

EMC Testing of Cixi Leonlux Technology CO., Ltd



China

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LED Work Light

99A10, 99A10-WO, 99AC10, 99AC10-WO;
99A20, 99A20-WO, 99AC20, 99AC20-WO;
99A30, 99A30-WO, 99AC30, 99AC30-WO;
99A40, 99A40-WO, 99AC40, 99AC40-WO;
99A50, 99A50-WO, 99AC50, 99AC50-WO

In accordance with EN 55015, EN 61547, EN
61000-3-2 and EN 61000-3-3

Prepared for: Cixi Leonlux Technology CO., Ltd
BeiSanhuan West Road,Zonghan Street, 315301, Cixi,Ningbo,Zhejiang,
PEOPLE'S REPUBLIC OF CHINA

COMMERCIAL-IN-CONFIDENCE

Date: 07/24/2018

Report Number: 708881872501-00

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Approved By	Keping ZANG	July 24, 2018	Zang Keping
Prepared By	Liping XUE	07-24, 2018	Liping Xue

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY

Two samples of this product were tested and found to be in compliance with EN 55015:2013/A1:2015, EN 61547:2009, EN 61000-3-2:2014 and EN 61000-3-3:2013

TÜV SÜD Certification and Testing
(China) Co., Ltd. Shanghai branch

3-13, No. 151, Heng Tong Road,
Shanghai, 200070
P.R.China

Phone: +86 021 61410123
www.tuv-sud.cn



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	07/24/2018

1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	Cixi Leonlux Technology CO., Ltd
Address	BeiSanhuan West Road, Zonghan Street, 315301, Cixi, Ningbo, Zhejiang, PEOPLE'S REPUBLIC OF CHINA
Manufacturer	Same as above
Address	Same as above
Factory	Same as above
Address	Same as above
Trade Name	leonlux
Model Number(s)	99A10, 99A10-WO, 99AC10, 99AC10-WO; 99A20, 99A20-WO, 99AC20, 99AC20-WO; 99A30, 99A30-WO, 99AC30, 99AC30-WO; 99A40, 99A40-WO, 99AC40, 99AC40-WO; 99A50, 99A50-WO, 99AC50, 99AC50-WO
Rated Input Voltage/Frequency	220-240V~, 50Hz
Rated Input Power	2*10W; 2*20W; 2*30W; 2*40W; 2*50W
Protection Class	Class I
Sample Number(s)	SHA-362681-1/-2
Number of Samples Tested	2
Test Specification	EN 55015:2013/A1:2015, EN 61547:2009, EN 61000-3-2:2014 and EN 61000-3-3:2013
Date of Receipt of EUT	07/05/2018
Start of Test	07/05/2018
Finish of Test	07/17/2018
Name of Engineer(s)	Liping XUE



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with EN 55015, EN 61000-3-2, EN 61000-3-3 and EN 61547 is shown below.

Section	Specification	Clause	Test Description	Result	Comments/Base Standard
AC Powered Light on(mid, max power)					
2.1	EN 55015:2013/A1:2015	4.3.1	Conducted Disturbance at Mains Terminals	Pass (Minimum limit margin: >6dB)	
2.2	EN 55015:2013/A1:2015	4.4.1	Radiated Disturbance (9KHz to 30MHz)	Pass (Minimum limit margin: >6dB)	
2.3	EN 55015:2013/A1:2015	4.4.2	Radiated Disturbance (30MHz to 300MHz)	Pass (Minimum limit margin: >6dB)	
2.4	EN 61000-3-2:2014	7	Harmonic Current Emissions	Pass	
2.5	EN 61000-3-3:2013	5	Flicker	Pass	
2.6	EN 61547:2009	5.2	Electrostatic discharge immunity test	Pass	IEC 61000-4-2:2008
2.7	EN 61547:2009	5.3	Radiated, radio-frequency, electromagnetic field immunity test	Pass	IEC 61000-4-3:2006/A1:2007
2.8	EN 61547:2009	5.5	Electrical fast transient /burst immunity test	Pass	IEC 61000-4-4:2004
2.9	EN 61547:2009	5.6	Immunity to conducted disturbances, induced by radio-frequency fields	Pass	IEC 61000-4-6:2008
2.10	EN 61547:2009	5.7	Surge immunity test	Pass	IEC 61000-4-5:2005
2.11	EN 61547:2009	5.8	Voltage dips, short interruptions and voltage variations immunity test	Pass	IEC 61000-4-11:2004

1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) was a LED Work Light.

According to the client's declaration:

1: All the models with rated power of 2*10W & 2*20W have the same electrical structure and PCB layout. The differences between them is different rated power.

2: All the model with rated power of 2*30W, 2*40W & 2*50W have the same electrical structure and PCB layout. The differences between them is different rated power.

Detailed model differences as below:

Model	Rated power	Socket
99A10	2*10W	With sockets
99A20	2*20W	
99A30	2*30W	
99A40	2*40W	
99A50	2*50W	
99A10-WO	2*10W	Without sockets
99A20-WO	2*20W	
99A30-WO	2*30W	
99A40-WO	2*40W	
99A50-WO	2*50W	
99AC10	2*10W	With sockets
99AC20	2*20W	
99AC30	2*30W	
99AC40	2*40W	
99AC50	2*50W	
99AC10-WO	2*10W	Without sockets
99AC20-WO	2*20W	
99AC30-WO	2*30W	
99AC40-WO	2*40W	
99AC50-WO	2*50W	

So model 99A20 and 99A50 were chosen to perform all the tests.

For model 99A20:

P-DSH: 617, decisions: A LED cannot be considered as an incandescent lamp, neither as discharge lamp. The clause 7.3 b of the standard (EN 61000-3-2:2014) give requirements for discharge lighting equipment with active power less than 25W and these requirements are not applicable to LED.

After pre-scanning under 220-240V~50Hz, mid. and max. power, the worst test results were recorded.

1.4.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Powered Light on(mid, max power)				
Line L	1.8m	AC power for the EUT	3 core	No
Line N	1.8m	AC power for the EUT	3 core	No

1.4.3 Test Configuration

Configuration	Description
AC Powered(mid, max power)	AC 220-240/50Hz

1.4.4 Modes of Operation

Mode	Description
Light on(mid, max power)	the EUT was lighted on
Switch on/off	The EUT was switched on /off

1.4.5 Monitoring of Performance

The luminous intensity does not deviate by more than 15%.

1.4.6 Performance Criteria

Performance criterion A: During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Performance criterion B: During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criterion C: During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended.

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Test Location

TÜV SÜD Product Service conducted the following tests at TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai branch.

Address:

No.16, Lane 1951,
Du Hui Road
Shanghai 201108,
P.R.China

Test Name	Name of Engineer(s)
Conducted Disturbance at Mains Terminals	Zhu LIU
Radiated Disturbance (9kHz to 30MHz)	Zhu LIU
Radiated Disturbance (30MHz to 300MHz)	Zhu LIU
Harmonic Current Emissions	Zhu LIU
Flicker	Zhu LIU
Electrostatic discharge immunity test	Chengjie GUO
Radiated, radio-frequency, electromagnetic field immunity test	Chengjie GUO
Electrical fast transient /burst immunity test	Chengjie GUO
Immunity to conducted disturbances, induced by radio-frequency fields	Chengjie GUO
Surge immunity test	Chengjie GUO
Voltage dips, short interruptions and voltage variations immunity test	Chengjie GUO

2 Test Details

2.1 Conducted Disturbance at Mains Terminals

2.1.1 Specification Reference

EN 55015:2013/A1:2015, Clause 4.3.1

2.1.2 Equipment Under Test

99A20, 99A50

2.1.3 Date of Test

07/05/2018

2.1.4 Test Method

The disturbance voltage shall be measured at the main terminals of the lighting equipment by means of the arrangement described in Figure 5 to Figure 11 of EN 55015:2013/A1:2015 for the relevant type of equipment.

The output terminals of the artificial mains network (V-network) and the terminals a-b shall be positioned $0,8\text{m} \pm 0.05\text{m}$ apart and shall be connected by the two power conductors of a flexible three-core cable of 0,8m length.

2.1.5 Environmental Conditions

Ambient Temperature 20.3 °C
Relative Humidity 45.3 %
Atmospheric Pressure 1032.0 mbar

2.1.6 Specification Limits

Disturbance voltage limits at the mains terminals		
Frequency range	Limits dB(μV)	
	Quasi-peak	Average
9kHz to 50kHz	110	--
50kHz to 150kHz	90 to 80	--
150kHz to 0.5MHz	66 to 56	56 to 46
0.5MHz to 5.0MHz	56	46
5.0MHz to 30MHz	60	50

2.1.7 Test Results

Results for Configuration and Mode: AC Powered/Light on (max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

9K-30MHz Conducted Emission Test

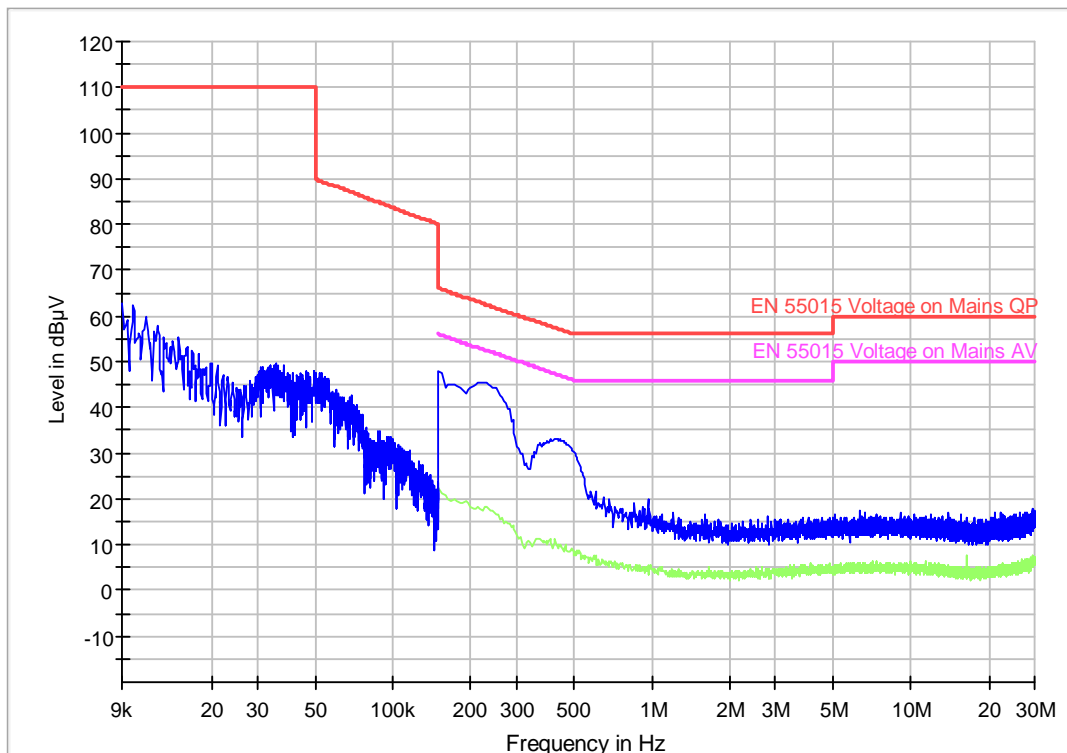
EUT Information

EUT Name: LED work light
 Model: 99A20
 Client: Cixi Leonlux Technology Co., Ltd.
 Op Cond: Light on,max, AC 230V/50Hz, T20.3, H45.3%, P103.2kPa
 Operator: Liuzhu
 Test Spec: EN 55015
 Comment: Phase L
 Sample No.: SHA-362681-1

