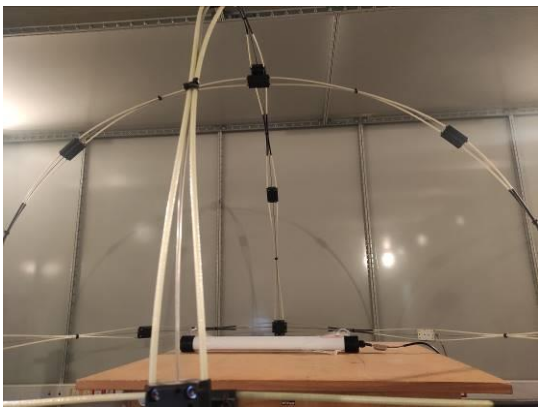
Prüfbericht-Nr.: *Test report no.*:	**CN22UA7A 001**	**Auftrags-Nr.:** *Order no.*:	180242371	Seite 1 von 31 *Page 1 of 31*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2022.09.06	
Auftraggeber: *Client*:	Zhejiang Meka Optoelectronic Co., Ltd NO.8 Canghai Road, Lihai Town,Binhai New City,Shaoxing, Zhejiang Province 312300 P.R. China			
Prüfgegenstand: *Test item*:	Tripod LED work light			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	Refer to next page			
Auftrags-Inhalt: *Order content*:	TÜV Rheinland – EMC Service			
Prüfgrundlage: *Test specification*:	**EN IEC 55015:2019+A11** **EN 61547:2009** **EN 61000-3-3:2013+A1+A2** **EN IEC 61000-3-2:2019+A1**			

Wareneingangsdatum: *Date of sample receipt*:	2022.09.15
Prüfmuster-Nr.: *Test sample no:*	A003334972 005
Prüfzeitraum: *Testing period*:	2022.09.23-2022.10.10
Ort der Prüfung: *Place of testing*:	Refer to section 1.1
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.
Prüfergebnis*: *Test result**:	Pass



geprüft von: tested by:		**genehmigt von:** *authorized by*:	
Datum: *Date:* 2022.11.01	Carrie Lei	**Ausstelldatum:** *Issue date:* 2022.11.01	Tracy Zhang
Stellung / Position:	Carrie Lei/PE	**Stellung** / Position:	Tracy Zhang/TC

Sonstiges / *Other*: Refer to page 2 for further information.

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*: Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.
V05

- Model List:

No.	Model name	Input voltage	Rated wattage (W)
1.	MK-020011015238–A(B/C/D/E/F)	220-240Vac, 50/60Hz	13
2.	MK-020011015239–A(B/C/D/E/F)		16
3.	MK-020011012493–A(B/C/D/E/F)		20
4.	MK-020011015240–A(B/C/D/E/F)		13
5.	MK-020011015241–A(B/C/D/E/F)		16
6.	MK-020011015242–A(B/C/D/E/F)		20
7.	MK-020011015243–A(B/C/D/E/F)		13
8.	MK-020011015244–A(B/C/D/E/F)		16
9.	MK-020011015245–A(B/C/D/E/F)		20
10.	MK-020011015246–A(B/C/D/E/F)		13
11.	MK-020011015247–A(B/C/D/E/F)		16
12.	MK-020011015248–A(B/C/D/E/F)		20
13.	MK-020011015249–A(B/C/D/E/F)		13
14.	MK-020011015250–A(B/C/D/E/F)		16
15.	MK-020011015251–A(B/C/D/E/F)		20
16.	MK-020011015252–A(B/C/D/E/F)		13
17.	MK-020011015253–A(B/C/D/E/F)		16
18.	MK-020011015254–A(B/C/D/E/F)		20

Other aspects:

1. In electrical characteristics, all models are based on the similar circuit diagram and PCB layout. The difference among them is rated power.
2. Therefore, all EMC tests were performed on model MK-020011015254 – A(B/C/D/E/F).

Test Summary

4.1.1 HARMONICS ON AC MAINS
Result:
Pass
4.1.2 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER ON AC MAINS
Result:
Pass
4.1.3 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE
Result:
Pass
4.1.4 RADIATED ELECTROMAGNETIC DISTURBANCE
Result:
Pass
4.2.1 RADIATED DISTURBANCE
Result:
Pass
5.1.1 ELECTROSTATIC DISCHARGE
Result:
Pass
5.1.2 RADIO FREQUENCY ELECTROMAGNETIC FIELD
Result:
Pass
5.2.1 FAST TRANSIENTS ON INPUT AND OUTPUT AC POWER LINES
Result:
Pass
5.2.2 INJECTED CURRENT INTO INPUT AND OUTPUT AC POWER PORT
Result:
Pass
5.2.3 SURGES TO AC POWER PORT
Result:
Pass
5.2.4 VOLTAGE DIPS AND INTERRUPTIONS TO AC POWER PORT
Result:
Pass

Contents

1 TEST SITES 5

1.1 TEST FACILITIES 5
1.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS 5
1.3 MEASUREMENT UNCERTAINTY 5

2 GENERAL PRODUCT INFORMATION 6

2.1 PRODUCT FUNCTION AND INTENDED USE 6
2.2 RATINGS AND SYSTEM DETAILS 6
2.3 INDEPENDENT OPERATION MODES 6
2.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS 6
2.5 SUBMITTED DOCUMENTS 6

3 TEST SET-UP AND OPERATION MODES 7

3.1 PRINCIPLE OF CONFIGURATION SELECTION 7
3.2 PHYSICAL CONFIGURATION FOR TESTING 7
3.3 TEST OPERATION AND TEST SOFTWARE 7
3.4 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT 7
3.5 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE 7

4 TEST RESULTS EMISSION 8

4.1 EMISSION IN THE FREQUENCY RANGE UP TO 30 MHZ 8
4.1.1 Harmonics on AC Mains 8
4.1.2 Voltage changes, voltage fluctuations and flicker on AC mains 10
4.1.3 Mains Terminal Continuous Disturbance Voltage 11
4.1.4 Radiated Electromagnetic Disturbance 14
4.2 EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHZ 18
4.2.1 Radiated disturbance 18

5 TEST RESULTS I M M U N I T Y 20

5.1 ENCLOSURE 21
5.1.1 Electrostatic Discharge 21
5.1.2 Radio Frequency Electromagnetic Field 22
5.2 INPUT AND OUTPUT AC POWER PORTS 23
5.2.1 Fast Transients on Input and Output AC Power Lines 23
5.2.2 Injected Current into Input and Output AC Power Port 24
5.2.3 Surges to AC Power Port 25
5.2.4 Voltage dips and interruptions to AC Power Port 26

6 PHOTOGRAPHS OF THE TEST SET-UP 27

7 LIST OF TABLES 31

8 LIST OF FIGURES 31

9 LIST OF PHOTOGRAPHS 31

1 Test Sites

1.1 Test Facilities

Laboratory : TÜV Rheinland /CCIC(Ningbo) Co., Ltd.

