

EMC Test Report

Applicant : Ledlenser Corporation Ltd.

Address : No.25, Yudong 1 Road, Dongcheng
Town, Yangdong District, Yangjiang City, GD,
529931, China

Product Name : Area Light

Report Date : Feb. 21, 2024

Shenzhen Anbotek Compliance Laboratory Limited



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TEST REPORT

Applicant : Ledlenser Corporation Ltd.

Manufacturer : Ledlenser GmbH & Co.KG

Product Name : Area Light

Test Model No. : AL10R Work

Reference Model No. : N/A

Trade Mark : Rating(s) : 30VDC,3.33A, 99.9W
Input: 100-240VAC, 50/60Hz,2.0A Max
Output: 30.0VDC,3.33A, 99.9W
Minimum: 10.8V 4700mAh 50.76Wh
Nominal:4900mAh10.8V 52.92WhTest Standard(s) : **EN IEC 55015:2019+A11:2020**
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A2:2021
EN IEC 61547:2023

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with above listed standard(s) requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt: Jan. 18, 2024

Date of Test: Jan. 18, 2024 to Jan. 25, 2024

Prepared By: 

(We Zeng)

Approved & Authorized Signer: 

(KingKong Jin)

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1. General Information

1.1. Client Information

Applicant	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD, 529931, China
Manufacturer	:	Ledlenser GmbH & Co.KG
Address	:	Kronenstrasse 5-7, 42699 Solingen, Germany
Factory	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD, 529931, China

1.2. Description of Device (EUT)

Product Name	:	Area Light
Test Model No.	:	AL10R Work
Reference Model No.	:	N/A
Trade Mark	:	
Test Power Supply	:	AC 230V, 50Hz / DC 10.8V
Test Sample No.	:	1-1-1
Adapter	:	LED Driver Model No:GQ120-300333-E3 Input:100-240V~50/60Hz 2.0A Max Output: 30.0V--- 3 33A 99.9W

Remark:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
/	/	/	/



1.4. Description of Test Modes

Pretest Modes	Descriptions
TM1	Charging mode
TM2	Lighting mode

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.5. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 9kHz~150kHz)	3.8dB
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Radiated emissions (30MHz~1000MHz)	Horizontal: 3.96dB; Vertical: 4.60dB
Harmonic current emissions	4.24%
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



1.6. Test Summary

Test Items	Test Modes	Status
Conducted disturbance requirements for wired network port - electric power supply	Mode1	P
LLAS radiated disturbance (9kHz-30MHz)	Mode1,2	P
Radiated disturbance (30MHz-1GHz)	Mode1,2	P
Harmonic current emission	Mode1	P
Voltage fluctuations and flicker	Mode1	P
Electrostatic discharges	Mode1,2	P
Radio-frequency electromagnetic fields	Mode1,2	P
Fast transients for AC power ports	Mode1	P
Surge for AC power ports	Mode1	P
Injected currents for AC power ports (150kHz-80MHz)	Mode1	P
Voltage dips	Mode1	P
Voltage short interruptions	Mode1	P
Note: P: Pass N: N/A, not applicable		

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1.7. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.:434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

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1.8. EMS Performance Criteria

Performance Criteria

General

For the various immunity tests that apply, the performance of the following functions shall be assessed, as far as applicable or specified by the manufacturer:

- the luminous intensity of the luminaire or of the light source(s);
- the control function, for example on/off switching, light level setting, colour adjustment, wireless control.

functions assessed and the performance criteria for each individual test shall be noted in the test report.

The effects of electromagnetic disturbances on the life of the equipment under test are excluded from this document.

Categorization of performance criteria

The following three categories of performance criteria apply.

a) 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.

b) 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 (30 min for high pressure gas discharge lamps). 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.

For emergency lighting equipment designed to operate in high-risk task areas, after the test, the luminous intensity shall be restored to its initial value within 0,5 s.

c) Performance criterion C

During and after the test, any change of the luminous intensity is allowed and the light source(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 following additional requirement applies to lighting equipment incorporating a starting device: after the test, the lighting equipment is switched off for 30 min and back on again. The lighting equipment shall start and operate as intended.

The application of the different performance criteria for the various types of tests and for different lighting equipment are specified in Clause 6.

Objective assessment of luminous intensity performance

A change of luminous intensity shall be checked by either one of the following requirements:

- no change of luminous intensity by visual observation, or
- the luminous intensity of a lighting equipment by measurement.

When being measured, the luminous intensity of lighting equipment shall be measured by means of an illuminance (lux) meter which is positioned in an axis perpendicular to the main plane of the lighting equipment, in its centre and at a distance for proper operation of the lux meter. The luminous intensity shall be deemed to be unchanged if the measured intensities during and after the test do not deviate by more than 15 %. In stand-by mode the change of the luminous intensity shall be less than 5 % of the maximum luminous intensity (100 % light output).

Care shall be taken to ensure the ambient light level does not influence the measurement results.

Precautions to achieve reproducible results given in the relevant light source performance standards shall be observed.



1.9. Test Equipment List

Conducted disturbance requirements for wired network port - electric power supply						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	2023-10-12	2024-10-11
2	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040D T001	2023-07-05	2024-07-04
3	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2023-10-12	2024-10-11
4	Software Name EZ-EMC	Farad Technology	ANB-03A	N/A	/	/

LLAS radiated disturbance (9kHz-30MHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2023-10-12	2024-10-11
2	Triple-Loop Antenna(2M)	EVERFINE	LLA-2	905003	2023-10-12	2024-10-11
3	Software Name EZ-EMC	Farad Technology	ANB-03A	N/A	/	/

Radiated disturbance (30MHz-1GHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2023-10-12	2024-10-11
2	Pre-amplifier	Schwarzbeck	BBV-9745	9745-075	2023-10-12	2024-10-11
3	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	2022-10-16	2025-10-15
4	Software Name EZ-EMC	Farad Technology	EMEC-3A1	N/A	/	/

Harmonic current emission Voltage fluctuations and flicker						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Programmable AC Power source	IVYTECH	APS-5005A	632734	2023-10-12	2024-10-11
2	Harmonic and Flicker Analyzer	EMC-PARTNER	HMONICS 1000-1P	164	2023-10-12	2024-10-11
3	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	/	/

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Electrostatic discharges						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	ESD Simulators	emtest	ESD NX30.1	11936	2023-03-17	2024-03-16

Radio-frequency electromagnetic fields						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Signal Generator	Agilent	N5181A	MY501431 07	2023-04-20	2024-04-19
2	Power Meter	Agilent	E4417A	MY451013 84	2023-04-20	2024-04-19
3	Amplifier	Micotop	MPA-80- 1000-600	MPA21103 18	2023-04-20	2024-04-19
4	Amplifier	Micotop	MPA-1000- 6000-100	MPA21103 27	2023-04-20	2024-04-19
5	Log.-Per.-Antenna	Schwarzbeck	VULP 9118E	01012	/	/
6	Microwave Log.- Per. Antenna	Schwarzbeck	STLP 9149	00788	/	/
7	Power Sensor	KEYSIGHT	E9323A	US404106 47	2023-04-20	2024-04-19
8	Power Sensor	KEYSIGHT	E9323A	MY531000 07	2023-04-20	2024-04-19
9	Electric field Probe	Narda S.T.S /PMM	EP 601	811ZX103 51	2023-04-20	2024-04-19
10	Software	EMtrace	EM 3	/	/	/

Fast transients for AC power ports						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Surge Generator	TESEQ	NSG 3060	1480	2023-10-12	2024-10-11
2	CDN	TESEQ	CDN 3061	1408	2023-10-12	2024-10-11
3	EFT-Clamp	PRIM	EFT-Clamp	/	2023-10-12	2024-10-11

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Surge for AC power ports						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Combined Wave Lightning Surge Simulator	3Ctest	CCS600	ES377170 2	2023-07-05	2024-07-04
2	Three Phase Power Coupling Network	3Ctest	SEPN69100 T	ES080175 7	2023-07-05	2024-07-04
3	Telecom port surge generator	PMI	TW101	190411	2023-04-20	2024-04-19

Injected currents for AC power ports (150kHz-80MHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/ 2012	2023-10-12	2024-10-11
2	CDN	FRANKONIA	CDN - M2+ M3	A2210178/ 2012	2023-10-12	2024-10-11
3	6dB Attenuator	FRANKONIA	DAM 26W	1172202	2023-10-12	2024-10-11
4	CIT-10	FRANKONIA	Version1.1.7	N/A	/	/
5	EM-Clamp	FRANKONIA	EMCL-20	18101728- 0103	2023-04-20	2024-04-19

Voltage dips Voltage short interruptions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	CYCLE SAG Simulator	PRIMA	DRP61011A G	PR120462 34	2023-10-12	2024-10-11

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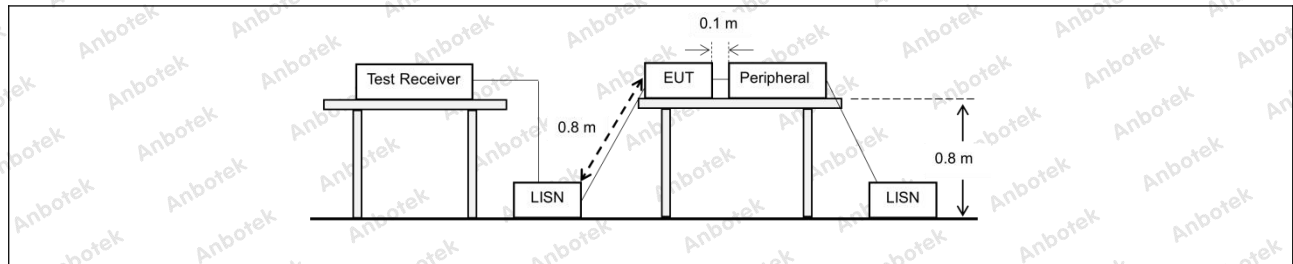
2. Conducted disturbance requirements for wired network port - electric power supply

Test Requirement:	Table 1		
Test Limit:	Frequency range	Limits (dBuV) (a)	
		Quasi-peak	Average
	9kHz to 50kHz	110	-
	50kHz to 150kHz	90 to 80	-
	150kHz to 0.5MHz	66 to 56 (b)	56 to 46 (b)
	0.5MHz to 5.0MHz	56 (c)	46 (c)
	5MHz to 30MHz	60	50
	Note: (a): At the transition frequency, the lower limit applies. (b): The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0,5 MHz. (c): For lighting equipment incorporating exclusively electrodeless lamps, the limit in the frequency range of 2,2 MHz to 3,0 MHz is 73 dB(μV) quasi-peak and 63 dB(μV) average.		
Test Method:	EN IEC 55015:2019+A11:2020		
Procedure:	An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.		

