Newtons4th Ltd
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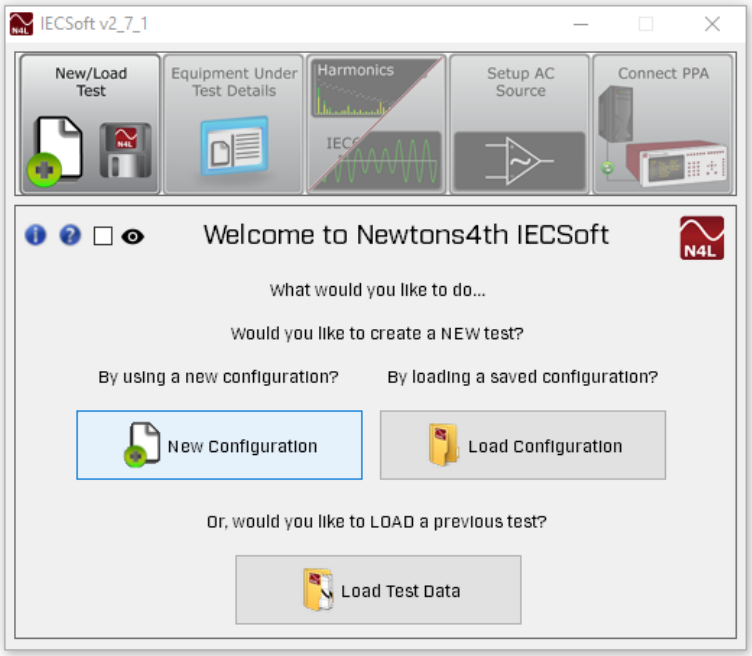
IECSoft

PPA Series PC Software
IEC61000 Harmonics Flicker and EMC Testing

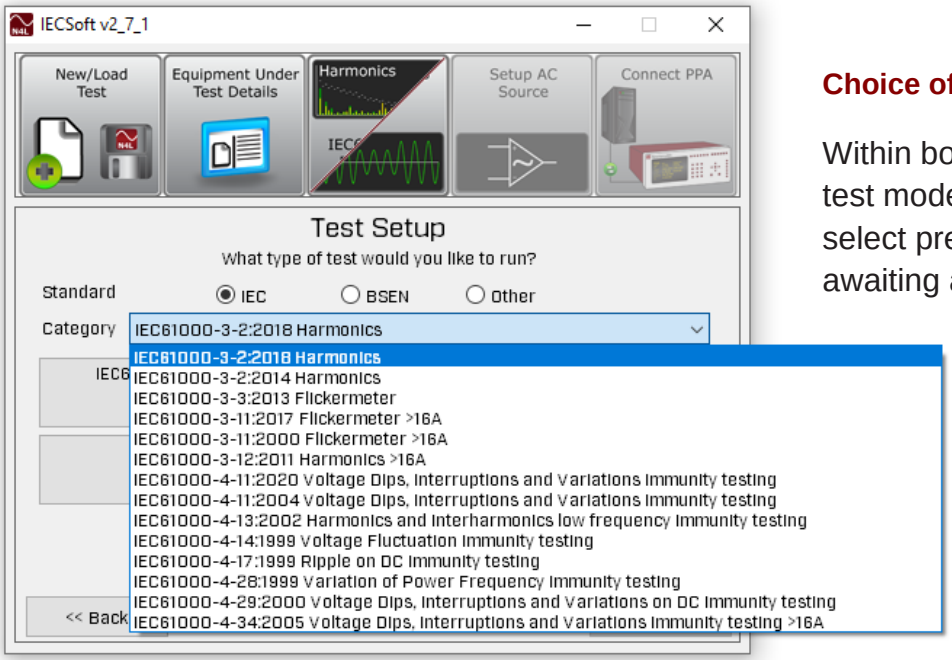
PPA55x1 series power analyzers combined with a unique level of ISO17025 accredited calibration for IEC61000 Harmonic and Flicker functions, have made N4L a leading test solution supplier in this field.

Developed to reflect the increasing complexity of these standards and the ongoing changes they involve, IECSoft PC software has become a reference against which others are compared.