1st Floor, Building 11, Scholar Innovation Park, No.1188 Zhongguan Road, Zhenhai District, Ningbo 315200 P.R. China.

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

No.	Equipment	Model	Serial no.	Cal. due date
1.	EMI test receiver	ESR3	102331	2022.11.08
2.	LISN	ENV216	102250	2022.11.08
3.	EMI test receiver	ESR3	102362	2022.11.08
4.	CDNE	CDNE M310	47294	2022.11.07
5.	Triple loop antenna	HM020	101000	2023.11.08
6.	ESD generator	NX30.1	11744	2022.11.11
7.	EFT &Surge & Dips Immunity test system	IMU4000F-S-D-V	1574	2022.11.08
8.	CS immunity test	NSG 4070C-80	47606	2022.11.08
9.	CDN	CDN M016S	47812	2022.11.07
10.	Attenuator	JTH-SJ-100W-6dB	100145143000 573	N/A
11.	Amplifier	BBA150-BC250	102749	2022.11.08
12.	Signal generator	SMB100A	180488	2022.11.08
13.	Stacked Log-Per Antenna	STLP 9128 ES	219	N/A
14.	Harmonic power supply	5001IX-CTS-400-413	1735A02292	2022.11.07
15.	Harmonics/voltage fluctuation Analyser	PACS-1	1736A00799	2022.11.07

1.3 Measurement Uncertainty

Table 2: Measurement Uncertainty

Test Item	Expanded Measurement Uncertainty (k=2)
Conducted Emission (9-150kHz)	3.70dB
Conducted Emission (150k-30MHz)	3.30dB
Disturbance Power	4.27dB
Radiated Emission (30-1000MHz)	4.39dB
Radiated Emission (1-18GHz)	4.67dB
Radiated Emission (CDNE method)	4.05dB

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary LED Street Light for Lighting and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input voltage	:	Refer to page 2	For all models
Rated power	:	Refer to page 2	For all models
Protection Class	:	Class II	For all models
Dimensions of the EUT	:	<1.5 m x 0.5 m x 0.5 m (l x w x h)	For all models

Refer to the User Manual for further information.

2.3 Independent Operation Modes

The basic operation modes are: "On" or "Off".

Refer to the User Manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram for further information.

2.5 Submitted Documents

Circuit diagram, PCB Layout, label, user manual etc.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report. No software was used.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

The tested sample contained noise suppression components as specified in the circuit diagram. No special measure is employed to achieve the requirement.

4 Test Results EMISSION

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Harmonics on AC Mains

Result:	**Pass**

Date of testing	:	2022.09.30
Test procedure	:	EN IEC 61000-3-2:2019+A1
Test duration	:	2.5min
Harmonic order	:	2 – 40th
Frequency range	:	0 – 2kHz
Test voltage	:	230V, 50Hz
Ambient Condition	:	Temperature: 21^{o}C; Relative Humidity: 58%
Test conditions	:	EN IEC 61000-3-2:2019 clause B.5

The harmonics on AC Mains in the frequency from 0 to 2kHz were measured in accordance with EN IEC 61000-3-2:2019+A1.

The measurement was conducted with an automatic current harmonic analyzing system. This equipment is in compliance with the requirements of EN IEC 61000-3-2:2019+A1.

The results indicated in the following tables and figures were those measured and recorded by an automatic measuring system.

Table 3: Harmonic currents measurement result

Equipment category: Class C (>=5W and <= 25W);
Test Result: Pass **Source qualification: Normal**

THC(A): 0.118 **I-THD(%): 111.8** **POHC: N/A** **POHC Limit: N/A**

Highest parameter values during test:

V_RMS (Volts):	**229.48**	**Frequency (Hz):**	
I_Peak (Amps):	**0.709**	**I_RMS (Amps):**	**0.178**
I_Fund (Amps):	**0.105**	**Crest Factor:**	**3.990**
Power (Watts):	**19.6**	**Power Factor:**	**0.484**

Waveform fails phase angle spec :

Peak current (Ipeak) = -708.54 mA (708.54 mA absolute)
Peak current max. phase angle = 57 degree (Pos) **Pass**

Min. Current at 60 deg (I_60) = -519.27 mA (Neg) **Limit = 35.43 mA** **Pass**
Min. Current at 90 deg (I_90) = -48 mA (Neg) **Limit = 35.43 mA** **Pass**

I_h3 : 80.14 **Limit : 90.55** **Pass**

I_h5 : 58.26 **Limit : 64.23** **Pass**

4.1.2 Voltage changes, voltage fluctuations and flicker on AC mains

Result:	**Pass**

Test procedure : EN 61000-3-3:2013+A1+A2

According to the low power of the sample, it will not produce voltage fluctuation and flick, which might exceed the related limits.

4.1.3 Mains Terminal Continuous Disturbance Voltage

Result:	**Pass**

Date of testing	:	2022.09.23
Kind of test site	:	EMC Shielding Room
Port	:	Mains
Basic Standard	:	EN IEC 55015:2019+A11
Frequency Range	:	9kHz – 30MHz
Limit	:	EN IEC 55015:2019+A11, Clause 4.3 & 4.4
Ambient Condition	:	Temperature: 21°C; Relative Humidity: 62%

Test Setup

Input Voltage	:	AC 230V, 50Hz
Operational mode	:	ON
Earthing	:	No
Test Setup	:	According to Clause 8 of EN IEC 55015:2019+A11

The measurement setup was made according to EN IEC 55015:2019+A11 in an EMC shielding room.

The measurement equipment like test receiver, quasi-peak detector and Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards and EN IEC 55015:2019+A11. The tested object was operated under its rated voltage and its rated frequency.

