



EMC TEST REPORT

For

Dimmable Constant Current LED Driver

MODEL NUMBER: DALPPW-XXXX-VV-T-YYYYY-ZZZZZ

REPORT NUMBER: 4789057363-E01-01

ISSUE DATE: April 03, 2020

Prepared for

**ENERGY RECOVERY PRODUCTS (ZHUHAI) CO LTD
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Prepared by

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	04/03/2020	Initial Issue	--



Test Summary

According to the specifications of the manufacture, the EUT must complies with the following standards' requirements:

EN 55015:2013/A1:2015

EN 61547:2009

EN 61000-3-2:2014

EN 61000-3-3:2013

Electromagnetic Interference (EMI)

Test Items	Test standard	Reference Clause	Result
Radiated Emission	EN 55015:2013/ A1:2015	Table 3b	PASS
Conducted Emission	EN 55015:2013/ A1:2015	Table 2a, Table 2b ^(N/A) & Table 2c	PASS
Radiated electromagnetic disturbances	EN 55015:2013/ A1:2015	Table 3a	PASS
Harmonic Emission on AC	EN 61000-3-2:2014	Class C	PASS
Flicker Emission on AC	EN 61000-3-3:2013	Clause 5	PASS

Electromagnetic Susceptibility(EMS)

Test Items	Test standard	Test Method	Result
ESD	EN 61547:2009	EN 61000-4-2:2009	PASS
Radiated Immunity	EN 61547:2009	EN 61000-4-3:2006 +A1:2008+A2:2010	PASS
Electrical Fast Transients (EFT) on AC	EN 61547:2009	EN 61000-4-4:2012	PASS
Surge Immunity on AC	EN 61547:2009	EN 61000-4-5:2014	PASS
Conducted Immunity on AC	EN 61547:2009	EN 61000-4-6:2014	PASS
Voltage Dips and Interruptions on AC	EN 61547:2009	EN 61000-4-11:2004	PASS

Remark 1:

N/A=not applicable.

Remark 2:

All necessary tests were performed on model DAL50W-1200-42-T.



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1 ATTESTATION OF TEST RESULTS

Applicant Information	
Company Name:	ENERGY RECOVERY PRODUCTS (ZHUHAI) CO LTD
Address:	NANPING SCIENTIFIC TEC INDUSTRY PARK, NO 8 PINGDONG RD 2,ZHUHAI, 519060 GUANGDONG China
Manufacturer Information	
Company Name:	Same as applicant
Address:	Same as applicant
EUT Description	
Product Name	Dimmable Constant Current LED Driver
Brand Name	N/A
Test Model Name	DAL50W-1200-42-T
Serial Number	DALPPW-XXXX-VV-T-YYYYY-ZZZZ
Model Difference	All models have same circuit diagram and PCB layouts except for rated power and some passive components due to their different output.
Date Tested	15 Jul 2019 ~ 25 Jul 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
EN 55015:2013/A1:2015	PASS*
EN 61547:2009	PASS*
EN 61000-3-2:2014	PASS*
EN 61000-3-3:2013	PASS*

**=Decision rule for statement(s) of conformity is based on IEC Guide 115:2007 Clause 4.4.3 Procedure 2" Accuracy Method"

Prepared By:

Ryan Pang
Project Engineer

Reviewed By:

Linda Ni
Senior Project Engineer



2 TEST METHODOLOGY

All tests were performed in accordance with the procedures documented:
EN 55015:2013/A1:2015
EN 61547:2009
EN 61000-3-2:2014
EN 61000-3-3:2013

3 FACILITIES AND ACCREDITATION

All tests were performed in the following lab.

Test Location	Shenzhen STS Test Services Co., Ltd. 1/F., Building B, Zhuoke Science Park, No. 190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
Accreditation Certificate	The Laboratory has been assessed and proved to be in compliance with CNAS, The Certificate Registration Number is L7649.

4 CALIBRATION AND UNCERTAINTY

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance	0.009MHz ~ 0.15MHz	2	2.88
	0.15MHz ~ 30MHz	2	2.67
Radiated electromagnetic disturbances	0.009MHz ~ 30MHz	2	2.88
Radiated Emission Test	30MHz~200MHz	2	3.73
	200MHz~1000MHz	2	3.92

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



5 GENERAL INFORMATION

5.1 GENERAL DESCRIPTION

Certified model DAL50W-1200-42-T was performed all necessary tests in test report 4789057363-E01-00.

5.2 MODIFICATION INFORMATION

Model name of certified model was changed from 'DAL50W-1200-42-T' to 'DALPPW-XXXX-VV-T-YYYYY-ZZZZZ'.

1. "PP" – Denotes output power (Pout) rating code. PP"– If Pout ≤ 10W, "PP"=10; if 10W<Pout ≤ 20W, "PP"=20; if 20 W<Pout ≤ 30W, "PP"=30; if 30W<Pout ≤ 40W, "PP"=40; if 40W<Pout ≤ 50.4W, "PP"=50.
2. "XXXX" – Denotes regulated output current. Regulated output current is not greater than Max. output regulated current within the output current range.
3. "VV" – Denotes Maximum output voltage, it may be "08-56" Vdc.
4. "-YYYYY"-Denotes customer code for market purpose only. It could be blank, 2-5 digits, any combination of alphanumeric characters or blank;
5. "-ZZZZZ" - Denotes customer code for market purpose only. It could be blank, 2-5 digits, any combination of alphanumeric characters or blank.

All models have same circuit diagram and PCB layouts except for rated power and some passive components due to their different output.

According to the electrical characteristics and usage of the equipment and differences between the previously certified model and new models, the change of the appliance does not affect the EMC characteristic, they deem to fulfill this test requirement without further tests. All tests date in this report is depended on test report 4789057363-E01-00.



6 EQUIPMENT UNDER TEST

6.1 DESCRIPTION FOR THE EUT

Product Name:	Dimmable Constant Current LED Driver
Model No.:	DAL50W-1200-42-T
Trade Mark:	N/A
Power Supply:	220-240Vac, 50/60HZ; Max.0.28A ;PF≥0.9
Test voltage:	AC 230V, 50Hz
Cable Type:	Unshielded
Rated Power:	50.4W (maximum)

6.2 TEST MODE

Mode 1	Full LED load with maximum light output (worst case)
Mode 2	Full LED load with minimum light output
Mode 3	Full LED load with continuous adjust light level (for Harmonic test only)

Note:

1. This product is a driver for LED luminaires.

6.3 DESCRIPTION OF TEST SETUP

The EUT has been tested with associated equipment below:

No.	Description	Paramater	Model No.
1	cement resistor	35Ω	--

Note: The customer has provided dedicated load.



6.4 MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emission						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	EMI Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
2	LISN	R&S	ENV216	101242	2018.10.11	2019.10.10
3	ISN	Schwarzbeck	NTFN8158	CAT 6	2018.10.15	2019.10.14

Radiated Emission						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	EMI Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
2	Bilog Antenna	TESEQ	CBL6111 D	34678	2017.11.02	2020.11.01
3	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
4	Pre-amplifier(0.1M-3GHz)	EM	EM330	060665	2018.10.13	2019.10.12

RE Loop test						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	Three Loop	ZNINAN	ZN30401	13018	2018.10.27	2021.10.26
2	EMI Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12

Harmonics / Flicker test						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	Harmonic Voltage & Flicker	LAPLACE	AC 2000A	311217	2018.10.13	2019.10.12
2	AC Power Source	MTONI	PHF-5010	631169	2018.10.13	2019.10.12

Electrostatic Discharge						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	ESD TEST GENERATOR	KZKUSUI	KES4021	LB003568	2019.06.29	2020.06.28



EFT, Surge, Voltage dips and Interruption						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	Surger Generator	HTEC	HCWG 10	152101	2018.10.13	2019.10.12
2	VOLTAGE DIPS & INTERRUPTION S Generator	HTEC	HPFS 161P	143803	2018.10.13	2019.10.12
3	EFT/B Generator	HTEC	HEFT 51	143801	2018.10.13	2019.10.12

Conducted Immunity						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	CS	SCHLODER	CDG- 6000-25	126A1280/2 014	2018.10.13	2019.10.12
2	CDN	Frankonia	CDN- M2+3	A2210275/2 014	2018.10.13	2019.10.12
3	Attenuator	Nemtest	ATT-6DB- 100	A100W224	2018.10.13	2019.10.12

Radiated Immunity						
No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
1	Power Meter	Agilent	E4419B	QB433122 6	2018.10.13	2019.10.12
2	Power Sensor	Hp	E9300A	US392101 70	2018.10.13	2019.10.12
3	Power Sensor	Hp	E9300A	US392104 76	2018.10.13	2019.10.12
4	Signal Generator	Agilent	N5181A	MY462405 56	2018.11.10	2019.11.09
5	Power Amplifier	MICOTOP	MPA-80- 1000-250	MPA17114 89	2018.10.13	2019.10.12
6	RS Test Antenna (80-1GHz)	Schwarzbeck	VULP 9118E	000999	2019.01.14	2022.01.13