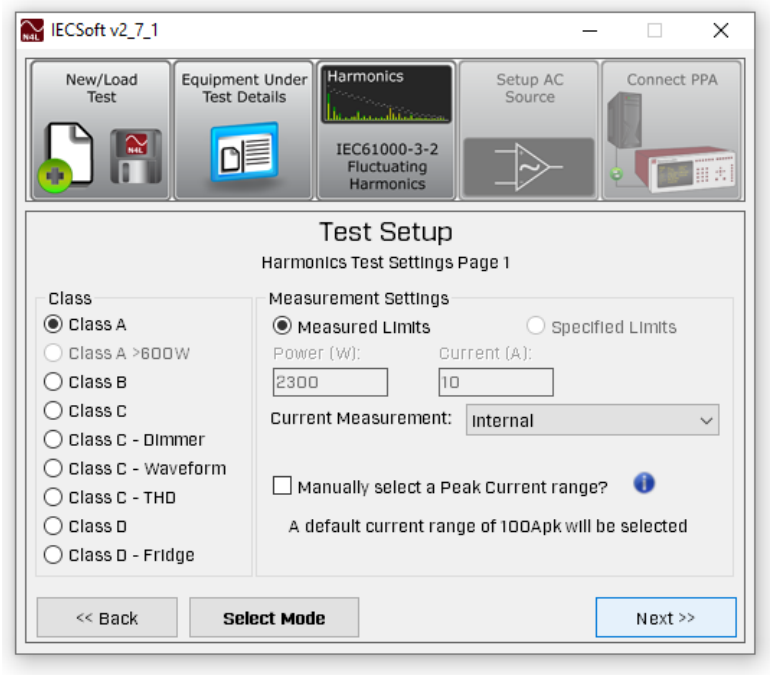
Intuitive user interface

With a clear sequence of operation stages, from first selecting what a user wishes to do, then confirmation of the equipment under test that will be presented in automatic report generation, IECSoft guides the user through a test process.



Choice of standards and revisions

Within both Harmonic and Flicker test modes, a user has the option to select prevailing standards or those awaiting a stability date, simplifying the comparison of test results made previously.



