



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CGZ3150304-00205-E



CTS (Guangzhou) Testing Service Technology Co., Ltd.
A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China.

<p align="center">TEST REPORT EN 55015:2013 Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment. EN 61547:2009 Equipment for general lighting purposes-EMC immunity requirements.</p>	
Report Reference No.	CGZ3150304-00205-E
Date of issue	16 March 2015
Testing Laboratory Name	CTS (Guangzhou) Testing Service Technology Co., Ltd.
Address	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China..
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	ZHONGSHAN PHOTON LIGHTING FACTORY
Address	NO.37 DONGCHENG ROAD, DONGSHENG TOWN, ZHONGSHAN CITY, GUANGDONG PRO., CHINA
Test specification:	
Standard	EN 55015:2013, EN 61547:2009 EN 61000-3-2:2006+A2:2009, EN 61000-3-3:2013
Test Report Form No.	CTSEMC-1.0
TRF Originator	CTS (Guangzhou) Testing Service Technology Co., Ltd.
Master TRF	Dated 2009-01
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Test item description	LED ceiling light
Trade Mark	/
Manufacturer	ZHONGSHAN PHOTON LIGHTING FACTORY
Model/Type reference	PT-LED 436/9
Ratings	AC 220-240V/50Hz, 9*4W(A)
Result	PASSED

Compiled by:

Kate

Kate zhang / File administrators

Supervised by:

Duke

Duke yang / Technique principal

Approved by:

[Signature]

Vincent yao / Manager

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EMC -- TEST REPORT

Test Report No. : CGZ3150304-00205-E	<u>16 March 2015</u> Date of issue
---	---------------------------------------

Type / Model.....	PT-LED 436/9
EUT.....	LED ceiling light
Applicant	ZHONGSHAN PHOTON LIGHTING FACTORY
Address.....	NO.37 DONGCHENG ROAD, DONGSHENG TOWN, ZHONGSHAN CITY, GUANGDONG PRO., CHINA
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Contact.....	Sabrina Suen
Manufacturer	ZHONGSHAN PHOTON LIGHTING FACTORY
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Contact.....	Sabrina Suen

The test report merely corresponds to the test sample.

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1 TEST STANDARDS

The tests were performed according to following standards:

EN 55015:2013 Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment.

EN 61547:2009 Equipment for general lighting purposes-EMC immunity requirements.

EN 61000-3-2:2006+A2:2009 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3:2013 Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	04 March 2015
Testing commenced on	04~14 March 2015
Testing concluded on	16 March 2015

2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

☒ - fulfilled.

☐ - **not** fulfilled.

The equipment under test

☒ - fulfils the EMC requirements cited on page 1.

☐ - **does not** fulfil the EMC requirements cited on page 1.

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage: ☒ AC 230V/50Hz
☐ Other (Specified blank below)

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

☒ - Normal

Operating Mode: Normal

Emissions tests.....: According to EN 55015,, searching for the highest disturbance.

Immunity tests: According to EN 61547, searching for the highest susceptibility.

Harmonic current..... : According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.

3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not Applicable

3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

3.6 Definition related to the performance level

☒ based on the used product standard

☐ based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Criterion D:

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

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4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CTS (Guangzhou) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CTS (Guangzhou) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

FCC-Registration No.: 971995

CTS (Guangzhou) Testing Service Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13, 2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

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4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance	EN 55015:2013	-----	PASS
Radiated Disturbance (Magnetic)	EN 55015:2013	-----	PASS
Radiated Disturbance (Electric)	EN 55015:2013	-----	PASS
Harmonic current emissions	EN 61000-3-2: 2006+A2:2009	Class C	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	PASS
IMMUNITY (EN 61547:2009)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2: 2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	PASS
Surge	IEC 61000-4-5: 2005	B	PASS
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6: 2008	A	PASS
Power frequency magnetic field	IEC 61000-4-8: 2009	A	PASS
Voltage dips 30%	IEC 61000-4-11: 2004	C	PASS
Interruptions 100%		B	PASS
N/A is an abbreviation for Not Applicable.			

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5 TEST CONDITIONS AND RESULTS

5.1 Conducted disturbance

For test instruments and accessories used see section 6 part 6.1.

5.1.1 Description of the test location

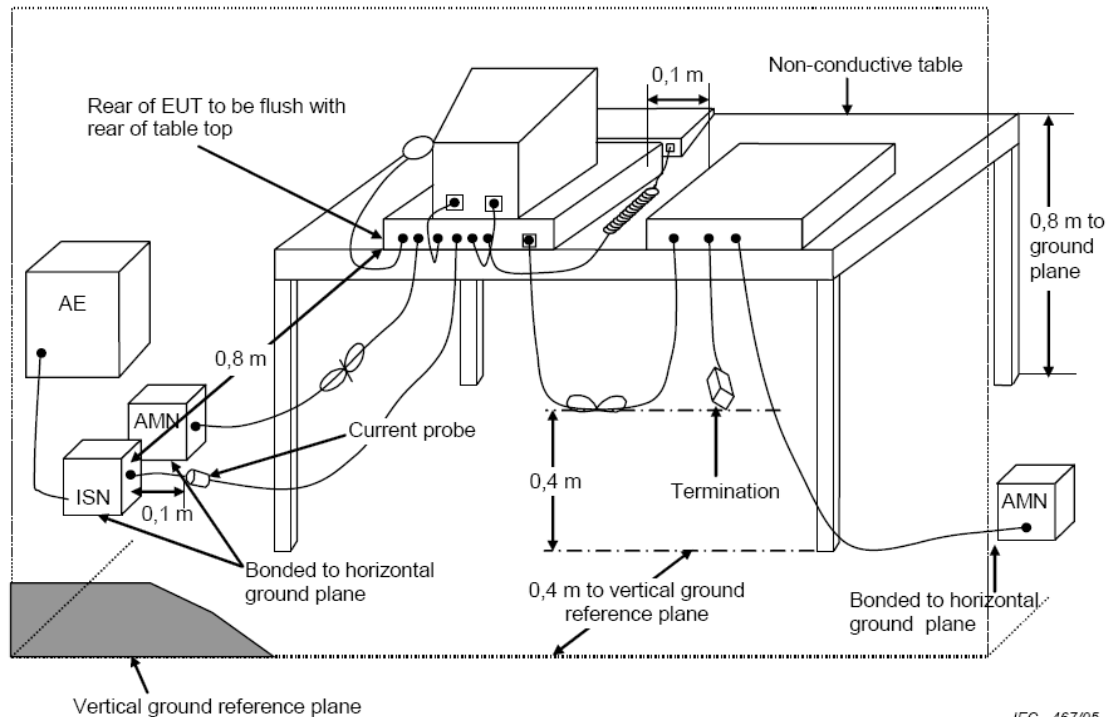
Test location: Shielded room

5.1.2 Description of the test set-up

5.1.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.1.2.2 Block Diagram of Test Setup



IEC 467/05

5.1.3 Limits disturbance

Frequency	At mains terminals (dB μ V)	
	Quasi-peak Level	Average Level
9kHz ~ 50kHz	110	--
50kHz ~ 150kHz	90 ~ 80*	--
150kHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

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5.1.4 Test result

The requirements are	Fulfilled
Band width	200Hz for 9KHz to 0.15MHz, and 9kHz for 0.15MHz to 30MHz
Frequency range	9kHz - 30 MHz
Min. limit margin	>9.98 dB at 9kHz - 30 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

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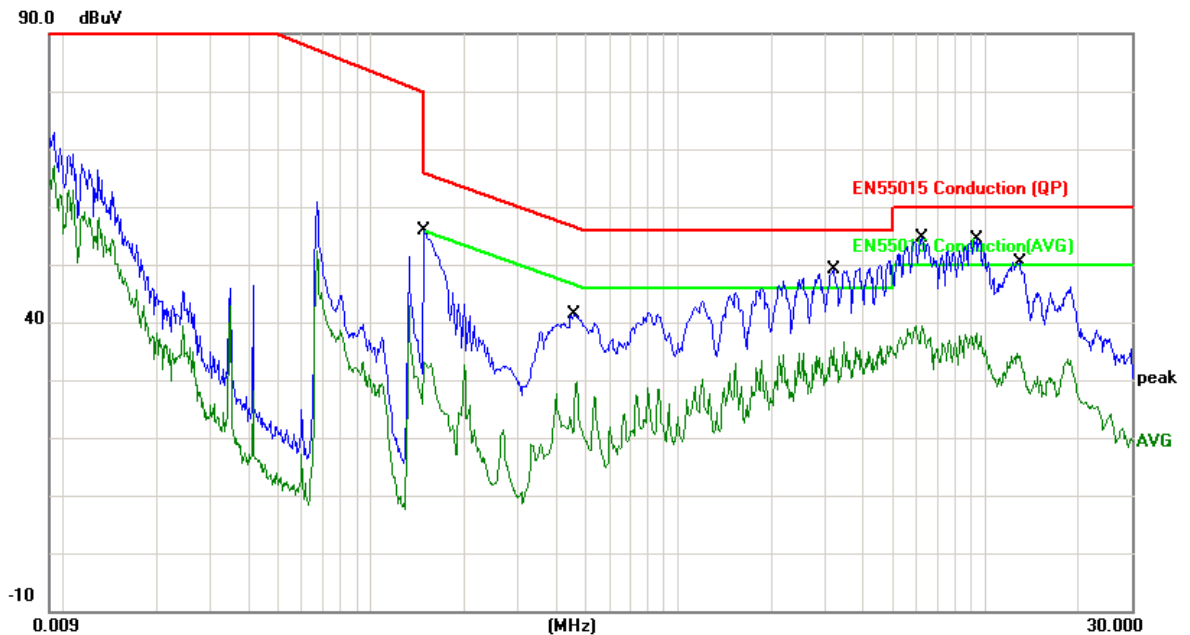
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5.1.5 Test protocol