2.1. EUT Operation

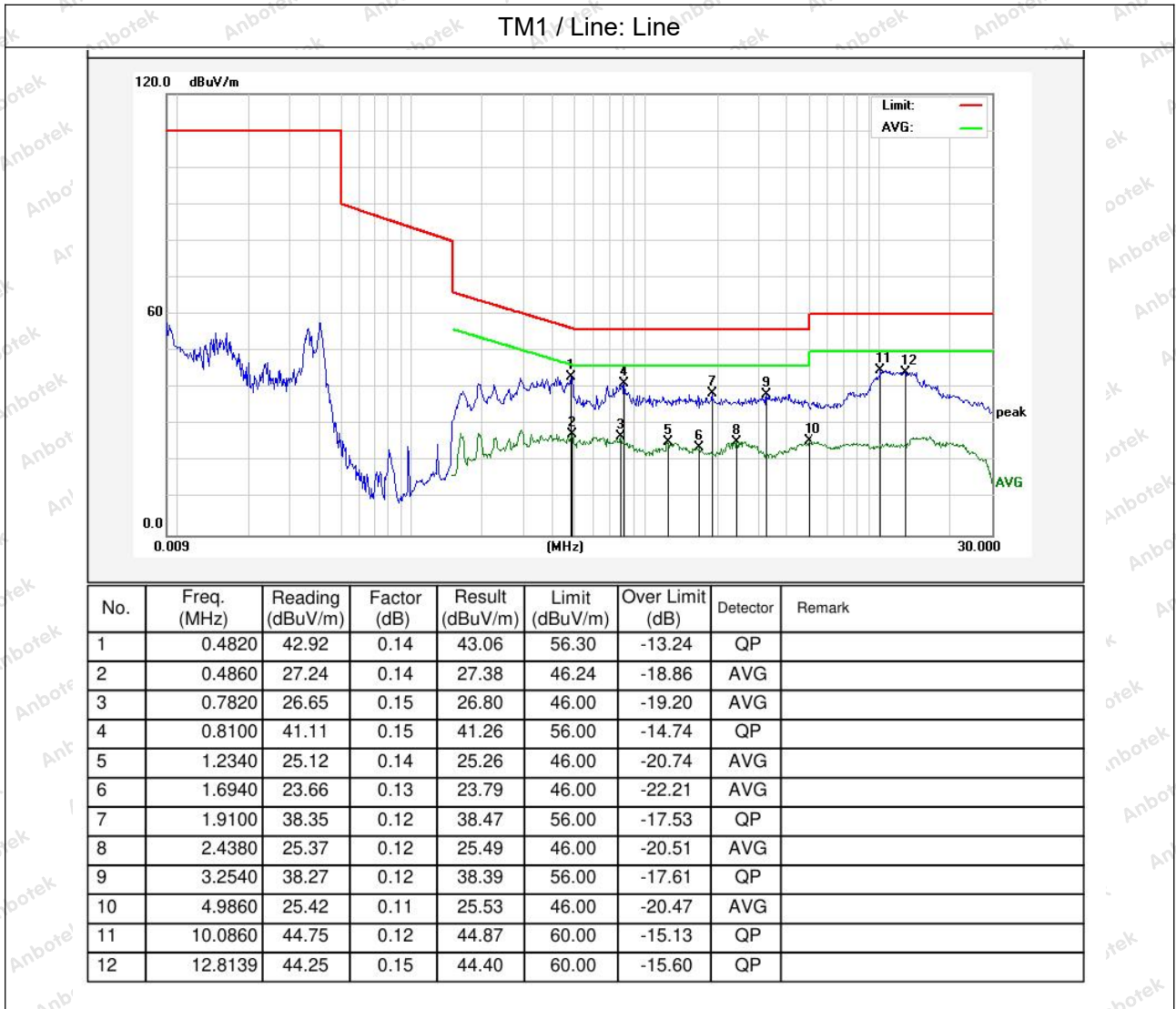
Operating Environment:	
Test mode:	1: TM1: Charging mode

2.2. Test Setup



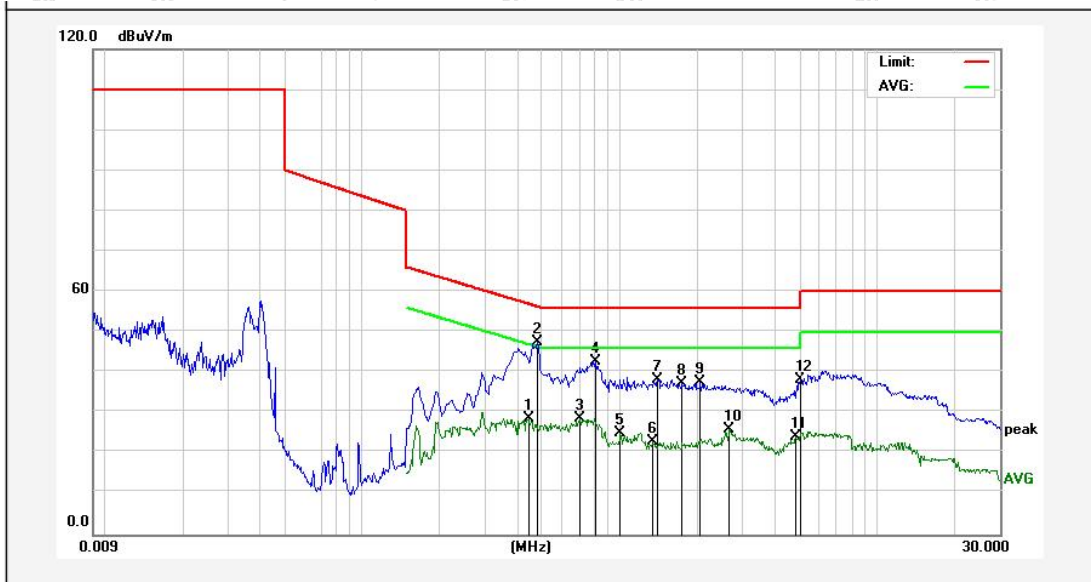
2.3. Test Data

Temperature:	23.1 °C	Humidity:	56.5 %	Atmospheric Pressure:	101 kPa
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Temperature:	23.1 °C	Humidity:	56.5 %	Atmospheric Pressure:	101 kPa
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TM1 / Line: Neutral



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Remark
1	0.4420	28.56	0.13	28.69	47.02	-18.33	AVG	
2	0.4820	47.28	0.14	47.42	56.30	-8.88	QP	
3	0.7019	28.49	0.15	28.64	46.00	-17.36	AVG	
4	0.8100	42.65	0.15	42.80	56.00	-13.20	QP	
5	1.0060	25.04	0.15	25.19	46.00	-20.81	AVG	
6	1.3460	22.67	0.14	22.81	46.00	-23.19	AVG	
7	1.3980	38.17	0.14	38.31	56.00	-17.69	QP	
8	1.7500	37.10	0.13	37.23	56.00	-18.77	QP	
9	2.0620	37.48	0.12	37.60	56.00	-18.40	QP	
10	2.6660	25.94	0.12	26.06	46.00	-19.94	AVG	
11	4.8260	23.95	0.11	24.06	46.00	-21.94	AVG	
12	4.9980	38.10	0.11	38.21	56.00	-17.79	QP	

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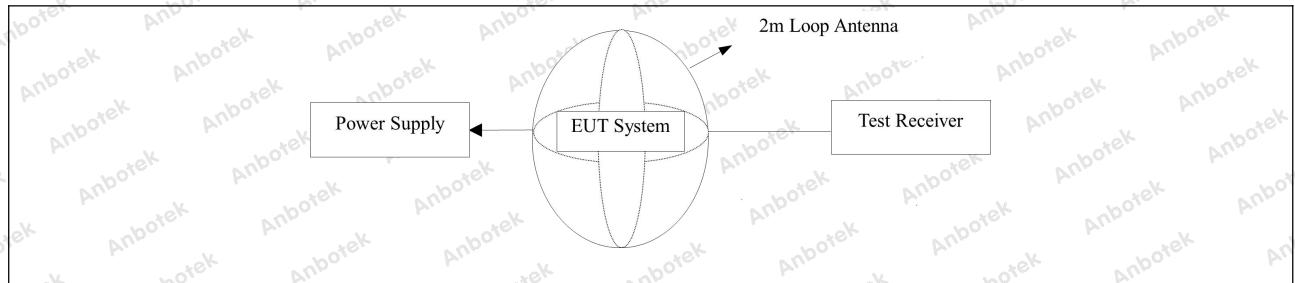
3. LLAS radiated disturbance (9kHz-30MHz)

Test Requirement:	Table 8	
Test Limit:	0.009MHz-0.07MHz	88dB(μA) quasi-peak
	0.07MHz-0.15MHz	88dB(μA)-58dB(μA) quasi-peak
	0.15MHz-3MHz	58dB(μA)-22dB(μA) quasi-peak
	3MHz-30MHz	22dB(μA) quasi-peak
	Detector:	Peak for pre-scan (200Hz resolution bandwidth) 0.009M to 0.15MHz Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz
Test Method:	EN IEC 55015:2019+A11:2020	
Procedure:	An initial pre-scan was performed in the 2m loop antenna using the spectrum analyser in peak detection mode. The EUT was measured for X(A), Y(B), Z(C) polarities.	