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
 Receiver: [ESR 3]
 Level Unit: dBμV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB



9K-30MHz Conducted Emission Test

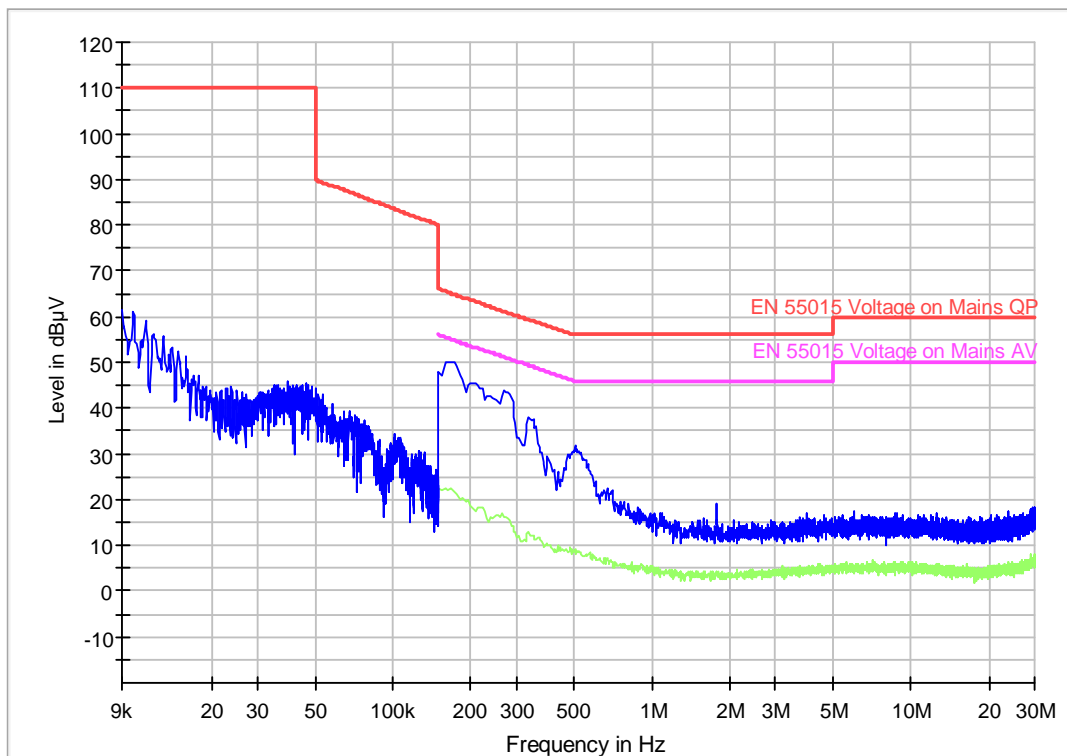
EUT Information

EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on,max, AC 230V/50Hz, T20.3, H45.3%, P103.2kPa
Operator: Liuzhu
Test Spec: EN 55015
Comment: Phase N
Sample No.: SHA-362681-1

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
Receiver: [ESR 3]
Level Unit: dB μ V

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB



9K-30MHz Conducted Emission Test

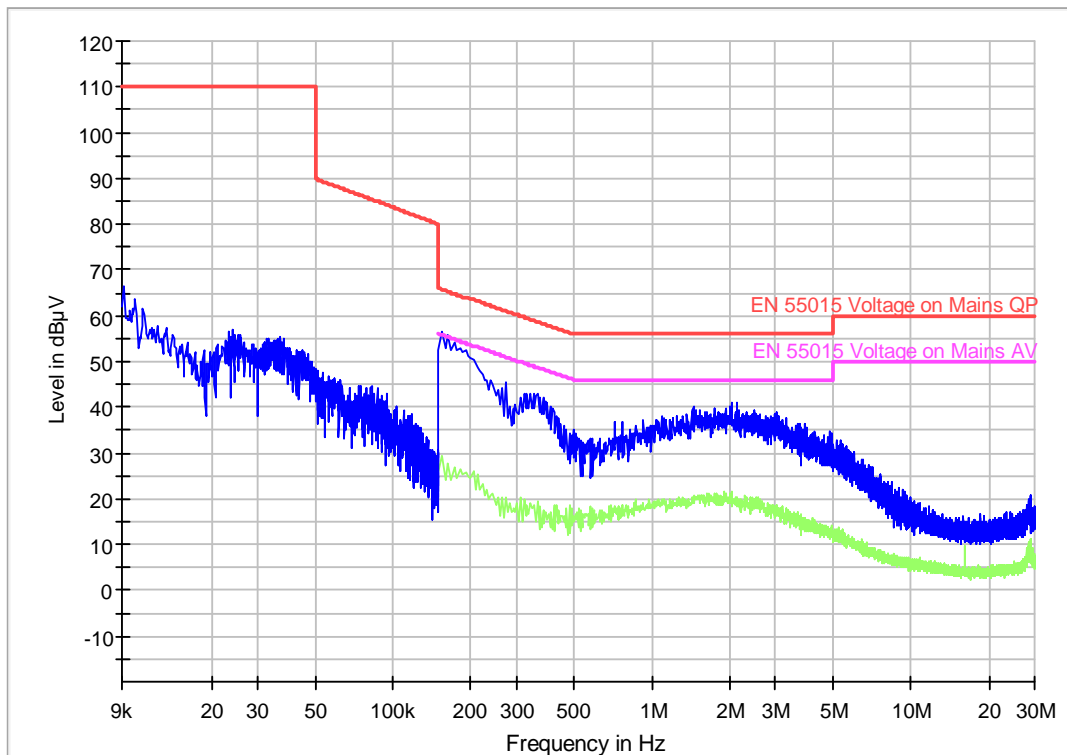
EUT Information

EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on, max, AC 230V/50Hz, T20.3, H45.3%, P103.2kPa
Operator: Liuzhu
Test Spec: EN 55015
Comment: Phase L
Sample No.: SHA-362681-2

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
Receiver: [ESR 3]
Level Unit: dB μ V

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB



9K-30MHz Conducted Emission Test

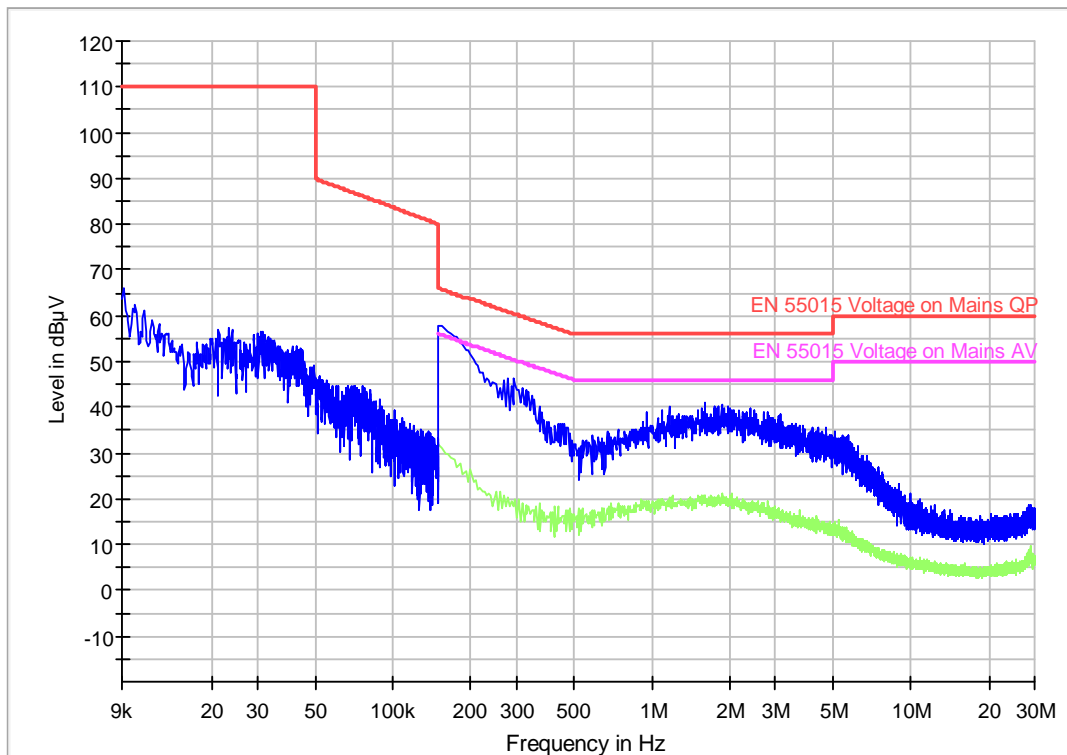
EUT Information

EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on, max, AC 230V/50Hz, T20.3, H45.3%, P103.2kPa
Operator: Liuzhu
Test Spec: EN 55015
Comment: Phase N
Sample No.: SHA-362681-2

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
Receiver: [ESR 3]
Level Unit: dB μ V

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB





Test Setup

2.1.8 Test Location

This test was carried out in shielded room Z119.

2.2 Radiated Disturbance (9KHz to 30MHz)

2.2.1 Specification Reference

EN 55015:2013/A1:2015, Clause 4.4.1

2.2.2 Equipment Under Test

99A20, 99A50

2.2.3 Date of Test

07/10/2018

2.2.4 Test Method

The magnetic component shall be measured by means of a loop antenna. The lighting equipment shall be placed in the center of the antenna.

The induced current in the loop antenna is measured by means of a current probe and the CISPR measuring receiver. By means of a coaxial switch, the three field directions can be measured in sequence.

