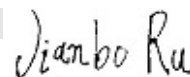


**TEST REPORT  
ELECTROMAGNETIC COMPATIBILITY (EMC) AND  
ASSESSMENT RELATED TO HUMAN EXPOSURE TO  
ELECTROMAGNETIC FIELDS (EMF)**

Report Reference No .....: 443276/EMC+EMF

Supervised by (name & signature) ...: Jianbo Ru



Approved by (name & signature).....: Juno Wong



Date of issue.....: 2021-06-16

Report issued by.....: Nemko Shanghai Ltd Shenzhen Branch

Address.....: Unit C&D, Floor 10, Tower 2, Financial Base, Kefa Road 8#,  
Hi-Technology Park, Nanshan District, Shenzhen 518057,  
China

Testing procedure.....: Supervised testing at external laboratory

Testing location/ address.....: See page 10

Applicant's name.....: Foshan Eaglerise Power Science & Technology (Shunde)  
Co., Ltd

Address.....: No.4, East Huanzhen Road, Beijiao Shunde, Foshan, Guang  
dong, China

**Test specification:**

Standards for Emission .....: EN IEC 55015:2019+A11:2020  
EN IEC 61000-3-2:2019  
EN 61000-3-3:2013+A1:2019

Standards for Immunity .....: EN 61547:2009

Standards for EMF.....: EN 62493:2015

Arrival of EUT .....: 2021-06-02

Test date of EUT .....: 2021-06-03 to 2021-06-07

Test item description ..... : LED Power Supply

Trade Mark .....: 

Manufacturer.....: Foshan Eaglerise Power Science & Technology (Shunde)  
Co., Ltd

Address .....: No.4, East Huanzhen Road, Beijiao Shunde, Foshan, Guang  
dong, China

Type.....: LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI

Serial number .....: See page 9

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## 1 Summary Emission of EN 55015

### 1.1 Standards

Generic standard

EN IEC 61000-3-2:2019

EN 61000-3-3:2013+A1:2019

Product or product family standard

EN IEC 55015:2019+A11:2020

Product category

Luminaries

### 1.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Limit class	Result
Conducted Emission	AC input power ports	EN IEC 55015 /CISPR 16	Table 1	Pass
Conducted Emission	wired network ports	EN IEC 55015 /CISPR 16	Table 2 or Table 3	N/A
Conducted Emission	Local wired ports	EN IEC 55015 /CISPR 16	Table 2b	N/A
Radiated emission	Enclosure port	EN IEC 55015 /CISPR 16	Table 10(3m)	Pass
Radiated Electromagnetic Disturbance	Enclosure port	EN IEC 55015 /CISPR 16	Table 8	Pass
Harmonic current emission	AC input power ports	EN IEC 61000-3-2:2019	Class C	Pass
Voltage fluctuations and flicker	AC input power ports	EN 61000-3-3:2013+A1:2019	Clause 5	Pass

Remarks: N/A-Not Applicable

Date: 2021-06-16

## 2 Summary Immunity of EN 61547

### 2.1 Standards

Generic standard	/
Product or product family standard	<b>EN61547:2009</b>
Product category:	<b>Luminaries</b>
Performance criteria:	<b>See as below</b>

### 2.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Performance criteria	Result
Electrostatic Discharge	Enclosure port	EN 61000-4-2:2009	<b>B</b>	<b>Pass</b>
Radiated Electromagnetic field Susceptibility Test	Enclosure port	EN 61000-4-3:2006/A1:2008/A2:2010	<b>A</b>	<b>Pass</b>
Electrical Fast Transient /Burst Test	Input Ac Power port	EN 61000-4-4:2012	<b>B</b>	<b>Pass</b>
Surge Test	Input Ac Power port	EN 61000-4-5:2014+A1:2017	<b>C</b>	<b>Pass</b>
Conducted Susceptibility Test	Input Ac Power port	EN 61000-4-6:2014	<b>A</b>	<b>Pass</b>
Voltage Dips and Interruptions Test	Input Ac Power port	EN IEC 61000-4-11:2020	<b>Table 11 of EN61547:C Table 12 of EN61547:B</b>	<b>Pass</b>
Power frequency magnetic fields	Enclosure port	EN 61000-4-8:2010	<b>A</b>	<b>N/A***</b>

Remarks: N/A-Not Applicable

\*\*\* ) not contain components susceptible to magnetic fields

### 2.3 Performance criteria according to product or product family standards

#### 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 were given.

#### 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. Additional requirement for lighting equipment incorporating a starting device: After the test the lighting equipment is switched off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

Date: 2021-06-16

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### 3 Summary EMF of EN 62493

#### 3.1 Standards

Generic standard	/
Product or product family standard	EN62493:2015
Product category	Luminaries

#### 3.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Test frequency range	Result
Induced current density	Enclosure port	EN62493	20 kHz to 10 MHz	N/A*

\*) Remark: It is a LED-Light-source technology deemed to comply with the Van der Hoofden test without testing.





Date: 2021-06-16

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#### 4.5 Testing location

Guangdong Keyway Testing Technology Co., Ltd.-ELA 814

No.7 of Zhangmutou District, Guanzhang Road, Zhangmutou town, Dongguan Guangdong China.

Remark: All tests have been supervised by a Nemko engineer.

Date: 2021-06-16

## 5 Measurement of Conducted Disturbance

### 5.1 Standards

Generic standard	/
Product or product family standard	EN IEC 55015:2019+A11:2020
Limit class	Table 1 of EN IEC 55015
Basic standard	CISPR 16
Date of testing	2021-06-03

### 5.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 09,22
<input checked="" type="checkbox"/>	Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Apr 09,22
<input checked="" type="checkbox"/>	RF Cable	FUJIKURA	3D-2W	944 Cable	Apr 09,22

### 5.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The test has been performed as following:

The cable connecting to the V-network shall not exceed 0,8 m. The lamp is placed 0.4 m above a metal plate of dimensions at least 2 m × 2 m and shall be kept at least 0,8 m from any other earthed conducting surface. The artificial mains network (V-network) shall also be placed at a distance of at least 0,8 m from the lamp . The plate shall be connected to the reference earth of the V-network.

A EMI test receiver used to test the emission from both side of AC line.

Scan setting:

Freq range			Receiver setting		
Start	Stop	Step	IF BW	Detector	Meas Time
9k	150k	100Hz	200Hz	PK+AV	10ms
150k	30M	4.5k	9k	PK+AV	10ms

Final measurement:

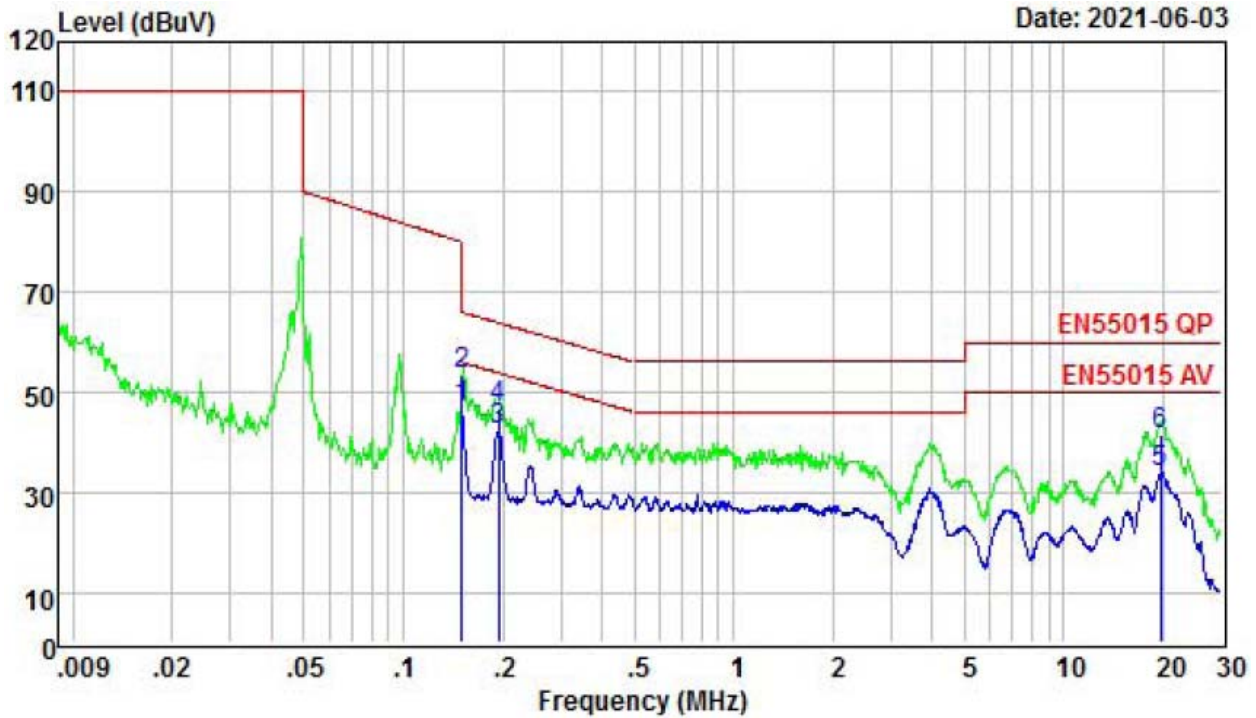
Detector	Meas time
QP/AV	1s

### 5.4 Test result

Test Model	Test Mode	Diagram	Test port	Remarks	Result
LS-12-12 MI	TM1	001	AC input port	Line L	Pass
		002		Line N	Pass
LS-12-24 MI	TM1	003	AC input port	Line L	Pass
		004		Line N	Pass
LS-20-12 MI	TM1	005	AC input port	Line L	Pass
		006		Line N	Pass
LS-20-24 MI	TM1	007	AC input port	Line L	Pass
		008		Line N	Pass

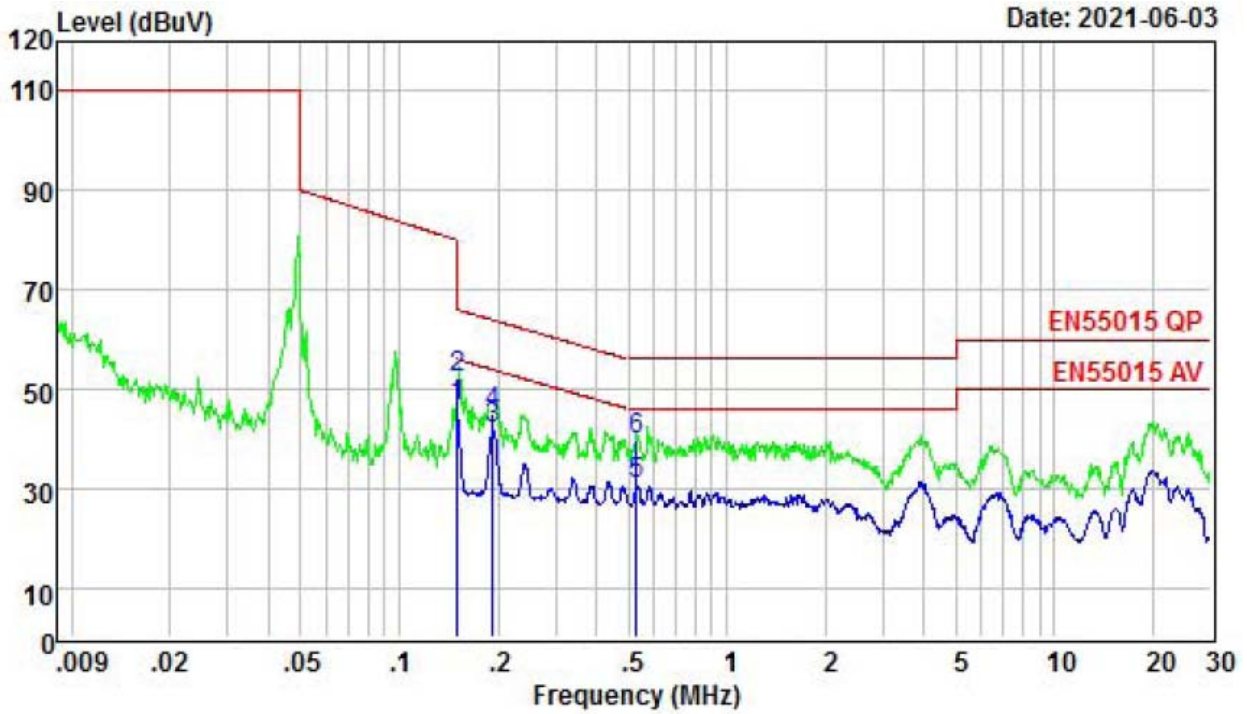
5.5 Diagrams

5.5.1 Diagram 001



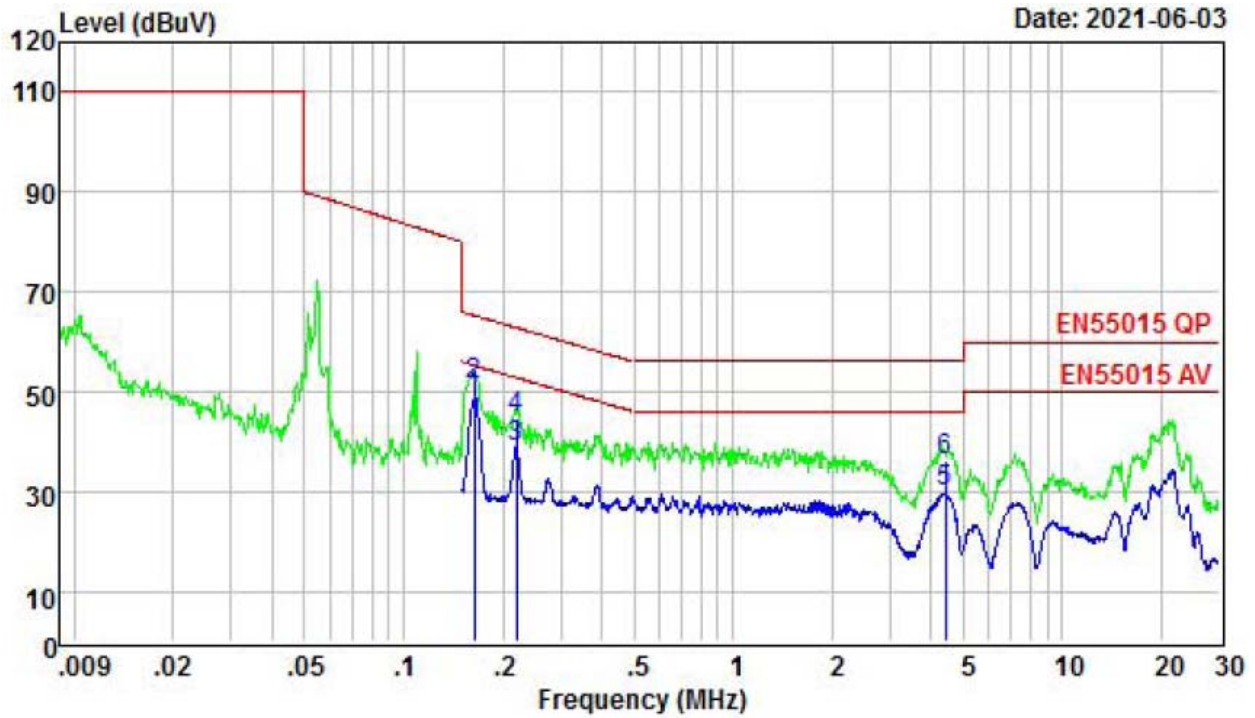
	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.15	47.00	56.00	-9.00	Average
2	0.15	53.60	66.00	-12.40	QP
3	0.19	42.59	53.84	-11.25	Average
4	0.19	46.80	63.84	-17.04	QP
5	19.64	33.91	50.00	-16.09	Average
6	19.64	41.30	60.00	-18.70	QP

5.5.2 Diagram 002



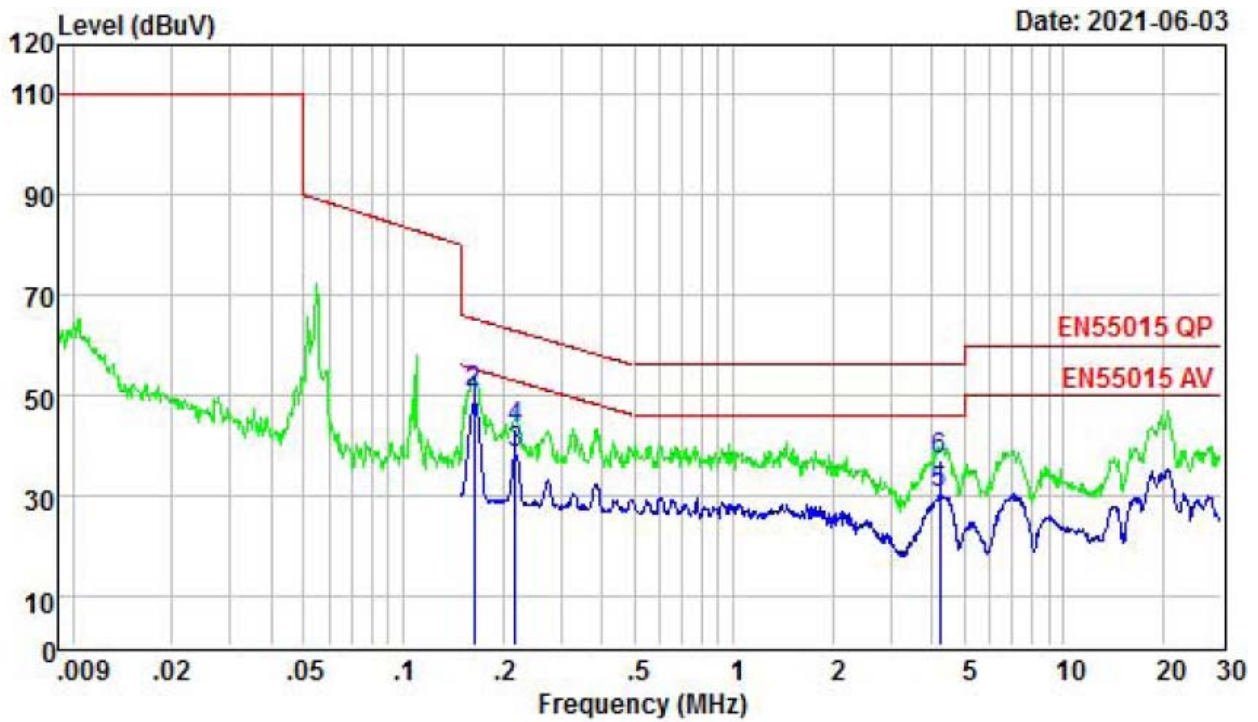
	Freq	Level	Limit	Over	Remark
	MHz	dBuV	Line	Limit	dB
1	0.15	46.38	56.00	-9.62	Average
2	0.15	52.30	66.00	-13.70	QP
3	0.19	41.75	53.93	-12.18	Average
4	0.19	45.20	63.93	-18.73	QP
5	0.53	30.75	46.00	-15.25	Average
6	0.53	39.50	56.00	-16.50	QP

5.5.3 Diagram 003



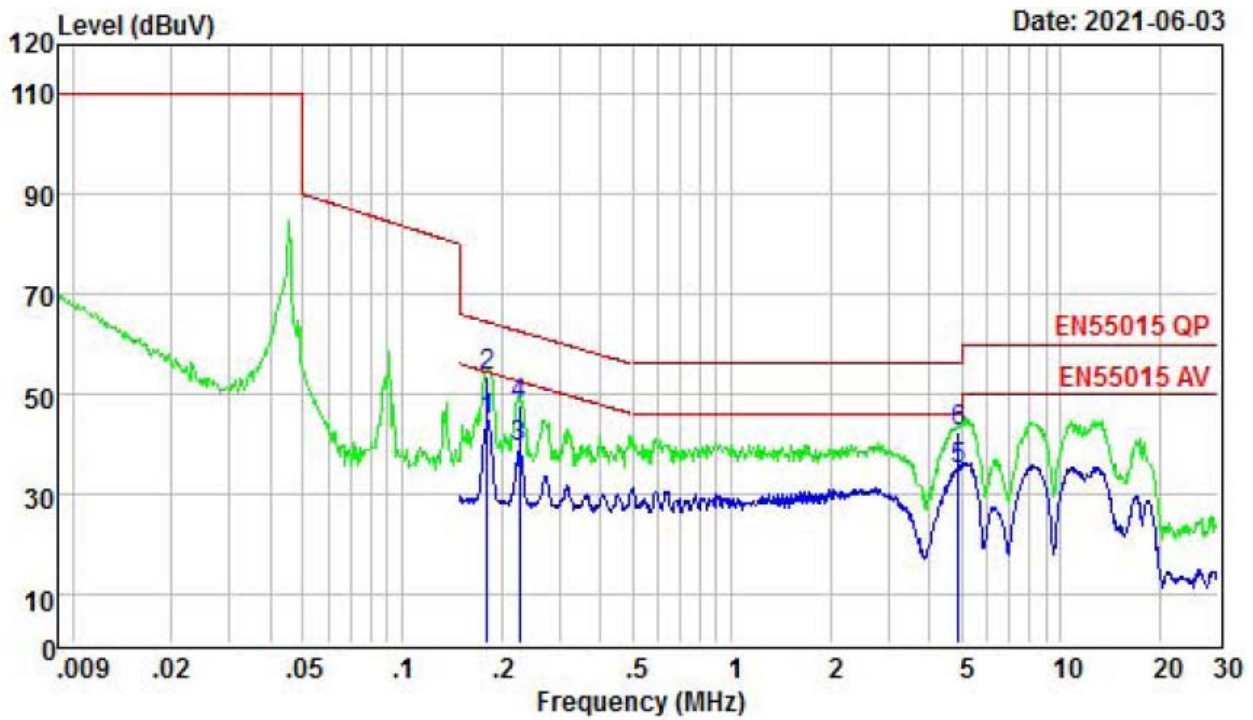
	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.16	48.69	55.30	-6.61	Average
2	0.16	51.30	65.30	-14.00	QP
3	0.22	38.87	52.83	-13.96	Average
4	0.22	44.60	62.83	-18.23	QP
5	4.41	29.98	46.00	-16.02	Average
6	4.41	36.20	56.00	-19.80	QP

