

Test Report

EN 55015: 2019+A11:2020

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
 EN 61547: 2009

Equipment for general lighting purposes - EMC immunity requirements

Report Reference No.: STON221205538-E

Compiled by

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Date of issue: 2022-12-05

Laboratory Name: Guangdong STON Testing Technology Co., Ltd.

Address: 1/F, No.42 ChangAn South Road, Henglan Town, Zhongshan City, Guangdong Province, China.

Testing location/ procedure: Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing methods

Applicant's name: Zhongshan Dingguang Lighting Co., Ltd

Address: No.13, Fuqing 1st Road, Yongxing Industrial Area, Henglan, Zhongshan, China 528478

Test specification:

Standards: EN 55015: 2019+A11:2020
 EN 61547: 2009

Test Report Form No.: IECEN55015-A1

TRF Originator: Guangdong STON Testing Technology Co., Ltd.

Master TRF: Dated 2021-03

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Product Name: Track Light

Model/Type reference: MS30-DF300

Ratings: 48VDC;30W

Result: Pass

EMC -- TEST REPORT

Test Report No. : STON221205538-E	2022-12-05
	Date of issue

Equipment under Test : Track Light

Trade Mark : Top

Model / Type : MS30-DF300

Listed Models : M20-DF200,M20-DF300,MS30-DF600,M20-DF340,MS30-LB24,M20-DF600,MS30-LB48,M20-DF680,MS30-FD5,M20-DF900,MS30-FD10,M20-DF1200,MS30-FD5D,M20-DF90,MS30-FD10D,M20-SP4,MS30-TL7,M20-SP8,MS30-TL12,M20-LBR6,MS30-DR54,M20-LBR12,MS30-DS54,M20-LBR18,MS30-DR54R,M20-DFR360,MS30-SP1,M20-DFR700,MS30-SA1,M20-FD6X,MS30-SP100,M20-FD12X,MS30-SP200,M20-FD18X,MS30-FT500,M20-FD340X,MS30-FT1000,M20-FD680X,MS30-FT1500,M20-LB10,MS30-HC7W,M20-LB20,MS30-HS7W,M20-LB6,M20-LB12,M20-LB18,M20-LB24,M20-FD6,M20-FD12,M20-FD6D,M20-FD12D,M20-RS6,M20-RS9,M20-TL5,M20-TL7,M20-TL9,M20-TL12,M20-TL18,M20-TL20,M20-TL30,M35-DF265,M35-DF530,M35-DF90,M35-LB5,M35-LB10,M35-LB15,L35-SL5,M35-SL10,M35-FD5,M35-FD10,M35-TL5,M35-TL7, M35-TL9,M35-TL12,M35-TL18,M35-TL20,M35-TL30,M20/35-TB9W,M20/35-TA7W,M20/35-HG9W,M20/35-MN25,M20/35-MN30,M20/35-MN35,M20/35-MN40,M20/35-MN45,M20-SP100,M20-SP200,M35-SP100,M35-SP200,M35-SP300,LRC-48V100W,LRC-48V150W,LRC-48V200W,LRC-48V300W,LRC-48V360W,M20-SP300,MS30-SP300

Applicant : Zhongshan Dingguang Lighting Co., Ltd

Address : No.13, Fuqing 1st Road,Yongxing Industrial Area, Henglan, Zhongshan, China 528478

Manufacturer : Zhongshan Dingguang Lighting Co., Ltd

Address : No.13, Fuqing 1st Road,Yongxing Industrial Area, Henglan, Zhongshan, China 528478

Test Result according to the standards on page 5:	Pass
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

History of this test report

Report No.	Version	Description	Issued Date
STON221205538-E	V1.0	Initial Issued Report	2022-12-05

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1. TEST STANDARDS

The tests were performed according to following standards:

[EN 55015: 2019+A11:2020](#) Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

[EN 61547: 2009](#) Equipment for general lighting purposes - EMC immunity requirements

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : 2022-12-01

Testing commenced on : 2022-12-01

Testing concluded on : 2022-12-05

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : 230V / 50 Hz 120V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)

48V DC

2.3. Short description of the Equipment under Test (EUT)

The EUT is a Track Light (Magnetic track light) .

