



TEST REPORT

Testing laboratories
EVPU, a. s.
Trencianska 19, 018 51 Nova Dubnica
Slovak Republic

0-0257E/21

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Object of test : Luminaire

Name of product : Luminaire for road and street lighting

Trade mark : -

Type : MARUT G2

Derivate variants : MARUT S G2, MARUT M G2, MARUT L G2, MARUT XL G2
see in page number: 4

Power supply, ratings : 220-240V/50-60Hz, class I, IP66, LED module

Applicant : ELEKTRO-LUMEN, s.r.o.
Hranická 505, Hranice IV - Drahotuše 75361,
Česká republika

Manufacturer : ELEKTRO-LUMEN, s.r.o.
Hranická 505, Hranice IV - Drahotuše 75361,
Česká republika

Place of production : ELEKTRO-LUMEN, s.r.o.
Hranická 505, Hranice IV - Drahotuše 75361,
Česká republika

Testing location : Trencianska 19, 018 51 Nova Dubnica, Slovak Republic

Contract : 0-0089/21

Regulations and standards : STN EN IEC 55015: 2020 + A11: 2020
STN EN 61000-4-5: 2015 + A1: 2018
STN EN 61547: 2010
STN EN IEC 61000-3-2: 2019
STN EN 61000-3-3: 2014 + A1: 2020

Tested by : Ing. Peter Ványi, test technician *Ványi*

Checked by : Jaroslav Bušo, test technician *Bušo*

Approved by : Mgr. Michal Balák, Head of Testing laboratories *Balák*

Date of specimen acceptance : 01st june 2021

Date of performance of tests : 01st june 2021– 26th October 2021

Date of test report issue : 29th October 2021



Results of the test, stated in this report are apply to the tested item only as it was received. This report can only be reproduced on the whole, articulately only with a written permission of Testing laboratories.

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1. Summary

Tests were performed according to following standards:

1.1 Emissions

- | | | |
|---|--|------|
| 1 | STN EN IEC 55015: 2020 + A11: 2020
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment | Pass |
| 2 | STN EN IEC 61000-3-2: 2019
Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) | Pass |
| 3 | STN EN 61000-3-3: 2014 + A1: 2020
Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection | Pass |

1.2 Immunity

- | | | |
|---|--|------|
| 4 | STN EN 61547: 2010
Equipment for general lighting purposes. EMC immunity requirements | Pass |
| 5 | STN EN 61000-4-5: 2015 + A1: 2018
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test | Pass |

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2. Description of equipment under test

Luminaire for road and street lighting MARUT G2 - general information:

MARUT S G2 :

- technical parameters:
 - AC 220V – 240V, 50 – 60 Hz
 - Class I , IP66
 - 5,8W – 66W
 - -40°C/+55°C
 - 1 000 lm – 9 000 lm
- derivate variants: MARUT S G2 1K0 – 9K0 (The variants differ only in the LED modules used)

MARUT M G2 :

- technical parameters:
 - AC 220V – 240V, 50 – 60 Hz
 - Class I , IP66
 - 12,5W – 84,9W
 - -40°C/+55°C
 - 2 000 lm – 12 000 lm
- derivate variants: MARUT M G2 2K0 – 12K0 (The variants differ only in the LED modules used)

MARUT L G2 :

- technical parameters:
 - AC 220V – 240V, 50 – 60 Hz
 - Class I , IP66
 - 36,9W – 101,7W
 - -40°C/+55°C
 - 7 000 lm – 15 000 lm
- derivate variants: MARUT L G2 7K0 – 15K0 (The variants differ only in the LED modules used)

MARUT XL G2 :

- technical parameters:
 - AC 220V – 240V, 50 – 60 Hz
 - Class I , IP66
 - 72,4W – 203,4W
 - -40°C/+55°C
 - 14 000 lm – 30 000 lm
- derivate variants: MARUT L G2 14K0 – 30K0 (The variants differ only in the LED modules used)

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3. Environmental conditions

Tests were performed in Laboratory - EMC under following environmental conditions:

- temperature: 23 - 23,5 °C
- relative humidity: 29 – 48,5 %
- atmospheric pressure: 88,8 – 99,5 kPa

4. Measurement uncertainty

Expanded measurement uncertainty according to parameters as follows:

Disturbance voltage	$\pm 3,15 \text{ dB(mV) [9-150KHz]}$ $\pm 2,73 \text{ dB(mV) [0,15-30MHz]}$
Disturbance power	$\pm 3,43 \text{ dB(pW)}$
Electromagnetic field intensity	$\pm 4,13 \text{ dB(mV/m)}$
Current – basic harmonic	$\pm 1,4 \cdot 10^{-2} I_{\text{inp}}$
Current – 2 nd – 40 th harmonic	$\pm (1,18 \cdot 10^{-2} I_{\text{inp}} + 5,0 \cdot 10^{-2} I_{\text{n LIM}})$
Voltage	$\pm 0,97 \%$

I_{inp} – mean effective value of measured equipment input current

$I_{\text{n LIM}}$ – calculated limit of nth –harmonic of measured equipment input current

5. Test procedures

5.1 Emissions

STN EN IEC 55015: 2020 + A11: 2020

Radio-frequency conducted emissions

- The equipment under test was placed on a wooden table 0.8 m high and powered through LISN. The equipment under test was operated under a normal operating conditions. Measurement of disturbance voltage was performed in the frequency range from 0,009 MHz to 30 MHz .

Radiated electromagnetic disturbances

- Where the light source is operated at a frequency exceeding 100 Hz shall be measured the magnetic component of radiated electromagnetic disturbances by a loop antenna. The lighting equipment was placed in the centre of the antenna. The three field directions were measured in sequence. Each value shall fulfill the requirements given.

Measurement of radio interference field

- The equipment under test was placed on a ground in semi-anechoic chamber. Disturbance field was measured in the frequency range from 30 MHz to 1000 MHz. The equipment under test was operated under normal operating conditions – running.

Low frequency emissions

- The current analyze was performed according to STN EN IEC 61000-3-2: 2019 by measuring system California Instruments. The lighting equipment is class C equipment.

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- **The voltage changes, voltage fluctuations and flicker** was performed according to STN EN 61000-3-3: 2014 + A1: 2020 by measuring system California Instruments. The lighting equipment is class C equipment.

5.2 Immunity

- **The immunity tests** to electromagnetic disturbance phenomena were performed according to **STN EN 61547: 2010** and **STN EN 61000-4-5: 2015 + A1: 2018**.

Electrostatic discharge (EN 61000 – 4 – 2)

The test was performed by simulator Static Discharge simulator DITO. EUT was placed on the ground reference plane on the wooden table 0,8 m high standing on the ground reference plane.

Direct and undirect contact discharge	Air discharge
± 4 kV	± 8 kV

Immunity to radio- frequency electromagnetic field (EN 61000 – 4 – 3)

The test was performed in frequency range from 80 MHz to 1000 MHz with level 3 V/m, AM 80 % (1 kHz).

Fast transients (Burst) (EN 61000 – 4 – 4)

The test was performed by simulator UCS 500M4+CNI 503. EUT was placed on the wooden table 0,8 m high standing on the ground reference plane.

Surge immunity test (EN 61000 – 4 – 5)

The test was performed by simulator UCS 500M4+CNI 503. EUT was placed on the wooden table 0,8 m high , without standing on the ground reference plane.

Immunity to conducted disturbances, induced by radio-frequency fields (EN 61000 – 4 – 6)

The test was performed in the frequency range 150 kHz - 80 MHz. EUT was placed on an insulating support 0,1 m above the ground reference plane.

Voltage dips, short interruptions and voltage variations immunity test (EN 61000 – 4 - 11)

The tests were performed by simulator California Instruments CTS Series.

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6. Used test equipments

Type	Range	Manufacturer	Date of calibration/verification	Cycle of calibration/verification	Registration number
Test receiver ESIB 26	20 Hz – 26,5 GHz	R&S	18.03.2020	3 years	E89
Antenna 3142C	26 MHz – 3 GHz	ETS-LINDGREN	18.10.2019	1 year	920250
Antenna AT1080	80 MHz – 1 GHz	AR	15.11.2019	1 year	26596
Amplifier 250A250AM3	0,09 – 230 MHz 250 W	AR	15.11.2019	1 year	20903
Amplifier 150E1000M3	200 – 1000 MHz 150 W	AR	15.11.2019	1 year	20903
Generator E8257CA	250 kHz – 20 GHz	Agilent Technologies	26.9.2019	3 years	MY4332157
Generator SMGU	100kHz-2,16 GHz	R&S	5.12.2018	3 years	20190
Coupling-Decoupling-Network CDN801-M2/M3	0,15-230 MHz Mains 240V 16A	Lüthi Elektronik Feinmechanik	24.04.2019	1 year	20903
Electromagnetic Injection Clamp EM 101	-	Lüthi Elektronik Feinmechanik	24.04.2019	1 year	35502
Static Discharge simulator DITO	2 kV - 15 kV	EM TEST	5.10.2018	2 years	20578
Ultra compact simulator UCS 500M4+CNI 503	EN/IEC 61000-4-4 EN/IEC 61000-4-5	EM TEST	5.12.2018	1 year	21145
Test system CTS Series C15003iX-400-CTS-413-EOS3-LR3	EN 61000-3-2 EN 61000-3-3 EN 61000-4-11	California Instruments	06.06.2019	3 years	E93
Continuous Wave Simulator CWS500N	EN/IEC 61000-4-6	EM TEST	24.04.2019	1 year	V0947105564
Large Loop Antenna RF300	-	Laplace Instruments Ltd	-	Verif.	21155

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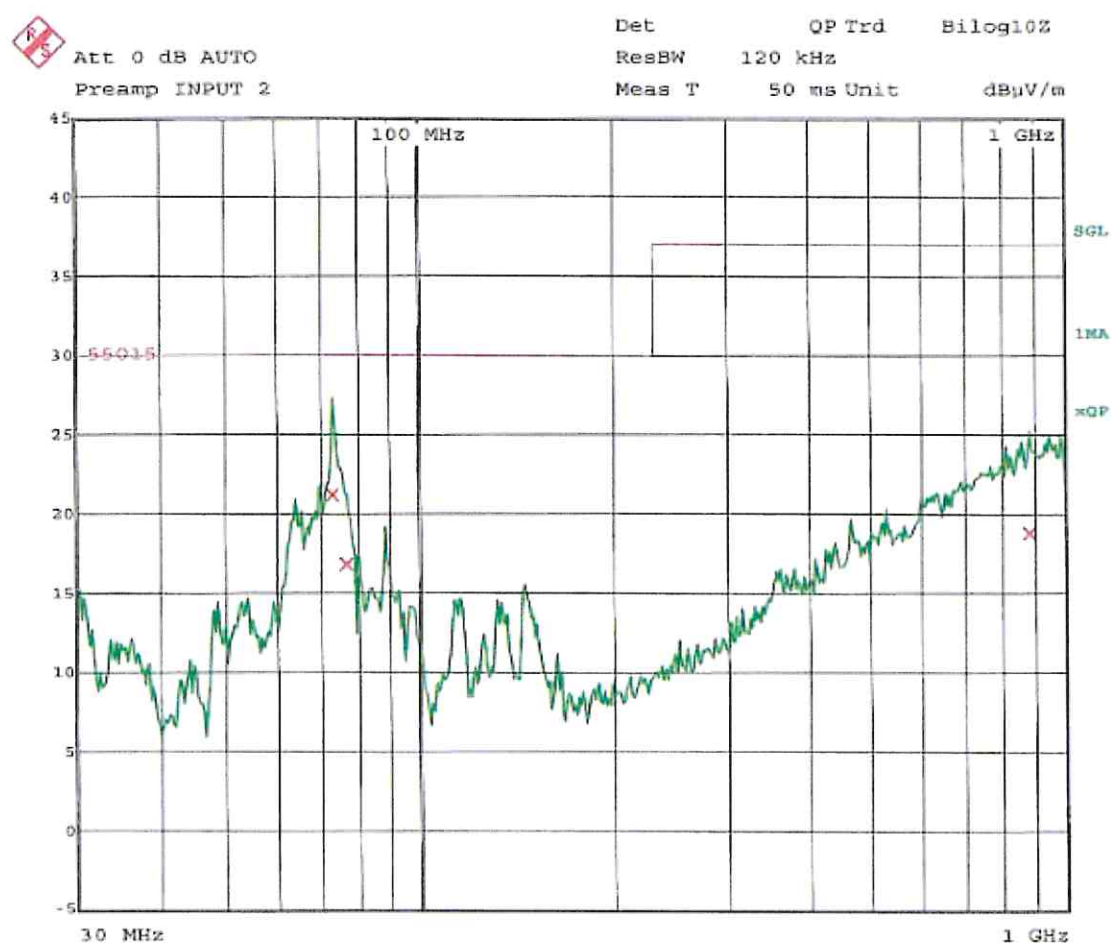
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7. Test results

Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT S G2 , (class I)**
Mode of operation: under a normal operating conditions
Antenna position: horizontal
Standard: STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBV/m	DELTA LIMIT dB
1 Quasi Peak	73.6400 MHz	21.09	-8.90
1 Quasi Peak	77.1600 MHz	16.73	-13.26
1 Quasi Peak	884.8800 MHz	18.71	-18.28

Result: **PASS**

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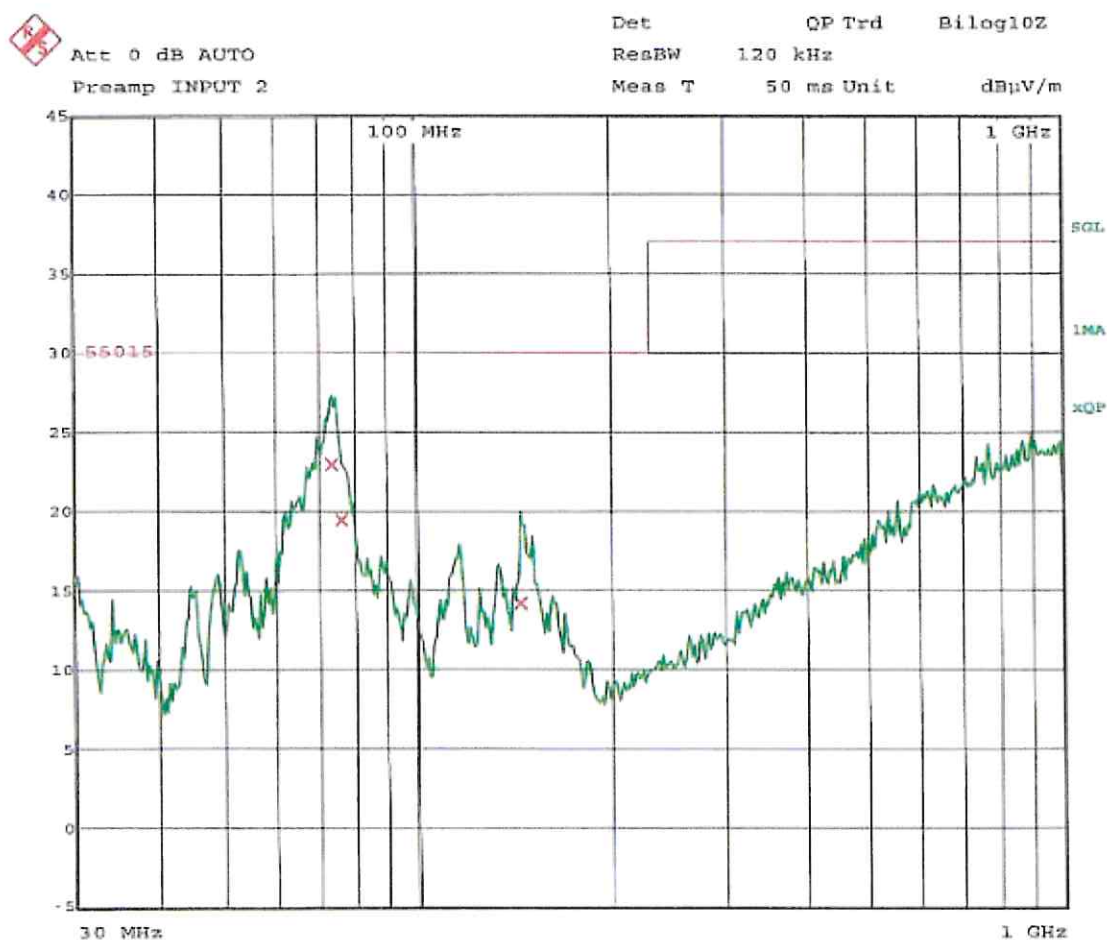
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Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT S G2 , (class I)
Mode of operation: under a normal operating conditions
Antenna position: vertical
Standard: STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	73.9200 MHz	22.75	-7.24
1 Quasi Peak	76.4400 MHz	19.33	-10.66
1 Quasi Peak	145.4800 MHz	14.03	-15.97