2.2.5 Environmental Conditions

Ambient Temperature 21.1 °C
Relative Humidity 49.5 %
Atmospheric Pressure 1029.0 mbar

2.2.6 Specification Limits

Radiated disturbance limits in the frequency range 9kHz to 30MHz			
Frequency range	Limits dB(μA) for loop diameter		
	2 m	3 m	4 m
9kHz to 70kHz	88	81	75
70kHz to 150kHz	88 to 58	81 to 51	75 to 45
150kHz to 3.0MHz	58 to 22	51 to 15	45 to 9
3.0MHz to 30MHz	22	15 to 16	9 to 12

2.2.7 Test Results

Results for Configuration and Mode: AC Powered/Light on(max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

9K-30MHz Radiated Disturbance Test

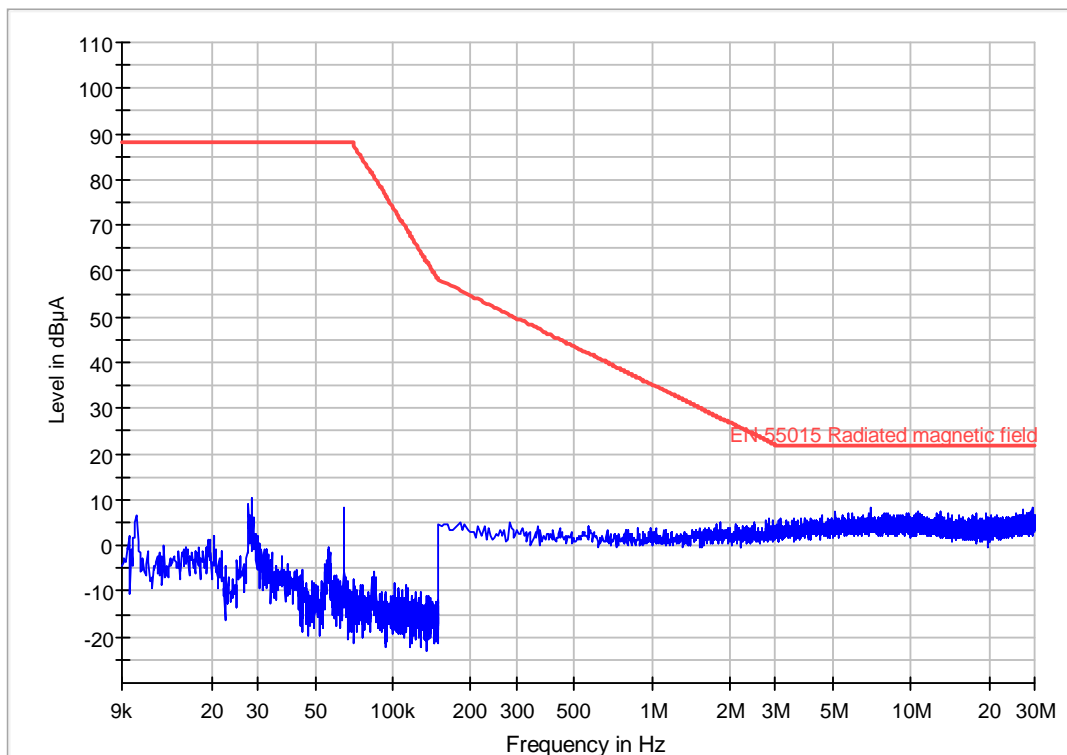
EUT Information

EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: X
Sample No.: SHA-362681-1

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dBμA

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB



9K-30MHz Radiated Disturbance Test

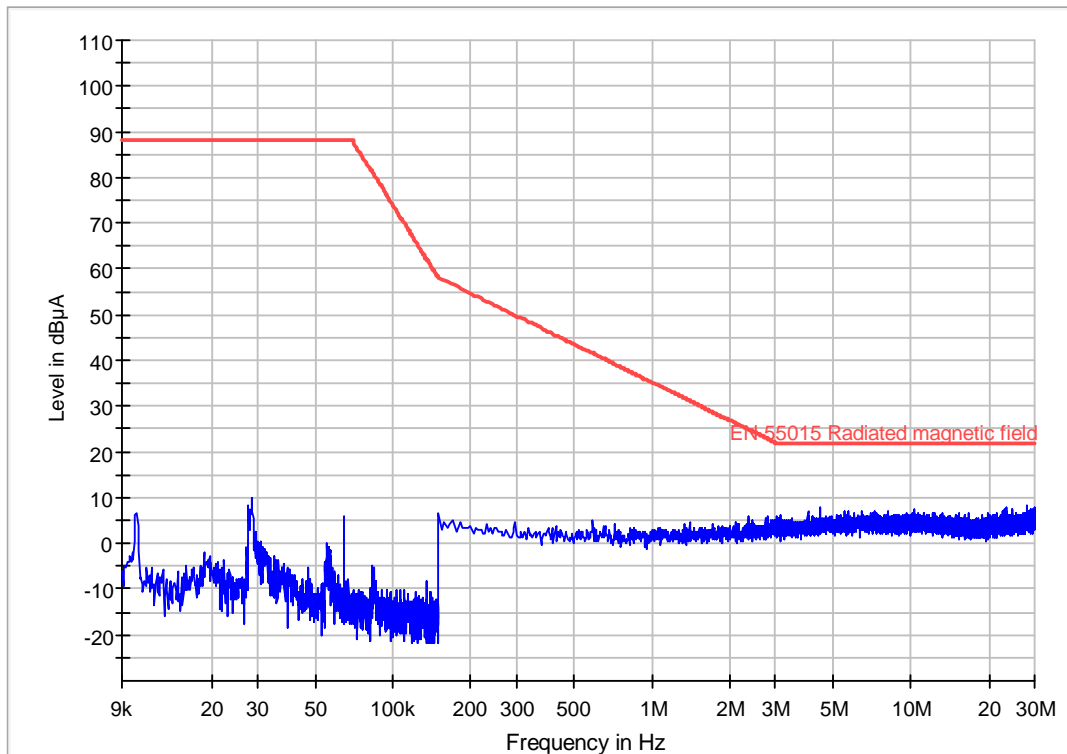
EUT Information

EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Y
Sample No.: SHA-362681-1

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dB μ A

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB



9K-30MHz Radiated Disturbance Test

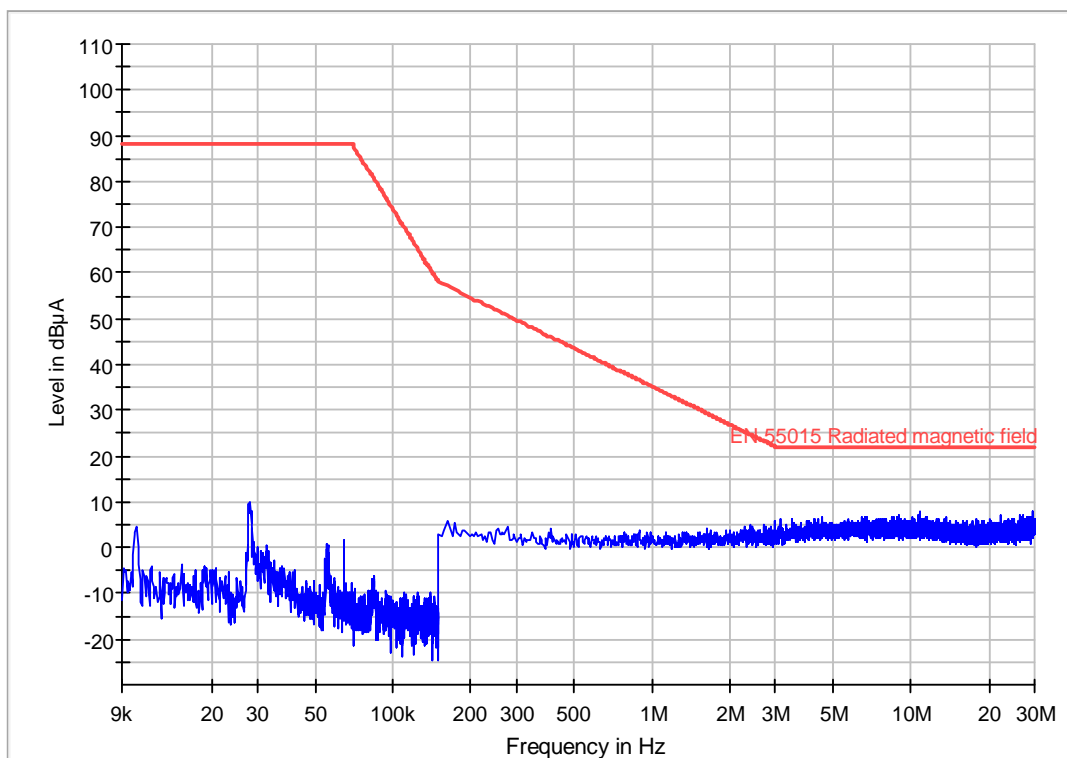
EUT Information

EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Z
Sample No.: SHA-362681-1

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dB μ A

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB



9K-30MHz Radiated Disturbance Test

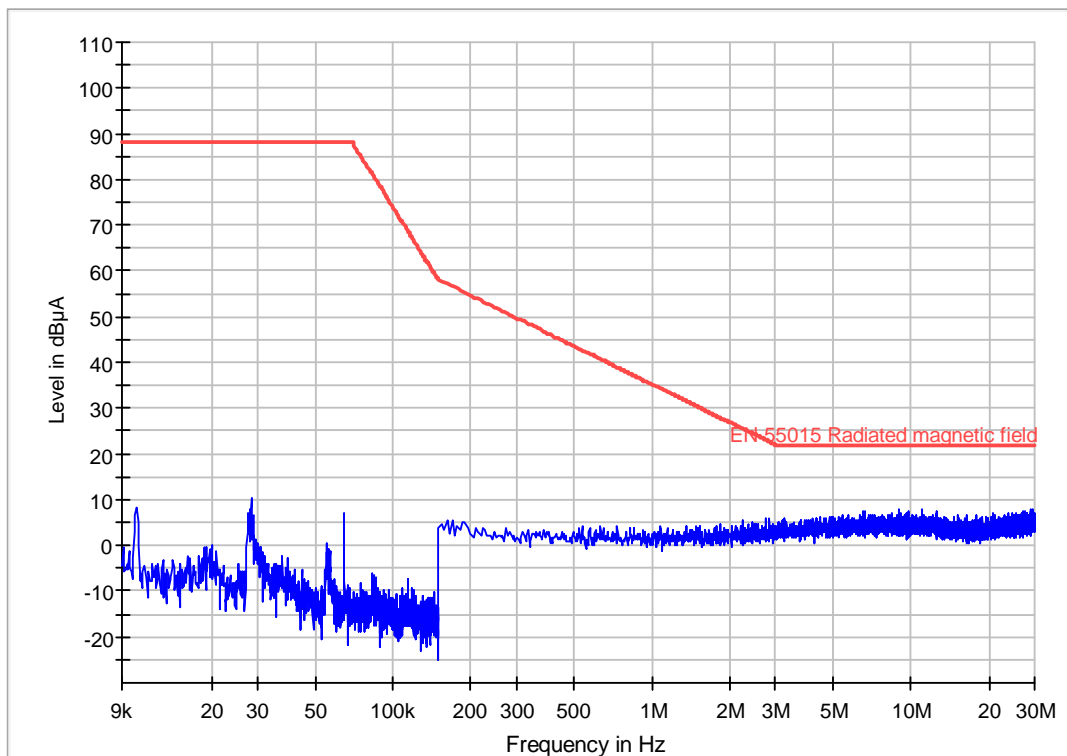
EUT Information

EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: X
Sample No.: SHA-362681-2