Test point	L	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			

EUT	LED ceiling light
Operating Condition	AC 230V/50Hz
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric
MODEL NO.	PT-LED 436/9



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1502	9.78	44.56	54.34	65.98	-11.64	QP
2	0.1502	9.78	25.27	35.05	55.98	-20.93	AVG
3	0.4580	9.83	27.82	37.65	56.73	-19.08	QP
4	0.4580	9.83	11.18	21.01	46.73	-25.72	AVG
5	3.2180	9.89	34.83	44.72	56.00	-11.28	QP
6	3.2180	9.89	22.37	32.26	46.00	-13.74	AVG
7	6.2460	9.90	38.84	48.74	60.00	-11.26	QP
8	6.2460	9.90	27.92	37.82	50.00	-12.18	AVG
9	9.4020	9.89	37.14	47.03	60.00	-12.97	QP
10	9.4020	9.89	24.95	34.84	50.00	-15.16	AVG
11	12.9060	9.92	33.35	43.27	60.00	-16.73	QP
12	12.9060	9.92	21.80	31.72	50.00	-18.28	AVG

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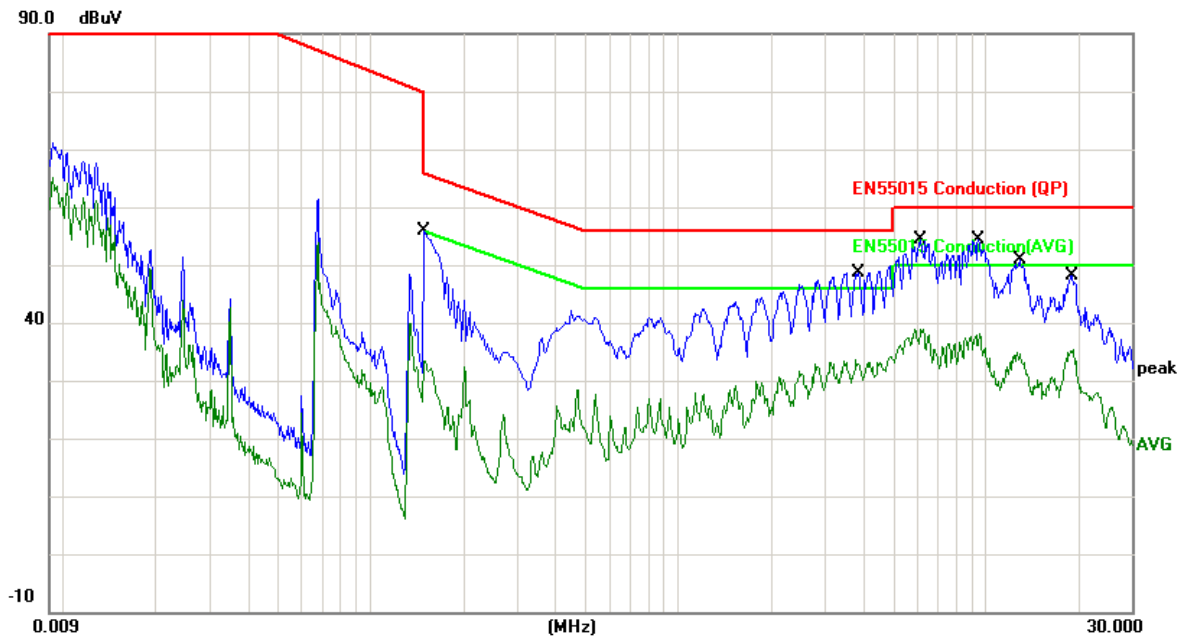
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Test point:	N	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1502	9.78	44.49	54.27	65.98	-11.71	QP
2	0.1502	9.78	25.01	34.79	55.98	-21.19	AVG
3	3.8780	9.90	35.96	45.86	56.00	-10.14	QP
4	3.8780	9.90	22.53	32.43	46.00	-13.57	AVG
5	6.2100	9.90	40.12	50.02	60.00	-9.98	QP
6	6.2100	9.90	27.36	37.26	50.00	-12.74	AVG
7	9.5580	9.89	37.61	47.50	60.00	-12.50	QP
8	9.5580	9.89	24.21	34.10	50.00	-15.90	AVG
9	13.0060	9.92	32.84	42.76	60.00	-17.24	QP
10	13.0060	9.92	22.74	32.66	50.00	-17.34	AVG
11	19.3340	10.00	31.85	41.85	60.00	-18.15	QP
12	19.3340	10.00	24.01	34.01	50.00	-15.99	AVG

Note: Level=Reading+Factor. Margin= Limit-Level

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5.2 Radiated disturbance (magnetic field)

For test instruments and accessories used see section 6 part **6.2**.

5.2.1 Description of the test location

Test location : Shielded room

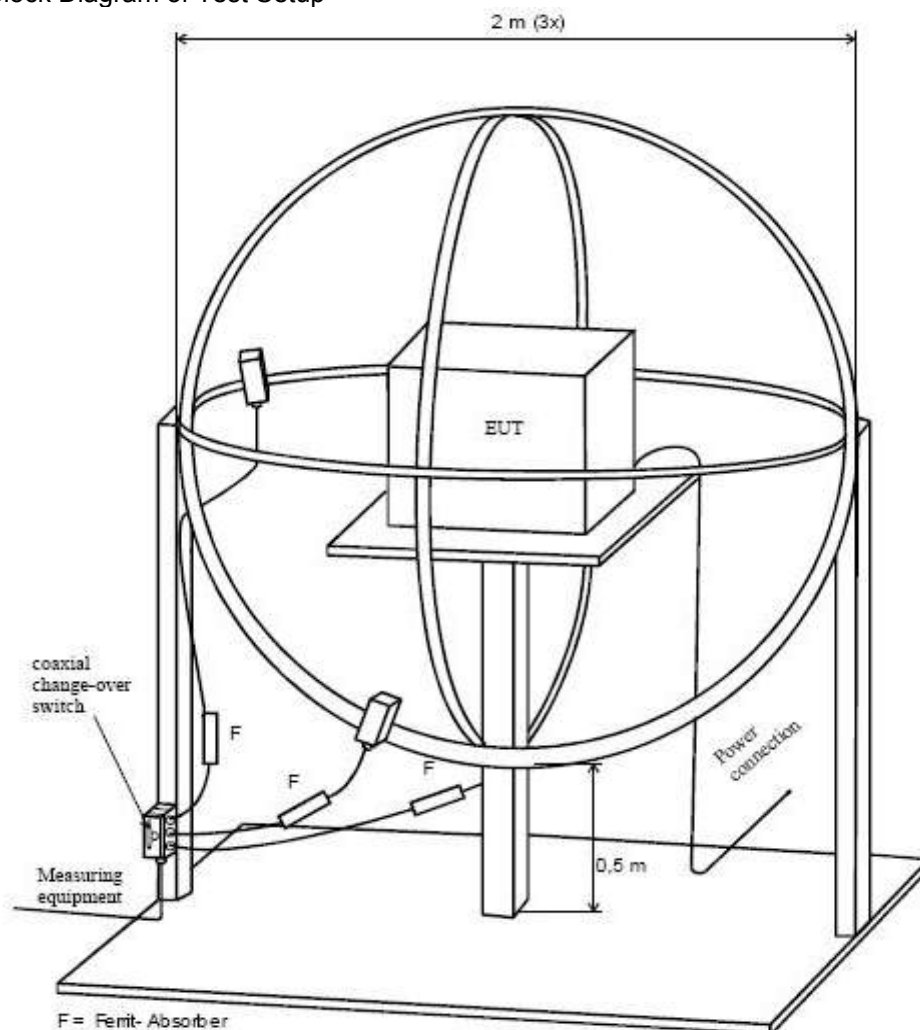
Test disturbance: 2 Meter

5.2.2 Description of the test set-up

5.2.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.2.2.2 Block Diagram of Test Setup



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5.2.3 Limits of disturbance

Frequency	Limits for loop diameter (dB μ A)	
	2m	
9kHz ~ 70kHz	88	
70kHz ~ 150kHz	88 ~ 58*	
150kHz ~ 3.0MHz	58 ~ 22*	
3.0MHz ~ 30MHz	22	

