Report No.: GZ11090457-1

TEST REPORT

Applicant Name & Address	:	Eaglerise Electric & Electronic (Foshan) Co., Ltd. Guicheng Sci-Tech Industrial Park, Jianping Road, Nanhai District, Foshan City, Guangdong Province, P.R. China
Manufacturing Site	:	Same as applicant
Sample Description		
Product	:	Electronic convertor for LED (Electronic LED driver)
Model No.	:	ELP020C0350LS; ELP020C0400LS; ELP020C0500LS; ELP020C0600LS; ELP020C0700LS; ELP020C0800LS; ELP020C0900LS; ELP020C1000LS; ELP020C1100LS; ELP020C1200LS; ELP020C1300LS; ELP020C1400LS; (totally 12 models)
Electrical Rating	:	Please refer page 5 for details
Date Received	:	13 September 2011
Date Test Conducted	:	14 September 2011 – 22 September 2011
Test standards	:	**EN 55015: 2006+A1: 2007+A2: 2009** **EN 61000-3-2: 2006+ A1:2009+ A2:2009** **EN 61000-3-3: 2008** **EN 61547:2009**
Test Result	:	Pass
Conclusion	:	The submitted samples complied with the above EMC standards.
Remark	:	None.

**********End of Page**********

Prepared and Checked By:

Helen Ma

Helen Ma
Project Engineer
Intertek Guangzhou

Approved By:

Signature
Carrie Chen
Sr. Project Engineer
Intertek Guangzhou
07 Nov, 2011 ***Date***

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Tel / Fax: 86-20-8213 9688/86-20-3205 7538

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1 TEST RESULTS SUMMARY

Test Item	Standard	Result
Continuous conducted disturbance voltage	EN 55015: 2006+A1: 2007+A2: 2009	Pass
Radiated electromagnetic disturbance (9 kHz -30 MHz)	EN 55015: 2006+A1: 2007+A2: 2009	Pass
Radiated Electromagnetic Disturbance (30 MHz -300 MHz)	EN 55015: 2006+A1: 2007+A2: 2009	Pass
Insertion loss	EN 55015: 2006+A1: 2007+A2: 2009	N/A
Harmonic of current	EN 61000-3-2: 2006+ A1:2009+ A2:2009	Pass
Flicker	EN 61000-3-3: 2008	Pass
ESD immunity	EN 61547:2009 Reference: EN 61000-4-2: 2009	Pass
Inject current immunity	EN 61547:2009 Reference: EN 61000-4-6:2009	Pass
Surge immunity	EN 61547:2009 Reference: EN 61000-4-5:2006	Pass
EFT immunity	EN 61547:2009 Reference: EN 61000-4-4:2004	Pass
Radiated EM filed immunity	EN 61547:2009 Reference: EN 61000-4-3:2006+A1 :2008	Pass
Voltage dips and interruption immunity	EN 61547:2009 Reference: EN 61000-4-11:2004	Pass
Power frequency magnetic field immunity	EN 61547:2009 Reference: EN 61000-4-8:1993+A1:2001	N/A

Remark: 1. The symbol "N/A" in above table means Not Applicable.
2. When determining the test results, measurement uncertainty of tests has been considered.

2 EMC Results Conclusion
(with Justification)

RE: EMC Testing Pursuant to EMC Directive 2004/108/EC Performed on the Electronic convertor for LED (Electronic LED driver), Models: ELP020C0350LS; ELP020C0400LS; ELP020C0500LS; ELP020C0600LS; ELP020C0700LS; ELP020C0800LS; ELP020C0900LS; ELP020C1000LS; ELP020C1100LS; ELP020C1200LS; ELP020C1300LS; ELP020C1400LS.

We tested the Electronic convertor for LED (Electronic LED driver), Model: ELP020C0500LS, ELP020C0800LS and ELP020C1400LS, to determine if they were in compliance with the relevant EN standards as marked on the Test Results Summary. We found that the units met the requirement of EN 55015, EN 61000-3-2, EN 61000-3-3, EN 61547 (EN 61000-4-2), EN 61547 (EN 61000-4-4), EN 61547 (EN 61000-4-6), EN 61547 (EN 61000-4-5), EN 61547 (EN 61000-4-11), & EN 61547 (EN 61000-4-3) standards when tested as received. The worst case's test data was presented in this test report. Test item Radiated EM filed immunity were subcontracted.

Model ratings:
Input: 100-240 VAC; 50/60 Hz; 0,3 A; Class II; IP 20; SELV;
ta 50 °C; tc 85 °C; Load: 10-20 W; independent; Constant current type; 110 °C thermal protection; Inherently short-circuit proof;
Suitable for direct mounting on normally flammable surfaces;
ELP020C0350LS: Output: 350 mA; max. 65 VDC;
ELP020C0400LS: Output: 400 mA; max. 55 VDC;
ELP020C0500LS: Output: 500 mA; max. 44 VDC;
ELP020C0600LS: Output: 600 mA; max. 34 VDC;
ELP020C0700LS: Output: 700 mA; max. 36 VDC;
ELP020C0800LS: Output: 800 mA; max. 31 VDC;
ELP020C0900LS: Output: 900 mA; max. 28 VDC;
ELP020C1000LS: Output: 1000 mA; max. 25 VDC;
ELP020C1100LS: Output: 1100 mA; max. 24 VDC;
ELP020C1200LS: Output: 1200 mA; max. 19 VDC;
ELP020C1300LS: Output: 1300 mA; max. 19 VDC;
ELP020C1400LS: Output: 1400 mA; max. 19 VDC

All models have the same load, circuit diagram, PCB layout and mechanical structure except the parameters of used components for secondary output circuit. Model ELP020C0500LS , ELP020C0800LS and ELP020C1400LS were selected to do the full tests.

The production units are required to conform to the initial sample as received when the units are placed on the market.

3 LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT):	Electronic convertor for LED (Electronic LED driver)
Model:	ELP020C0500LS, ELP020C0800LS and ELP020C1400LS
Serial No.	Not Labelled
Support Equipment:	N/A
Rated Voltage:	100-240 VAC; 50/60 Hz
Condition of Environment:	Temperature : 15~25°C Relative Humidity: 35~60% Atmosphere Pressure 86~106kPa

Notes:
1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications.
An attempt had been made to maximize the emission by varying the configuration of the EUT.

2. The EMS measurements had been made in the frequency bands being investigated, with the EUT in the most susceptible operating mode consistent with normal applications. The configuration of the test sample had been varied to achieve maximum susceptibility.

4 EMI TEST

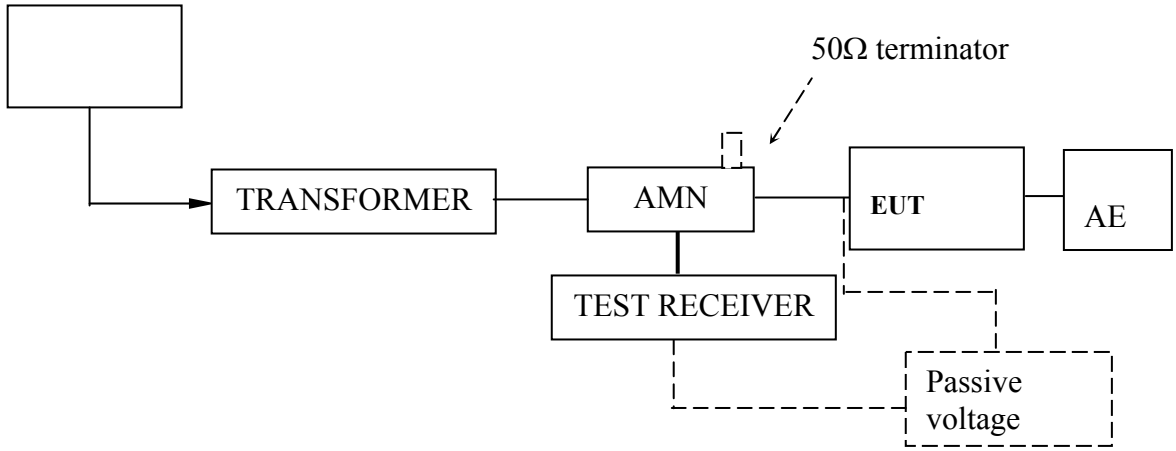
4.1 EN 55015 Continuous Conducted Disturbance Voltage Test

Test Result: Pass

4.1.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM080-05	EMI receiver	ESCI	R&S
EM006-05	LISN	ENV216	R&S
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu

4.1.2 Block Diagram of Test Setup



4.1.3 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provide a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The EUT was placed on a 0.4m high non-metallic table above a metallic plane, and 0.4m from wall of shielded room which is considered as Ground Reference Plane (GRP) (For floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP) The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 200Hz in the frequency range from 9kHz to 150KHz, and 9kHz in the frequency range from 150kHz to 30MHz.

4.1.4 Test Data

At main terminal: Pass

Model no.: ELP020C0500LS

Tested Wire: Live **Operation Mode: on mode**

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	85.24 kHz	62.25 L1	-22.88
2 Average	150 kHz	45.38 L1	-10.62
1 Quasi Peak	162 kHz	54.44 L1	-10.91
2 Average	234 kHz	35.51 L1	-16.79
1 Quasi Peak	474 kHz	38.88 L1	-17.55
1 Quasi Peak	786 kHz	44.33 L1	-11.67
2 Average	786 kHz	35.07 L1	-10.92
2 Average	1.234 MHz	25.54 L1	-20.45

Tested Wire: Neutral

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	88.12 kHz	61.66 L1	-23.17
2 Average	154 kHz	46.40 L1	-9.37
1 Quasi Peak	162 kHz	55.16 L1	-10.19
2 Average	238 kHz	36.05 L1	-16.11
1 Quasi Peak	518 kHz	39.06 L1	-16.93
1 Quasi Peak	814 kHz	43.99 L1	-12.00
2 Average	818 kHz	34.13 L1	-11.86
2 Average	1.222 MHz	26.60 L1	-19.39
1 Quasi Peak	1.39 MHz	34.04 L1	-21.95
1 Quasi Peak	2.758 MHz	34.62 L1	-21.37
2 Average	4.126 MHz	28.07 L1	-17.92
2 Average	7.726 MHz	36.25 L1	-13.74
1 Quasi Peak	11.274 MHz	42.78 L1	-17.21
2 Average	16.006 MHz	41.87 L1	-8.12

Model no.: ELP020C0800LS

Tested Wire: Live **Operation Mode: on mode**

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	84.6 kHz	60.07 L1	-25.13
1 Quasi Peak	**158 kHz**	55.95 L1	-9.61
2 Average	166 kHz	46.51 L1	-8.64
2 Average	242 kHz	35.59 L1	-16.43
1 Quasi Peak	514 kHz	39.76 L1	-16.23
2 Average	838 kHz	37.15 L1	-8.84
1 Quasi Peak	846 kHz	46.59 L1	-9.40

Tested Wire: Neutral

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	**162 kHz**	54.36 L1	-10.99
2 Average	162 kHz	45.36 L1	-9.99
1 Quasi Peak	514 kHz	38.61 L1	-17.38
2 Average	514 kHz	30.31 L1	-15.68
1 Quasi Peak	846 kHz	46.74 L1	-9.25
2 Average	846 kHz	37.06 L1	-8.93
2 Average	1.262 MHz	26.74 L1	-19.25
1 Quasi Peak	1.374 MHz	37.09 L1	-18.90

Model no.: ELP020C1400LS

Tested Wire: Live **Operation Mode: on mode**

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	90.68 kHz	67.16 L1	-17.41
1 Quasi Peak	170 kHz	52.54 L1	-12.41
2 Average	178 kHz	47.64 L1	-6.93
2 Average	502 kHz	29.88 L1	-16.11
1 Quasi Peak	506 kHz	38.53 L1	-17.46
1 Quasi Peak	778 kHz	47.66 L1	-8.33
2 Average	842 kHz	35.08 L1	-10.91
1 Quasi Peak	1.426 MHz	36.33 L1	-19.66
2 Average	2.57 MHz	27.18 L1	-18.81
1 Quasi Peak	4.558 MHz	42.76 L1	-13.23
2 Average	4.738 MHz	36.21 L1	-9.78

Tested Wire: Neutral

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE1511QP		
Trace2:	CE1511AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	89.48 kHz	68.23 L1	-16.46
1 Quasi Peak	174 kHz	58.31 L1	-6.45
2 Average	178 kHz	50.40 L1	-4.17
2 Average	270 kHz	40.70 L1	-10.41
1 Quasi Peak	478 kHz	41.26 L1	-15.10
2 Average	750 kHz	38.90 L1	-7.09
1 Quasi Peak	774 kHz	49.25 L1	-6.74
1 Quasi Peak	1.406 MHz	37.92 L1	-18.07
2 Average	1.406 MHz	28.59 L1	-17.40

