



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

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CGZ3170330-00479-E



CTS (Ningbo) Testing Service Technology Co., Ltd.

Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd., Hi-Tech Zone, Ningbo, Zhejiang, China

TEST REPORT

EN 55015:2013+A1:2015

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.

Report Reference No. CGZ3170330-00479-E

Date of issue..... 14 July 2017

Testing Laboratory Name CTS (Ningbo) 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 ☒
 Partial application of Harmonised standards ☐
 Other standard testing method ☐

Applicant's name..... CHROMATEQ

Address..... 191 Allée de Lauzard - Bat B, Rdc 1
34980 St Gély du Fesc
France

Test specification:

Standard **EN 55015:2013+A1:2015, EN 61547:2009**

EN 61000-3-2:2014, EN 61000-3-3:2013

Test Report Form No...... CTSEMC-1.0

TRF Originator CTS (Ningbo) Testing Service Technology Co., Ltd.

Master TRF..... Dated 2009-01

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Test item description..... DMX Controller

Trade Mark /

Manufacturer..... CHROMATEQ

Model/Type reference..... LP32

Ratings..... DC 5V, 3W(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. : CGZ3170330-00479-E	<u>14 July 2017</u> Date of issue
---	--------------------------------------

Type / Model.....	LP32
EUT.....	DMX Controller
Applicant	CHROMATEQ
Address.....	191 Allée de Lauzard - Bat B, Rdc 1 34980 St Gély du Fesc France
Telephone.....	+33 952210755
Fax.....	/
Contact.....	BOURJOT
Manufacturer	CHROMATEQ
Address.....	191 Allée de Lauzard - Bat B, Rdc 1 34980 St Gély du Fesc France
Telephone.....	+33 952210755
Fax.....	/
Contact.....	BOURJOT
Factory	CHROMATEQ
Address.....	191 Allée de Lauzard - Bat B, Rdc 1 34980 St Gély du Fesc France
Telephone.....	+33 952210755
Fax.....	/
Contact.....	BOURJOT

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

EN 55015:2013+A1:2015 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 61000-3-2:2014 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	30 March 2017
Testing commenced on	30 March ~ 20 April 2017
Testing concluded on	14 July 2017

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: ☒ DC 5V by PC
☐ 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)

Fax: +86-20-38780406

4.2 Test facility

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

CNAS-Lab Code: L3394

CTS (Ningbo) 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 (Ningbo) 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 (Ningbo) 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, July13, 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.

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+A1:2015	-----	PASS
Radiated Disturbance (Magnetic)	EN 55015:2013+A1:2015	-----	PASS
Radiated Disturbance (Electric)	EN 55015:2013+A1:2015	-----	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class D	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: 2014	B	PASS
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6: 2013	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

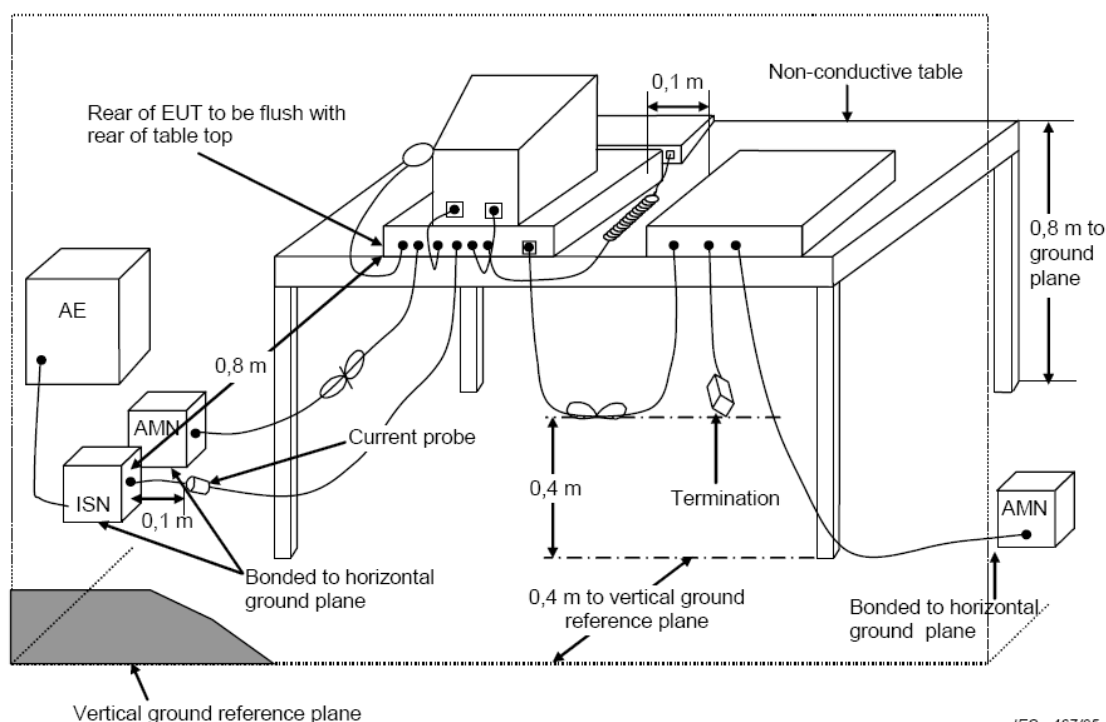
Test location: Shielded room

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



IFC 467/05

5.1.3 Limits disturbance

Frequency	At mains terminals (dBμV)	
	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

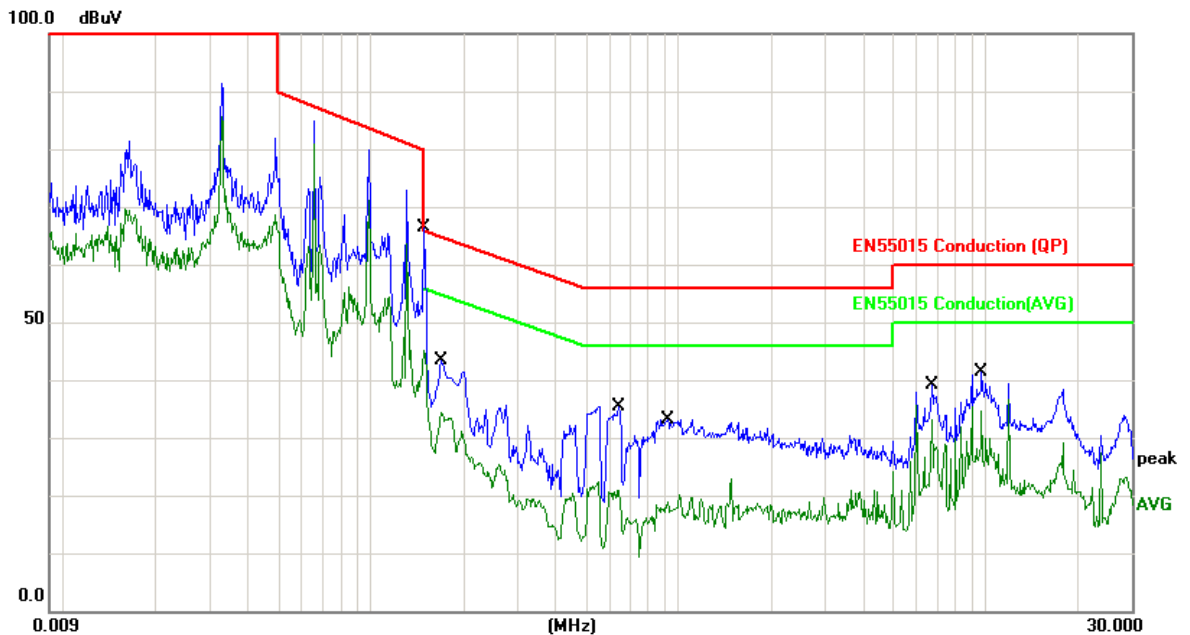
The requirements are	Fulfilled
Band width	200Hz for 9KHz to 0.15MHz, and 9kHz for 0.15MHz to 30MHz
Frequency range	9kHz - 30 MHz
Min. limit margin	>8.23 dB at 9kHz - 30 MHz