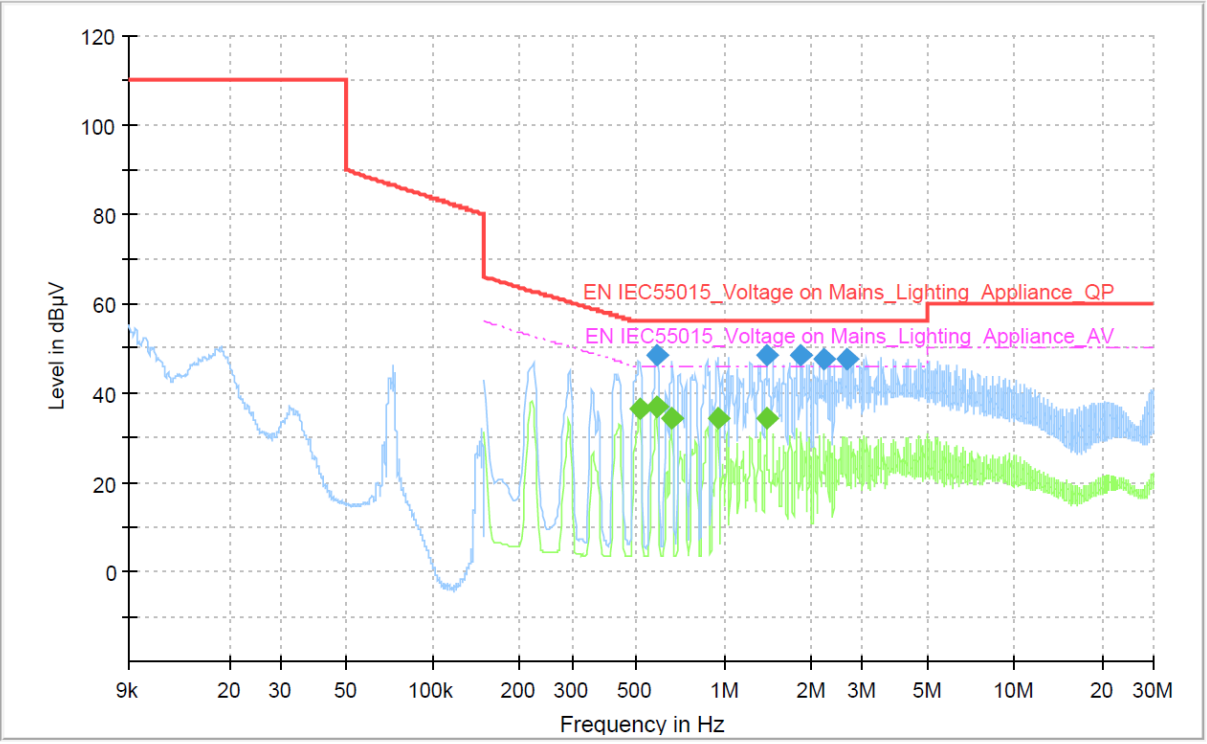
Furthermore an internal calibration with the test receiver was conducted prior to and after each measurement.

The tested object was set-up on a wooden table and 0.8m away from the AMN. The length of the power cord of the tested object was about 1.5m.

The Disturbance Voltage was determined according to clause 8 of EN IEC 55015:2019+A11 while measuring the line and neutral conductor by turns.

The following figures were those measured by an automatic measuring system. The disturbance voltage was performed with both Quasi-peak and Average detector at the frequencies which showed the Max. in a designated frequency sub-range. In the figures below, the higher curve is that of Quasi-peak and the lower one is average-value. “*” refers to Quasi-peak value and the Average value which were measured in the final measurement.

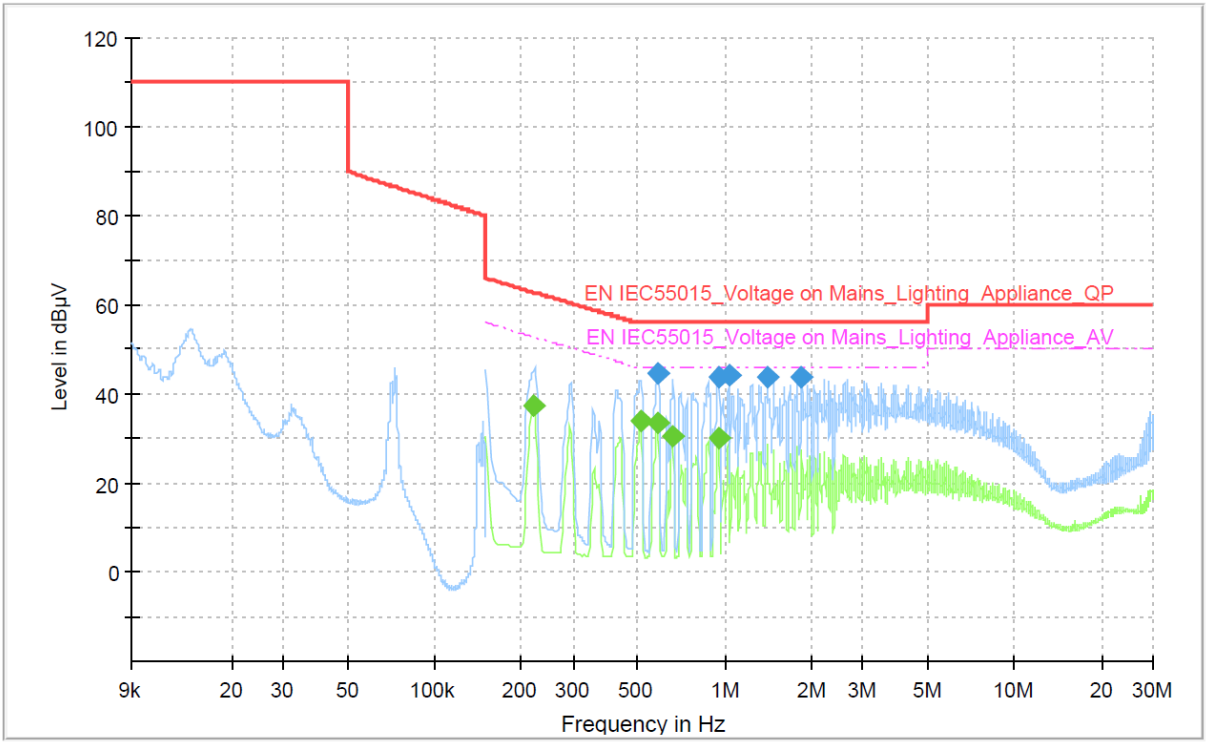
Figure 1: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.512250	---	36.41	46.00	9.59	1000.0	9.000	L1	OFF	10.3
0.588750	---	36.85	46.00	9.15	1000.0	9.000	L1	OFF	10.3
0.591000	48.50	---	56.00	7.50	1000.0	9.000	L1	OFF	10.3
0.663000	---	34.25	46.00	11.75	1000.0	9.000	L1	OFF	10.3
0.960000	---	34.32	46.00	11.68	1000.0	9.000	L1	OFF	10.3
1.403250	---	34.44	46.00	11.56	1000.0	9.000	L1	OFF	10.3
1.405500	48.43	---	56.00	7.57	1000.0	9.000	L1	OFF	10.3
1.848750	48.46	---	56.00	7.54	1000.0	9.000	L1	OFF	10.3
2.220000	47.81	---	56.00	8.19	1000.0	9.000	L1	OFF	10.4
2.663250	47.73	---	56.00	8.27	1000.0	9.000	L1	OFF	10.4

Figure 2: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.219750	---	37.29	52.83	15.54	1000.0	9.000	N	OFF	10.2
0.512250	---	33.85	46.00	12.15	1000.0	9.000	N	OFF	10.3
0.586500	---	33.48	46.00	12.52	1000.0	9.000	N	OFF	10.3
0.591000	44.60	---	56.00	11.40	1000.0	9.000	N	OFF	10.3
0.663000	---	30.71	46.00	15.29	1000.0	9.000	N	OFF	10.3
0.957750	---	30.22	46.00	15.78	1000.0	9.000	N	OFF	10.3
0.962250	43.65	---	56.00	12.35	1000.0	9.000	N	OFF	10.3
1.036500	44.01	---	56.00	11.99	1000.0	9.000	N	OFF	10.3
1.405500	43.91	---	56.00	12.09	1000.0	9.000	N	OFF	10.3
1.848750	43.95	---	56.00	12.05	1000.0	9.000	N	OFF	10.4