At load/control terminal: Not Applicable

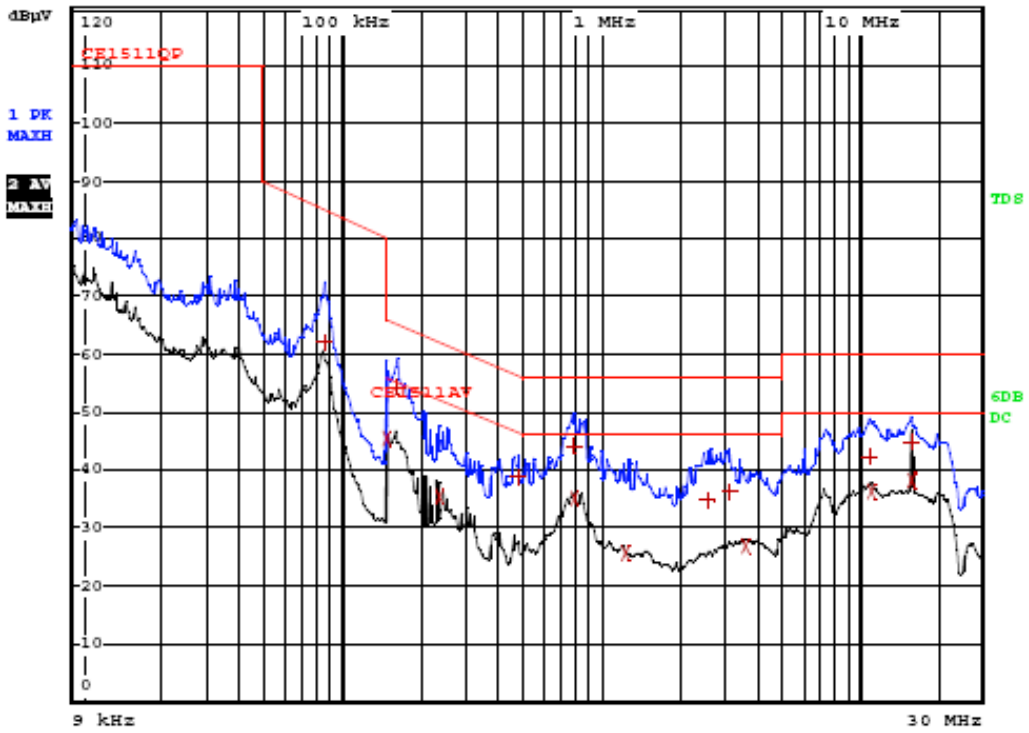
Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(µV)]	Permitted limit [dB(µV)]	Disturbance level [dB(µV)]	Permitted limit [dB(µV)]
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

4.1.5 Emission Curve

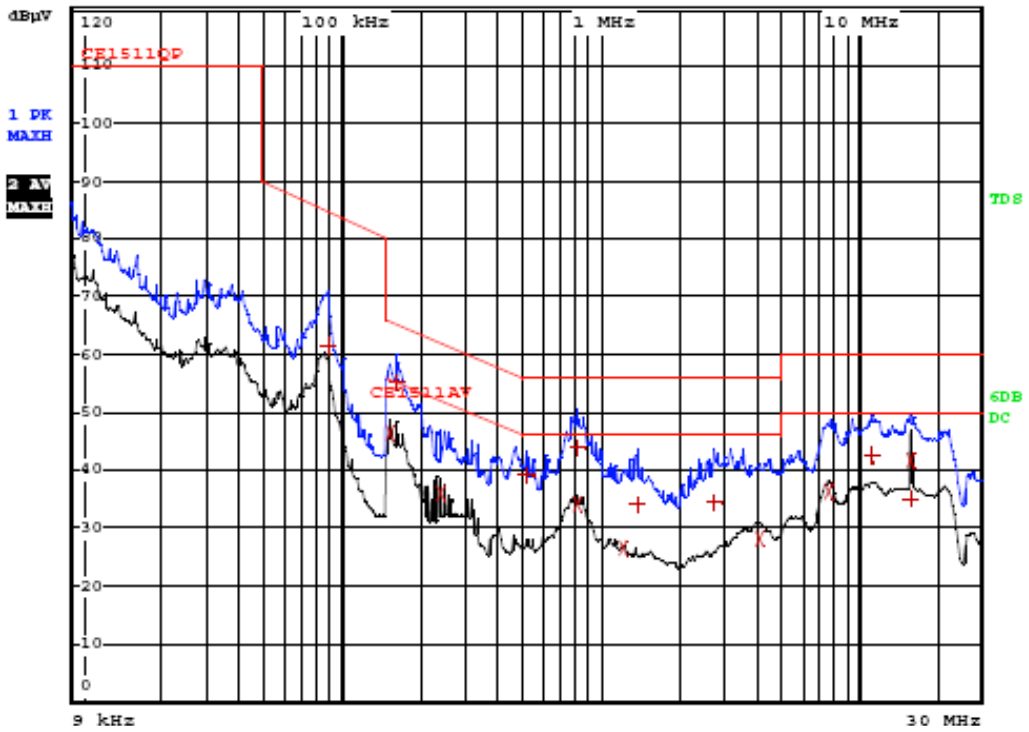
At mains terminal:

Model no.: ELP020C0500LS

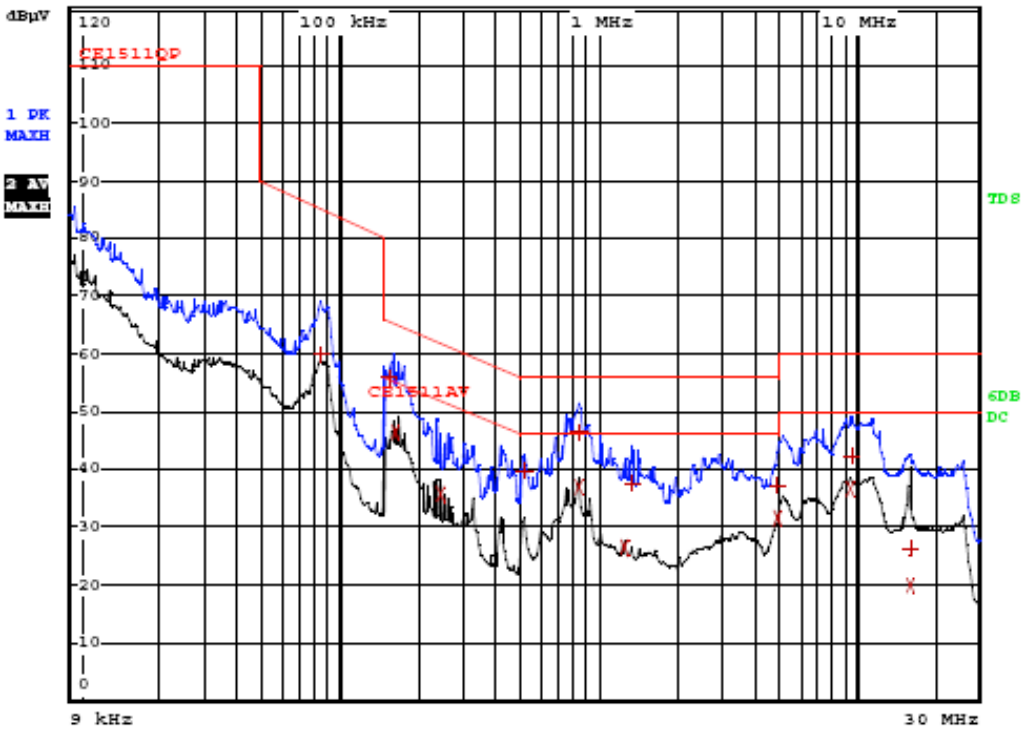
Tested Wire: Live



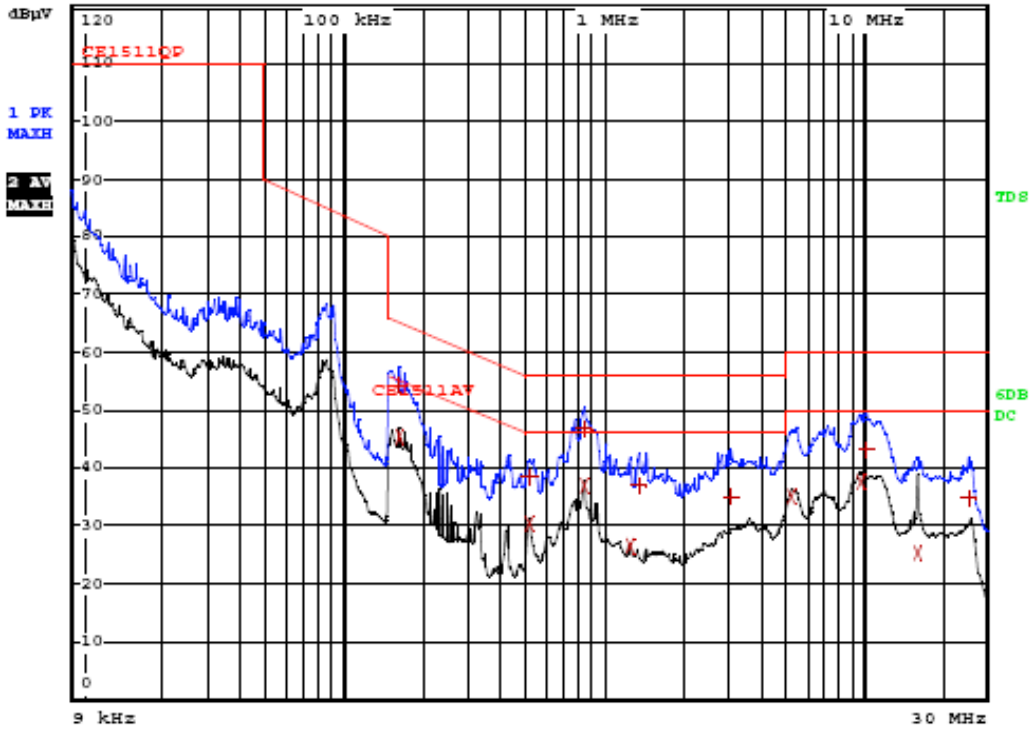
Tested Wire: Neutral



Model no.: ELP020C0800LS
Tested Wire: Live

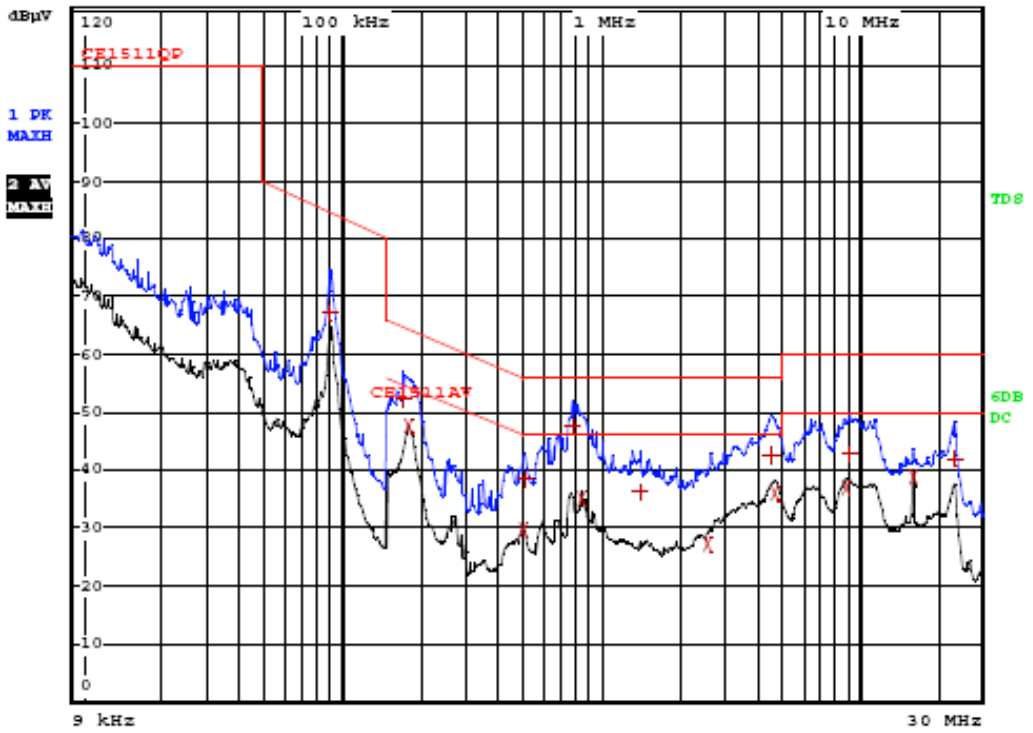


Tested Wire: Neutral

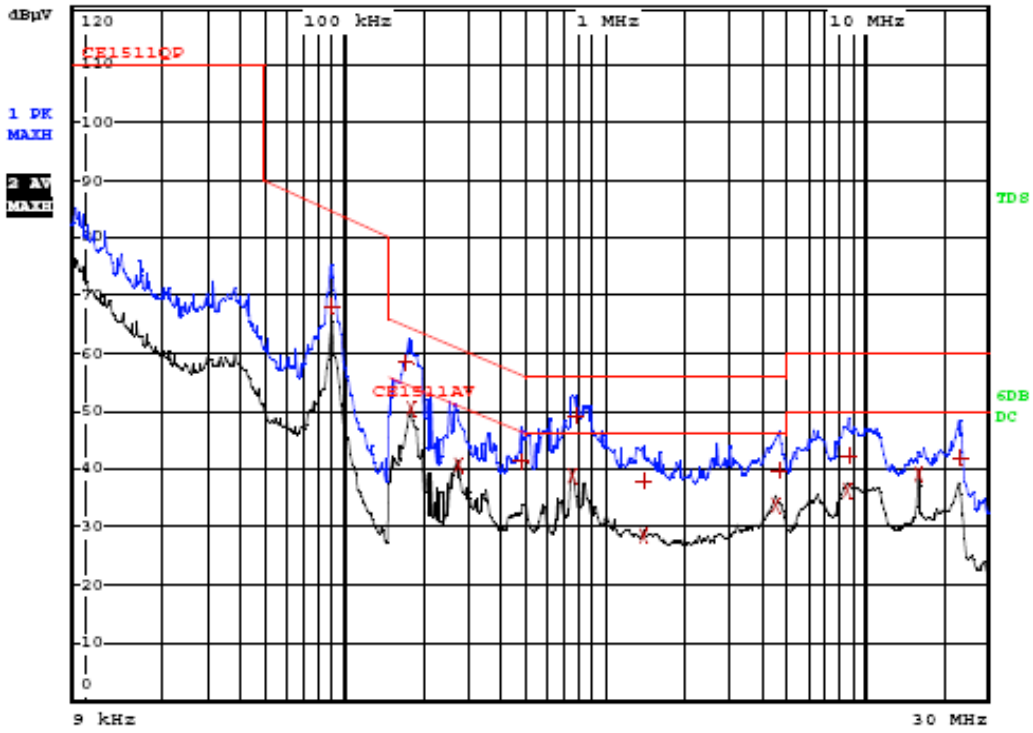


Model no.: ELP020C1400LS

Tested Wire: Live



Tested Wire: Neutral



At load/control terminal:

Not Applicable.

