ZES ZIMMER
A Rohde & Schwarz Company

LMG Test Suite

Compliance test system by ZES ZIMMER

Standard: *EN 61000-4-7:2002 + A1:2009*
Limits: *EN IEC 61000-3-2:2019 + A1:2021 (Table 1)*
EUT: *(Class A)*

Test name	% of Limit	State	Details
Supply Voltage Frequency Test (61000-4-7) [L1]		OK	50.00 Hz (50.00 Hz ± 0.5
Supply peak voltage test (61000-4-7) [L1]		**OK**	
Positive peak test		OK	All positive peak values
Negative peak test		OK	All negative peak value
Supply peak position test (61000-4-7) [L1]		OK	All peak values within t
Supply Voltage Harmonic Distortion Test (61000-4-7) [L1]		**OK**	
Voltage Distortion H2	30%	OK	0.06 % < 0.20 %
Voltage Distortion H3	3%	OK	0.02 % < 0.90 %
Voltage Distortion H4	5%	OK	0.01 % < 0.20 %
Voltage Distortion H5	7%	OK	0.03 % < 0.40 %
Voltage Distortion H6	8%	OK	0.02 % < 0.20 %
Voltage Distortion H7	10%	OK	0.03 % < 0.30 %
Voltage Distortion H8	3%	OK	0.01 % < 0.20 %
Voltage Distortion H9	11%	OK	0.02 % < 0.20 %
Voltage Distortion H10	1%	OK	0.00 % < 0.20 %
Voltage Distortion H11	35%	OK	0.03 % < 0.10 %
Voltage Distortion H12	7%	OK	0.01 % < 0.10 %
Voltage Distortion H13	22%	OK	0.02 % < 0.10 %
Voltage Distortion H14	6%	OK	0.01 % < 0.10 %
Voltage Distortion H15	30%	OK	0.03 % < 0.10 %
Voltage Distortion H16	2%	OK	0.00 % < 0.10 %
Voltage Distortion H17	20%	OK	0.02 % < 0.10 %
Voltage Distortion H18	4%	OK	0.00 % < 0.10 %
Voltage Distortion H19	19%	OK	0.02 % < 0.10 %
Voltage Distortion H20	4%	OK	0.00 % < 0.10 %
Voltage Distortion H21	18%	OK	0.02 % < 0.10 %
Voltage Distortion H22	3%	OK	0.00 % < 0.10 %
Voltage Distortion H23	16%	OK	0.02 % < 0.10 %
Voltage Distortion H24	4%	OK	0.00 % < 0.10 %
Voltage Distortion H25	18%	OK	0.02 % < 0.10 %
Voltage Distortion H26	4%	OK	0.00 % < 0.10 %
Voltage Distortion H27	17%	OK	0.02 % < 0.10 %
Voltage Distortion H28	4%	OK	0.00 % < 0.10 %
Voltage Distortion H29	19%	OK	0.02 % < 0.10 %
Voltage Distortion H30	6%	OK	0.01 % < 0.10 %
Voltage Distortion H31	19%	OK	0.02 % < 0.10 %
Voltage Distortion H32	5%	OK	0.01 % < 0.10 %
Voltage Distortion H33	20%	OK	0.02 % < 0.10 %
Voltage Distortion H34	4%	OK	0.00 % < 0.10 %
Voltage Distortion H35	22%	OK	0.02 % < 0.10 %
Voltage Distortion H36	5%	OK	0.00 % < 0.10 %
Voltage Distortion H37	15%	OK	0.02 % < 0.10 %
Voltage Distortion H38	5%	OK	0.01 % < 0.10 %
Voltage Distortion H39	16%	OK	0.02 % < 0.10 %
Voltage Distortion H40	4%	OK	0.00 % < 0.10 %
Frequency groups up to 9 kHz (61000-4-7) [L1]		OK	
Table 1 Harmonic Current Test (61000-3-2) [L1]		**OK**	
Harmonic Current Test 100 %		**OK**	
100 % Test H2		OK	No test required (0.001 A ≤ 0.005 A)
100 % Test H3	1%	OK	Limit met (0.032 A ≤ 2.300 A)
100 % Test H4		OK	No test required (0.001 A ≤ 0.005 A)

