



Newton4th Ltd

IECSoft

USER MANUAL - Volume 2

IEC 61000

EMC Immunity Testing software

IEC61000-4-11 & IEC61000-4-13



Version 1.06

30th August 2019

ABOUT THIS MANUAL

IECSoft is a self contained executable software program for use with the N4L PPA55xx series power analyzers.

Volume 1 of this User Manual details the use of the software for Flicker and Harmonic testing to the IEC61000-3-2/3-3 and IEC61000-3-11/3-12 Standards. This includes the equivalent JIS (Japanese Industrial standard) and BSEN (British Standard European Norm Standard) versions of these standards.

This second volume concentrates on two of the Immunity Testing options available using the software, IEC61000-4-11 and IEC61000-4-13 along with Flicker PST Simulation testing.

The third volume details the remaining Immunity Test modes not included in volume 2. These are: IEC61000-4-14, IEC61000-4-17, IEC61000-4-28, IEC61000-4-29 and IEC61000-4-34

Each of the Test options is described in turn, in its own chapter, with details of the principles on which it is based, how to use it and the test options available etc.

Revision: 06

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30th August 2019

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1 Introduction

1.1 Introduction to IECSoft

IECSoft is a self contained executable software program written in C++ using the Microsoft win32 graphics set.

IECSoft has the ability to connect to a PPA55x1 or PPA55x0 via RS232, USB and LAN. The software includes all measurement modes to reflect instrument operation.

The ability to export directly to Excel, CSV, PDF and “.n4liec” / “.n4lvdi” is supported by IECSoft.

IECSoft version **v2.6** and PPA55xx Firmware version **v2_179** were used to compile this volume of the User Manual.

1.2 PC Requirements

The minimum PC requirements to run the IECSoft software are as follows:

Windows XP (Service Pack 3) or later
At least 1GHz Processor
Minimum of 1GB RAM
At least 100MB of Hard Drive space.

For optimum performance the following PC requirements are recommended:

Windows XP (Service Pack 3) or later
At least 1GHz Processor
2GB RAM or more
At least 1GB of Hard Drive

2 Getting Started

2.1 Download

As with all N4L software, it is available free to download from our website. See www.newtons4th.com/support for more details, once registered and your account is activated you will have access to the software downloads section. The latest PPA firmware releases can also be found on our website.

2.2 Installation

At N4L we develop software that enables the engineer to be up and running and performing tests as soon as possible. With this in mind we have avoided the use of the .net environment and used the Microsoft win32 graphics set.

As such, installation is simple. All that is required is to download the .exe from the N4L website and extract the software to the desired location on your hard drive.

Alternatively the software can be run directly from USB memory stick.

2.3 Firmware Requirements

For full functionality using version **2.6** of IECSOFT Software the following firmware releases are recommended.

PPA55xx Firmware version **v2.179** or later

N4A AC Source Firmware version **v1.29** or later

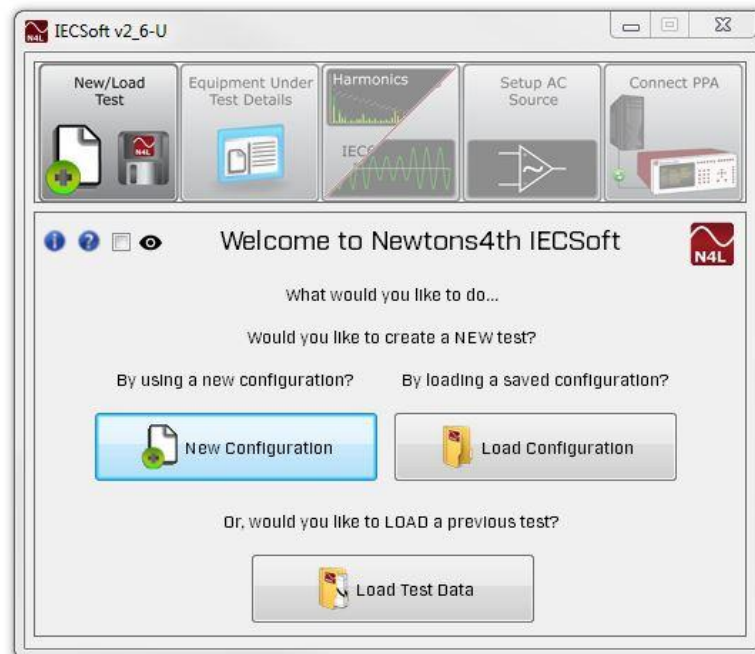
2.4 Impedance Network Switch Setting.

Before running any Immunity tests check that the three way switch (Harmonics / OFF / Flicker) on the front of the Impedance Network is set to the Harmonics position.

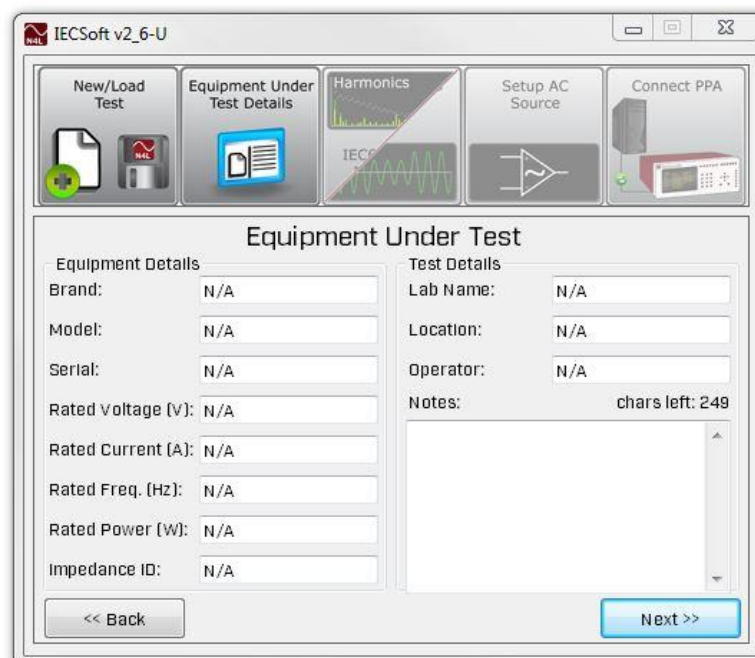
3 Initial Configuration.

This applies for all EMC test options.

Open the software and click on New Configuration.



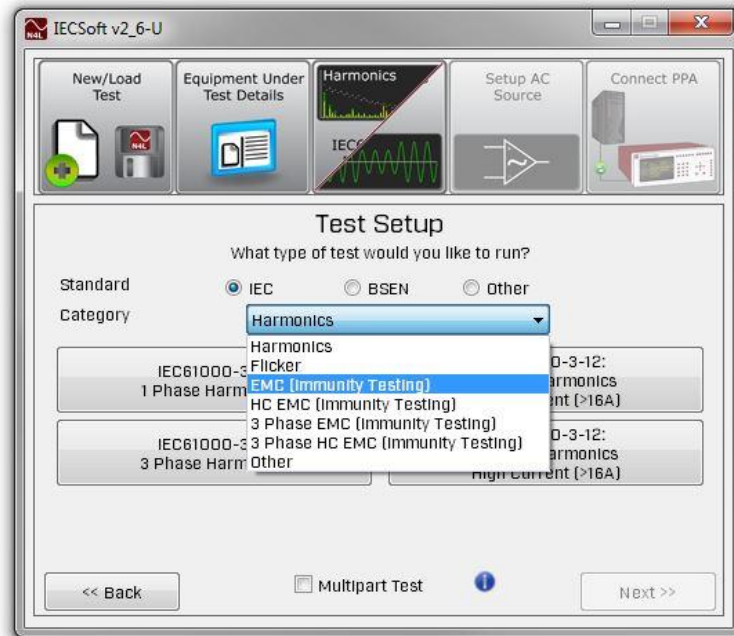
The Equipment under Test screen is displayed.



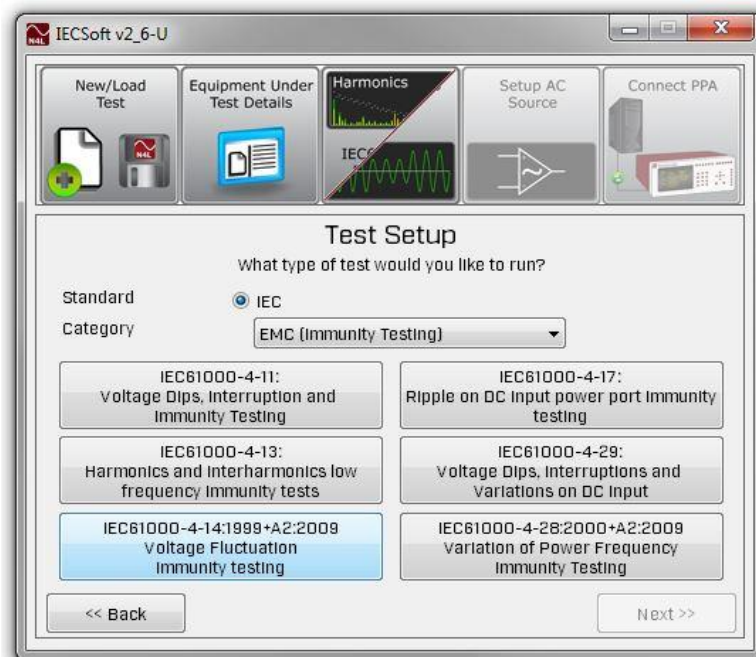
The User has the option to enter any of the equipment details.

Click on **Next** to continue.

Click on Category and select EMC (Immunity testing) on the drop down menu.



The Test setup screen will then display the various EMC tests that can be performed.



Now click on the required EMC test to continue.

4 IEC61000-4-11

Voltage Dips, Interruption and Immunity Testing

This section explains how to use the IECSoft test software along with a N4A Source to perform Voltage Dips, Interruption and Immunity tests to the requirements defined in IEC61000-4-11.

4.1 Scope

The object of these tests is to evaluate the immunity of electrical and electronic equipment when subjected to voltage dips, short interruptions and voltage variations.

Whilst the tests are being performed the Equipment Under Test (EUT) should be under constant observation. There should be no malfunction of the EUT during any of the tests.

On completion of each test the software will ask for the result of the test to be entered. The result entered is determined by the observation of the behaviour of the EUT during the test.

Observation of the loss of function or degradation of performance of the EUT during the tests is used to determine the classification. The definitions of acceptable performance and a malfunction should be agreed between the laboratory performing the tests and the manufacturers / purchasers of the EUT. More details on Classifications can be found in section 9 of the IEC61000-4-11 Standard document.

4.2 Test Description

The EUT (Equipment under test) is initially operated at a steady supply voltage (this can be 50Hz or 60Hz) and is then subjected to voltage dips, short interruptions and voltage variations.

There are 3 test classes detailed in Annex B of the Standard.

Class 1 allows the user to create a sequence of up to 9 individual Dip, Interruption and Variation tests. The test level and duration needs to be entered.

Class 2 and Class 3 each contain a predetermined set of Dip and interruption tests.

Table 1 in the Standard details the test levels and durations for Voltage Dips that apply to all classes.

Table 2 in the Standard details the test levels and durations for Short Interruptions that apply to all classes.

Table 3 in the Standard details the Voltage Variations that optional.

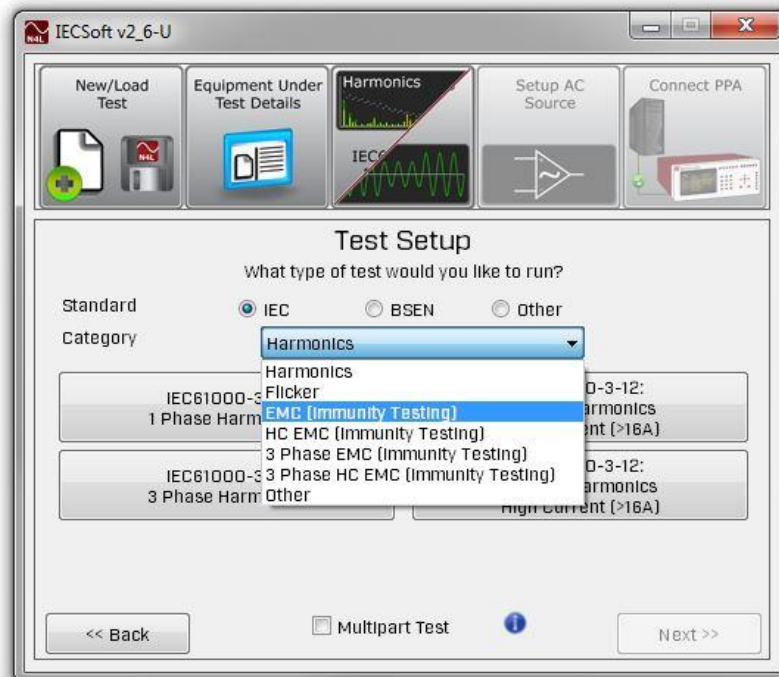
To comply with the requirements of the Standard, each Test (event) must be repeated three times with a minimum interval between each event of 10 seconds.

Having observed the behaviour of the EUT during the test the User should select the appropriate result from the drop down menu.

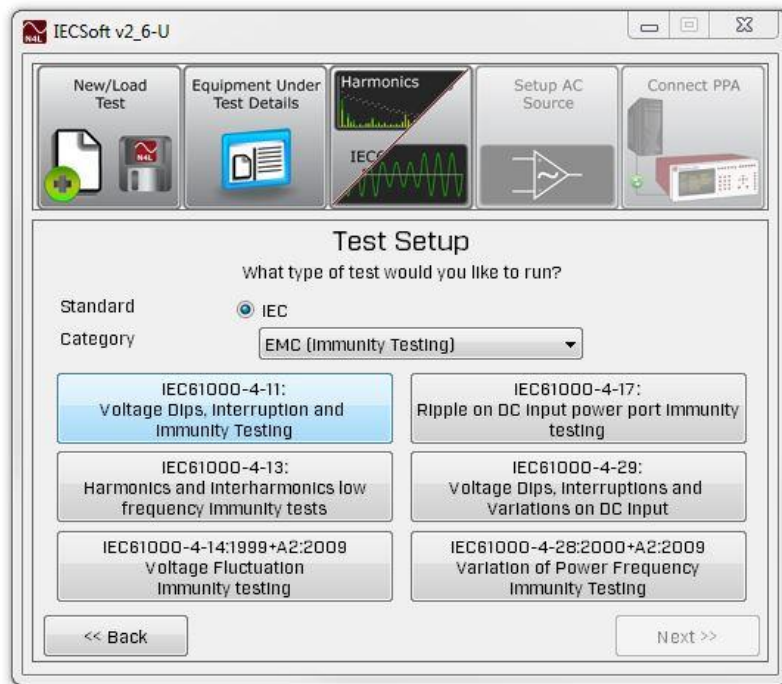
Class X. For certain EUT's the product committee can also define the levels for a Class X. Should a Class X test need to be performed the User should use Class 1 in the software. This is because for class 1 ANY combination of test level and duration can be selected.

4.3 Single Phase Test Procedure

Open the software and step through the dialog screens. In the Test Setup dialog click on category and select EMC (Immunity Testing) from the drop down menu.



The Test setup screen will then display the various EMC tests that can be performed.



Click on the IEC61000-4-11 Voltage Dips, Interruption and Immunity testing option.



The Connect to AC Source Dialog is then displayed. Check the Interface settings and then click on “**Connect & Setup**”

The Test Overview dialog is displayed with default information:

The screenshot shows a software window titled "IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations" with a subtitle "Test Overview". The window is divided into two main panels. The left panel, "Test Sequence Settings", contains "Sequence Details" (Number of Configurations: 1, Sequence Class: 2, Class test sequences: 4, Total test sequences: 4) and "Test Details" (Voltage Dips: 0.00% during 0.5 cycles, 0.00% during 1.0 cycles, 70.00% during 25.0 cycles; Voltage Interruptions: 0.00% during 250.0 cycles). The right panel, "Configurations", shows "Configuration: 1 / 1" with fields for "Nominal Voltage (UT): 230.00 V" and "Frequency: 50.00 Hz". Below these are "EUT Details" (EUT Type, Input port tested, Operation mode, Connection, Cables, Peripherals, all N/A) and "Test Setup Notes". A "General Notes" section is at the bottom. At the bottom of the window are four buttons: "Start testing", "Configure", "Clear", and "Close".

Test Sequence Settings		Configurations	
Sequence Details		Configuration: 1 / 1	
Number of Configurations:	1	Nominal Voltage (UT):	230.00 V
Sequence Class:	2	Frequency:	50.00 Hz
Class test sequences:	4	EUT Details:	
Total test sequences:	4	EUT Type:	N/A
Test Details:		Input port tested:	N/A
Voltage Dips		Operation mode:	N/A
0.00% during 0.5 cycles		Connection:	N/A
0.00% during 1.0 cycles		Cables:	N/A
70.00% during 25.0 cycles		Peripherals:	N/A
Voltage Interruptions		Test Setup Notes:	
0.00% during 250.0 cycles		General Notes:	

Start testing Configure Clear Close

Click on "**Configure**" to display the Add / Edit Configuration dialog box.

IECSoft v2.6-U LAN,N4A03,91J-11932.1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Add/Edit Configuration

Prev Configuration: 1 / 1 Add

Configure details

Nominal Voltage (UT): 230.00 V Frequency: 50 Hz

EUT Details

Sequence Class: ☐ Class 1 ☒ Class 2 ☐ Class 3

Sequence 1 Add Edit Remove

EUT Type: N/A EUT input port tested: N/A

EUT operation mode: N/A Connections: N/A

Cables: N/A Peripherals: N/A

Test Setup Notes: General Notes:

Save and Return Remove

Test configurations can be added, edited or deleted.

The software displays the 3 types of Test configuration defined in IEC61000-4-11. These are Class 1, Class 2 and Class 3.

Class 1 allows the user to create a sequence of up to 9 individual Voltage Dip, Interruption and variation tests. The test level and duration needs to be entered. This is described in more detail later in this document.

Class 2 and Class 3 each contain a predetermined set of Dip and interrupt tests. The tests included for each Class are defined in IEC61000-4-11. They are displayed in the Test Overview dialog which is described in more detail later in this document.

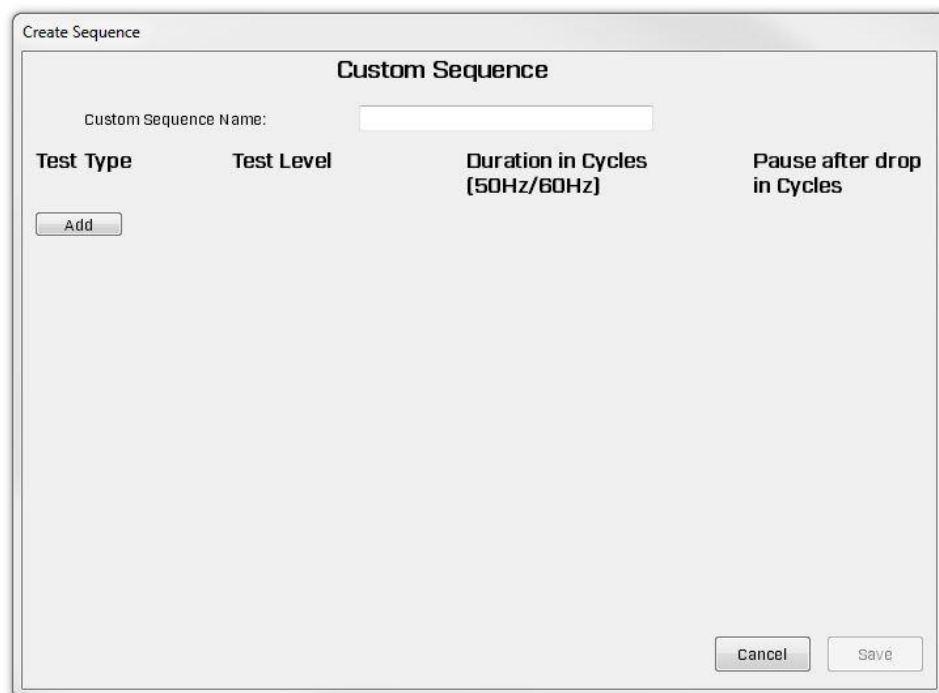
Voltage variations are detailed in table 3 in the Standard. These tests are optional and are therefore only selectable when performing a Class 1 test.

Any number of configurations can be added including more than 1 example of each Class. Each configuration can have a separate Nominal Voltage and Frequency. Test setup details and Notes can be added but these will be common to all configurations.

To create a Class 2 or Class 3 configuration select the Class type under EUT Details. Enter the Nominal Voltage and Frequency and enter or update any of the test details if required. Click on "**Add**" in the top right hand corner of the dialog box to save the current configuration, and add and display the next configuration.

The configuration details near the top of the dialog box will be updated.

To create a **Sequence** configuration select Class 1 under EUT details. Then click on "**Add**" under EUT details. A Create Custom Sequence window opens:



Custom Sequence

Custom Sequence Name:

Test Type	Test Level	Duration in Cycles (50Hz/60Hz)	Pause after drop in Cycles
Add			

Enter a name for sequence.

Click on "**Add**"

Create Sequence

Custom Sequence

Custom Sequence Name:

Test Type	Test Level	Duration in Cycles (50Hz/60Hz)	Pause after drop in Cycles
Dip	50.00 %	10.0 / 12.0 ☒ Auto Ratio	0.0
Add			Remove

The first test will be displayed.

Under Test Type select Dip, Interrupt or variation from the drop down menu.

Voltage Dips

Enter the required test Level. This is the percentage change that the voltage will "Dip" to whilst the test is running. For example, with a nominal voltage of 100V and a Test level of 75% is entered, the voltage would drop to 75V or 75% of the nominal voltage.

Enter the duration in cycles. The voltage "Dip" will be applied for this number of cycles. A value can be entered individually for 50Hz and 60Hz tests. Alternatively if the Auto Ratio box is selected when a value is entered for 50Hz the duration of the same ratio is automatically calculated and entered for 60Hz. If a value is entered for 60Hz first then the value for 50Hz will be calculated and entered into the window.

Voltage Interruptions

The voltage test level for interruptions should be 0%. The software defaults to this level when interruptions are selected.

Enter the duration in cycles. Refer to Voltage Dips above for full details on selecting the duration.

Voltage Variations

Enter the test levels. The preferred settings detailed in table 3 of the Standard are 70% to 100%.

Enter the duration in cycles. The preferred duration in table 3 is 25 cycles at 50Hz and 30 cycles at 60Hz. For voltage variations this is the time for the voltage to increase from the lower test level to the higher test level.

Enter the "pause after drop in cycles". This is the time interval that the voltage remains at the low (reduced) test level before starting to return to the higher test level. The preferred value stated in table 3 of the Standard is 1 cycle. The software automatically defaults to 1 cycle when a variation test type is selected.

Note: Table 3 states that the product committee can define their own test levels, duration and pause after the abrupt drop in voltage. Therefore, the user is able to adjust any of these settings in the software if required.

Click on "**Add**" to add another test to the sequence. The test can be deleted by clicking on "**Remove**".

The maximum number of tests in each sequence is 9. Once this figure is reached the option to "**Add**" a test is no longer displayed.

Create Sequence

Custom Sequence

Custom Sequence Name:

Test Type	Test Level	Duration in Cycles (50Hz/60Hz)	Pause after drop in Cycles
Dip	50.00 %	10.0 / 12.0 ☒ Auto Ratio	0.0
Dip	50.00 %	20.0 / 24.0 ☒ Auto Ratio	0.0
Dip	40.00 %	10.0 / 12.0 ☒ Auto Ratio	0.0
Interrupt	0.00 %	15.0 / 18.0 ☒ Auto Ratio	0.0
Interrupt	0.00 %	10.0 / 12.0 ☒ Auto Ratio	0.0
Variation	50.00 % 100.00 %	10.0 / 12.0 ☒ Auto Ratio	1.0
Variation	80.00 % 100.00 %	20.0 / 24.0 ☒ Auto Ratio	1.0
Dip	70.00 %	20.0 / 24.0 ☒ Auto Ratio	0.0
Dip	25.00 %	1.0 / 1.0 ☒ Auto Ratio	0.0

When the required number of tests have been entered click on **"Save"**.

This returns the user to the Add / Edit Configuration dialog which will have been updated to include the new configurations selected above.

IECSoft v2.6-U

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Add/Edit Configuration

Configuration: 1 / 6

Prev

Configure details

Nominal Voltage (UT): V Frequency:

EUT Details

Sequence Class: ☒ Class 1 ☐ Class 2 ☐ Class 3

EUT Type: EUT input port tested:

EUT operation mode: Connections:

Cables: Peripherals:

Test Setup Notes:

General Notes:

To enter another sequence click on "**Add**" under EUT details and follow the above procedure to create another sequence.