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dBμA

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB



9K-30MHz Radiated Disturbance Test

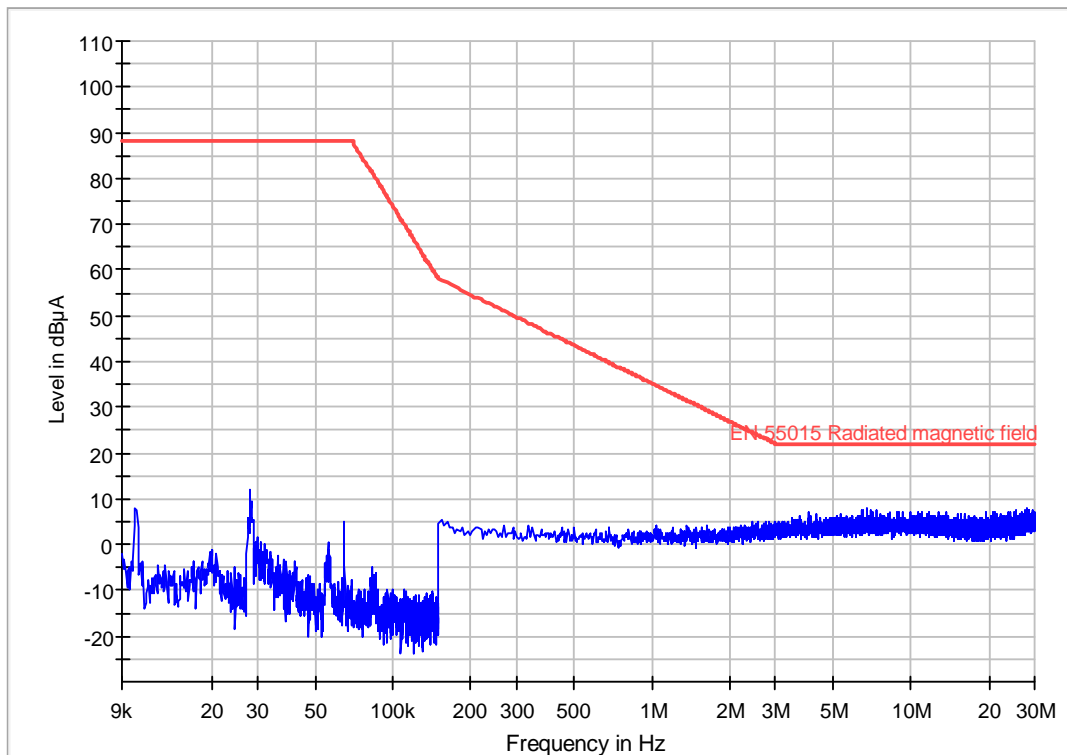
EUT Information

EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Y
Sample No.: SHA-362681-2

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dB μ A

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamplifier
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB



9K-30MHz Radiated Disturbance Test

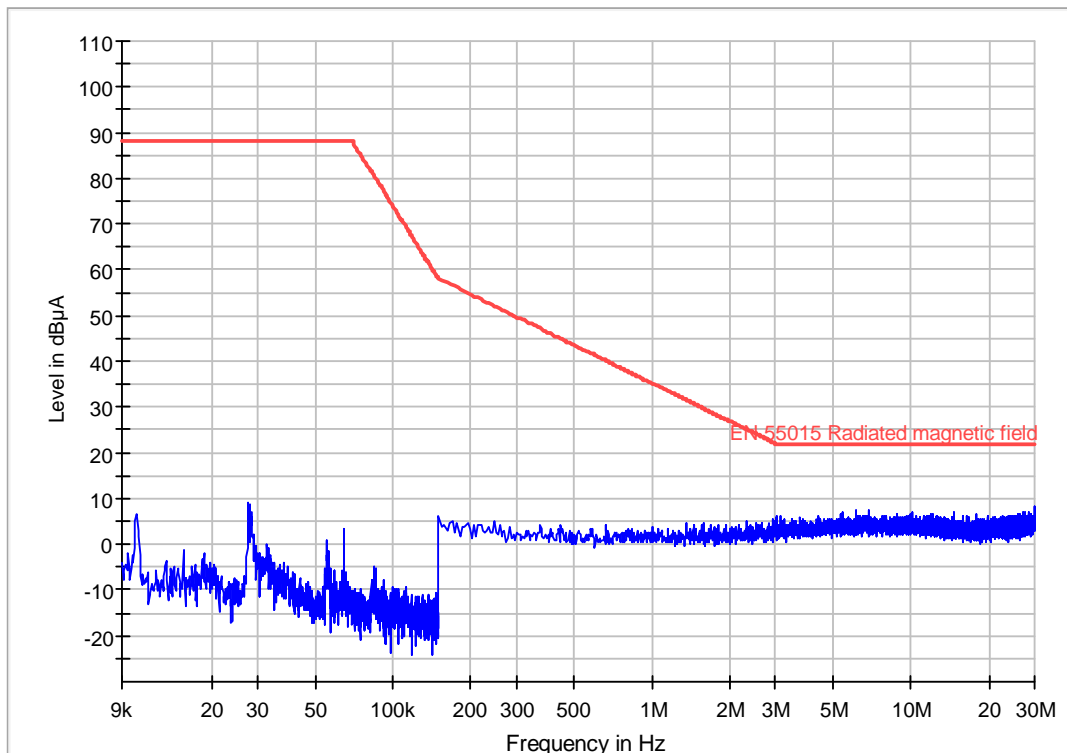
EUT Information

EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op cond: Light on, max, AC 230V/50Hz, T21.1, H49.5%, P102.9kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Z
Sample No.: SHA-362681-2

Scan Setup: TripleLoop max [EMI radiated]

Hardware Setup: TripleLoop
Receiver: [ESR 3]
Level Unit: dBμA

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	0 dB





Test Setup

2.2.8 Test Location

This test was carried out in shielded room Z120.

2.3 Radiated Disturbance (30MHz to 300MHz)

2.3.1 Specification Reference

EN 55015:2013/A1:2015, Clause 4.4.2

2.3.2 Equipment Under Test

99A20, 99A50

2.3.3 Date of Test

07/05/2018

2.3.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive. Guidance on how to arrange the luminaire during the measurements can be found in Annex C of EN 55015:2013/A1:2015.

A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.

2.3.5 Environmental Conditions

Ambient Temperature 20.9 °C
Relative Humidity 49.3 %
Atmospheric Pressure 1025.0 mbar

2.3.6 Specification Limits

Radiated disturbance limits in the frequency range 30MHz to 300MHz at a measuring distance of 3 m	
Frequency range MHz	Quasi-peak limits dB(μV/m)
30 to 230	40
230 to 300	47

2.3.7 Test Results

Results for Configuration and Mode: AC Powered/Light on (max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Frequency Range of Test: 30 MHz to 300MHz

30-300MHz Radiated Emission

EUT Information

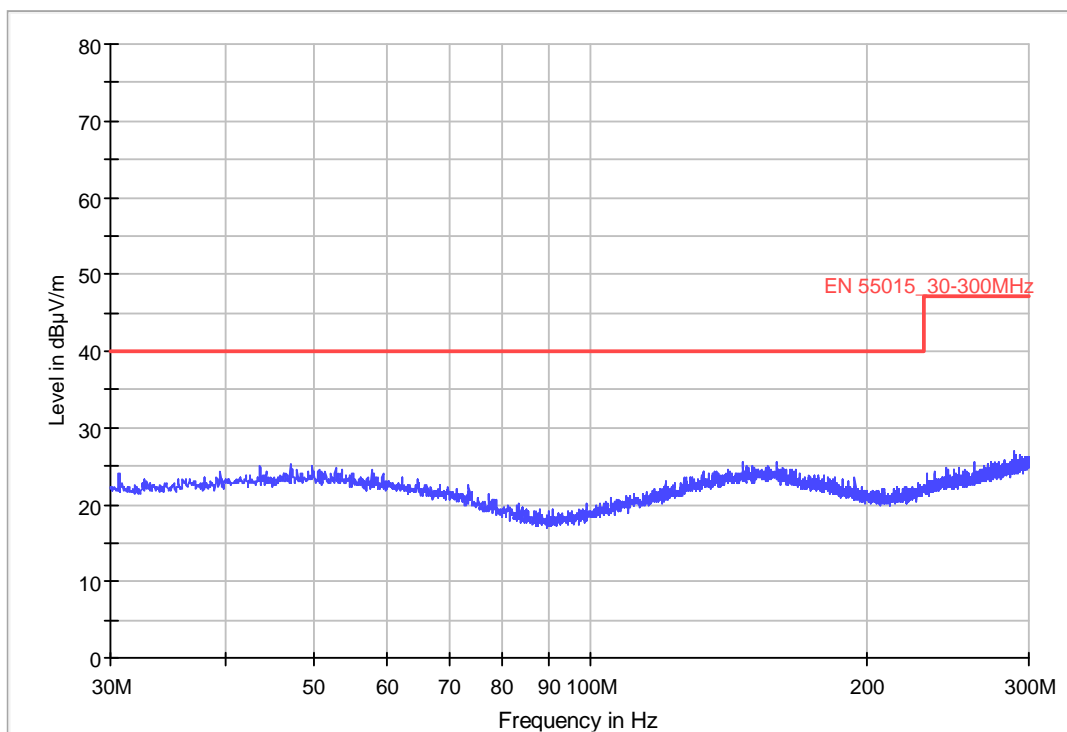
EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on, max, AC 230V/50Hz, T20.9, H49.3%, P102.5kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Horizontal
Sample No: SHA-362681-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup: RE_VULB9163
Receiver: [ESR 3]
Level Unit: dB μ V/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 300 MHz	50 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9163_pre_Cont_30_300



30-300MHz Radiated Emission

EUT Information

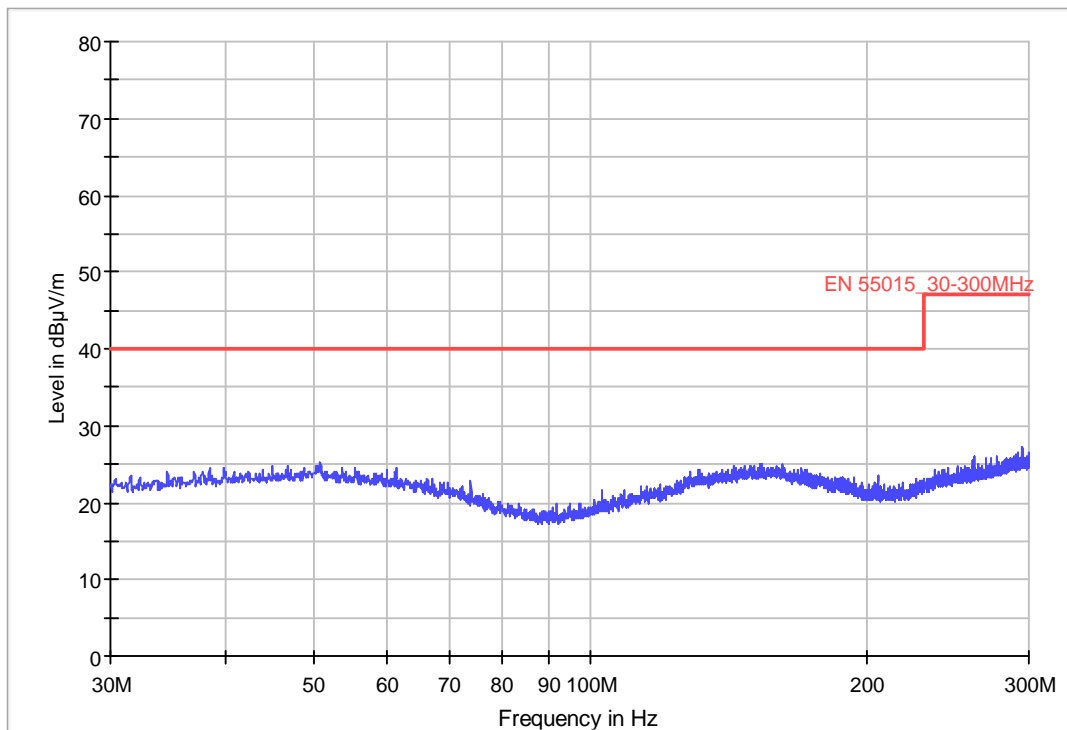
EUT Name: LED work light
Model: 99A20
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on,max, AC 230V/50Hz,T20.9, H49.3%, P102.5kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Vertical
Sample No: SHA-362681-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup: RE_VULB9163
Receiver: [ESR 3]
Level Unit: dB μ V/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
30 MHz - 300 MHz	50 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9163_pre_Cont_30_300



