EMC Testing of SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD

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LED Downlight

SL82 5W, SL82 7W, SL82-LD-3S 5W, SL82-LD-3S 7W, SL82-SD 5W, SL82-SD 7W, SL90 5W, SL90 7W, SL110 5W, SL110 7W

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

Prepared for: SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
No.33, Luda RD, Liuzao Town, Pudong New Area 201322, SHANGHAI,
People's Republic of China

COMMERCIAL-IN-CONFIDENCE

Date: 06/22/2018
Report Number: 708881846201-00

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Approved By	Hui TONG	06.22.2018	
Prepared By	Yong ZHANG	06.22.2018	

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

EXECUTIVE SUMMARY
Four 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

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Contents

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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	06/22/2018

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	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Address	No.33, Luda RD, Liuzao Town, Pudong New Area 201322, SHANGHAI, P. R. C.
Manufacturer	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Address	No.33, Luda RD, Liuzao Town, Pudong New Area 201322, SHANGHAI, P. R. C.
Factory	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Address	No.33, Luda RD, Liuzao Town, Pudong New Area 201322, SHANGHAI, P. R. C.
Model Number(s)	SL82 5W, SL82 7W, SL82-LD-3S 5W, SL82-LD-3S 7W, SL82-SD 5W, SL82-SD 7W, SL90 5W, SL90 7W, SL110 5W, SL110 7W
Rated Input Voltage/Frequency	220-240V~, 50/60Hz
Rated Input Power	SL82 5W, SL82-LD-3S 5W, SL82-SD 5W, SL90 5W, SL110 5W: 5W; SL82 7W, SL82-LD-3S 7W, SL82-SD 7W, SL90 7W, SL110 7W: 7W
Sample Number(s)	SHA-355279-1, SHA-355279-3, SHA-359383-1, SHA-359383-2
Number of Samples Tested	4
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	05/22/2018
Start of Test	05/24/2018
Finish of Test	06/19/2018
Name of Engineer(s)	Yong ZHANG

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1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with EN 55015 and EN 61547 is shown below.

Section	Specification	Clause	Test Description	Result	Comments/Base Standard
For test model SL82-LD-3S 7W: AC Powered Light on (minimum light output & middle light output & maximum light output). For other models: AC Powered Light on.					
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: 2.5dB）	
For test model SL82-LD-3S 7W: AC Powered Light on (middle light output). For other models: AC Powered Light on.					
2.4	EN 61547:2009	5.2	Electrostatic discharge immunity test	Pass	IEC 61000-4-2:2008
2.5	EN 61547:2009	5.3	Radiated, radio-frequency, electromagnetic field immunity test	Pass	IEC 61000-4-3:2006 /A1: 2007
2.6	EN 61547:2009	5.5	Electrical fast transient /burst immunity test	Pass	IEC 61000-4-4:2004
2.7	EN 61547:2009	5.6	Immunity to conducted disturbances, induced by radio-frequency fields	Pass	IEC 61000-4-6:2008
2.8	EN 61547:2009	5.7	Surge immunity test	Pass	IEC 61000-4-5:2005
2.9	EN 61547:2009	5.8	Voltage dips, short interruptions and voltage variations immunity test	Pass	IEC 61000-4-11:2004

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1.4 Product Information

1.4.1 Technical Description

According to client's declaration, Models difference are listed in below table.

Model	Rated power (W)	Circuit	PCB layout	Remark
SL82 5W	5	1	1	have same circuit diagram and PCB layout except for the different rated power.
SL82 7W	7			
SL90 5W	5		2	have same circuit diagram and PCB layout except for the different rated power and lampshade size.
SL90 7W	7			
SL110 5W	5			
SL110 7W	7			
SL82-SD 5W	5	2	3	have same circuit diagram and PCB layout except for the different rated power.
SL82-SD 7W	7			
SL82-LD-3S 5W	5	3	4	have same circuit diagram and PCB layout except for the different rated power.
SL82-LD-3S 7W	7			

So models SL82 7W, SL82-SD 7W, SL82-LD-3S 7W and SL90 7W were chosen to perform all the tests.

For test model SL82-LD-3S 7W: After pre-scanning under 220-240V~50/60Hz, minimum light output & middle light output & maximum light output, the worst test results were recorded.

For other test models: Pre-tests are performed under 220-240V~, 50/60Hz, the worst test results are recorded.

Remarks:
1.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.
2.Tests need not be made on equipment which is unlikely to produce significant voltage fluctuations or flicker. (EN 61000-3-3:2013, clause 6.1).

1.4.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
For test model SL82-LD-3S 7W: AC Powered Light on (minimum light output & middle light output & maximum light output). For other models: AC Powered Light on.				
Line L	N/A	AC power for the EUT	2 core	No
Line N	N/A	AC power for the EUT	2 core	No

1.4.3 Test Configuration

Configuration	Description
AC Powered	AC 220-240V, 50/60Hz

1.4.4 Modes of Operation

Mode	Description
Light on	The EUT was lighted on.
Light on (minimum light output)	The EUT was light on and set minimum light output by the power on/off.
Light on (middle light output)	The EUT was light on and set middle light output by the power on/off.
Light on (maximum light output)	The EUT was light on and set maximum light output by the power on/off.

1.4.5 Monitoring of Performance

The luminous intensity doesn't 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.

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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)	Accreditation
For test model SL82-LD-3S 7W: AC Powered Light on (minimum light output & middle light output & maximum light output). For other models: AC Powered Light on.		
Conducted Disturbance at Mains Terminals	Huali CHENG	A2LA
Radiated Disturbance (9kHz to 30MHz)	Huali CHENG	A2LA
Radiated Disturbance (30MHz to 300MHz)	Huali CHENG	A2LA
Electrostatic discharge immunity test	Huali CHENG	A2LA
Radiated, radio-frequency, electromagnetic field immunity test	Huali CHENG	A2LA
Electrical fast transient /burst immunity test	Huali CHENG	A2LA
Immunity to conducted disturbances, induced by radio-frequency fields	Huali CHENG	A2LA
Surge immunity test	Huali CHENG	A2LA
Voltage dips, short interruptions and voltage variations immunity test	Huali CHENG	A2LA

China

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

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.1.3 Date of Test

05/24/2018~06/19/2018

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 0,8m ± 0.05m 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	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 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:
1.For test model SL82-LD-3S 7W: AC Powered Light on (maximum light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

China

9K-30MHz Conducted Emission Test

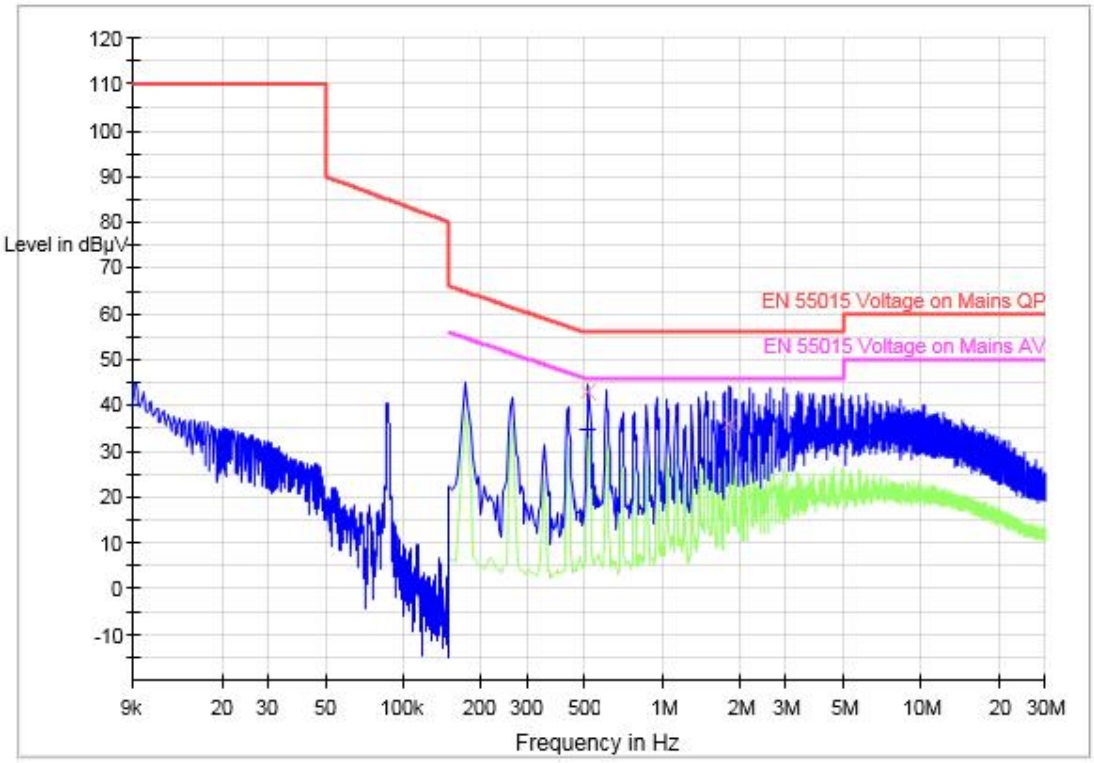
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase L
Sample No.:	SHA-355279-1

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



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.519000	---	34.96	46.00	11.04	1000.0	9.000	L1
0.519000	43.07	---	56.00	12.93	1000.0	9.000	L1
1.819500	35.85	---	56.00	20.15	1000.0	9.000	L1

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9K-30MHz Conducted Emission Test

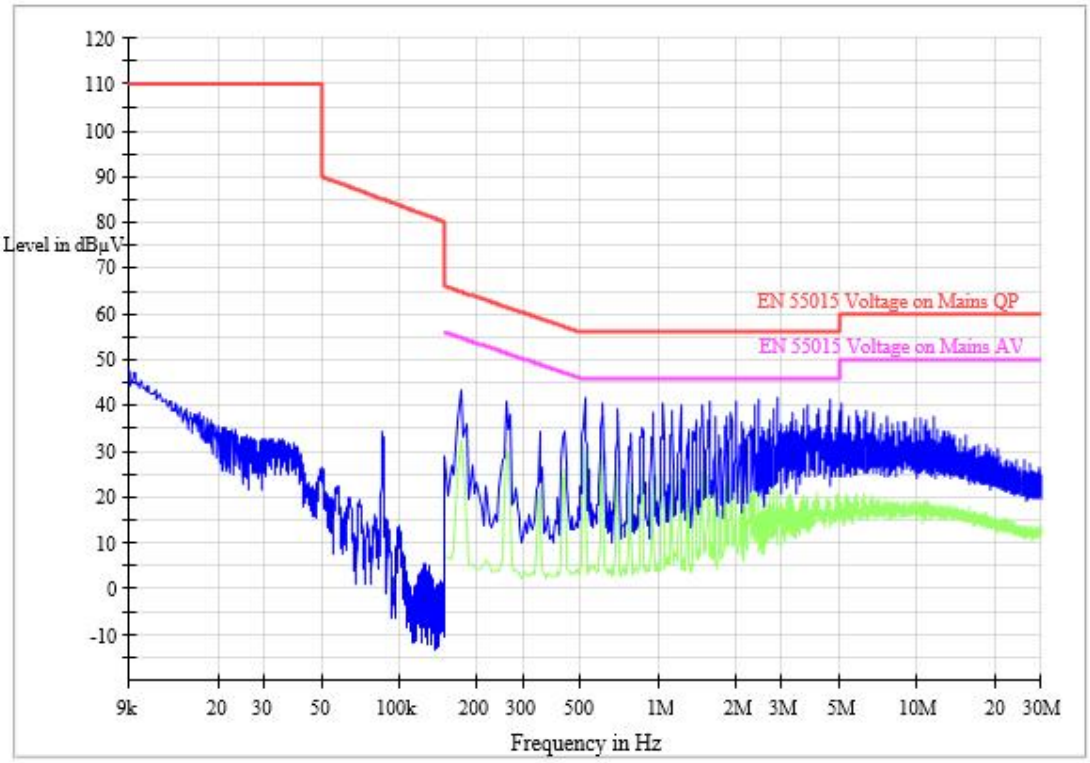
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase N
Sample No.:	SHA-355279-1

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



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9K-30MHz Conducted Emission Test

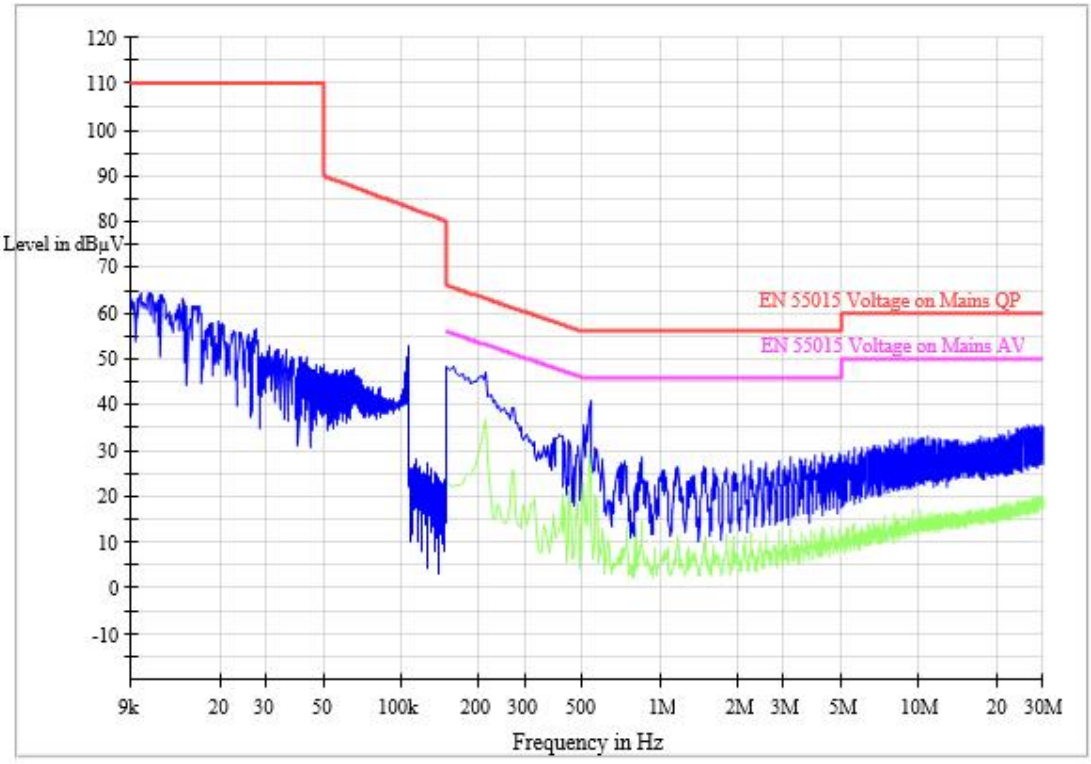
EUT Information

EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H47.3%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase L
Sample No.:	SHA-355279-3

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



China

9K-30MHz Conducted Emission Test

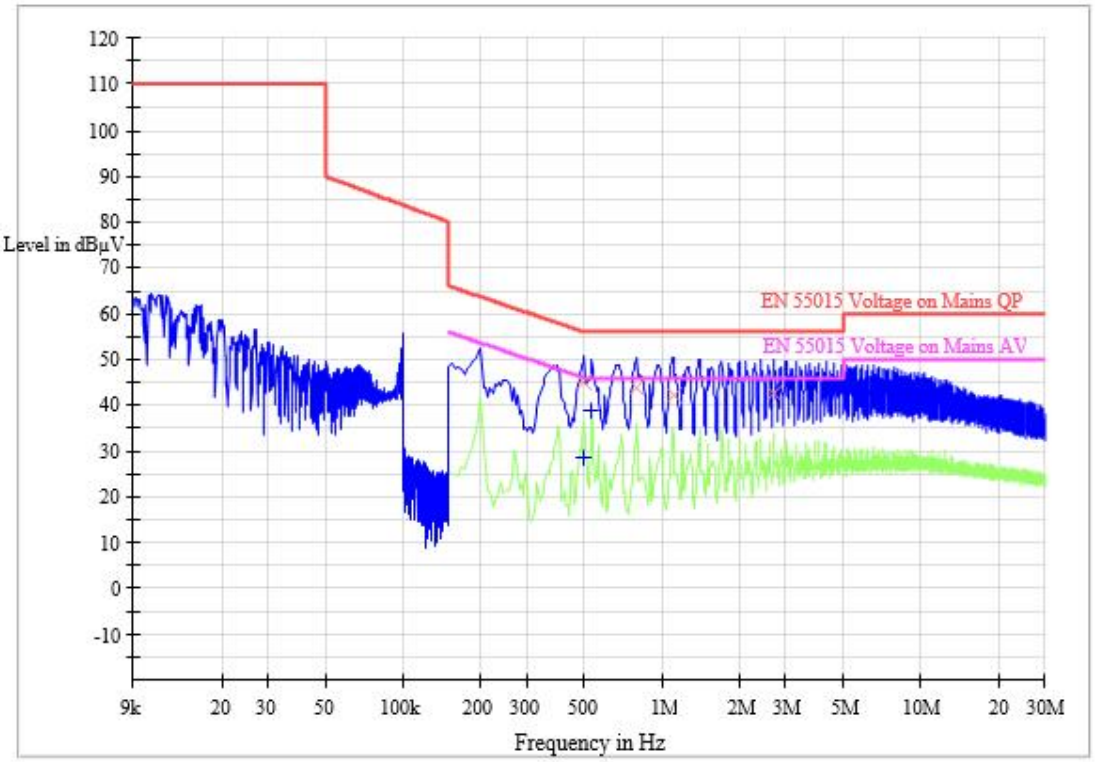
EUT Information

EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H47.3%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase N
Sample No.:	SHA-355279-3

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



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Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.501000	---	28.50	46.00	17.50	1000.0	9.000	N
0.501000	45.16	---	56.00	10.84	1000.0	9.000	N
0.537000	---	38.88	46.00	7.12	1000.0	9.000	N
0.802500	43.92	---	56.00	12.08	1000.0	9.000	N
1.104000	42.34	---	56.00	13.66	1000.0	9.000	N
2.706000	42.79	---	56.00	13.21	1000.0	9.000	N

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9K-30MHz Conducted Emission Test