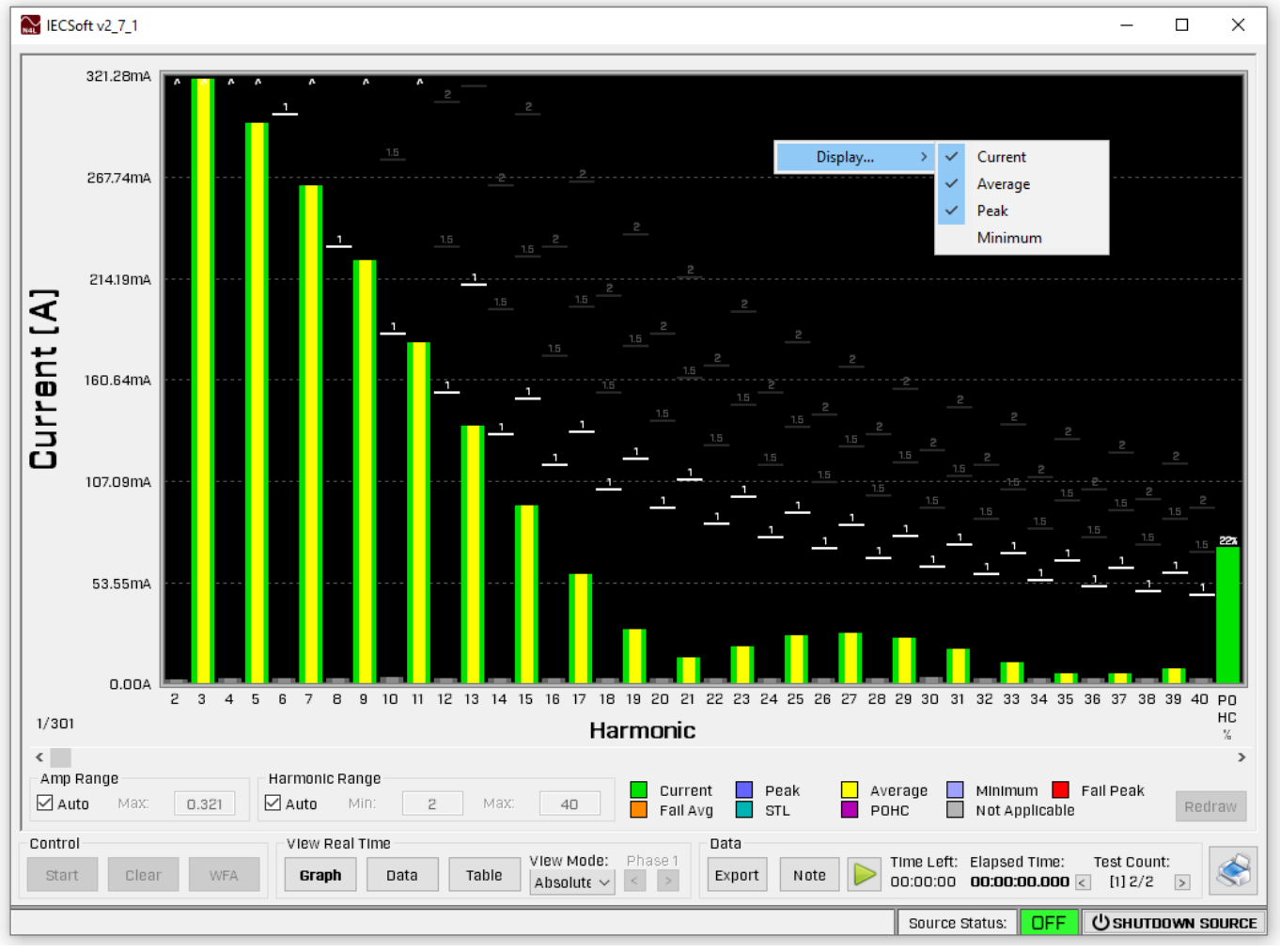
Logical option sequence

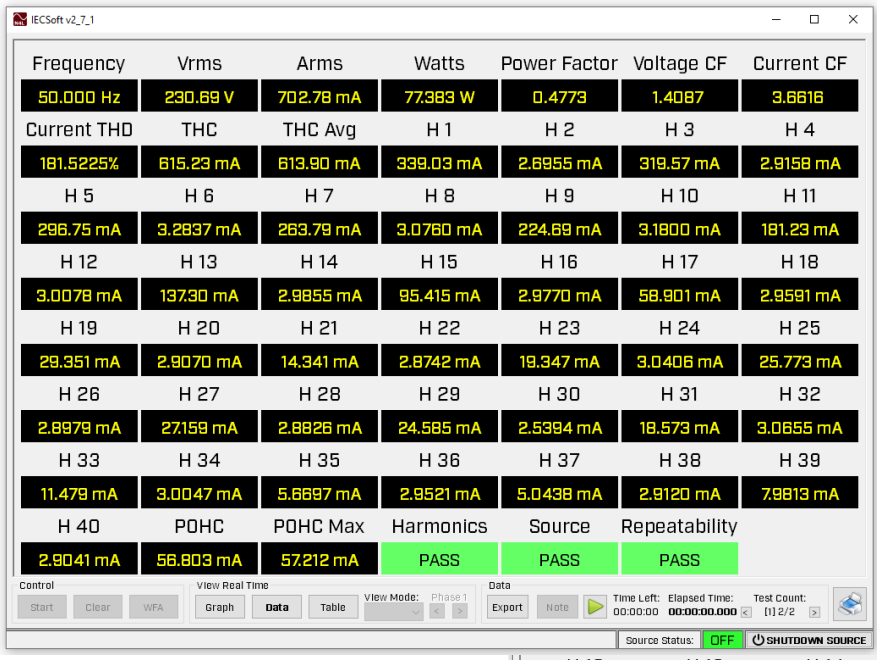
Having selected the test mode, for example Harmonics, associated options are presented.

In this example, harmonic test ‘class’ options are displayed and selected with radio buttons.

Real time data presentation

Unlike many IEC61000 systems that rely on PC sample processing, IECSoft presents real time measured results from a PPA55 series power analyzer. This PPA+IECSoft combination allows real time measurement presentation without excessive PC processing or memory constraints.

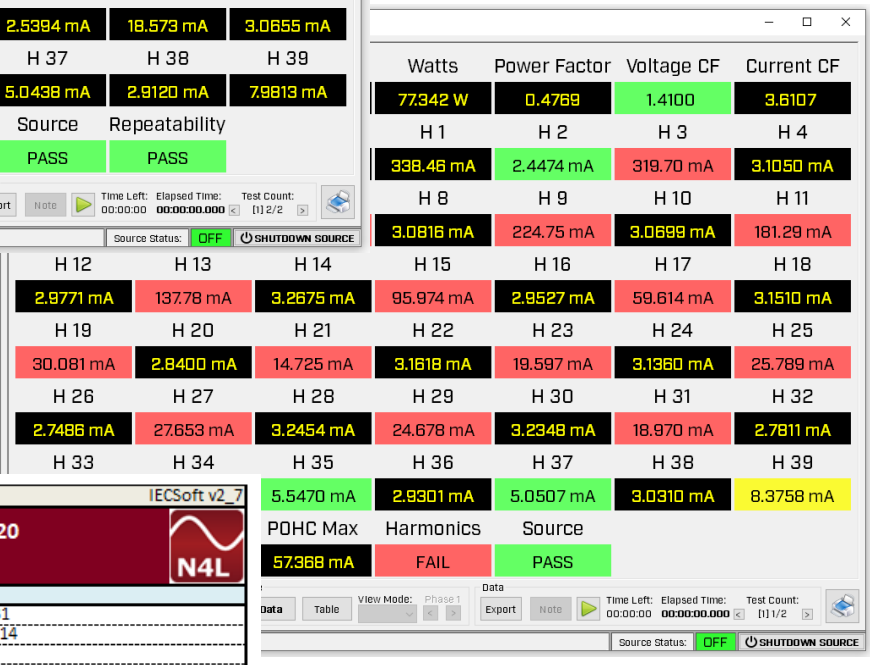




Flexible presentation

The optimum data presentation format will depend upon many things, not least user preference.