30-300MHz Radiated Emission

EUT Information

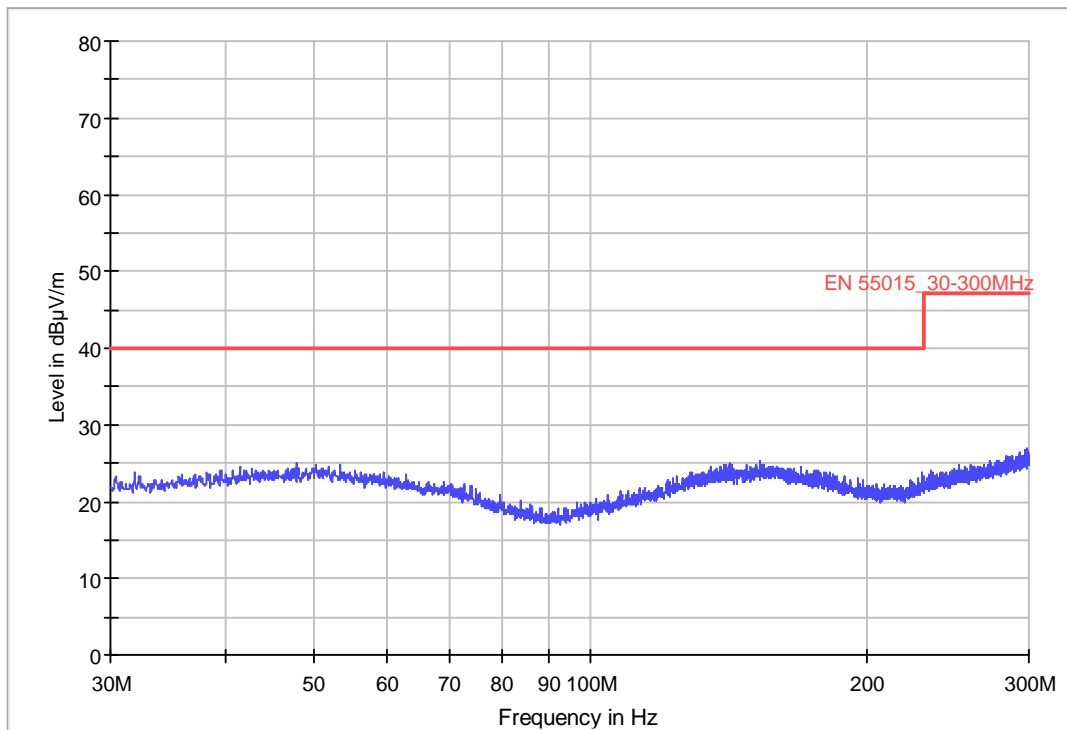
EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on, max, AC 230V/50Hz, T20.9, H49.3%, P102.5kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Horizontal
Sample No: SHA-362681-2

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup: RE_VULB9163
Receiver: [ESR 3]
Level Unit: dB μ V/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 300 MHz	50 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9163_pre_Cont_30_300



30-300MHz Radiated Emission

EUT Information

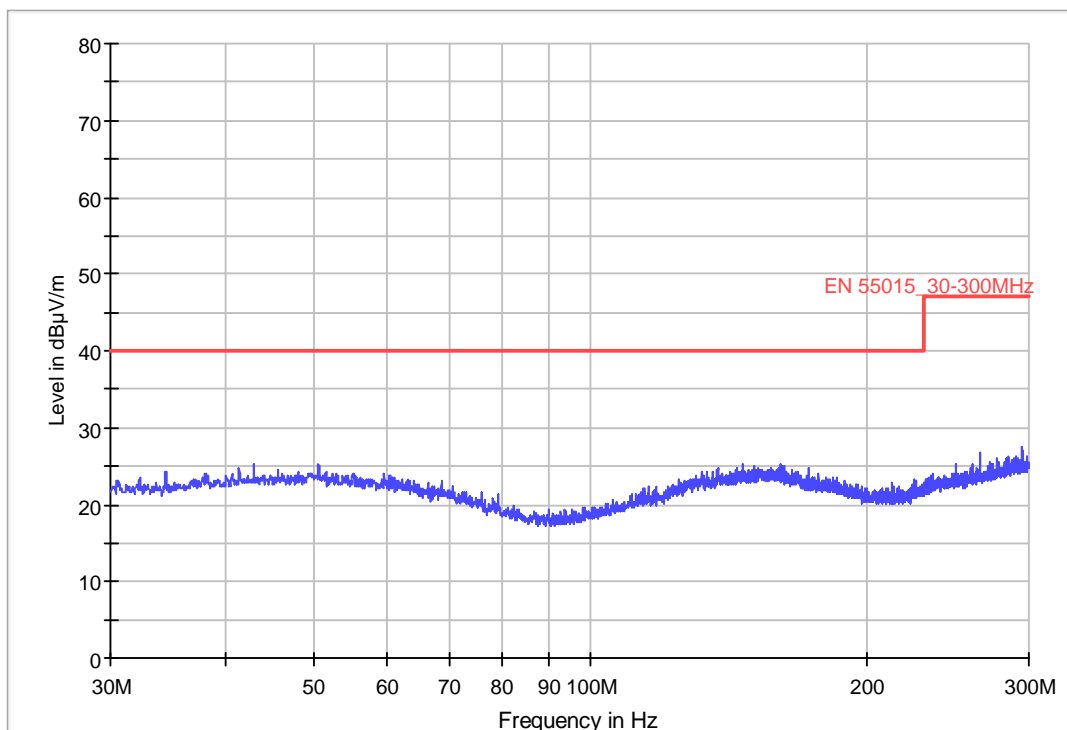
EUT Name: LED work light
Model: 99A50
Client: Cixi Leonlux Technology Co., Ltd.
Op Cond: Light on,max, AC 230V/50Hz,T20.9, H49.3%, P102.5kPa
Operator: Liu zhu
Test Spec: EN 55015
Comment: Vertical
Sample No: SHA-362681-2

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup: RE_VULB9163
Receiver: [ESR 3]
Level Unit: dB μ V/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 300 MHz	50 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9163_pre_Cont_30_300





Test Setup

2.3.8 Test Location

This test was carried out in 3-meter semi-anechoic chamber.

2.4 Harmonic Current Emissions

2.4.1 Specification Reference

EN 61000-3-2:2014, Clause 7

2.4.2 Equipment Under Test

99A50

2.4.3 Date of Test

07/09/2018

2.4.4 Test Method

The EUT was placed on a non-conductive table 0.1 m above a reference ground plane. All power was connected to the EUT through a software controller AC power amplifier. The amplitude of the AC mains harmonic components was then measured.

2.4.5 Environmental Conditions

Ambient Temperature 23.6 °C
Relative Humidity 48.2 %
Atmospheric Pressure 1025.0 mbar

2.4.6 Specification Limits

Limits for class C Equipment active input power > 25W	
Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	30 λ
5	10
7	7
9	5
11 ≤ n ≤ 39 (odd harmonic only)	3
λ is the circuit power factor	

2.4.7 Test Results

Results for Configuration and Mode: AC Powered/Light on (max. power).

Performance assessment of the EUT made during this test: *Pass*.

Detailed results are shown below.

Line Under Test: power line

Harmonics – Class-C per Ed. 4.0 (2014)(Run time) incl. inter-harmonics

EUT: LED work light

Tested by: Liu zhu

Test category: Class-C per Ed. 4.0 (2014) (European limits)

Test Margin: 100

Test date: 7/9/2018

Start time: 10:38:10 AM

End time: 10:41:02 AM

Test duration (min): 2.5

Data file name: H-000576.cts_data

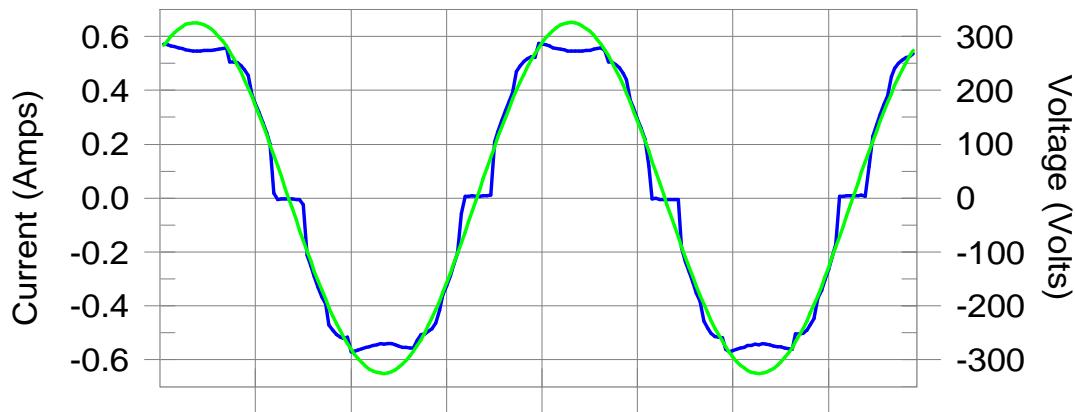
Comment: Light on, 99A50, max, SHA-362681-2, T23.6, H48.2%, P102.5KPa

Customer: Cixi Leonlux Technology Co., Ltd.

