

4317137.50

EMC Test report for LED Fixed luminaires

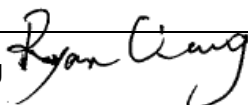
**Models LED12036-1R, LED12036-2TU, LED120363R,
LED12036-4TU2, LED12036-6TR, LED12036-1R CHR,
LED12036-2TU CHR, LED12036-3R CHR,
LED12036-4TU2 CHR, LED12036-6TR CHR, LED12036-3SP
and LED12036-4TU**

Guangzhou, date of issue: 2014-05-29

Author Ryan Liang

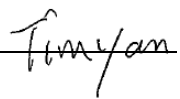
By order of ZHONGSHAN LIANGYI LIGHTING CO., LTD. at Zhongshan, China

Author : Ryan Liang

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Pages : 27 pages

Reviewed : Tim Yan

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Annex : NIL

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1 CONCLUSION

The equipment under test (EUT) does meet the essential requirements of the EMC Directive 2014/30/EU.

This report is based on report 4314372.50. In this updated,

- 1, The applied EMC directive and applied standards were upgraded.
- 2, adding two new models LED 12036-3SP, LED12036-4TU. They are identical as the former models except the number of the spot light.

After technical review, no additional test was needed.

Report 4314372.50 was based on report 4313270.50. In this update, all model names were updated.

- 1, for the model names including "WH", the "WH" was deleted.
- 2, for the model names including "CHROME", the "CHROME" was changed to "CHR".

After technical review, no additional test was needed.

The test results in this report belong to model LED12036-6TR CHR and the results are also representative for all models LED 12036-3SP, LED12036-4TU, LED12036-1R, LED12036-2TU, LED12036-3R, LED12036-4TU2, LED12036-6TR, LED12036-1R CHR, LED12036-2TU CHR, LED12036-3R CHR and LED12036-4TU2 CHR.

The conclusion and results stated in this test report are based on a non-recurrent examination of sample(s) provided by the applicant.

1.1 Model description

The apparatus as supplied for the test is a LED Fixed luminaires, model LED12036-6TR CHR for residential use and the product contains electronic control circuitry but without earth connection and no component susceptible to magnetic fields.

Base on client's declaration, all models are with same electronic circuitry but different in the no. of the spot light, rated power and appearance.

Hence, model LED12036-6TR CHR was chosen for full testing and the corresponding data is representative of models LED 12036-3SP, LED12036-4TU, LED12036-1R, LED12036-2TU, LED12036-3R, LED12036-4TU2, LED12036-6TR, LED12036-1R CHR, LED12036-2TU CHR, LED12036-3R CHR and LED12036-4TU2 CHR as well.



Figure 1 Model LED12036-6TR CHR

The Operating Modes as stated in the User Manual are on and off

1.2 Environment

The requirements and standards apply to equipment intended for use in:

√	Residential (domestic) environment
√	Commercial and light-industrial environment
	Industrial environment
	Medical environment

2 SUMMARY

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

2.1 Applied standards

Standard	Year	Title
EN 55015	2013	Emission – Electrical lighting and similar equipment
EN 61547	2009	Immunity - Equipment for general lighting purposes
EN 61000-3-2	2006	Limits for harmonic currents emissions
A1	2009	
A2	2009	
EN 61000-3-3	2013	Limitation of voltage fluctuations and flicker

2.2 Overview of results

Emission tests	Result
Mains conducted disturbance voltage	PASS
Radiated magnetic field	PASS
Radiated emission	PASS
Harmonic current emission	PASS
Limitation of voltage fluctuations (flicker)	PASS


Immunity tests	Result
Electrostatic Discharges (ESD)	PASS
Radiated EM Field	PASS
Electrical fast transient (EFT)	PASS
Surge transients	PASS
Conducted RF disturbances	PASS
Power supply voltage interruptions & dips	PASS

2.3 Overview of measurement uncertainty

Measurement	Uncertainty
Mains disturbance voltage (9 kHz – 30MHz)	± 1,66 dB
Radiated Magnetic Field emission (9 kHz – 30MHz)	± 4,64 dB
Radiated disturbance (30MHz– 300MHz)	± 3,32 dB