4.1.4 Radiated Electromagnetic Disturbance

Result:	**Pass**

Date of testing	:	2022.09.23
Port	:	Enclosure
Basic standard	:	EN IEC 55015:2019+A11
Frequency range	:	9kHz – 30MHz
Limit	:	EN IEC 55015:2019+A11, clause 4.5
Ambient Condition	:	Temperature: 21°C; Relative Humidity: 62%

Test Setup

Operational Mode	:	ON
Earthing	:	No
Test Site	:	EMC shielding room

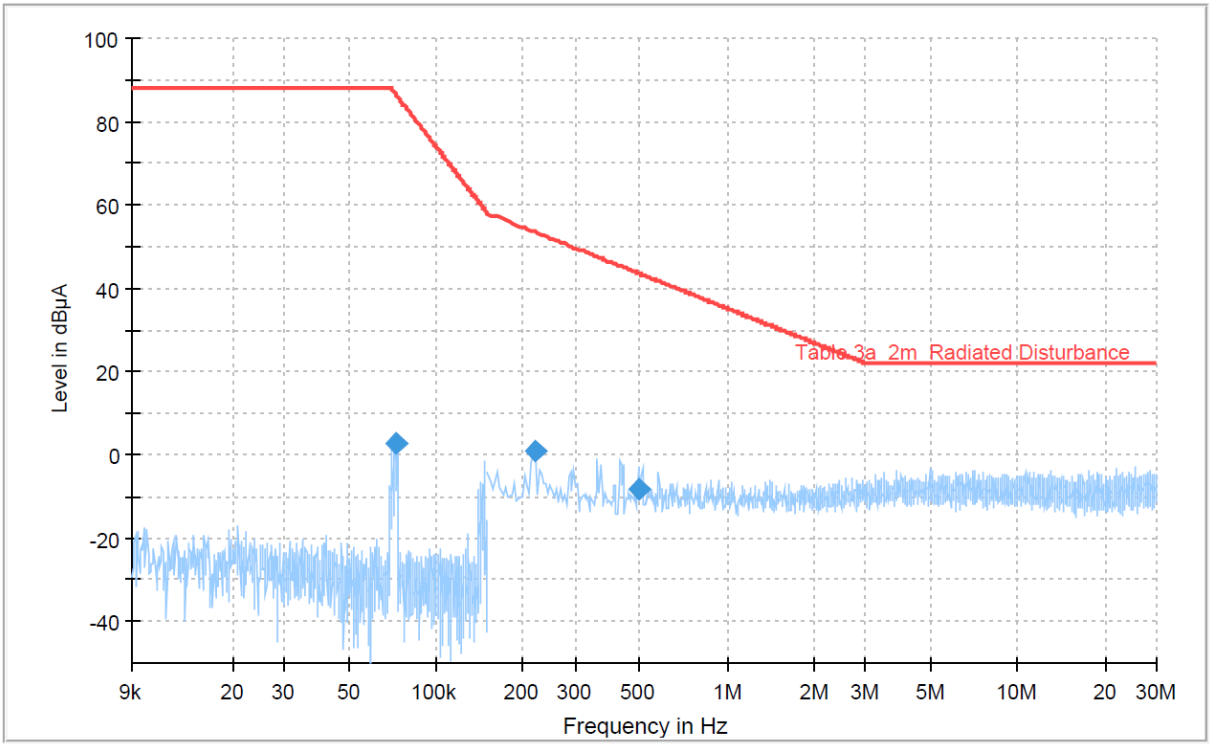
Measuring configuration and description

The measurement equipment like test receiver, loop antenna and coaxial switch are in compliance with the CISPR 16-1 series standards. The test setup was made according to Clause 9 of EN IEC 55015:2019+A11.

The EUT operated in ON mode and at its rated voltage. The EUT is put on a wooden table in the center of the loop antenna. Before a measurement the EUT was operated for about 20 min.

Induced current in the loop antenna was measured by means of a current probe (1V/A) according to clause 9 of EN IEC 55015:2019+A11. The three field components were measured in sequence by means of a coaxial switch (loop antenna controller).

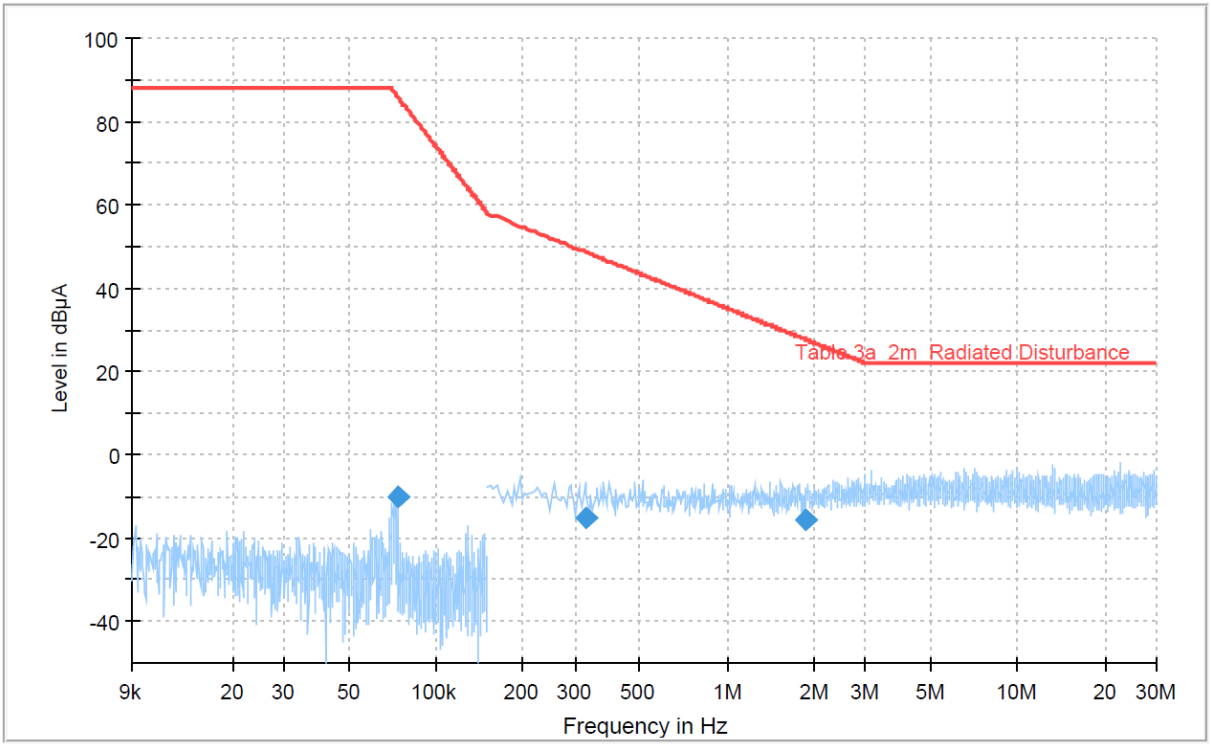
Figure 3: Graphic description of radiated electromagnetic disturbances for X direction



Final_Result

Frequency (MHz)	QuasiPeak (dBµA)	CAverage (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.073160	2.72	---	86.26	83.54	1000.0	0.200	X	0.1
0.218000	0.88	---	53.51	52.63	1000.0	9.000	X	0.0
0.498000	-8.16	---	43.58	51.74	1000.0	9.000	X	0.0

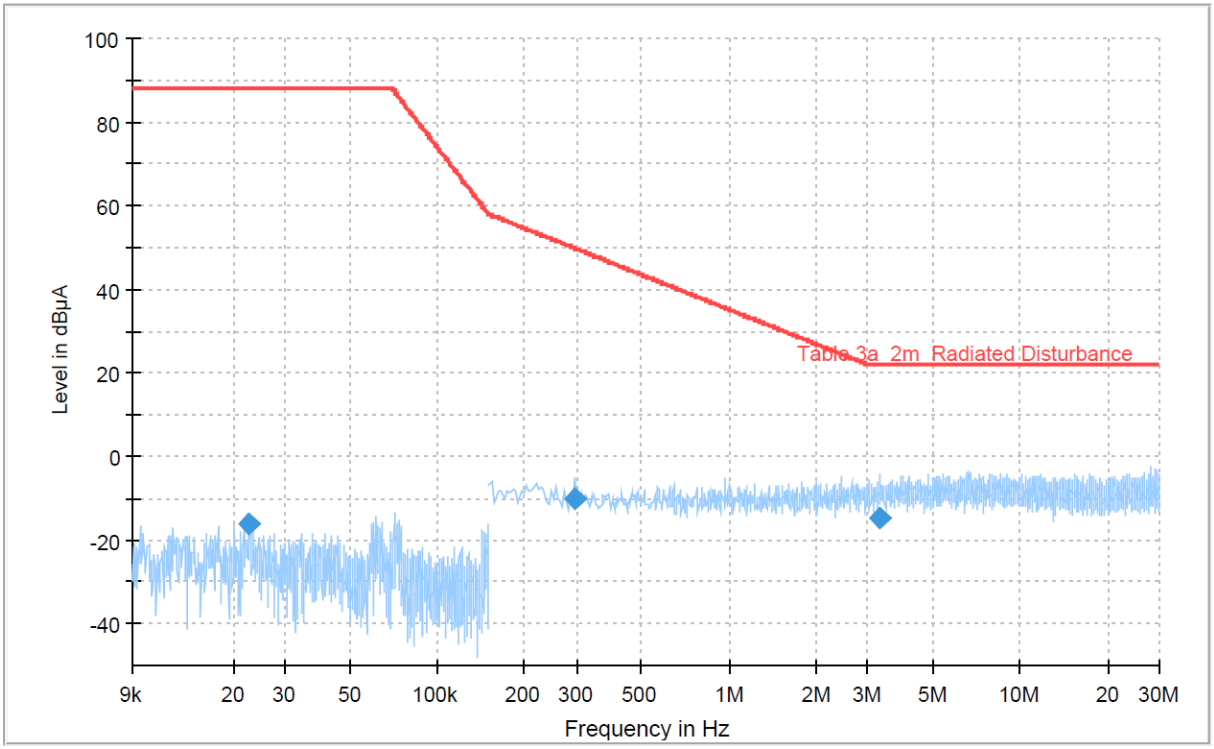
Figure 4: Graphic description of radiated electromagnetic disturbances for Y direction



Final_Result

Frequency (MHz)	QuasiPeak (dBµA)	CAverage (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.073560	-10.08	---	86.05	96.13	1000.0	0.200	Y	0.1
0.326000	-14.95	---	48.67	63.62	1000.0	9.000	Y	0.0
1.866000	-15.78	---	27.71	43.49	1000.0	9.000	Y	0.0

Figure 5: Graphic description of radiated electromagnetic disturbances for Z direction



Final_Result

Frequency (MHz)	QuasiPeak (dBµA)	CAverage (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.022760	-16.06	---	88.00	104.06	1000.0	0.200	Z	0.1
0.298000	-10.14	---	49.75	59.89	1000.0	9.000	Z	0.0
3.322000	-14.71	---	22.00	36.71	1000.0	9.000	Z	0.0

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated disturbance

Result:	**Pass**

Date of testing	:	2022.09.23
Test procedure	:	EN IEC 55015:2019+A11 clause 9.3.4.4 & CISPR 16-2-1 CDNE method
Frequency range	:	30-300MHz
Kind of test site	:	Shielding Room
Limit	:	EN IEC 55015:2019+A11 Table 10 Quasi-peak limits: 30-100MHz, 64-54dBµV; 100-200MHz, 54 dBµV; 200-300MHz, 54-51dBµV

Test Setup

Input voltage	:	AC 230V, 50Hz
Operational mode	:	ON
Temperature	:	21°C
Relative humidity	:	58%

Measuring configuration and description

The clock frequencies of the EUT is below 30 MHz. If the EUT complies with the requirements of clause 9.3.4.4 of EN IEC 55015:2019+A11, it is deemed to comply with the radiated disturbances requirements in the frequency range 30MHz to 1000MHz specified in 4.5.3 of EN IEC 55015:2019+A11.

The Conducted RF emission test was measured in the frequency range from 30MHz to 300MHz according to EN IEC 55015:2019+A11. The measurement was performed in accordance with the method specified in CISPR 16-2-1 and clause 9.3.4.4 of EN IEC 55015:2019+A11.