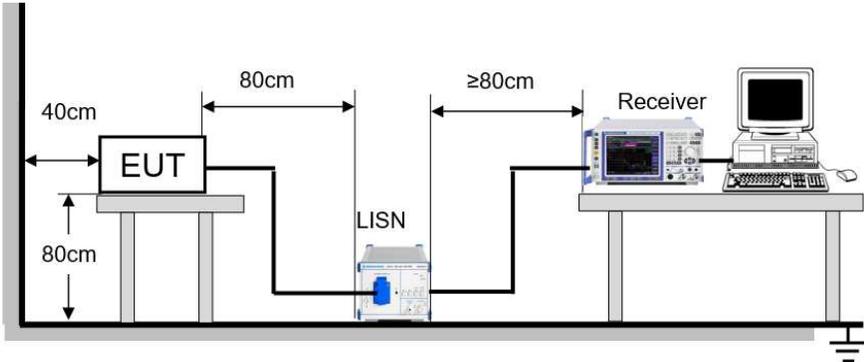


7 ELECTROMAGNETIC COMPATIBILITY (EMC)

7.1 ELECTROMAGNETIC INTERFERENCE (EMI)

7.1.1 CONDUCTED EMISSION

Test Method:	EN 55015																																	
Detector:	Peak for pre-scan (200 Hz & 9kHz Resolution Bandwidth)																																	
	Quasi-Peak if maximized peak within 6dB of Quasi-Peak limit																																	
EUT Operation:																																		
Ambient:	Temp.: 22.0 °C	Humid.: 53 %	Press.: 1005 mbar																															
Test Mode:	Mode 1 (worst case)																																	
Test Status:	<p>For Main: Mode 1 For additional: --</p> <p>Pre-scan was performed with peak detected on AC ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected. Please see the attached Quasi-peak and Average test results.</p>																																	
Limit:	<p>(1) Limits for conducted disturbance at the mains ports</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency Range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.009-0.05</td> <td>110</td> <td>--</td> </tr> <tr> <td>0.05-0.15</td> <td>90 to 80⁽²⁾</td> <td>--</td> </tr> <tr> <td>0.15 to 0.50</td> <td>66 to 56⁽²⁾</td> <td>56 to 46⁽²⁾</td> </tr> <tr> <td>0.50 to 5</td> <td>56⁽³⁾</td> <td>46⁽³⁾</td> </tr> <tr> <td>5 to 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>Note 1: At the transition frequency, the lower limit applies. Note 2: The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0,5 MHz. Note 3: For electrodeless lamps and luminaires, the limit in the frequency range of 2,51 MHz to 3,0 MHz is 73 dB(μV) quasi-peak and 63 dB(μV) average.</p> <p>(2) Limits for conducted disturbance at the load ports</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency Range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 to 0.50</td> <td>80</td> <td>70</td> </tr> <tr> <td>0.50 to 30</td> <td>74</td> <td>64</td> </tr> </tbody> </table> <p>Note 1: At the transition frequency, the lower limit applies. Note 2: The manufacturer gives strict installation instructions for the EUT, so the test on load terminals is not applicable.</p>			Frequency Range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.009-0.05	110	--	0.05-0.15	90 to 80 ⁽²⁾	--	0.15 to 0.50	66 to 56 ⁽²⁾	56 to 46 ⁽²⁾	0.50 to 5	56 ⁽³⁾	46 ⁽³⁾	5 to 30	60	50	Frequency Range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15 to 0.50	80	70	0.50 to 30	74	64
Frequency Range (MHz)	Limit (dBuV)																																	
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	<p>(3) Limits for conducted disturbance at the control ports</p> <table border="1" data-bbox="542 325 1442 485"> <thead> <tr> <th rowspan="2">Frequency Range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 to 0.50</td> <td>80 to 74</td> <td>70 to 64</td> </tr> <tr> <td>0.50 to 30</td> <td>74</td> <td>64</td> </tr> </tbody> </table> <p>Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz. Note 2; The voltage disturbance limits are derived for use with an Asymmetric Artificial Network (AAN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the control terminal. Note 3: There is no control and signal port incorporated. Therefore this test is not applicable for this EUT.</p>	Frequency Range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15 to 0.50	80 to 74	70 to 64	0.50 to 30	74	64
Frequency Range (MHz)	Limit (dBuV)											
	Quasi-peak	Average										
0.15 to 0.50	80 to 74	70 to 64										
0.50 to 30	74	64										
<p>Test Setup:</p>												
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 											



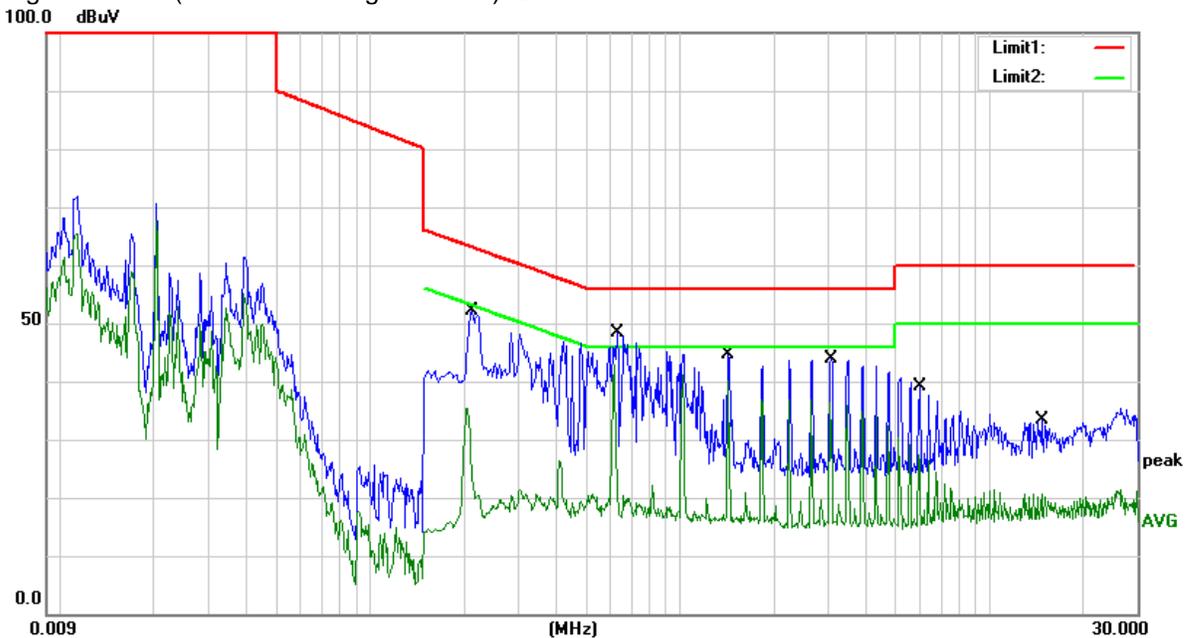
Measurement Data

Test Mode :	Mode 1 (worst case)		
Power :	AC 230 V	Phase :	LINE
Equipment :	LED Driver	Model No :	DAL50W-1200-42-T
Temperature :	25.3°C	Humidity :	62%
Pressure(mbar) :	1005	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2140	31.75	20.30	52.05	63.05	-11.00	QP
2	0.2140	15.13	20.30	35.43	53.05	-17.62	AVG
3	0.6300	27.95	20.34	48.29	56.00	-7.71	QP
4	0.6300	22.48	20.34	42.82	46.00	-3.18	AVG
5	1.4340	24.49	20.12	44.61	56.00	-11.39	QP
6	1.4340	19.97	20.12	40.09	46.00	-5.91	AVG
7	3.0740	23.78	19.98	43.76	56.00	-12.24	QP
8	3.0740	16.35	19.98	36.33	46.00	-9.67	AVG
9	5.9740	19.23	19.89	39.12	60.00	-20.88	QP
10	5.9740	9.13	19.89	29.02	50.00	-20.98	AVG
11	14.7060	13.51	19.98	33.49	60.00	-26.51	QP
12	14.7060	0.68	19.98	20.66	50.00	-29.34	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit



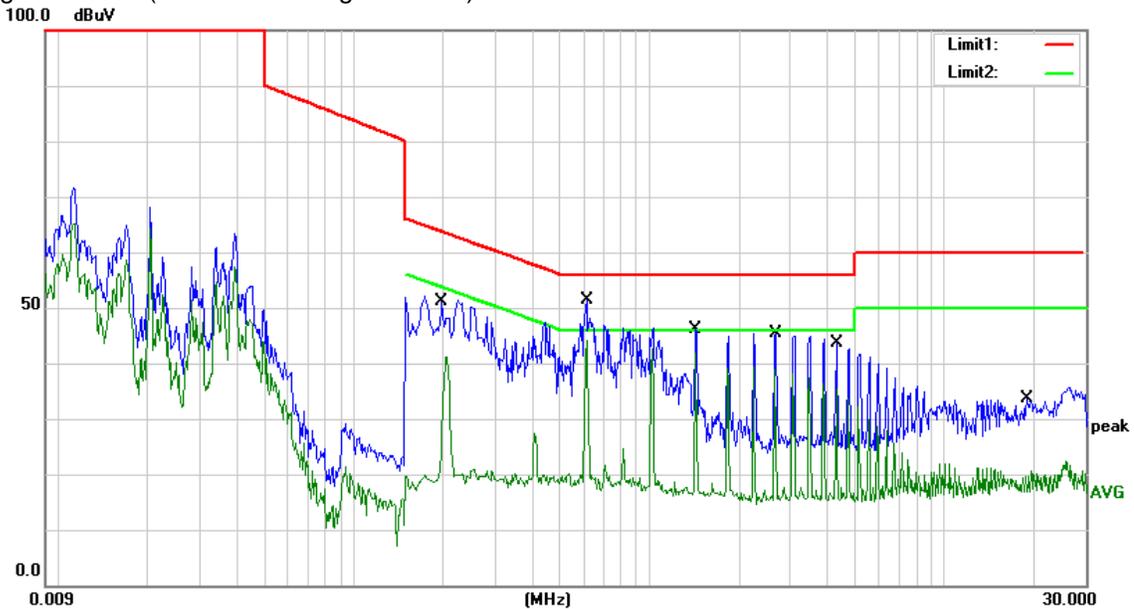


Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Phase :	NEUTRAL
Equipment :	LED Driver	Model No :	DAL50W-1200-42-T
Temperature :	25.3°C	Humidity :	62%
Pressure(mbar) :	1005	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBUV)	Factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.1980	30.73	20.32	51.05	63.69	-12.64	QP
2	0.1980	20.83	20.32	41.15	53.69	-12.54	AVG
3	0.6140	31.01	20.34	51.35	56.00	-4.65	QP
4	0.6140	21.69	20.34	42.03	46.00	-3.97	AVG
5	1.4340	25.95	20.16	46.11	56.00	-9.89	QP
6	1.4340	21.82	20.16	41.98	46.00	-4.02	AVG
7	2.6780	25.33	20.10	45.43	56.00	-10.57	QP
8	2.6780	18.75	20.10	38.85	46.00	-7.15	AVG
9	4.3260	23.68	20.05	43.73	56.00	-12.27	QP
10	4.3260	15.28	20.05	35.33	46.00	-10.67	AVG
11	18.9220	13.64	19.92	33.56	60.00	-26.44	QP
12	18.9220	0.64	19.92	20.56	50.00	-29.44	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit



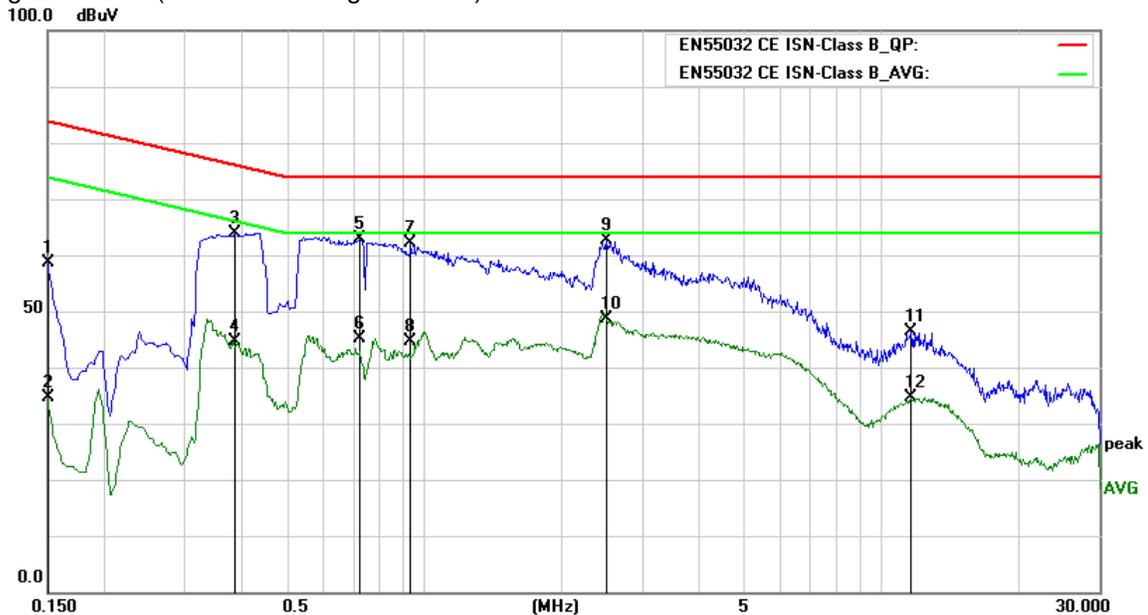


Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Phase :	Control port
Equipment :	LED Driver	Model No :	DAL50W-1200-42-T
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1005	Date :	2019/08/16