Test Result: Pass

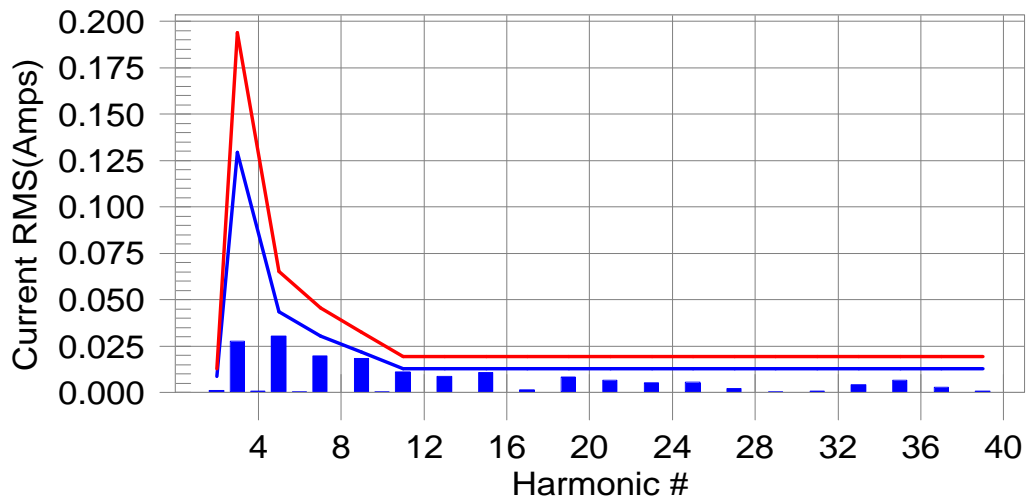
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line

European Limits



Test result: Pass Worst harmonics H11-58.5% of 150% limit, H11-85.7% of 100% limit.

Current Test Result Summary (Run time)

EUT: LED work light
 Test category: Class-C per Ed. 4.0 (2014) (European limits)
 Test date: 7/9/2018 Start time: 10:38:10 AM End time: 10:41:02 AM
 Test duration (min): 2.5 Data file name: H-000576.cts_data
 Comment: Light on,99A50, max,SHA-362681-2, T23.6, H48.2%, P102.5KPa
 Customer: Cixi Leonlux Technology Co., Ltd.

Test Result: Pass Source qualification: Normal
 THC(A): 0.055 I-THD(%): 12.7 POHC(A): 0.012 POHC Limit(A): 0.041

Highest parameter values during test:

V_RMS (Volts):	230.23	Frequency(Hz):	50.00
I_Peak (Amps):	0.586	I_RMS (Amps):	0.437
I_Fund (Amps):	0.434	Crest Factor:	1.344
Power (Watts):	99.9	Power Factor:	0.992

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.009	N/A	0.001	0.013	N/A	Pass
3	0.028	0.129	21.5	0.030	0.194	15.3	Pass
4	0.001	0.000	N/A	0.001	0.000	N/A	Pass
5	0.030	0.043	69.8	0.031	0.065	47.4	Pass
6	0.000	0.000	N/A	0.000	0.000	N/A	Pass
7	0.020	0.030	64.8	0.020	0.046	44.5	Pass
8	0.000	0.000	N/A	0.000	0.000	N/A	Pass
9	0.018	0.022	84.7	0.019	0.033	57.0	Pass
10	0.000	0.000	N/A	0.000	0.000	N/A	Pass
11	0.011	0.013	85.7	0.011	0.020	58.5	Pass
12	0.000	0.000	N/A	0.000	0.000	N/A	Pass
13	0.009	0.013	66.0	0.009	0.020	45.4	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.011	0.013	81.6	0.011	0.020	55.4	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.001	0.013	N/A	0.002	0.020	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.008	0.013	63.3	0.008	0.020	43.2	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.007	0.013	50.5	0.007	0.020	34.8	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.005	0.013	40.2	0.005	0.020	27.8	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.006	0.013	44.3	0.006	0.020	29.7	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.002	0.013	N/A	0.002	0.020	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.013	N/A	0.001	0.020	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.013	N/A	0.001	0.020	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.004	0.013	N/A	0.005	0.020	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.007	0.013	50.9	0.007	0.020	34.5	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.003	0.013	N/A	0.003	0.020	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.013	N/A	0.001	0.020	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

Voltage Source Verification Data (Run time)

EUT: LED work light
 Test category: Class-C per Ed. 4.0 (2014) (European limits)
 Test date: 7/9/2018
 Test duration (min): 2.5
 Comment: Light on,99A50, max, SHA-362681-2, T23.6, H48.2%, P102.5KPa
 Customer: Cixi Leonlux Technology Co., Ltd.

Tested by: Liu zhu
 Test Margin: 100
 Start time: 10:38:10 AM
 End time: 10:41:02 AM
 Data file name: H-000576.cts_data

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.23	Frequency(Hz):	50.00
I _{Peak} (Amps):	0.586	I _{RMS} (Amps):	0.437
I _{Fund} (Amps):	0.434	Crest Factor:	1.344
Power (Watts):	99.9	Power Factor:	0.992

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.077	0.460	16.78	OK
3	0.391	2.072	18.88	OK
4	0.057	0.460	12.34	OK
5	0.054	0.921	5.88	OK
6	0.019	0.460	4.18	OK
7	0.040	0.691	5.86	OK
8	0.020	0.460	4.40	OK
9	0.014	0.460	2.95	OK
10	0.019	0.460	4.18	OK
11	0.014	0.230	5.91	OK
12	0.011	0.230	4.56	OK
13	0.014	0.230	5.98	OK
14	0.004	0.230	1.80	OK
15	0.011	0.230	4.82	OK
16	0.009	0.230	4.03	OK
17	0.005	0.230	2.16	OK
18	0.007	0.230	3.16	OK
19	0.008	0.230	3.45	OK
20	0.010	0.230	4.42	OK
21	0.008	0.230	3.31	OK
22	0.004	0.230	1.81	OK
23	0.008	0.230	3.59	OK
24	0.003	0.230	1.41	OK
25	0.009	0.230	3.79	OK
26	0.003	0.230	1.28	OK
27	0.007	0.230	3.17	OK
28	0.003	0.230	1.37	OK
29	0.005	0.230	2.26	OK
30	0.003	0.230	1.35	OK
31	0.004	0.230	1.61	OK
32	0.003	0.230	1.17	OK
33	0.007	0.230	2.86	OK
34	0.002	0.230	0.98	OK
35	0.010	0.230	4.30	OK
36	0.002	0.230	0.96	OK
37	0.006	0.230	2.67	OK
38	0.002	0.230	0.87	OK
39	0.004	0.230	1.95	OK
40	0.005	0.230	2.01	OK



Test Setup

2.4.8 Test Location

This test was carried out in harmonic current emission and flicker test area.

2.5 Flicker

2.5.1 Specification Reference

EN 61000-3-3:2013, Clause 6

2.5.2 Equipment Under Test

99A20, 99A50

2.5.3 Date of Test

07/09/2018

2.5.4 Test Method

For equipment not mentioned in annex A of EN 6100-3-3:2013, controls or automatic programs should be set to produce the most unfavourable sequence of voltage change, using only those combinations of controls and programmes which are mentioned by the manufacturer in the instruction manual, or are otherwise likely to be used

2.5.5 Environmental Conditions

Ambient Temperature	23.6 °C
Relative Humidity	48.2 %
Atmospheric Pressure	1027.0 mbar

2.5.6 Specification Limits

The value of Pst shall not be greater than 1.0

The value of Plt shall not be greater than 0.65

Tmax, the accumulated time value of d(t) with a deviation exceeding 3.3% during a single voltage change at the EUT terminals, shall not exceed 500ms

The maximum relative steady-state voltage change, dc, shall not exceed 3.3%

The maximum relative voltage change dmax, shall not exceed

- a) 4% without additional conditions
- b) 6% for equipment which is:
 - Switched manually, or
 - Switched automatically more frequently than twice per day, and also has either a delayed start, or manual restart, after a power supply interruption
- c) 7% for equipment which is:
 - Attended whilst in use, or
 - Switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart or manual restart, after a power supply interruption

2.5.7 Test Results

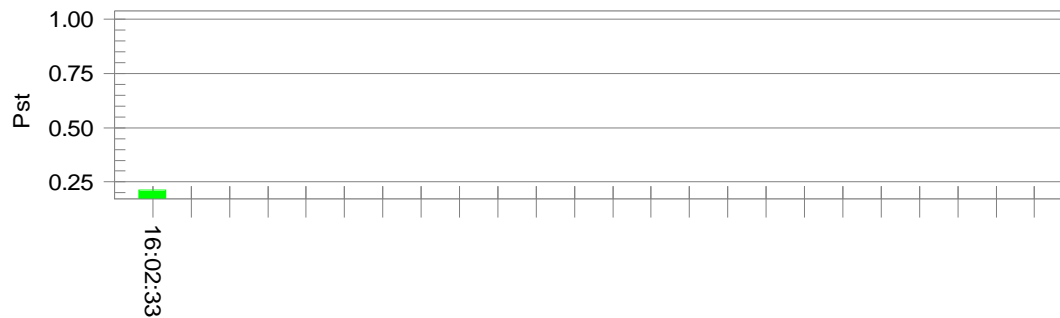
Results for Configuration and Mode: AC Powered/Light on (max. power).

Performance assessment of the EUT made during this test: *Pass*.

Detailed results are shown below.



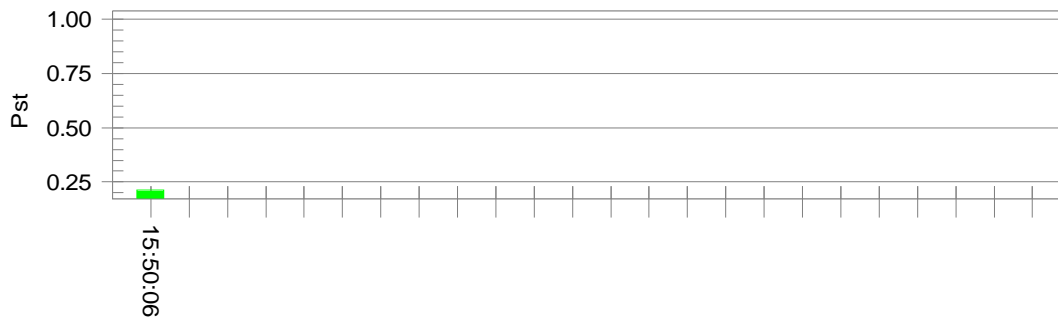
China

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)**EUT: LED work light****Tested by: Liu zhu****Test category: dt,dmax,dc and Pst (European limits)****Test Margin: 100****Test date: 7/9/2018****Start time: 3:52:03 PM****End time: 4:02:34 PM****Test duration (min): 10****Data file name: F-000589.cts_data****Comment: Power on/off,99A20, SHA-362681-1,T23.6, H48.2%, P102.7KPa****Customer: Cixi Leonlux Technology Co., Ltd.****Test Result: Pass****Status: Test Completed****Pst_i and limit line****European Limits****Parameter values recorded during the test:****Vrms at the end of test (Volt): 230.09****Highest dt (%): 0.00****T-max (mS): 0****Highest dc (%): 0.00****Highest dmax (%): 0.08****Highest Pst (10 min. period): 0.213****Test limit (%): N/A N/A****Test limit (mS): 500.0 Pass****Test limit (%): 3.30 Pass****Test limit (%): 4.00 Pass****Test limit: 1.000 Pass**

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: LED work light
Test category: dt,dmax,dc and Pst (European limits)
Test date: 7/9/2018
Test duration (min): 10
Comment: Power on/off,99A50, SHA-362681-2,T23.6, H48.2%, P102.7KPa
Customer: Cixi Leonlux Technology Co., Ltd.