2.4. EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Test program (customer specific)

Emission tests.....: According to EN 55015, searching for the highest disturbance.
Immunity tests.....: According to EN 61547, searching for the highest susceptibility.

2.5. EUT configuration:

The following peripheral devices and interface cables were connected during the measurement:

n - supplied by the manufacturer

o - supplied by the lab

2.6. Performance level

A functional description of performance criteria, during or as a consequence of the immunity testing, shall be provided by the manufacturer and noted in the test report.

The performance of lighting equipment shall be assessed by monitoring:

- the luminous intensity of the luminaire or of the lamp(s);
- the functioning of the control in the case of equipment which includes a regulating control or concerns the regulating control itself;
- the functioning of the starting device, if any.

Definition related to the performance level:

- based on the used product standard
- o based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Criterion B:

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Criterion C:

During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished . After the test , within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Guangdong STON Testing Technology Co., Ltd.
1/F, No.42 ChangAn South Road, Henglan Town, Zhongshan City, Guangdong Province, China.

There is one Shield Room and Two EMC Labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 15/EN 55015 requirements.

3.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.3. Test Description

Emission Measurement		
Magnetic Field Emission	EN 55015: 2019+A11:2020	PASS
Conducted Disturbance	EN 55015: 2019+A11:2020	N/A
Radiation Emission	EN 55015: 2019+A11:2020	PASS
Harmonic Current	EN 61000-3-2: 2019+A1:2021	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013+A1:2019	N/A
Immunity Measurement		
Electrostatic Discharge	EN 61547: 2009 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility	EN 61547: 2009 IEC 61000-4-3: 2010 #	PASS
Electrical Fast Transient/Burst Test	EN 61547: 2009 IEC 61000-4-4: 2012	N/A
Surge Test	EN 61547: 2009 IEC 61000-4-5: 2017	N/A
Conducted Susceptibility Test	EN 61547: 2009 IEC 61000-4-6: 2013	N/A
Power Frequency Magnetic Field Susceptibility Test	EN 61547: 2009 IEC 61000-4-8: 2009 #	N/A
Voltage Dips and Interruptions Test	EN 61547: 2009 IEC 61000-4-11: 2017	N/A

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.
2. "#" indicates the testing item(s) was(were) fulfilled by subcontracted lab.

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Guangdong STON Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for STON laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Magnetic Field Emission	9kHz ~ 30MHz	$\pm 1.82\text{dB}$	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3.5. Equipments Used during the Test

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	R&S	ESCI 7	100965	2021/07/17	2022/07/16
2	Log-periodic Dipole Antenna	Schwarzbeck	VULB 9162	058	2021/07/19	2022/07/18
3	3m Semi-anechoic	Zhongshuo Electronics	9mx6mx6m	N/A	2021/07/21	2022/07/20
4	RF Cable	R&S	R01	10403	2021/07/19	2022/07/18

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Signal generator	R&S	SMB 100A	102710	2021/07/21	2022/07/20
2	Power amplifier	BONN Elektronik	BLWA 0810-160/100D	149644	2021/07/21	2022/07/20
3	Isotropic Field Probe	Narda	EP-601	511WX30620	2021/07/21	2022/07/20
4	Log-periodic Antenna	SCHWARZBECK	STLP 9128D	078	2021/07/19	2022/07/18
5	Power Meter	FEANKONIA	PMS 1084	108B1289	2021/07/21	2022/07/20

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ESD Simulator	HAEFELY	ONYX	176084	2021/07/21	2022/07/20

Magnetic Field Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	1142.8007.03	2021/07/21	2022/07/20
2	Triple-Loop Antenna	ZHINAN	ZN30401	13011	2021/07/21	2022/07/20

4. TEST CONDITIONS AND RESULTS

4.1. Magnetic Field Emission

For test instruments and accessories used see section 3.5.

4.1.1. Description of the test location

Test location: SHIELD ROOM

4.1.2. Limits of disturbance

Frequency	Limit For Loop Diameter of 2m (dB μ A)
9 kHz ~ 70 kHz	88
70 kHz ~ 150 kHz	88 ~58
150 kHz ~ 3.0 MHz	58~22
3.0 MHz ~ 30 MHz	22

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(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.