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	38.14	20.59	58.73	84.00	-25.27	QP
2	0.1500	14.01	20.59	34.60	74.00	-39.40	AVG
3	0.3860	43.79	20.19	63.98	76.15	-12.17	QP
4	0.3860	24.42	20.19	44.61	66.15	-21.54	AVG
5	0.7260	42.67	20.10	62.77	74.00	-11.23	QP
6	0.7260	25.04	20.10	45.14	64.00	-18.86	AVG
7	0.9380	42.00	20.05	62.05	74.00	-11.95	QP
8	0.9380	24.61	20.05	44.66	64.00	-19.34	AVG
9	2.5020	42.60	20.05	62.65	74.00	-11.35	QP
10	2.5020	28.46	20.05	48.51	64.00	-15.49	AVG
11	11.6780	25.76	20.61	46.37	74.00	-27.63	QP
12	11.6780	14.05	20.61	34.66	64.00	-29.34	AVG

Remark:

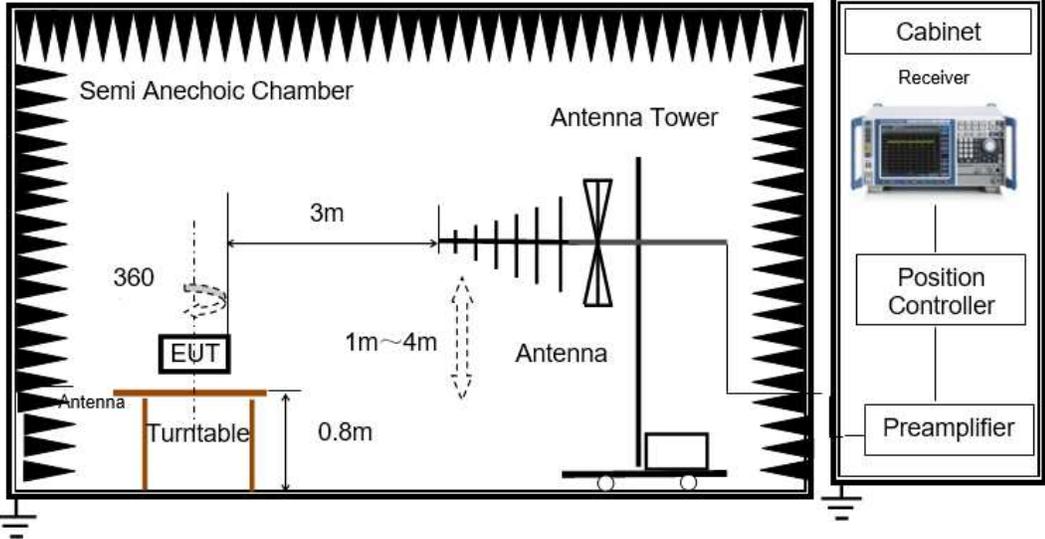
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit





7.1.2 RADIATED EMISSION

Test Method:	EN 55015			
EUT Operation:				
Ambient:	Temp.: 23 °C	Humid.: 55 %	Press.:1001 mbar	
Test Mode:	Mode 1 (worst case)			
Test Status:	Pre-scan was performed with peak detected on all ports, Quasi-peak measurements were performed at the frequencies at which maximum peak emission level were detected. Please see the attached Quasi-peak test results.			
Receive Setup:	Frequency range (MHz)	Detector	RBW	VBW
	30-1000	Quasi-peak	120kHz	300kHz
Limit:	Frequency	Limit (3m)		Remark
	30MHz-230MHz	40dBuV/m		QP value
	230MHz-300MHz	47dBuV/m		QP value

Test Setup:	
 <p>The diagram illustrates the test setup for radiated emissions testing. It features a Semi Anechoic Chamber with an EUT (Electrical Under Test) placed on a turntable that is 0.8m above the ground plane. The turntable is rotated 360 degrees. The EUT is positioned 3m away from the receiving antenna, which is mounted on an Antenna Tower. The distance between the EUT and the antenna is adjustable, ranging from 1m to 4m. The receiving antenna is connected to a cabinet containing a Receiver, Position Controller, and Preamplifier.</p>	
<p>Figure 1. 30MHz to 300MHz</p>	
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. From 30 MHz to 300MHz test procedure as below: <ol style="list-style-type: none"> 1) The radiated emissions were tested in a semi-anechoic chamber. 2) The EUT is placed on a turntable, which is 0.8m above ground plane. 3) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. 4) EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. 5) Maximum procedure was performed on the six highest emissions to ensure EUT compliance. 6) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. 7) Repeat above procedures until the measurements for all frequencies are complete.



Measurement Data:

30MHz ~ 300MHz

Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Ant. Polarization:	Horizontal
Equipment :	LED driver	Model No :	DAL50W-1200-42-T
Temp :	25.3°C	Humidity :	59%
Pressure(mbar) :	1001	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.2195	44.52	-20.36	24.16	40.00	-15.84	QP
2	70.9775	57.91	-25.63	32.28	40.00	-7.72	QP
3	97.3020	47.40	-20.57	26.83	40.00	-13.17	QP
4	150.3562	49.99	-18.50	31.49	40.00	-8.51	QP
5	192.8063	45.35	-21.96	23.39	40.00	-16.61	QP
6	260.6881	32.81	-15.35	17.46	47.00	-29.54	QP

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor) –Limit



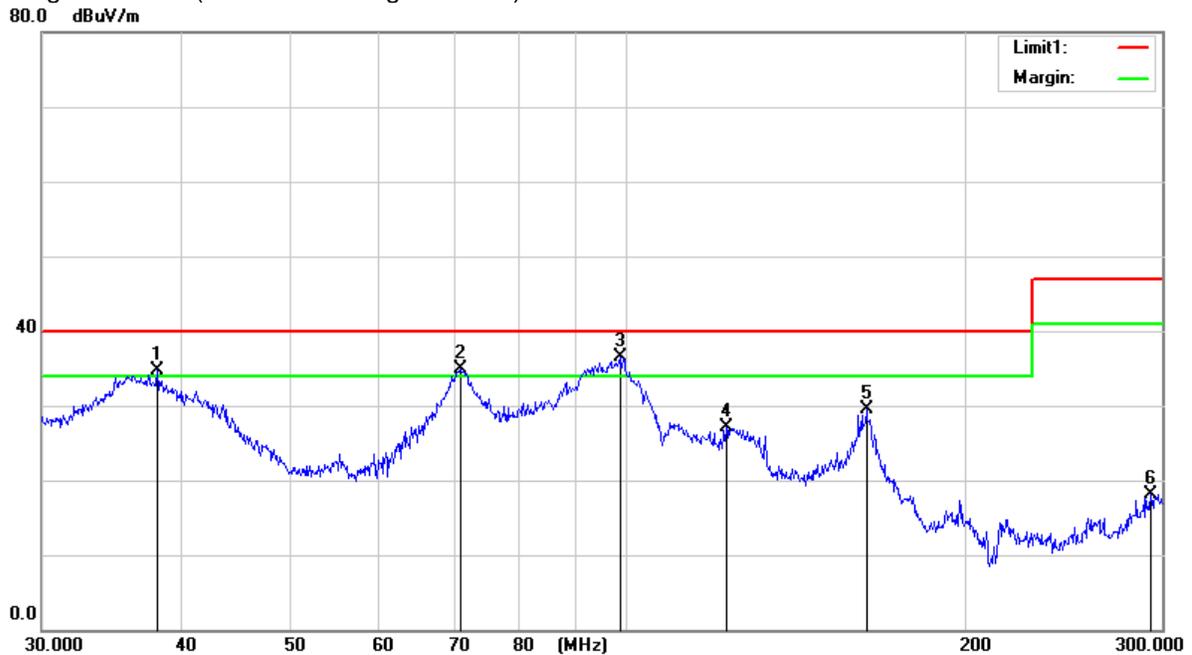


Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Ant. Polarization:	Vertical
Equipment :	LED driver	Model No :	DAL50W-1200-42-T
Temp :	25.3°C	Humidity :	59%
Pressure(mbar) :	1001	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.0296	51.19	-16.56	34.63	40.00	-5.37	QP
2	70.9775	59.94	-25.10	34.84	40.00	-5.16	QP
3	98.4286	57.54	-21.00	36.54	40.00	-3.46	QP
4	122.4958	46.47	-19.35	27.12	40.00	-12.88	QP
5	163.3508	50.04	-20.52	29.52	40.00	-10.48	QP
6	293.1712	35.34	-17.27	18.07	47.00	-28.93	QP

Remark:

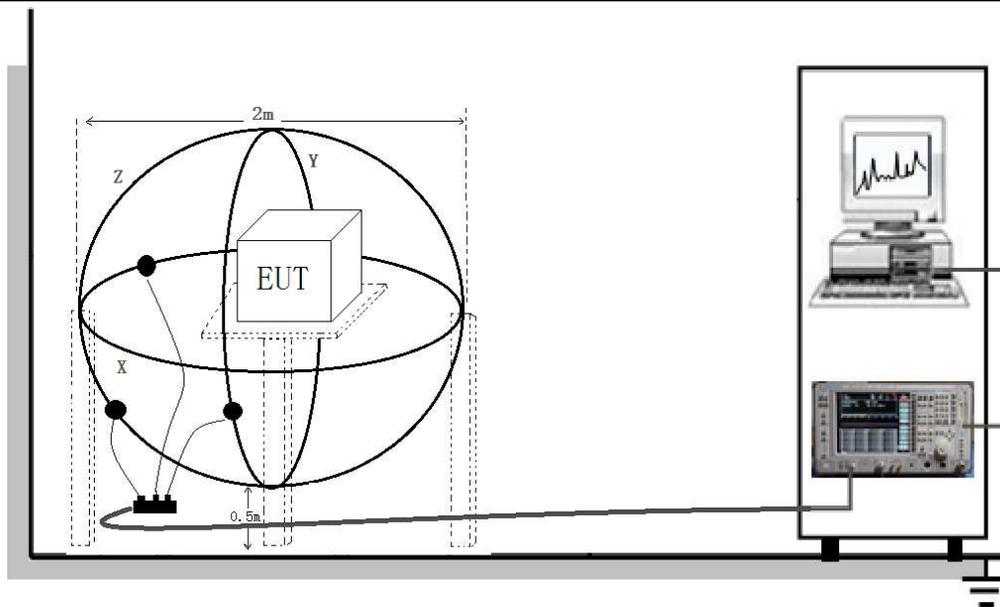
1. All readings are Quasi-Peak.
2. Margin = Result = Reading + Factor)-Limit





7.1.3 RADIATED ELECTROMAGNETIC DISTURBANCES TEST

Test Method:	EN 55015			
EUT Operation:				
Ambient:	Temp.: 25.0 °C	Humid.: 56 %	Press.: 1005 mbar	
Test Mode:	Mode 1 (worst case)			
Test Status:	<p>For Main: Mode 1 Additional: --</p> <p>Pre-scan was performed with peak detected on all ports, Quasi-peak measurements were performed at the frequencies at which maximum peak emission level were detected. Please see the attached Quasi-peak test results.</p>			
Receive Setup:	Frequency range (MHz)	Detector	RBW	
	0.009-0.15	Quasi-peak	200Hz	
	0.15-30	Quasi-peak	120kHz	
Limit:	Table 2a			
	Frequency range	QP limits dB(μA)		
	9 kHz to 70 kHz	88		
	70 kHz to 150 kHz	88 to 58 ⁽¹⁾		
	150 kHz to 3,0 MHz	58 to 22 ⁽¹⁾		
	3,0 MHz to 30 MHz	22		
<p>(1) Decreasing linearly with the logarithm of the frequency. For electrodeless lamps and luminaires, the limit in the frequency range of 2,2 MHz to 3,0 MHz is 58 dB(μA) for 2 m, 51 dB(μA) for 3 m and 45 dB(μA) for 4 m loop diameter.</p> <p>(2) Increasing linearly with the logarithm of the frequency.</p>				
Test Setup:				



Test Procedure:

1. The magnetic component was measured by means of a loop antenna. The lighting equipment was placed in the centre of the antenna. The position of the mains lead was optimized for maximum current induction.
2. The induced current in the loop antenna was measured by means of a current probe (1 V/A) and the CISPR measuring receiver. During the measurements the EUT remains in a fixed position. By means of a coaxial switch, The currents in the three large loop antennas, originating from the three mutually orthogonal magnetic field components, were measured in sequence. Each value was fulfil the requirements given.
3. There were no special instructions for the supply wiring.
4. The distance between the outer perimeter of the Loop Antenna System and nearby objects, such as floor and walls, was at least 0.5 m.
5. To avoid unwanted capacitive coupling between the EUT and the Loop Antenna System, the maximum dimensions of the EUT allowed a distance of at least 0.20 m between the EUT and the standardized 2 m large loop antennas of the Loop Antenna System.



