



# EMC Test Report

Report No.: HB-079E-0345/16

**Product** : Flow Table Lamp , Stage Floor Lamp  
Momento Table Lamp , Acrobat lamp

**Model/Type** : See model list

**Brand Name** : Normann Copenhagen

**Applicant** : Normann Copenhagen Aps

**Application No.** : 2016102802

**Date of Test** : Nov. 09 to 10, 2016

**Date of Issue** : 24 Nov, 2016

**Standards** : EN 55015:2013  
EN 61000-3-2:2014  
EN 61000-3-3:2013  
EN 61547:2009  
EN 62493:2010

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## 1- GENERAL INFORMATION

### 1.1 Test Summary

Table 1:

Standard	Test Items	Status	Result
EN 55015	Disturbance Voltage at Mains Terminals (9kHz to 30MHz)	<input checked="" type="checkbox"/>	Pass
	Radiated Electromagnetic Disturbance (9kHz to 30MHz)	<input checked="" type="checkbox"/>	Pass
	Radiated Disturbances (30MHz to 300MHz)	<input checked="" type="checkbox"/>	Pass

Note: ☒ Indicates that the test is applicable, ☐ Indicates that the test is not applicable

Table 2:

Standard	Test Items	Status	Result
EN 62493	Disturbance Voltage at Mains Terminals (20kHz to 30MHz)	<input checked="" type="checkbox"/>	Pass
	Radiated Electromagnetic Disturbance (10kHz to 30MHz)	<input checked="" type="checkbox"/>	Pass
	Radiated Disturbances (30MHz to 300MHz)	<input checked="" type="checkbox"/>	Pass
	Induced Current Density	<input checked="" type="checkbox"/>	Pass

Note: ☒ Indicates that the test is applicable, ☐ Indicates that the test is not applicable

Table 3:

Standard	Test Items	Status	Result
EN 61000-3-2	Harmonic Current Test	<input checked="" type="checkbox"/>	Pass
EN 61000-3-3	Voltage Fluctuations and Flicker Test	<input checked="" type="checkbox"/>	Pass

Note: ☒ Indicates that the test is applicable, ☐ Indicates that the test is not applicable

Table 4

Standard	Test Items	Status	Result
EN 61547:	Test items as below listed	<input checked="" type="checkbox"/>	Pass
EN 61000-4-2	Electrostatic discharge Immunity	<input checked="" type="checkbox"/>	Pass
EN 61000-4-3	Radiated Susceptibility (80MHz to 1GHz)	<input checked="" type="checkbox"/>	Pass
EN 61000-4-4	Electrical Fast Transient/Burst Immunity	<input checked="" type="checkbox"/>	Pass
EN 61000-4-5	Surge Immunity	<input checked="" type="checkbox"/>	Pass
EN 61000-4-6	Conducted Susceptibility (150kHz to 80MHz)	<input checked="" type="checkbox"/>	Pass
EN 61000-4-8	Power Frequency Magnetic Field Immunity (50/60Hz)	<input checked="" type="checkbox"/>	Pass
EN 61000-4-11	Voltage Dips, Short Interruptions Immunity	<input checked="" type="checkbox"/>	Pass

Note: ☒ Indicates that the test is applicable, ☐ Indicates that the test is not applicable

Tested By: Chun Liu /

Date: 24 Nov, 2016

Checked By: Lechun Guan /

Date: 24 Nov, 2016

Approved By: Zhaofu Peng /

Date: 24 Nov, 2016



## 1.2 Product Description for Equipment under Test (EUT)

### Client Information

Applicant: Normann Copenhagen Aps  
Address of applicant: Østerbrogade 70, 2100 Copenhagen, Denmark

### General Description of E.U.T

EUT Name: LED portable luminaire  
Trade Mark: NORMANN COPENHAGEN  
EUT Model No.: 505055, 505075, 502124  
Supplementary Models: 505053, 505054, 505062, 505063, 505064, 505065, 505074, 505076, 505077, 502122, 502123, 502125  
Power Supply: ☒ 220-240V~, 50/60Hz  
☐ Power by AC/DC adaptor

### Remark:

1. The products are class III LED portable luminaires, IP20, for indoor used only.
2. All models have similar construction, only difference with appearance, power and model of LED driver. There are 3 types of LED driver according to different circuit diagram and PCB layout.
3. Full tests were performed on 502124, 505055 and 505075. The test data gathered are from the production sample provided by the manufacturer.

### Model list:

No.	Model	Power	LED driver	PCB of LED driver	Remark
1	505053	7W	HSP7-25V350I	1	Table lamp
2	505054				
3	505055				
4	505062	7W			
5	505063				
6	505064				
7	505065				
8	505074	13W	HSP18-26V700I	2	Floor lamp
9	505075				
10	505076				
11	505077				
12	502122	8W	HSP12-12V	3	Table lamp
13	502123				
14	502124				
15	502125				

### 1.3 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

EN 55015:2013

EN 61000-3-2:2014

EN 61000-3-3:2013

EN 61547:2009

EN 62493:2010

The objective of the manufacturer is to demonstrate compliance with the described standards above.

### 1.4 Test Methodology

All measurements contained in this report were conducted with CISPR 16-1-1: 2006, Radio disturbance and immunity measuring apparatus – Measuring apparatus, and CISPR 16-2-3: 2010, Method of measurement of disturbances and immunity.

## 2- SYSTEM TEST CONFIGURATION

### 2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

### 2.2 Equipment Modifications

The EUT tested was not modified by LTS.

### 2.3 Basic Configuration of Test System

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

Immunity: The equipment under test (EUT) was configured to the representative operating mode and conditions.



EUT

### 2.4 General Description of Test Auxiliary

None

EUT Description:	Manufacturer	Model No.	Certificate
/	/	/	/

## 3- DISTURBANCE VOLTAGE AT MAINS TERMINALS

### 3.1 Measurement Uncertainty

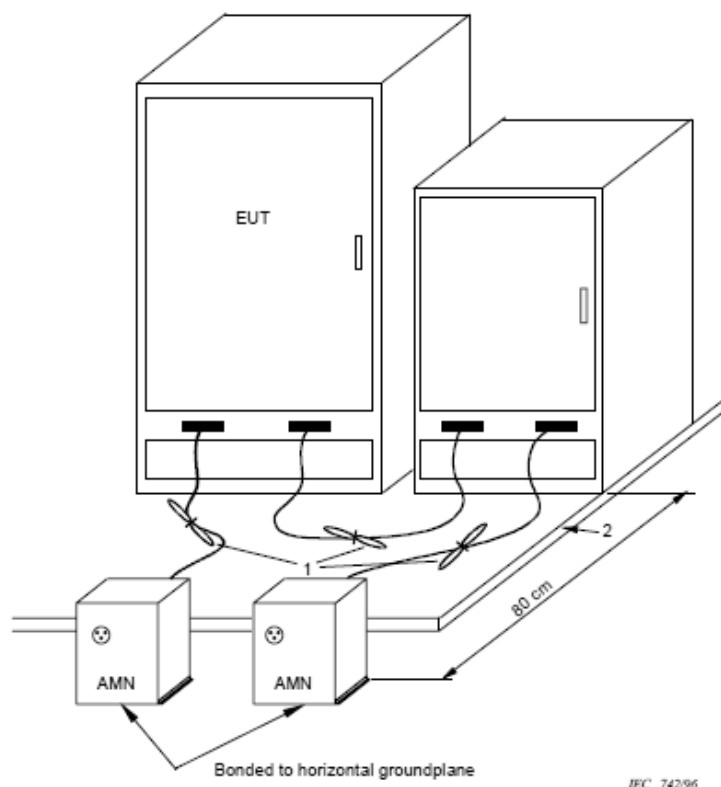
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN. The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 2.9 dB.

### 3.2 Limit of Disturbance Voltage at Mains Terminals

Frequency Range (MHz)	Quasi-Peak (dB $\mu$ V)	Average (dB $\mu$ V)
9kHz ~ 50kHz	110	-----
50kHz ~ 150kHz	90 ~ 80*	-----
150kHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 5.0MHz	56	46
5.0MHz ~ 30MHz	60	50

NOTE 1: The tighter limit shall apply at the edge between two frequency bands.  
 NOTE 2: The limits decrease linearly with the logarithm of the frequency in the range 50kHz to 150 kHz and 150 kHz to 0.5 MHz.

### 3.3 EUT Setup



The setup of EUT is according with CISPR 16-1-1: 2006, CISPR 16-2-3: 2010 measurement procedure. The specification used was the EN 55015 limits.


The EUT was placed center and the back edge of the test plate.

The cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

### 3.4 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver			100943	2015-12-16	2016-12-15
L.I.S.N.			101047	2015-12-16	2016-12-15
RF Cable			/	2015-12-16	2016-12-15

### 3.5 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range..... 9 kHz to 30 MHz  
 Detector.....Peak & Quasi-Peak & Average  
 Sweep Speed..... Auto  
 IF Band Width.....200Hz / 9kHz

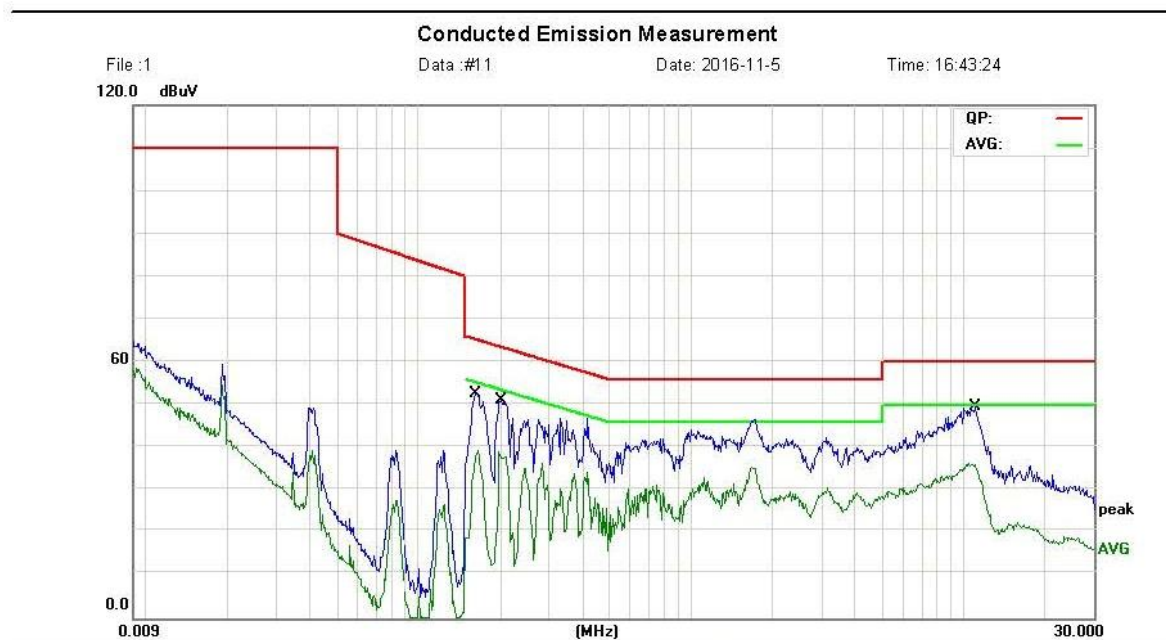
### 3.6 Test Procedure

1. During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.
3. All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB $\mu$ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AVG".