4.1.3. Description of the test set-up

4.1.3.1. Operating Condition

The EUT is ON during the test, and the results of the maximum emanation are recorded.

4.1.3.2. Test Configuration and Procedure

The magnetic component shall be measured by means of a loop antenna. The lighting equipment shall be placed in the center of the antenna.

The induced current in the loop antenna is measured by means of a current probe and the CISPR measuring receiver. By means of a coaxial switch, the three field directions can be measured in sequence.

4.1.4. Test result

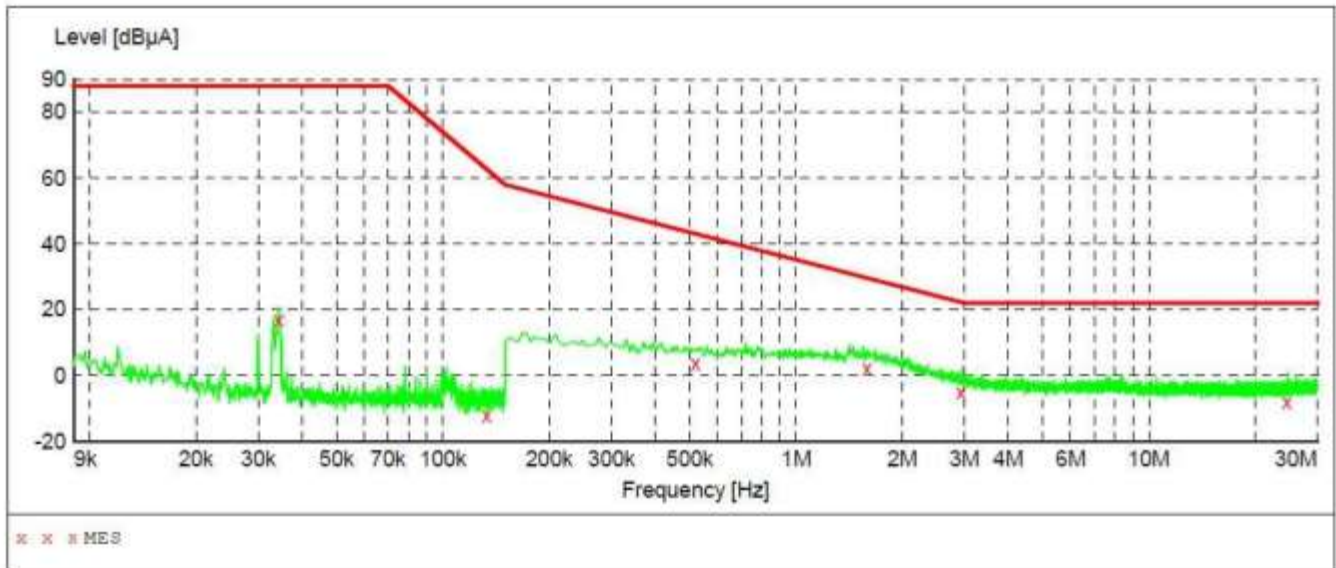
The requirements are **Fulfilled**

Band Width: 200Hz / 9kHz

Frequency Range: 9kHz to 150kHz / 150kHz to 30MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