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

5.1.5 Test protocol

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

EUT	DMX Controller
Operating Condition	DC 5V by PC
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	LP32



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.21	47.27	57.48	65.99	-8.51	QP
2	0.1500	10.21	32.08	42.29	55.99	-13.70	AVG
3	0.1700	10.21	29.61	39.82	64.96	-25.14	QP
4	0.1700	10.21	23.43	33.64	54.96	-21.32	AVG
5	0.6460	10.23	21.73	31.96	56.00	-24.04	QP
6	0.6460	10.23	10.11	20.34	46.00	-25.66	AVG
7	0.9300	10.29	21.01	31.30	56.00	-24.70	QP
8	0.9300	10.29	8.47	18.76	46.00	-27.24	AVG
9	6.7020	10.92	25.06	35.98	60.00	-24.02	QP
10	6.7020	10.92	21.64	32.56	50.00	-17.44	AVG
11	9.7180	11.21	27.22	38.43	60.00	-21.57	QP
12	9.7180	11.21	23.20	34.41	50.00	-15.59	AVG

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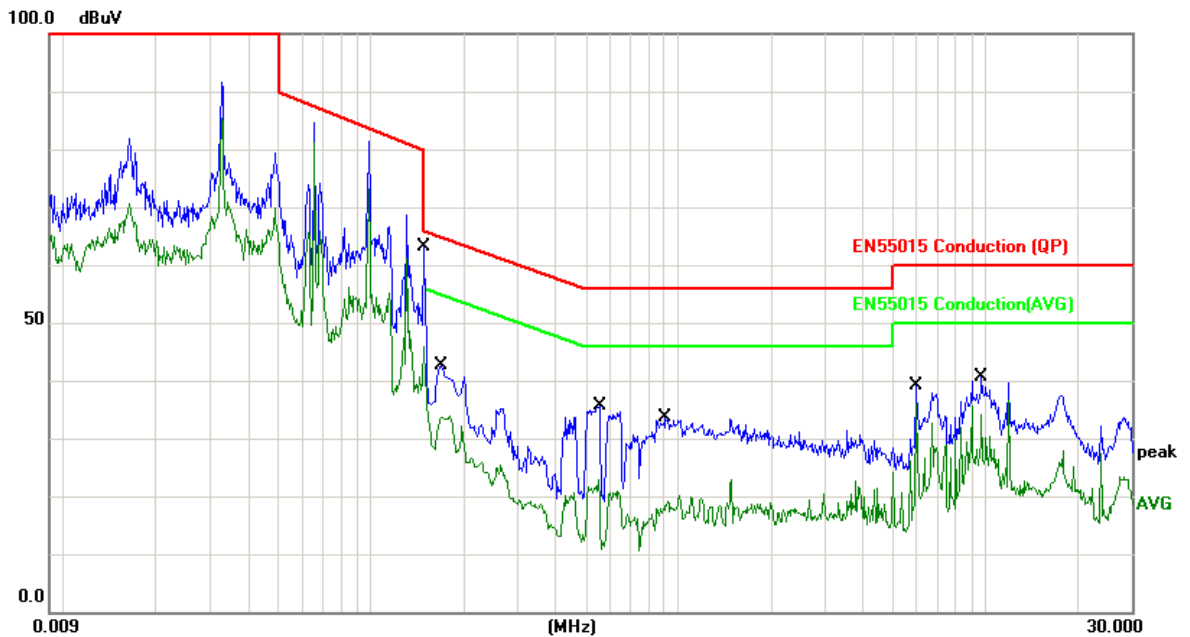
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Test point:	N	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.30	47.46	57.76	65.99	-8.23	QP
2	0.1500	10.30	33.22	43.52	55.99	-12.47	AVG
3	0.1700	10.30	29.70	40.00	64.96	-24.96	QP
4	0.1700	10.30	23.51	33.81	54.96	-21.15	AVG
5	0.5580	10.32	23.60	33.92	56.00	-22.08	QP
6	0.5580	10.32	8.33	18.65	46.00	-27.35	AVG
7	0.9100	10.41	20.50	30.91	56.00	-25.09	QP
8	0.9100	10.41	7.30	17.71	46.00	-28.29	AVG
9	5.9699	10.87	26.60	37.47	60.00	-22.53	QP
10	5.9699	10.87	25.58	36.45	50.00	-13.55	AVG
11	9.7180	11.12	27.47	38.59	60.00	-21.41	QP
12	9.7180	11.12	23.62	34.74	50.00	-15.26	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