IECSoft allows users to switch between Real Time Data, Graph, or Table view during a test.



Real time test status

With ‘Real Time Data’ view, colour coding gives an instant status of individual harmonics relative to their respective limits, PASS or FAIL up to this moment in time, plus verification of voltage source compliance, which is needed for a valid test.

13th March 2023 - 13:53:17 Ph:1 Page 1/10 IECSoft v2_7

N4L **IEC61000-3-2:2018+AMD1:2020** N4L
Fluctuating Harmonics

Instrument Details	
Instrument Model	PPA5531
Serial Number	166-00914
Firmware Version	2.185
N4L Calibration Date	07th July 2022
Instrument Version	Standard
Source Details	
Source Model	N4A03
Source Serial	91J-11932
Source Frequency	50.000Hz
Source Voltage RMS	230.000V
Source Settling Time	10.0 s
Test Settings	
Class	Class A
Mode	Measured
Equipment Under Test	
Brand	N4L
Model	Z100
Serial	P1234
Impedance Network ID	IMP001

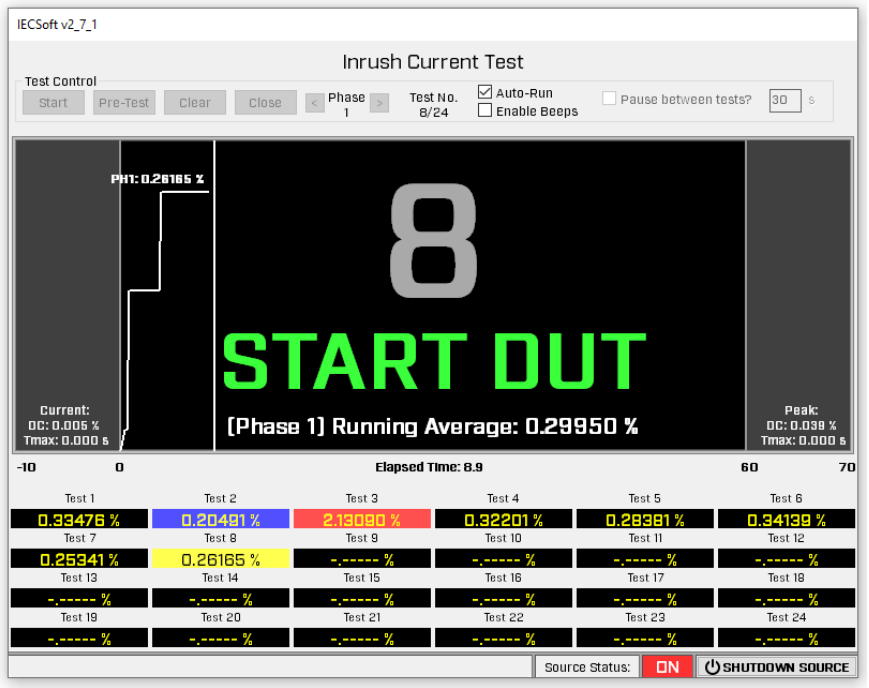
Test Conditions	User Entered	Measured
Rated Voltage	230.000V	230.688V
Rated Current	750.000mA	702.385mA
Rated Frequency	50.000Hz	50.000Hz
Rated Power	172.500W	77.423W

Additional Test Information	
Measured Power Factor	0.478
Max Current THD	182.48%
Average THC	617.572mA
Max Power	77.778W
Max F.Current	340.714mA
Average F.Current	338.956mA
Peak Current Range	30A
Test Duration	1.0 minute
Additional Test Details	
Operator	KAR
Lab Name	N4L
Location	LAB1
Notes	Harmonic Class A test data
Signature	
Results	Phase 1: PASS

Harmonic Test summary sheet

All measurement data taken during a test is recorded and available in an Excel format, so users can review all test detail.

The first page of this report is a summary sheet, confirming the overall test result with product and primary test data.



