TEST REPORT

Applicant: BRAYTRON S.R.L.

Address of Applicant: B.DUL IULIU MANIU, NR.616, CORP B, ETAJ 1 SECTOR 6, 061129, BUCHAREST, ROMANIA

Equipment Under Test (EUT)

Product Name: LED OUTDOOR LIGHTING FIXTURE

Brand Name: Braytron

Model No.: Please Refer To Page 5.

Applicable standards: EN IEC 55015:2019+A11:2020
EN 61547:2009
EN IEC 61000-3-2:2019
EN 61000-3-3:2013+A1:2019

Date of sample receipt: May 17, 2021

Date of Test: May 17, 2021 To June 1, 2021

Date of report issued: June 3, 2021

Test Result : PASS *

*In the configuration tested, the EUT complied with the standards specified above

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.

Authorized Signature

Kevin Wang
Laboratory Manager

CE

2 Version

Version No.	Date	Description
00	*June 3, 2021*	*Original*

Prepared By: Gary Wang ***Date:*** *June 3, 2021*

Project Engineer

Reviewed By: Kevin Wang ***Date:*** *June 3, 2021*

Reviewer

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4 Test Summary

Test Item	Test Requirement	Test Method	Class / Severity	Result
Radiated Emissions (30MHz-1000MHz)	EN IEC 55015	EN IEC 55015	Table 10	Pass
Radiated Emissions (9kHz-30MHz)	EN IEC 55015	EN IEC 55015	Table 8	Pass
Conducted Emissions	EN IEC 55015	EN IEC 55015	Table 1	Pass
Harmonic Current Emission	EN IEC 61000-3-2	EN IEC 61000-3-2	Class C	Pass
Voltage Fluctuations and Flicker	EN 61000-3-3	EN 61000-3-3	Clause 5 of EN61000-3-3	Pass
Electrostatic discharges	EN 61547	EN 61000-4-2	Contact ± 4 kV Air± 8 kV	Pass
Radiated Immunity	EN 61547	EN 61000-4-3	3V/m 80%, 1kHz, AM	Pass
Electrical Fast Transients	EN 61547	EN 61000-4-4	AC ± 1.0kV	Pass
Surges	EN 61547	EN 61000-4-5	1kV Line to Line 2kV Line to Ground	Pass
Conducted Immunity	EN 61547	EN 61000-4-6	3Vrms (emf), 80%, 1kHz Amp. Mod.	Pass
Voltage dips and Interruptions	EN 61547	EN 61000-4-11	0 % UT for 0.5per 70 % UT for 10per UT is Supply Voltage	Pass

Remark:

UT is the nominal supply voltage.*

N/A: Not applicable.

Model No.:

BT45-09112	BT45-09132	BT45-09412	BT45-09432
BT45-09612	BT45-09632	BT45-19112	BT45-19132
BT45-19412	BT45-19432	BT45-19612	BT45-19632
BT44-080X2	BT44-090X2	BT44-091X2	BT44-092X2
BT44-093X2	BT44-094X2	BT44-095X2	BT44-096X2
BT44-097X2	BT44-098X2	BT44-099X2	BT44-180X2
BT44-190X2	BT44-191X2	BT44-192X2	BT44-193X2
BT44-194X2	BT44-195X2	BT44-196X2	BT44-197X2
BT44-198X2	BT44-199X2	BT45-080X2	BT45-090X2
BT45-091X2	BT45-092X2	BT45-093X2	BT45-094X2
BT45-095X2	BT45-096X2	BT45-097X2	BT45-098X2
BT45-099X2	BT45-180X2	BT45-190X2	BT45-191X2
BT45-192X2	BT45-193X2	BT45-194X2	BT45-195X2
BT45-196X2	BT45-197X2	BT45-198X2	BT45-199X2
BT45-380X2	BT45-390X2	BT45-391X2	BT45-392X2
BT45-393X2	BT45-394X2	BT45-395X2	BT45-396X2
BT45-397X2	BT45-398X2	BT45-399X2	BT46-060XX
BT46-075XX	BT46-080XX	BT46-090XX	BT46-091XX
BT46-092XX	BT46-093XX	BT46-094XX	BT46-095XX
BT46-096XX	BT46-097XX	BT47-001XX	BT47-002XX
BT47-003XX	BT47-004XX	BT47-005XX	BT47-006XX
BT47-007XX	BT47-008XX	BT47-009XX	
X=0,1,2,3,4,5,6,7,8,9			
Remark: All models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose.			

5 General Information

5.1 Client Information

Applicant:	BRAYTRON S.R.L.
Address of Applicant:	B.DUL IULIU MANIU, NR.616, CORP B, ETAJ 1 SECTOR 6, 061129, BUCHAREST, ROMANIA
Manufacturer:	DEMGRUP INTERNATIONAL LIGHTING LIMITED
Address of Manufacturer:	UNIT D 16/F, ONE CAPITAL PLACE, 18 LUARD ROAD, WAN CHAI, HONG KONG

5.2 General Description of E.U.T

Product Name:	LED OUTDOOR LIGHTING FIXTURE
Brand Name:	Braytron
Model No.:	Please Refer To Page 5.
Test Model No.:	BT45-19632
Power Supply:	AC220-240V, 50/60Hz, 200W

5.3 Test mode

On mode	Keep the EUT lighting

5.4 Description of Support Units

None.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Visual:	Monitor the lighting of EUT
Audio:	N/A

6 Test Instruments List

Radiated Emission (30MHz-1000MHz):						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	Jul. 3 2016	Jul. 2 2021
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	Jun. 29 2020	Jun. 28 2021
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	Jun. 29 2020	Jun. 28 2021
5	Double-ridged horn antenna	SCHWARZBECK	9120D	GTS208	Jun. 29 2020	Jun. 28 2021
6	RF Amplifier	HP	8347A	GTS204	Jun. 29 2020	Jun. 28 2021
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Jun. 29 2020	Jun. 28 2021
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS211	N/A	N/A
11	Thermo meter	KTJ	TA328	GTS256	Jun. 29 2020	Jun. 28 2021

Radiated Emissions (9kHz-30MHz):						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 3 2020	Jul. 2 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Jun. 29 2020	Jun. 28 2021
3	TPIPLE-LOOP ANTENNA	EVERFINE	LLA-2	GTS539	Jun. 29 2020	Jun. 28 2021
4	Pulse Limiter	R&S	ESH3-Z2	GTS224	Jun. 29 2020	Jun. 28 2021
5	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 29 2020	Jun. 28 2021
6	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	Jun. 29 2020	Jun. 28 2021

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 3 2020	Jul. 2 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Jun. 29 2020	Jun. 28 2021
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	Jun. 29 2020	Jun. 28 2021
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 29 2020	Jun. 28 2021
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	Jun. 29 2020	Jun. 28 2021
6	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	Jun. 29 2020	Jun. 28 2021
9	ISN	EMTEST	FCC-TLISN-T8-02	GTS563	Jun. 29 2020	Jun. 28 2021

EFT, Surge, Voltage dips and Interruption:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	EMTEST system	EMTEST	UCS500N	GTS239	Jun. 29 2020	Jun. 28 2021
2	Thermo meter	KTJ	TA328	GTS233	Jun. 29 2020	Jun. 28 2021
3	capacitive Clamp	EMTEST	HFK	GTS557	Jun. 29 2020	Jun. 28 2021