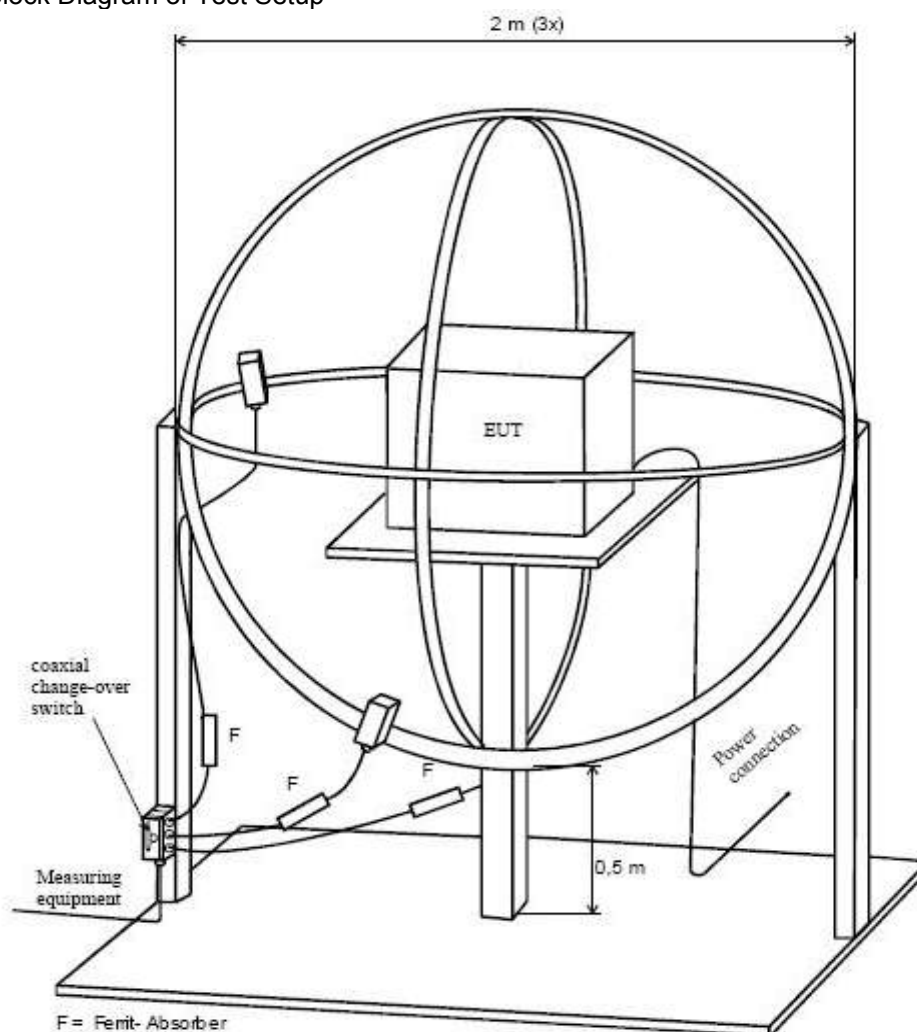
Test disturbance: 2 Meter

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

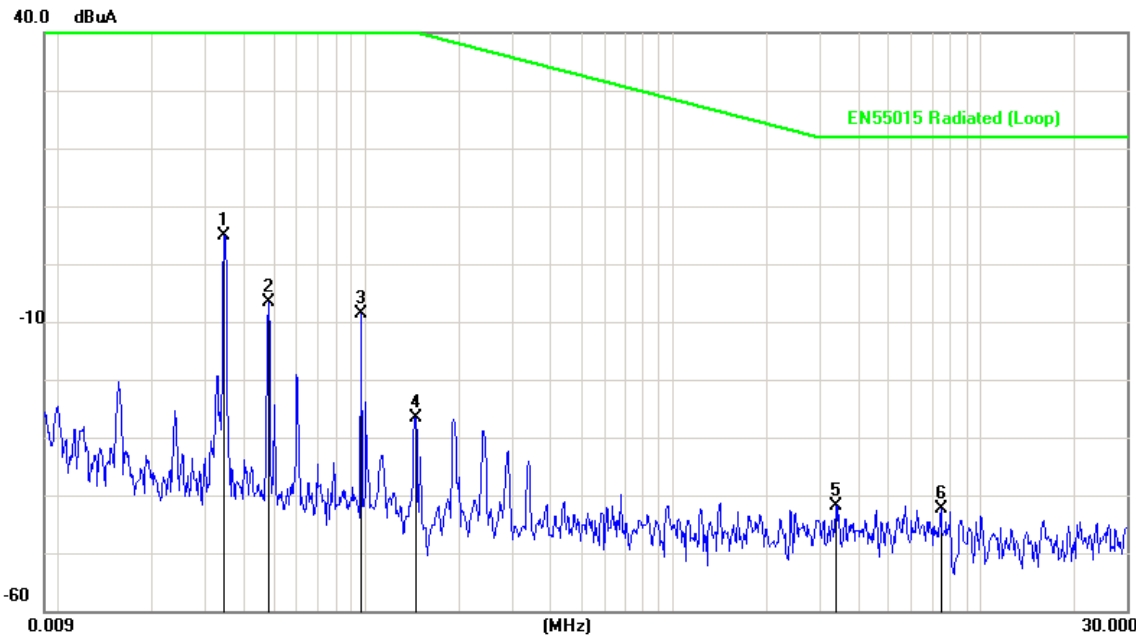
The requirements are	Fulfilled
Band width	200Hz for 9KHz to 0.15MHz, and 9kHz for 0.15MHz to 30MHz
Frequency range	9kHz - 30 MHz
Min. limit margin MHz	>63.36 dB at 9kHz- 30MHz

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:			

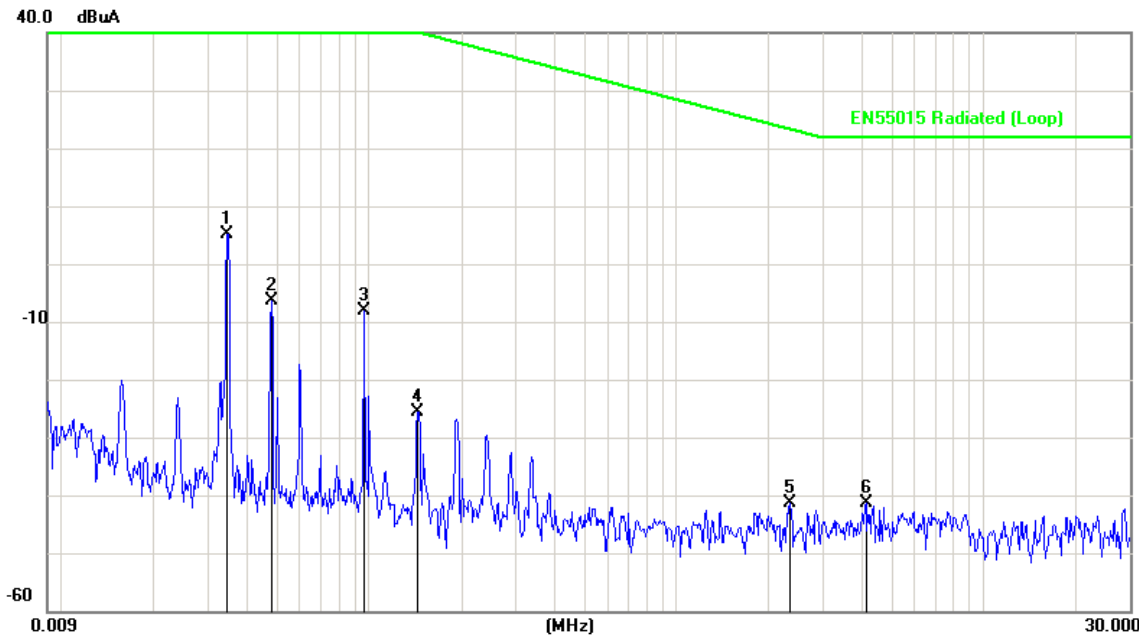
EUT	DMX Controller
Operating Condition	DC 5V by PC
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	LP32



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0346	0.90	4.06	4.96	88.00	-83.04	peak
2	0.0482	0.81	-7.44	-6.63	88.00	-94.63	peak
3	0.0961	0.62	-9.22	-8.60	75.53	-84.13	peak
4	0.1454	0.58	-27.08	-26.50	59.23	-85.73	peak
5	3.3843	0.32	-42.27	-41.95	22.00	-63.95	peak
6	7.4334	0.55	-42.89	-42.34	22.00	-64.34	peak



Test point:	Y	Result:	<input checked="" type="checkbox"/> – passed
Operation mode	Normal		<input type="checkbox"/> – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0346	0.90	4.16	5.06	88.00	-82.94	peak
2	0.0482	1.08	-7.37	-6.29	88.00	-94.29	peak
3	0.0961	0.92	-9.06	-8.14	75.53	-83.67	peak
4	0.1442	0.84	-26.36	-25.52	59.55	-85.07	peak
5	2.3493	0.65	-41.97	-41.32	24.94	-66.26	peak
6	4.1451	0.71	-42.20	-41.49	22.00	-63.49	peak

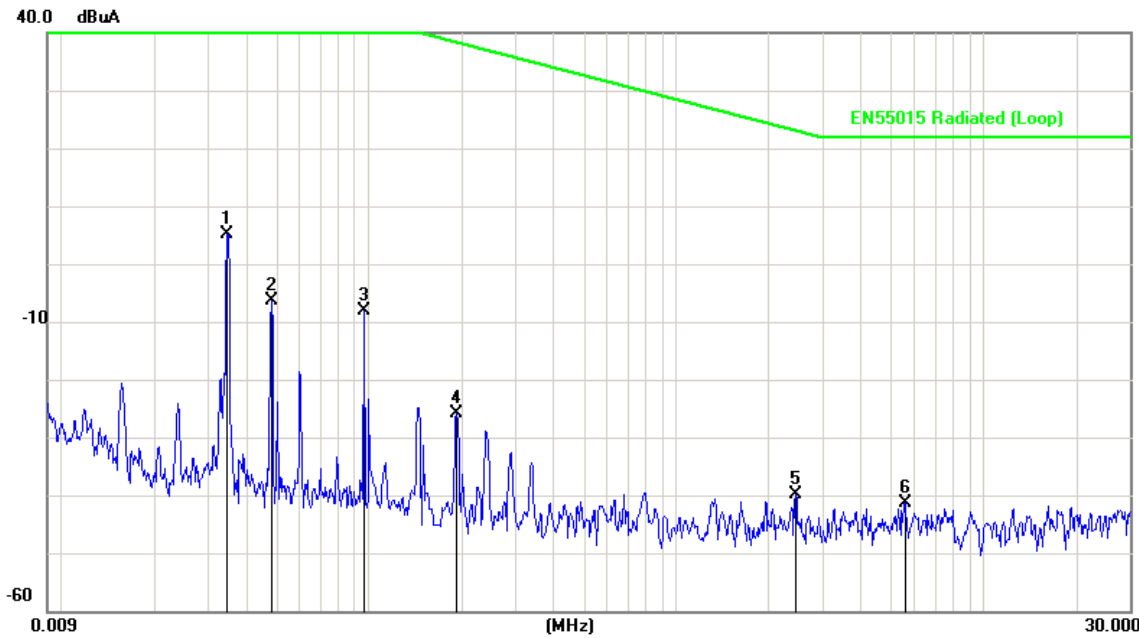
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Test point:	Z	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBμA)	Level (dBμA)	Limit (dBμA)	Margin (dB)	Detector
1	0.0346	1.21	3.87	5.08	88.00	-82.92	peak
2	0.0482	1.07	-7.49	-6.42	88.00	-94.42	peak
3	0.0961	0.92	-8.94	-8.02	75.53	-83.55	peak
4	0.1931	0.75	-26.74	-25.99	54.96	-80.95	peak
5	2.4465	0.58	-40.47	-39.89	24.45	-64.34	peak
6	5.5509	0.66	-42.02	-41.36	22.00	-63.36	peak