Test Report

was tested according to

EN 61000-4-7:2002 + A1:2009

EN IEC 61000-3-2:2019 + A1:2021 (Table 1)

Test result was

OK

Test Settings

Test	
Measuring Standard	EN 61000-4-7:2002 + A1:2009
Limits	EN IEC 61000-3-2:2019 + A1:2021 (Table 1)
Test Date	19.03.2019
Test Time	08:37:00
Measurement Duration	00:02:30
EUT Classification	Class A
EUT / Measurement Setup	
Power Supply	
Nominal Voltage	230 V
Nominal Frequency	50 Hz

A complete software and hardware solution

Compliance tests according to IEC/EN 61000-3 harmonics and flicker standards

Standby power measurement

CE marking

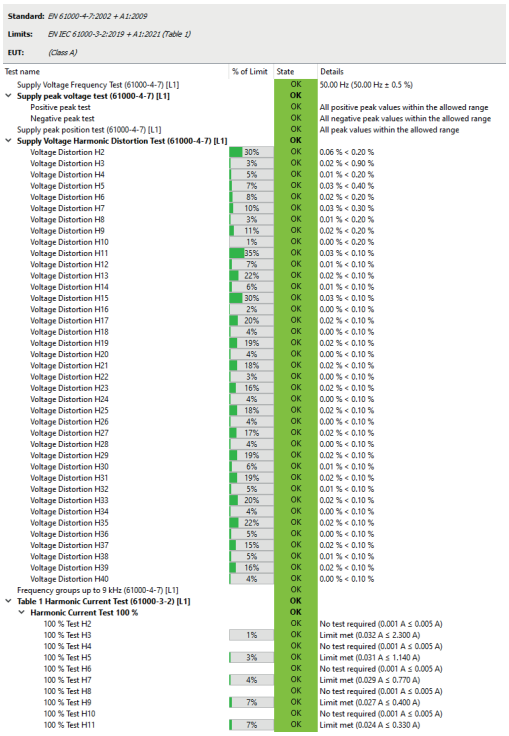
Standards-compliant and meaningful

In modern power grids, the electromagnetic compatibility between all connected devices is ensured, when phenomena such as harmonic current emissions and flicker disturbance are strictly regulated. This is the scope of part of the IEC 61000 EMC standard family. The European Union is particularly demanding when it comes to electromagnetic compatibility, requiring from products that are intended for sale and distribution in its territory to bear the “CE” marking. The European Committee for Electrotechnical Standardization (Cenelec) commonly reviews the IEC international standards before they become European (EN) standards.

The LMG Test Suite is a ZES ZIMMER developed software, used together with the LMG Power Analyzers to perform EMC compliance tests in accordance with the currently valid versions of the IEC/EN 61000-3-2/-12/-16* standards for harmonic emissions and the IEC/EN 61000-3-3/-11 standards for flicker disturbance. The software further supports measurements of standby power according to IEC 62301 & EN 50564. The LMG600 itself performs the harmonic analysis and flicker measurement according to the IEC/EN 61000-4-7 and IEC/EN 61000-4-15 standards.