ESD:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	Jun. 29 2020	Jun. 28 2021
2	Thermo meter	KTJ	TA328	GTS243	Jun. 29 2020	Jun. 28 2021

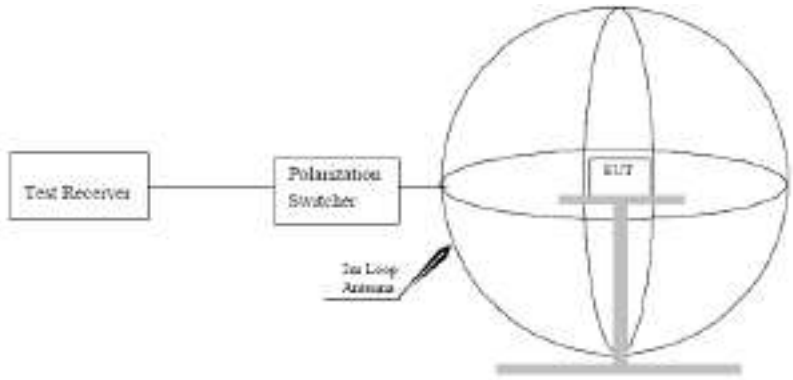
Harmonic/ Flicker:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	HARMONIC/FLICKER ANALYZER	KIKUSUI	KHA1000	GTS235	Jun. 29 2020	Jun. 28 2021
2	AC POWER SUPPLY	KIKUSUI	PCR4000LE	GTS236	Jun. 29 2020	Jun. 28 2021
3	LINE IMPEDANCE NETWORK	KIKUSUI	LIN1020JF	GTS237	Jun. 29 2020	Jun. 28 2021
4	Thermo meter	KTJ	TA328	GTS256	Jun. 29 2020	Jun. 28 2021

Conducted Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Signal Generator	SCHLODER	CDG-6000-25	GTS553	Jun. 29 2020	Jun. 28 2021
2	CDN	SCHLODER	CDN-M2+3	GTS554	Jun. 29 2020	Jun. 28 2021
3	EM-Clapm	SCHLODER	EMCL-20	GTS555	Jun. 29 2020	Jun. 28 2021
4	ATT	SCHLODER	ATT-6DB-100	GTS556	Jun. 29 2020	Jun. 28 2021

Radiated Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due Date (mm-dd-yy)**
1	Signal Generator	Rohde & Schwarz	SMT03	100059	Jan. 15 2021	Jan. 14 2022
2	Power Amplifier	AR	150W1000	300999	Jan. 15 2021	Jan. 14 2022
3	Power Amplifier	AR	25S1G4AM1	305993	Jan. 15 2021	Jan. 14 2022
4	Power Amplifier	AR	150A220M6	305965	Jan. 15 2021	Jan. 14 2022
5	Broadband antenna	CHASE	CBL6111C	2576	Jan. 15 2021	Jan. 14 2022
6	Horn Antenna	AR	AT4002A	2783	Jan. 15 2021	Jan. 14 2022

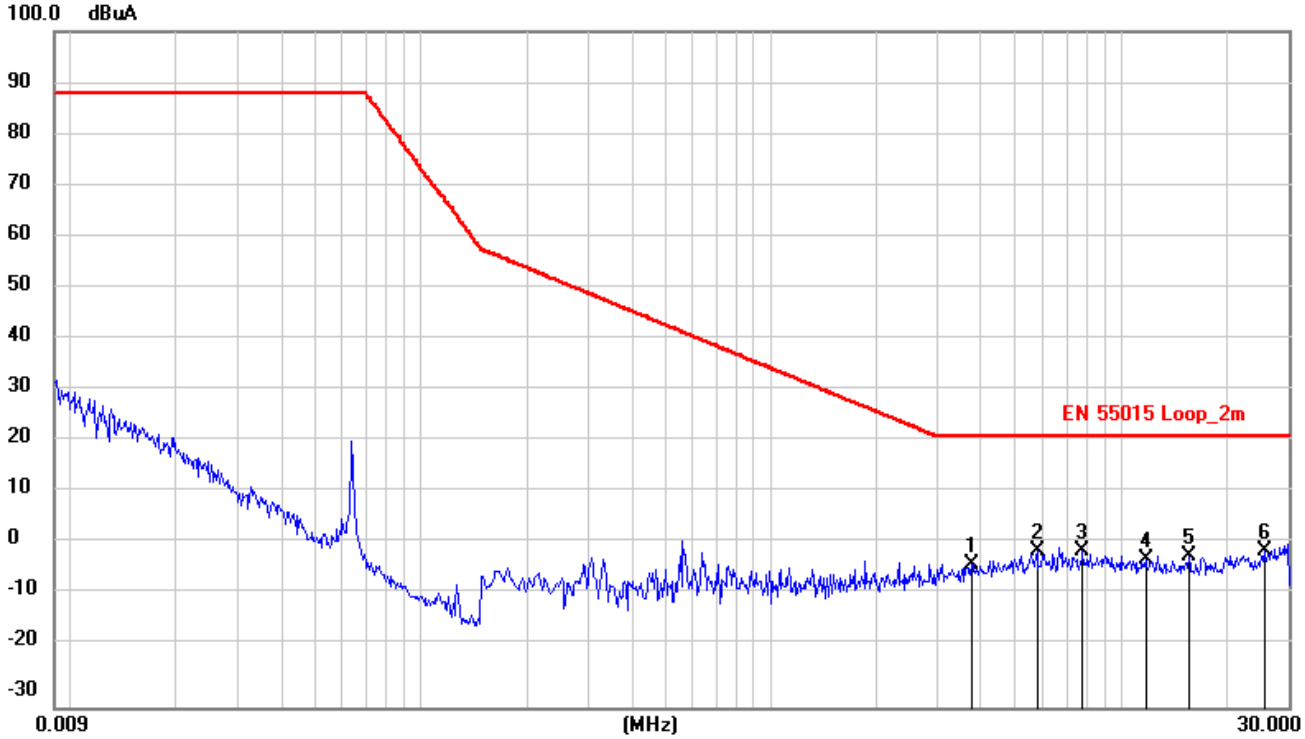
7 Emission Test Results

7.1 Radiated Emissions (9kHz-30MHz)

<table>
<tr><td>Test Requirement:</td><td colspan="3">EN IEC 55015</td></tr>
<tr><td>Test Method:</td><td colspan="3">EN IEC 55015</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">9kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td colspan="3">
<table>
<tr><th>Frequency range (MHz)</th><th>Limits for loop diameter
dBuA @2m</th></tr>
<tr><td>0.009-0.070</td><td>88</td></tr>
<tr><td>0.070-0.150</td><td>88 to 58*</td></tr>
<tr><td>0.15-3.0</td><td>58 to22*</td></tr>
<tr><td>3.0-30</td><td>22</td></tr>
</table>
*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, 51dB(μA) for 3 m and 45 dB(μA) for 4 m loop diameter.
</td></tr>
<tr><td>Test Setup:</td><td colspan="3"> 
</td></tr>
<tr><td>Test procedure</td><td colspan="3">1. An initial pre-scan was performed in the 2m loop antenna using the spectrum analyser in peak detection mode.
2. The EUT was measured for X(A), Y(B), Z(C) polarities.
3. No further quasi-peak measurements were performed since no peak emissions from the EUT were detected within 6dB of the limit for 2m diameter loop antenna.</td></tr>
<tr><td>Test Instruments:</td><td>Temp.: 25 °C</td><td>Humid.: 50%</td><td>Press.: 1012mbar</td></tr>
<tr><td>Measurement Record:</td><td colspan="3">Uncertainty: ± 4.5dB</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details.</td></tr>
<tr><td>Test results:</td><td colspan="3">Pass</td></tr>
</table>

