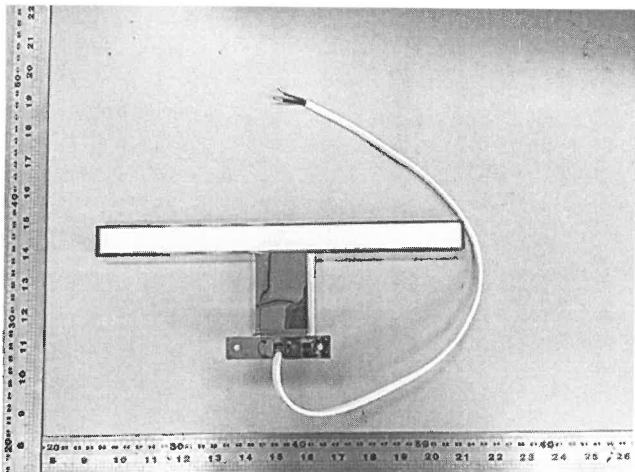


Prüfbericht - Nr.: <i>Test Report No.:</i>	50098016 001	Auftrags-Nr.: <i>Order No.:</i>	1160035834	Seite 1 von 39 <i>Page 1 of 39</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	27.05.2017	
Auftraggeber: <i>Client:</i>	NINGBO JIAHANG ELECTRIC APPLIANCE CO., LTD. Zhangjiaying Village, Qiu'ai Town, Yinzhou District, Ningbo City P.R. China			
Prüfgegenstand: <i>Test item:</i>	LED MIRROR LIGHT			
Bezeichnung / Typ-Nr. : <i>Identification / Type No. :</i>	NC-LE71, NC-LE72, NC-LE78, NC-LE80			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland – EMC Service			
Prüfgrundlage: <i>Test specification:</i>	EN 55015:2013+A1 EN 61547:2009 EN 61000-3-3:2013 EN 61000-3-2:2014			
Wareneingangsdatum: <i>Date of receipt:</i>	27.05.2017			
Prüfmuster-Nr.: <i>Test sample No.:</i>	1160035834			
Prüfzeitraum: <i>Testing period:</i>	11.07.2017-01.09.2017			
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von/ tested by:		kontrolliert von/ reviewed by:		
07.09.2017 Shey Zheng/trainee <i>Shey Zheng</i>		13.09.2017 Feng Liang/TC <i>Feng Liang</i>		
07.09.2017 Carrie Lei/PE <i>Carrie Lei</i>				
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>
				Unterschrift <i>Signature</i>
Sonstiges/ Other:				
Refer to page 2 for more information.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery :</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
*Legende:	1= Sehr gut	2 = gut	3= befriedigend	4= ausreichend
	P(ass) =entspricht o.g. Prüfgrundlage(n)	F(ail)= entspricht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	5 = mangelhaft
Legend:	1= very good	2 = good	3= satisfactory	4= sufficient
	P(ass) = passed a.m. test specification(s)	F(ail)= failed a.m. test specification(s)	N/A = not applicable	5 = poor
				N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>				

V04

TEST SUMMARY

4.1.1 HARMONICS ON AC MAINS

Result:

Pass

4.1.2 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER ON AC MAINS

Result:

Pass

4.1.3 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

Result:

Pass

4.1.4 RADIATED ELECTROMAGNETIC DISTURBANCE

Result:

Pass

4.2.1 RADIATED DISTURBANCE

Result:

Pass

5.1.1 ELECTROSTATIC DISCHARGE

Result:

Pass

5.1.2 RADIO FREQUENCY ELECTROMAGNETIC FIELD

Result:

Pass

5.2.1 FAST TRANSIENTS ON INPUT AND OUTPUT AC POWER LINES

Result:

Pass

5.2.2 INJECTED CURRENT INTO INPUT AND OUTPUT AC POWER PORT

Result:

Pass

5.2.3 SURGES TO AC POWER PORT

Result:

Pass

5.2.4 VOLTAGE DIPS AND INTERRUPTIONS TO AC POWER PORT

Result:

Pass

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1 Test Sites

1.1 Test Facilities

Laboratory: Ningbo Joysun Product Testing Service Co., Ltd.

No.66, Qingyi Road, Hi-Tech District, Ningbo, Zhejiang, China.

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment of Laboratory

No.	Equipment	Model	Serial no.	Cal. due date
1.	EMI test receiver	ESCI	100708	2018.02.24
2.	Artificial mains network	ENV216	101022	2018.02.24
3.	ESD generator	DITO	B07040	2018.02.24
4.	Dip Surge Burst Test System	UCS500-M6B	V0746103125	2018.02.24
5.	Integrated measurement system	IMS	100012	2018.02.24
6.	CDN	FCC-801-M2/M3-16A	7079	2018.02.24
7.	6 dB Attenuator	75-A-FFN-06	141733	2018.02.24
8.	Power Amplifier	75A250A	327549	2018.02.24
9.	Log-periodic Antenna	AT1080	325189	2018.02.24
10.	Power Amplifier	250W1000A	327579	2018.02.24
11.	Loop Antenna	SWB-HXYZ 9170	2010038ASB001	2018.02.24

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary LED MIRROR LIGHT for Lighting and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

Input voltage	: Refer to page 2	For all models
Frequency	: Refer to page 2	For all models
Rated Power	: Refer to page 2	For all models
Protection Class	: Class II	For all models

Refer to the User Manual for further information.

2.3 Independent Operation Modes

The basic operation modes are: "On" or "Off", without power regulation means.

Refer to the User Manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram for further information.

2.5 Submitted Documents

Circuit diagram, label, user manual etc.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

Immunity: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report. No software was used.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

The tested sample contained noise suppression components as specified in the circuit diagram. No special measure is employed to achieve the requirement.

4 Test Results EMISSION

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Harmonics on AC Mains

Result:	Pass
----------------	-------------

Test procedure : EN 61000-3-2:2014
Harmonic order : 2 – 40th
Frequency range : 0 – 2kHz

According to the Clause 7.3 in the EN 61000-3-2:2014

Limits for Class C equipment

b) Active input power ≤ 25 W

- Discharge lighting equipment having an active input power smaller than or equal to 25 W shall comply with one of the following two sets of requirements:
 - the harmonic currents shall not exceed the power-related limits of Table 3, column 2, or:
 - the third harmonic current, ”

The maximum rated input of the samples is less than 25W and not belongs to Discharge lighting equipment, so the limits of harmonics on AC main are not applied to the samples.

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4.1.2 Voltage changes, voltage fluctuations and flicker on AC mains

Result:

Pass

Test procedure : EN 61000-3-3:2013

According to the low power of the sample, it will not produce voltage fluctuation and flicker, which might exceed the related limits.

4.1.3 Mains Terminal Continuous Disturbance Voltage

Result:	Pass
----------------	-------------

Date of testing : 2017.07.14-2017.8.25
 Kind of test site : EMC Shielding Room
 Port : Mains
 Basic Standard : EN 55015:2013+A1
 Frequency Range : 9kHz – 30MHz
 Limit : EN 55015:2013+A1, Clause 4.3

Test Setup

Input Voltage : AC 220-240V, 50Hz
 Operational mode : ON
 Earthing : No
 Ambient Temp. : 20-25°C
 Test Setup : According to Clause 8 of EN 55015:2013+A1

The measurement setup was made according to EN 55015:2013+A1 in an EMC shielding room.

The measurement equipment like test receiver, quasi-peak detector and Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards and EN 55015:2013+A1. The tested object was operated under its rated voltage and its rated frequency.

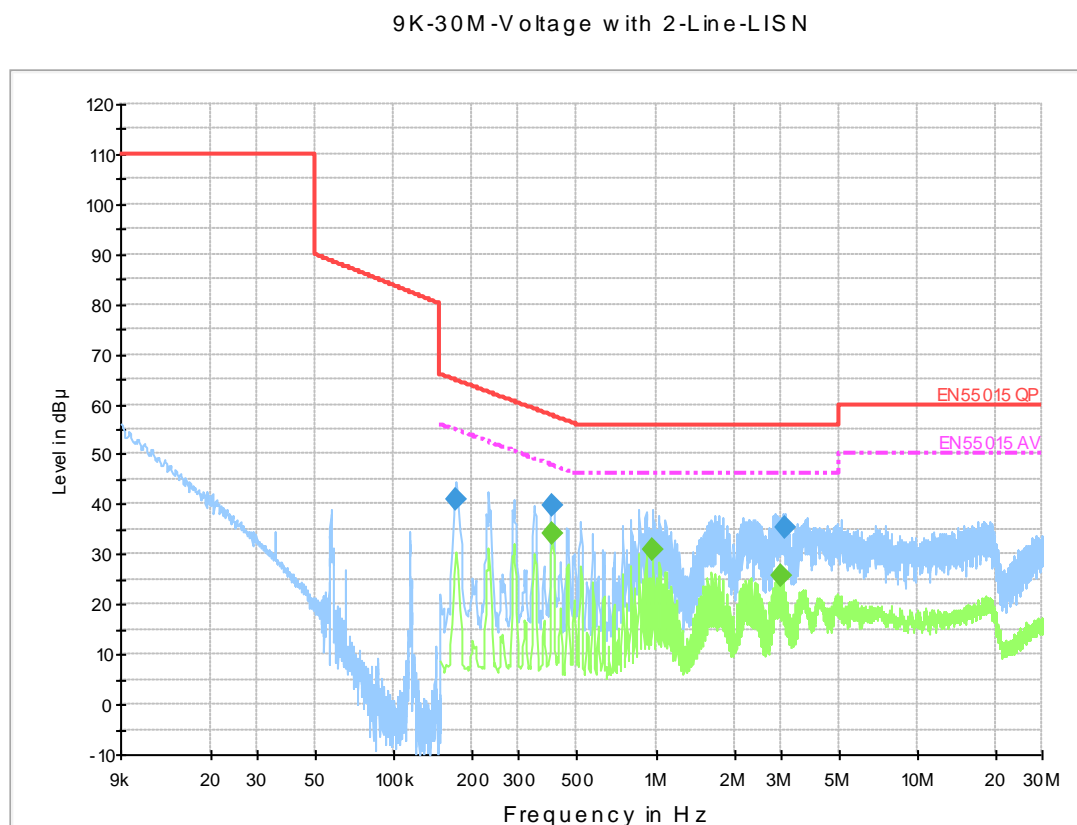
Furthermore an internal calibration with the test receiver was conducted prior to and after each measurement.

The tested object was set-up on a wooden table and 0.8m away from the AMN. The length of the extension power cord of the tested object was about 0.8m.

The Disturbance Voltage was determined according to clause 8 of EN 55015:2013+A1 while measuring the line and neutral conductor by turns.