Result: **PASS**

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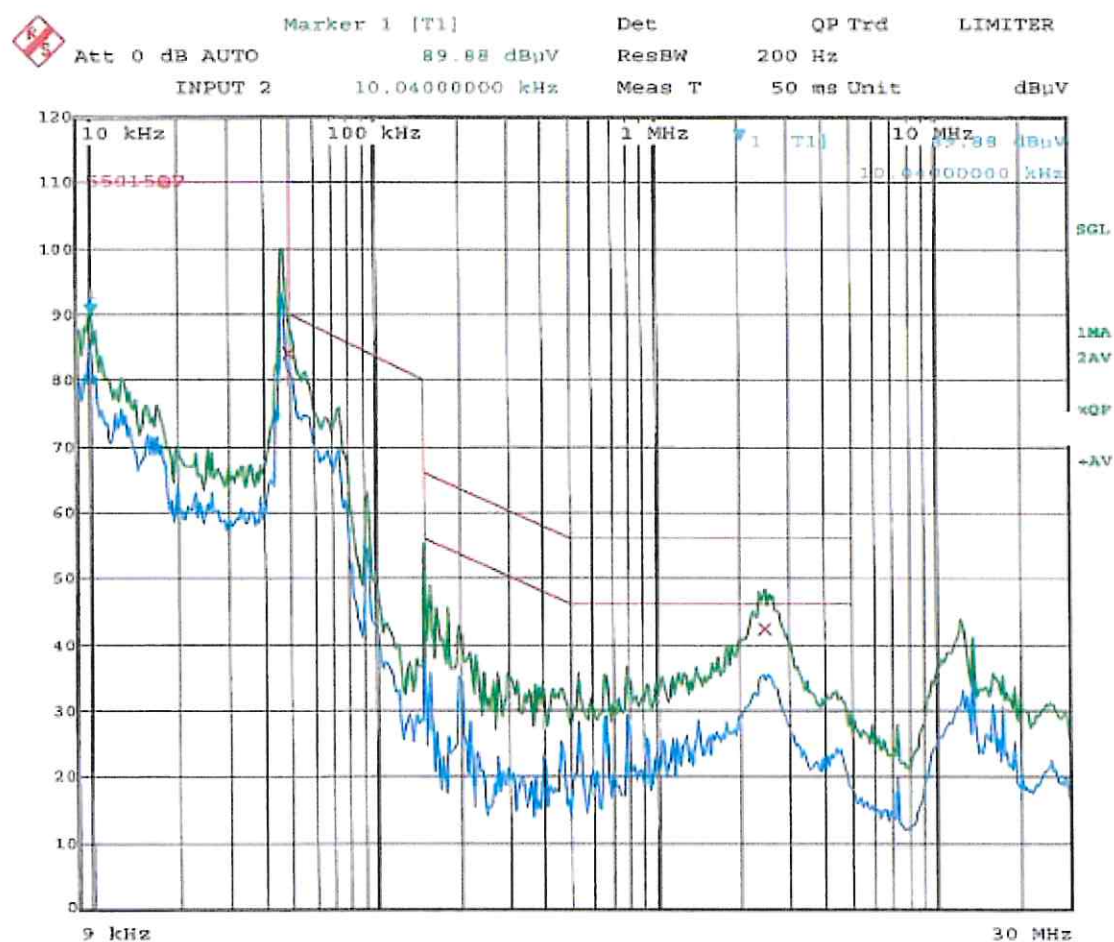
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Conducted emissions measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT S G2 , (class I)
Mode of operation: under a normal operating conditions
Measured terminal: power supply, N
Standard: STN EN IEC 55015



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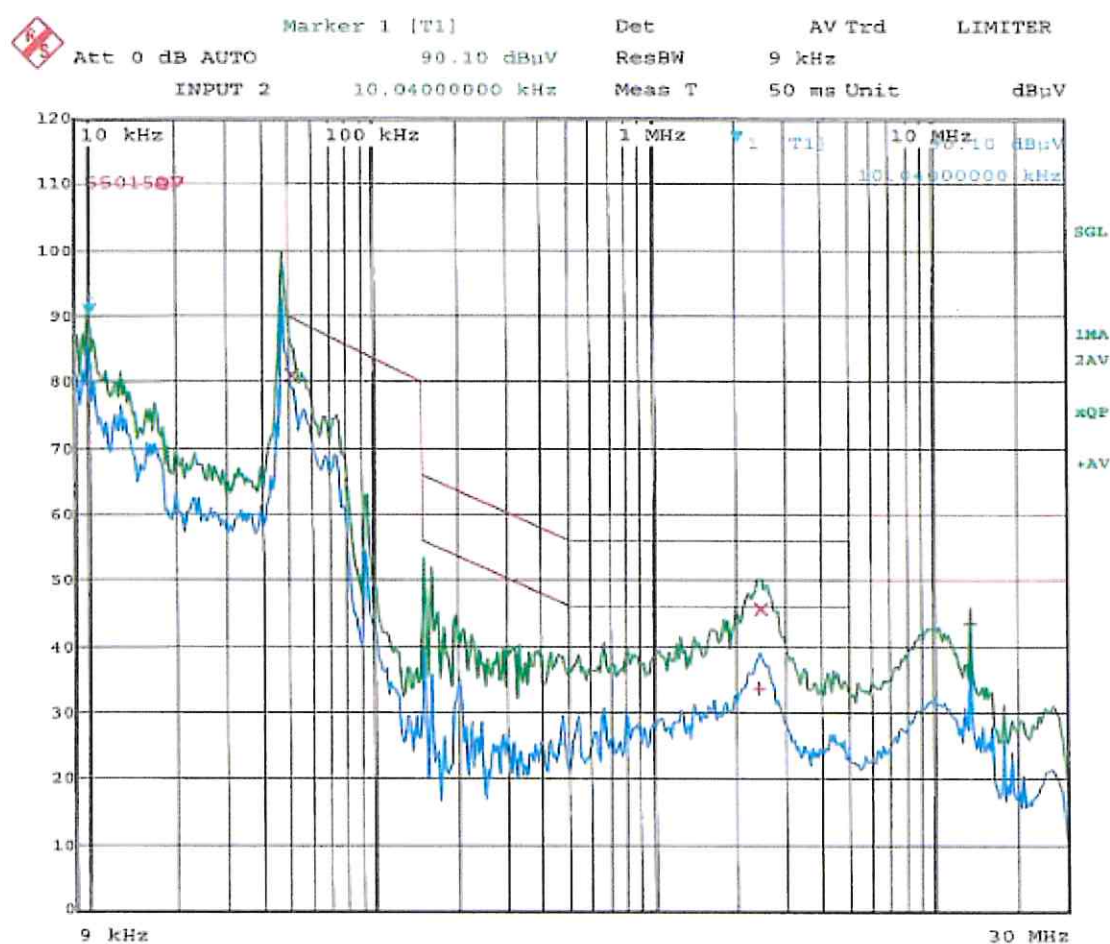
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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	50.0400 kHz	83.93	-6.05
2 Average	50.2800 kHz	79.93	-10.01
1 Quasi Peak	2.4580 MHz	42.26	-13.73

Result: **PASS**



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBpV	DELTA LIMIT dB
2 Average	13.6340 MHz	43.21	-6.78
1 Quasi Peak	51.8000 kHz	80.75	-8.91
1 Quasi Peak	2.4820 MHz	45.41	-10.59
2 Average	2.4300 MHz	33.50	-12.50

Result: **PASS**

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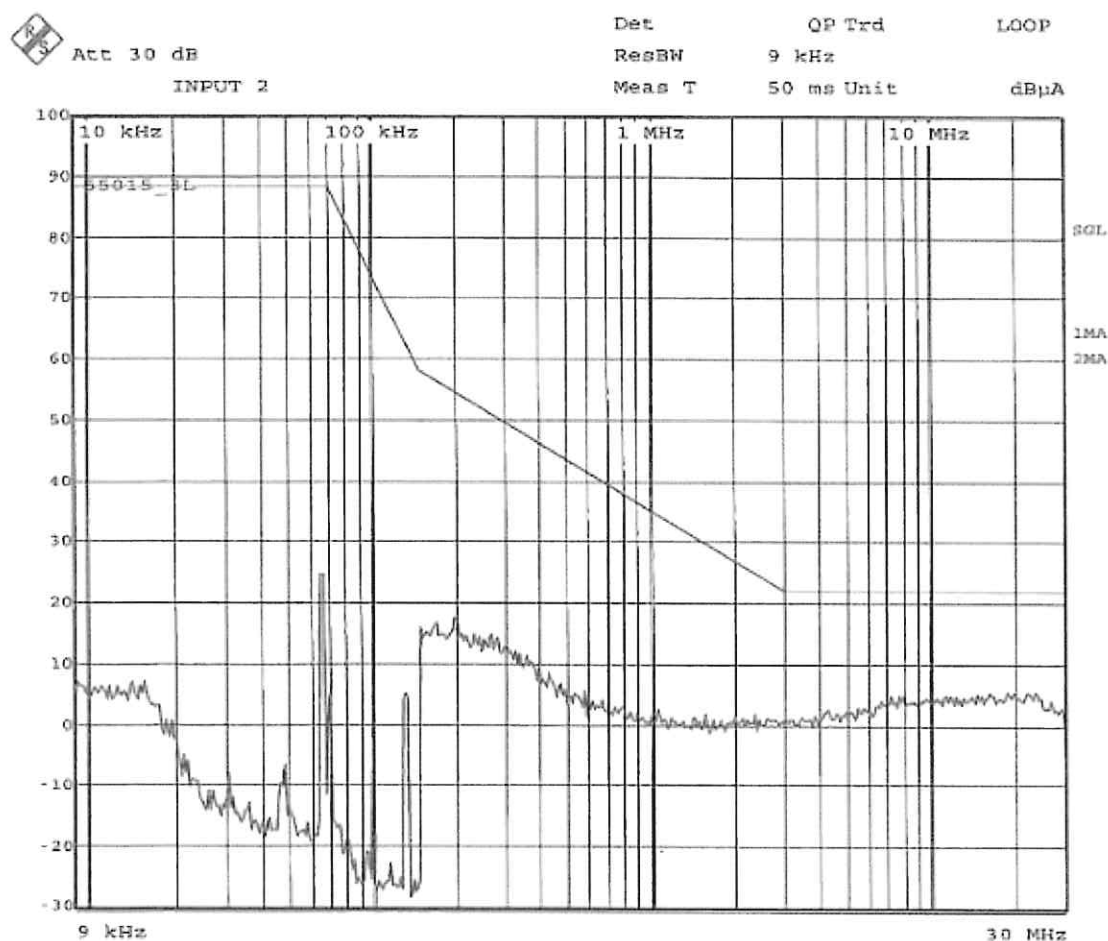
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT S G2 , (class I)**
Mode of operation: under a normal operating conditions
Loop antenna plane: x
Standard: STN EN IEC 55015



Result: **PASS**

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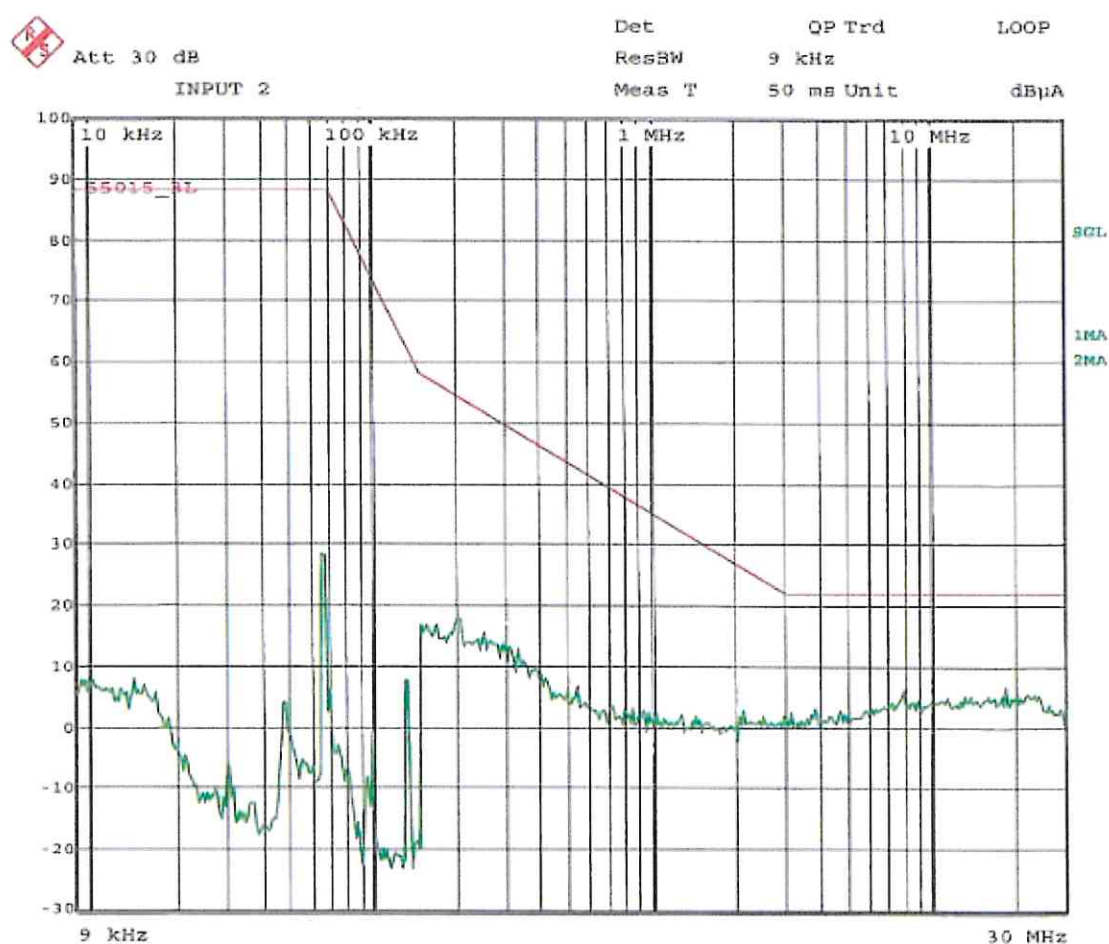
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT S G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: y
Standard: STN EN IEC 55015