Measurement Data

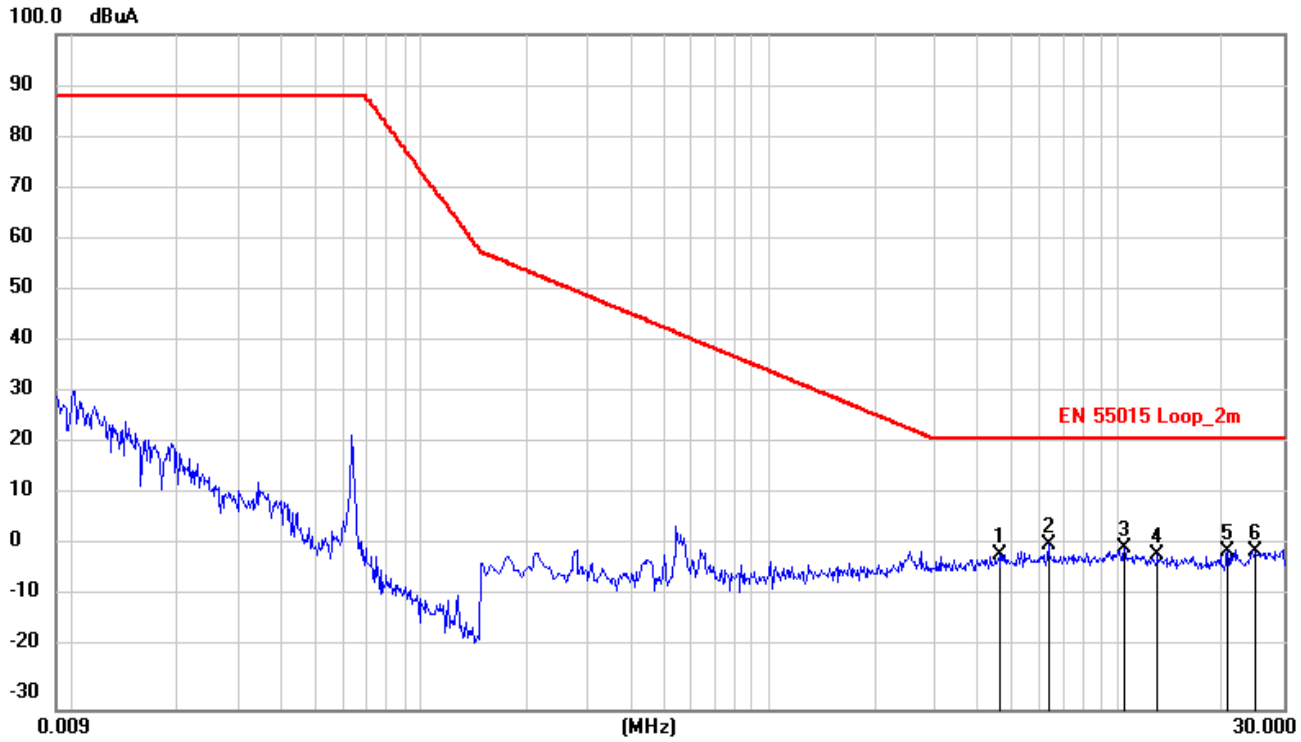
Axial: X



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuA)	dB	(dBuA)	(dBuA)	(dB)	
1	3.7546	-37.11	34.68	-2.43	22.00	-24.43	QP
2	5.7571	-34.88	35.08	0.20	22.00	-21.80	QP
3	7.7596	-35.03	34.99	-0.04	22.00	-22.04	QP
4	11.7871	-36.21	34.70	-1.51	22.00	-23.51	QP
5	15.6481	-35.67	34.66	-1.01	22.00	-23.01	QP
6	25.7101	-34.99	35.16	0.17	22.00	-21.83	QP

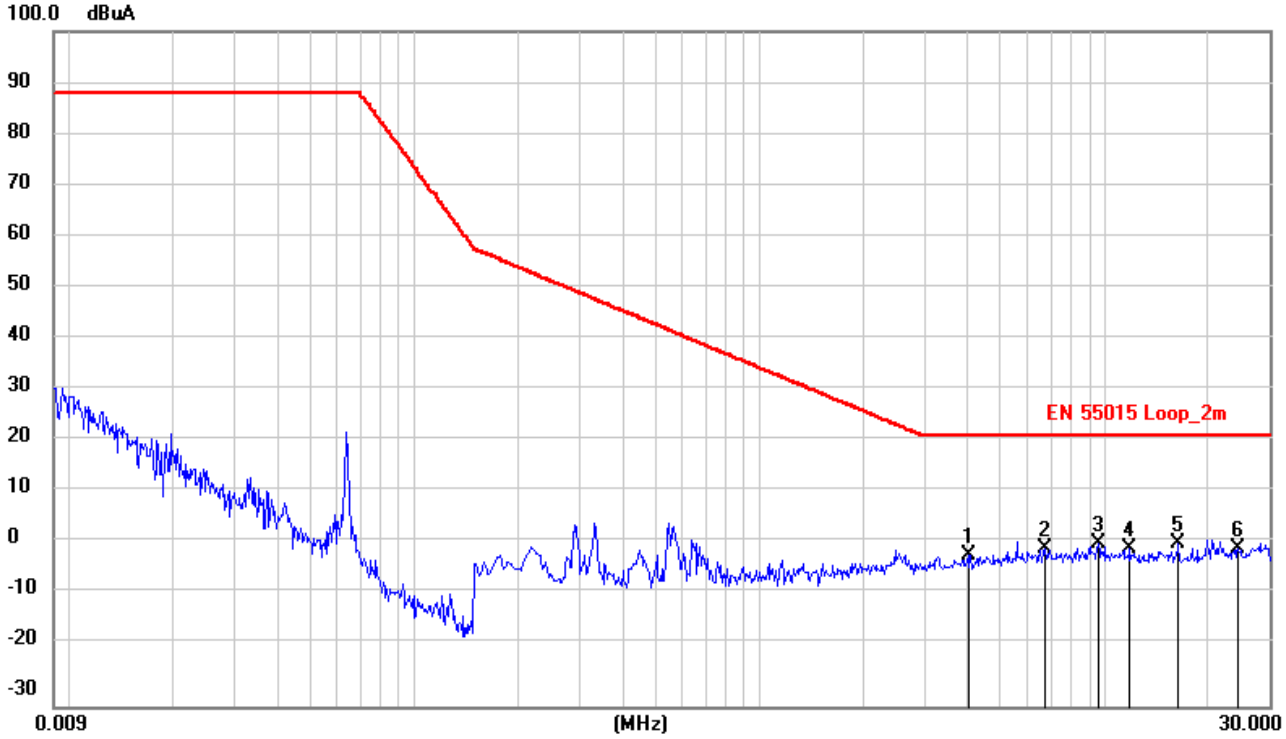
Axial: Y

.