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

5.2.4 Test result

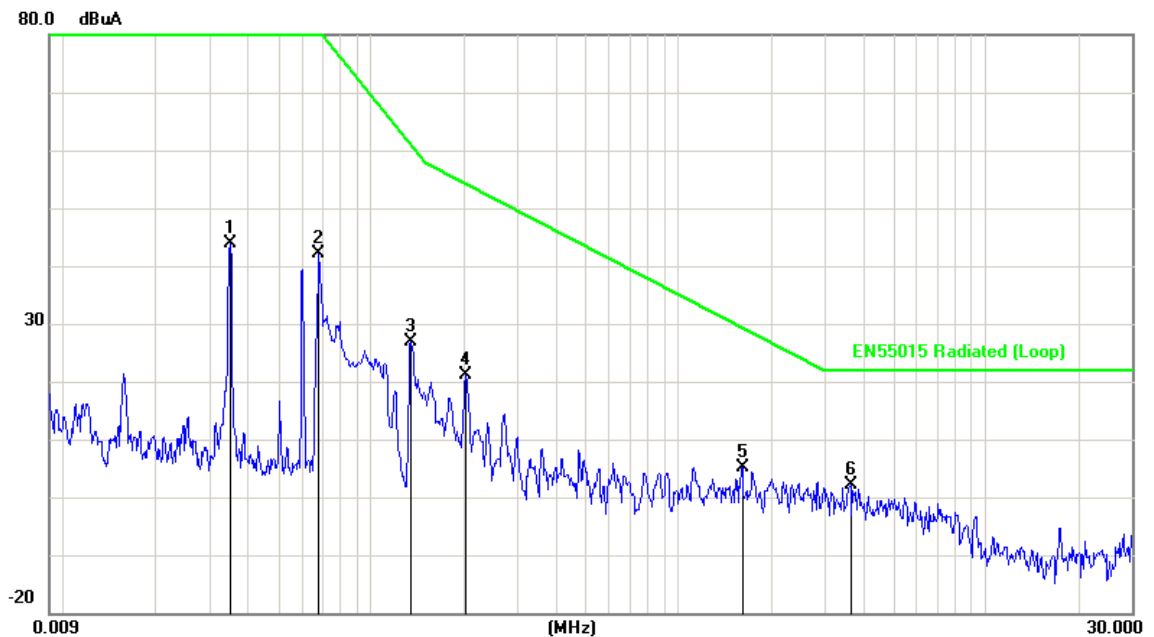
The requirements are	Fulfilled
Band width	200Hz for 9KHz to 0.15MHz, and 9kHz for 0.15MHz to 30MHz
Frequency range	9kHz - 30 MHz
Min. limit margin MHz	>19.84 dB at 9kHz- 30MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.2.5 Test protocol

Test point:	X	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			

EUT	LED ceiling light
Operating Condition	Normal
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric
MODEL NO.	PT-LED 436/9



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0349	47.25	-3.45	43.80	88.00	-44.20	peak
2	0.0678	47.44	-5.41	42.03	88.00	-45.97	peak
3	0.1352	47.57	-20.73	26.84	62.09	-35.25	peak
4	0.2044	47.71	-26.63	21.08	54.28	-33.20	peak
5	1.6177	46.88	-41.63	5.25	29.42	-24.17	peak
6	3.6406	44.77	-42.61	2.16	22.00	-19.84	peak

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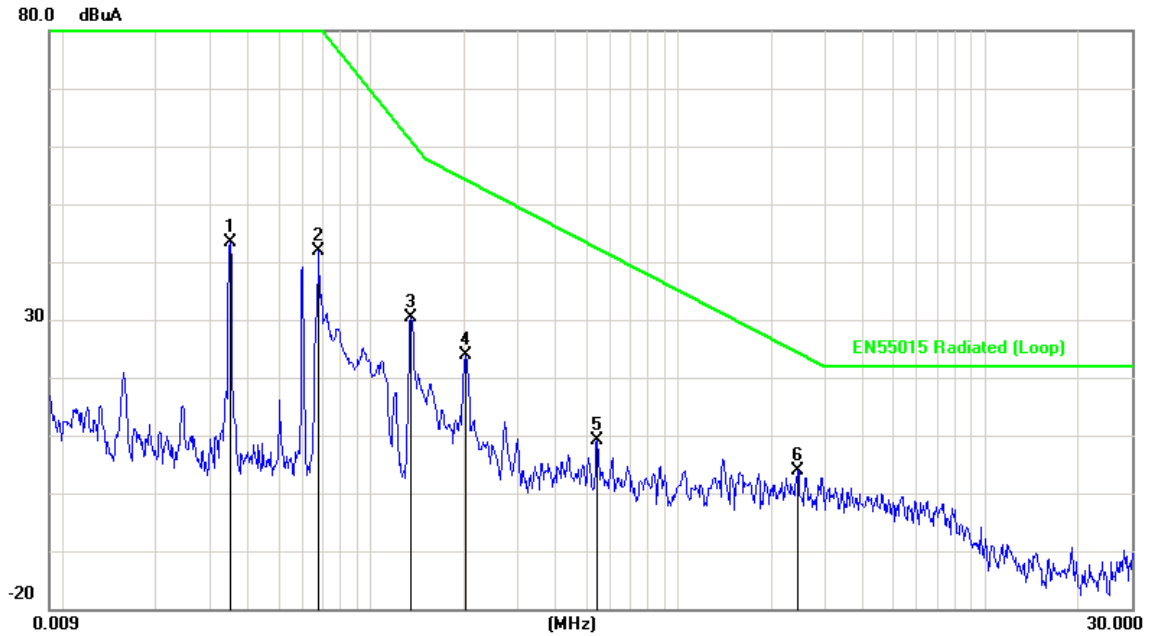
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Test point:	Y	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0349	46.90	-3.46	43.44	88.00	-44.56	peak
2	0.0678	47.04	-5.20	41.84	88.00	-46.16	peak
3	0.1352	47.31	-17.01	30.30	62.09	-31.79	peak
4	0.2028	47.69	-23.70	23.99	54.38	-30.39	peak
5	0.5455	47.48	-38.24	9.24	42.49	-33.25	peak
6	2.4465	45.92	-42.06	3.86	24.45	-20.59	peak

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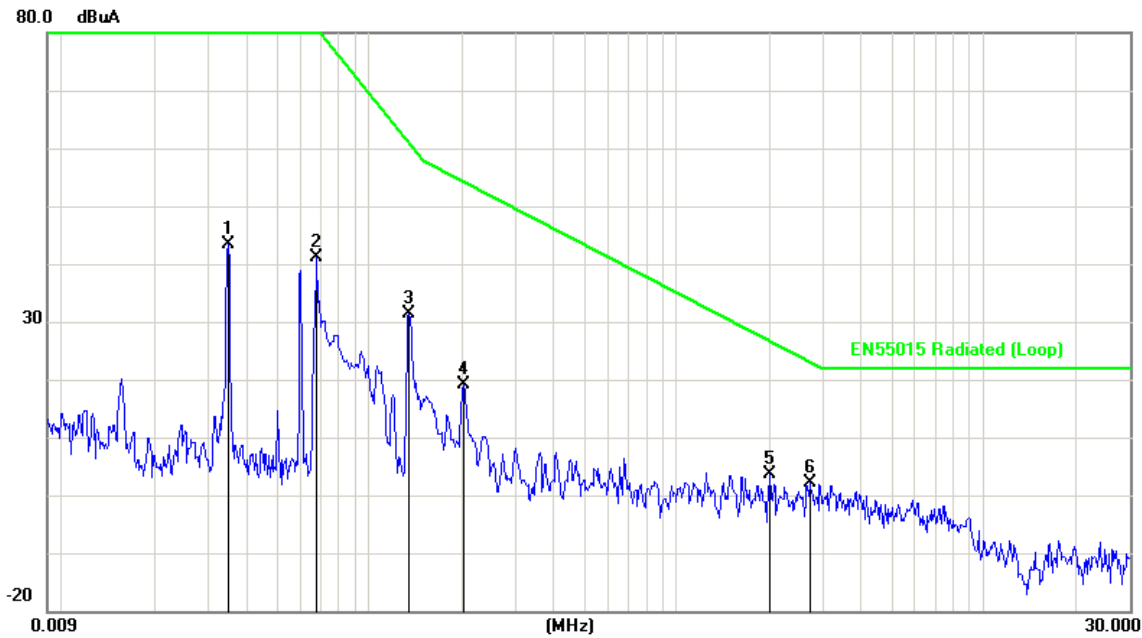
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Test point:	Z	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0349	46.65	-3.22	43.43	88.00	-44.57	peak
2	0.0678	46.84	-5.61	41.23	88.00	-46.77	peak
3	0.1352	47.14	-15.86	31.28	62.09	-30.81	peak
4	0.2028	47.21	-28.08	19.13	54.38	-35.25	peak
5	2.0137	46.29	-42.68	3.61	26.79	-23.18	peak
6	2.7186	45.58	-43.54	2.04	23.18	-21.14	peak

Note:Level=Reading+Factor. Margin= Limit-Level
Factor=Antenna factor+Cable loss

5.3 Radiated disturbance (Electric field)

For test instruments and accessories used see section 6 part 6.3.