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

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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

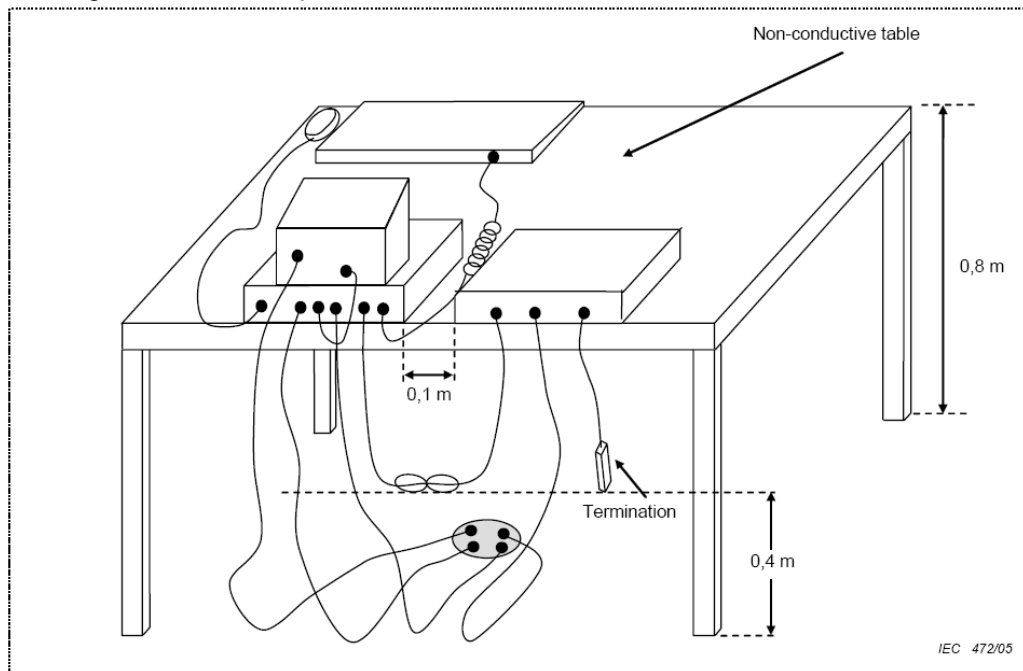
Test disturbance: 3 Meter

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

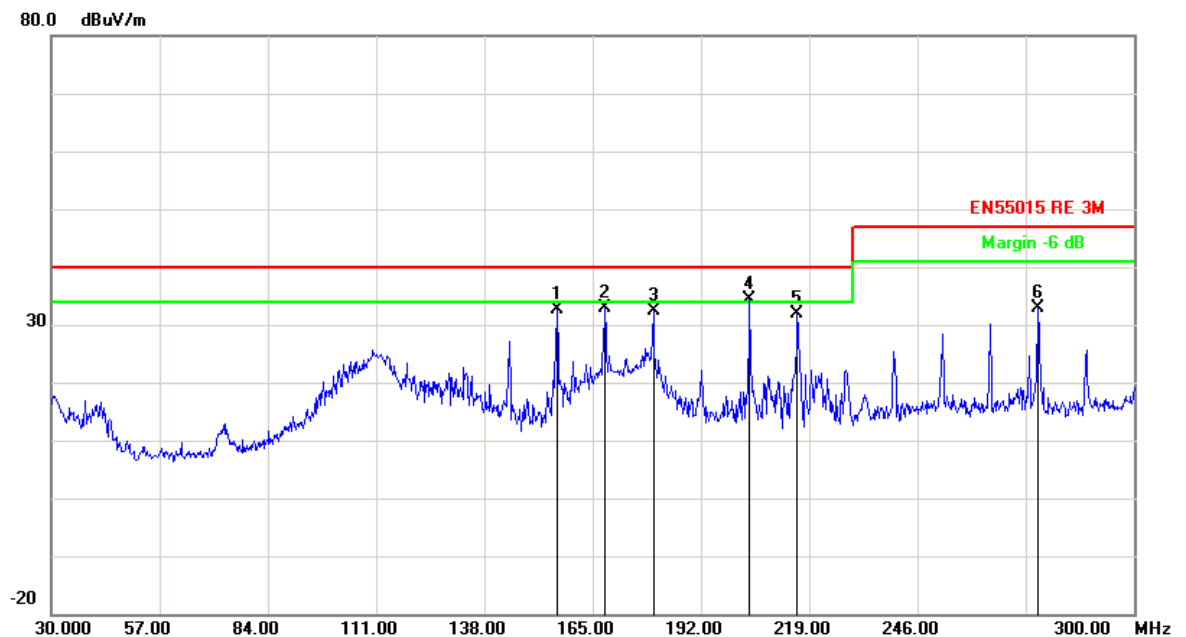
The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 300 MHz
Min. limit margin	>5.63 dB at 30 - 300 MHz

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

5.3.5 Test protocol

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

EUT	DMX Controller
Operating Condition	DC 5V by PC
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	LP32



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	156.0900	-18.40	51.01	32.61	40.00	-7.39	QP
2	167.9700	-17.65	50.51	32.86	40.00	-7.14	QP
3	180.1200	-17.08	49.38	32.30	40.00	-7.70	QP
4	204.1500	-16.18	50.55	34.37	40.00	-5.63	QP
5	216.0300	-15.78	47.73	31.95	40.00	-8.05	QP
6	275.9700	-13.46	46.44	32.98	47.00	-14.02	QP

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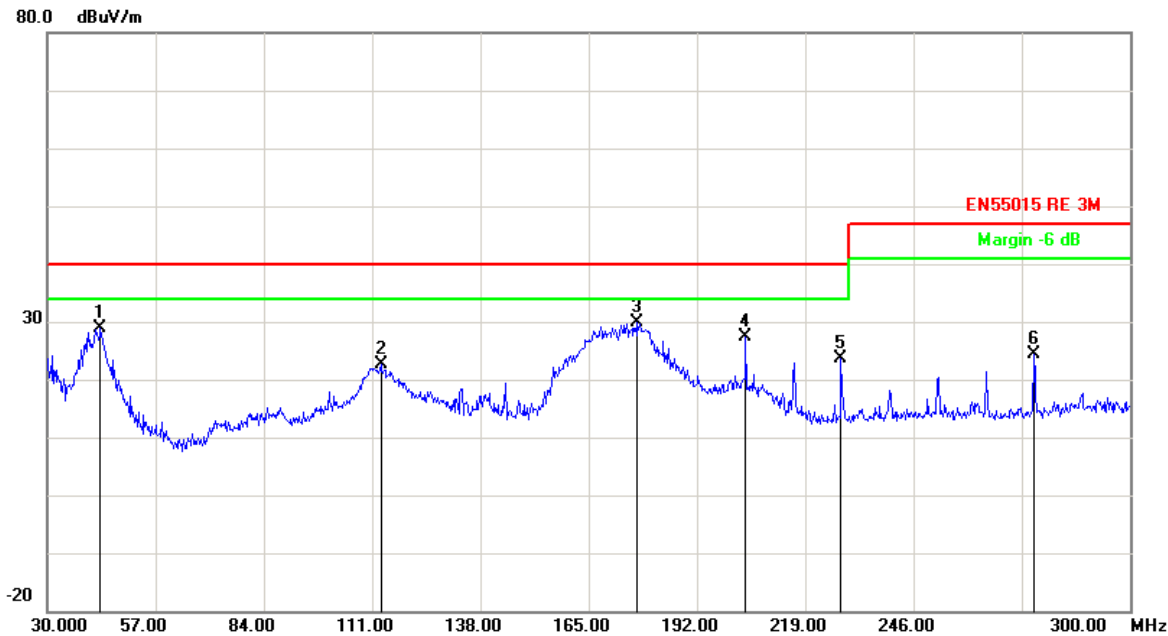
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Test point:	Vertical	Result:	■ – passed
Operation mode	Normal		□ – not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.2300	-16.74	45.57	28.83	40.00	-11.17	QP
2	113.1600	-19.35	42.10	22.75	40.00	-17.25	QP
3	177.1500	-17.21	47.18	29.97	40.00	-10.03	QP
4	204.1500	-16.18	43.56	27.38	40.00	-12.62	QP
5	227.9100	-15.37	39.09	23.72	40.00	-16.28	QP
6	275.9700	-13.46	37.96	24.50	47.00	-22.50	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 61000-3-2:2014.