The following figures were those measured by an automatic measuring system. The disturbance voltage was scanned firstly with both Peak and Average detector and then a final measurement was performed with both Quasi-peak and Average detector at the frequencies which showed the Max. in a designated frequency sub-range. In the figures below, the higher curve is that of peak-value and the lower one is average-value. “♦” refers to Quasi-peak value and the Average value which were measured in the final measurement.

Figure 1: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L for model NC-LE71



Final Result 1

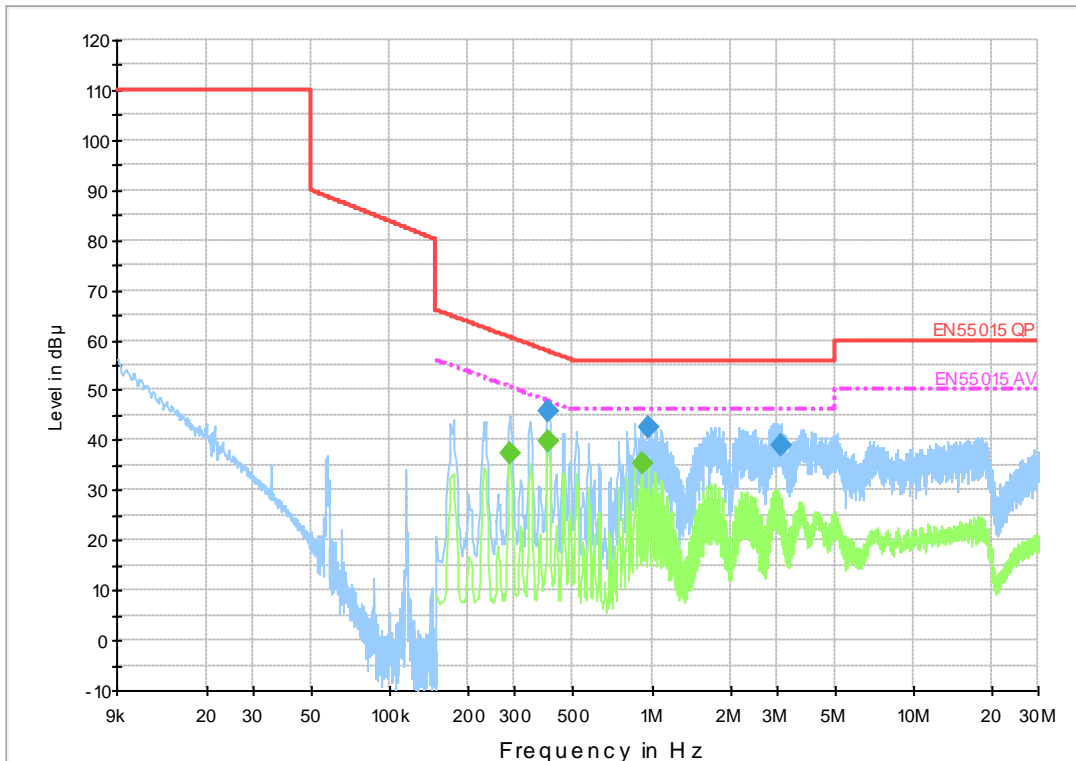
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.172000	40.9	1000.0	9.000	Off	L1	10.8	24.0	64.9	
0.400000	39.9	1000.0	9.000	Off	L1	10.8	17.9	57.9	
3.117000	35.3	1000.0	9.000	Off	L1	10.8	20.7	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.402000	34.2	1000.0	9.000	Off	L1	10.8	13.6	47.8	
0.975000	30.7	1000.0	9.000	Off	L1	10.8	15.3	46.0	
3.008000	25.7	1000.0	9.000	Off	L1	10.8	20.3	46.0	

Figure 2: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N for model NC-LE71

9K-30M-Voltage with 2-Line-LISN



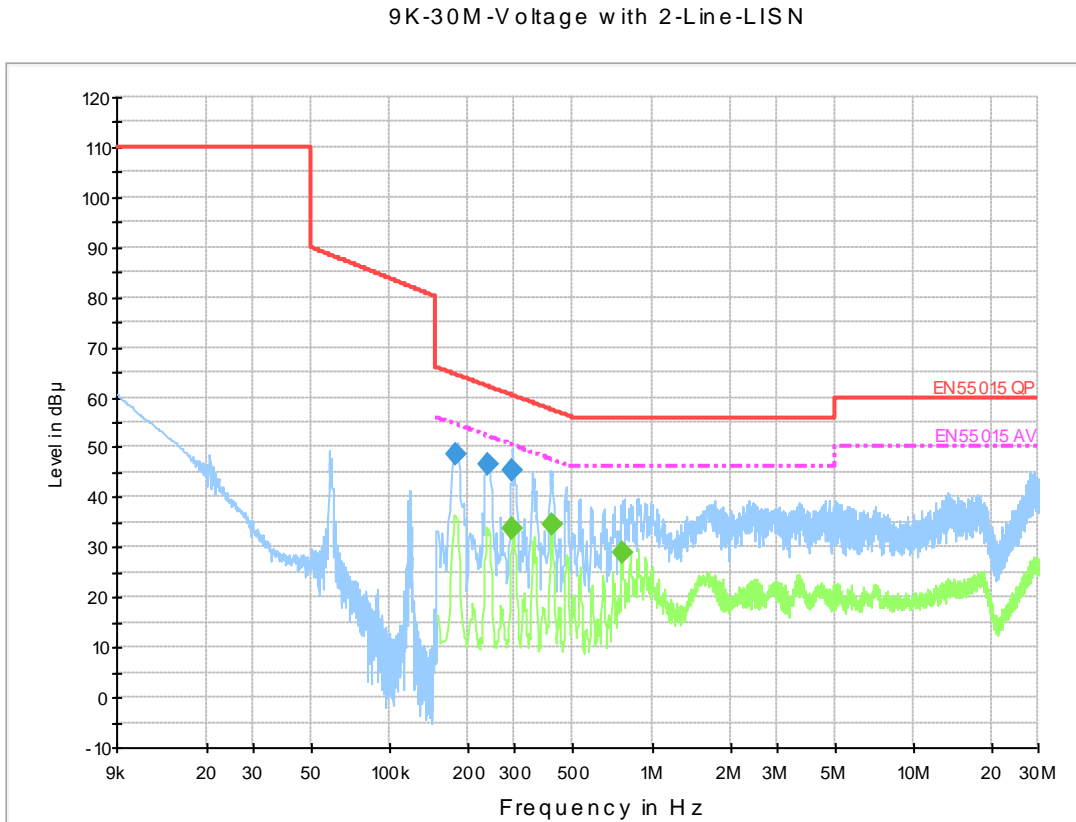
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.400000	45.9	1000.0	9.000	Off	N	10.8	12.0	57.9	
0.973000	42.4	1000.0	9.000	Off	N	10.8	13.6	56.0	
3.121000	38.9	1000.0	9.000	Off	N	10.8	17.1	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.287000	37.3	1000.0	9.000	Off	N	10.7	13.3	50.6	
0.401000	39.9	1000.0	9.000	Off	N	10.8	7.9	47.8	
0.918000	35.2	1000.0	9.000	Off	N	10.8	10.8	46.0	

Figure 3: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L for model NC-LE72



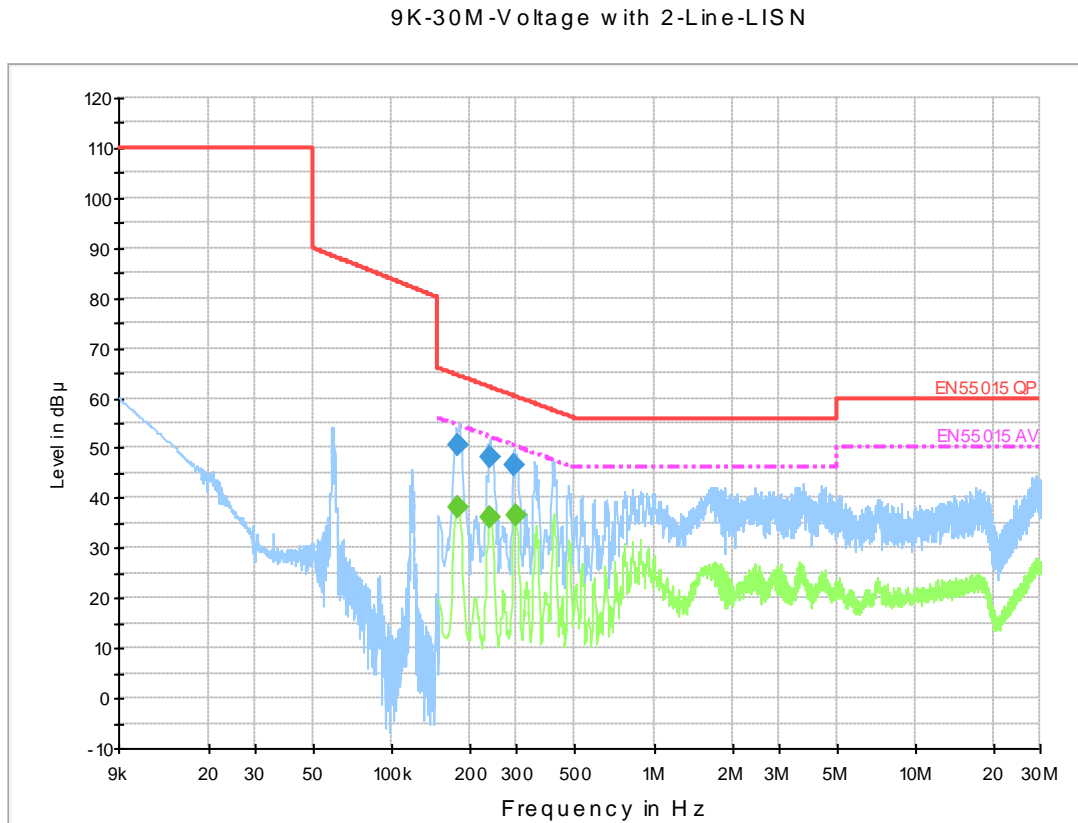
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.177000	48.8	1000.0	9.000	Off	L1	10.7	15.9	64.6	
0.235000	46.6	1000.0	9.000	Off	L1	10.7	15.7	62.3	
0.294000	45.2	1000.0	9.000	Off	L1	10.8	15.2	60.4	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.295000	33.9	1000.0	9.000	Off	L1	10.8	16.5	50.4	
0.414000	34.5	1000.0	9.000	Off	L1	10.8	13.1	47.6	
0.770000	28.8	1000.0	9.000	Off	L1	10.7	17.2	46.0	