5.3.1 Description of the test location

Test location : Semi-Anechoic chamber

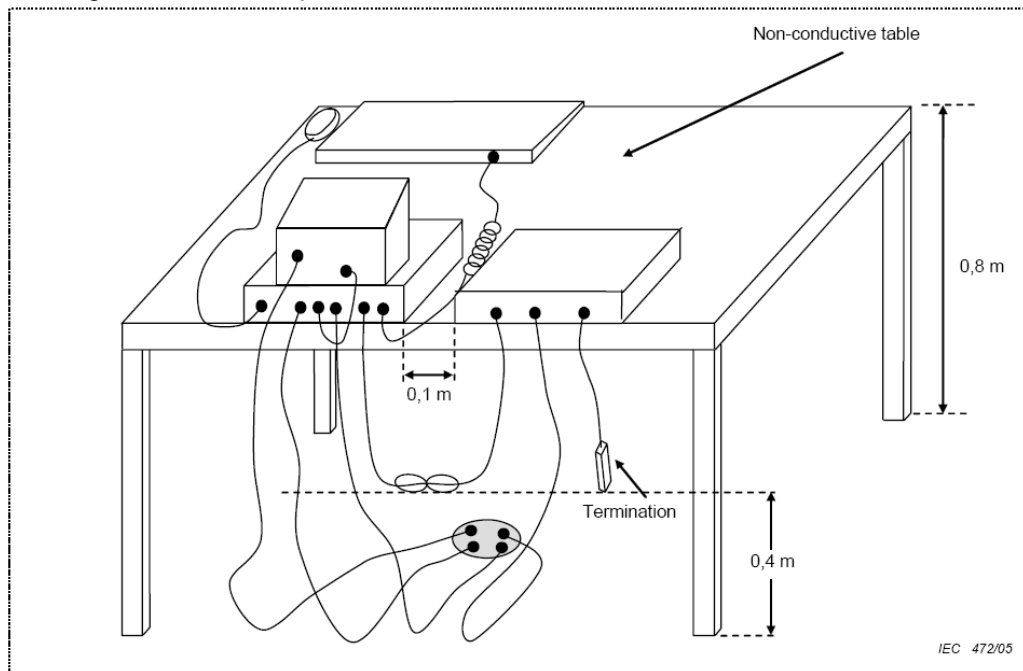
Test disturbance: 3 Meter

5.3.2 Description of the test set-up

5.3.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.3.2.2 Block Diagram of Test Setup



5.3.3 Limits of disturbance

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	40
230 ~ 300	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.



5.3.4 Test result

The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 300 MHz
Min. limit margin	>2.41 dB at 30 - 300 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

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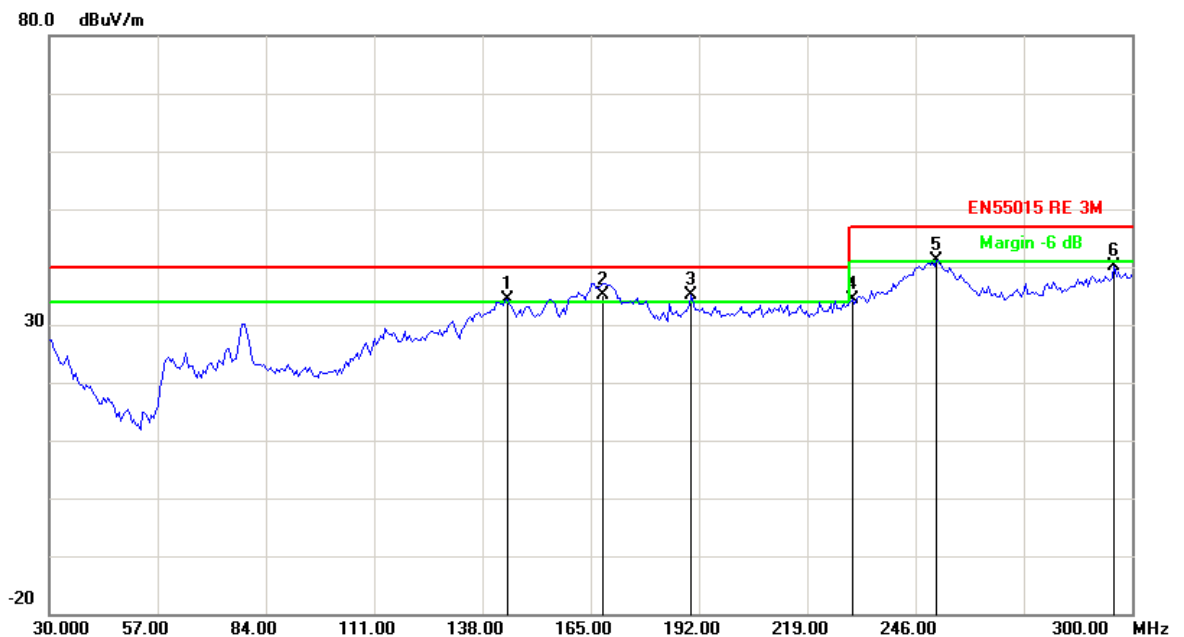
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5.3.5 Test protocol

Test point:	Horizontal	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			

EUT	LED ceiling light
Operating Condition	Normal
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Eric
MODEL NO.	PT-LED 436/9



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	144.1683	-22.78	57.17	34.39	40.00	-5.61	QP
2	167.9760	-23.10	58.20	35.10	40.00	-4.90	QP
3	190.1603	-18.02	53.10	35.08	40.00	-4.92	QP
4	230.2004	-18.36	52.66	34.30	47.00	-12.70	QP
5	251.3026	-18.75	59.86	41.11	47.00	-5.89	QP
6	295.6713	-12.50	52.67	40.17	47.00	-6.83	QP

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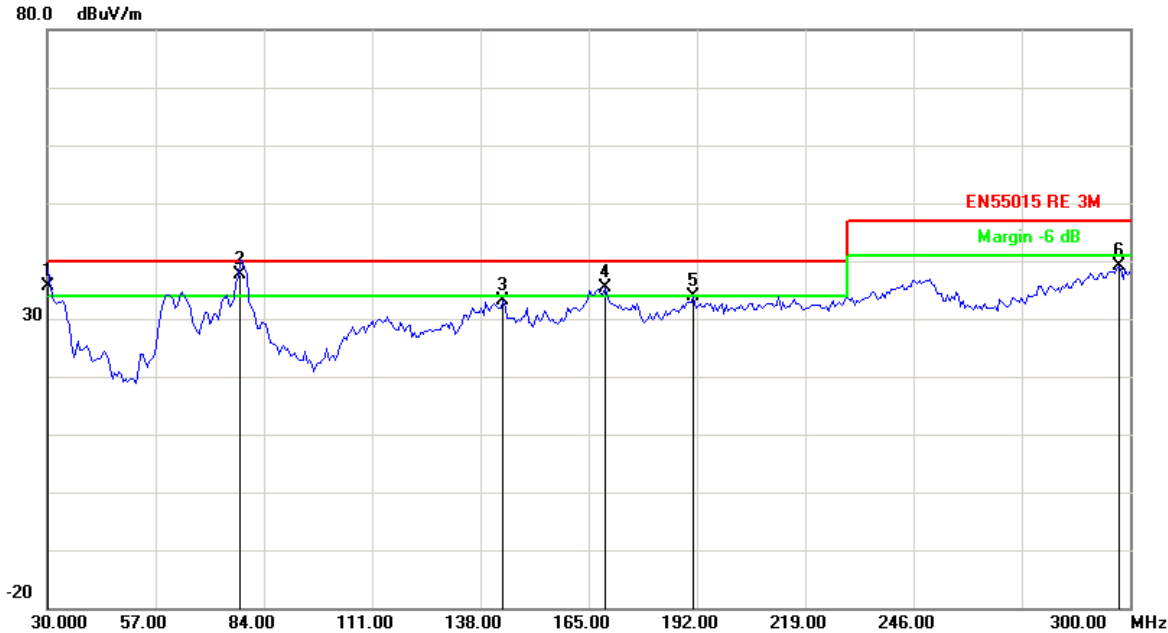
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Test point:	Vertical	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.0000	-24.45	60.09	35.64	40.00	-4.36	QP
2	78.1563	-27.42	65.01	37.59	40.00	-2.41	QP
3	143.6272	-22.73	55.86	33.13	40.00	-6.87	QP
4	169.0581	-22.85	58.12	35.27	40.00	-4.73	QP
5	191.2424	-18.09	51.86	33.77	40.00	-6.23	QP
6	297.2945	-12.34	51.40	39.06	47.00	-7.94	QP

Note:Level=Reading+Factor. Margin= Limit-Level

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5.4 Harmonic current

For test instruments and accessories used see section 6 part 6.4.

5.4.1 Description of the test location

Test location : Test location no. 1

5.4.2 Limits of harmonic current

Test configuration and procedure see clause 7.3 of standard EN 61000-3-2:2006+A2:2009.

There is no need for Harmonics test to be performed on this product(not discharge lighting equipment, and rated power is less than 75W) in accordance with EN 61000-3-2.

For further detail, please refer to Clause 7 and 7.3b) of EN 61000-3-2 which state:

" For the following categories of equipment, limits are not specified in this edition of the standard:

-equipment with a rated power of 75W or less, other than lighting equipment "

" Limits for Class C equipment

a) Active input power > 25W

For lighting equipment having an active input power greater than 25W, the harmonic currents shall not exceed the relative limits given in Table 2.