3.1. EUT Operation

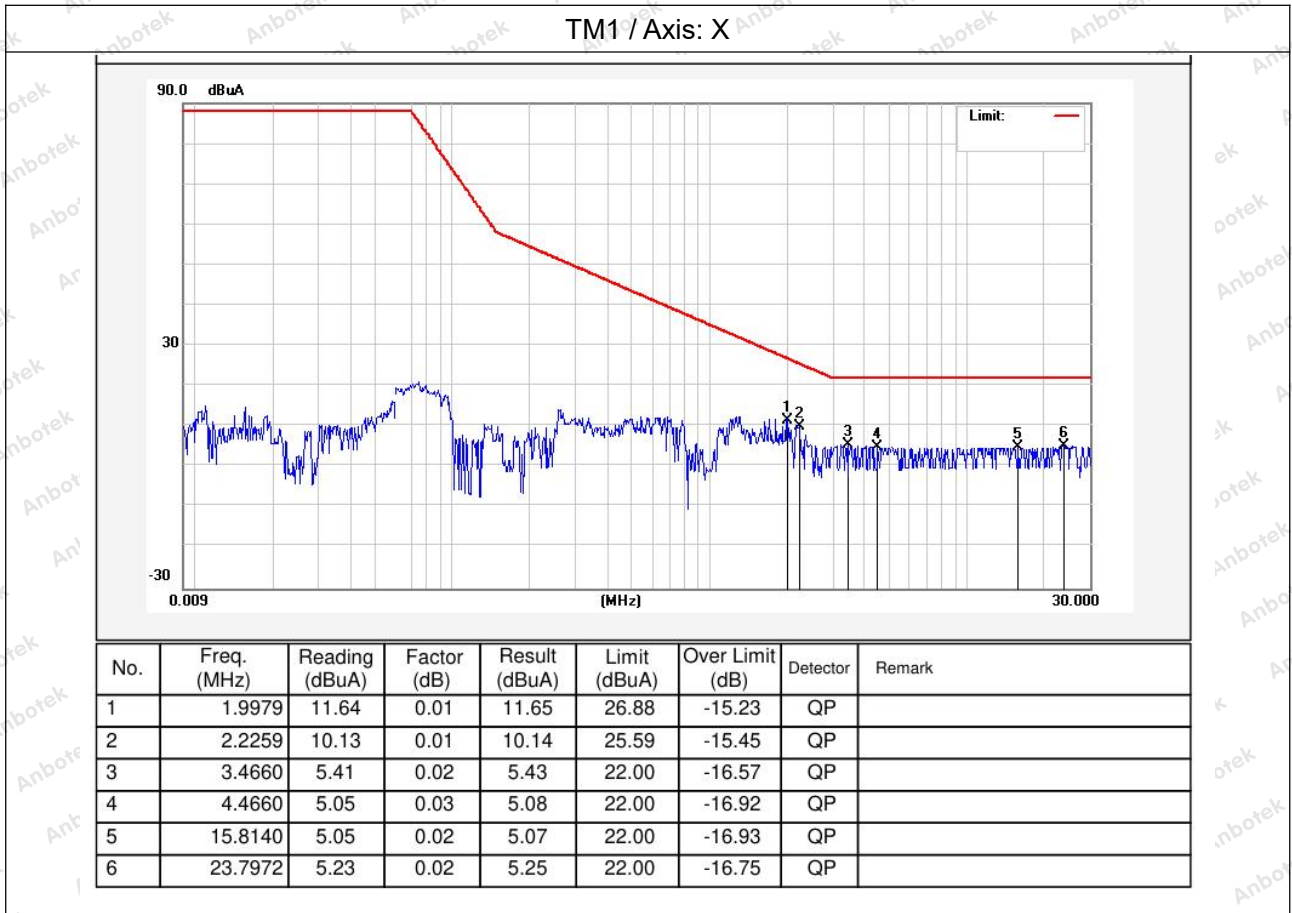
Operating Environment:	
Test mode:	1: TM1: Charging mode 2: TM2: Lighting mode

3.2. Test Setup



3.3. Test Data

Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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TM1 / Axis: Y



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	2.7099	10.39	0.02	10.41	23.22	-12.81	QP	
2	4.0739	5.48	0.03	5.51	22.00	-16.49	QP	
3	6.3780	7.02	0.07	7.09	22.00	-14.91	QP	
4	7.7380	5.18	0.06	5.24	22.00	-16.76	QP	
5	10.6059	5.33	0.01	5.34	22.00	-16.66	QP	
6	12.7780	5.27	0.02	5.29	22.00	-16.71	QP	

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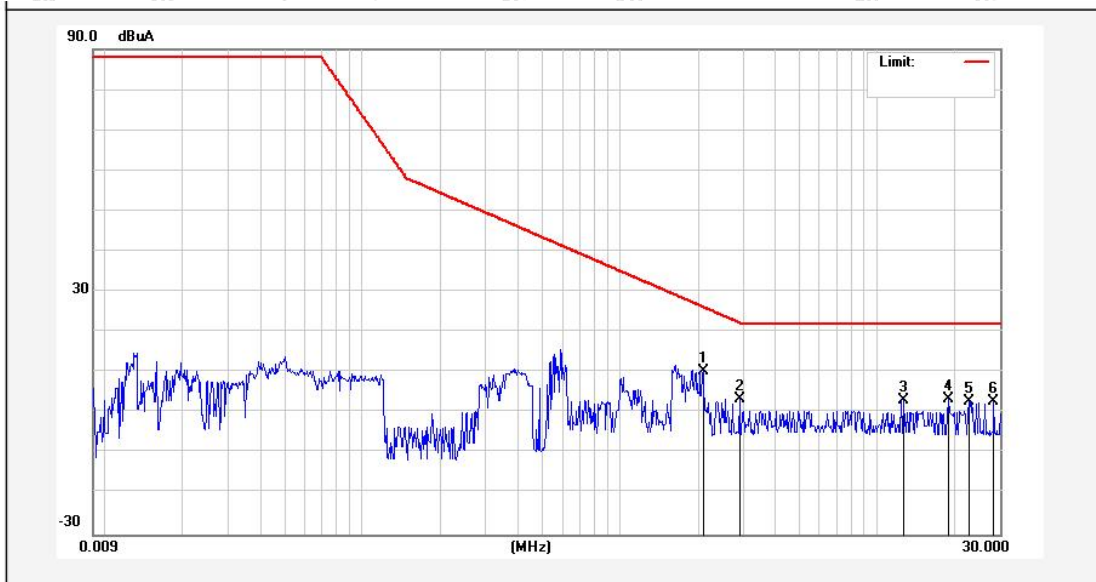
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Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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TM1 / Axis: Z



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	2.1059	10.30	0.01	10.31	26.25	-15.94	QP	
2	2.9100	3.55	0.02	3.57	22.37	-18.80	QP	
3	12.7217	3.04	0.02	3.06	22.00	-18.94	QP	
4	19.0457	3.50	0.02	3.52	22.00	-18.48	QP	
5	22.7896	2.90	0.02	2.92	22.00	-19.08	QP	
6	28.5457	2.69	0.02	2.71	22.00	-19.29	QP	

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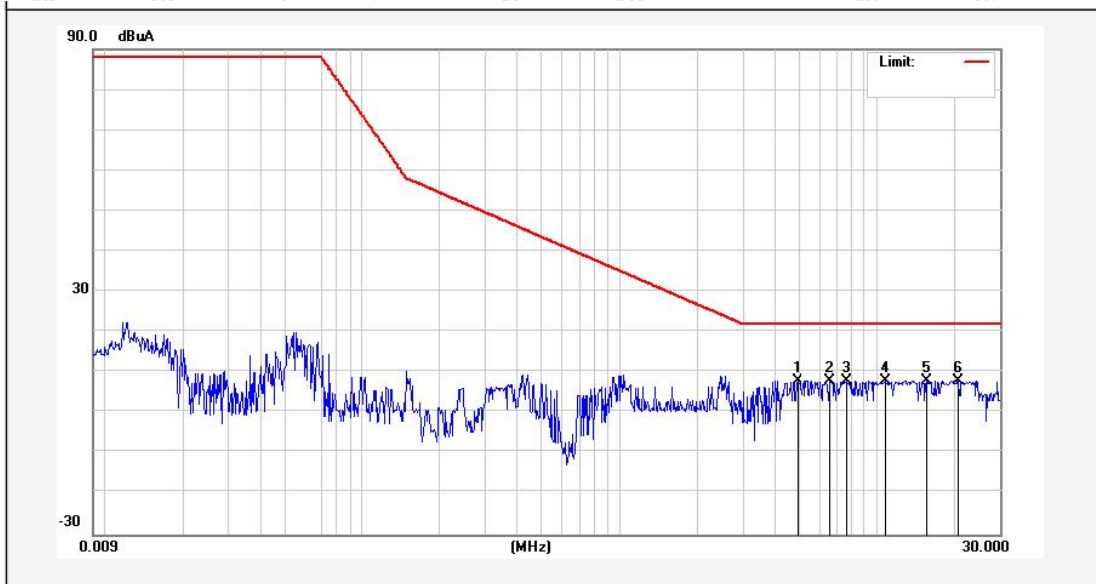
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Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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TM2 / Axis: X



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	4.9138	7.90	0.04	7.94	22.00	-14.06	QP	
2	6.6260	7.86	0.07	7.93	22.00	-14.07	QP	
3	7.6699	7.87	0.06	7.93	22.00	-14.07	QP	
4	10.8215	7.93	0.01	7.94	22.00	-14.06	QP	
5	15.5937	7.94	0.02	7.96	22.00	-14.04	QP	
6	20.6858	7.95	0.02	7.97	22.00	-14.03	QP	

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Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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TM2 / Axis: Y



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	1.6491	13.63	0.01	13.64	29.19	-15.55	QP	
2	1.9737	12.21	0.01	12.22	27.03	-14.81	QP	
3	3.0979	5.50	0.02	5.52	22.00	-16.48	QP	
4	13.9740	5.53	0.02	5.55	22.00	-16.45	QP	
5	17.1780	7.37	0.02	7.39	22.00	-14.61	QP	
6	29.2576	5.60	0.02	5.62	22.00	-16.38	QP	

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Temperature:	24 °C	Humidity:	50 %	Atmospheric Pressure:	101 kPa
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TM2 / Axis: Z



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	2.8500	10.06	0.02	10.08	22.62	-12.54	QP	
2	4.5620	6.44	0.04	6.48	22.00	-15.52	QP	
3	5.8098	7.68	0.06	7.74	22.00	-14.26	QP	
4	7.6580	6.43	0.06	6.49	22.00	-15.51	QP	
5	10.4458	7.74	0.01	7.75	22.00	-14.25	QP	
6	13.6257	7.68	0.02	7.70	22.00	-14.30	QP	

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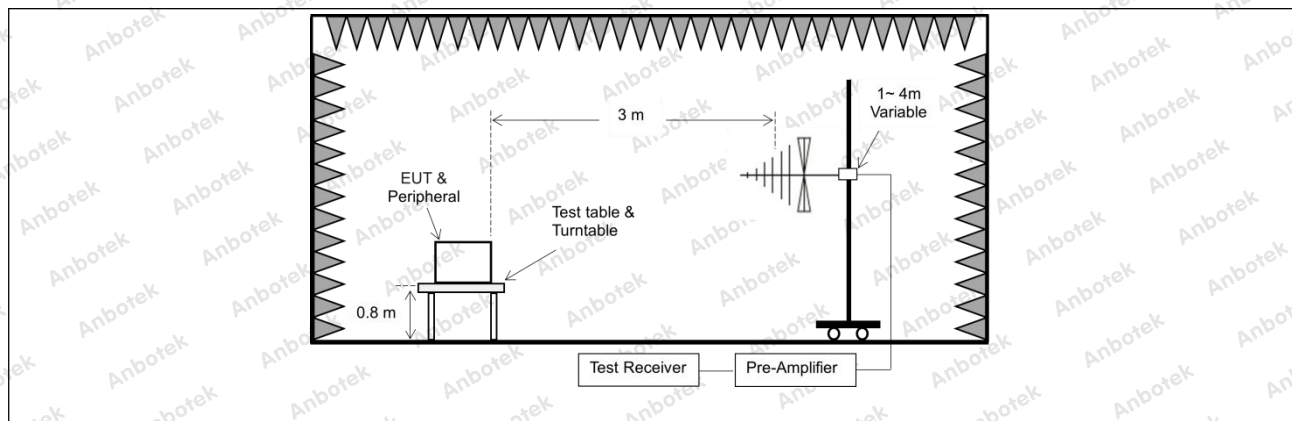
4. Radiated disturbance (30MHz-1GHz)

Test Requirement:	Table 10		
Test Limit:	FREQUENCY (MHz)	dB(μV/m) At 10m	dB(μV/m) At 3m
	30MHz-230MHz	30	40
	230MHz-1GHz	37	47
	Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz		
Test Method:	EN IEC 55015:2019+A11:2020		
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.		