5.5.4 Diagram 004



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.16	48.73	55.25	-6.52	Average
2	0.16	50.50	65.25	-14.75	QP
3	0.22	38.42	52.88	-14.46	Average
4	0.22	43.30	62.88	-19.58	QP
5	4.20	30.23	46.00	-15.77	Average
6	4.20	37.20	56.00	-18.80	QP

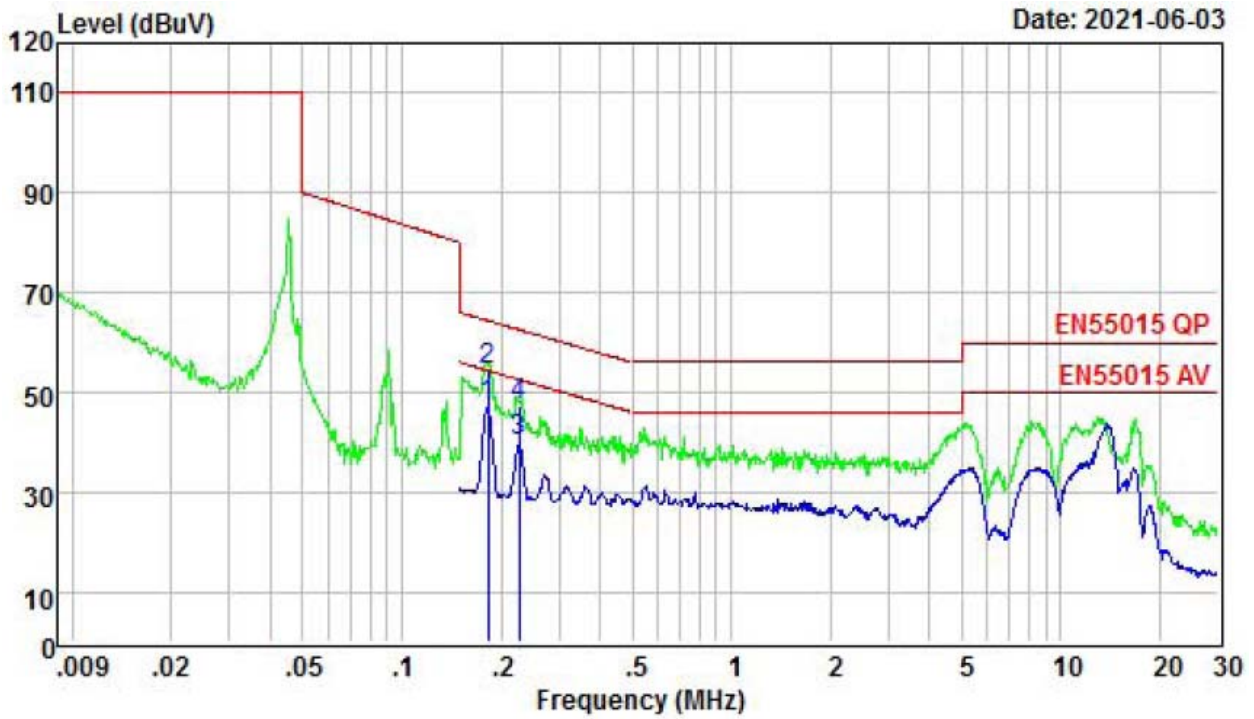
5.5.5 Diagram 005



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.18	44.66	54.42	-9.76	Average
2	0.18	53.60	64.42	-10.82	QP
3	0.23	39.21	52.52	-13.31	Average
4	0.23	47.60	62.52	-14.92	QP
5	4.90	34.94	46.00	-11.06	Average
6	4.90	42.60	56.00	-13.40	QP

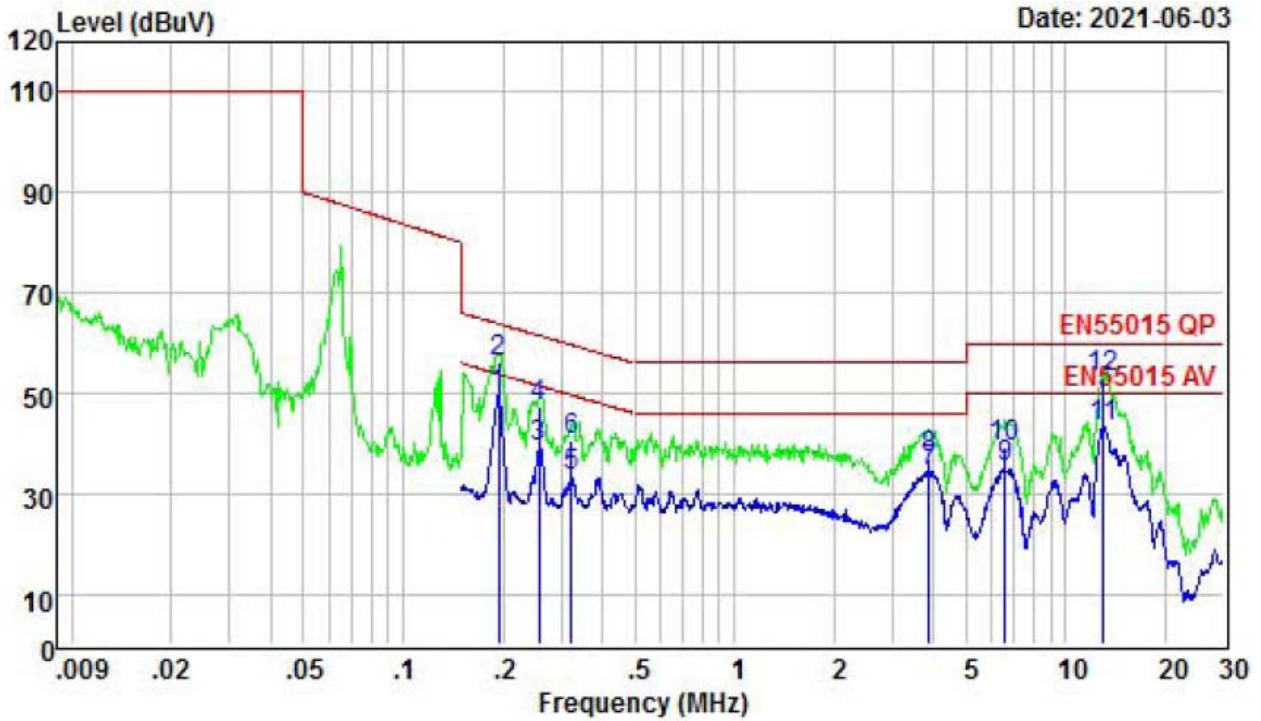


5.5.6 Diagram 006



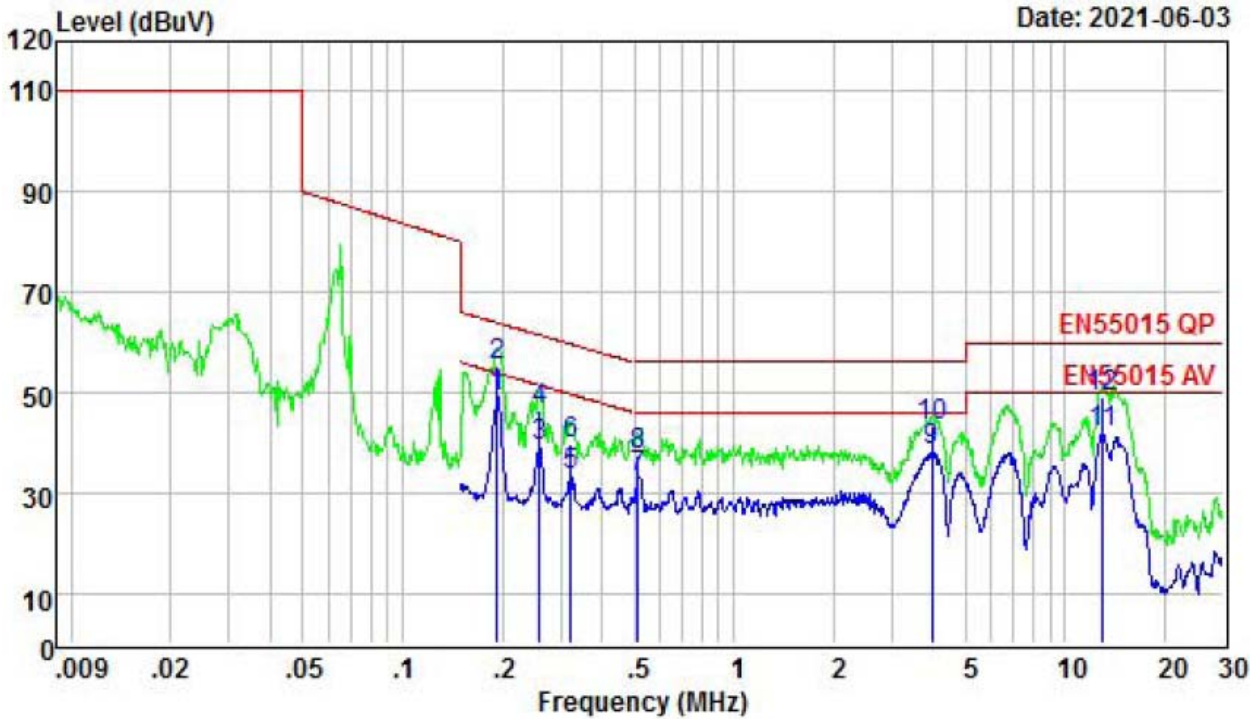
	Freq	Level	Limit	Over	Remark
	MHz	dBuV	Line	Limit	
			dBuV	dB	
1	0.18	47.16	54.37	-7.21	Average
2	0.18	54.30	64.37	-10.07	QP
3	0.23	39.93	52.52	-12.59	Average
4	0.23	47.50	62.52	-15.02	QP

5.5.7 Diagram 007



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	Line	Limit	
			dBuV	dB	
1	0.19	49.38	53.84	-4.46	Average
2	0.19	56.20	63.84	-7.64	QP
3	0.26	39.11	51.51	-12.40	Average
4	0.26	47.20	61.51	-14.31	QP
5	0.32	33.43	49.62	-16.19	Average
6	0.32	40.63	59.62	-18.99	QP
7	3.88	34.49	46.00	-11.51	Average
8	3.88	36.98	56.00	-19.02	QP
9	6.56	35.23	50.00	-14.77	Average
10	6.56	39.25	60.00	-20.75	QP
11	12.99	43.13	50.00	-6.87	Average
12	12.99	53.20	60.00	-6.80	QP

5.5.8 Diagram 008



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.19	49.13	53.89	-4.76	Average
2	0.19	55.30	63.89	-8.59	QP
3	0.26	39.04	51.47	-12.43	Average
4	0.26	46.58	61.47	-14.89	QP
5	0.32	33.54	49.62	-16.08	Average
6	0.32	39.89	59.62	-19.73	QP
7	0.52	33.15	46.00	-12.85	Average
8	0.52	37.63	56.00	-18.37	QP
9	3.96	38.26	46.00	-7.74	Average
10	3.96	43.30	56.00	-12.70	QP
11	12.99	41.95	50.00	-8.05	Average
12	12.99	49.20	60.00	-10.80	QP

Date: 2021-06-16

## 6 Measurement of Radiated Emission

### 6.1 Standards

Generic standard	/
Product or product family standard	<b>EN IEC 55015:2019+A11:2020</b>
Limit class	<b>Table 10 of EN IEC 55015</b>
Basic standard	<b>CISPR 16</b>
Date of testing	<b>2021-06-03</b>

### 6.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 09,22
<input checked="" type="checkbox"/>	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00829	Apr 11,22
<input checked="" type="checkbox"/>	3m Semi-anechoic Chamber	ETS-LINDGREN	966	170326	Apr 19,22
<input checked="" type="checkbox"/>	RF Cable	Junkosha	MWX322-2m	1305G007	Apr 09,22
<input checked="" type="checkbox"/>	RF Cable	Junkosha	MWX322-8m	1305G008	Apr 09,22
<input checked="" type="checkbox"/>	MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A

### 6.3 Test set-up

The EUT has been tested according to the above-mentioned standard, as following:  
 The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode.

If more details are necessary, e.g. because of wiring or auxiliary equipment, annex B with a photo or a rough figure of the test set-up is attached.

The test has been performed as following:

- 1) Preview test; Peak; IF BW=100kHz, VBW=300kHz, Antenna: from 1 to 4m Turntable 0-360deg
- 2) Find frequencies with maximum emission:  
 Acceptance-analysis: Limit minus 10 dB  
 Peak-reduction: Peaks frequency range 30 MHz - 1000 MHz
- 3) Final test; Quasi-Peak; measuring time 1 s; at frequencies from step 2); Search maximum: vary turntable and antenna position to find the maximum readings
- 4) If there are more than 10 peaks within the 10 dB margin a manual test with all settings is necessary to find the maximum readings.

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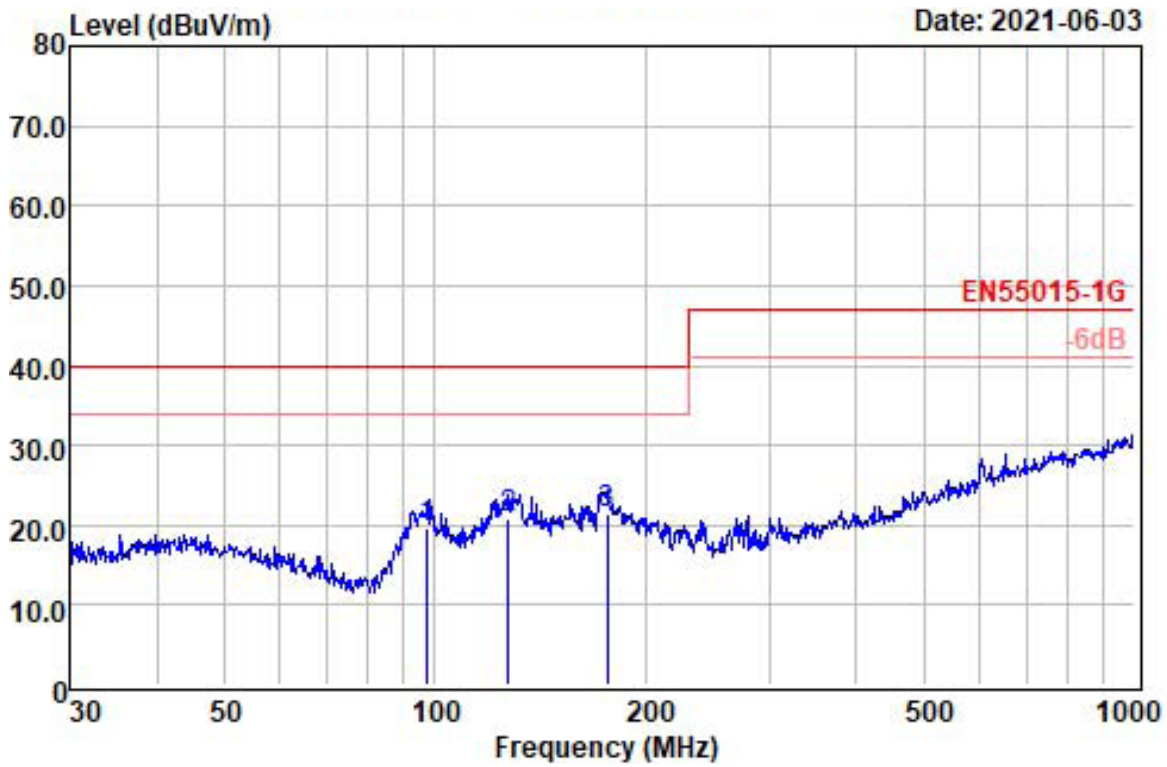
**6.4 Test result**

Test Model	Test Mode	Test port	Diagram	Remarks	Result
LS-12-12 MI	TM1	Enclosure port	009	H	Pass
			010	V	Pass
LS-12-24 MI	TM1	Enclosure port	011	H	Pass
			012	V	Pass
LS-20-12 MI	TM1	Enclosure port	013	H	Pass
			014	V	Pass
LS-20-24 MI	TM1	Enclosure port	015	H	Pass
			016	V	Pass

Date: 2021-06-16

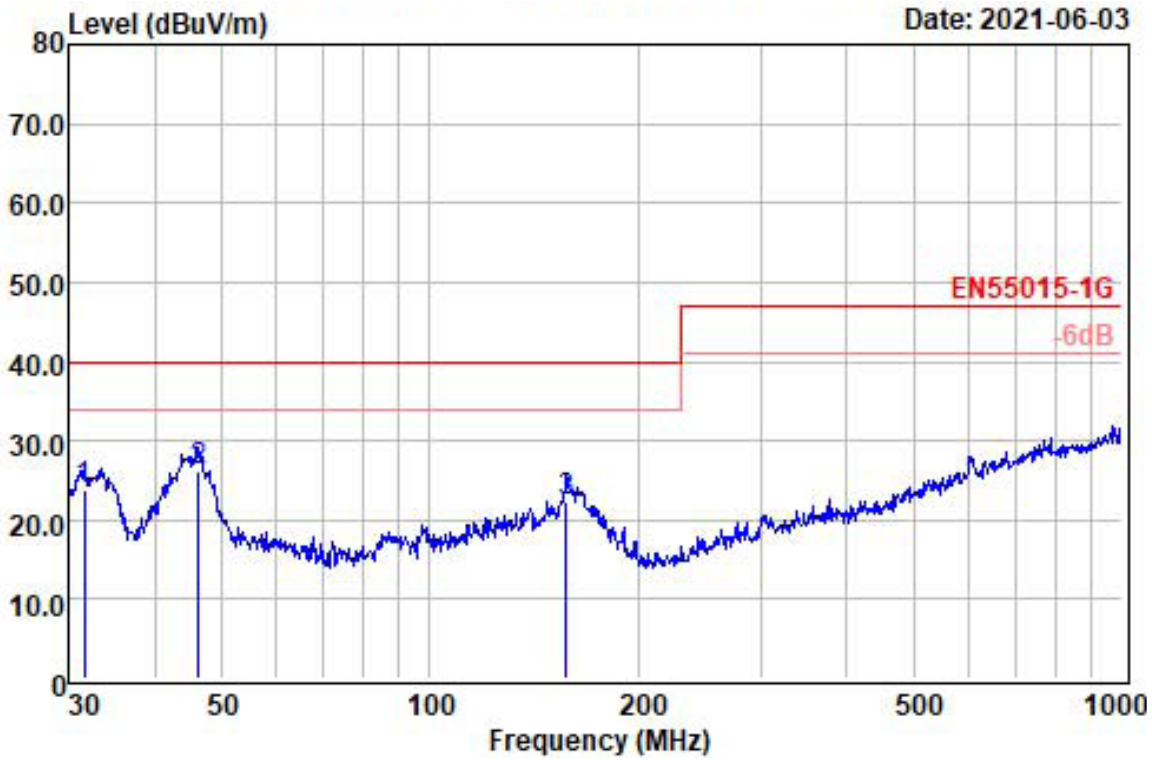
6.5 Diagrams

6.5.1 Diagram 009



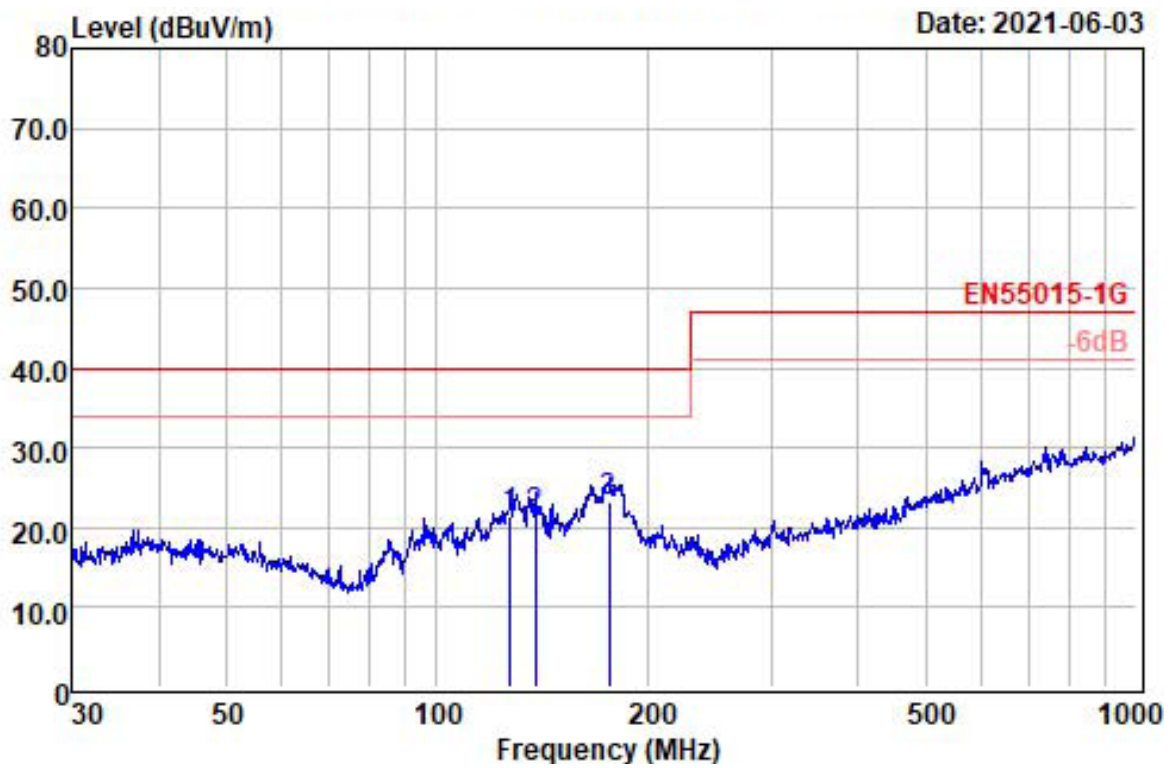
	ReadAntenna	Cable	Limit	Over			
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	97.46	8.39	10.35	0.83	19.57	40.00	-20.43 QP
2	127.22	6.12	13.95	0.84	20.91	40.00	-19.09 QP
3	176.27	7.35	13.29	0.87	21.51	40.00	-18.49 QP