Figure 4: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N for model NC-LE72



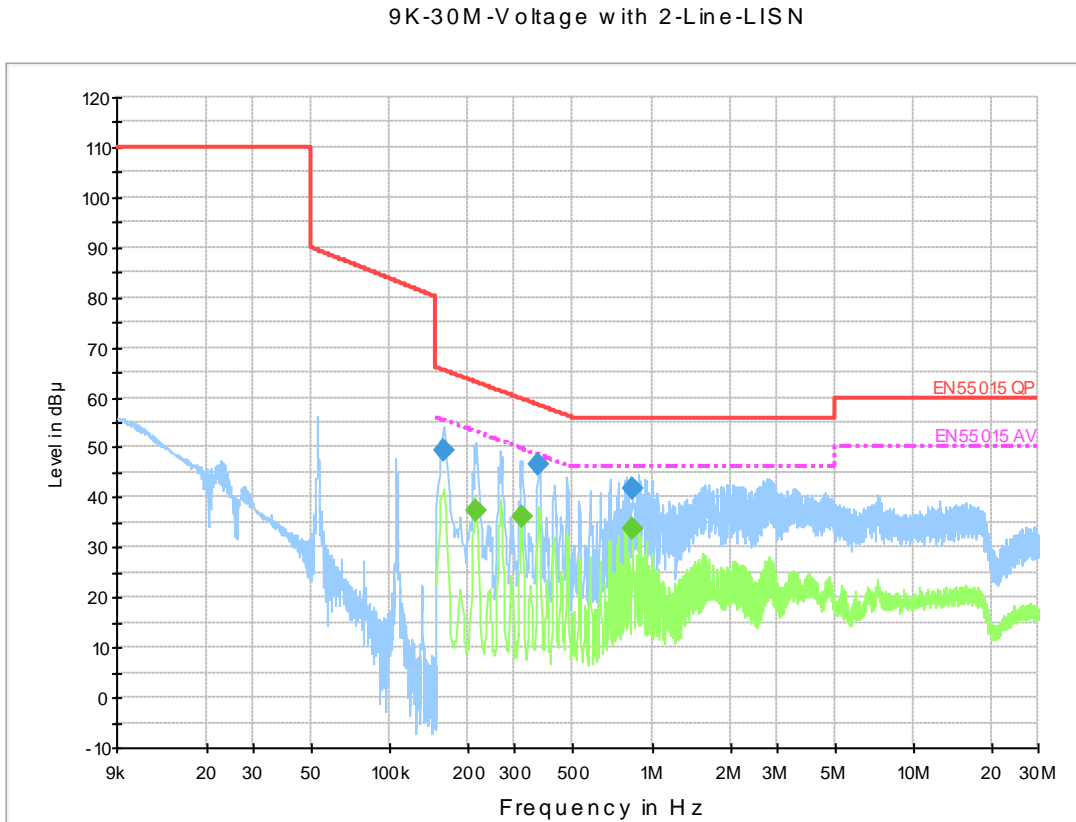
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.179000	50.5	1000.0	9.000	Off	N	10.7	14.0	64.5	
0.237000	48.3	1000.0	9.000	Off	N	10.7	13.9	62.2	
0.295000	46.4	1000.0	9.000	Off	N	10.7	14.0	60.4	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.177000	38.3	1000.0	9.000	Off	N	10.7	16.3	54.6	
0.237000	36.0	1000.0	9.000	Off	N	10.7	16.2	52.2	
0.296000	36.4	1000.0	9.000	Off	N	10.7	13.9	50.4	

Figure 5: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L for model NC-LE78



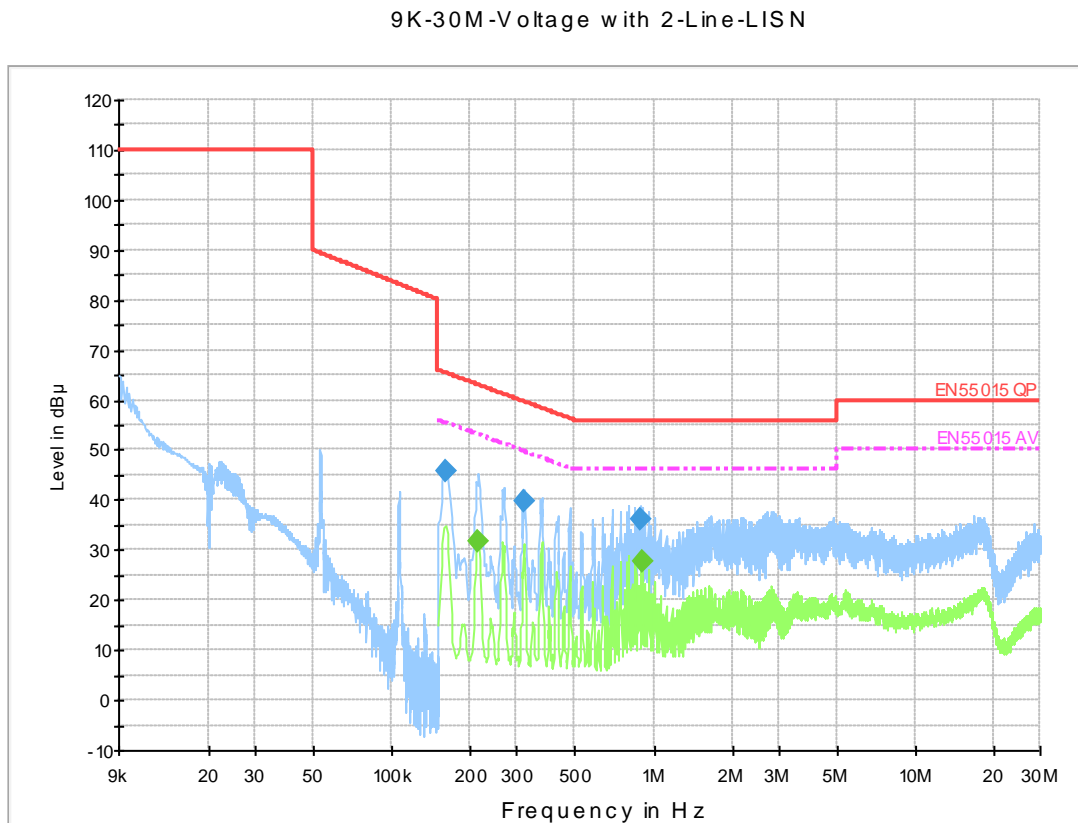
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.160000	49.5	1000.0	9.000	Off	L1	10.8	15.9	65.5	
0.370000	46.8	1000.0	9.000	Off	L1	10.7	11.7	58.5	
0.849000	41.9	1000.0	9.000	Off	L1	10.8	14.1	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.213000	37.4	1000.0	9.000	Off	L1	10.8	15.7	53.1	
0.319000	36.0	1000.0	9.000	Off	L1	10.7	13.7	49.7	
0.849000	33.7	1000.0	9.000	Off	L1	10.8	12.3	46.0	

Figure 6: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N for model NC-LE78



Final Result 1

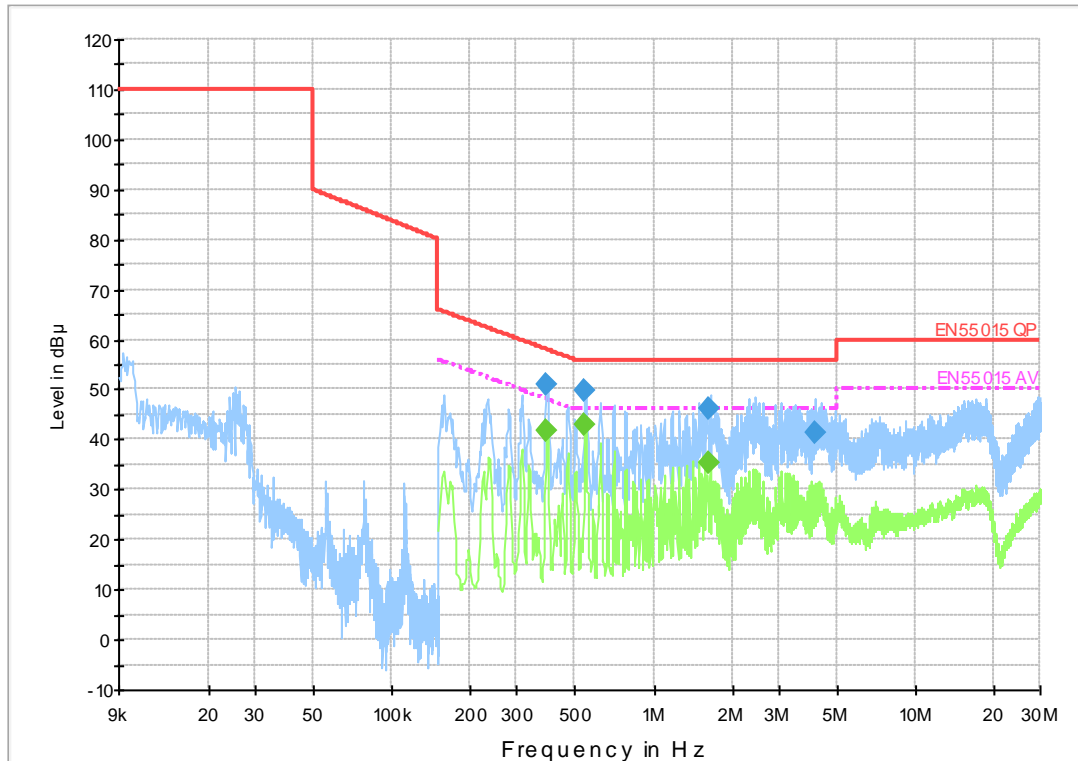
Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.160000	45.9	1000.0	9.000	Off	N	10.8	19.6	65.5	
0.317000	39.9	1000.0	9.000	Off	N	10.7	19.9	59.8	
0.898000	36.3	1000.0	9.000	Off	N	10.8	19.7	56.0	

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.212000	31.8	1000.0	9.000	Off	N	10.7	21.3	53.1	
0.901000	27.6	1000.0	9.000	Off	N	10.8	18.4	46.0	

Figure 7: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L for model NC-LE80