Tested by: Liu zhu
Test Margin: 100
End time: 3:50:07 PM
Data file name: F-000588.cts_data

Test Result: Pass**Status: Test Completed****Pst_i and limit line****European Limits****Parameter values recorded during the test:**

Vrms at the end of test (Volt):	229.99		
Highest dt (%):	0.00	Test limit (%):	N/A
T-max (mS):	0	Test limit (mS):	500.0
Highest dc (%):	0.00	Test limit (%):	3.30
Highest dmax (%):	-0.13	Test limit (%):	4.00
Highest Pst (10 min. period):	0.213	Test limit:	1.000



Test setup

2.5.8 Test Location

This test was carried out in harmonic current emission and flicker test area.

2.6 Electrostatic discharge immunity test

2.6.1 Specification Reference

EN 61547:2009, Clause 5.2

2.6.2 Equipment Under Test

99A20, 99A50

2.6.3 Date of Test

07/17/2018

2.6.4 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.5mm isolator, a horizontal coupling plane fitted to the top of a 0.8m non-conductive table for table-top equipment; and on a 0.1m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.

2.6.5 Environmental Conditions

Ambient Temperature 20.1 °C
Relative Humidity 40.5 %
Atmospheric Pressure 1030.0 mbar

2.6.6 Specification Limits

Required Test Levels				Performance Criteria
Discharge type	Discharge Level (kV)		Number of discharges per location (each polarity)	
	Positive	Negative		
Air – Direct	2, 4 and 8	2, 4 and 8	<10>	B
Contact – Direct	2 and 4	2 and 4	<10>	B
Contact – Indirect	2 and 4	2 and 4	<10>	B

2.6.7 Test Results

Results for Configuration and Mode: AC Powered/Light on (max. power).

Performance assessment of the EUT made during this test: Pass.
Detailed results are shown below.

ID	Test Point	Discharge	Results									
			2kV		4kV		6kV		8kV		15kV	
			+	-	+	-	+	-	+	-	+	-
A	Vertical coupling plane	Contact	✓	✓	✓	✓						
B	Horizontal coupling plane	Contact	✓	✓	✓	✓						
C	screw	Contact	✓	✓	✓	✓						
D	Plastic enclosure	Contact	✓	✓	✓	✓			✓	✓		
E	Gap	Air	✓	✓	✓	✓			✓	✓		

Note:

✓	The EUTs performance was not impacted when the ESD pulse was applied.
✓*	No discharge occurred at this point when the ESD pulse was applied.
Ox	Observation number A, B, ...etc.

**Test Setup****2.6.8 Test Location**

This test was carried out in shielded room Z118.

2.7 Radiated, radio-frequency, electromagnetic field immunity test

2.7.1 Specification Reference

EN 61547:2009, Clause 5.3

2.7.2 Equipment Under Test

99A20, 99A50

2.7.3 Date of Test

07/17/2018

2.7.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

All four side of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.

2.7.5 Environmental Conditions

Ambient Temperature 20.0 °C
Relative Humidity 40.5 %
Atmospheric Pressure 1030.0 mbar

2.7.6 Specification Limits

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	3	AM (80 %, 1 kHz, sine wave)	1	3	A
Note 1. EUT powered at one of the Nominal input voltages and frequencies					

2.7.7 Test Results

Results for Configuration and Mode: AC Powered/Light on(max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for RF Electromagnetic Field 80 - 1000 MHz				
Side of the equipment under test	Antenna polarization	Test Level	Dwell Time	Result
Front	Horizontal	3 V/m	3 s	Pass PC A
Front	Vertical	3 V/m	3 s	Pass PC A
Right	Horizontal	3 V/m	3 s	Pass PC A
Right	Vertical	3 V/m	3 s	Pass PC A
Rear	Horizontal	3 V/m	3 s	Pass PC A
Rear	Vertical	3 V/m	3 s	Pass PC A
Left	Horizontal	3 V/m	3 s	Pass PC A
Left	Vertical	3 V/m	3 s	Pass PC A
Remark:				

**Test Setup**

2.7.8 Test Location

This test was carried out in 3m anechoic chamber.

2.8 Electrical fast transient /burst immunity test

2.8.1 Specification Reference

EN 61547:2009, Clause 5.5

2.8.2 Equipment Under Test

99A20, 99A50

2.8.3 Date of Test

07/17/2018

2.8.4 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.1 m isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using a CDN for power ports, capacitive coupling clamp for signal and control ports and a 33nF coupling capacitor for earth ports, the required fast transient burst voltage levels in both voltage polarities were applied at the detailed pulse repartition rate and duration of test.

During this testing any anomalies in the equipment under tests performance was recorded.

2.8.5 Environmental Conditions

Ambient Temperature 20.0 °C
Relative Humidity 40.1 %
Atmospheric Pressure 1030.0 mbar

2.8.6 Specification Limits

Required Test Levels at input and output a.c. power port					Performance Criteria
Line Under Test	Level (kV)	Repetition Rate (kHz)	Test Duration	Coupling Method	
AC Power Port	± 1	5 kHz	2 min per polarity	CDN	B
Note 1. EUT powered at one of the Nominal input voltages and frequencies					

2.8.7 Test Results

Results for Configuration and Mode: AC Powered/Light on(max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for Fast Transient Burst Immunity					
Line under test	Test Level (kV)	Repetition Rate	Test Duration	Coupling Method	Result
power line	± 1.0	5 kHz	2 min	CDN	Pass PC A
Remark:					

**Test Setup**

2.8.8 Test Location

This test was carried out in shielded room Z118.

2.9 Immunity to conducted disturbances, induced by radio-frequency fields

2.9.1 Specification Reference

EN 61547:2009, Clause 5.6

2.9.2 Equipment Under Test

99A20, 99A50

2.9.3 Date of Test

07/17/2018

2.9.4 Test Method

The equipment under test was placed on an insulating support 0,1 m above the reference ground plane.

All associated cabling was configured, on but insulated from, using a 50 mm isolator, the same horizontal coupling plane as the equipment under test.

Using CDNs, EM Clamps or current clamps as appropriate, the power ports and applicable signal and control ports were subjected to the required, pre calibrated RF injected signal strength, modulated as described, swept over the frequency range of test.

During this testing any anomalies in the equipment under tests performance was recorded.

2.9.5 Environmental Conditions

Ambient Temperature 20.0 °C
Relative Humidity 40.5 %
Atmospheric Pressure 1030.0 mbar

2.9.6 Specification Limits

Required Test Levels at input and output a.c. power ports						Performance Criteria
Line Under Test	Frequency Range (MHz)	Level (V)	Modulation	Step Size (%)	Dwell (s)	
AC power ports	0.15 to 80	3	AM (80 %, 1 kHz, sine wave)	1	3	A
Note Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, may exceed 3m						

2.9.7 Test Results

Results for Configuration and Mode: AC Powered/Light on(max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for Injected current						
Line under test	Test Level	Step	Dwell Time	Coupling Method	Modulation	Result
power line	3V	1%	3S	CDN	1KHZ 80%	Pass PC A
Remark:						



Test Setup

2.9.8 Test Location

This test was carried out in shielded room Z118.

2.10 Surge immunity test

2.10.1 Specification Reference

EN 61547:2009, Clause 5.7

2.10.2 Equipment Under Test

99A20, 99A50

2.10.3 Date of Test

07/17/2018

2.10.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using CDNs for power ports and appropriate coupling methods for applicable signal and control ports, the required number of surges was applied for each surge voltage level using both positive and negative surge voltage polarities. Surges were applied at the power line frequency phase angles and repartition rates detailed.

During this testing any anomalies in the equipment under tests performance was recorded.

2.10.5 Environmental Conditions

Ambient Temperature 20.0 °C
Relative Humidity 40.1 %
Atmospheric Pressure 1030.0 mbar

2.10.6 Specification Limits

Characteristics	Test Levels			Performance Criteria
	Device			
	Self-ballasted lamps And semi-luminaires	Luminaires and independent auxiliaries		
		Input power		
		≤25W	>25W	
Wave- shape data Test levels line to line line to ground	1.2/50 μs ± 0.5 kV ±1.0 kV	1.2/50 μs ± 0.5 kV ±1.0 kV	1.2/50 μs ± 1.0 kV ±2.0 kV	C
Note In addition to the specified test level, all lower levels as detailed in IEC 61000-4-5 should also be satisfied.				

2.10.7 Test Results

Results for Configuration and Mode: AC Powered/Light on(max. power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for Surge Immunity (Power Ports)							
Line Name	Coupling	Level	Polarity	Phase Angle	No of Pulses	Repetition Rate	Result
power line	Live to Neutral	-0.5/1kV	NEGATIVE	270 deg	5	60 sec	Pass PC A
power line	Live to Neutral	+0.5/1kV	POSITIVE	90 deg	5	60 sec	Pass PC A
power line	Live to ground	+1/2kV	NEGATIVE	270 deg	5	60 sec	Pass PC A
power line	Live to ground	+1/2kV	POSITIVE	90 deg	5	60 sec	Pass PC A
power line	Neutral to ground	+1/2kV	NEGATIVE	270 deg	5	60 sec	Pass PC A
power line	Neutral to ground	+1/2kV	POSITIVE	90 deg	5	60 sec	Pass PC A
Remark: For model 99A20: Line to line 0.5KV, Line to ground 1KV For model 99A50: Line to line 1KV, line to ground 2KV.							

**Test Setup****2.10.8 Test Location**

This test was carried out in shielded room Z118.

2.11 Voltage dips, short interruptions and voltage variations immunity test

2.11.1 Specification Reference

EN 61547:2009, Clause 5.8

2.11.2 Equipment Under Test

99A20, 99A50

2.11.3 Date of Test

07/17/2018

2.11.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using a programmable power supply the equipment under test was subjected to the detailed supply voltage dips and interruptions. The required supply phase synchronization and test repetition rate, detailed, was controlled by the programmable power supply.

During this testing any anomalies in the equipment under tests performance was recorded.

2.11.5 Environmental Conditions

Ambient Temperature 20.0 °C
Relative Humidity 40.5 %
Atmospheric Pressure 1030.0 mbar

2.11.6 Specification Limits

Required Test Levels			Performance Criteria
Test	Test Level	Duration	
Voltage short interruptions	0 % of Vnom	½ cycle	B
Voltage dips	70 % of Vnom	10 cycles	C
Note EUT powered at one of the Nominal input voltages and frequencies			

2.11.7 Test Results

Results for Configuration and Mode: AC Powered/Light on (max. Power).

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for Voltage Dip and Short Interruption					
Line under test	Vnom	Operating Frequency	Test Level	Duration	Result
power line	230 Vac	50 Hz	0% of Vnom	½ cycle	Pass PC B
power line	230 Vac	50 Hz	70% of Vnom	10 cycles (50Hz)	Pass PC B
Remark: During the test of voltage dips and interruptions, the lamp flashed. Once removing the interferences, it can restore its original mode by itself.					

**Test Setup****2.11.8 Test Location**

This test was carried out in shielded room Z118.