6.5.2 Diagram 010



	ReadAntenna Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	31.62	10.94	12.36	0.53	23.83	40.00	-16.17	QP
2	46.34	12.66	13.31	0.27	26.24	40.00	-13.76	QP
3	157.56	6.11	15.48	0.86	22.45	40.00	-17.55	QP

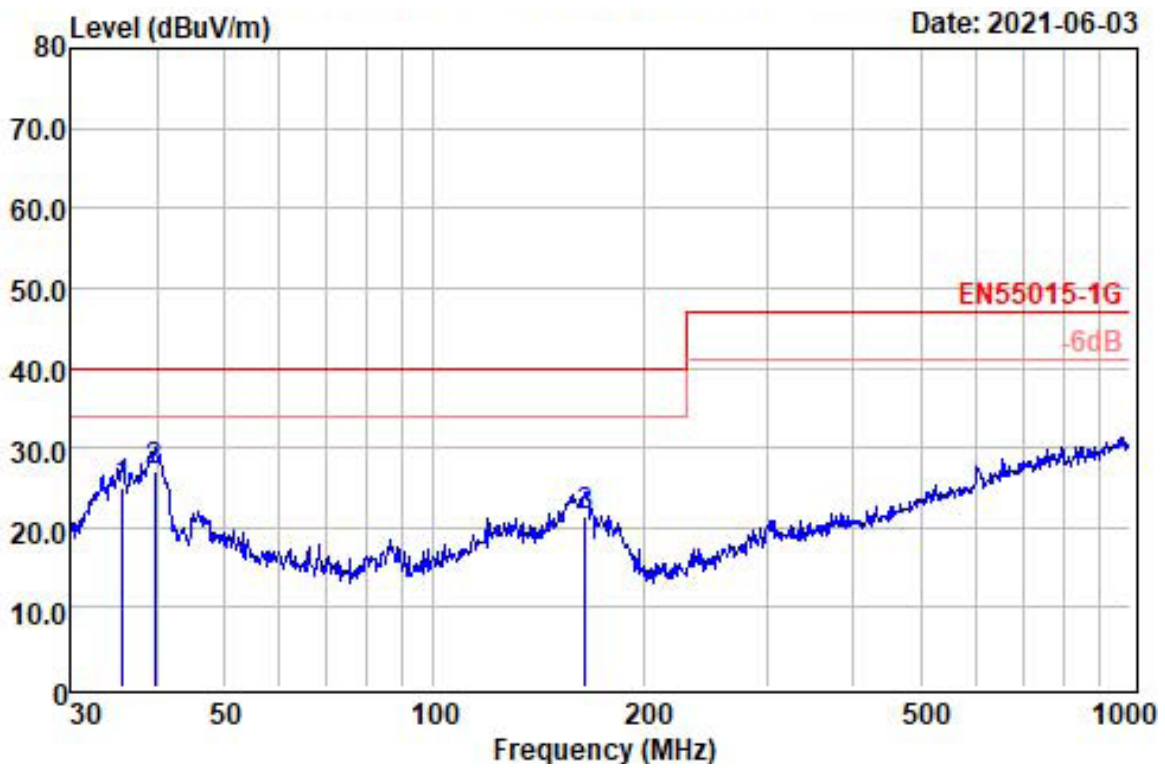
6.5.3 Diagram 011



	ReadAntenna	Cable		Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	127.22	6.63	13.95	0.84	21.42	40.00	-18.58 QP
2	138.39	6.24	14.44	0.85	21.53	40.00	-18.47 QP
3	176.27	8.96	13.29	0.87	23.12	40.00	-16.88 QP

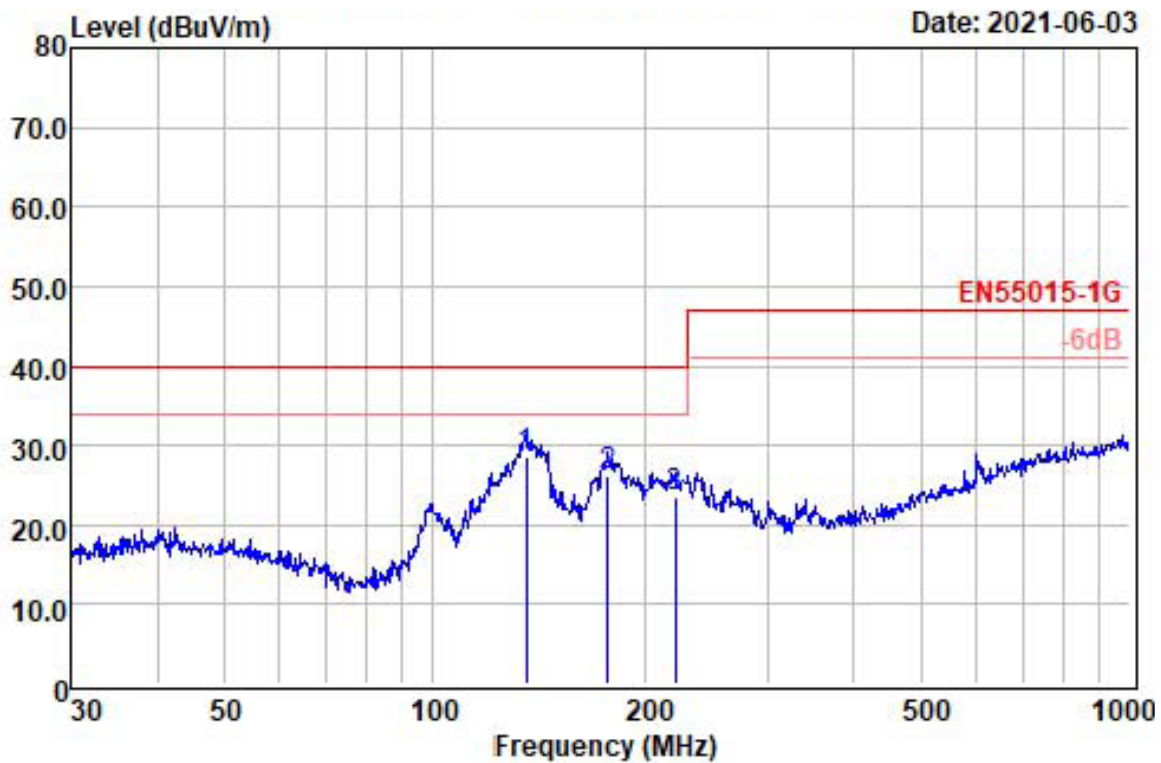


6.5.4 Diagram 012



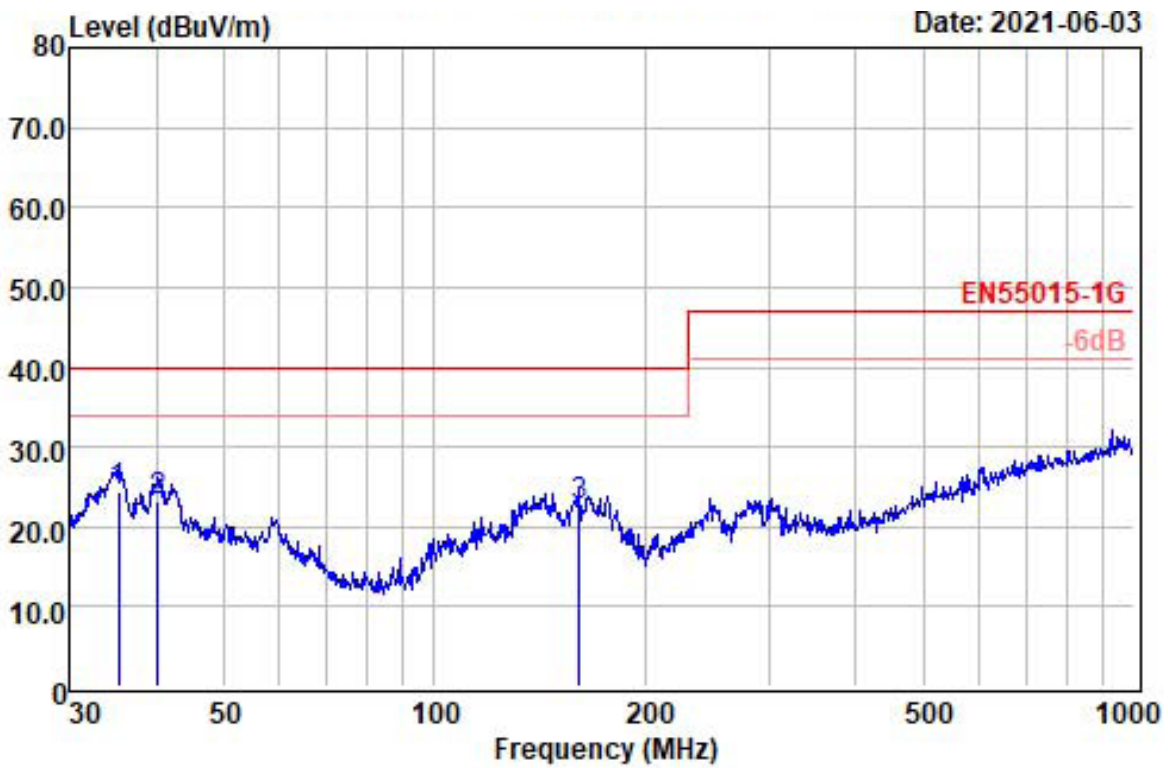
	ReadAntenna	Cable	Limit	Over			
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	35.75	11.66	12.89	0.40	24.95	40.00	-15.05 QP
2	39.71	12.98	13.84	0.29	27.11	40.00	-12.89 QP
3	164.91	5.77	14.86	0.86	21.49	40.00	-18.51 QP

6.5.5 Diagram 013



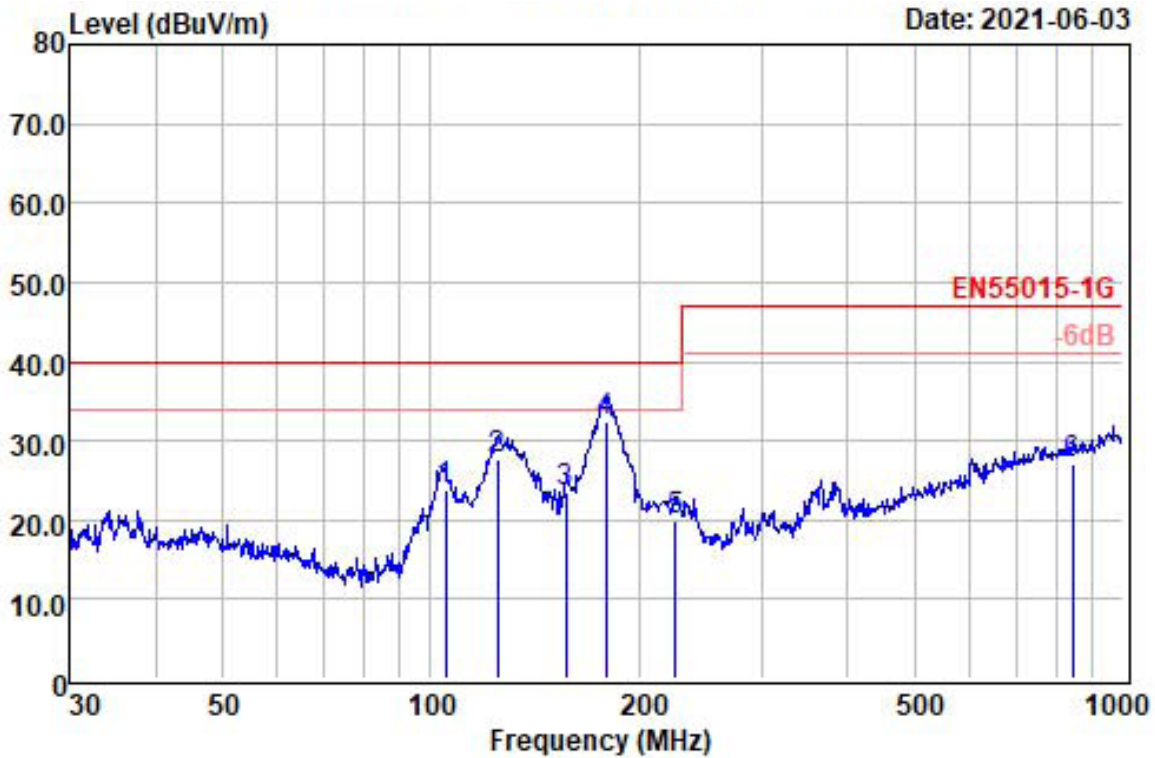
	ReadAntenna	Cable	Limit	Over			
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	135.03	13.27	14.30	0.85	28.42	40.00	-11.58 QP
2	176.89	12.01	13.21	0.87	26.09	40.00	-13.91 QP
3	221.39	12.47	10.27	0.87	23.61	40.00	-16.39 QP

6.5.6 Diagram 014



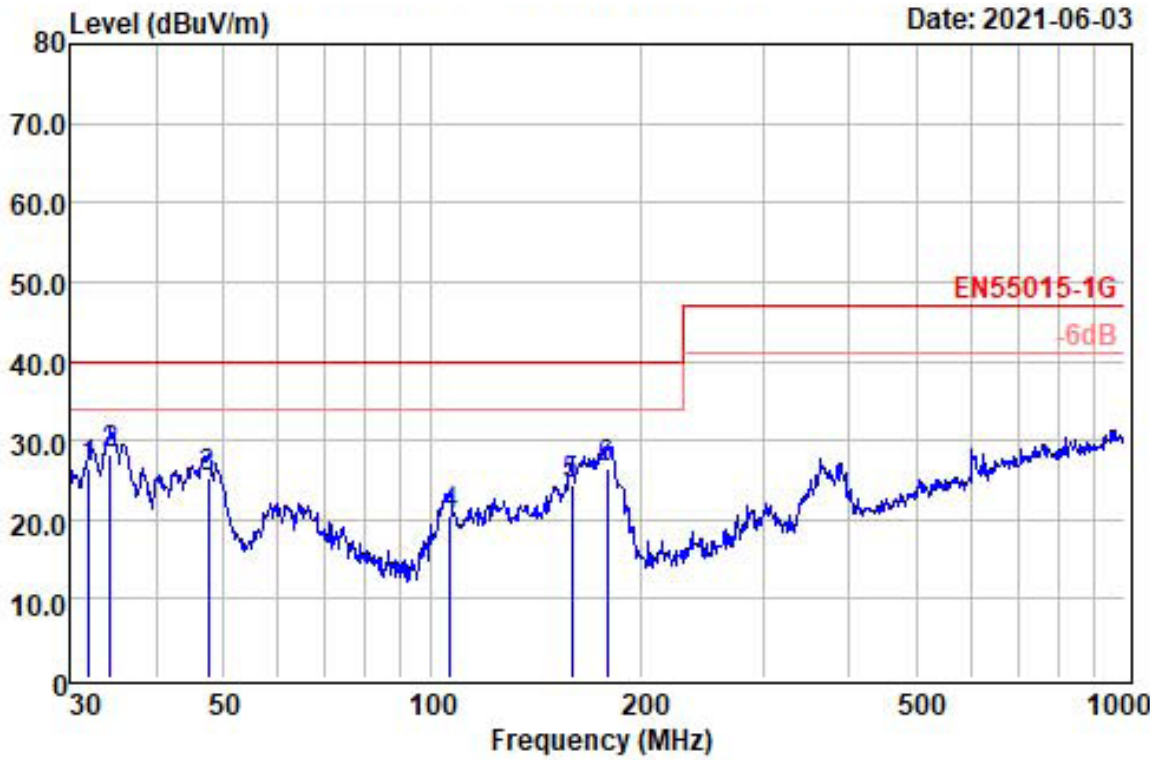
	ReadAntenna	Cable	Limit	Over				
Freq	Level	Factor	Loss	Level	Line			
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m			
1	35.25	11.10	12.76	0.41	24.27	40.00	-15.73	QP
2	40.13	8.96	13.88	0.28	23.12	40.00	-16.88	QP
3	160.91	6.39	15.44	0.86	22.69	40.00	-17.31	QP

6.5.7 Diagram 015



	ReadAntenna	Cable		Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	104.90	11.17	11.85	0.82	23.84	40.00	-16.16 QP
2	125.01	12.83	13.85	0.84	27.52	40.00	-12.48 QP
3	156.46	7.19	15.43	0.86	23.48	40.00	-16.52 QP
4	179.39	18.62	12.88	0.87	32.37	40.00	-7.63 QP
5	226.10	8.57	10.41	0.87	19.85	40.00	-20.15 QP
6	848.06	2.51	22.27	2.16	26.94	47.00	-20.06 QP

6.5.8 Diagram 016



	ReadAntenna	Cable		Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	32.07	13.69	12.40	0.51	26.60	40.00	-13.40 QP
2	34.40	15.30	12.64	0.44	28.38	40.00	-11.62 QP
3	47.49	11.57	13.40	0.26	25.23	40.00	-14.77 QP
4	106.39	7.70	12.03	0.83	20.56	40.00	-19.44 QP
5	159.23	8.09	15.57	0.86	24.52	40.00	-15.48 QP
6	179.39	12.61	12.88	0.87	26.36	40.00	-13.64 QP

Date: 2021-06-16

## 7 Measurement of Radiated Electromagnetic Disturbances

### 7.1 Standards

Generic standard	/
Product or product family standard	EN IEC 55015:2019+A11:2020
Limit class	Table 8 of EN IEC 55015
Basic standard	CISPR 16
Date of testing	2021-06-03

### 7.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 09,22
<input checked="" type="checkbox"/>	Triple-loop Antenna	EVERFINE	LLA-2	11070001	Apr 09,22

### 7.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The test has been performed as following:

The magnetic component shall be measured by means of a loop antenna as described in EN 55015 .The lighting equipment shall be placed in the center of the antenna and the position is not critical.

The inducted current in the loop antenna is measured by means of a current probe(1V/A) and the CISPR measuring receiver . By means of a coaxial switch the three field directions can be measured in sequence. Each value shall fulfil the requirements given.

Self-ballasted lamps and semi-luminaries shall be measured when inserted in a relevant lamp-holder, mounted on a piece of insulating material.

Scan setting:

Freq range			Receiver setting		
Start	Stop	Step	IF BW	Detector	Meas Time
9k	150k	100Hz	200Hz	PK	10ms
150k	30M	4.5k	9k	PK	20ms

Final measurement

Meas time :1s

Detector QP

### 7.4 Test result

Test port:		Enclosure		
Test Model	Test Mode	Diagram	Remarks	Result
LS-12-12 MI	TM1	017	X	Pass
		018	Y	Pass
		019	Z	Pass
LS-12-24 MI	TM1	020	X	Pass
		021	Y	Pass
		022	Z	Pass

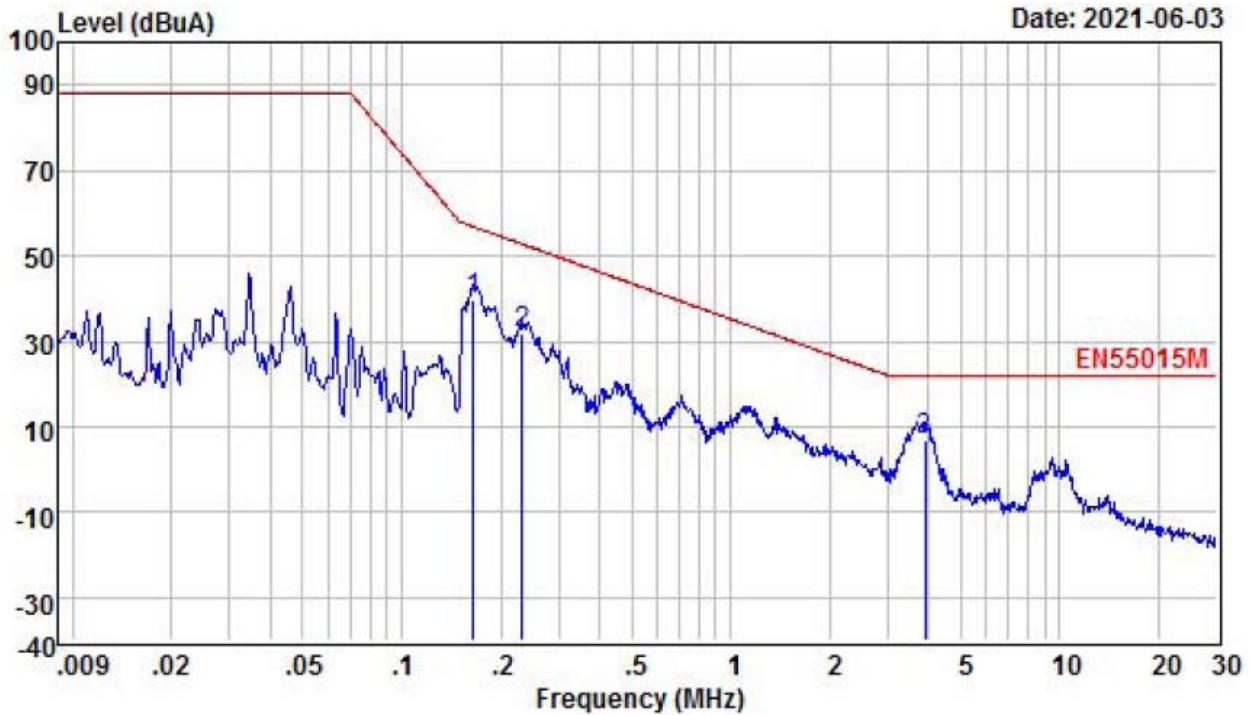
Date: 2021-06-16

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Test port:		Enclosure		
Test Model	Test Mode	Diagram	Remarks	Result
LS-20-12 MI	TM1	023	X	Pass
		024	Y	Pass
		025	Z	Pass
LS-20-24 MI	TM1	026	X	Pass
		027	Y	Pass
		028	Z	Pass