### 3.7 Test Data

Temperature:	22~25 ( $\varnothing$ )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Date of Test:	09 Nov, 2016
Test Result:	Pass

Model/Type 505055  
Comment: Live Line  
Level dBμV  
Peak & Average Scan



Site EMC Testing Room

Phase: L1

Temperature: 23

Limit: (CE)EN55015\_QP

Power: AC 230V/50Hz

Humidity: 46 %

EUT:

MN: 505055

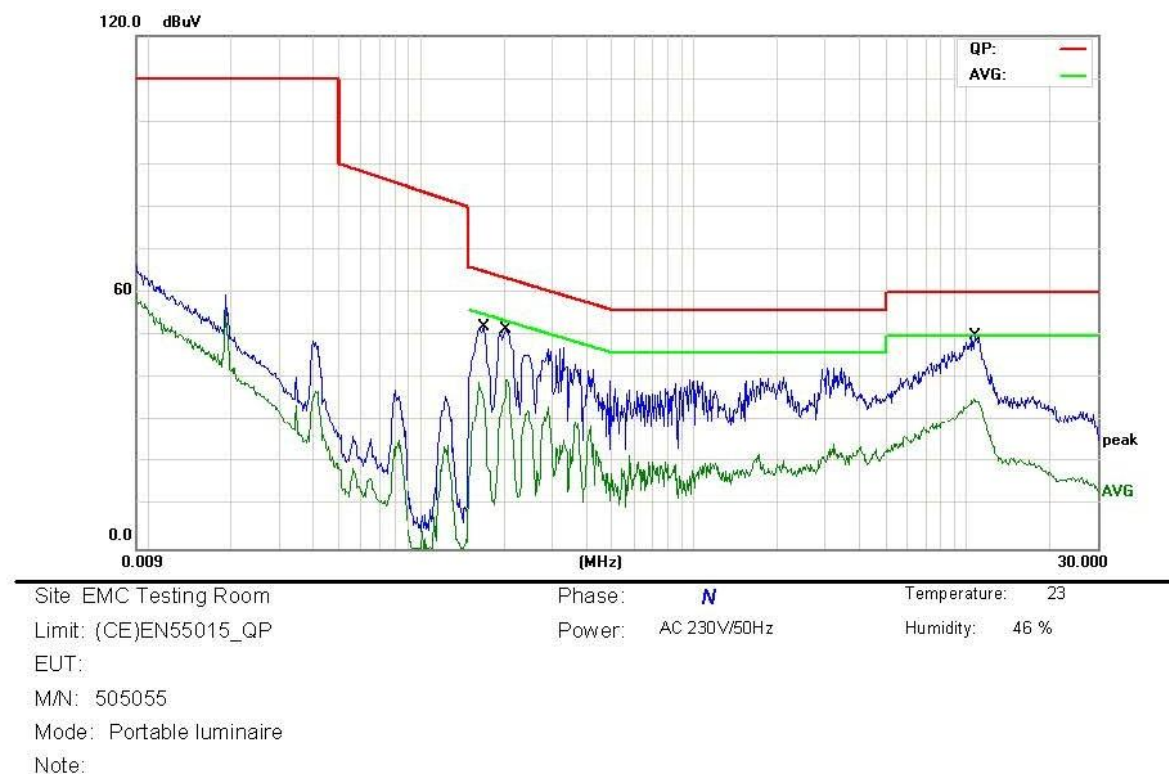
Mode: Portable luminaire

Note:

No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1	*	0.1620	41.21	9.54	50.75	65.36	-14.61	QP	
2		0.1620	29.00	9.54	38.54	55.36	-16.82	AVG	
3		0.2020	38.81	9.65	48.46	63.52	-15.06	QP	
4		0.2020	27.31	9.65	36.96	53.52	-16.56	AVG	
5		11.0780	31.39	9.83	41.22	60.00	-18.78	QP	
6		11.0780	24.57	9.83	34.40	50.00	-15.60	AVG	

Remark: data mark with "\*" comes nearest to limit.

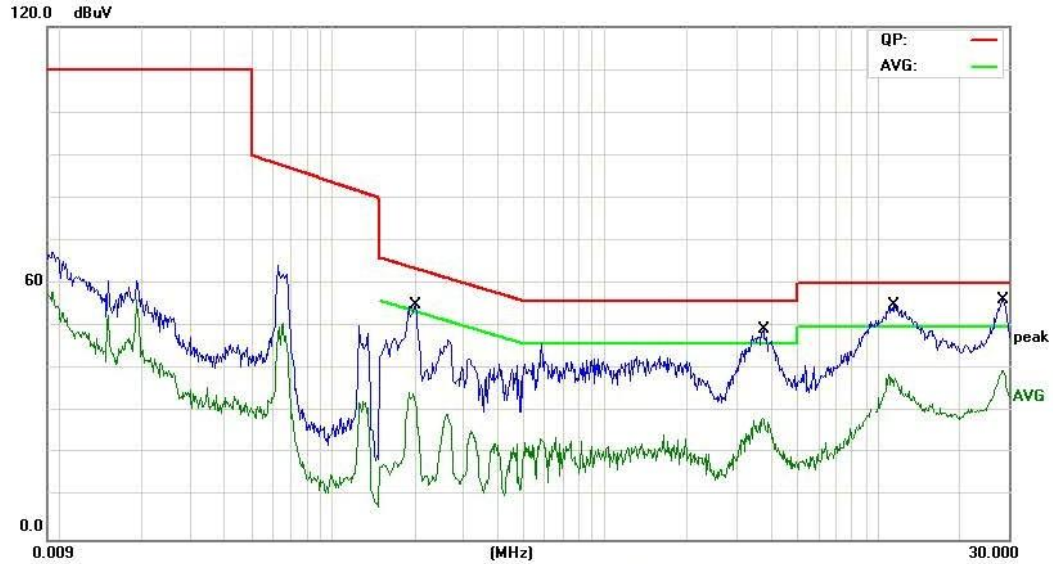
Model/Type 505055  
Comment: Neutral Line  
Level dBμV  
Peak & Average Scan



No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.1700	39.18	9.57	48.75	64.96	-16.21	QP	
2		0.1700	22.98	9.57	32.55	54.96	-22.41	AVG	
3	*	0.2060	39.49	9.65	49.14	63.36	-14.22	QP	
4		0.2060	27.77	9.65	37.42	53.36	-15.94	AVG	
5		10.6860	31.80	9.82	41.62	60.00	-18.38	QP	
6		10.6860	23.91	9.82	33.73	50.00	-16.27	AVG	

Remark: data mark with “\*” comes nearest to limit.

Model/Type 505075  
Comment: Live Line  
Level dB $\mu$ V  
Peak & Average Scan



Site: EMC Testing Room

Phase: L1

Temperature: 23

Limit: (CE)EN55015\_QP

Power: AC 230V/50Hz

Humidity: 46 %

EUT:

MN: 505075

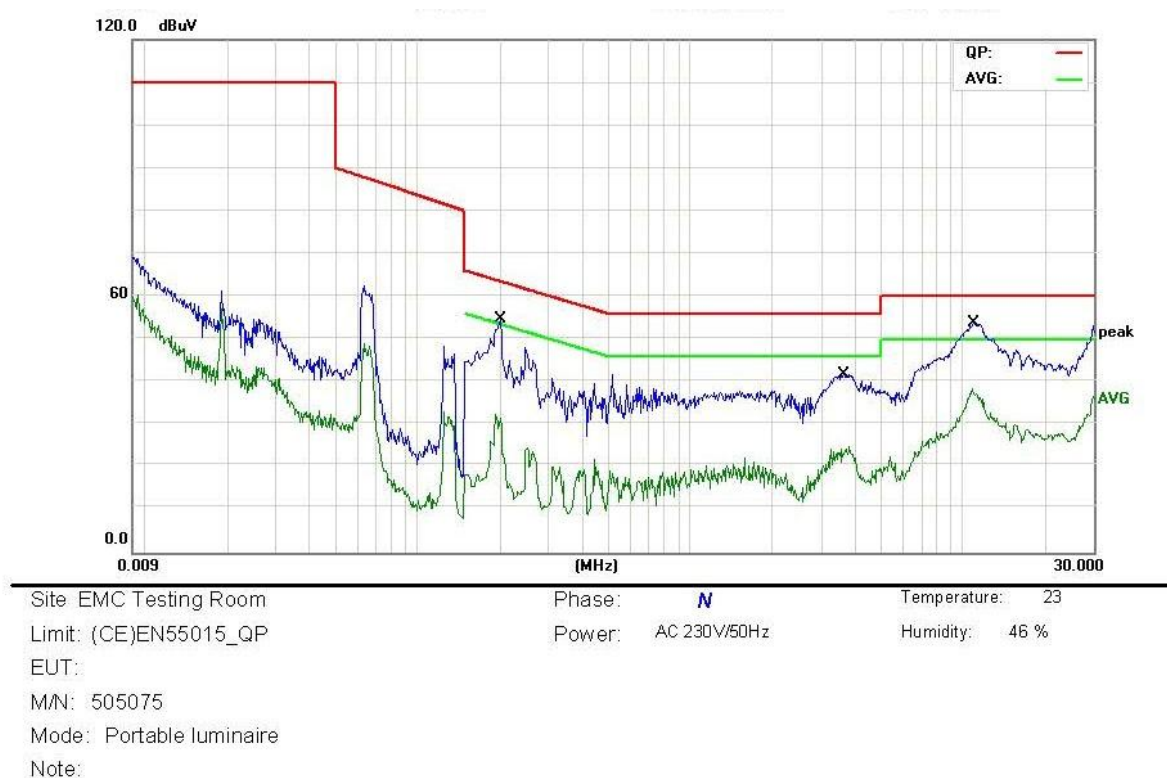
Mode: Portable luminaire

Note:

No.	Mk.	Freq. MHz	Reading Level dB $\mu$ V	Correct Factor dB	Measure- ment dB $\mu$ V	Limit dB $\mu$ V	Over dB	Detector	Comment
1		0.2020	40.05	9.65	49.70	63.52	-13.82	QP	
2		0.2020	20.97	9.65	30.62	53.52	-22.90	AVG	
3		3.7700	32.08	9.72	41.80	56.00	-14.20	QP	
4		3.7700	14.61	9.72	24.33	46.00	-21.67	AVG	
5	*	11.3860	39.80	9.83	49.63	60.00	-10.37	QP	
6		11.3860	25.81	9.83	35.64	50.00	-14.36	AVG	
7		28.5980	37.90	10.01	47.91	60.00	-12.09	QP	
8		28.5980	26.84	10.01	36.85	50.00	-13.15	AVG	

Remark: data mark with "\*" comes nearest to limit.

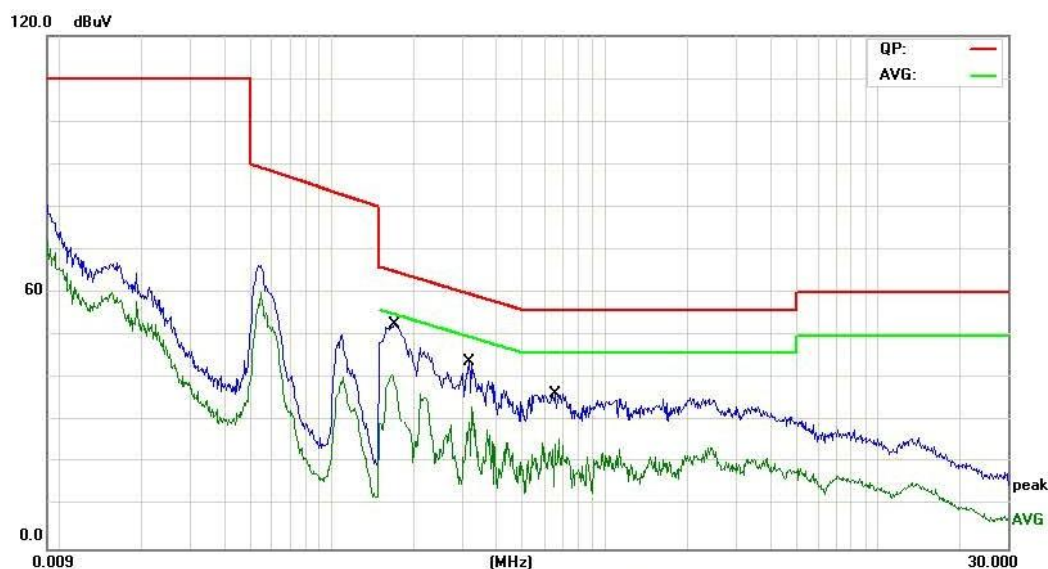
Model/Type 505075  
Comment: Neutral Line  
Level dBμV  
Peak & Average Scan



No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.2020	40.06	9.65	49.71	63.52	-13.81	QP	
2		0.2020	18.99	9.65	28.64	53.52	-24.88	AVG	
3		3.6180	27.56	9.72	37.28	56.00	-18.72	QP	
4		3.6180	11.15	9.72	20.87	46.00	-25.13	AVG	
5	*	10.9260	39.93	9.82	49.75	60.00	-10.25	QP	
6		10.9260	26.87	9.82	36.69	50.00	-13.31	AVG	

Remark: data mark with "\*" comes nearest to limit.

Model/Type 502124  
Comment: Live Line  
Level dBμV  
Peak & Average Scan



Site EMC Testing Room

Phase: L1

Temperature: 23

Limit: (CE)EN55015\_QP

Power: AC 230V/50Hz

Humidity: 46 %

EUT:

MN: 502124

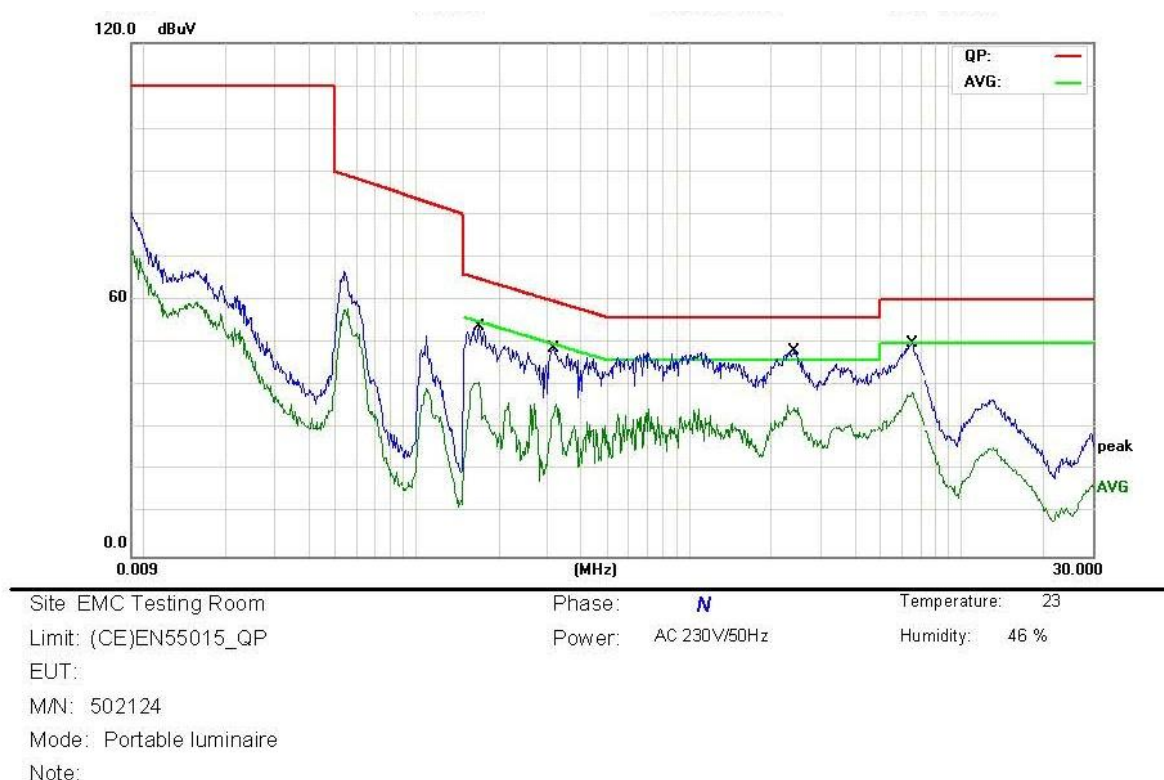
Mode: Portable luminaire

Note:

No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1	*	0.1700	40.96	9.57	50.53	64.96	-14.43	QP	
2		0.1700	27.96	9.57	37.53	54.96	-17.43	AVG	
3		0.3180	31.41	9.65	41.06	59.76	-18.70	QP	
4		0.3180	18.62	9.65	28.27	49.76	-21.49	AVG	
5		0.6540	24.56	9.66	34.22	56.00	-21.78	QP	
6		0.6540	12.38	9.66	22.04	46.00	-23.96	AVG	

Remark: data mark with “\*” comes nearest to limit.

Model/Type 502124  
Comment: Neutral Line  
Level dBμV  
Peak & Average Scan



No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.1700	41.68	9.57	51.25	64.96	-13.71	QP	
2		0.1700	28.13	9.57	37.70	54.96	-17.26	AVG	
3		0.3180	37.08	9.65	46.73	59.76	-13.03	QP	
4		0.3180	24.22	9.65	33.87	49.76	-15.89	AVG	
5	*	2.4140	34.86	9.70	44.56	56.00	-11.44	QP	
6		2.4140	23.98	9.70	33.68	46.00	-12.32	AVG	
7		6.4820	35.38	9.76	45.14	60.00	-14.86	QP	
8		6.4820	27.73	9.76	37.49	50.00	-12.51	AVG	

Remark: data mark with “\*” comes nearest to limit.

## 4- RADIATED ELECTROMEGNETIC DISTURBANCE

### 4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, measurement distance variation, site imperfections, mismatch (average), and system repeatability. The treatment of uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is  $\pm 3.6\text{dB}$ .

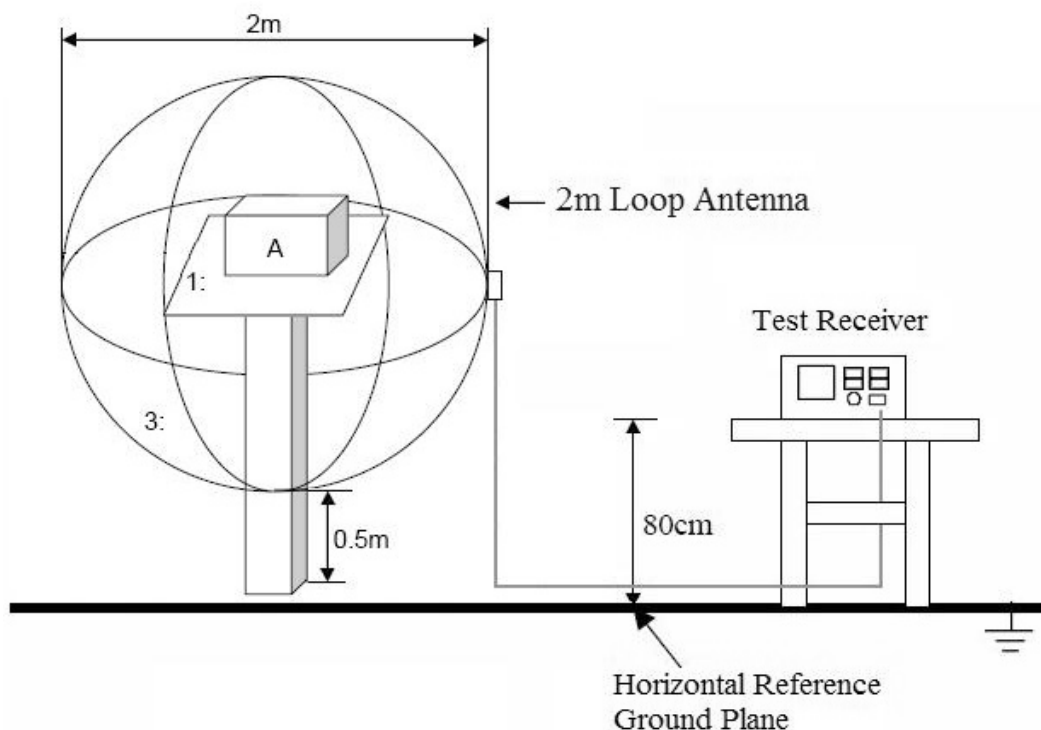
### 4.2 Limit of Radiated Electromagnetic Disturbance

Frequency Range	Limits Frequency for loop diameter (dB $\mu\text{A}$ )
	2m
9kHz ~ 70kHz	88
70kHz ~ 150kHz	88 ~ 58*
150kHz ~ 3.0MHz	58 ~ 26*
3.0MHz ~ 30MHz	22

NOTE 1: The tighter limit shall apply at the edge between two frequency bands.

NOTE 2: Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

### 4.3 EUT Setup



#### 4.4 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
2m Loop Antenna	SCHWARZBECK	HXYZ-9170	N/A	2015-12-16	2016-12-15
EMI Test Receiver	R & S	ESCI	100943	2015-12-16	2016-12-15
RF Cable	HUBER+SUHNER	RG 223/U	/	2015-12-16	2016-12-15

#### 4.5 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....9 kHz to 30 MHz  
 Detector.....Peak & Quasi-Peak & Average  
 Sweep Speed.....Auto  
 IF Band Width.....200Hz / 9kHz

#### 4.6 Test Procedure

1. The EUT is placed on a wood table in the center of a loop antenna and the onerous position is considered. The induced current in the loop antenna is measured by means of a current probe and the test receiver. Three field components are checked by means of a coaxial switch.
2. The frequency range from 9 kHz to 30MHz is investigated. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.
3. All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -10 dB $\mu$ V of specification limits). Quasi-peak readings are distinguished with a "QP".