4.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode 2: TM2: Lighting mode

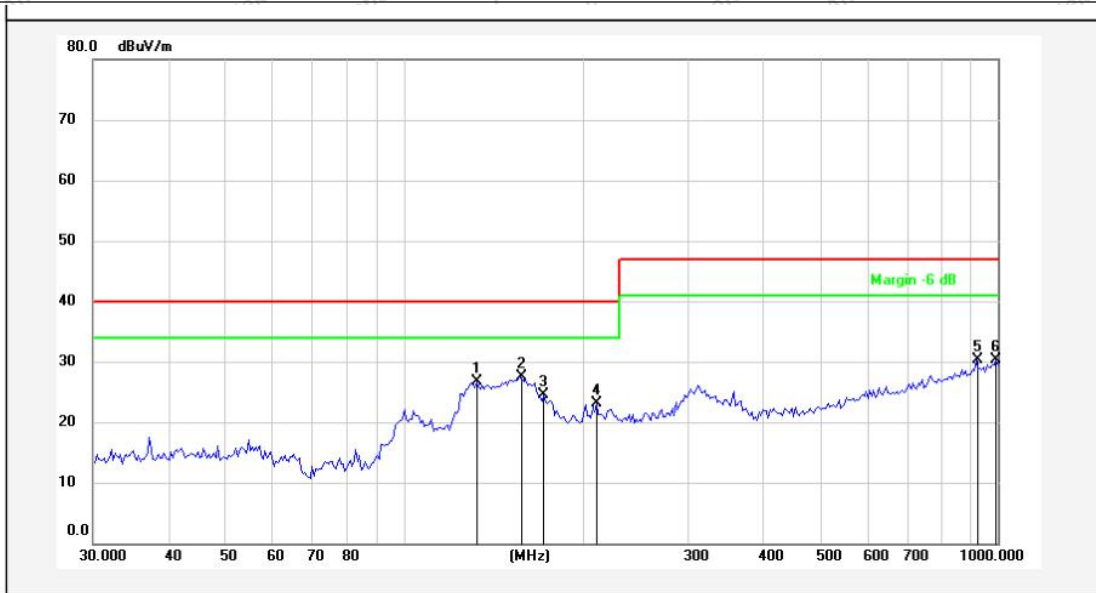
4.2. Test Setup



4.3. Test Data

Temperature:	24.9 °C	Humidity:	53.3 %	Atmospheric Pressure:	102 kPa
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TM1 / Polarization: Horizontal

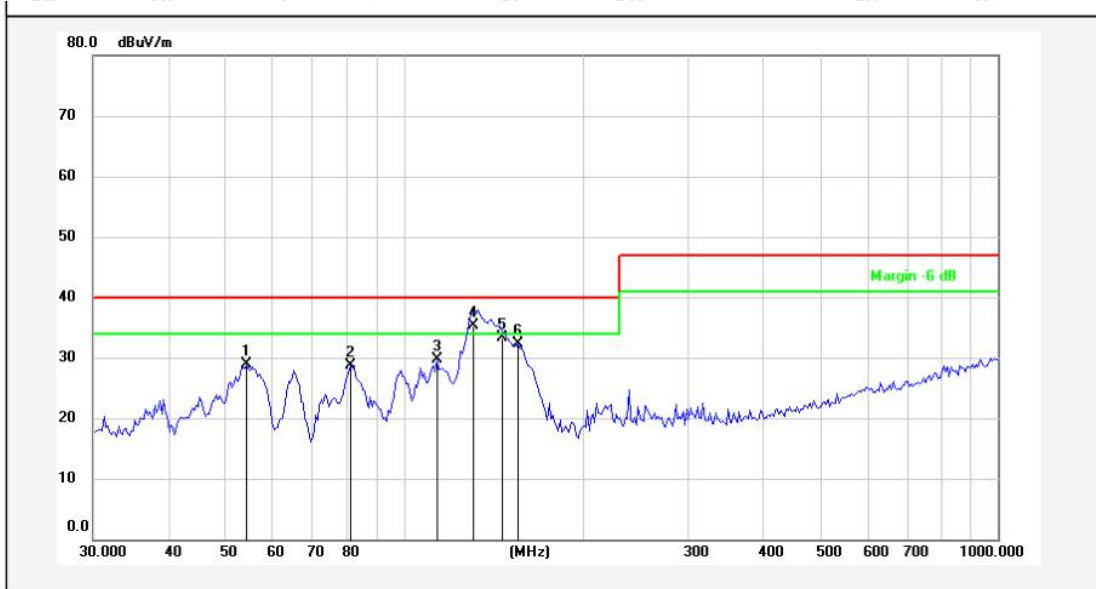


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	132.6850	47.64	-20.96	26.68	40.00	-13.32	QP			
2	157.0074	48.17	-20.70	27.47	40.00	-12.53	QP			
3	171.9946	44.28	-19.82	24.46	40.00	-15.54	QP			
4	210.7860	40.84	-17.73	23.11	40.00	-16.89	QP			
5	919.2866	34.63	-4.29	30.34	47.00	-16.66	QP			
6	993.0114	33.81	-3.55	30.26	47.00	-16.74	QP			



Temperature:	24.9 °C	Humidity:	53.3 %	Atmospheric Pressure:	102 kPa
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TM1 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	54.4516	46.41	-17.41	29.00	40.00	-11.00	QP			
2	81.2117	50.02	-21.28	28.74	40.00	-11.26	QP			
3	113.7143	48.41	-18.74	29.67	40.00	-10.33	QP			
4	130.2988	56.13	-20.83	35.30	40.00	-4.70	QP			
5	145.3506	54.45	-21.23	33.22	40.00	-6.78	QP			
6	155.9101	53.14	-20.77	32.37	40.00	-7.63	QP			

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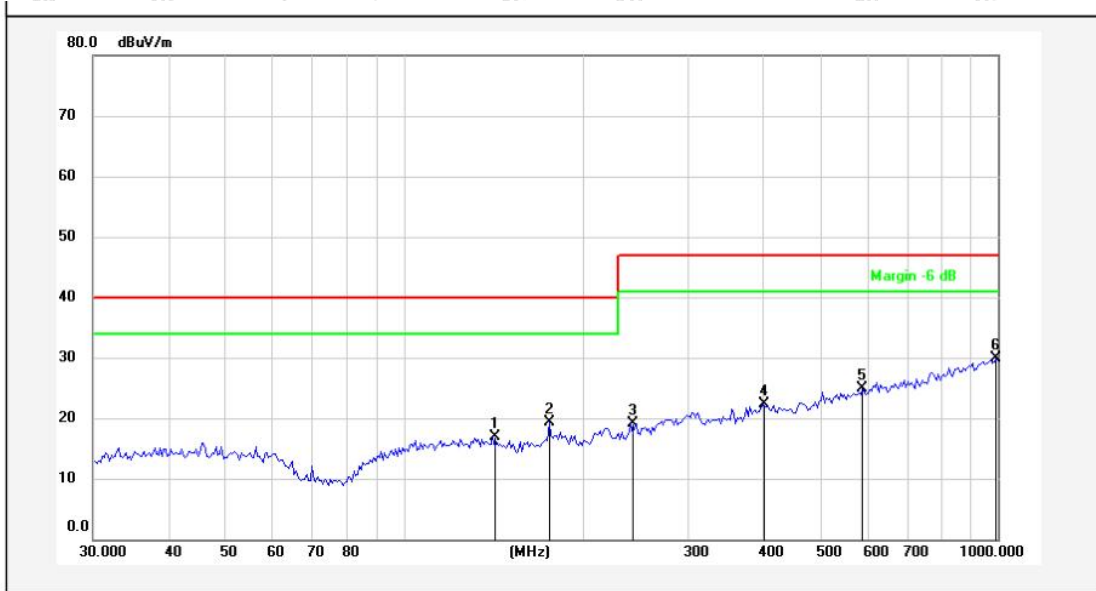
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Temperature:	24.9 °C	Humidity:	53.3 %	Atmospheric Pressure:	102 kPa
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TM2 / Polarization: Horizontal

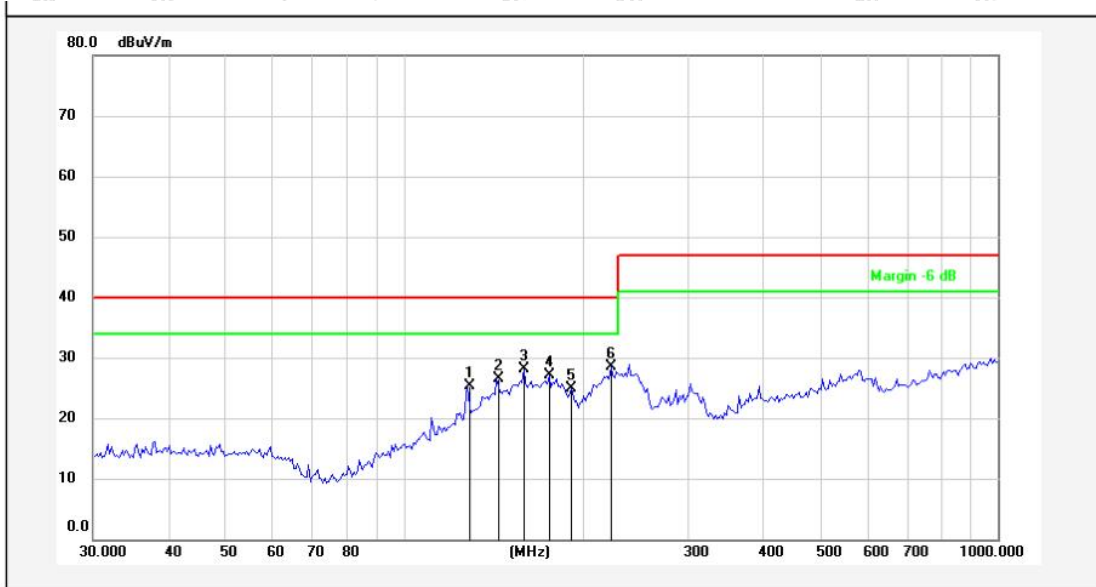


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	141.3298	38.29	-21.33	16.96	40.00	-23.04	QP			
2	175.6516	38.88	-19.60	19.28	40.00	-20.72	QP			
3	240.8304	35.48	-16.46	19.02	47.00	-27.98	QP			
4	401.8385	34.64	-12.38	22.26	47.00	-24.74	QP			
5	590.9737	33.47	-8.47	25.00	47.00	-22.00	QP			
6	993.0114	33.40	-3.55	29.85	47.00	-17.15	QP			