Result: **PASS**

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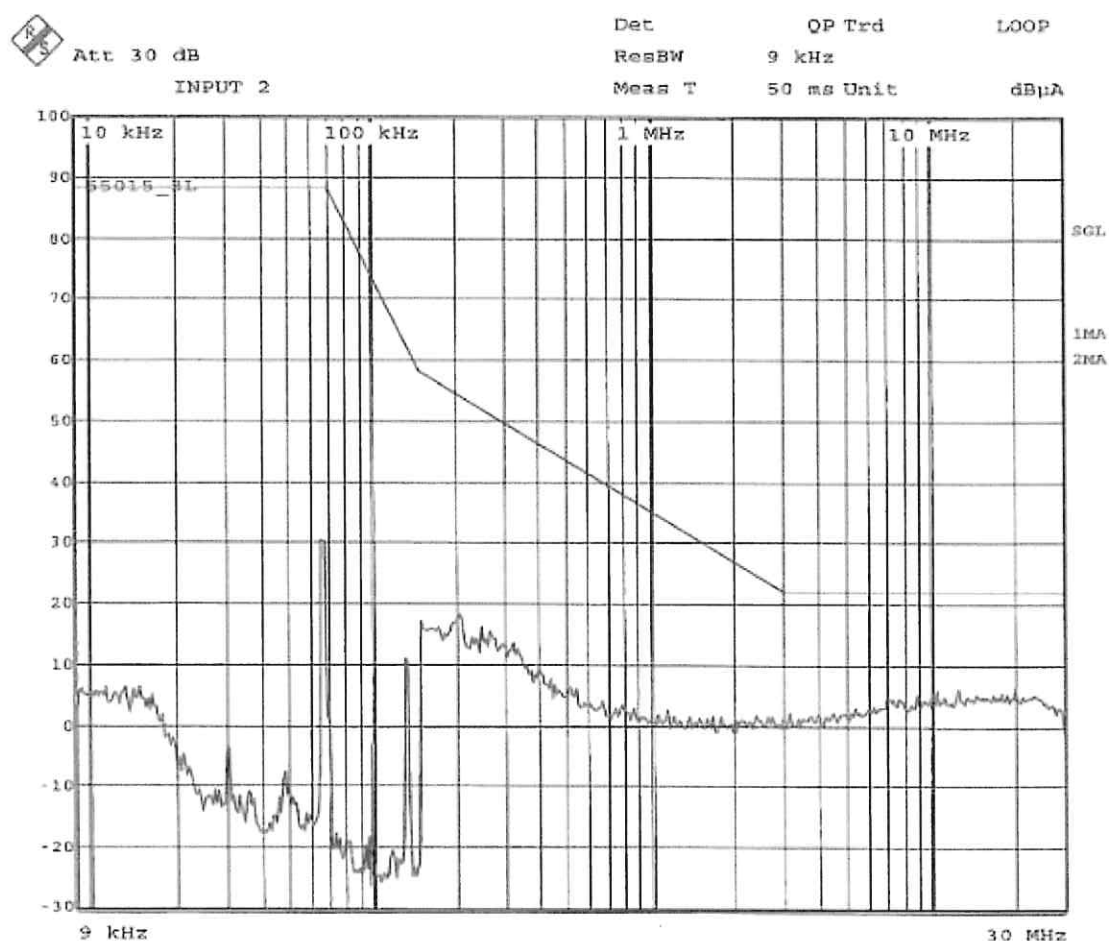
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT S G2 , (class I)**
Mode of operation: under a normal operating conditions
Loop antenna plane: z
Standard: STN EN IEC 55015

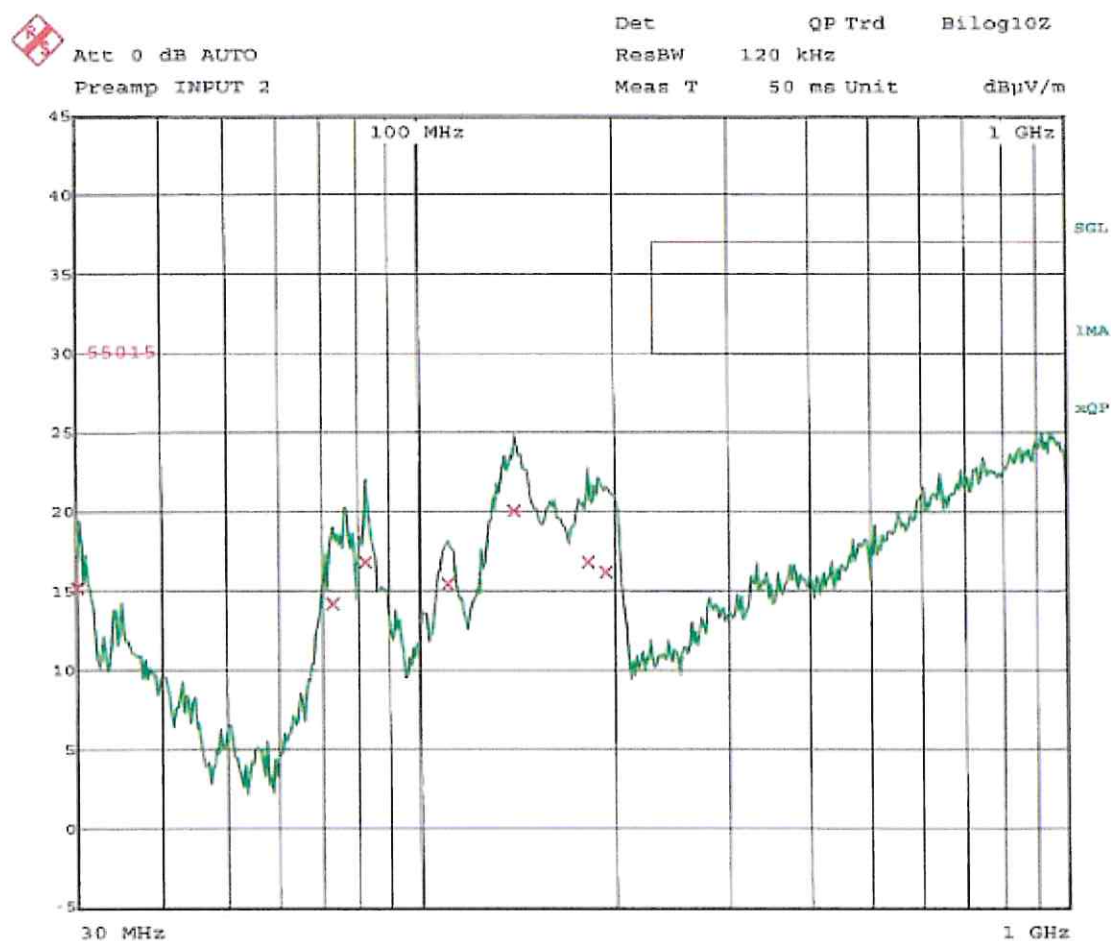


Result: **PASS**

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EUT:	Luminaire for road and street lighting
Type:	MARUT G2 / MARUT M G2 , (class I)
Mode of operation:	under a normal operating conditions
Antenna position:	horizontal
Standard:	STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	141.6000 MHz	19.96	-10.03
1 Quasi Peak	183.5600 MHz	16.69	-13.30
1 Quasi Peak	83.0400 MHz	16.62	-13.37
1 Quasi Peak	193.0800 MHz	16.04	-13.95
1 Quasi Peak	110.9200 MHz	15.31	-14.68
1 Quasi Peak	30.2000 MHz	15.08	-14.91
1 Quasi Peak	73.6800 MHz	14.05	-15.94

Result: **PASS**

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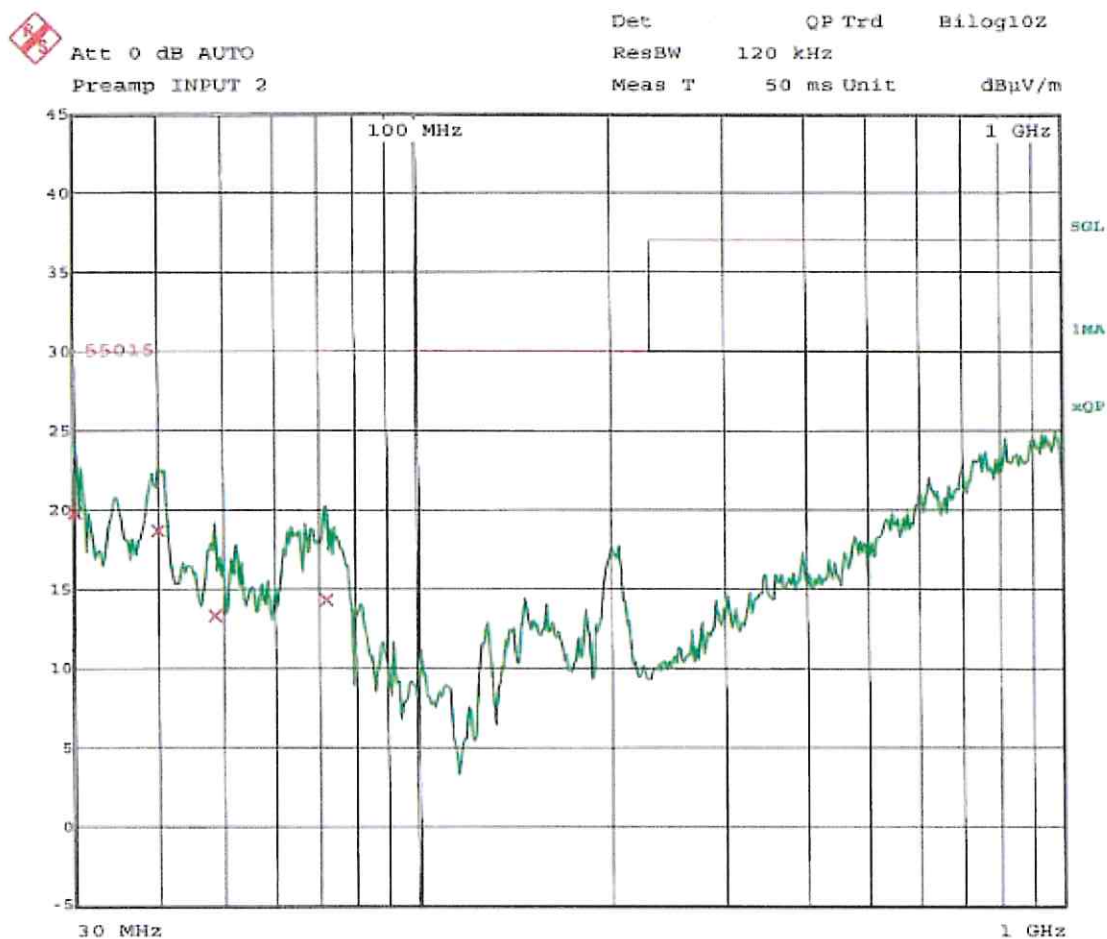
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Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT M G2 , (class I)**
Mode of operation: under a normal operating conditions
Antenna position: vertical
Standard: STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBV/m	DELTA LIMIT dB
1 Quasi Peak	30.0000 MHz	19.70	-10.29
1 Quasi Peak	40.2000 MHz	18.52	-11.47
1 Quasi Peak	72.6800 MHz	14.12	-15.87
1 Quasi Peak	48.7600 MHz	13.22	-16.77

Result: **PASS**

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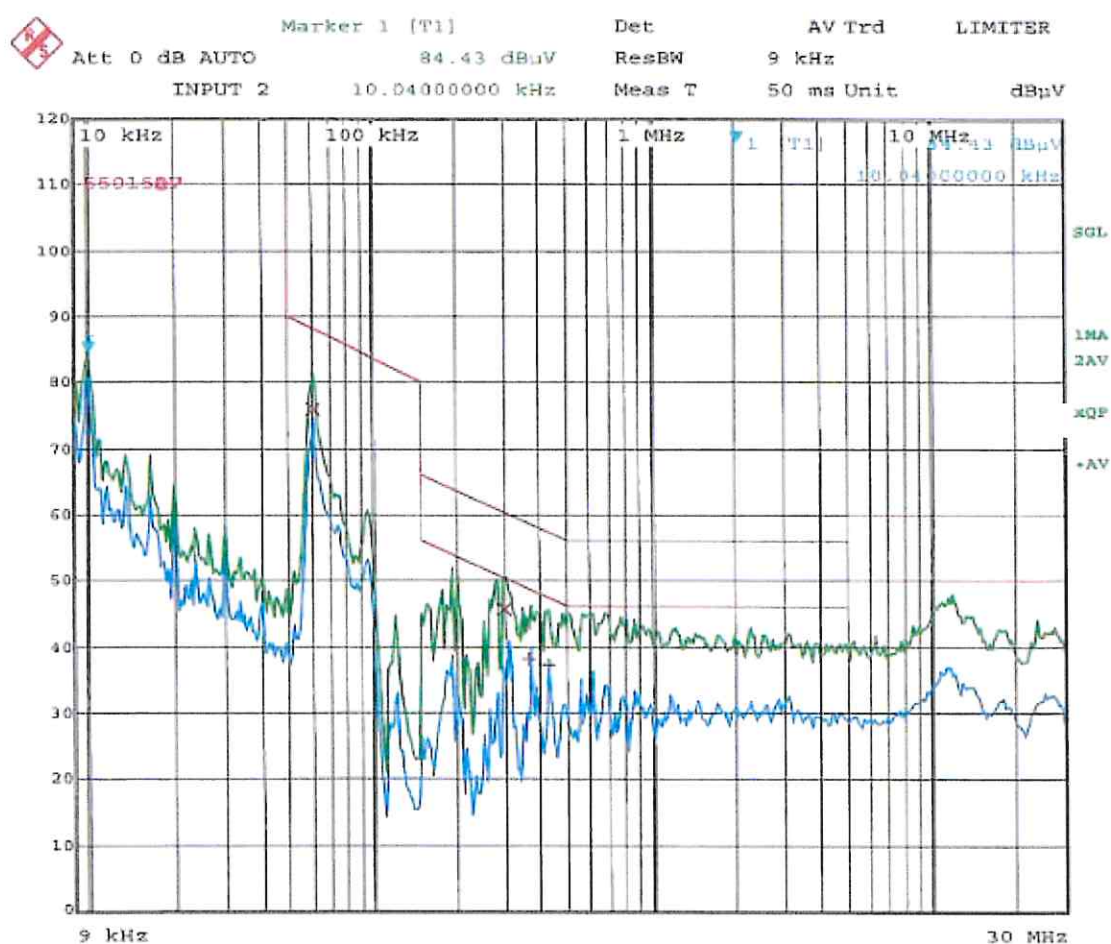
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Conducted emissions measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT M G2 , (class I)
Mode of operation: under a normal operating conditions
Measured terminal: power supply, N
Standard: STN EN IEC 55015