3 GENERAL INFORMATION

3.1 Product Information

Equipment under test	LED Fixed luminaires
Trade mark	
Tested Type	LED12036-6TR CHR
U nominal	220-240 Vac, 50/60 Hz, Class II
P rated	6 x 3 W

Represented type(s)	LED12036-1R, LED12036-2TU, LED12036-3R, LED12036-4TU2, LED12036-6TR, LED12036-1R CHR, LED12036-2TU CHR, LED12036-3R CHR, LED12036-4TU2 CHR, LED 12036-3SP, LED12036-4TU
U nominal	220-240 Vac, 50/60 Hz, Class II
P rated	1 x 3 W for models LED12036-1R, LED12036-1R CHR; 2 x 3 W for models LED12036-2TU, LED12036-2TU CHR; 3 x 3 W for models LED12036-3R, LED 12036-3SP, LED12036-3R CHR; 4 x 3 W for models LED12036-4TU2, LED12036-4TU, LED12036-4TU2 CHR; 6 x 3 W for models LED12036-6TR

3.2 Customer Information

Applicant / Manufacturer	Zhongshan Liangyi Lighting Co., Ltd.
Contact person	Mr. Joe
Telephone	+86 760 2236 1212
Telefax	+86 760 2231 0221
Address	Beihai Industrial Zone, Guzhen Town, Zhongshan, Guangdong, P. R. China

Factory	Zhongshan Liangyi Lighting Co., Ltd.
Contact person	Mr. Joe
Telephone	+86 760 2236 1212
Telefax	+86 760 2231 0221
Address	Beihai Industrial Zone, Guzhen Town, Zhongshan, Guangdong, P. R. China

3.3 Test data

Location	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch
Address	Building A3, No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, P.R. China
Location	Guangzhou Electrical Safety Testing Institute (CEST)
Address	No.6, Haichengdong Street, Xingangdong Road, Haizhu District, Guangzhou, 510330, P. R. China
Date	2013-07-30 to 2013-08-08
Supervised by	Ryan Liang

3.4 Environmental conditions

Tests have been performed in a controlled laboratory environment, where the environmental conditions are maintained within the applicable ranges.

Ambient temperature	15 °C – 25 °C
Relative Humidity air	30% - 60%

4 EMISSION TEST RESULTS

4.1 Mains conducted disturbance voltage

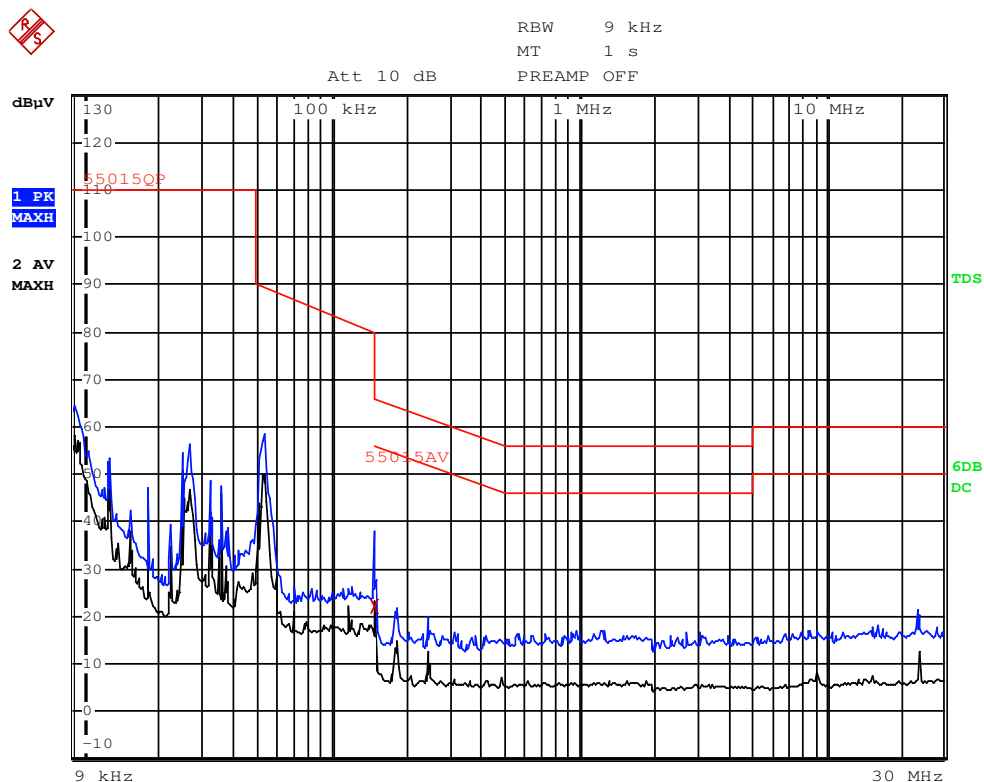
Standard	EN 55015		
Frequency [MHz]	Limits		
	QP [dB(μV)]		AV [dB(μV)]
0,009 – 0,05	110		N/A
0,05 – 0,15	90 – 80 *)	N/A	
0,15 – 0,50	66 – 56 *)	56 - 46 *)	
0,50 – 5,0	56	46	
5,0 – 30,0	60	50	