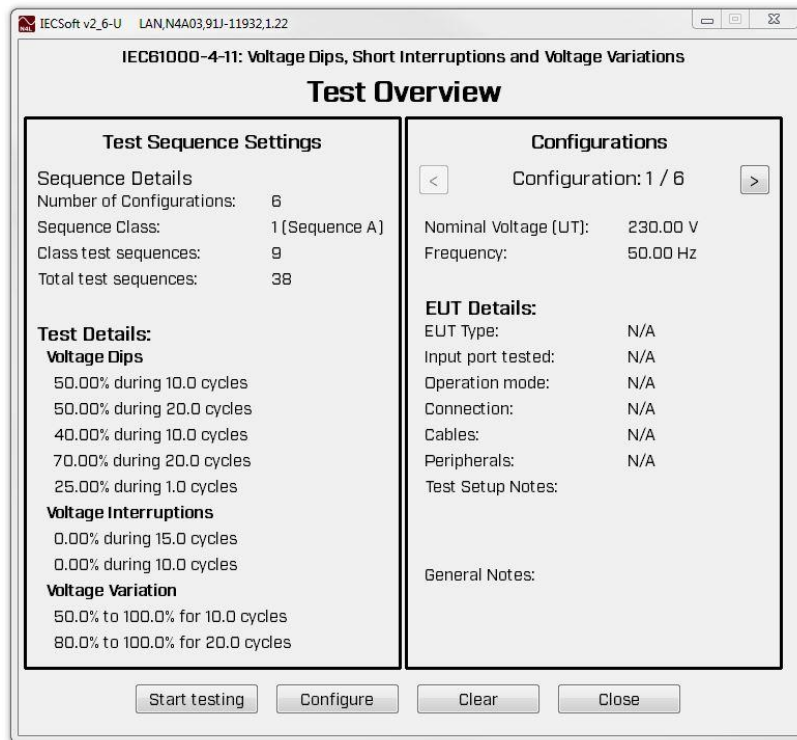
To include a custom sequence in a Configuration, click on Class 1 under EUT details. Click on the drop down menu under Class 1 and select the required sequence.

It is possible to step through the configurations. If you click on "**Prev**" button in the top left hand corner the "**Add**" button in the top right hand corner will change to "**Next**". You can step through the Configurations using these buttons.

Note: The "Add / Next" button changes to "**Add**" when the highest Configuration is being displayed but changes back to "**Next**" when any other configuration is displayed.

If the "**Remove**" button is pressed the displayed Configuration is deleted and the total number of Configurations displayed near the top of the dialog box is reduced by one.

Once the desired number of Test configurations has been entered click the "**Save and Return**" button. The test Overview dialog box appears:



The Test Overview dialog box data on the individual tests to be performed for each configuration. The configuration displayed is adjusted using the < > arrow keys in the top right hand corner of the dialog box.

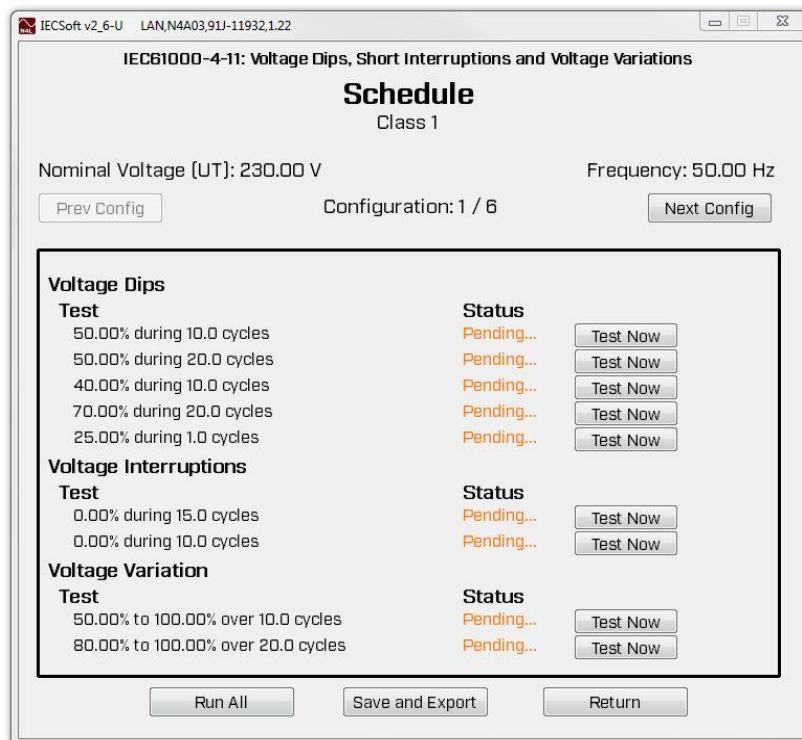
The test sequence details are displayed along with the EUT details and notes entered previously. When a different Configuration is selected the test details will be updated to represent the new configuration.

Click on "**Configure**" to return to the previous screen to update the Test Configurations.

Click on "**Clear**" to display the default setting which will clear any saved Configurations.

Click on "**Close**" to close the window and return to the "Connect to AC Source" dialog box.

Click on “**Start Testing**” to proceed with the tests:



The Schedule dialog box is displayed. This lists the individual DIP and Interruption tests to be performed for each test configuration along with detail of each test.

The “**Next Config**” & “**Prev Config**” buttons can be used to select which configuration is displayed in the dialog box.

The Status is shown for each of the individual tests. PENDING against a test indicates that that test has not yet been performed. The status will change to COMPLETE once that test has been performed.

The tests are executed one at a time by clicking on “**Test Now**” against each test. Once one test is complete another test is started by clicking on “**Test Now**” against that test. The test can be executed in any order.

Alternatively all tests can be performed one after each other by clicking on the “**Run All**” button which is described in more detail later in this document.

4.3.1 Individual testing:

Clicking on “**Test Now**” opens the Test Sequence dialog box.

The screenshot shows a software window titled "IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations" with a subtitle "Test Sequence". The window displays configuration details: "Configuration: 1 / 6", "Nominal Voltage (UT): 230.00 V", and "Frequency: 50.00 Hz". It features an "Event Timing" section with input fields for "Pause for 10 s between events" and "Pause for 10 s between phases". Below this, a section titled "Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles" contains three buttons: "Start Source", "Run Sequence", and "Stop Source". The "AC Source" status is shown as "OFF" in a green box. At the bottom of this section, there is a "Result:" dropdown menu set to "Undetermined" and a "Notes:" text area. The main window has a footer with "Previous", "Save and Return", and "Next" buttons.

The Source Status is displayed. This will be displaying **OFF** and shaded green so that the User will know that the Source output is not enabled and the EUT does not have power applied.

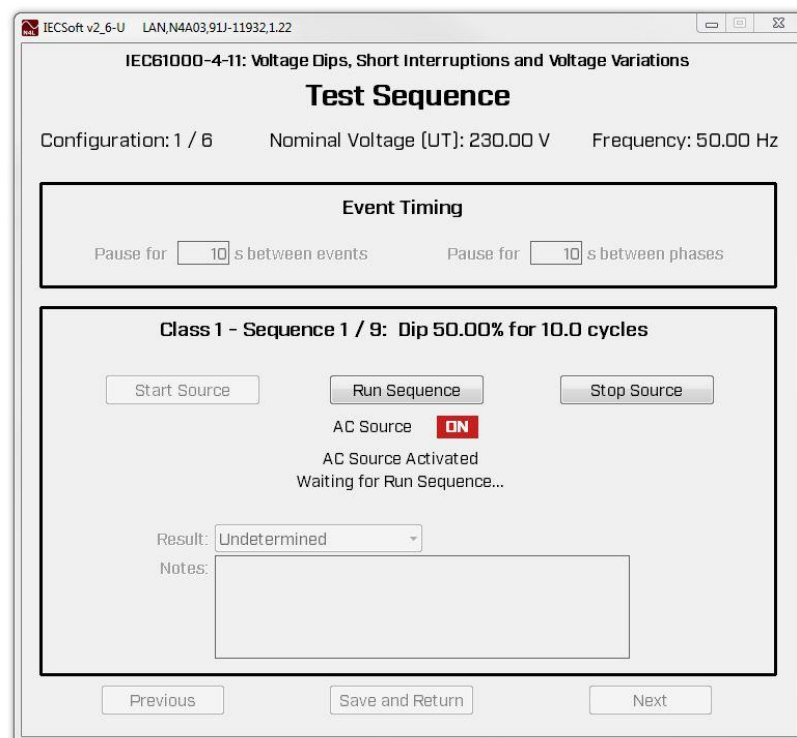
The selected nominal voltage and frequency are displayed along with the Configuration number of the test being performed.

Details of the individual test are also displayed. This information includes the Class type, the DIP / Interrupt percentage figure and the number of Cycles.

The user can enter a value for “Pause between Events”. The value entered will determine how long the AC source output remains on for before the test starts and after the test is completed. A default value of 10 seconds applies which is the minimum period stated in the Standard document.

The "Pause between Phases" option does not apply for single phase testing so is greyed out and can't be selected in the test window.

Clicking on "**Start Source**" enables the "Run Sequence" and "Stop Source" buttons and disables the "Start Source" button.



The Start Source button is now greyed out and can't be selected. The Source Status now displays **ON** indicating that the Source Output is enabled. It is also highlighted with a red background to warn the User that the EUT is now powered up.

The output of the AC Source will remain **ON until the Stop Source button is pressed. It will NOT be switched off on completion of the test.**

The AC Source can be switched off at any time by clicking on the STOP SOURCE button.

The Test status message also indicates that the source Output is On and that the software is waiting to be told to start the event (test).

Click on **“Run Sequence”** to start the test running:

IECSoft v2.6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing

Pause for s between events Pause for s between phases

Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles

AC Source **ON**

AC Source Activated
Waiting for next Event
Time until Event 1 starts: 5 s, 491 ms

Result:

Notes:

To comply with the requirements of the Standard, each Test (event) must be repeated three times. This can be seen in the Test status message which is constantly updated with the event being performed or the time until the next event begins.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing

Pause for s between events Pause for s between phases

Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles

AC Source **ON**

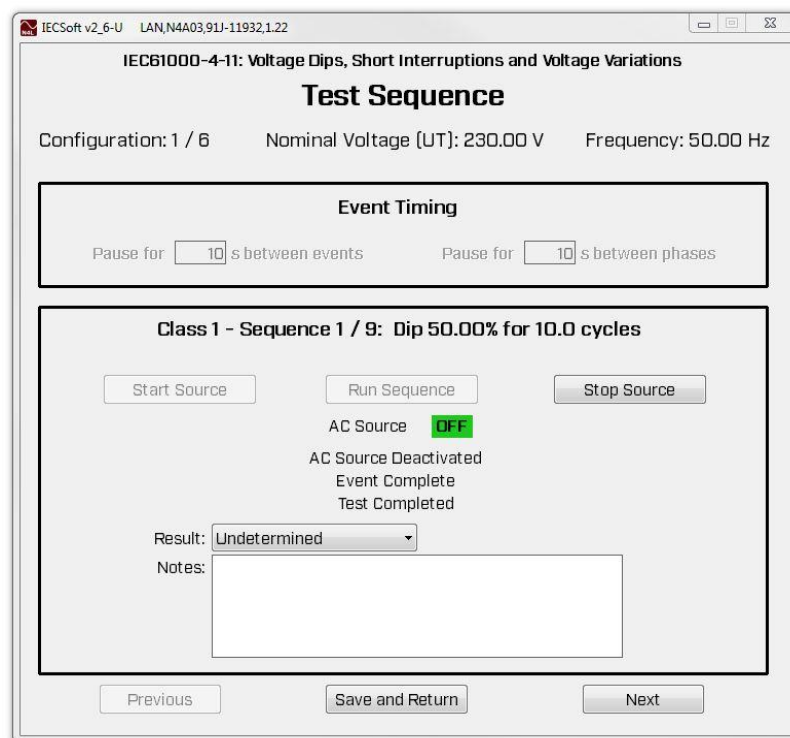
AC Source Activated
Event Complete

Result:

Notes:

At the end of the test the status message will confirm that the event (3 tests) is complete. The status message and warning Icon will both indicate that the source output is still **ON**.

Click on "**Stop Source**" to switch **OFF** the AC Source output.



The AC Source warning Icon now changes to **OFF** with a green background to indicate that the Source Output is now off and the EUT is safe to handle.

The Status message also indicates that the AC Source is now deactivated along with details of the test.

The result of the test can be entered along with tests notes.

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing

Pause for s between events Pause for s between phases

Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles

AC Source **OFF**

AC Source Deactivated
Event Complete
Test Completed

Result:

Notes:

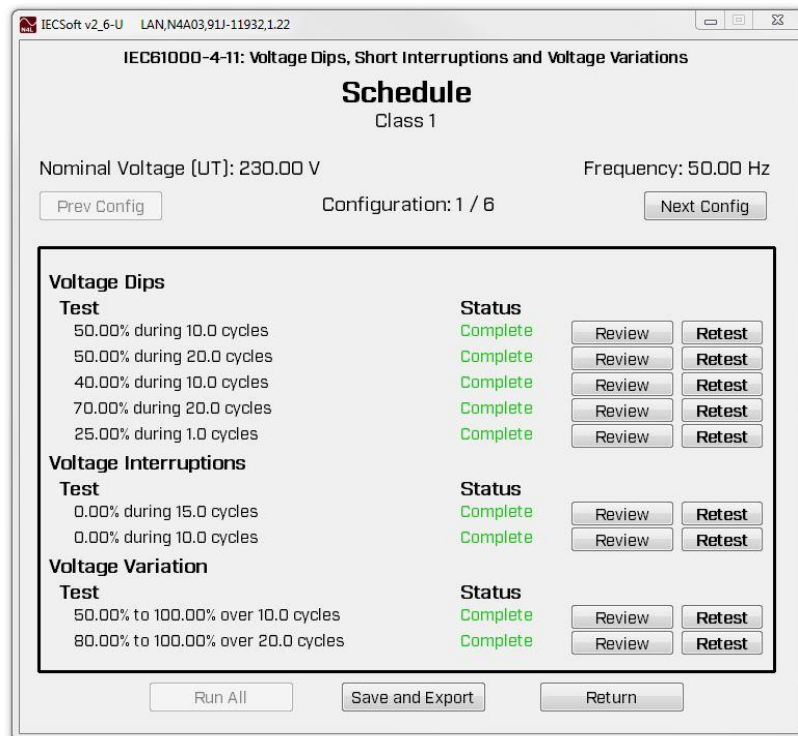
The result of the test can be selected from the list of options in the drop down menu: Pass, Fail or Undetermined. There is also a space to enter any notes about this particular test.

The **"Next"** and **"Previous"** buttons can be used to step through the Test Sequences to allow another test to be selected. The above procedure is then repeated to perform another test.

The buttons also allow the status of each Test Sequence to be confirmed.

The user can return to the Schedule window at any time by clicking on **"Save and Return"**.

When each test is completed the Status in the Schedule dialog box changes to Complete. The “Test Now” button is changed to “Review” and an extra “Retest” button appears.



Clicking on “**Review**” displays the Test Sequence dialog box for that test. Clicking on “**Retest**” will change the Status for that test back to “Pending”. The “Review” button will be replaced by a “Test Now” button which can be used to repeat the test.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Schedule

Class 1

Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Prev Config Configuration: 1 / 6 Next Config

Test	Status	
Voltage Dips		
50.00% during 10.0 cycles	Pending...	Test Now
50.00% during 20.0 cycles	Complete	Review Retest
40.00% during 10.0 cycles	Complete	Review Retest
70.00% during 20.0 cycles	Complete	Review Retest
25.00% during 1.0 cycles	Complete	Review Retest
Voltage Interruptions		
0.00% during 15.0 cycles	Complete	Review Retest
0.00% during 10.0 cycles	Complete	Review Retest
Voltage Variation		
50.00% to 100.00% over 10.0 cycles	Complete	Review Retest
80.00% to 100.00% over 20.0 cycles	Complete	Review Retest

Run All Save and Export Return

The test can be repeated by clicking on the **"Return"** button at the bottom of the Schedule dialog box. A message will appear reminding you that continuing will delete all save tests. Clicking **"Yes"** to continue will return you to the Test Overview dialog box.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Schedule

Class 1

Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Prev Config Configuration: 1 / 6 Next Config

Test	Status	
Voltage Dips		
50.00% during 10.0 cycles	Pending...	Test Now
50.00% during 20.0 cycles	Complete	Review Retest
40.00% during 10.0 cycles	Complete	Review Retest
70.00% during 20.0 cycles	Complete	Review Retest
25.00% during 1.0 cycles	Complete	Review Retest
Voltage Interruptions		
0.00% during 15.0 cycles	Complete	Review Retest
0.00% during 10.0 cycles	Complete	Review Retest
Voltage Variation		
50.00% to 100.00% over 10.0 cycles	Complete	Review Retest
80.00% to 100.00% over 20.0 cycles	Complete	Review Retest

Run All Save and Export Return

Clear results

Returning to the Overview screen will clear any results. Would you like to return to Overview?

Yes No

4.3.2 Continuous “Run All” test mode:

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Schedule

Class 1

Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Prev Config Configuration: 1 / 6 Next Config

Test	Status	
50.00% during 10.0 cycles	Pending...	Test Now
50.00% during 20.0 cycles	Pending...	Test Now
40.00% during 10.0 cycles	Pending...	Test Now
70.00% during 20.0 cycles	Pending...	Test Now
25.00% during 1.0 cycles	Pending...	Test Now
Voltage Interruptions		
0.00% during 15.0 cycles	Pending...	Test Now
0.00% during 10.0 cycles	Pending...	Test Now
Voltage Variation		
50.00% to 100.00% over 10.0 cycles	Pending...	Test Now
80.00% to 100.00% over 20.0 cycles	Pending...	Test Now

Run All Save and Export Return

On the Schedule screen click on “**Run All**”. This will display the Run all Scheduled Tests settings window:

Run All Scheduled Tests

Autorun Settings

Pause Between Events: 10 s

Pause Between Phases: 10 s

Pause Between Tests: 5 s

Sounds

☒ Event Start ☒ Event End ☒ Test End

☒ Sequence Change ☒ Configuration Change

Keyboard Controls:

P = PASS F = FAIL U = UNDETERMINED

Press TAB to edit the notes

Press the ENTER to go to the next Config, and ESC to end autorun

WARNING: Source will be active throughout all tests

Begin Cancel

AUTO RUN SETTINGS

The user can enter a value for "Pause Between Events". The value entered will determine how long the AC source output remains on for before the test starts and after the test is completed. A default value of 10 seconds applies.

The "Pause between Phases" option does not apply for single phase testing so is greyed out and can't be selected in the test window.

The "Pause Between Tests" option means that it possible to adjust the delay period between a test finishing and the next one starting.

SOUNDS

It is possible to set sounds that will be triggered when Events and Tests start or finish. Each option selected will have a different sound to the others selected.

KEYPAD CONTROLS and MESSAGES

Details of the keypad control features are displayed along with messages.

NOTE:

The message warns the user that the AC Source Output will remain ON for the full duration of the Auto Run tests and will remain ON after the tests are completed until switched off by the user.

Click on "**Begin**" to Run All tests.

The software will now run through all of the tests for each sequence for the selected configuration.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing

Pause for s between events Pause for s between phases

Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles

Start Source Stop Source

AC Source **ON**

AC Source Activated
Waiting for next Event
Time until Event 1 starts: 4 s, 868 ms

Result:

Notes:

Previous Save and Return Next

The Test Sequence screen is displayed. The software will then step through all of the tests included in each of the Sequences. All tests will be repeated 3 times as per the requirements.

The warning Icon will indicate that the Source Output is **ON** and the EUT powered up.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.22

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing

Pause for s between events Pause for s between phases

Class 1 - Sequence 1 / 9: Dip 50.00% for 10.0 cycles

Start Source Stop Source

AC Source **ON**

AC Source Activated
Event Complete
Time until sequence changes: 2 s, 603 ms

Result:

Notes:

Previous Save and Return Next

The test status message will be continuously updated with details of the Configuration or Sequence being performed.

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations
Test Sequence
Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing
Pause for s between events Pause for s between phases

Class 1 - Sequence 9 / 9: Variation 80.00% to 100.00% for 20.0 cycles

Start Source Stop Source

AC Source **ON**
AC Source Activated
Event Complete
The next configuration is 230.0V at 50.0Hz

Result:
Notes:

Previous Save and Return Next

Once the test is completed Click on “**Stop Source**” to switch the Source Output **OFF**. When one configuration ends the “Enter” button can be used to move to the next configuration.

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations
Test Sequence
Configuration: 1 / 6 Nominal Voltage (UT): 230.00 V Frequency: 50.00 Hz

Event Timing
Pause for s between events Pause for s between phases

Class 1 - Sequence 9 / 9: Variation 80.00% to 100.00% for 20.0 cycles

Start Source Run Sequence Stop Source

AC Source **OFF**
AC Source Deactivated
Event Complete
Test Completed

Result:
Notes:

Previous Save and Return Next

Click on "**Save and Export**" to return to the SCHEDULE display.

The results from each test can be reviewed and Re-tested if required.

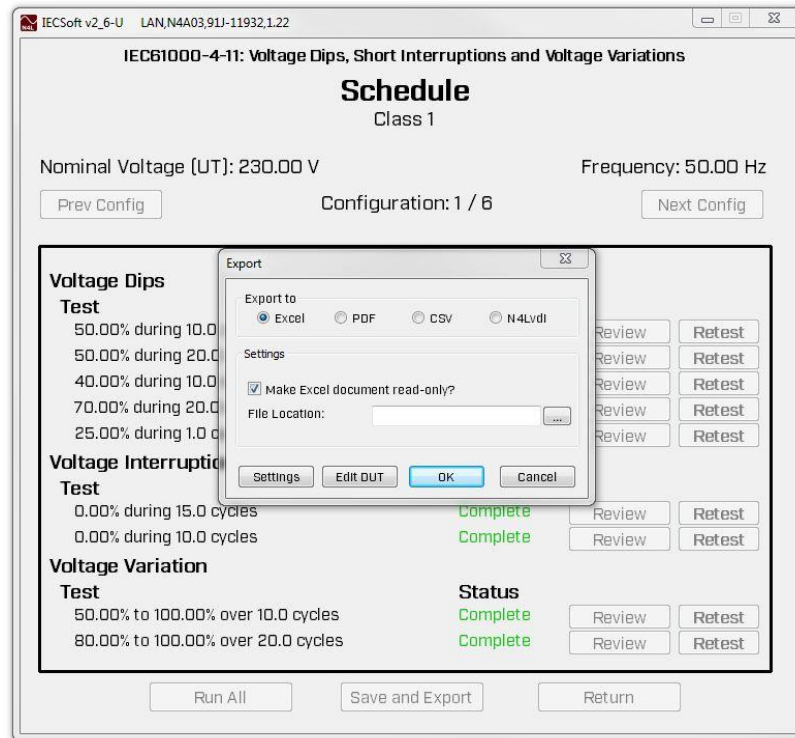
To continue testing click on "**Next Config**" in the top right hand corner of the test window. The details of the Next configuration are then displayed. To run all tests in the Configuration click on "**Run All**" or click on "**Test Now**" against any test to run that individual test.

NOTE:

Always ensure that the AC SOURCE is switched OFF when testing is complete.

4.4 Saving / Exporting test data.

Clicking on “**Save and Export**” displays the Export window.



For IEC61000-4-11 mode Excel & PDF reports can be created and the results can be exported to “.csv” and “.n4lvgdi” files.

Section 6 in this manual provides full details of the IECSoft software Export function.