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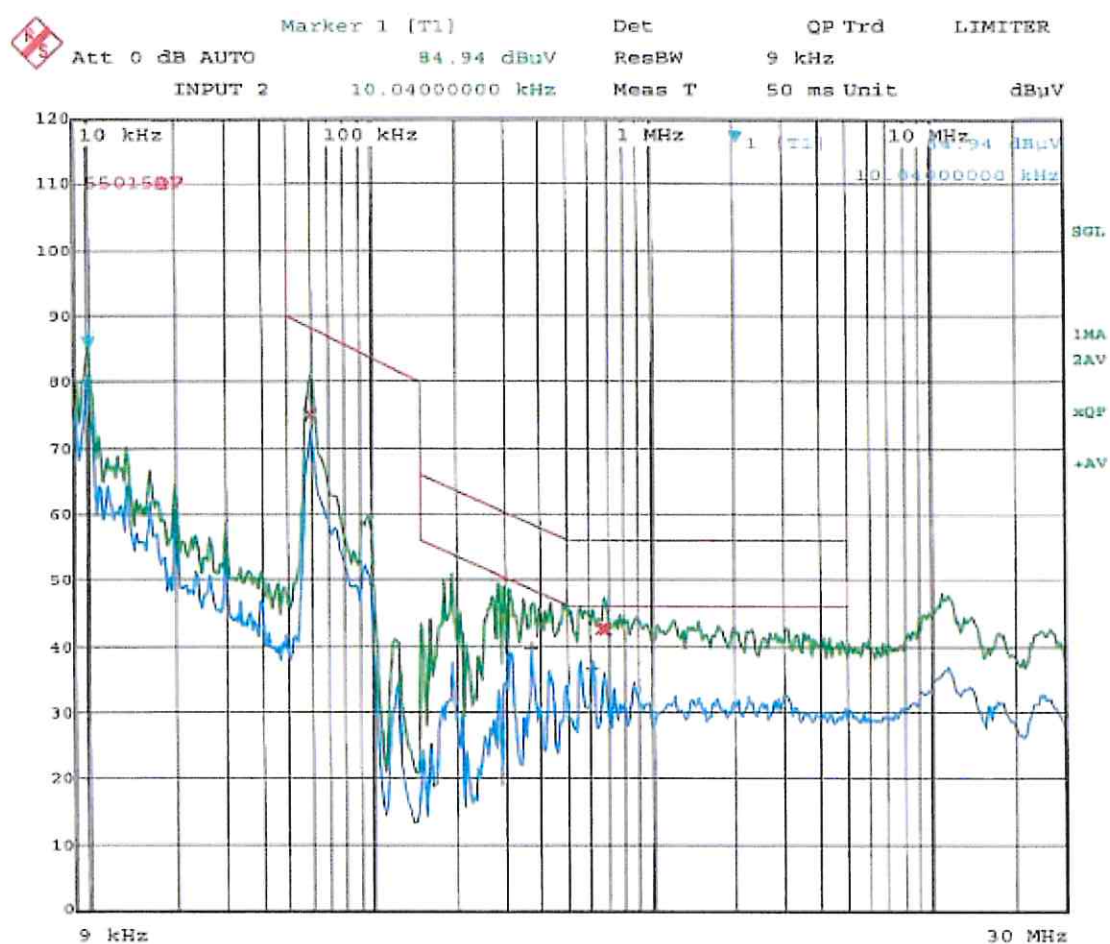
EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	434.0000 kHz	37.01	-10.15
2 Average	370.0000 kHz	37.89	-10.61
1 Quasi Peak	61.5600 kHz	75.86	-12.23
1 Quasi Peak	306.0000 kHz	45.44	-14.63

Result: **PASS**

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EUT:	Luminaire for road and street lighting
Type:	MARUT G2 / MARUT M G2 , (class I)
Mode of operation:	under a normal operating conditions
Measured terminal:	power supply, L
Standard:	STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 5501SQP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBuV	DELTA LIMIT dB
2 Average	374.0000 kHz	39.31	-9.09
2 Average	622.0000 kHz	36.59	-9.40
1 Quasi Peak	60.9200 kHz	74.82	-13.37
1 Quasi Peak	678.0000 kHz	42.59	-13.40
1 Quasi Peak	694.0000 kHz	42.33	-13.66

Result: **PASS**

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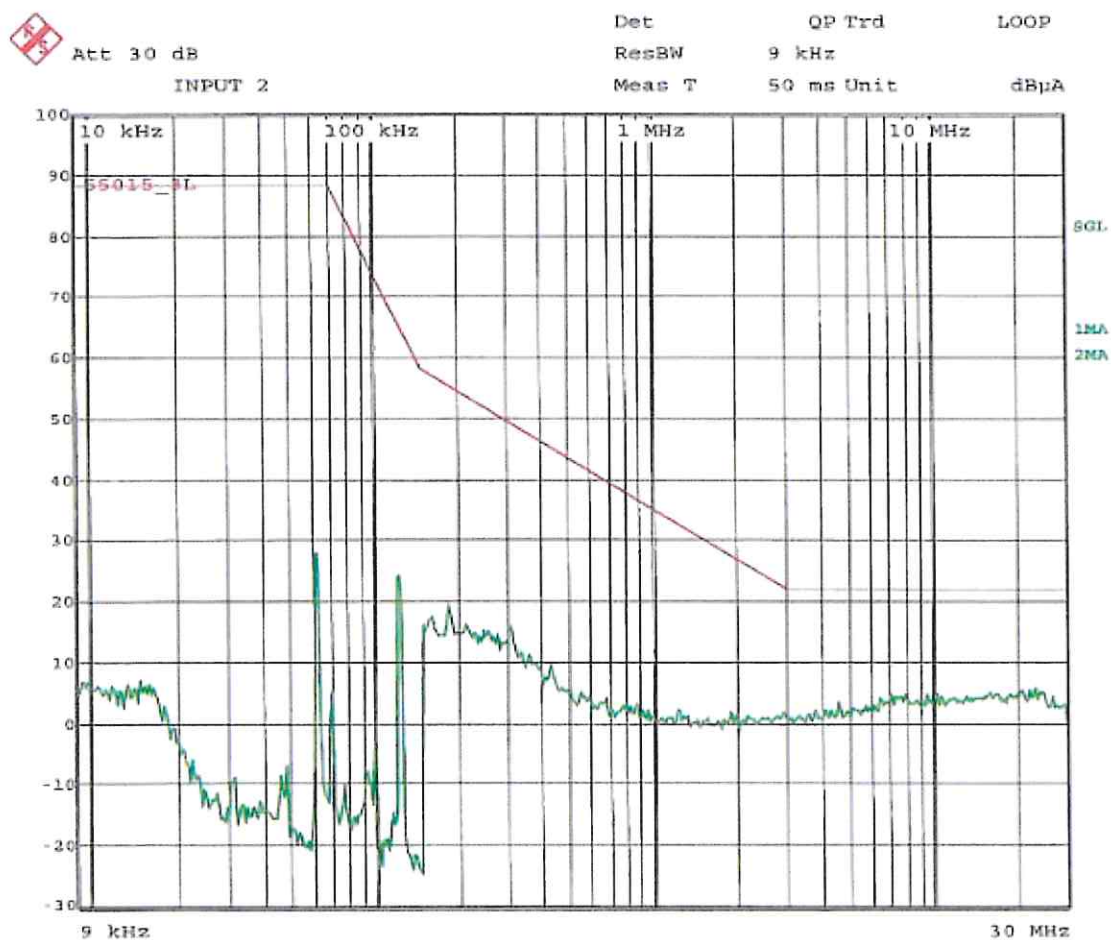
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT M G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: x
Standard: STN EN IEC 55015



Result: PASS

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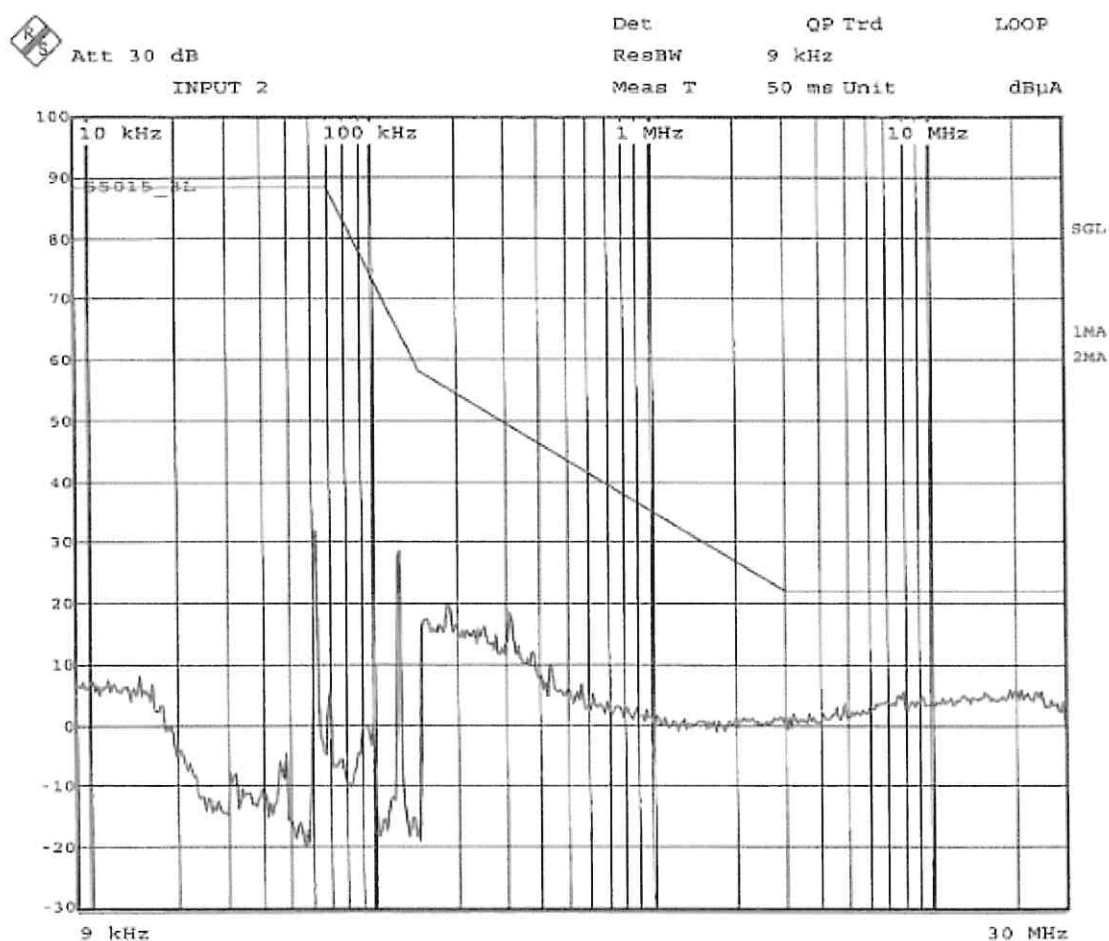
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT M G2 , (class I)**
Mode of operation: under a normal operating conditions
Loop antenna plane: y
Standard: STN EN IEC 55015



Result: **PASS**

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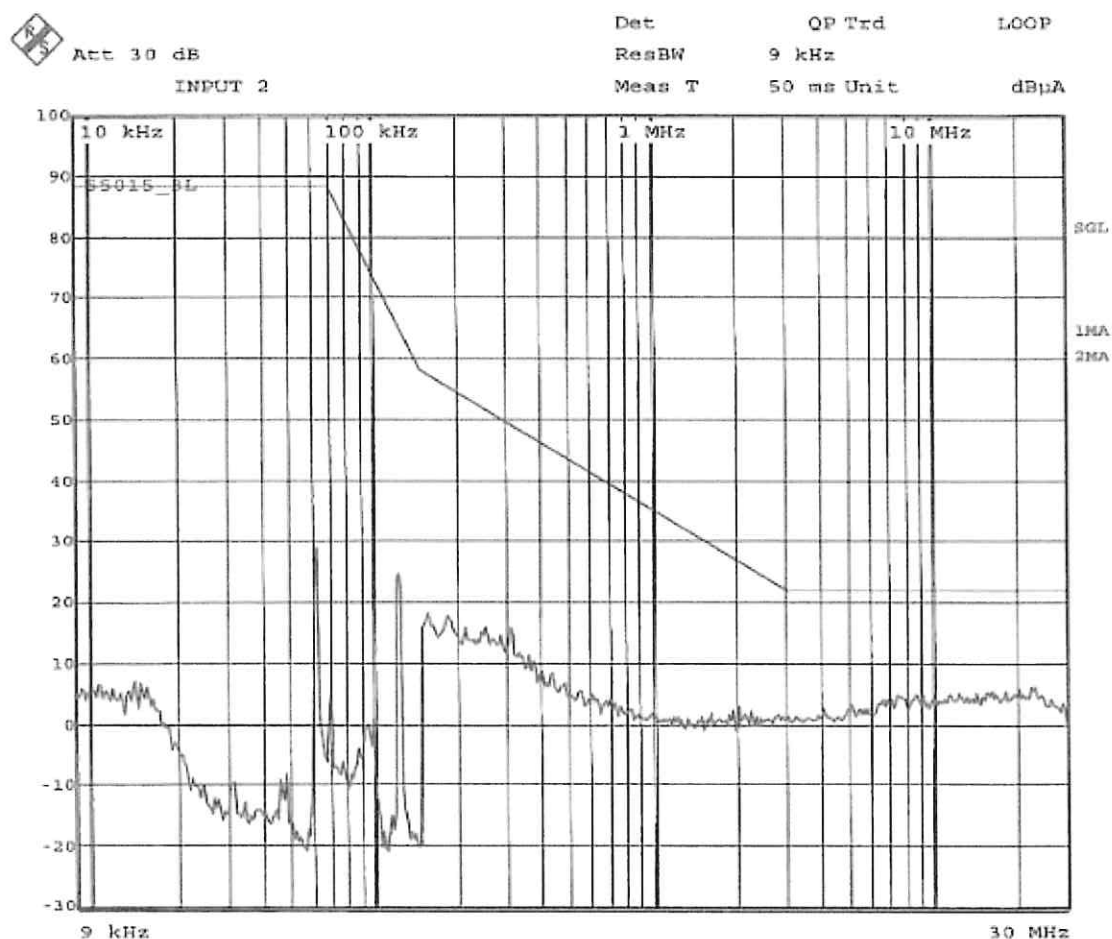
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT M G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: z
Standard: STN EN IEC 55015