9K-30M-Voltage with 2-Line-LISN



Final Result 1

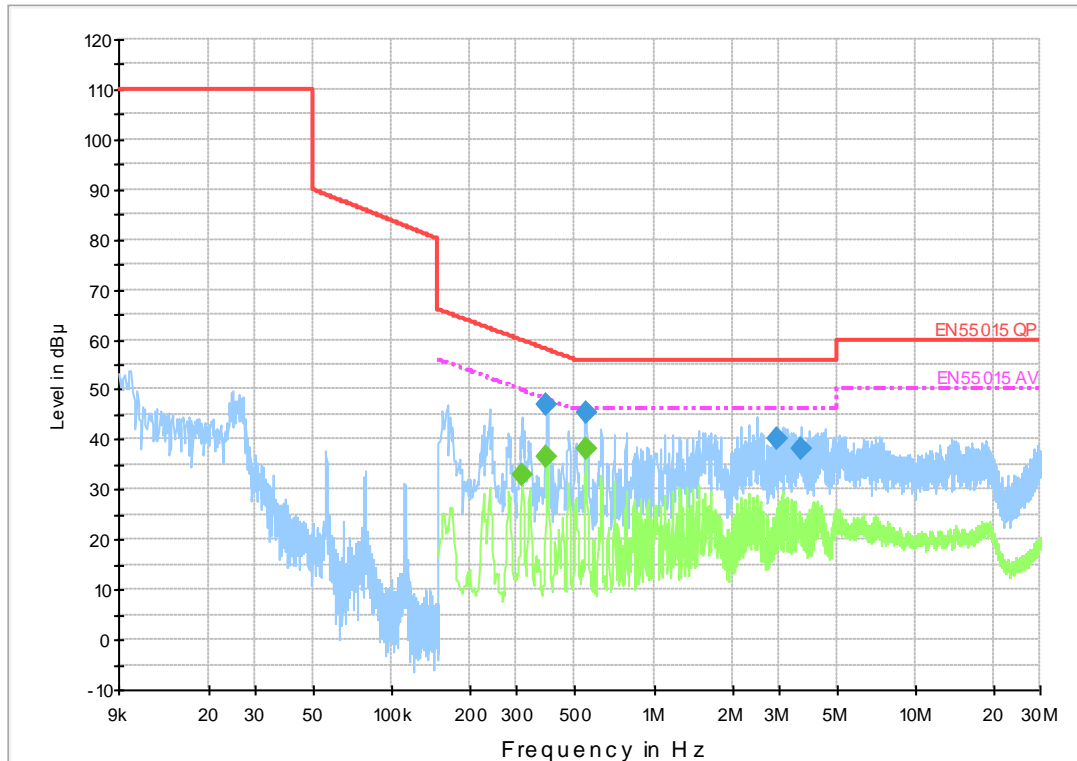
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.389000	51.1	1000.0	9.000	Off	L1	10.8	6.9	58.1	
0.545000	49.7	1000.0	9.000	Off	L1	10.8	6.3	56.0	
1.634000	46.3	1000.0	9.000	Off	L1	10.7	9.7	56.0	
4.173000	41.5	1000.0	9.000	Off	L1	10.8	14.5	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.390000	41.7	1000.0	9.000	Off	L1	10.8	6.4	48.1	
0.546000	42.9	1000.0	9.000	Off	L1	10.8	3.1	46.0	
1.638000	35.4	1000.0	9.000	Off	L1	10.7	10.6	46.0	

Figure 8: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N for model NC-LE80

9K-30M-Voltage with 2-Line-LISN



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.391000	47.0	1000.0	9.000	Off	N	10.8	11.1	58.0	
0.549000	45.3	1000.0	9.000	Off	N	10.7	10.7	56.0	
2.941000	40.2	1000.0	9.000	Off	N	10.8	15.8	56.0	
3.644000	38.1	1000.0	9.000	Off	N	10.8	17.9	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.314000	33.1	1000.0	9.000	Off	N	10.7	16.8	49.9	
0.391000	36.5	1000.0	9.000	Off	N	10.8	11.5	48.0	
0.550000	38.2	1000.0	9.000	Off	N	10.7	7.8	46.0	

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4.1.4 Radiated Electromagnetic Disturbance

Result:	Pass
----------------	-------------

Date of testing : 2017.08.03
Port : Enclosure
Basic standard : EN 55015:2013+A1
Frequency range : 9kHz – 30MHz
Limit : EN 55015:2013+A1, clause 4.4

Test Setup

Operational Mode : ON
Earthing : No
Test Site : EMC chamber

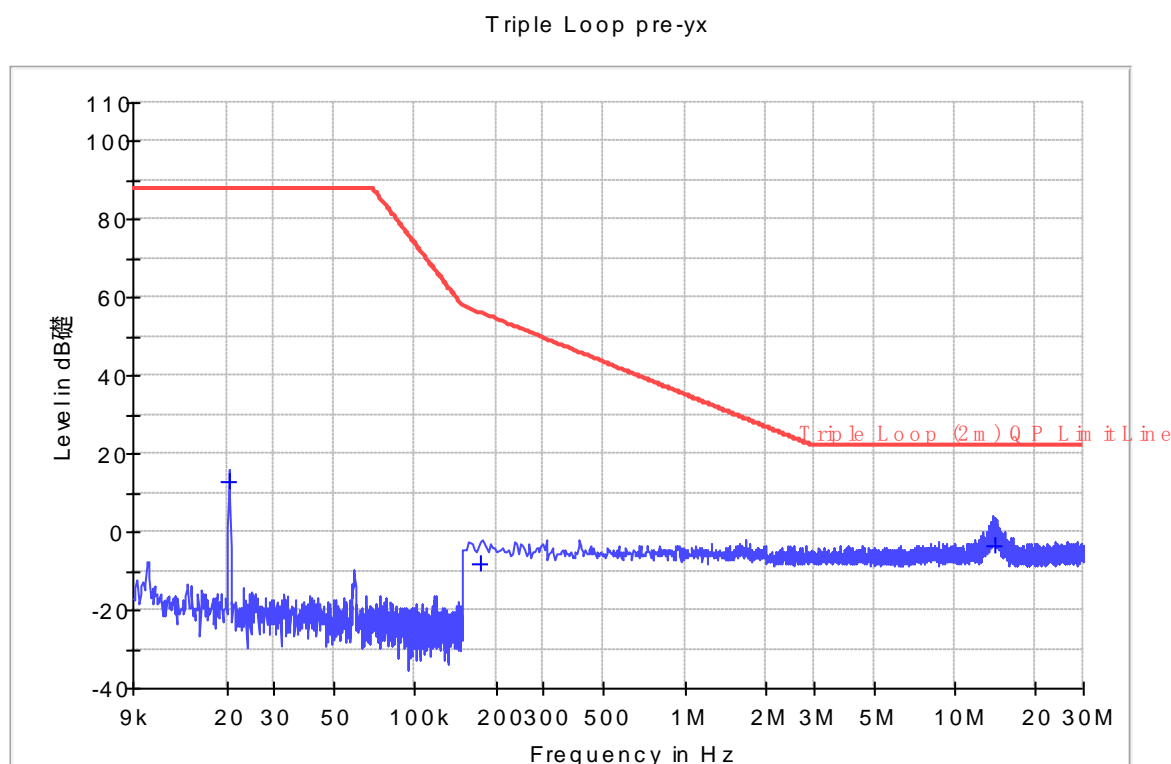
Measuring configuration and description

The measurement equipment like test receiver, loop antenna and coaxial switch are in compliance with the CISPR 16-1 series standards. The test setup was made according to Clause 9 of EN 55015:2013+A1.

The EUT operated in ON mode and at its rated voltage. The EUT is put on a wooden table in the center of the loop antenna. Before a measurement the EUT was operated for about 20 min.

Induced current in the loop antenna was measured by means of a current probe (1V/A) according to clause 9 of EN 55015:2013+A1. The three field components were measured in sequence by means of a coaxial switch (loop antenna controller).

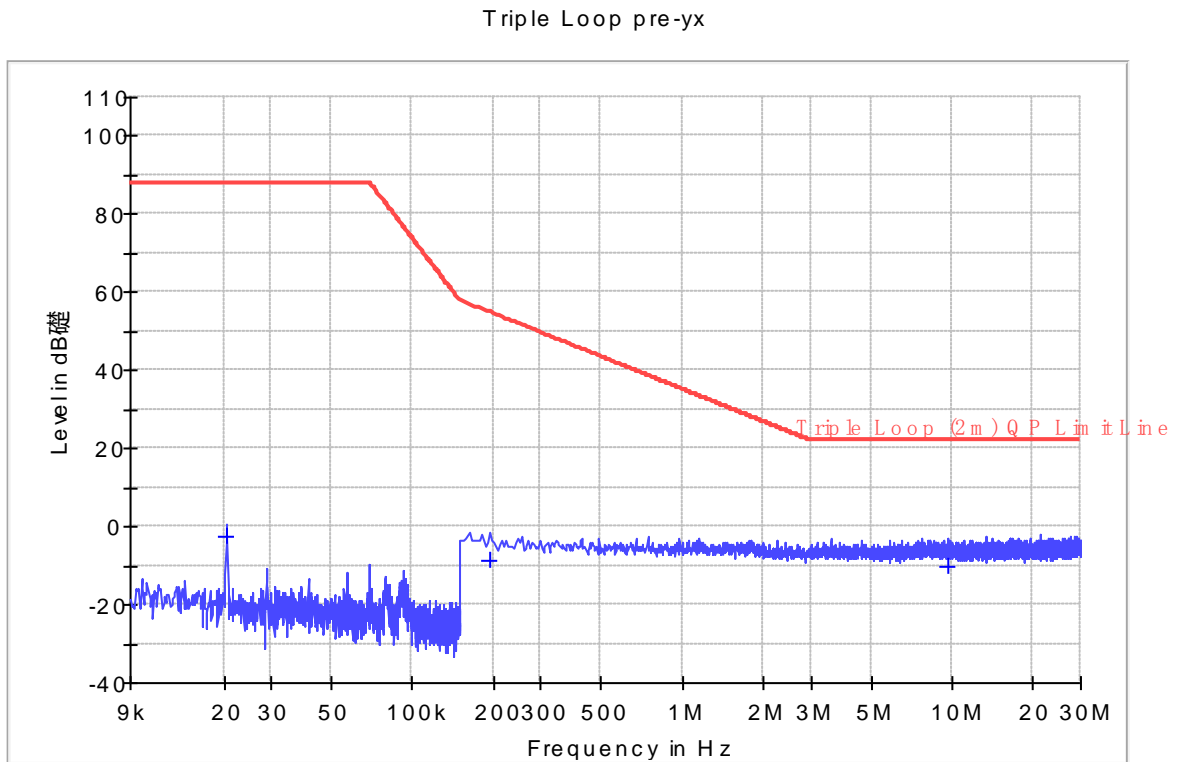
Figure 9: Graphic description of radiated electromagnetic disturbances for X direction



Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dBµA)	Meas. Time (ms)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµA)	Comment
0.020520	13.1	1000.0	0.200	X	0.0	74.9	88.0	
0.174000	-8.0	1000.0	9.000	X	0.0	64.2	56.2	
14.022000	-3.3	1000.0	9.000	X	0.2	25.3	22.0	

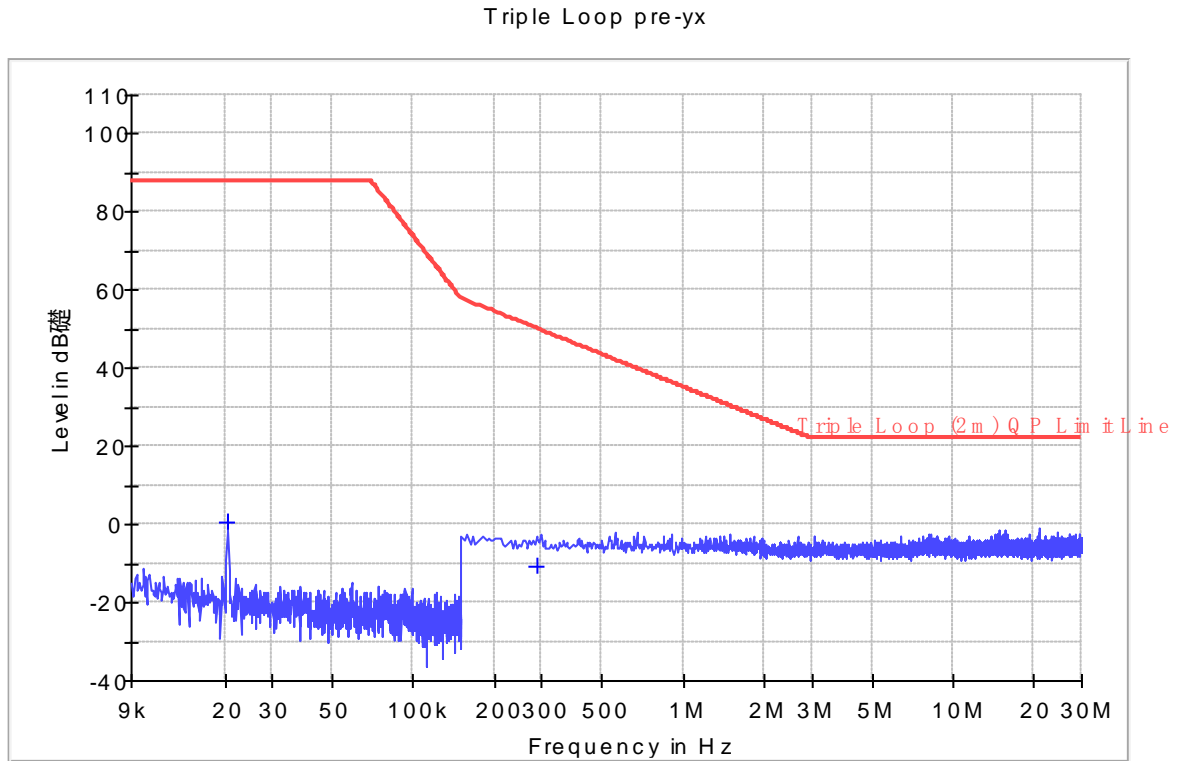
Figure 10: Graphic description of radiated electromagnetic disturbances for Y direction



Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dBµA)	Meas. Time (ms)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµA)	Comment
0.020520	-2.3	1000.0	0.200	Y	0.0	90.3	88.0	
0.194000	-8.8	1000.0	9.000	Y	0.0	63.7	54.9	
9.706000	-10.4	1000.0	9.000	Y	0.2	32.4	22.0	

Figure 11: Graphic description of radiated electromagnetic disturbances for Z direction



Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dBµA)	Meas. Time (ms)	Bandwidth (kHz)	Triple Loop frame	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµA)	Comment
0.020520	0.6	1000.0	0.200	Z	0.0	87.4	88.0	
0.290000	-10.5	1000.0	9.000	Z	0.0	60.6	50.1	

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated disturbance

Result:	Pass
Date of testing	: 2017.08.11-2017.08.29
Test procedure	: EN 55015:2013+A1 Annex B CDN method
Frequency range	: 30-300MHz
Kind of test site	: Shielding Room
Limit	: EN 55015:2013+A1 Table B.1
	Quasi-peak limits: 30-100MHz, 64-54dB μ V; 100-230MHz, 54 dB μ V; 230-300MHz, 61dB μ V

Test Setup

Input voltage	: AC 220-240V, 50Hz
Operational mode	: ON
Temperature	: 20-25°C
Relative humidity	: 45-55%

Measuring configuration and description

If the EUT complies with the requirements of Annex B of EN 55015:2013+A1, it is deemed to comply with the radiated disturbances requirements in the frequency range 30MHz to 300MHz specified in 4.4.2 of EN 55015:2013+A1.

The Conducted RF emission test was measured in the frequency range from 30MHz to 300MHz according to EN 55015:2013+A1. The measurement was performed in accordance with the method specified in Annex B of EN 55015:2013+A1.

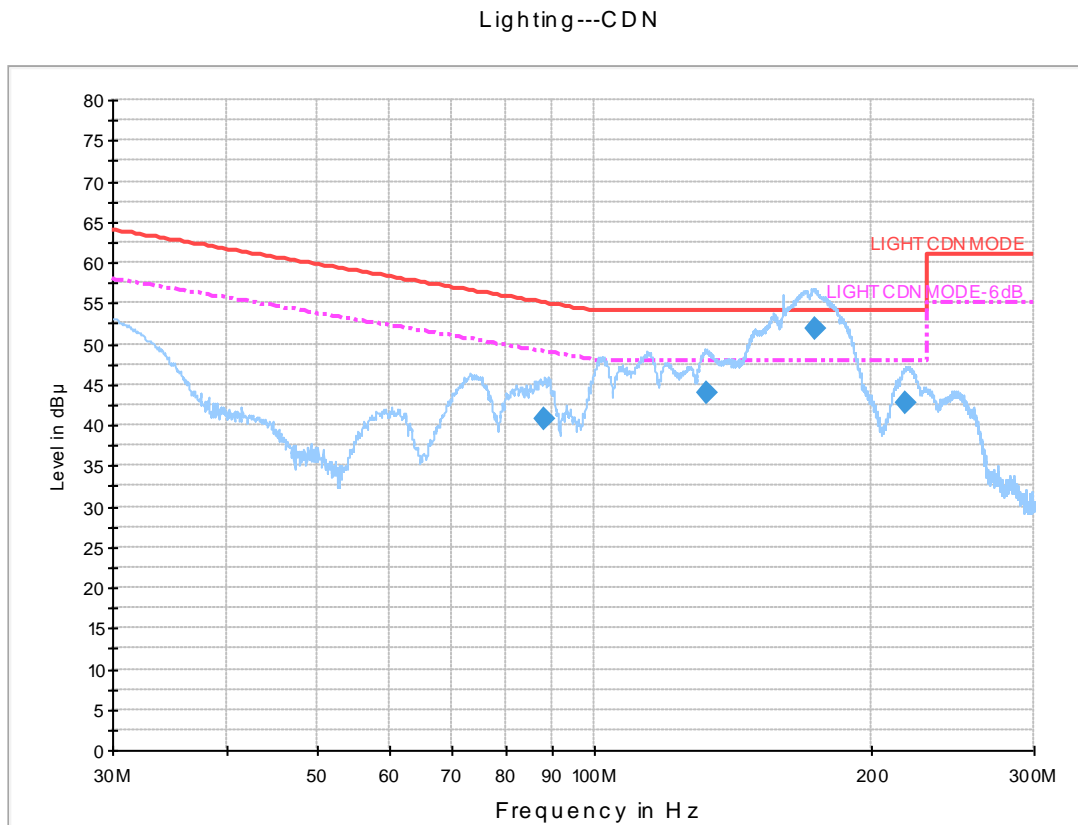
The Conducted RF emission test was performed in a shielding room with a CDN FCC-801-M2/M3-16A. The EUT is placed on one non-conducting block with a height of (10 \pm 0.2) cm which in turn are placed on an earthed metal plate with dimensions at least 20 cm larger than the lighting equipment.

The EUT is connected via a mains supply cable with a length of (20 \pm 10) cm to the CDN. The distance of the cable to the metal plate should be (4 \pm 1) cm. The CDN is mounted on the metal plate.

Each tested EUT was operated for at least 30min before test.

The following figures were those measured and recorded by a test receiver. The curves in the figure were those measured with a Peak detector. The symbol “◆” refers to Quasi-peak values which were measured in the final measurement.

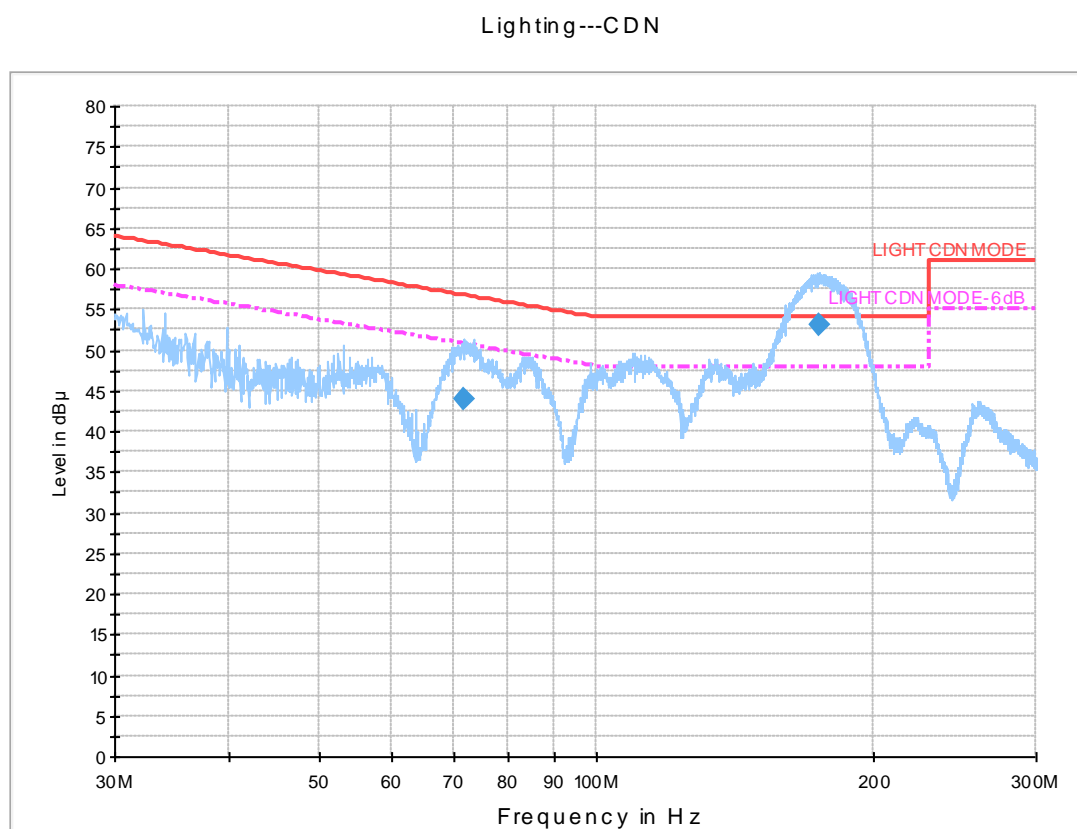
Figure 12: Spectral Diagrams, RF Emission for model NC-LE71