4.4.1 Example Excel Report

Click to add header

07th August 2019 - 11:24:15		Page 1/10		IECSoft v2_6	
		IEC61000-4-11:2004			
Voltage Dips, Short Interruptions, Voltage Variations					
Source Details					
Source Model	N4A03				
Source Serial	91J-11932				
Source Firmware	1.29				
Equipment Under Test					
Brand	N4L				
Model	Z100				
Serial	P1234				
Impedance Network ID	IMP001				
Rated Voltage	230.000V				
Rated Current	5.000A				
Rated Frequency	50.000Hz				
Rated Power	1.000kW				
Additional Test Details					
Operator	KAR				
Lab Name	N4L				
Location	LAB1				
Notes	IEC61000-4-11 test.				
Signature					

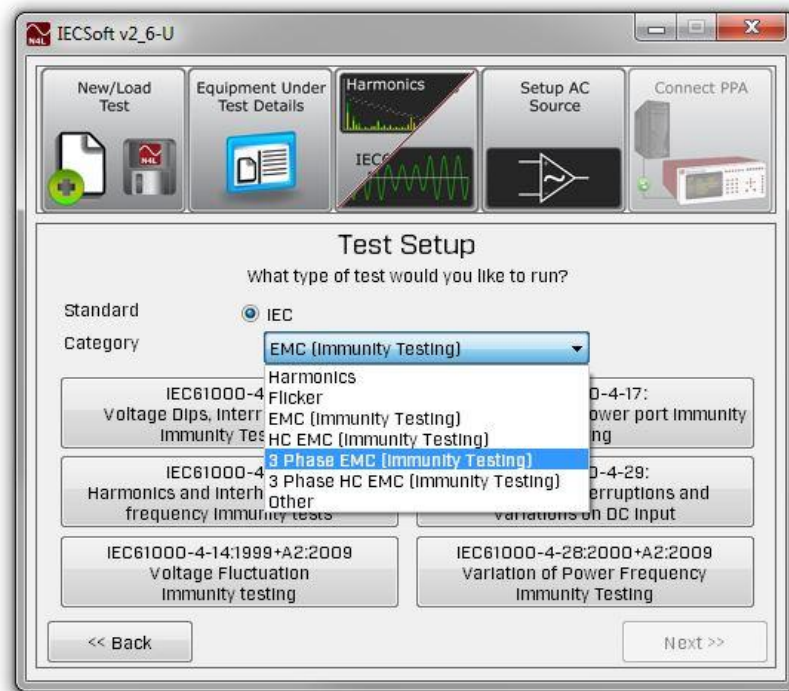
Click to add header

07th August 2019 - 11:24:15		Page 2/10	IECSoft v2_6
IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations			
Instrument Details			
Source Model	N4A03		
Source Serial	91J-11932		
Source Firmware	1.29		
Equipment Under Test			
Brand	N4L		
Model	Z100		
Serial	P1234		
Equipment Under Test			
EUT Type	N/A		
Input Port	N/A		
Operating Mode	N/A		
Connections	N/A		
Cables	N/A		
Peripherals	N/A		
Setup Notes			
General Notes			
Configuration Settings			
Nominal Voltage (UT)	230.000V		
Frequency	50.000Hz		
Sequence Class	1		
Sequence Name	Jan 19 seq2		
Test Results 1/9			
Test Type	Dip		
Test Level	50%		
Duration in cycles	10		
Test Notes			
Test Results	Undetermined		

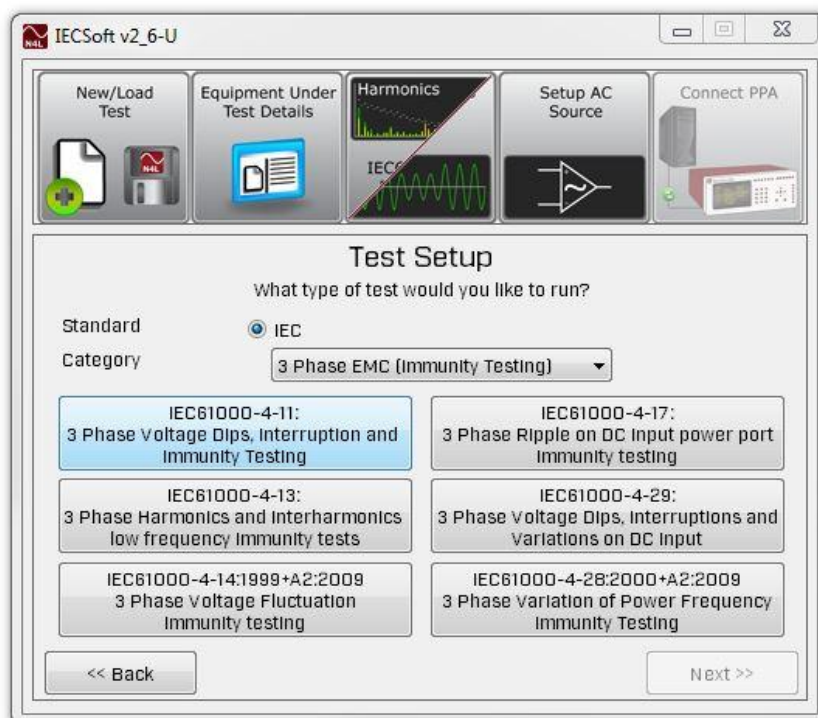
4.4.2 Example PDF Report

07th August 2019 - 11:24:15		Page 1/9	IECSoft v2_6
IEC61000-4-11:2004 Voltage Dips, Short Interruptions, Voltage Variations			
Config 1 Sequence 1			
AC Source Impedance Network ID EUT Details User Rated Voltage User Rated Current User Rated Frequency User Rated Power EUT Type Operation Mode Input Port Connections Cables Peripherals Setup Notes General Notes Operator Lab Name Location Notes Class Nominal Voltage (UT) Frequency Test Type Test Level Test Duration Test Notes	Instrumentation Details Newtons4th N4A03 SN: 91J-11932 Firmware: v1.29 IMP001 Brand: N4L Model: Z100 Serial: P1234 230.000V 5.000A 50.000Hz 1.000kW N/A N/A N/A N/A N/A Operating Conditions KAR N4L LAB1 IEC61000-4-11 test. Test Configuration 1 (Jan 19 seq2) 230.000V 50.000Hz Dip 50% 10 cycles		
Signature			
Results	Undetermined		

4.5 3-Phase Test Procedure.



Open the software and step through the dialog screens. In the Test Setup dialog click on category and select 3-Phase EMC (Immunity Testing) from the drop down menu.

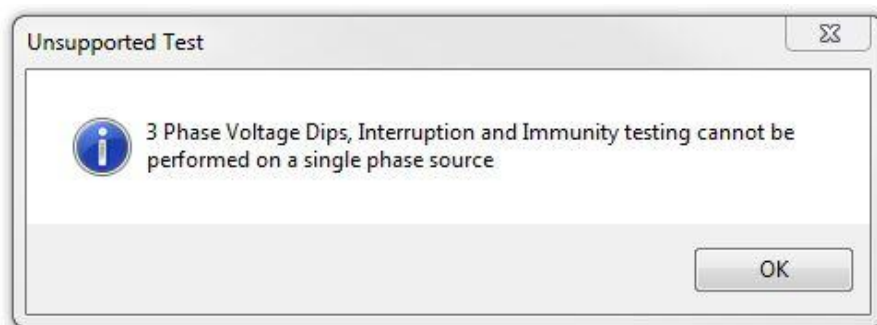


Click on the IEC61000-4-11 3 Phase Voltage Dips, Interruption and Immunity testing option.

Follow the on screen instructions as per Single Phase testing to connect to the AC Source.

Note:

A 3-phase AC Source is required to perform these tests. When attempting to connect to a Single Phase Source in this mode the following message is displayed.



Clicking on "**OK**" will return the user back to the Connect to AC Source dialog box.

The procedure is the same as for Single Phase tests with the exception of the following:

- The Dips have to be performed on all phase to phase options along with phase to neutral. This results in 18 different tests per DIP test (That is: 3x ph1-ph2, 3x ph2-3, 3x ph3-1, 3x ph1-n, 3x ph2-n and 3x ph3-n). Further details can be found in Section 8.2.1 and figure 4b in the BSEN 61000-4-11 Standard document.
- Interrupts (and variations) are performed simultaneously on all 3 phases.

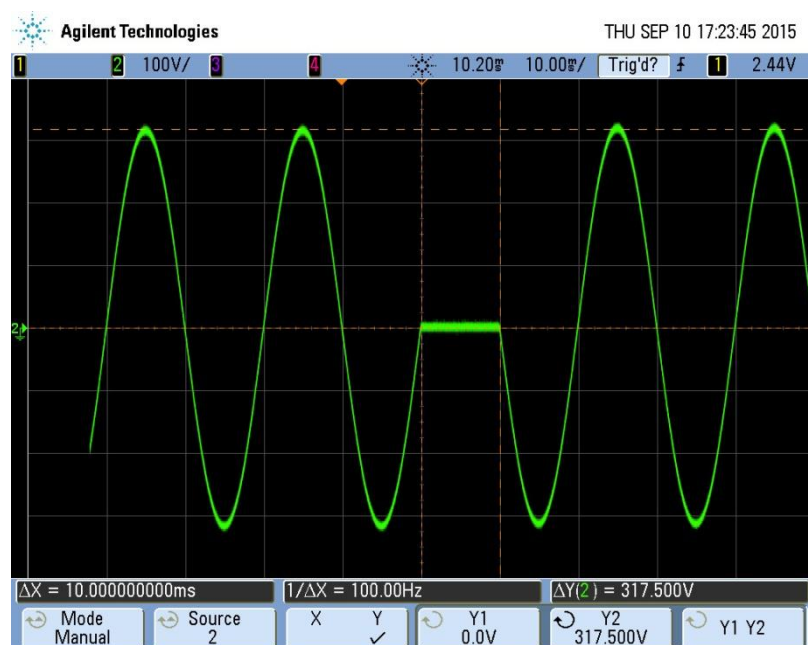
4.6 Example Voltage DIP & Voltage Interruption Waveforms.

IEC61000-4-11 refers to specific Voltage Dip and Interruption tests of defined Voltage level and duration (cycles). This software controls the output of a N4A AC source to apply these signals to the EUT. The tests defined in the Standard can be viewed in the Schedule and Test Sequence dialog windows.

On the following pages are several examples of the AC Source output during these tests when monitored using an Oscilloscope.

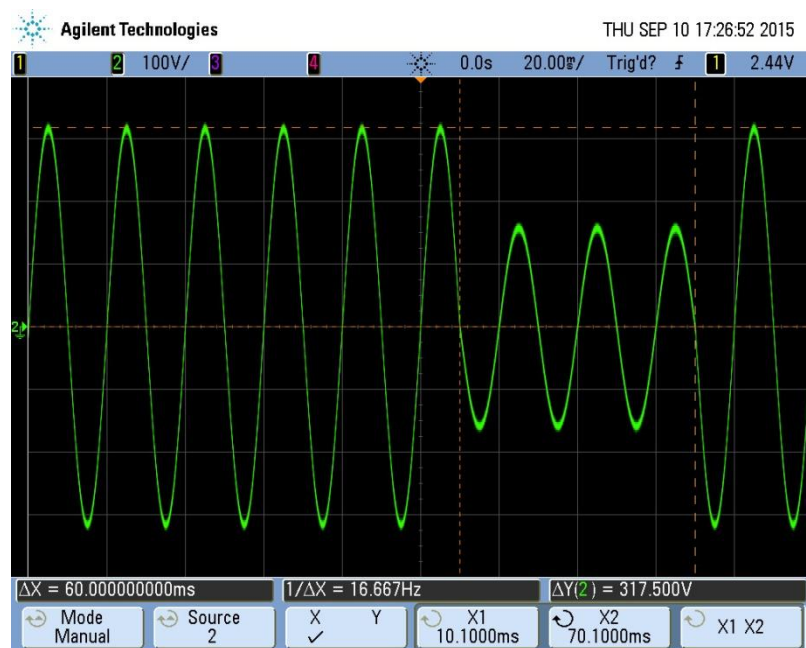
Class 2 - 230V 50Hz

Voltage Dip test – 0% during 0.5 cycles.



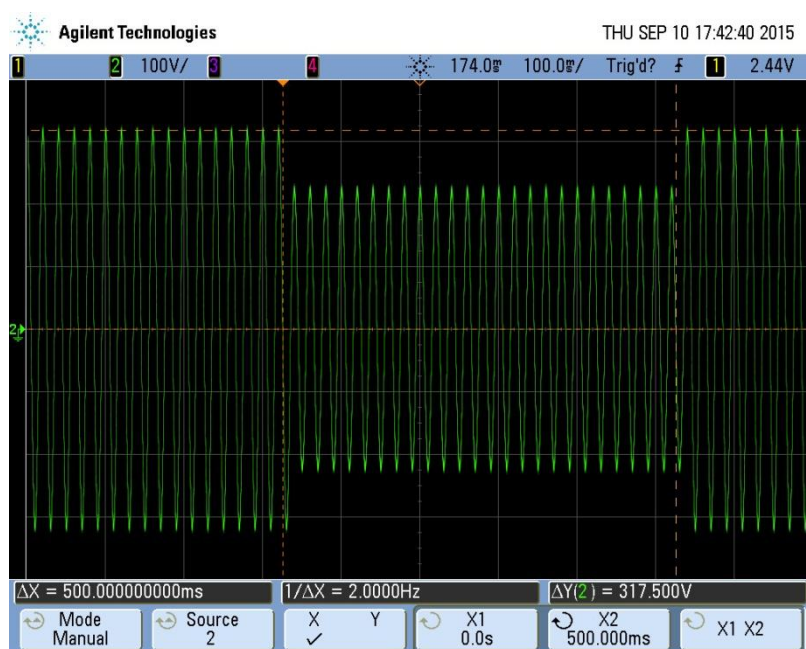
Class 2 - 230V 50Hz

Voltage Interruption test – 50% during 3 cycles.



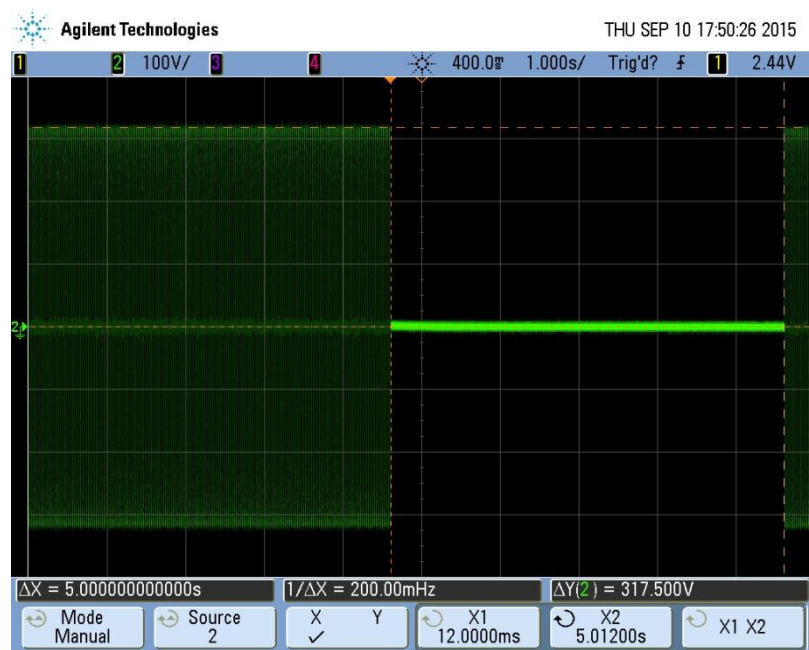
Class 3 - 230V 50Hz

Voltage Dip test – 70% during 25 cycles.



Class 3 - 230V 50Hz

Voltage Interruption test – 0% during 250 cycles.



5 IEC61000-4-13

Harmonics and Inter-harmonics Low frequency Immunity tests.

This section explains how to use the IECSoft test software along with a N4A Source and PPA to perform Harmonic and Inter-harmonic Low Frequency Immunity Tests to the requirements defined in IEC61000-4-13.

5.1 Scope

The object of these tests is to evaluate the functional immunity of electrical and electronic equipment when subjected to harmonics and inter-harmonics and mains signalling frequencies.

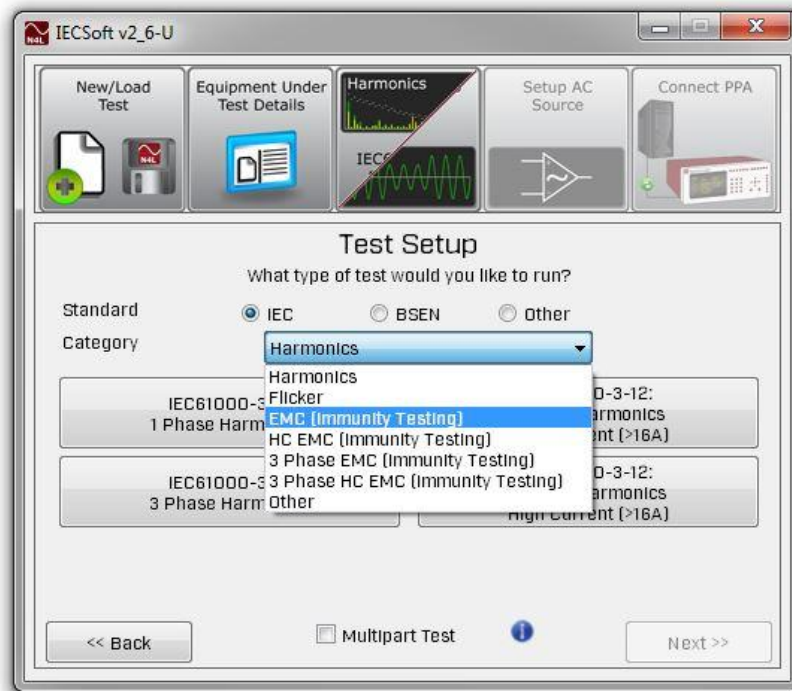
Whilst the tests are being performed the Equipment Under Test (EUT) should be under constant observation. There should be no malfunction of the EUT during any of the tests.

On completion of each test the software will ask for the result of the test to be entered. The result entered is determined by the observation of the behaviour of the EUT during the test.

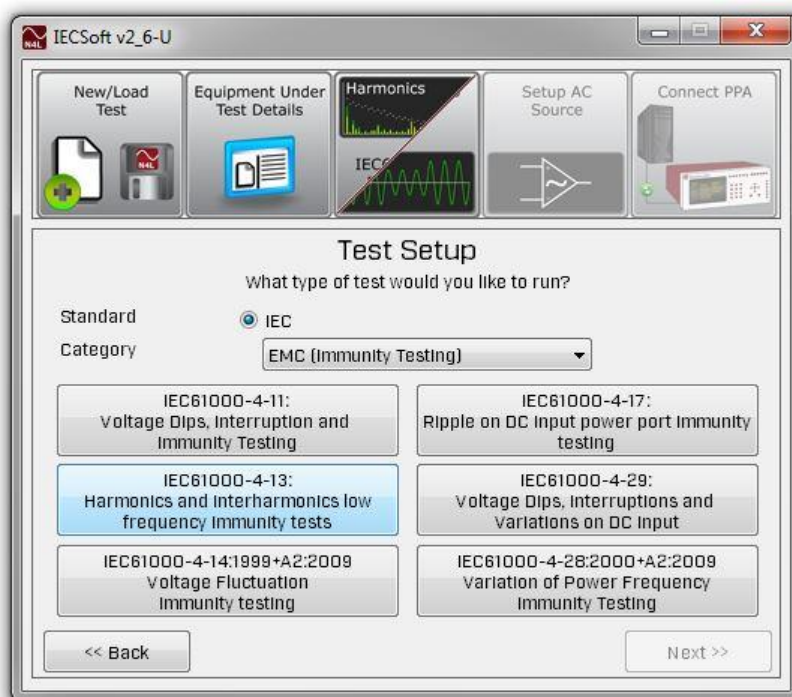
Observation of the loss of function or degradation of performance of the EUT during the tests is used to determine the classification. The definitions of acceptable performance and a malfunction should be agreed between the laboratory performing the tests and the manufacturers / purchasers of the EUT. More details on Classifications can be found in section 9 of the IEC61000-4-13 Standard document.

5.2 Test Procedure

Open the software and step through the dialog screens. In the Test Setup dialog click on category and select EMC (Immunity Testing) from the drop down menu.



The Test Setup screen will then display the various EMC tests that can be performed.

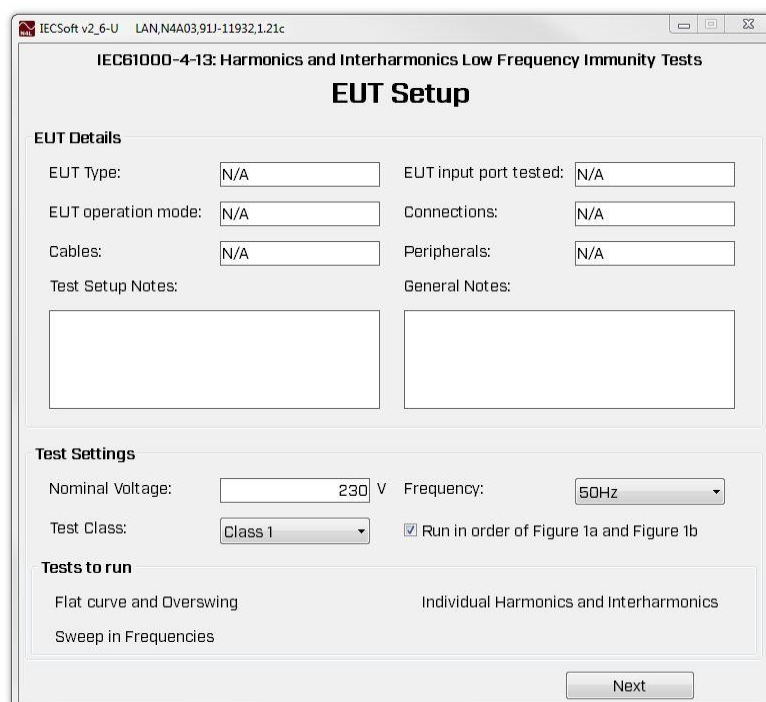


Click on the IEC61000-4-13 Harmonics and Inter-harmonics Low frequency Immunity tests option.



The Connect to AC Source Dialog is then displayed. Check the Interface settings and then click on “**Connect & Setup**”.

The EUT Setup dialog box is displayed:



Select the required class to be tested from the “**Test Class**” drop down menu.

The screenshot shows a software window titled "IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests" with a subtitle "EUT Setup". The window is divided into two main sections: "EUT Details" and "Test Settings".

EUT Details:

- EUT Type: N/A
- EUT input port tested: N/A
- EUT operation mode: N/A
- Connections: N/A
- Cables: N/A
- Peripherals: N/A
- Test Setup Notes: (empty text area)
- General Notes: (empty text area)

Test Settings:

- Nominal Voltage: 230 V
- Frequency: 50Hz
- Test Class: A dropdown menu is open, showing options: Class 1 (highlighted), Class 2, Class 3, and Class X.
- ☒ Run in order of Figure 1a and Figure 1b
- Tests to run:** A section with checkboxes for "Flat curve and Overswing" and "Sweep in Frequencies".
- ☐ Individual Harmonics and Interharmonics

A "Next" button is located at the bottom right of the dialog box.

There is also an option to select the order in which the tests are performed. Once selected the tests can only be performed in the order shown in figure 1a and figure 1b of the IEC61000-4-13 Standard document. If not selected on this screen, the tests can be performed in any order.

Click “**Next**” to continue.

The Test Level Settings dialog box for the selected Test Class is displayed.

Test Class 1:

The screenshot shows a software window titled "IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests". The main heading is "Test Level Settings". Below this, the "Frequency" is set to "50Hz" and the "Nominal Voltage" is set to "230V". The "Test Class" is "Test Class 1".

The "Harmonic Combination Levels (Section 8.2.1 including Table 7 and 8)" section includes:

- Flat Curve Voltage Ratio: 1.01331
- Flat Curve Voltage Level: 95.0 %
- Overswing: Test levels as a percentage of Nominal Voltage
- H3: 4.0 %
- H5: 3.0 %

The "Sweep in Frequency Levels (Section 8.2.2 including Table 9)" section includes:

- Test levels as a percentage of Nominal Voltage
- 16.5Hz to 100.0Hz: 2.000 %
- 100.0Hz to 500.0Hz: 5.000 %
- 500.0Hz to 1000.0Hz: 4.000 %
- 1000.0Hz to 1500.0Hz: 2.000 %
- 1500.0Hz to 2000.0Hz: 2.000 %

The "Meister Curve Levels (Section 8.2.4 including Table 11)" section includes:

- Test levels as a percentage of Nominal Voltage
- 16.5Hz to 100.0Hz: N/A %
- 100.0Hz to 500.0Hz: N/A %
- 500.0Hz to 1000.0Hz: N/A /f %
- 1000.0Hz to 2000.0Hz: N/A /f %

At the bottom, there are "Previous" and "Next" buttons.

The Test level Settings dialog box includes details of the tests to be performed along with the test levels and limits to be applied during the test. This information is determined using the information in the IEC61000-4-13 Standard document. References to the Document Section number and Table numbers are included in this dialog box to aid the clarification of the Values displayed in the dialog box.

With the exception of Class X, these levels and limits can't be changed by the user.

If a test does not apply to a particular class then that test will be "greyed out" with the limits shown as N/A. This individual test will not be performed.

Please refer to IEC61000-4-13 for confirmation of which tests apply to each class and for details of test levels and limits.

The screenshot above gives details of the applicable tests and test limits etc for Test Class 1.

Details of the other classes are:

Test Class 2:

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Test Level Settings

Frequency: 50Hz Nominal Voltage: 230V

Test Class 2

Harmonic Combination Levels (Section 8.2.1 including Table 7 and 8)

Flat Curve Voltage Ratio: 1.03792 Overswing
Test levels as a percentage of Nominal Voltage

Flat Curve Voltage Level: 90.0 % H3: 6.0 % H5: 4.0 %

Sweep in Frequency Levels (Section 8.2.2 including Table 9)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	N/A %	1000.0Hz to 1500.0Hz	N/A %
100.0Hz to 500.0Hz	N/A %	1500.0Hz to 2000.0Hz	N/A %
500.0Hz to 1000.0Hz	N/A %		

Meister Curve Levels (Section 8.2.4 including Table 11)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	3.000 %	500.0Hz to 1000.0Hz	4500.000 /f %
100.0Hz to 500.0Hz	9.000 %	1000.0Hz to 2000.0Hz	4500.000 /f %

Previous Next

Test Class 3:

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Test Level Settings

Frequency: 50Hz Nominal Voltage: 230V

Test Class 3

Harmonic Combination Levels (Section 8.2.1 including Table 7 and 8)

Flat Curve Voltage Ratio: 1.11170 Overswing
Test levels as a percentage of Nominal Voltage

Flat Curve Voltage Level: 80.0 % H3: 8.0 % H5: 5.0 %

Sweep in Frequency Levels (Section 8.2.2 including Table 9)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	4.500 %	1000.0Hz to 1500.0Hz	6.000 %
100.0Hz to 500.0Hz	14.000 %	1500.0Hz to 2000.0Hz	4.000 %
500.0Hz to 1000.0Hz	9.000 %		

Meister Curve Levels (Section 8.2.4 including Table 11)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	N/A %	500.0Hz to 1000.0Hz	N/A /f %
100.0Hz to 500.0Hz	N/A %	1000.0Hz to 2000.0Hz	N/A /f %

Previous Next

Class X:

This is an example only. For Class X the tests and limits can be selected by the user. Please refer to Section 2.3 for full details of the Class X setup procedure.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Test Level Settings

Frequency: 50Hz Nominal Voltage: 230V

Test Class X

Harmonic Combination Levels (Section 8.2.1 including Table 7 and 8)

Flat Curve Voltage Ratio: 1.03792 Overswing

Flat Curve Voltage Level: 90.0 % Test levels as a percentage of Nominal Voltage

H3: 6.0 % H5: 4.0 %

Sweep in Frequency Levels (Section 8.2.2 including Table 9)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	☒	3.000 %	1000.0Hz to 1500.0Hz	☒	2.000 %
100.0Hz to 500.0Hz	☒	9.000 %	1500.0Hz to 2000.0Hz	☒	2.000 %
500.0Hz to 1000.0Hz	☒	4.500 %			

Meister Curve Levels (Section 8.2.4 including Table 11)

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz	☐	N/A %	500.0Hz to 1000.0Hz	☐	N/A /f %
100.0Hz to 500.0Hz	☐	N/A %	1000.0Hz to 2000.0Hz	☐	N/A /f %

Previous Next

Click “**Next**” to display the Harmonic Levels dialog box.