4.1.6 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2003.
Measurement uncertainty of mains terminal disturbance voltage in CISPR band A: 1.6dB.
Measurement uncertainty of mains terminal disturbance voltage in CISPR band B: 2.5dB.
The measurement uncertainty is given with a confidence of 95%, k=2.

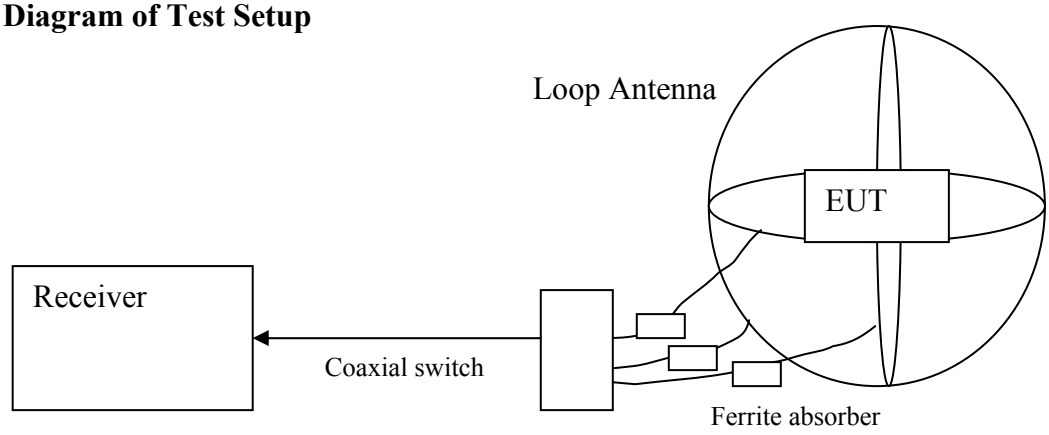
4.2 EN 55015 Radiated Electromagnetic Disturbance (9 kHz-30 MHz)

Test Result: Pass

4.2.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM080-04	EMI receiver	ESC30	R&S
EM061-04	Triple Loop Antenna	HXYZ9170	SCHWARZBECK
EM004-03	EMC shield Room	8m×4m×3m	Zhongyu

4.2.2 Block Diagram of Test Setup



4.2.3 Test Setup and Procedure

The EUT is placed in the centre of the loop antenna system(LAS). The current induced by the magnetic field from the EUT into each of the three large loop antennas of the LAS is measured by connecting the current probe of the large loop antenna to a measuring receiver. During the measurements the EUT remains in a fixed position.
The currents in the three large loop antenna, origination from the three mutually orthogonal magnetic field components, are measured in sequence. Each current level measured shall comply with the emission limit, expressed in dBμA, as specified in table of EN 55015.
The distance between the outer perimeter of the LAS and nearby objects, such as floor and walls, shall be at least 0.5m.

To avoid unwanted capacitive coupling between the EUT and the LAS, the maximum dimensions of the EUT shall allow a distance of at least 0.2m between the EUT and the standardized 2m large loop antenna of the LAS.
The position of the mains lead shall be optimized for maximum current induction. In general, this position will not be critical when the EUT complies with the conducted emission limit.

4.2.4 Test Data

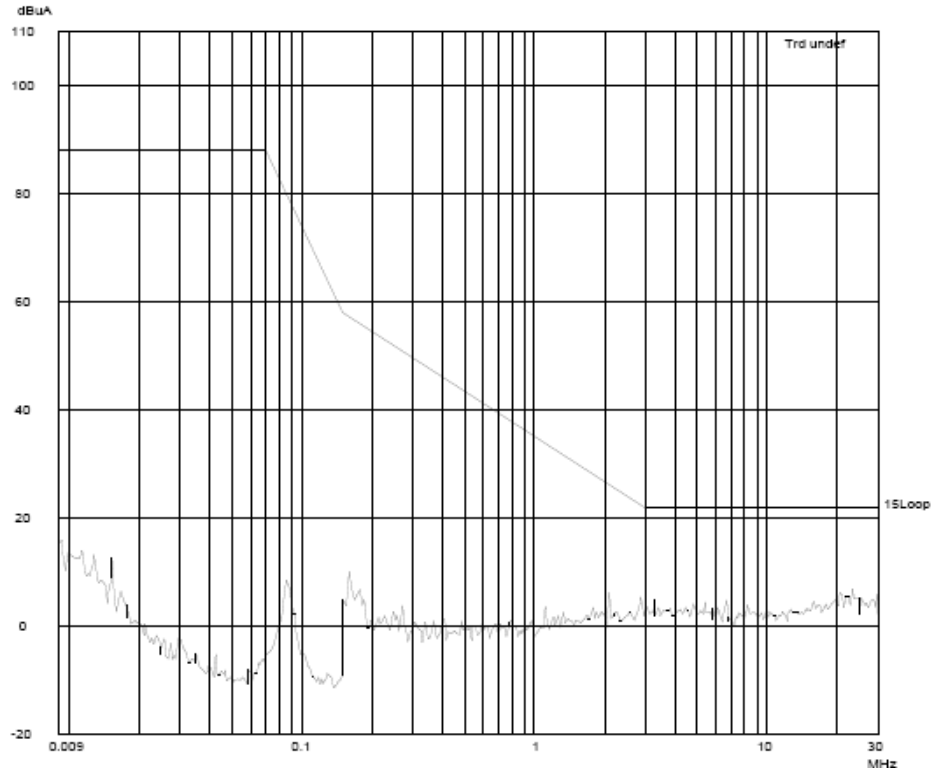
For model: ELP020C0500LS, ELP020C0800LS, ELP020C1400LS
Operating mode: on mode.

Frequency [MHz]	X axis [dB(μA)]	Y axis [dB(μA)]	Z axis [dB(μA)]	Limit [dB(μA)]
0.009	<78	<78	<78	88.0
0.050	<78	<78	<78	88.0
0.100	<64	<64	<64	74.0
0.160	<47	<47	<47	57.2
0.240	<40	<40	<40	52.4
0.550	<30	<30	<30	42.5
1.000	<25	<25	<25	35.4
1.400	<20	<20	<20	31.4
2.000	<17	<17	<17	27.1
3.500	<12	<12	<12	22.0
6.000	<12	<12	<12	22.0
10.000	<12	<12	<12	22.0
22.000	<12	<12	<12	22.0
30.000	<12	<12	<12	22.0