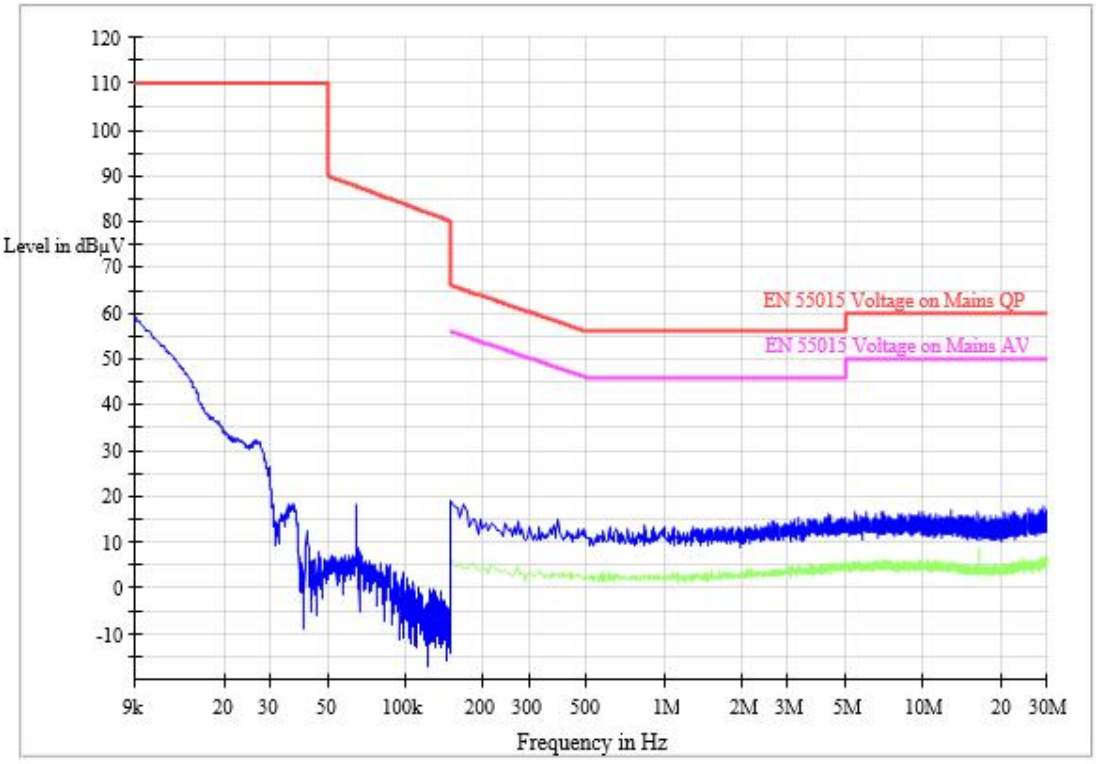
EUT Information

EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T20.3, H45.3%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase L, maximum light output
Sample No.:	SHA-359383-1

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



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9K-30MHz Conducted Emission Test

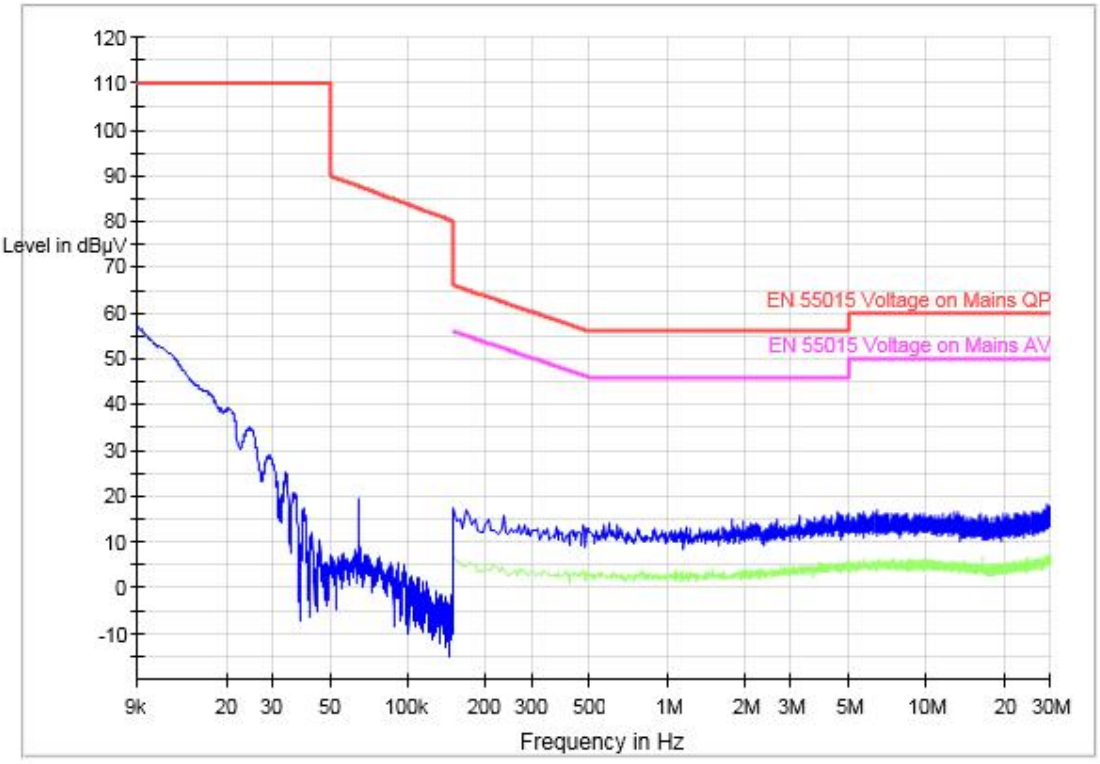
EUT Information

EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T20.3, H45.3%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase N, maximum light output
Sample No.:	SHA-359383-1

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



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9K-30MHz Conducted Emission Test

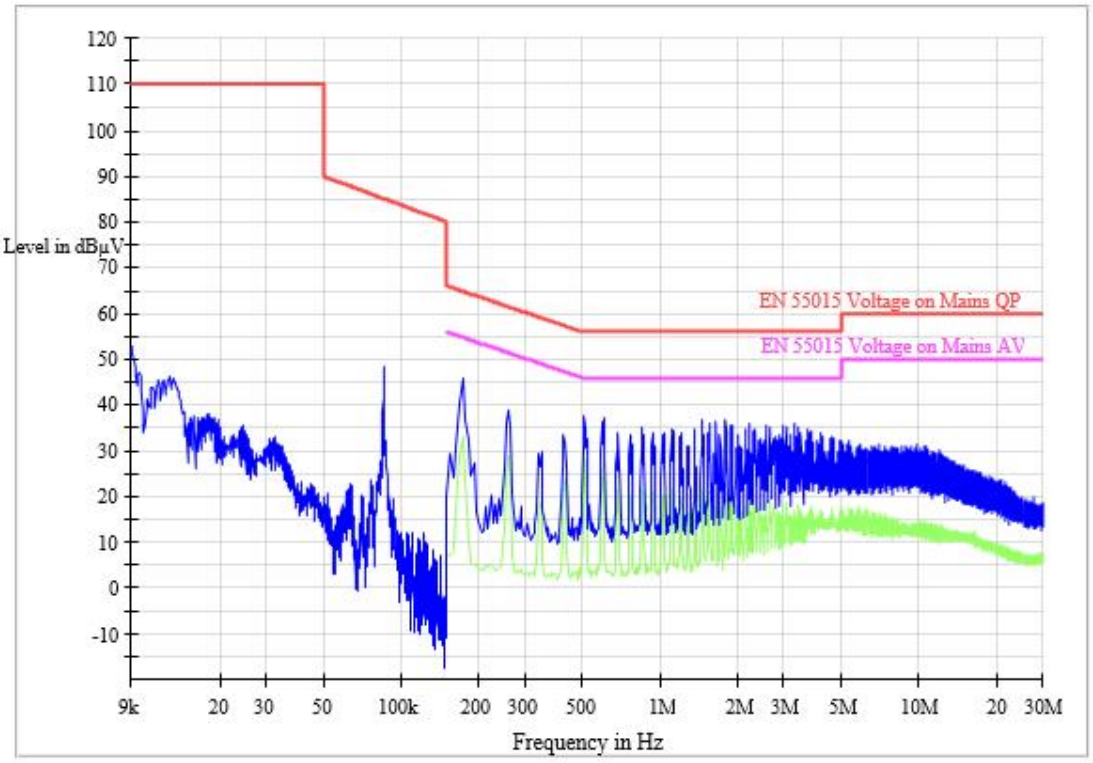
EUT Information

EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T20.3, H45.3%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase L
Sample No.:	SHA-359383-2

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



China

9K-30MHz Conducted Emission Test

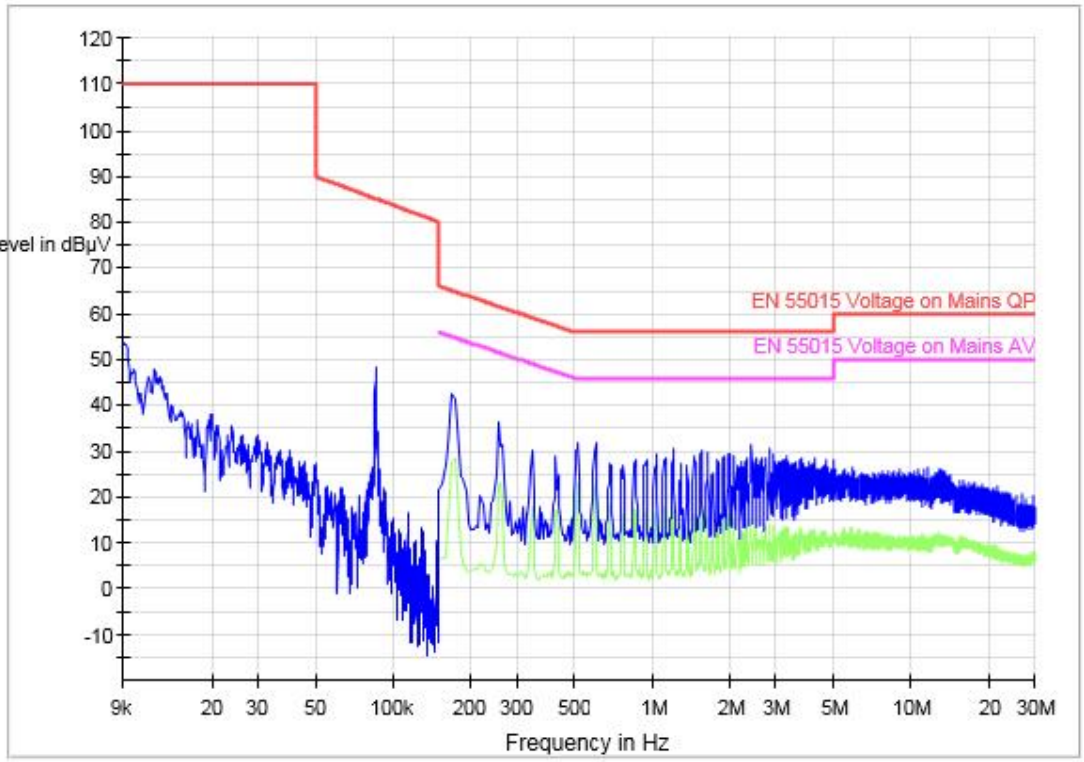
EUT Information

EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T20.3, H45.3%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Phase N
Sample No.:	SHA-359383-2

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



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

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.2.3 Date of Test

05/24/2018~06/19/2018

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	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 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:
1.For test model SL82-LD-3S 7W: AC Powered Light on (maximum light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

China

9K-30MHz Radiated Emission Test

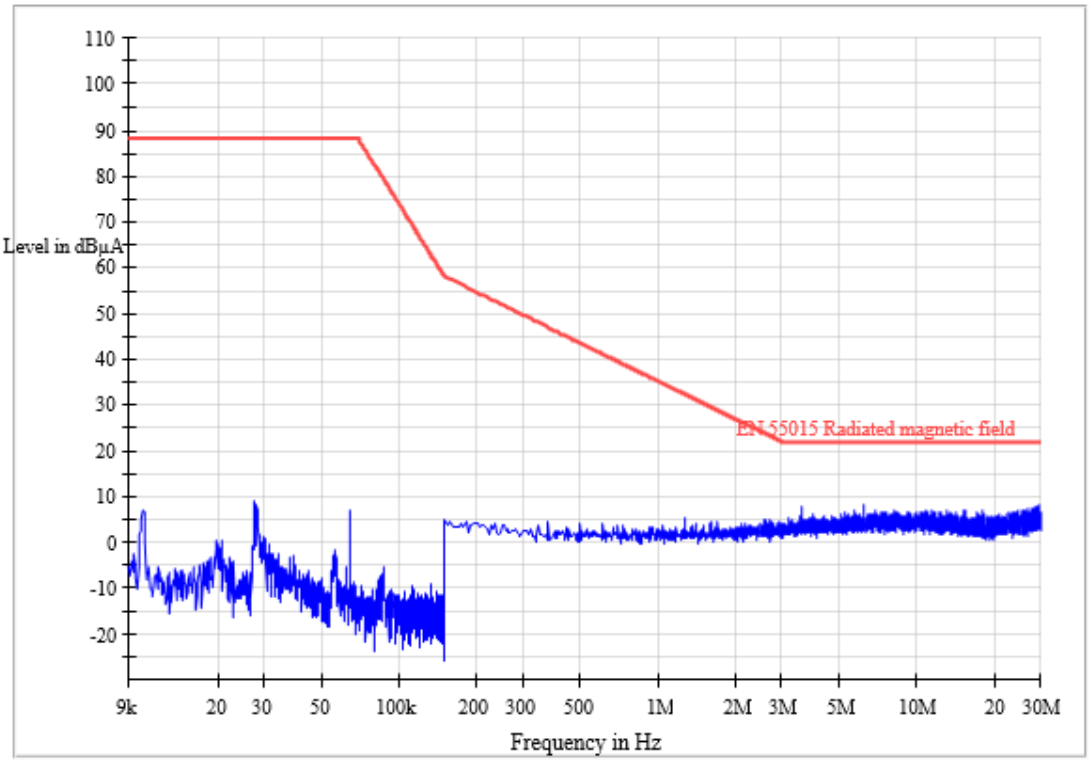
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	X
Sample No.:	SHA-355279-1

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



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9K-30MHz Radiated Emission Test

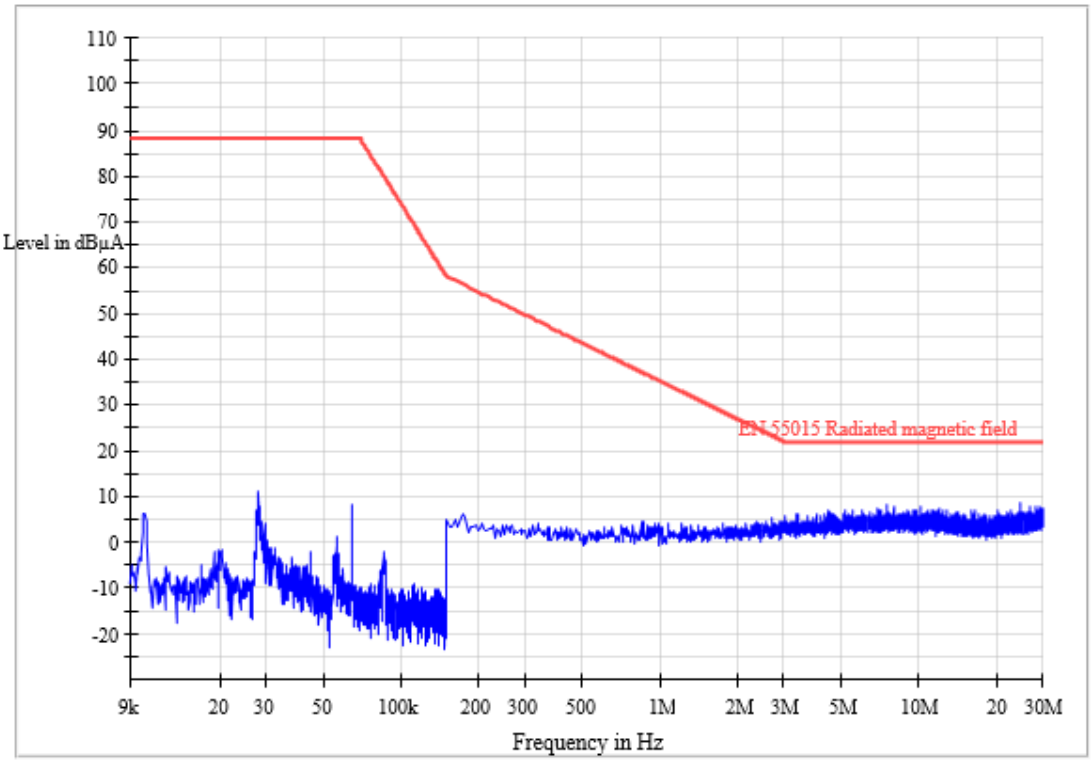
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Y
Sample No.:	SHA-355279-1