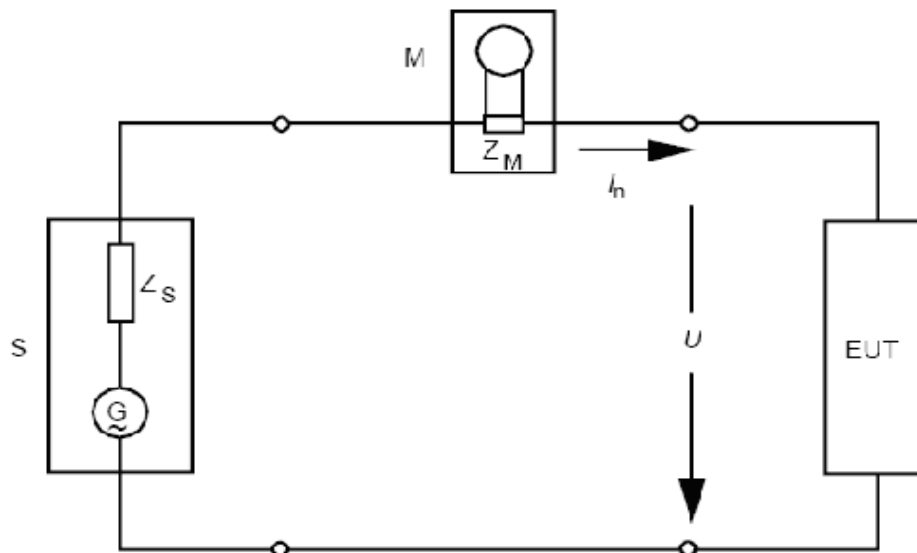
b) Discharge lighting equipment having an active power smaller or equal to 25W shall comply with one of the following two sets of requirements "

5.4.3 Description of the test set-up

5.4.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.4.3.2 Block Diagram of Test Setup



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5.4.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.4.5 Test protocol

Operation mode	Normal	Result:	<input checked="" type="checkbox"/> - passed
Remarks:			<input type="checkbox"/> - not passed

Standard used:	EN 61000-3-2 Quasi-Stationary – Equipment class C
Observation time:	5 min
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Mains supply voltage:	AC 230V/50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106kPa
E. U. T.:	LED ceiling light
M/N:	PT-LED 436/9
Date of test:	12 March 2015
Tester:	Eric

Test result	
E. U. T.:	PASS
Power Source:	PASS

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	Order (n): None
Harmonic(s) with average > 150%:	Order (n): None

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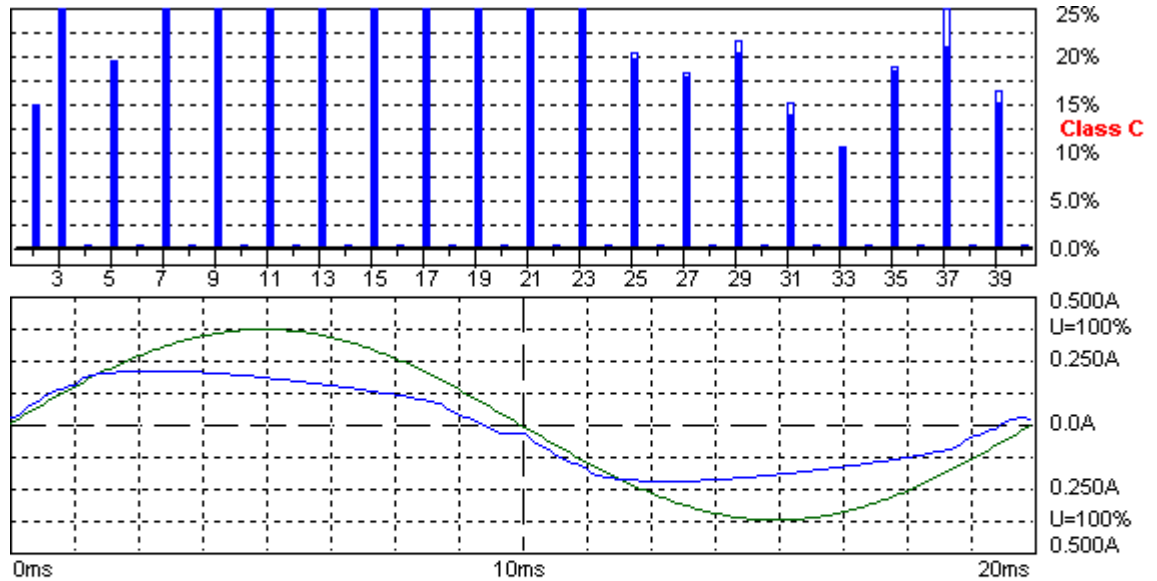
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Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

2015-3-12 14:41:02

Urms = 229.9 V P = 34.57 W THD(I) = 14.0 %
 Irms = 0.158 A pf = 0.952 H1 (I) = 0.156 A

Range: 0.5 A
 V-nom: 230 V
 TestTime: 10 min (10)

CLARK

Test completed, Result: PASSED

HAR-1000 EMC-Par

Order	Freq. [Hz]	Irms [A]	Imax [A]	Limit [A]	Status	Remarks
1	50	0.1563	0.1575			
2	100	0.0005	0.0005	0.0031		
3	150	0.0203	0.0206	0.0446		
4	200	0.0002	0.0002			
5	250	0.0030	0.0030	0.0156		
6	300	0.0001	0.0001			
7	350	0.0042	0.0043	0.0109		
8	400	0.0002	0.0002			
9	450	0.0038	0.0038	0.0078		
10	500	0.0002	0.0002			
11	550	0.0023	0.0024	0.0047		
12	600	0.0001	0.0001			
13	650	0.0014	0.0015	0.0047		
14	700	0.0001	0.0001			
15	750	0.0013	0.0013	0.0047		
16	800	0.0001	0.0001			
17	850	0.0013	0.0013	0.0047		
18	900	0.0001	0.0001			
19	950	0.0018	0.0018	0.0047		
20	1000	0.0002	0.0002			
21	1050	0.0020	0.0021	0.0047		

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22	1100	0.0002	0.0002			
23	1150	0.0016	0.0016	0.0047		
24	1200	0.0002	0.0002			
25	1250	0.0009	0.0009	0.0047		
26	1300	0.0001	0.0001			
27	1350	0.0008	0.0009	0.0047		
28	1400	0.0002	0.0002			
29	1450	0.0009	0.0010	0.0047		
30	1500	0.0002	0.0002			
31	1550	0.0006	0.0007	0.0047		
32	1600	0.0001	0.0001			
33	1650	0.0005	0.0005	0.0047		
34	1700	0.0001	0.0001			
35	1750	0.0009	0.0009	0.0047		
36	1800	0.0002	0.0002			
37	1850	0.0010	0.0010	0.0047		
38	1900	0.0002	0.0002			
39	1950	0.0007	0.0008	0.0047		
40	2000	0.0001	0.0001			

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5.5 Voltage fluctuations and flicker

For test instruments and accessories used see section 6 part 6.5.

5.5.1 Description of the test location

Test location : Test location no. 1

5.5.2 Limits of voltage fluctuation and flicker

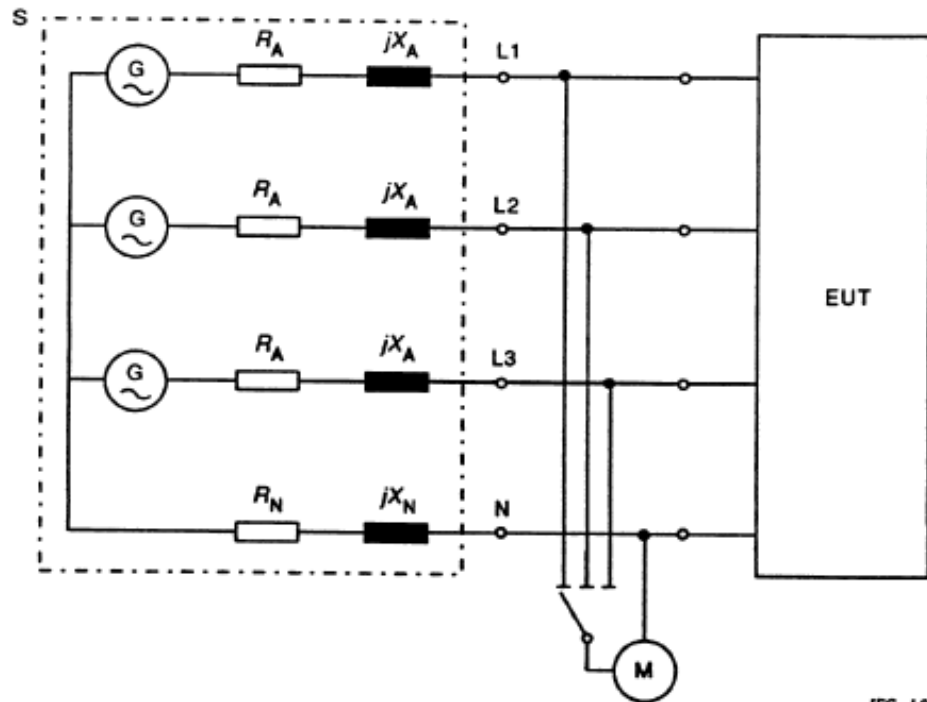
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013.