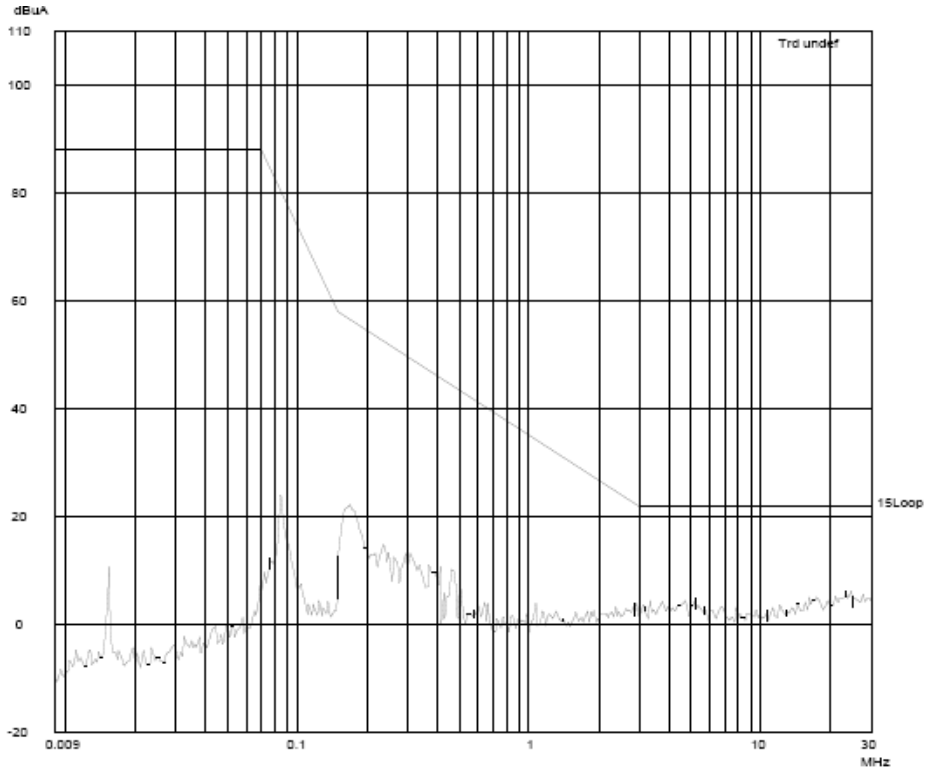
4.2.5 Test Curve

Model no.: ELP020C0500LS

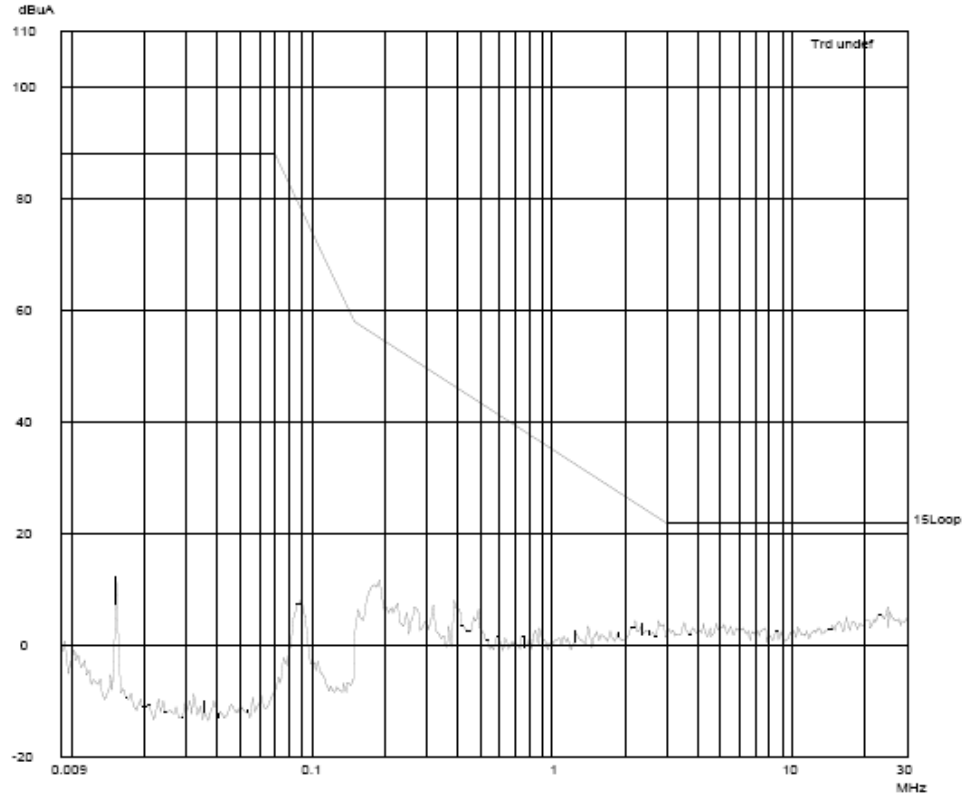
X axis



Y axis

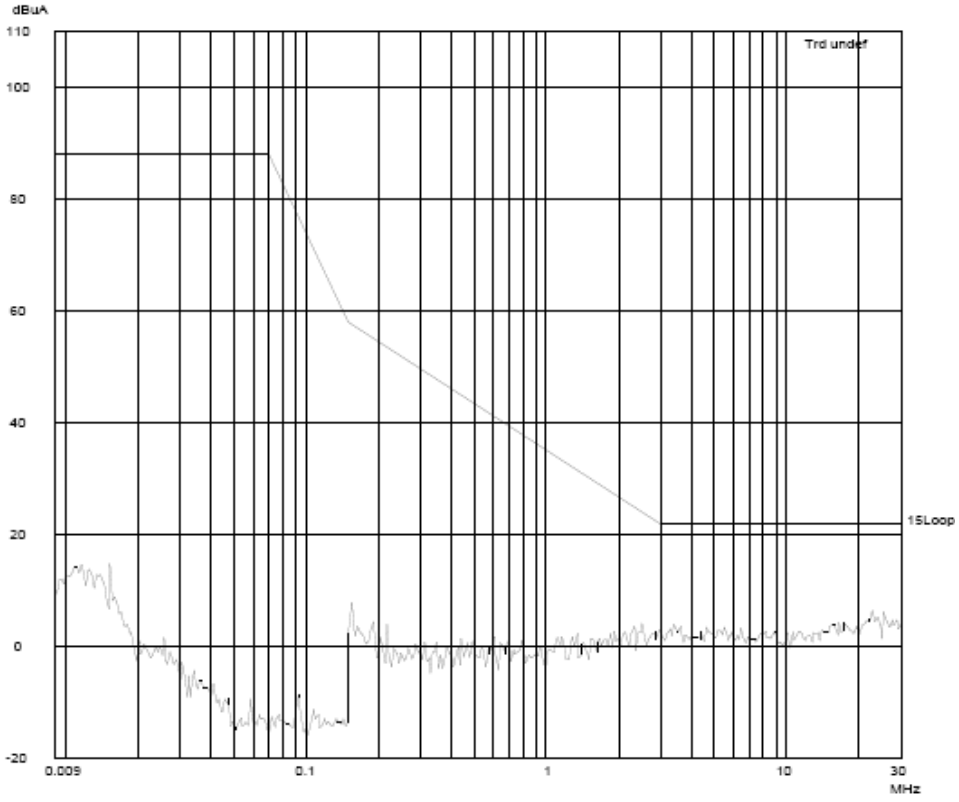


Z axis

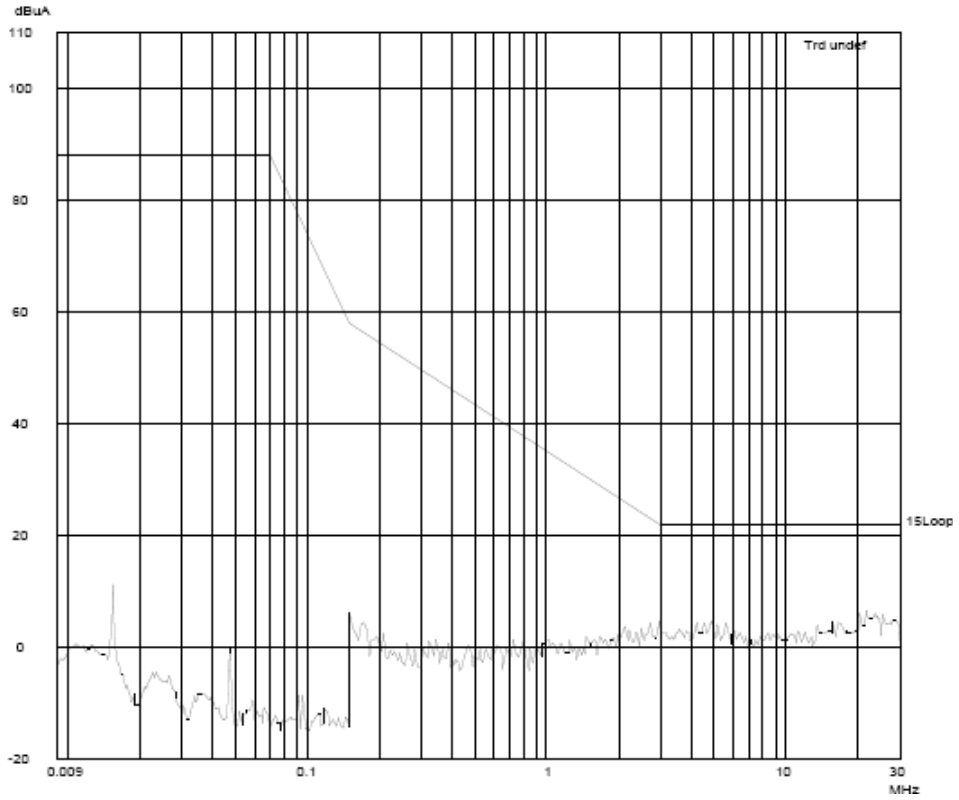


Model no.: ELP020C0800LS

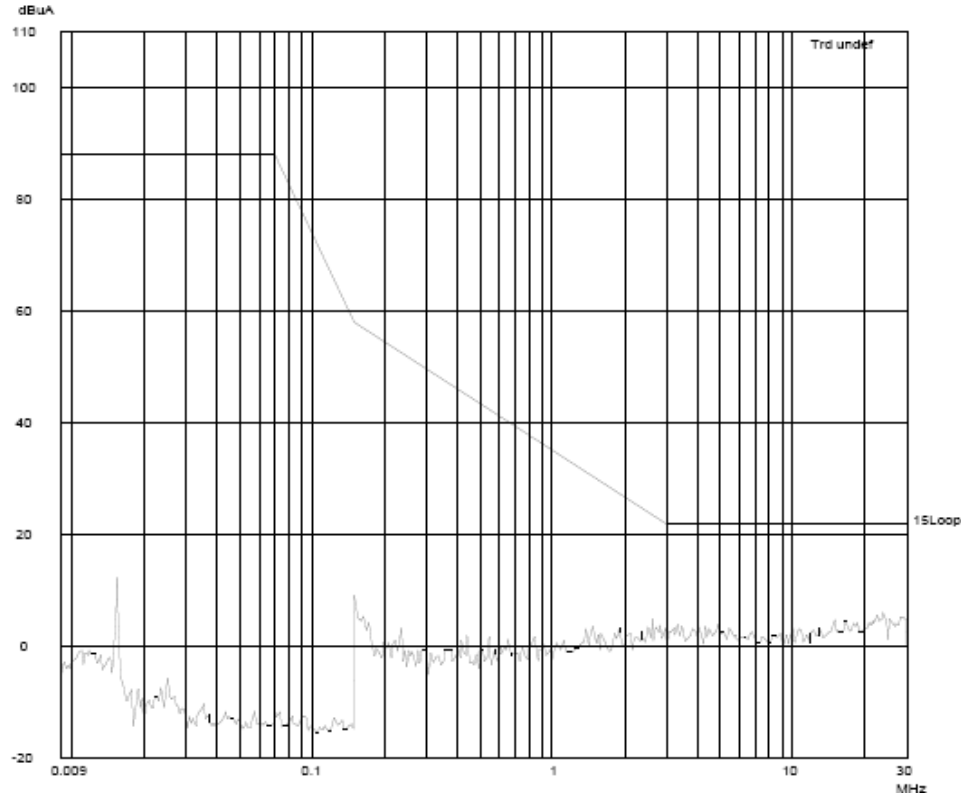
X axis:



Y axis:

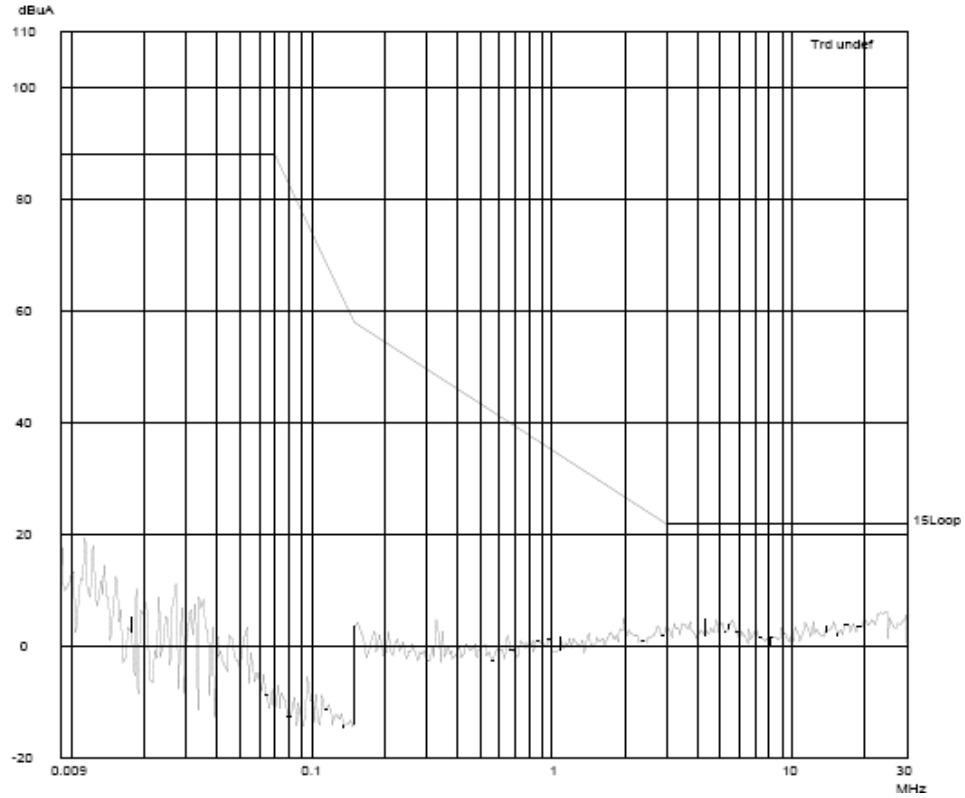

dBuA
110
100
80
60
40
20
0
-20
0.009
0.1
1
10
30
MHz
Trd undef
15Loop

Z axis:

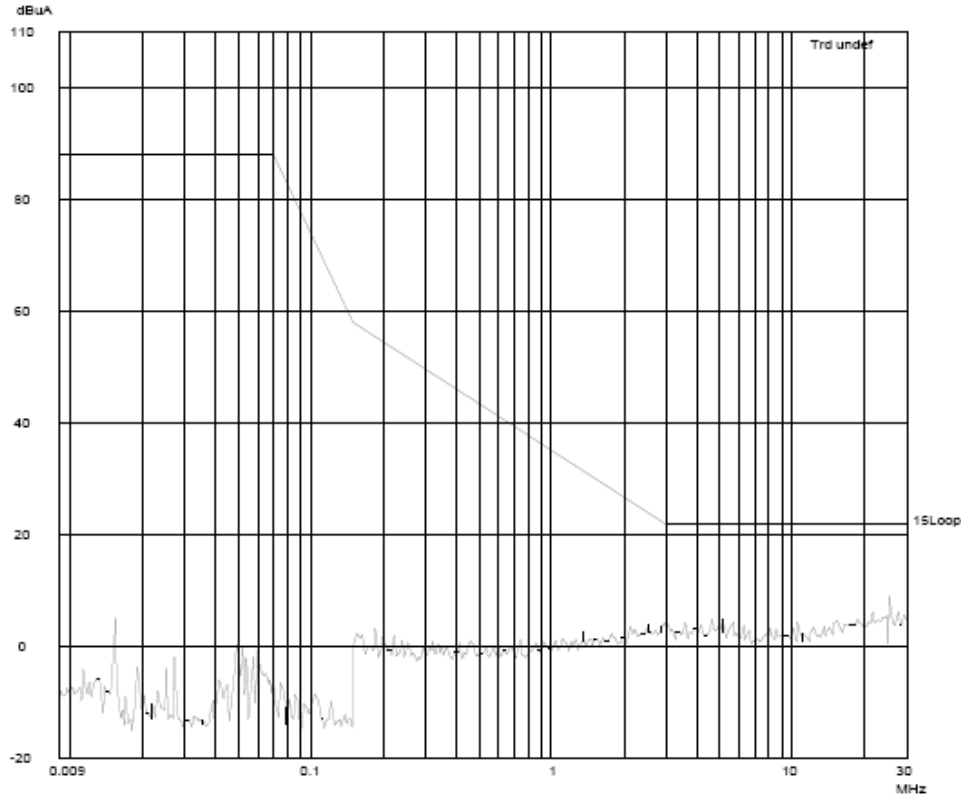

dBuA
110
100
80
60
40
20
0
-20
0.009
0.1
1
10
30
MHz
Trd undef
15Loop

Model no.: ELP020C1400LS

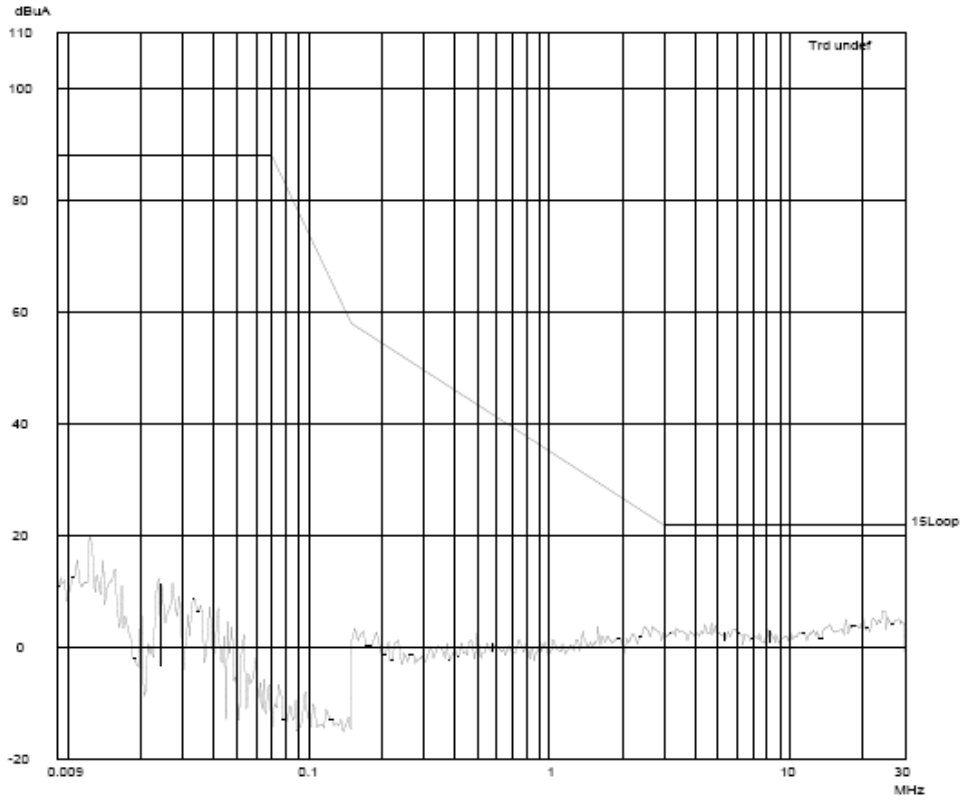
X axis:



Y axis:



Z axis:



4.2.6 Measurement Uncertainty

The measurement uncertainty for induction current is under consideration according to CISPR 16-4-2:2003.