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



China

9K-30MHz Radiated Emission Test

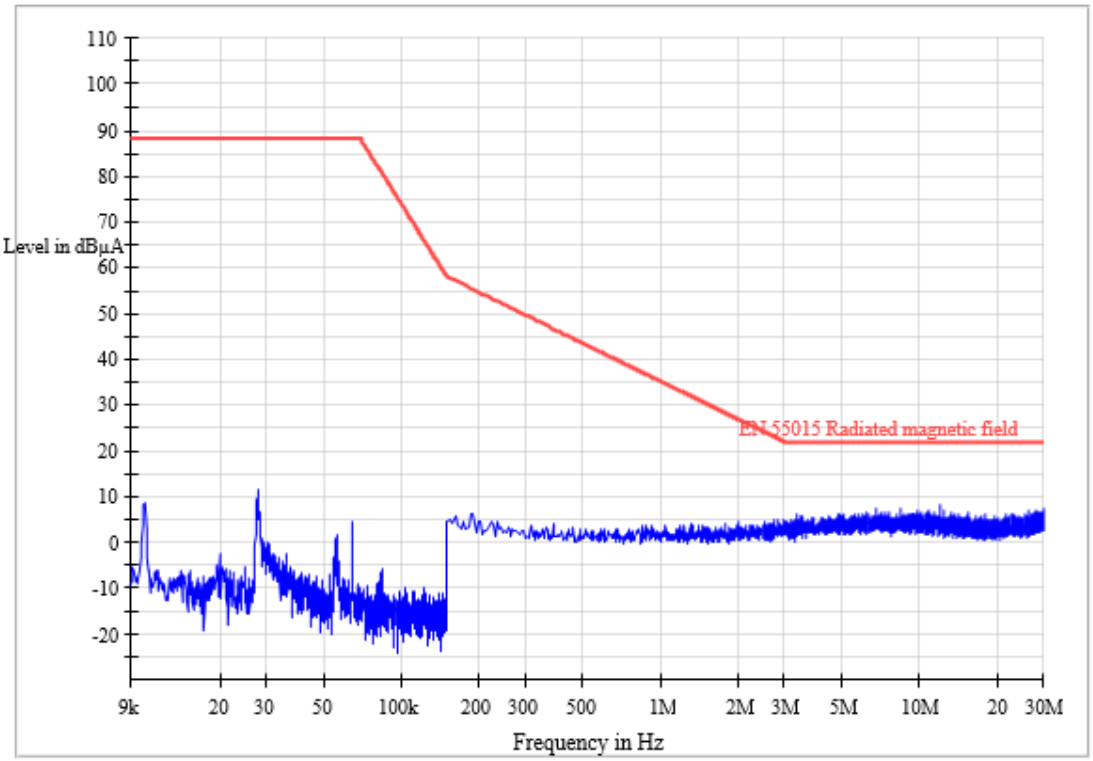
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Z
Sample No.:	SHA-355279-1

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



China

9K-30MHz Radiated Emission Test

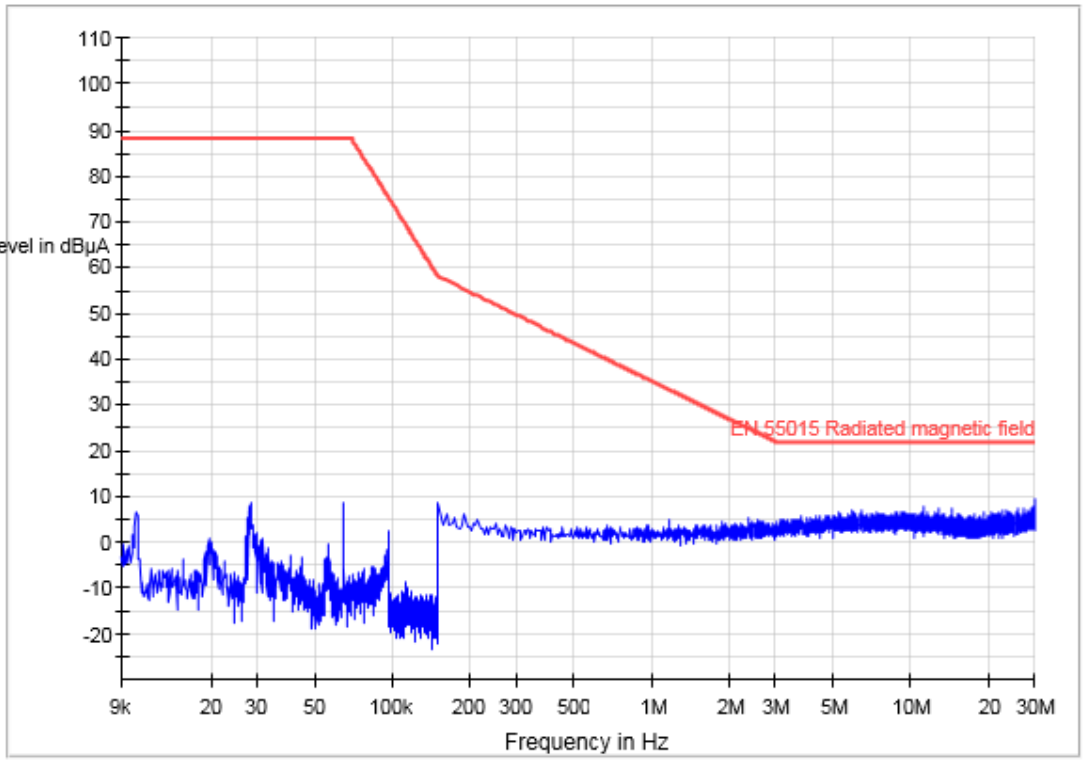
EUT Information

EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	X
Sample No.:	SHA-355279-3

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



China

9K-30MHz Radiated Emission Test

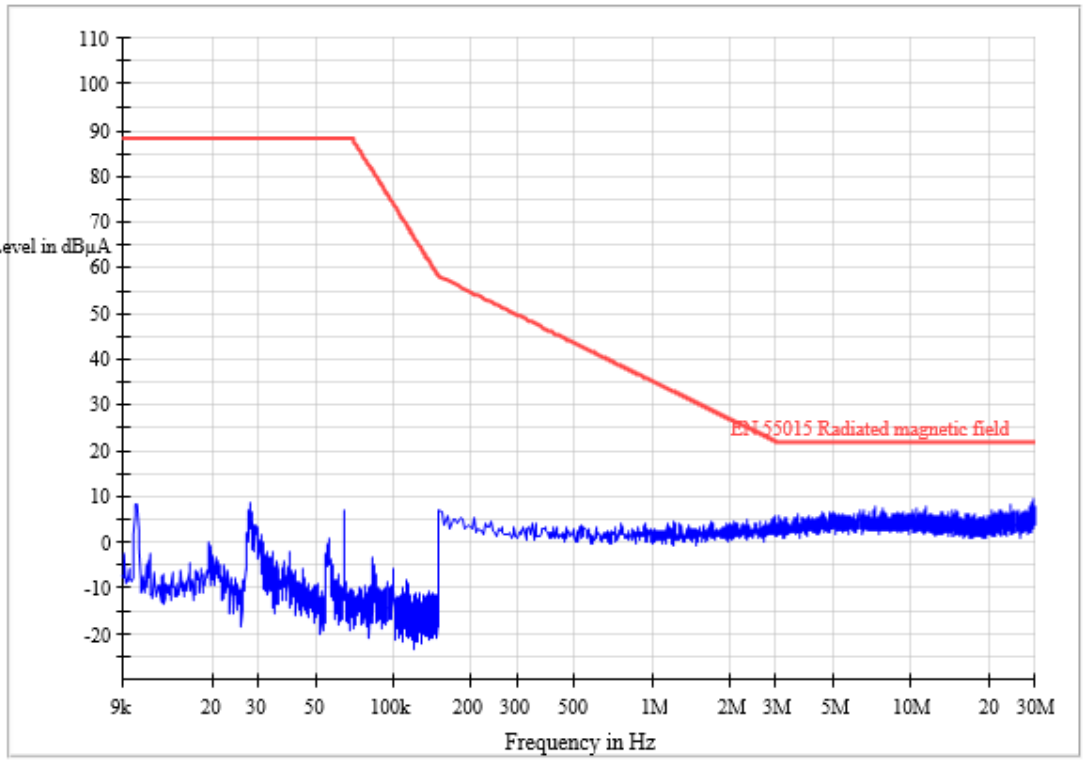
EUT Information

EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Y
Sample No.:	SHA-355279-3

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



China

9K-30MHz Radiated Emission Test

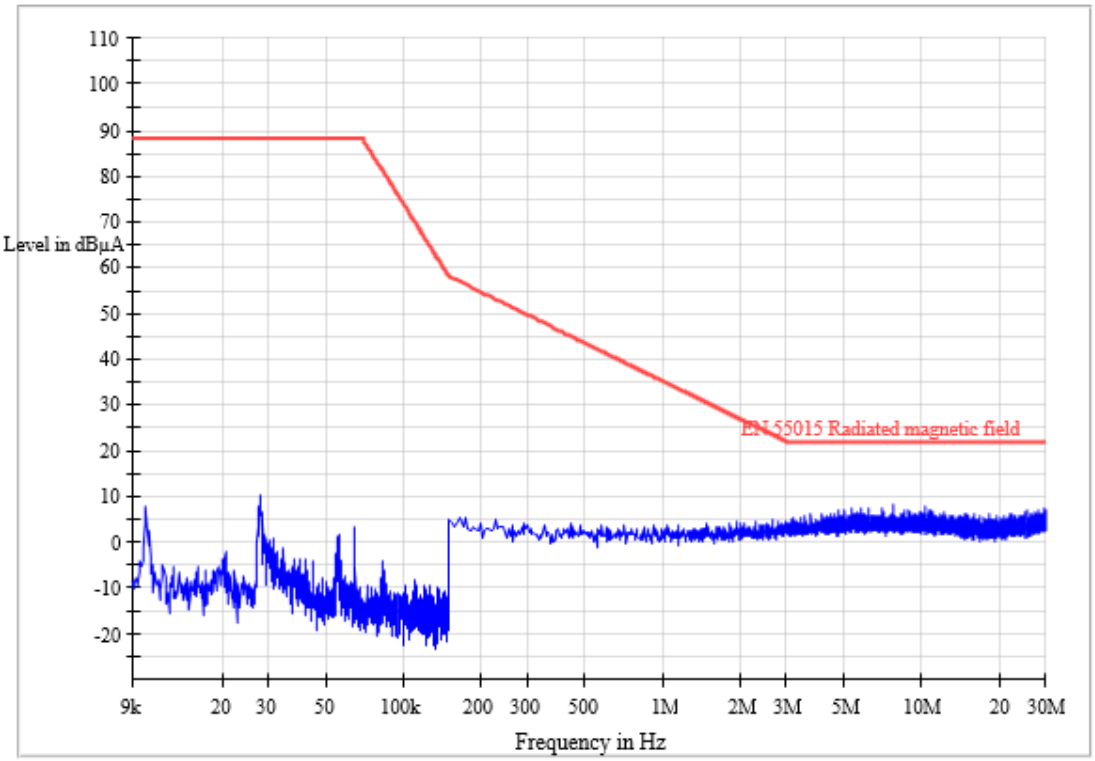
EUT Information

EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.3, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Z
Sample No.:	SHA-355279-3

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



China

9K-30MHz Radiated Emission Test

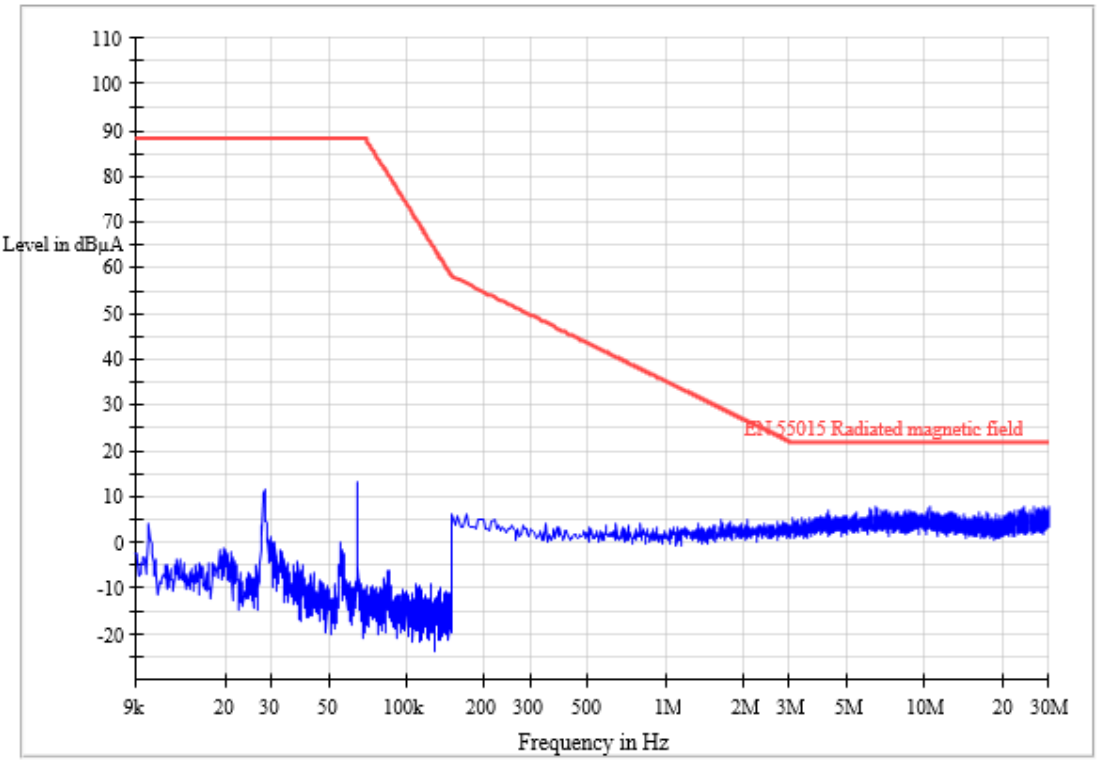
EUT Information

EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	X, maximum light output
Sample No.:	SHA-359383-1

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



China

9K-30MHz Radiated Emission Test

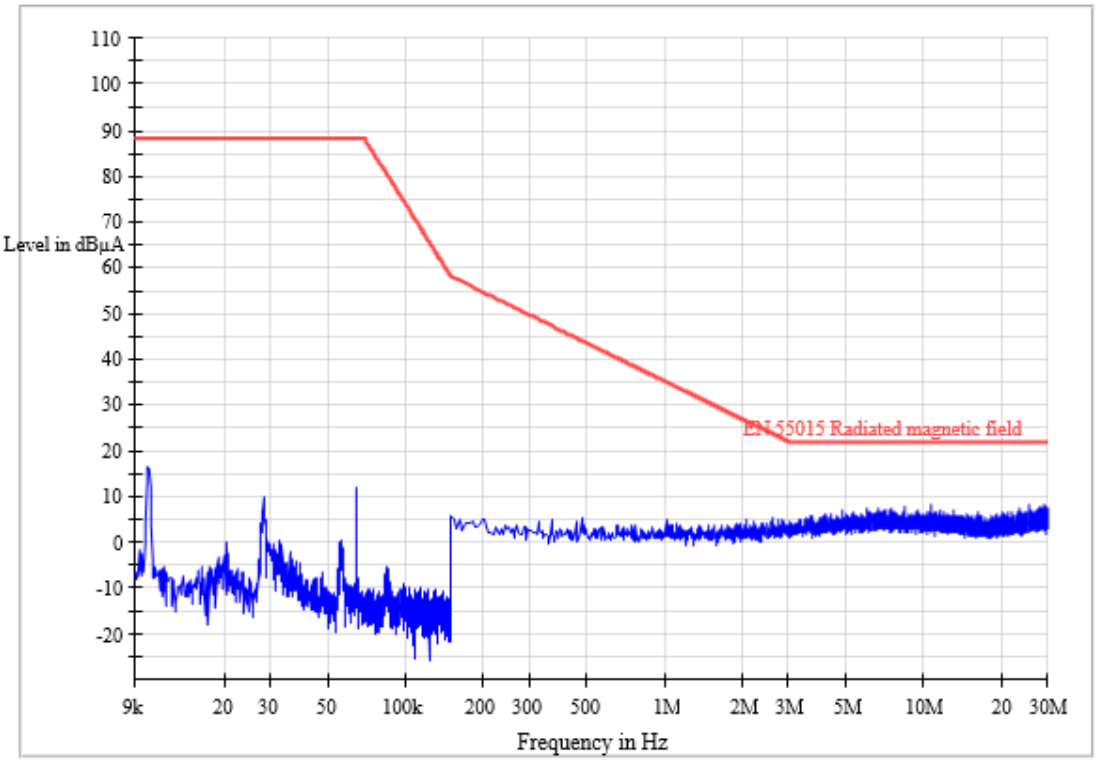
EUT Information

EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Y, maximum light output
Sample No.:	SHA-359383-1

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



China

9K-30MHz Radiated Emission Test

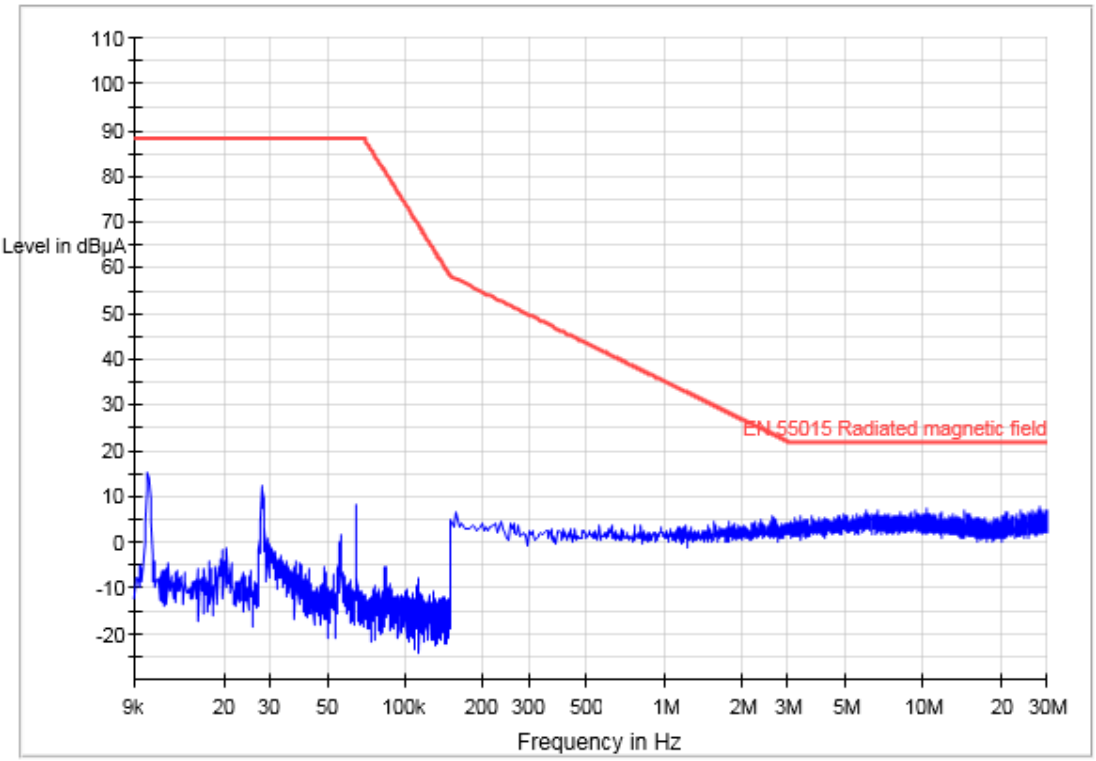
EUT Information

EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Z, maximum light output
Sample No.:	SHA-359383-1