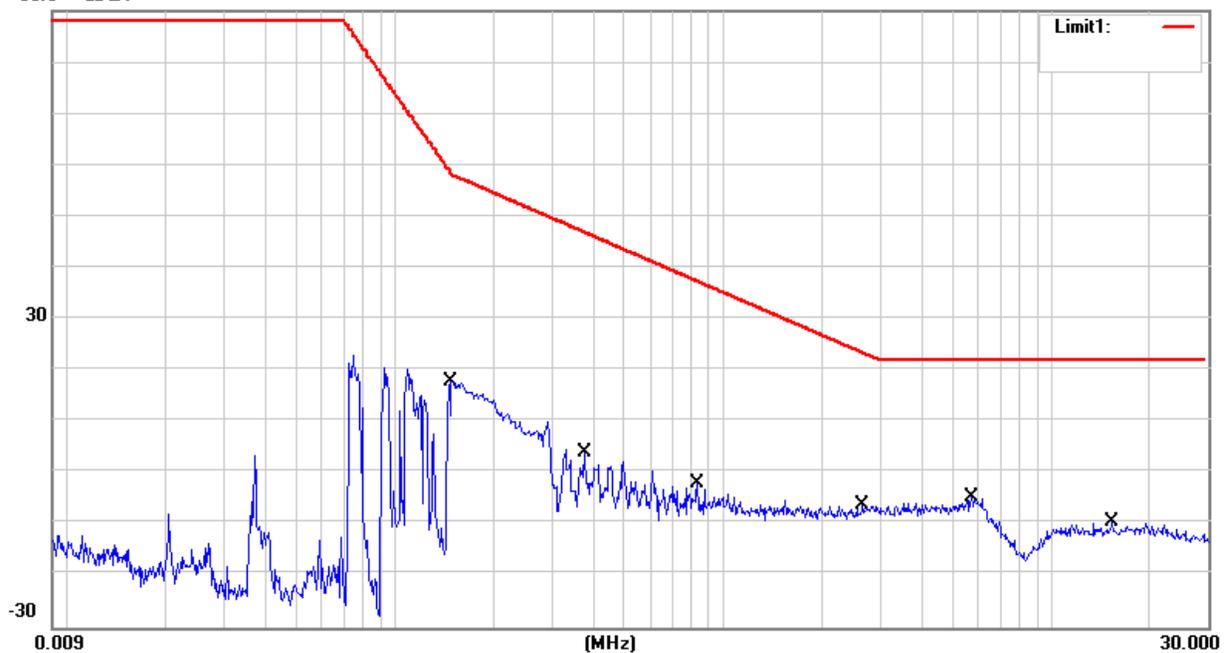
Measurement Data:

Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Polarity:	X
Equipment :	LED driver	Model No :	DAL50W-1200-42-T
Temp :	25.3°C	Humidity :	62%
Pressure(mbar) :	1005	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuA)	Factor (dB)	Results (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.1500	-3.59	21.31	17.72	58.00	-40.28	QP
2	0.3780	-17.58	21.73	4.15	46.89	-42.74	QP
3	0.8380	-24.04	21.96	-2.08	37.33	-39.41	QP
4	2.6580	-27.99	21.85	-6.14	23.45	-29.59	QP
5	5.7180	-27.77	23.14	-4.63	22.00	-26.63	QP
6	15.3580	-26.92	17.60	-9.32	22.00	-31.32	QP

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result = Reading + Factor) - Limit
90.0 dBuA



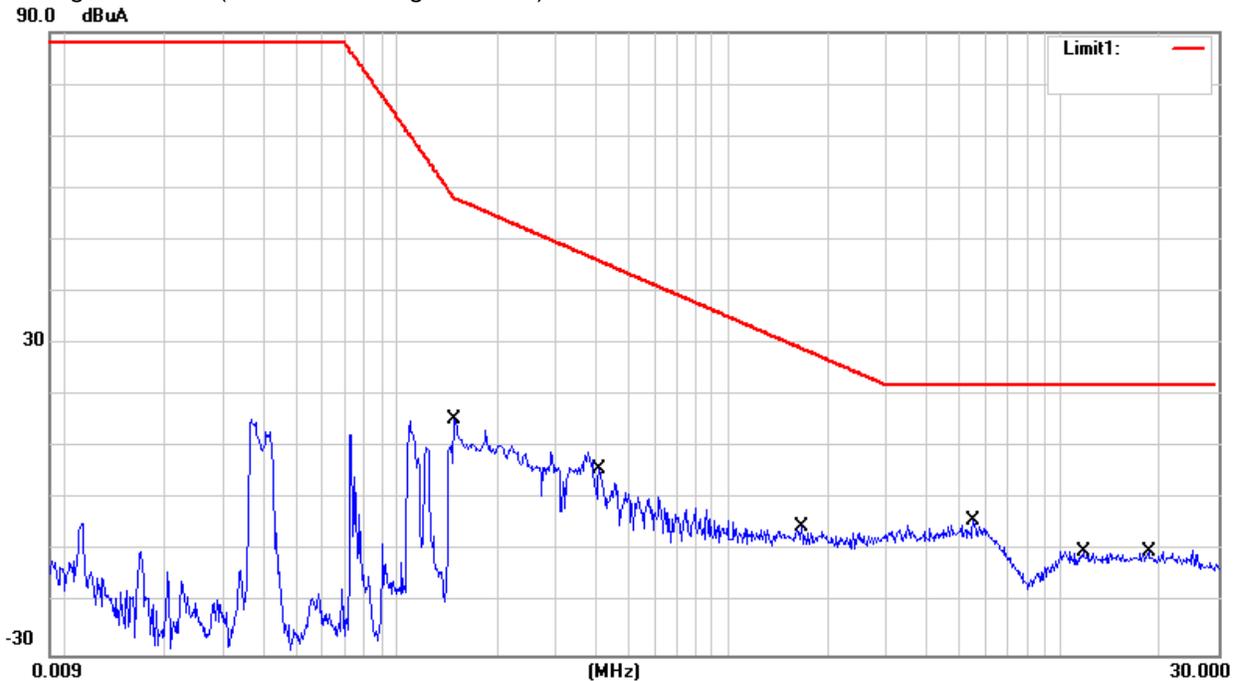


Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Polarity:	Y
Equipment :	LED driver	Model No :	DAL50W-1200-42-T
Temp :	25.3°C	Humidity :	62%
Pressure(mbar) :	1005	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuA)	Factor (dB)	Results (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.1500	-5.90	21.31	15.41	58.00	-42.59	QP
2	0.4100	-15.95	21.74	5.79	45.92	-40.13	QP
3	1.6660	-27.23	21.90	-5.33	29.07	-34.40	QP
4	5.4860	-27.11	23.03	-4.08	22.00	-26.08	QP
5	11.7780	-27.57	17.56	-10.01	22.00	-32.01	QP
6	18.5780	-27.71	17.59	-10.12	22.00	-32.12	QP

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor)-Limit



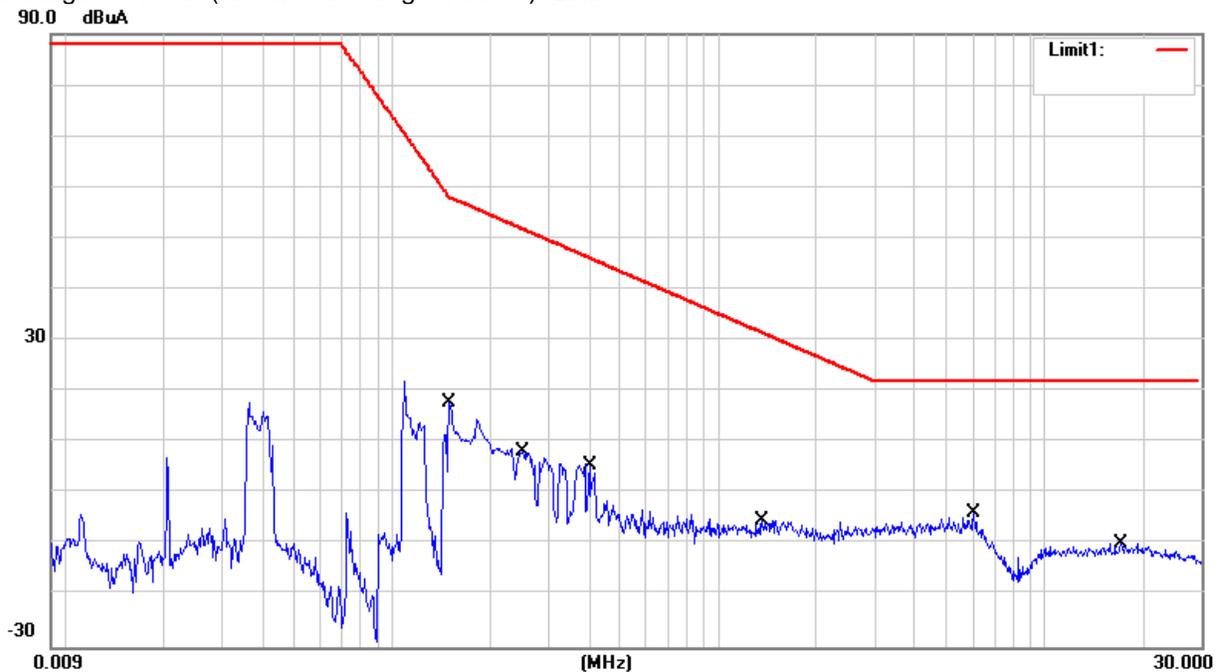


Test Mode :	Mode 1 (worst case)		
Power :	AC 230V	Polarity:	Z
Equipment :	LED driver	Model No :	DAL50W-1200-42-T
Temp :	25.3°C	Humidity :	62%
Pressure(mbar) :	1005	Date :	2019/07/22

No.	Frequency (MHz)	Reading (dBuA)	Factor (dB)	Results (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.1500	-3.33	21.31	17.98	58.00	-40.02	QP
2	0.2504	-13.36	21.59	8.23	51.84	-43.61	QP
3	0.4020	-16.27	21.74	5.47	46.15	-40.68	QP
4	1.3540	-27.31	22.11	-5.20	31.56	-36.76	QP
5	6.0260	-26.74	23.13	-3.61	22.00	-25.61	QP
6	17.0660	-27.32	17.61	-9.71	22.00	-31.71	QP

Remark:

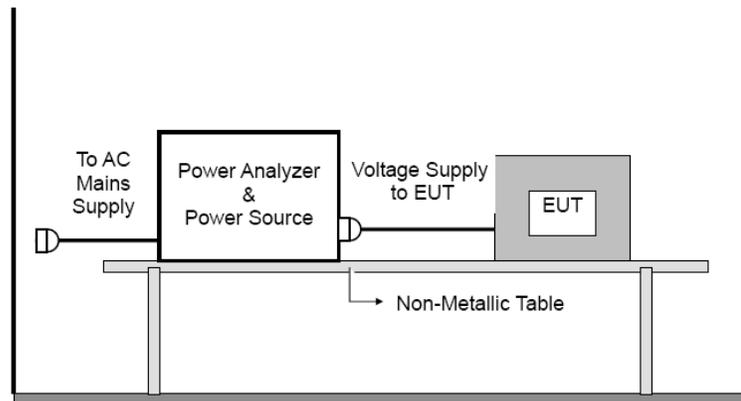
1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor) –Limit



7.1.4 HARMONICS TEST

Test Method:	EN 61000-3-2
Test Result:	PASS
Frequency Range:	50Hz to 2kHz
Measurement Time:	2.5mins
Class / Severity:	Class C
Test mode:	Mode 3

Test Setup and Procedure



1. The EUT was tested with the equipment configured to its rated current.
2. The measurements were carried out under steady conditions. When a piece of EUT is brought into operation or is taken out of operation, manually or automatically, harmonic currents and power are not taken into account at first 10s following the switching event. EUT shall not be in standby mode for more than 10% of any observation period.
3. Harmonics of the fundamental current were measured using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system.