## 7.5 Diagram

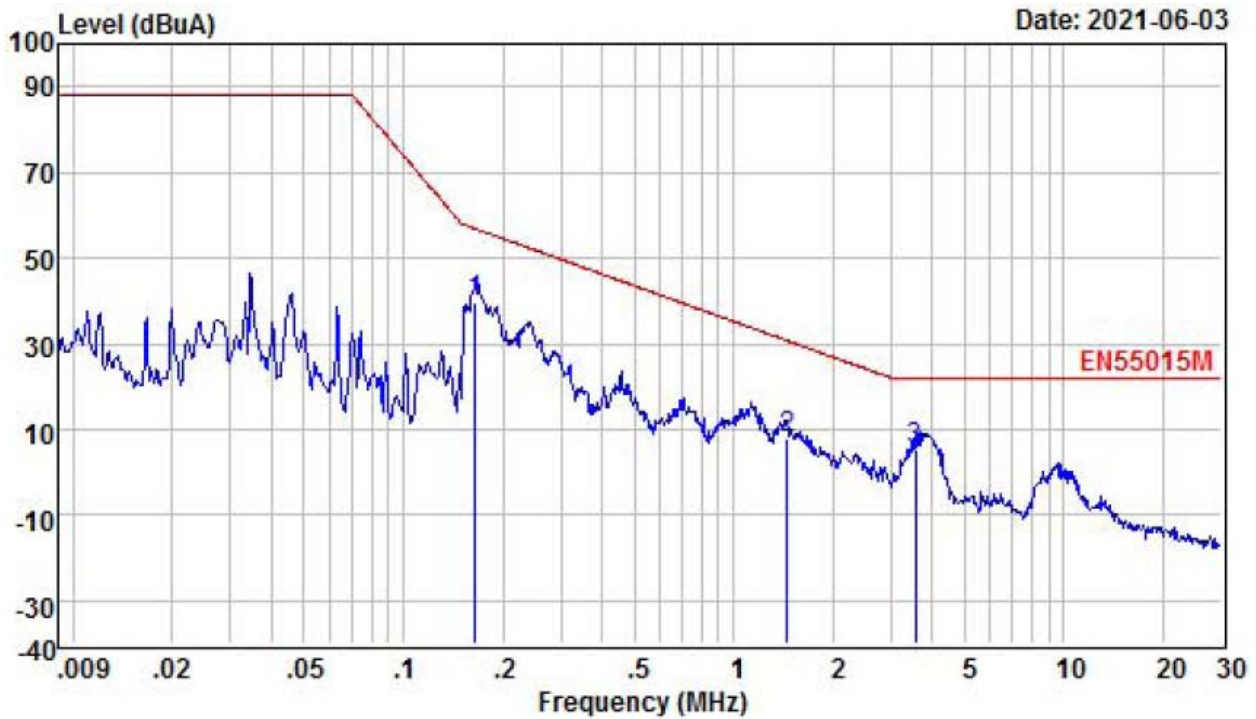
### 7.5.1 Diagram 017



	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.17	39.42	56.83	-17.41	QP
2	0.23	31.82	52.74	-20.92	QP
3	3.92	6.86	22.02	-15.16	QP

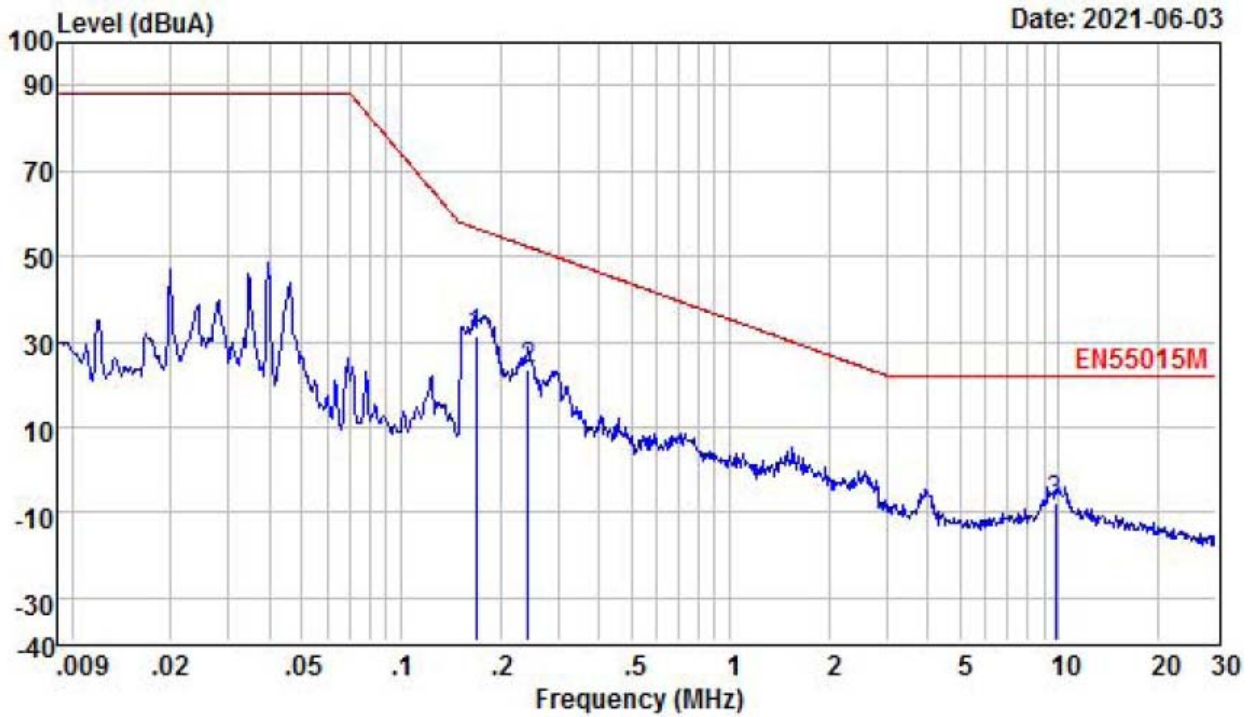


7.5.2 Diagram 018



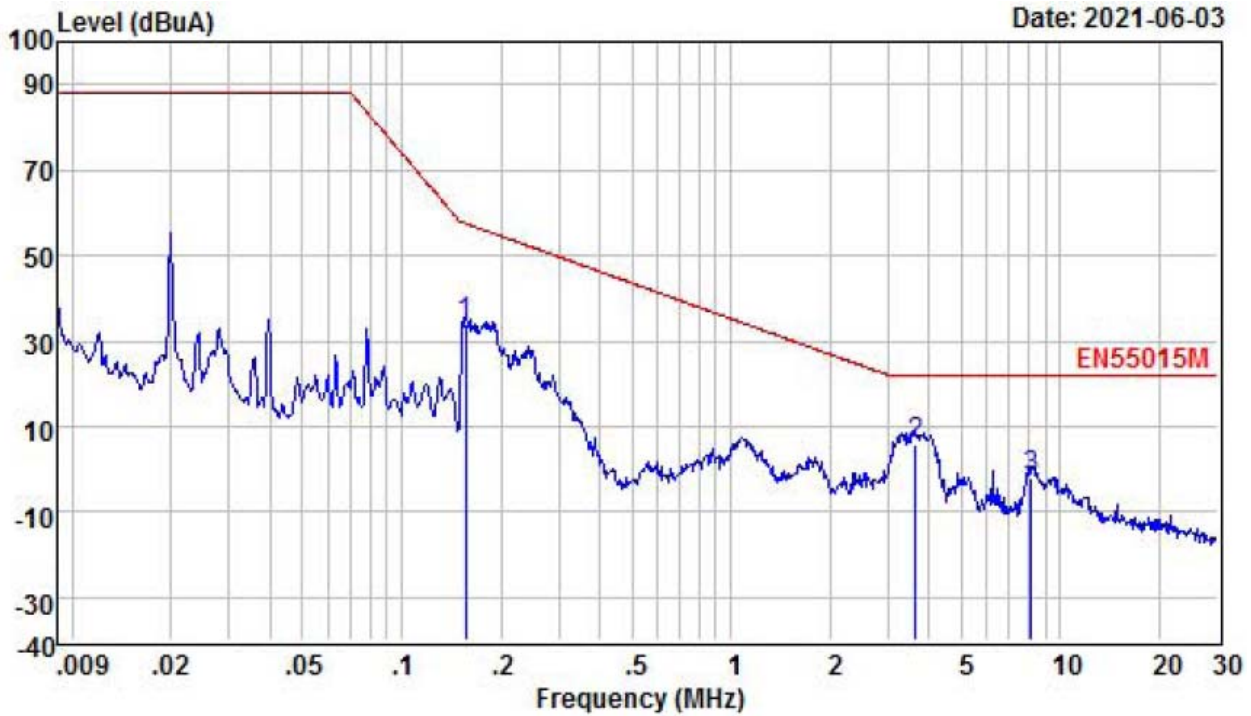
	Limit	Over		
Freq	Level	Line	Limit	Remark
MHz	dBuA	dBuA	dB	
1	0.17	39.75	56.83	-17.08 QP
2	1.46	8.08	30.71	-22.63 QP
3	3.55	5.33	22.02	-16.69 QP

7.5.3 Diagram 019



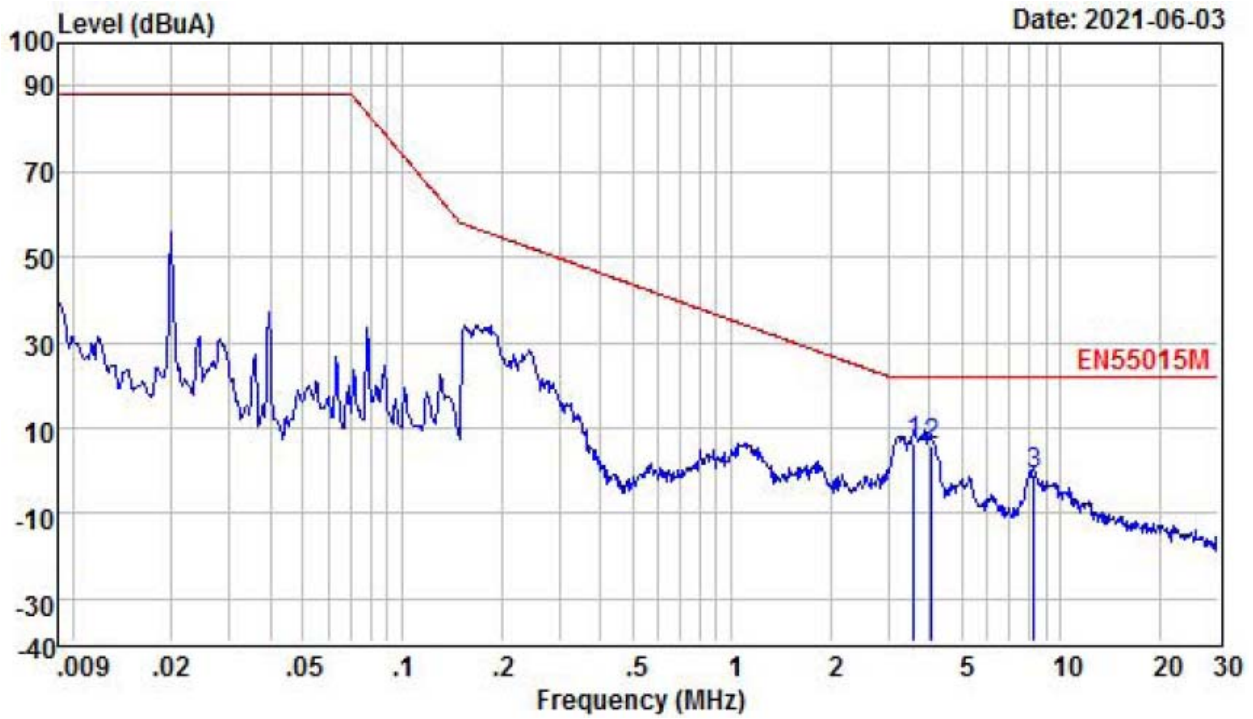
	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.17	31.06	56.54	-25.48	QP
2	0.24	23.72	52.16	-28.44	QP
3	9.79	-7.66	22.02	-29.68	QP

7.5.4 Diagram 020



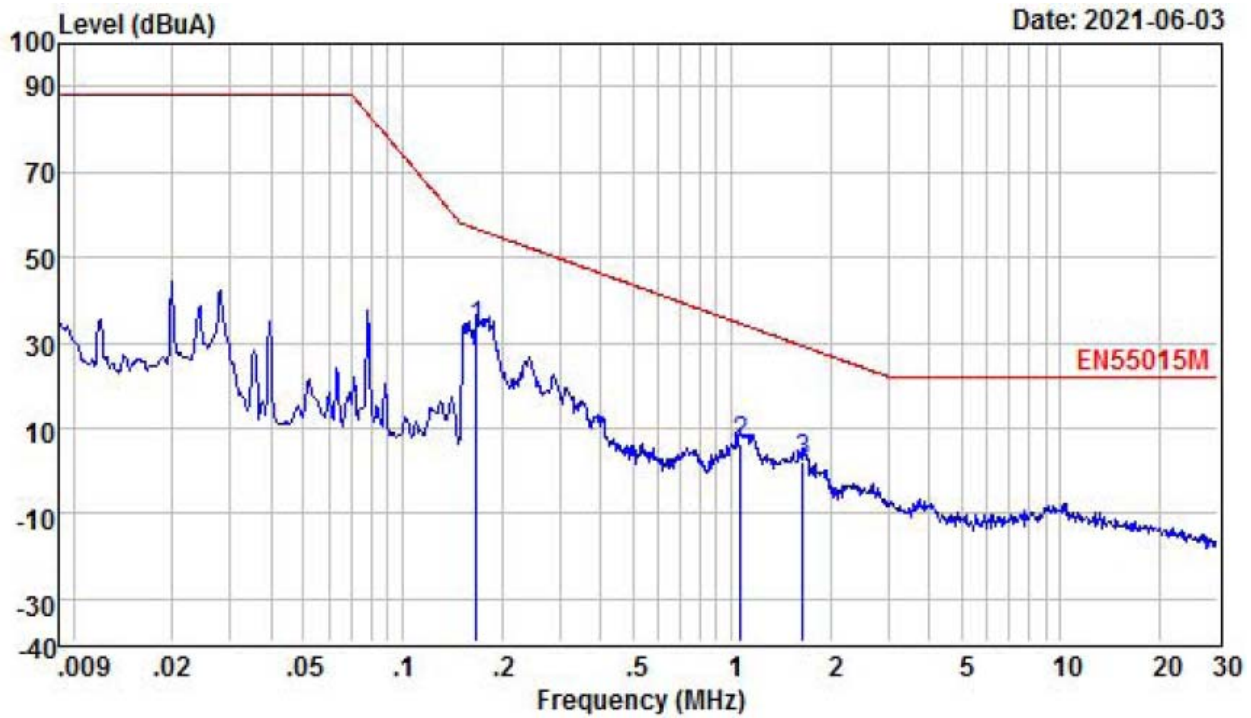
	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.16	33.84	57.52	-23.68	QP
2	3.64	5.95	22.02	-16.07	QP
3	8.19	-2.21	22.02	-24.23	QP

7.5.5 Diagram 021



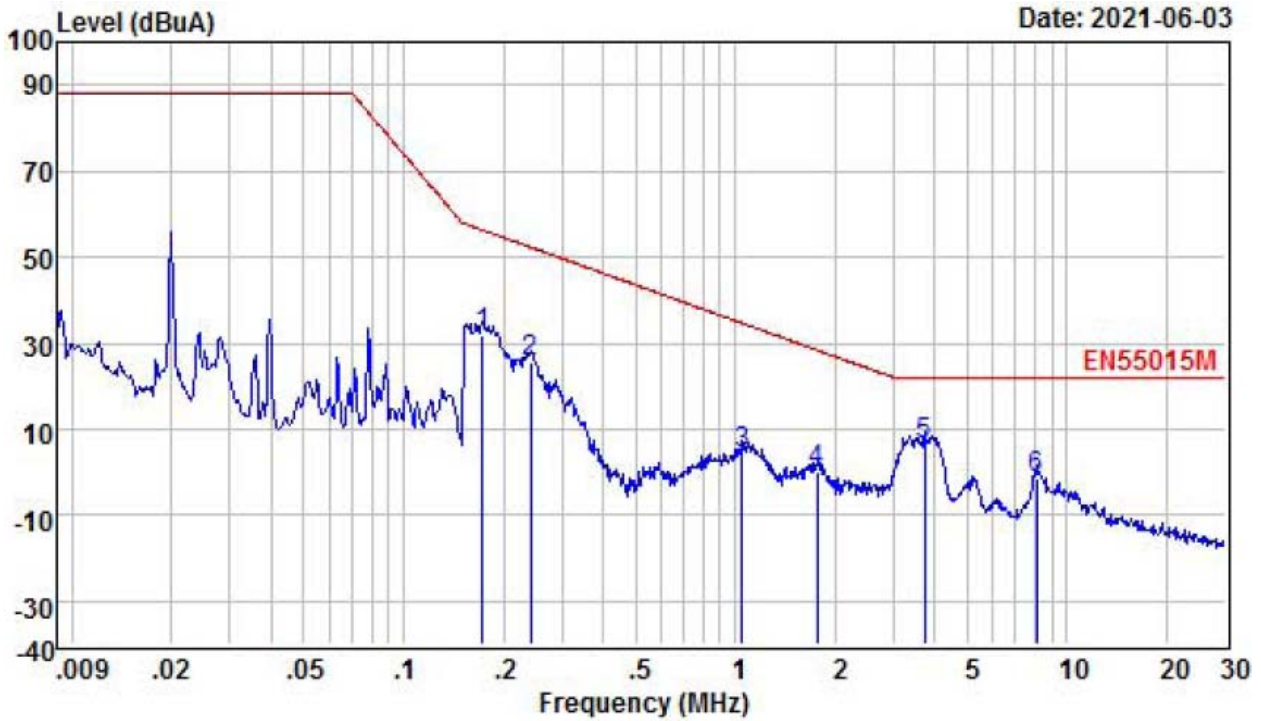
	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	3.58	6.56	22.02	-15.46	QP
2	4.05	5.56	22.02	-16.46	QP
3	8.26	-0.85	22.02	-22.87	QP

7.5.6 Diagram 022



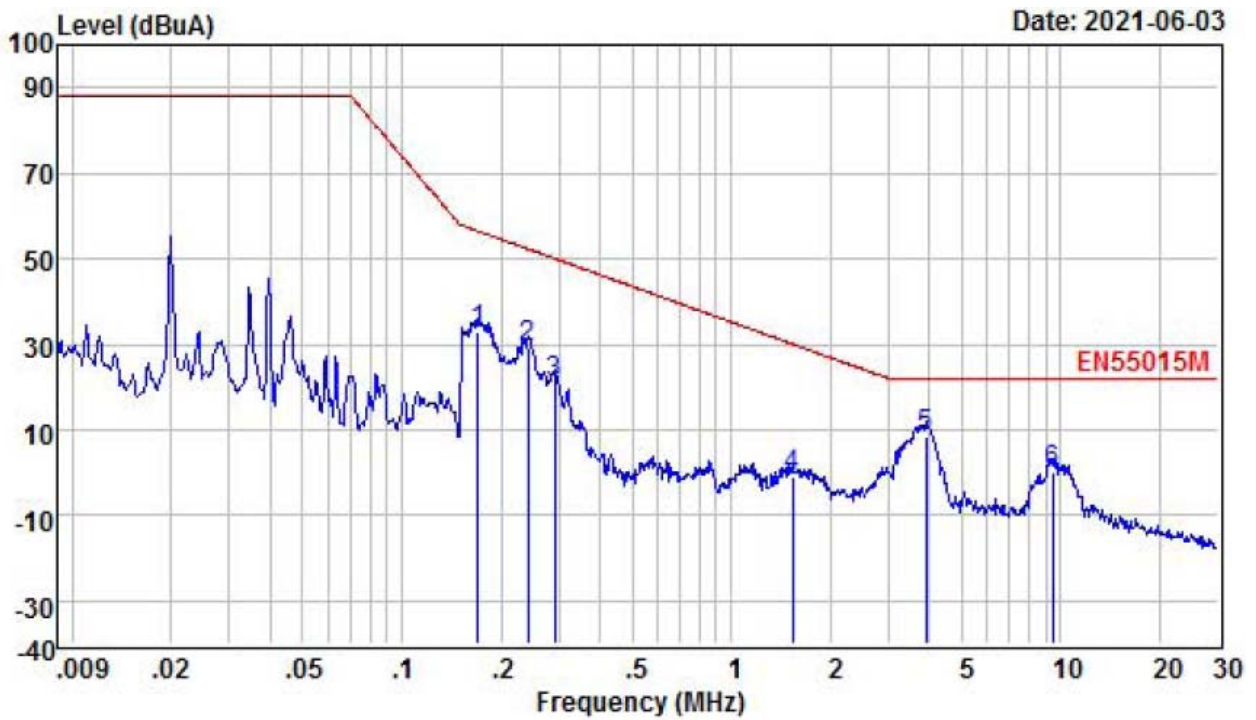
	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.17	33.52	56.64	-23.12	QP
2	1.07	6.39	34.41	-28.02	QP
3	1.64	2.35	29.25	-26.90	QP