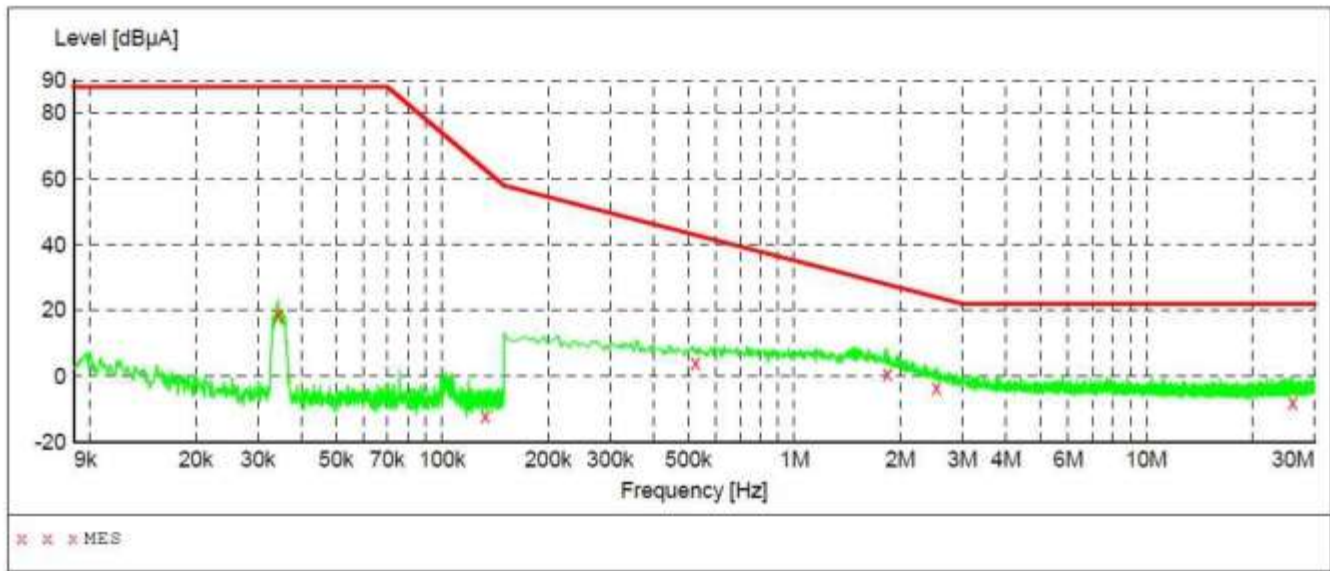
SCAN TABLE: "Magnetic test fin"
 Short Description: EN55015 Triple Loop



MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.034200	16.80	0.0	88	71.2	QP	X	0.00
0.133000	-12.30	0.0	63	75.0	QP	X	0.00
0.519000	3.70	0.1	43	39.4	QP	X	0.00
1.585500	2.10	0.1	30	27.6	QP	X	0.00
2.931000	-5.20	0.1	22	27.5	QP	X	0.00
24.571500	-8.10	0.2	22	30.1	QP	X	0.00

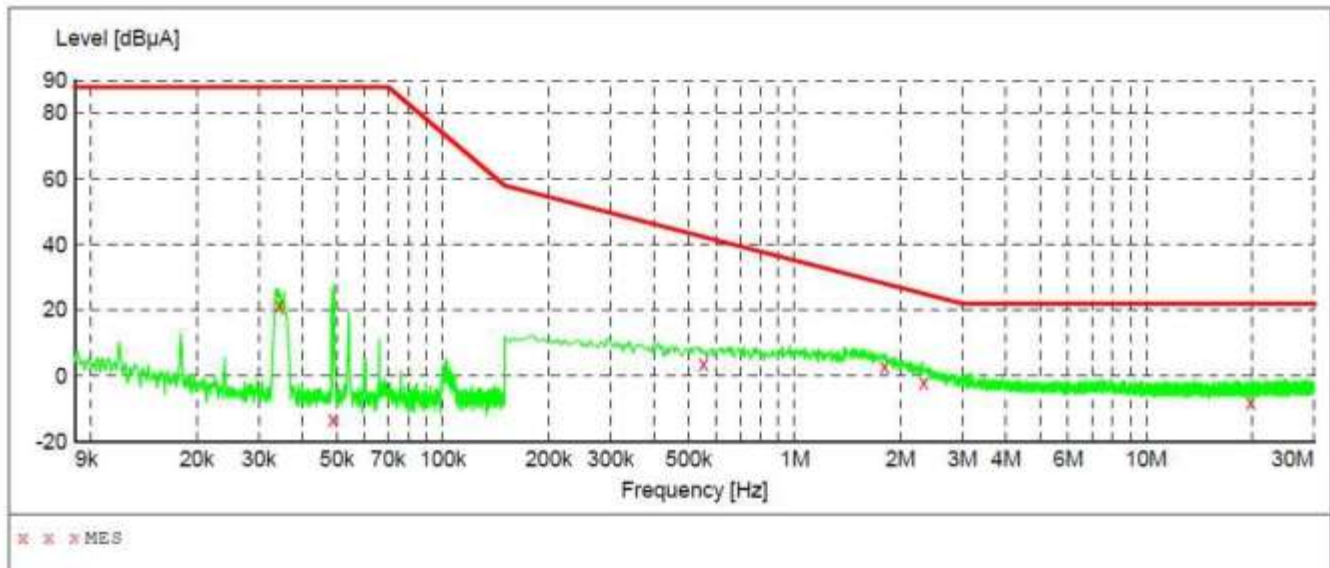
SCAN TABLE: "Magnetic test fin"
 Short Description: EN55015 Triple Loop



MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.034200	18.60	0.0	88	69.4	QP	Y	0.00
0.132400	-12.30	0.0	63	75.2	QP	Y	0.00
0.523500	3.80	0.1	43	39.2	QP	Y	0.00
1.837500	0.50	0.1	28	27.4	QP	Y	0.00
2.535000	-3.50	0.1	24	27.5	QP	Y	0.00
26.038500	-8.00	0.2	22	30.0	QP	Y	0.00

SCAN TABLE: "Magnetic test fin"
 Short Description: EN55015 Triple Loop



MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.034200	21.50	0.0	88	66.5	QP	Z	0.00
0.048700	-13.40	0.0	88	101.4	QP	Z	0.00
0.550500	3.70	0.1	42	38.7	QP	Z	0.00
1.801500	2.80	0.1	28	25.3	QP	Z	0.00
2.328000	-2.20	0.1	25	27.2	QP	Z	0.00
19.815000	-8.10	0.2	22	30.1	QP	Z	0.00

4.2. Conducted disturbance

The test is not applicable.

4.3. Radiation Emission

For test instruments and accessories used see section 3.5.

4.3.1. Description of the test location

Test location: Subcontracted Lab

4.3.2. Limit of Radiation Emission

Frequency range MHz	Quasi-peak limits dB(μ V/m)
30 to 230	40
230 to 1000	47

4.3.3. Description of the test set-up

4.3.3.1 Operating Condition

The EUT is ON and Emergency mode during the test, and the results of the maximum emanation are recorded.

4.3.3.2 Test Configuration and Procedure

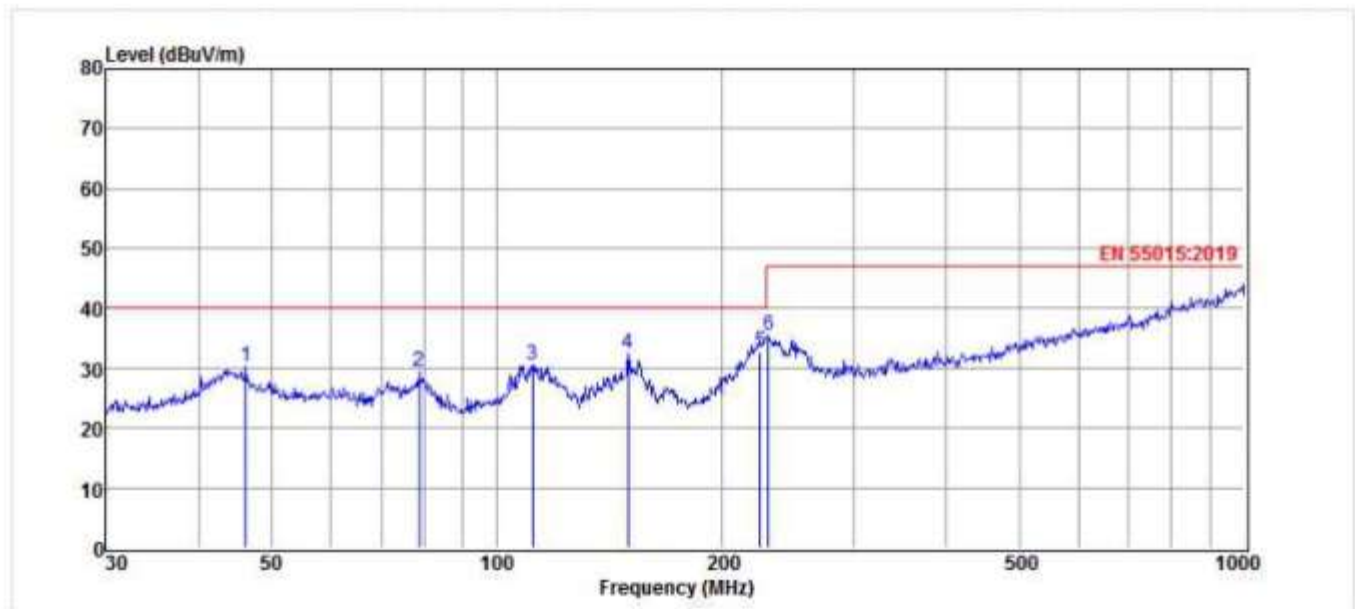
The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive. Guidance on how to arrange the luminaire during the measurements can be found in Annex C.