5.5.3 Description of the test set-up

5.5.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.5.3.2 Block Diagram of Test Setup



IEC 1035/94

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5.5.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.5.5 Test protocol

Operation mode	Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Remarks:			

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Mains supply voltage:	AC 230V/50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106kPa
E. U. T.:	LED ceiling light
M/N:	PT-LED 436/9
Date of test:	12 March 2015
Tester:	Eric

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.07	1.00	PASS
dc [%]	0.00	3.30	PASS
dmax [%]	0.00	4.00	PASS
dt [s]	0.00	0.50	PASS

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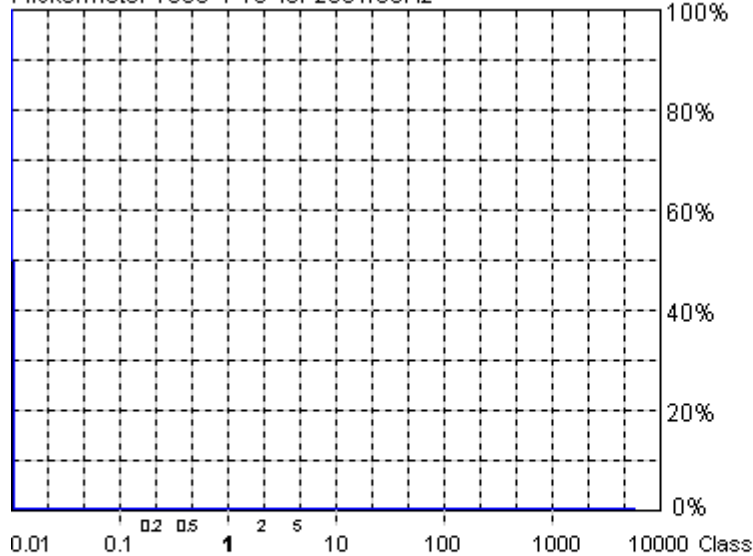
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Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	0.00
Short-term Flicker (Pst):	0.07
Limit (Pst):	1.00
Long-term Flicker (Plt):	0.07
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	0.00%
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	0.00%
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	0.00ms
Limit (dt>Lim):	200ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)

2015-3-12 17:38:20

Urms = 229.7 V P = 34.56 W
 Irms = 0.158 A pf = 0.952

Range: 0.5 A
 V-nom: 230 V
 TestTime: 10 min (100%)

CLARK

Test completed, Result: PASSED

HAR-1000 EMC-Parber

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5.6 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.6.

5.6.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Operate mode:	Normal
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.6.2 Severity of levels electrostatic discharge

5.6.2.1 Severity level: Contact discharge at $\pm 4\text{KV}$ air discharge at $\pm 8\text{KV}$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

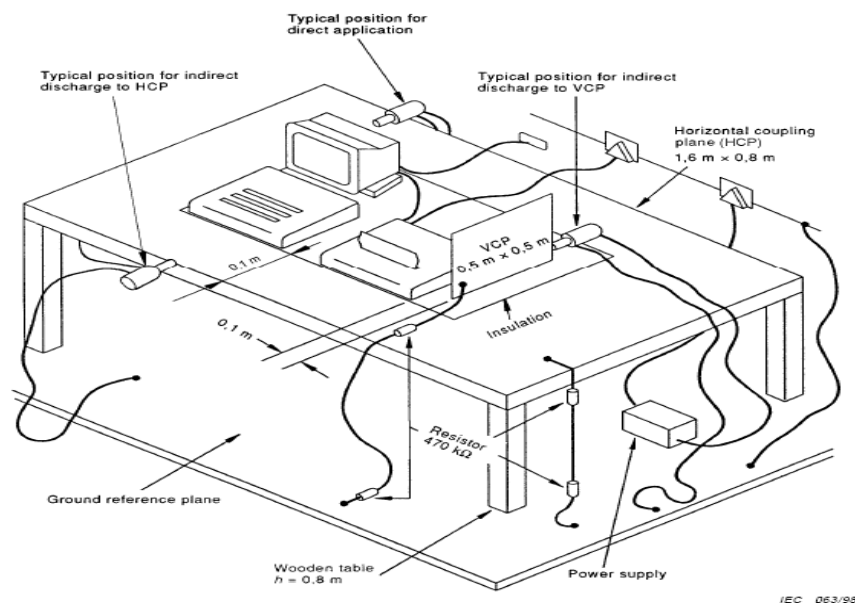
5.6.2.2 Performance criterion: B

5.6.3 Description of the test set-up

5.6.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.6.3.2 Block Diagram of Test Setup



IEC 063/98

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5.6.4 Test specification:

Contact discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV
Air discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV <input type="checkbox"/> 8 kV
Discharge impedance:	<input type="checkbox"/> 330 Ω / 150 pF	
Discharge factor:	<input type="checkbox"/> ≥ 1 sec.	
Number of discharges:	<input type="checkbox"/> ≥ 10	
Type of discharge:	Direct discharge	<input type="checkbox"/> Air discharge
		<input type="checkbox"/> Contact discharge
	Indirect discharge	<input type="checkbox"/> Contact discharge
Polarity:	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative
Discharge location:	<input type="checkbox"/> see photo documentation of the test set-up	
	<input type="checkbox"/> all external locations accessible by hand	
	<input type="checkbox"/> horizontal plate (HCP)	
	<input type="checkbox"/> vertical coupling plate (VCP)	

5.6.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.7 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.7.

5.7.1 Description of the test location

Test location :	GTEM chamber
Power supply:	AC 230V/50Hz
Operate mode:	Normal
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.7.2 Severity levels of radiated, Radio-frequency, electromagnetic field

5.7.2.1 Severity level: 3V/m

Level	Field strenght(V/m)
1	1
2	3
3	10
X	Special

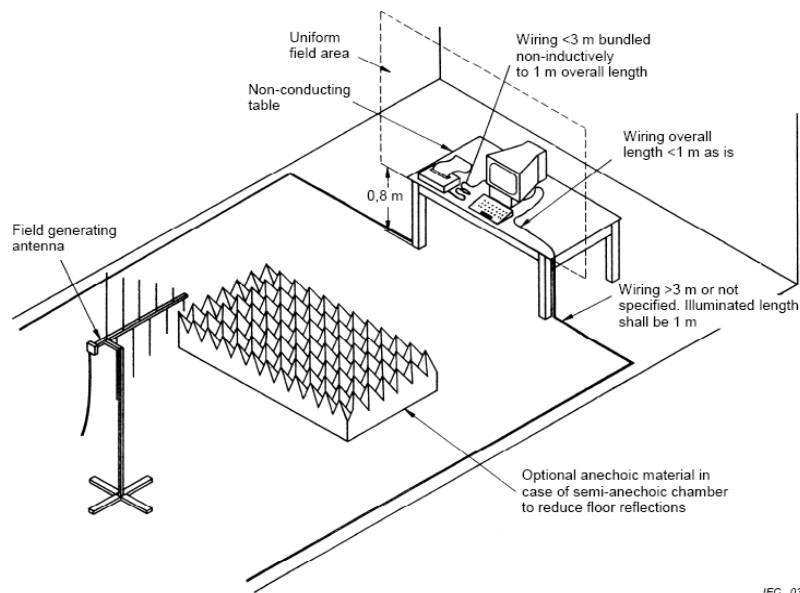
5.7.2.2 Performance criterion: A

5.7.3 Description of the test set-up

5.7.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.7.3.2 Block Diagram of Test Setup



IEC 034/06

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5.7.4 Test specification:

Frequency range:	■ 80 MHz to 1000 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal ■ vertical

5.7.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.8 Electrical fast transients / Burst

For test instruments and accessories used see section 6 part 6.8.

5.8.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.8.2 Severity levels of electrical fast transients / Burst

5.8.2.1 Severity level: $\pm 1000\text{V}$ for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak (KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

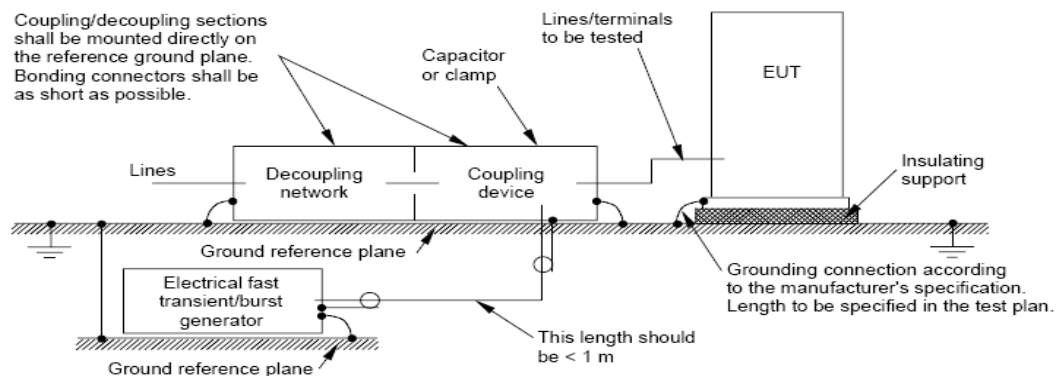
5.8.2.2 Performance criterion: B

5.8.3 Description of the test set-up

5.8.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.8.3.2 Block Diagram of Test Setup



IEC 900/04

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5.8.4 Test specification:

Coupling network:	<input checked="" type="checkbox"/> 0.5 kV <input checked="" type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV
Coupling clamp:	<input type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV
Burst frequency:	<input checked="" type="checkbox"/> 5.0 kHz
Coupling duration:	<input checked="" type="checkbox"/> ≥ 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

5.8.5 Coupling points

Cable description:	AC power line: L ,N, L+N
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

5.8.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.9 Surge

For test instruments and accessories used see section 6 part 6.9.

