

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	OK	50.00 Hz (50.00 Hz \pm 0.5 %)
Supply peak voltage test (61000-4-7) [L1]	OK	OK	All positive peak values within the allowed range
Positive peak test	OK	OK	All negative peak values within the allowed range
Negative peak test	OK	OK	All peak values within the allowed range
Supply peak position test (61000-4-7) [L1]	OK	OK	
Supply Voltage Harmonic Distortion Test (61000-4-7) [L1]	OK	OK	
Voltage Distortion H2	30%	OK	3.06 % < 6.00 %
Voltage Distortion H3	3%	OK	3.02 % < 6.00 %
Voltage Distortion H4	5%	OK	3.01 % < 6.00 %
Voltage Distortion H5	7%	OK	3.03 % < 6.00 %
Voltage Distortion H6	8%	OK	3.02 % < 6.00 %
Voltage Distortion H7	10%	OK	3.03 % < 6.00 %
Voltage Distortion H8	3%	OK	3.01 % < 6.00 %
Voltage Distortion H9	11%	OK	3.02 % < 6.00 %
Voltage Distortion H10	1%	OK	3.00 % < 6.00 %
Voltage Distortion H11	35%	OK	3.03 % < 6.10 %
Voltage Distortion H12	7%	OK	3.01 % < 6.10 %
Voltage Distortion H13	22%	OK	3.02 % < 6.10 %
Voltage Distortion H14	6%	OK	3.01 % < 6.10 %
Voltage Distortion H15	30%	OK	3.03 % < 6.10 %
Voltage Distortion H16	2%	OK	3.00 % < 6.10 %
Voltage Distortion H17	20%	OK	3.02 % < 6.10 %
Voltage Distortion H18	4%	OK	3.00 % < 6.10 %
Voltage Distortion H19	19%	OK	3.02 % < 6.10 %
Voltage Distortion H20	4%	OK	3.00 % < 6.10 %
Voltage Distortion H21	18%	OK	3.02 % < 6.10 %
Voltage Distortion H22	3%	OK	3.00 % < 6.10 %
Voltage Distortion H23	16%	OK	3.02 % < 6.10 %
Voltage Distortion H24	4%	OK	3.00 % < 6.10 %
Voltage Distortion H25	18%	OK	3.02 % < 6.10 %
Voltage Distortion H26	4%	OK	3.00 % < 6.10 %
Voltage Distortion H27	17%	OK	3.02 % < 6.10 %
Voltage Distortion H28	4%	OK	3.00 % < 6.10 %
Voltage Distortion H29	19%	OK	3.02 % < 6.10 %
Voltage Distortion H30	6%	OK	3.01 % < 6.10 %
Voltage Distortion H31	19%	OK	3.02 % < 6.10 %
Voltage Distortion H32	5%	OK	3.01 % < 6.10 %
Voltage Distortion H33	20%	OK	3.02 % < 6.10 %
Voltage Distortion H34	4%	OK	3.00 % < 6.10 %
Voltage Distortion H35	22%	OK	3.02 % < 6.10 %
Voltage Distortion H36	5%	OK	3.00 % < 6.10 %
Voltage Distortion H37	15%	OK	3.02 % < 6.10 %
Voltage Distortion H38	5%	OK	3.01 % < 6.10 %
Voltage Distortion H39	16%	OK	3.02 % < 6.10 %
Voltage Distortion H40	4%	OK	3.00 % < 6.10 %
Frequency groups up to 9 kHz (61000-4-7) [L1]	OK	OK	
Table 1 Harmonic Current Test (61000-3-2) [L1]	OK	OK	
Harmonic Current Test 100 %	OK	OK	No test required (0.001 A \leq 0.005 A)
100 % Test H2	OK	OK	Limit met (0.012 A \leq 2.300 A)
100 % Test H3	OK	OK	No test required (0.001 A \leq 0.005 A)
100 % Test H4	1%	OK	



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

Text	
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.



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



Test name:	% of Limit	Status	Details
Supply Undervoltage Frequency Test (IEC61000-4-7) [3.1]			
Supply peak voltage test (IEC61000-4-17) [3.6]			
Positive peak test			
Negative peak test	0%	OK	All positive peak values within the allowed range
Supply peak position test (IEC61000-4-17) [3.7]			
Supply Voltage Fluctuation, Distortion Test (IEC61000-4-15) [3.1]			
Supply voltage fluctuation	0%	OK	All peak values within the allowed range
Supply voltage distortion	0%	OK	All peak values within the allowed range
Supply voltage distortion H1	0%	OK	All peak values within the allowed range
Supply voltage distortion H2	0%	OK	All peak values within the allowed range
Supply voltage distortion H3	0%	OK	All peak values within the allowed range
Supply voltage distortion H4	0%	OK	All peak values within the allowed range
Supply voltage distortion H5	0%	OK	All peak values within the allowed range
Supply voltage distortion H6	0%	OK	All peak values within the allowed range
Supply voltage distortion H7	0%	OK	All peak values within the allowed range
Supply voltage distortion H8	0%	OK	All peak values within the allowed range
Supply voltage distortion H9	0%	OK	All peak values within the allowed range
Supply voltage distortion H10	0%	OK	All peak values within the allowed range
Supply voltage distortion H11	0%	OK	All peak values within the allowed range
Supply voltage distortion H12	0%	OK	All peak values within the allowed range
Supply voltage distortion H13	0%	OK	All peak values within the allowed range
Supply voltage distortion H14	0%	OK	All peak values within the allowed range
Supply voltage distortion H15	0%	OK	All peak values within the allowed range
Supply voltage distortion H16	0%	OK	All peak values within the allowed range
Supply voltage distortion H17	0%	OK	All peak values within the allowed range
Supply voltage distortion H18	0%	OK	All peak values within the allowed range
Supply voltage distortion H19	0%	OK	All peak values within the allowed range
Supply voltage distortion H20	0%	OK	All peak values within the allowed range
Supply voltage distortion H21	0%	OK	All peak values within the allowed range
Supply voltage distortion H22	0%	OK	All peak values within the allowed range
Supply voltage distortion H23	0%	OK	All peak values within the allowed range
Supply voltage distortion H24	0%	OK	All peak values within the allowed range
Supply voltage distortion H25	0%	OK	All peak values within the allowed range
Supply voltage distortion H26	0%	OK	All peak values within the allowed range
Supply voltage distortion H27	0%	OK	All peak values within the allowed range
Supply voltage distortion H28	0%	OK	All peak values within the allowed range
Supply voltage distortion H29	0%	OK	All peak values within the allowed range
Supply voltage distortion H30	0%	OK	All peak values within the allowed range
Supply voltage distortion H31	0%	OK	All peak values within the allowed range
Supply voltage distortion H32	0%	OK	All peak values within the allowed range
Supply voltage distortion H33	0%	OK	All peak values within the allowed range
Supply voltage distortion H34	0%	OK	All peak values within the allowed range
Supply voltage distortion H35	0%	OK	All peak values within the allowed range
Supply voltage distortion H36	0%	OK	All peak values within the allowed range
Supply voltage distortion H37	0%	OK	All peak values within the allowed range
Supply voltage distortion H38	0%	OK	All peak values within the allowed range
Supply voltage distortion H39	0%	OK	All peak values within the allowed range
Supply voltage distortion H40	0%	OK	All peak values within the allowed range
Harmonic Current Test (IEC61000-4-7) [3.1]			
Total harmonic current test (IEC61000-3-25) [3.1]			
Harmonic current group up to THD (IEC61000-4-7) [3.1]			
100 % Test H1	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H2	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H3	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H4	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H5	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H6	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H7	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H8	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H9	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H10	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H11	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H12	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H13	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H14	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H15	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H16	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H17	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H18	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H19	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H20	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H21	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H22	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H23	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H24	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H25	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H26	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H27	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H28	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H29	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H30	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H31	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H32	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H33	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H34	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H35	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H36	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H37	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H38	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H39	0%	OK	No test required (0.001 A < 0.001 A)
100 % Test H40	0%	OK	No test required (0.001 A < 0.001 A)

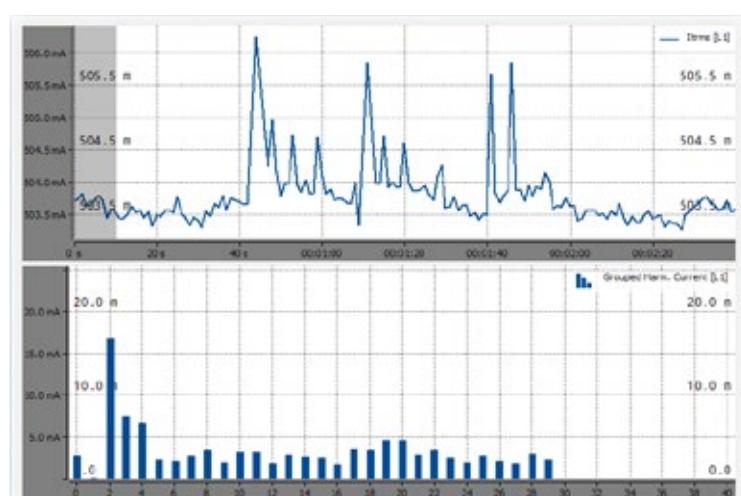
Innovative power measurement technology

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	18.03.2019
Test Time	08:37:00
Measurement Duration	00:02:39
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 upcomings changes in the standards are observed and immediately incorporated into the test software.

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 controllable. 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	$U_m \geq 1\% U_{nom}$	±5 % U_m
	$U_m < 1\% U_{nom}$	±0,05 % U_{nom}
Current measurement	$I_m \geq 3\% I_{nom}$	±5 % I_m
	$I_m < 3\% I_{nom}$	±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 7/8/10/11 (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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Please refer to the enclosed data sheet for changes