A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.

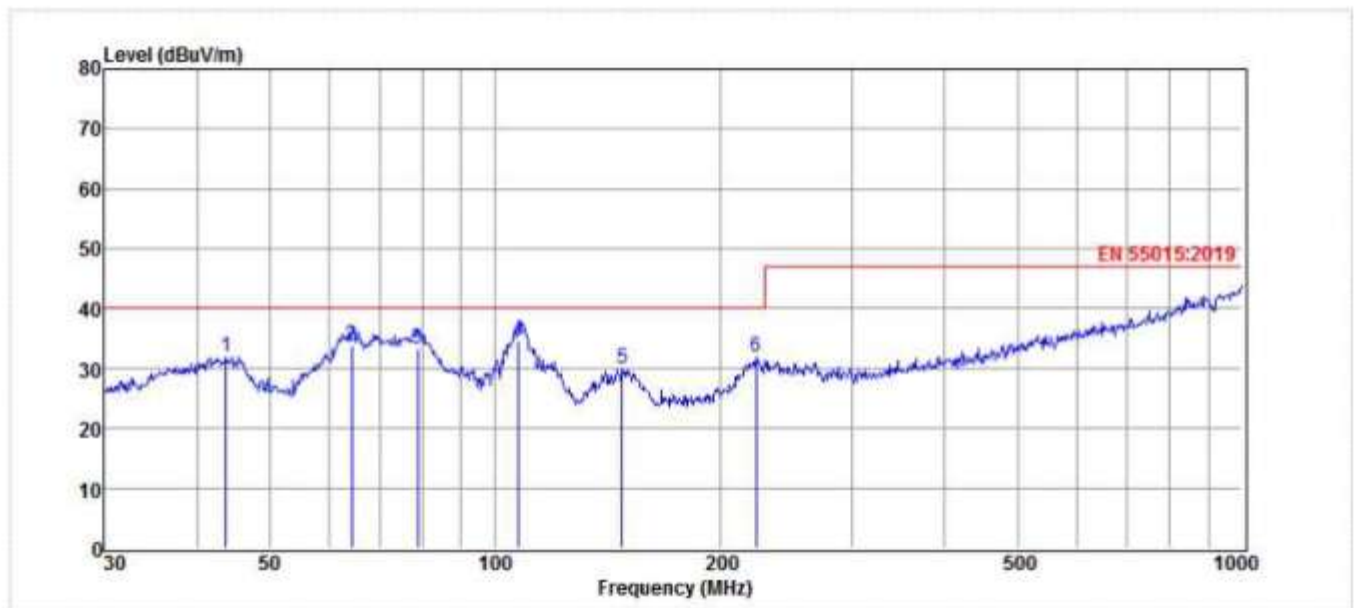
4.3.4. Test Result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).



Item	Freq	Read	Antenna	PRM	Cable	Result	Limit	Over	Detector	Polarization
(Mark)	(MHz)	(dBuV)	Factor	Factor	Loss	Level	Line	Limit		
			(dB/m)	dB	dB	(dBuV/m)	(dBuV/m)	(dB)		
1	46.18	13.86	15.78	0.00	0.65	30.29	40.00	-9.71	Peak	HORIZONTAL
2	78.69	20.58	8.08	0.00	0.75	29.41	40.00	-10.59	Peak	HORIZONTAL
3	111.74	17.00	12.50	0.00	1.08	30.58	40.00	-9.42	Peak	HORIZONTAL
4	150.01	20.58	10.50	0.00	1.25	32.33	40.00	-7.67	Peak	HORIZONTAL
5	225.31	18.00	13.04	0.00	1.68	32.72	40.00	-7.28	QP	HORIZONTAL
6	230.91	20.22	13.62	0.00	1.68	35.52	47.00	-11.48	Peak	HORIZONTAL