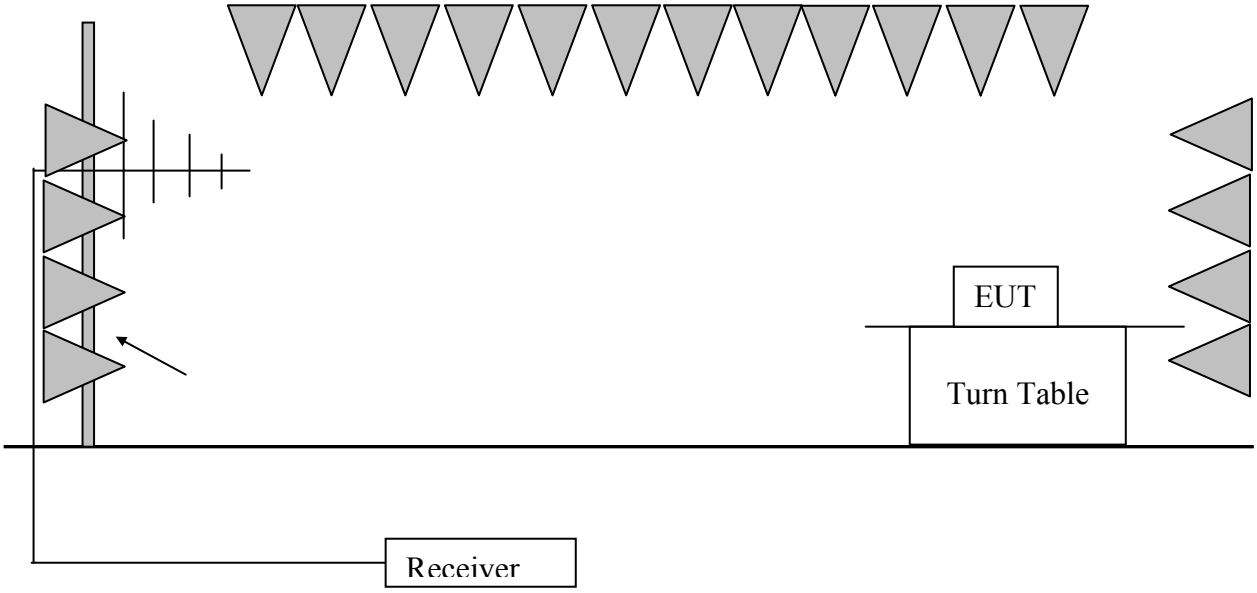
4.3 EN 55015 Radiated Electromagnetic Disturbance (30 MHz -300 MHz)

Test Result: Pass

4.3.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
SZ185-01	EMI receiver	ESCI	R&S
SZ061-03	BiConiLog Antenna	3142C	ETS
SZ188-01	3 m Anechoic Chamber	RFD-F/A-100	ETS

4.3.2 Block Diagram of Test Setup



4.3.3 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN55022 requirement during radiated test.
The bandwidth setting on R&S Test Receiver was 120 kHz.
The frequency range from 30MHz to 300MHz was checked

4.3.4 Test Data

For model: ELP020C0500LS

Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μV/m)]	Limit at 3m [dB(μV/m)]
Horizontal	30.0	< 30.0	40.0
Horizontal	150.0	< 30.0	40.0
Horizontal	300.0	< 37.0	47.0
Vertical	30.0	< 30.0	40.0
Vertical	54.6	34.3	40.0
Vertical	80.9	31.4	40.0

For model: ELP020C0800LS

Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μV/m)]	Limit at 3m [dB(μV/m)]
Horizontal	30.0	< 30.0	40.0
Horizontal	150.0	< 30.0	40.0
Horizontal	215.8	32.4	40.0
Vertical	106.2	31.7	40.0
Vertical	123.3	33.8	40.0
Vertical	165.2	36.8	40.0

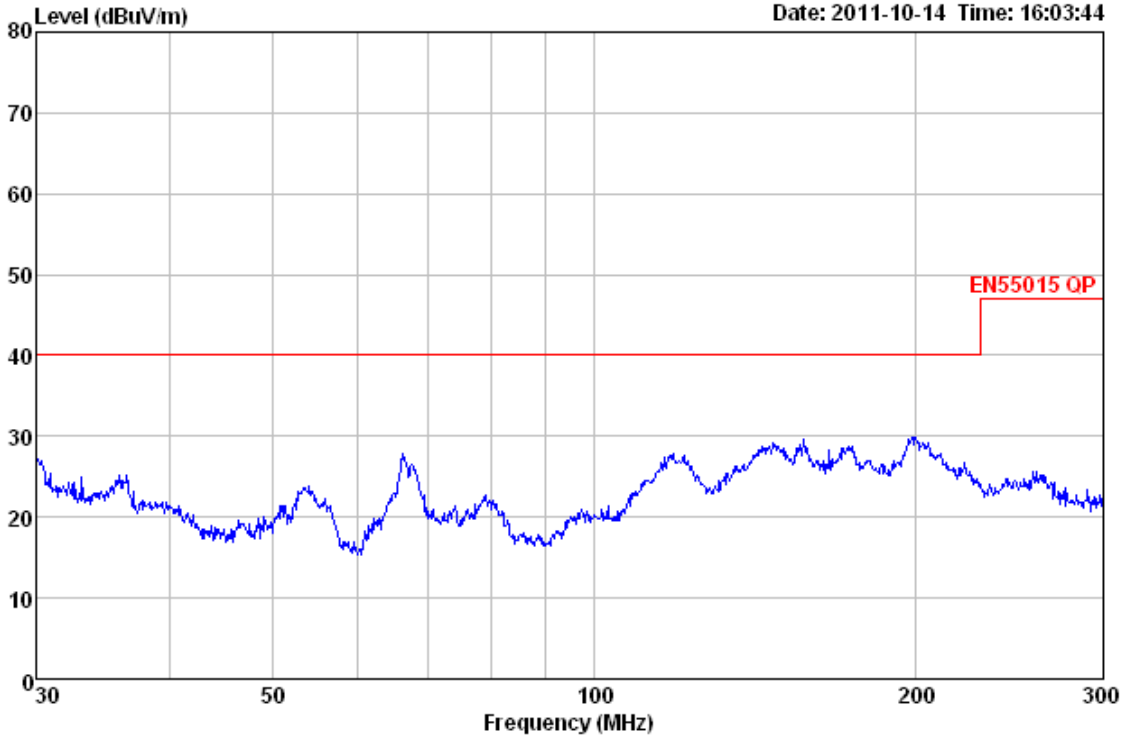
For model: ELP020C1400LS

Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μV/m)]	Limit at 3m [dB(μV/m)]
Horizontal	30.0	< 30.0	40.0
Horizontal	157.8	31.6	40.0
Horizontal	215.8	33.4	40.0
Vertical	105.2	34.2	40.0
Vertical	123.6	31.8	40.0
Vertical	150.4	34.4	40.0