7.5.7 Diagram 023



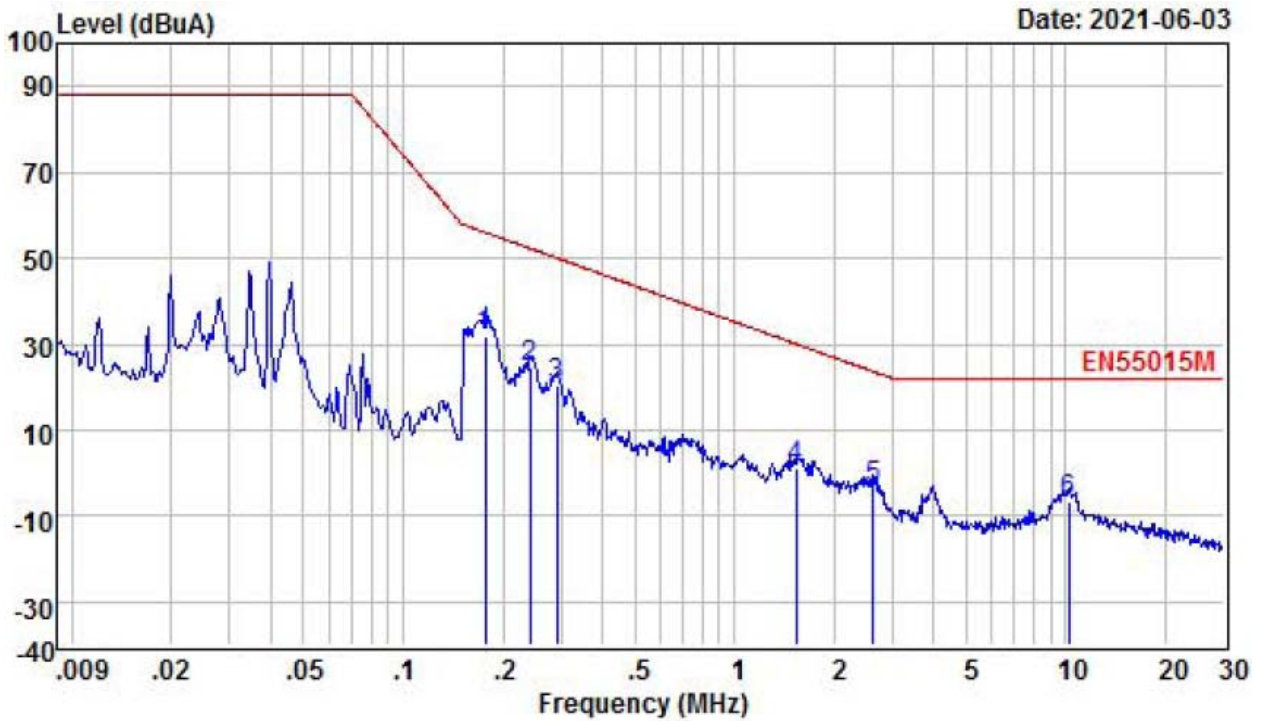
	Limit	Over		
Freq	Level	Line	Limit	Remark
MHz	dBuA	dBuA	dB	
1	0.17	31.75	56.35	-24.60 QP
2	0.24	25.38	52.25	-26.87 QP
3	1.05	4.23	34.61	-30.38 QP
4	1.77	0.17	28.37	-28.20 QP
5	3.73	6.32	22.02	-15.70 QP
6	8.13	-1.27	22.02	-23.29 QP

7.5.8 Diagram 024



	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.17	32.80	56.44	-23.64	QP
2	0.24	29.01	52.25	-23.24	QP
3	0.29	20.85	50.01	-29.16	QP
4	1.54	-0.96	30.03	-30.99	QP
5	3.92	8.28	22.02	-13.74	QP
6	9.48	0.22	22.02	-21.80	QP

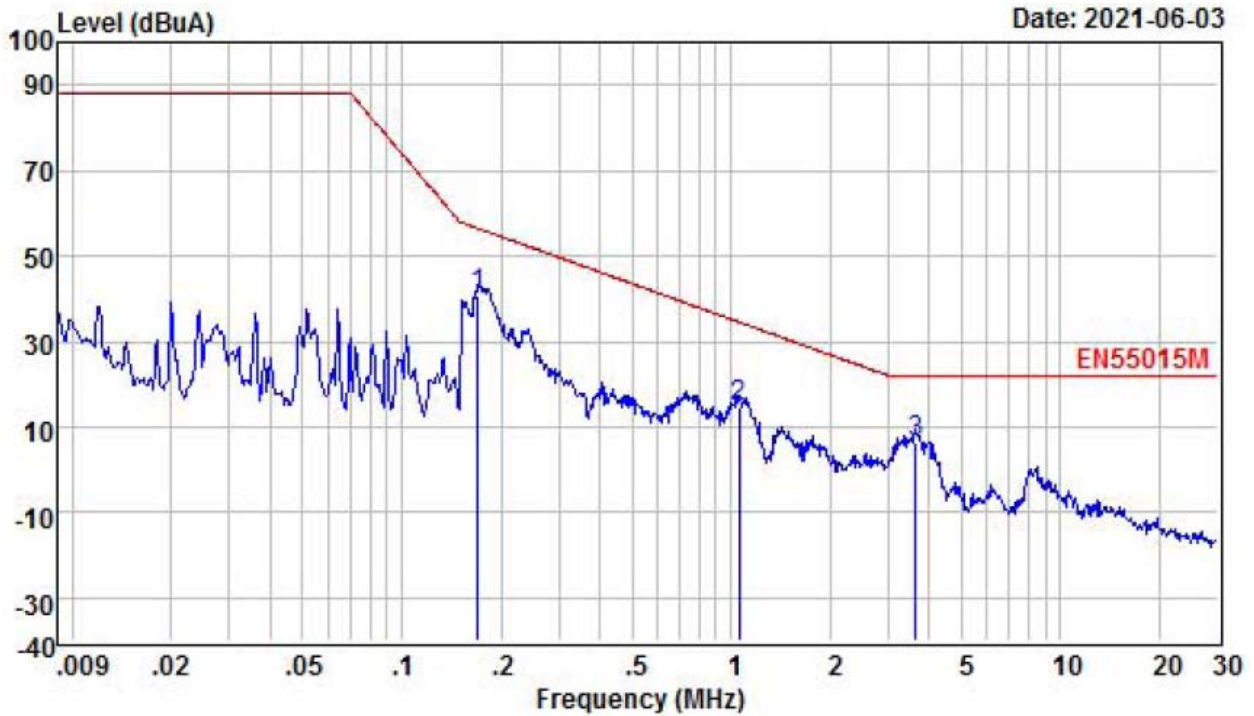
7.5.9 Diagram 025



	Limit	Over		
Freq	Level	Line	Limit	Remark
MHz	dBuA	dBuA	dB	
1	0.18	31.62	56.05	-24.43 QP
2	0.24	24.40	52.25	-27.85 QP
3	0.29	20.45	50.01	-29.56 QP
4	1.54	0.88	30.03	-29.15 QP
5	2.63	-3.70	23.59	-27.29 QP
6	10.20	-6.63	22.02	-28.65 QP

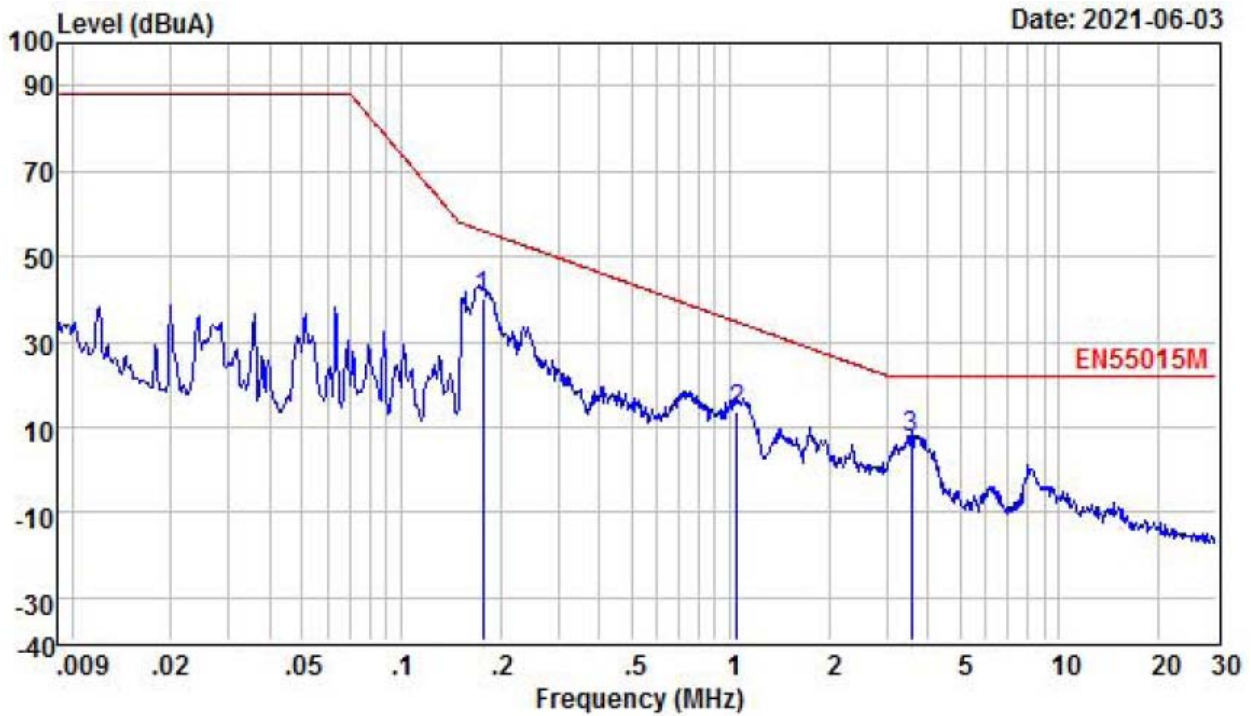


7.5.10 Diagram 026



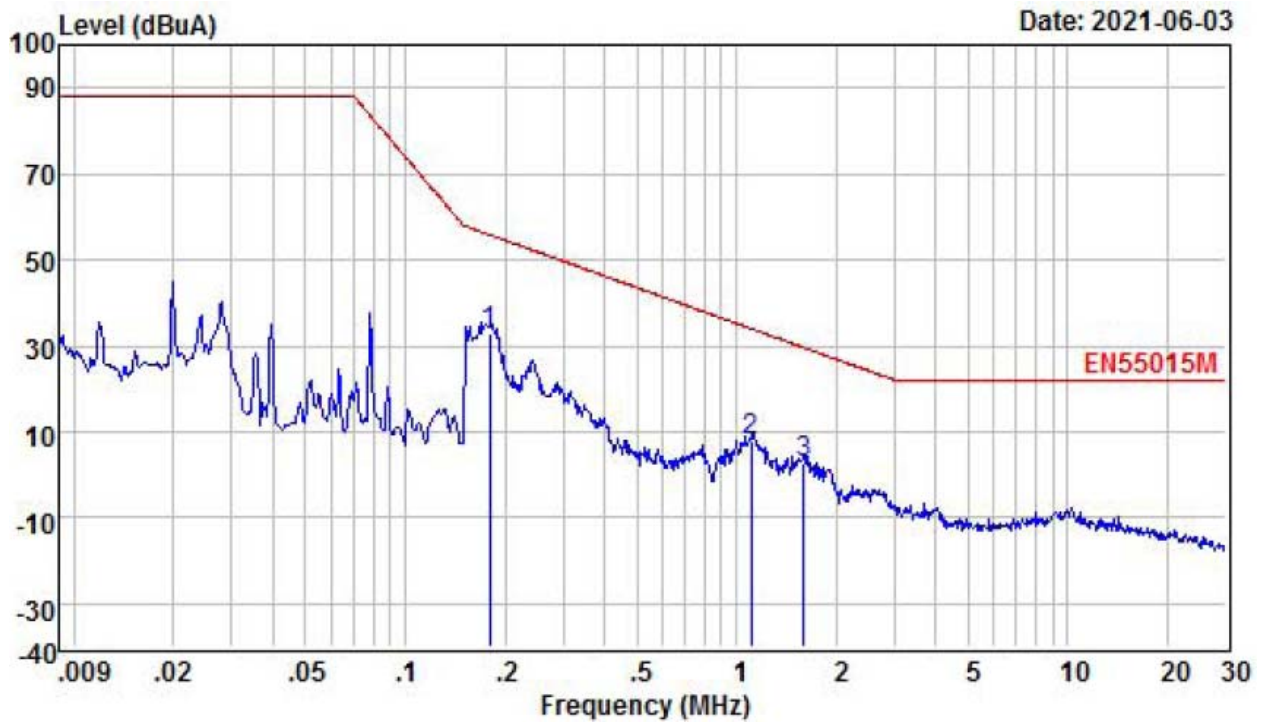
	Freq	Level	Limit	Over	Remark
	MHz	dBuA	Line	Limit	
			dBuA	dB	
1	0.17	40.45	56.49	-16.04	QP
2	1.05	14.48	34.59	-20.11	QP
3	3.64	6.20	22.02	-15.82	QP

7.5.11 Diagram 027



	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.18	40.32	56.05	-15.73	QP
2	1.05	13.68	34.65	-20.97	QP
3	3.57	7.24	22.02	-14.78	QP

7.5.12 Diagram 028



	Freq	Level	Limit	Over	Remark
	MHz	dBuA	dBuA	dB	
1	0.18	32.87	55.79	-22.92	QP
2	1.11	7.65	33.95	-26.30	QP
3	1.59	2.74	29.64	-26.90	QP

Date: 2021-06-16

## 8 Harmonic current

### 8.1 Standard

Generic standard **EN IEC 61000-3-2:2019**  
 Limit class **Class C**  
 Date of testing **2021-06-04**

### 8.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	5kVA AC Power Source	California Instruments	5001iX	60138	Apr 09,22
<input checked="" type="checkbox"/>	Harmonic/Flicker Test System	California Instruments	PACS-1	72847	Apr 09,22

### 8.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

- Devices with an active input power of  $P < 25 \text{ W}$
- Balanced three-phase equipment and all other equipment, expect that stated in one of the following classes **Class A**
- Portable tools **Class B**
- Lighting equipment, including dimming devices **Class C**
- Equipment having an input current with a "special wave shape" as defined in figure 1 in the standard and an active input power,  $P \leq 600 \text{ W}$  and motor driven with phase angle control **Class D**

The power cord of the EUT is connected to the output of the test systems, Turn on the power of the EUT and use the test system to test the harmonic current level. Observation time: 150s

If Harmonic current less than 0.6% of the input current measured under the test condition, or less than 5mA, then whichever is greater, are disregarded.

### 8.4 Test results

Model	Mode	Table	Test port	Power	Result
LS-12-12 MI	TM1	029	AC Input	12.2W	Pass
LS-12-24 MI	TM1	030	AC Input	14.5W	Pass
LS-20-12 MI	TM1	031	AC Input	20.2W	Pass
LS-20-24 MI	TM1	032	AC Input	22.6W	Pass

8.5 Tables

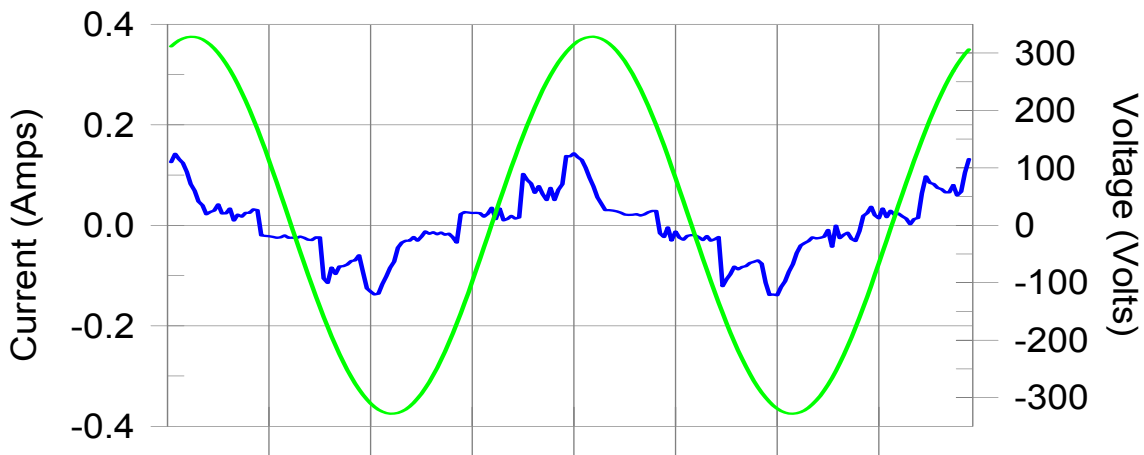
8.5.1 Table 029

Harmonics – Class-C ( $\geq 5W$  and  $\leq 25W$ ) per Ed. 5.0 (2018)(Run time)

EUT: LED Power Supply M/N: LS-12-12 MI Tested by: Ken  
Test category: Class-C per Ed. 5.0 (2018) (European limits) Test Margin: 100  
Test date: 2021-6-04 Start time: 17:11:00 End time: 17:13:41  
Test duration (min): 2.5 Data file name: H-000372.cts\_data  
Comment: Lighting Temp: 22.8°; Humi:55.8%; Press:101.52kPa  
Customer: CQ21040206

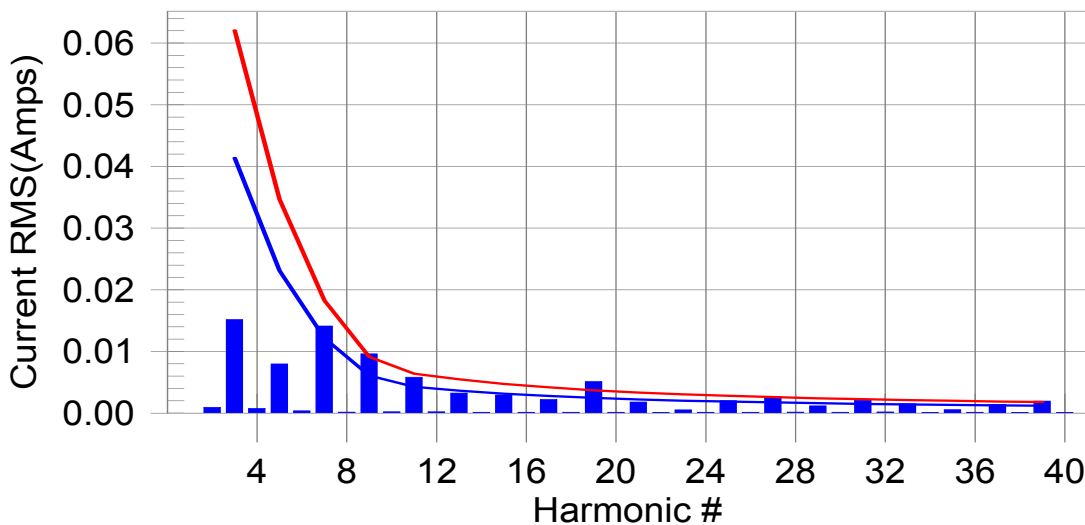
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C)

European Limits



Test result: Pass (THD & Harmonics < limit)

Date: 2021-06-16

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**Current Test Result Summary (Run time)**

EUT: LED Power Supply M/N: LS-12-12 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 17:11:00      End time: 17:13:41  
 Test duration (min): 2.5      Data file name: H-000372.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass      Source qualification: Normal

THC(A): 0.026      I-THD(%): 45.2      POHC: N/A      POHC Limit: N/A

**Highest parameter values during test:**

V_RMS (Volts):	232.13	Frequency (Hz):	50.00
I_Peak (Amps):	0.185	I_RMS (Amps):	0.065
I_Fund (Amps):	0.059	Crest Factor:	2.876
Power (Watts):	12.2	Power Factor:	0.813

Harm#	Harms	100%Limit	%of Limit	
2	0.95	2.93	32.4	Pass
3	15.17	20.53	73.9	Pass
5	7.98	14.66	54.4	Pass
7	14.13	17.60	80.3	Pass
9	9.62	11.73	82.0	Pass
11	5.83	11.73	49.7	Pass

Date: 2021-06-16

### Voltage Source Verification Data (Run time)

EUT: LED Power Supply M/N: LS-12-12 MI Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits) Test Margin: 100  
 Test date: 2021-6-04 Start time: 17:11:00 End time: 17:13:41  
 Test duration (min): 2.5 Data file name: H-000372.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass Source qualification: Normal

## Highest parameter values during test:

Voltage (Vrms):	232.13	Frequency(Hz):	50.00
I_Peak (Amps):	0.185	I_RMS (Amps):	0.065
I_Fund (Amps):	0.059	Crest Factor:	2.876
Power (Watts):	12.2	Power Factor:	0.813

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.039	0.464	8.47	OK
3	0.515	2.089	24.66	OK
4	0.058	0.464	12.47	OK
5	0.050	0.928	5.40	OK
6	0.026	0.464	5.69	OK
7	0.042	0.696	5.97	OK
8	0.010	0.464	2.16	OK
9	0.035	0.464	7.46	OK
10	0.013	0.464	2.83	OK
11	0.010	0.232	4.52	OK
12	0.014	0.232	6.10	OK
13	0.009	0.232	3.92	OK
14	0.006	0.232	2.65	OK
15	0.013	0.232	5.62	OK
16	0.012	0.232	5.21	OK
17	0.007	0.232	3.05	OK
18	0.014	0.232	6.22	OK
19	0.010	0.232	4.24	OK
20	0.017	0.232	7.38	OK
21	0.007	0.232	3.23	OK
22	0.006	0.232	2.48	OK
23	0.005	0.232	2.33	OK
24	0.005	0.232	2.03	OK
25	0.006	0.232	2.51	OK
26	0.004	0.232	1.83	OK
27	0.009	0.232	3.93	OK
28	0.004	0.232	1.68	OK
29	0.006	0.232	2.38	OK
30	0.005	0.232	2.21	OK
31	0.006	0.232	2.53	OK
32	0.004	0.232	1.89	OK
33	0.006	0.232	2.47	OK
34	0.004	0.232	1.59	OK
35	0.004	0.232	1.74	OK
36	0.005	0.232	1.98	OK
37	0.007	0.232	2.94	OK
38	0.004	0.232	1.72	OK
39	0.005	0.232	2.14	OK
40	0.009	0.232	3.98	OK