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



China

9K-30MHz Radiated Emission Test

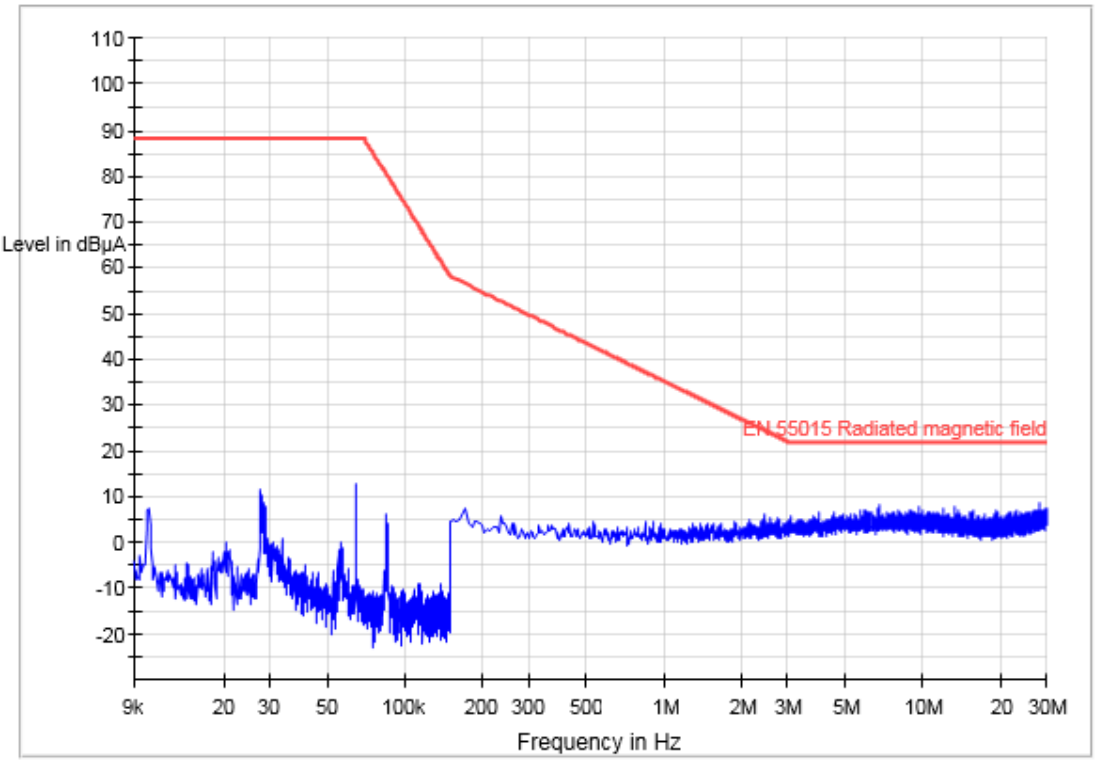
EUT Information

EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	X
Sample No.:	SHA-359383-2

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



China

9K-30MHz Radiated Emission Test

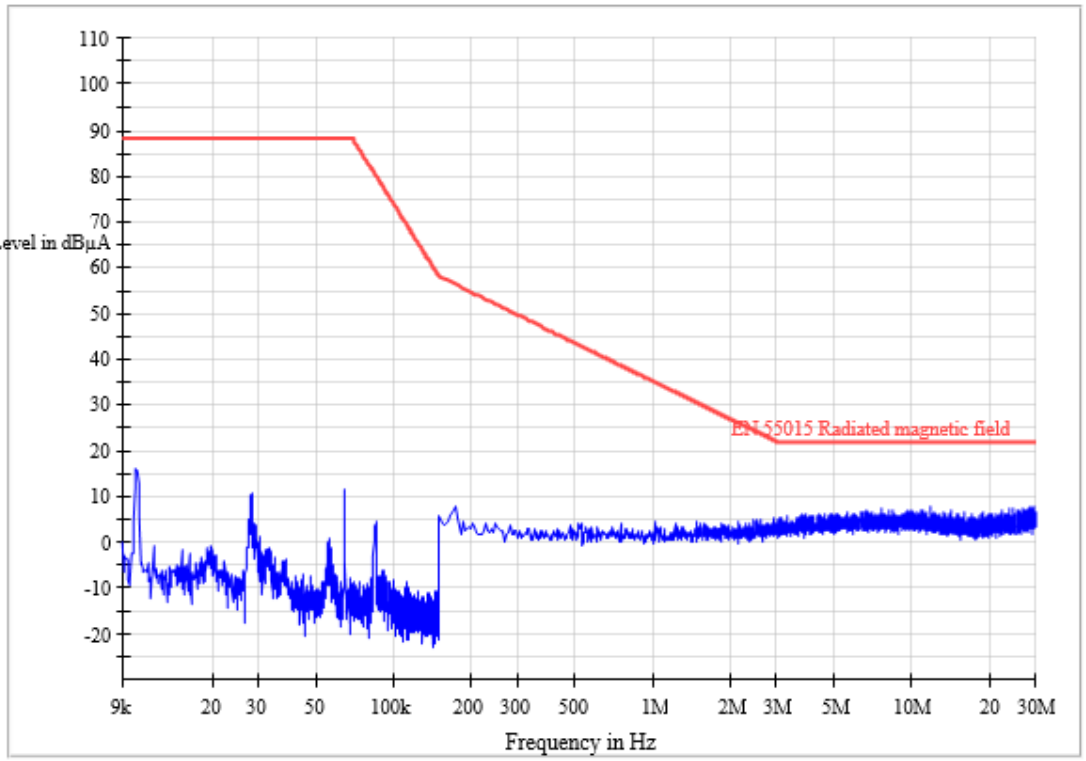
EUT Information

EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Y
Sample No.:	SHA-359383-2

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



China

9K-30MHz Radiated Emission Test

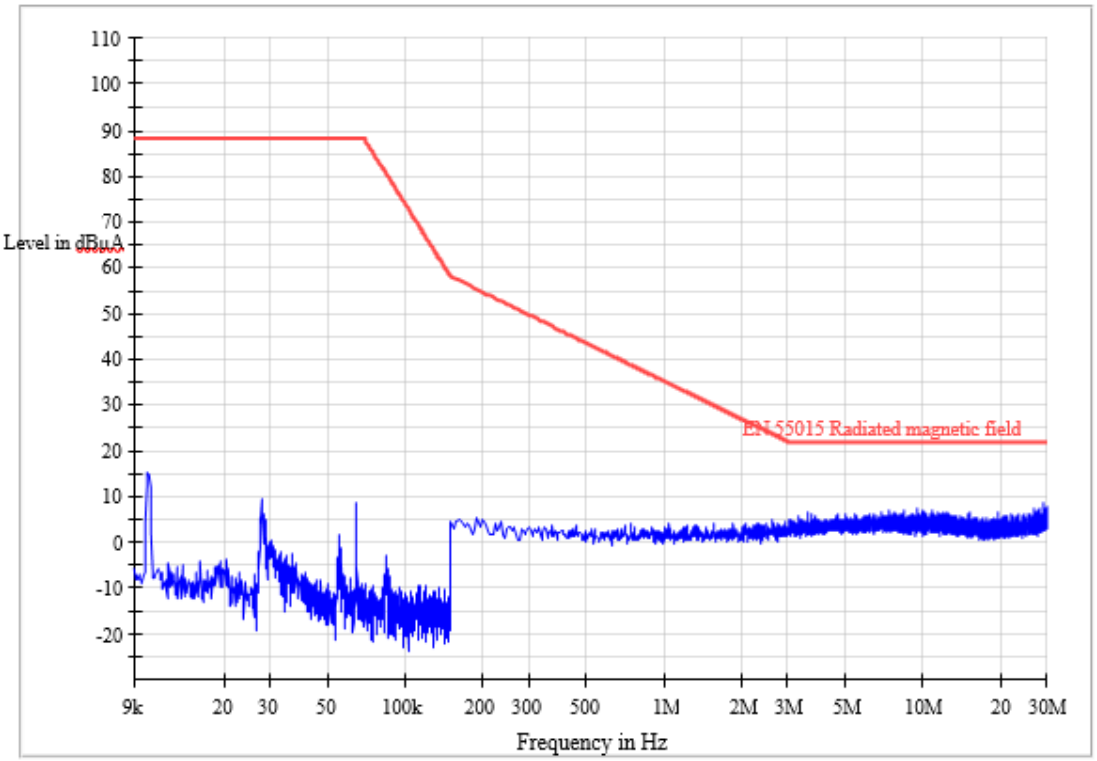
EUT Information

EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.1, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Z
Sample No.:	SHA-359383-2

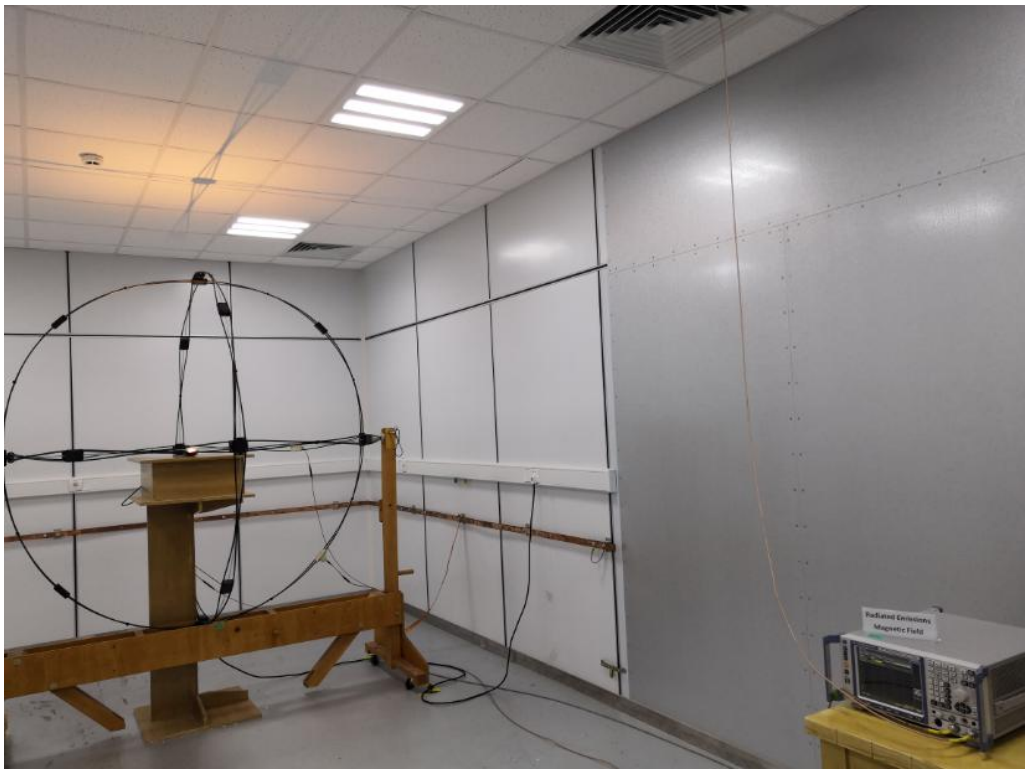
Scan Setup: TripleLoop max [EMI radiated]

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



China



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

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.3.3 Date of Test

05/24/2018~06/19/2018

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	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 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:
1.For test model SL82-LD-3S 7W: AC Powered Light on (maximum light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

Frequency Range of Test: 30 MHz to 300MHz

China

30-300MHz Radiated Emission Test

EUT Information

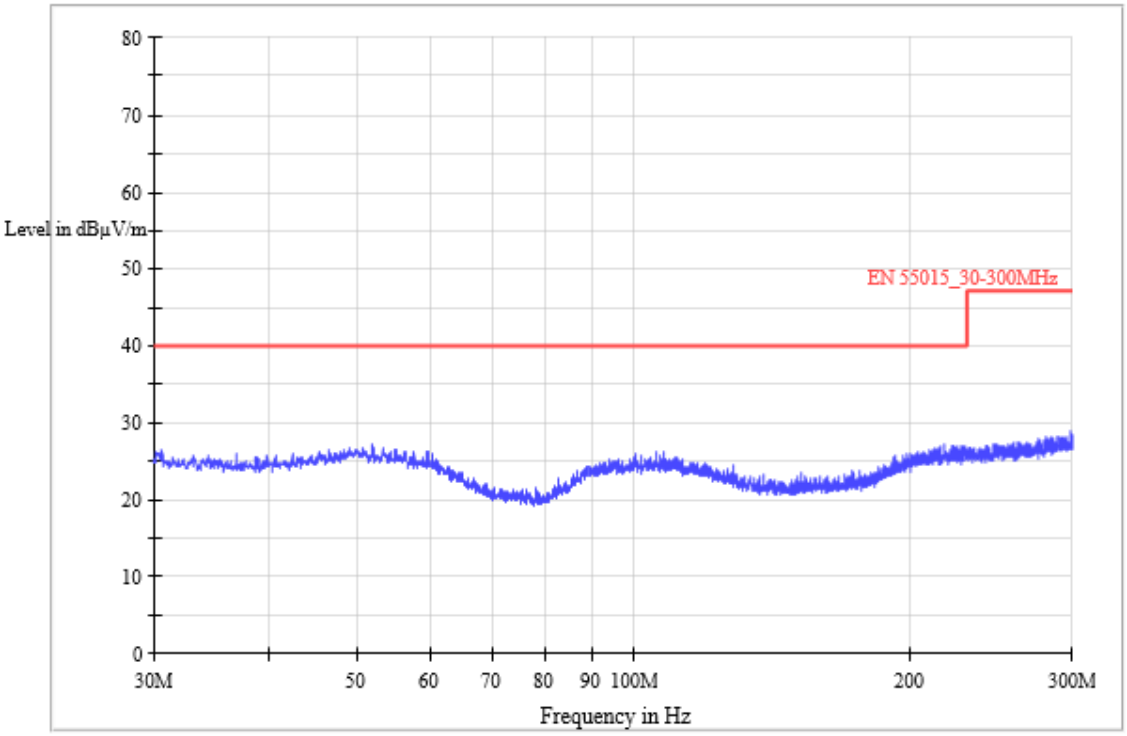
EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.9, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Horizontal
Sample No:	SHA-355279-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



China

30-300MHz Radiated Emission Test

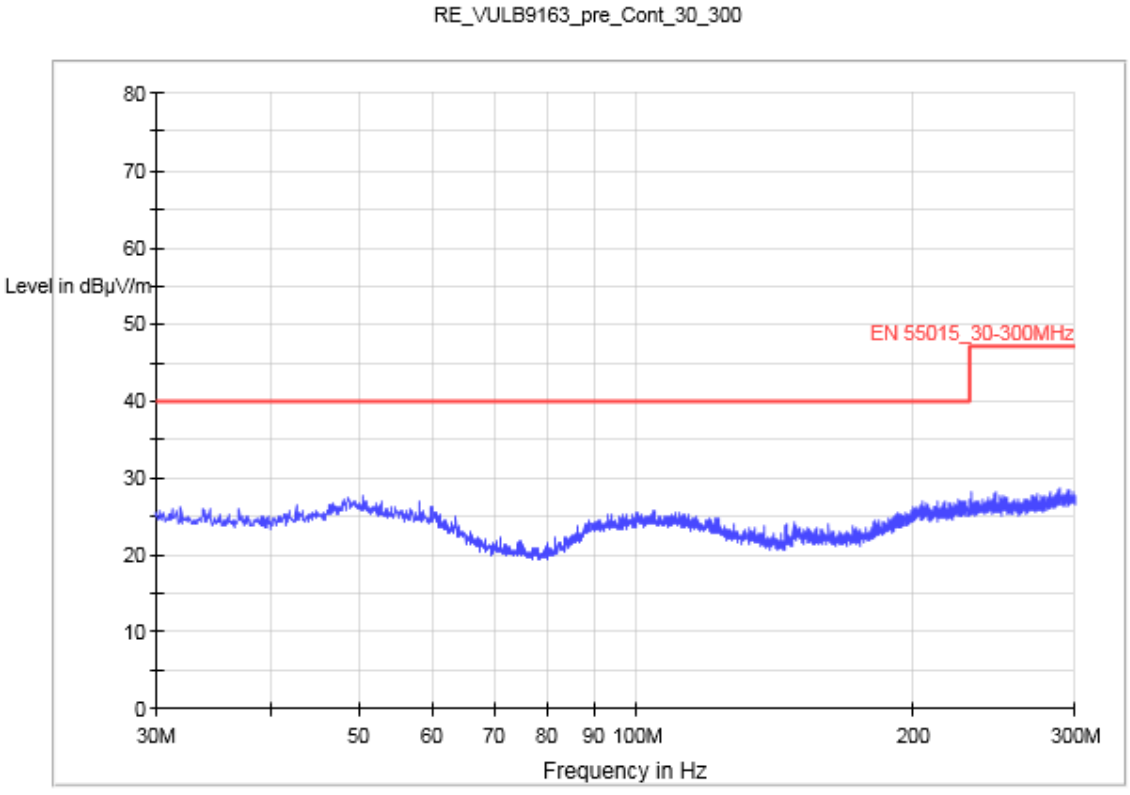
EUT Information

EUT Name:	LED Downlight
Model:	SL82 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, 230VAC/50Hz, T21.9, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Vertical
Sample No:	SHA-355279-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/m