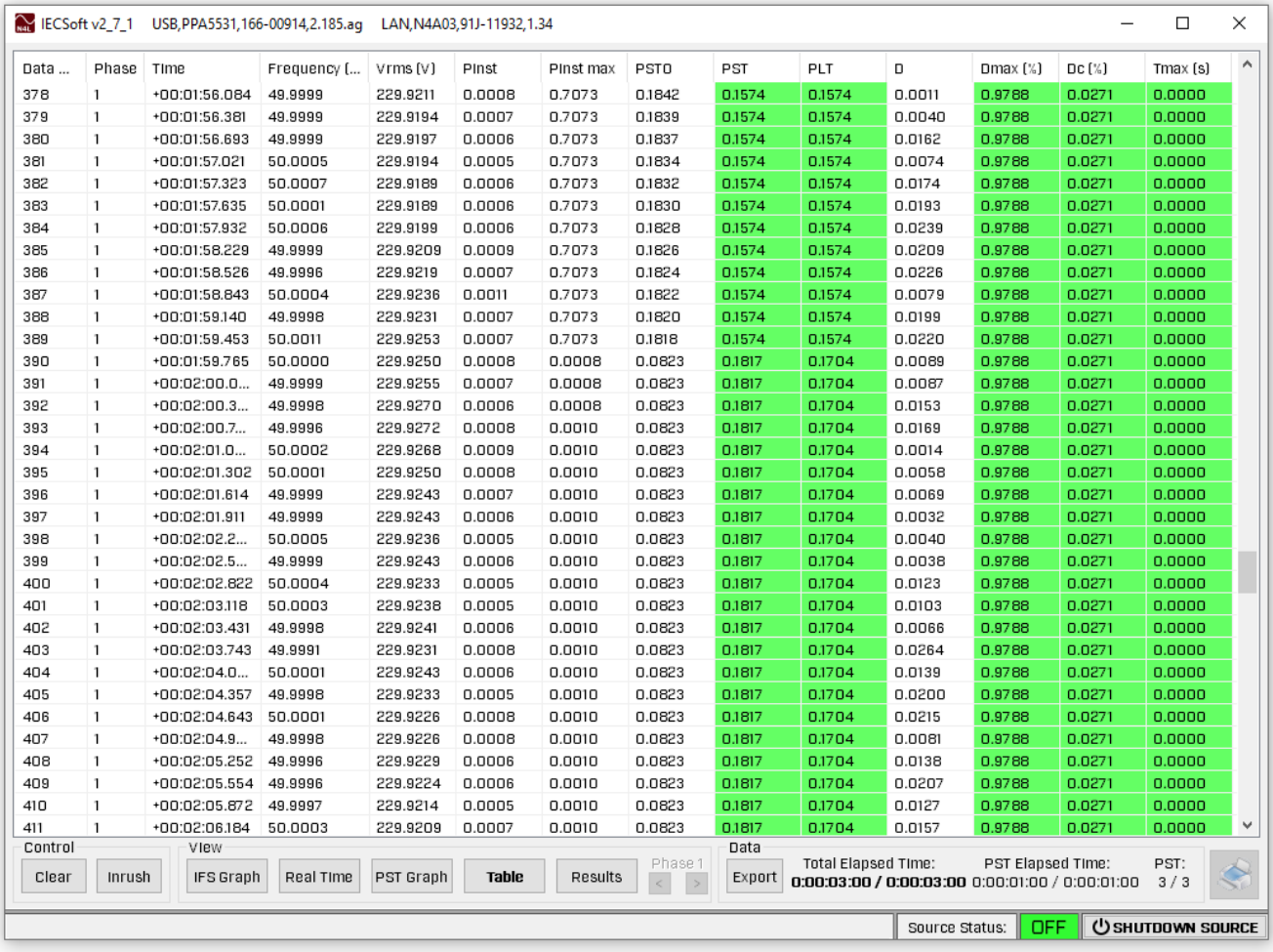
Flicker Inrush

Limiting the chance of user error when making inrush tests, IECSoft presents an intuitive progress plot in addition to measurement results as each of 24 tests are made.

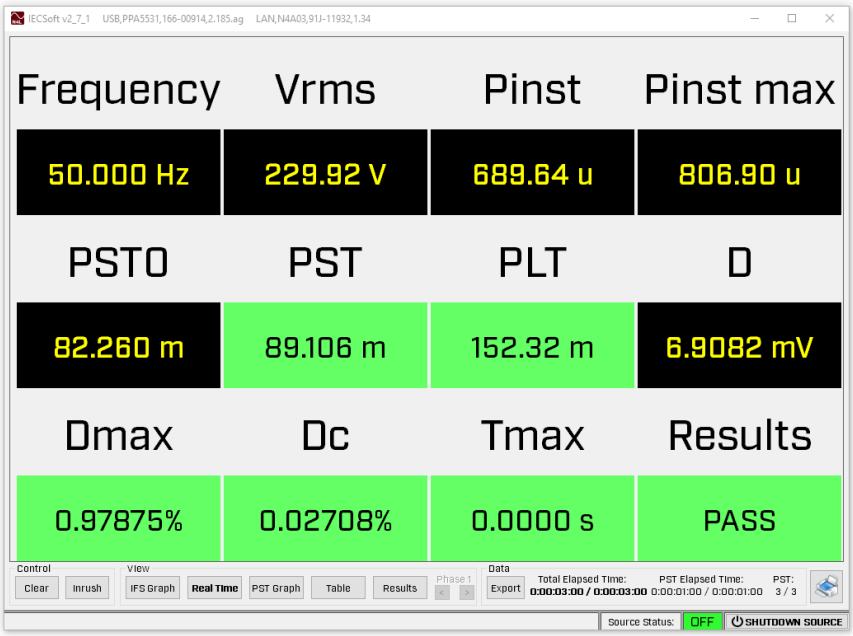
At each test stage, WAIT, START DUT and STOP DUT displays guide the user thought the test process.