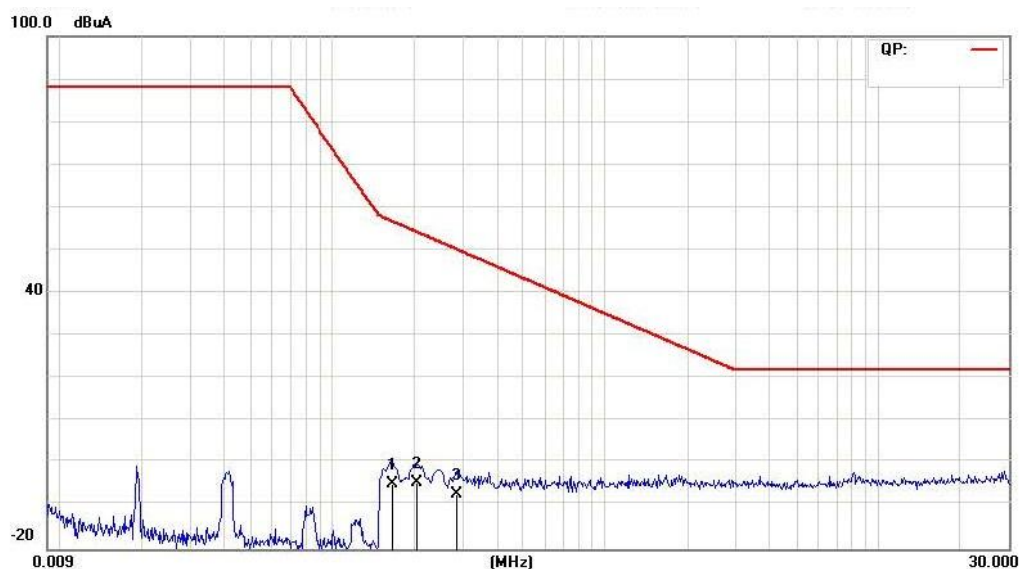
#### 4.7 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:  
 Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor

#### 4.8 Test Data

Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	09 Nov, 2016
Test Result:	Pass

Model/Type 505055  
 Comment: Polarization: X  
 Level dBμA  
 Peak Scan



Site EMC Testing Room

Phase: X

Temperature: 23

Limit: (RE) EN55015- QP

Power: AC 230V/50Hz

Humidity: 46 %

EUT:

MN: 505055

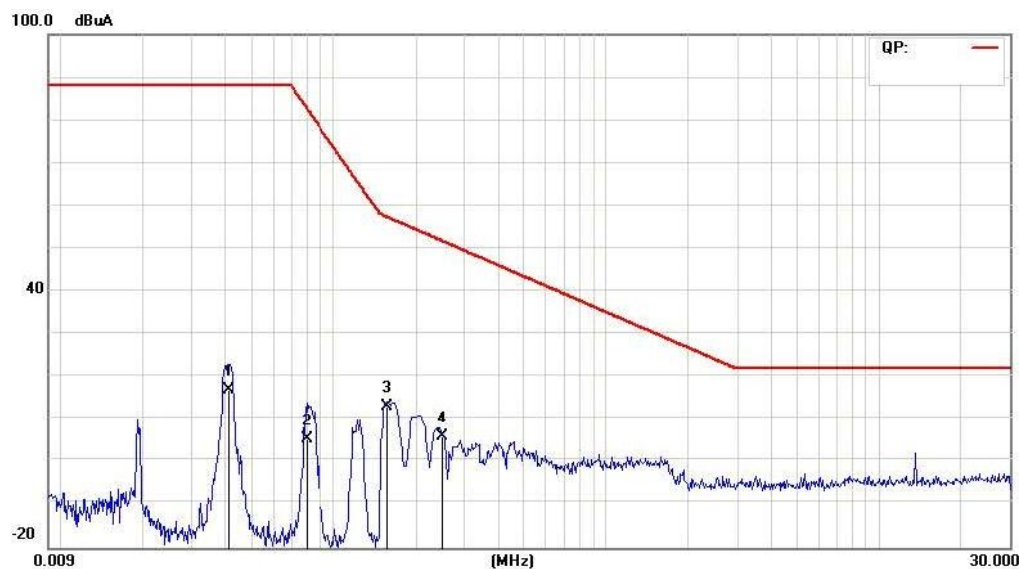
Mode: Portable luminaire

Note:

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.1660	-38.88	34.00	-4.88	56.77	-61.65	QP	
2		0.2060	-38.61	34.00	-4.61	54.18	-58.79	QP	
3	*	0.2860	-41.32	34.00	-7.32	50.24	-57.56	QP	

Remark: data mark with '\*' comes nearest to limit.

Model/Type 505055  
Comment: Polarization: Y  
Level dBμA  
Peak Scan

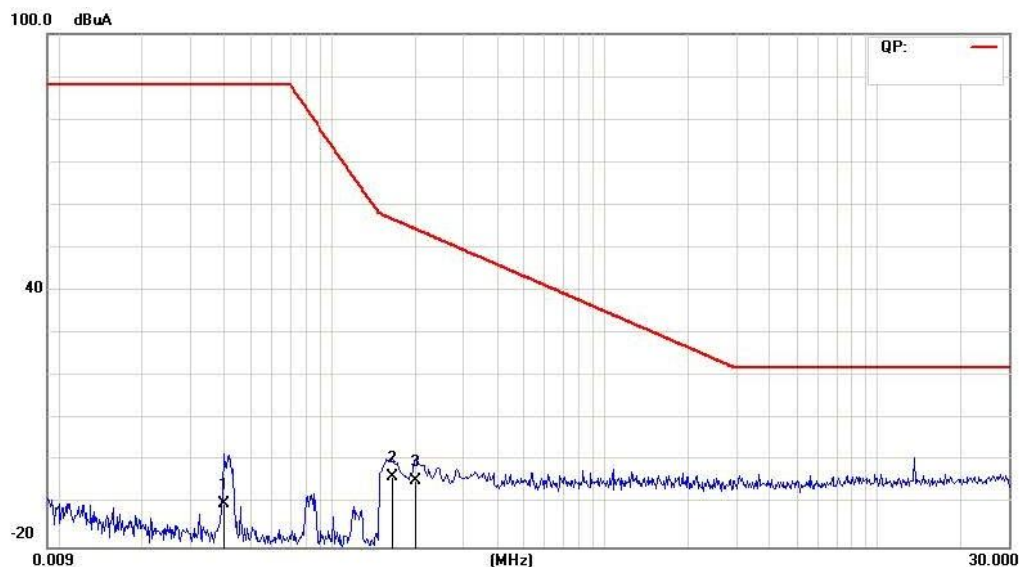


Site: EMC Testing Room Phase: Y Temperature: 23  
Limit: (RE) EN55015- QP Power: AC 230V/50Hz Humidity: 46 %  
EUT:  
MN: 505055  
Mode: Portable luminaire  
Note:

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0413	-16.89	34.00	17.11	88.00	-70.89	QP	
2		0.0798	-28.63	34.00	5.37	82.84	-77.47	QP	
3	*	0.1580	-20.93	34.00	13.07	57.37	-44.30	QP	
4		0.2504	-28.13	34.00	5.87	51.84	-45.97	QP	

Remark: data mark with "\*" comes nearest to limit.

Model/Type 505055  
 Comment: Polarization: Z  
 Level dBμA  
 Peak Scan



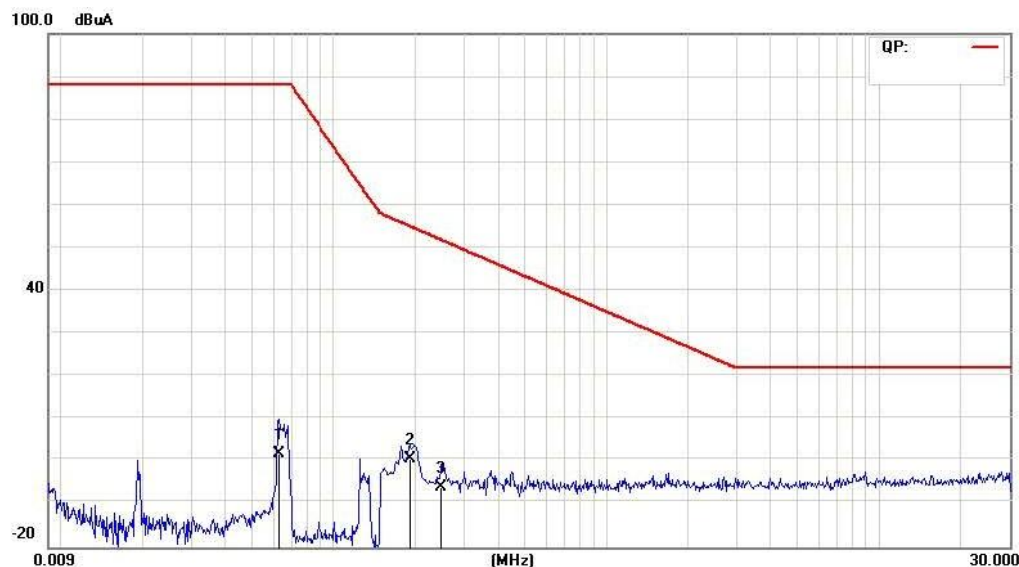
Site: EMC Testing Room  
 Limit: (RE) EN55015- QP  
 EUT:  
 MN: 505055  
 Mode: Portable luminaire  
 Note:

Phase: Z  
 Power: AC 230V/50Hz  
 Temperature: 23  
 Humidity: 46 %

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0400	-44.04	34.00	-10.04	88.00	-98.04	QP	
2		0.1660	-37.58	34.00	-3.58	56.77	-60.35	QP	
3	*	0.2020	-38.40	34.00	-4.40	54.42	-58.82	QP	

Remark: data mark with '\*' comes nearest to limit.

Model/Type 505075  
Comment: Polarization: X  
Level dBμA  
Peak Scan

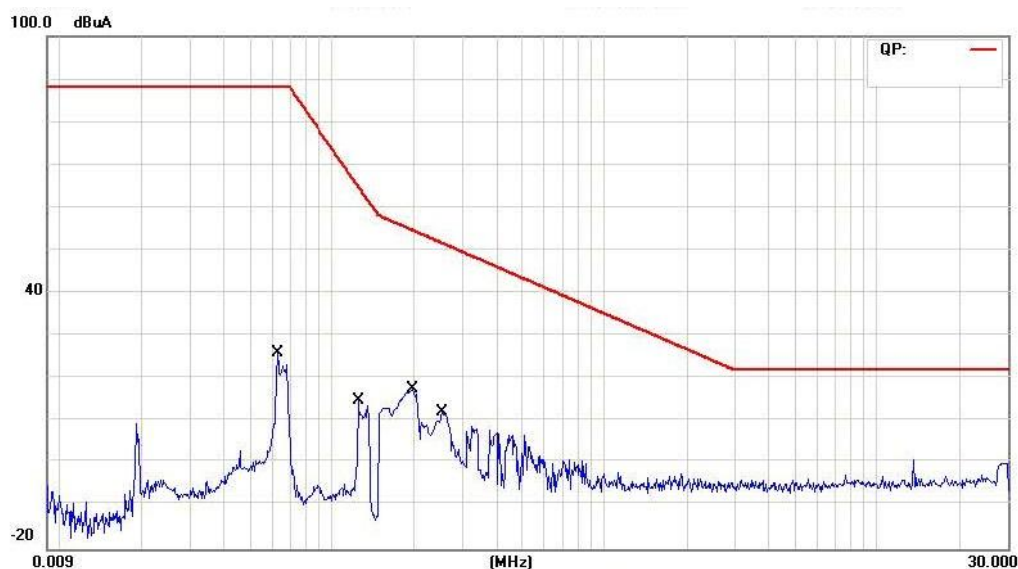


Site EMC Testing Room Phase: X Temperature: 23  
Limit: (RE) EN55015- QP Power: AC 230V/50Hz Humidity: 46 %  
EUT:  
MN: 505075  
Mode: Portable luminaire  
Note:

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0631	-32.19	34.00	1.81	88.00	-86.19	QP	
2	*	0.1900	-33.57	34.00	0.43	55.15	-54.72	QP	
3		0.2500	-40.11	34.00	-6.11	51.85	-57.96	QP	

Remark: data mark with “\*” comes nearest to limit.