Temperature:	24.9 °C	Humidity:	53.3 %	Atmospheric Pressure:	102 kPa
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TM2 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	128.1130	45.83	-20.57	25.26	40.00	-14.74	QP			
2	143.3261	47.87	-21.28	26.59	40.00	-13.41	QP			
3	159.2251	48.68	-20.57	28.11	40.00	-11.89	QP			
4	175.6516	46.71	-19.60	27.11	40.00	-12.89	QP			
5	191.0738	43.61	-18.70	24.91	40.00	-15.09	QP			
6	222.9502	45.65	-17.21	28.44	40.00	-11.56	QP			



5. Harmonic current emission

Test Requirement:	Class C
Test Limit:	<p>For luminaires with incandescent lamps and built-in phase control dimming having a rated power greater than 25 W, the harmonics of the input current shall not exceed the limits given in Table 1.</p> <p>For any other lighting equipment having a rated power greater than 25 W, the harmonics of the input current shall not exceed the relative limits given in Table 2. For those types that include means for control (e.g. dimming, colour), the harmonics of the input current shall not exceed the harmonic current values derived from the percentage limits given in Table 2 for the maximum active input power (P_{max}) condition when tested in both following conditions:</p> <ul style="list-style-type: none"> - with the means for control set to obtain P_{max}; - with the means for control set to the position expected to produce the maximum total harmonic current (THC) within the active input power range [P_{min}, P_{max}], where <ul style="list-style-type: none"> • $P_{min} = 5 \text{ W}$, if $P_{max} \leq 50 \text{ W}$; • $P_{min} = 10 \%$ of P_{max}, if $50 \text{ W} < P_{max} \leq 250 \text{ W}$; • $P_{min} = 25 \text{ W}$, if $P_{max} > 250 \text{ W}$.



Table 1 – Limits for Class A equipment

Harmonic order <i>h</i>	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq h \leq 39$	$0,15 \frac{15}{h}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq h \leq 40$	$0,23 \frac{8}{h}$

Table 2 – Limits for Class C equipment ^a

Harmonic order <i>h</i>	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$\boxed{A_1}$ 27 ^b $\boxed{A_1}$
5	10
7	7
9	5
$11 \leq h \leq 39$ (odd harmonics only)	3

^a For some Class C products, other emission limits apply (see 7.4).

$\boxed{A_1}$ ^b The limit is determined based on the assumption of modern lighting technologies having power factors of 0,90 or higher. $\boxed{A_1}$

Test Method: EN IEC 61000-3-2:2019+A1:2021

5.1. EUT Operation

Operating Environment:

Test mode: 1: TM1: Charging mode

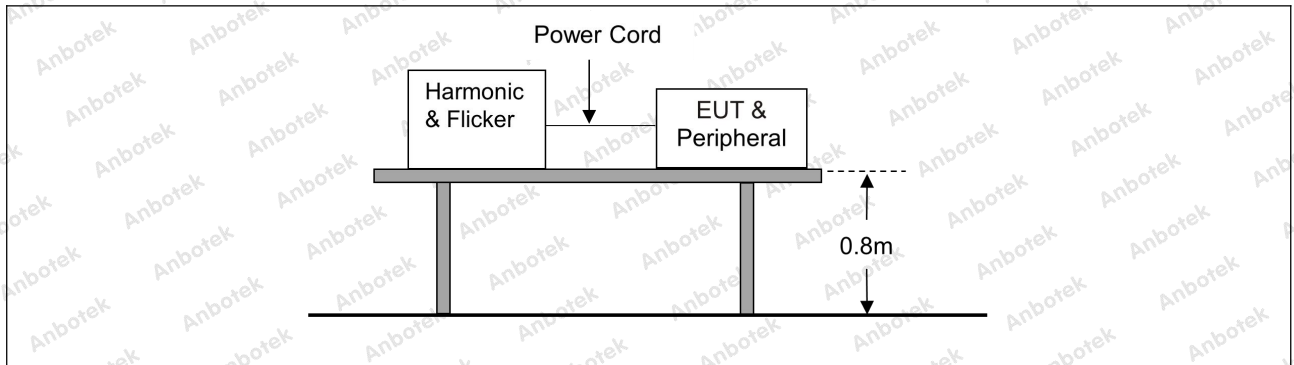
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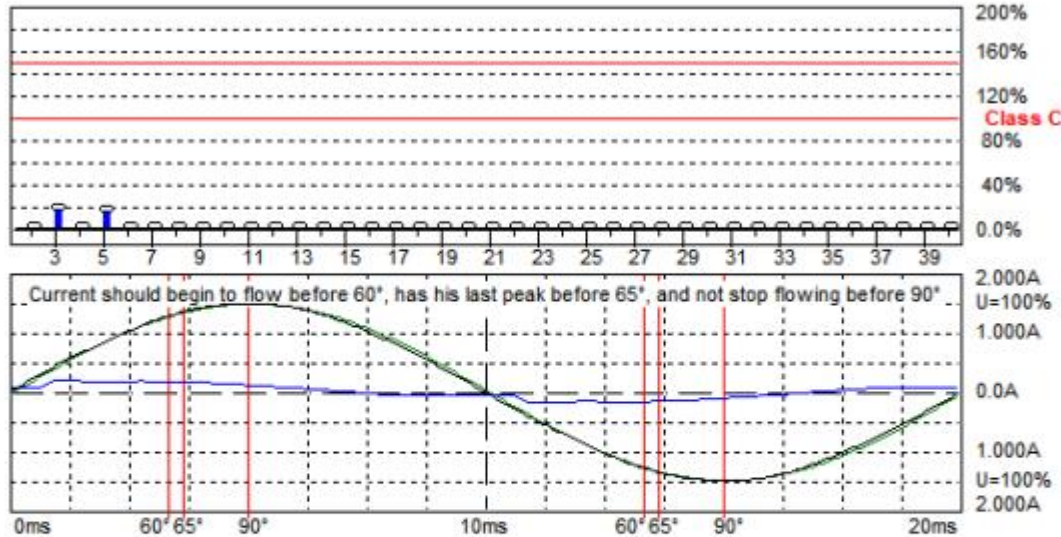
5.2. Test Setup



5.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
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Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)



Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

Urms = 229.5 V	P = 17.38 W	THC = 0.025 A	Range: 2 A
Irms = 0.114 A	pf = 0.663	H1max = 0.112 A	V-nom: 230 V

Test aborted, Result: PASSED

HAR-1000 EMC Partner

Full Bar : Actual Values
 Empty Bar : Maximum Values
 Blue : Current , Green : Voltage , Red : Failed



Report No.: 18240EC40003501

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Urms = 229.5V Freq = 50.013 Range: 2 A
 Irms = 0.114A Ipk = 0.198A cf = 1.735
 P = 17.38W S = 26.22VA pf = 0.663
 THDi = 21.9 % THDu = 0.10 % Class C

Test - Time : 3min (100 %)

Limit Reference: H1(max)= 0.1118A pf(max)= 1.000

Test aborted, Result: PASSED

Order	Freq.	Iavg	Iavg%	L	Irms	Irms%	Irms%	L	I _{max}	I _{max} %	Limit	Status	V _{max}
	[Hz]	[A]	[%]	[A]	[%]	[%]	[A]	[%]	[A]	[V]			
1	50	0.1099	0.1115	97.543	0.1116				229.54				
2	100	0.0000	0.0000	0.0000	0.0001				0.1473				
3	150	0.0161	16.800	0.0161	14.103	16.764	0.0162	16.891	0.0961			0.0245	
4	200	0.0000	0.0000	0.0000	0.0000				0.0000				
5	250	0.0106	15.577	0.0106	9.2949	15.577	0.0106	15.577	0.0682			0.0000	
6	300	0.0000	0.0000	0.0000	0.0000				0.0000				
7	350	0.0079	0.0079	6.9444	0.0081				0.0000				
8	400	0.0000	0.0000	0.0000	0.0000				0.0000				
9	450	0.0061	0.0061	5.3419	0.0061				0.0000				
10	500	0.0000	0.0000	0.0000	0.0000				0.0000				
11	550	0.0067	0.0067	5.8761	0.0067				0.0000				
12	600	0.0000	0.0000	0.0000	0.0001				0.0000				
13	650	0.0052	0.0052	4.5940	0.0052				0.0000				
14	700	0.0000	0.0000	0.0000	0.0000				0.0000				
15	750	0.0000	0.0038	3.3120	0.0038				0.0000				
16	800	0.0000	0.0000	0.0000	0.0000				0.0000				
17	850	0.0000	0.0028	2.4573	0.0028				0.0000				
18	900	0.0000	0.0000	0.0000	0.0000				0.0000				
19	950	0.0000	0.0026	2.2436	0.0027				0.0000				
20	1000	0.0000	0.0000	0.0000	0.0000				0.0000				
21	1050	0.0000	0.0027	2.3504	0.0027				0.0000				
22	1100	0.0000	0.0000	0.0000	0.0000				0.0000				
23	1150	0.0000	0.0026	2.2436	0.0026				0.0000				
24	1200	0.0000	0.0000	0.0000	0.0000				0.0000				
25	1250	0.0000	0.0026	2.2436	0.0027				0.0000				
26	1300	0.0000	0.0000	0.0000	0.0000				0.0000				
27	1350	0.0000	0.0023	2.0299	0.0023				0.0000				
28	1400	0.0000	0.0000	0.0000	0.0000				0.0000				
29	1450	0.0000	0.0018	1.6026	0.0018				0.0000				
30	1500	0.0000	0.0000	0.0000	0.0000				0.0000				
31	1550	0.0000	0.0016	1.3889	0.0016				0.0000				
32	1600	0.0000	0.0000	0.0000	0.0000				0.0000				
33	1650	0.0000	0.0016	1.3889	0.0016				0.0000				
34	1700	0.0000	0.0000	0.0000	0.0000				0.0000				
35	1750	0.0000	0.0017	1.4957	0.0017				0.0000				
36	1800	0.0000	0.0000	0.0000	0.0000				0.0000				
37	1850	0.0000	0.0016	1.3889	0.0017				0.0000				
38	1900	0.0000	0.0000	0.0000	0.0000				0.0000				
39	1950	0.0000	0.0015	1.2821	0.0015				0.0000				
40	2000	0.0000	0.0000	0.0000	0.0000				0.0000				

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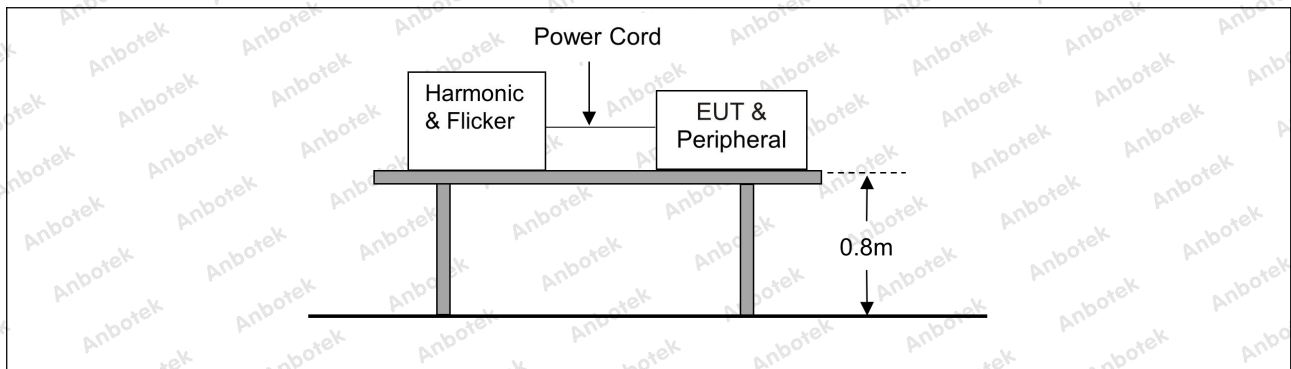
6. Voltage fluctuations and flicker

Test Requirement:	Clause 4
Test Limit:	Clause 5
Test Method:	EN 61000-3-3:2013+A2:2021

6.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

6.2. Test Setup

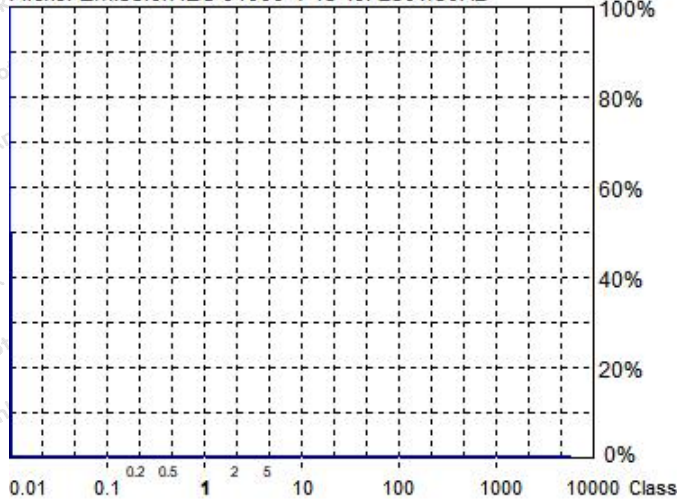


6.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
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Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

Flicker Emission IEC 61000-4-15 for 230V/50Hz



Actual Flicker (Fli):	0.00
Short-term Flicker (Pst):	0.07
Limit (Pst):	1.00
Long-term Flicker (Plt):	0.03
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	0.00%
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	0.00%
Limit (dc):	3.30%
Tmax 3.30% (dt):	0.00ms
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

Urms = 229.5 V P = 17.82 W
Irms = 0.116 A pf = 0.668

Range: 2 A
V-nom: 230 V

Test aborted, Result: PASSED

HAR-1000 EMC-Partner

Full Bar : Actual Values
Empty Bar : Maximum Values
Circles : Average Values
Blue : Current , Green : Voltage , Red : Failed

Urms = 229.5V Freq = 50.000 Range: 2 A
Irms = 0.116A Ipk = 0.205A cf = 1.765
P = 17.82W S = 26.67VA pf = 0.668

Test - Time : 10 x 1min = 10min (100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits : Plt : 0.65Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test aborted, Result: PASSED

P3s	dmax	dc	dt>Lim
	[%]	[%]	[ms]
1	0.010	0.000	0.000

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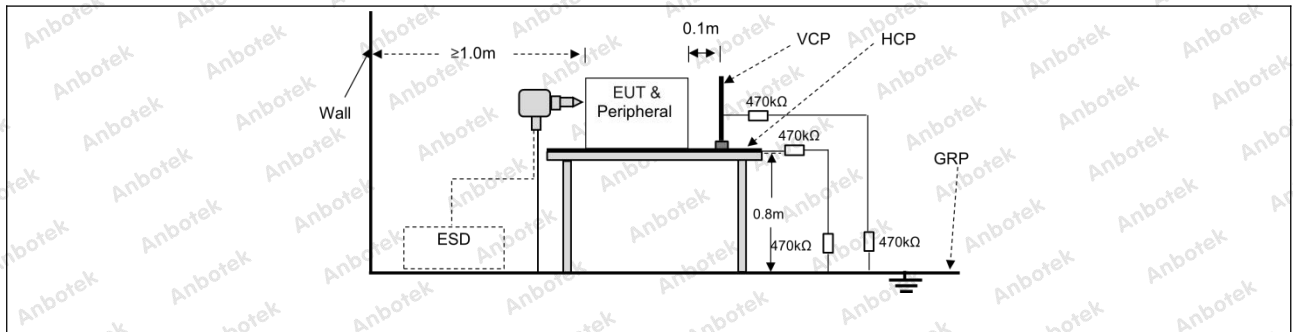
7. Electrostatic discharges

Test Requirement:	Contact Discharge: +/- 4kV Air Discharge: +/- 8kV
Test Method:	EN 61000-4-2: 2009
Procedure:	Discharge Impedance: 330Ω/150pF Number of Discharge: Minimum 10 times at each test point Discharge Mode: Single Discharge Discharge Period: 1 second minimum
Performance Criteria:	B

7.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode 2: TM2: Lighting mode

7.2. Test Setup



7.3. Test Data

Temperature:	22.1 °C	Humidity:	51 %	Atmospheric Pressure:	101 kPa
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Discharge type	Volt (kV)	Polarity	Test Point	Result/ Observations
Air discharge	2,4,8	+	1	A
Air discharge	2,4,8	-	1	A
Contact discharge	4	+	2	A
Contact discharge	4	-	2	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A

A: No degradation in the performance of the EUT was observed.



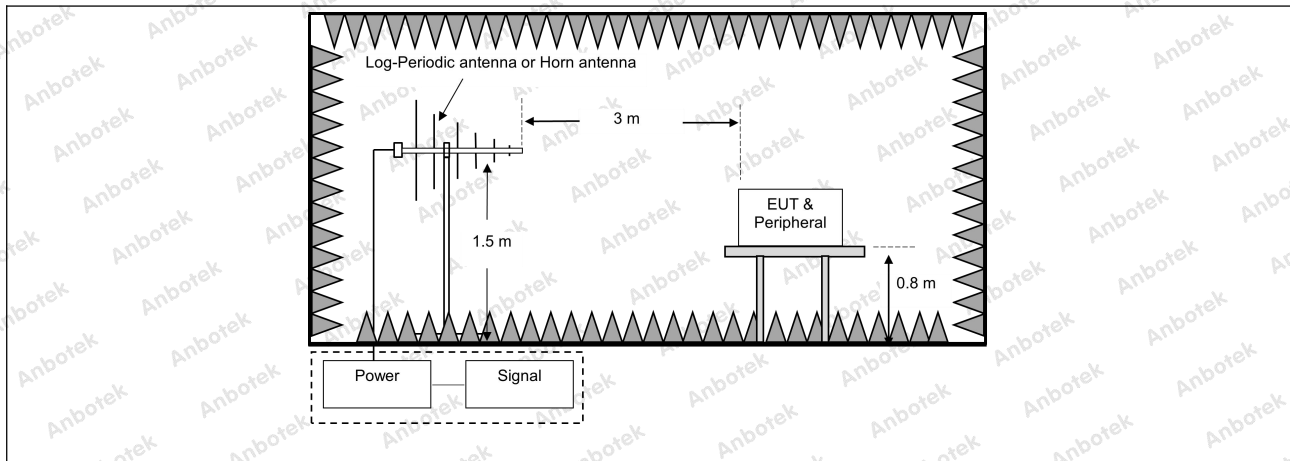
8. Radio-frequency electromagnetic fields

Test Requirement:	3V/m, 80%, 1kHz Amp. Mod.
Test Method:	EN IEC 61000-4-3: 2020
Procedure:	Frequency Range: 80MHz to 1GHz Antenna Polarisation: Vertical and Horizontal Modulation: 1kHz,80% Amp. Mod,1% increment
Performance Criteria:	A

8.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode 2: TM2: Lighting mode

8.2. Test Setup



8.3. Test Data

Temperature:	24.4 °C	Humidity:	51 %	Atmospheric Pressure:	101 kPa
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Frequency	Field Strength (V/m)	EUT face	Dwell time	Result/ Observations
80MHz-1GHz	3	Front	3s	A
80MHz-1GHz	3	Back	3s	A
80MHz-1GHz	3	Left	3s	A
80MHz-1GHz	3	Right	3s	A
80MHz-1GHz	3	Top	3s	A
80MHz-1GHz	3	Bottom	3s	A

A: No degradation in the performance of the EUT was observed.



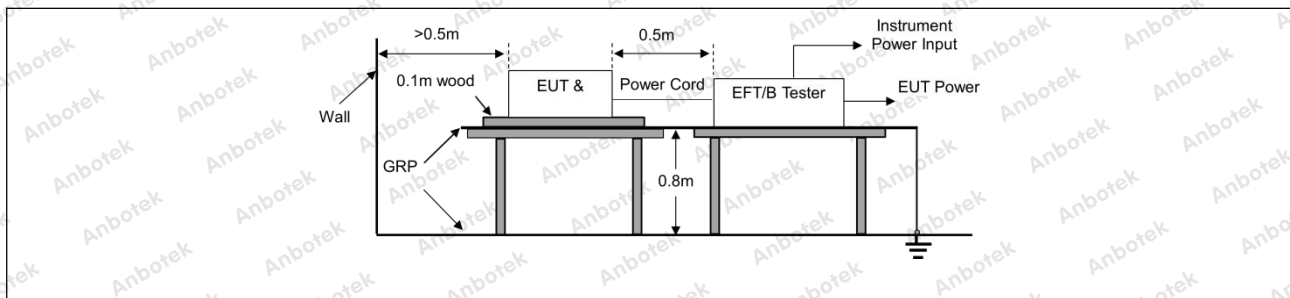
9. Fast transients for AC power ports

Test Requirement:	1kV; 5/50ns Tr/Td; 5kHz Repetition Frequency
Test Method:	EN 61000-4-4: 2012
Procedure:	Repetition Frequency: 5kHz Burst Period: 300ms Test Duration: 2 minute per level & polarity
Performance Criteria:	B

9.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

9.2. Test Setup



9.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
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Port	Volt (kV)	Polarity	CDN/ Clamp	Result/ Observations
AC power port	1	+	CDN	A
AC power port	1	-	CDN	A

A: No degradation in the performance of the EUT was observed.