3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Conducted Emission					
EMI test receiver	R & S	ESR3	S1503001-YQ-EMC	2017.8.8	2018.8.7
2-Line V-network	R & S	ENV216	S1503103-YQ-EMC	2017.8.8	2018.8.7
Radiated Disturbance (9kHz to 30MHz)					
EMI test receiver	R & S	ESR3	S1503101-YQ-EMC	2017.8.8	2018.8.7
Triple loop antenna	R & S	HM020	S1503115-YQ-EMC	2018.7.12	2019.7.11
Radiated Disturbance (30MHz to 300MHz)					
EMI test receiver	R & S	ESR3	S1503109-YQ-EMC	2017.8.8	2018.8.7
Trilog super broadband test antenna	SCHWARZBECK	VULB9163	S1503008-YQ-EMC	2015.9.18	2018.9.17
3 meter semi-anechoic chamber	TDK	3m	S1503231-YQ-EMC	2018.5.11	2021.5.10
Harmonic current emission and Flicker					
Harmonic-flicker test system	California Instruments	15003IX-CTS-400-413-LF-411	S1503193-YQ-EMC	2018.7.12	2019.7.11
Electrostatic discharge immunity test					
ESD Simulator	HAEFELY	ONYX 30	S1705268-YQ-EMC	2017.8.08	2018.8.07
T/H record	Shanghai meteorological instrument	ZJ1-2A	S1503201-YQ-EMC	2017.9.20	2018.9.19
Horizontal Coupling Plane	TÜV Product Service	---	---	---	---
Vertical Coupling Plane	TÜV Product Service	---	---	---	---
Radiated, radio-frequency, electromagnetic field immunity test					
Signal generator	R & S	SMB 100A	S1503055-YQ-EMC	2017.8.8	2018.8.7
Amplifier	A R	1000W1000EM1	S1503076-YQ-EMC	2017.8.8	2018.8.7
Power meter	R & S	NRP2	S1503062-YQ-EMC	2017.8.8	2018.8.7
Dual directional coupler	AR	DC6280AM1	S1503077-YQ-EMC	2017.8.8	2018.8.7
High gain log-periodic antenna	R & S	HL046E	S1503083-SB-EMC	--	--
Wideband power sensor	R & S	NRP-Z81	S1503097-YQ-EMC	2017.8.8	2018.8.7



China

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Wideband power sensor	R & S	NRP-Z81	S1503098-YQ-EMC	2017.8.8	2018.8.7
Electrical fast transient/burst immunity test					
Ultra compact simulator	EM test	UCS 500N5T	S1503171-YQ-EMC	2017.8.8	2018.8.7
3-phase coupling/decoupling network	EM test	CNI 503A	S1503172-YQ-EMC	2017.8.8	2018.8.7
Capacitive coupling clamp	EM test	HFK	S1503173-YQ-EMC	2017.8.8	2018.8.7
Immunity to conducted disturbances, induced by radio-frequency field					
Signal generator	SCHAFFNER	NSG 2070	S1507207-YQ-EMC	2017.8.8	2018.8.7
6dB attenuator	EM test	ATT 6/80	S1503180-SB-EMC	--	--
Coupling and decoupling network	EM test	CDN M2/M3	S1503186-YQ-EMC	2017.8.8	2018.8.7
Surge immunity test					
Ultra compact simulator	EM test	UCS 500N5T	S1503171-YQ-EMC	2017.8.8	2018.8.7
Voltage dips, short interruptions and voltage variations immunity test					
Ultra compact simulator	EM test	UCS 500N5T	S1503171-YQ-EMC	2017.8.8	2018.8.7
Motor driven AC source	EM test	MV 2616	S1503175-YQ-EMC	2017.8.8	2018.8.7



4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	9kHz to 150kHz, ± 3.56 dB
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, ± 2.73 dB
Radiated Disturbance (9kHz to 30MHz)	9kHz to 30MHz, ± 3.21 dB
Radiated Disturbance (30MHz to 300MHz)	30MHz to 1GHz, ± 5.03 dB (Horizontal) ± 5.11 dB (Vertical)

5 Photographs

99A20
Photo Title: appearance

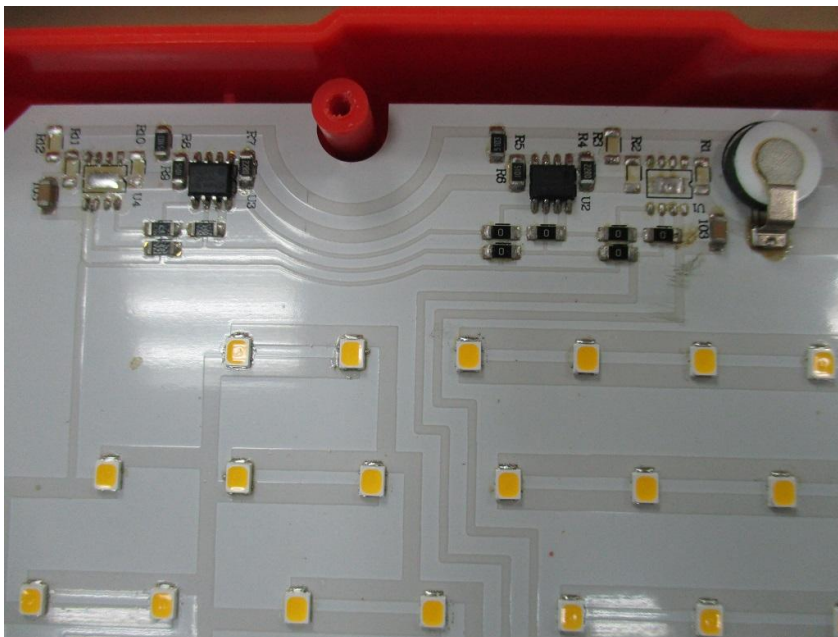
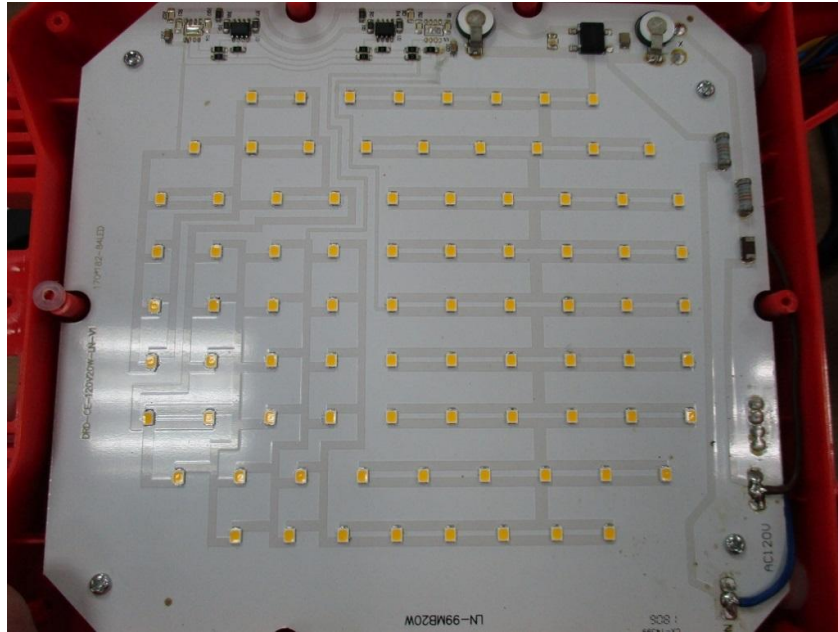
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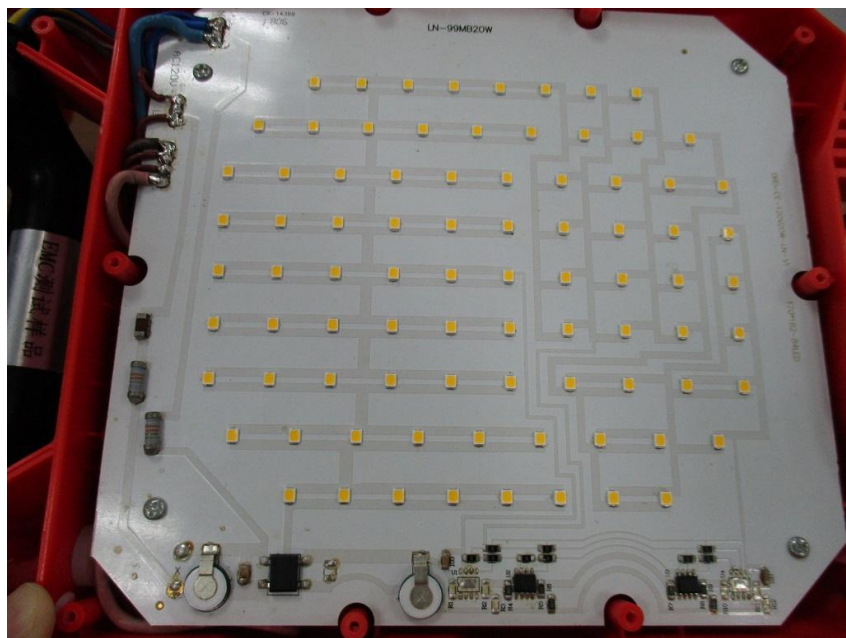
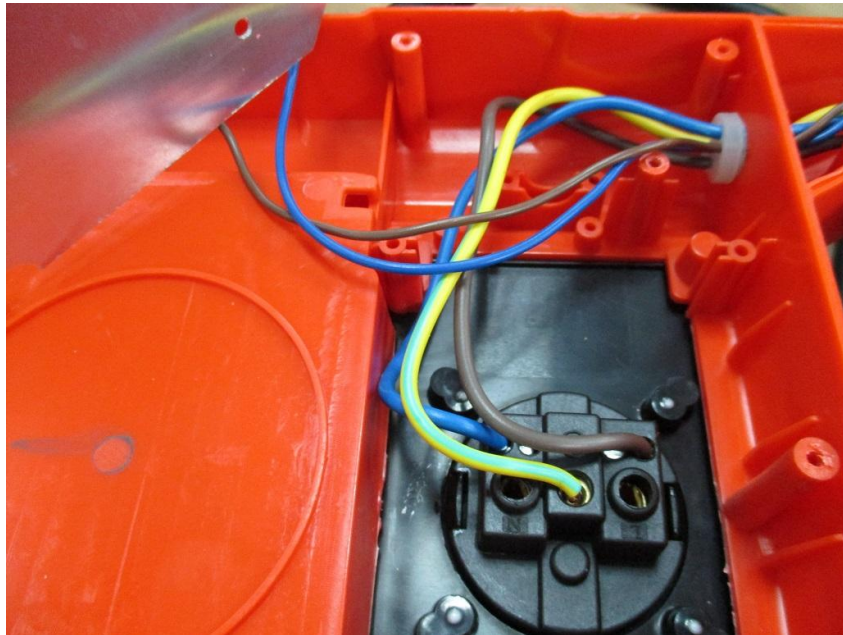




Photo Title: inner

Photo:





99A50
Photo Title: appearance

Photo:



