



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

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CGZ3170330-00472-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 55032:2015 Electromagnetic compatibility of multimedia equipment - Emission Requirements EN 55035:2017 Electromagnetic compatibility of multimedia equipment - Immunity requirements	
Report Reference No.	CGZ3170330-00472-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 <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	CHROMATEQ
Address	191 Allée de Lauzard - Bat B, Rdc 1 34980 St Gély du Fesc France
Test specification:	
Standard	EN 55032:2015, EN 55035:2017, 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 zhang / File administrators

Supervised by:



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Vincent yao / Manager

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EMC -- TEST REPORT

Test Report No. : CGZ3170330-00472-E
14 July 2017
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.
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1 TEST STANDARDS

The tests were performed according to following standards:

EN 55032:2015 Electromagnetic compatibility of multimedia equipment - Emission Requirements.

EN 55035:2017 Electromagnetic compatibility of multimedia equipment - 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~13 July 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 55032, searching for the highest disturbance.

Immunity tests: According to EN 55035, 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 :

N/A

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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 (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, 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.

4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	$\pm 1.22\text{dB}$	(1)
Power disturbance	30MHz~300MHz	$\pm 1.38\text{dB}$	(1)
Radiation emission (3m)	30MHz~300MHz	$\pm 3.14\text{dB}$	(1)
	300MHz~1000MHz	$\pm 3.18\text{dB}$	(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 at mains terminals	EN 55032:2015	Class B	PASS
Conducted disturbance at telecommunication port	EN 55032:2015	Class B	N/A
Radiated disturbance	EN 55032:2015	Class B	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class D	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	PASS
IMMUNITY (EN 55035:2017)			
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 (Input a.c. power ports)	IEC 61000-4-5:2014	B	PASS
Surge (Telecommunication ports)		B	N/A
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, >95% reduction	IEC 61000-4-11: 2004	B	PASS
Voltage dips, 30% reduction		C	PASS
Voltage interruptions		C	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 6.2.

5.1.1 Description of the test location

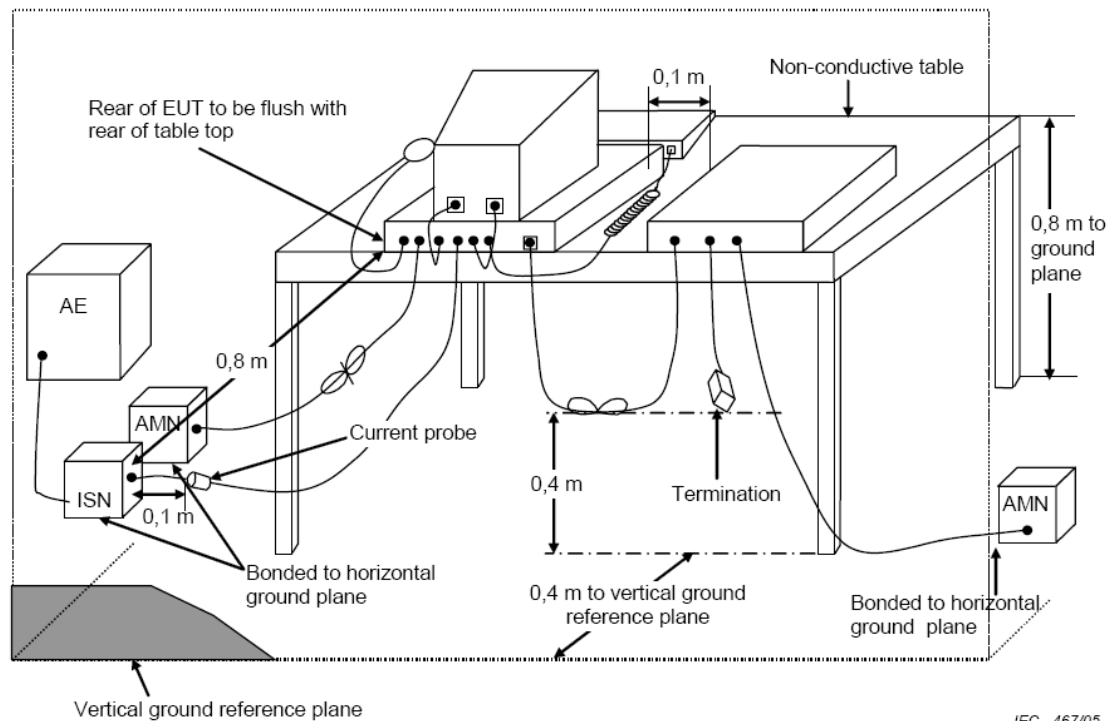
Test location: Shielded room

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	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 *	56 ~ 46 *
500kHz ~ 5MHz	56	46
5MHz ~ 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	9kHz
Frequency range	0.15 MHz - 30 MHz
Min. limit margin	>8.32 dB at 0.15 - 30 MHz

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

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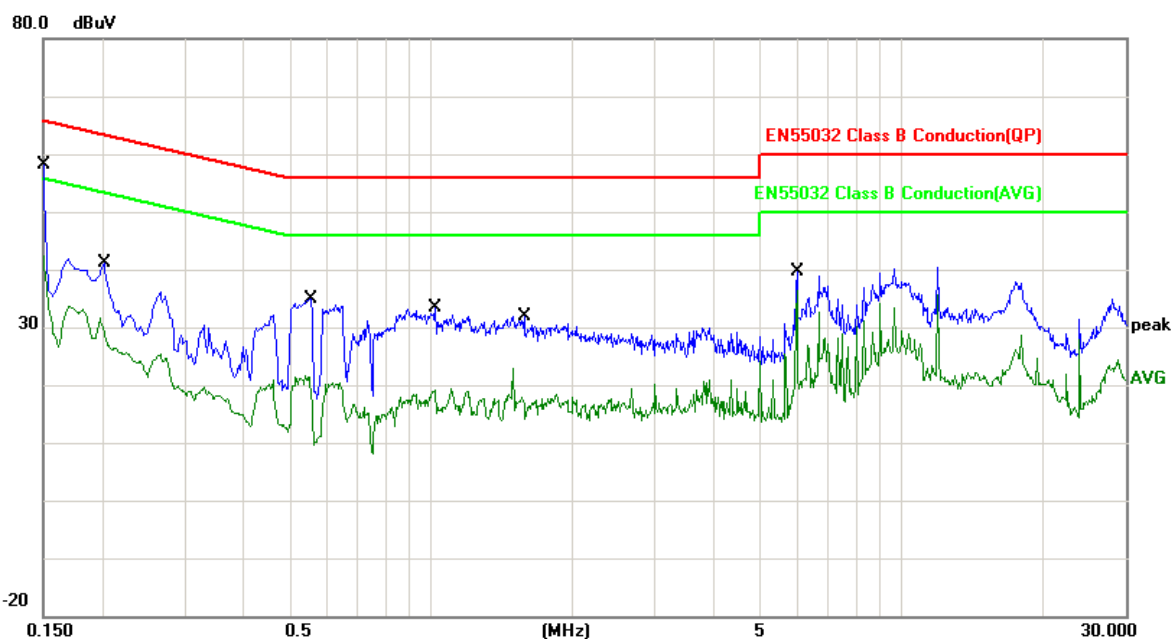
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5.1.5 Test protocol

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

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



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.21	46.27	56.48	65.99	-9.51	QP
2	0.1500	10.21	32.09	42.30	55.99	-13.69	AVG
3	0.2020	10.21	25.33	35.54	63.52	-27.98	QP
4	0.2020	10.21	18.55	28.76	53.52	-24.76	AVG
5	0.5580	10.21	23.19	33.40	56.00	-22.60	QP
6	0.5580	10.21	8.08	18.29	46.00	-27.71	AVG
7	1.0220	10.31	20.38	30.69	56.00	-25.31	QP
8	1.0220	10.31	8.27	18.58	46.00	-27.42	AVG
9	1.5780	10.37	19.77	30.14	56.00	-25.86	QP
10	1.5780	10.37	6.74	17.11	46.00	-28.89	AVG
11	5.9940	10.84	26.68	37.52	60.00	-22.48	QP
12	5.9940	10.84	25.31	36.15	50.00	-13.85	AVG

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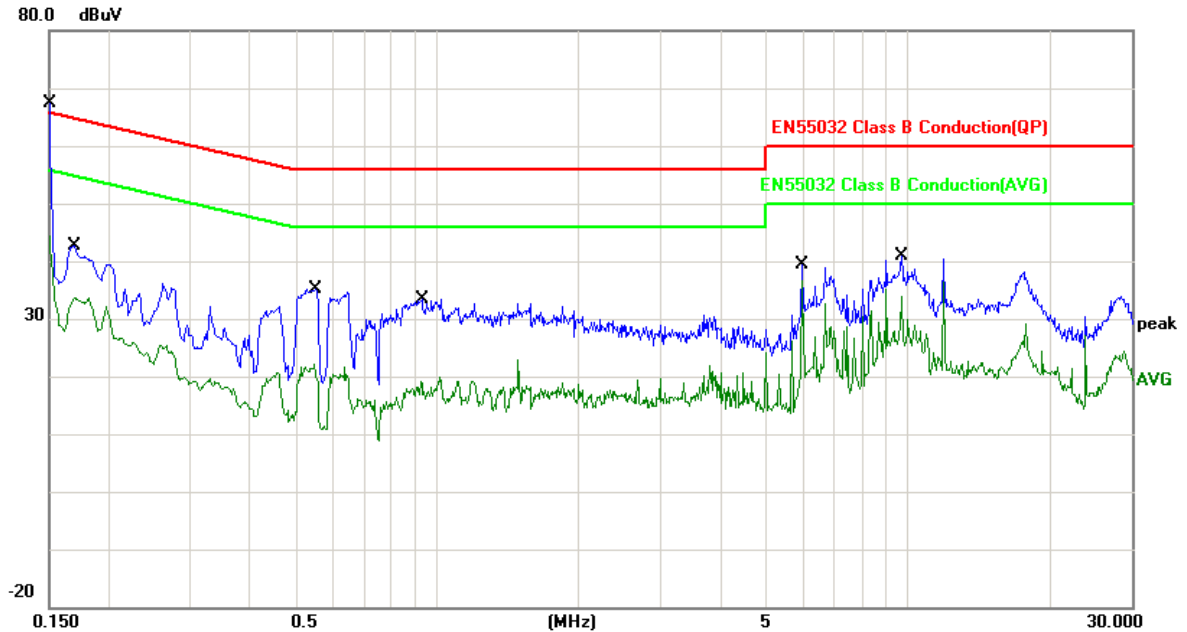
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Test point:	N	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.30	47.37	57.67	65.99	-8.32	QP
2	0.1500	10.30	32.53	42.83	55.99	-13.16	AVG
3	0.1700	10.30	29.30	39.60	64.96	-25.36	QP
4	0.1700	10.30	23.22	33.52	54.96	-21.44	AVG
5	0.5540	10.32	23.00	33.32	56.00	-22.68	QP
6	0.5540	10.32	10.74	21.06	46.00	-24.94	AVG
7	0.9300	10.41	20.82	31.23	56.00	-24.77	QP
8	0.9300	10.41	8.27	18.68	46.00	-27.32	AVG
9	5.9740	10.87	26.76	37.63	60.00	-22.37	QP
10	5.9740	10.87	25.69	36.56	50.00	-13.44	AVG
11	9.7060	11.12	25.18	36.30	60.00	-23.70	QP
12	9.7060	11.12	19.93	31.05	50.00	-18.95	AVG

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

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5.2 Radiated disturbance (electric field)

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

5.2.1 Description of the test location

Test location : Semi-Anechoic chamber

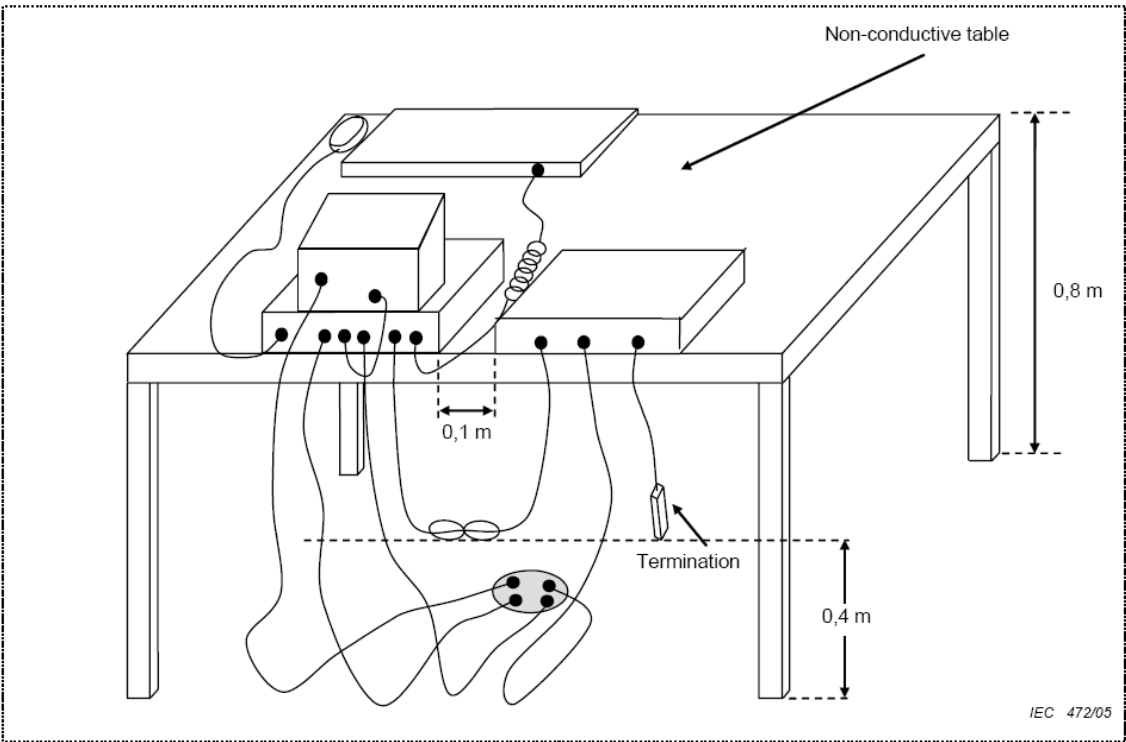
Test disturbance: 3 Meter

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



5.2.3 Limits of disturbance (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	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.

5.2.4 Test result

The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 1000 MHz
Min. limit margin	>6.18 dB at 30 - 1000 MHz

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

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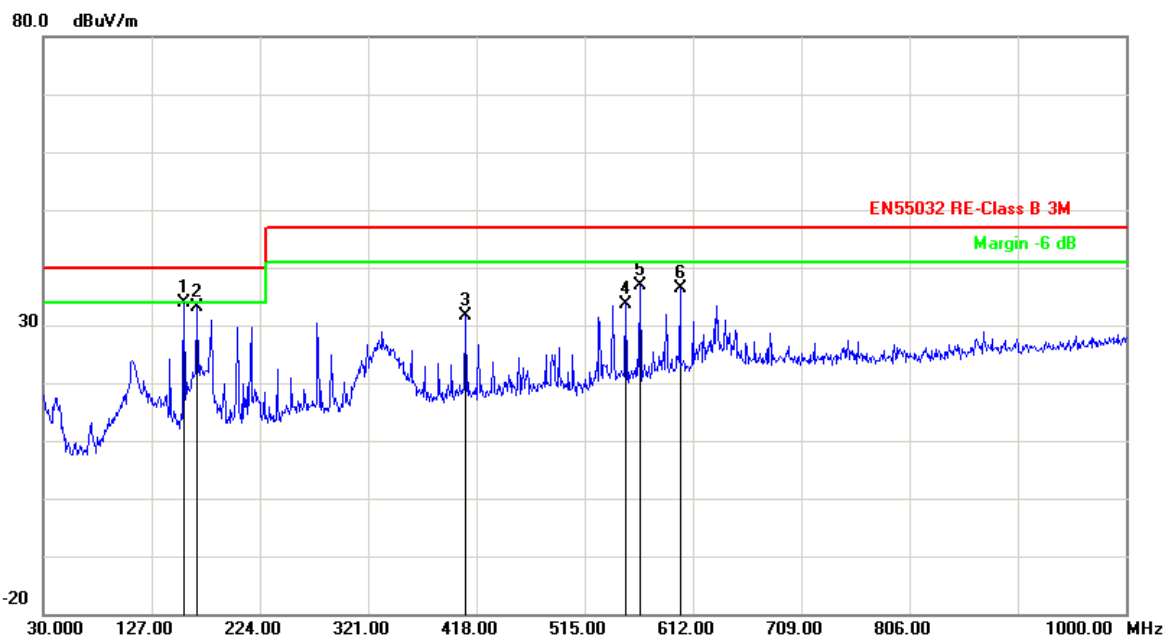
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5.2.5 Test protocol

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

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



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	156.0999	-18.40	52.22	33.82	40.00	-6.18	QP
2	167.7400	-17.66	50.76	33.10	40.00	-6.90	QP
3	408.3000	-9.62	41.32	31.70	47.00	-15.30	QP
4	551.8600	-6.76	40.51	33.75	47.00	-13.25	QP
5	564.4699	-6.52	43.43	36.91	47.00	-10.09	QP
6	600.3600	-5.83	42.14	36.31	47.00	-10.69	QP

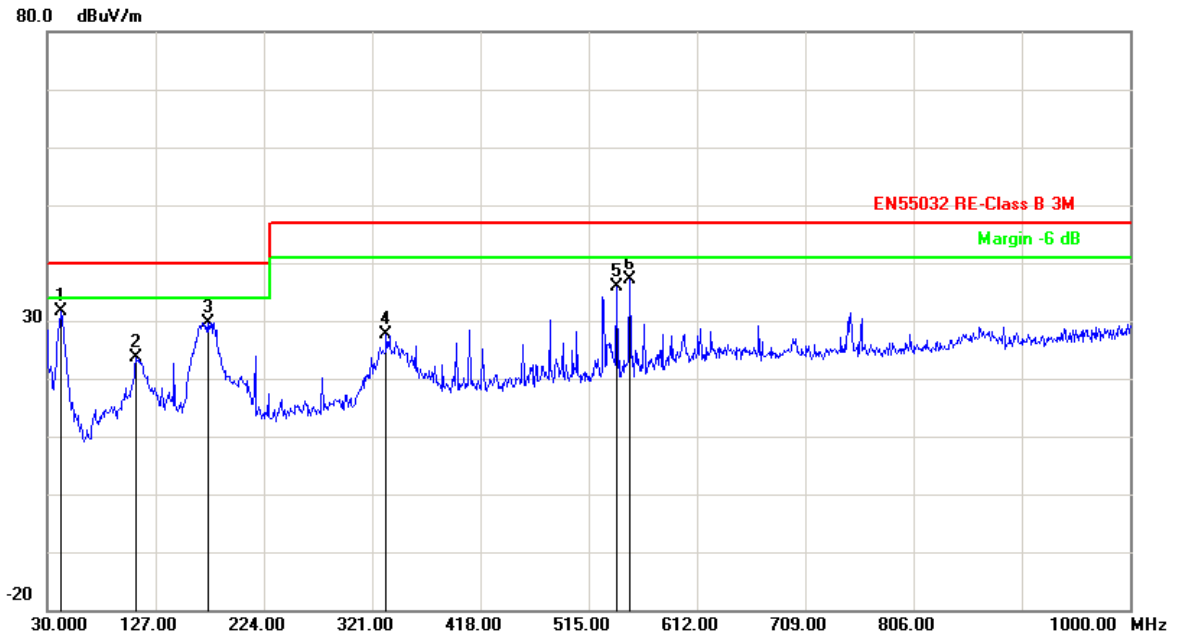
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Test point:	Vertical	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	42.6099	-16.46	48.00	31.54	40.00	-8.46	QP
2	109.5400	-19.30	42.96	23.66	40.00	-16.34	QP
3	173.5600	-17.36	47.02	29.66	40.00	-10.34	QP
4	333.6099	-11.86	39.43	27.57	47.00	-19.43	QP
5	540.2199	-7.03	42.81	35.78	47.00	-11.22	QP
6	551.8600	-6.76	43.77	37.01	47.00	-9.99	QP

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

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5.3 Harmonic current

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

5.3.1 Description of the test location

Test location : Test location no. 1

5.3.2 Limits of harmonic current

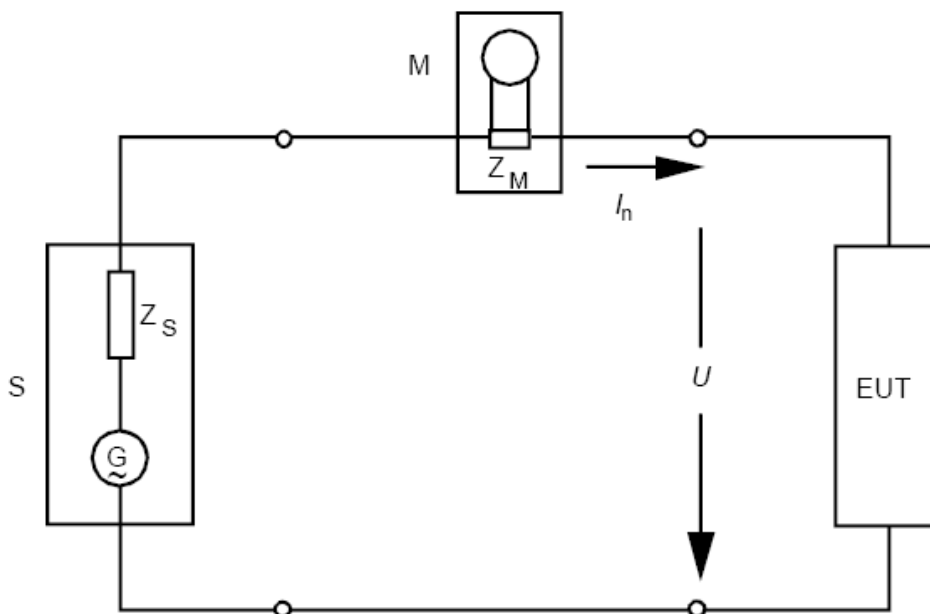
Test configuration and procedure see clause 7.1 of standard EN 61000-3-2:2014.

5.3.3 Description of the test set-up

5.3.3.1 Operating Condition

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

5.3.3.2 Block Diagram of Test Setup



5.3.4 Test result

The requirements are **Fulfilled**

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

5.3.5 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

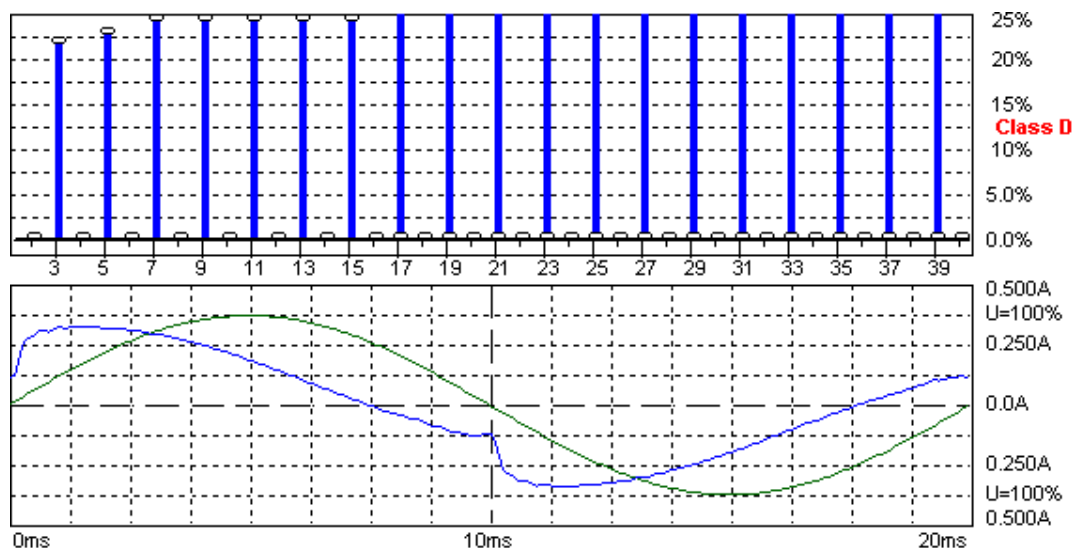
Harmonic(s) with average > 100%:

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 11:59:22

Urms = 229.9 V P = 34.89 W THC = 0.036 A Range: 0.5 A
 Irms = 0.215 A pf = 0.705 Pmax = 35.71 W V-nom: 230 V
 TestTime: 10 min (100%)

Eric

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Order	Freq.	Iavg	Irms	Imax	Limit	Remark
	[Hz]	[A]	[A]	[A]	[A]	
1	50	0.2116	0.2120	0.2145		
2	100	0.0000	0.0005	0.0006		
3	150	0.0265	0.0263	0.0269	0.1214	
4	200	0.0000	0.0005	0.0005		
5	250	0.0155	0.0154	0.0156	0.0678	
6	300	0.0000	0.0004	0.0004		
7	350	0.0102	0.0102	0.0102	0.0357	
8	400	0.0000	0.0004	0.0005		
9	450	0.0078	0.0078	0.0078	0.0179	
10	500	0.0000	0.0004	0.0004		
11	550	0.0063	0.0063	0.0064	0.0125	
12	600	0.0000	0.0004	0.0004		
13	650	0.0057	0.0057	0.0058	0.0106	
14	700	0.0000	0.0004	0.0005		
15	750	0.0052	0.0052	0.0052	0.0092	
16	800	0.0000	0.0004	0.0005		
17	850	0.0000	0.0044	0.0045	0.0081	
18	900	0.0000	0.0003	0.0004		
19	950	0.0000	0.0039	0.0040	0.0072	
20	1000	0.0000	0.0004	0.0004		
21	1050	0.0000	0.0035	0.0036	0.0065	
22	1100	0.0000	0.0004	0.0004		

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23	1150	0.0000	0.0031	0.0032	0.0060	
24	1200	0.0000	0.0004	0.0004		
25	1250	0.0000	0.0029	0.0030	0.0055	
26	1300	0.0000	0.0004	0.0004		
27	1350	0.0000	0.0026	0.0027	0.0051	
28	1400	0.0000	0.0003	0.0003		
29	1450	0.0000	0.0024	0.0025	0.0047	
30	1500	0.0000	0.0004	0.0004		
31	1550	0.0000	0.0023	0.0024	0.0044	
32	1600	0.0000	0.0004	0.0004		
33	1650	0.0000	0.0023	0.0024	0.0042	
34	1700	0.0000	0.0004	0.0005		
35	1750	0.0000	0.0023	0.0025	0.0039	
36	1800	0.0000	0.0004	0.0005		
37	1850	0.0000	0.0021	0.0022	0.0037	
38	1900	0.0000	0.0004	0.0005		
39	1950	0.0000	0.0018	0.0020	0.0035	
40	2000	0.0000	0.0003	0.0004		

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5.4 Voltage fluctuations and flicker

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 voltage fluctuation and flicker

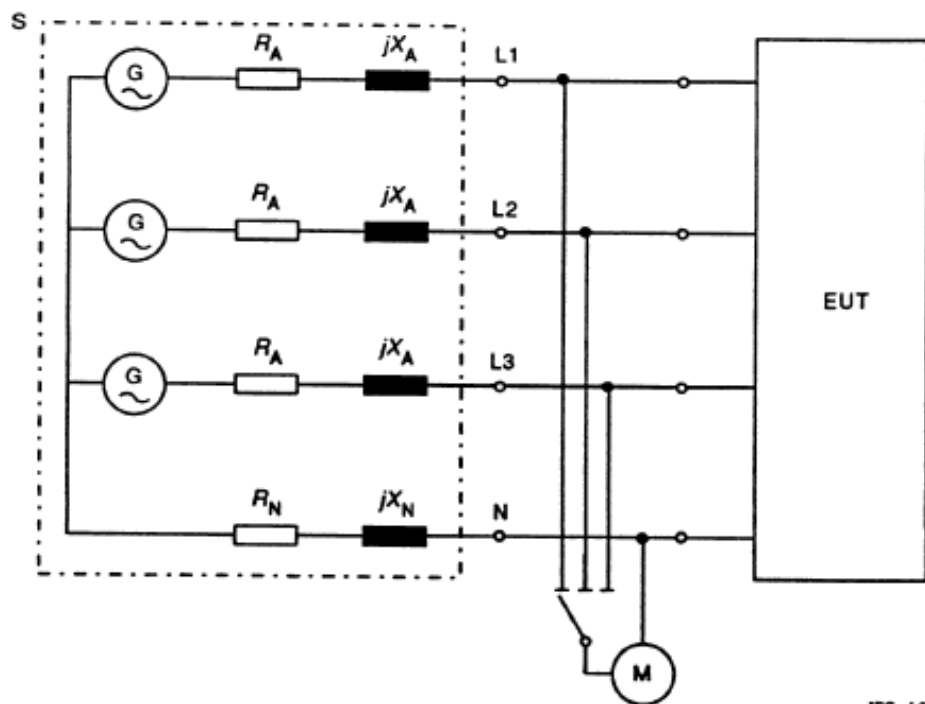
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013.

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 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	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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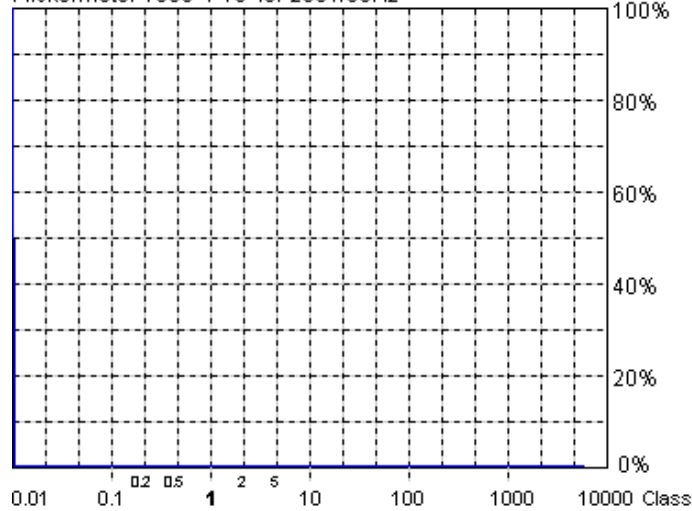
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Flickermeter 1000-4-15 for 230V/50Hz



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)

Urms = 229.7 V P = 34.89 W
Irms = 0.215 A pf = 0.708

Eric

Test completed, Result: PASSED

2017-4-20 12:10:40

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

HAR-1000 EMC-Parber

5.5 Electrostatic discharge

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. 2
Power supply:	DC 5V By PC
Test condition:	Ambient Temperature: 24℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.5.2 Severity of levels electrostatic discharge

5.5.2.1 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

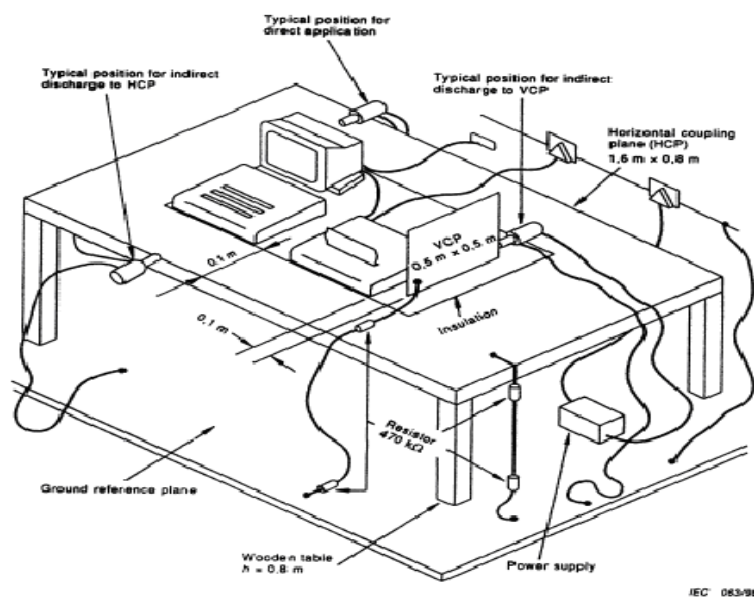
5.5.2.2 Performance criterion: B

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 specification:

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

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

5.6 Radiated, radio-frequency, electromagnetic field

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

5.6.1 Description of the test location

Test location :	GTEM chamber
Power supply:	DC 5V By PC
Test condition:	Ambient Temperature: 24°C, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

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

5.6.2.1 Severity level: 3V/m

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

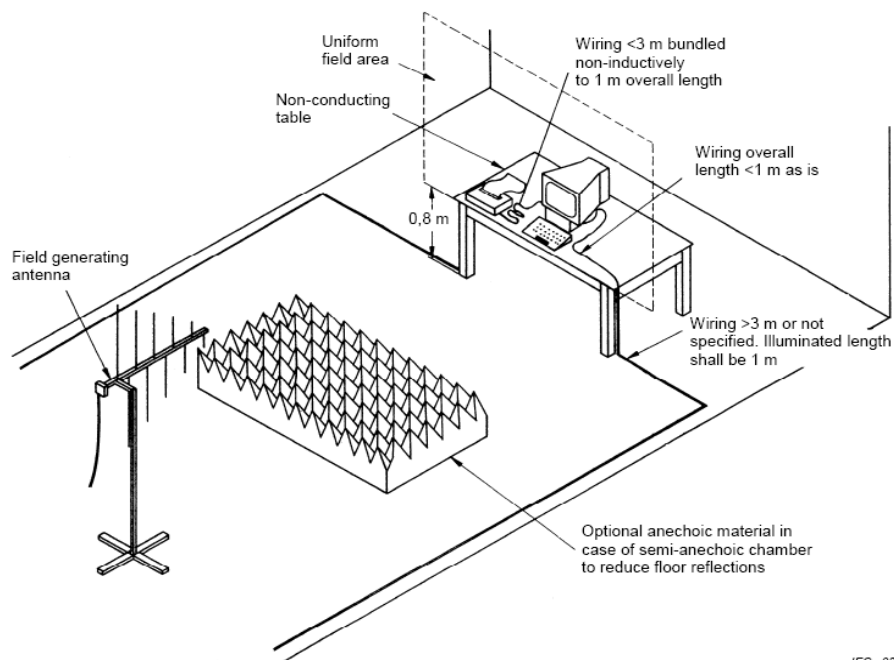
5.6.2.2 Performance criterion: A

5.6.3 Description of the test set-up

5.6.3.1 Operating Condition

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5.6.3.2 Block Diagram of Test Setup



IEC 034/06

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5.6.4 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

Frequency range:	■ 1800 MHz to 5000 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

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

5.7 Electrical fast transients / Burst

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

5.7.1 Description of the test location

Test location :	Test location no. 2
Power supply:	DC 5V By PC
Test condition:	Ambient Temperature: 24℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.7.2 Severity levels of electrical fast transients / Burst

5.7.2.1 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

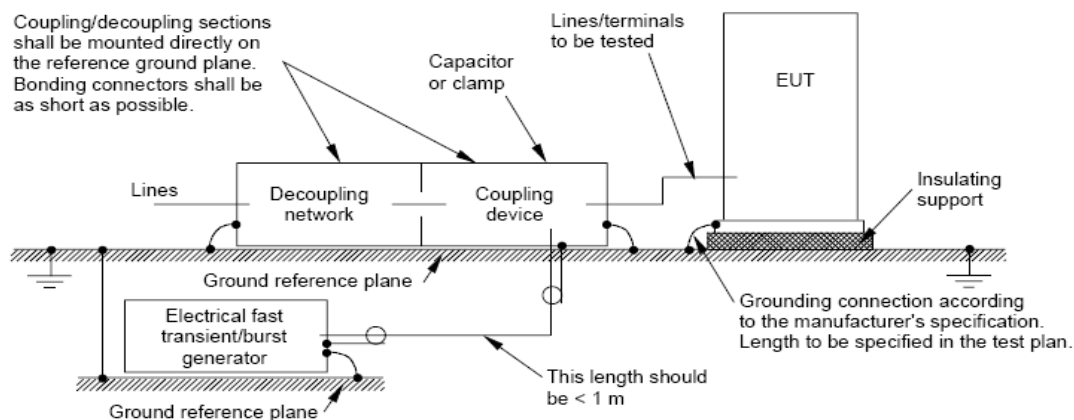
5.7.2.2 Performance criterion: B

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 900/04

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5.7.4 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

5.7.5 Coupling points

Cable description:	AC power line: L, N, PE, L+PE, N+PE, L+N, 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

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

5.8 Surge

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:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.8.2 Severity levels of surge

5.8.2.1 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

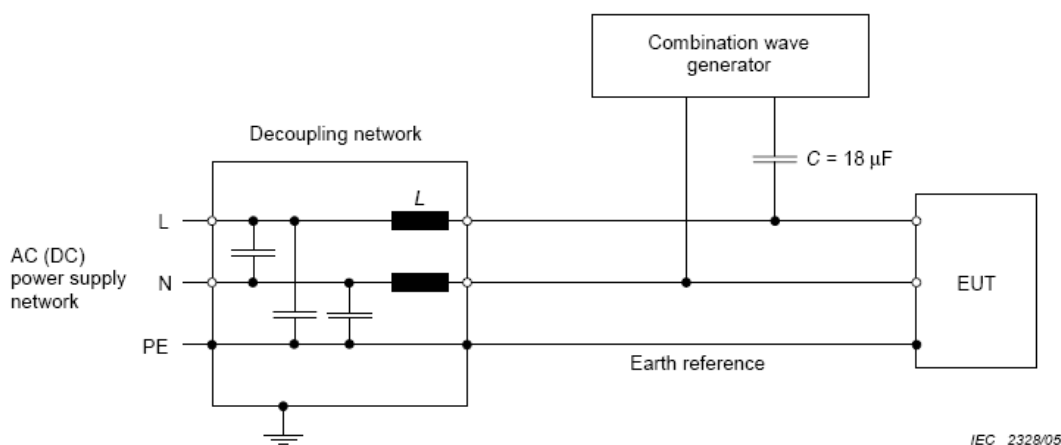
5.8.2.2 Performance Criterion: B

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



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5.8.4 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

5.8.5 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

5.8.6 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 Conducted disturbances induced by radio-frequency fields

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℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

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

5.9.2.1 Severity Level: 3V

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

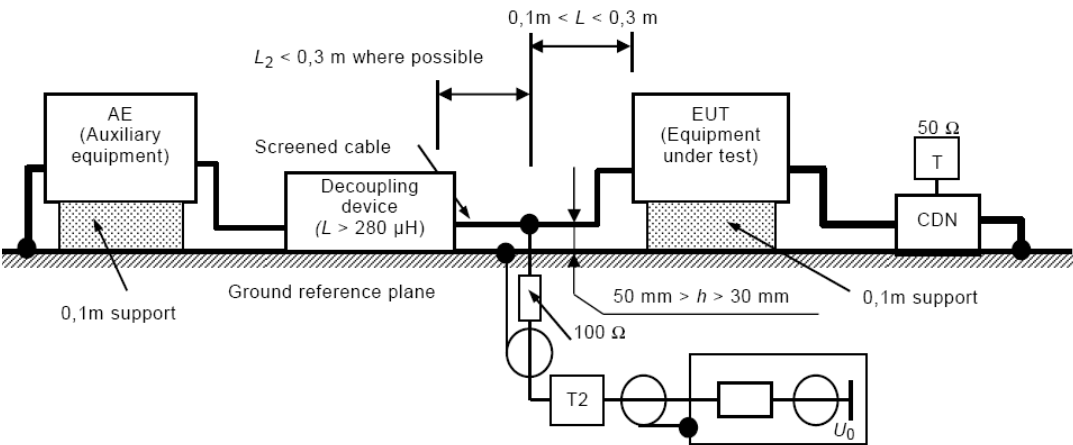
5.9.2.2 Performance Criterion: A

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



IEC 1586/03

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5.9.4 Test specification:

Frequency range:	■ 0.15 MHz to 10 MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

Frequency range:	■ 10 MHz to 30 MHz
Test voltage:	■ 3 V to 1V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

Frequency range:	■ 30 MHz to 80 MHz
Test voltage:	■ 1 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

5.9.5 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

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

5.10 Power frequency magnetic field

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℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.10.2 Severity levels of magnetic field immunity

5.10.2.1 Severity Level: 1A/m

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

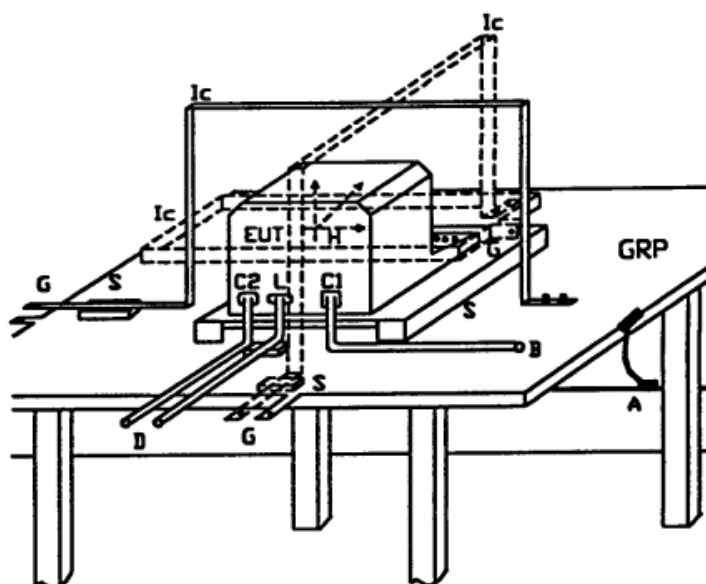
5.10.2.2 Performance Criterion: A

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



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5.10.4 Test specification:

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

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

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5.11 Voltage dips

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℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.11.2 Severity levels of voltage dips

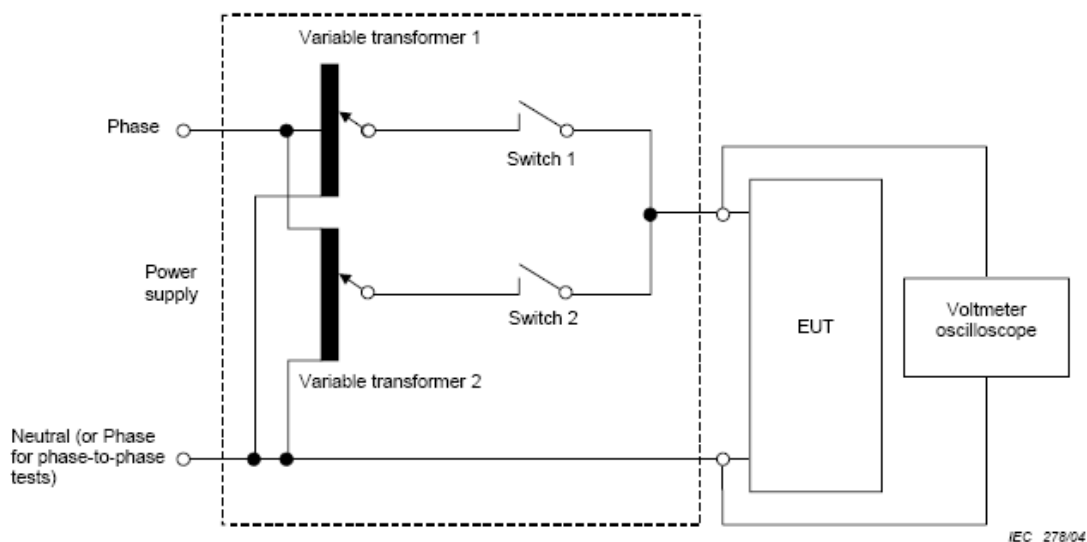
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5
70	30	C	25

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:

Nominal Mains Voltage (V_N):	■ AC 230V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 100 % / 20ms
Level of reduction(dip) / duration:	■ 30 % / 500ms

5.11.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

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

5.12 Voltage Short interruptions

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℃, Humidity:46%
Date of test :	30 March~13 July 2017
Operator :	Clark

5.12.2 Severity levels of voltage short interruptions

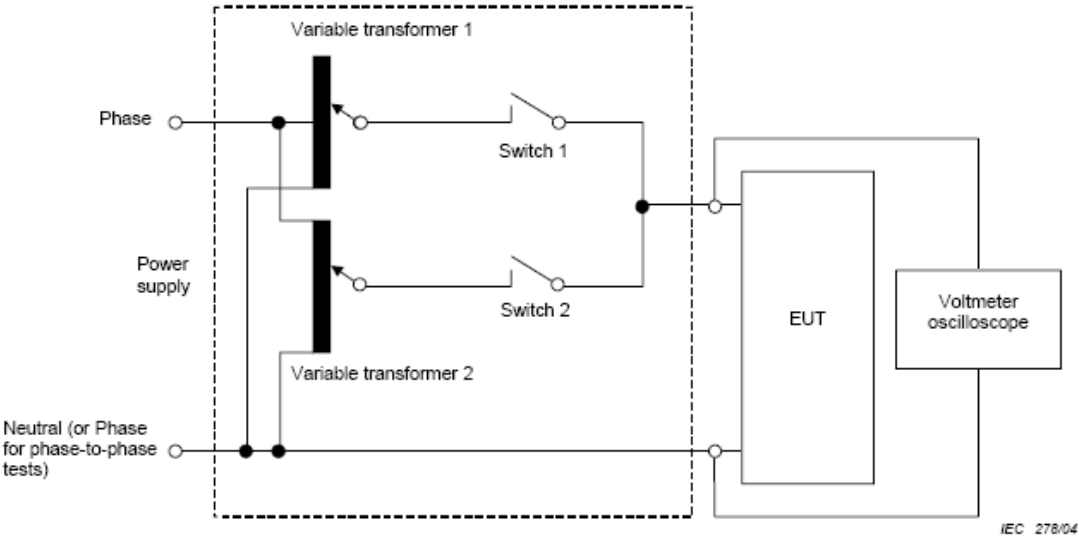
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	C	250

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:	■ 5000 ms

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).

6 USED TEST EQUIPMENT

6.1					
Radiated disturbance (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	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2017/03/29
5	Pre-Amplifier	EMC	EMC330	980113	2017/04/26
6	Pre-Amplifier	EMC	EMC012645	980114	2017/04/26
7	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2					
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

6.3					
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

6.4					
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

6.5					
Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 230	106003	2017/01/06

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6.6					
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

6.7					
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

6.8					
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

6.9					
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	Schlöde	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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6.10

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

6.11

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

6.12

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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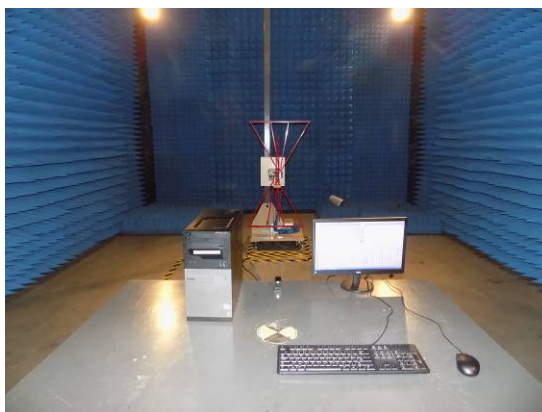
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7 TEST PHOTOGRAPHS

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



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



7.3. Photo of harmonic current and flicker emission measurement (H.&F.)



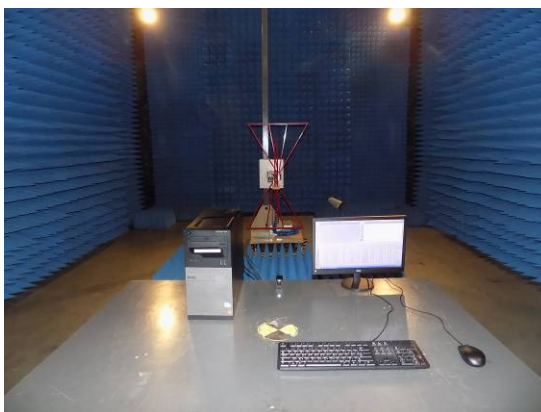
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7.4. Photo of electrostatic discharge Immunity measurement (E.S.D.)**7.5. Photo of RF field strength Immunity measurement (R.S.)****7.6. Photo of EFT/surge/Dips immunity measurement (E.F.T./Surge./Dips.)**

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7.7. Photo of conducted disturbance Immunity measurement (C.S.)



7.8. Photo of PFM field immunity measurement (P.F.M.F.)



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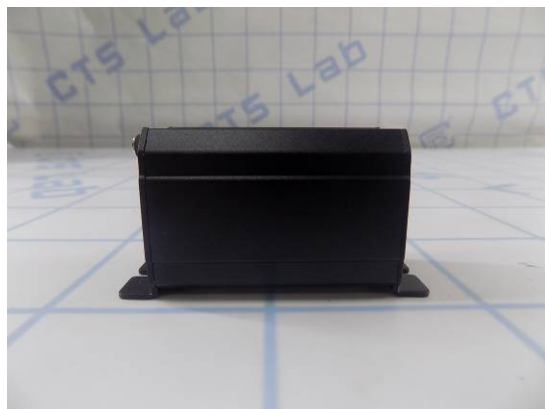
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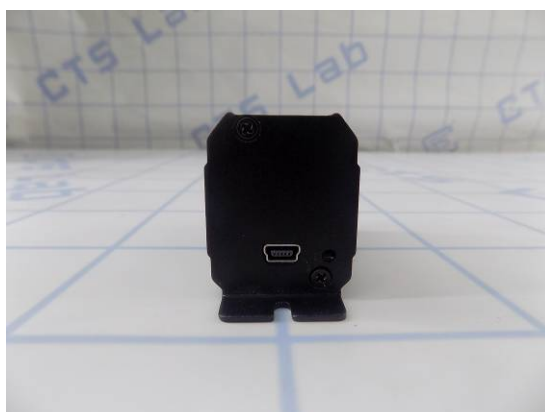
8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view 1



External view 2



External view 3

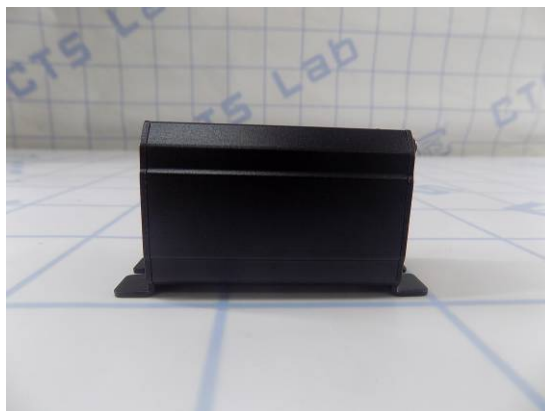
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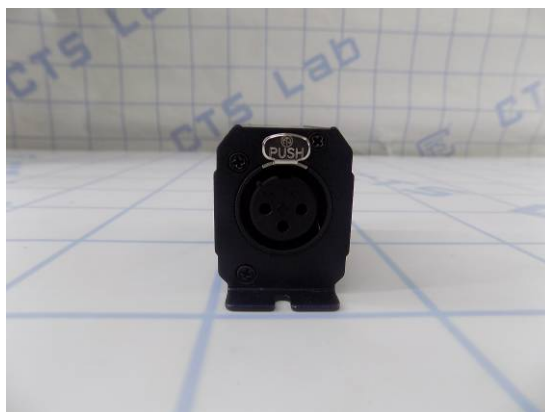
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External view 4



External view 5



External view 6

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External view 7



Internal view



PCB view 1

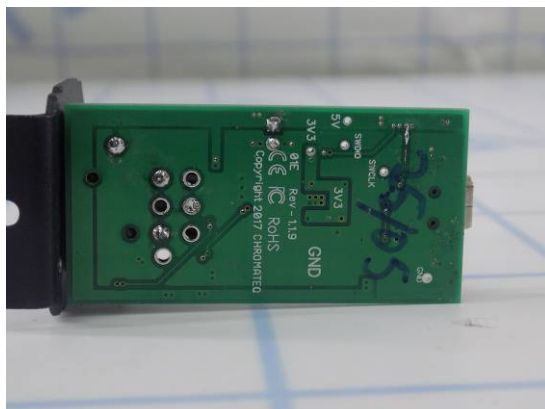
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**PCB view 2**

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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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