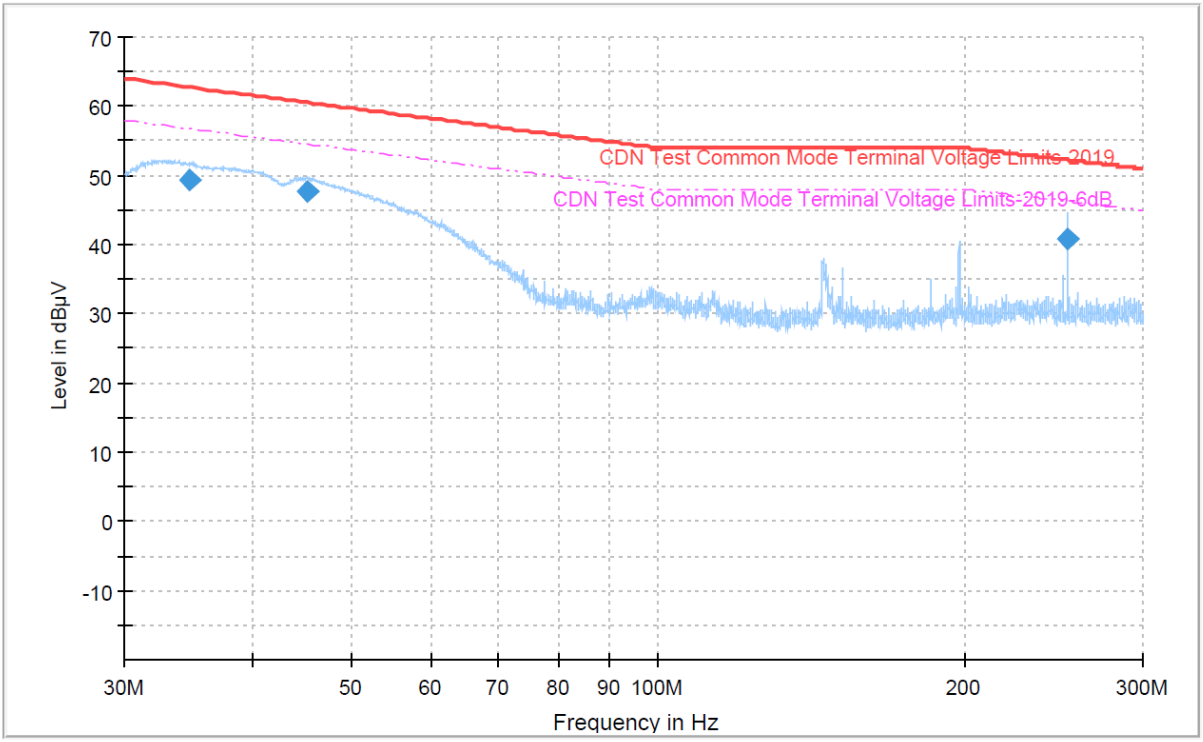
The Conducted RF emission test was performed in a shielding room with a CDNE-M2/M3. The EUT is placed on one non-conducting block with a height of (10±0.2) cm which in turn are placed on an earthed metal plate with dimensions at least 20 cm larger than the lighting equipment.

The EUT is connected via a mains supply cable with a length of (20±10) cm to the CDNE. The distance of the cable to the metal plate should be (3-4) cm. The CDNE is mounted on the metal plate.

Each tested EUT was operated for at least 15min before test.

The following figures were those measured and recorded by a test receiver. The curves in the figure were those measured with a Peak detector. The symbol "♦" refers to Quasi-peak values which were measured in the final measurement.

Figure 6: Spectral Diagrams, RF Emission



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
34.680000	49.42	62.80	13.37	1000.0	120.000	Single Line	20.8
45.320000	47.79	60.57	12.79	1000.0	120.000	Single Line	20.9
253.160000	40.92	52.26	11.33	1000.0	120.000	Single Line	22.2

5 Test Results I M M U N I T Y

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

Performance 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.

Performance 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.

Performance 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.

The EMC immunity performances of the EUT were tested according to EN 61547:2009.

Testing date: 2022.10.09

Room temperature:	21-23°C	
Relative Humidity:	51%	For ESD test
	51-62%	For other tests
Atmospheric pressure:	102.1 kPa	

5.1 Enclosure

5.1.1 Electrostatic Discharge

Result:	**Pass**

The immunity against electrostatic discharge was tested in accordance EN 61547:2009. Test setup and ESD-Generator are according to IEC 61000–4–2 which is specified under EN 61547:2009. The EUT was placed on an insulation lining of 0.5mm thick. Between the insulation lining and the wooden table, there was a horizontal coupling plane (HCP) of 1.6×0.8m. The EUT and its power supply cord were isolated from the HCP by the insulating lining.

Charge voltage	:	±4.0kV (Contact Discharge) ±8.0kV (Air Discharge)
Polarity	:	positive / negative
Number of discharges	:	>10
Performance criteria	:	B

Table 4: ESD, Positive / Negative Polarity

Position	Kind of Discharge	Remarks	Result
Nonmetal enclosure	Air discharge ±8kV	No change of luminous intensity	Pass
Coupling plane (Both HCP and VCP)	Contact discharge ±4kV	No change of luminous intensity	Pass

5.1.2 Radio Frequency Electromagnetic Field

Result:	**Pass**

The immunity against radio-frequency electromagnetic fields in the frequency range between 80MHz and 1000MHz was tested in accordance to IEC 61000-4-3 which is specified by clause 5.3 in EN 61547:2009.

The test was performed inside a 3m modified semi-anechoic chamber. During the test the part of the ground plane between the field generating antenna and the equipment under test was covered by absorbing material. The distance between the tip of the antenna and the side of the system tested is 3m. The field uniformity of the 1.5mx1.5m plane where the surface of the EUT tested coincides with is regularly calibrated to ensure the 0-6 dB field uniformity criterion as specified by IEC 61000-4-3 is met.

Test Level	:	3V/m
Frequency Range	:	80-1000MHz
Modulation	:	80%AM, 1kHz
Frequency Sweep Speed	:	≤0.005 octave/s (1.5×1E−3 decades/s)
Performance Criteria	:	A

Table 5: Radiated Susceptibility, Field Strength 3V/m

Position	Observation	Result
Antenna in vertical orientation	No change of luminous intensity	Pass
Antenna in horizontal orientation	No change of luminous intensity	Pass

5.2 Input and Output AC Power Ports

5.2.1 Fast Transients on Input and Output AC Power Lines

Result:	**Pass**

The immunity against fast transients on AC power lines was tested in accordance to EN 61000-4-4 which is specified by clause 5.5 in EN 61547:2009.

Test setup and the fast transient noise generator was according to IEC 61000–4–4 which is specified by EN 61547:2009. The EUT was placed on a wooden table 0.1m above the reference ground plane of aluminum and was insulated from it by an insulating support 0.1m thick.

Test Voltage	:	±1kV
Polarity	:	negative/positive
Repetition frequency	:	5kHz
Test duration	:	≥120sec
Tr/Tn	:	5ns/50ns
Severity level	:	2
Performance criteria	:	B

Table 6: Burst, Input AC Power lines, Positive/Negative Polarity

Coupling Method: Direct Injection			
Coupling Port	Test Voltage / Result		Remark
AC mains: L1 (L), L2 (N), --	±1000V	Pass	No change of luminous intensity

5.2.2 Injected Current into Input and Output AC Power Port

Result:	**Pass**

The immunity against injected current into AC power port was tested according to EN 61547:2009 in a shielded room.

The test setup and the test generator was according to IEC 61000–4–6 which is specified by EN 61547:2009. The EUT was placed on a small wooden support 0.1m above a reference ground plane that is of aluminum. The coupling and decoupling networks was inserted on the power supply connection. The coupling and decoupling networks was placed on the ground reference plane, making direct contact with it at about 0.1 – 0.3 meters from EUT. The height of cable between the EUT and the coupling and decoupling networks above the ground reference plane was 50mm.