*) Limits decreasing linearly with the logarithm of the frequency

Port	AC mains
Test method	LISN
Mode	On mode

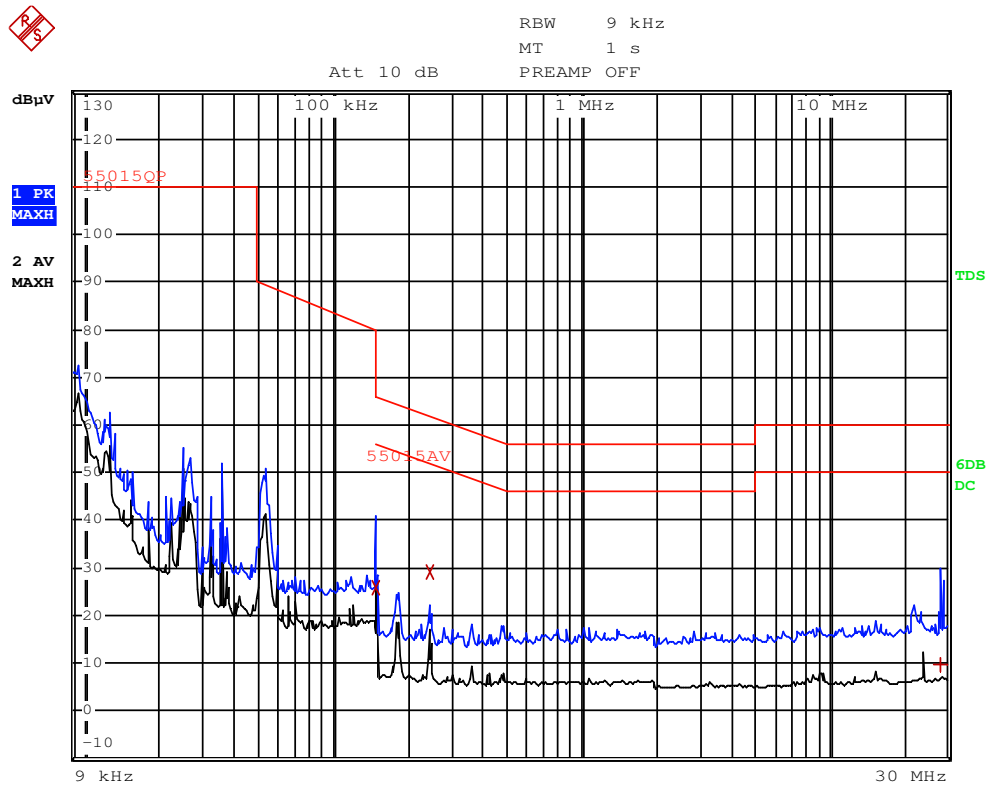
Results

Live:



No significant emissions were measured at the frequency range of interest employing both the QP and AV detectors (more than 20dB below the limit).

Neutral:



No significant emissions were measured at the frequency range of interest employing both the QP and AV detectors (more than 20dB below the limit).

Refer to chapter 6 for the test setup.