Date: 2021-06-16

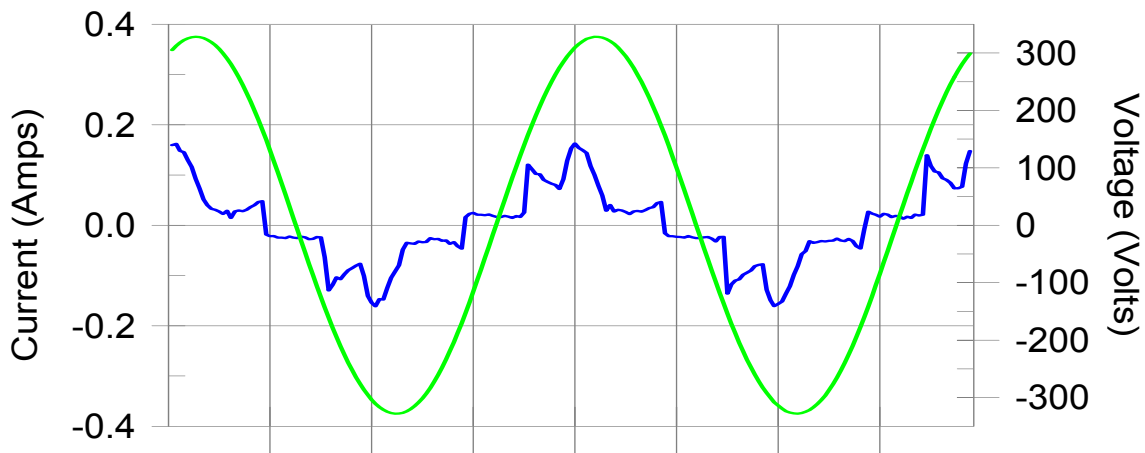
8.5.2 Table 030

**Harmonics – Class-C (  $\geq 5W$  and  $\leq 25W$  ) per Ed. 5.0 (2018)(Run time)**

EUT: LED Power Supply M/N: LS-12-24 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:21:30      End time: 16:24:11  
 Test duration (min): 2.5      Data file name: H-000364.cts\_data  
 Comment: Lighting Temp: 22.8°; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

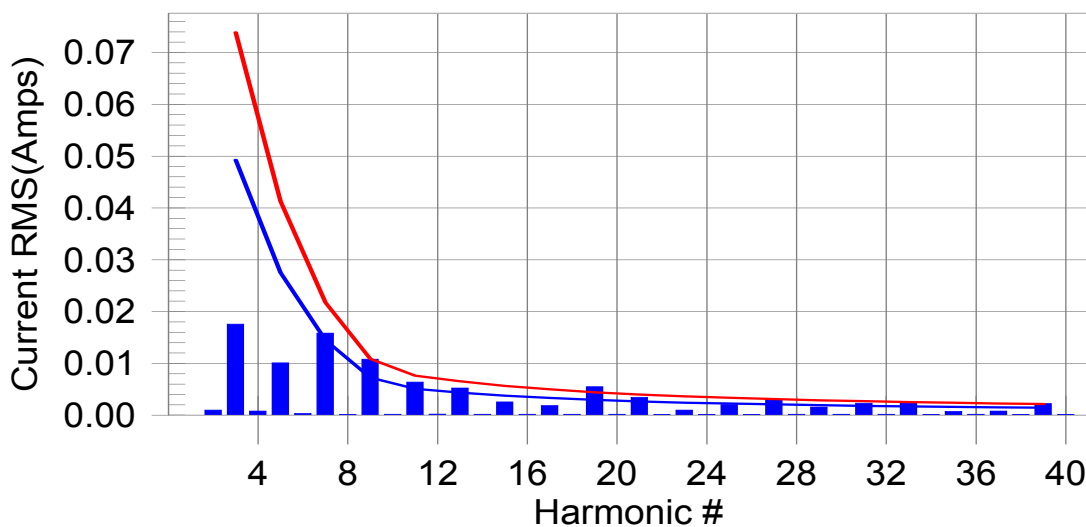
Test Result: Pass      Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C)

European Limits



**Test result: Pass (THD & Harmonics < limit)**



Date: 2021-06-16

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**Current Test Result Summary (Run time)**

EUT: LED Power Supply M/N: LS-12-24 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:21:30      End time: 16:24:11  
 Test duration (min): 2.5      Data file name: H-000364.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass      Source qualification: Normal

THC(A): 0.031      I-THD(%): 44.5      POHC: N/A      POHC Limit: N/A

**Highest parameter values during test:**

V_RMS (Volts):	232.15	Frequency (Hz):	50.00
I_Peak (Amps):	0.195	I_RMS (Amps):	0.076
I_Fund (Amps):	0.069	Crest Factor:	2.583
Power (Watts):	14.5	Power Factor:	0.829

Harm#	Harms	100%Limit	%of Limit	
2	0.99	3.44	28.8	Pass
3	17.58	24.05	73.1	Pass
5	10.10	17.18	58.8	Pass
7	15.82	20.61	76.8	Pass
9	10.81	13.74	78.7	Pass
11	6.40	13.74	46.6	Pass

Date: 2021-06-16

**Voltage Source Verification Data (Run time)**

EUT: LED Power Supply M/N: LS-12-24 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:21:30      End time: 16:24:11  
 Test duration (min): 2.5      Data file name: H-000364.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass      Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	232.15	Frequency(Hz):	50.00
I_Peak (Amps):	0.195	I_RMS (Amps):	0.076
I_Fund (Amps):	0.069	Crest Factor:	2.583
Power (Watts):	14.5	Power Factor:	0.829

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.058	0.464	12.59	OK
3	0.499	2.089	23.89	OK
4	0.061	0.464	13.07	OK
5	0.036	0.928	3.93	OK
6	0.022	0.464	4.83	OK
7	0.028	0.696	4.03	OK
8	0.011	0.464	2.44	OK
9	0.035	0.464	7.46	OK
10	0.013	0.464	2.82	OK
11	0.012	0.232	5.04	OK
12	0.016	0.232	6.97	OK
13	0.010	0.232	4.40	OK
14	0.007	0.232	3.14	OK
15	0.013	0.232	5.63	OK
16	0.011	0.232	4.90	OK
17	0.007	0.232	3.18	OK
18	0.015	0.232	6.48	OK
19	0.011	0.232	4.72	OK
20	0.018	0.232	7.76	OK
21	0.008	0.232	3.38	OK
22	0.007	0.232	2.91	OK
23	0.006	0.232	2.57	OK
24	0.005	0.232	2.11	OK
25	0.006	0.232	2.42	OK
26	0.005	0.232	2.10	OK
27	0.010	0.232	4.50	OK
28	0.005	0.232	2.15	OK
29	0.008	0.232	3.31	OK
30	0.005	0.232	2.31	OK
31	0.007	0.232	2.96	OK
32	0.004	0.232	1.67	OK
33	0.007	0.232	2.83	OK
34	0.005	0.232	2.00	OK
35	0.005	0.232	2.15	OK
36	0.005	0.232	2.17	OK
37	0.006	0.232	2.67	OK
38	0.005	0.232	2.02	OK
39	0.005	0.232	2.28	OK
40	0.010	0.232	4.19	OK

Date: 2021-06-16

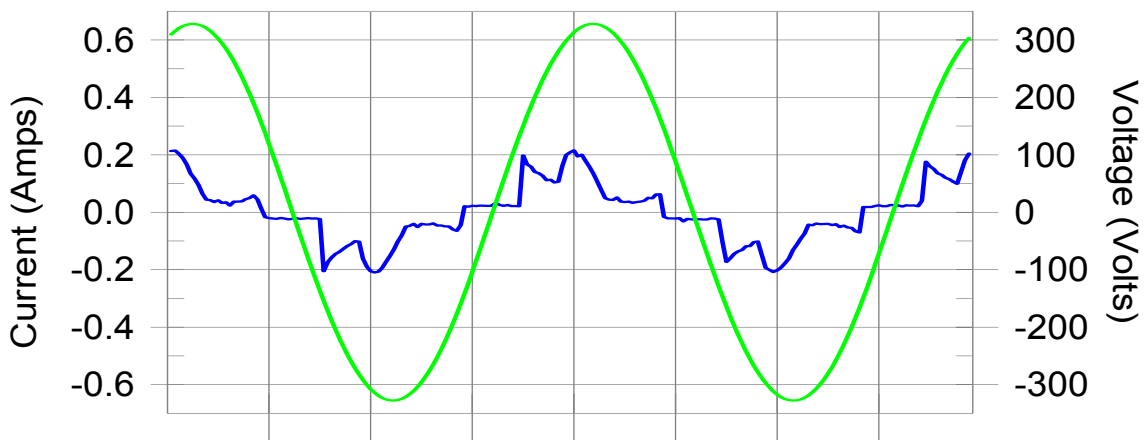
8.5.3 Table 031

**Harmonics – Class-C (  $\geq 5W$  and  $\leq 25W$  ) per Ed. 5.0 (2018)(Run time)**

EUT: LED Power Supply M/N: LS-20-12 MI Tested by: Ken  
Test category: Class-C per Ed. 5.0 (2018) (European limits) Test Margin: 100  
Test date: 2021-6-04 Start time: 16:49:14 End time: 16:51:55  
Test duration (min): 2.5 Data file name: H-000369.cts\_data  
Comment: Lighting Temp: 22.8°; Humi:55.8%; Press:101.52kPa  
Customer: CQ21040206

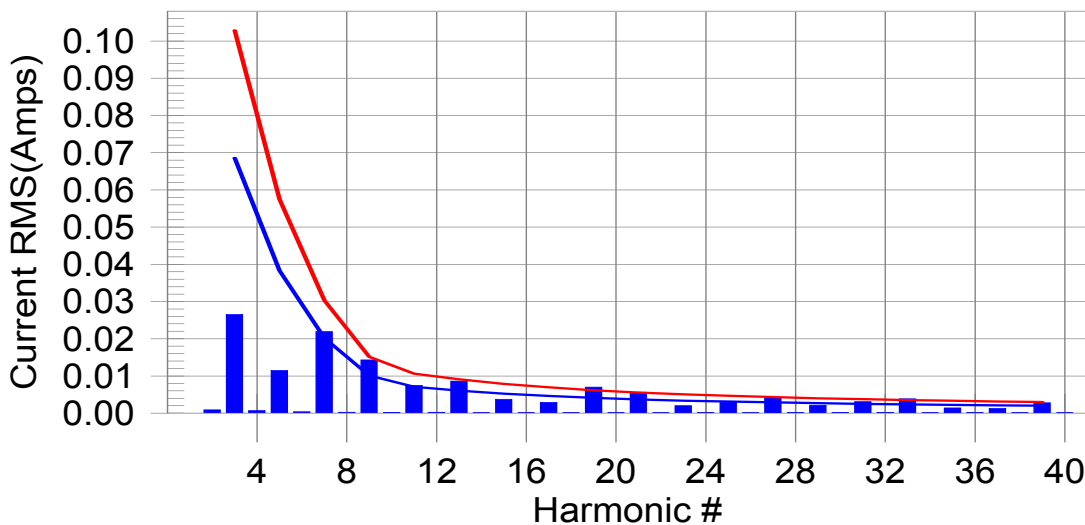
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C)

European Limits



Test result: Pass (THD & Harmonics < limit)

Date: 2021-06-16

---

**Current Test Result Summary (Run time)**

EUT: LED Power Supply M/N: LS-20-12 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:49:14      End time: 16:51:55  
 Test duration (min): 2.5      Data file name: H-000369.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass      Source qualification: Normal

THC(A): 0.043      I-THD(%): 45.3      POHC: N/A      POHC Limit: N/A

**Highest parameter values during test:**

V_RMS (Volts):	232.06	Frequency (Hz):	50.00
I_Peak (Amps):	0.559	I_RMS (Amps):	0.104
I_Fund (Amps):	0.094	Crest Factor:	5.404
Power (Watts):	20.2	Power Factor:	0.839

Harm#	Harms	100%Limit	%of Limit	
2	0.89	4.72	19.0	Pass
3	26.54	33.01	80.4	Pass
5	11.49	23.58	48.7	Pass
7	21.92	28.29	77.5	Pass
9	14.30	18.86	75.8	Pass
11	7.47	18.86	39.6	Pass

Date: 2021-06-16

### Voltage Source Verification Data (Run time)

EUT: LED Power Supply M/N: LS-20-12 MI Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits) Test Margin: 100  
 Test date: 2021-6-04 Start time: 16:49:14 End time: 16:51:55  
 Test duration (min): 2.5 Data file name: H-000369.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass Source qualification: Normal

#### Highest parameter values during test:

Voltage (Vrms):	232.06	Frequency(Hz):	50.00
I_Peak (Amps):	0.559	I_RMS (Amps):	0.104
I_Fund (Amps):	0.094	Crest Factor:	5.404
Power (Watts):	20.2	Power Factor:	0.839

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.044	0.464	9.38	OK
3	0.517	2.088	24.78	OK
4	0.052	0.464	11.11	OK
5	0.072	0.928	7.79	OK
6	0.017	0.464	3.67	OK
7	0.042	0.696	5.99	OK
8	0.011	0.464	2.47	OK
9	0.038	0.464	8.15	OK
10	0.014	0.464	3.09	OK
11	0.011	0.232	4.53	OK
12	0.015	0.232	6.32	OK
13	0.012	0.232	5.28	OK
14	0.007	0.232	3.04	OK
15	0.013	0.232	5.64	OK
16	0.012	0.232	5.23	OK
17	0.007	0.232	3.08	OK
18	0.015	0.232	6.44	OK
19	0.011	0.232	4.75	OK
20	0.017	0.232	7.47	OK
21	0.009	0.232	3.78	OK
22	0.007	0.232	2.86	OK
23	0.005	0.232	2.11	OK
24	0.005	0.232	2.11	OK
25	0.007	0.232	2.86	OK
26	0.005	0.232	2.06	OK
27	0.011	0.232	4.57	OK
28	0.004	0.232	1.89	OK
29	0.007	0.232	3.04	OK
30	0.005	0.232	2.35	OK
31	0.008	0.232	3.35	OK
32	0.005	0.232	2.01	OK
33	0.008	0.232	3.51	OK
34	0.005	0.232	1.95	OK
35	0.005	0.232	2.26	OK
36	0.005	0.232	2.16	OK
37	0.006	0.232	2.79	OK
38	0.005	0.232	2.02	OK
39	0.005	0.232	2.21	OK
40	0.009	0.232	3.99	OK

Date: 2021-06-16

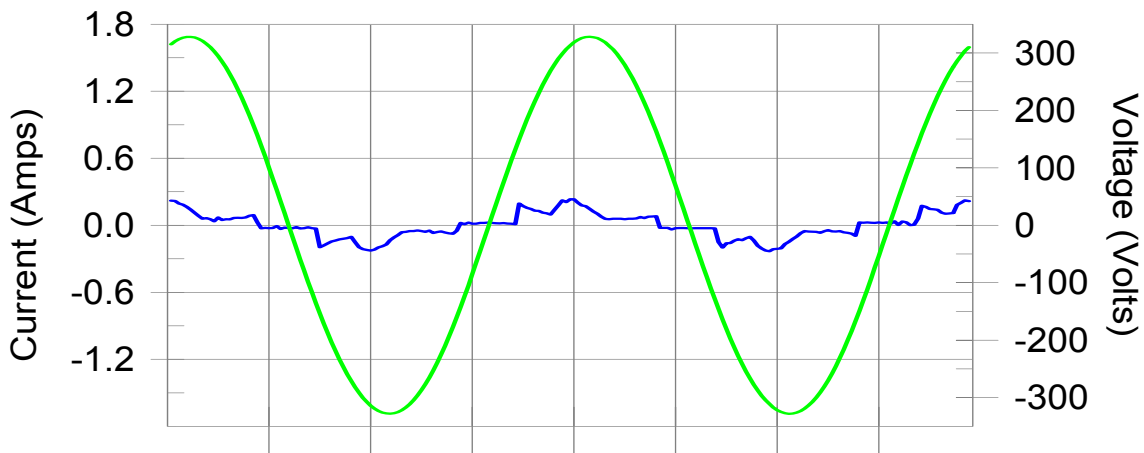
8.5.4 Table 032

**Harmonics – Class-C (  $\geq 5W$  and  $\leq 25W$  ) per Ed. 5.0 (2018)(Run time)**

EUT: LED Power Supply M/N: LS-20-24 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:14:45      End time: 16:17:26  
 Test duration (min): 2.5      Data file name: H-000363.cts\_data  
 Comment: Lighting Temp: 22.8°; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

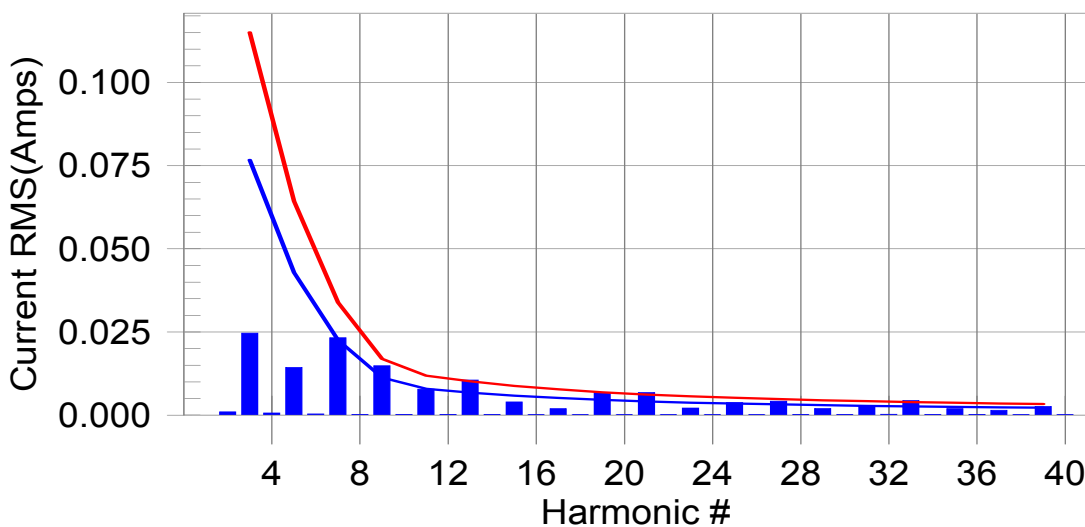
Test Result: Pass      Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C)

European Limits



Test result: Pass (THD & Harmonics < limit)

Date: 2021-06-16

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**Current Test Result Summary (Run time)**

EUT: LED Power Supply M/N: LS-20-24 MI      Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits)      Test Margin: 100  
 Test date: 2021-6-04      Start time: 16:14:45      End time: 16:17:26  
 Test duration (min): 2.5      Data file name: H-000363.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass      Source qualification: Normal

THC(A): 0.044      I-THD(%): 42.7      POHC: N/A      POHC Limit: N/A

**Highest parameter values during test:**

V_RMS (Volts):	232.11	Frequency (Hz):	50.00
I_Peak (Amps):	1.268	I_RMS (Amps):	0.113
I_Fund (Amps):	0.103	Crest Factor:	11.185
Power (Watts):	22.6	Power Factor:	0.866

Harm#	Harms	100%Limit	%of Limit	
2	1.04	5.16	20.0	Pass
3	24.69	36.14	68.3	Pass
5	14.36	25.81	55.6	Pass
7	23.26	30.98	75.1	Pass
9	14.84	20.65	71.9	Pass
11	7.81	20.65	37.9	Pass

Date: 2021-06-16

### Voltage Source Verification Data (Run time)

EUT: LED Power Supply M/N: LS-20-24 MI Tested by: Ken  
 Test category: Class-C per Ed. 5.0 (2018) (European limits) Test Margin: 100  
 Test date: 2021-6-04 Start time: 16:14:45 End time: 16:17:26  
 Test duration (min): 2.5 Data file name: H-000363.cts\_data  
 Comment: Lighting Temp: 22.8'; Humi:55.8%; Press:101.52kPa  
 Customer: CQ21040206

Test Result: Pass Source qualification: Normal

#### Highest parameter values during test:

Voltage (Vrms):	232.11	Frequency(Hz):	50.00
I_Peak (Amps):	1.268	I_RMS (Amps):	0.113
I_Fund (Amps):	0.103	Crest Factor:	11.185
Power (Watts):	22.6	Power Factor:	0.866

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.070	0.464	15.13	OK
3	0.560	2.089	26.83	OK
4	0.036	0.464	7.81	OK
5	0.060	0.928	6.48	OK
6	0.023	0.464	4.98	OK
7	0.036	0.696	5.15	OK
8	0.010	0.464	2.15	OK
9	0.039	0.464	8.50	OK
10	0.011	0.464	2.44	OK
11	0.011	0.232	4.76	OK
12	0.016	0.232	6.83	OK
13	0.014	0.232	5.99	OK
14	0.008	0.232	3.47	OK
15	0.014	0.232	5.94	OK
16	0.012	0.232	4.96	OK
17	0.007	0.232	3.22	OK
18	0.015	0.232	6.38	OK
19	0.012	0.232	5.04	OK
20	0.018	0.232	7.61	OK
21	0.010	0.232	4.28	OK
22	0.006	0.232	2.64	OK
23	0.005	0.232	2.33	OK
24	0.005	0.232	1.98	OK
25	0.007	0.232	3.05	OK
26	0.005	0.232	2.07	OK
27	0.011	0.232	4.95	OK
28	0.005	0.232	2.15	OK
29	0.008	0.232	3.63	OK
30	0.005	0.232	2.08	OK
31	0.007	0.232	3.18	OK
32	0.004	0.232	1.88	OK
33	0.008	0.232	3.62	OK
34	0.005	0.232	1.95	OK
35	0.006	0.232	2.43	OK
36	0.005	0.232	2.31	OK
37	0.006	0.232	2.69	OK
38	0.004	0.232	1.78	OK
39	0.005	0.232	2.15	OK
40	0.010	0.232	4.10	OK



Date: 2021-06-16

## 9 Voltage fluctuations and flicker

### 9.1 Standard

Generic standard

EN 61000-3-3:2013+A1:2019

Date of testing

2021-06-03

### 9.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	5kVA AC Power Source	California Instruments	5001iX	60138	Apr 09.22
<input checked="" type="checkbox"/>	Harmonic/Flicker Test System	California Instruments	PACS-1	72847	Apr 09,22

### 9.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The power cord of the EUT is connected to the output of the test systems, Turn on the power of the EUT and use the test system to test the voltage fluctuation and flicker.