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.

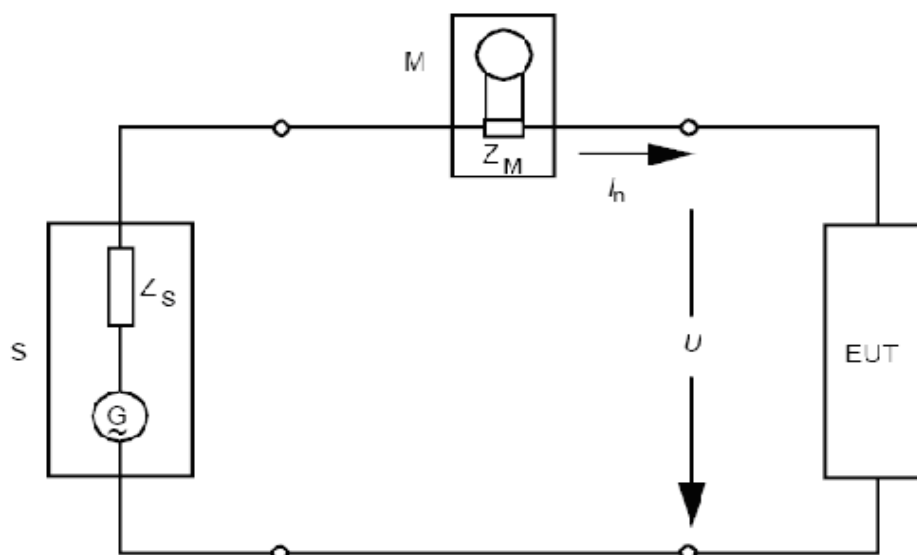
b) Discharge lighting equipment having an active power smaller or equal to 25W shall comply with one of the following two sets of requirements "

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 D
Observation time:	5 min
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Mains supply voltage:	DC 5V by PC
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106kPa
E. U. T.:	DMX Controller
M/N:	LP32
Date of test:	20 April 2017
Tester:	Clark

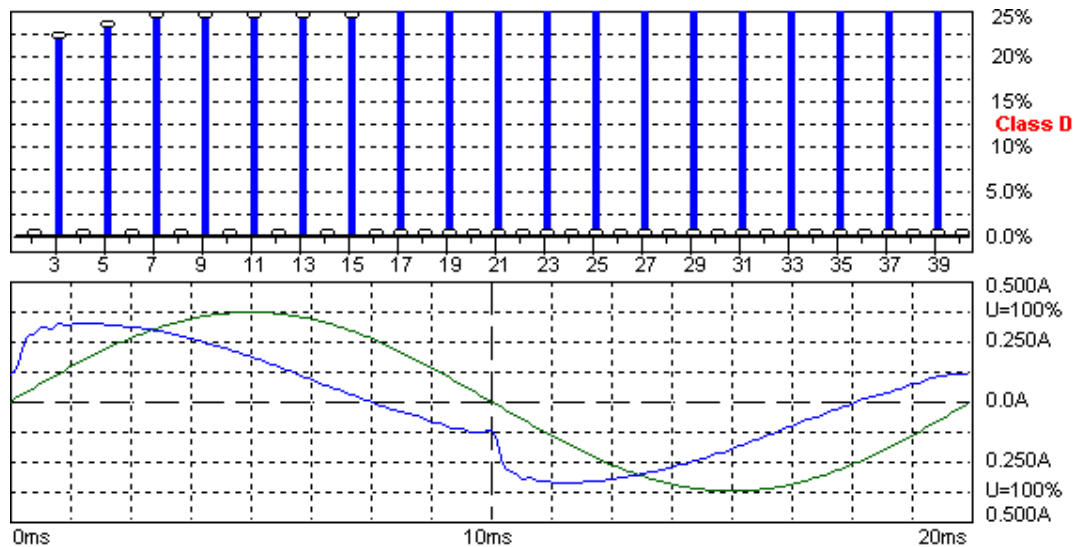
Test result	
E. U. T.:	PASS
Power Source:	PASS

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


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

2017-4-20 13:25:58

Urms = 229.9 V

P = 34.84 W

THC = 0.036 A

Range: 0.5 A

Irms = 0.215 A

pf = 0.705

Pmax = 35.05 W

V-nom: 230 V

TestTime: 10 min (100%)

Eric

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Order	Freq. [Hz]	Iavg [A]	Irms [A]	Imax [A]	Limit [A]	Status
1	50	0.2101	0.2120	0.2129		
2	100	0.0000	0.0005	0.0006		
3	150	0.0262	0.0262	0.0265	0.1192	
4	200	0.0000	0.0005	0.0005		
5	250	0.0154	0.0154	0.0155	0.0666	
6	300	0.0000	0.0004	0.0004		
7	350	0.0102	0.0102	0.0102	0.0351	
8	400	0.0000	0.0004	0.0005		
9	450	0.0078	0.0078	0.0078	0.0175	
10	500	0.0000	0.0004	0.0004		
11	550	0.0063	0.0063	0.0063	0.0123	
12	600	0.0000	0.0004	0.0004		
13	650	0.0057	0.0057	0.0058	0.0104	
14	700	0.0000	0.0004	0.0005		
15	750	0.0052	0.0052	0.0053	0.0090	
16	800	0.0000	0.0004	0.0005		
17	850	0.0000	0.0044	0.0045	0.0079	
18	900	0.0000	0.0004	0.0004		
19	950	0.0000	0.0039	0.0040	0.0071	
20	1000	0.0000	0.0004	0.0004		
21	1050	0.0000	0.0035	0.0036	0.0064	
22	1100	0.0000	0.0004	0.0004		

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23	1150	0.0000	0.0032	0.0032	0.0059	
24	1200	0.0000	0.0004	0.0005		
25	1250	0.0000	0.0029	0.0030	0.0054	
26	1300	0.0000	0.0004	0.0004		
27	1350	0.0000	0.0026	0.0026	0.0050	
28	1400	0.0000	0.0003	0.0004		
29	1450	0.0000	0.0024	0.0024	0.0047	
30	1500	0.0000	0.0004	0.0004		
31	1550	0.0000	0.0023	0.0023	0.0044	
32	1600	0.0000	0.0004	0.0004		
33	1650	0.0000	0.0023	0.0023	0.0041	
34	1700	0.0000	0.0004	0.0005		
35	1750	0.0000	0.0023	0.0024	0.0039	
36	1800	0.0000	0.0005	0.0005		
37	1850	0.0000	0.0021	0.0022	0.0036	
38	1900	0.0000	0.0004	0.0005		
39	1950	0.0000	0.0018	0.0020	0.0035	
40	2000	0.0000	0.0004	0.0004		

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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

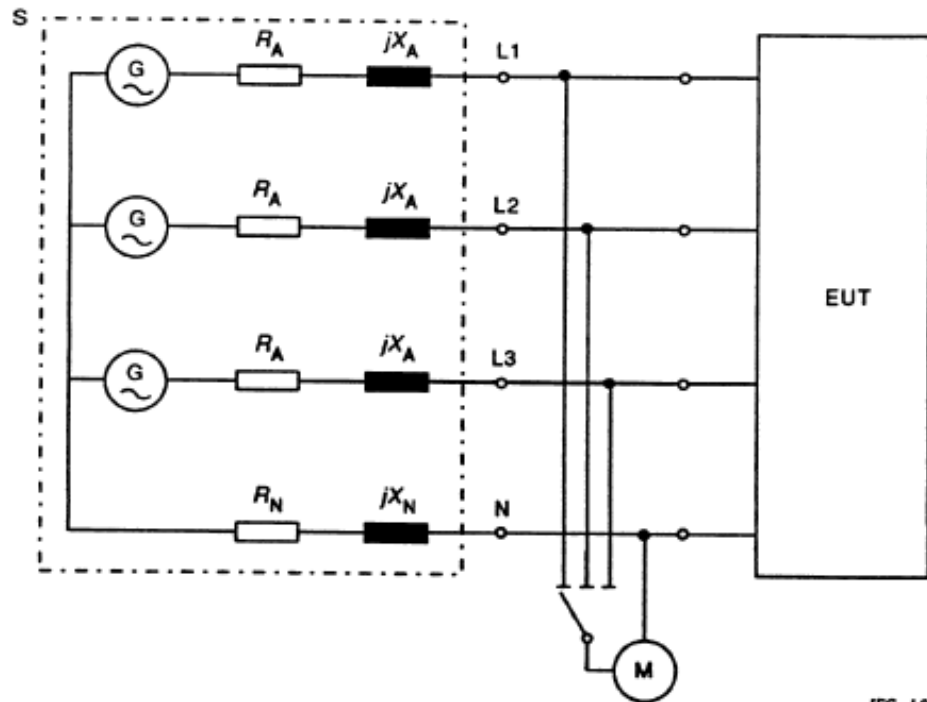
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013.