Item	Freq	Read	Antenna	PRM	Cable	Result	Limit	Over	Detector	Polarization
(Mark)	(MHz)	(dBuV)	(dB/m)	Factor	Loss	Level	Line	Limit		
				dB	dB	(dBuV/m)	(dBuV/m)	(dB)		
1	43.66	14.63	16.68	0.00	0.67	31.98	40.00	-8.02	Peak	VERTICAL
2	64.21	22.10	11.09	0.00	0.68	33.87	40.00	-6.13	QP	VERTICAL
3	78.69	24.39	8.08	0.00	0.75	33.22	40.00	-6.78	QP	VERTICAL
4	107.51	21.09	12.65	0.00	0.98	34.72	40.00	-5.28	QP	VERTICAL
5	147.92	18.18	10.46	0.00	1.24	29.88	40.00	-10.12	Peak	VERTICAL
6	223.73	17.30	12.87	0.00	1.69	31.86	40.00	-8.14	Peak	VERTICAL

4.4. Harmonic current

The test is not applicable.

4.5. Voltage Fluctuation and Flicker

The test is not applicable.

4.6. Electrostatic discharge

For test instruments and accessories used see section 3.5.

4.6.1. Description of the test location and date

Test location: 1# EMC Test Room

Date of test: 2022-12-05

Operator: Feng

4.6.2. Severity levels of electrostatic discharge

4.6.2.1. Severity level: Contact Discharge at $\pm 4\text{kV}$ Air Discharge at $\pm 8\text{kV}$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.6.2.2. Performance criterion: **B**

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.6.3.2. Test Configuration and Procedure:

Direct Discharge:

Air Discharge:

- This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Contact Discharge:

- All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

Indirect Discharge:

- The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.
- The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point

around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.6.4. Test specification:

<u>Contact discharge voltage:</u>	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	
<u>Air discharge voltage:</u>	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 8 kV
<u>Number of discharges:</u>	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 25	
<u>Type of discharge:</u>	Direct discharge	<input checked="" type="checkbox"/> Air discharge	
		<input checked="" type="checkbox"/> Contact discharge	
	Indirect discharge	<input checked="" type="checkbox"/> Contact discharge	
<u>Polarity:</u>	<input checked="" type="checkbox"/> Positive	<input checked="" type="checkbox"/> Negative	
<u>Discharge location:</u>	<input checked="" type="checkbox"/> all external locations accessible by hand		
	<input checked="" type="checkbox"/> horizontal coupling plane (HCP)		
	<input checked="" type="checkbox"/> vertical coupling plane (VCP)		

4.6.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.7. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.5.

4.7.1. Description of the test location and date

Test location: Subcontracted Lab

Date of test: 2022-12-05

Operator: Feng

4.7.2. Severity levels of radiated, radio-frequency, electromagnetic field

4.7.2.1 Severity level: 3 V/m

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

4.7.2.2 Performance criterion: **A**

4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.7.3.2. Test Configuration and Procedure

EUT is placed on a table which is 0.8 meter above ground. The center of the transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.7.4. Test specification:

Frequency range: n 80 MHz to 1000 MHz

Field strength: n 3 V/m

EUT - antenna separation: n 3 m

Modulation: n AM: 80 %
n sinusoidal 1000Hz

Frequency step: n 1 % with 1 s dwell time

Antenna polarisation: n horizontal n vertical

4.7.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.8. Electrical fast transients / Burst

The test is not applicable.

4.9. Surge

The test is not applicable.

4.10. Conducted disturbances induced by radio-frequency fields

The test is not applicable.

4.11. Magnetic Field Immunity

The test is not applicable.

4.12. Voltage Dips and Interruptions

The test is not applicable.

5. Photos of the EUT

Photo 1



Photo 2



.....End of Report.....

STATEMENT

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

If you have any objection to this report, please submit it to the test unit within 15 days from the date of receipt of the report.

Test Laboratory: Guangdong STON Testing Technology Co., Ltd.

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