For each harmonic order, measure the 1,5 s smoothed r.m.s. harmonic current in each DFT time window and calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period. Each harmonic order, all 1.5 s smoothed r.m.s. harmonic current values and the average values for the individual harmonic currents, taken over the entire test observation period shall be less than or equal to the applicable limits.



Measurement Data

HA-PC Link Plus. Software v3.03. Firmware v3.02

Report Number : 89

Tested On : 23 Jul. 2019 19:08 for 150 Seconds.

Equipment Under Test : LED driver

Serial Number : DAL50W-1200-42-T

Tested by : Micheal.Li

Supply Voltage : 230.1 to 230.3 Vrms 325.2 Vpk Frequency : 50.00 Hz

Supply Meets EN Requirements

Load Power : 54.50 to 55.06 W 54.97 VA Power Factor 0.993

Load Current : 238.5 to 240.7 mArms 335.2 to 337.1 mApk Crest Factor 1.406

Max THC : 14.84 mA

THD :6.3%

Measurement Standard : EN61000-4-7:2002+A1:2009

Limits Applied : EN61000-3-2:2014 Class C Limits >25W for 0.240A at 0.993 PF.

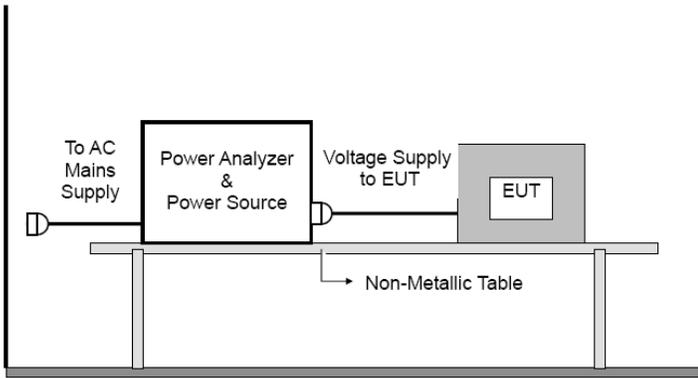
Harmonic Number	Limit Current mA	Average (filtered) mA	% Limit mA	% max. Value (Filtered)	% Limit	Assessment
Fundamental :		483.0				
2 :	9.7	0.1	1.0	0.0	-	Pass
3 :	145.0	4.1	2.8	4.1	2.8	Pass
4 :	-	0.0	-	0.0	-	-
5 :	48.3	0.4	0.8	0.3	0.6	Pass
6 :	-	0.0	-	0.0	-	-
7 :	33.8	0.2	0.6	0.2	0.6	Pass
8 :	-	0.0	-	0.0	-	-
9 :	24.2	0.0	-	0.0	-	Pass
10 :	-	0.0	-	0.0	-	-
11 :	14.5	0.0	-	0.0	-	Pass
12 :	-	0.0	-	0.0	-	-
13 :	14.5	0.0	-	0.0	-	Pass
14 :	-	0.0	-	0.0	-	-
15 :	14.5	0.1	0.7	0.1	0.7	Pass
16 :	-	0.0	-	0.0	-	-
17 :	14.5	0.0	-	0.0	-	Pass
18 :	-	0.0	-	0.0	-	-
19 :	14.5	0.1	0.7	0.0	-	Pass
20 :	-	0.0	-	0.0	-	-
21 :	14.5	0.0	-	0.0	-	Pass
22 :	-	0.0	-	0.0	-	-
23 :	14.5	0.0	-	0.0	-	Pass
24 :	-	0.0	-	0.0	-	-



25 :	14.5	0.0	-	0.0	-	Pass
26 :	-	0.0	-	0.0	-	-
27 :	14.5	0.1	0.7	0.1	0.7	Pass
28 :	-	0.0	-	0.0	-	-
29 :	14.5	0.0	-	0.0	-	Pass
30 :	-	0.0	-	0.0	-	-
31 :	14.5	0.0	-	0.0	-	Pass
32 :	-	0.0	-	0.0	-	-
33 :	14.5	0.0	-	0.0	-	Pass
34 :	-	0.0	-	0.0	-	-
35 :	14.5	0.0	-	0.0	-	Pass



7.1.5 FLICKER TEST

Test Method:	EN 61000-3-3		
EUT Operation:			
Ambient:	Temp.: 20.0	°C	Humid.: 45 % Press.:1005 mbar
Test Mode:	Mode 1		
Limits:	Test items	Limits(EN61000-3-3)	Descriptions
	P_{st}	≤1.0, T _p =10min	short-term flicker indicator
	P_{lt}	≤0.65, T _p =2h	long-term flicker indicator
	d_c	≤3.3%	relative steady-state voltage change
	d_{max}	≤4%(or 6% ^{Note(1)} , 7% ^{Note(2)})	maximum relative voltage change:
	T_{max}	d _c >3.3%, no more than 500ms	relative voltage change characteristic
Test Setup:	 <p>The diagram illustrates the test setup. On the left, a plug symbol is labeled 'To AC Mains Supply'. A line connects this to a box labeled 'Power Analyzer & Power Source'. From this box, a line labeled 'Voltage Supply to EUT' connects to a box labeled 'EUT'. The 'EUT' box is placed on a 'Non-Metallic Table'.</p>		
	<ol style="list-style-type: none"> 1. The test supply voltage (open-circuit voltage) was the rated voltage of the EUT. The Test voltage: was maintained within $\pm 2\%$ of the nominal value. The frequency was 50 Hz $\pm 0.5\%$. 2. The voltage fluctuations and flicker were measured at the supply terminals of the EUT. 3. The observation period, T_p, for the assessment of flicker values by flicker measurement, flicker simulation, or analytical method was: <ul style="list-style-type: none"> — for P_{st}, T_p = 10 min; — for P_{lt}, T_p = 2 h. <p>The observation period included that part of the whole operation cycle in which the EUT produces the most unfavorable sequence of voltage changes.</p>		



Measurement Data

Test Parameter	Measurement Value	Limit	Remarks
Pst	0.00	1.0	Pass
Plt	--	0.65	--
T _{max} (s)	0.00	0.5	Pass
d _{max} (%)	0.00%	4%	Pass
dc(%)	0.05%	3.3%	Pass

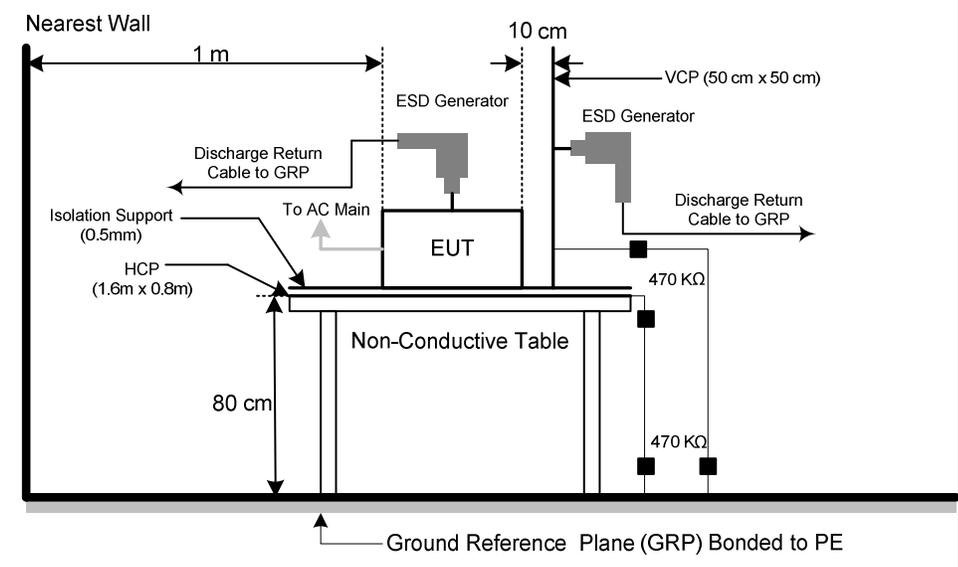


7.2 ELECTROMAGNETIC SUSCEPTIBILITY (IMMUNITY)

Performance Criteria Description

Criterion A:
During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.
Criterion B:
During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.
Criterion C:
During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control. Additional requirement for lighting equipment incorporating a starting device: After the test the lighting equipment is switched off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

7.2.1 ELECTROSTATIC DISCHARGE (ESD)

Test Method:	EN 61000-4-2
EUT Operation:	
Ambient:	Temp.: 24.1 °C Humid.: 46 % Press.: 1005 mbar
Test Mode:	Mode 1
Criterion Required:	B
Discharge Impedance:	330 Ω / 150 pF
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Equipment Used:	Refer to section 5 for details.
Test Setup:	 <p style="text-align: center;">Test set-up for tabletop equipment</p>
Test Procedure:	<p>1) Contact discharges to the conductive surfaces and to coupling planes: Air discharge at slots and apertures, and insulating surfaces: On those parts of the EUT where it was not possible to perform contact discharge testing, the equipment was investigated to identify user accessible points where breakdown may occur. This investigation was restricted to those areas normally handled by the user. A minimum of 10 single air discharges were applied to the selected test point for each such area.</p> <p>The application of electrostatic discharges to the contacts of open</p>



	<p>connectors was not required by this standard.</p> <p>2) The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).</p> <p>3) A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & think mess as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surfaces excepted the GRP, HCP and VCP was greater than 1m.</p> <p>4) During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.</p> <p>5) After each discharge, the ESD generator was removed from the EUT, the generator was then retriggeder for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.</p>
Test Results:	
Observations:	<p>Test Point:</p> <ol style="list-style-type: none"> All insulated enclosure and seams. All accessible metal parts of the enclosure.