Result: **PASS**

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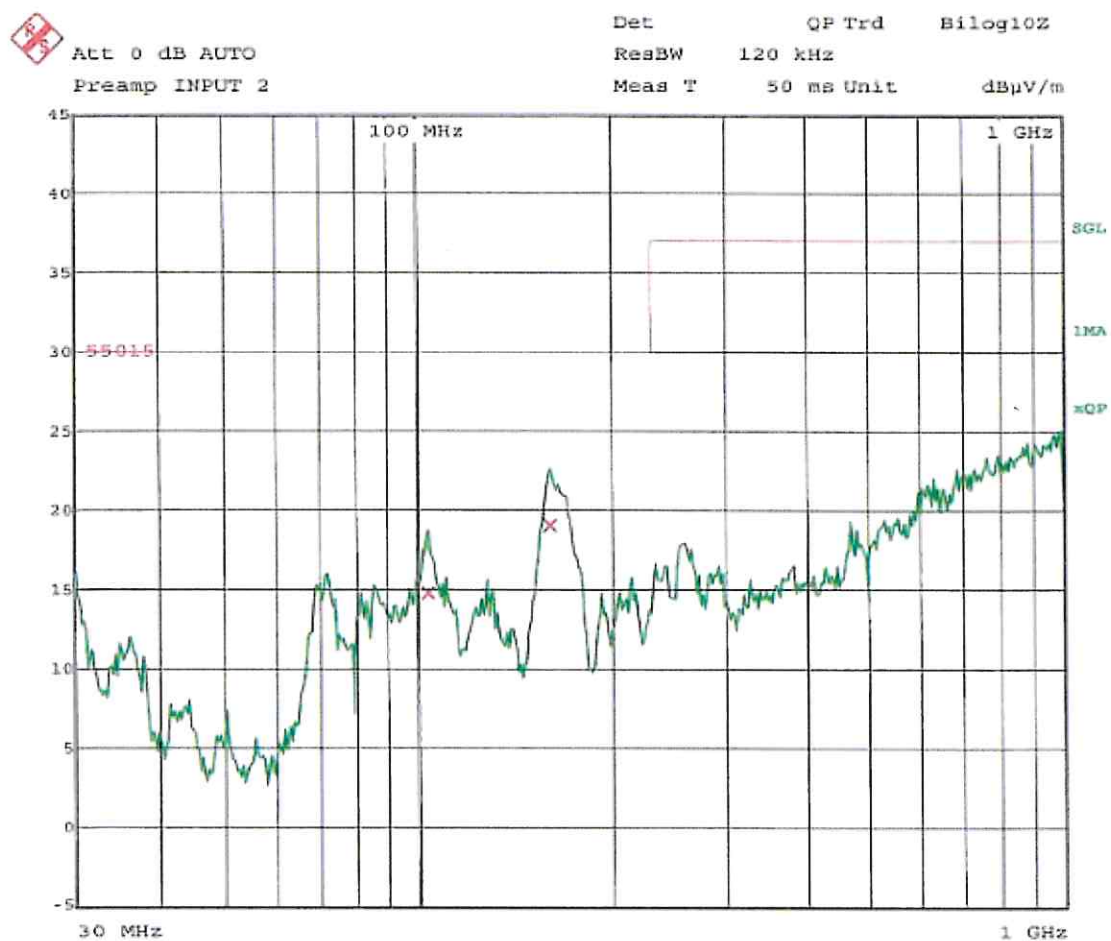
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Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Antenna position: horizontal
Standard: STN EN IEC 55015



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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBpV/m	DELTA LIMIT dB
1 Quasi Peak	161.0000 MHz	18.98	-11.01
1 Quasi Peak	104.4000 MHz	14.66	-15.33

Result: **PASS**

TEST REPORT

Testing laboratories

EVPÚ a.s.,

Trenčianska 19, 018 51 Nová Dubnica

0-0257E/21

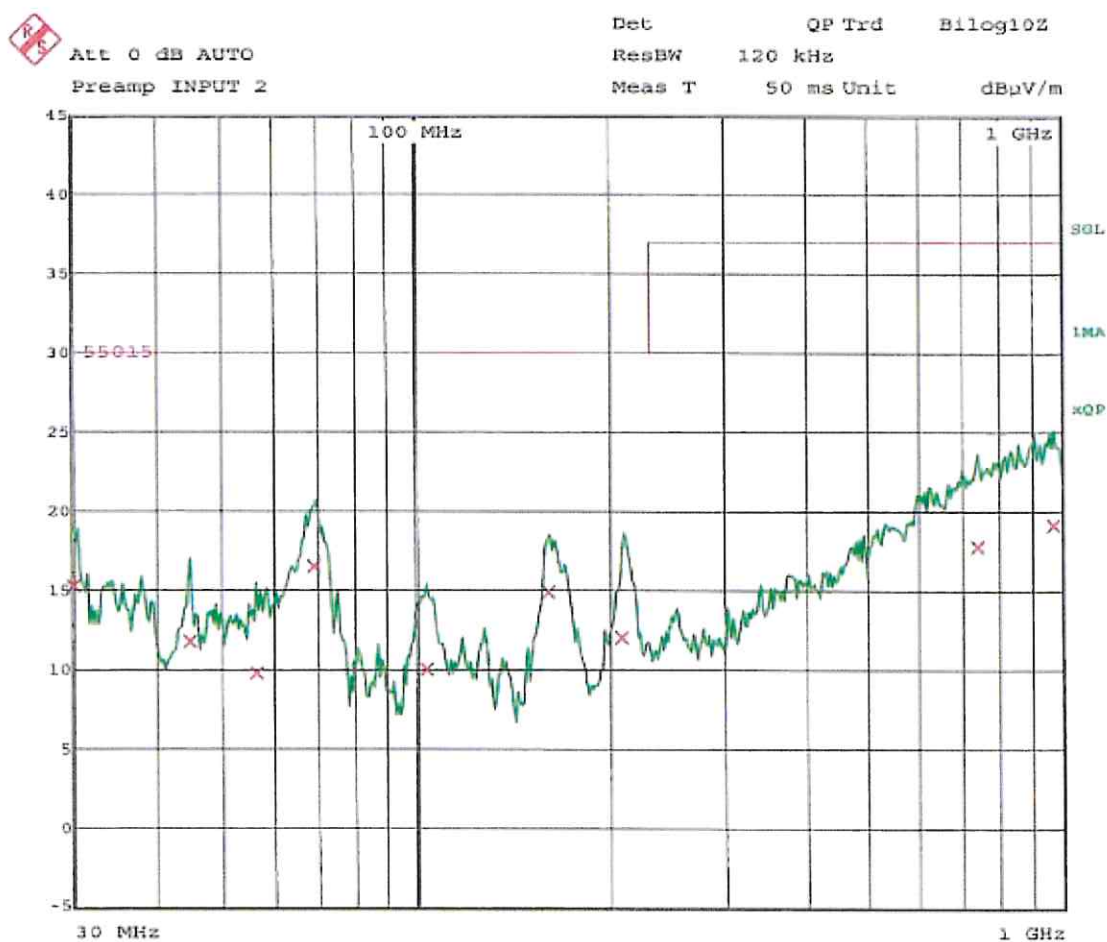
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Attachments : 0

Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Antenna position: vertical
Standard: STN EN IEC 55015



TEST REPORT

Testing laboratories

EVPÚ a.s.,

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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	69.6800 MHz	16.40	-13.59
1 Quasi Peak	30.1600 MHz	15.22	-14.77
1 Quasi Peak	161.0000 MHz	14.80	-15.20
1 Quasi Peak	974.4400 MHz	19.12	-17.87
1 Quasi Peak	210.1200 MHz	11.96	-18.03
1 Quasi Peak	45.0000 MHz	11.68	-18.31
1 Quasi Peak	739.9200 MHz	17.74	-19.25
1 Quasi Peak	104.1600 MHz	9.94	-20.05
1 Quasi Peak	56.8000 MHz	9.73	-20.26

Result: **PASS**

TEST REPORT

Testing laboratories

EVPU a.s.,

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0-0257E/21

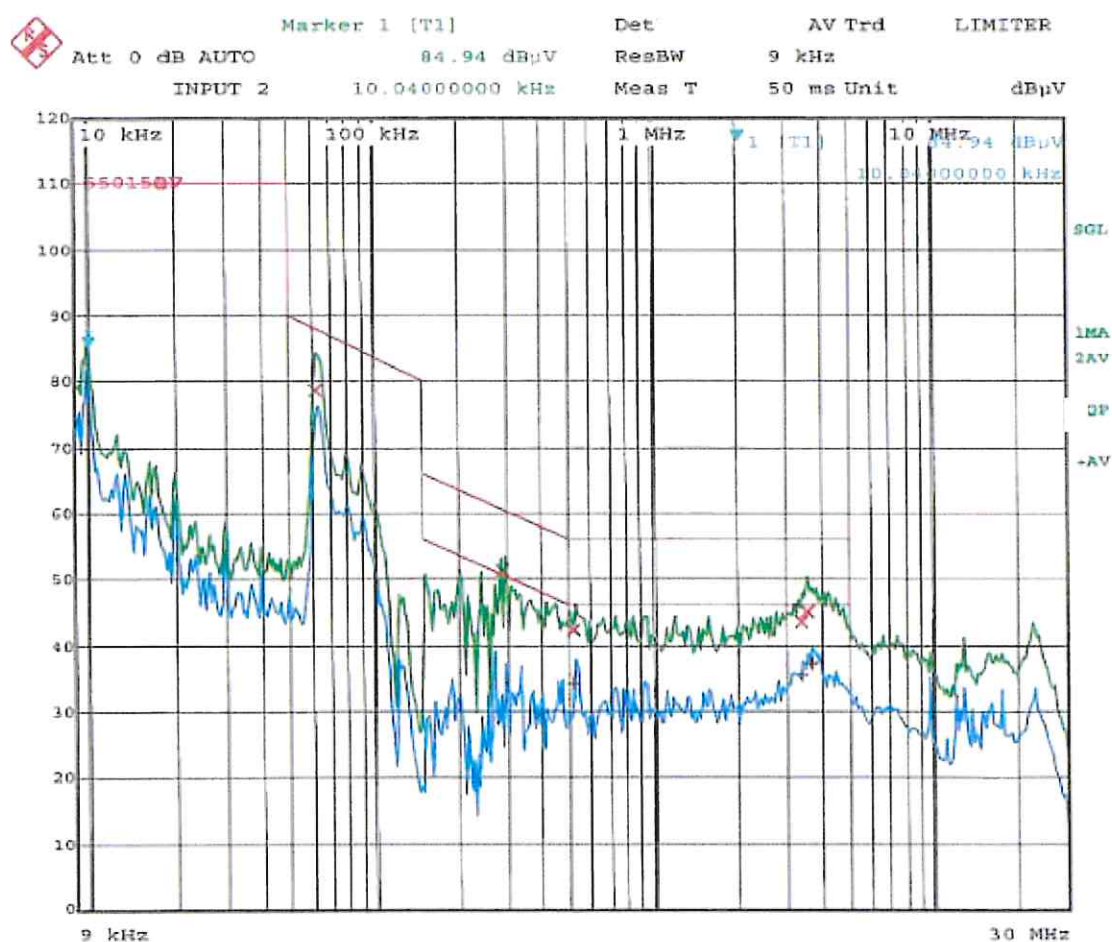
Page No. : 34

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Attachments : 0

Conducted emissions measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Measured terminal: power supply, N
Standard: STN EN IEC 55015



TEST REPORT

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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	3.7020 MHz	37.00	-8.99
1 Quasi Peak	294.0000 kHz	51.13	-9.27
1 Quasi Peak	62.9200 kHz	78.48	-9.42
2 Average	3.4340 MHz	35.24	-10.75
1 Quasi Peak	3.5940 MHz	44.98	-11.01
2 Average	530.0000 kHz	33.97	-12.02
1 Quasi Peak	3.4260 MHz	43.40	-12.60
1 Quasi Peak	530.0000 kHz	42.23	-13.76

Result: PASS

TEST REPORT

Testing laboratories

EVPU a.s.,

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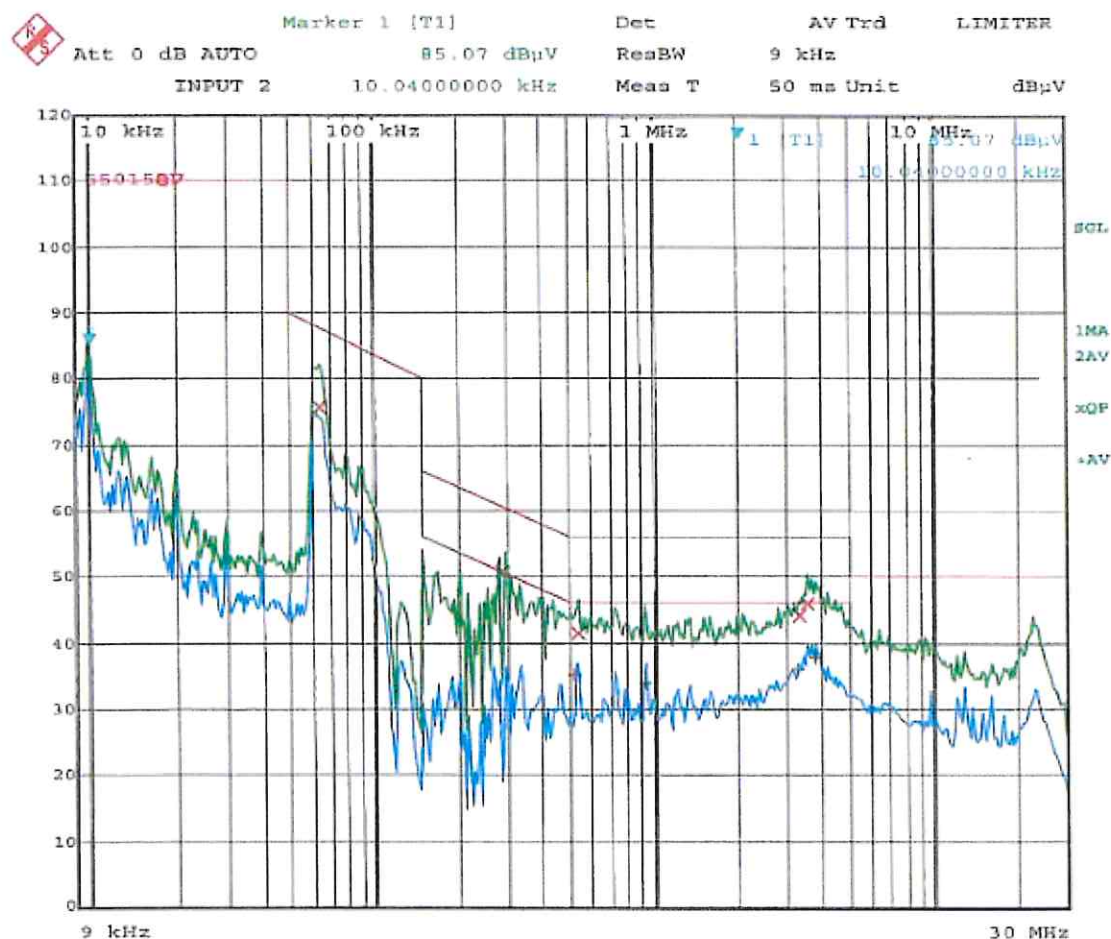
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Attachments : 0

