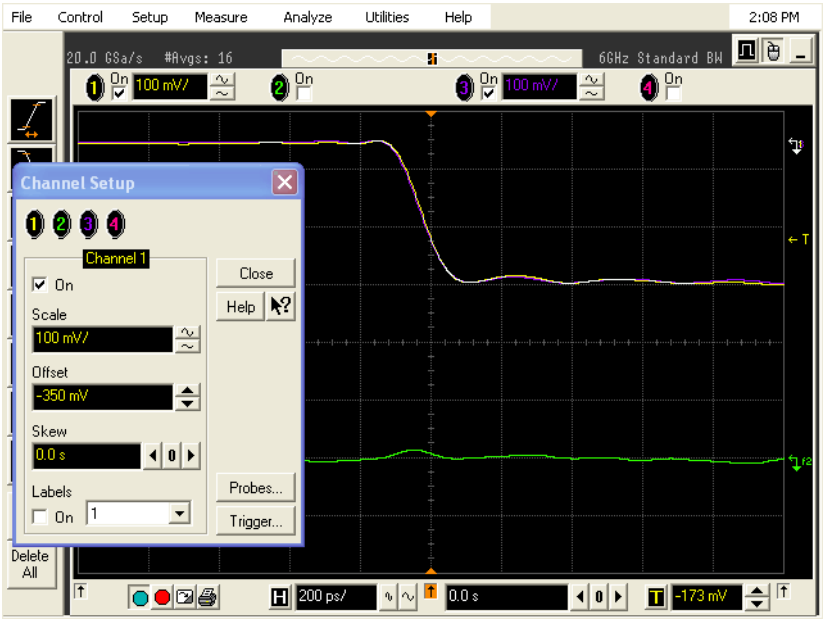


4 De-skew the channels:

a Choose **Setup>Channel 1...**.

b Move the Channel Setup dialog to the left so you can see the traces.

c Adjust the **Skew** (by clicking on the < or > arrows) to achieve the flattest response on the differential signal (green trace).



d Click **Close** to close the Channel Setup dialog.

5 Disconnect the cables from the T-adapter on the Aux Out BNC. Leave the cables connected to the Channel 1 and Channel 3 inputs.

NOTE Each cable is now calibrated for the oscilloscope channel it is connected to. Do not switch cables between channels or other oscilloscopes, or it will be necessary to calibrate them again. It is recommended that the cables be labeled with the channel they were calibrated for.

INF_SMA_Deskew.set Setup File Details

If the INF_SMA_Deskew.set file is not available, you can create it by following these instructions.

1 Start from a default setup by pressing the Default Setup key on the front panel. Then, configure the following settings:

Acquisition:	Averaging on, number of averages 16, Interpolation on.
Channel 1:	Scale 100.0 mV/, Offset −350 mV, Coupling DC, Impedance 50 Ohms.

Channel 3:	Turn Channel On; Scale 100.0 mV/, Offset −350 mV, Coupling DC, Impedance 50 Ohms.
Time base:	Scale 200 ps/div.
Trigger:	Trigger level −173 mV, Slope falling.
Function 2:	Turn on and configure for channel 1 subtract channel 3, Vertical scale 50 mV/, Offset 100.000 mV.

2 From the oscilloscope's main menu, choose **File>Save>Setup...**, enter the file name "INF_SMA_Deskew.set", and click **Save**.