Model/Type 505075  
Comment: Polarization: Y  
Level dBμA  
Peak Scan



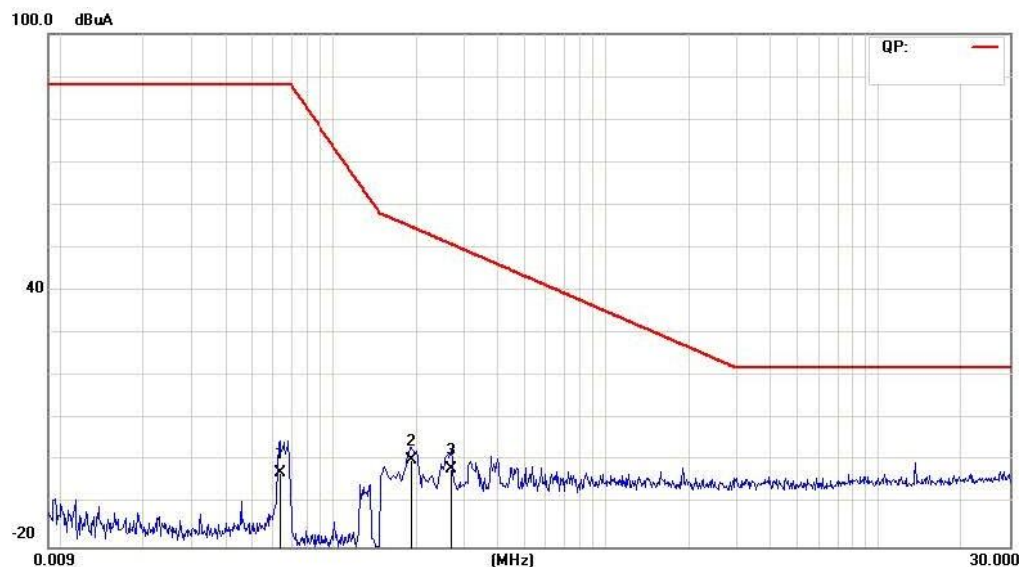
Site EMC Testing Room  
Limit: (RE) EN55015- QP  
EUT:  
MN: 505075  
Mode: Portable luminaire  
Note:

Phase: Y Temperature: 23  
Power: AC 230V/50Hz Humidity: 46 %

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0631	-17.02	34.00	16.98	88.00	-71.02	QP	
2		0.1256	-27.38	34.00	6.62	64.97	-58.35	QP	
3	*	0.1980	-17.90	34.00	16.10	54.66	-38.56	QP	
4		0.2540	-23.83	34.00	10.17	51.66	-41.49	QP	

Remark: data mark with "\*" comes nearest to limit.

Model/Type 242713  
Comment: Polarization: Z  
Level dBμA  
Peak Scan



Site: EMC Testing Room Phase: Z Temperature: 23  
Limit: (RE) EN55015- QP Power: AC 230V/50Hz Humidity: 46 %  
EUT:  
MN: 505075  
Mode: Portable luminaire  
Note:

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0636	-36.78	34.00	-2.78	88.00	-90.78	QP	
2		0.1940	-33.70	34.00	0.30	54.90	-54.60	QP	
3	*	0.2700	-35.98	34.00	-1.98	50.93	-52.91	QP	

Remark: data mark with '\*' comes nearest to limit.

Model/Type 502124  
Comment: Polarization: X  
Level dBμA  
Peak Scan



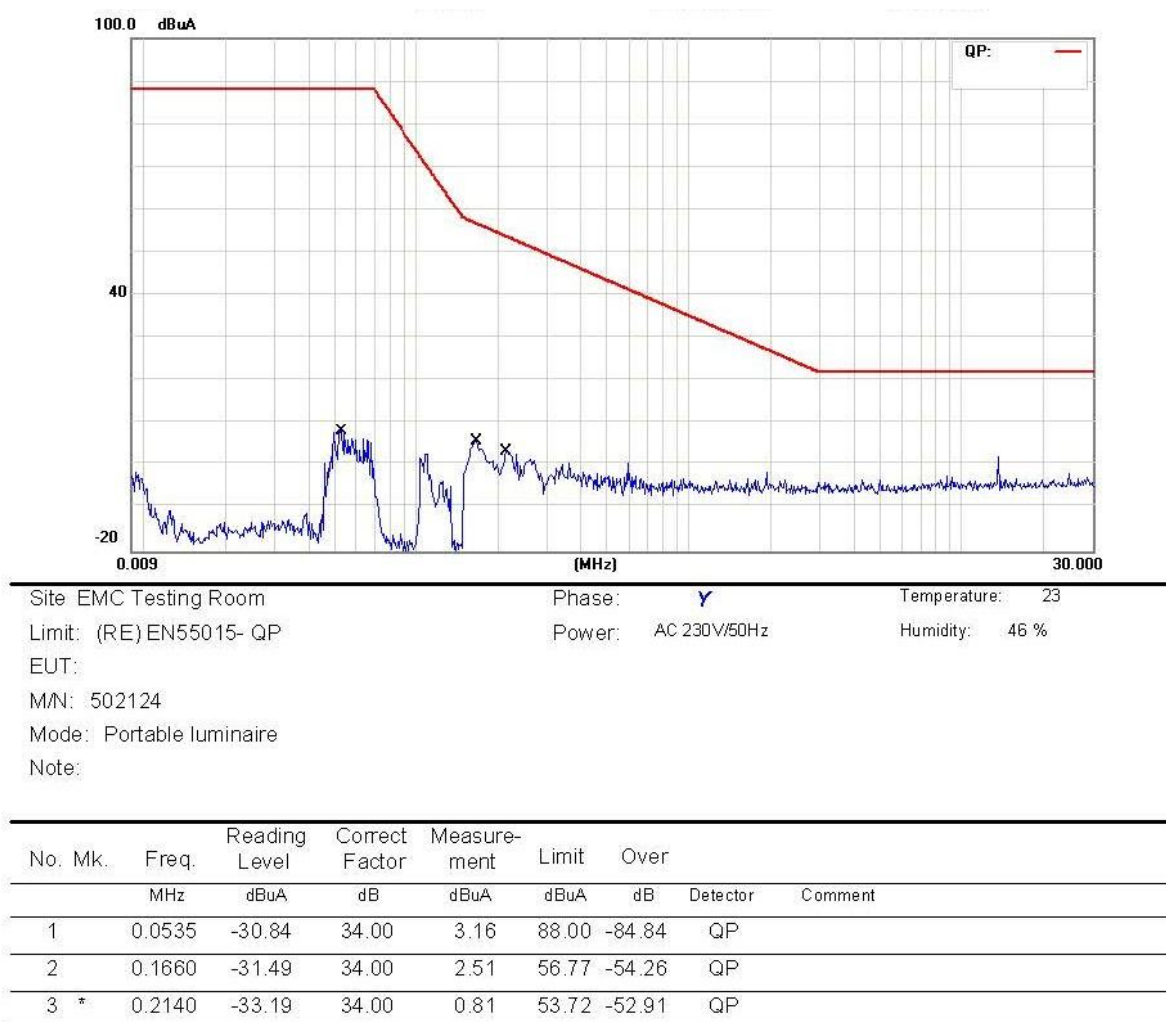
Site: EMC Testing Room  
Limit: (RE) EN55015- QP  
EUT:  
MN: 502124  
Mode: Portable luminaire  
Note:

Phase: X  
Power: AC 230V/50Hz  
Temperature: 23  
Humidity: 46 %

No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0554	-36.92	34.00	-2.92	88.00	-90.92	QP	
2		0.1580	-37.25	34.00	-3.25	57.37	-60.62	QP	
3	*	0.2140	-40.35	34.00	-6.35	53.72	-60.07	QP	

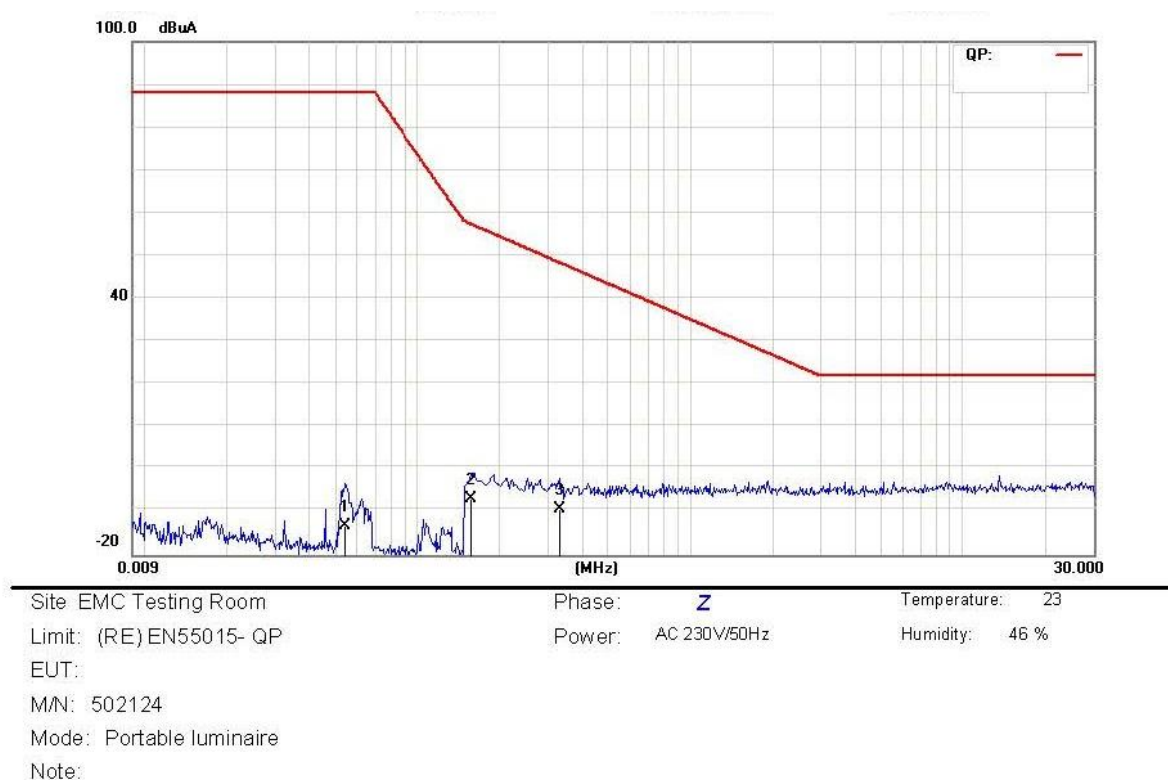
Remark: data mark with "\*" comes nearest to limit.