Conducted emissions measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Measured terminal: power supply, L
Standard: STN EN IEC 55015



TEST REPORT

Testing laboratories

EVPÚ a.s.,

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SDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	3.8340 MHz	37.58	-8.41
1 Quasi Peak	294.0000 kHz	50.62	-9.78
1 Quasi Peak	3.5740 MHz	45.88	-10.12
2 Average	3.3220 MHz	35.85	-10.14
2 Average	530.0000 kHz	35.06	-10.93
1 Quasi Peak	3.3620 MHz	43.84	-12.15
1 Quasi Peak	64.9200 kHz	75.46	-12.15
2 Average	946.0000 kHz	33.72	-12.27
1 Quasi Peak	546.0000 kHz	41.18	-14.81

Result: **PASS**

TEST REPORT

Testing laboratories

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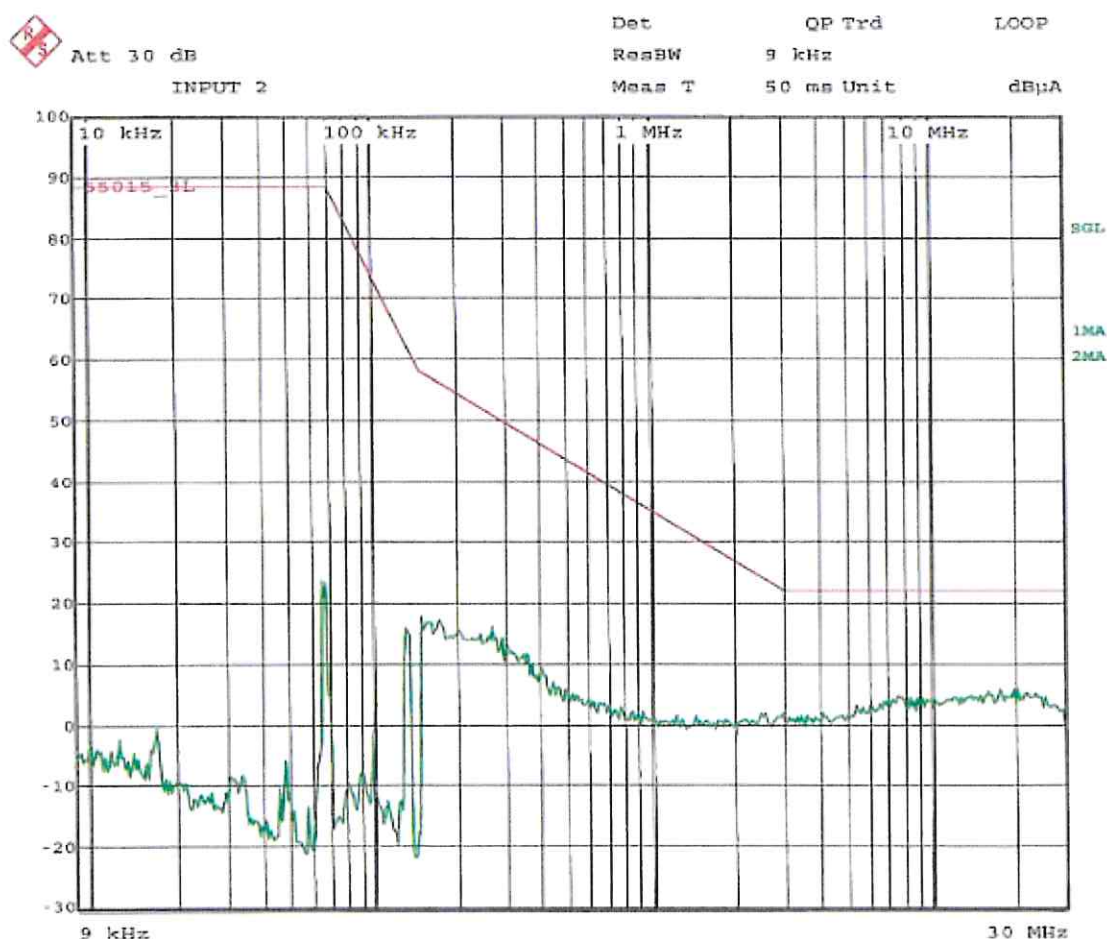
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Attachments : 0

Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: x
Standard: STN EN IEC 55015



Result: **PASS**

TEST REPORT

Testing laboratories

EVPÚ a.s.,

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0-0257E/21

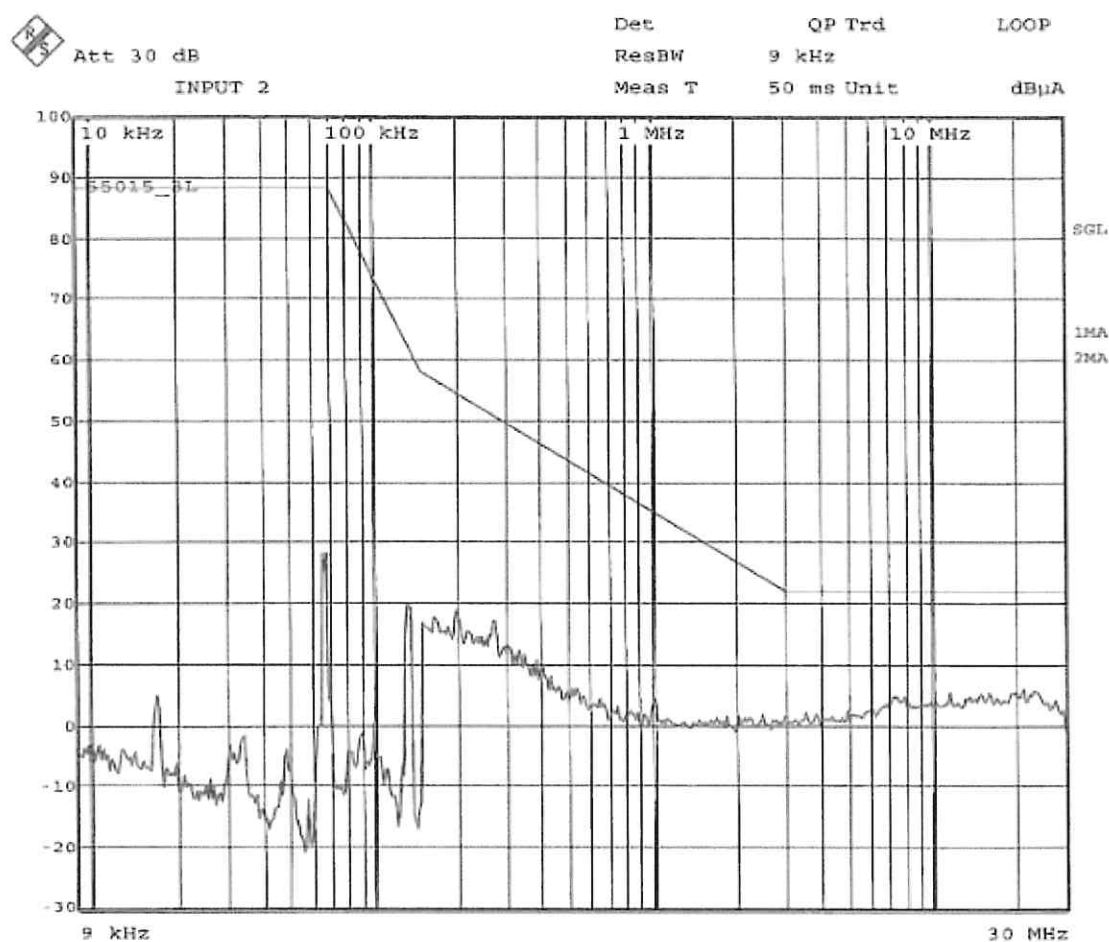
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Attachments : 0

Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT L G2 , (class I)**
Mode of operation: under a normal operating conditions
Loop antenna plane: y
Standard: STN EN IEC 55015



Result: **PASS**

TEST REPORT

Testing laboratories

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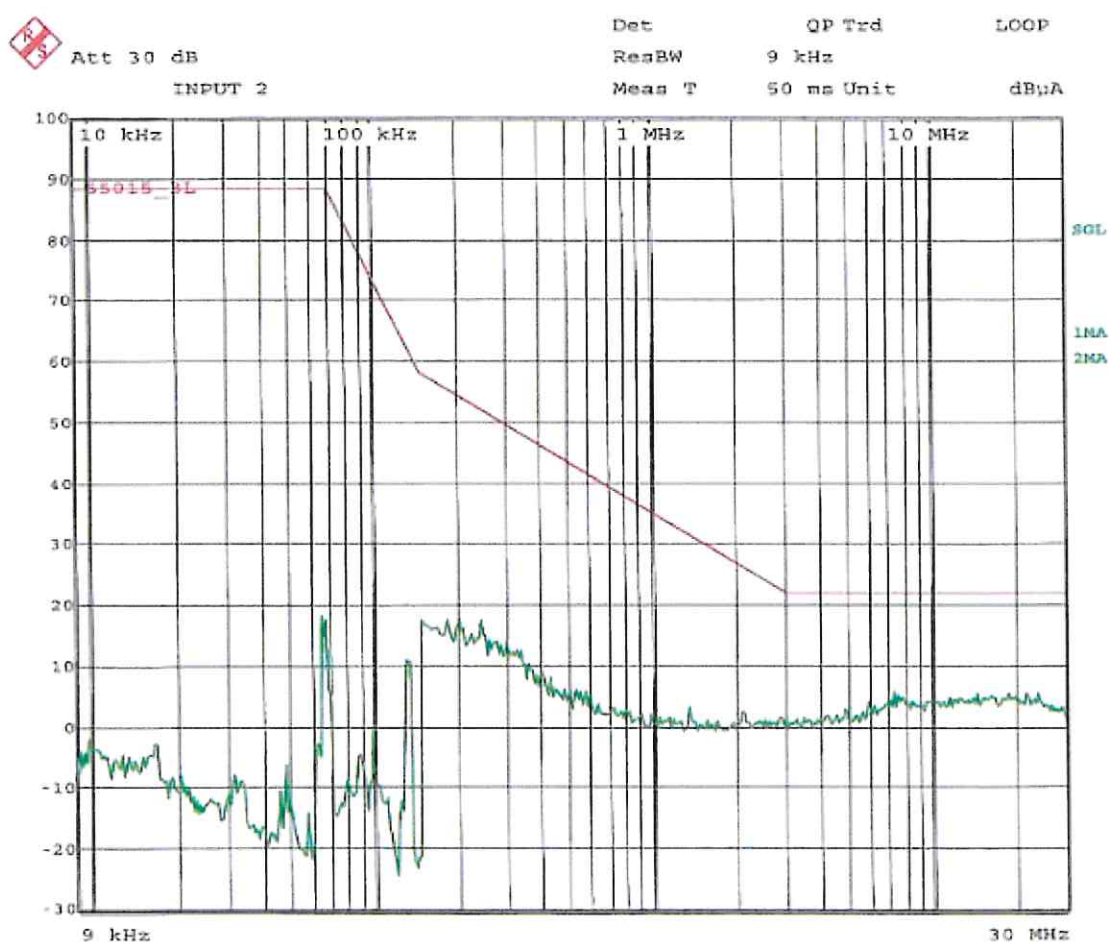
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Attachments : 0

Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT L G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: z
Standard: STN EN IEC 55015



Result: **PASS**

TEST REPORT

Testing laboratories

EVPÚ a.s.,

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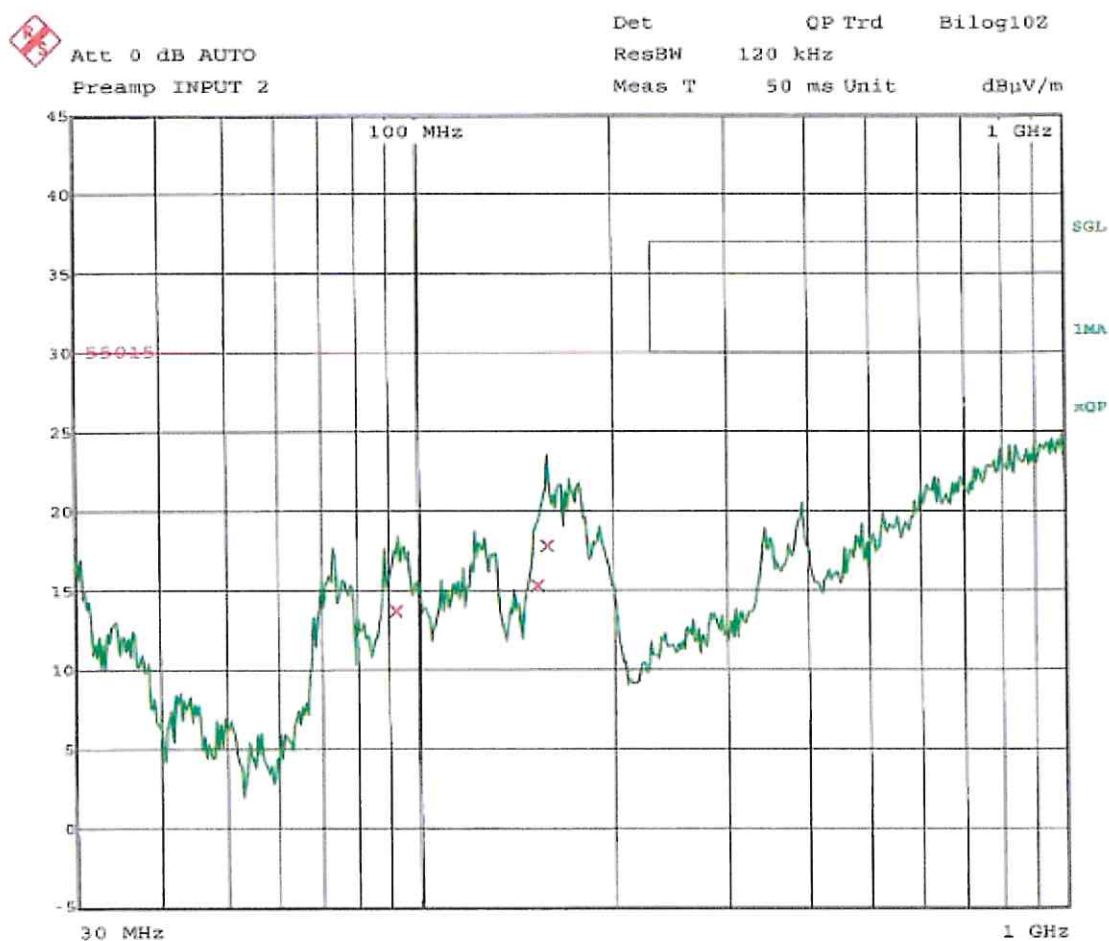
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Attachments : 0

Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / **MARUT XL G2 , (class I)**
Mode of operation: under a normal operating conditions
Antenna position: horizontal
Standard: STN EN IEC 55015



TEST REPORT

Testing laboratories

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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	159.0000 MHz	17.67	-12.32
1 Quasi Peak	153.5200 MHz	15.14	-14.85
1 Quasi Peak	92.9600 MHz	13.57	-16.42

Result: **PASS**

TEST REPORT

Testing laboratories

EVPÚ a.s.,

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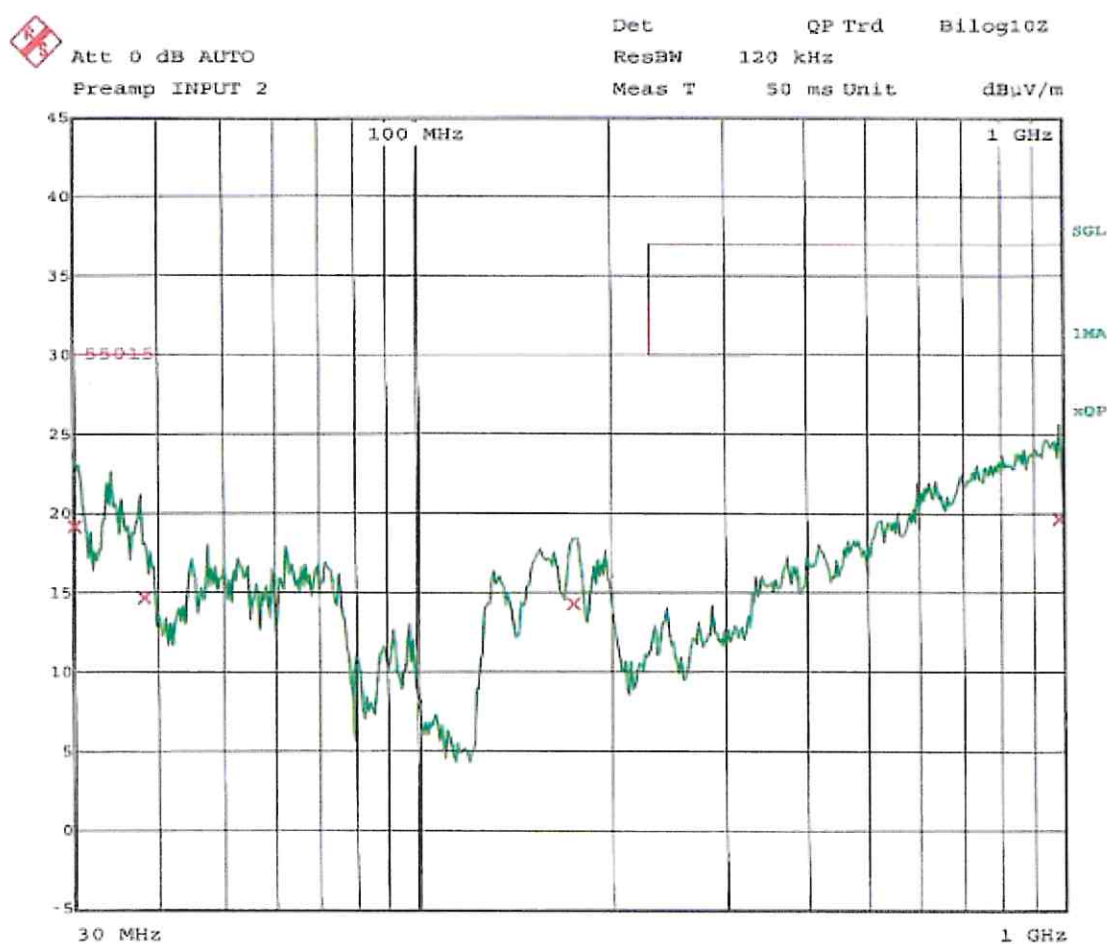
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Attachments : 0

Electromagnetic field measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT XL G2 , (class I)
Mode of operation: under a normal operating conditions
Antenna position: vertical
Standard: STN EN IEC 55015



TEST REPORT

Testing laboratories

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EDOT PEAK LIST (Final Measurement Results)			
Trace1: 55015		Trace2: ---	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.0000 MHz	19.04	-10.95
1 Quasi Peak	38.3200 MHz	14.55	-15.44
1 Quasi Peak	175.7200 MHz	14.12	-15.87
1 Quasi Peak	986.8000 MHz	19.55	-17.44

Result: **PASS**

TEST REPORT

Testing laboratories

EVPÚ a.s.,

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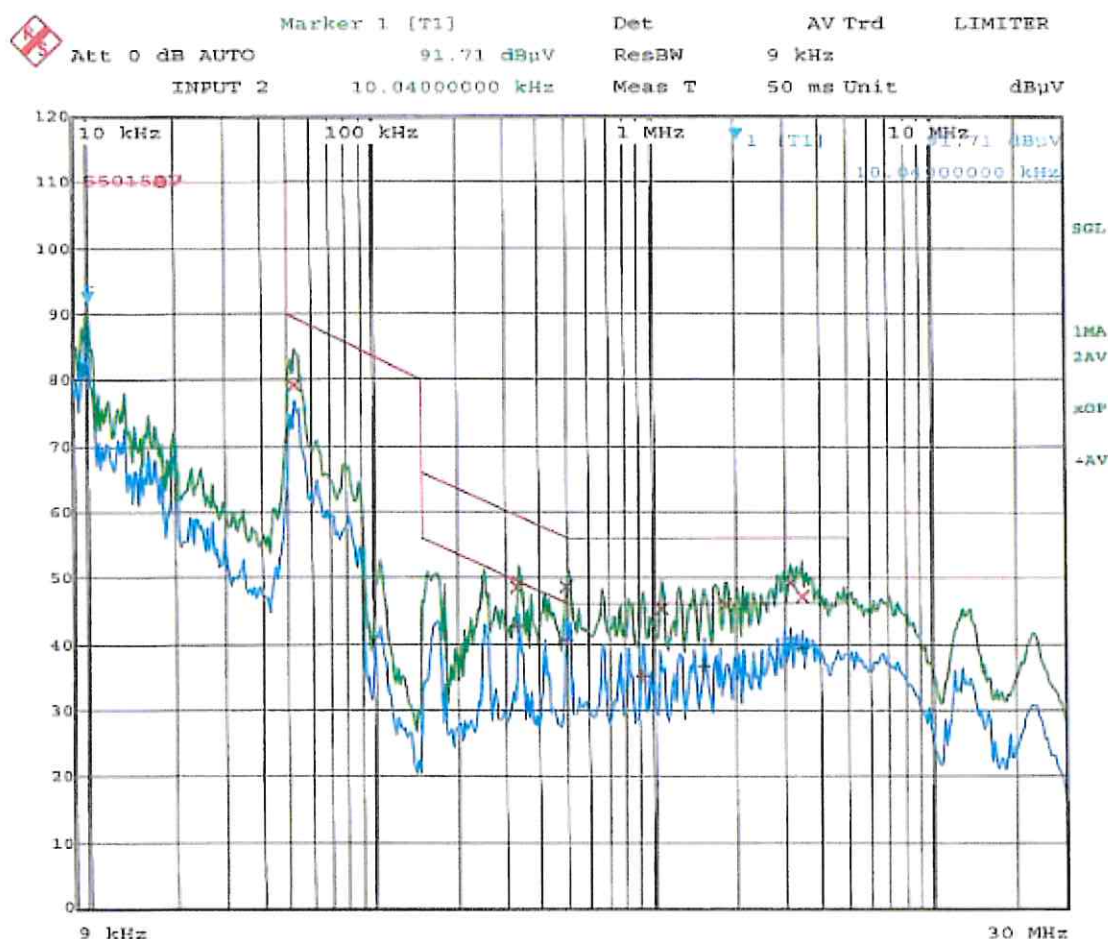
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Conducted emissions measurement

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT XL G2 , (class I)
Mode of operation: under a normal operating conditions
Measured terminal: power supply, N
Standard: STN EN IEC 55015



TEST REPORT

Testing laboratories

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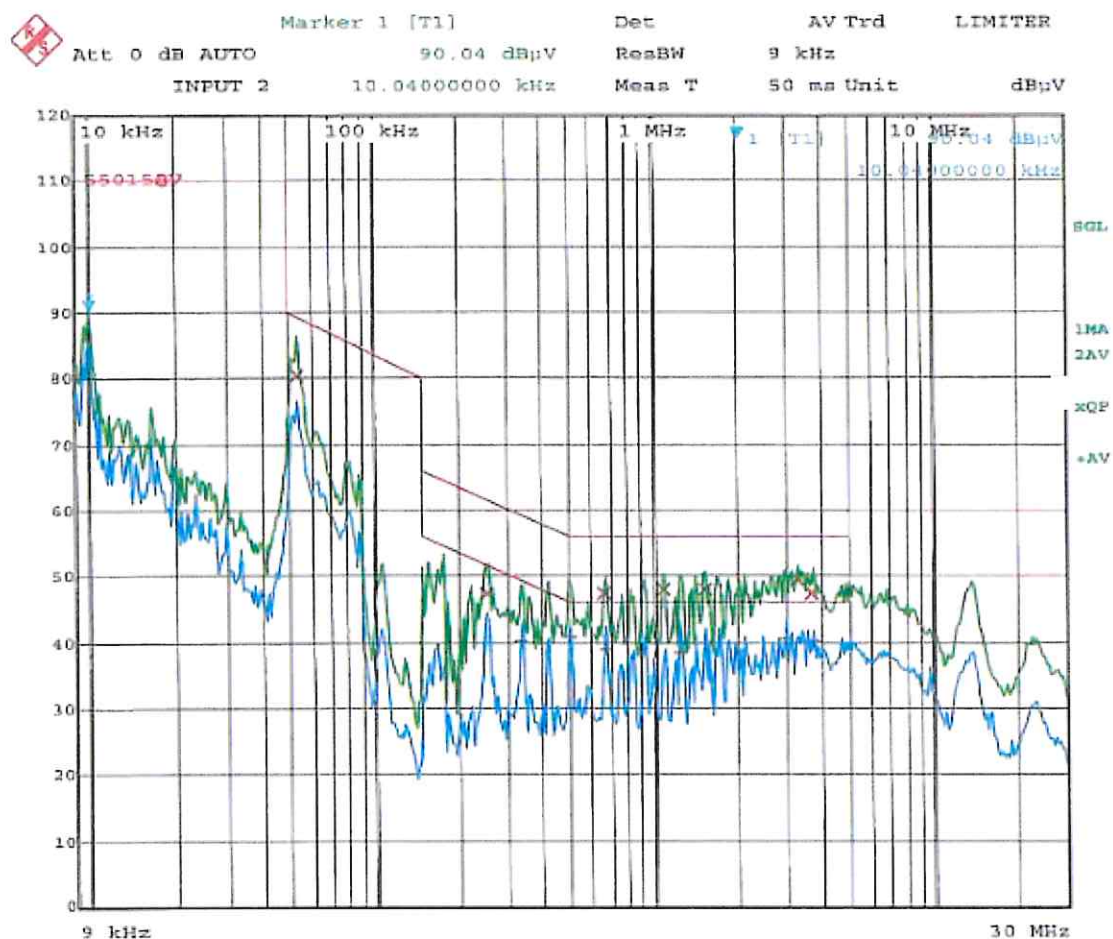
WATT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	3.1580 MHz	40.69	-5.30
2 Average	502.0000 kHz	40.45	-5.54
2 Average	3.4900 MHz	39.00	-6.99
2 Average	334.0000 kHz	42.32	-7.02
1 Quasi Peak	3.1580 MHz	48.93	-7.06
1 Quasi Peak	506.0000 kHz	48.44	-7.55
1 Quasi Peak	3.4820 MHz	46.84	-9.15
2 Average	1.5380 MHz	36.45	-9.54
1 Quasi Peak	1.8540 MHz	45.75	-10.24
1 Quasi Peak	53.6400 kHz	78.98	-10.37
1 Quasi Peak	1.0940 MHz	45.22	-10.78
1 Quasi Peak	334.0000 kHz	48.53	-10.82
2 Average	934.0000 kHz	35.05	-10.94

Result: PASS

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Attachments : 0

EUT:	Luminaire for road and street lighting
Type:	MARUT G2 / MARUT XL G2 , (class I)
Mode of operation:	under a normal operating conditions
Measured terminal:	power supply, L
Standard:	STN EN IEC 55015



TEST REPORT

Testing laboratories

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EDIT PEAK LIST (Final Measurement Results)			
Trace1: 55015QP		Trace2: 55015AV	
Trace3: ---		Trace4: ---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	510.0000 kHz	40.65	-5.35
2 Average	3.0020 MHz	40.28	-5.71
2 Average	3.7460 MHz	40.00	-5.99
1 Quasi Peak	3.3260 MHz	49.37	-6.62
2 Average	682.0000 kHz	38.93	-7.06
2 Average	1.2500 MHz	38.31	-7.68
1 Quasi Peak	1.5420 MHz	47.97	-8.02
1 Quasi Peak	1.0980 MHz	47.75	-8.24
1 Quasi Peak	678.0000 kHz	47.24	-8.75
1 Quasi Peak	3.7420 MHz	47.20	-8.79
2 Average	342.0000 kHz	40.18	-8.96
1 Quasi Peak	54.1200 kHz	80.30	-8.97
1 Quasi Peak	258.0000 kHz	47.38	-14.10