Test Class 1

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Frequency: 50Hz Nominal Voltage: 230V

Test Class 1

Harmonics and Interharmonics (Section 8.2.3)

Frequencies between harmonic frequencies (Table 4a, 4b and 10)

Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	N/A %	750.0Hz to 1000.0Hz	N/A %
100.0Hz to 500.0Hz	N/A %	1000.0Hz to 2000.0Hz	N/A %
500.0Hz to 750.0Hz	N/A %		

Harmonics Test Levels (Table 1, 2 and 3)

Test levels as a percentage of Nominal Voltage

H 5	4.500 %	H 25	2.000 %	H 3	4.500 %	H 2	3.000 %
H 7	4.500 %	H 29	1.500 %	H 9	2.000 %	H 4	1.500 %
H 11	4.500 %	H 31	1.500 %	H 15	N/A	H 6	N/A %
H 13	4.000 %	H 35	1.500 %	H 21	N/A	H 8	N/A %
H 17	3.000 %	H 37	1.500 %	H 27	N/A	H 10	N/A %
H 19	2.000 %			H 33	N/A	Even H	N/A %
H 23	2.000 %			H 39	N/A	12-40	

Previous Next

Test Class 2

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Frequency: 50Hz Nominal Voltage: 230V

Test Class 2

Harmonics and Interharmonics (Section 8.2.3)

Frequencies between harmonic Frequencies (Table 4a, 4b and 10)

Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	N/A %	750.0Hz to 1000.0Hz	N/A %
100.0Hz to 500.0Hz	N/A %	1000.0Hz to 2000.0Hz	N/A %
500.0Hz to 750.0Hz	N/A %		

Harmonics Test Levels (Table 1, 2 and 3)

Test levels as a percentage of Nominal Voltage

H 5	N/A %	H 25	N/A %	H 3	N/A %	H 2	N/A %
H 7	N/A %	H 29	N/A %	H 9	N/A %	H 4	N/A %
H 11	N/A %	H 31	N/A %	H 15	N/A %	H 6	N/A %
H 13	N/A %	H 35	N/A %	H 21	N/A %	H 8	N/A %
H 17	N/A %	H 37	N/A %	H 27	N/A %	H 10	N/A %
H 19	N/A %			H 33	N/A %	Even H	N/A %
H 23	N/A %			H 39	N/A %	12-40	N/A %

Previous Next

Test Class 3

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Frequency: 50Hz Nominal Voltage: 230V

Test Class 3

Harmonics and Interharmonics (Section 8.2.3)

Frequencies between harmonic Frequencies (Table 4a, 4b and 10)

Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	4.000 %	750.0Hz to 1000.0Hz	3.000 %
100.0Hz to 500.0Hz	9.000 %	1000.0Hz to 2000.0Hz	2.000 %
500.0Hz to 750.0Hz	5.000 %		

Harmonics Test Levels (Table 1, 2 and 3)

Test levels as a percentage of Nominal Voltage

H 5	12.000 %	H 25	6.000 %	H 3	9.000 %	H 2	5.000 %
H 7	10.000 %	H 29	5.000 %	H 9	4.000 %	H 4	2.000 %
H 11	7.000 %	H 31	3.000 %	H 15	3.000 %	H 6	1.500 %
H 13	7.000 %	H 35	3.000 %	H 21	2.000 %	H 8	1.500 %
H 17	6.000 %	H 37	3.000 %	H 27	2.000 %	H 10	1.500 %
H 19	6.000 %			H 33	2.000 %	Even H	1.500 %
H 23	6.000 %			H 39	2.000 %	12-40	

Previous Next

Details of the Class X setup are explained in section 2.3.

Click “**Next**” to display the Test Schedule dialog box.

The following are examples for Test Class 1.

Example 1

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Schedule

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Test	Status	
Harmonic Combination	Pending...	Test Now
Sweep in Frequencies	Pending...	Test Now
Individual Harmonics	Pending...	Test Now
Meister Curve	Not Required	Test Now

Cancel Export

Example 2

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Schedule

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Test	Status	
Harmonic Combination	Pending...	Test Now
Sweep in Frequencies	Pending...	Test Now
Individual Harmonics	Pending...	Test Now
Meister Curve	Not Required	Test Now

Cancel Export

Details of the tests that can be performed along with the status of each test are displayed.

Example 1 above is for Test Class 1 with "Run in order of figure 1a and Figure 1b" selected in the EUT Setup dialog box. Only the Harmonic Combination test can be performed. Once this test is completed the Sweep in Frequencies test will become available. Once that test is completed the Individual Harmonics test will become available.

In Example 2 "Run in order of figure 1a and figure 1b" was not selected so the applicable Class 1 tests can be performed in any order.

The tests are executed one at a time by clicking on "Test Now" against each test. Once one test is complete another test is started by clicking on "Test Now" against that test.

The Status is shown for each of the individual tests. PENDING against a test indicates that that test has not yet been performed. The status will change to COMPLETE once that test has been performed.

If a test is not applicable to that Test Class it will be "greyed out" and the test can't be performed.

The following are examples of the other Test Classes with "Run in order of figure 1a and Figure 1b" selected in the EUT Setup dialog box.

Test Class 2

IECSoft v2_6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Schedule

Frequency: 50Hz Nominal Voltage: 230V

Test Class 2

Test	Status	
Harmonic Combination	Pending...	Test Now
Sweep in Frequencies	Not Required	Test Now
Individual Harmonics	Not Required	Test Now
Meister Curve	Pending...	Test Now

Test Class 3

IECSoft v2_6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Schedule

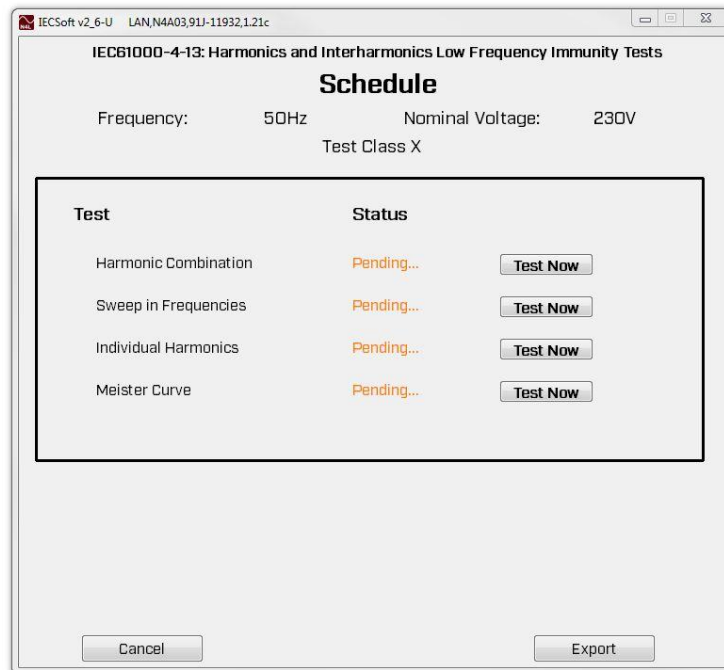
Frequency: 50Hz Nominal Voltage: 230V

Test Class 3

Test	Status	
Harmonic Combination	Pending...	Test Now
Sweep in Frequencies	Pending...	Test Now
Individual Harmonics	Pending...	Test Now
Meister Curve	Not Required	Test Now

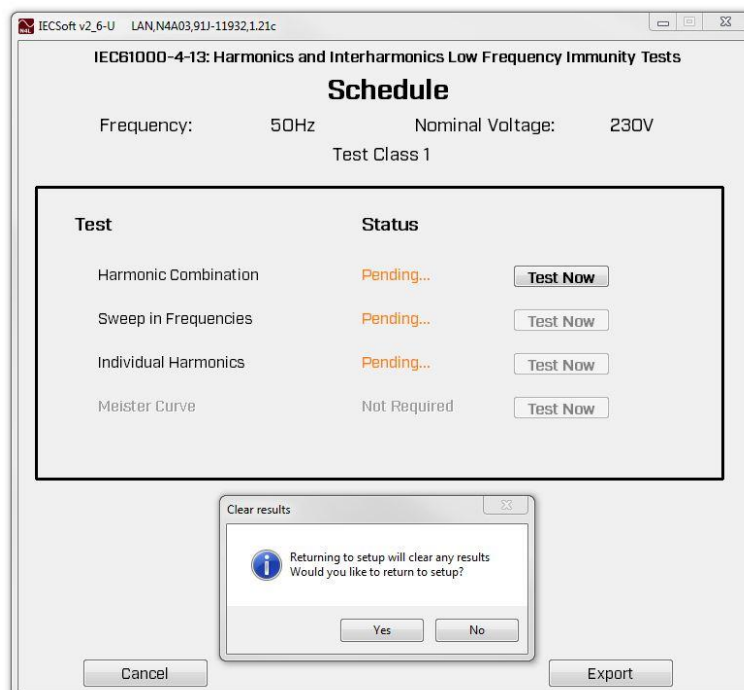
Class X

This is an example. The tests to be performed can be selected by the user. Please refer to section 2.3.



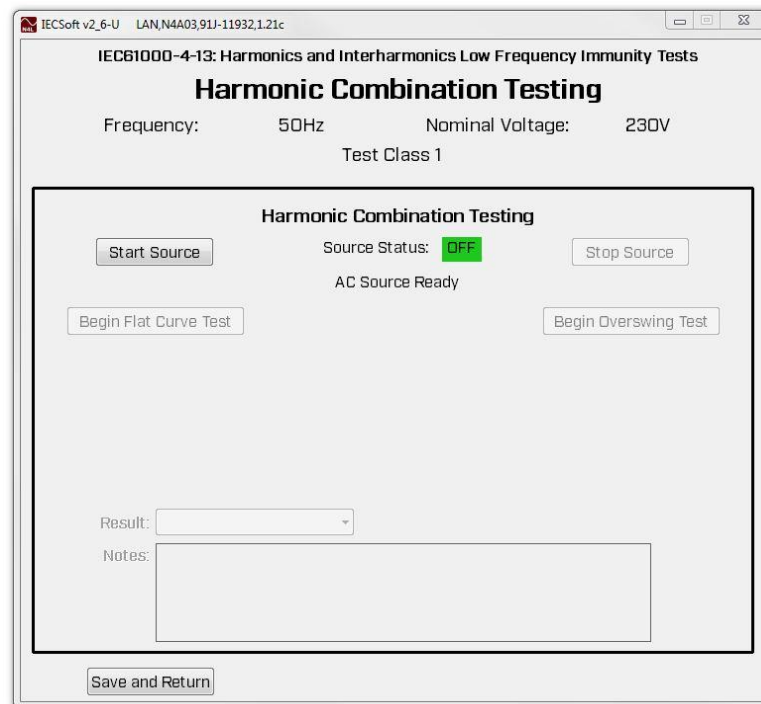
Cancelling the test:

Selecting to cancel the test will return the user to the Harmonic Levels screen. A message is displayed to remind the user that any data from tests already performed will be lost.



5.2.1 Harmonic Combination testing

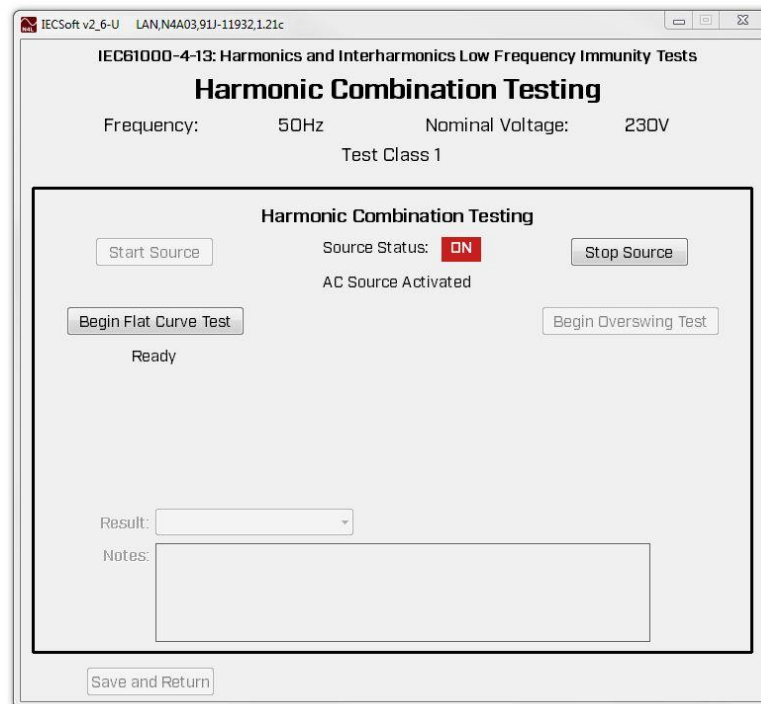
Click **Test Now** against Harmonic Combination in the Schedule dialog box.



The selected test is displayed along the top of the test window. Below this can be found the Test Class, Frequency and Nominal Voltage.

The Source Status is displayed. This will be displaying **OFF** and shaded green so that the User will know that the Source output is not enabled and the EUT does not have power applied.

Click on "**Start Source**" to continue testing:



The Start Source button is now greyed out and can't be selected. The Source Status now displays **ON** indicating that the Source Output is enabled. It is also highlighted with a red background to warn the User that the EUT is now powered up.

The STOP SOURCE button can be used AT ANY TIME during the test to immediately disable the Source Output and power down the EUT. To continue the user will have to click on Start Source and begin the test again from the start.

Click on “**Begin Flat Curve Test**” to continue.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **ON**

Stop Source

Begin Flat Curve Test

Begin Overswing Test

Test Begun Flat Curve time remaining:

Flat Curve Running... 1 m, 54 s

Result:

Notes:

Save and Return

The test now starts running with detailing displayed of the remaining time until this part of the test is completed.

On completion of the Flat Curve Test the test window prepares to perform the Overswing Test.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **ON**

Stop Source

Begin Flat Curve Test

Begin Overswing Test

Test Begun Overswing available in:

Flat Curve Finished 6 s

Flat Curve Testing Complete

Result:

Notes:

Save and Return

On completion of the setup process the Overswing test becomes available in the test window.

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **ON**

Stop Source

Begin Flat Curve Test

Begin Overswing Test

Test Begun
Flat Curve Finished
Flat Curve Testing Complete

Ready

Result:

Notes:

Save and Return

Click on “**Begin Overswing Test**” when ready to continue

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **ON**

Stop Source

Begin Flat Curve Test

Begin Overswing Test

Test Begun
Flat Curve Finished
Flat Curve Testing Complete

Overswing time remaining:
1 m, 54 s

Test Begun
Overswing Running...

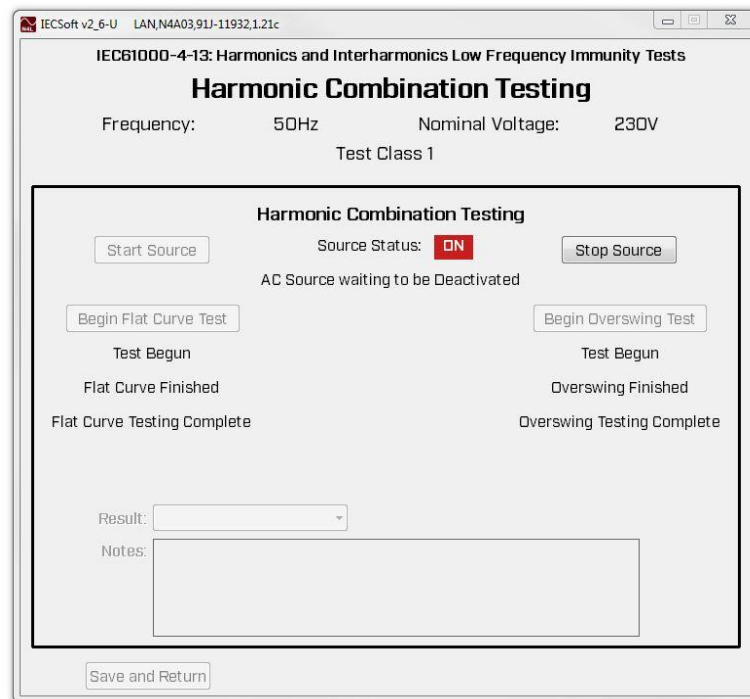
Result:

Notes:

Save and Return

The Overswing test now starts running. The time until the test is completed is displayed in the test window.

The test window confirms when the test is completed. There is also a warning message to indicate that the Source output is still **ON** and needs to be switched off.



IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Begin Flat Curve Test

Test Begun

Flat Curve Finished

Flat Curve Testing Complete

Result:

Notes:

Save and Return

Source Status: **ON**

AC Source waiting to be Deactivated

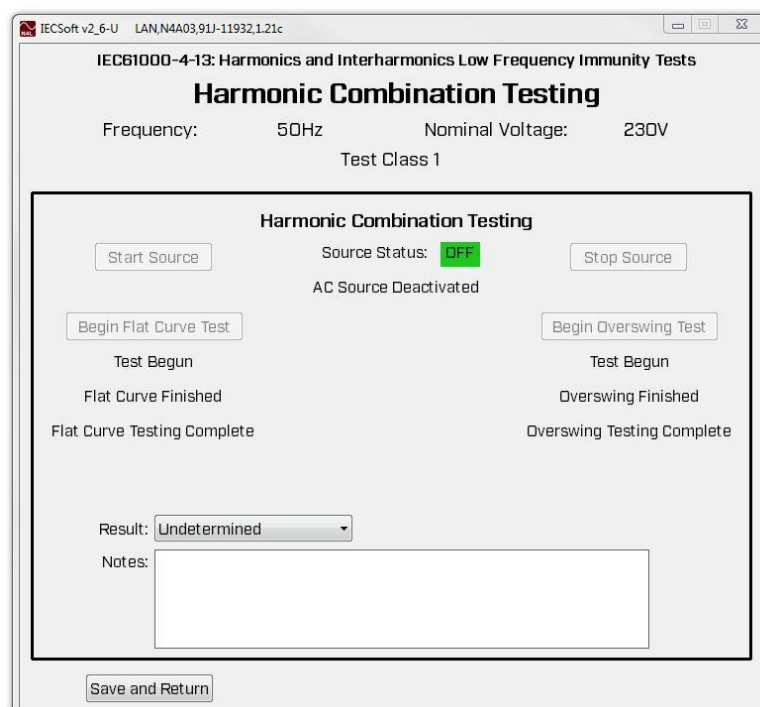
Begin Overswing Test

Test Begun

Overswing Finished

Overswing Testing Complete

Click on **"Stop Source"** to switch the Source output **OFF**.



IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Combination Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Begin Flat Curve Test

Test Begun

Flat Curve Finished

Flat Curve Testing Complete

Result:

Notes:

Save and Return

Source Status: **OFF**

AC Source Deactivated

Begin Overswing Test

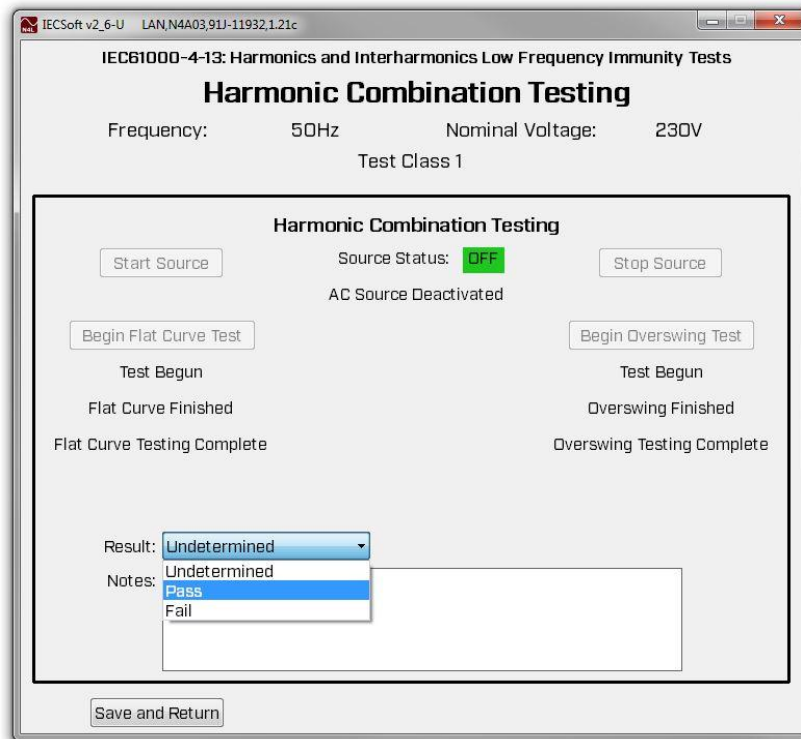
Test Begun

Overswing Finished

Overswing Testing Complete

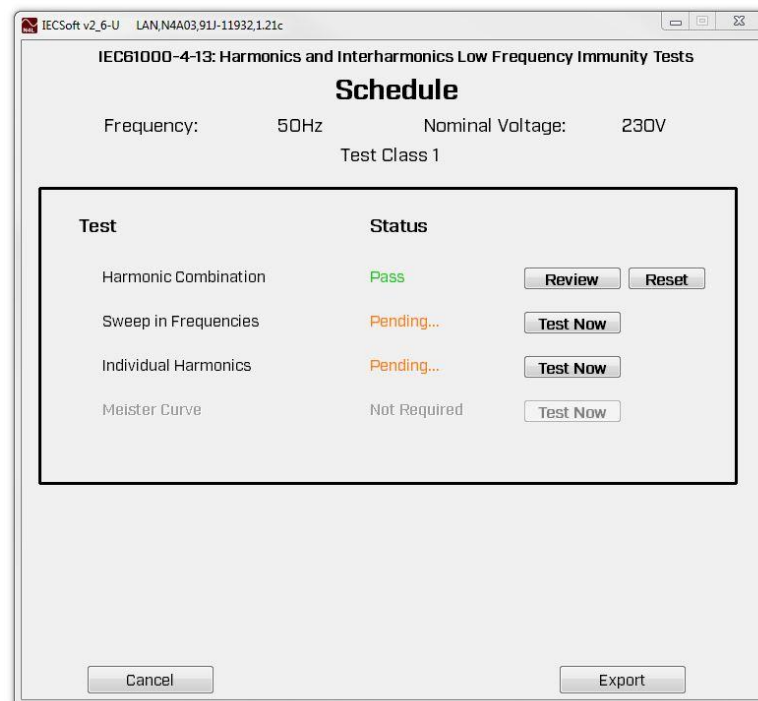
The Source status changes to **OFF** and the background colour turns green to indicate that the Source output is now off and that the EUT is no longer powered up

The results of the test can be entered using the options in the RESULT drop down menu. There is also the option to add any notes.



Click on **“Save and Return”** to continue

The updated Schedule dialog box is displayed.



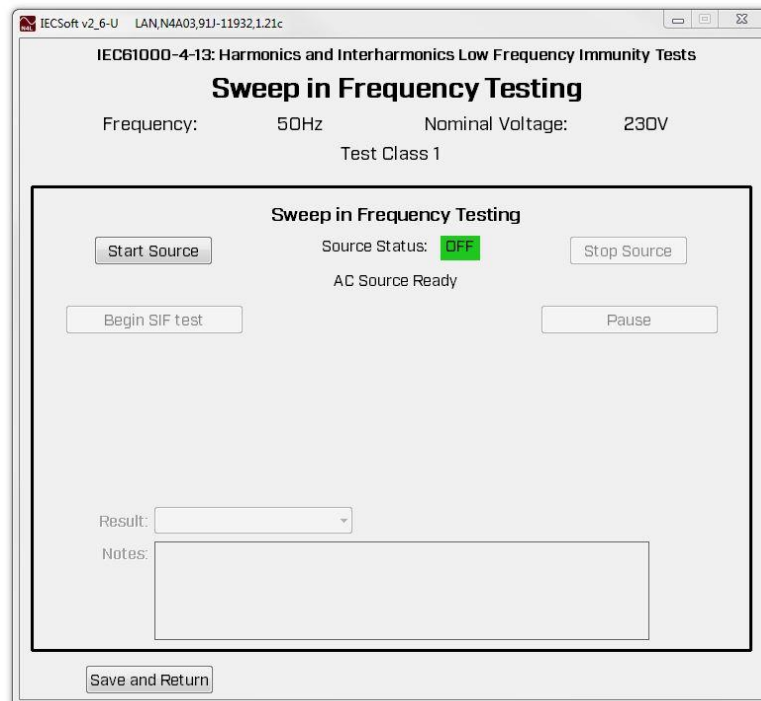
When each test is completed the Status in the Schedule dialog box changes to Complete. The "Test Now" button is changed to "Review" and an extra Retest button appears.

Clicking on "Review" displays the Test Sequence dialog box for that test. Clicking on "Retest" will change the Status for that test back to Pending. The "Review" button will be replaced by a "Test Now" button which can be used to repeat the test.

Testing can continue by clicking on "**Test Now**" adjacent to another test.