Model/Type 502124  
Comment: Polarization: Y  
Level dBμA  
Peak Scan



Remark: data mark with "\*" comes nearest to limit.

Model/Type 502124  
Comment: Polarization: Z  
Level dBμA  
Peak Scan



No.	Mk.	Freq. MHz	Reading Level dBμA	Correct Factor dB	Measure- ment dBμA	Limit dBμA	Over dB	Detector	Comment
1		0.0544	-47.18	34.00	-13.18	88.00	-101.18	QP	
2		0.1580	-40.90	34.00	-6.90	57.37	-64.27	QP	
3	*	0.3300	-43.22	34.00	-9.22	48.52	-57.74	QP	

Remark: data mark with “\*” comes nearest to limit.

## 5- RADIATED DISTURBANCES

### 5.1 Measurement Uncertainty

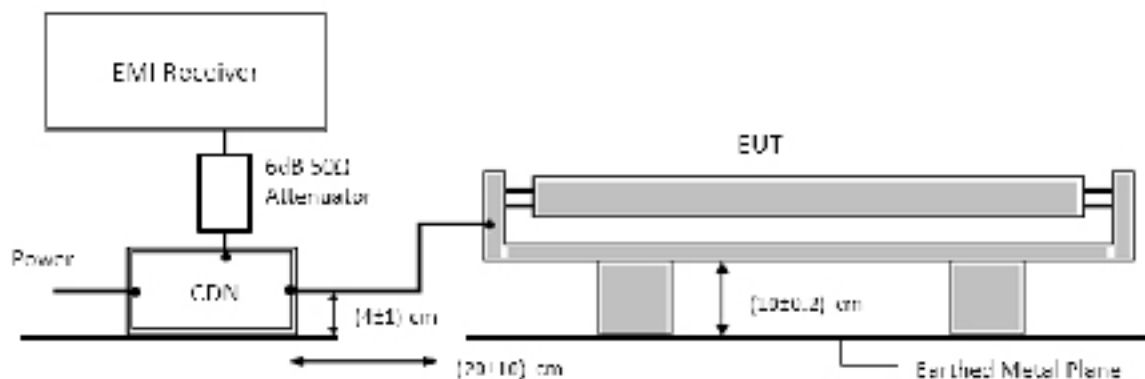
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, measurement distance variation, site imperfections, mismatch (average), and system repeatability. The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 3.6dB.

### 5.2 Limit of Radiated Disturbances

Frequency (MHz)	Quasi-Peak (dB $\mu$ V)
30 ~ 100	64 ~ 54
100 ~ 230	54
230 ~ 300	61

NOTE 1 The lower limit shall apply at the transition frequency.  
NOTE 2 Additional provisions may be required for cases where interference occurs.

### 5.3 EUT Setup



The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the CISPR 16-1-1: 2006, CISPR 16-2-3: 2010. The specification used was EN 55015 limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

### 5.4 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver			100943	2015-12-18	2016-12-15
Coupling Decoupling Network			2524	2015-12-18	2016-12-15
RF Cable			/	2015-12-18	2016-12-15

## 5.5 Test Receiver Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak  
IF Band Width.....120kHz  
Frequency Range.....30MHz to 300MHz

## 5.6 Test Procedure

1. The test is conducted in a shielding room, by means of CDN method. EUT is placed upon a wood board 10cm above the ground reference plane. Cable length between CDN and EUT is  $20\text{cm} \pm 10\text{cm}$ .
2. All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within  $-10\text{ dB}\mu\text{V}$  of specification limits), and are distinguished with a "QP" in the data table.

## 5.7 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the CDN Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + CDN Factor + Cable Factor

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of  $7\text{dB}\mu\text{V}$  means the emission is  $7\text{dB}\mu\text{V}$  below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corr. Ampl.

## 5.8 Test Data

Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	09 Nov, 2016
Test Result:	Pass

Model/Type 505055  
Level dBμV  
Peak Scan



Site: EMC Testing Room Phase: Temperature: 23  
Limit: (RE) EN55015-CDN-QP Power: AC 230V/50Hz Humidity: 46 %  
EUT:  
M/N: 505055  
Mode: Portable luminaire  
Note:

No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		80.1600	15.87	17.55	33.42	55.84	-22.42	QP	
2		100.0000	18.78	17.90	36.68	54.00	-17.32	QP	
3	*	133.3600	22.98	17.83	40.81	54.00	-13.19	QP	

Remark: data mark with '\*' comes nearest to limit.

Model/Type 505075  
Level dB $\mu$ V  
Peak Scan



Site: EMC Testing Room Phase: Temperature: 23  
Limit: (RE) EN55015-CDN-QP Power: AC 230V/50Hz Humidity: 46 %  
EUT:  
MN: 505075  
Mode: Portable luminaire  
Note:

No.	Mk.	Freq. MHz	Reading Level dB $\mu$ V	Correct Factor dB	Measure- ment dB $\mu$ V	Limit dB $\mu$ V	Over dB	Detector	Comment
1	*	41.1200	36.78	16.53	53.31	61.38	-8.07	QP	
2		67.9200	19.14	17.16	36.30	57.21	-20.91	QP	
3		135.8400	19.60	17.83	37.43	54.00	-16.57	QP	

Remark: data mark with '\*' comes nearest to limit.

Model/Type	502124
Level	dBµV
Peak Scan	



Site: EMC Testing Room  
Limit: (RE) EN55015-CDN-QP  
EUT:  
M/N: 502124  
Mode: Portable luminaire  
Note:

Phase:  
Power: AC 230V/50Hz

Temperature: 23  
Humidity: 46 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector Comment
1	*	45.2800	27.32	16.55	43.87	60.58	-16.71	QP
2		100.2400	18.94	17.90	36.84	54.00	-17.16	QP
3		133.3600	17.37	17.83	35.20	54.00	-18.80	QP

Remark: data mark with '\*' comes nearest to limit.

## 6– HARMONIC CURRENT TEST (EN 61000-3-2)

n accordance with EN 61000-3-2, there is no Harmonics limit applied to this LED lighting device without discharge lamp and rated power of the LED lighting device if less than 25W.

Remark:

For LED lighting equipment with an active input power equal to or less than 25 W, ECANB interpretation that:

There are 2 possible ways ahead:

1. LED equipment with an active input power equal to or less than 25 W cannot be considered discharge lighting equipment'. Therefore there are no harmonic limits for LED equipment below 25 W.

2. LED lighting equipment can be regarded as a discharge lamp when it comes to selecting the limits in sub-clause 7.3 in the standard. That would mean that LED lighting equipment with an active input power equal to or less than 25 W shall fulfil the limits in table 3, column 2 or the waveform requirement in sub-clause 7.3.b. Consequently, LED lighting equipment with an active input power more than 25 W shall fulfil the limits in table 2.

ECANB considers option 1 the correct option but ECANB Members should be aware that IEC 77A may in future adopt option 2. (ECANB (07) 024 Version 1)

Required by the applicant and the manufacturer, Harmonics Current Emission test is not application.

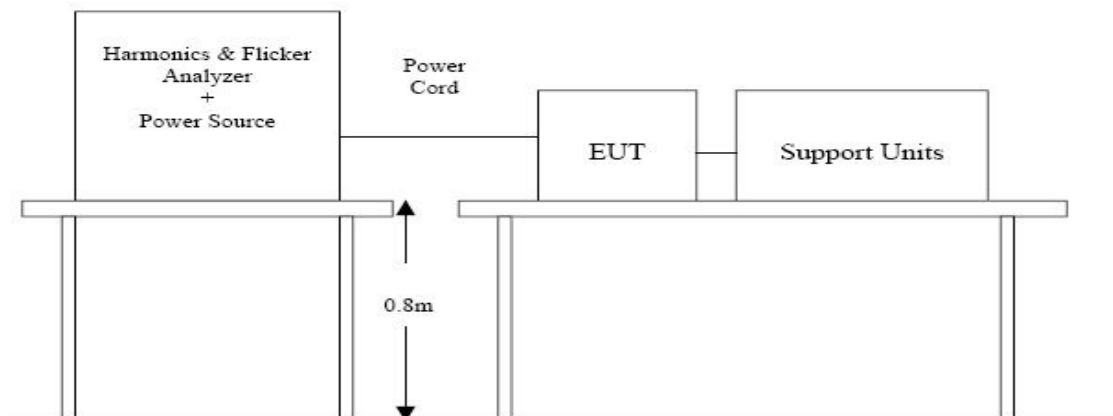
## 7 – VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3)

### 7.1 Application and Limit of Voltage Fluctuations and Flicker Test

Compliance to these standards ensures that tested equipment will not generate flickers and voltage change at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

Test Item	Limit	Remark
Pst	1.0	Pst means short-term flicker indicator.
Plt	0.65	Plt means long-term flicker indicator.
Tdt (ms)	500	Tdt means maximum time that dt exceeds 3 %.
dmax (%)	4%	dmax means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

### 7.2 Block Diagram of Test Setup:



### 7.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Harmonic and Flicker Analyzer	Voltech	PM6000	200006700524	2015-12-16	2016-12-15
AC Power Source	EMToni	AFC-150	630642	2015-12-16	2016-12-15

### 7.4 Test Procedure:

1. The test voltage was maintained within  $\pm 2\%$  of the nominal value. The frequency was  $50\text{Hz} \pm 0.5\%$ .
2. The voltage fluctuations and flicker were measured at the supply terminals of EUT.
3. There is no testing required if the device does not generate any significant voltage fluctuation or flicker. A short time measurement confirmed the assumption that this is the fact. The details in the test module are representing the results of the short time measurement.

## 7.5 Test Result

Basic Standard:	EN/IEC 61000-3-3 Flicker
Short time (Pst)	10 min
Observation time	10 min (1 Flicker measurement)
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	09 Nov, 2016
Test Result:	Pass

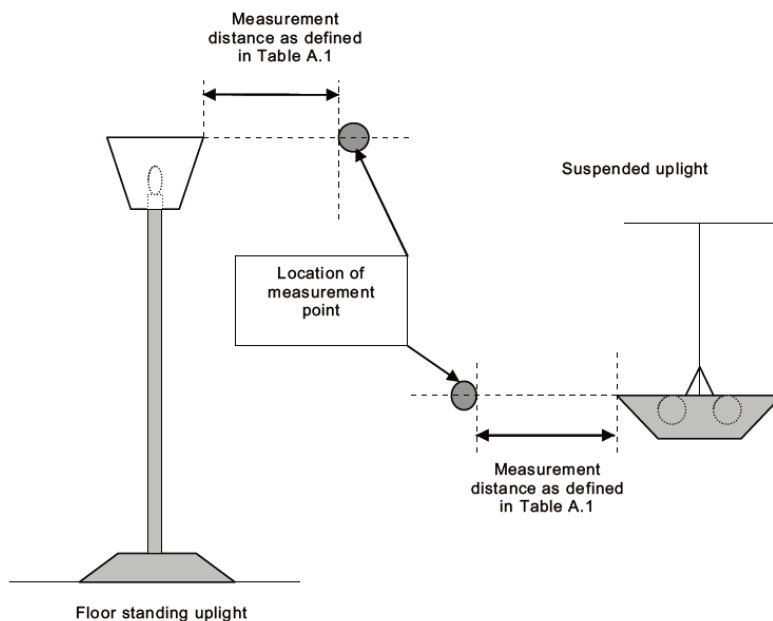
Maximum Flicker results			
Test Item	EUT values	Limit	Result
Pst	0.084	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.000	4.00	PASS
dt [s]	0.000	0.50	PASS

## 8-ELECTROMAGNETIC FIELD TEST

### 8.1 Application of Electromagnetic Field

Compliance to these standards ensures that the exposure level of electromagnetic field generated by lighting equipment is acceptable. The EUT should primarily comply with tests in clause 3 to 5 of this report and fulfill the requirement of this clause in addition.