B
Running the Automated Test Application on a Second Monitor

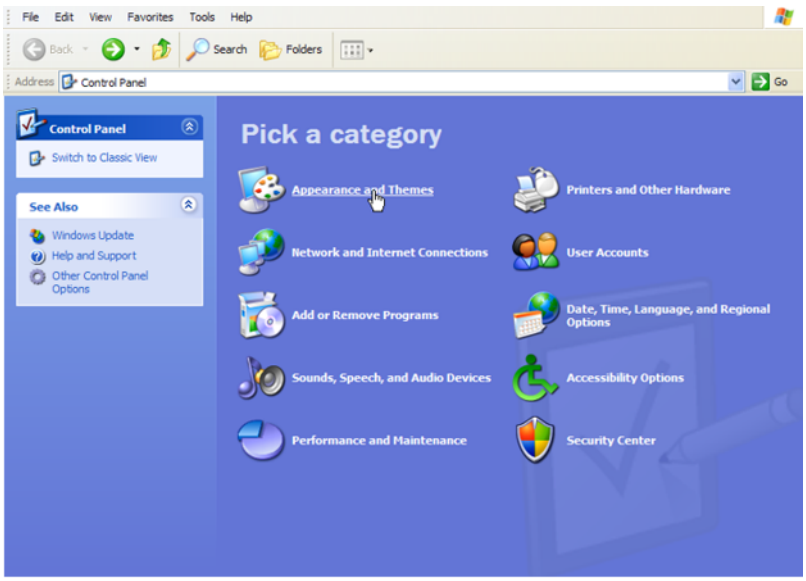
A second monitor can be used to display the automated test application, allowing you to view the oscilloscope while using the application. You need to connect a second monitor to the video port labeled Second Monitor on the rear panel of the oscilloscope and not to the port labeled VGA. (The VGA output is only used to display the screen of the oscilloscope on the external monitor.)

Before starting the automated test application, you should be sure that the second monitor is properly configured:

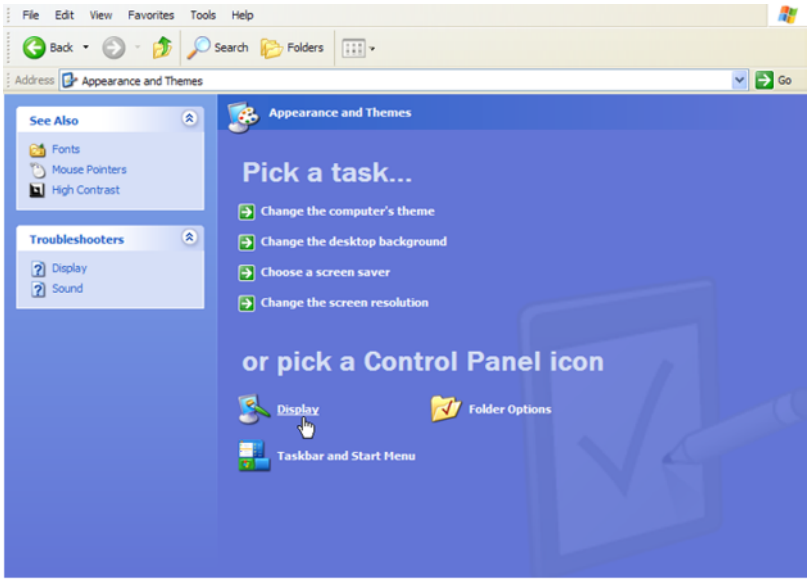
1 Exit the oscilloscope application, and click on the Windows **Start** menu button.

2 Select the **Control Panel** menu item.

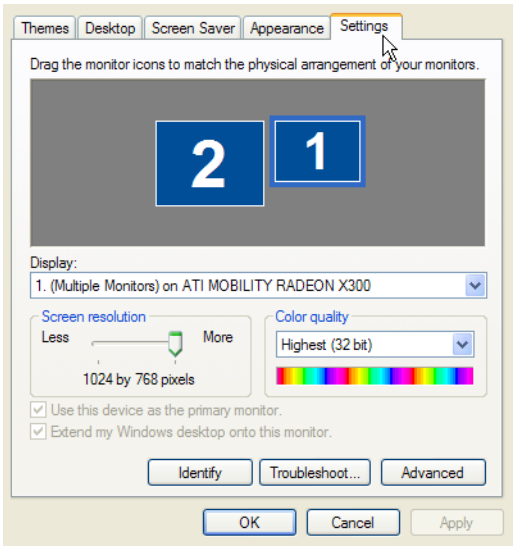
3 Select **Appearance and Themes**.



4 Select **Display**.



5 Select the **Settings** tab.



6 Select monitor two and set the Screen resolution and Color quality for your monitor.

7 Enable the **Extend my Windows desktop onto this monitor** control.

8 Click **OK** to apply these changes and close the Display Properties dialog box.

Once the second monitor is configured, moving the mouse off the oscilloscope screen will cause the mouse to be displayed on the second monitor. If you want to stop using the second monitor, you should disable the **Extend my Windows desktop onto this monitor** control.

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