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



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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
Remarks:			<input type="checkbox"/> - not passed

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Mains supply voltage:	DC 5V by PC
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106kPa
E. U. T.:	DMX Controller
M/N:	LP32
Date of test:	20 April 2017
Tester:	Clark

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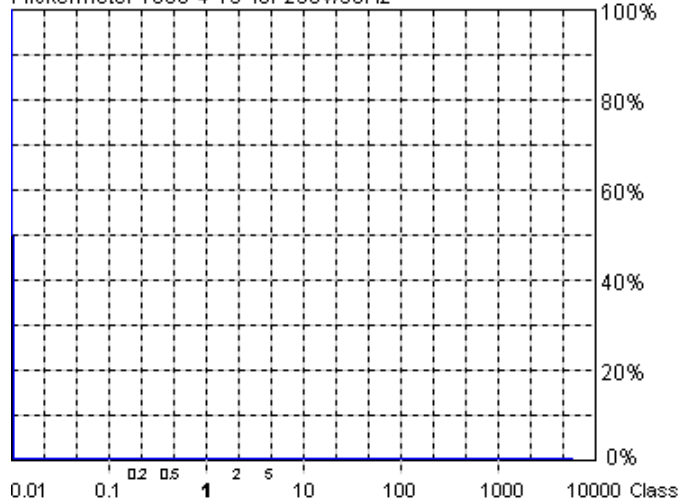
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Flickermeter 1000-4-15 for 230V/50Hz



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)

2017-4-20 13:15:22

Urms = 229.7 V P = 34.89 W
 Irms = 0.215 A pf = 0.707

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

Eric

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:	DC 5V by PC
Operate mode:	Normal
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

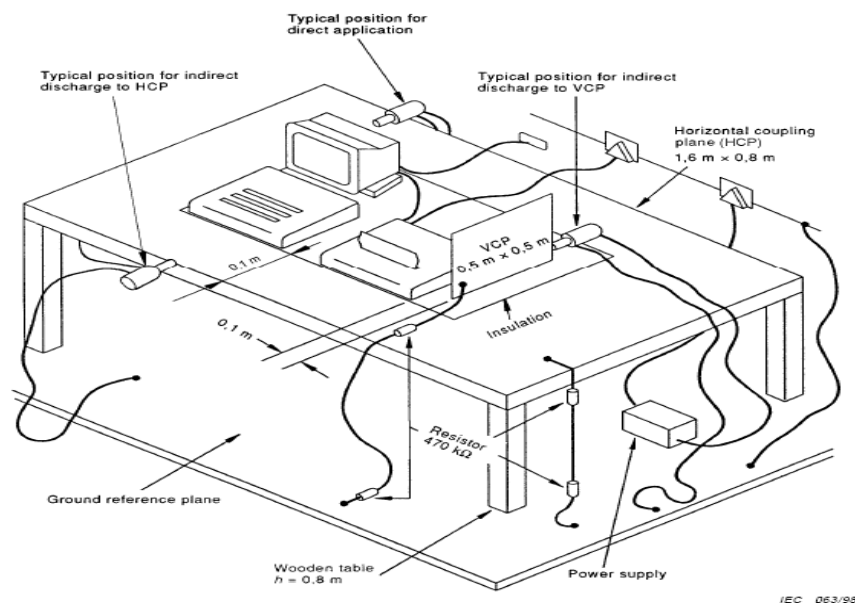
5.6.2.2 Performance criterion: B

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:	DC 5V by PC
Operate mode:	Normal
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

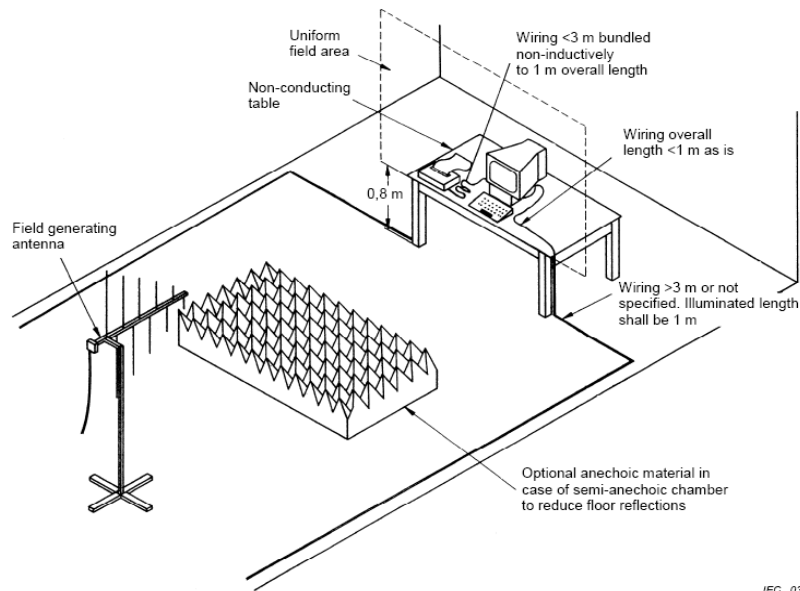
5.7.2.2 Performance criterion: A

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:	DC 5V by PC
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

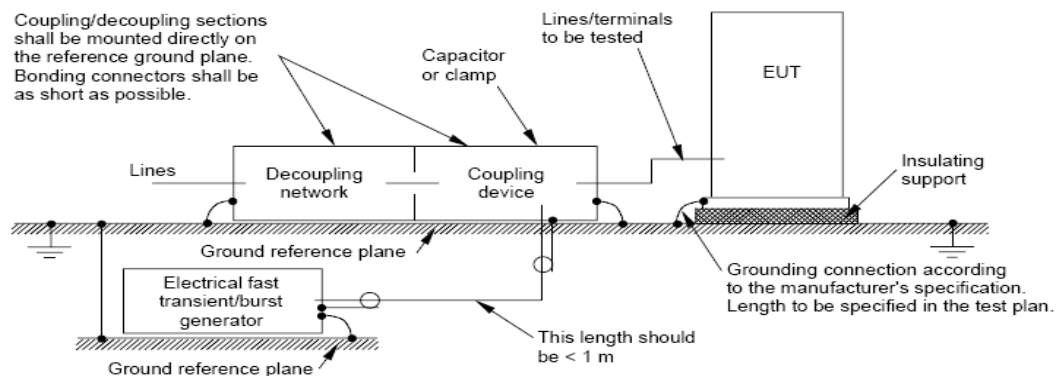
5.8.2.2 Performance criterion: B

5.8.3 Description of the test set-up

5.8.3.1 Operating Condition

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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,PE,L+N,L+PE,N+PE,L+N+PE
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 resultThe 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:	DC 5V by PC
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