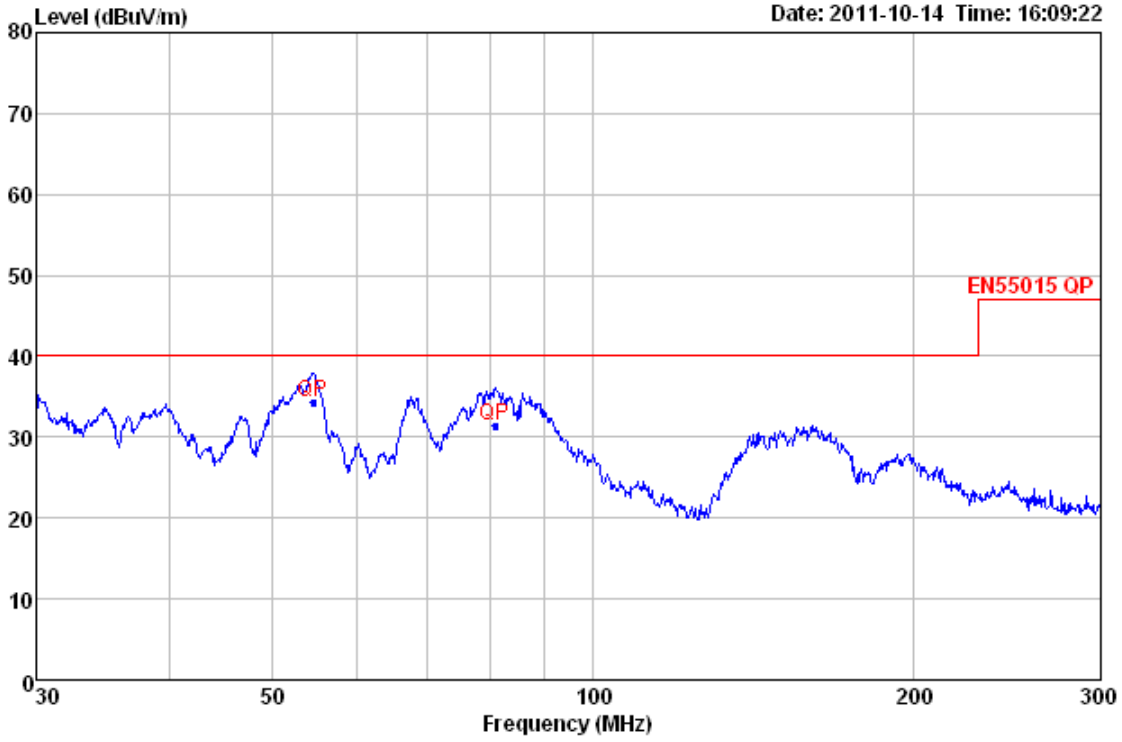
4.3.5 Test Curve

ELP020C0500LS

Horizontal

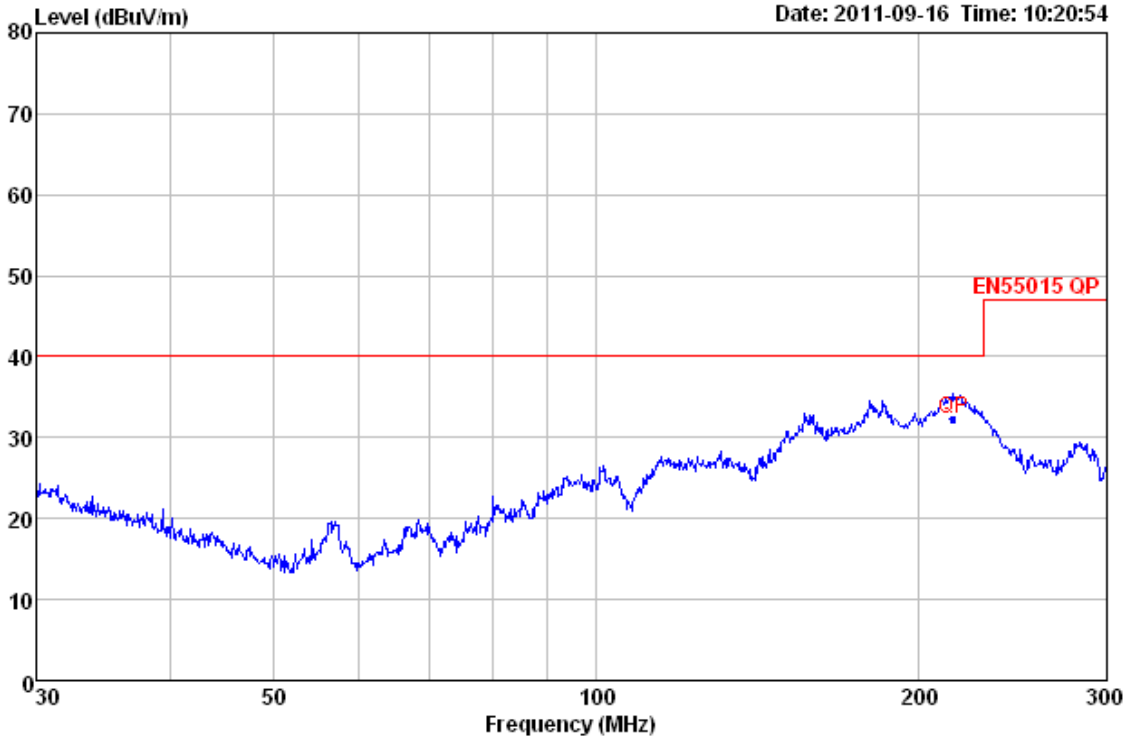


Vertical

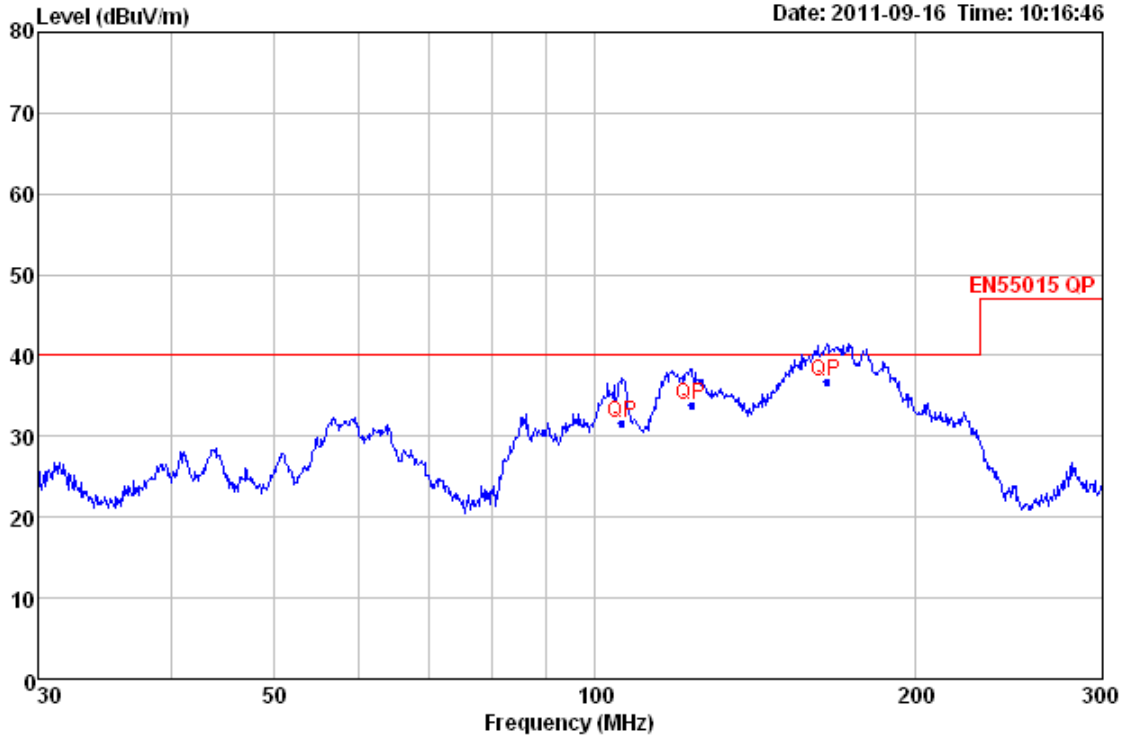


ELP020C0800LS

Horizontal

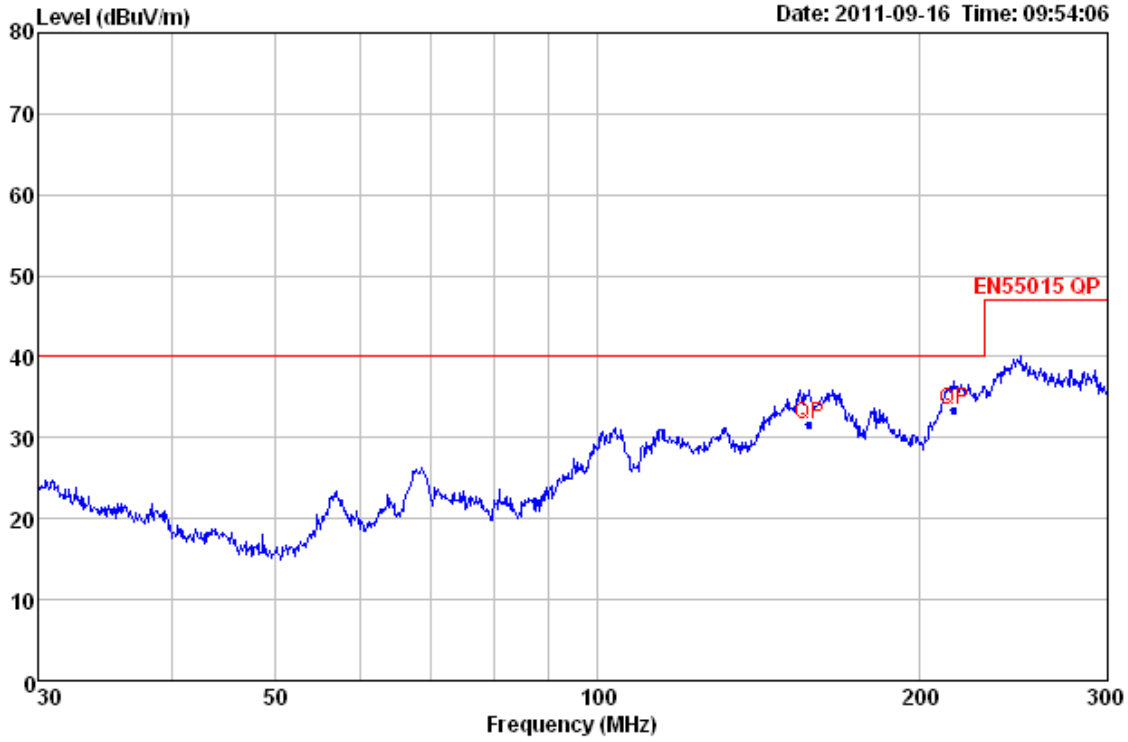


Vertical

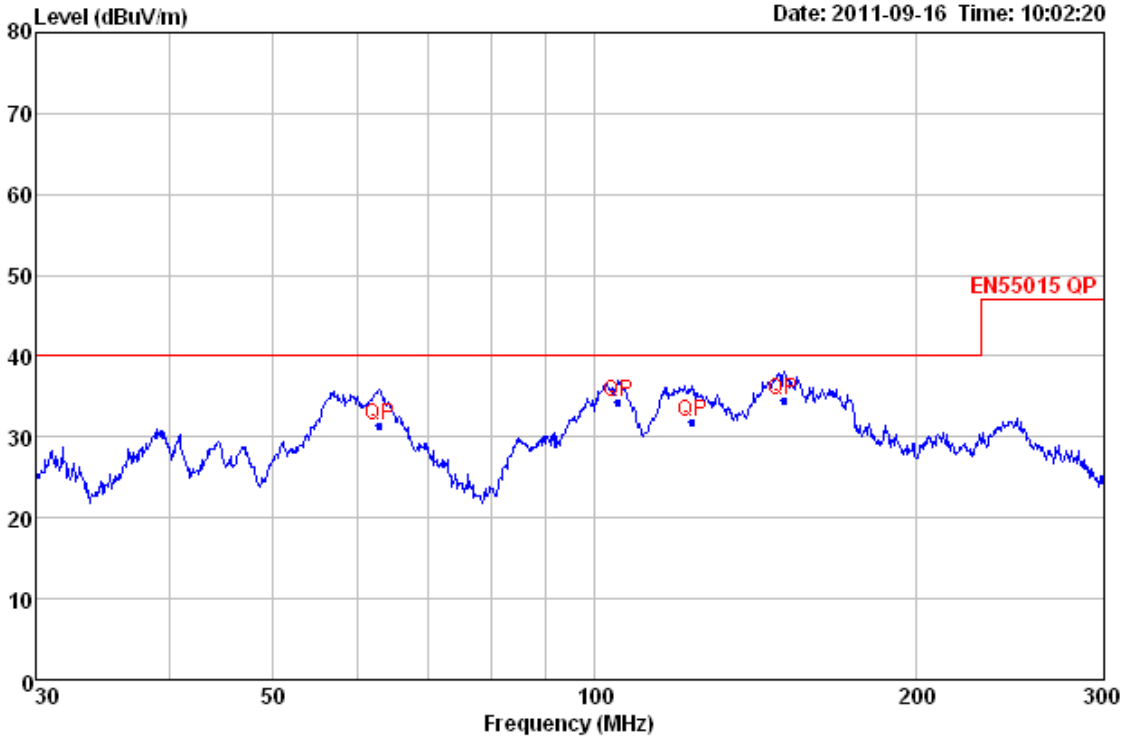


ELP020C1400LS

Horizontal



Vertical



4.3.6 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2003.
Measurement uncertainty of radiated emission: 4.8 dB.
The measurement uncertainty is given with a confidence of 95%, k=2.

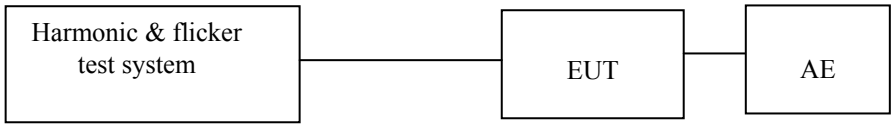
5 Harmonics of current

Test Result: Pass

5.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM001-02	Harmonic & Flicker Test System	5001IX-CTS-400-413	California Instrument

5.2 Block Diagram of Test Setup



5.3 Test Setup and Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

☑ EUT is not discharge lighting, the harmonics currents limits are not specified for the equipment with a rated power smaller than or equal to 25W. Therefore the EUT was deemed fulfill the requirements of relative standard without testing.

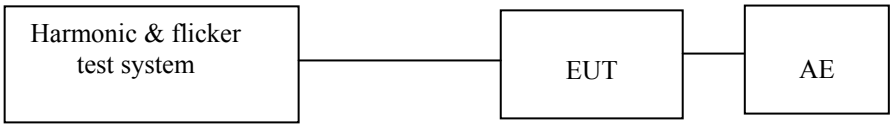
6 Flicker

Test Result: Pass

6.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM001-02	Harmonic & Flicker Test System	5001IX-CTS-400-413	California Instrument

6.2 Block Diagram of Test Setup



6.3 Test Setup and Procedure

6.3.1 Definition

Flicker: impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.

Pst: Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability

Plt: long-term flicker indicator; the flicker severity evaluated over a long period (a few hous). Using successive Pst valuse.

dc: the relative steady-state voltage change

dmax: the maximum relative voltage change

d(t): the value during a voltage change

6.3.2 Test condition

The EUT is unlikely to produce significant voltage fluctuations or flicker, so tests need not be made on it.

7 EMS TEST

Performance Criteria:

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 incorporation a starting device:

After the test the lighting equipment is switched off. After half an hour it is witched on again. The lighting equipment shall start and operate as intended.

Measurement Uncertainty

According to CISPR 16-4-2:2003, measurement uncertainty to immunity test is under consideration.

Note: "N/A" means Not Applicable in below text.

7.1 EN 61000-4-2(Pursuant to EN 61547) Electrostatic Discharge Immunity

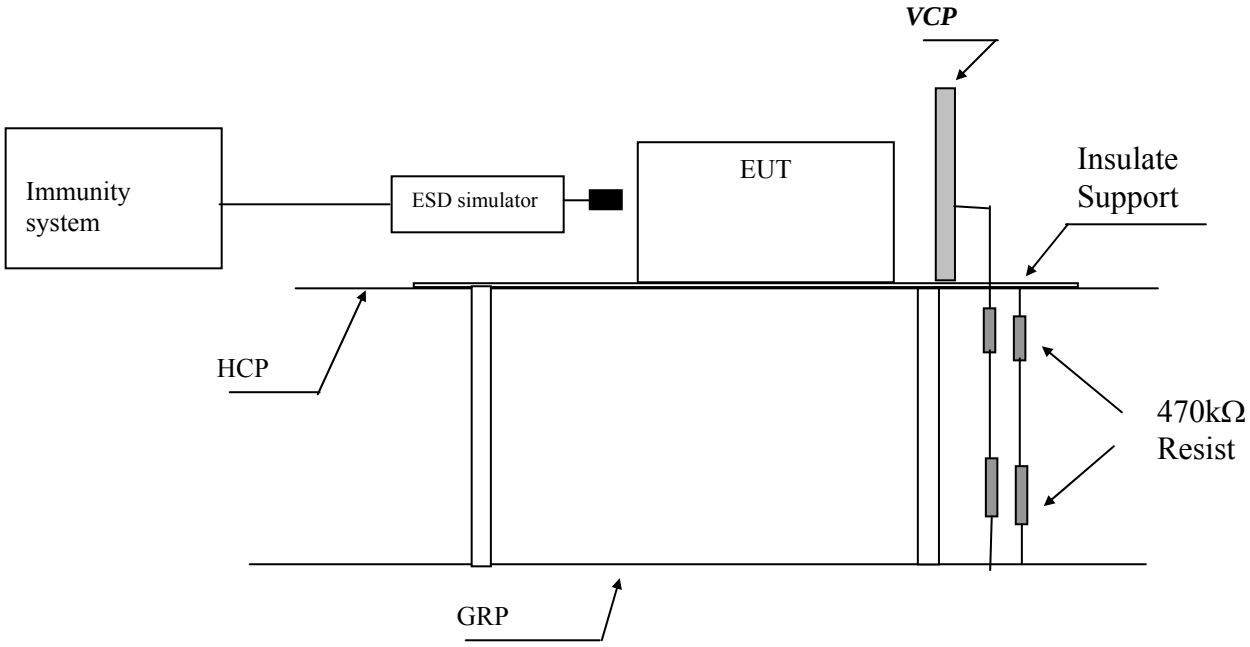
Performance criterion: B

Test Result: Pass

7.1.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM077-02	ESD Simulator	NSG435	SCHAFFNER

7.1.2 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,
VCP means Vertical Coupling Plane
GRP means Ground Reference Plane

7.1.3 Test Setup and Procedure

The EUT was put on a (0,8 ±0,08) m high wooden tabel/0.1m high for floor standing equipment standing on the ground reference plane(GRP) 3m by 2m in size, made by iron 1.0 mm thick. A horizontal coupling plane(HCP) (1,6 ±0,02) m by (0,8 ±0,02) m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support with (0.5±0.05)mm thick. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & thinkmess as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end.

For floor standing equipment, The EUT shall be isolated from the ground reference plane by an insulating support of 0,05 mto 0,15 m thick. The EUT cables shall be isolated from the ground reference plane by an insulating support of (0,5 ± 0,05) mm. This cable isolation shall extend beyond the edge of the EUT isolation.

The distance between EUT and any of the other metallic surface excepted the GRP, HCP & VCP was greater than 0.8m.

The EUT was arranged and connected according to its functional requirements.

Direct static electricity discharges was applied only to those points and surface which are accessible to personnel during normal usage, terminals are excluded.

On each preselected points 10 times of each polarity single discharge were applied .

The ESD generator was held perpendicular to the surface to which the discharge is applied.

The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge is being applied. 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.

Indirect discharge was conducted to objects placed near the EUT, simulated by applying the dischares of the ESD generator to a coupling plane, in the contact discharge mode.