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Marg in (dB)	Limit (dBµV)	Comment
88.380000	40.7	1000.0	120.000		16.6	14.4	55.0	
132.300000	44.1	1000.0	120.000		17.2	9.9	54.0	
173.400000	51.8	1000.0	120.000		17.5	2.2	54.0	
217.620000	42.8	1000.0	120.000		17.8	11.2	54.0	

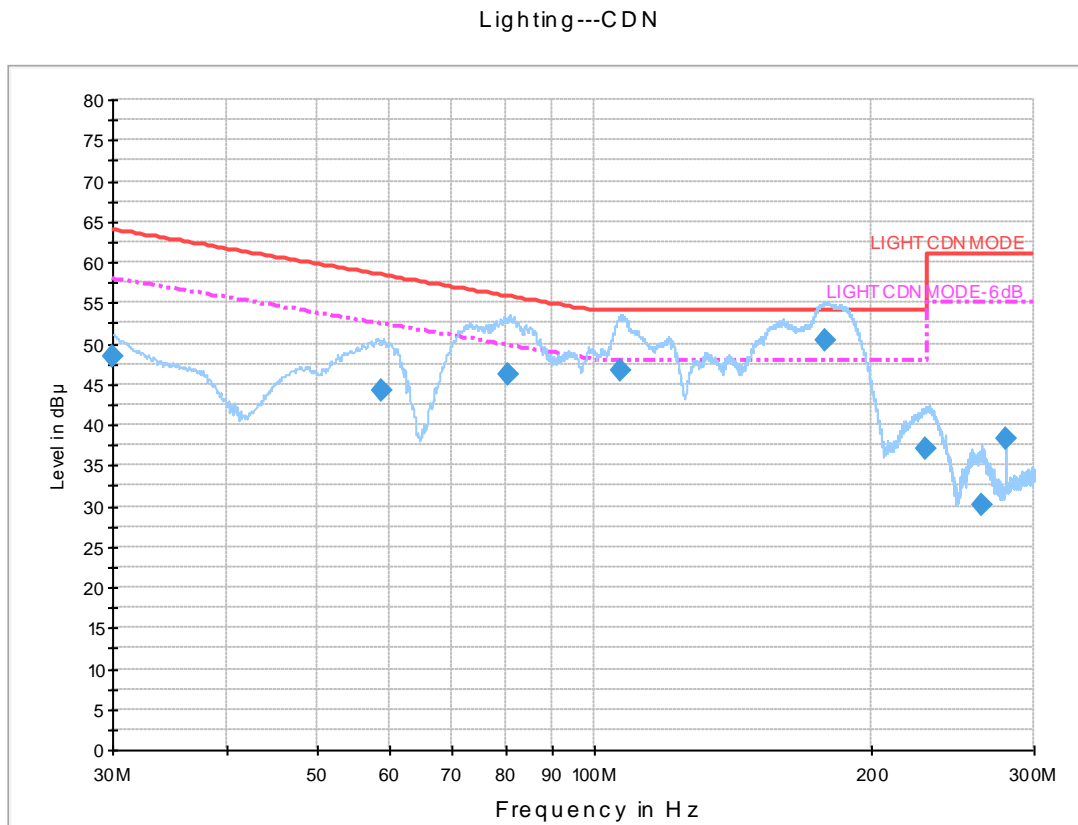
Figure 13: Spectral Diagrams, RF Emission for model NC-LE72



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Marg in (dB)	Limit (dBµV)	Comment
71.890000	44.0	1000.0	120.000		16.4	12.7	56.7	
174.130000	53.1	1000.0	120.000		17.5	0.9	54.0	

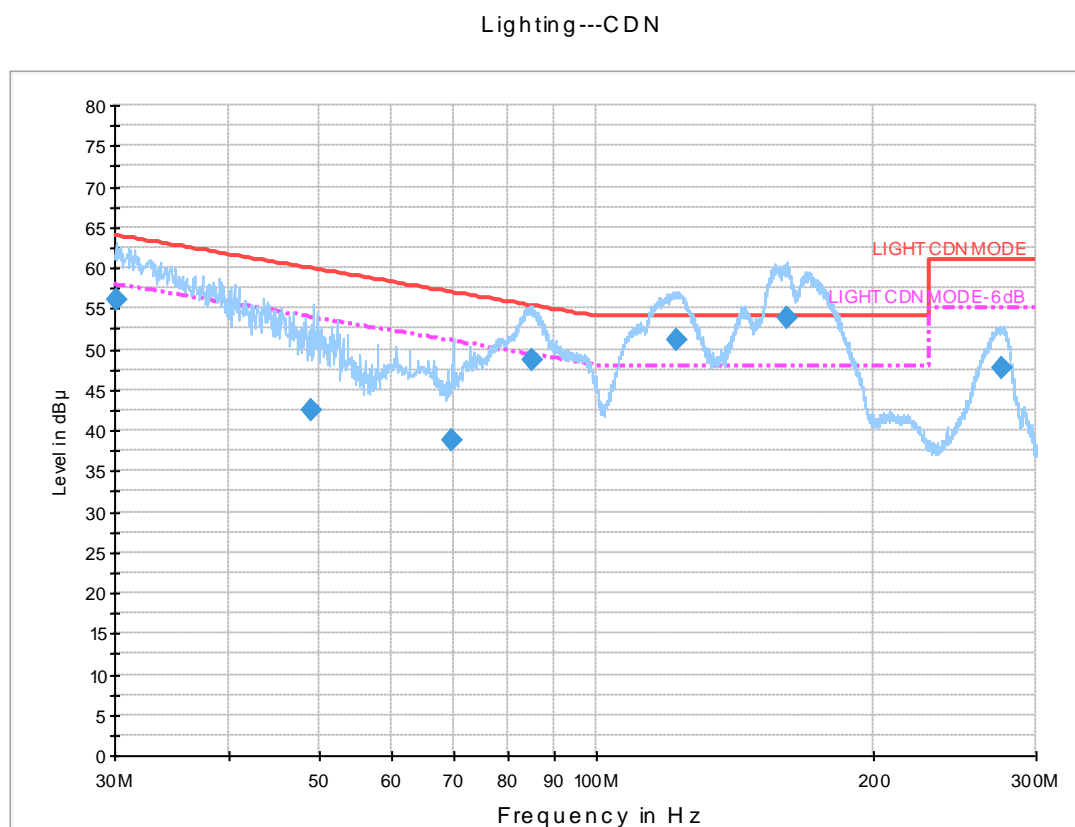
Figure 14: Spectral Diagrams, RF Emission for model NC-LE78



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
30.020000	48.4	1000.0	120.000		16.0	15.6	64.0	
58.880000	44.3	1000.0	120.000		16.2	14.1	58.4	
80.730000	46.1	1000.0	120.000		16.5	9.7	55.8	
106.900000	46.6	1000.0	120.000		16.8	7.4	54.0	
178.220000	50.5	1000.0	120.000		17.6	3.5	54.0	
229.360000	37.1	1000.0	120.000		17.8	16.9	54.0	
262.940000	30.2	1000.0	120.000		18.7	30.8	61.0	
280.000000	38.2	1000.0	120.000		19.3	22.8	61.0	

Figure 15: Spectral Diagrams, RF Emission for model NC-LE80



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
30.200000	56.1	1000.0	120.000		16.0	7.8	63.9	
49.140000	42.4	1000.0	120.000		16.1	17.5	59.9	
69.730000	38.6	1000.0	120.000		16.3	18.3	57.0	
85.060000	48.7	1000.0	120.000		16.6	6.7	55.3	
122.500000	51.1	1000.0	120.000		17.0	2.9	54.0	
160.700000	53.8	1000.0	120.000		17.5	0.2	54.0	
275.960000	47.6	1000.0	120.000		19.1	13.4	61.0	

5 Test Results I M M U N I T Y

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

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.

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.

The EMC immunity performances of the EUT were tested according to EN 61547:2009.

Testing date: 2017.07.11-2017.09.01

Room temperature: 20-25 °C

Relative Humidity: 45-50%

5.1 Enclosure

5.1.1 Electrostatic Discharge

Result:	Pass
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The immunity against electrostatic discharge was tested in accordance EN 61547:2009. Test setup and ESD-Generator are according to IEC 61000-4-2 which is specified under EN 61547:2009. The EUT was placed on an insulation lining of 0.5mm thick. Between the insulation lining and the wooden table, there was a horizontal coupling plane (HCP) of 1.6×0.8m. The EUT and its power supply cord were isolated from the HCP by the insulating lining.

Charge voltage	: ±4.0kV (Conducted Discharge) ±8.0kV (Air Discharge)
Polarity	: positive / negative
Number of discharges	: >10
Performance criteria	: B

Table 2: ESD, Positive / Negative Polarity

Position	Kind of Discharge	Remarks	Result
Nonmetal enclosure	Air discharge ±8kV	No change of output parameter	Pass
Coupling plane (Both HCP and VCP)	Contact discharge ±4kV	No change of output parameter	Pass
Metal enclosure	Contact discharge ±4kV	No change of output parameter	Pass

5.1.2 Radio Frequency Electromagnetic Field

Result:

Pass

The immunity against radio-frequency electromagnetic fields in the frequency range between 80MHz and 1000MHz was tested in accordance to IEC 61000-4-3 which is specified by clause 5.3 in EN 61547:2009.

The test was performed inside a 3m modified semi-anechoic chamber. During the test the part of the ground plane between the field generating antenna and the equipment under test was covered by absorbing material. The distance between the tip of the antenna and the side of the system tested is 3m. The field uniformity of the 1.5mx1.5m plane where the surface of the EUT tested coincides with is regularly calibrated to ensure the 0-6 dB field uniformity criterion as specified by IEC 61000-4-3 is met.