Test Results: Pass

	Contact Discharge								Air Discharge							
	10 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
HCP	---	---	A	A	---	---	---	---	---	---	---	---	---	---	---	---
VCP	---	---	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Metal shell	---	---	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Crevice	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---

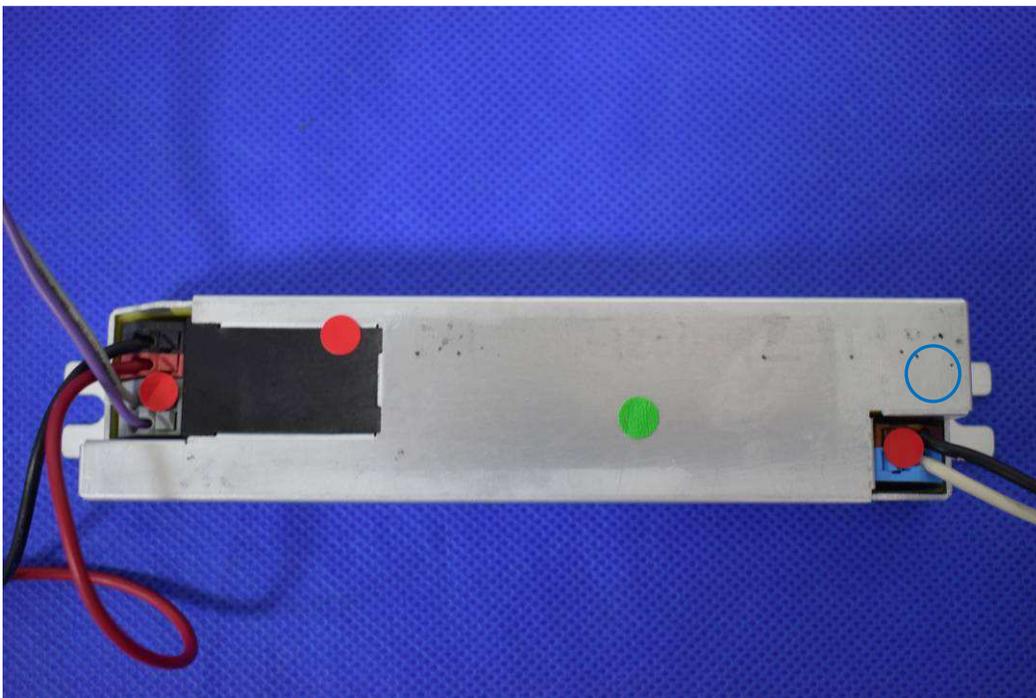
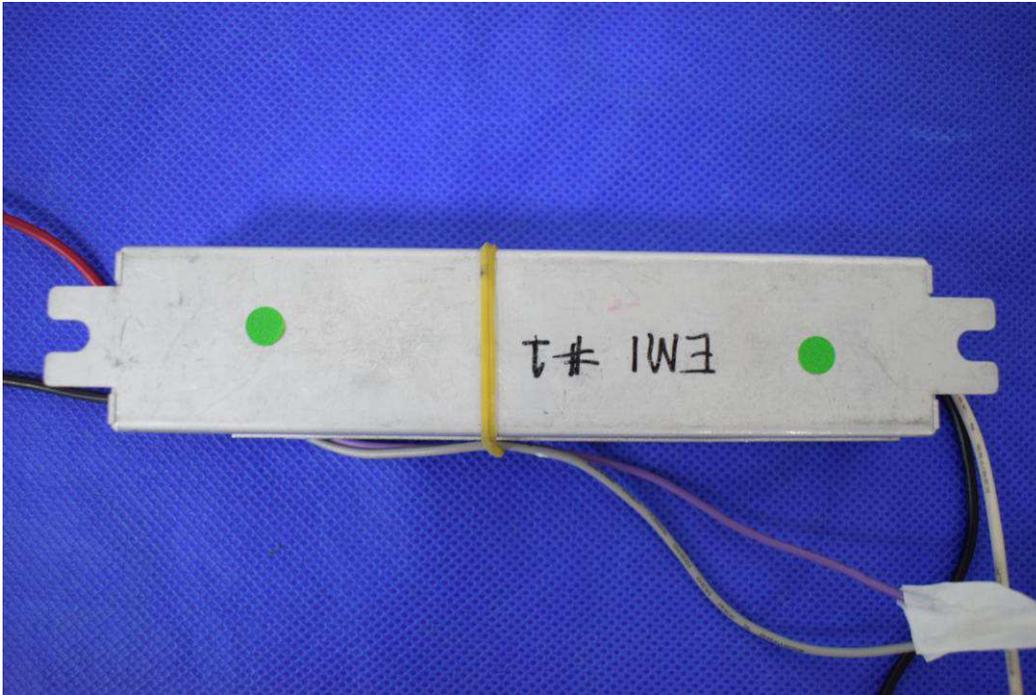
Results: Pass

Note:

Test phenomenon description for the EUT:

A. The EUT working is normal, during and after the test.

The Photo for Discharge Points of EUT



- = Contact discharge test points
- = Air discharge test points

7.2.2 RADIATED IMMUNITY

Test Method:	EN 61000-4-3			
EUT Operation:				
Ambient:	Temp.: 25.3	°C	Humid.: 54	%
Test Mode:	Mode 1			
Criterion Required:	A			
Test Setup:				

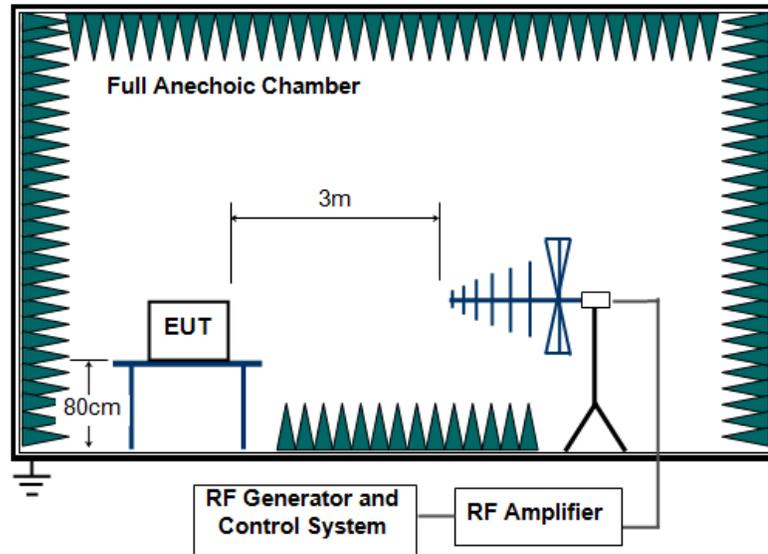


Figure 1. 80MHz to 1GHz ,



Test Procedure:	<ol style="list-style-type: none"> 1) For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2) If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3) The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4) The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1% of the preceding frequency value. 5) The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5s. 6) The test normally was performed with the generating antenna facing each side of the EUT. 7) The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8) The EUT was performed in a configuration to actual installation conditions, a video camera, test data and/or an audio monitor were used to monitor the performance of the EUT.
------------------------	--

Modulation : AM 80% , 1KHz sine wave , Dwell time: 2.0 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~1000	Horizontal &Vertical	Front	3 V/m	A
80~1000	Horizontal &Vertical	Rear	3 V/m	A
80~1000	Horizontal &Vertical	Left	3 V/m	A
80~1000	Horizontal &Vertical	Right	3 V/m	A

Test Results: Pass

Note:

Test phenomenon description for the EUT:

A. The EUT working is normal, during and after the test.



7.2.3 ELECTRICAL FAST TRANSIENTS (EFT)

Test Method:	EN 61000-4-4
Test Level:	± 1.0kV on AC port
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Period:	300ms
Test Duration:	1 minute per level & polarity
EUT Operation:	
Ambient:	Temp.: 24.8 °C Humid.: 50 % Press.: 1005 mbar
Test Mode:	Mode 1
Test Setup:	
Test Procedure:	<ol style="list-style-type: none"> 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP. 2) The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. A cable not subject to EFT was routed as far as possible from cable under test to minimize the coupling between the cables. 3) The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP. 4) The EUT was conducted the below specified test voltages for line and neutral or line, neutral and earth simultaneously (for telecommunication, single, control and DC port line with capacitive coupling clamp), 120 seconds duration. If the equipment contains identical ports, only one was tested; multicomputer cables, such as a 50-pair telecommunication cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.



Pulse : 5/50 ns		Repetition Rate: <u>5 kHz</u>			
Burst : 15m/300ms					
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>0.5 kV</u>		<u>1.0 kV</u>	
		+	-	+	-
Power Line	L	---	---	A	A
	N	---	---	A	A
	L+N	---	---	A	A
	PE	---	---	---	---
	L+PE	---	---	---	---
	N+PE	---	---	---	---
	L+N+PE	---	---	---	---
	Control Lines <small>(Note 2)</small>	---	---	---	---
	DC Power Port <small>(Note 3)</small>	---	---	---	---

Test Results: Pass

Note 1:

Test phenomenon description for the EUT:

A. The EUT working is normal, during and after the test.

Note 2:

The length of control lines are less than 3 m, therefore this test is not applicable for this EUT.

Note 3:

There is no DC power port incorporated. Therefore this test is not applicable for this EUT.



7.2.4 SURGE IMMUNITY

Test Method:	EN 61000-4-5
Test Level:	For AC port 1) $\pm 0.5, \pm 1.0\text{kV}$ Live to Neutral
Criterion Required:	B
Polarity:	Positive & Negative
Interval:	60s between each surge
No. of Surges:	5 positive at 90°, 5 negative at 270°.
EUT Operation:	
Ambient:	Temp.: 24.8 °C Humid.: 50 % Press.: 1005 mbar
Test Mode:	Mode 1
Test Setup:	<p style="text-align: center;">For AC port</p>
Test Procedure:	<ol style="list-style-type: none"> 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP. 2) The 1.2/50 μs surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be applied on the lines under test. 3) The power cord between the EUT and the coupling/decoupling network was not exceed 2 m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length. 4) The EUT was conducted 0.5 kV and 1 kV test voltage for line to line and line to neutral and conducted 0.5 kV, 1 kV and 2 kV test voltage for line to earth and neutral to earth, five positive pulses and five negative pulses each at 0°.



	<p>90°, 180° and 270° for a.c. power ports and five positive pulses and five negative surge pulses for d.c. power ports (for telecommunication port, It was 0.5 kV for indoor cable longer than 10m line to ground and 0.5kV,1kV test voltage for outdoor cable line to ground, five positive pulses and five negative surge pulses), The test levels were applied on the EUT with a 2 Ω generator source impedance for power supply terminals and 40Ω output impedance for interconnection lines. The tests were done at repetition rate one per minute.</p>
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Waveform : 1.2/50µs(8/20µs) Repetition rate : 60 sec Time : 20 time/each condition						
Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
<u>±0.5, ±1KV</u>	L-N	+	--	A	--	--
		-	--	--	--	A
<u>±0.5, ±1KV, ±2KV</u>	L-PE	±	--	--	--	--
		-	--	--	--	--
	N-PE	±	--	--	--	--
		-	--	--	--	--

Test Results: Pass

Note:

Test phenomenon description for the EUT:

A. The EUT working is normal, during and after the test.



7.2.5 CONDUCTED IMMUNITY

Test Method:	EN 61000-4-6
Criterion Required:	A
EUT Operation:	Mode 1
Ambient:	Temp.:24.1 °C Humid.: 46 % Press.: 1005 mbar
Test Mode:	Mode 1
Test Setup:	<p style="text-align: center;">For AC port</p>
Test Procedure:	<ol style="list-style-type: none"> 1) The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement. All cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane. 2) The coupling and decoupling devices were required; they were located between 0.1m and 0.3m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device. 3) Each AE, used with clamp injection, shall be placed on an insulating support 0.1m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test. All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0.3m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30mm and 50mm above the ground reference plane. 4) The frequency range was swept from 150 kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size does not exceed 1% of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency was not less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.



Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 2.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 80MHz	AC mains	3	A (Note 1)
0.15 ~ 80MHz	Control Lines	3	N/A (Note 2)
0.15 ~ 80MHz	DC power port	3	N/A (Note 3)

Test Results: Pass

Note 1:

Test phenomenon description for the EUT:

A. The EUT working is normal, during and after the test.

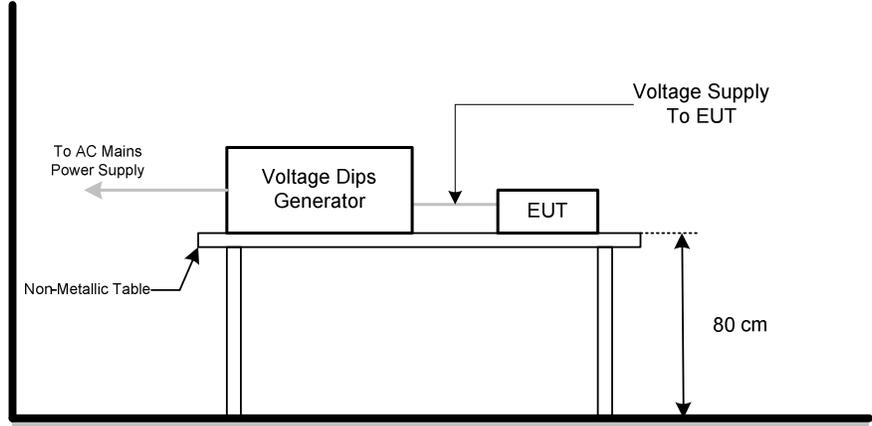
Note 2:

The length of control lines are less than 3 m, therefore this test is not applicable for this EUT.

Note 3:

There is no DC power port incorporated. Therefore this test is not applicable for this EUT.

7.2.6 VOLTAGE DIPS AND INTERRUPTIONS

Test Method:	EN 61000-4-11			
Test Level:	1) Voltage dip: 70 % residual voltage for 10 cycles; 2) Voltage dip: 0% residual voltage for 0.5 cycles;			
No. of Dips / Interruptions:	3 per Level			
EUT Operation:				
Ambient:	Temp.: 24.8	°C	Humid.: 50	% Press.:1005 mbar
Test Mode:	Mode 1			
Test Setup:				
Test Procedure:	<ol style="list-style-type: none"> 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP. 2) The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer. 3) The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested. 4) For EUT with more than one power cord, each power cord was tested individually. 			



Voltage(UT): AC 230V/50Hz Interval(s) : 10s Times : 3										
Test mode	Test level UT %	Durations (period / ms)	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage dips	70%	10	B	--	--	--	B	--	--	--
	>95%	0.5	B	--	--	--	B	--	--	--

Test Results: Pass

Note:

Test phenomenon description for the EUT:

B. The EUT was abnormal working during the test and recovered by itself after the test.

8 PHOTOGRAPHS OF EMC TEST CONFIGURATION & INTERNAL and EXTERNAL

8.1 CONDUCTED EMISSION TEST SETUP

All tests setup had been carried out according to the manufacturer's specified installation.



8.2 CONDUCTED EMISSION (CONTROL PORT) TEST SETUP

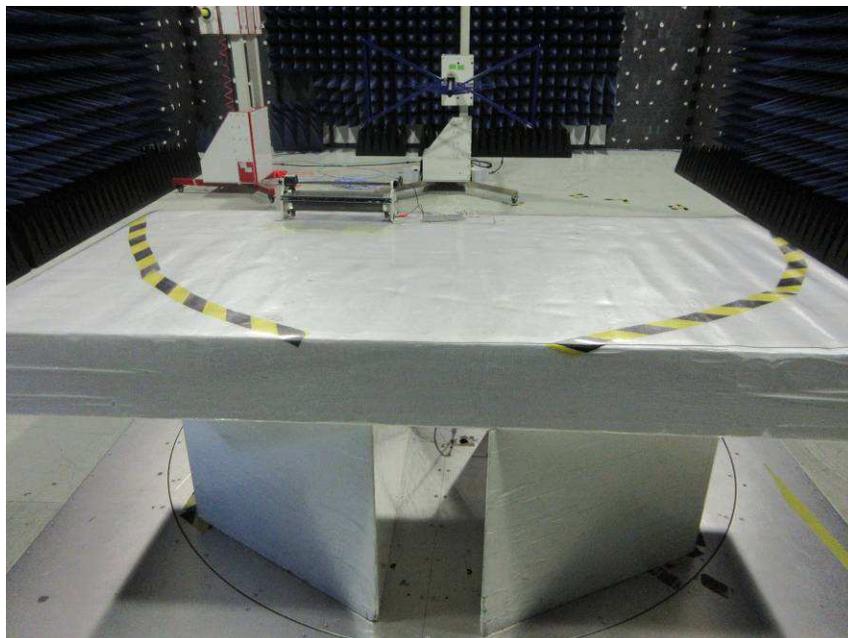
All tests setup had been carried out according to the manufacturer's specified installation.



8.3 RADIATED ELECTROMAGNETIC DISTURBANCES Test SETUP



8.4 RADIATED EMISSION TEST SETUP



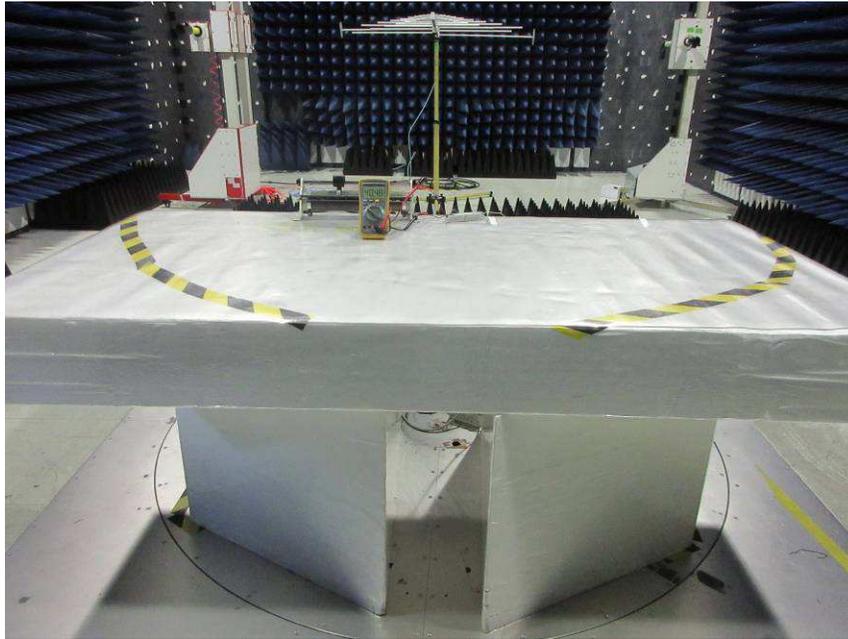
8.5 HARMONICES AND FLICK MEASUREMENT



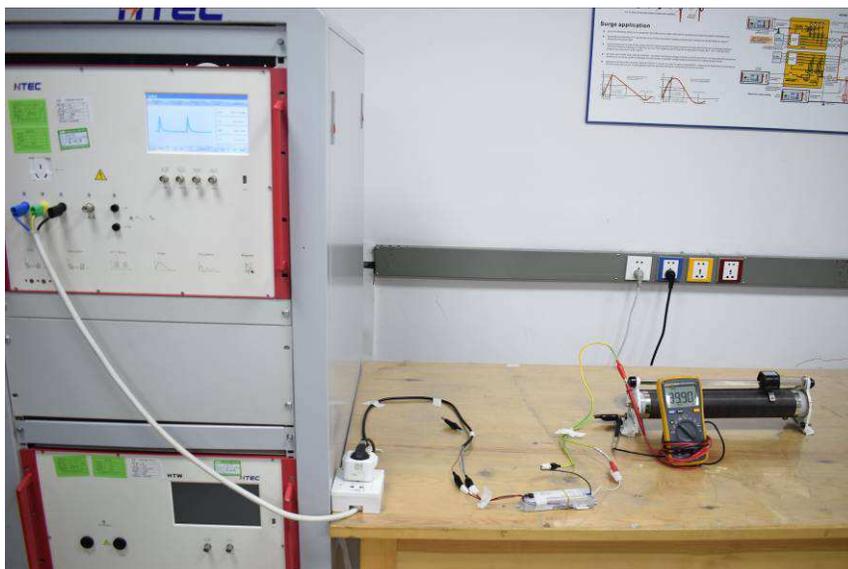
8.6 ESD



8.7 RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY



8.8 SURGE



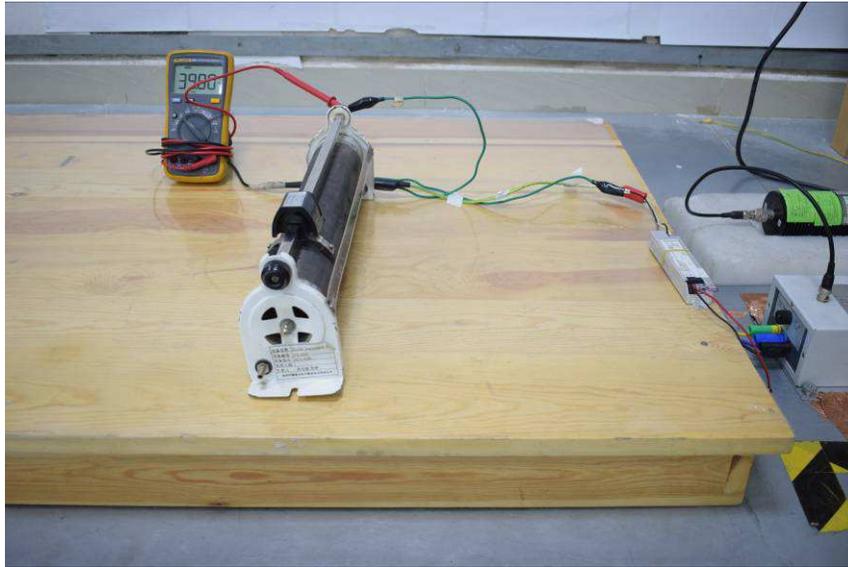
8.9 ELECTRICAL FAST TRANSIENT/BURST



8.10 VOLTAGE DIPS AND INTERRUPTIONS



8.11 CONDUCTED IMMUNITY



8.12 INTERNAL and EXTERNAL

Photo 1

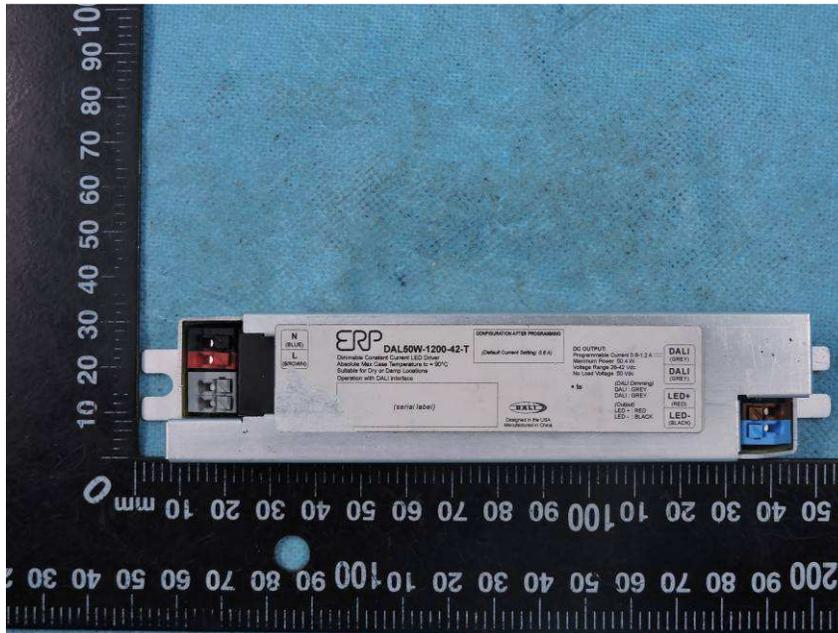


Photo 2

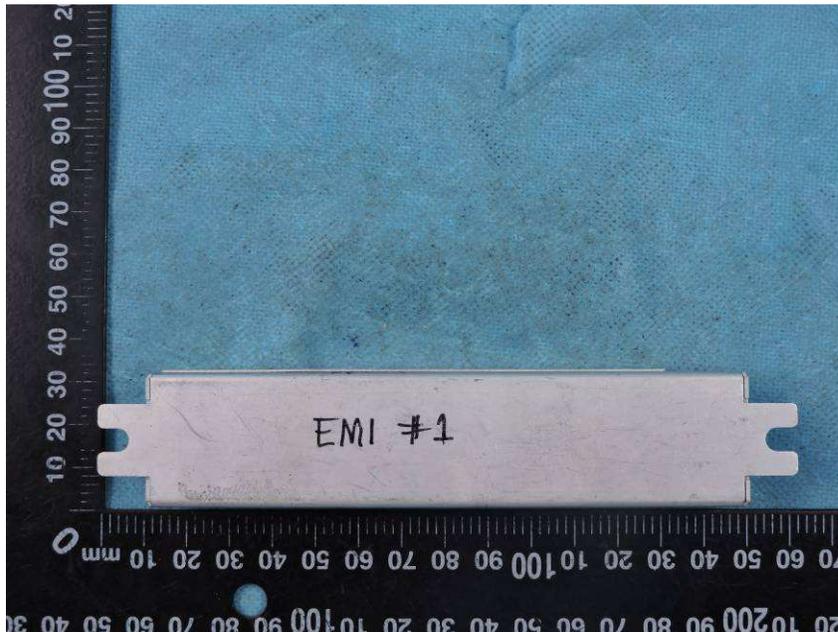




Photo 3

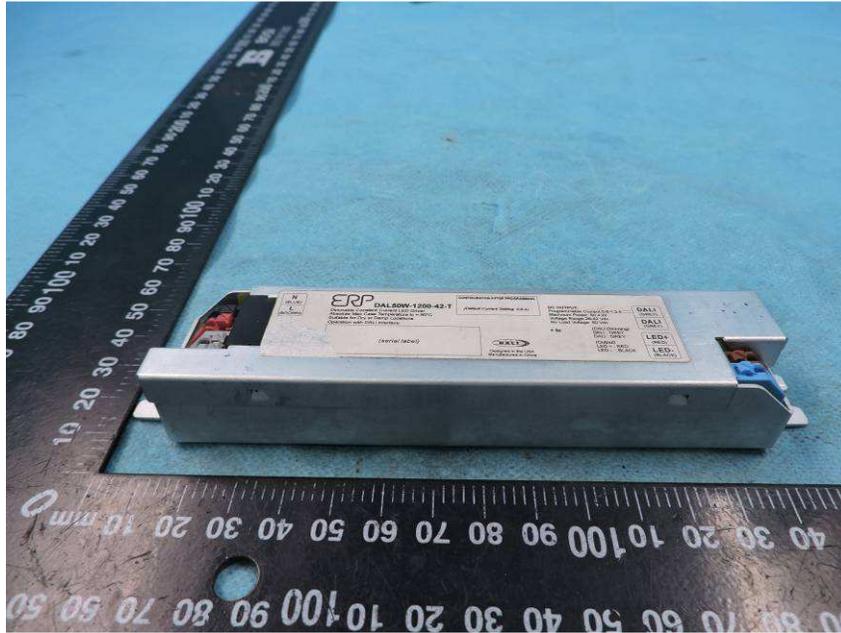


Photo 4





Photo 5

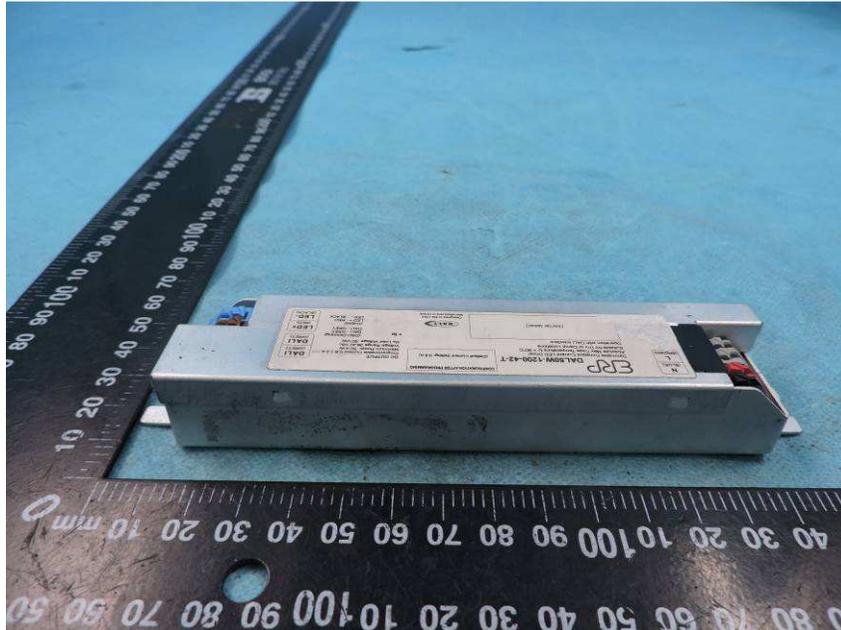


Photo 6

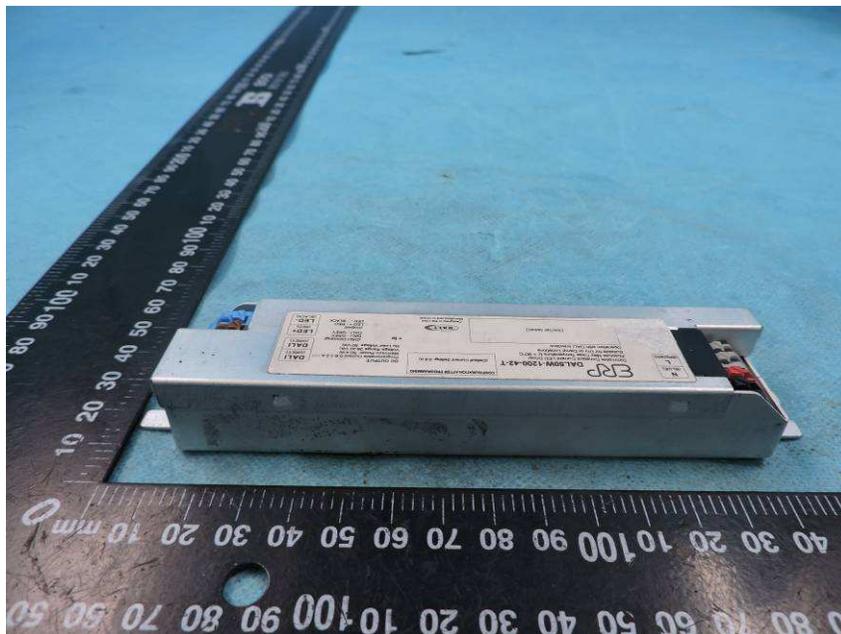




Photo 7

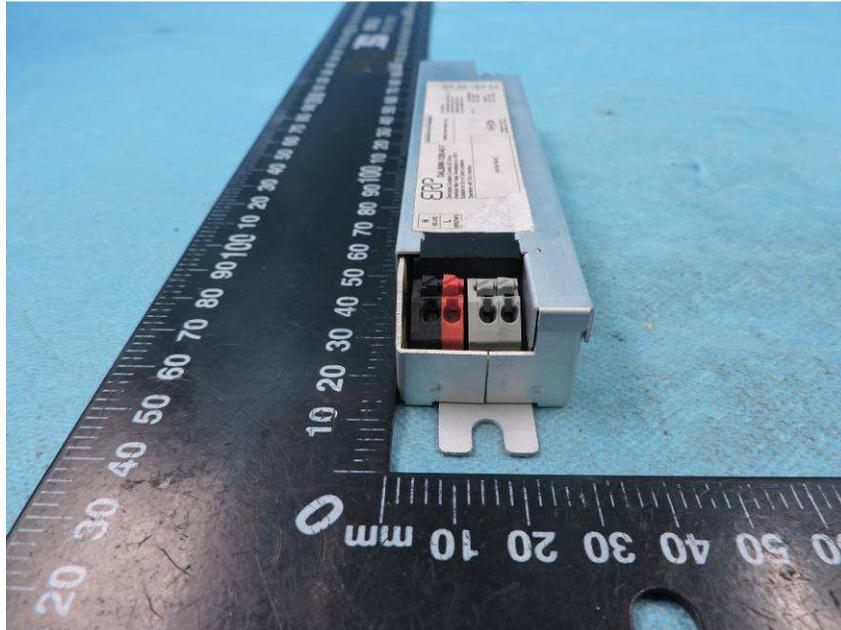
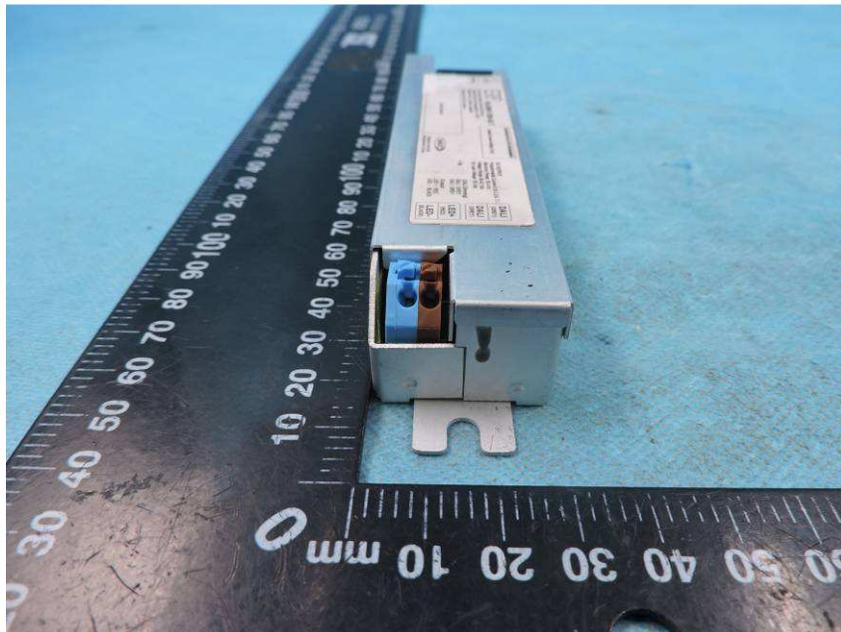


Photo 8



END OF REPORT