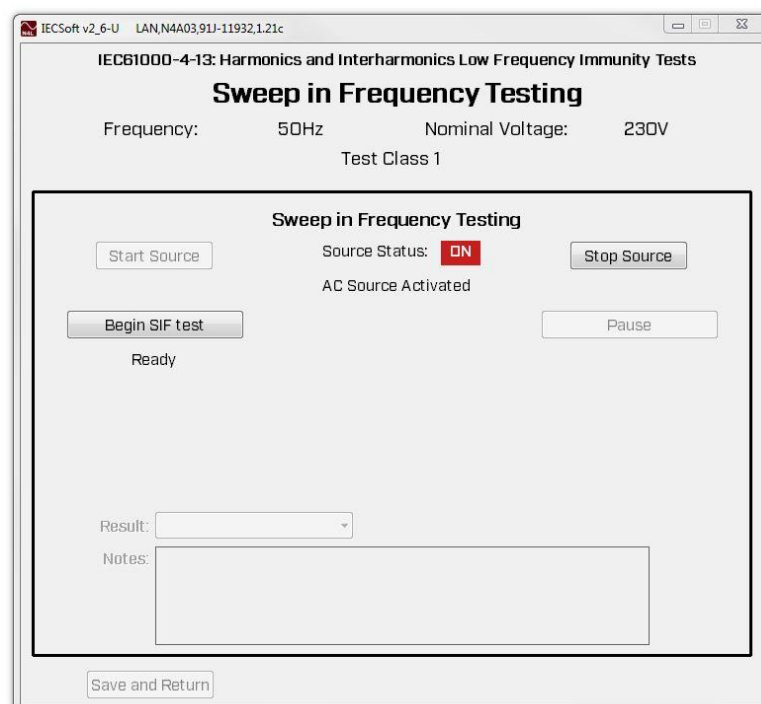
5.2.2 Sweep in Frequencies Testing

Click on **“Test Now”** against Sweep in Frequencies in the Schedule dialog box.



Click on **“Start Source”** to continue testing:

The Source Status is now updated to indicate the Output is **ON**.



Click on "**Begin SIF Test**" to continue:

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Sweep in Frequency Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source Source Status: **ON** Stop Source

Begin SIF test

Testing between 16.50Hz and 100.00Hz

Test Begun Elapsed Time: 5 s Currently Testing: Frequency 16.50Hz Voltage 4.60V

SIF test Running... Frequency change in: 13 s

Result:

Notes:

Save and Return

The test window is updated with details of the Elapsed time, the time until the next frequency change will occur and the Frequency & Voltage of the test currently being performed.

Testing can be paused at any time by clicking on "**Pause**". The button will be renamed "Resume" so testing can be restarted by clicking on "**Resume**".

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Sweep in Frequency Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source Source Status: **ON** Stop Source

Begin SIF test

Testing between 16.50Hz and 100.00Hz

Test Begun Paused Currently Testing: Frequency 21.50Hz Voltage 4.60V

SIF test Running... Frequency change in: 5 s

Result:

Notes:

Save and Return

The test window is updated when SIF Testing is Complete.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Sweep in Frequency Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **ON**

Stop Source

AC Source waiting to be Deactivated

Begin SIF test

Pause

Test Begun
SIF test Finished
SIF Testing Complete

Result:

Notes:

Save and Return

On completion of the test the Source Output remains **ON**.
Click on "**Stop Source**" to switch the Source output **OFF**.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Sweep in Frequency Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 1

Start Source

Source Status: **OFF**

Stop Source

AC Source Deactivated

Begin SIF test

Pause

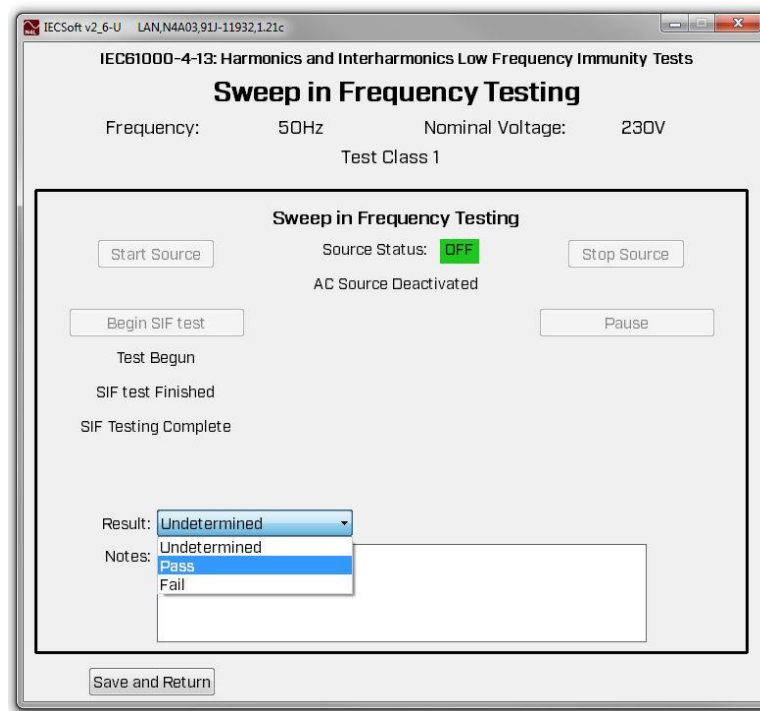
Test Begun
SIF test Finished
SIF Testing Complete

Result:

Notes:

Save and Return

The results of the test can be entered using the options in the RESULT drop down menu. There is also the option to add any notes.



Click on **"Save and Return"** to continue:



The schedule dialog box is updated with details of the latest test performed. The results can be reviewed or another test selected.

5.2.3 Individual Harmonics Testing

Click on **"Test Now"** against Individual Harmonics Testing in the Schedule dialog box. Test Class 3 was selected to perform this test as this requires the checking of Individual Harmonics and Interharmonics.

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V

Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: OFF Stop Source

AC Source Ready

Begin Harmonic Test Begin Interharm. Test

Result:

Notes:

Save and Return

Click on **"Start Source"** to Switch **ON** the Source Output.

IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V

Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: ON Stop Source

AC Source Activated

Begin Harmonic Test Begin Interharm. Test

Ready

Result:

Notes:

Save and Return

Click on **"Begin Harmonic Test"**

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: **ON** Stop Source

Begin Harmonic Test Pause

Test Begun Elapsed Time: Currently Testing:
Harmonic test Running... 6 s Harmonic 2 at 5.0% and
Harmonic Changes in: 0" at frequency 50Hz
1 s (OFF)

Result:
Notes:

Save and Return

The test now starts running. The test window is updated with details of the elapsed time, how long until the harmonic changes and details of the Harmonic currently being tested.

A message is then displayed to indicate that Inter-Harmonic testing can start shortly.

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: **ON** Stop Source

Begin Harmonic Test Begin Interharm. Test

Test Begun Interharm. Available in:
Harmonic test Finished 7 s
Harmonic Testing Complete

Result:
Notes:

Save and Return

Click on “**Begin Interharmonic Test**” to continue testing.

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: **ON** Stop Source

Begin Harmonic Test Begin Interharm. Test

Test Begun Ready

Harmonic test Finished

Harmonic Testing Complete

Result:

Notes:

Save and Return

The test window indicates that Interharmonic testing is running and gives details of the Elapsed time and how long until the Frequency next changes. The (ON) and (OFF) displayed against the Frequency change timer in the test window relate to the requirements in the Standard. This states that the interharmonic should be applied (ON) for 5 seconds then off (OFF) for 1 second between interharmonics.

IECSoft v2.6-U LAN,N4A03,91J-11932,1,21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: **ON** Stop Source

Begin Harmonic Test Begin Interharm. Test

Testing between 16.00Hz and 100.00Hz

Currently Testing: Frequency 21.00Hz Voltage 9.20V

Elapsed Time: 10 s

Frequency Changes in: 3 s (ON)

Test Begun Interharm. test Running...

Result:

Notes:

Save and Return

The test window indicates when testing is complete and also displays a warning message that the AC source output is still **ON**.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source

Source Status: **ON**

Stop Source

AC Source waiting to be Deactivated

Begin Harmonic Test

Begin Interharm. Test

Test Begun

Test Begun

Harmonic test Finished

Interharm. test Finished

Harmonic Testing Complete

Interharm. Testing Complete

Result:

Notes:

Save and Return

Click on "**Stop Source**" to switch the source output **OFF**.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source

Source Status: **OFF**

Stop Source

AC Source Deactivated

Begin Harmonic Test

Begin Interharm. Test

Test Begun

Test Begun

Harmonic test Finished

Interharm. test Finished

Harmonic Testing Complete

Interharm. Testing Complete

Result:

Notes:

Save and Return

The results of the test can be entered using the options in the RESULT drop down menu. There is also the option to add any notes.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Individual Harmonics and Interharmonics Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

Individual Harmonics and Interharmonics Testing

Start Source Source Status: OFF Stop Source
AC Source Deactivated

Begin Harmonic Test Begin Interharm. Test

Test Begun Test Begun

Harmonic test Finished Interharm. test Finished

Harmonic Testing Complete Interharm. Testing Complete

Result: Undetermined
Notes: Undetermined
Pass
Fail

Save and Return

Click on “**Save and Return**” to return to the Schedule dialog box.

IECSoft v2.6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Schedule

Frequency: 50Hz Nominal Voltage: 230V
Test Class 3

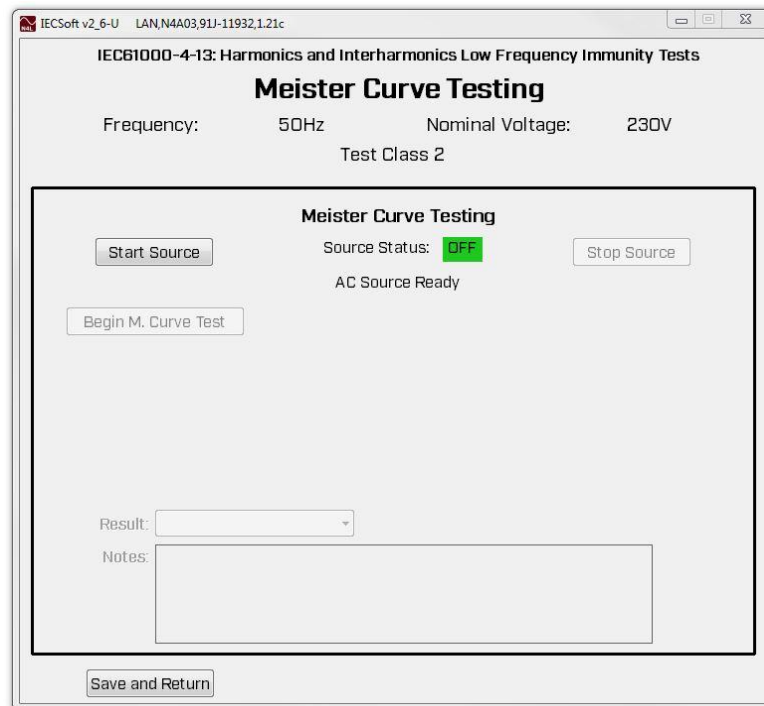
Test	Status	
Harmonic Combination	Pending...	Test Now
Sweep in Frequencies	Pending...	Test Now
Individual Harmonics	Pass	Review Reset
Meister Curve	Not Required	Test Now

Cancel Export

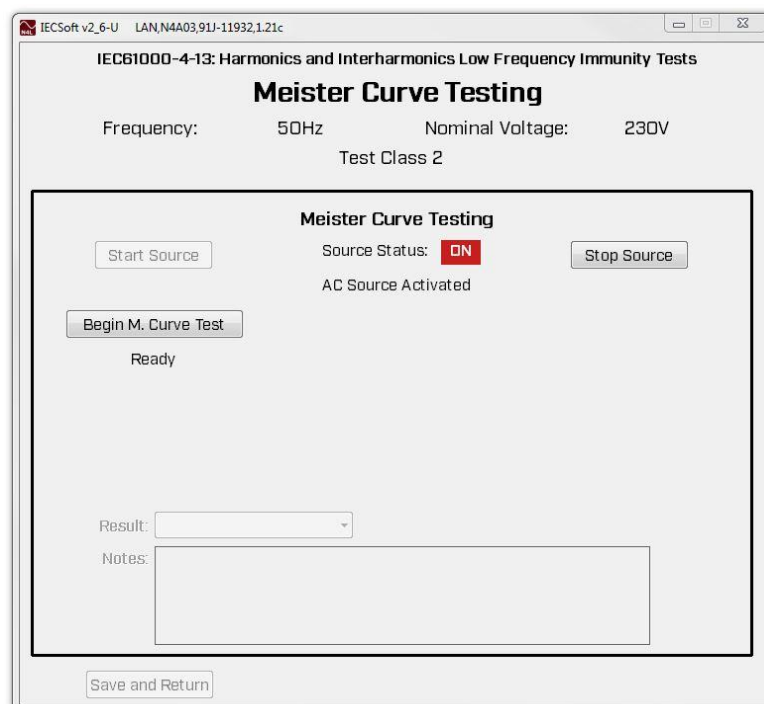
5.2.4 Meister Curve Testing

Click on **"Test Now"** against Meister Curve in the Schedule dialog box. Test Class 2 was selected to perform this test.

Click on **"Start Source"** to Switch **ON** the Source Output.



Click on **"Begin M. Curve Test"** to continue testing:



The test starts running. The test window is updated with details of the Elapsed time, the frequency range of the present test, the Frequency and Voltage details of the present test along with how long until the frequency next changes.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Meister Curve Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 2

Start Source Source Status: **ON** Stop Source

Begin M. Curve Test

Testing between 16.50Hz and 100.00Hz

Test Begun Elapsed Time: Currently Testing:

M. Curve test Running... 5 s Frequency 16.50Hz

Frequency change in: Voltage 6.90V

13 s

Result:

Notes:

Save and Return

The test window is updated when the test is completed. A warning message also indicates that the source output is still switched on.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Meister Curve Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 2

Start Source Source Status: **ON** Stop Source

AC Source waiting to be Deactivated

Begin M. Curve Test

Test Begun

M. Curve test Finished

M. Curve Testing Complete

Result:

Notes:

Save and Return

Click on **"Stop Source"** to switch **OFF** the Source output.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Meister Curve Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 2

Start Source

Source Status: **OFF**
AC Source Deactivated

Stop Source

Begin M. Curve Test

Test Begun
M. Curve test Finished
M. Curve Testing Complete

Result: Undetermined

Notes:

Save and Return

The results of the test can be entered using the options in the RESULT drop down menu. There is also the option to add any notes.

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Meister Curve Testing

Frequency: 50Hz Nominal Voltage: 230V
Test Class 2

Start Source

Source Status: **OFF**
AC Source Deactivated

Stop Source

Begin M. Curve Test

Test Begun
M. Curve test Finished
M. Curve Testing Complete

Result: Undetermined

Notes:

Save and Return

Click on **“Save and Return”** to return to the Schedule dialog box.

The screenshot shows a software window titled "IECSoft v2.6-U LAN,N4A03,91J-11932.1.21c". The main content area is titled "IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests" and "Schedule". It displays test parameters: Frequency: 50Hz, Nominal Voltage: 230V, and Test Class 2. Below this is a table with two columns: "Test" and "Status". The table lists four tests: Harmonic Combination (Pass), Sweep in Frequencies (Not Required), Individual Harmonics (Not Required), and Meister Curve (Pass). Each test has associated buttons: "Review" and "Reset" for Harmonic Combination and Meister Curve, and "Test Now" for Sweep in Frequencies and Individual Harmonics. At the bottom of the window are "Cancel" and "Export" buttons.

Test	Status	Buttons
Harmonic Combination	Pass	Review, Reset
Sweep in Frequencies	Not Required	Test Now
Individual Harmonics	Not Required	Test Now
Meister Curve	Pass	Review, Reset

5.3 Selecting Class X settings

IECSoft v2.6-U LAN,N4A03.91J-11932.1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

EUT Setup

EUT Details

EUT Type: N/A EUT input port tested: N/A

EUT operation mode: N/A Connections: N/A

Cables: N/A Peripherals: N/A

Test Setup Notes: General Notes:

Test Settings

Nominal Voltage: 230 V Frequency: 50Hz

Test Class: Class X New... Delete

Tests to run

☒ Flat curve and Overswing ☐ Individual Harmonics and Interharmonics

☐ Sweep in Frequencies ☒ Meister Curve

Next

Select "**Class X**" in the EUT Setup dialog box.

Select "**New**" or a previously created Class X test if there is one in the drop down menu. There is also a "**Delete**" button that allows a selected Class X test to be deleted.

IECSoft v2.6-U LAN,N4A03.91J-11932.1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

EUT Setup

EUT Details

EUT Type: N/A EUT input port tested: N/A

EUT operation mode: N/A Connections: N/A

Cables: N/A Peripherals: N/A

Test Setup Notes: General Notes:

Test Settings

Nominal Voltage: 230 V Frequency: 50Hz

Test Class: Class X New... Delete

Tests to run

☒ Flat curve and Overswing ☐ Individual Harmonics and Interharmonics

☐ Sweep in Frequencies ☒ Meister Curve

Next

Creating a NEW class X test:

Select the tests to be included in the EUT Setup dialog box using the “tick” boxes in the “Tests to run” section.

Click on “**Next**” to display the Test Level Settings.

The screenshot shows a software window titled "IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests" with a subtitle "Test Level Settings". The window is for "Test Class X" with a "Frequency" of 50Hz and "Nominal Voltage" of 230V. It contains three main sections: "Harmonic Combination Levels", "Sweep in Frequency Levels", and "Meister Curve Levels". Each section has input fields for test levels as a percentage of nominal voltage, with checkboxes to select or deselect frequency ranges. The "Next" button is at the bottom right.

Section	Frequency Range	Test Level (%)	Selected
Harmonic Combination Levels	Flat Curve Voltage Ratio	1.03792	
	Flat Curve Voltage Level	90.0	
	Overswing		
Sweep in Frequency Levels	16.5Hz to 100.0Hz	3.000	☒
	100.0Hz to 500.0Hz	9.000	☒
	500.0Hz to 1000.0Hz	4.500	☒
	1000.0Hz to 1500.0Hz	2.000	☒
	1500.0Hz to 2000.0Hz	2.000	☒
Meister Curve Levels	16.5Hz to 100.0Hz	3.000	☒
	100.0Hz to 500.0Hz	9.000	☒
	500.0Hz to 1000.0Hz	4500.000	☒
	1000.0Hz to 2000.0Hz	4500.000	☒

The frequency ranges to be included in the test are selected or de-selected using the “tick” boxes. The percentage values are adjusted by overwriting the displayed values. In the example above all frequency ranges are selected with the default percentage test level displayed for each frequency range.

Refer to the tables in IEC61000-4-13 for further details on the acceptable levels for Class X tests.

Click on “**Next**” to display the Harmonic Levels.

IECSoft v2_6-U LAN,N4A03,91J-11932,1.21c

IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Frequency: 50Hz Nominal Voltage: 230V
Test Class X

Harmonics and Interharmonics [Section 8.2.3]
Frequencies between harmonic Frequencies [Table 4a, 4b and 10]
Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	☒	2.500 %	750.0Hz to 1000.0Hz	☒	2.000 %
100.0Hz to 500.0Hz	☒	5.000 %	1000.0Hz to 2000.0Hz	☒	1.500 %
500.0Hz to 750.0Hz	☒	3.500 %			

Harmonics Test Levels [Table 1, 2 and 3]
Test levels as a percentage of Nominal Voltage

H 5 ☒	9.000 %	H 25 ☒	2.000 %	H 3 ☒	8.000 %	H 2 ☒	3.000 %
H 7 ☒	7.500 %	H 29 ☒	1.500 %	H 9 ☒	2.500 %	H 4 ☒	1.500 %
H 11 ☒	5.000 %	H 31 ☒	1.500 %	H 15 ☐	N/A %	H 6 ☐	N/A %
H 13 ☒	4.500 %	H 35 ☒	1.500 %	H 21 ☐	N/A %	H 8 ☐	N/A %
H 17 ☒	3.000 %	H 37 ☒	1.500 %	H 27 ☐	N/A %	H 10 ☐	N/A %
H 19 ☒	2.000 %			H 33 ☐	N/A %	Even H 12-40 ☐	N/A %
H 23 ☒	2.000 %			H 39 ☐	N/A %		

Previous Save Setup Next

The frequency ranges and individual harmonics to be included are selected or de-selected using the “tick” boxes. The percentage Test Levels are adjusted by overwriting the displayed values. In the example above all frequency ranges are selected with the default percentage test level displayed for each frequency range. The default Individual Harmonics are displayed along with the default Test Levels.

Refer to the tables in IEC61000-4-13 for further details on the acceptable levels for Class X tests.

Select the required options to be tested. Click **“Save Setup”**.

A “Save Setup” window appears

The screenshot shows the 'Save Setup' dialog box in the foreground, which is a small window with a title bar 'Save Test Setup'. It contains a text field for 'Setup Name:' and two buttons: 'Save' and 'Cancel'. In the background, the 'Harmonic Levels' configuration window is visible. It has a title bar 'IECSoft v2_6-U LAN,N4A03,91J-11932,1,21c'. The main content area is titled 'Interharmonics Low Frequency Immunity Tests' and 'Harmonic Levels'. It displays 'Nominal Voltage: 230V' and 'Test Class X'. Below this, there are two sections: 'Frequencies between harmonic Frequencies (Table 4a, 4b and 10)' and 'Harmonics Test Levels (Table 1, 2 and 3)'. Both sections show test levels as a percentage of Nominal Voltage. The 'Frequencies' section has five rows with checkboxes and input fields for percentages. The 'Harmonics Test Levels' section has two columns of rows, each with a checkbox and an input field for percentages. At the bottom of the window are three buttons: 'Previous', 'Save Setup', and 'Next'.

Save Test Setup

Setup Name:

Save Cancel

Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Nominal Voltage: 230V

Test Class X

8.2.3]

Frequencies between harmonic Frequencies (Table 4a, 4b and 10)

Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	☒	2.500 %	750.0Hz to 1000.0Hz	☒	2.000 %
100.0Hz to 500.0Hz	☒	5.000 %	1000.0Hz to 2000.0Hz	☒	1.500 %
500.0Hz to 750.0Hz	☒	3.500 %			

Harmonics Test Levels (Table 1, 2 and 3)

Test levels as a percentage of Nominal Voltage

H 5	☒	9.000 %	H 25	☒	2.000 %	H 3	☒	8.000 %	H 2	☒	3.000 %
H 7	☒	7.500 %	H 29	☒	1.500 %	H 9	☒	2.500 %	H 4	☒	1.500 %
H 11	☒	5.000 %	H 31	☒	1.500 %	H 15	☐	N/A %	H 6	☐	N/A %
H 13	☒	4.500 %	H 35	☒	1.500 %	H 21	☐	N/A %	H 8	☐	N/A %
H 17	☒	3.000 %	H 37	☒	1.500 %	H 27	☐	N/A %	H 10	☐	N/A %
H 19	☒	2.000 %				H 33	☐	N/A %	Even H	☐	N/A %
H 23	☒	2.000 %				H 39	☐	N/A %	12-40	☐	N/A %

Previous Save Setup Next

Enter a Setup Name and then click on “**Save**”.

This screenshot is similar to the previous one, but the 'Setup Name' field in the 'Save Setup' dialog box now contains the text 'Class X test A'. The background 'Harmonic Levels' configuration window remains the same, showing the same test levels and frequency ranges. The 'Save Setup' button is still visible at the bottom of the dialog box.

Save Test Setup

Setup Name: Class X test A

Save Cancel

Interharmonics Low Frequency Immunity Tests

Harmonic Levels

Nominal Voltage: 230V

Test Class X

8.2.3]

Frequencies between harmonic Frequencies (Table 4a, 4b and 10)

Test levels as a percentage of Nominal Voltage

16.0Hz to 100.0Hz	☒	2.500 %	750.0Hz to 1000.0Hz	☒	2.000 %
100.0Hz to 500.0Hz	☒	5.000 %	1000.0Hz to 2000.0Hz	☒	1.500 %
500.0Hz to 750.0Hz	☒	3.500 %			

Harmonics Test Levels (Table 1, 2 and 3)

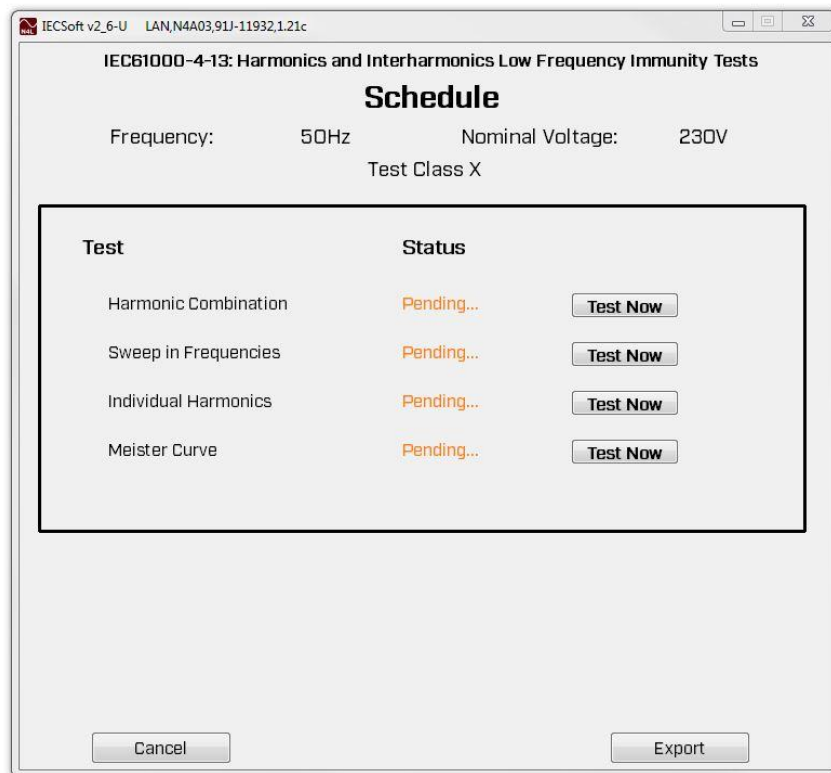
Test levels as a percentage of Nominal Voltage

H 5	☒	9.000 %	H 25	☒	2.000 %	H 3	☒	8.000 %	H 2	☒	3.000 %
H 7	☒	7.500 %	H 29	☒	1.500 %	H 9	☒	2.500 %	H 4	☒	1.500 %
H 11	☒	5.000 %	H 31	☒	1.500 %	H 15	☐	N/A %	H 6	☐	N/A %
H 13	☒	4.500 %	H 35	☒	1.500 %	H 21	☐	N/A %	H 8	☐	N/A %
H 17	☒	3.000 %	H 37	☒	1.500 %	H 27	☐	N/A %	H 10	☐	N/A %
H 19	☒	2.000 %				H 33	☐	N/A %	Even H	☐	N/A %
H 23	☒	2.000 %				H 39	☐	N/A %	12-40	☐	N/A %

Previous Save Setup Next

Finally click on “**Next**” to continue testing.