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



China

30-300MHz Radiated Emission Test

EUT Information

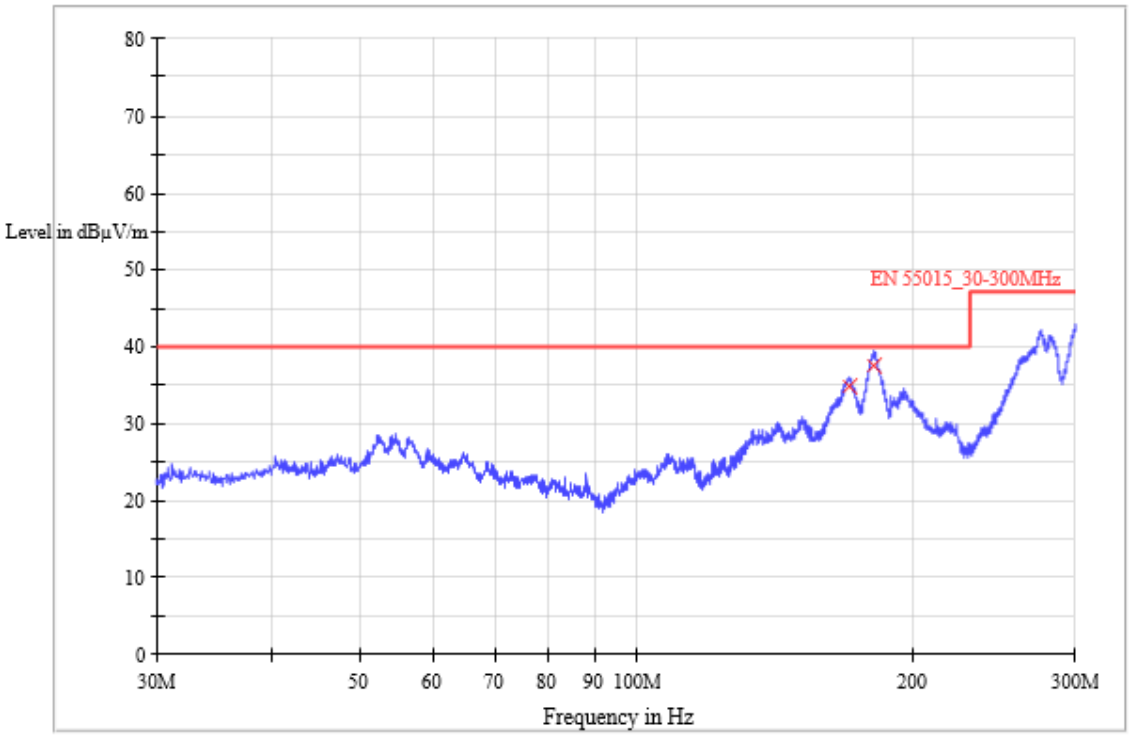
EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.9, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Horizontal
Sample No:	SHA-355279-3

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



Result Table_Single

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Comment
180.880000	37.5	1000.0	120.000	200.0	H	2.0	
170.480000	34.9	1000.0	120.000	200.0	H	359.0	

China

30-300MHz Radiated Emission Test

EUT Information

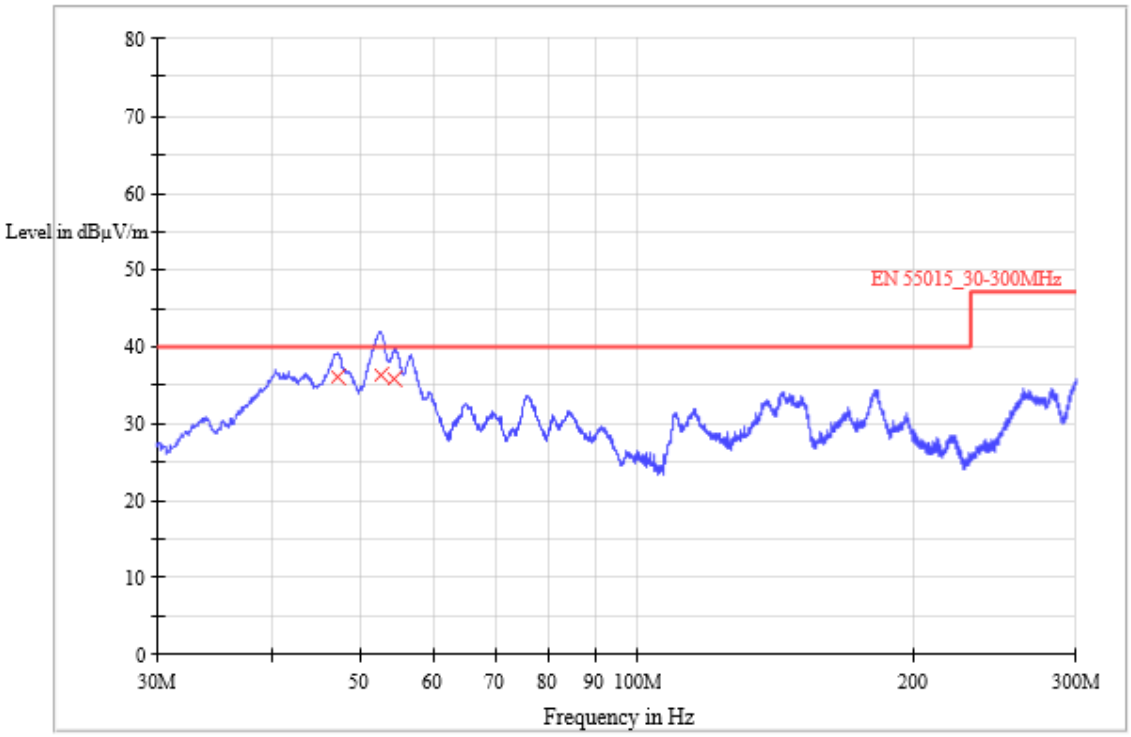
EUT Name:	LED Downlight
Model:	SL82-SD 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, 230VAC/50Hz, T21.9, H46.4%, P103.2kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Vertical
Sample No:	SHA-355279-3

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



Result Table_Single

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Comment
52.640000	36.4	1000.0	120.000	100.3	V	359.0	
54.480000	35.9	1000.0	120.000	100.3	V	0.0	
47.240000	36.0	1000.0	120.000	100.3	V	182.0	

China

30-300MHz Radiated Emission Test

EUT Information

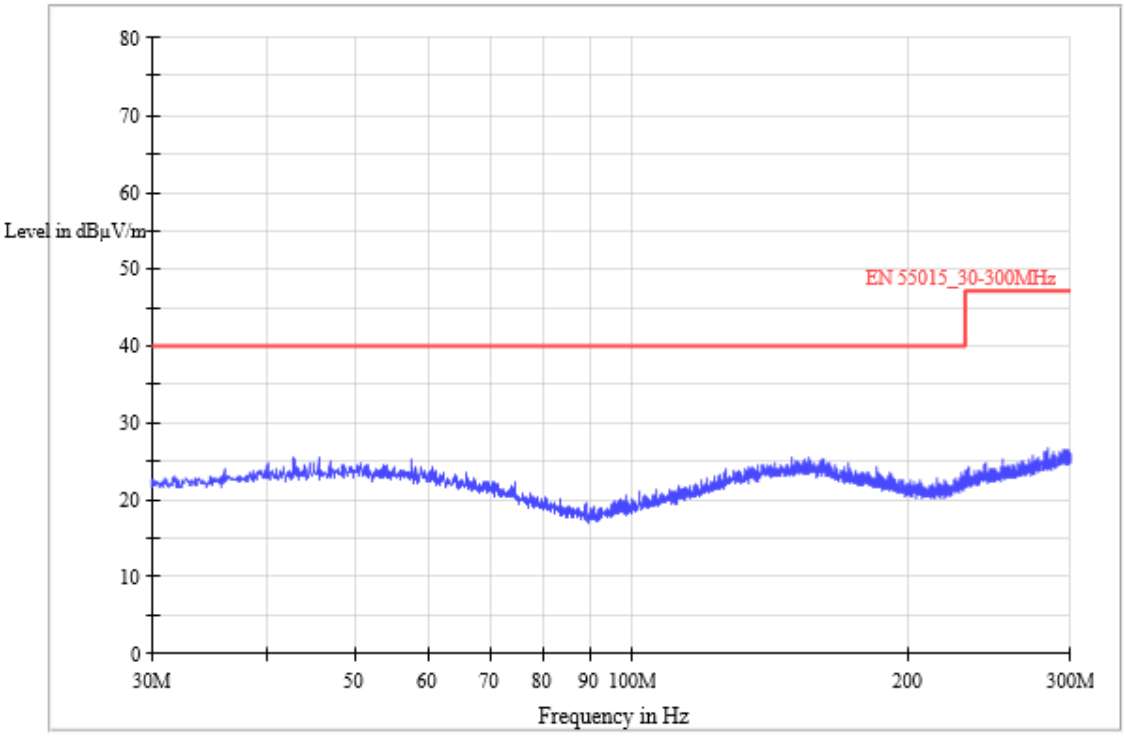
EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.9, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Horizontal, maximum light output
Sample No:	SHA-359383-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



China

30-300MHz Radiated Emission Test

EUT Information

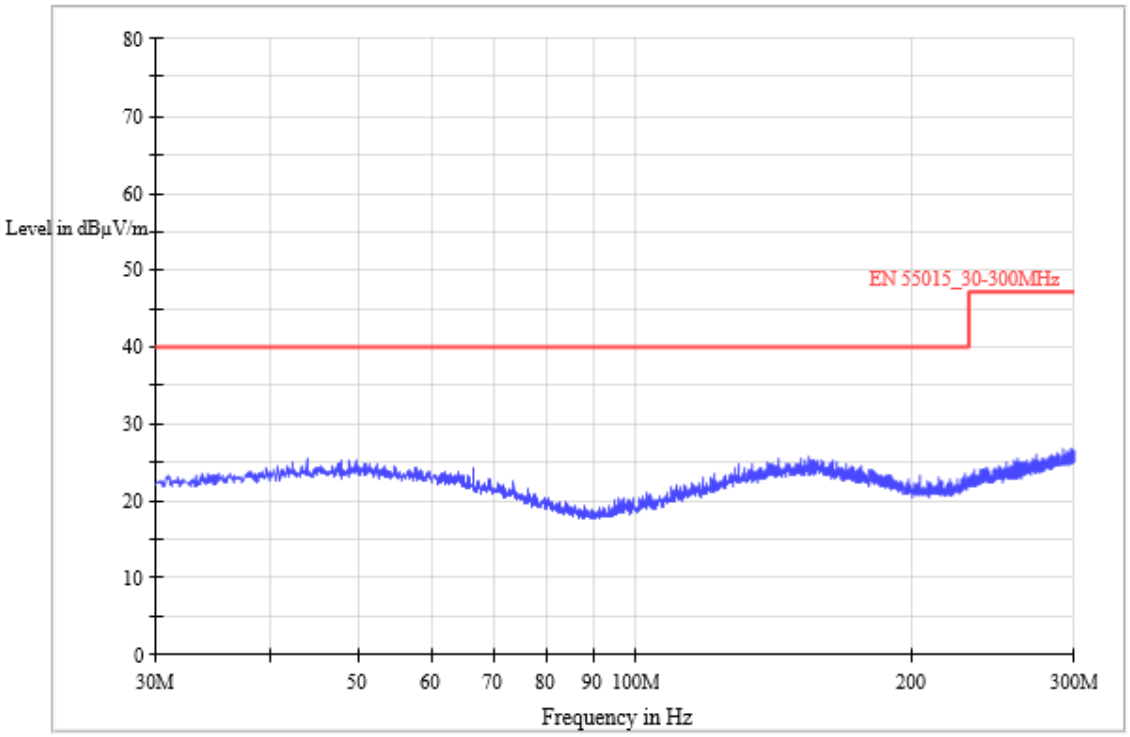
EUT Name:	LED Downlight
Model:	SL82-LD-3S 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, 230VAC/50Hz, T21.9, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Vertical, maximum light output
Sample No:	SHA-359383-1

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



China

30-300MHz Radiated Emission Test

EUT Information

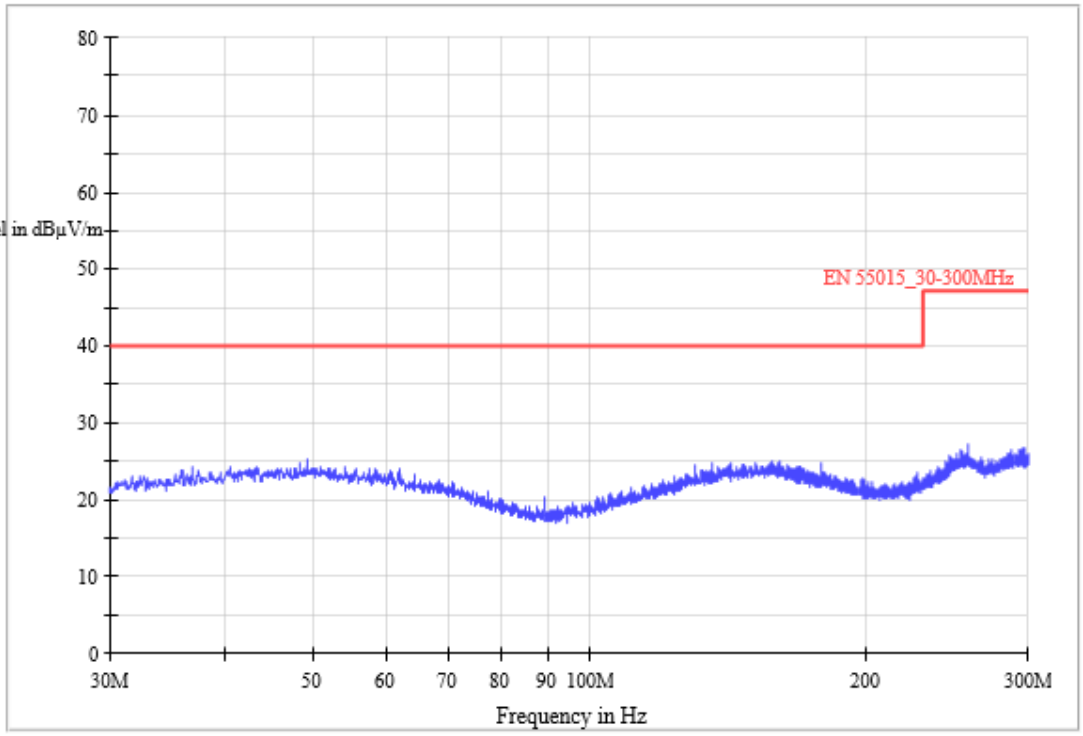
EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, AC 230V/50Hz, T21.9, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Horizontal
Sample No:	SHA-359383-2

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/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



China

30-300MHz Radiated Emission Test

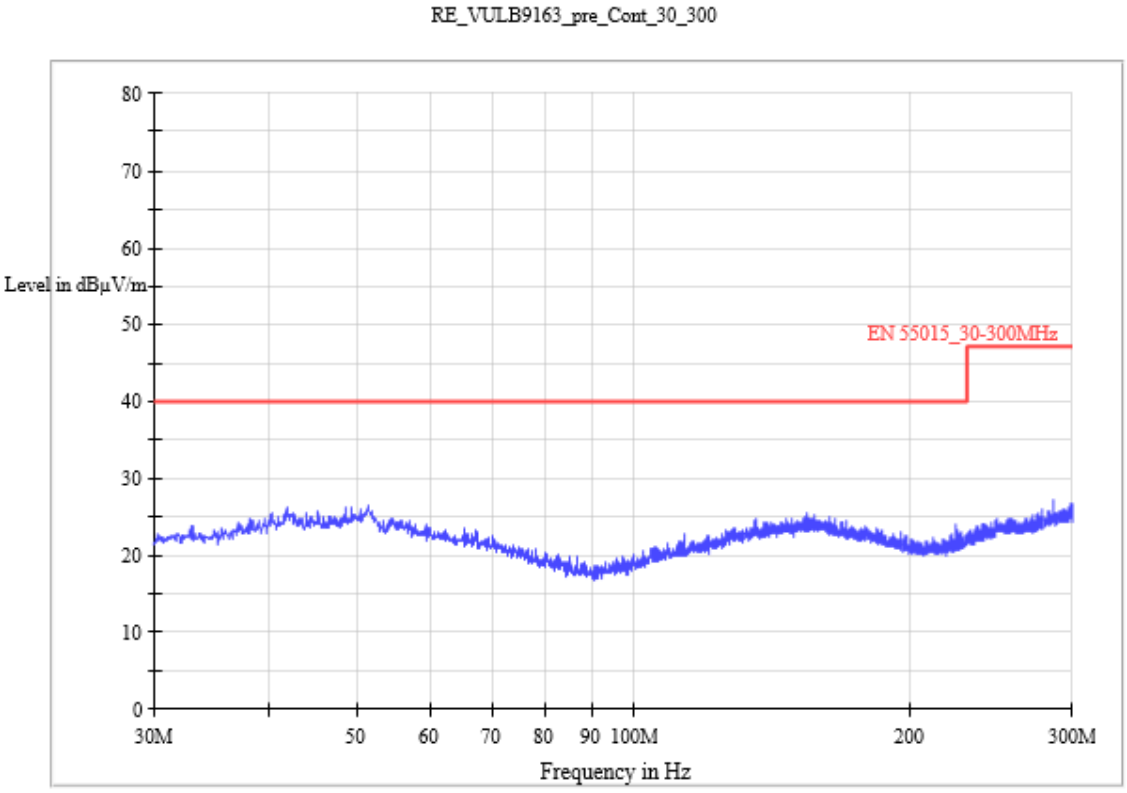
EUT Information

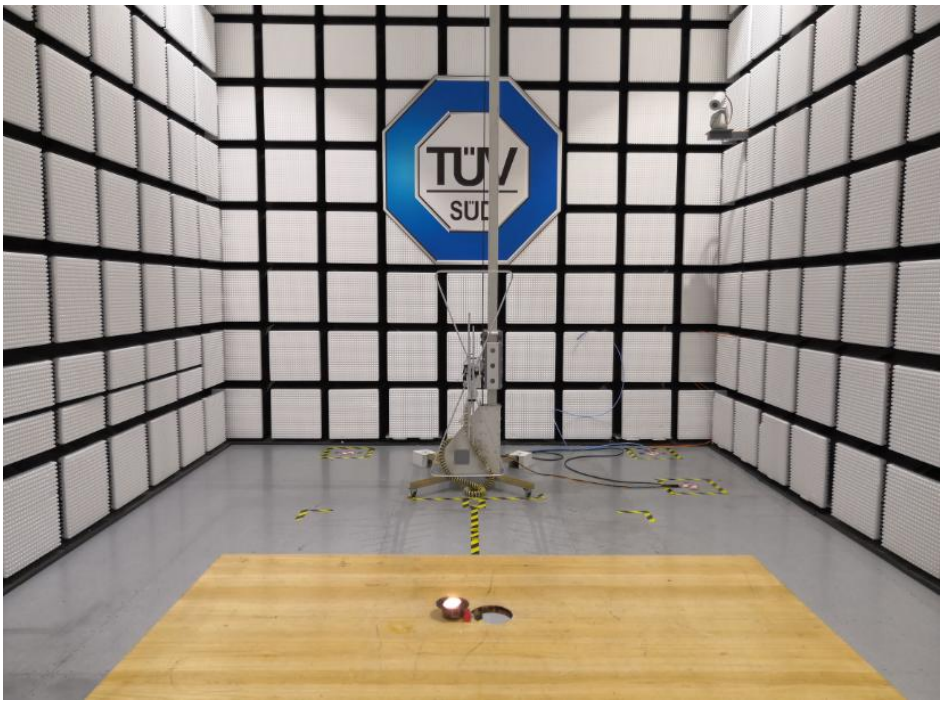
EUT Name:	LED Downlight
Model:	SL90 7W
Manufacturer:	SHANGHAI HAIFENG ELECTRICAL LIGHTING CO., LTD
Op Cond:	Light on, 230VAC/50Hz, T21.9, H46.4%, P103.3kPa
Operator:	Huali CHENG
Test Spec:	EN 55015
Comment:	Vertical
Sample No:	SHA-359383-2

Sweep Setup: RE_VULB9163_pre_Cont_30_300 [EMI radiated]

Hardware Setup:	RE_VULB9163
Receiver:	[ESR 3]
Level Unit:	dBµV/m

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





Test Setup

2.3.8 Test Location

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

2.4 Electrostatic discharge immunity test

2.4.1 Specification Reference

EN 61547:2009, Clause 5.2

2.4.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.4.3 Date of Test

06/06/2018~06/19/2018

2.4.4 Test Method

The equipment under test including associated cabling was configured on but insulted 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.