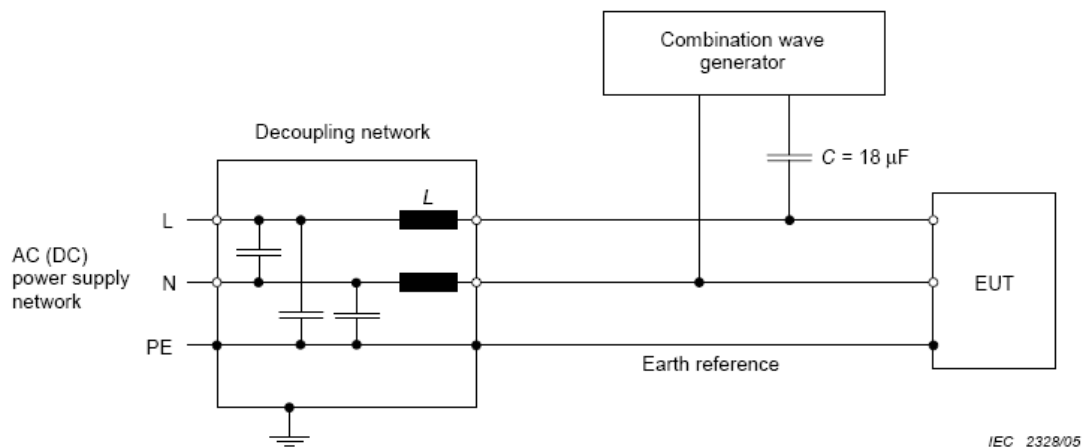
5.9.2.2 Performance Criterion: B

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: $2\ \Omega + 18\mu\text{F}$	<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: $12\ \Omega + 9\mu\text{F}$	<input checked="" type="checkbox"/> 0.5 kV <input checked="" type="checkbox"/> 1 kV <input checked="" 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,L+PE,N+PE
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 resultThe 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:	DC 5V by PC
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

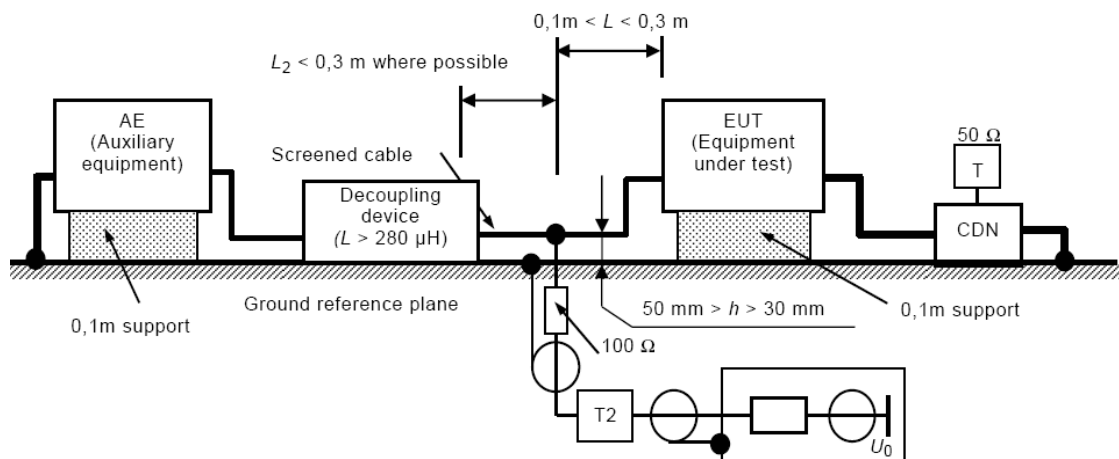
5.10.2.2 Performance Criterion: A

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+PE	
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:	DC 5V by PC
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

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

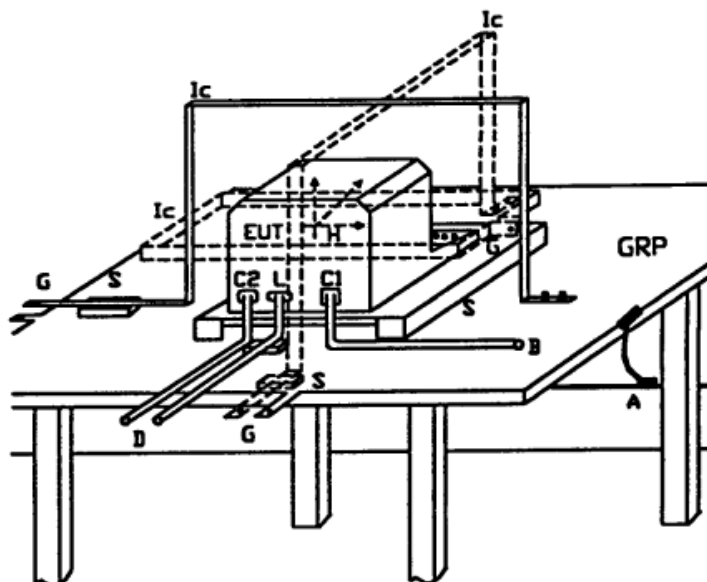
5.11.2.2 Performance Criterion: A

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:	DC 5V by PC
Test condition:	Ambient Temperature: 24 °C, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

5.12.2 Severity levels of voltage dips

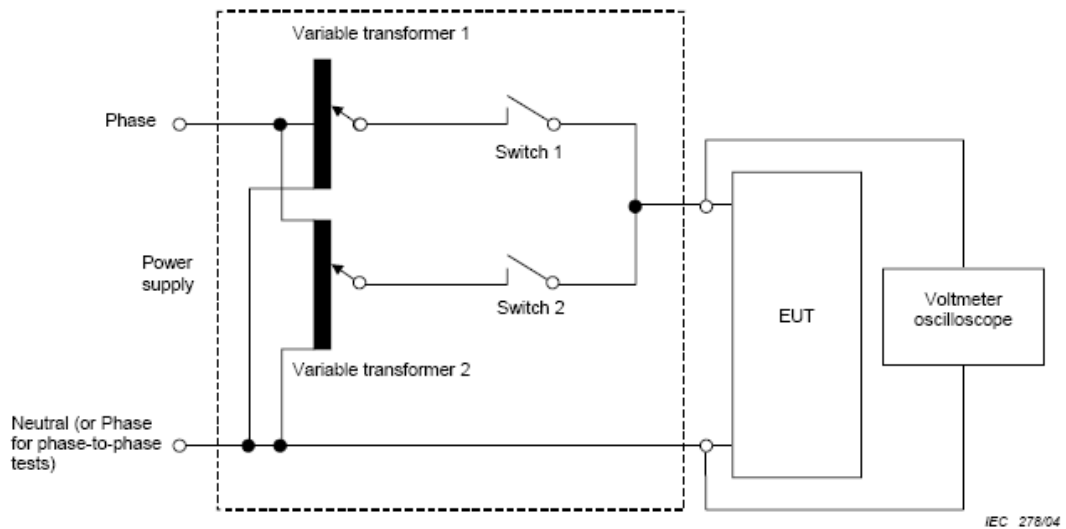
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
70	30	C	10

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



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:	DC 5V by PC
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	30 March ~ 20 April 2017
Operator :	Clark

5.13.2 Severity levels of voltage short interruptions

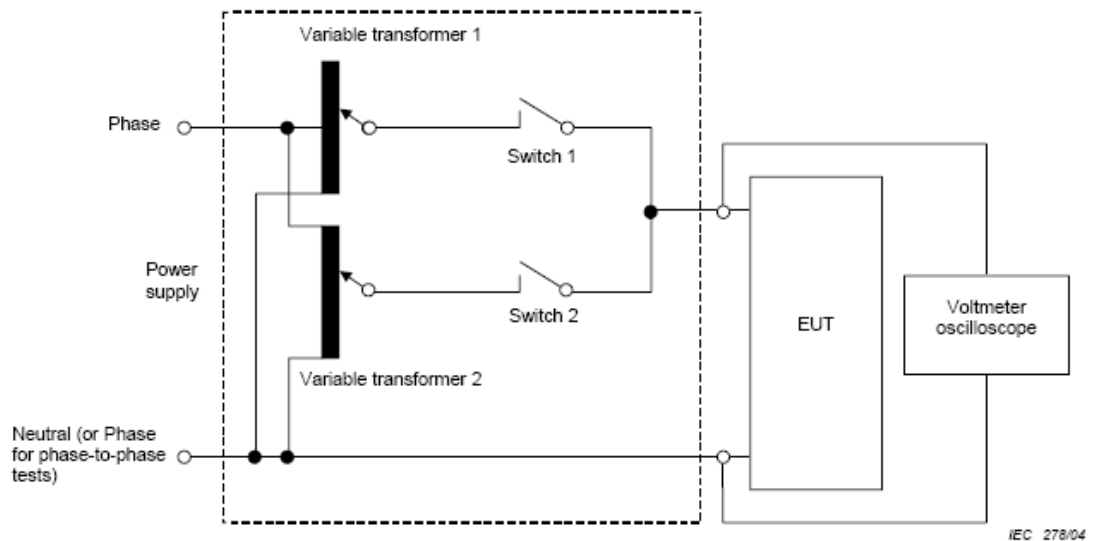
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5