Conclusion:

PASS

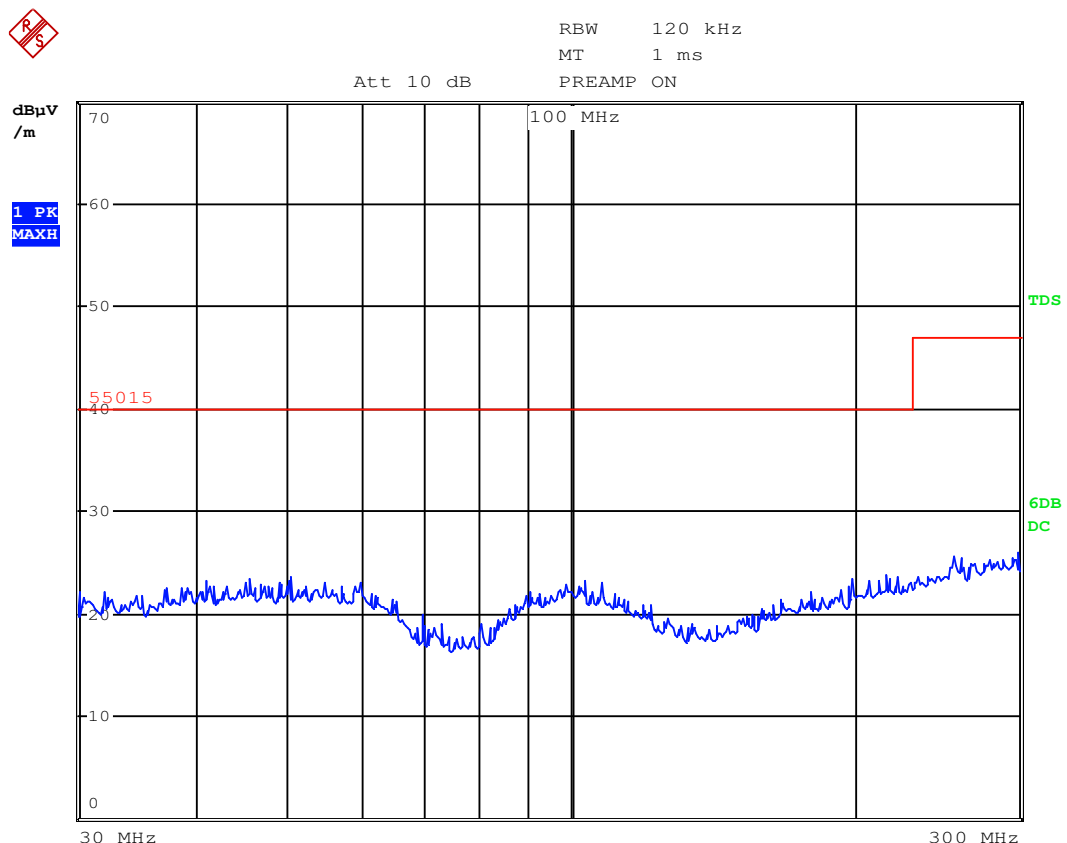
4.2 Radiated EM Field emission

Standard	EN 55015
Port	Enclosure with cabling
Test method	Semi-Anechoic chamber
Mode	On mode