Voltage Level	**:**	3V(rms)(unmodulated)
Environmental phenomena	**:**	r.f. current, common mode, 1kHz, 80%AM
Source impedance	**:**	150 Ω
Frequency range	**:**	0.15 – 80 MHz
Sweeping rate	**:**	$\leq 1{,}5 \times 10^{-3}$ decades/s
Performance criteria	**:**	A

Table 7: Injected current, AC Power lines

Coupling Port	Coupling Method:	Result	Remark
AC mains: L1 (L), L2 (N), --	CDN M-2	Pass	No change of luminous intensity

5.2.3 Surges to AC Power Port

Result:	**Pass**

The immunity against surges to AC power port was tested in accordance to IEC 61000-4-5 which is specified by clause 5.7 in EN 61547:2009.

Test setup and the Combination Wave Generator (CWG) was according to IEC 61000–4–5. The decoupling network is incorporated in the CWG.

Test Level	:	phase to neutral ±0.5kV
Tr/Tn	:	1.2/50μs (open-circuit voltage) 8/20μs (short-circuit current)
Test numbers	:	5 positive and 5 negative pulses at phases of ±π/2
Repitition rate	:	1/min
Performance criteria	:	C

Table 8: Surges to AC Power lines, positive/negative

Line	Tested Voltage/coupling phase	Observation	Result
Phase to neutral	+0.5kV, +π/2(5 times) –0.5kV, –π/2 (5 times)	No change of luminous intensity No change of luminous intensity	Pass Pass

5.2.4 Voltage dips and interruptions to AC Power Port

Result:	**Pass**

The immunity against voltage dips and interruptions to AC power port was tested in accordance to EN 61000-4-11 which is specified by clause 5.8 in EN 61547:2009.

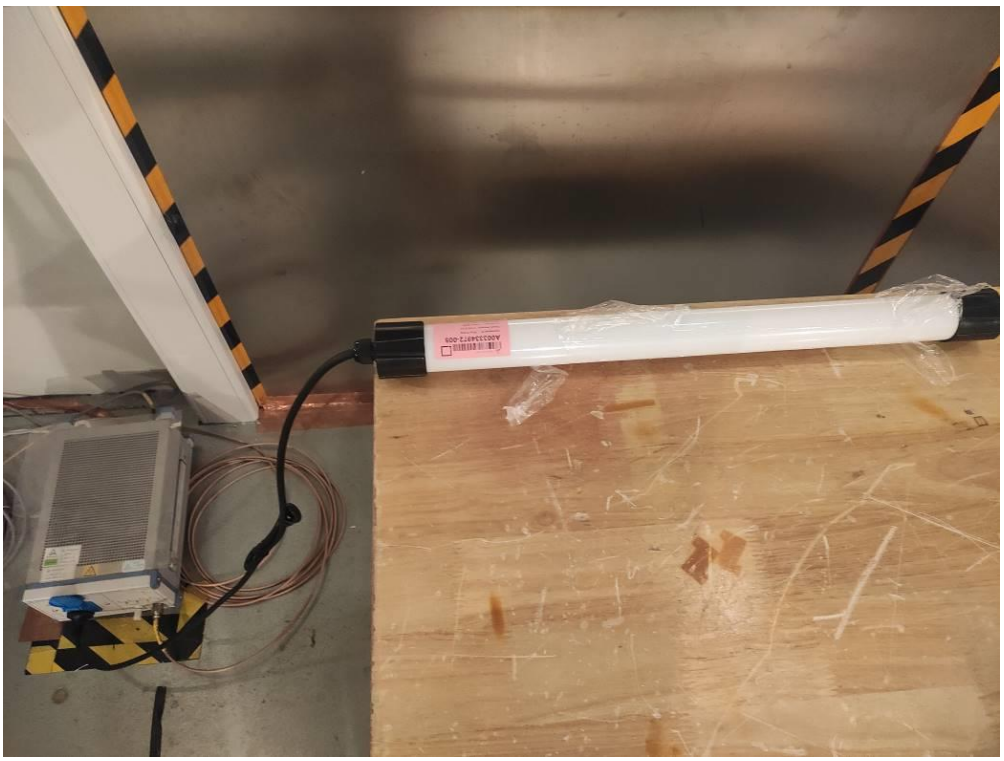
Test setup and the test generator was according to IEC 61000−4−11.

Table 9: Test condition and Test result for Voltage Dips

Environmental Phenomena	Test level (in % UT)	Duration (in period of the rated frequency)	Performance criteria	Result
Interruptions	0	0.5 (10ms)	B	Pass
Voltage dips (in % UT) 30	70	10 (200ms)	C	Pass

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Conducted Emission



Photograph 2: Set-up for Radiated Emission (CDNE mode)



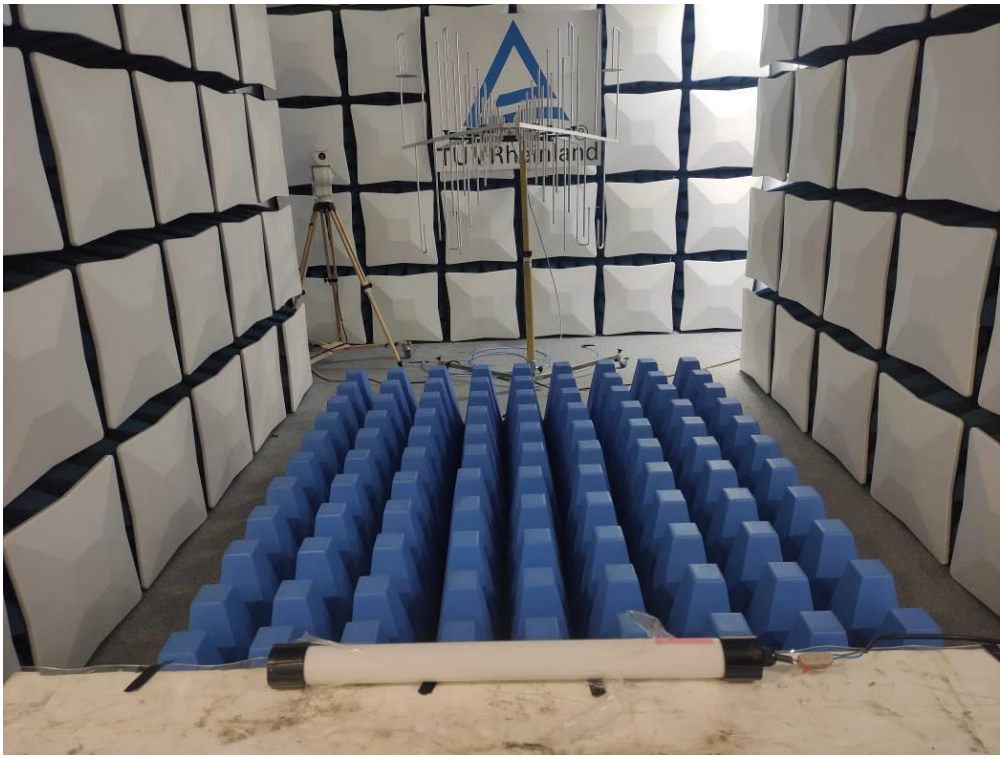
Photograph 3: Set-up for Electrostatic Discharge