5.9.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.9.2 Severity levels of surge

5.9.2.1 Severity level: Line to line: $\pm 1\text{KV}$, Line to earth: $\pm 2\text{KV}$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

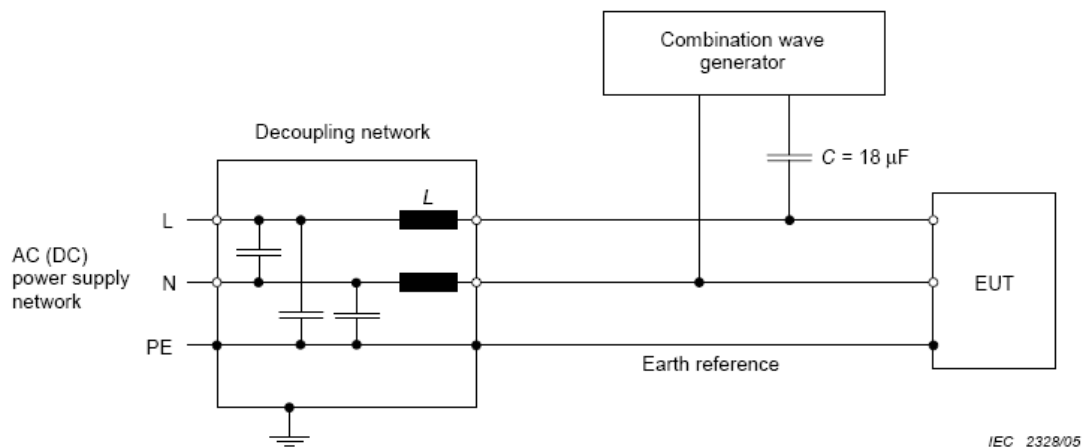
5.9.2.2 Performance Criterion: B

5.9.3 Description of the test set-up

5.9.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.9.3.2 Block Diagram of Test Setup



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5.9.4 Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 Ω + 18 μ F	<input checked="" type="checkbox"/> 0.5 kV <input checked="" type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Pulse amplitude-Power line unsym.: Source impedance: 12 Ω + 9 μ F	<input type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Number of surges:	<input checked="" type="checkbox"/> 5 Surges/Phase angle
Phase angle:	<input checked="" type="checkbox"/> 0 ° <input checked="" type="checkbox"/> 90 ° <input checked="" type="checkbox"/> 180 ° <input checked="" type="checkbox"/> 270 °
Repetition rate:	<input checked="" type="checkbox"/> 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

5.9.5 Coupling points

Cable description:	AC power line: L+N
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

5.9.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.10 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6 part 6.10.

5.10.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.10.2 Severity levels of conducted disturbances induced by radio-frequency fields discharge

5.10.2.1 Severity Level: 3V

Level	Field Strength (V)
1	1
2	3
3	10
X	Special

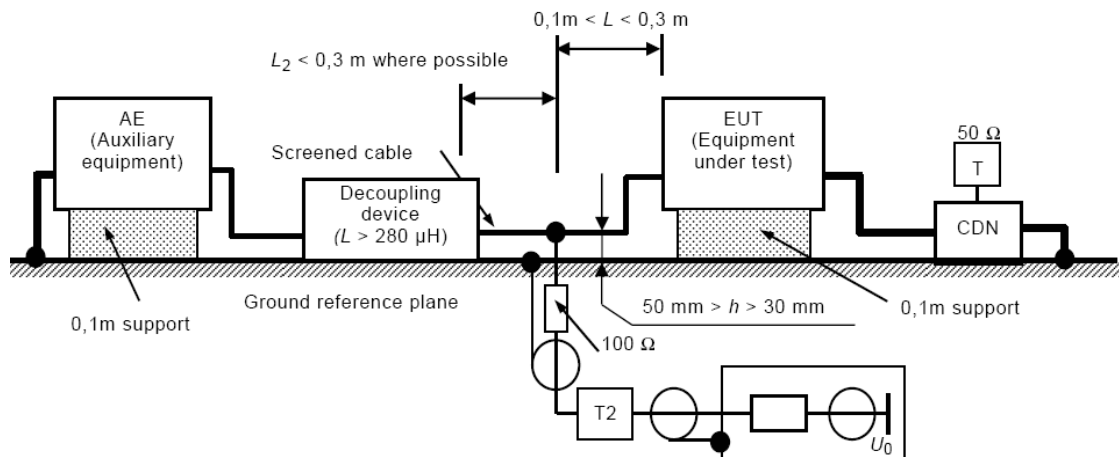
5.10.2.2 Performance Criterion: A

5.10.3 Description of the test set-up

5.10.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.10.3.2 Block Diagram of Test Setup



IEC 1586/03

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5.10.4 Test specification:

Frequency range:	■ 0.15 MHz to 80MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

5.10.5 Coupling points

Cable description (Port1):	AC power line: L+N	
Screening:	<input type="checkbox"/> screened	■ unscreened
Status:	<input type="checkbox"/> passive	■ active
Signal transmission:	■ analogue	<input type="checkbox"/> digital
Length:	■ 0.3 m	

5.10.6 Test resultThe requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.11 Power frequency magnetic field

For test instruments and accessories used see section 6 part 6.11.

5.11.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.11.2 Severity levels of magnetic field immunity

5.11.2.1 Severity Level: 3A/m

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X	Special

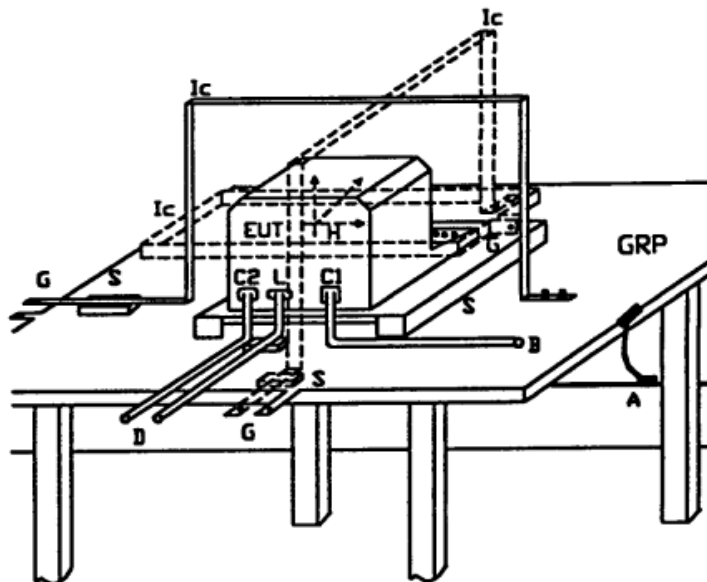
5.11.2.2 Performance Criterion: A

5.11.3 Description of the test set-up

5.11.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.11.3.2 Block Diagram of Test Setup



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5.11.4 Test specification:

Test frequency:	■ 50 Hz		
Continuous field:	■ 3 A/m		
Duration (Continuous field):	■ 60 s each Axis		
Short duration (1-3s):	■ 3s		
Axis:	■ x-axis	■ y-axis	■ z-axis

5.11.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.12 Voltage dips

For test instruments and accessories used see section 6 part 6.12.

5.12.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.12.2 Severity levels of voltage dips

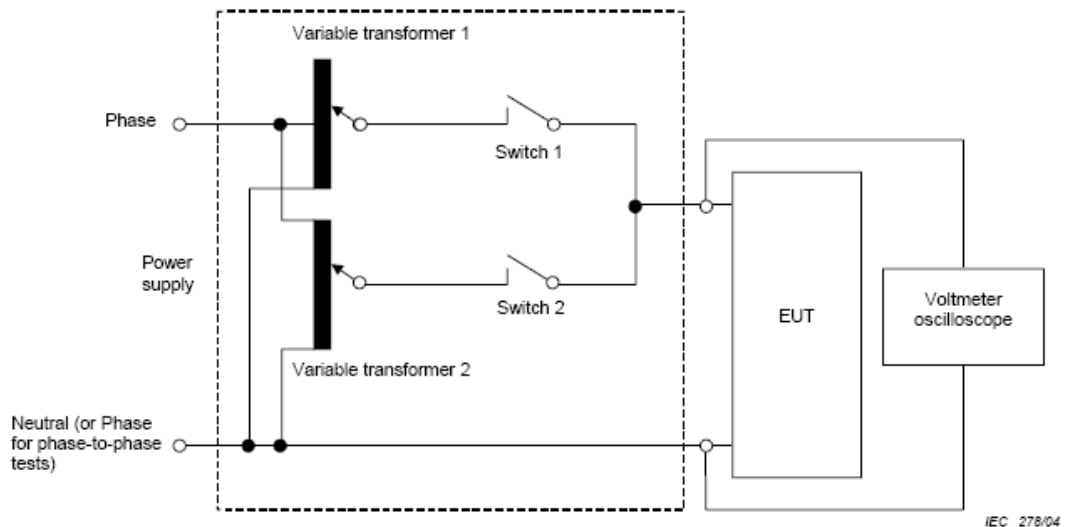
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
70	30	C	10

5.12.3 Description of the test set-up

5.12.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.12.3.2 Block Diagram of Test Setup



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5.12.4 Test specification:

Nominal Mains Voltage (V _N):	■ AC 230 V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 30 % / 200ms

5.12.5 Test result

The requirements are **Fulfilled** Performance Criterion: **C**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.13 Voltage short interruptions

For test instruments and accessories used see section 6 part 6.13.