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



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	2016/10/24
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2016/10/24
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2016/10/24
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2016/10/24
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	2016/10/24
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2016/10/24
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	2017/04/26
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2016/10/24
3	Log per Antenna	ETS	3142C	00060447	2017/03/29
4	Pre-Amplifier	EMC	EMC330	980113	2017/04/26
5	Pre-Amplifier	EMC	EMC012645	980114	2017/04/26
6	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	2016/10/24
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	2016/10/24
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 230	106003	2017/01/06

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	2016/10/24
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2016/10/24
3	Amplifier	KALMUS	713FC	7385-1	2016/10/24
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2016/10/24
5	Field Probe	ETS	HI-6005	00075047	2016/10/24
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	2016/10/24
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2016/10/24
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2016/10/24
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	2016/10/24
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2016/10/24
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2016/10/24
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	2016/10/24
2	CDN	Schlöder	CDN M3	A3003008	2016/10/24
3	CDN	Schlöder	CDN T2	A3010005	2016/10/24
4	Attenuator	Abschwächer	DC-500MHz	N/A	2016/10/24
5	EM injection clamp	Liithi	EM101	35670	2016/10/24
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	2016/10/24

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	2016/10/24
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2016/10/24
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	2016/10/24
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2016/10/24
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

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7 TEST PHOTOGRAPHS

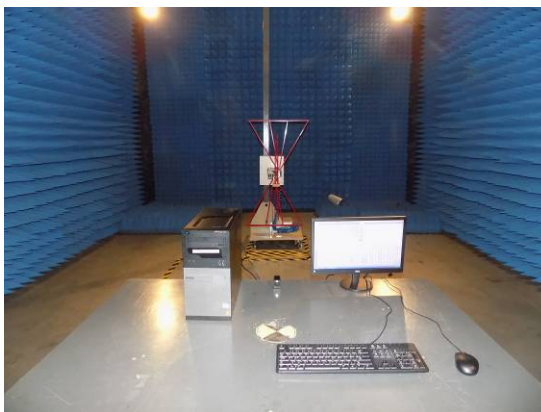
7.1. Photo of power line conducted emission measurement (C.E.)



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



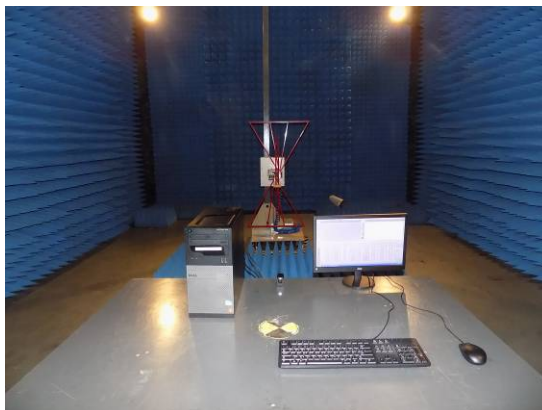
7.3. Photo of radiated emission measurement (R.E. Electric field)



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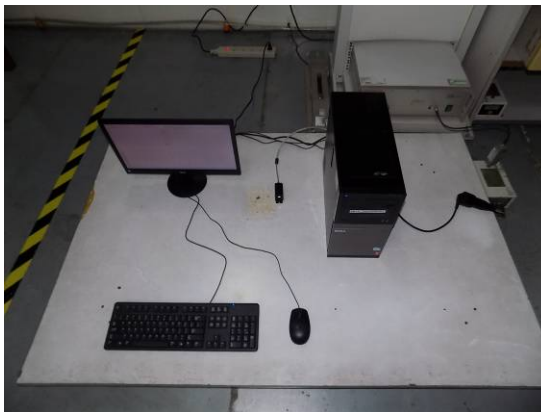
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7.7. Photo of EFT/surge/Dips immunity measurement (E.F.T./Surge./Dips.)**7.8. Photo of conducted disturbance Immunity measurement (C.S.)****7.9. Photo of PFM field immunity measurement (P.F.M.F.)**

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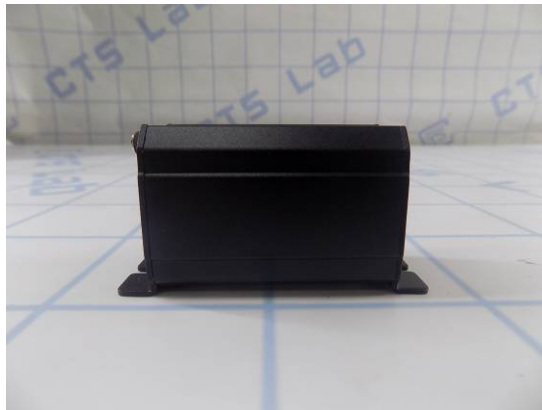
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8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view 1



External view 2



External view 3

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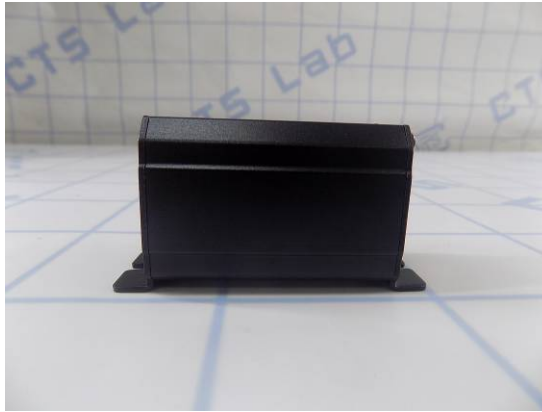
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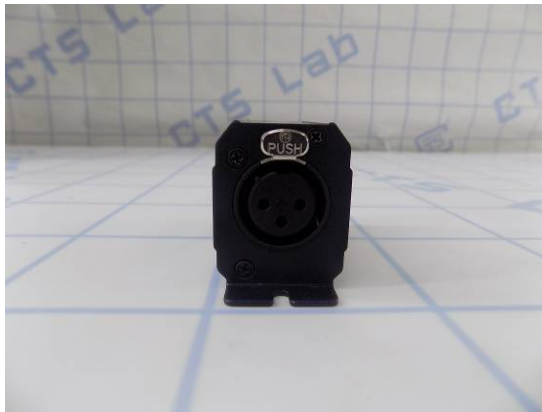
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External view 5



External view 6

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External view 7



Internal view

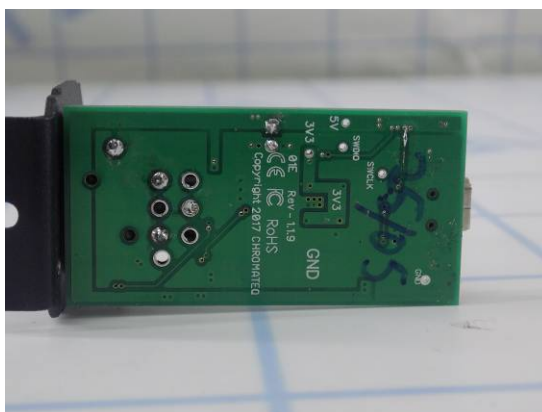
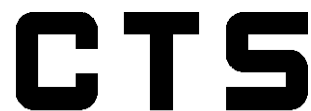


PCB view 1

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PCB view 2

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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

LP128

Belong to the tested device:

Product description: **DMX Controller**
Model name: **LP32**

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