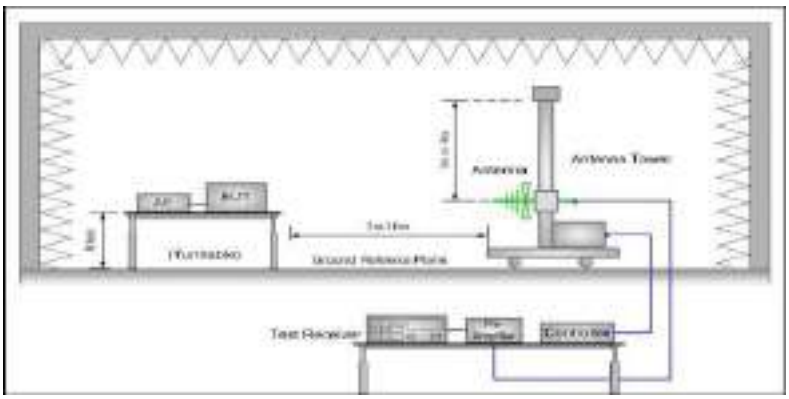
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuA)	dB	(dBuA)	(dBuA)	(dB)	
1	4.6006	-34.85	34.63	-0.22	22.00	-22.22	QP
2	6.3466	-33.11	34.96	1.85	22.00	-20.15	QP
3	10.4956	-34.00	35.07	1.07	22.00	-20.93	QP
4	13.0876	-35.07	34.78	-0.29	22.00	-22.29	QP
5	20.7061	-33.58	34.13	0.55	22.00	-21.45	QP
6	24.6976	-33.96	34.35	0.39	22.00	-21.61	QP

Axial: Z



No.	Frequency (MHz)	Reading (dBuA)	Correct dB	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	4.0156	-35.13	34.21	-0.92	22.00	-22.92	QP
2	6.7111	-34.40	34.80	0.40	22.00	-21.60	QP
3	9.6226	-33.52	34.91	1.39	22.00	-20.61	QP
4	11.8635	-34.43	34.89	0.46	22.00	-21.54	QP
5	16.4490	-33.61	34.87	1.26	22.00	-20.74	QP
6	24.3331	-34.70	35.04	0.34	22.00	-21.66	QP

7.2 Radiated Emissions (30MHz-1000MHz)

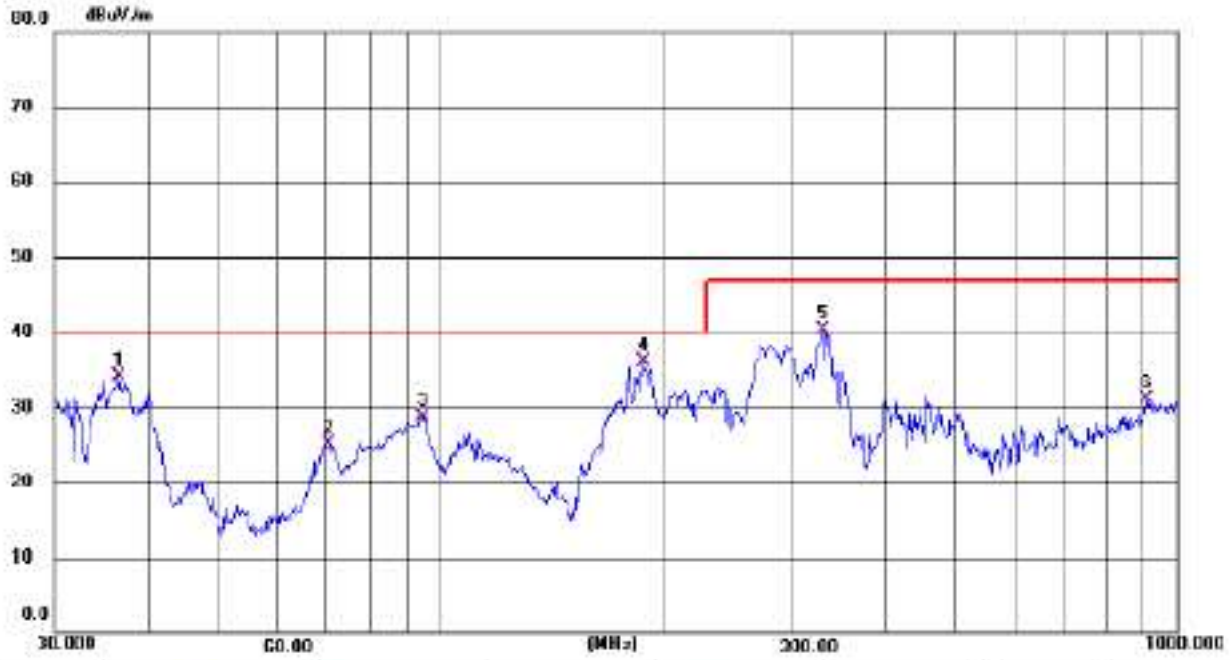
Test Requirement:	EN IEC 55015
Test Method:	EN IEC 55015
Test Frequency Range:	30MHz to 1000MHz
Measurement Distance:	3m
Limit:	Frequency range(MHz) / Limit (dBuV/m) 30 to 230 / 40.00 230 to 1000 / 47.00
Test setup:	
Test procedure	1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. 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, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test Instruments:	Temp.: 25 °C / Humid.: 50% / Press.: 1012mbar
Measurement Record:	**Uncertainty: ± 4.50dB**
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Pass

Measurement Data

Test mode:	On mode	Antenna Polarity:	Horizontal

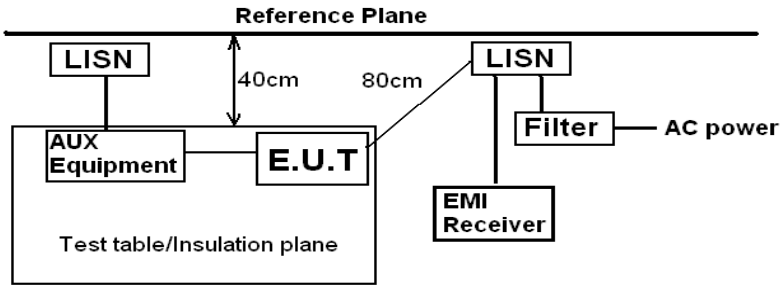
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.3172	34.67	-4.69	29.98	40.00	-10.02	QP
2	36.2540	38.48	-8.51	29.97	40.00	-10.03	QP
3	92.7871	46.53	-20.18	26.35	40.00	-13.65	QP
4 *	196.5098	51.49	-18.12	33.37	40.00	-6.63	QP
5	287.9904	50.90	-15.15	35.75	47.00	-11.25	QP
6	455.9058	40.81	-8.74	32.07	47.00	-14.93	QP

Test mode:	On mode	Antenna Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.6374	50.59	-16.58	34.01	40.00	-5.99	QP
2	70.5835	45.06	-19.91	25.15	40.00	-14.85	QP
3	94.4283	50.02	-21.30	28.72	40.00	-11.28	QP
4 *	188.4125	52.74	-16.58	36.16	40.00	-3.84	QP
5	330.1948	51.29	-11.06	40.23	47.00	-6.77	QP
6	909.6666	31.33	-0.32	31.01	47.00	-15.99	QP