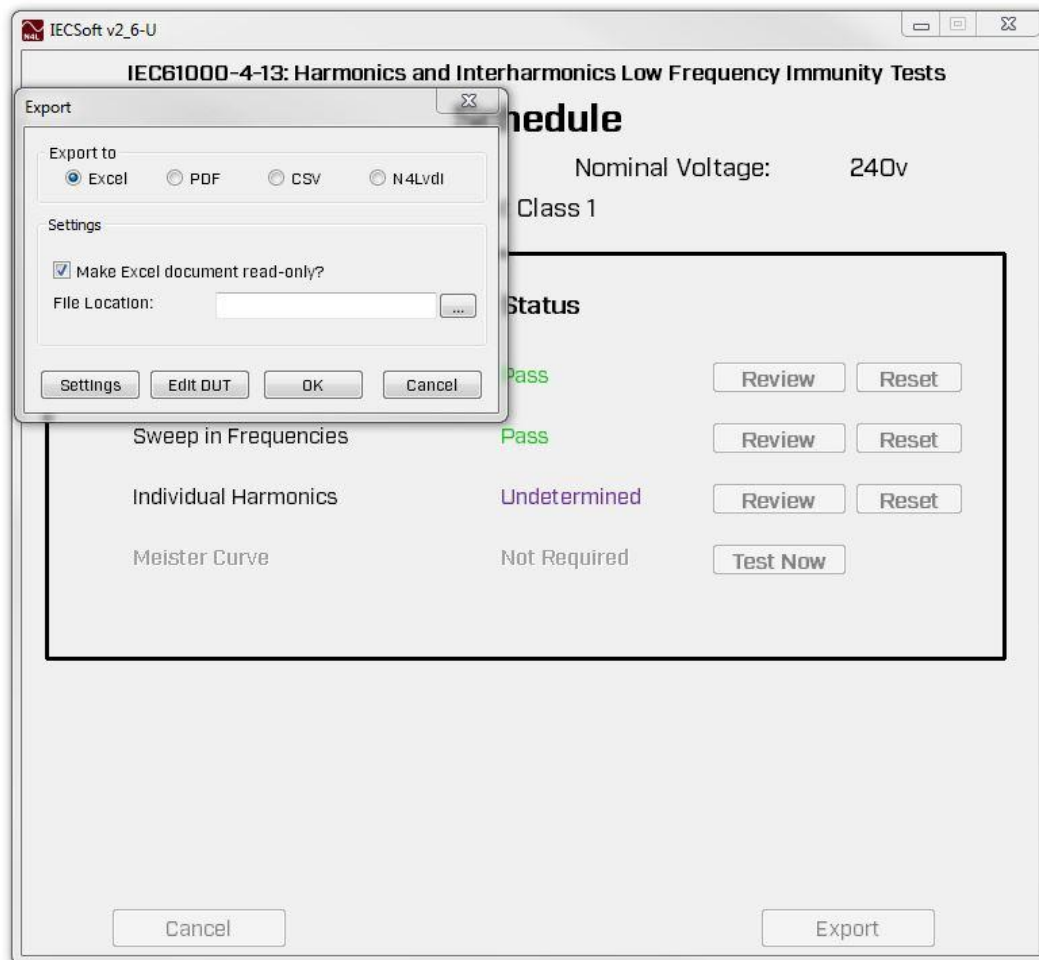
The schedule dialog box is displayed.



The test process is then the same as the other Test Class options. All selected tests will be displayed in the Schedule dialog box. The tests can be performed in any order.

5.4 Saving / Exporting test data.

Click on “**Export**” on the Schedule dialog box to display the Export window.



For IEC61000-4-13 mode Excel & PDF reports can be created and the results can be exported to “.csv” and “.n4lvdi” files.

Section 6 in this manual provides full details of the IECSoft software Export function.

5.4.1 Excel Report:

Example Front sheet.

Click to add header

07th August 2019 - 13:53:42		Page 1/4		IECSoft v2_6		
		IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests				
Source Details						
Source Model	N4A03					
Source Serial	91J-11932					
Source Firmware	1.29					
Equipment Under Test						
Brand	N4L					
Model	Z100					
Serial	P1234					
Impedance Network ID	IMP001					
Rated Voltage	230.000V					
Rated Current	5.000A					
Rated Frequency	50.000Hz					
Rated Power	1.000kW					
Test Results						
Harmonic Combination	Pass					
Sweep In Frequencies	Pass					
Harmonics + Interharmonics	Pass					
Test Sequence	Not in sequence according to Figure 1a/1b of 8.2					
Additional Test Details						
Operator	KAR					
Lab Name	N4L					
Location	LAB1					
Notes	IEC61000-4-13 test					
Signature						

Example Harmonic Combination tests

Click to add header

07th August 2019 - 13:53:42		Page 2/4	IECSoft v2_6
IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests			
Instrument Details			
Source Model	N4A03		
Source Serial	91J-11932		
Source Firmware	1.29		
Equipment Under Test			
Brand	N4L		
Model	Z100		
Serial	P1234		
Test Settings			
Nominal Voltage	230.000V		
Nominal Frequency	50.000Hz		
Test Class	Class 3		
Test Level			
Overswing Percentage	80.00%		
H3 Overswing Level	18.40V (8.00%)		
H5 Overswing Level	11.50V (5.00%)		
Harmonic Combination Results			
Test Notes			
Test Results	Pass		

Example Sweep in Frequency results

Click to add header

07th August 2019 - 13:53:42		Page 3/4		IECSoft v2_6	
IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests					
Instrument Details					
Source Model		N4A03			
Source Serial		91J-11932			
Source Firmware		1.29			
Equipment Under Test					
Brand		N4L			
Model		Z100			
Serial		P1234			
Test Settings					
Nominal Voltage		230.000V			
Nominal Frequency		50.000Hz			
Test Class		Class 3			
Test Level					
Frequency Range		Frequency Step		Test Level	
16.50Hz to 100.00Hz		5.00Hz		10.35V (4.50%)	
100.00Hz to 500.00Hz		10.00Hz		32.20V (14.00%)	
500.00Hz to 1000.00Hz		10.00Hz		20.70V (9.00%)	
1000.00Hz to 1500.00Hz		25.00Hz		13.80V (6.00%)	
1500.00Hz to 2000.00Hz		25.00Hz		9.20V (4.00%)	
Sweep In Frequency Results					
Test Notes					
Test Results		Pass			

Example Harmonic and Interharmonic results

Click to add header

07th August 2019 - 13:53:42		Page 4/4		IECSoft v2_6	
IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests					
Instrument Details					
Source Model	N4A03				
Source Serial	91J-11932				
Source Firmware	1.29				
Equipment Under Test					
Brand	N4L				
Model	Z100				
Serial	P1234				
Test Settings					
Nominal Voltage	230.000V				
Nominal Frequency	50.000Hz				
Test Class	Class 3				
Test Level					
Frequency Range		Frequency Step		Test Level	
16.00Hz to 100.00Hz		5.00Hz		9.20V (4.00%)	
100.00Hz to 500.00Hz		10.00Hz		20.70V (9.00%)	
500.00Hz to 750.00Hz		10.00Hz		11.50V (5.00%)	
750.00Hz to 1000.00Hz		10.00Hz		6.90V (3.00%)	
1000.00Hz to 2000.00Hz		25.00Hz		4.60V (2.00%)	
Harmonic	Test Level	Harmonic	Test Level	Harmonic	Test Level
H5	27.60V (12.00%)	H3	20.70V (9.00%)	H2	11.50V (5.00%)
H7	23.00V (10.00%)	H9	9.20V (4.00%)	H4	4.60V (2.00%)
H11	16.10V (7.00%)	H15	6.90V (3.00%)	H6	3.45V (1.50%)
H13	16.10V (7.00%)	H21	4.60V (2.00%)	H8	3.45V (1.50%)
H17	13.80V (6.00%)	H27	4.60V (2.00%)	H10	3.45V (1.50%)
H19	13.80V (6.00%)	H33	4.60V (2.00%)	Even H12 to H40	3.45V (1.50%)
H23	13.80V (6.00%)	H39	4.60V (2.00%)		
H25	13.80V (6.00%)				
H29	11.50V (5.00%)				
H31	6.90V (3.00%)				
H35	6.90V (3.00%)				
H37	6.90V (3.00%)				
Individual Harmonics and Interharmonics Results					
Test Notes					
Test Results	Pass				

Example Meister test results

Click to add header

07th August 2019 - 13:53:42		Page 3/3		IECSoft v2_6	
IEC61000-4-13: Harmonics and Interharmonics Low Frequency Immunity Tests					
Instrument Details					
Source Model		N4A03			
Source Serial		91J-11932			
Source Firmware		1.29			
Equipment Under Test					
Brand		N/A			
Model		N/A			
Serial		N/A			
Test Settings					
Nominal Voltage		230.000V			
Nominal Frequency		50.000Hz			
Test Class		Class 2			
Test Level					
Frequency Range		Frequency Step		Test Level	
16.50Hz to 100.00Hz		5.00Hz		6.90V (3.00%)	
100.00Hz to 500.00Hz		10.00Hz		20.70V (9.00%)	
500.00Hz to 1000.00Hz		10.00Hz		20.70V to 10.35V (4500.00/f%)	
1000.00Hz to 2000.00Hz		25.00Hz		20.70V to 10.35V (4500.00/f%)	
Meister Curve Results					
Test Notes					
Test Results		Undetermined			

5.4.2 PDF Report:

Example Harmonic Combination test report.

07th August 2019 - 13:53:42		Page 1/4	IECSoft v2_6
IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests			
Harmonic Combination			
AC Source	Instrumentation Details Newtons4th N4A03 SN: 91J-11932 Firmware: v1.29		
Impedance Network ID	IMP001		
EUT Details	Brand: N4L Model: Z100 Serial: P1234		
User Rated Voltage	230.000V		
User Rated Current	5.000A		
User Rated Frequency	50.000Hz		
User Rated Power	1.000kW		
EUT Type	N/A		
Operation Mode	N/A		
Input Port	N/A		
Connections	N/A		
Cables	N/A		
Peripherals	N/A		
Setup Notes			
General Notes			
Operator	KAR		
Lab Name	N4L		
Location	LAB1		
Notes	IEC61000-4-13 test		
Class	Class 3		
Sequence	Not in sequence according to Figure 1a/1b of 8.2		
Nominal Voltage (UT)	230.000V		
Frequency	50.000Hz		
Overswing Percentage	80%		
H3 Overswing	18.4V (8%)		
H5 Overswing	11.5V (5%)		
Test Notes			
Signature			
Results	Pass		

Example Sweep in Frequency results

07th August 2019 - 13:53:42		Page 2/4		IECSoft v2_6																			
IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests																							
Sweep In Frequency																							
AC Source Impedance Network ID EUT Details User Rated Voltage User Rated Current User Rated Frequency User Rated Power EUT Type Operation Mode Input Port Connections Cables Peripherals Setup Notes General Notes Operator Lab Name Location Notes Class Sequence Nominal Voltage (UT) Frequency Test Levels Test Notes	Instrumentation Details Newtons4th N4A03 SN: 91J-11932 Firmware: v1.29 IMP001 Brand: N4L Model: Z100 Serial: P1234 230.000V 5.000A 50.000Hz 1.000kW N/A N/A N/A N/A N/A N/A Operating Conditions KAR N4L LAB1 IEC61000-4-13 test Test Configuration Class 3 Not in sequence according to Figure 1a/1b of 8.2 230.000V 50.000Hz <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Frequency Range</th> <th style="text-align: left;">Frequency Step</th> <th style="text-align: left;">Test Level</th> </tr> </thead> <tbody> <tr> <td>16.50Hz to 100.00Hz</td> <td>5.00Hz</td> <td>10.35V (4.50%)</td> </tr> <tr> <td>100.00Hz to 500.00Hz</td> <td>10.00Hz</td> <td>32.20V (14.00%)</td> </tr> <tr> <td>500.00Hz to 1000.00Hz</td> <td>10.00Hz</td> <td>20.70V (9.00%)</td> </tr> <tr> <td>1000.00Hz to 1500.00Hz</td> <td>25.00Hz</td> <td>13.80V (6.00%)</td> </tr> <tr> <td>1500.00Hz to 2000.00Hz</td> <td>25.00Hz</td> <td>9.20V (4.00%)</td> </tr> </tbody> </table>					Frequency Range	Frequency Step	Test Level	16.50Hz to 100.00Hz	5.00Hz	10.35V (4.50%)	100.00Hz to 500.00Hz	10.00Hz	32.20V (14.00%)	500.00Hz to 1000.00Hz	10.00Hz	20.70V (9.00%)	1000.00Hz to 1500.00Hz	25.00Hz	13.80V (6.00%)	1500.00Hz to 2000.00Hz	25.00Hz	9.20V (4.00%)
Frequency Range	Frequency Step	Test Level																					
16.50Hz to 100.00Hz	5.00Hz	10.35V (4.50%)																					
100.00Hz to 500.00Hz	10.00Hz	32.20V (14.00%)																					
500.00Hz to 1000.00Hz	10.00Hz	20.70V (9.00%)																					
1000.00Hz to 1500.00Hz	25.00Hz	13.80V (6.00%)																					
1500.00Hz to 2000.00Hz	25.00Hz	9.20V (4.00%)																					
Signature																							
Results	Pass																						

Example Harmonic and Interharmonic results

07th August 2019 - 13:53:42		Page 3/4		IECSoft v2_6	
IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests					
Harmonics and Interharmonics					
AC Source Impedance Network ID EUT Details User Rated Voltage User Rated Current User Rated Frequency User Rated Power EUT Type Operation Mode Input Port Connections Cables Peripherals Setup Notes General Notes Operator Lab Name Location Notes Class Sequence Nominal Voltage (UT) Frequency Test Notes		Instrumentation Details Newton4th N4A03 SN: 91J-11932 Firmware: v1.29 IMP001 Brand: N4L Model: Z100 Serial: P1234 230.000V 5.000A 50.000Hz 1.000kW N/A N/A N/A N/A N/A N/A Operating Conditions KAR N4L LAB1 IEC61000-4-13 test Test Configuration Class 3 Not in sequence according to Figure 1a/1b of 8.2 230.000V 50.000Hz			
Signature					
Results		Pass			

IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests

Harmonics and Interharmonics Test Levels

Test Levels

Frequency Range	Frequency Step	Test Level
16.00Hz to 100.00Hz	5.00Hz	N/A
100.00Hz to 500.00Hz	10.00Hz	N/A
500.00Hz to 750.00Hz	10.00Hz	N/A
750.00Hz to 1000.00Hz	10.00Hz	N/A
1000.00Hz to 2000.00Hz	25.00Hz	N/A

Harmonic Levels

Harmonic	Test Level	Harmonic	Test Level	Harmonic	Test Level
H5	10.35V (4.50%)	H3	10.35V (4.50%)	H2	6.90V (3.00%)
H7	10.35V (4.50%)	H9	4.60V (2.00%)	H4	3.45V (1.50%)
H11	10.35V (4.50%)	H15	N/A	H6	N/A
H13	9.20V (4.00%)	H21	N/A	H8	N/A
H17	6.90V (3.00%)	H27	N/A	H10	N/A
H19	4.60V (2.00%)	H33	N/A	Even H12 to H40	N/A
H23	4.60V (2.00%)	H39	N/A		
H25	4.60V (2.00%)				
H29	3.45V (1.50%)				
H31	3.45V (1.50%)				
H35	3.45V (1.50%)				
H37	3.45V (1.50%)				

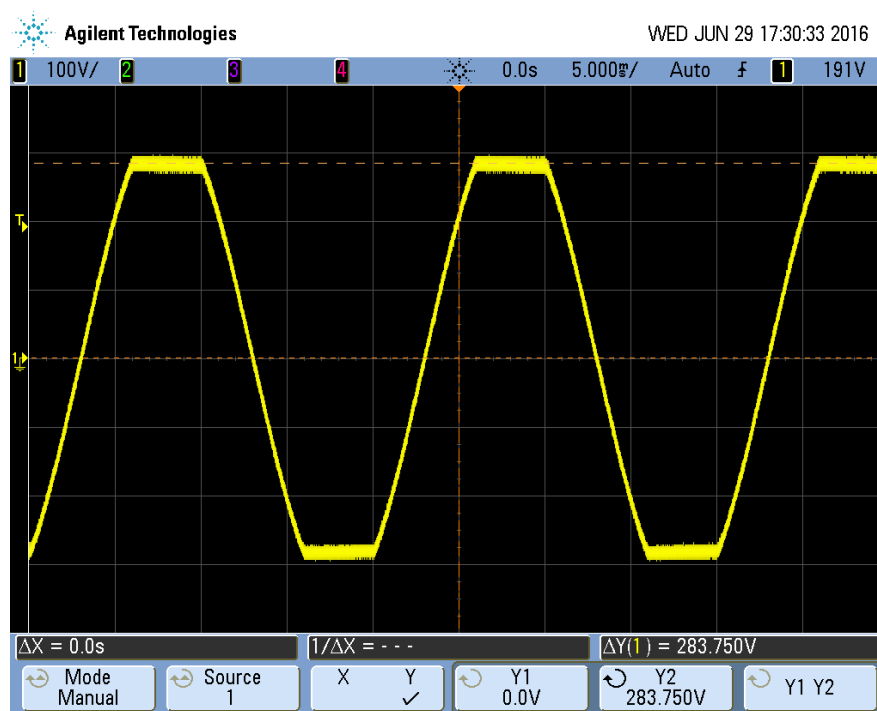
IEC61000-4-13:2009 Harmonics and Interharmonics low frequency immunity tests																
Meister Curve																
AC Source	Instrumentation Details Newtons4th N4A03 SN: 91J-11932 Firmware: v1.29															
Impedance Network ID	N/A															
EUT Details	Brand: N/A Model: N/A Serial: N/A															
User Rated Voltage	N/A															
User Rated Current	N/A															
User Rated Frequency	N/A															
User Rated Power	N/A															
EUT Type	N/A															
Operation Mode	N/A															
Input Port	N/A															
Connections	N/A															
Cables	N/A															
Peripherals	N/A															
Setup Notes																
General Notes																
Operator	Operating Conditions N/A															
Lab Name	N/A															
Location	N/A															
Notes																
Class	Test Configuration Class 2															
Sequence	Not in sequence according to Figure 1a/1b of 8.2															
Nominal Voltage (UT)	230.000V															
Frequency	50.000Hz															
Test Levels	<table border="1"> <thead> <tr> <th>Frequency Range</th> <th>Frequency Step</th> <th>Test Level</th> </tr> </thead> <tbody> <tr> <td>16.50Hz to 100.00Hz</td> <td>5.00Hz</td> <td>6.90V (3.00%)</td> </tr> <tr> <td>100.00Hz to 500.00Hz</td> <td>10.00Hz</td> <td>20.70V (9.00%)</td> </tr> <tr> <td>500.00Hz to 1000.00Hz</td> <td>10.00Hz</td> <td>20.70V to 10.35V (4500.00/f%)</td> </tr> <tr> <td>1000.00Hz to 2000.00Hz</td> <td>25.00Hz</td> <td>20.70V to 10.35V (4500.00/f%)</td> </tr> </tbody> </table>	Frequency Range	Frequency Step	Test Level	16.50Hz to 100.00Hz	5.00Hz	6.90V (3.00%)	100.00Hz to 500.00Hz	10.00Hz	20.70V (9.00%)	500.00Hz to 1000.00Hz	10.00Hz	20.70V to 10.35V (4500.00/f%)	1000.00Hz to 2000.00Hz	25.00Hz	20.70V to 10.35V (4500.00/f%)
Frequency Range	Frequency Step	Test Level														
16.50Hz to 100.00Hz	5.00Hz	6.90V (3.00%)														
100.00Hz to 500.00Hz	10.00Hz	20.70V (9.00%)														
500.00Hz to 1000.00Hz	10.00Hz	20.70V to 10.35V (4500.00/f%)														
1000.00Hz to 2000.00Hz	25.00Hz	20.70V to 10.35V (4500.00/f%)														
Test Notes																
Signature																
Results	Undetermined															

5.5 Example IEC61000-4-13 Waveforms

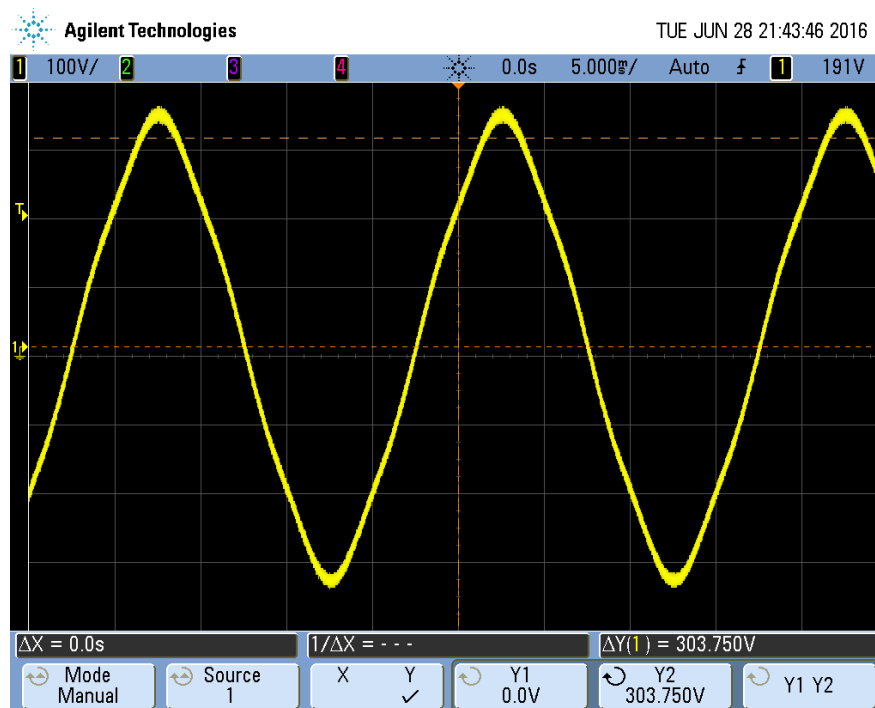
These tests used a N4A Source to generate the waveforms that were applied to the (EUT) Equipment under Test. Page 23 in the Standard document gives more details about these waveforms.

Below can be seen some examples of the different types of waveform applied to the EUT. These examples are screenshots from an Oscilloscope monitoring the waveforms during the tests.

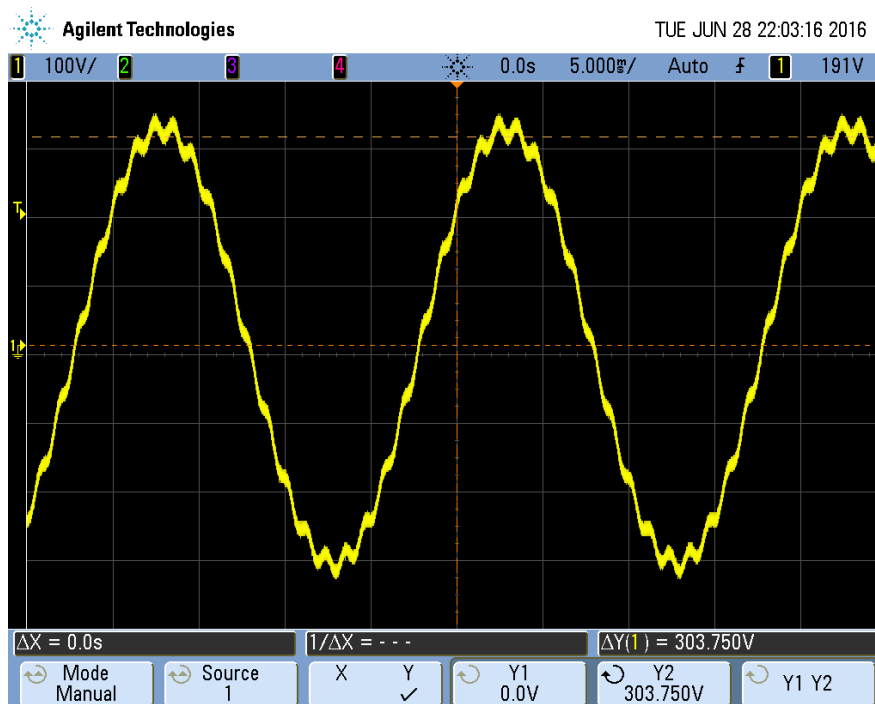
Example Flat Curve Waveform



Example Overswing Waveform.



Example Harmonic test Waveform



6 IEC61000-3-3: Flicker PST Simulation Testing

This section explains how to use the IECSoft test software along with a N4A Source and N4A PPA (or a suitable alternative) to perform PST Simulation tests.

6.1 Scope

The N4A range of power sources can be used to generate nominal PST waveforms, such waveforms can be used to check that the connections between the power source, impedance network and flickermeter (PPA) are correct.