Test Level : 3V/m
 Frequency Range : 80-1000MHz
 Modulation : 80% AM, 1kHz
 Frequency Sweep Speed : ≤0.005 octave/s (1.5×1E-3 decades/s)
 Performance Criteria : A

Table 3: Radiated Susceptibility, Field Strength 3V/m

Position	Observation	Result
Antenna in vertical orientation	No change of output parameter	Pass
Antenna in horizontal orientation	No change of output parameter	Pass

5.2 Input and Output AC Power Ports

5.2.1 Fast Transients on Input and Output AC Power Lines

Result:	Pass
----------------	-------------

The immunity against fast transients on AC power lines was tested in accordance to EN 61000-4-4 which is specified by clause 5.5 in EN 61547:2009.

Test setup and the fast transient noise generator was according to IEC 61000-4-4 which is specified by EN 61547:2009. The EUT was placed on a wooden table 0.1m above the reference ground plane of aluminum and was insulated from it by an insulating support 0.1m thick.

Test Voltage	:	±1kV
Polarity	:	negative/positive
Repetition frequency	:	5kHz
Test duration	:	≥120sec
Tr/Tn	:	5ns/50ns
Severity level	:	2
Performance criteria	:	B

Table 4: Burst, Input AC Power lines, Positive/Negative Polarity

Coupling Method: Direct Injection		
Coupling Port	Test Voltage / Result	Remark
AC mains: L1 (L), L2 (N), --	±1000V Pass	No change of output parameter

5.2.2 Injected Current into Input and Output AC Power Port

Result:	Pass
----------------	-------------

The immunity against injected current into AC power port was tested according to EN 61547:2009 in a shielded room.

The test setup and the test generator was according to IEC 61000-4-6 which is specified by EN 61547:2009. The EUT was placed on a small wooden support 0.1m above a reference ground plane that is of aluminum. The coupling and decoupling networks was inserted on the power supply connection. The coupling and decoupling networks was placed on the ground reference plane, making direct contact with it at about 0.1 – 0.3 meters from EUT. The height of cable between the EUT and the coupling and decoupling networks above the ground reference plane was 50mm.

Voltage Level	: 3V(rms)(unmodulated)
Environmental phenomena	: r.f. current, common mode, 1kHz, 80% AM
Source impedance	: 150 Ω
Frequency range	: 0.15 – 80 MHz
Sweeping rate	: $\leq 1,5 \times 10^{-3}$ decades/s
Performance criteria	: A

Table 5: Injected current, AC Power lines

Coupling Port	Coupling Method:	Result	Remark
AC mains: L1 (L), L2 (N)	CDN M-2	Pass	No change of output parameter

5.2.3 Surges to AC Power Port

Result:	Pass
----------------	-------------

The immunity against surges to AC power port was tested in accordance to IEC 61000-4-5 which is specified by clause 5.7 in EN 61547:2009.

Test setup and the Combination Wave Generator (CWG) was according to IEC 61000-4-5. The decoupling network is incorporated in the CWG.

- Test Level : phase to neutral ±1.0kV
- Tr/Tn : 1.2/50µs (open-circuit voltage)
8/20µs (short-circuit current)
- Test numbers : 5 positive and 5 negative pulses at phases of $\pm\pi/2$
- Repetition rate : 1/min
- Performance criteria : C

Table 6: Surges to AC Power lines, positive/negative

Line	Tested Voltage/coupling phase	Observation	Result
Phase to neutral	+0.5kV, $+\pi/2$ (5 times)	No change of output parameter	Pass
	-0.5kV, $-\pi/2$ (5 times)	No change of output parameter	Pass

5.2.4 Voltage dips and interruptions to AC Power Port

Result:	Pass
----------------	-------------

The immunity against voltage dips and interruptions to AC power port was tested in accordance to EN 61000-4-11 which is specified by clause 5.8 in EN 61547:2009.

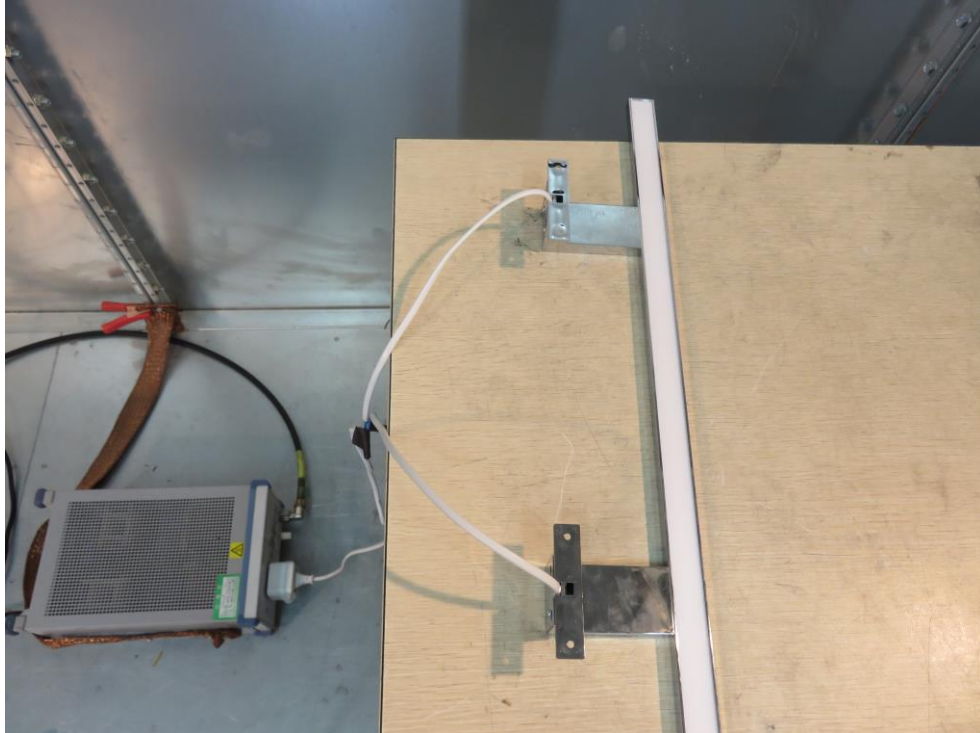
Test setup and the test generator was according to IEC 61000-4-11.

Table 7: Test condition and Test result for Voltage Dips

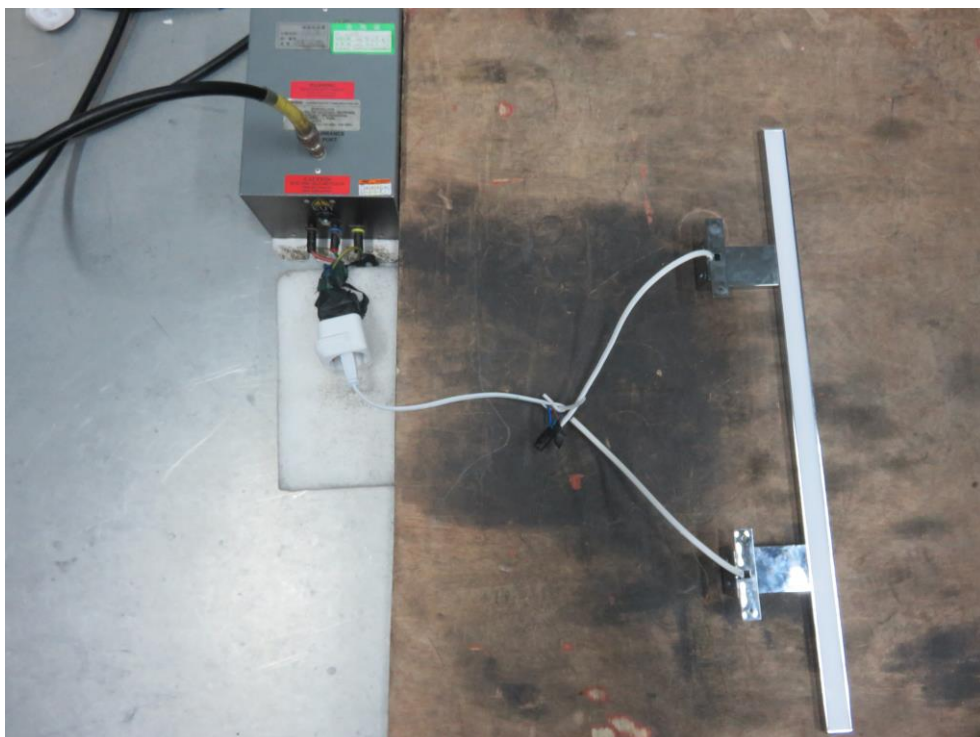
Environmental Phenomena	Test level (in % UT)	Duration (in period of the rated frequency)	Performance criteria	Result
Interruptions	0	0.5 (10ms)	B	Pass
Voltage dips (in % UT) 30	70	10 (200ms)	C	Pass

6 Photographs of the Test Set-Up

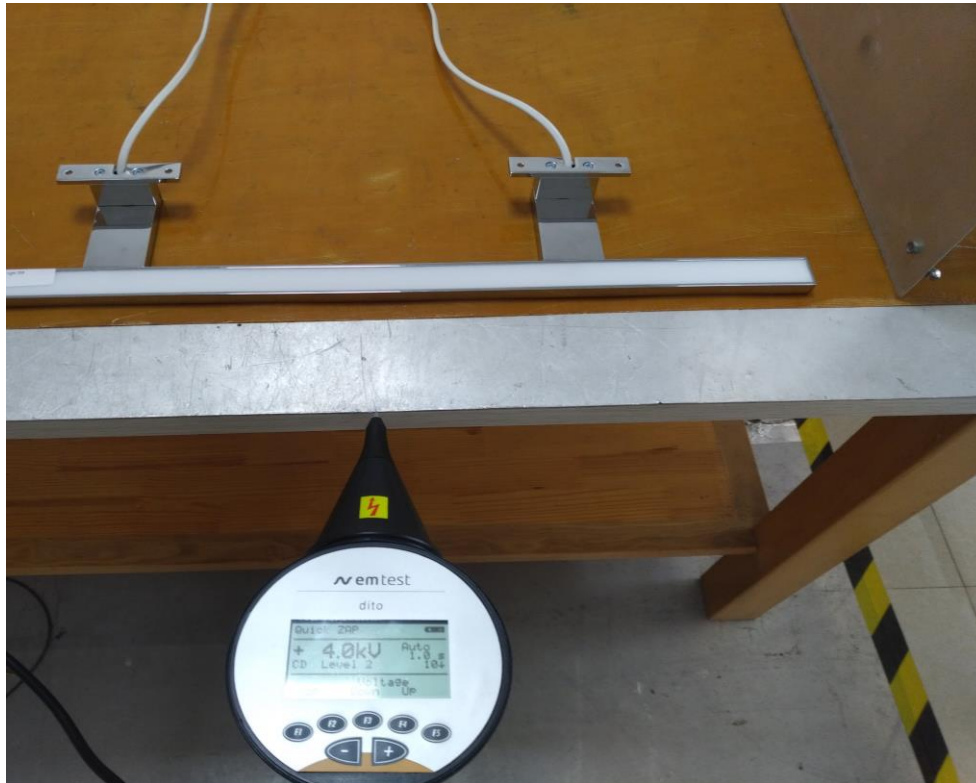
Photograph 1: Set-up for Conducted Emission