After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors (2×470 kΩ) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

10 times of each polarity single discharge were applied to HCP and VCP. The detail selected points are listed in the following table.

7.1.4 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result (Pursuant to EN 61547)	Discharged Points
4	20	Pass	Accessible metal parts of the EUT

Direct Air Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result (Pursuant to EN 61547)	Discharged Points
2, 4, 8	20	Pass	All accessible points where contact discharge cannot be applied such as Displays, Indicators light, Keyboard, Button, Switch, Knob, Air gap, Slots, Hole and so on

Indirect Application of ESD

Horizontal Coupling Plane under the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result (pursuant to EN 61547)	Discharged Point
4	20	Pass	At the front edge of each HCP opposite the centre point of each unit of the EUT

Vertical Coupling Plane beside the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result (pursuant to EN 61547 criterion B)	Discharged Point
4	20	Pass	The centre of the vertical edge of the coupling plane

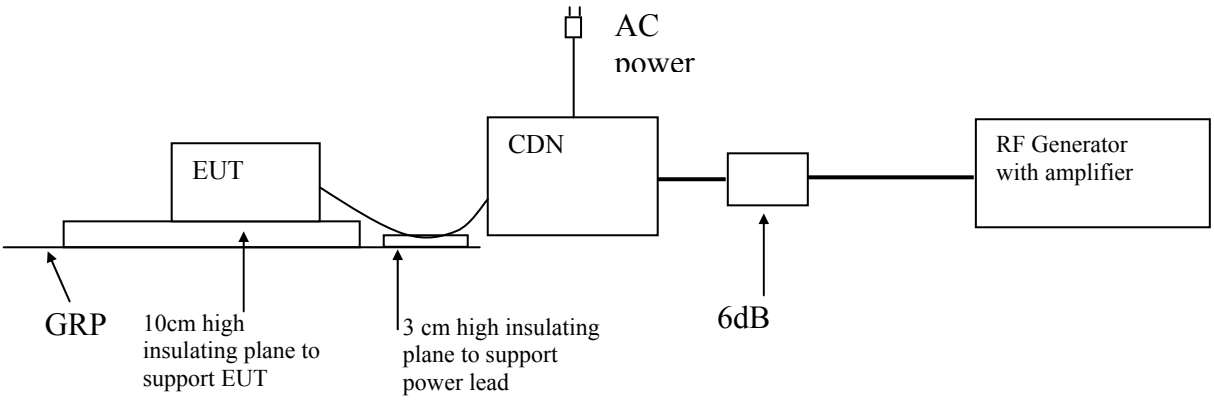
7.2 EN 61000-4-6(Pursuant to EN 61547) Injected Current (0.15 MHz to 80 MHz)

Performance criterion: A
Test Result: Pass

7.2.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM003-01	Conducted Disturbance Generator	CDG_1020	Dr.Hubert GmbH

7.2.2 Block Diagram of Test Setup



7.2.3 Test Setup and Procedure

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 relevant cables were provided with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on an insulating support of 0.03m height above the ground reference plane.
Test voltage was verified before each testing though power meter combined in the RF generator with AMP.
Dwell time was set to 3s and step was set as 1% to keep sufficient response time for EUT.
The frequency from 0.15MHz to 80MHz was checked.

7.2.4 Test Result

Port:	Frequency (MHz)	Level (Pursuant to EN 61547)	Result
A.C. Power Lines	0.15 to 80	3V (r.m.s.)	Pass
D.C. Power Lines	0.15 to 80	3V (r.m.s.)	N/A
Signal Lines	0.15 to 80	3V (r.m.s.)	N/A
Control Lines	0.15 to 80	3V (r.m.s.)	N/A

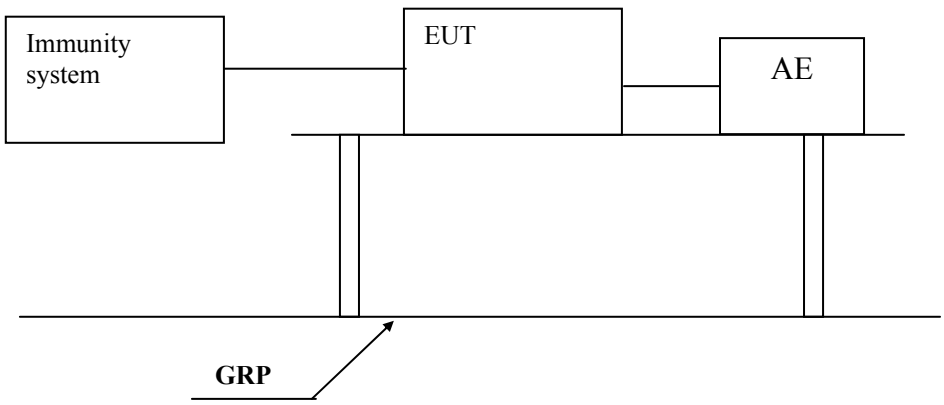
7.3 EN 61000-4-4(Pursuant to EN 61547) Electrical Fast Transient/Burst

Performance criterion: B
Test Result: Pass

7.3.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM005-07	EMS test system	Ecompact 4	HAEFELY

7.3.2 Block Diagram of Test Setup



7.3.3 Test Setup and Procedure

The EUT was placed on a 0.1m high wooden table, standing on the ground reference plane 3m by 2m in size, made by steel 1mm thick.

The distance between the EUT and any other of the metallic surface except the GRP is greater than 0.5m.

The mains lead excess than 0.5m is folded to avoid a flat coil and situated at a distance of 0.1m above the ground reference plane to insure the distance between the coupling device and the EUT were 0.5m.

The EUT was arranged and connected to satisfy its functional requirement and supplied by the coupling-decoupling network.

7.3.4 Test Result

Level (Pursuant to EN 61547)	Polarity	Input and Output A.C. Power Ports	D.C. Power Ports, Signal and Control Lines
0.5kV	+	N/A	N/A
0.5kV	-	N/A	N/A
1kV	+	Pass	N/A
1kV	-	Pass	N/A

7.4 EN 61000-4-5(Pursuant to EN 61547) Surge Immunity

Performance criterion: ☒ **C**

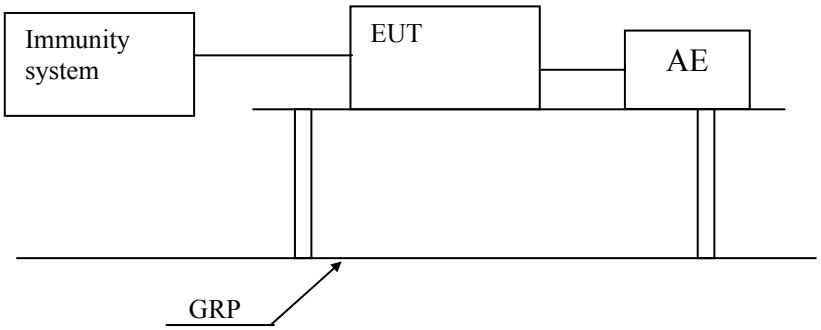
☐ **B** (lumimaire for emergency lighting)

Test Result: Pass

7.4.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM005-09	Surge/DIP Generator	NSG3040	TESEQ

7.4.2 Block Diagram of Test Setup



7.4.3 Test Setup and Procedure

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network.

Decoupling networks are 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 developed on the lines under test.

The EUT was arranged and connected according to its functional requirements.

The EUT was placed on a 0.1m high wooden support above the GRP), supplied by the coupling-decoupling network, and arranged and connected to satisfy its functional requirement. The power cord between the EUT and the coupling/decoupling network was less than 2 meters.

Five positive and five negative pulses shall be applied at the peak value and zero crossing points of the a.c. voltage wave.

7.4.4 Test Result

☑ I. For Self-ballasted lamps and semi-luminaires and independent auxiliaries with input power less or equal to 25 W:

Level (Pursuant to EN 61547)		Result
Between Phase And Phase:	0.5 kV	N/A
Between Phase And Neutral:	0.5 kV	Pass
Between Phase And Earth:	0.5 kV, 1.0 kV	N/A
Between Neutral And Earth:	0.5 kV, 1.0 kV	N/A

☐ II. For luminaires and independent auxiliaries with input power greater than 25 W:

Level (Pursuant to EN 61547)		Result
Between Phase And Phase:	0.5 kV, 1.0 kV	N/A
Between Phase And Neutral:	0.5 kV, 1.0 kV	N/A
Between Phase And Earth:	0.5 kV, 1.0 kV, 2.0 kV	N/A
Between Neutral And Earth:	0.5 kV, 1.0 kV, 2.0 kV	N/A

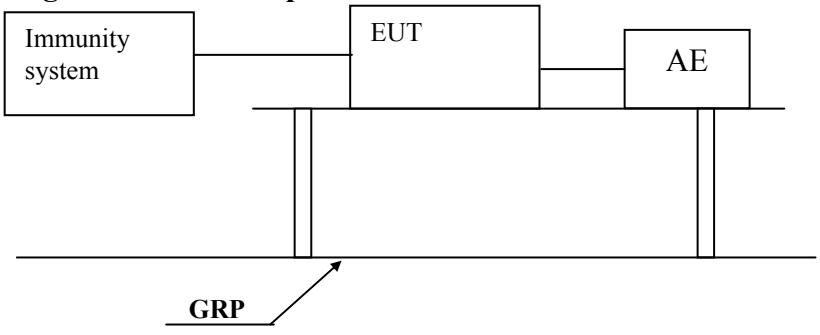
7.5 EN 61000-4-11(Pursuant to EN 61547) Voltage Dips and Interruptions

Performance criterion:
for table 11 of EN 61547 ------ **C**
for table 12 of EN 61547------- **B**
Test Result: Pass

7.5.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM005-07	EMS test system	Ecompact 4	HAEFELY

7.5.2 Block Diagram of Test Setup



7.5.3 Test Setup and Procedure

The EUT was placed on an insulating support of 0.8m height, standing on a ground reference plane, and arranged and connected to satisfy its functional requirement

The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

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.

EUT is tested for voltage reduction of 0%Ut, 0.5 period, 70%Ut, 10 periods, both the positive and negative polarity test was conducted.

Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform.

7.5.4 Test Result

I. According to table 11 of EN 61547

Test condition (Pursuant to EN 61547)		Result
Test Level in $\%U_T$	Duration (in period of the rated frequency)	
70	10	Pass

II. According to table 12 of EN 61547

Test condition (Pursuant to EN 61547)		Result
Test Level in $\%U_T$	Duration (in period of the rated frequency)	
0	0.5	Pass

Remark: U_T is the rated voltage for the equipment.

7.6 EN 61000-4-3(Pursuant to EN 61547) Radiated Electromagnetic Field Immunity

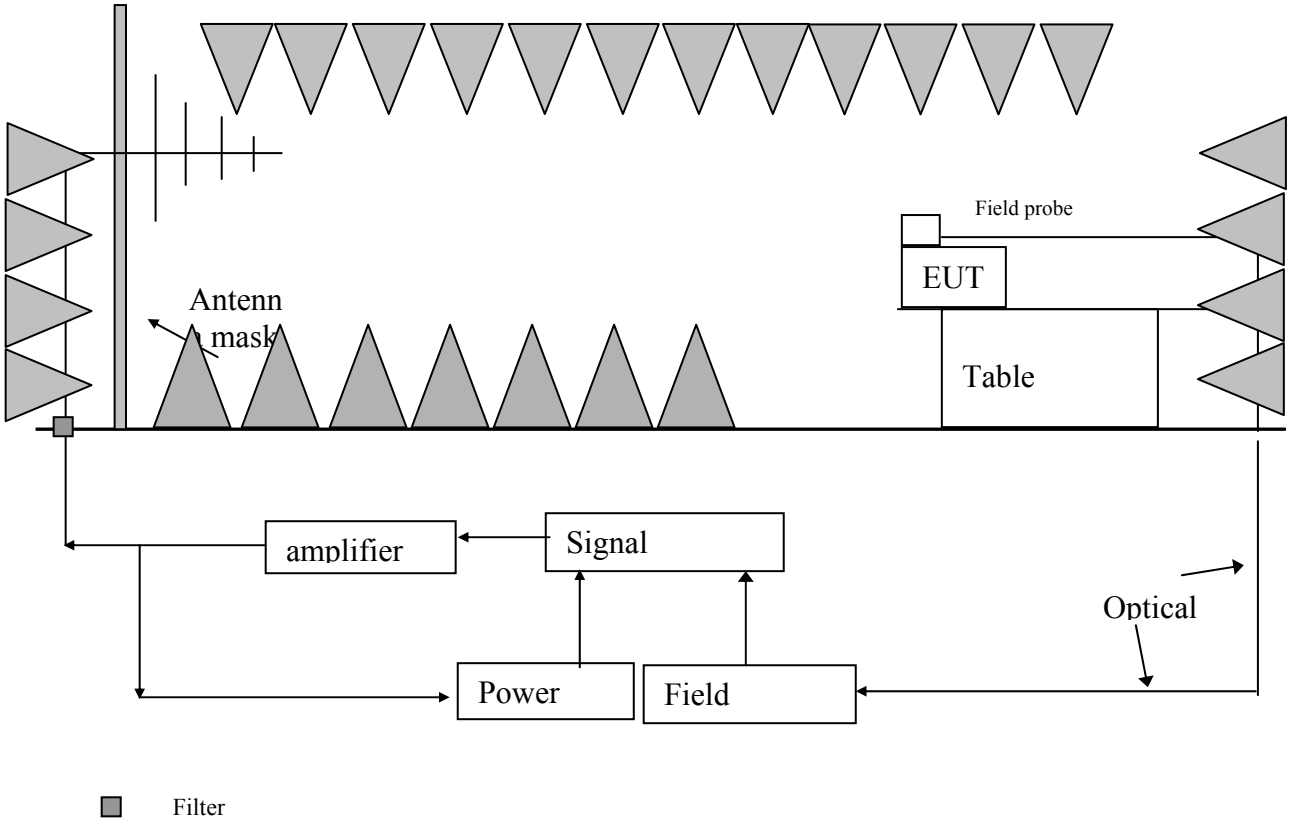
Performance criterion: A

Test Result: Pass

7.6.1 Used Test Equipment

Serial Number	Name of Equipment	Model	Manufacturer
103002	Signal Generator	SML03	R&S
9128E-029	Antenna	STLP 9128 E	SCHWARZBECK
0611-768	Power Amplifier	AP32 DT214	PRANA R&D
10543	Power Meter	4232A	BOOTON

7.6.2 Block Diagram of Test Setup



7.6.3 Test Setup and Procedure

The test was conducted in an fully anechoic chamber to maintain a uniform field of sufficient dimensions with respect to the EUT, and also in order to comply with various national and international laws prohibiting interference to radio communications.