Frequency [MHz]	Limits – QP [dB(μV/m)] at 3 meter
30 – 230	40
230 – 300	47

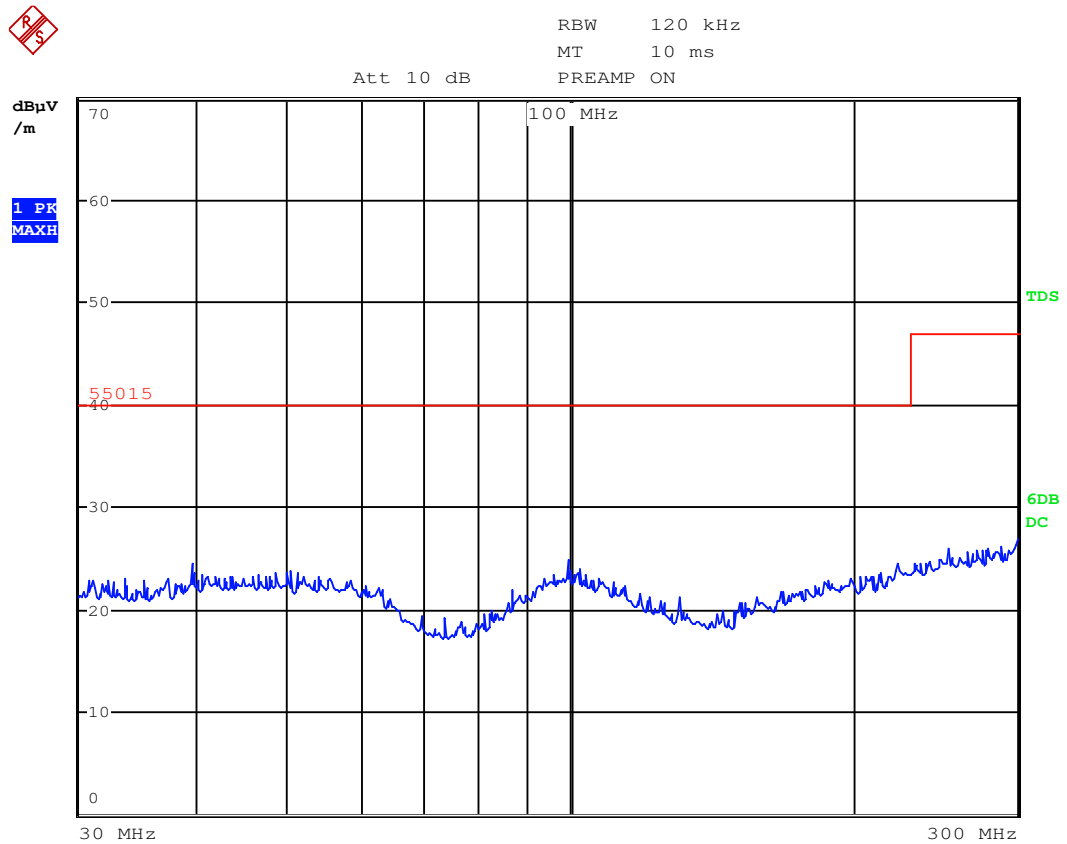
Results

Horizontal



No significant emissions were measured at the frequency range of interest employing the QP detector (more than 20dB below the limit).

Vertical:



No significant emissions were measured at the frequency range of interest employing the QP detector (more than 20dB below the limit).

Refer to chapter 6 for the test setup.

Conclusion:

PASS

4.3 Radiated Magnetic Field emission

Standard	EN 55015
Port	Enclosure with cabling
Mode / Set-up	Van Veen loop with 2 meter diameter
Mode	On mode

Frequency [MHz]	Limits – QP [dB(μV/m)]
0,009 – 0,07	88
0,07 – 0,15	88 – 58 *)
0,15 – 3,0	58 – 22 *)
3,0 – 30,0	22

*) Limits decreasing linearly with the logarithm of the frequency

Results

Direction	X- Axis	
Frequency [MHz]	QP [dB(μA)]	
	Level	Limit
0,009 – 30,0	More than 20 dB below the limits	

Direction	Y- Axis	
Frequency [MHz]	QP [dB(μA)]	
	Level	Limit
0,009 – 30,0	More than 20 dB below the limits	

Direction	Z- Axis	
Frequency [MHz]	QP [dB(μA)]	
	Level	Limit
0,009 – 30,0	More than 20 dB below the limits	

No significant emissions were measured at the frequency range of interest employing the QP detectors.

Refer to chapter 6 for the test setup.

Conclusion:

PASS

4.4 Harmonic currents

Standard	EN 61000-3-2
Port	AC Mains supply
Rated power	6 x 3 W
Mode	On mode

	Class A	All apparatus not classified as Class B, C or D
	Class B	Portable tools
√	Class C	Lighting equipment
	Class D	Personal computers, television receivers

Results and limits

The harmonics currents limits are not specified for the lighting equipment with an active input power of 25W or less, other than discharge lighting equipment. Therefore the EUT was deemed fulfill the requirements of relative standard without testing.