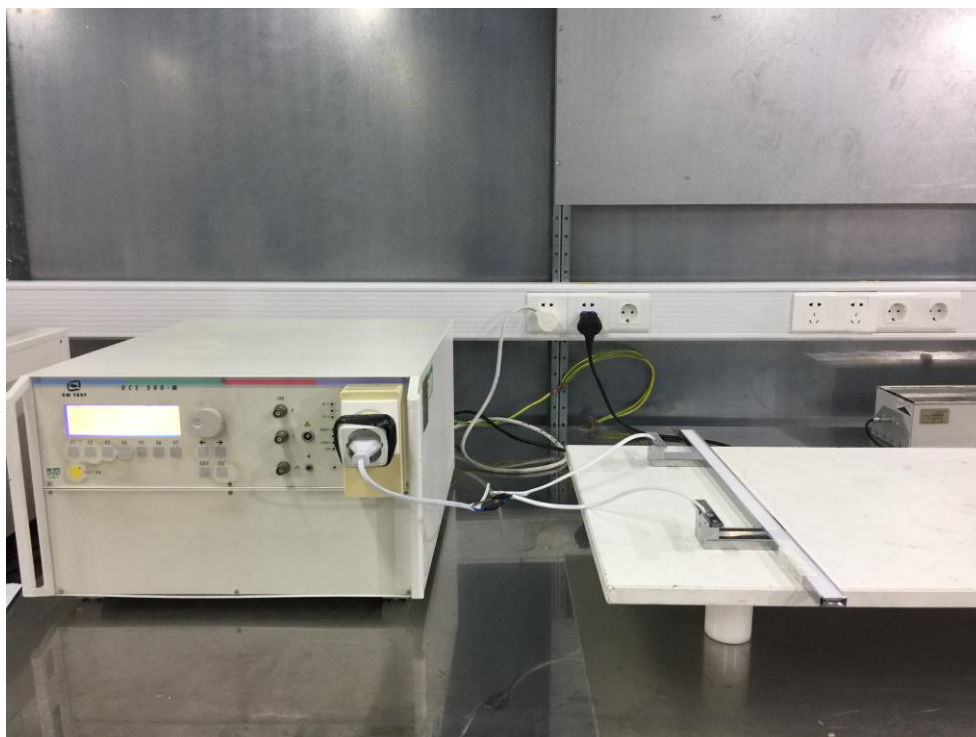
Photograph 2: Set-up for Radiated Emission (CDN Method)



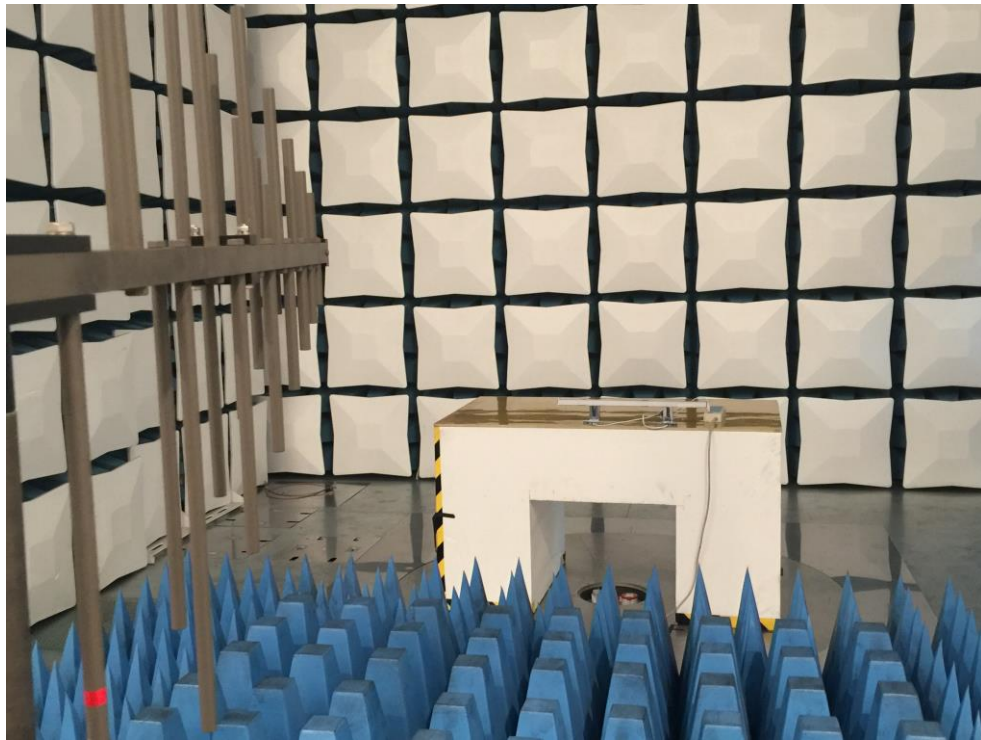
Photograph 3: Set-up for Electrostatic Discharge



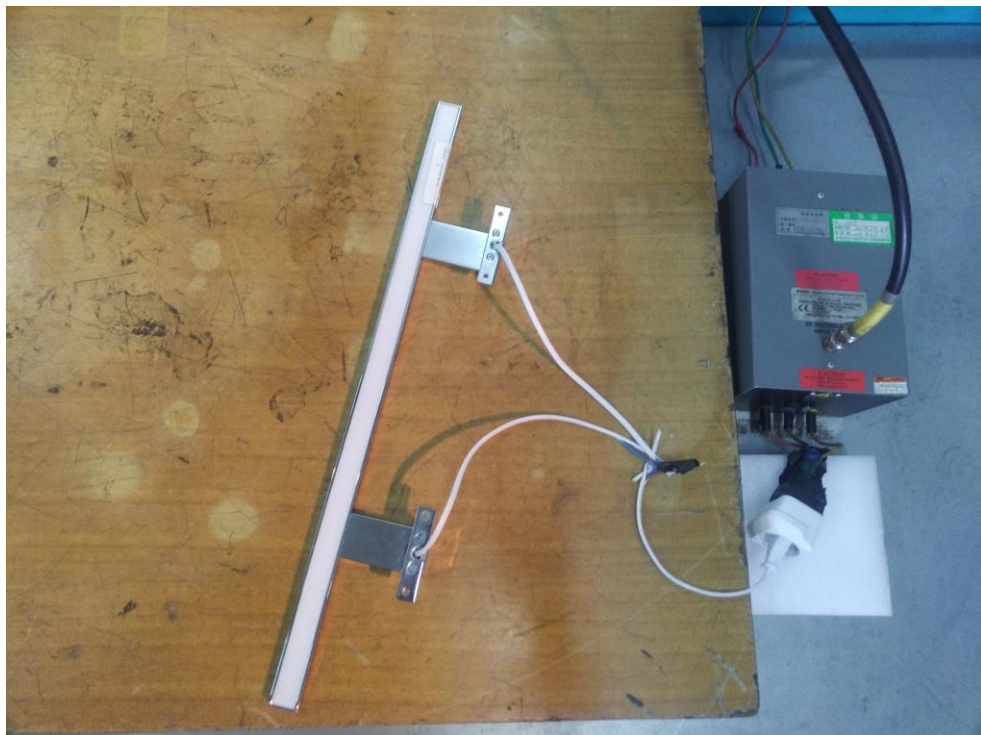
Photograph 4: Set-up for Fast Transient Burst, Surges and Voltage Dips



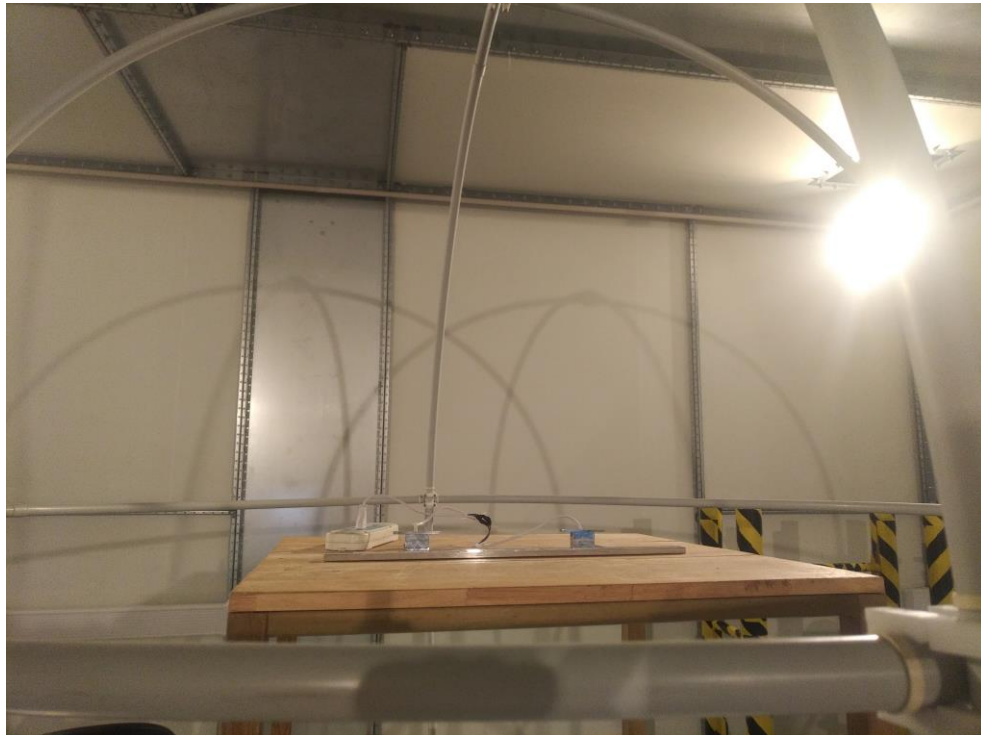
Photograph 5: Set-up for Radiated Susceptibility



Photograph 6: Set-up for Injected Current



Photograph 7: Set-up for Radiated electromagnetic disturbances



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