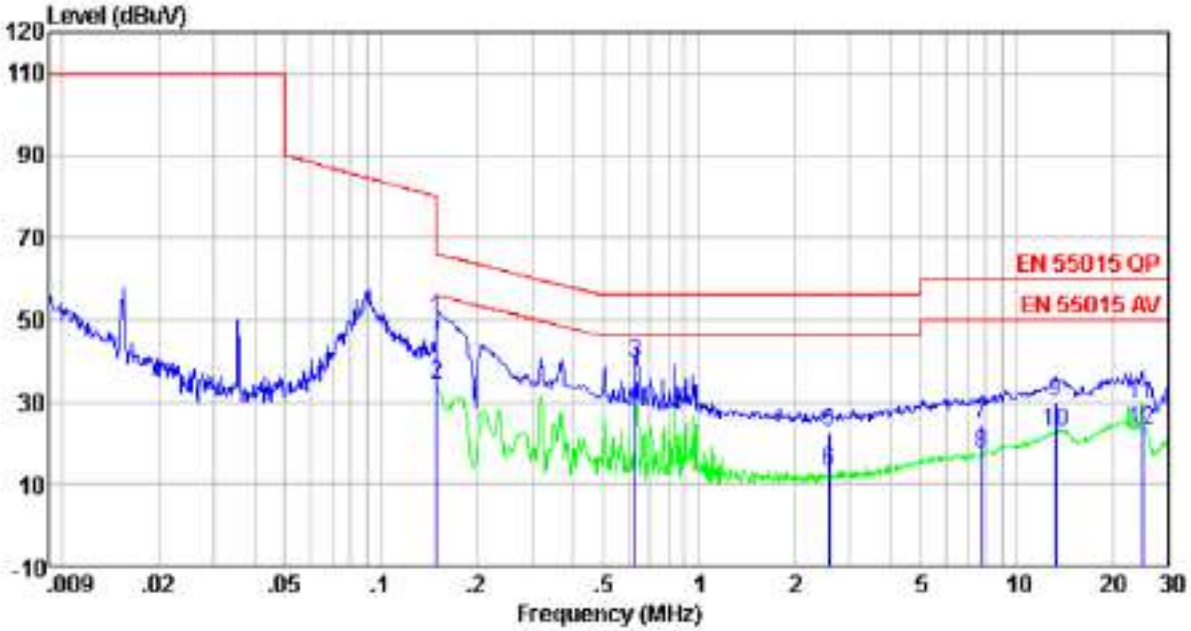
7.3 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="3">EN IEC 55015</td></tr>
<tr><td>Test Method:</td><td colspan="3">EN IEC 55015</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">9kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td colspan="3">
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.009-0.05</td><td>110</td><td>-</td></tr>
<tr><td>0.05-0.15</td><td>90-80*</td><td>-</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="3">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55022 Class B on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td>Temp.: 25 °C</td><td>Humid.: 50%</td><td>Press.: 1012mbar</td></tr>
<tr><td>Measurement Record:</td><td colspan="3">Uncertainty: ± 3.45dB</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details.</td></tr>
<tr><td>Test results:</td><td colspan="3">Pass</td></tr>
</table>

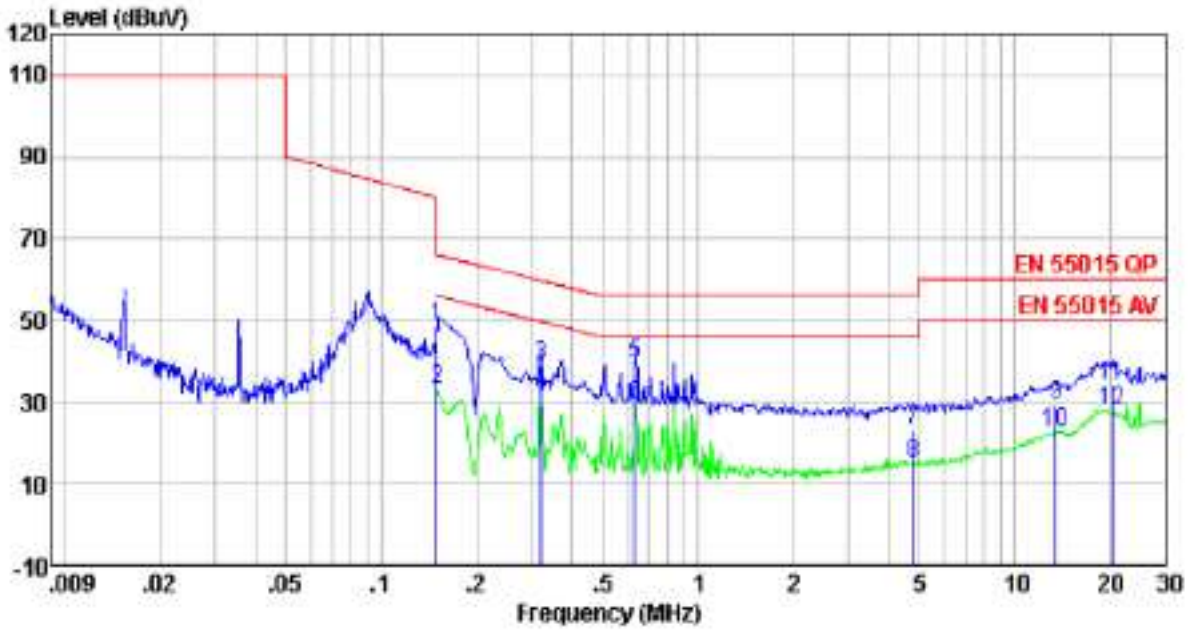
Measurement Data

Test mode:	On mode	Antenna Polarity:	Line



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dBuV	dBuV	dB	
0.15	29.36	20.40	0.07	49.83	66.00	-16.17	QP
0.15	13.64	20.40	0.07	34.11	56.00	-21.89	Average
0.63	18.87	20.28	0.12	39.27	56.00	-16.73	QP
0.63	8.53	20.28	0.12	28.93	46.00	-17.07	Average
2.58	2.27	20.20	0.18	22.65	56.00	-33.35	QP
2.58	-7.42	20.20	0.18	12.96	46.00	-33.04	Average
7.77	4.24	20.20	0.19	24.63	60.00	-35.37	QP
7.77	-3.28	20.20	0.19	17.11	50.00	-32.89	Average
13.27	9.38	20.20	0.21	29.79	60.00	-30.21	QP
13.27	2.31	20.20	0.21	22.72	50.00	-27.28	Average
24.79	8.75	20.35	0.23	29.33	60.00	-30.67	QP
24.79	2.52	20.35	0.23	23.10	50.00	-26.90	Average

Test mode:	On mode	Antenna Polarity:	Neutral



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dBuV	dBuV	dB	
0.15	28.25	20.40	0.07	48.72	66.00	-17.28	QP
0.15	12.85	20.40	0.07	33.32	56.00	-22.68	Average
0.32	18.59	20.39	0.10	39.08	59.71	-20.63	QP
0.32	10.64	20.39	0.10	31.13	49.71	-18.58	Average
0.63	18.93	20.28	0.12	39.33	56.00	-16.67	QP
0.63	8.74	20.28	0.12	29.14	46.00	-16.86	Average
4.77	2.94	20.20	0.17	23.31	56.00	-32.69	QP
4.77	-5.23	20.20	0.17	15.14	46.00	-30.86	Average
13.55	9.16	20.20	0.21	29.57	60.00	-30.43	QP
13.55	2.11	20.20	0.21	22.52	50.00	-27.48	Average
20.38	13.55	20.30	0.23	34.08	60.00	-25.92	QP
20.38	7.31	20.30	0.23	27.84	50.00	-22.16	Average