The equipment is placed in the test facility on a non-conducting table 0.8m high (for floor standing EUT, is placed on a non-conducting support 0.1m height).

The EUT was placed on the uniform calibrated plane which is 3V/m EM field.

For all ports connected to EUT, manufacturer specified cable type and length was used, for those cables no specification, unshielded cable applied.

Wire is left exposed to the electromagnetic field for a distance of 1m from the EUT.

The EUT was arranged and connected according to its functional requirements

Before testing, the intensity of the established field strength have been checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward power needed to give the calibrated field strength was measured.

Spot checks was made at a number of calibration grid points over the frequency range 80MHz to 1000MHz, both polarizations was checked.

After calibration, the EUT is initially placed with one face coincident with the calibration plane.

The frequency range is swept from 80MHz to 1000MHz, with the signal 80% amplitude modulated with a 1 kHz sinewave, pausing to adjust the r.f. signal level.

The dwell time at each frequency was 3s so as that the EUT to be exercised and be able to respond.

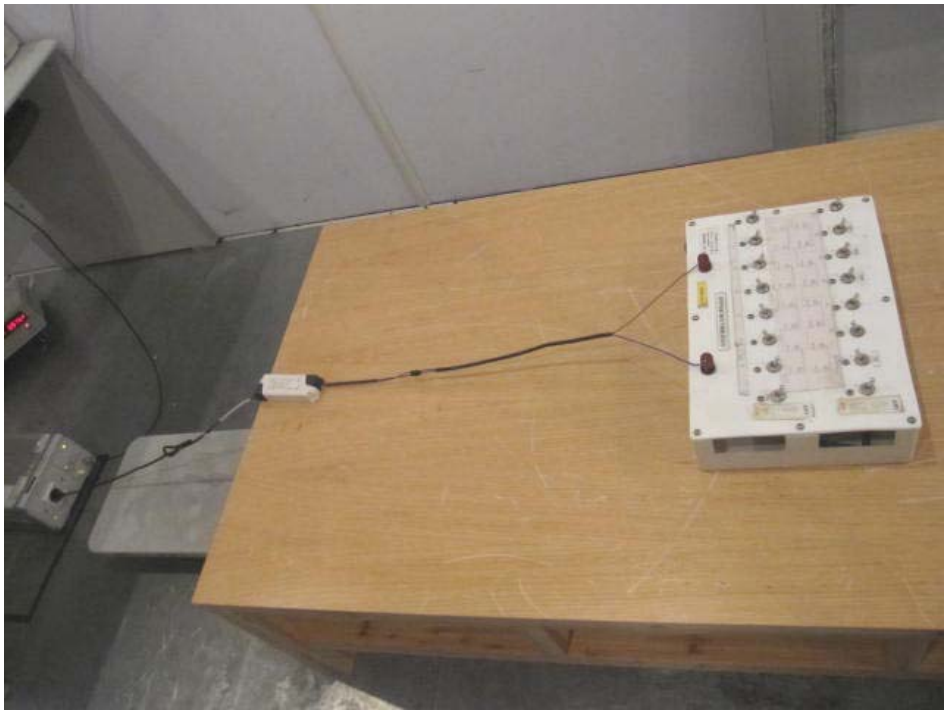
The step size was 1% of the fundamental with linear interpolation between calibrated points. Test was performed with the generating antenna facing each of the four sides of the EUT.

7.6.4 Test Result

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80 to 1000	Front	3V/m (r.m.s.)	Pass
80 to 1000	Left	3V/m (r.m.s.)	Pass
80 to 1000	Rear	3V/m (r.m.s.)	Pass
80 to 1000	Right	3V/m (r.m.s.)	Pass

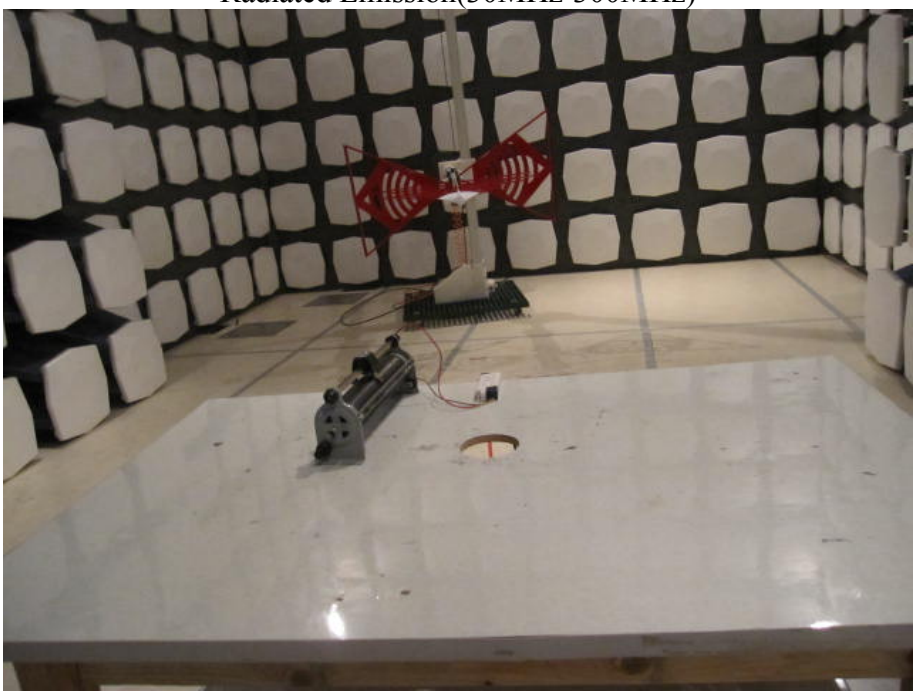
8 Appendix I - Photos of test setup

Conducted Emission

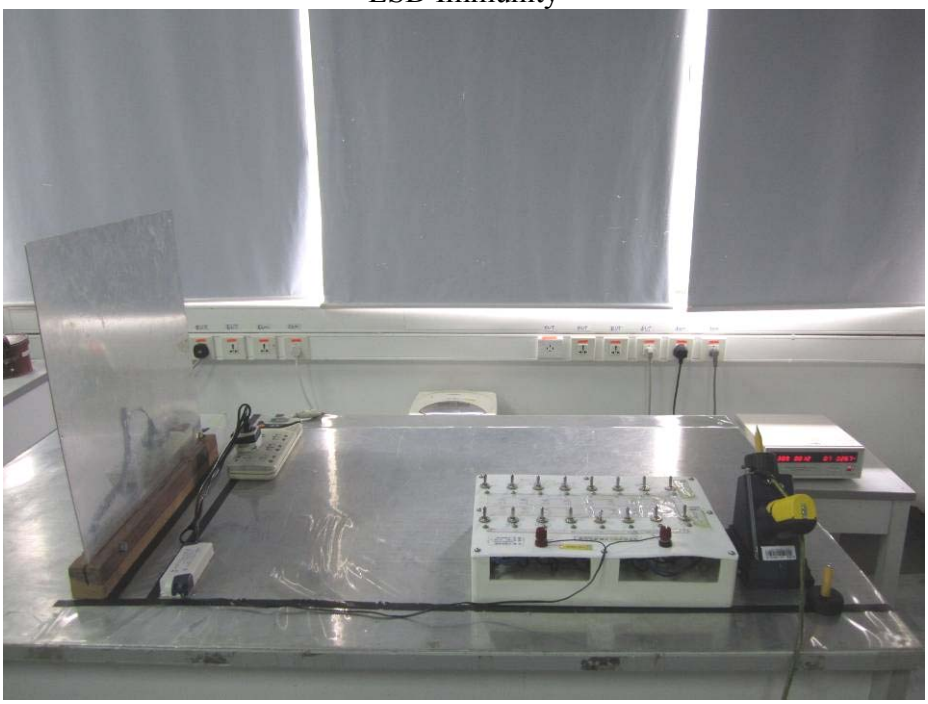


Radiated Emission(9kHz-30MHz)

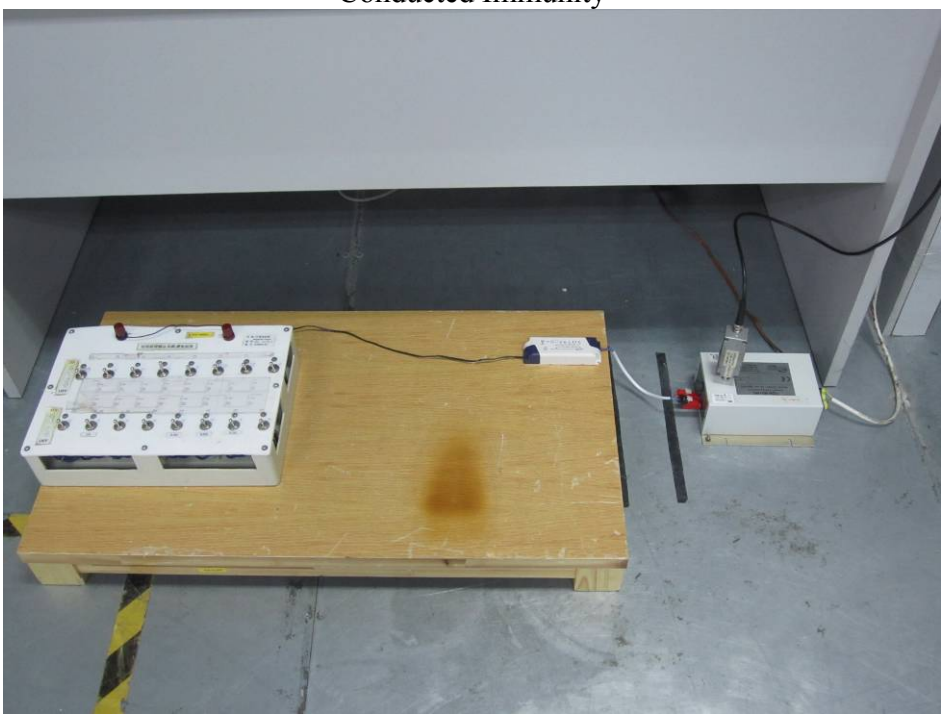
Radiated Emission(30MHz-300MHz)



ESD Immunity

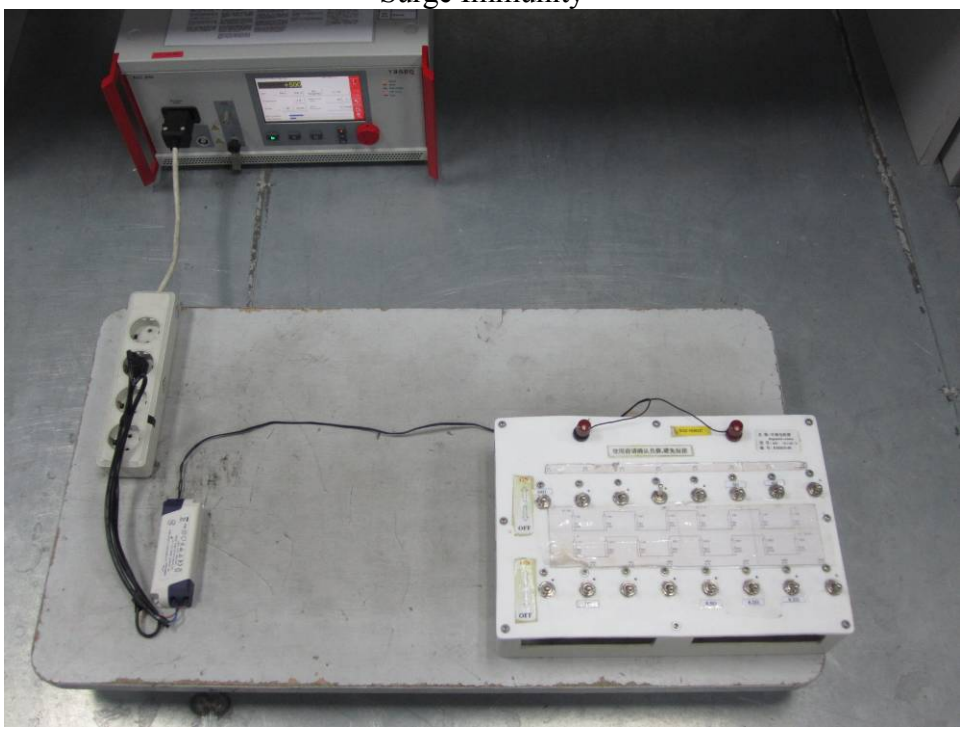


Conducted Immunity



Radiated field Immunity

Surge Immunity



EFT&DIP Immunity