There is no testing required if the device does not generate any significant voltage fluctuations or flicker. A short time measurement confirmed the assumption that this is the fact. The details in the test module are representing the results of the short time measurement.

Short time (Pst): 10 min

### 9.4 Test results

Model	Mode	Table	Test port	Result
LS-12-12 MI	TM1	033	AC Input	Pass
LS-12-24 MI	TM1	034	AC Input	Pass
LS-20-12 MI	TM1	035	AC Input	Pass
LS-20-24 MI	TM1	036	AC Input	Pass

Date: 2021-06-16

9.5 Tables

9.5.1 Table 033

**Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)**

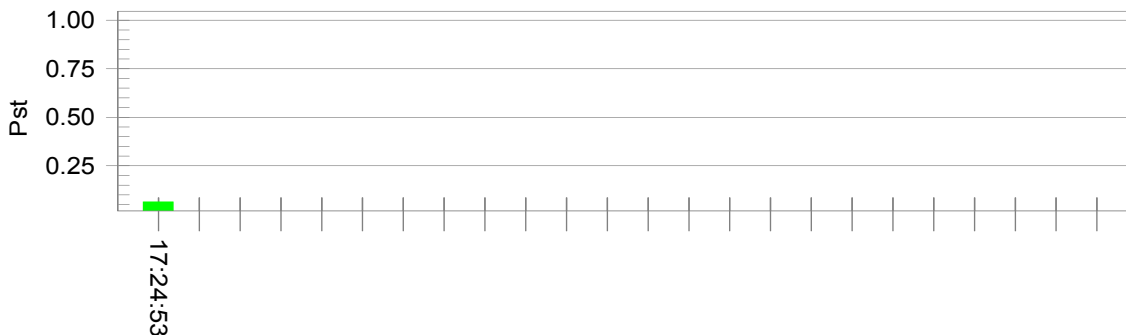
EUT: LED Power Supply M/N: LS-12-12 MI	Tested by: Ken
Test category: All parameters (European limits)	Test Margin: 100
Test date: 2021-6-05	Start time: 17:14:32
Test duration (min): 10	End time: 17:24:59
Comment: Lighting Temp: 22.8°; Humi:55.8%; Press:101.52kPa	Data file name: F-000373.cts_data
Customer: CQ21040206	

Test Result: Pass

Status: Test Completed

P<sub>st</sub> and limit line

European Limits



Parameter values recorded during the test:

Vrms at the end of test (Volt):	232.02		
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass







## 10 Electrostatic Discharge

### 10.1 Standard

Generic standard	<b>EN 61000-4-2:2009</b>
Date of testing	<b>2021-06-07</b>
Performance criteria:	<b>B</b>

### 10.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	ESD Generator	TESEQ	NSG437	433	Apr 11,22

### 10.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

These tests are carried out according to IEC 61000-4-2, with test levels as given in Table 1 of this standard. Contact discharge is the preferred test method. Twenty discharges (10 with positive and 10 with negative polarity) shall be applied on each accessible metallic part of the enclosure (terminals are excluded). Air discharges shall be used where contact discharges cannot be applied. Discharges shall be applied on the horizontal or vertical coupling planes, as specified in IEC 61000-4-2.

Contact Discharge: The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Air Discharge: Air discharge is used where contact discharge can't be applied.. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator 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 .Indirect discharge for horizontal coupling plane At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. Indirect discharge for vertical coupling plane At least 20 single discharge shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

### 10.4 Test results

Port: Enclosure			
Test Model	Test mode	Table	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	037	Pass

Date: 2021-06-16

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**10.5 Table****10.5.1 Table 037**

Location	Voltage	Amount of test points	Amount of discharge	Discharge Method	Performance
Conductive Enclosure: metal, screws	$\pm 2,4\text{kV}$	1	20	Contact	A
Nonconductive Enclosure: slot	$\pm 2,4,8\text{kV}$	2	40	Air	A
HCP	$\pm 2,4\text{kV}$	4	80	Contact	A
VCP	$\pm 2,4\text{kV}$	4	80	Contact	A

Date: 2021-06-16

## 11 Radiated Electromagnetic Field Immunity

### 11.1 Standard

Generic standard **EN 61000-4-3:2006+A1:2008+A2:2010**  
 Date of testing **2021-06-07**  
 Performance criteria: **A**

### 11.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	Bilog Antenna	ETS	3142D	00135452	Apr 09,22
<input checked="" type="checkbox"/>	Amplifier (80-1000MHz)	SKET	AP801000_250	MPA1708341	Apr 09,22
<input checked="" type="checkbox"/>	Amplifier (1-3GHz)	SKET	AP0103_75	MPA1708342	Apr 09,22
<input checked="" type="checkbox"/>	Amplifier (3-6GHz)	SKET	AP0206_50	MPA1708343	Apr 09,22
<input checked="" type="checkbox"/>	RF Switch	EMC TOYO	/	/	Apr 09,22
<input checked="" type="checkbox"/>	Power Sensor	Agilent	/	MY41496069	Apr 09,22
<input checked="" type="checkbox"/>	Signal Generator	Agilent	N5181B	MY53050432	Apr 09,22
<input checked="" type="checkbox"/>	Power Meter	Agilent	E4418B	MY41294414	Apr 09,22

### 11.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on Test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

### 11.4 Test results

Test Model	Test Mode	Table	Description	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	038	Enclosure Port	<b>Pass</b>



## 11.5 Table

### 11.5.1 Table 038

Frequency Range (MHz)	80-1000MHz	
Field Strength(V/m)	3V/m ; 1kHz 80%AM (sine wave)	
Steps (%)	1%	
Dwell time	1s	
Polarization	Horizontal	Vertical
Front	A	A
Rear	A	A
Left	A	A
Right	A	A

Date: 2021-06-16

## 12 Electrical Fast Transients/Bursts Immunity

### 12.1 Standard

Generic standard **EN 61000-4-4:2012**  
 Date of testing **2021-06-07**  
 Performance criteria: **B**

### 12.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	EFT Tester	EMtest	EFT500N5	V1105108698	Apr 09,22
<input checked="" type="checkbox"/>	EFT Coupling Clamp	EMtest	HFK	0211-168	Apr 09,22

### 12.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT located  $0.1\text{m} \pm 0.01\text{m}$  above the ground reference plane. The ground reference plane shall project beyond the EUT at least 0.1m on all side, All cables to the EUT shall be placed on the insulation support 0.1m above the ground reference plane.

When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, shall be 0,5 m. Unless otherwise specified in the product standard or the product family standard, the length of the signal and power lines between the coupling device and the EUT shall be  $0,5\text{ m} \pm 0,05\text{ m}$ . If the manufacturer provides a non-detachable supply cable more than  $0,5\text{ m} \pm 0,05\text{ m}$  long with the equipment, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0,1 m above the ground reference plane.

Fast transients are carried out during 2min with a positive polarity and during 2min with a negative polarity.

Test level at input is as below:  
 1kV (peak); 5/50ns;5kHz

and Test level output dc. power ports is as below:  
 0.5kV (peak); 5/50ns;5kHz

### 12.4 Test results

Port: AC input			
Test Model	Test Mode	Table	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	039	Pass

Date: 2021-06-16

**12.5 Table****12.5.1 Table 039**

Test specification	1KV; 5/50ns Tr/Th;5kHz repetition frequency			
Injected Line	Voltage (kV)	Test Time (s)	Injected Method	Performance
L	+1	120	Direct	B
	-1	120	Direct	B
N	+1	120	Direct	B
	-1	120	Direct	B
L,N	+1	120	Direct	B
	-1	120	Direct	B

Date: 2021-06-16

## 13 Surge Immunity

### 13.1 Standard

Basic standard **EN 61000-4-5:2014+A1:2017**  
 Date of testing **2021-06-07**  
 Performance criteria: **B**

### 13.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	Surge Tester	EMtest	UCS500N7	V1105108699	Apr 09,22

### 13.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

If not otherwise specified the power cord between the EUT and the coupling/decoupling network shall not exceed 2m in length.

These tests are carried out according to IEC 61000-4-5, with test levels as given in Table 10 of this standard. Lower levels need not to be tested. Pulses shall be applied to the a.c. voltage wave as follows; five positive polarity pulses at the 90° phase angle, five negative polarity pulses at the 270° phase angle. Two test levels are given for different types of lighting equipment.

### 13.4 Test results

Port: AC input				
Test Model	Test Mode	Table	Test specification	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	040	Input AC power Port 1.2/50(8/20) $\mu$ s Tr/Th ■ < 25W 0.5KV L-N;	Pass

### 13.5 Table

#### 13.5.1 Table 040

Injected Line	Wave Form	Voltage(kV)	Phase	Number of Pulse/per phase	Interval time	Performance
L-N	1.2/50 $\mu$ s	+0.5	90°	5	60s	B
		-0.5	270°	5	60s	B

Date: 2021-06-16

## 14 Conducted Immunity

### 14.1 Standard

Basic standard **EN 61000-4-6:2014**  
 Date of testing **2021-06-07**  
 Performance criteria: **A**

### 14.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	C/S Test system	FRANKONIA	CIT-10	126B1164	Apr 11,22
<input checked="" type="checkbox"/>	CDN	Luthi	L-801 M2/M3	2789	Apr 11,22
<input checked="" type="checkbox"/>	Electromagnetic injection clamp	Luthi	EM101	36041	Apr 11,22

### 14.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

Set up the EUT, CDN and test generators as shown above. The equipment to be tested is placed on an insulating support of 0.1m height above a ground reference plane, all cable exiting the EUT shall be supported at a height of at least 30mm above the ground reference plane.

The test is performed with the generator contacted to each CDN in turn. The frequency range is swept from 150kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

### 14.4 Test results

Port: AC input power port				
Test Model	Test Mode	Table	Test specification	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	041	0.15MHz~80MHz 3V(r.m.s.) (unmodulated) 1kHz ,80%AM ,sine wave Source impedance 150Ω	Pass

### 14.5 Table

#### 14.5.1 Table 041

Frequency Range (MHz)	Injected Position	Strength	Performance
0.15MHz ~ 80MHz	AC main port	3V(r.m.s, Unmodulated)	A
Dwell time: 1s; Steps: 1%			

Date: 2021-06-16

## 15 Voltage dips and interruptions Immunity

### 15.1 Standard

Basic standard **EN IEC 61000-4-11:2020**  
 Date of testing **2021-06-07**  
 Performance criteria: **C, B**

### 15.2 Measurement equipment

	Equipment	Manufacturer	Model No.	Serial No.	Calibration due
<input checked="" type="checkbox"/>	Dips Tester	EVERFINE	EMS61000-11K	YG100319N11040005	Apr 11,22

### 15.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT is tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10s minimum. Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform.

### 15.4 Test results

Port: AC input				
Test Model	Test Mode	Table	Test specification	Result
LS-12-12 MI, LS-12-24 MI, LS-20-12 MI, LS-20-24 MI,	TM1	042	Voltage reduction 30% Number of periods 10 Performance criteria:C; Voltage reduction 100% Number of periods 0.5 Performance criteria:B.	<b>Pass</b>

### 15.5 Table

#### 15.5.1 Table 042

Test level %U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (ms)	Phase Angle	Performance
0	100	10	0°, 180°	B
70	30	200	0°, 180°	B

## 16 Induced current density

### 16.1 Standard

Generic standard **EN 62493:2015**  
 Date of testing **N/A**

### 16.2 Measurement equipment

N/A

### 16.3 Test set-up

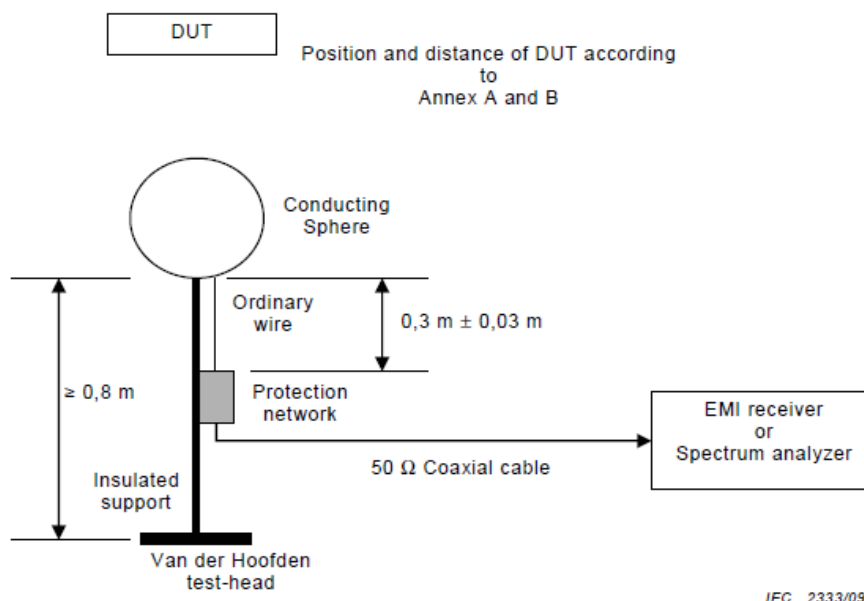
Annex B with a photo or a rough figure of the test set-up is attached.

**30mins stabilisation time.**

**Receiver setting :**

Frequency range	$B_6$ according to CISPR 16-1-1	Measurement time	$f_{step}$	Detector
20 kHz – 150 kHz	200 Hz	100 ms	220 Hz	Peak
150 kHz – 10 MHz	9 kHz	20 ms	10 kHz	Peak

Measurement setup:



If the lighting equipment is provided with an earthing terminal, the lighting equipment shall be connected by means of an earth conductor contained in the power cable to the lighting equipment.

During the tests no conductive plane or object or human being should be closer to the lighting equipment than 0,8 m.

The height of the insulated support is minimum 0,8 m. The conducting sphere is connected to the protection network via an ordinary wire of length 30 cm  $\pm$  3 cm. The protection network is

Date: 2021-06-16

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then connected to the EMI receiver, or spectrum analyser, by a 50  $\Omega$  coaxial cable having a maximum cable loss of 0,2 dB and a d.c. resistance of  $\leq 10\Omega$ .

$$\sum_{f_i=20\text{kHz}}^{150\text{kHz}} \frac{E_{\text{cap}}(f_i, d)}{E_{\text{Lim}}(f_i)} + \sum_{f_i=150\text{kHz}}^{10\text{MHz}} \frac{E_{\text{cap}}(f_i, d)}{E_{\text{Lim}}(f_i)} \leq 1$$

Step=220Hz                      Step=10kHz

#### 16.4 Test results

N/A\*

\*): Remark: It is a LED-Light-source technology deemed to comply with the Van der Hoofden test without testing.



**Annex A**

**EUT / technical data**

Port	Label	Description		
Enclosure	GH	Enclosure port Plastic		
Mains input AC	NAC.E	220-240V,50/60Hz.Cl.II		
Mains input DC	NDC.E	N.A		
Mains output AC	NAC.E	N.A		
Mains output DC	NAC.A	N.A		
Process measurement and control ports	PMS.E/A	N.A		
I/O and communication ports	SD.E/A	N.A		
Protective earth connection	EA	N.A		
Interface Cables	Length	Shielded	Type	Special
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Figure A-1 External photo of EUT (LS-12-12 MI and LS-12-24 MI)**



Figure A-2 External photo of EUT (LS-12-12 MI and LS-12-24 MI)



Figure A-3 External photo of EUT (LS-12-12 MI and LS-12-24 MI)

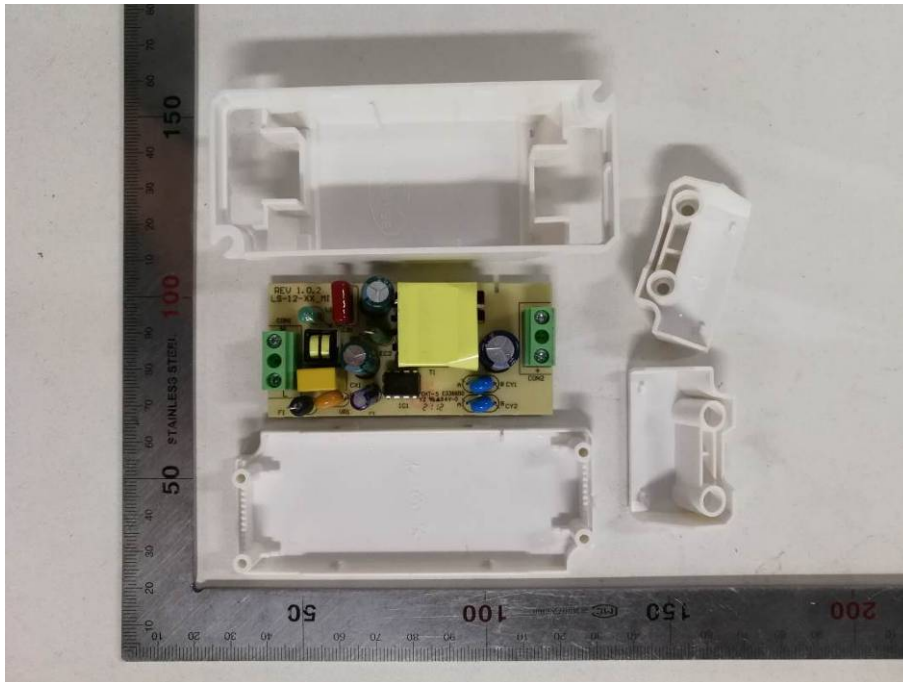


Figure A-4 Internal photo of EUT (LS-12-12 MI)

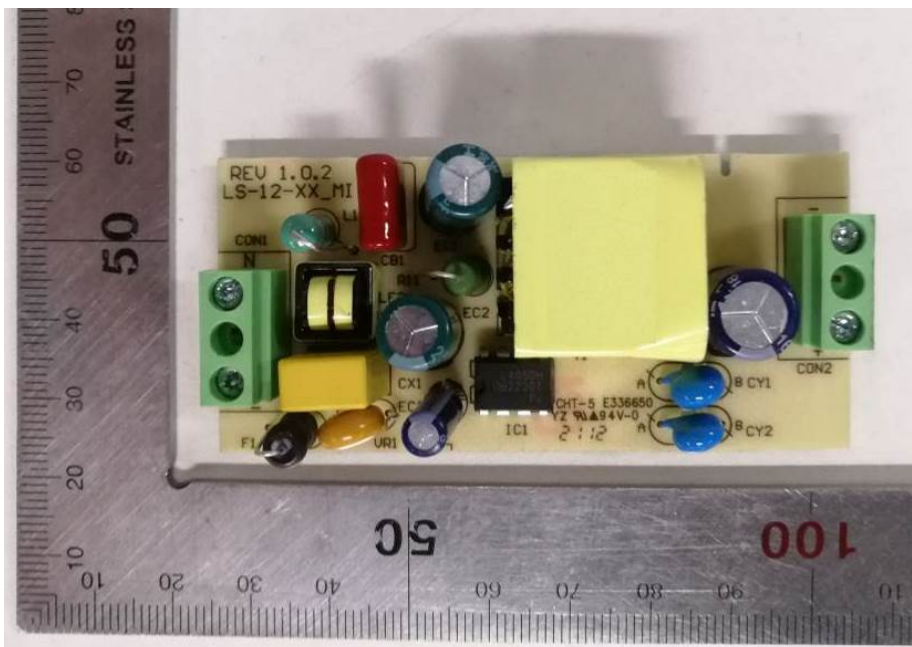


Figure A-5 Internal photo of EUT (LS-12-12 MI)

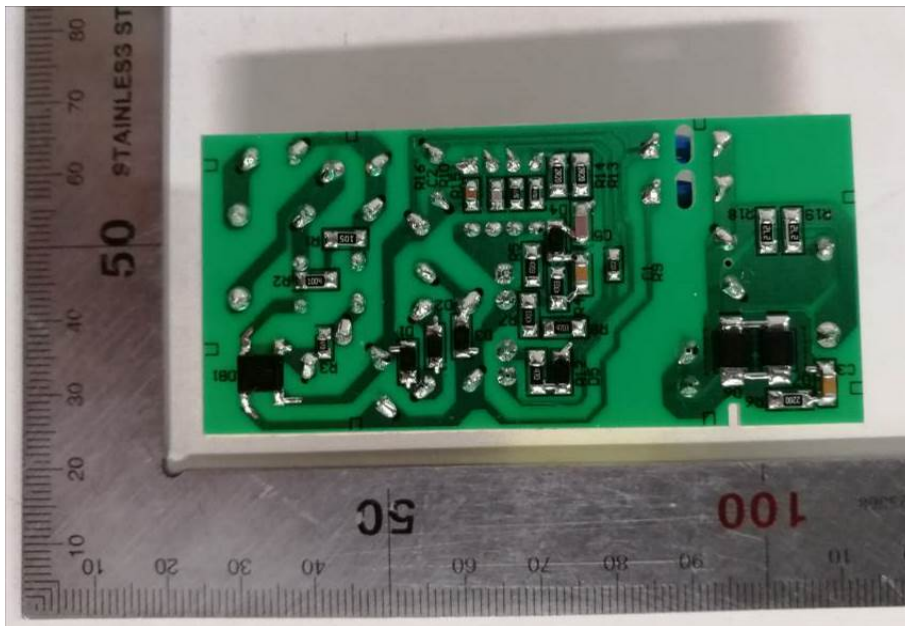


Figure A-6 Internal photo of EUT (LS-12-12 MI)