Conclusion:

PASS

4.5 Voltage fluctuations (Flicker)

Standard	EN 61000-3-3
Port	AC Mains supply
Voltage	230 Vac
Mode	On mode

Equipment intended to be connected to 230/400 V, 50 Hz supply systems may not produce voltage fluctuations in the supply systems due to variation of the input current above the limits as stated below.

P_{ST}	≤ 1 Not applicable
P_{LT}	$\leq 0,65$ Not applicable
$dt > 3.3\%$	≤ 500 ms
d_C	$\leq 3\% \leq 4\%$ Not applicable
d_{MAX}	$\leq 4\% \leq 5,32\% \leq 6\% \leq 7\%$ Not applicable

Results

√	Tests are not necessary because the EUT is unlikely to produce significant voltage fluctuations or flicker (clause 6.1)
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Conclusion:

PASS

5 IMMUNITY TEST RESULTS

5.1 Electrostatic discharge immunity

Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

Requirements

Standard	EN 61547
Basic standard	EN 61000-4-2
Port	Enclosure
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.
Air discharges	8 kV
Contact discharges	4 kV
Mode	On mode

Performed tests

Air discharges		4 kV	√	8 kV		15 kV		kV
Contact discharges		2 kV	√	4 kV		8 kV		kV
Via coupling planes	√	Horizontal			√	Vertical		
Polarity	√	Positive			√	Negative		
Set-up	√	Table-top				Floor standing		
Ambient temperature	22 °C							
Relative Humidity air	53 %							

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

5.2 Radiated EM field immunity

During the test it is verified if the equipment under test has sufficient immunity against radiated electromagnetic fields. Walkie-talkies, radio transmitters, television transmitters, and telecommunication equipment including cellular telephones and other emitting devices, like industrial electromagnetic sources can generate these fields.

Requirements

Standard	EN 61547
Basic standard	EN 61000-4-3
Port	Enclosure
Performance criterion	A; Operation as intended
Frequency range	80 - 1000 MHz
Modulation	1 kHz – 80% AM
Field strength	3 V/m

Performed tests

Frequency range	80 - 1000 MHz
Tested Field strength	3V/m
Dwell time	1 second
Test set-up	Full Anechoic Chamber
Mode	On mode

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

5.3 Electrical Fast Transient immunity

The EFT immunity test simulates disturbances by bursts of very short transients caused for example by switching off loads such as an AC motor or bouncing relay contacts. The transients are likely to disturb electronics but less likely to cause damage.

Requirements

Standard	EN 61547			
Basic standard	EN 61000-4-4			
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.			
Pulse characteristics	5/50 ns			
Peak Voltage; Port	1 kV; AC input power port 0,5 kV; DC input output power port			
Repetition frequency	√	5 kHz		2,5 kHz

Performed tests

Tested Voltage; Port	1 kV; AC input power port			
Mode	On mode			
Injection method	√	CDN		Capacitive clamp
Polarity	√	Positive	√	Negative
Set-up	√	Table-top		Floor standing

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

5.4 Surge transient immunity

The surge transient immunity test simulates the surges that are caused by overvoltages due to indirect (induced) lightning transients. The pulse is a slow transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

Requirements

Standard	EN 61547
Basic standard	EN 61000-4-5
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.
Pulse characteristics	1,2/50 μ s
Peak Voltage; Port	Input power > 25W: 1 kV; AC input power port (line to line) 2 kV; AC input power port (line to earth) Input power \leq 25W: 0,5 kV; AC input power port (line to line) 1 kV; AC input power port (line to earth)

Performed tests

Tested Voltage; Port	0,5 kV; AC input power port (line to line)			
Mode	On mode			
Polarity	√	Positive	√	Negative

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

5.5 RF Conducted immunity

During this test the immunity of the equipment for induced or conducted electromagnetic fields is checked. Fields generated by radio and other transmitters cause RF voltages in long cables like the mains network. This test reproduces these induced disturbing voltages by injecting them to the EUT via the cabling.

Requirements

Standard	EN 61547
Basic standard	EN 61000-4-6
Performance criterion	A; Operation as intended
Frequency range	0,15 – 80 MHz
Modulation	1 kHz – 80% AM
Test level; Port	3 V; AC input output power port 1 V; DC input output power port

Performed tests

Tested level; Port	3 V; AC input output power port			
Mode	On mode			
Frequency range	0,15 – 80 MHz			
Dwell time	3 seconds			
Injection method	√	CDN-M2	√	EM clamp

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

5.6 Power supply interruptions and dips

Requirements

Basic standard	EN 61000-4-11
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed. C; Temporary, self-recoverable loss of function is allowed.

Standard	EN 61547
AC input power port	C $U_{\text{NOM}} - 30\%$ (10 periods)
	C $U_{\text{NOM}} - 100\%$ (0,5 period)

Performed tests

Tested voltage	AC input power port, 230 Vac
Mode	On mode
AC input power port	$U_{\text{NOM}} - 30\%$ (10 periods)
	$U_{\text{NOM}} - 100\%$ (0,5 period)

Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

Conclusion:

PASS

6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photograph shows the tested device.



Figure 2 Conducted Emission test setup

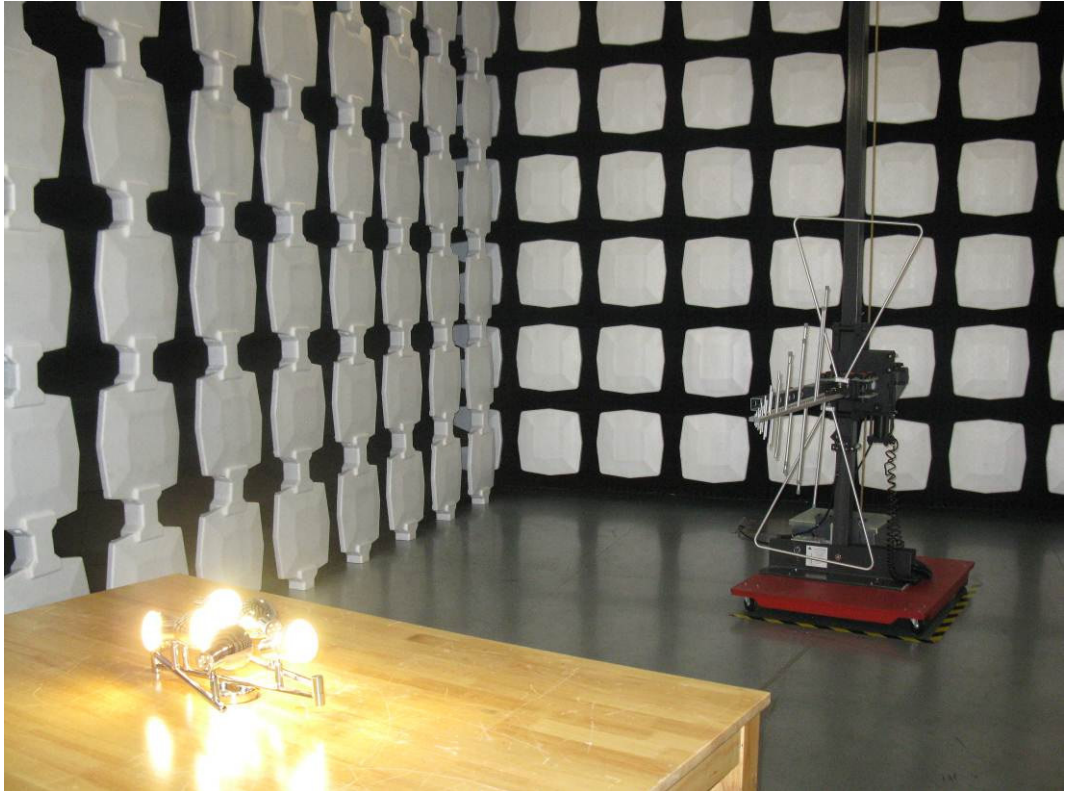


Figure 3 Radiated emission test setup



Figure 4 Radiated magnetic emission test setup

7 PRODUCTE INTERNAL VIEW



Main PCB and LED module



Main PCB and LED module