5.13.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	04~14 March 2015
Operator :	Eric

5.13.2 Severity levels of voltage short interruptions

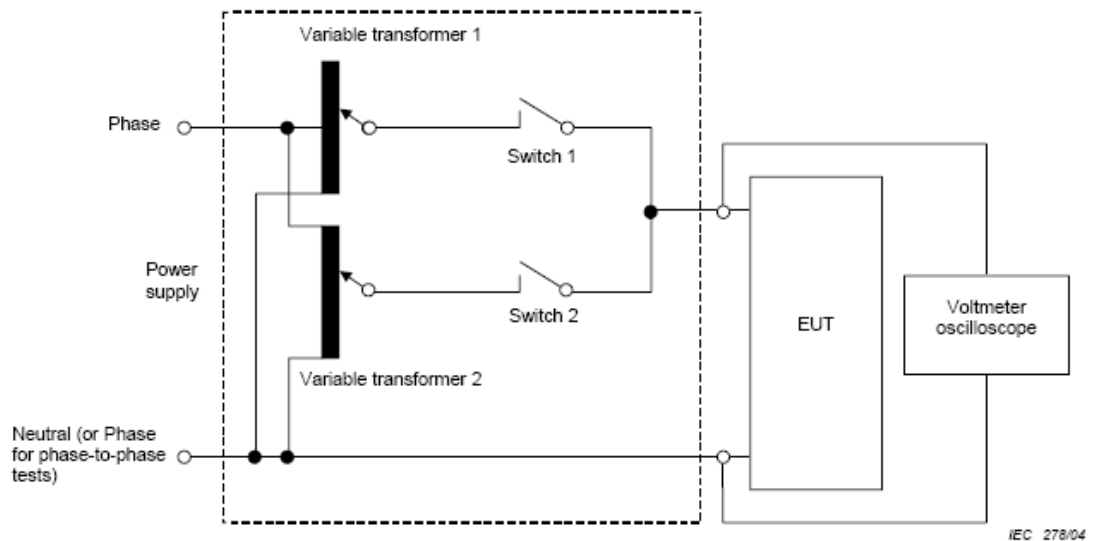
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5

5.13.3 Description of the test set-up

5.13.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.13.3.2 Block Diagram of Test Setup



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5.13.4 Test specification:

Nominal Mains Voltage (V _N):	■ AC 230 V
Number of Interruptions:	■ 3
Duration of the Interruption:	■ 10 ms

5.13.5 Test result

The requirements are **Fulfilled** Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

6 USED TEST EQUIPMENT

6.1

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2014/11/04
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2014/11/04
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2014/11/04
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2014/11/04
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2

Radiated Disturbance (Magnetic field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Triple-Loop Antenna	ROHDE & SCHWARZ	HM020	100015	2014/11/04
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2014/11/04
3	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.3

Radiated Emission(Electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2014/03/25
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2014/11/04
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2014/03/30
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2014/03/30
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2014/03/30
6	Pre-Amplifier	EMC	EMC330	980113	2014/03/25
7	Pre-Amplifier	EMC	EMC012645	980114	2014/03/25
8	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.4

Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2014/11/04
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.5

Voltage fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2014/11/04
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

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6.6

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	302016	2014/03/27

6.7

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	SMY 01	843215/014	2014/11/04
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2014/11/04
3	Amplifier	KALMUS	713FC	7385-1	2014/11/04
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2014/11/04
5	Field Probe	ETS	HI-6005	00075047	2014/11/11
6	RS Test Software	Farad	EZ-RS	N/A	N/A

6.8

Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2013/11/05
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.9

Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2014/11/04
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.10

Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2014/11/04
2	CDN	Schlöder	CDN M3	A3003008	2014/11/04
3	CDN	Schlöder	CDN T2	A3010005	2014/11/04
4	Attenuator	Abschwächer	DC-500MHz	N/A	2014/11/04
5	EM injection clamp	Liithi	EM101	35670	2013/11/06
6	CDG-6000 Software	Schlöder	N/A	N/A	N/A

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6.11

Power Frequency Magnetic Field Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power frequency mag-field generator System	EM TEST	EMS61000-8K	409001	2014/11/04

6.12

Voltage Dips					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

6.13

Voltage Short Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

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7 TEST PHOTOGRAPHS

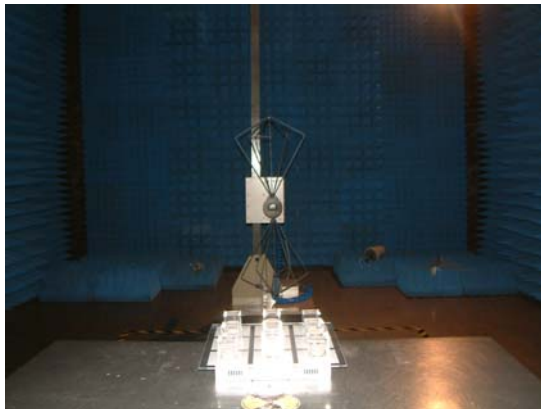
7.1. Photo of power line conducted emission measurement (C.E.)



7.2. Photo of radiated emission measurement (R.E. Magnetic field)



7.3. Photo of radiated emission measurement (R.E. Electric field)



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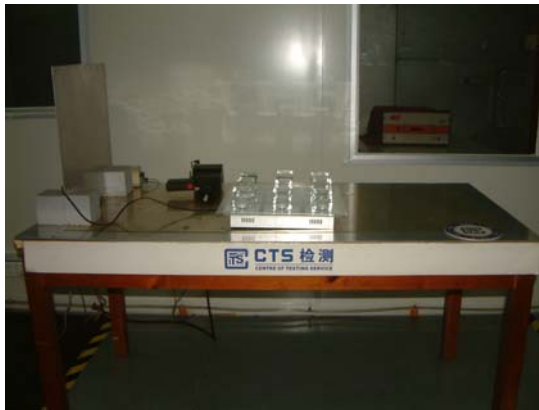
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7.4. Photo of harmonic current and flicker emission measurement (H.&F.)**7.5. Photo of electrostatic discharge Immunity measurement (E.S.D.)****7.6. Photo of RF field strength Immunity measurement (R.S.)**

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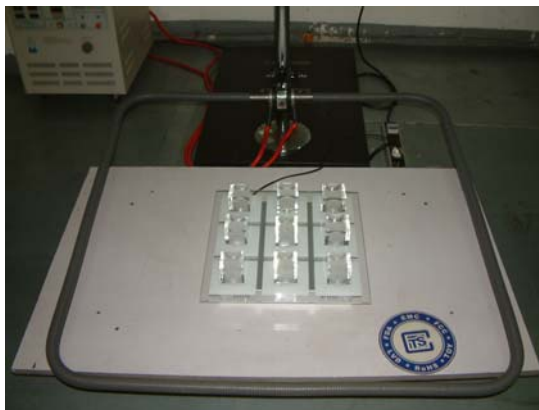
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7.7. Photo of EFT/surge/Dips immunity measurement (E.F.T./Surge./Dips.)**7.8. Photo of conducted disturbance Immunity measurement (C.S.)****7.9. Photo of PFM field immunity measurement (P.F.M.F.)**

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8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view 1



External view 2



External view 3

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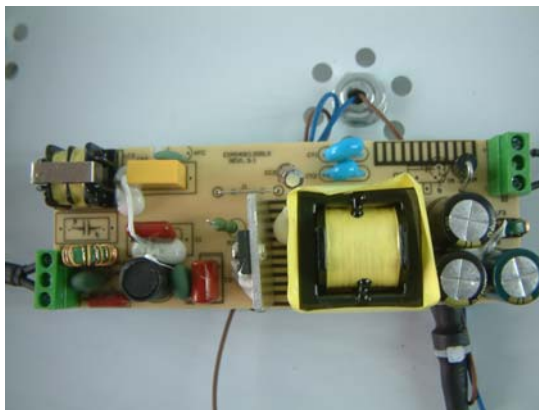
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**External view 4****Label view****PCB view**

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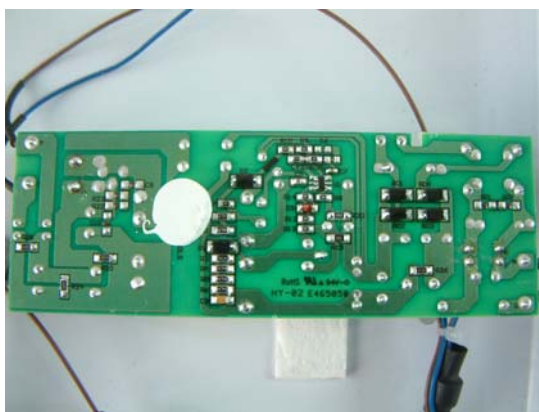
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**PCB view 2****Following Number External view PT-LED 425/3****Following Number External view PT-LED 444/4**

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Following Number External view PT-LED 444/5



Following Number External view PT-LED 437/4



Following Number External view PT-LED 436/9

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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

PT-LED 417/5, PT-LED 437/4, PT-LED 444/4, PT-LED 444/5

Belong to the tested device:

Product description: **LED ceiling light**

Model name: **PT-LED 436/9**

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