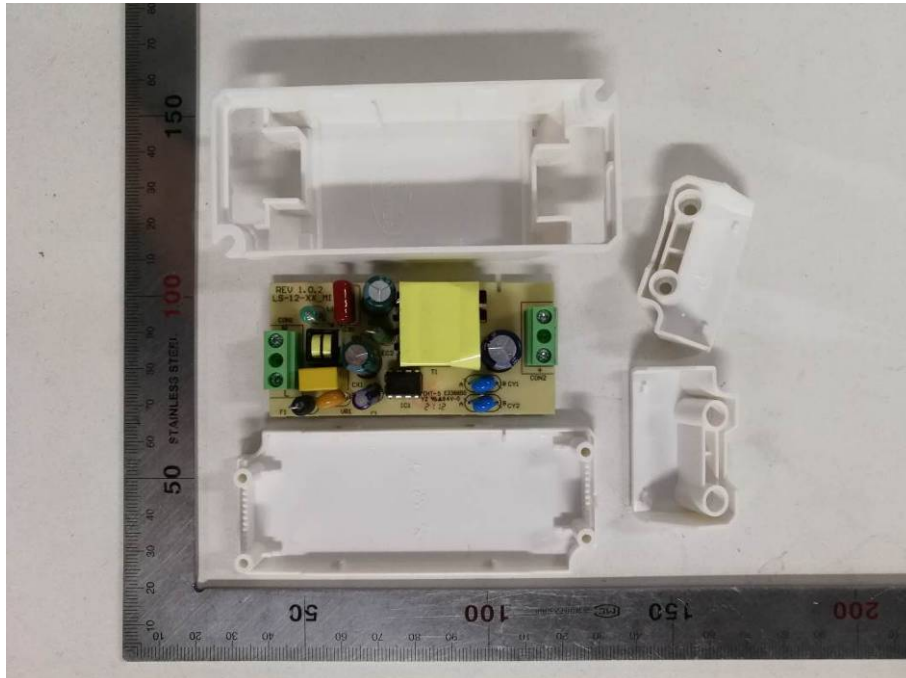


Figure A-7 Internal photo of EUT (LS-12-24 MI)

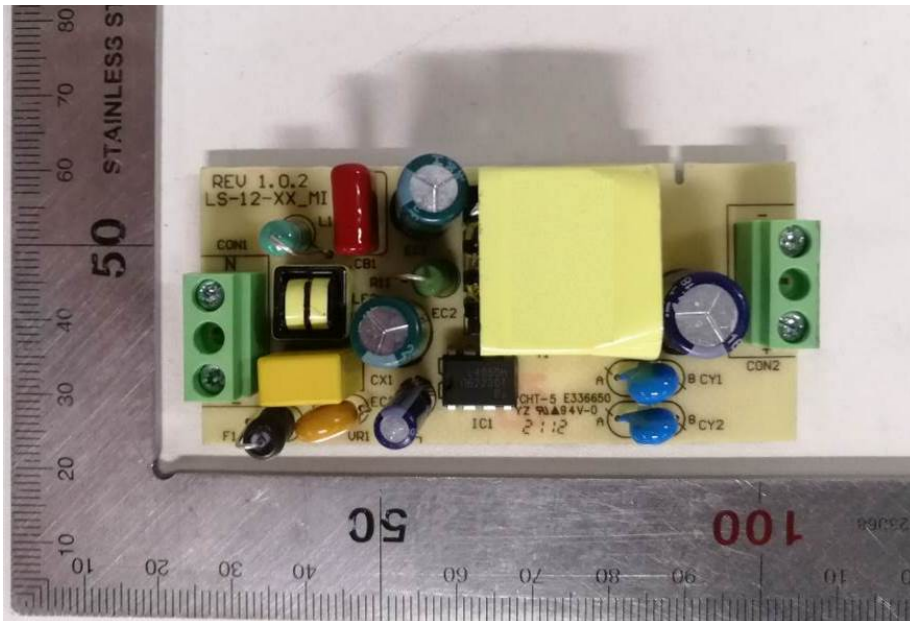


Figure A-8 Internal photo of EUT (LS-12-24 MI)

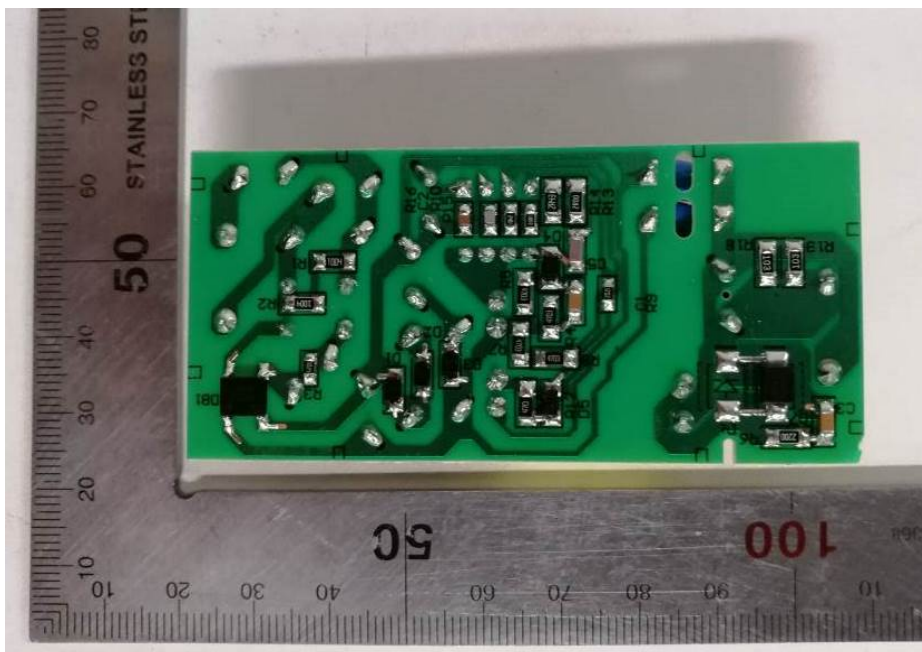


Figure A-9 Internal photo of EUT (LS-12-24 MI)



Figure A-10 External photo of EUT (LS-20-12 MI and LS-20-24 MI)



Figure A-11 External photo of EUT (LS-20-12 MI and LS-20-24 MI)



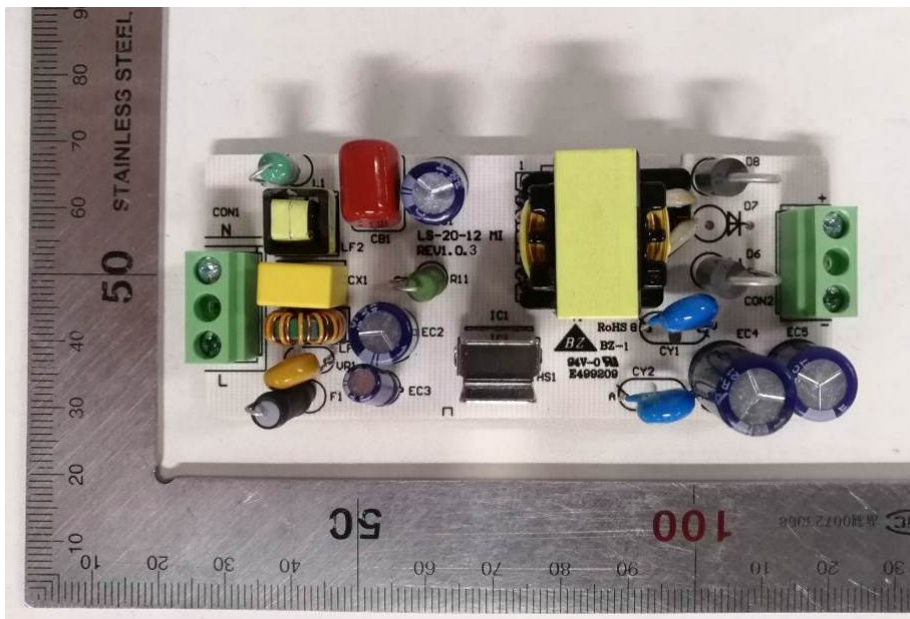


Figure A-14 Internal photo of EUT (LS-20-12 MI)

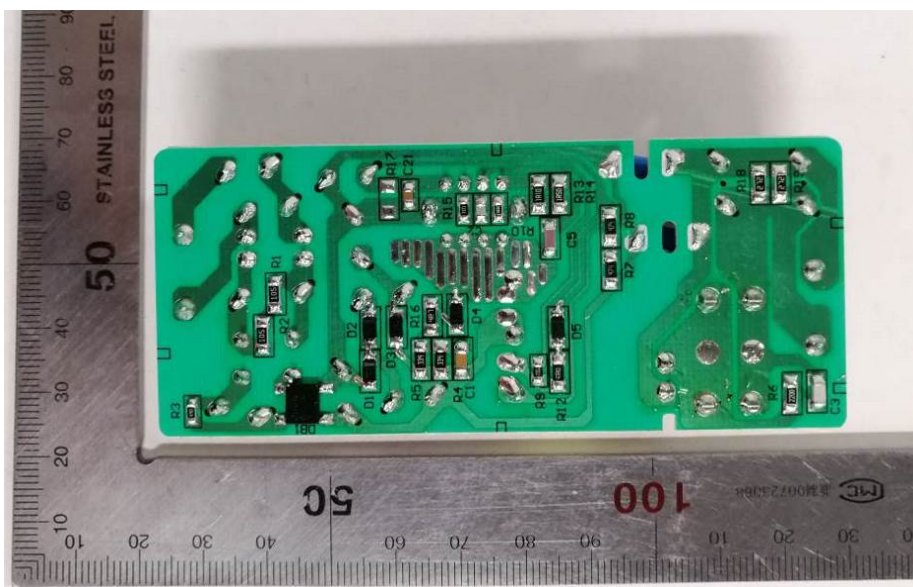


Figure A-15 Internal photo of EUT (LS-20-12 MI)



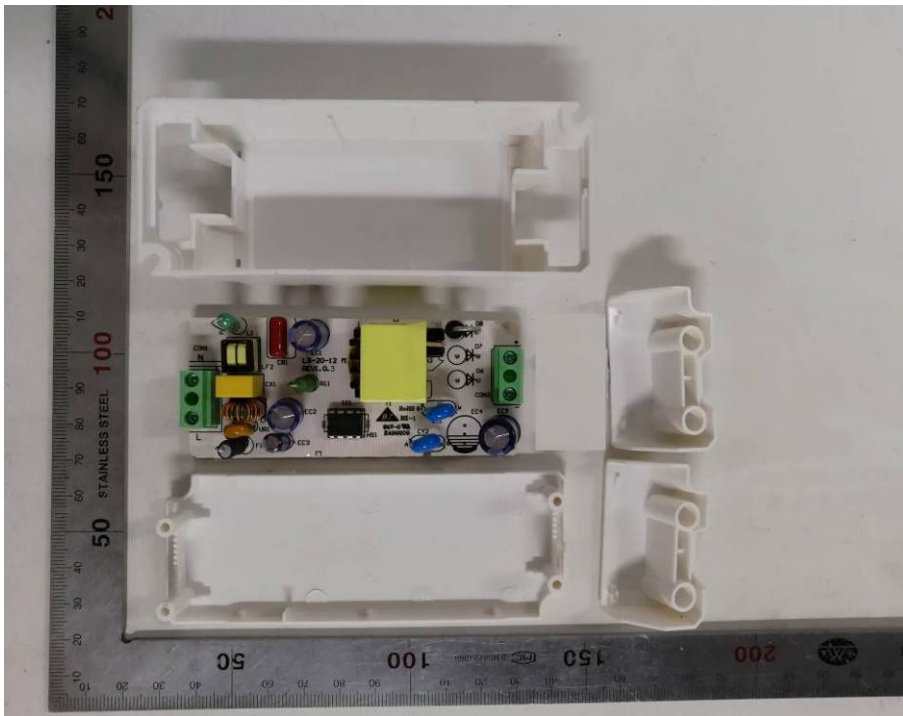


Figure A-16 Internal photo of EUT (LS-20-24 MI)

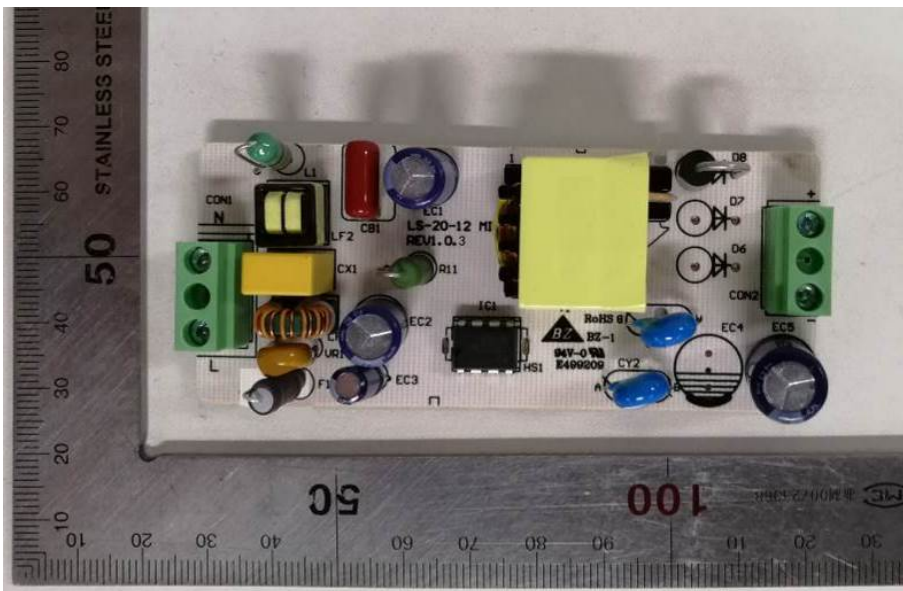


Figure A-16 Internal photo of EUT (LS-20-24 MI)

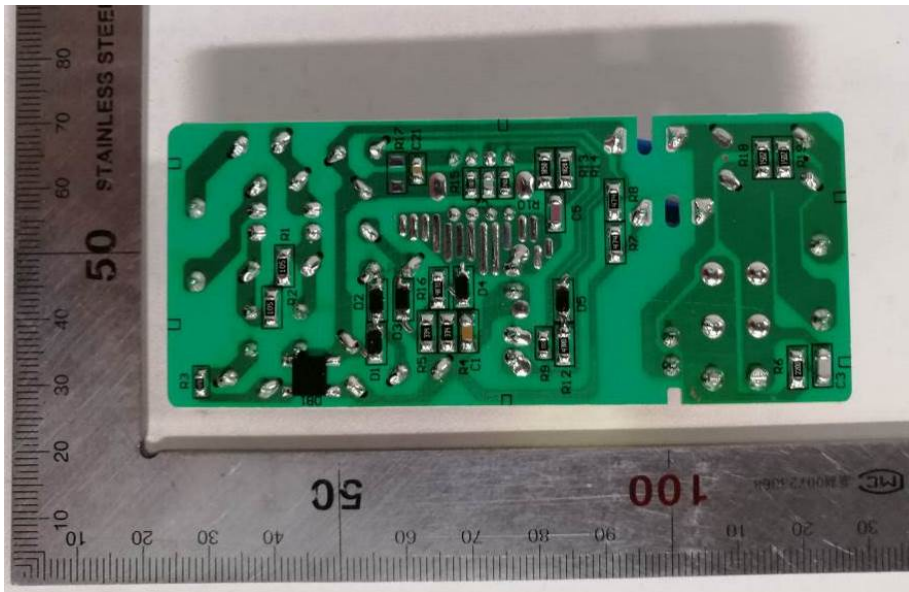


Figure A-17 Internal photo of EUT (LS-20-24 MI)



Figure A-18 LS-12-12 MI and LS-12-24 MI (the left one);  
LS-20-12 MI and LS-20-24 MI (the right one)

## Annex B

### EUT set-up -details-



Figure B-1 Setup for Conducted Emission

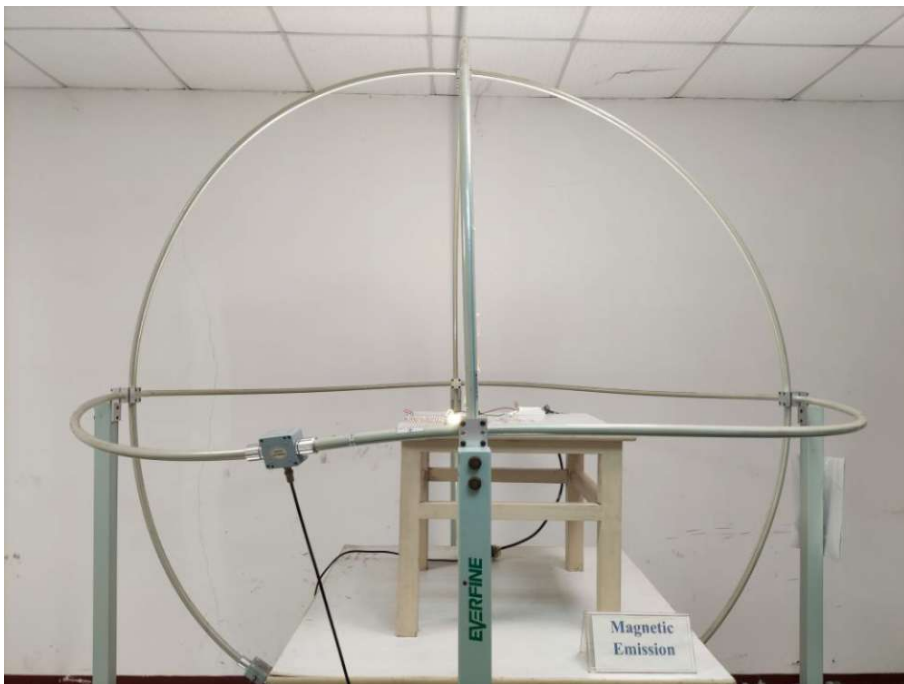


Figure B-2 Setup for Radiated Electromagnetic Disturbances



**Figure B-3 Setup for Radiated Emission**



**Figure B-4 Setup for Harmonic current emission & Voltage fluctuations and flicker**



Figure B-5 Setup for Electrostatic Discharge

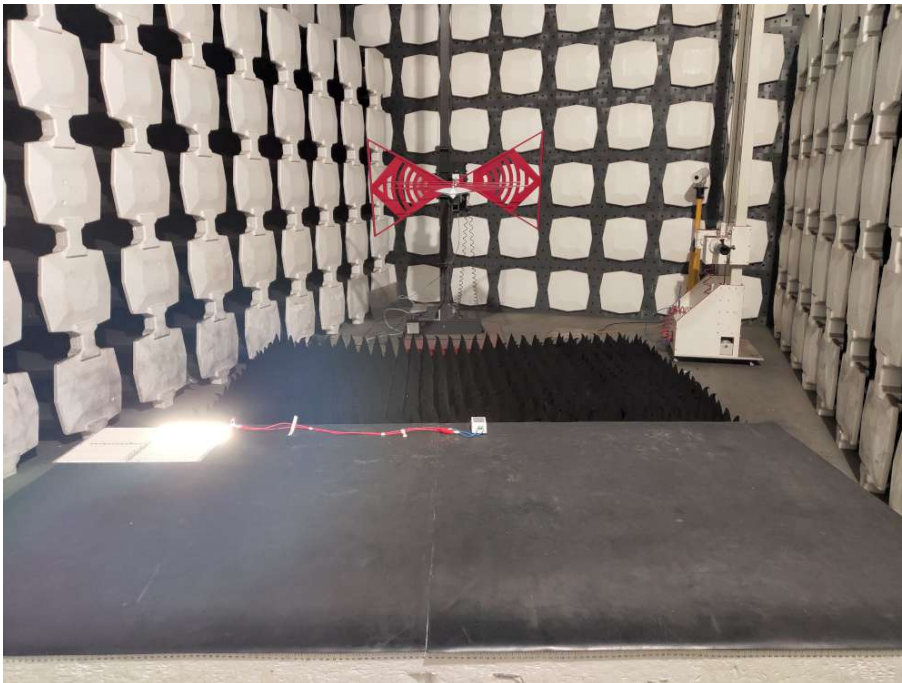


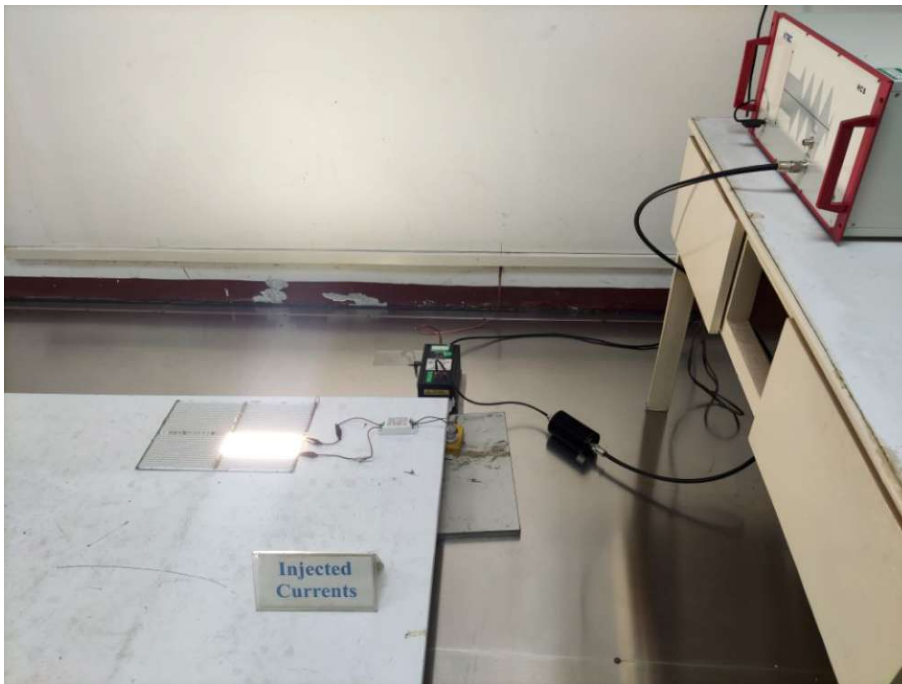
Figure B-6 Setup for Radiated immunity



Figure B-7 Setup for Electrical Fast Transients/Bursts



Figure B-8 Setup for Surge



**Figure B-9** Setup for Conducted immunity



**Figure B-10** Setup for Dips & interruption

\*\*\*\*\* End of Test Report \*\*\*\*\*