2.4.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.4.6 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

2.4.7 Test Results

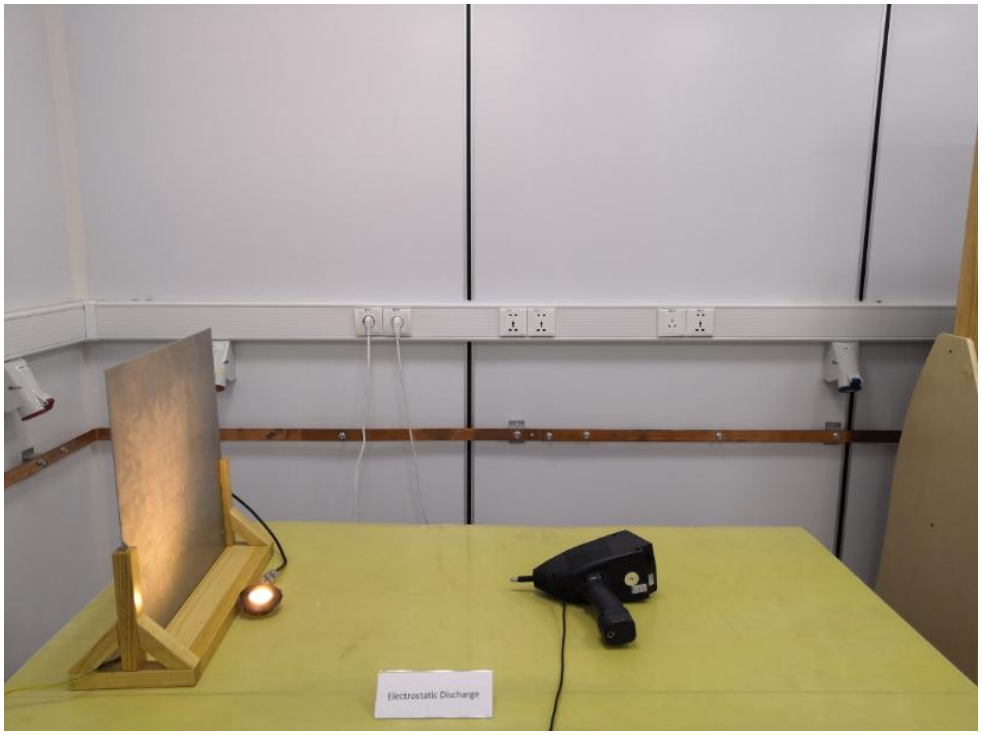
Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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	Glass shell	Air	✓	✓	✓	✓			✓	✓		
D	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

2.4.8 Test Location

This test was carried out in shielded room Z118.

2.5 Radiated, radio-frequency, electromagnetic field immunity test

2.5.1 Specification Reference

EN 61547:2009, Clause 5.3

2.5.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.5.3 Date of Test

06/06/2018~06/19/2018

2.5.4 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.

2.5.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.5.6 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					

2.5.7 Test Results

Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

Tabulated 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

2.5.8 Test Location

This test was carried out in 3m anechoic chamber.

2.6 Electrical fast transient /burst immunity test

2.6.1 Specification Reference

EN 61547:2009, Clause 5.5

2.6.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.6.3 Date of Test

06/06/2018~06/19/2018

2.6.4 Test Method

The equipment under test including associated cabling was configured on but insulted 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.

2.6.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.6.6 Specification Limits

Required Test Levels at input and output a.c. power port					
Line Under Test	Level (kV)	Repetition Rate (kHz)	Test Duration	Coupling Method	Performance Criteria
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.					

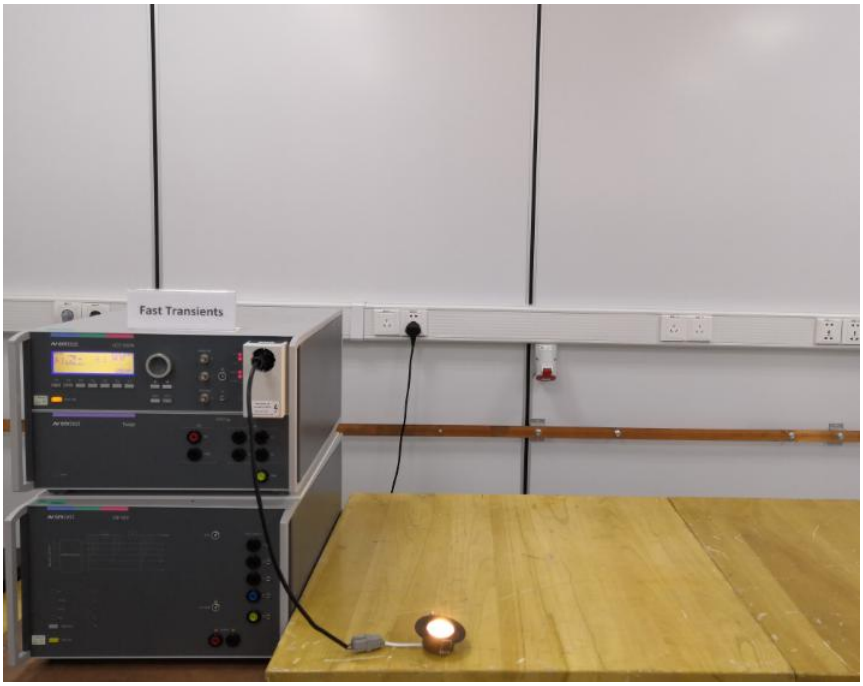
2.6.7 Test Results

Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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 (V/m)	Repetition Rate	Test Duration	Coupling Method	Result
power line	± 1.0 kV	5 kHz	2 min	CDN	Pass PC A
Remark:					



Test Setup

2.6.8 Test Location

This test was carried out in shielded room Z118.

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

2.7.1 Specification Reference

EN 61547:2009, Clause 5.6

2.7.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.7.3 Date of Test

05/24/2018~06/19/2018

2.7.4 Test Method

The equipment under test was configured, on but insulted 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.

All associated cabling was configured, on but insulted 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.

2.7.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.7.6 Specification Limits

Required Test Levels at input and output a.c. power ports						Performance Criteria
Line Under Test	Frequency Range (MHz)	Level (V/m)	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.						

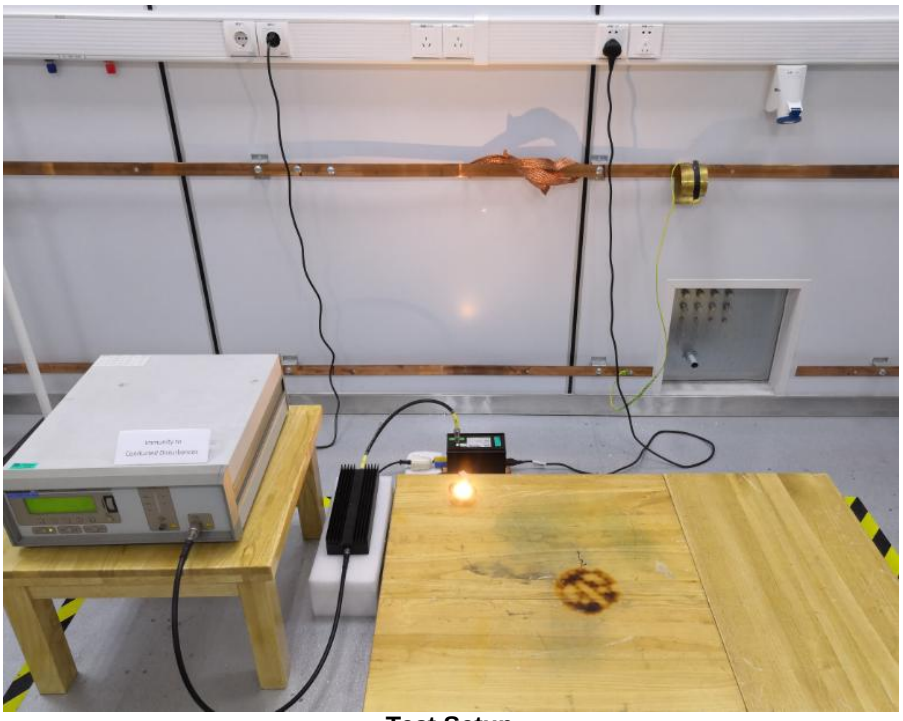
2.7.7 Test Results

Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

Tabulated 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

2.7.8 Test Location

This test was carried out in shielded room Z118.

China

2.8 Surge immunity test

2.8.1 Specification Reference

EN 61547:2009, Clause 5.7

2.8.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.8.3 Date of Test

05/24/2018~06/19/2018

2.8.4 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.

2.8.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.8.6 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.				

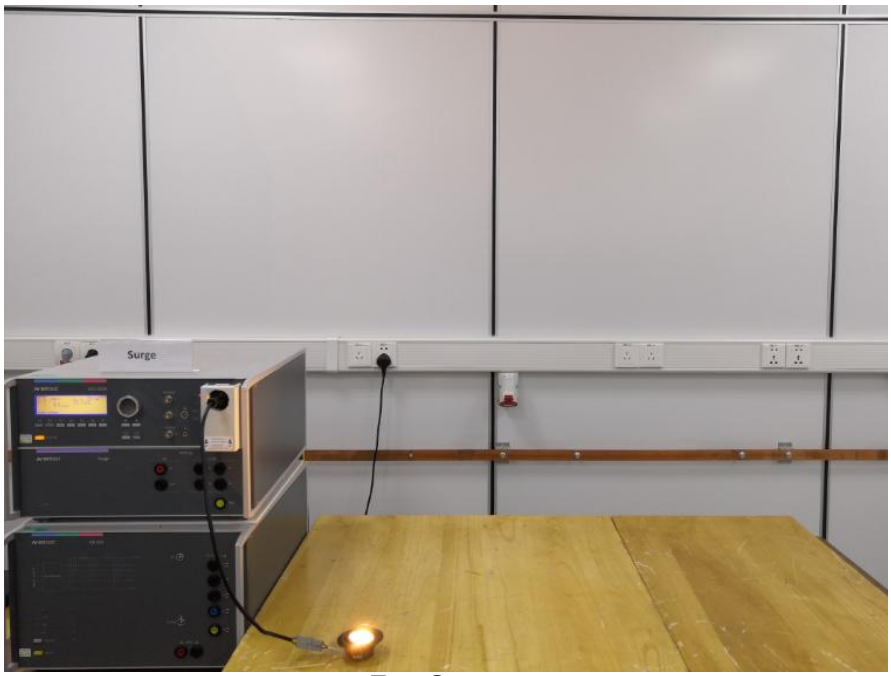
2.8.7 Test Results

Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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	-0.5kV	NEGATIVE	270 deg	5	60 sec	Pass PC A
power line	Live to Neutral	+0.5kV	POSITIVE	90 deg	5	60 sec	Pass PC A
Remark:							



Test Setup

2.8.8 Test Location

This test was carried out in shielded room Z118.

2.9 Voltage dips, short interruptions and voltage variations immunity test

2.9.1 Specification Reference

EN 61547:2009, Clause 5.8

2.9.2 Equipment Under Test

SL82 7W, SL82-SD 7W, SL82-LD-3S 7W, SL90 7W

2.9.3 Date of Test

05/24/2018~06/19/2018

2.9.4 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.

2.9.5 Environmental Conditions

Ambient Temperature	20~25°C
Relative Humidity	30~60%
Atmospheric Pressure	1000~1040 mbar

2.9.6 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.			

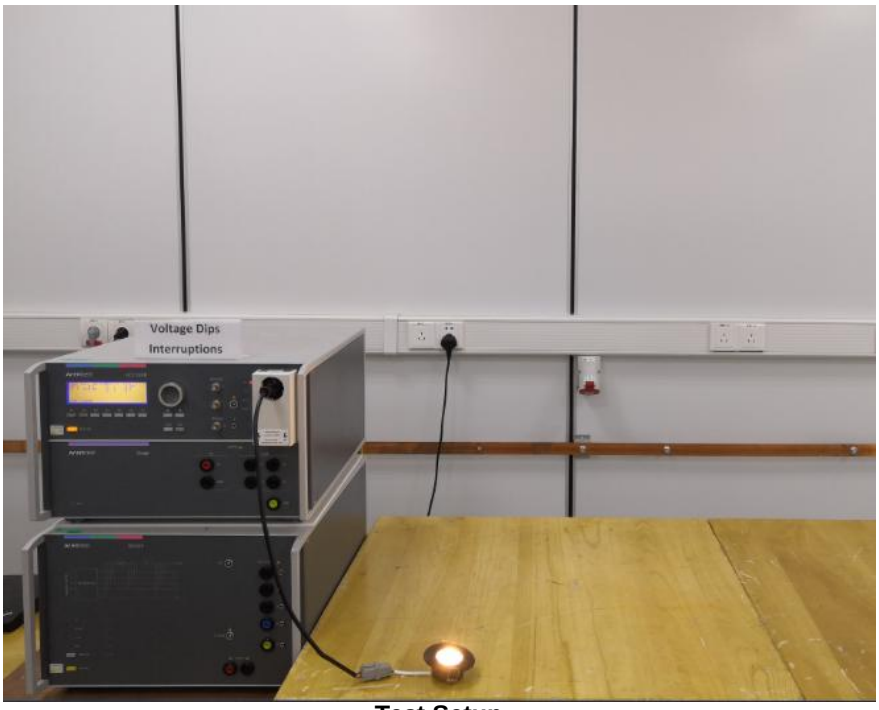
2.9.7 Test Results

Results for Configuration and Mode:
1.For test model SL82-LD-3S 7W: AC Powered Light on (middle light output).
2.For other models: AC Powered Light on.

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

Detailed results are shown below.

Tested 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 A & B (Remark 1)
power line	230 Vac	50 Hz	70% of Vnom	10 cycles (50Hz)	Pass PC A & B (Remark 1. 2)
Remark: 1.For model SL82-SD 7W: During the test of voltage dips to 70% of Vnom and interruption, the EUT flashing, once removing the disturbance, the EUT restores to its normal status automatically immediately. 2. For model SL82-LD-3S 7W: During the test of voltage dips to 70% of Vnom, the EUT flashing, once removing the disturbance, the EUT restores to its normal status automatically immediately.					