Real time Flicker storage

Correct measurement of Flicker functions requires gapless sampling of half cycle Vrms i.e. 100 measurements per second @ 50Hz and 120 measurements per second @ 60Hz. The PPA processes instantaneous flicker sensation at full speed, then sends derived PST and PLT plus captured 'D' events to IECSoft for logging and presentation.



Data ...	Phase	Time	Frequency (...	Vrms (V)	PInst	PInst max	PSTO	PST	PLT	D	Dmax (%)	Dc (%)	Tmax (s)
378	1	+00:01:56.084	49.9999	229.9211	0.0008	0.7073	0.1842	0.1574	0.1574	0.0011	0.9788	0.0271	0.0000
379	1	+00:01:56.381	49.9999	229.9194	0.0007	0.7073	0.1839	0.1574	0.1574	0.0040	0.9788	0.0271	0.0000
380	1	+00:01:56.693	49.9999	229.9197	0.0006	0.7073	0.1837	0.1574	0.1574	0.0162	0.9788	0.0271	0.0000
381	1	+00:01:57.021	50.0005	229.9194	0.0005	0.7073	0.1834	0.1574	0.1574	0.0074	0.9788	0.0271	0.0000
382	1	+00:01:57.323	50.0007	229.9189	0.0006	0.7073	0.1832	0.1574	0.1574	0.0174	0.9788	0.0271	0.0000
383	1	+00:01:57.635	50.0001	229.9189	0.0006	0.7073	0.1830	0.1574	0.1574	0.0193	0.9788	0.0271	0.0000
384	1	+00:01:57.932	50.0006	229.9199	0.0006	0.7073	0.1828	0.1574	0.1574	0.0239	0.9788	0.0271	0.0000
385	1	+00:01:58.229	49.9999	229.9209	0.0009	0.7073	0.1826	0.1574	0.1574	0.0209	0.9788	0.0271	0.0000
386	1	+00:01:58.526	49.9996	229.9219	0.0007	0.7073	0.1824	0.1574	0.1574	0.0226	0.9788	0.0271	0.0000
387	1	+00:01:58.843	50.0004	229.9236	0.0011	0.7073	0.1822	0.1574	0.1574	0.0079	0.9788	0.0271	0.0000
388	1	+00:01:59.140	49.9998	229.9231	0.0007	0.7073	0.1820	0.1574	0.1574	0.0199	0.9788	0.0271	0.0000
389	1	+00:01:59.453	50.0011	229.9253	0.0007	0.7073	0.1818	0.1574	0.1574	0.0220	0.9788	0.0271	0.0000
390	1	+00:01:59.765	50.0000	229.9250	0.0008	0.0008	0.0823	0.1817	0.1704	0.0089	0.9788	0.0271	0.0000
391	1	+00:02:00.0...	49.9999	229.9255	0.0007	0.0008	0.0823	0.1817	0.1704	0.0087	0.9788	0.0271	0.0000
392	1	+00:02:00.3...	49.9998	229.9270	0.0006	0.0008	0.0823	0.1817	0.1704	0.0153	0.9788	0.0271	0.0000
393	1	+00:02:00.7...	49.9996	229.9272	0.0008	0.0010	0.0823	0.1817	0.1704	0.0169	0.9788	0.0271	0.0000
394	1	+00:02:01.0...	50.0002	229.9268	0.0009	0.0010	0.0823	0.1817	0.1704	0.0014	0.9788	0.0271	0.0000
395	1	+00:02:01.302	50.0001	229.9250	0.0008	0.0010	0.0823	0.1817	0.1704	0.0058	0.9788	0.0271	0.0000
396	1	+00:02:01.614	49.9999	229.9243	0.0007	0.0010	0.0823	0.1817	0.1704	0.0069	0.9788	0.0271	0.0000
397	1	+00:02:01.911	49.9999	229.9243	0.0006	0.0010	0.0823	0.1817	0.1704	0.0032	0.9788	0.0271	0.0000
398	1	+00:02:02.2...	50.0005	229.9236	0.0005	0.0010	0.0823	0.1817	0.1704	0.0040	0.9788	0.0271	0.0000
399	1	+00:02:02.5...	49.9999	229.9243	0.0006	0.0010	0.0823	0.1817	0.1704	0.0038	0.9788	0.0271	0.0000
400	1	+00:02:02.822	50.0004	229.9233	0.0005	0.0010	0.0823	0.1817	0.1704	0.0123	0.9788	0.0271	0.0000
401	1	+00:02:03.118	50.0003	229.9238	0.0005	0.0010	0.0823	0.1817	0.1704	0.0103	0.9788	0.0271	0.0000
402	1	+00:02:03.431	49.9998	229.9241	0.0006	0.0010	0.0823	0.1817	0.1704	0.0066	0.9788	0.0271	0.0000
403	1	+00:02:03.743	49.9991	229.9231	0.0008	0.0010	0.0823	0.1817	0.1704	0.0264	0.9788	0.0271	0.0000
404	1	+00:02:04.0...	50.0001	229.9243	0.0006	0.0010	0.0823	0.1817	0.1704	0.0139	0.9788	0.0271	0.0000
405	1	+00:02:04.357	49.9998	229.9233	0.0005	0.0010	0.0823	0.1817	0.1704	0.0200	0.9788	0.0271	0.0000
406	1	+00:02:04.643	50.0001	229.9226	0.0008	0.0010	0.0823	0.1817	0.1704	0.0215	0.9788	0.0271	0.0000
407	1	+00:02:04.9...	49.9998	229.9226	0.0008	0.0010	0.0823	0.1817	0.1704	0.0081	0.9788	0.0271	0.0000
408	1	+00:02:05.252	49.9996	229.9229	0.0006	0.0010	0.0823	0.1817	0.1704	0.0138	0.9788	0.0271	0.0000
409	1	+00:02:05.554	49.9996	229.9224	0.0006	0.0010	0.0823	0.1817	0.1704	0.0207	0.9788	0.0271	0.0000
410	1	+00:02:05.872	49.9997	229.9214	0.0005	0.0010	0.0823	0.1817	0.1704	0.0127	0.9788	0.0271	0.0000
411	1	+00:02:06.184	50.0003	229.9209	0.0007	0.0010	0.0823	0.1817	0.1704	0.0157	0.9788	0.0271	0.0000



Flicker results

While long term flicker testing requires a huge number of voltage measurements from which all other parameters are derived, the resulting pass/fail criteria involves a relatively simple report.

While not shown here, IFS and PST Sum Probability graphs are also presented in Flicker Test results.

21st August 2023 - 16:17:39 Ph:1 Page 1/4 IECSoft v2_7

IEC61000-3-3:2013+AMD1:2017+AMD2:2021+COR1:2022
Flickermeter

Instrument Details	
Instrument Model	PPA5531
Serial Number	166-00914
Firmware Version	2.185
N4L Calibration Date	07th July 2022
Instrument Version	Standard
Source Details	
Source Model	N4A03
Source Serial	91J-11932
Source Frequency	50.000Hz
Source Voltage RMS	230.000V
Test Settings	
Class	Voltage
Mode	Normal (4.0%)
Peak Current Range	100A
PST	1 minutes
PLT	3 PSTs
Equipment Under Test	
Brand	N4L
Model	Z100
Serial	P1234
Impedance Network ID	IMP001

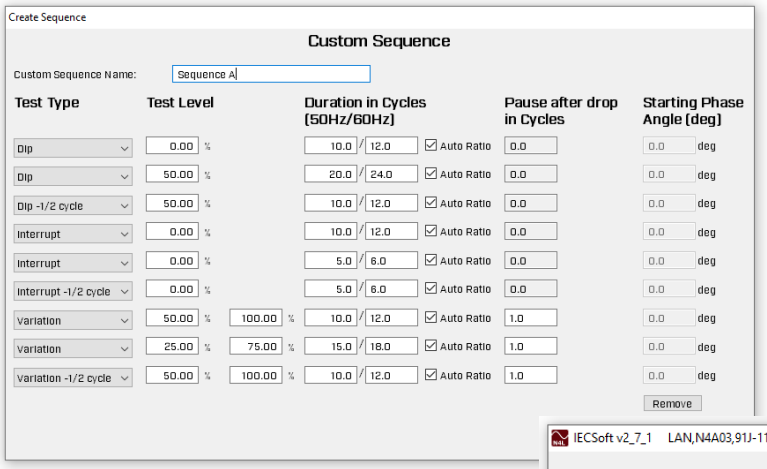
Test Conditions	User Entered	Measured
Rated Voltage	230.000V	229.927V
Rated Current	750.000mA	N/A
Rated Frequency	50.000Hz	50.000Hz
Rated Power	172.500W	N/A
D max	0.9788% (Limit: 4.0%)	
T max	0.0000 s (Limit: 0.5 s)	
DC max	0.0271% (Limit: 3.3%)	
Inrush Test	0.2995% (Limit: 4.0%)	
Inrush Results	Phase1: Pass	

Additional Test Details	
Operator	KAR
Lab Name	N4L
Location	LAB1
Notes	Flicker and Inrush test data
Signature	
Results	Phase1: PASS

Flicker Test summary sheet

All measurement data taken during a test is recorded and available in an Excel format, so users can review all test detail.