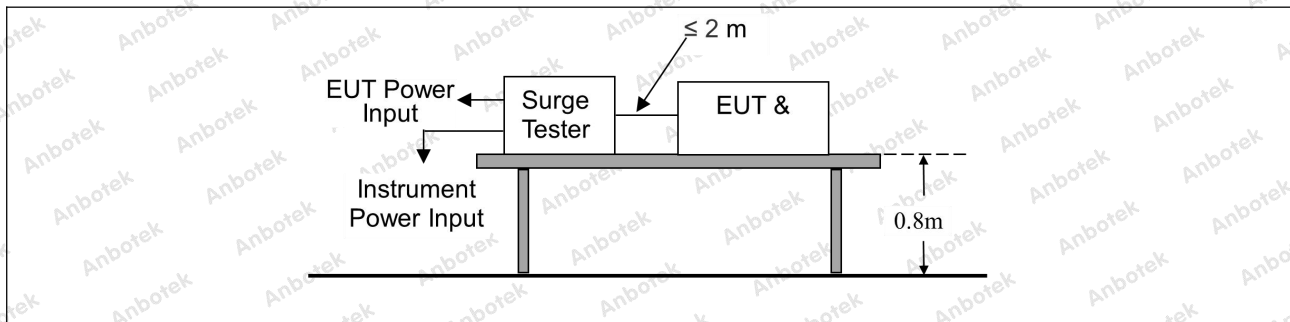
10. Surge for AC power ports

Test Requirement:	1.2/50 μ s Tr/Td; 1kV Line to Line
Test Method:	EN 61000-4-5:2014 +A1:2017
Procedure:	Interval: 60s between each surge No. of surges: 5 positive, 5 negative at 90°, 270°
Performance Criteria:	C

10.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

10.2. Test Setup



10.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
--------------	---------	-----------	------	-----------------------	---------

Port	Volt (kV)	Polarity	Phase(degree)	Result/ Observations
L-N	1	+	90°	A
L-N	1	-	270°	A

A: No degradation in the performance of the EUT was observed.



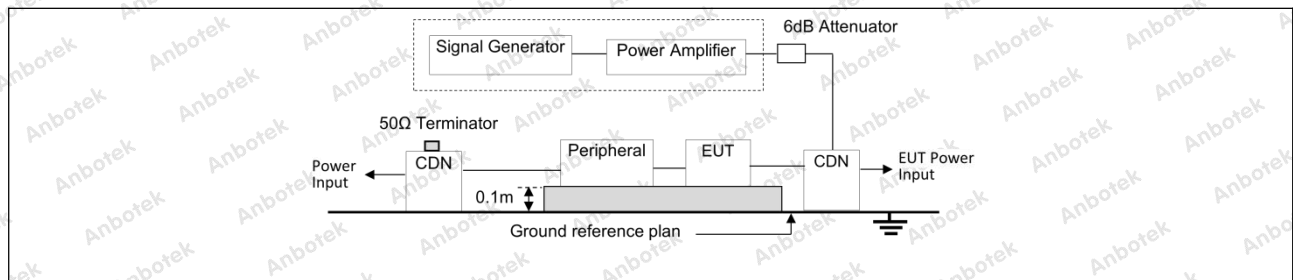
11. Injected currents for AC power ports (150kHz-80MHz)

Test Requirement:	0,15 to 80MHz 3Vrms (emf), 80%,1kHz Amp. Mod.
Test Method:	EN 61000-4-6: 2014
Procedure:	Frequency Range: 0.15MHz to 80MHz Modulation: 80%, 1kHz Amplitude Modulation Step Size: 1%
Performance Criteria:	A

11.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

11.2. Test Setup



11.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
--------------	---------	-----------	------	-----------------------	---------

Port	Strength (Vrms)	CDN/Clamp	Dwell time	Result/ Observations
AC power port	3	CDN	3s	A

A: No degradation in the performance of the EUT was observed.

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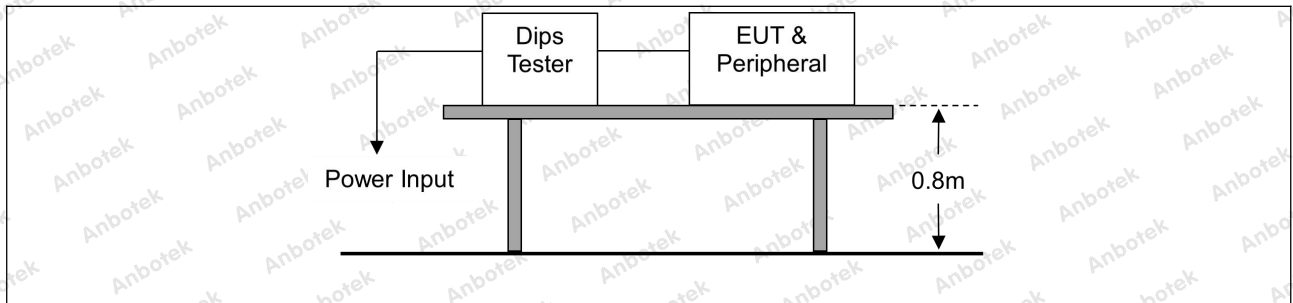
12. Voltage dips

Test Requirement:	70 % UT for 10cycles, UT is Supply Voltage
Test Method:	EN IEC 61000-4-11:2020
Procedure:	70 % of UT (Supply Voltage) for 10 Period; No. of Dips / Interruptions: 3 per Level Time between dropout 10s
Performance Criteria:	B

12.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

12.2. Test Setup



12.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
--------------	---------	-----------	------	-----------------------	---------

Level %UT	Phase (degree)	Duration	No. of Dips/ Interruptions	Result/ Observations
70	0°	10 Cycles	3	A
70	180°	10 Cycles	3	A

A: No degradation in the performance of the EUT was observed.



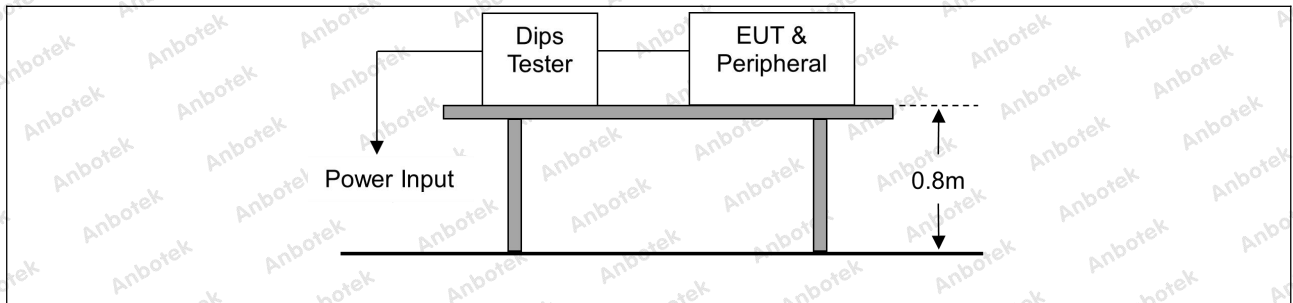
13. Voltage short interruptions

Test Requirement:	0 % UT for 0.5cycle, UT is Supply Voltage
Test Method:	EN IEC 61000-4-11:2020
Procedure:	0% of UT (Supply Voltage) for 0.5 Periods; No. of Dips / Interruptions: 3 per Level Time between dropout 10s
Performance Criteria:	B

13.1. EUT Operation

Operating Environment:	
Test mode:	1: TM1: Charging mode

13.2. Test Setup



13.3. Test Data

Temperature:	22.3 °C	Humidity:	48 %	Atmospheric Pressure:	101 kPa
--------------	---------	-----------	------	-----------------------	---------

Level %UT	Phase (degree)	Duration	No. of Dips/ Interruptions	Result/ Observations
0	0°	0.5 Cycles	3	A
0	180°	0.5 Cycles	3	A

A: No degradation in the performance of the EUT was observed.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Conducted disturbance requirements for wired network port - electric power supply



LLAS radiated disturbance (9kHz-30MHz)



Radiated disturbance (30MHz-1GHz)



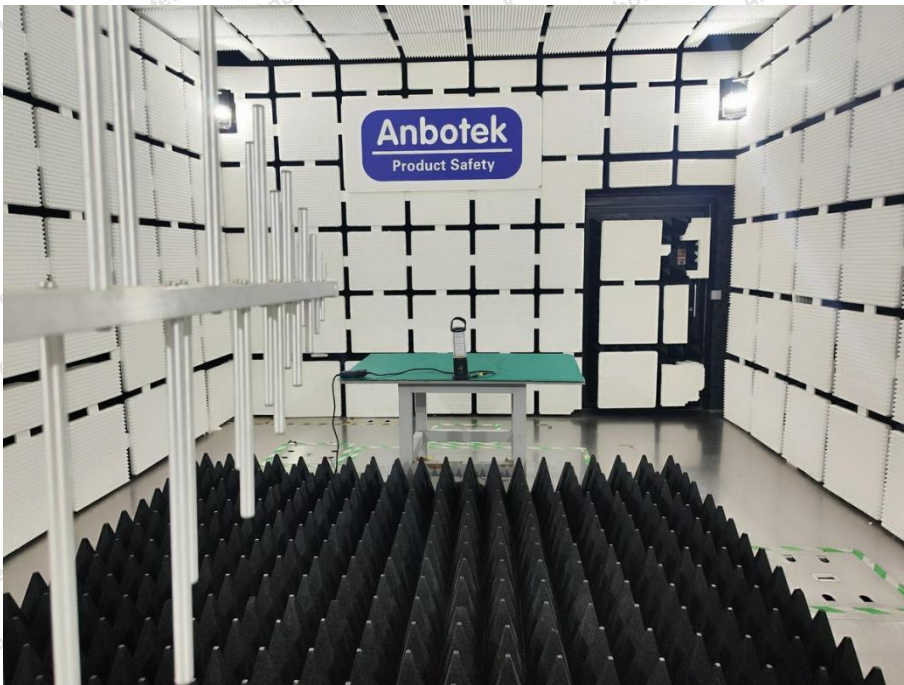
Harmonic current emission Voltage fluctuations and flicker