Test Setup

2.9.8 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	2017.7.14	2018.7.13
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
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	---	---	---	---

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
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
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
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

China

4 Measurement Uncertainty

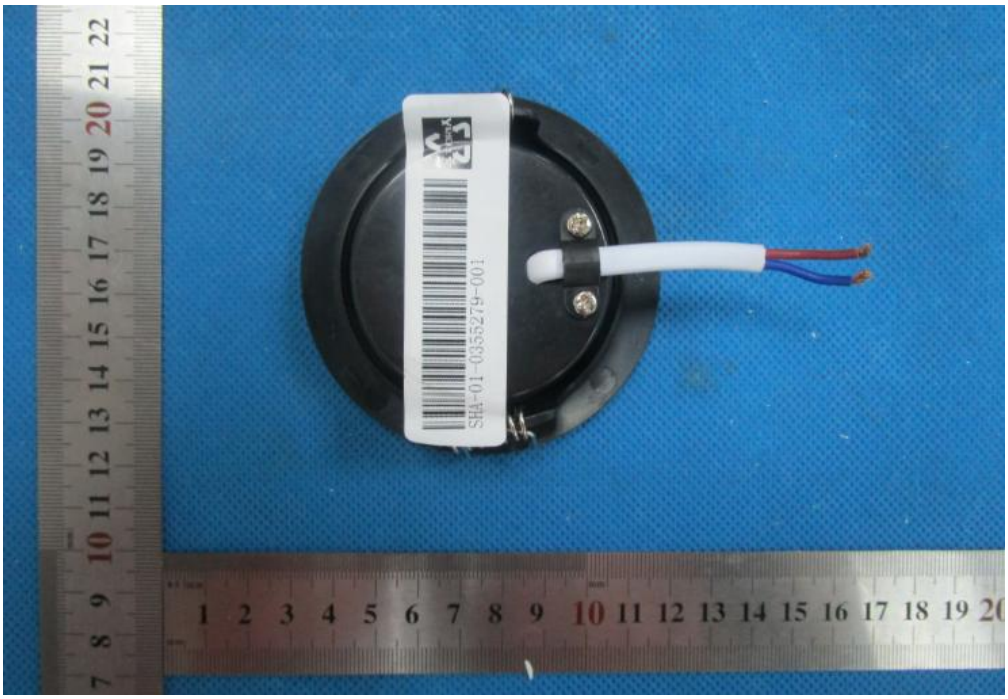
For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	9kHz to 150kHz, ±3.56dB
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, ±2.73dB
Radiated Disturbance (9kHz to 30MHz)	9kHz to 30MHz, ±3.21dB
Radiated Disturbance (30MHz to 300MHz)	30MHz to 1GHz, ±5.03dB (Horizontal) ±5.11dB (Vertical)
Electrostatic discharge immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-3
Electrical fast transient /burst immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4
Immunity to conducted disturbances, induced by radio-frequency fields	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-6
Radiated, radio-frequency, electromagnetic field immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-3
Surge immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5
Voltage dips, short interruptions and voltage variations immunity tests	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11

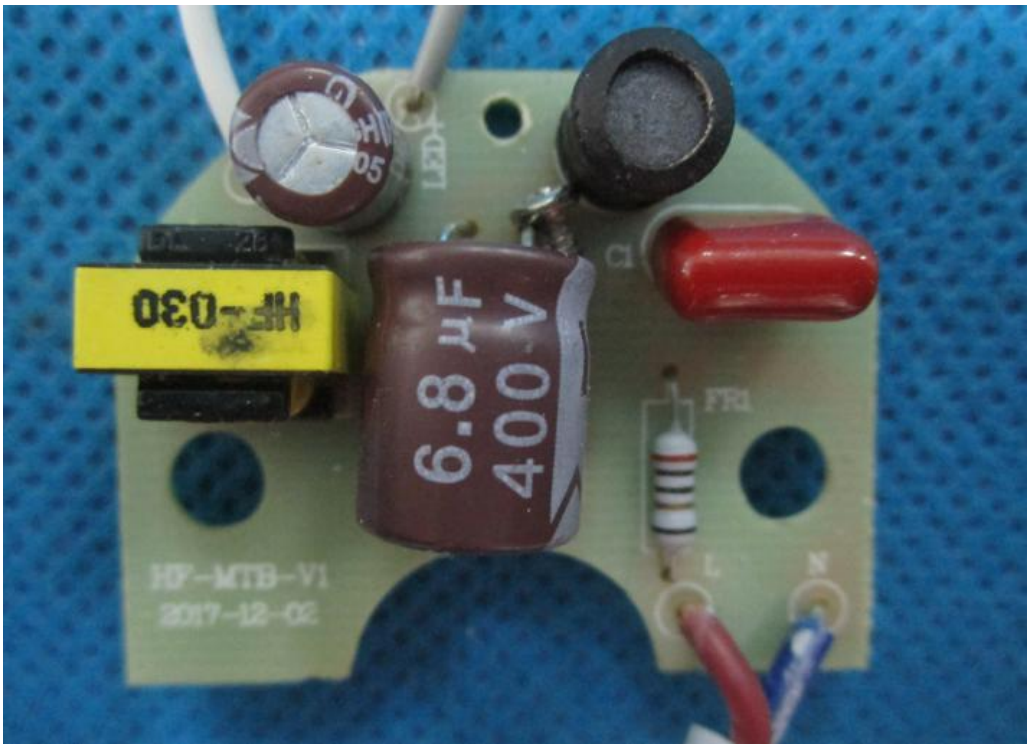
China

5 Photographs

SL82 7W



China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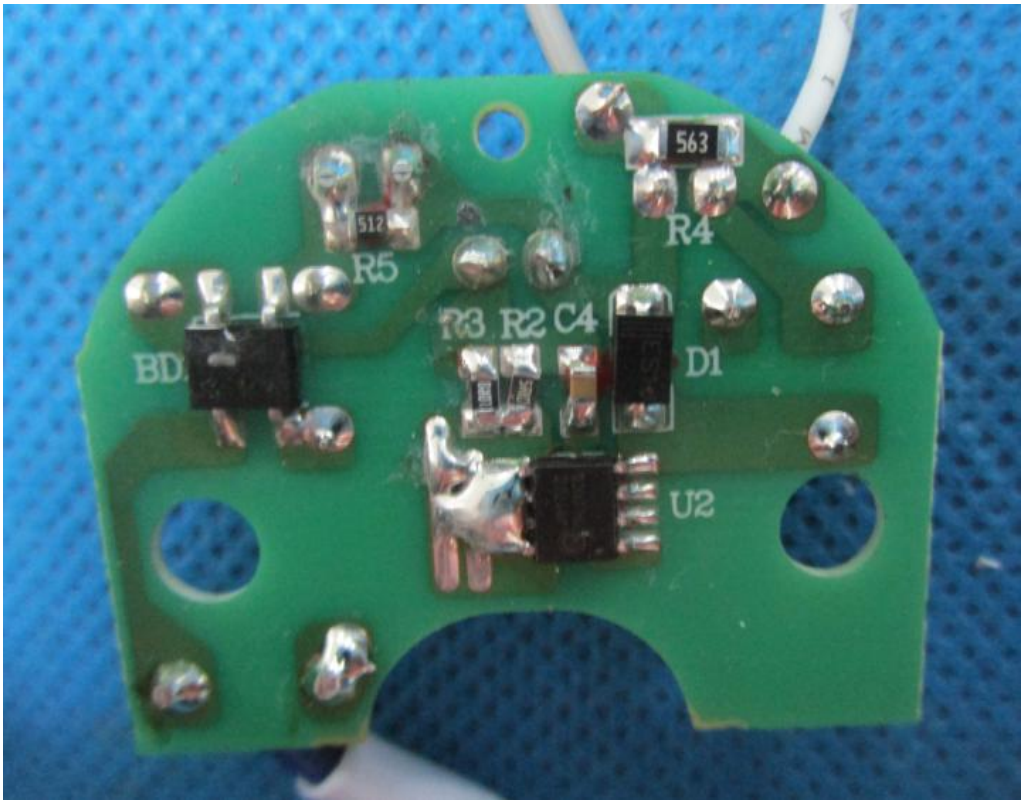
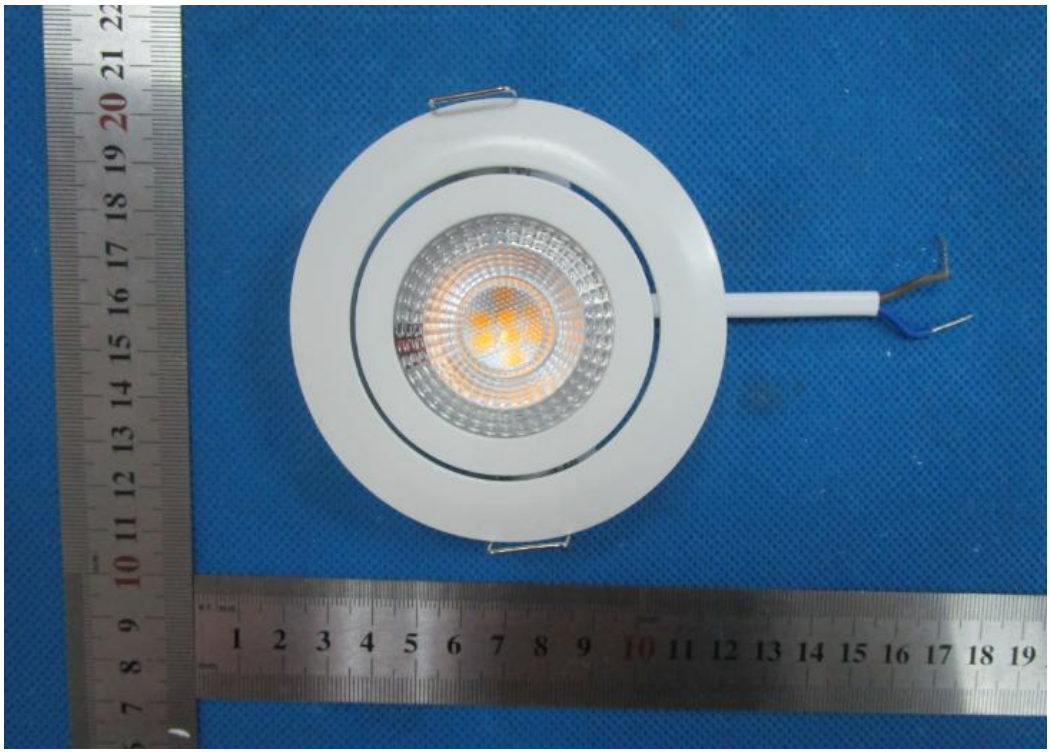
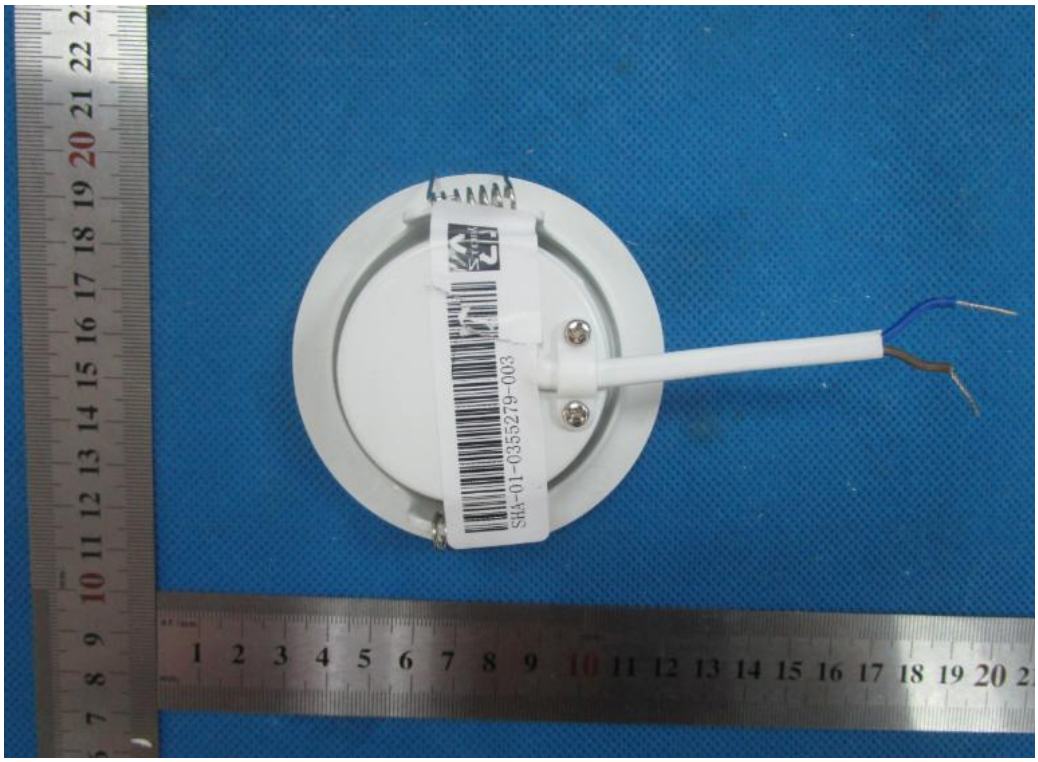
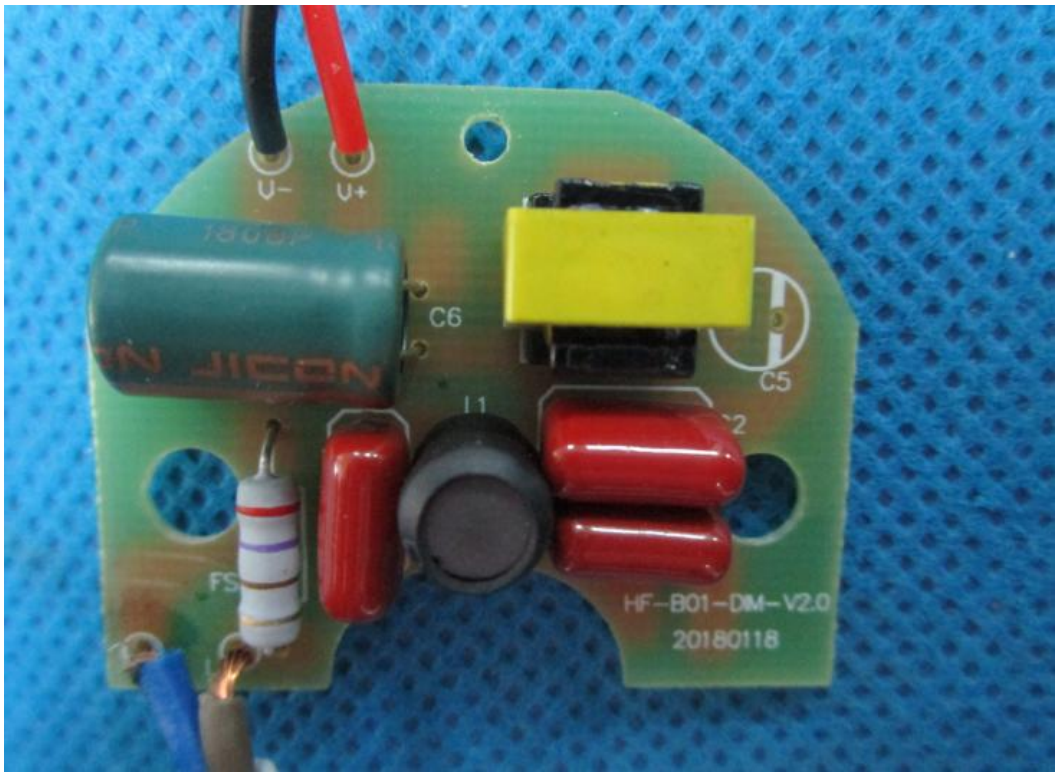
400 V
HF-030
HF-MTB-V1
2017-12-02
L
N

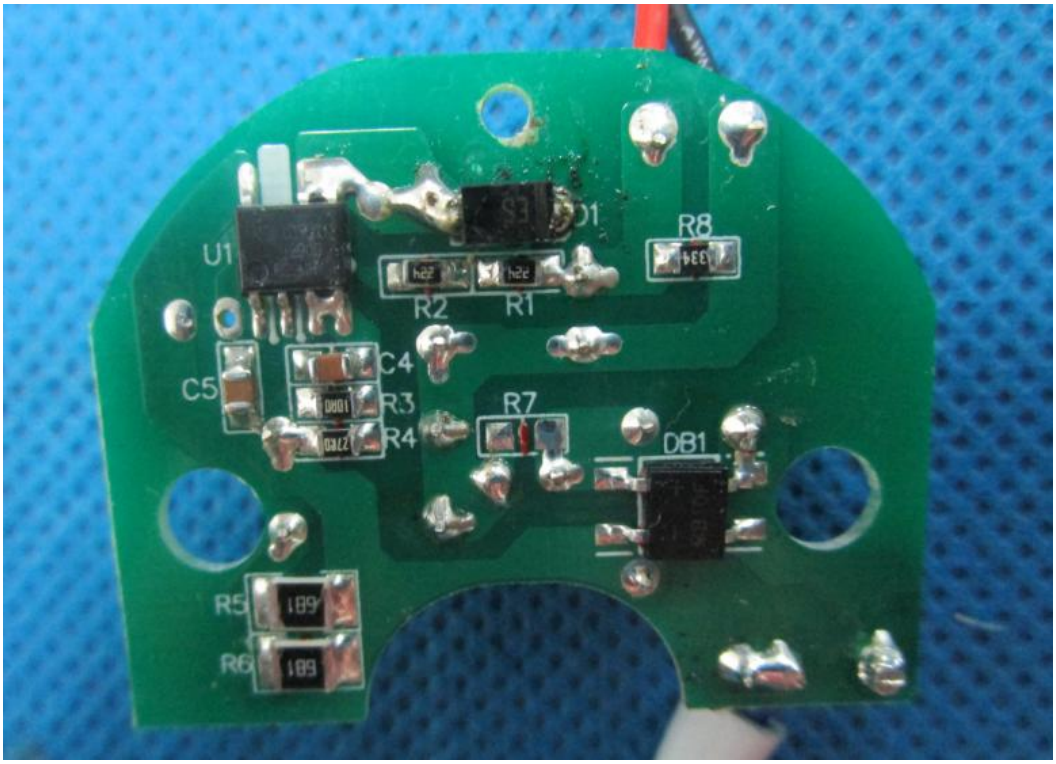

563
R4
512
R5
R3
R2
C4
D1
U2

SL82-SD 7W

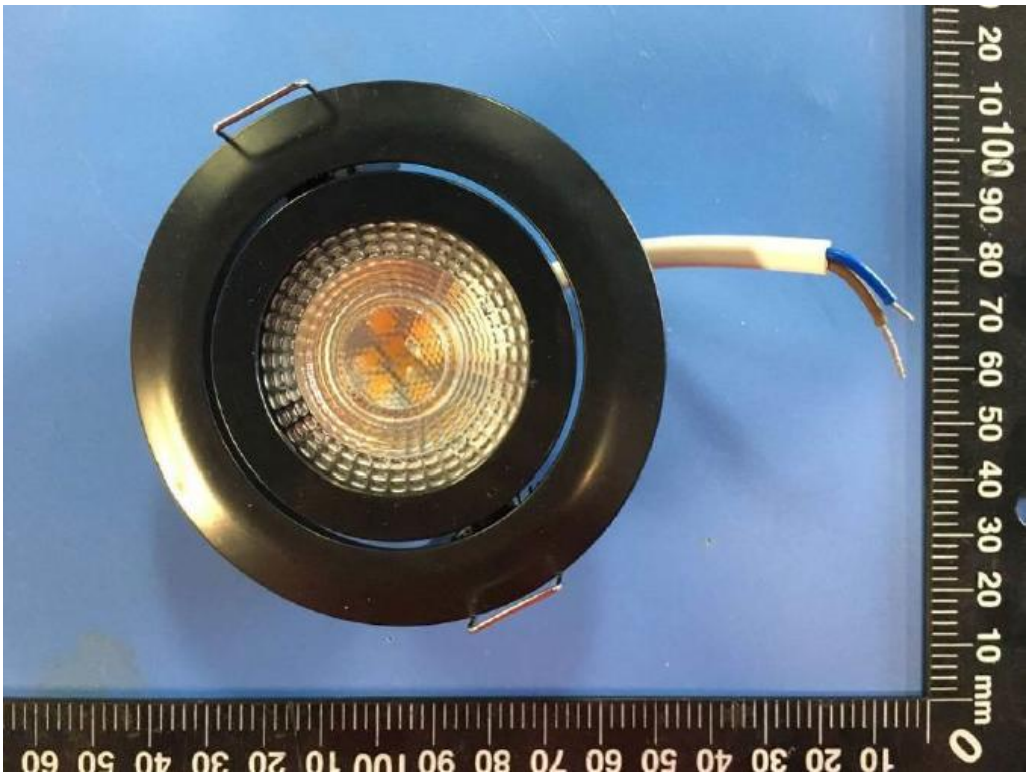


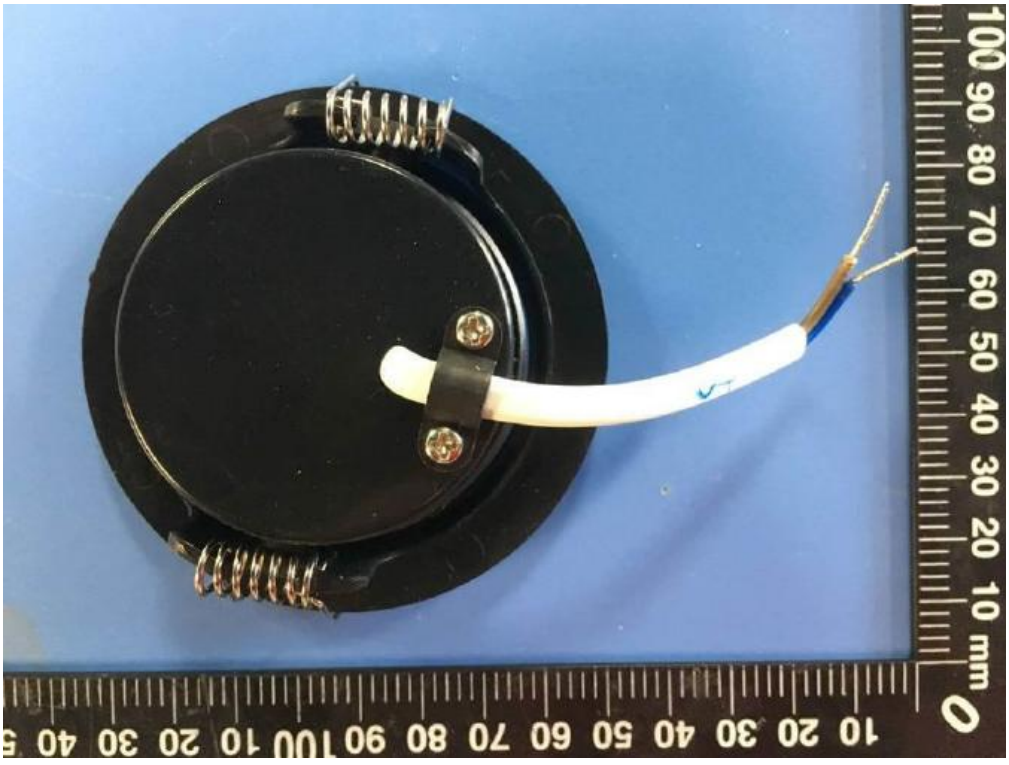



U-
U+
C6
C5
L1
FS
HF-B01-DM-V2.0
20180118


U1
D1
R8
R2
R1
C4
C5
R3
R4
R7
DB1
R5
R6

SL82-LD-3S 7W





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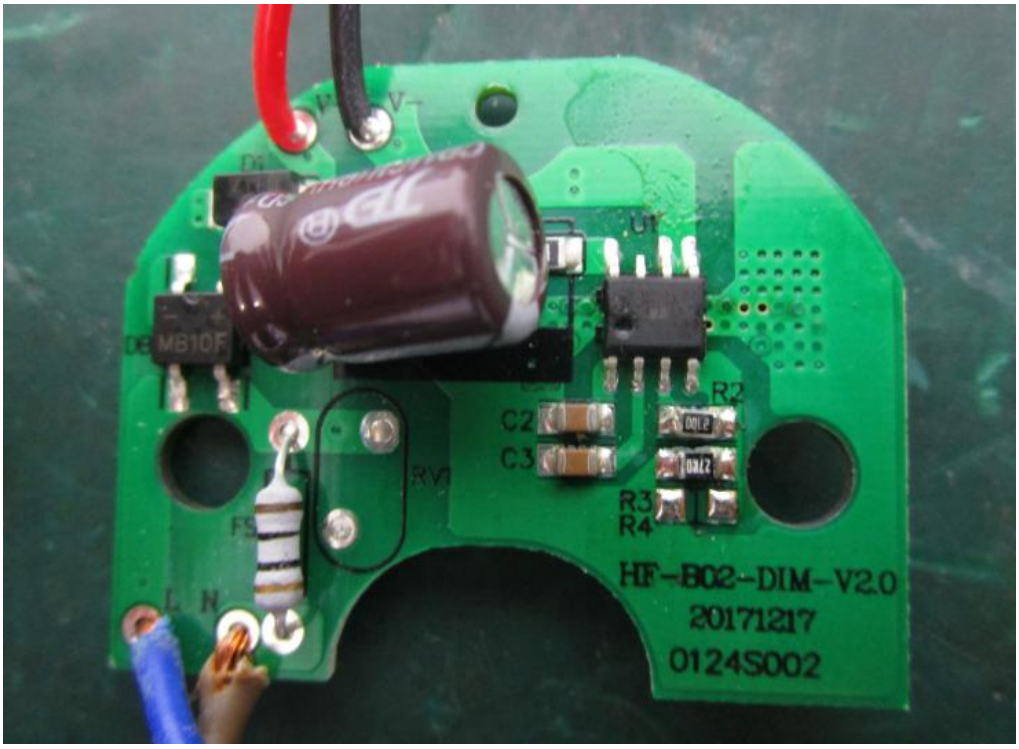
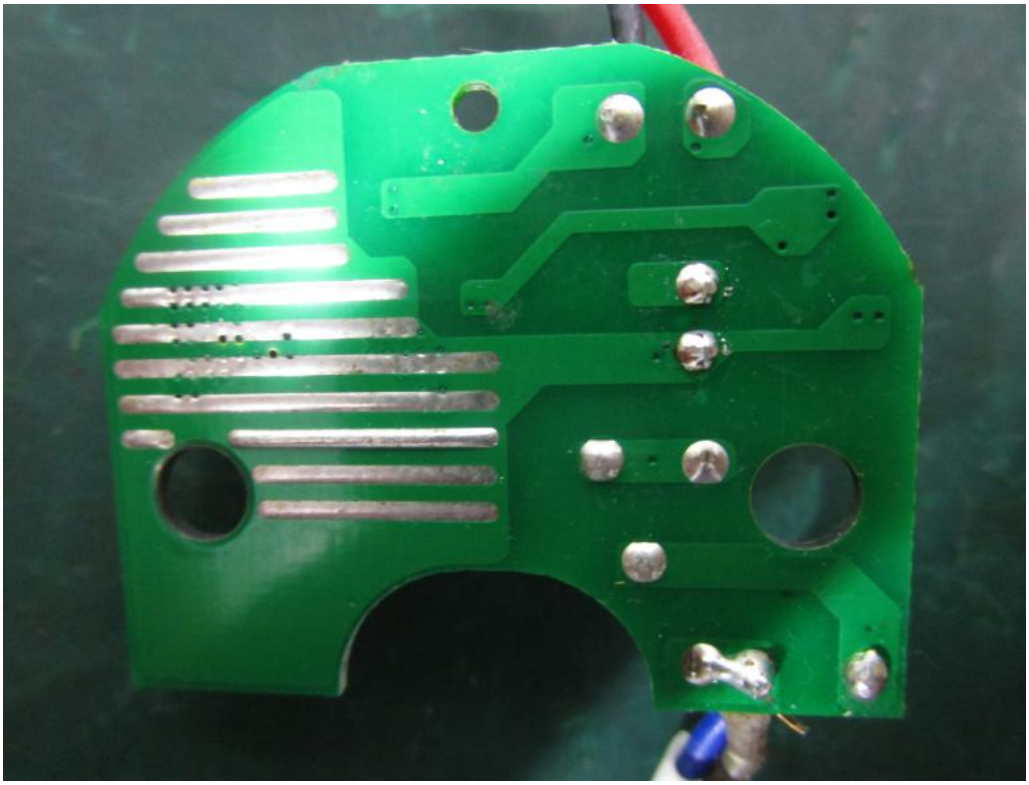
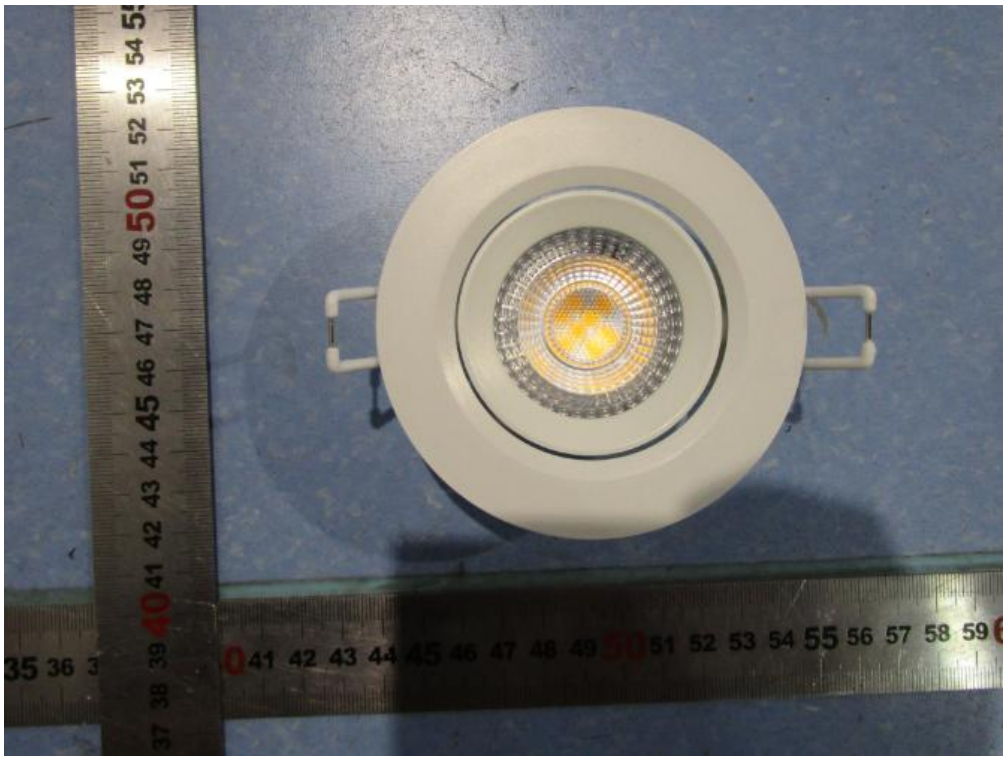
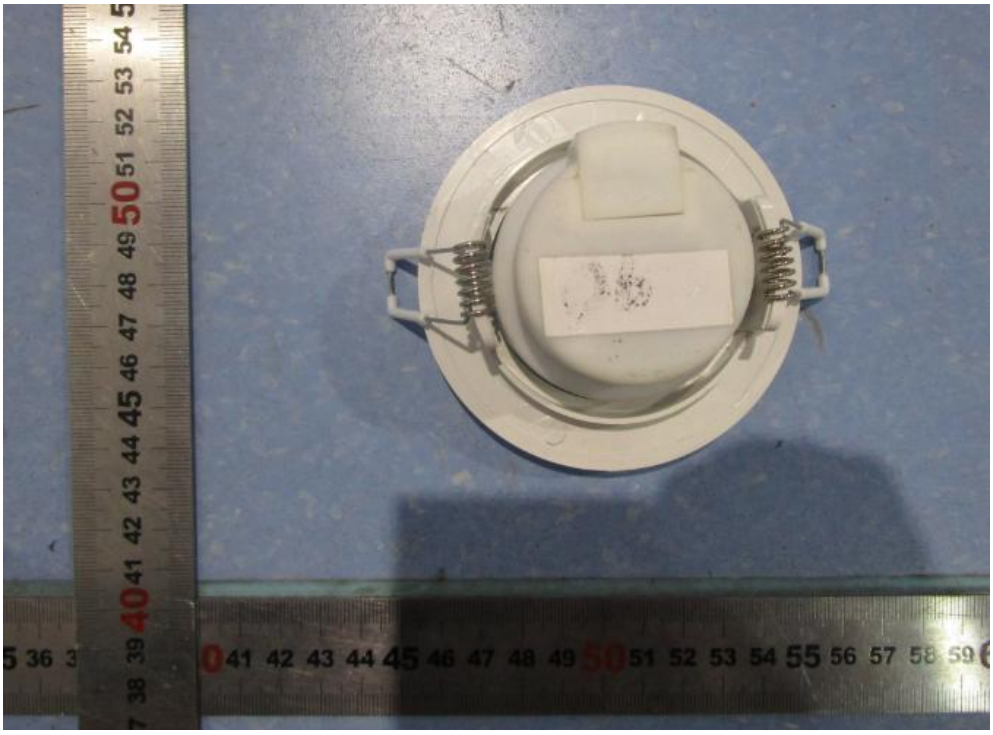


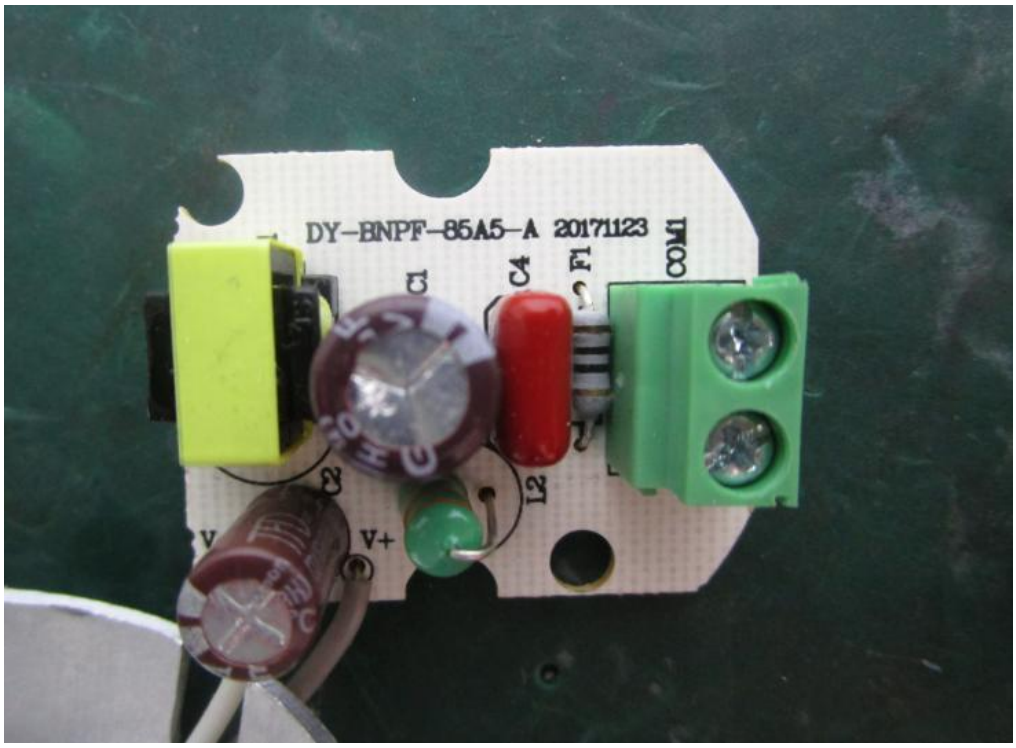


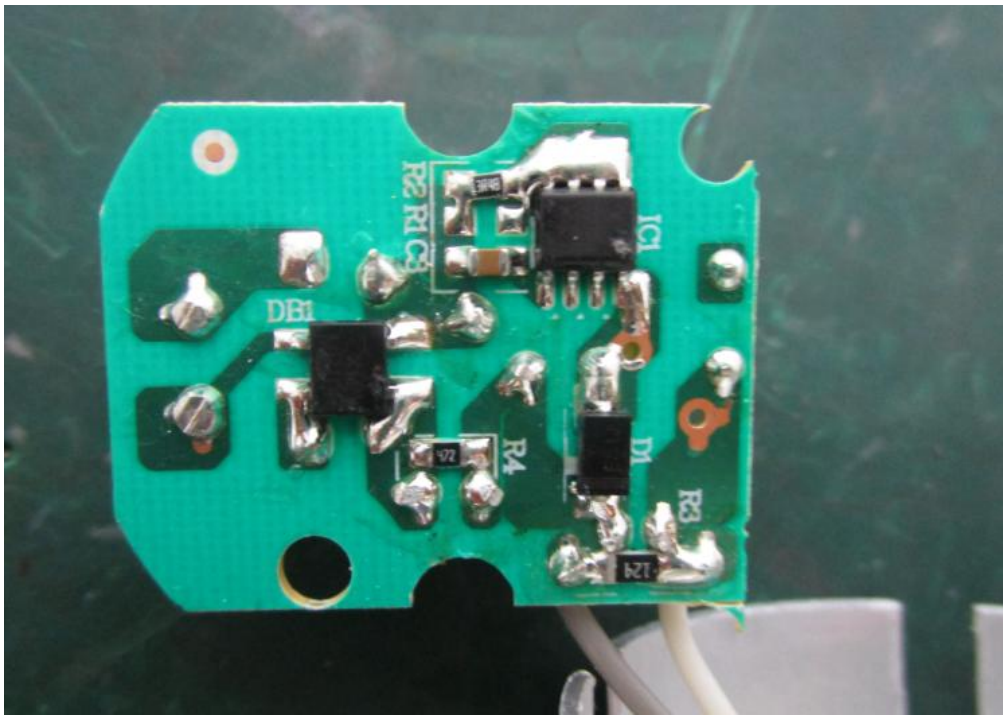
China

SL90 7W






DY-BNPF-85A5-A 20171123
C1
C4
L2
V-
V+


R2
R1
C3
IC1
DB1
R4
D1
R3