CE

IEC EN
61000-3-2/12
61000-3-16
61000-3-3/11
EN 50564
IEC 63201

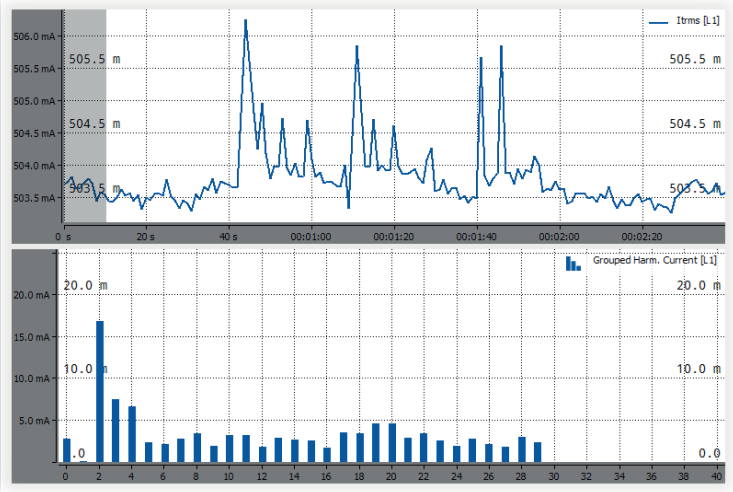


Innovative power measurement technology

The LMG Test Suite employs the LMG600’s proven excellence in precision power measurement. All ZES ZIMMER power analyzers measure with particularly great reliability and precision. The instrument itself does not only serve as compliance testing hardware, but is also a powerful R&D tool. Among its various interfaces, a fast Ethernet (Gbit) port guarantees smooth communication and data transfer between the software and hardware.

Detailed analysis for rapid diagnostics and product improvement

Compliance tests with the LMG Test Suite are carried out either online through direct connection with the LMG600 or offline by using stored data records. Each relevant measurement parameter can be displayed and evaluated in the time and/or frequency domain. This helps the user to quickly identify and address causes of non-compliance. All measured data points and test results can be exported in csv format for further analysis. At the same time, the connection with the LMG600 is quick and seamless.

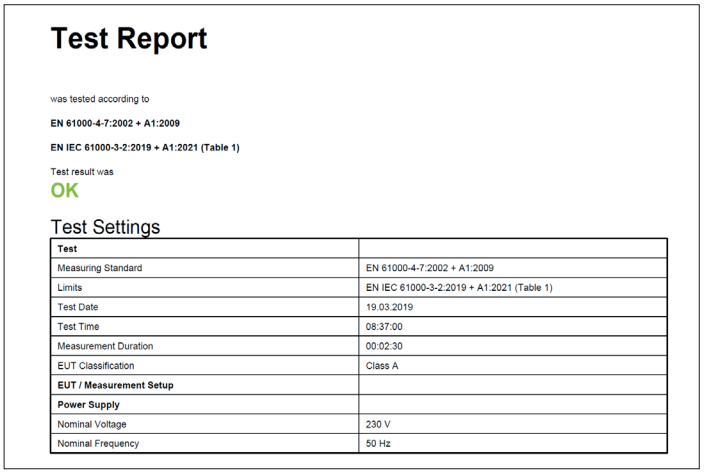


Flexible hardware use, independent of manufacturer

The LMG Test Suite supports all AC power sources available on the market that comply with the standards. This provides maximum flexibility to the user. In particular, as long as the user owns an AC source that complies to the requirements of the desired tests, they may continue using the source that they already have in possession and thus avoid additional investments. At the same time, ZES ZIMMER is in position to recommend and supply an AC sources from third party manufacturers. Standards-specific calibration of the source is not necessary, as the test system monitors the compliance to the specified source parameters. For instance, the system analyzes the source's voltage harmonics and presents them graphically. Any problems from this side of the test structure are thus reliably excluded.

Comprehensive, customer-specific documentation

All results are documented in clear, comprehensive PDF/ Word/Excel test reports. According to the standard, the test report may be based on information supplied by the manufacturer to a testing facility, or be a document recording details of the manufacturer's own tests. It includes all relevant information for the test conditions, the test observation period, alongside with the appointed measurement values. All data regarding the measurement equipment, test structure and settings -such as type designations, serial numbers and information on the calibration and traceability- is also integrated into the test reports. Of course, the reports can be supplemented with additional customer-specific information and design elements, in order to avoid unnecessary post-editing outside the system.



Test Report

was tested according to

EN 61000-4-7:2002 + A1:2009

EN IEC 61000-3-2:2019 + A1:2021 (Table 1)

Test result was

OK

Test Settings

Test	
Measuring Standard	EN 61000-4-7:2002 + A1:2009
Limits	EN IEC 61000-3-2:2019 + A1:2021 (Table 1)
Test Date	19.03.2019
Test Time	08:37:00
Measurement Duration	00:02:30
EUT Classification	Class A
EUT / Measurement Setup	
Power Supply	
Nominal Voltage	230 V
Nominal Frequency	50 Hz

Constant support of existing and upcoming standards

The LMG Test Suite supports compliance tests according to the following standards:

- **IEC/EN 61000-4-7**: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto.
  - **IEC/EN 61000-3-2**: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase).
  - **IEC/EN 61000-3-12:** Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase.
  - **IEC 61000-3-16*:** Limits -Limits for harmonic currents produced by energy supplying equipment with a rated current less than or equal to 75 A per phase connected to public low-voltage systems.
- **IEC/EN 61000-4-15**: Testing and measurement techniques - Flickermeter - Functional and design specifications.
  - **IEC/EN 61000-3-3**: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
  - **IEC/EN 61000-3-11:** Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection.
- **EN 50564**: Electrical and electronic household and office equipment - Measurement of low power consumption.
- **IEC 62301**: Household electrical appliances - Measurement of standby power

ZES ZIMMER, as a manufacturer of precision power measurement technology, is represented in the international standards committee. As a result, all upcomincs changes in the standards are observed and immediately incorporated into the test software.

*05/2022: Support of the current Comitee Draft version of the standard.

Accessories: RI2415-TP/SP

For single and three-phase flicker conformity tests according to the IEC/EN 61000-3-3/-11 limits, ZES ZIMMER manufactures and supplies the RI2415-SP and RI2415-TP network impedance models. The RI2415 complies to the characteristics of the reference impedance described in clause 6.4 of the 61000-3-3 standard and defined in IEC/TR 60725. For seamless transition between flicker and harmonics testing the RI2415 includes a bypass switch. Via the 15-pin SUB-D connector at the back side all functions of the device are remote controlable. The RI2415 has Sense terminals for the correction of the supply voltage of the AC source at the connection point to the power source.

Technical specifications	
Maximum current	16 A
Accuracy	±2 % at 50 Hz, 23 °C ± 3 °C
Dimensions	(WxHxD) 428,6 mm x 132,5 mm x 316,7 mm
Weight	max. 8 kg (-SP), 14 kg (-TP)
Connections	IEC 320/C20 (-SP), CEE/3 (-TP), 230 V, 16 A

Range extension with sensors? Plug 'n' Measure!

We offer a wide range of current and voltage sensors, which work perfectly in unison with the LMG600 precision power analyzer and extend the measurement ranges of the device to currents up to 75A or higher. The sensors of our Plug 'n' Measure series are equipped with a bus system, which enables automatic configuration of the LMG600. This allows for all of the important parameters, such as the precise scaling factor, the delay compensation variable, the last calibration date, and the sensor type, to be read and used automatically by the power analyzer. Moreover, the sensors are actively supplied with power by the LMG600. Separate power supplies are no longer required.

Accuracy specifications LMG600 (extract)

CE Harmonics

The instrument complies with class I according to IEC/EN 61000-4-7 Ed. 2.0, for fundamental frequency between 45Hz and 65Hz and interharmonics set to 9 on the LMG. Index m representing the measuring value and nom the nominal value of the range.

Voltage measurement	$U_m \geq 1\,\% U_{nom}$	$\pm 5\,\% U_m$
	$U_m < 1\,\% U_{nom}$	$\pm 0{,}05\,\% U_{nom}$
Current measurement	$I_m \geq 3\,\% I_{nom}$	$\pm 5\,\% I_m$
	$I_m < 3\,\% I_{bom}$	$\pm 0.15\,\% I_{nom}$

CE Flicker

The LMG600 is a class F1 flicker meter according to EN 61000-4-15:2011 resp. IEC 61000-4-15:2010.

Flickermeter	±5 %
	acc. to EN 61000-4-15, 0.3<k<5.4
d-meter	±5 %
	acc. to EN 61000-4-15

System requirements LMG Test Suite

- Operating System: Windows 7/8/10 (32/64 bit)
- Required disk space: Software: min. 50 MB, Data ca. 20 MB per minute measurement period/phase
- Memory: min. 2 GB
- Processor: min. 2 GHz, dual-core
- Supported Interfaces: Gbit-Ethernet

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