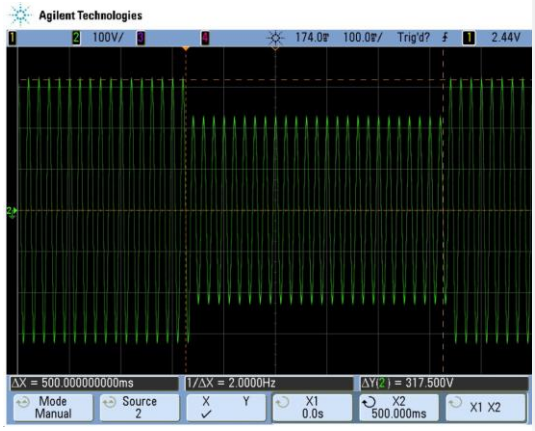
The first page of this report is a summary sheet, confirming the overall test result with product and primary test data.

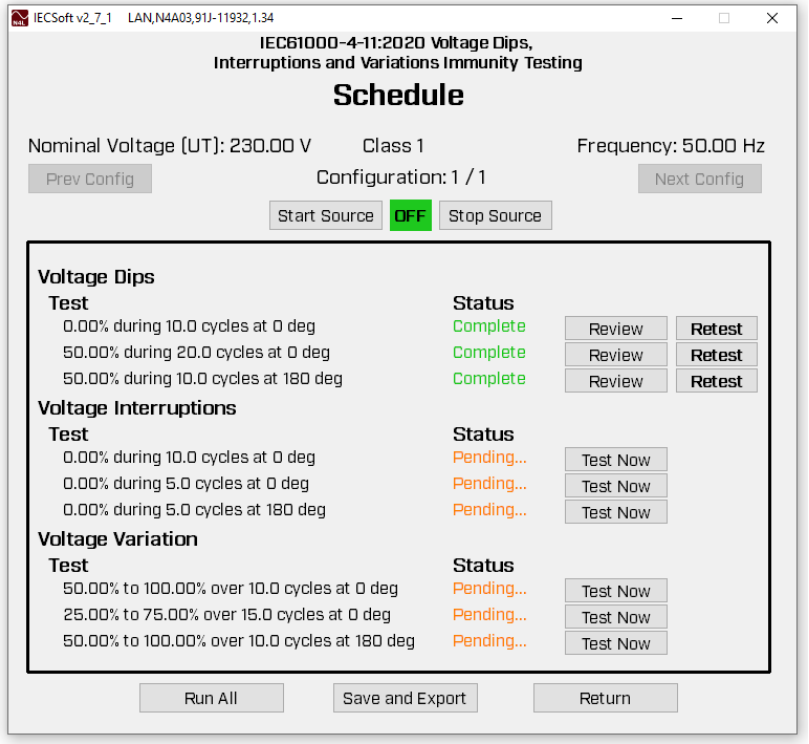


EMC Susceptibility

Susceptibility tests involve the generation of defined mains disturbance, during which the behaviour of a device under test is observed.

IECSoft provides an easy and versatile sequence builder from which a test Schedule can be produced.





Reports and Fast Switching

Since the outcome of these tests relates to the behaviour of a DUT, it is the responsibility of a user to state this on a report and there are no measured ‘results’ as seen in Harmonic and Flicker testing.

Note: Latest revisions of susceptibility standards include fast switch speed and timing which may require external switch hardware that is not presently supported by N4L.

Summary:

Standalone executable PC program for Full Compliance*[1] **Harmonics and Flicker** testing to **IEC61000-3-2/12** (Harmonics) and **IEC61000-3-3/11** (Flicker)

*[1] When used together with Newtons4th PPA(Analyzer)+IMP(Impedance)+N4A(Source)

EMC Susceptibility Testing to:
IEC61000-4-11*[2]**, IEC61000-4-13, IEC61000-4-14, IEC61000-4-17, IEC61000-4-28, IEC61000-4-29***[2]**, IEC61000-4-34****[2]**

*[2] Full compliance requires external switching, please contact us for more information

Minimum System Requirements: *OS: Windows XP SP3, Processor: 233MHz, RAM: 1GB*
Recommended System Requirements: *OS: Windows 11 Processor: 1GHz 2+ cores RAM: 4GB*