### 8.2 Block Diagram of Test Setup:



### 8.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R & S	ESCI	100943	2015-12-16	2016-12-15
Van Der Hoofden Test Head	Narda S.T.S. / PMM	PMM VDH-01	000WX20608	2015-12-16	2016-12-15

### 8.4 Test Procedure:

1. The test is carried out in a shielding room. The EUT is placed on the insulated table and no conductive plane or object or human being was closer to lighting equipment than 0.8m.
2. The VDH test-head is adjusted to the same height of the test point and located at 0.5m away from it.

### 8.5 Test Result

Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 240V/50Hz
Start of Test:	09 Nov, 2016
Test Result:	Pass

Model/Type	Test point	Distance	Factor (F)	Limit
505055	Around the lamp	0.5m	F=0.0200	0.85
505075	Around the lamp	0.5m	F=0.0187	0.85
502124	Around the lamp	0.5m	F=0.0171	0.85

## 9- IMMUNITY TEST DESCRIPTION

### 9.1 General Description

Product Standard	EN 61547	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~ 1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Port: 1kV, DC port: 0.5kV, Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: 1.2/50 $\mu$ s Open Circuit Voltage, 8 /20 $\mu$ s Short Circuit Current, AC Port: line to line 0.5 kV, Performance Criterion C
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	EN 61000-4-11	1) 0% residual for 0.5 cycle, Performance Criterion B 2) 70% residual for 10 cycles, Performance Criterion C

**9.2 The phenomena allowed during and after test in each criterion are clearly stated in the following table**

Performance criteria		
Criteria	During test	After test
A	No change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.	No change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.
B	The luminous intensity may change to any value.	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
C	Any change of the luminous intensity is allowed and the lamp(s) may be extinguished.	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.		

### 9.3 Deviations from the standard

No deviations from EN 61547 were made when performing the tests described in this report.

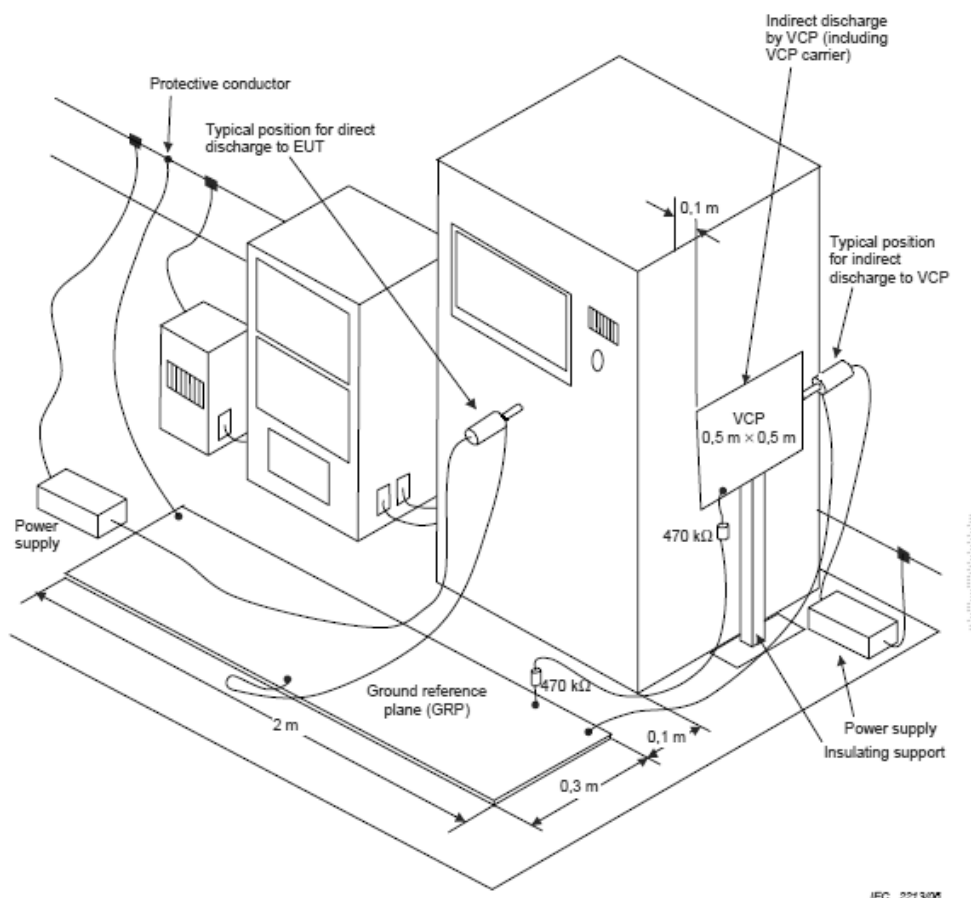
## 10- IMMUNITY TEST RESULTS

### 10.1 Electrostatic Discharge Immunity Test (EN 61000-4-2)

#### 10.1.1 Test Specification

Basic Standard:	EN 61000-4-2
Test Level:	$\pm 2, 4, 8$ kV (Air Discharge) $\pm 4$ kV (Contact Discharge) $\pm 4$ kV (Indirect Contact HCP) $\pm 4$ kV (Indirect Contact VCP)
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov, 2016

#### 10.1.2 Test Setup



IEC 2213/08

### 10.1.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Electrostatic Generator	KIKUSUI	KES4021A	SF002900	2015-12-16	2016-12-15

### 10.1.4 Test Procedure

1. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges was at least 1 second.
4. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
5. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
7. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

### 10.1.5 Performance Criterion Required & Test Result

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Gap	A	B
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Insulated crust	A	B
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Other Points	A	B

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Metal	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Other Points	A	B

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Front Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Back Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Left Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Right Side	A	B

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Front Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Back Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Left Side	A	B
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Right Side	A	B

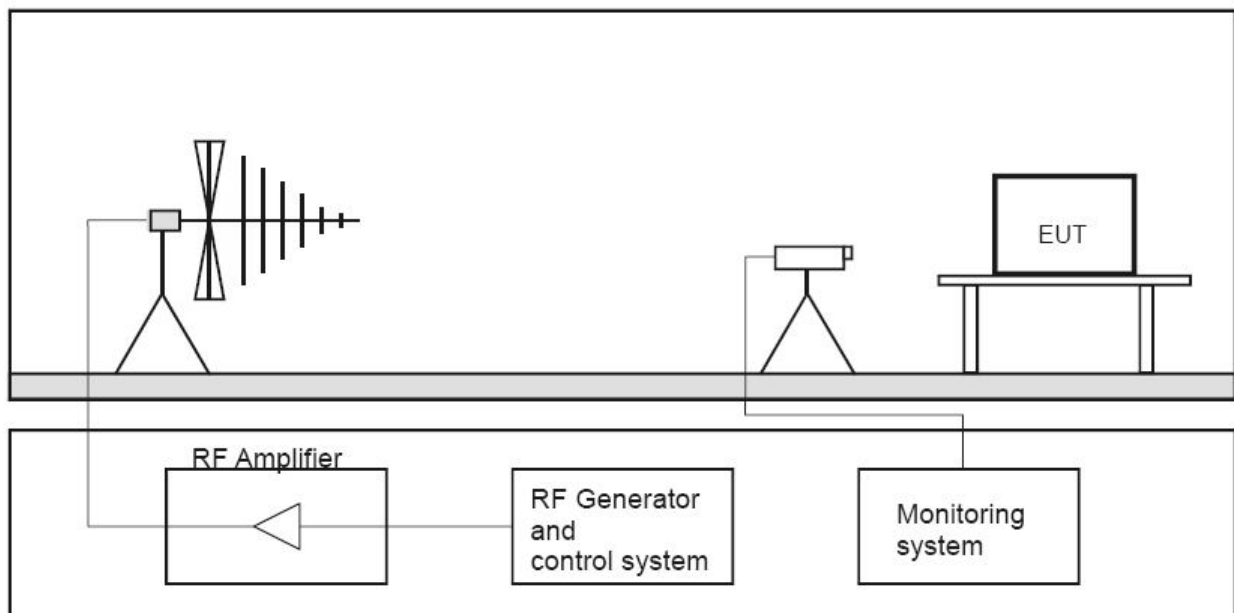
Test Result: Pass

## 10.2 Radiated Susceptibility Test (EN 61000-4-3)

### 10.2.1 Test Specification

Basic Standard:	EN 61000-4-3
Frequency Range:	80~1000MHz (MHz)
Modulation:	Amplitude 80%, 1kHz sinewave
Test Level:	3V/m
Temperature:	23 ( °C )
Humidity:	46( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov, 2016

### 10.2.2 Test Setup



### 10.2.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
3m Chamber& Accessory Equipment	ETS-LINDGREN	FACT-3	3510	2016-07-08	2017-07-07
ESG Vector signal generators	Agilent	E4438C	MY45094744	2016-03-06	2017-03-05
Power Amplifier	AR	150W1000	0322288	2016-07-05	2017-07-04
TRILOG Broadband Antenna	Schwarzbeck	VULB9136	401	2016-07-05	2017-07-04
Spectrum analyzer	Agilent	E4440A	MY46185649	2016-07-05	2017-07-04

## 10.2.4 Test Procedure

1. The testing was performed in a fully-anechoic chamber.
2. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
3. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5s.
4. The field strength level was 3V/m.
5. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

## 10.2.5 Performance Criterion Required & Test Result

Frequency Band (MHz)	Test Level	Test Points	Observation Performance	Criterion Required
80-1000	3V/m	Front Side	A	A
80-1000	3V/m	Rear Side	A	A
80-1000	3V/m	Left Side	A	A
80-1000	3V/m	Right Side	A	A

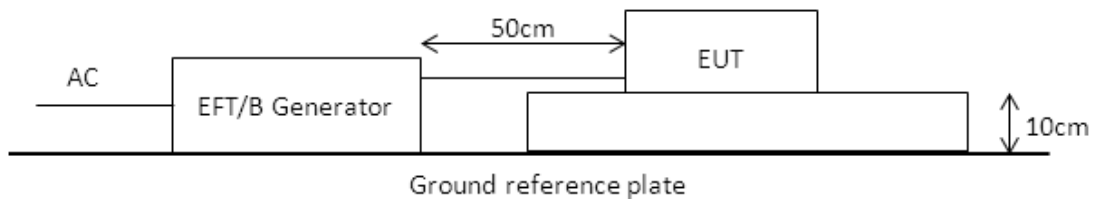
Test Result: Pass

### 10.3 Electrical Fast Transient/Burst Immunity Test (EN 61000-4-4)

#### 10.3.1 Test Specification

Basic Standard :	EN 61000-4-4
Test Level:	$\pm 1$ kV for AC power ports, $\pm 0.5$ kV for DC output port (If applicable)
Impulse Frequency:	5kHz
Impulse Wave-shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 min.
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov, 2016

#### 10.3.2 Test Setup



#### 10.3.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Electrical Fast Transient Generator	3CTEST	EFT-4001G	EC0461221	2015-12-16	2016-12-15
Capacitive Coupling Clamp	3CTEST	EFTC	EC0441348	2015-12-16	2016-12-15

#### 10.3.4 Test Procedure

- Both positive and negative polarity discharges were applied.
- The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should be 0.5m.