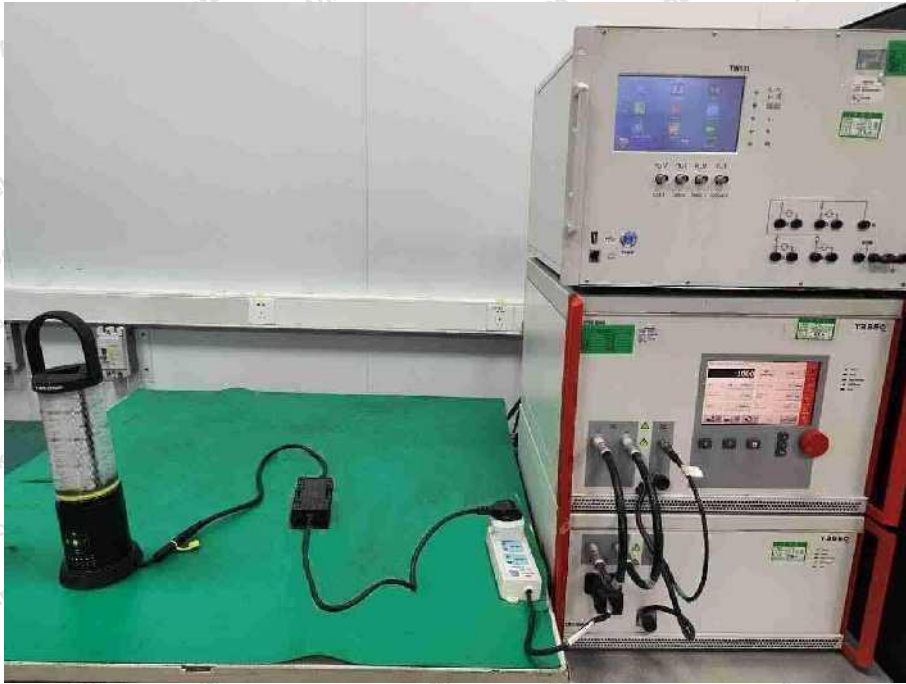
Electrostatic discharges



Radio-frequency electromagnetic fields



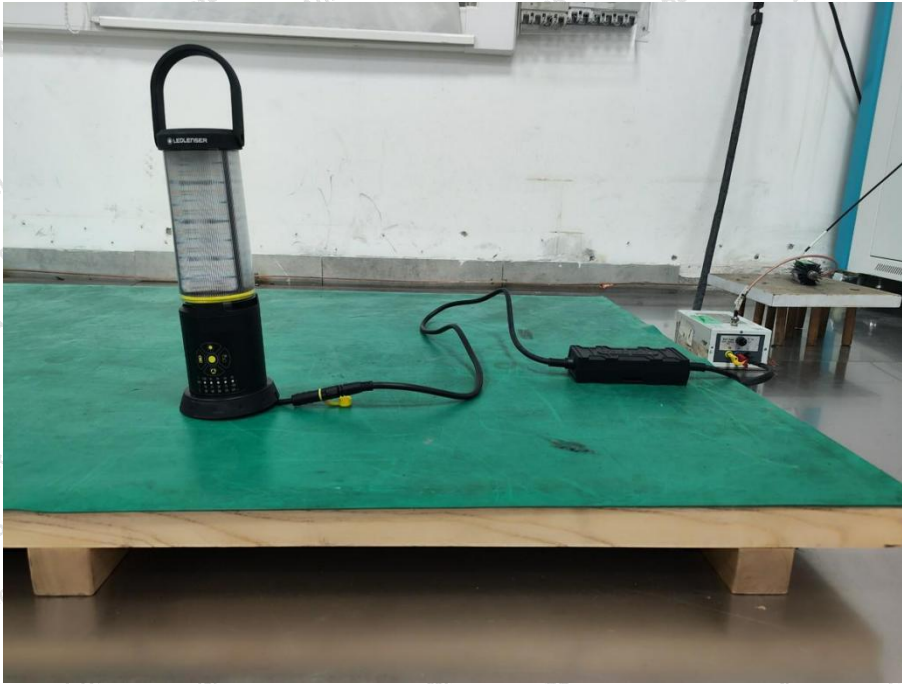
Fast transients for AC power ports



Surge for AC power ports



Injected currents for AC power ports (150kHz-80MHz)



Voltage dips
Voltage short interruptions



APPENDIX II -- Photo documentation



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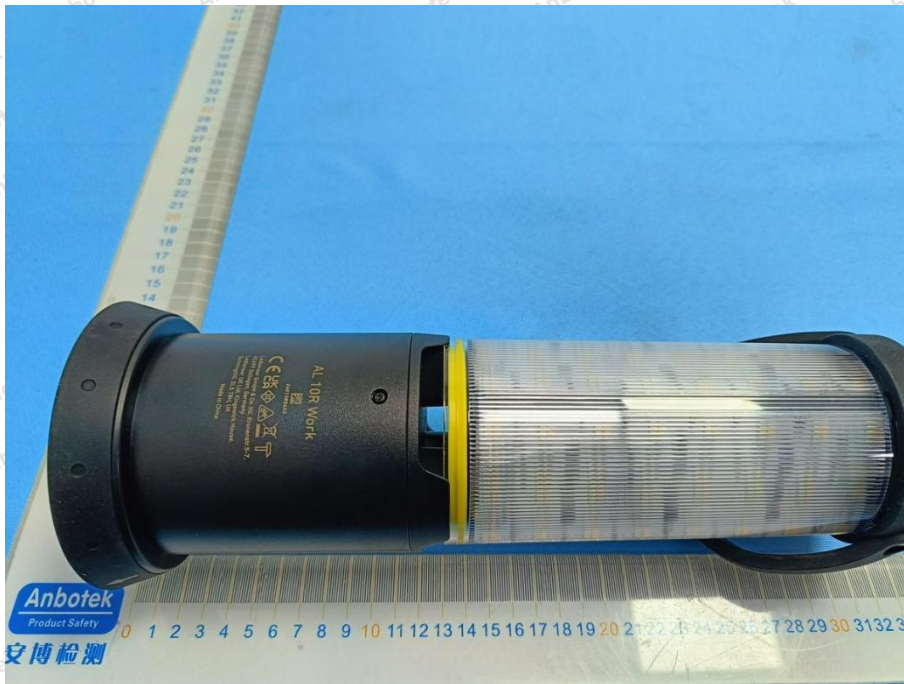
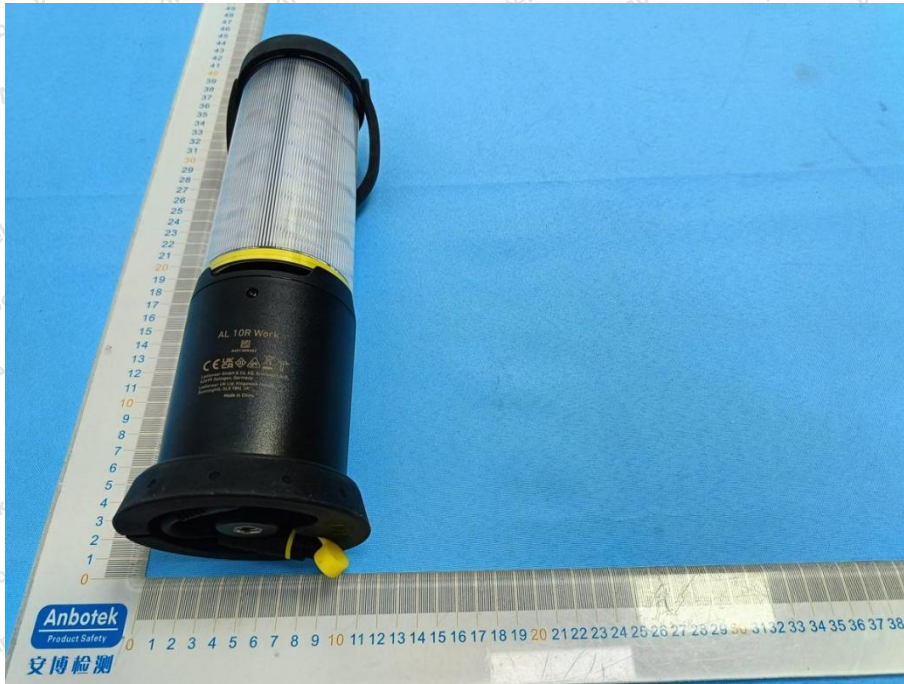
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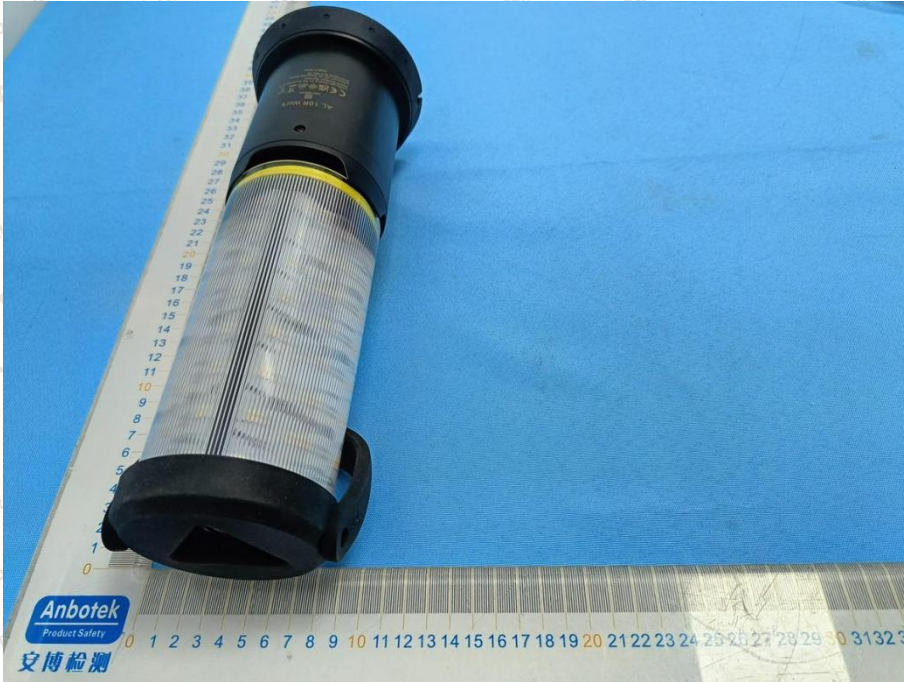


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CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:
If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.
4. The CE marking must be affixed visibly, legibly and indelibly.
It must have the same height as the initials 'CE'.

----- End of Report -----

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