7.4 Harmonics Current Emission

Test Requirement:	EN IEC 61000-3-2		
Test Method:	EN IEC 61000-3-2		
Frequency range:	100Hz to 2kHz		
Measurement Time:	2.5 min		
Class/Severity:	Class C		
Detector:	As per EN 61000-3-2		
Test environment:	Temp.:24 °C	Humid.: 51%	Press.: 1012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

7.5 Voltage Fluctuations and Flicker

Test Requirement:	EN 61000-3-3		
Test Method:	EN 61000-3-3		
Class/Severity:	Clause 5 of EN 61000-3-3		
Measurement Time:	10 min		
Detector:	As per EN 61000-3-3		
Test environment:	Temp.:24 °C	Humid.: 51%	Press.: 1012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement Data

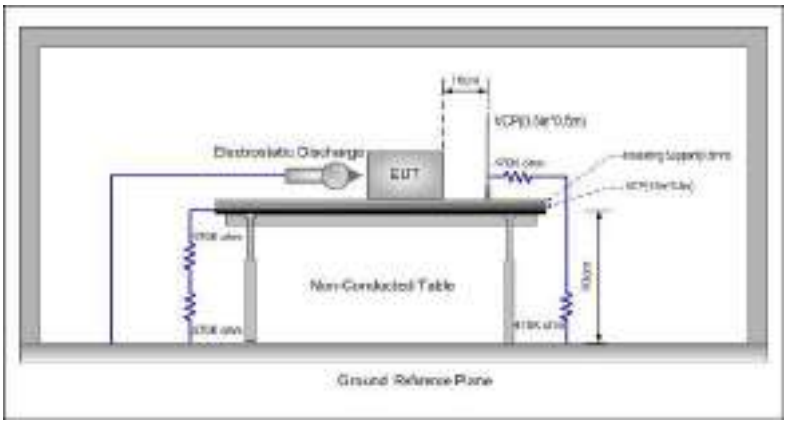
	EUT values	Limit	Result
Pst	0.038	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.056	4.00	PASS
dt [s]	0.000	0.50	PASS

8 Immunity Test Results

8.1 Performance Criteria Description of EN 61547

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.

8.2 Electrostatic Discharge

Test Requirement:	EN 61547
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: ±4kV Air Discharge: ±8kV HCP/VCP: ±4kV
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Performance Criterion:	B
Test setup:	
Test Procedure:	1. Air discharge: The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed 2. Contact Discharge: The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. 3. Indirect discharge for horizontal coupling plane At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. Consideration should be given to exposing all sides of the EUT.

	4. Indirect discharge for vertical coupling plane At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.		
Test environment:	Temp.: 24 °C	Humid.: 51%	Press.: 1012mbar
Test mode:	Refer to section 5.3 for detail		
Test Instruments:	Refer to section 6 for details		
Test results:	Pass		

Measurement Record:

Test points:	I: Screw, Metal shell
	II: N/A

Direct discharge

Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observations (Performance Criterion)**	**Result**
± 4	Contact	I	A	Pass
± 8	Air	II	N/A	N/A

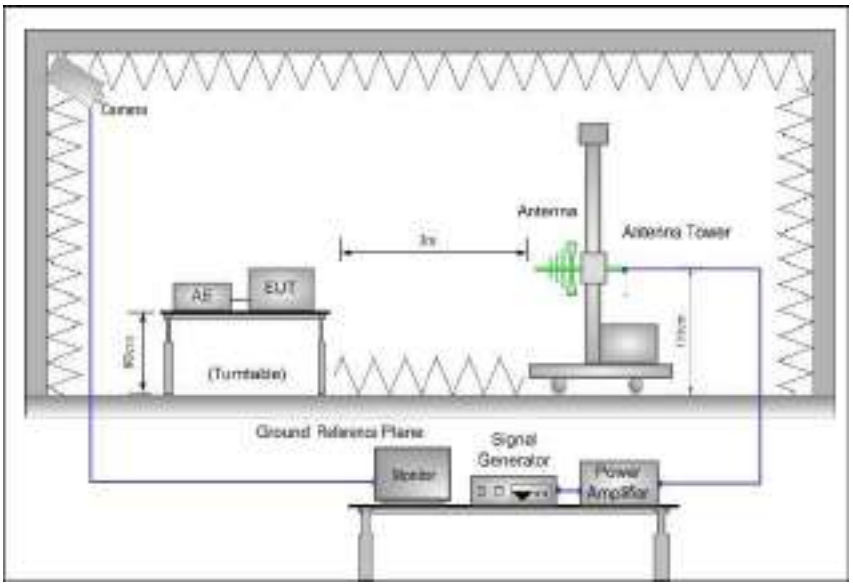
Indirect discharge

Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

Performance Criteria: A, B, C: Refer to section 8.1 for details

8.3 Radiated Immunity

Test Requirement:	EN 61547
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	A
Test setup:	
Test Procedure:	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 0,5 s. 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 and/or a audio monitor were used to monitor the performance of the EUT.		
Test environment:	Temp.: 25 °C	Humid.: 52%	Press.: 1012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

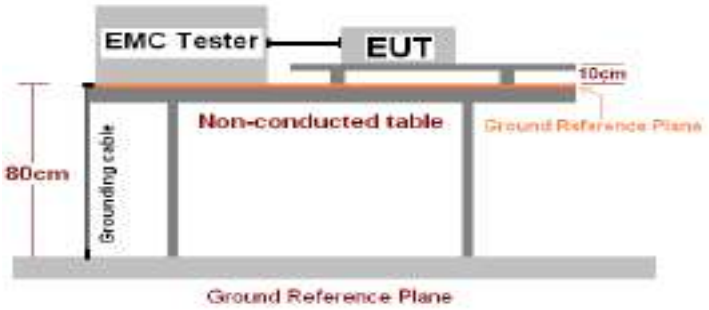
Measurement Record:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	**Observations** (Performance Criterion)
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

Remarks:

Performance Criteria: A, B, C: Refer to section 8.1 for details

8.4 Electrical fast transients

Test Requirement:	EN 61547		
Test Method:	EN 61000-4-4		
Test Level:	1.0kV on AC port		
Polarity:	Positive & Negative		
Repetition Frequency:	5kHz		
Burst Duration:	15ms		
Burst Period:	300ms		
Test Duration:	2 minute per level & polarity		
Performance Criterion:	B		
Test setup:			
Test Procedure:	1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. 2. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 3. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. 4. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. 5. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes. 6. The length of the signal and power lines between the coupling device and the EUT is 0.5m		
Test environment:	Temp.: 26 °C	Humid.: 54%	Press.: 1012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

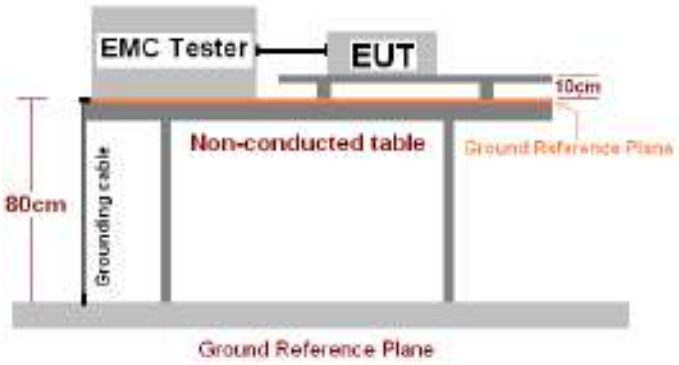
Measurement Record:

Lead under Test	Level (±kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass
L-PE	± 1.0	Direct	A	Pass
L-PE	± 1.0	Direct	A	Pass
L-N-PE	± 1.0	Direct	A	Pass

Remarks:

Performance Criteria: A, B, C: Refer to section 8.1 for details

8.5 Surges

<table>
<tr><td>Test Requirement:</td><td colspan="4">EN 61547</td></tr>
<tr><td>Test Method:</td><td colspan="4">EN 61000-4-5</td></tr>
<tr><td>Test Level:</td><td colspan="4">
<table>
<tr><td rowspan="2">Characteristics</td><td colspan="3">Test Levels</td></tr>
<tr><td rowspan="2">Self-ballasted lamps and semi-luminaires</td><td colspan="2">Luminaires and independent auxiliaries</td></tr>
<tr><td>≤25W</td><td>>25W</td></tr>
<tr><td>Line to line</td><td>±0.5kV</td><td>±0.5kV</td><td>±1.0kV</td></tr>
<tr><td>Line to ground</td><td>±1.0kV</td><td>±1.0kV</td><td>±2.0kV</td></tr>
</table>
Note: In addition to the specified test level, all lower test levels as detailed in IEC 61000-4-5 should also be satisfed.
</td></tr>
<tr><td>Polarity:</td><td colspan="4">Positive & Negative</td></tr>
<tr><td>Generator source impedance:</td><td colspan="4">2Ω (line-line coupling)</td></tr>
<tr><td>No. of surges:</td><td colspan="4">5 positive at 90°, 5 negative at 270°</td></tr>
<tr><td>Performance Criterion:</td><td colspan="4">C</td></tr>
<tr><td>Test setup:</td><td colspan="4"> 
</td></tr>
<tr><td>Test procedure</td><td colspan="4">1. For line-to-line coupling mode, provide a 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground.
2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
3. Different phase angles are done individually.
4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.</td></tr>
<tr><td>Test environment:</td><td>Temp.: 26 °C</td><td>Humid.: 53%</td><td colspan="2">Press.: 1012mbar</td></tr>
<tr><td>Test Instruments:</td><td colspan="4">Refer to section 6 for details</td></tr>
<tr><td>Test mode:</td><td colspan="4">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="4">Pass</td></tr>
</table>

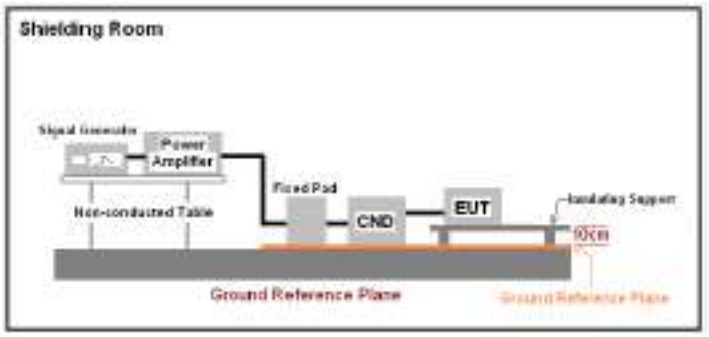
Measurement Record:

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	+1	5	60s	90°	A	Pass
	-1			270°		
L-PE	+2	5	60s	90°	A	Pass
	-2			270°		
N-PE	+2	5	60s	90°	A	Pass
	-2			270°		

Remarks:

Performance Criteria: A, B, C: Refer to section 8.1 for details

8.6 Conducted Immunity

Test Requirement:	EN 61547		
Test Method:	EN 61000-4-6		
Frequency range:	0.15MHz to 80MHz		
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)		
Modulation:	80%, 1kHz Amplitude Modulation		
Performance Criterion:	A		
Test setup:			
Test Procedure:	1. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 2. The disturbance signal described below is injected to EUT through CDN. 3. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 4. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.		
Test environment:	Temp.: 24 °C	Humid.: 51%	Press.: 1012mbar
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

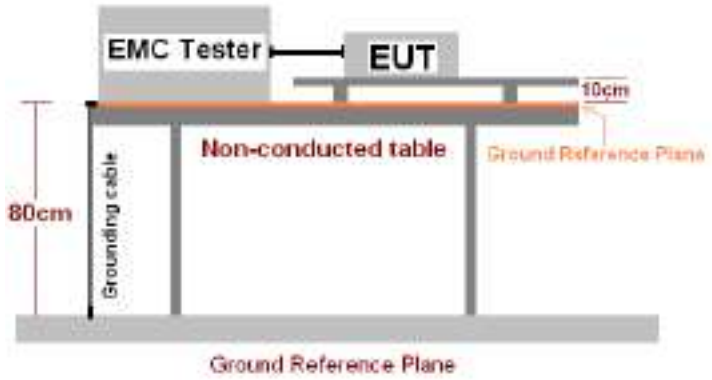
Measurement Record:

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	AC Mains	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=2seconds	A	Pass

Remark:

Performance Criteria: A, B, C: Refer to section 8.1 for details

8.7 Voltage Dips and Interruptions

Test Requirement:	EN 61547					
Test Method:	EN 61000-4-11					
Test Level:	0% of U_T (Supply Voltage) for 0.5 Periods 70 % of U_T (Supply Voltage) for 10 Periods					
No. of Dips / Interruptions:	3 per Level					
Performance Criterion:	100% VD ----Performance criterion: B 30% VD ----Performance criterion: C					
Test setup:						
Test Procedure:	1. The EUT and test generator were setup as shown on above setup photo. 2. The interruptions are introduced at selected phase angles with specified duration. 3. Record any degradation of performance.					
Test environment:	Temp.:	26 °C	Humid.:	53%	Press.:	1 012mbar
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

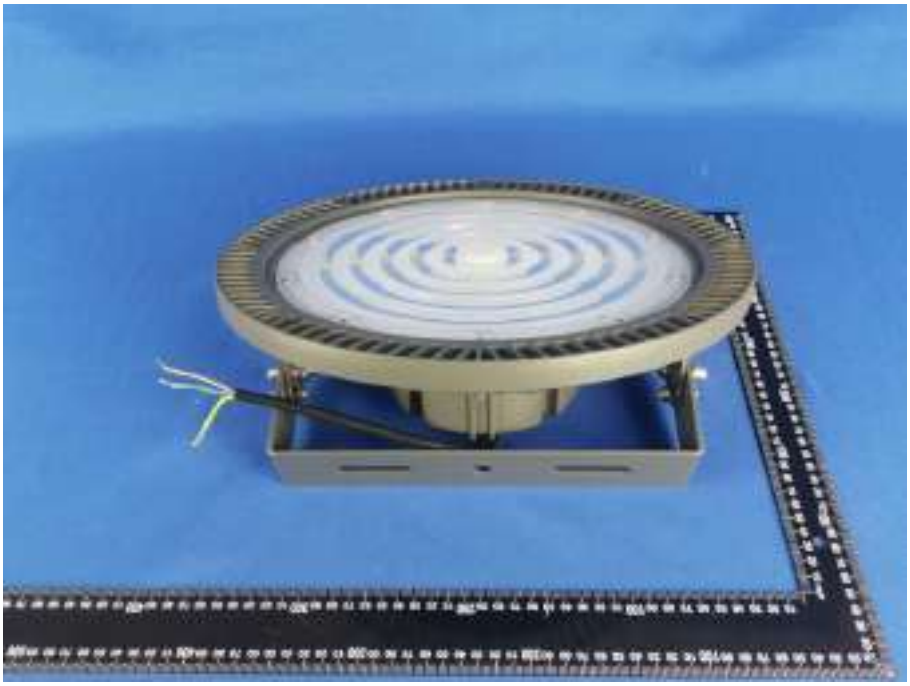
Measurement Record:

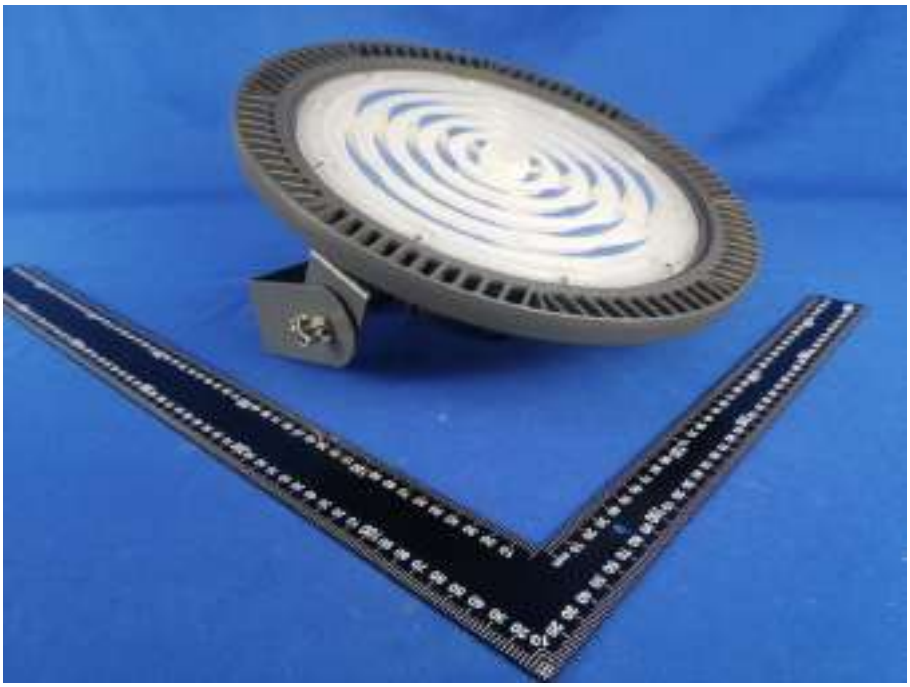
Test Level % UT	Duration (Periods)	Phase angle	No. of drop out	Time between dropout	Observations (Performance Criterion)	Result
0	0.5	0°,90°,180°,270°	3	10s	A	Pass
70	10	0°,90°,180°,270°	3	10s	B	Pass

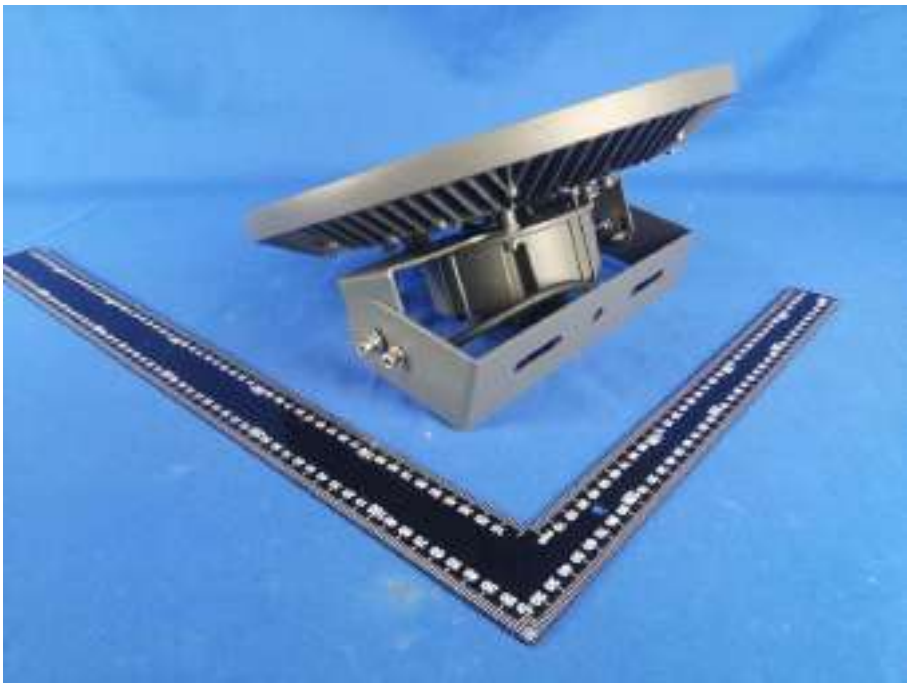
Remark:

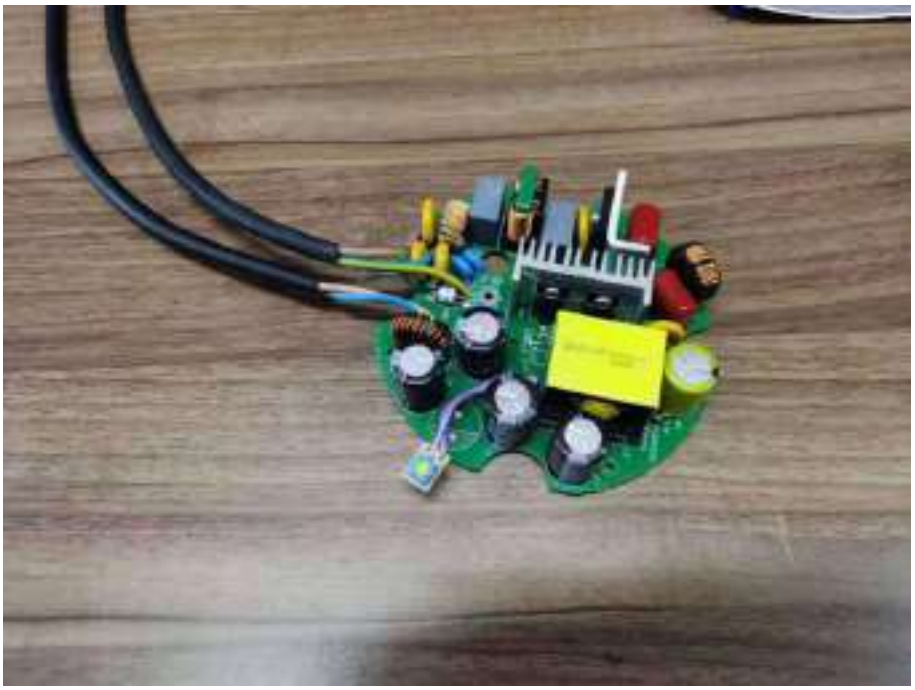
Performance Criteria: A, B, C: Refer to section 8.1 for details

9 EUT Constructional Details









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