### 10.3.5 Performance Criterion Required & Test Result

Voltage	Test Points	Observation Performance	Criterion Required
±1kV	L	A	B
±1kV	N	A	B
±1kV	Earth	/	B
±1kV	L+N	A	B
±1kV	L + Earth	/	B
±1kV	N + Earth	/	B
±1kV	L + N + Earth	/	B
±0.5kV	DC port	A	B

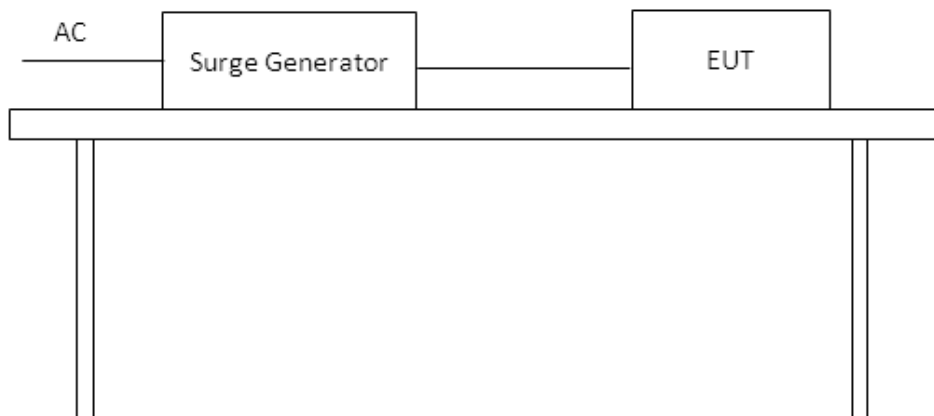
Test Result: Pass

## 10.4 Surge Immunity Test (EN 61000-4-5)

### 10.4.1 Test Specification

Basic Standard :	EN 61000-4-5
Test Level:	$\pm 0.5$ kV (Line to Line) for AC power ports
Wave-Shape:	1.2/50 $\mu$ s Open Circuit Voltage
Generator Impedance:	42 ohm between signal line and ground 2 ohm between networks
Phase Angle:	90°, 270°
Pulse Repetition Rate:	1 time / min
Number of Tests:	5 positive at 90° and 5 negative at 270°
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov 2016

### 10.4.2 Test Setup



### 10.4.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Surge Generator	EVERFINE	EMS61000-5B	712004	2015-12-16	2016-12-15

#### 10.4.4 Test Procedure

1. For EUT power supply:

The surge is 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. The power cord between the EUT and the CDN was shorter than 2 meters in length.

2. For test applied to unshielded unsymmetrically operated interconnection lines of EUT: (If applicable)

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

#### 10.4.5 Performance Criterion Required & Test Result

Voltage	Test Points	Observation Performance	Criterion Required
$\pm 0.5\text{kV}$	L-N	A	C
$\pm 1\text{kV}$	L-N	/	/
	L-PE	/	/
	N-PE	/	/
$\pm 2\text{kV}$	L-PE	/	/
	N-PE	/	/

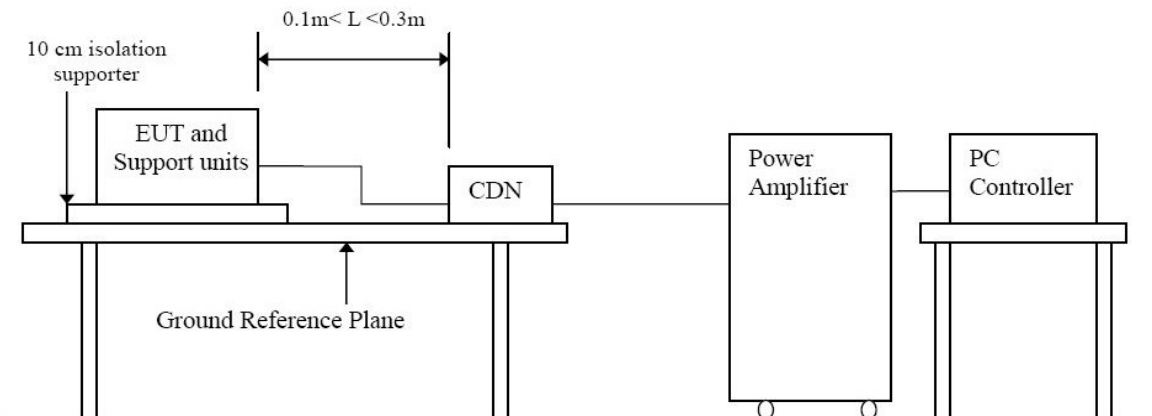
Test Result: Pass

## 10.5 Conducted Susceptibility Test (EN 61000-4-6)

### 10.5.1 Test Specification

Basic Standard:	EN 61000-4-6
Test Level:	3Vr.m.s
Frequency Range:	0.15~80MHz (MHz)
Modulation:	Amplitude 80%, 1kHz sinewave
Frequency Step:	1 % of preceding frequency value
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov, 2016

### 10.5.2 Test Setup



### 10.5.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2016-4-25	2017-4-24
CDN	FRANKONIA	CDN M2+M3	A3027019	2016-4-25	2017-4-24
6DB Attenuator	FRANKONIA	N/A	1001698	2016-4-25	2017-4-24
EM Injection clamp	FCC	F-203I-23mm	091536	2016-4-25	2017-4-24

### 10.5.4 Test Procedure

1. The test was performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
2. The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch

coupling devices as necessary. The sweep rate was  $1.5 \times 10^{-3}$  decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

3. The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.
4. Attempts were made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

#### 10.5.5 Performance Criterion Required & Test Result

Frequency Band (MHz)	Voltage ( $V_{rms}$ )	Test Points	Observation Performance	Criterion Required
0.15-80	3	L-N	A	A

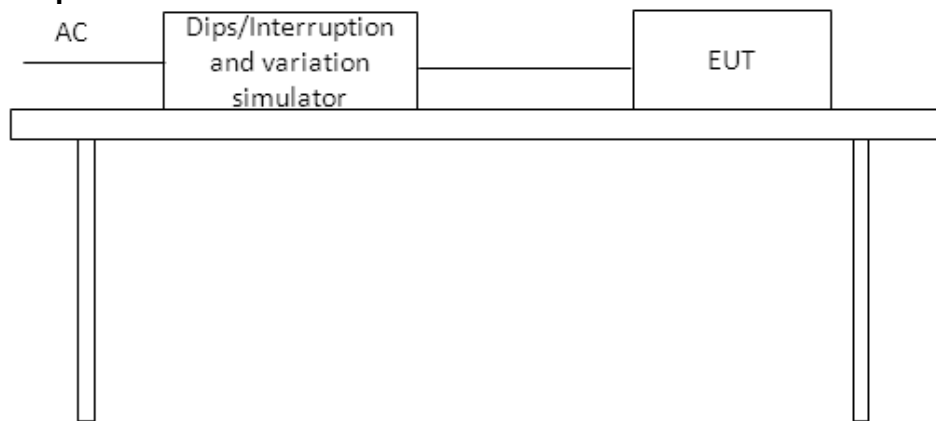
Test Result: Pass

## 10.6 Voltage Dips, Short Interruptions Immunity Tests (EN 61000-4-11)

### 10.6.1 Test Specification

Basic Standard:	EN 61000-4-11
Test Level:	0% residual voltage for 0.5 cycle 70% residual voltage for 10 cycles
Interval between event:	10 seconds
Phase Angle:	0°/180°
Test cycle:	3 times
Temperature:	22~25 ( °C )
Humidity:	45~50( %RH )
Barometric Pressure:	950~1000 ( mbar )
Operating Mode:	On
Test Specification:	AC 230V/50Hz
Start of Test:	10 Nov, 2016

### 10.6.2 Test Setup



### 10.6.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Voltage Dips and Interruptions Generator	EVERFINE	EMS61000-11K	706001	2015-12-16	2016-12-15

### 10.6.4 Test Procedure

The EUT was tested for each selected combination of test levels and duration with a sequence of 3 dips/interruptions with intervals of 10s (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

### 10.6.5 Performance Criterion Required & Test Result

Voltage (% Residual)	Duration (Period)	Observation Performance	Criterion Required
0	0.5	A	B
70	10	A	C

Test Result: Pass

## APPENDIX A - EUT PHOTOGRAPHS

<p>EUT view</p> <p>505055</p> <p>Whole view</p> <p><input checked="" type="checkbox"/> Front</p> <p><input type="checkbox"/> Rear</p> <p><input type="checkbox"/> Right Side</p> <p><input type="checkbox"/> Left Side</p> <p><input type="checkbox"/> Top</p> <p><input type="checkbox"/> Bottom</p> <p><input type="checkbox"/> Internal</p>	
<p>EUT view</p> <p>505055</p> <p>Whole view</p> <p><input checked="" type="checkbox"/> Front</p> <p><input type="checkbox"/> Rear</p> <p><input type="checkbox"/> Right Side</p> <p><input checked="" type="checkbox"/> Left Side</p> <p><input type="checkbox"/> Top</p> <p><input type="checkbox"/> Bottom</p> <p><input type="checkbox"/> Internal</p>	



<p>EUT view</p> <p>242713</p> <p>Whole view</p> <p><input checked="" type="checkbox"/> Front</p> <p><input type="checkbox"/> Rear</p> <p><input type="checkbox"/> Right Side</p> <p><input type="checkbox"/> Left Side</p> <p><input type="checkbox"/> Top</p> <p><input type="checkbox"/> Bottom</p> <p><input type="checkbox"/> Internal</p>	
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<p>EUT view</p> <p>242713</p> <p>Controlgear</p> <p><input checked="" type="checkbox"/> Front</p> <p><input type="checkbox"/> Rear</p> <p><input type="checkbox"/> Right Side</p> <p><input type="checkbox"/> Left Side</p> <p><input type="checkbox"/> Top</p> <p><input type="checkbox"/> Bottom</p> <p><input type="checkbox"/> Internal</p>	
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## APPENDIX B - TEST SETUP PHOTOGRAPHS

### Conducted Emission



### Radiated Electromagnetic Disturbance



### Radiated Disturbances



### Harmonic Current & Voltage Fluctuations and Flicker Test (EN61000-3-2/3)



### Electromagnetic field Test Setup



### Electrostatic Discharge Immunity Test (EN 61000-4-2)



Electrical Fast Transient/Burst Immunity Test For AC (EN 61000-4-4)



Electrical Fast Transient/Burst Immunity Test For DC (EN 61000-4-4)



Surge Immunity Test (EN 61000-4-5)



## Voltage Dips, Short Interruptions Immunity Test (EN 61000-4-11)



---- End of Report ----