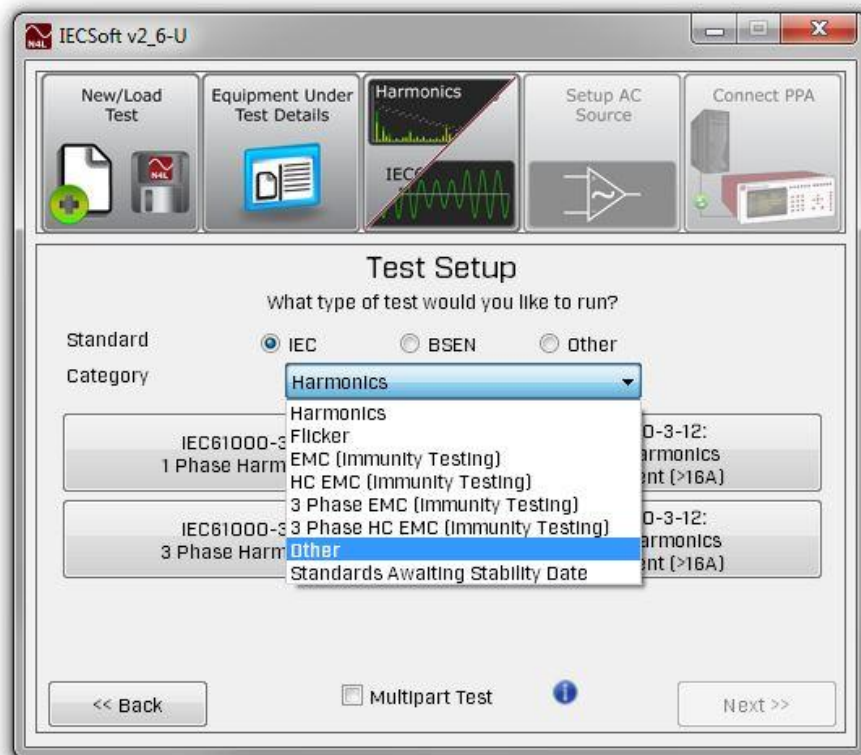
While the N4A power sources are market leading power generators offering the best performance for compliant IEC61000 testing of DUT's, they are not intended to be used as a flickermeter calibrator. For this reason, no specification is given with regards to the accuracy when performing flicker simulation waveforms. Users can expect a nominal accuracy of 10%.

To perform the test, users should connect their N4A, Impedance Network and Flickermeter (PPA) as per standard procedures. Do not connect a DUT during these tests.

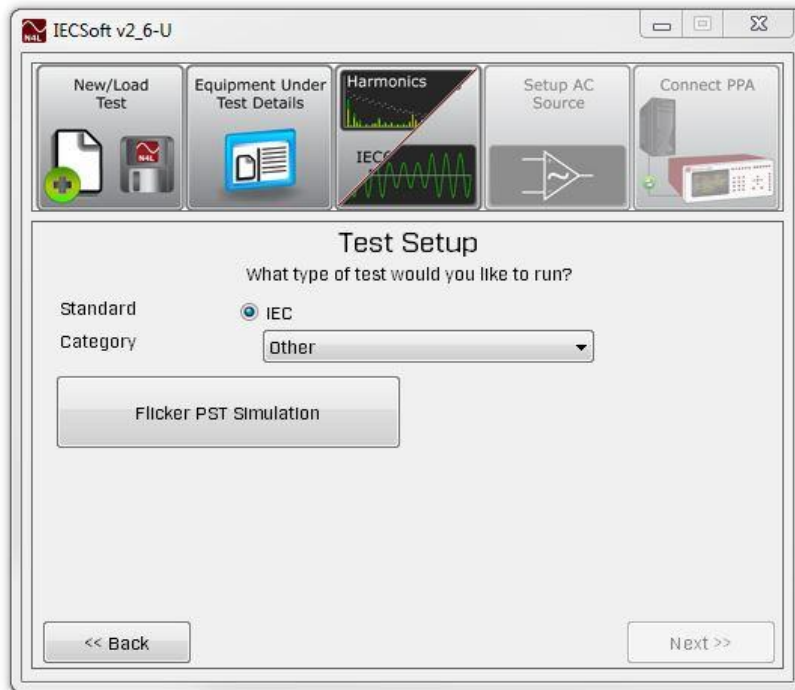
Users have the choice to perform the test at 50Hz@230V or 60Hz@120V and can simulate PST's of 0.500, 0.800 or 1.00. There is also the option to produce an Excel report.

6.2 Test Procedure

Open the software and step through the dialog screens. In the Test Setup dialog click on CATEGORY and select "Other" from the drop down menu.



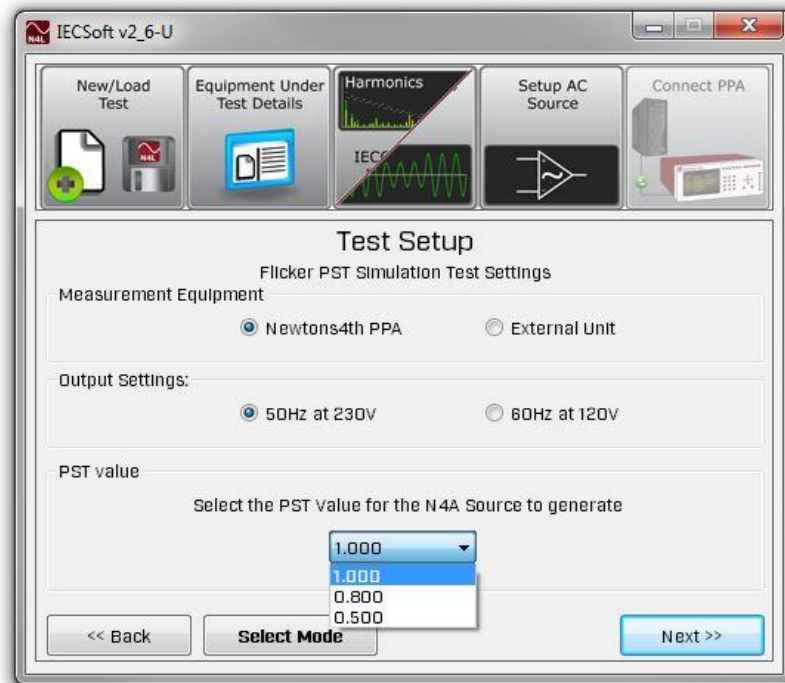
The Test setup screen will then display the various EMC tests that can be performed.



Click on the Flicker PST Simulation option. This will display the Test Setup dialog box.



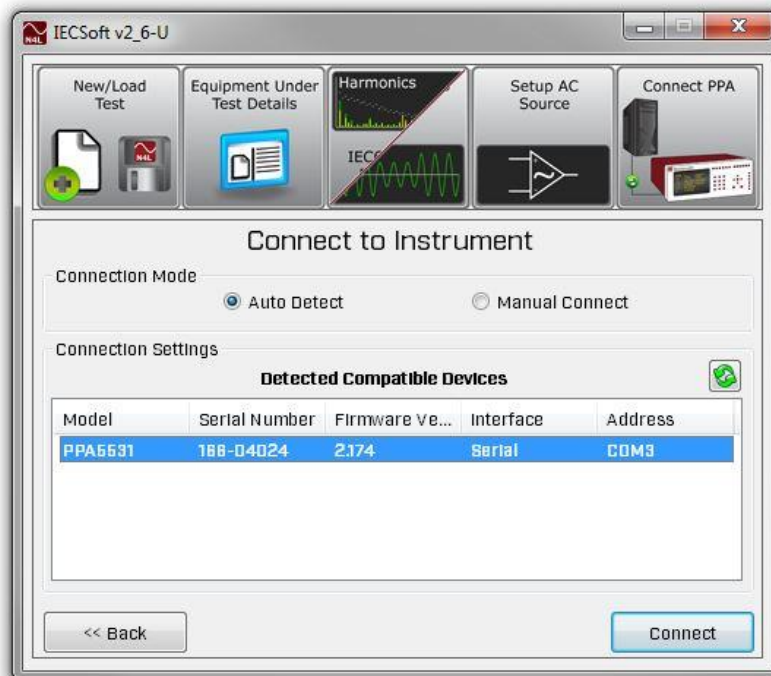
Select the Source type to be tested along with the test frequency, the tests can be performed at 50Hz@230V or 60Hz@120V.



From the drop down menu select the PST value you want to be generated by the source. There are three PST options: 0.500, 0.800 and 1.000. Click on "**Next**" to continue.

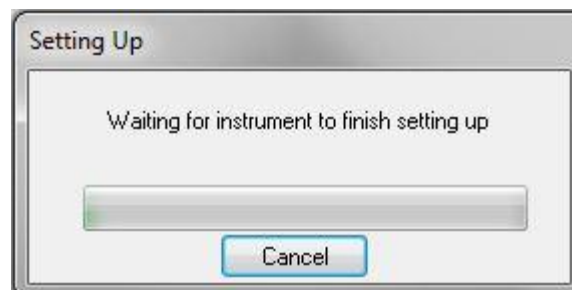
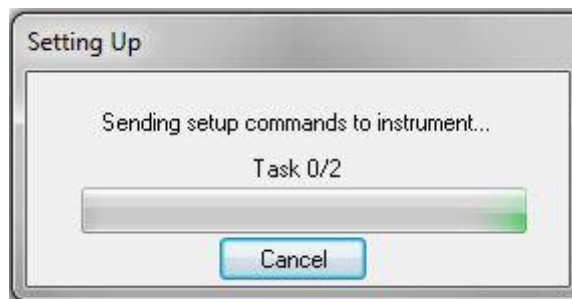
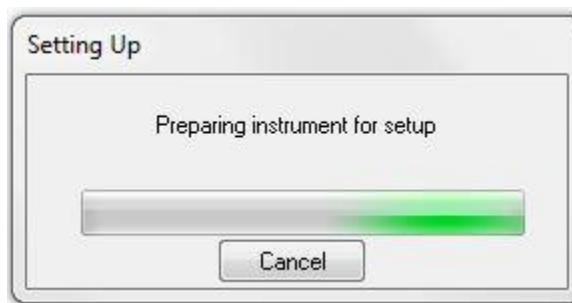


The Connect to AC Source dialog box appears. For this test the "Mains" source selection is not available. Select the required Interface option, LAN, Serial/RS232 and USB options are available. Click on "**Connect & Setup**" to continue.

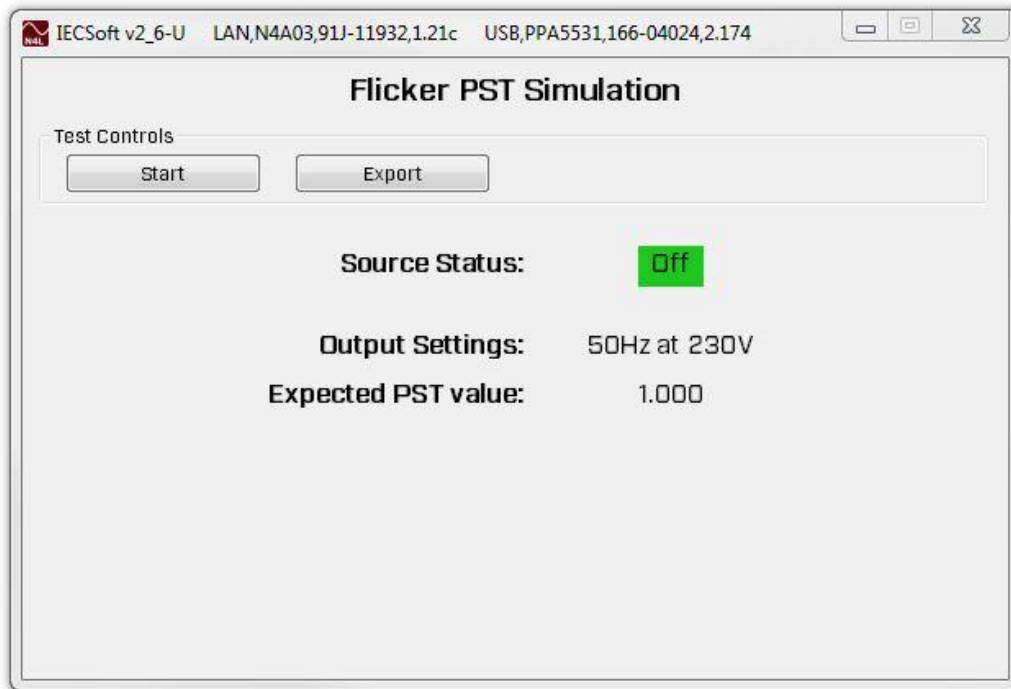


Select the required instrument from the list of compatible devices and click on "**Connect**" to continue.

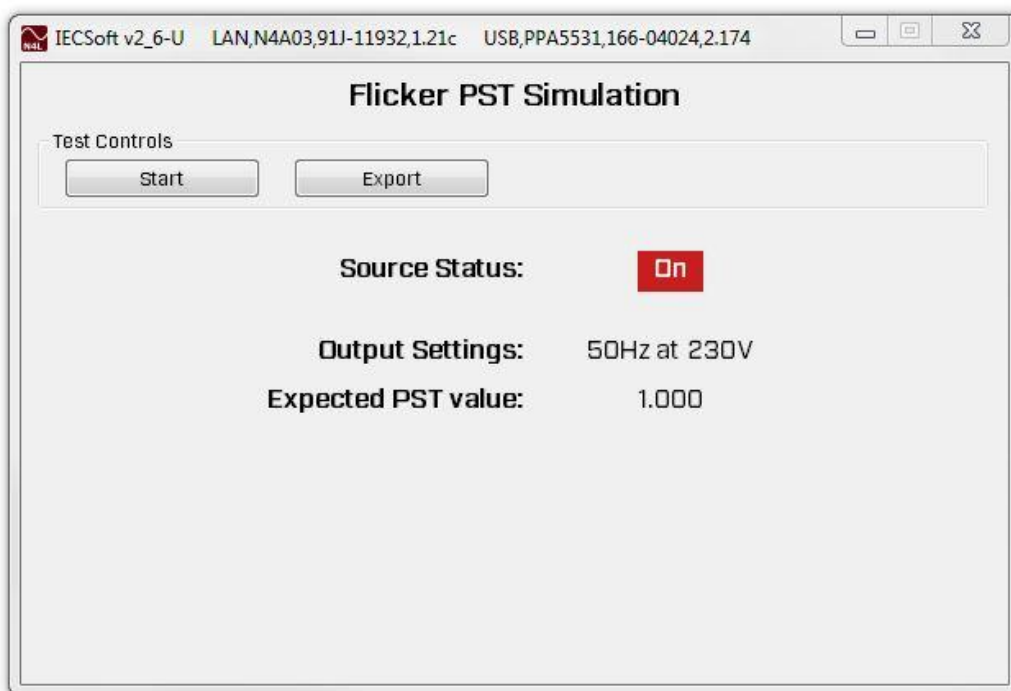
When using a N4A Source the following series of windows are displayed for several seconds whilst IECSoft sends the setup commands to the instrument.



The Flicker PST Simulation dialog box is displayed. This dialog box will be displayed immediately if using an "External" source.



This includes details of the Expected PST result and the status of the source which will be **OFF**. Click "**Start**" to continue.

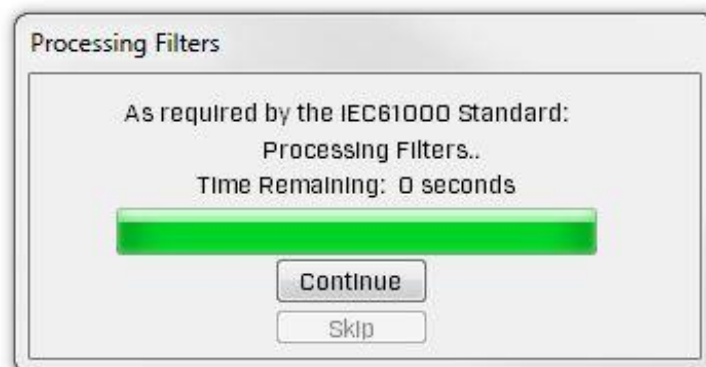


The Source Status will change to **ON**. The Flicker PST simulation dialog box is updated to indicate that the Source output is switched on ready to start the test.

The Processing Filters window is also displayed above the Flicker PST Simulation dialog box:

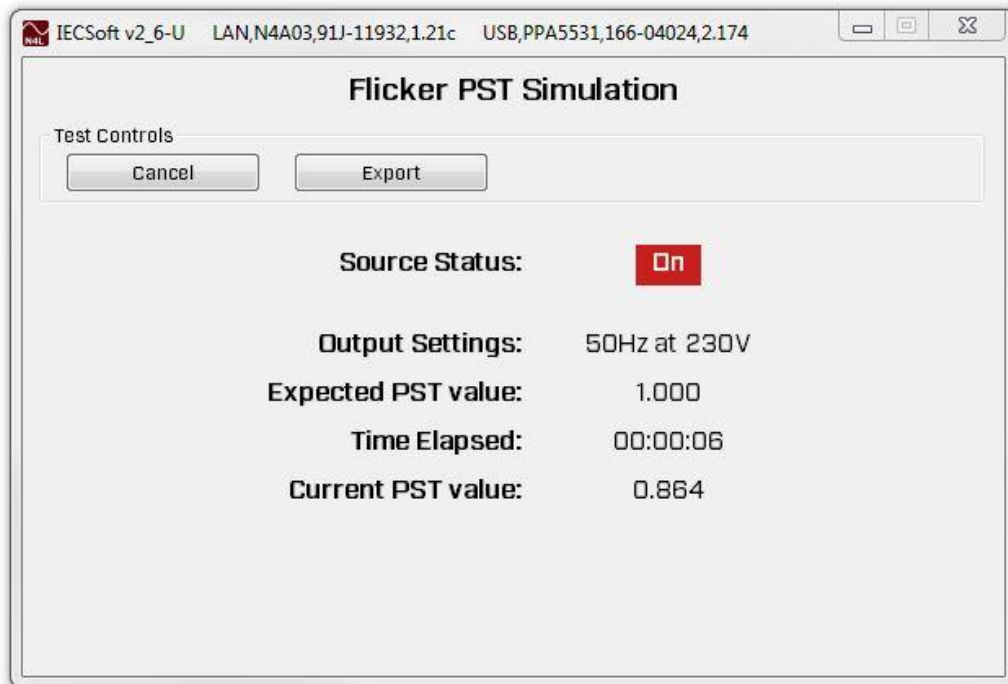


The IEC61000 standard specifies a minimum period of 1 minute must be allowed for filter stabilisation. It is possible to “Skip” this delay but the test will then be invalid because it does not comply with the requirements defined in the Standard. The test can also be cancelled at this stage. After 1 minute the message in the Processing Filters window will change to:

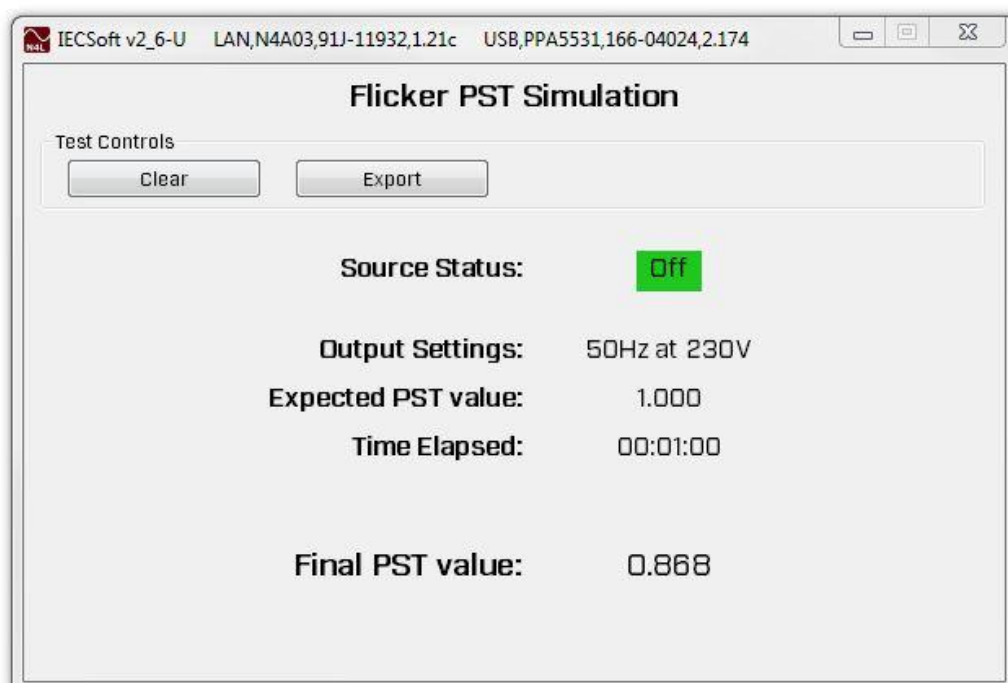


In some situations the EUT will require longer than 1 minute to stabilise. To allow for this the test will not continue until the user is ready to proceed by clicking on “**Continue**”

The dialog box will be constantly updating the Elapsed Time and the Current PST value. The “Cancel” button can be used at any time to stop the test.



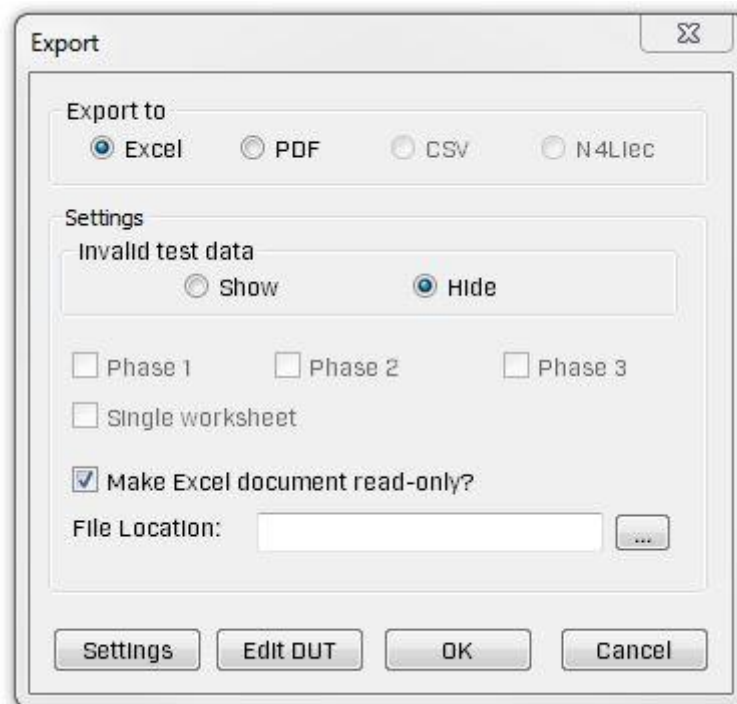
On completion of the test the Source output is switched **OFF** and the dialog box is updated to display the Final PST value. No Pass or Fail message is displayed. A nominal accuracy of +/- 10% of the expected PST value should be achieved.



Note: When using an "External" unit the Time Elapsed will be updating but the Current PST value will be blank.

6.3 Saving / Exporting test data.

Click on “**Export**” to display the Export options window.



Only Excel and PDF Reports can be created. It is not possible to create “*.CSV” or “*.N4Liec” files for Flicker PST Simulation tests.

6.3.1 Example Excel Report:

Click to add header

13th August 2019 - 10:24:51		Page 1/1	IECSoft v2_6
		Flicker PST Simulation 	
Source Details			
Source Model	N4A03		
Source Serial	91J-11932		
Source Firmware	1.29		
Instrument Details			
Instrument Model	PPA5531		
Serial Number	166-05225		
Firmware Version	2.178		
N4L Calibration Date	26th September 2017		
Instrument Version	Standard		
Equipment Under Test			
Brand	N4L		
Model	Z100		
Serial	P1234		
Impedance Network ID	IMP001		
Rated Voltage	230		
Rated Current	5		
Rated Frequency	50		
Rated Power	1000		
Test Details			
Frequency	50Hz at 230V		
Simulated PST Value	1		
Measured PST Value	1		
Additional Test Details			
Operator	KAR		
Lab Name	N4L		
Location	LAB1		
Notes			
Signature			
Results			

Notes:

No Pass or Fail Result is included in the report.

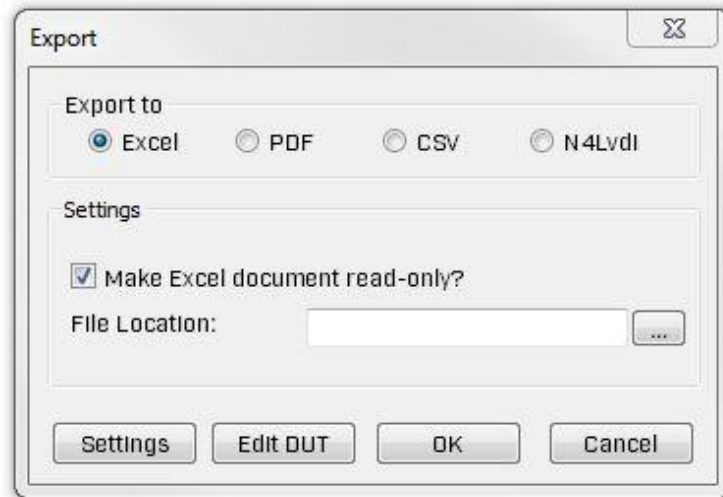
When an "External" source is used the following details will have to be manually entered onto Sheet 2 of the Excel Report: Instrument model, Instrument serial number, Instrument Firmware, Instrument Calibration date & Instrument version. It will also be necessary to enter the Measured PST Value.

6.3.2 Example PDF Report:

13th August 2019 - 10:24:51		Page 1/1	IECSoft v2_6
Flicker PST Simulation			
Measurement Equipment	Instrumentation Details Newtons4th PPA5531 STD SN: 166-05225 Firmware: v2.178 Last calibration date: 26th September 2017		
AC Source	Newtons4th N4A03 SN: 91J-11932 Firmware: v1.29		
Impedance Network ID	N/A		
EUT Details	Brand: N/A Model: N/A Serial: N/A		
User Rated Voltage	N/A		
User Rated Current	N/A		
User Rated Frequency	N/A		
User Rated Power	N/A		
Operator	Operating Conditions N/A		
Lab Name	N/A		
Location	N/A		
Notes			
Output	Test Configuration 50Hz at 230V		
Simulated PST Value	1.000		
Measured PST Value	0.867		
Signature			
Results			

7 The Export function

Clicking on the “save and export” button will display the Export Settings window. The setting options in this window are described below:



In addition to producing an Excel or PDF report it is recommended that the test data is saved to an “.N4Lvdi” file. This allows the test data to be reviewed again in IECSoft at a later date allowing you to re-create the report along with allowing further tests to be performed using the same settings etc. The file can also be used to aid Technical Support should this be required.

7.1 “Export to” options:

The results can be exported and saved into 4 file types:

Excel report document - A document containing all of the results for the test performed.

PDF report document - A document containing all of the results for the test performed.

“.CSV” file – A file containing the result data that can be viewed using “notepad”.

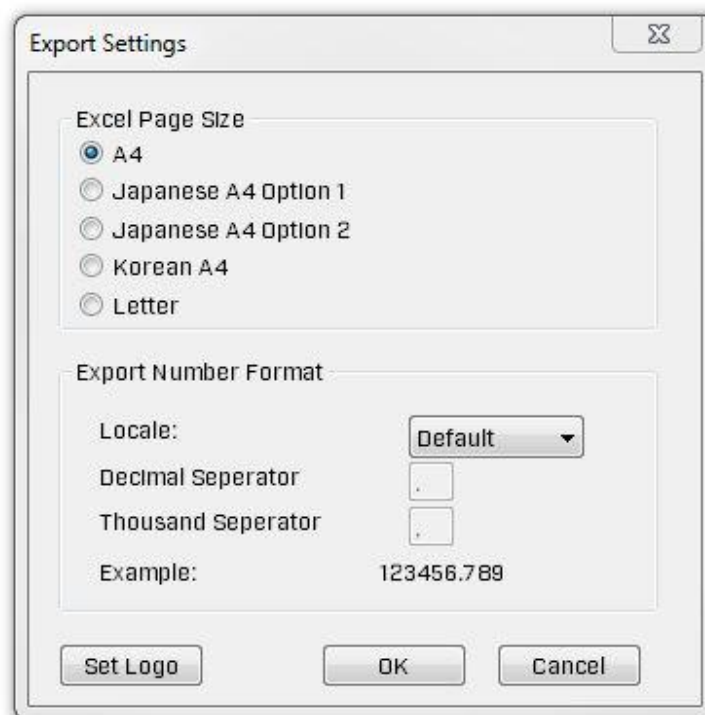
“.N4Lvdi” file – A file containing all of the data that can be recalled into IECSoft using the “Load IEC Test” (or using drag and drop) function on the welcome screen.

7.2 Make Excel document read-only:

The default setting is to create a Read Only Excel document. By deselecting this option the Excel report can be edited at a later date.

7.2.1 Export Settings Button.

Click on the “**Settings**” button in the Export window to display the Export settings window:



Excel page size:

There are a number of Excel Report page size options that can be selected by the user:

A4 – Standard A4 size for the UK and Europe.

Japanese A4 Option 1 – Required for use with Japanese Excel version 2013 and later.

Japanese A4 Option 2 – Required for use with Japanese Excel version 2010 and earlier.

Korean A4 – Required for use with Korean versions of Excel.

Letter – Letter style format. (Mainly used in the USA).

Note: The User should select the appropriate option for the version of Excel installed on their PC or Laptop. This will ensure that the report is displayed and printed out correctly.

Export Number format:

The number format can be adjusted by the User. This allows the format to be adjusted to agree with the version of Excel to ensure that numbers are correctly displayed in the reports.

7.2.2 Edit DUT Button:

Before saving the results it is possible to add or amend the information entered into the "Equipment under Test" window.

Click on "**Edit DUT**" in the Export window on the following page will open:

The screenshot shows a software window titled "Additional Details". It contains two columns of input fields. The left column, labeled "Device Details", includes fields for Brand, Model, Serial, Rated Voltage (V), Rated Current (A), Rated Frequency (Hz), Rated Power (W), and Impedance ID, each with a text input box containing "N/A". The right column, labeled "Test Details", includes fields for Lab Name, Location, and Operator, also with "N/A" in the input boxes, and a larger "Notes" section with a text area and a "chars left: 249" counter. At the bottom of the window are "Cancel" and "OK" buttons.

Any of the details can be amended if required and comments can be entered into the Notes section. Click "**OK**" to save the changes and close the window. The information entered here will then be included in the report or results file.

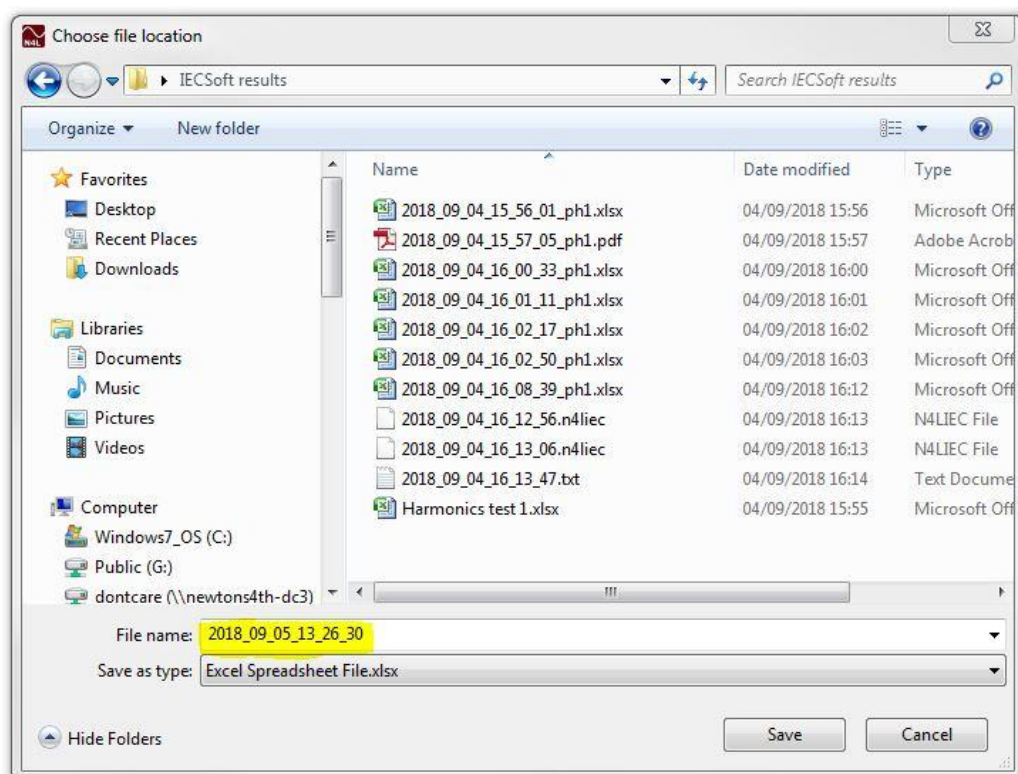
7.3 Creating an Excel report.

The default Excel report will contain locked spreadsheets with "Finalize document" applied to prevent the data from being changed at a later date. It is possible to produce an editable document but this **MUST** be selected at the time the Excel report is produced. The locked report can't be unlocked by the user. However, if an ".N4Lvdi" file was created at the time the test was performed this file can be loaded back into IECSoft to create a new unlocked Excel document.

7.3.1 Non-Editable Documents.

Ensure "Export to Excel" and "Make Excel document read-only?" are still selected in the Export window along with any other optional selections.

Click on the file location box, the "Choose File Location" window will be displayed.



Select the location to where you want the file to be stored.

You will see that IECSoft automatically gives the file a name based on the date and time. This file name can be kept or deleted and a new file name entered. Click "**Save**" which will close the window and then click on "**OK**" in the Export window.

The following message will be displayed for a short period.

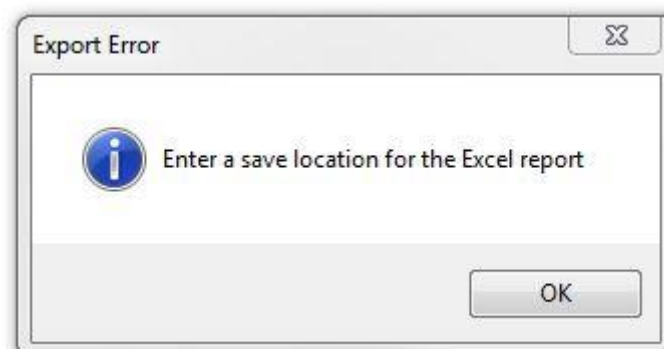


The file will then be stored to the requested location and will also open up on the PC. The following message is then displayed to confirm that the excel document was successfully saved to the required location.



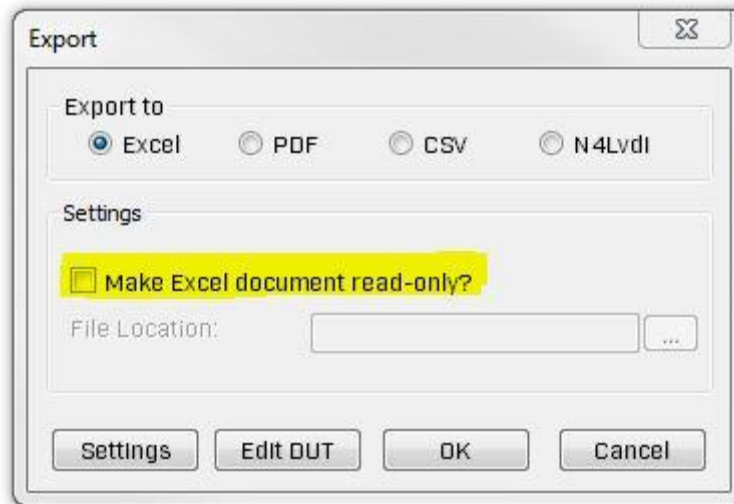
Click on **Close** to clear the message.

Note: If you click on "**OK**" without entering a file location the following error message is displayed. Click on "**Ok**" and enter a file location as described above.



7.3.2 Excel documents that can be edited.

Ensure in the Export window that “Make Excel document read-only?” is not selected.



Note: It is not possible to enter a file name and save the file directly to the PC. The file must be saved once it is open.

Click on “**OK**” in the Export window,

The following message will be displayed for a short period.



The file will then be open up on the PC.

The following message is then displayed to confirm that the excel document was successfully opened on the PC.

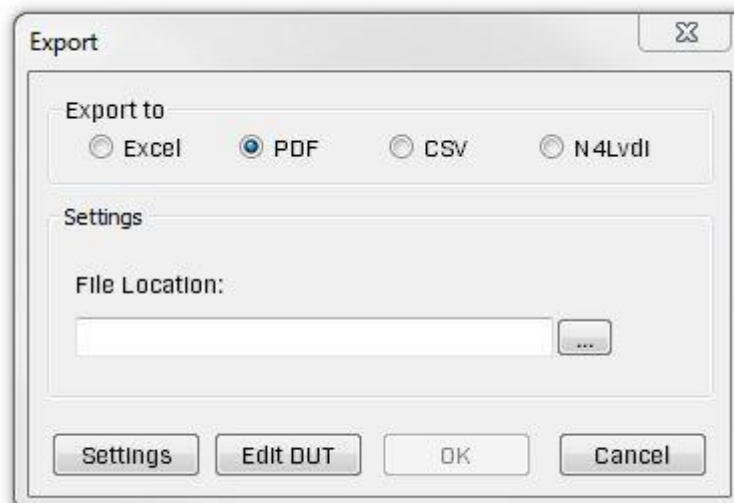


Click on **Close** to clear the message.

The Excel file can now be edited but remember the document **MUST** be saved before it is closed otherwise it will be lost and can't be recovered if the test window is already closed.

7.4 Creating a PDF report

Click on "**Export to PDF**". The window will be updated:



The DUT details can be added or updated if required and the Settings can also be adjusted if necessary.

Click on the file location box, the "Choose File Location" window will be displayed. Select the location to where you want the file to be stored.

IECSoft automatically gives the file a name based on the date and time. This file name can be kept or deleted and a new file name entered. Click "**Save**" which will close the window and then click on "**OK**" in the Export window.

The following message will be displayed for a short period.



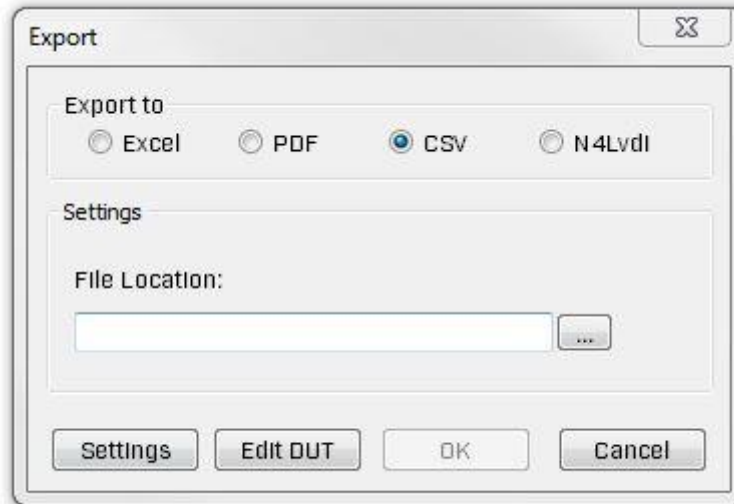
The file will then be stored to the requested location. The following message is displayed to confirm that the PDF document was successfully saved to the required location.



Click on **Close** to clear the message.

7.5 Creating “.CSV” files.

Click on “**Export to .CSV**”. The window will be updated:



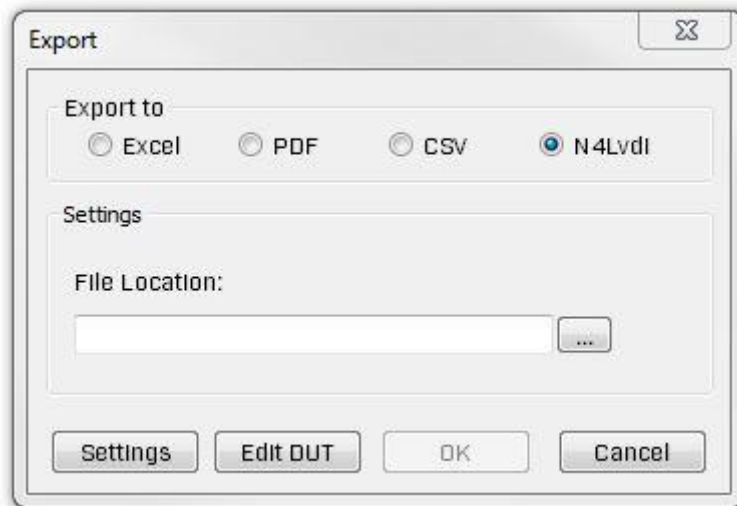
The DUT details can be added or updated if required and the Settings can also be adjusted if necessary.

Click on the file location box, the “Choose File Location” window will be displayed. Select the location to where you want the file to be stored.

IECSOft automatically gives the file a name based on the date and time. This file name can be kept or deleted and a new file name entered. Click “**Save**” which will close the window and then click on “**OK**” in the Export window to save the file in “.CSV” format to the requested location.

7.6 Creating “.N4Lvdi” files.

Click on “Export to .N4Lvdi”. The window will be updated:



The DUT details can be added or updated if required and the Settings can also be adjusted if necessary.

Click on the file location box, the “Choose File Location” window will be displayed. Select the location to where you want the file to be stored.

IECSoft automatically gives the file a name based on the date and time. This file name can be kept or deleted and a new file name entered. Click “**Save**” which will close the window and then click on “**OK**” in the Export window to save the file in “.N4Lvdi” format to the requested location.

7.7 Recalling stored Configuration & Result files.

Configuration settings can be recalled into IECSoft using stored configuration files (.iecfg files).

Result files can be recalled into IECSoft and then viewed using stored result files (.N4Lvdi).

There are two methods of recalling the “.iecfg” configuration and the “.N4Lvdi” Result files. These are:

- 1) Using the IECSoft Welcome screen.
- 2) Using Drag “n” drop.

7.7.1 Using the Welcome Screen.



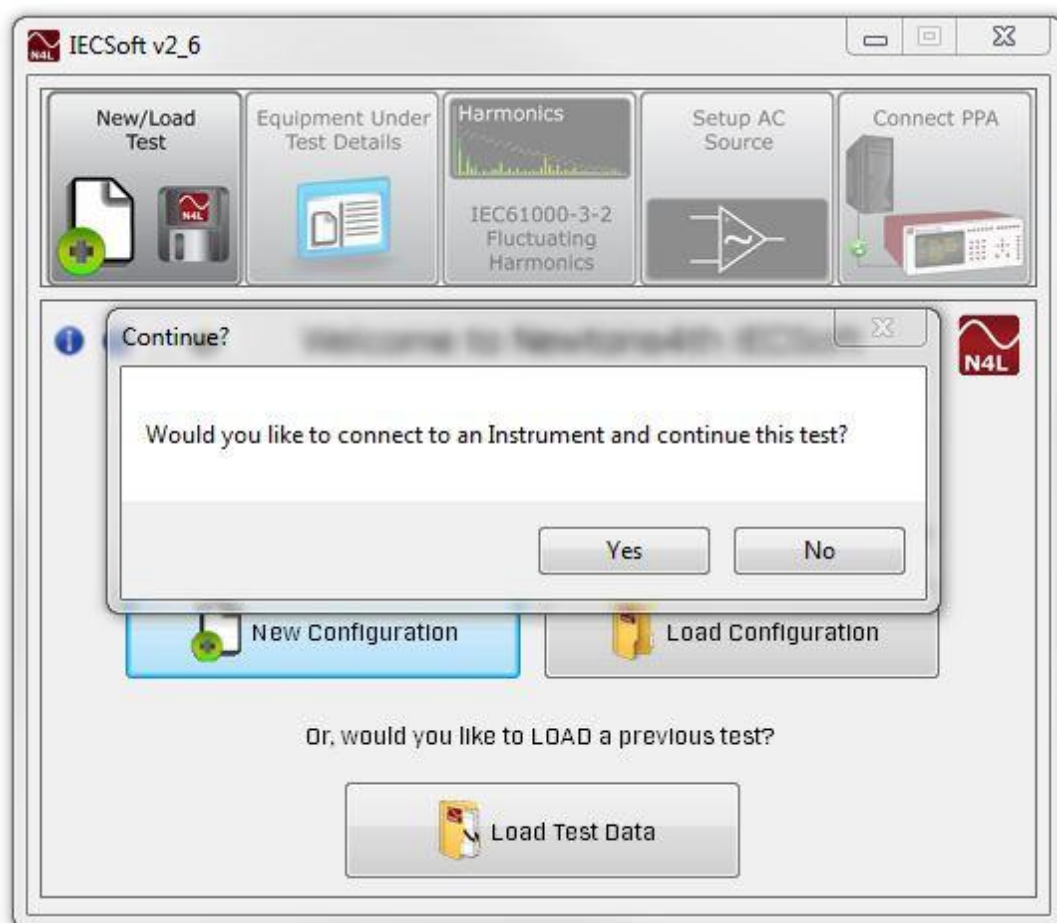
To Load Configuration Files.

To load a stored “.iecfg” Configuration file click on “**Load Configuration**”. Double click on the file once it is located on the computer. The configuration settings will then be recalled into IECSoft and the “Test Setup – page 2” dialog will be displayed.

Click “**Next**” to continue with the instrument Setup and to perform the tests.

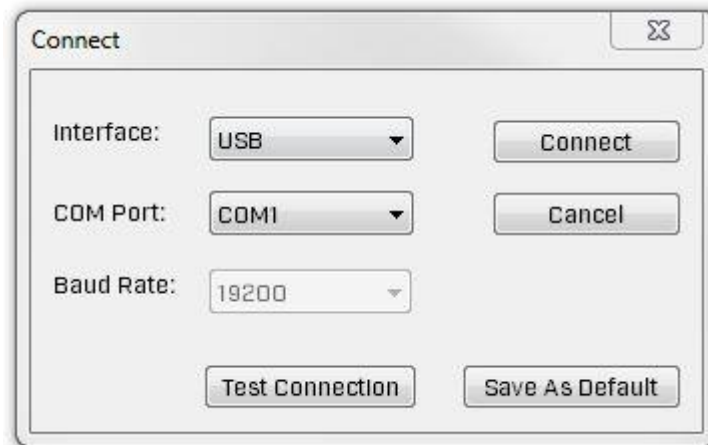
To Load Result files.

To load a stored “.N4Lvdi” Result file click on “**Load Test Data**”. Double click on the file once it is located on the computer. The following message window appears:



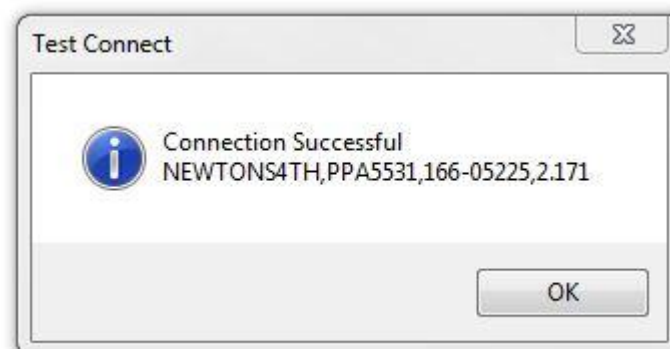
Click on "**NO**" and the results page is displayed allowing the results to be reviewed. The software will not be connected to the instrument but the user can view the saved results in the various formats and export the results again if required.

Click on "**YES**" and the connection window is displayed:

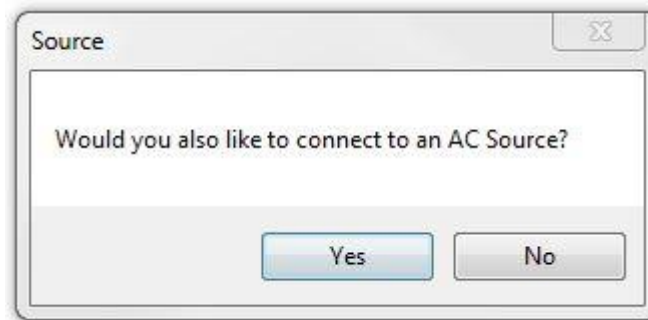


Select the required Interface option and ensure the instrument is set to the same option. For a LAN interface click on search and select the IP address of the instrument. For Serial and USB select the appropriate COM Port. For serial interface connections only ensure the Baud Rate in the connection window *and* on the instrument are set to 19200.

Click on "**Connect**": The test Connection window appears.

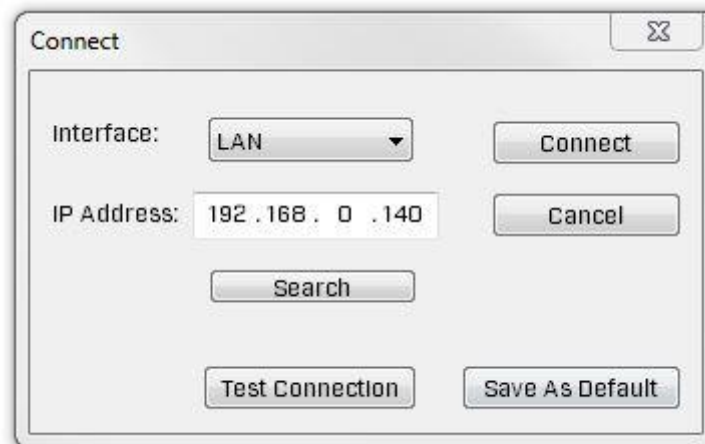


Click on "**OK**": The Source connection window appears:

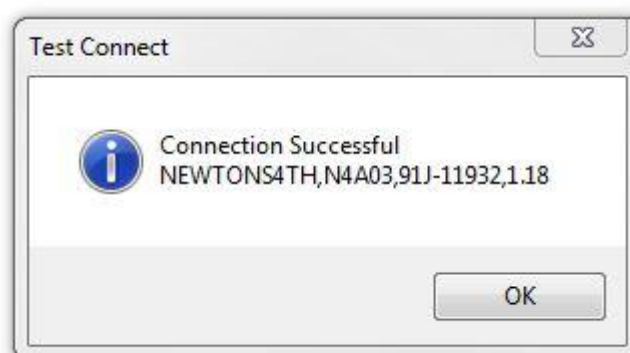


Click "**NO**": The results page is displayed.

Click "**YES**": The Source connection window appears.



Select the correct Interface settings then click on "**Connect**":



Click on "**OK**": The Setup windows will then appear.

The results page is displayed allowing the results to be reviewed and the tests to be repeated as required.

7.7.2 Drag “n” drop.

Drag an “.iecfg” Configuration file on to the IECSoft “.exe” file or shortcut. IECSoft will then automatically start up and load the configuration settings from the stored file. The “Test Setup Page 2” dialog will be displayed. Click “**Next**” to continue with the setup and connect to the instrument to perform the tests.

Drag an “.N4Lvdi” Result file on to the IECSoft “.exe” file or shortcut. IECSoft will then automatically start up and display the “Would you like to connect to an Instrument and continue this test?” message. Click on “**NO**” to view the results data or “**YES**” to connect to an instrument, view the results data and perform further tests.

Appendices

Appendix A – Help and Assistance.

If you require any further assistance with the operation of IECSoft please do not hesitate to contact your local distributor or N4L on support@newtons4th.com