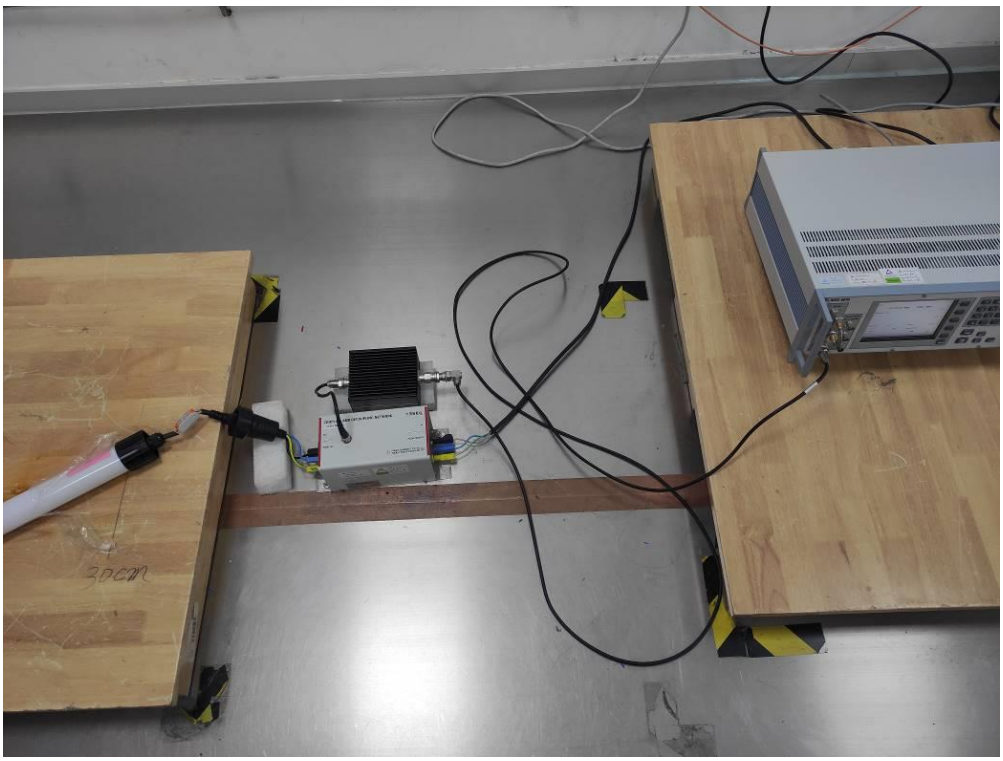
Photograph 4: Set-up for Fast Transient Burst, Surges and Voltage Dips



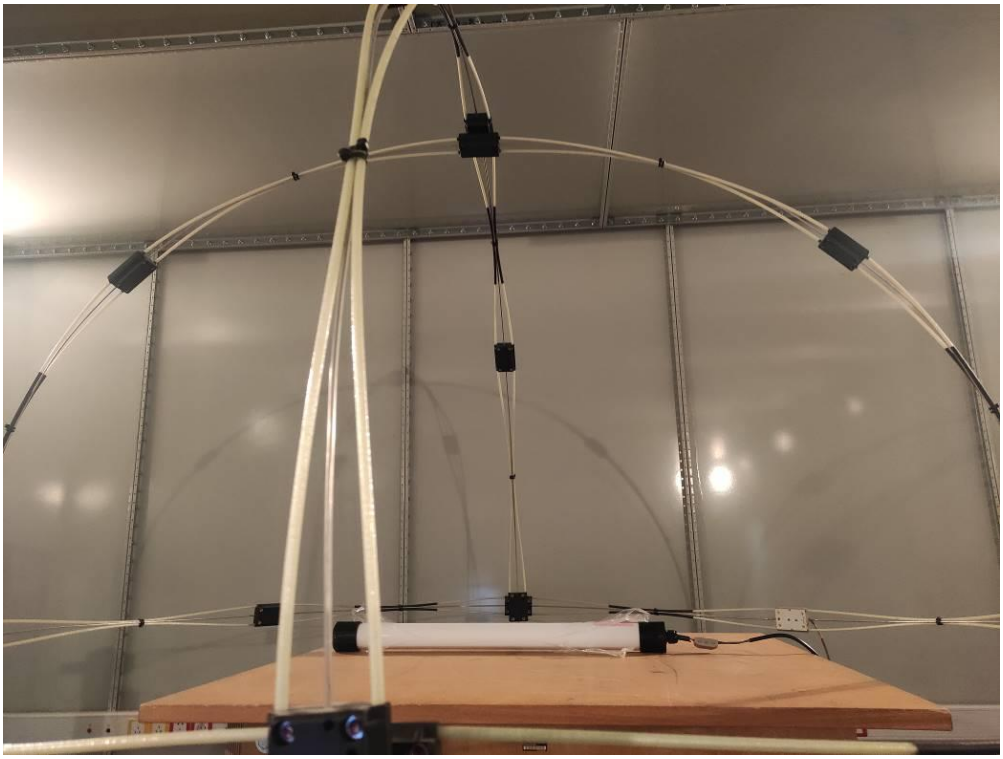
Photograph 5: Set-up for Radiated Susceptibility



Photograph 6: Set-up for Injected Current



Photograph 7: Set-up for Radiated electromagnetic disturbances



Photograph 8: Set-up for Harmonics



7 List of Tables

Table 1: List of Test and Measurement Equipment 5
Table 2: Measurement Uncertainty 5
Table 3: Harmonic currents measurement result 9
Table 4: ESD, Positive / Negative Polarity 21
Table 5: Radiated Susceptibility, Field Strength 3V/m 22
Table 6: Burst, Input AC Power lines, Positive/Negative Polarity 23
Table 7: Injected current, AC Power lines 24
Table 8: Surges to AC Power lines, positive/negative 25
Table 9: Test condition and Test result for Voltage Dips 26

8 List of Figures

Figure 1: Spectral Diagrams of disturbance voltage, 0.009-30MHz, L 12
Figure 2: Spectral Diagrams of disturbance voltage, 0.009-30MHz, N 13
Figure 3: Graphic description of radiated electromagnetic disturbances for X direction 15
Figure 4: Graphic description of radiated electromagnetic disturbances for Y direction 16
Figure 5: Graphic description of radiated electromagnetic disturbances for Z direction 17
Figure 6: Spectral Diagrams, RF Emission 19

9 List of Photographs

Photograph 1: Set-up for Conducted Emission 27
Photograph 2: Set-up for Radiated Emission (CDNE mode) 27
Photograph 3: Set-up for Electrostatic Discharge 28
Photograph 4: Set-up for Fast Transient Burst, Surges and Voltage Dips 28
Photograph 5: Set-up for Radiated Susceptibility 29
Photograph 6: Set-up for Injected Current 29
Photograph 7: Set-up for Radiated electromagnetic disturbances 30
Photograph 8: Set-up for Harmonics 30

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