Result: **PASS**

TEST REPORT

Testing laboratories

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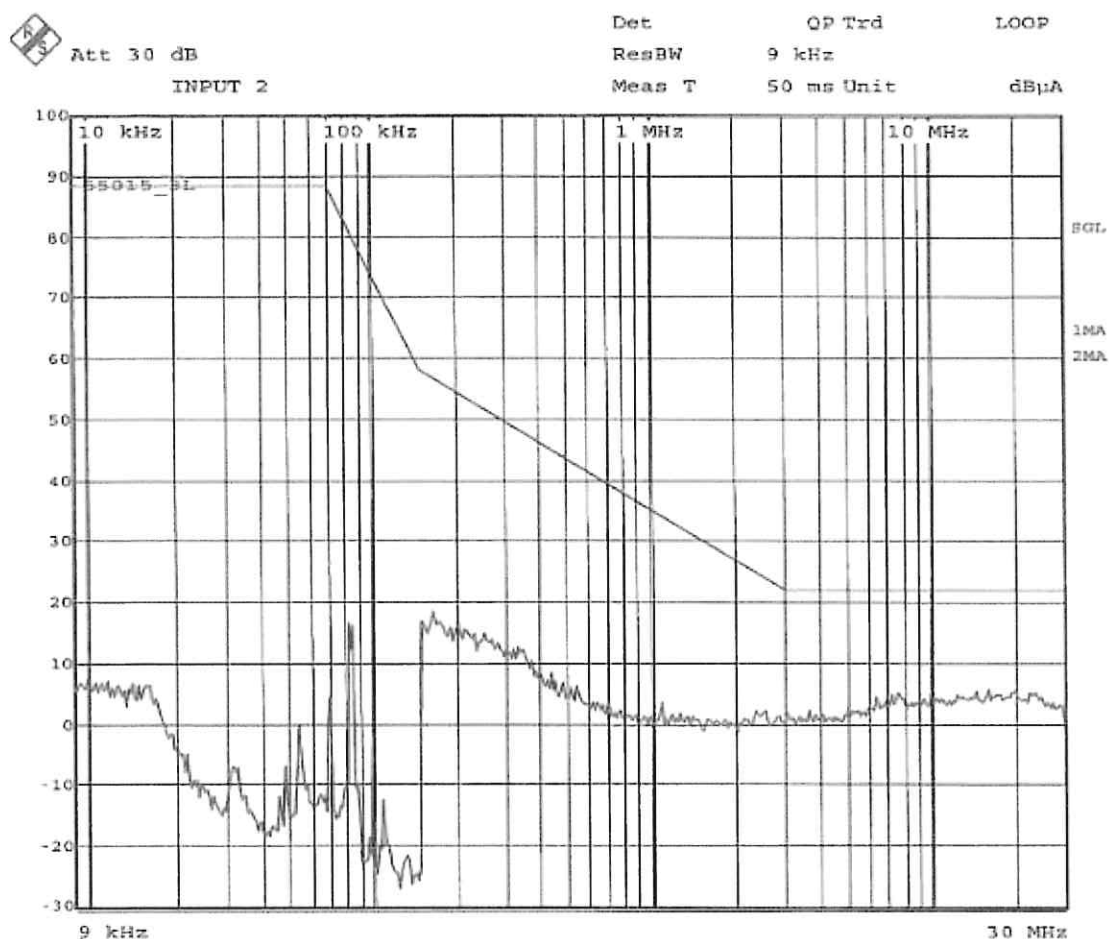
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Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT XL G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: x
Standard: STN EN IEC 55015



Result: **PASS**

TEST REPORT

Testing laboratories

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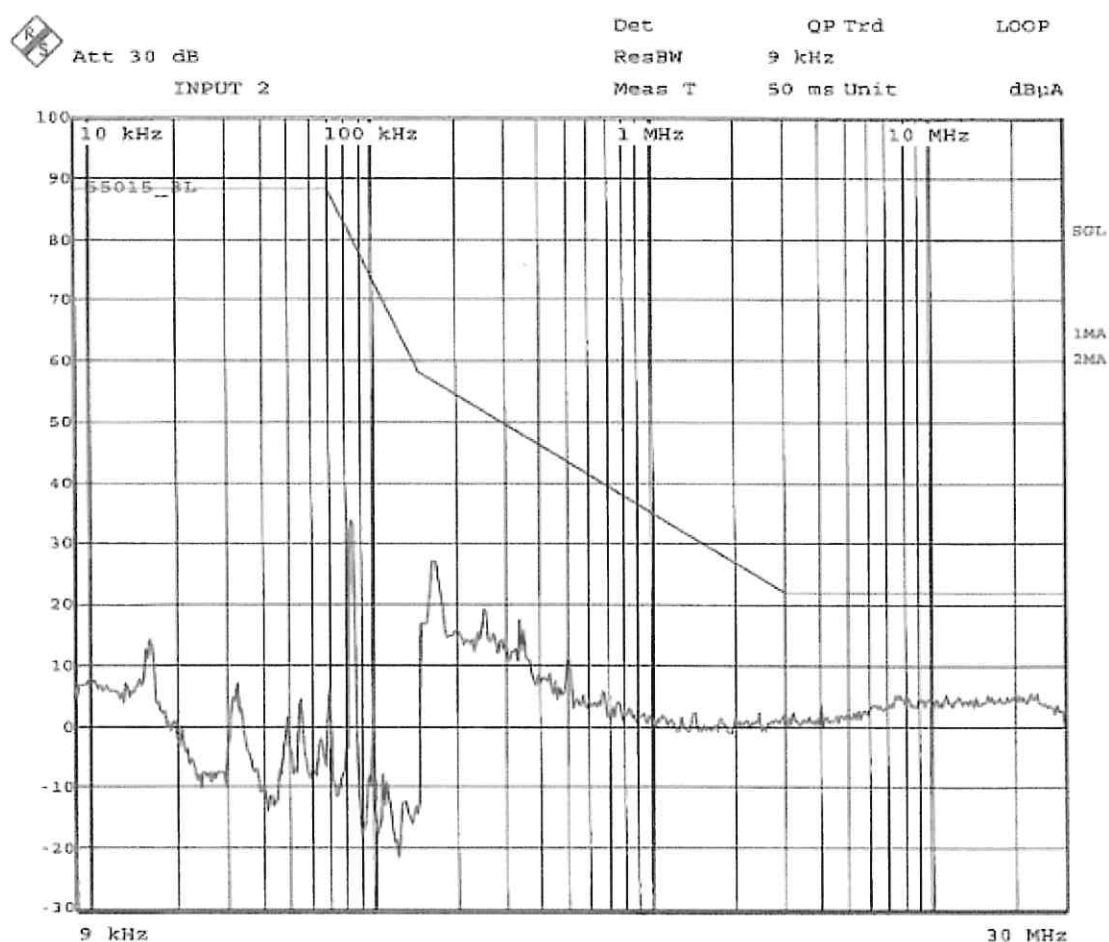
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Attachments : 0

Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT XL G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: y
Standard: STN EN IEC 55015



Result: **PASS**

TEST REPORT

Testing laboratories

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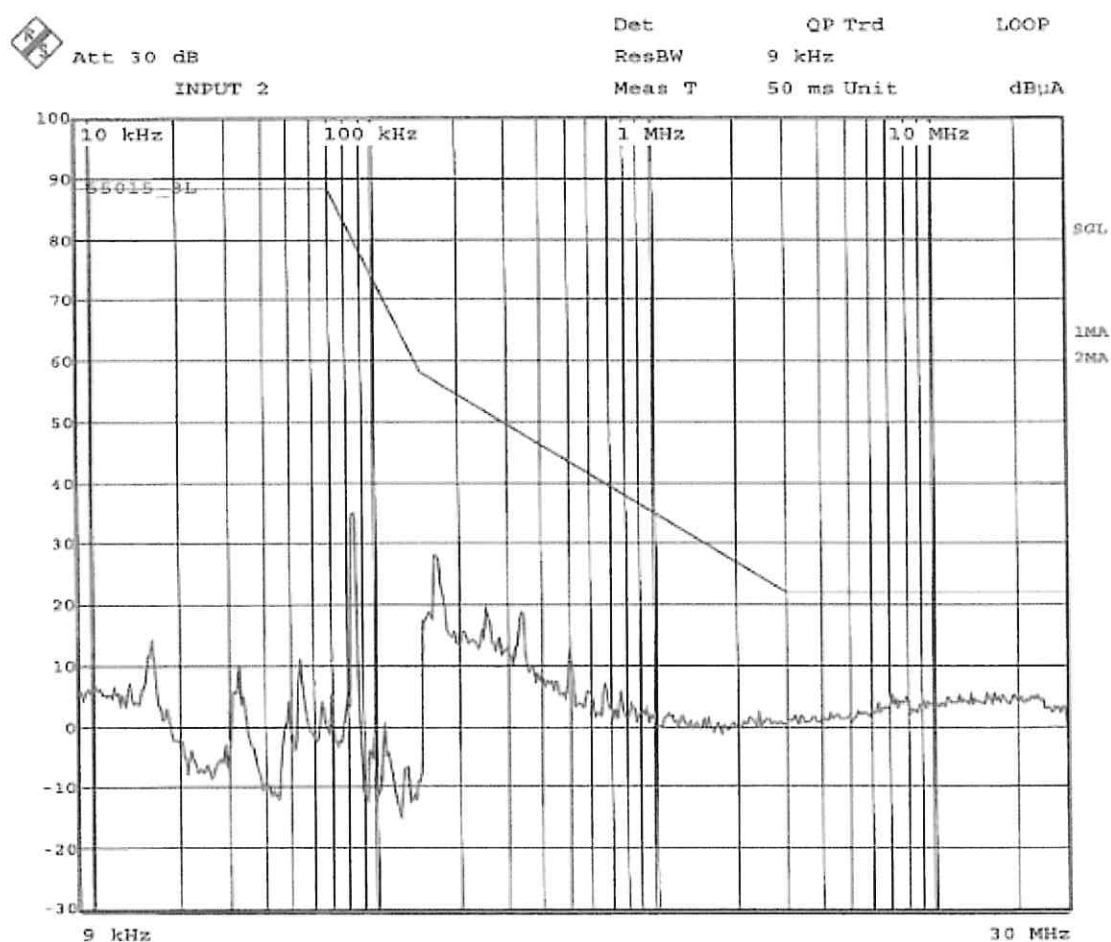
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Attachments : 0

Radiated electromagnetic disturbances

EUT: Luminaire for road and street lighting
Type: MARUT G2 / MARUT XL G2 , (class I)
Mode of operation: under a normal operating conditions
Loop antenna plane: z
Standard: STN EN IEC 55015



Result: **PASS**

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Harmonics – Class-C per EN/IEC61000-3-2

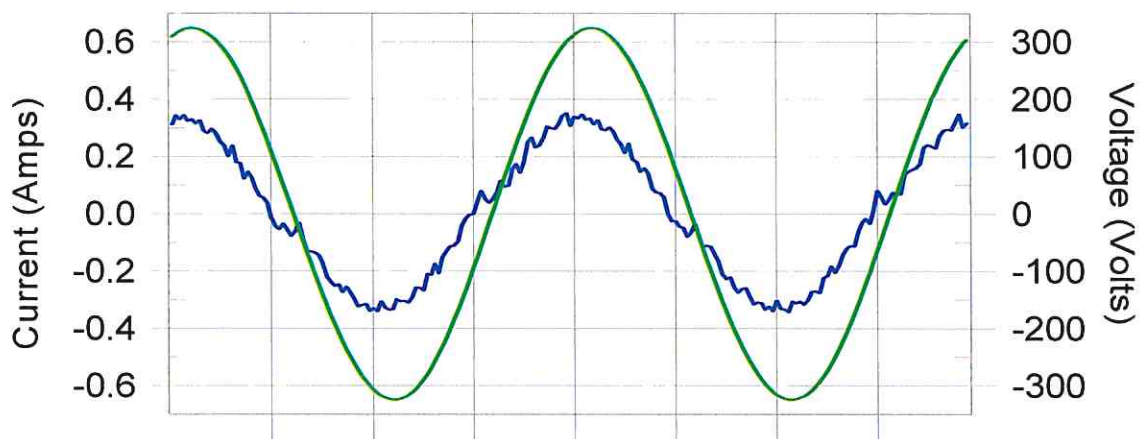
EUT: Marut S G2

Test category: Class-C

Test Result: Pass

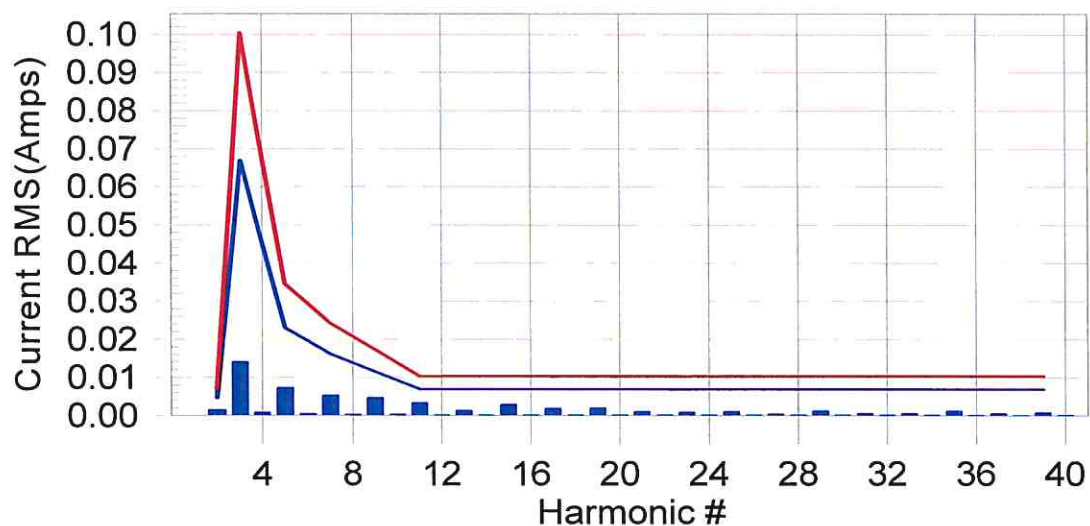
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line

European Limits



Test result: Pass Worst harmonic was #11 with 32.79% of the limit.

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Current Test Result Summary

EUT: Marut S G2
Test category: Class-C

Test Result: Pass Source qualification: Normal
THC(A): 0.02 I-THD(%): 7.50 POHC(A): 0.003 POHC Limit(A): 0.022

Highest parameter values during test:

V_RMS (Volts): 229.48	Frequency(Hz): 50.00
I_Peak (Amps): 0.374	I_RMS (Amps): 0.231
I_Fund (Amps): 0.230	Crest Factor: 1.634
Power (Watts): 51.5	Power Factor: 0.973

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.005	27.8	0.002	0.007	21.92	Pass
3	0.013	0.067	19.0	0.014	0.100	14.02	Pass
4	0.001						
5	0.007	0.023	30.1	0.007	0.034	21.13	Pass
6	0.001						
7	0.005	0.016	31.2	0.005	0.024	22.07	Pass
8	0.000						
9	0.004	0.011	39.0	0.005	0.017	27.33	Pass
10	0.000						
11	0.003	0.007	46.7	0.003	0.010	32.74	Pass
12	0.000						
13	0.001	0.007	16.8	0.001	0.010	13.15	Pass
14	0.000						
15	0.003	0.007	40.4	0.003	0.010	28.10	Pass
16	0.000						
17	0.002	0.007	25.6	0.002	0.010	18.23	Pass
18	0.000						
19	0.002	0.007	26.5	0.002	0.010	19.15	Pass
20	0.000						
21	0.001	0.007	14.4	0.001	0.010	10.52	Pass
22	0.000						
23	0.001	0.007	11.9	0.001	0.010	8.86	Pass
24	0.000						
25	0.001	0.007	14.1	0.001	0.010	10.18	Pass
26	0.000						
27	0.000	0.007	5.1	0.000	0.010	4.06	Pass
28	0.000						
29	0.001	0.007	16.1	0.001	0.010	11.94	Pass
30	0.000						
31	0.000	0.007	7.0	0.001	0.010	5.32	Pass
32	0.000						
33	0.000	0.007	7.0	0.001	0.010	5.32	Pass
34	0.000						
35	0.001	0.007	17.4	0.001	0.010	12.47	Pass
36	0.000						
37	0.001	0.007	7.9	0.001	0.010	5.87	Pass
38	0.000						
39	0.001	0.007	10.6	0.001	0.010	8.02	Pass
40	0.000						

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

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Voltage Source Verification Data

EUT: Marut S G2
Test category: Class-C

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 229.48	Frequency(Hz): 50.00
I_Peak (Amps): 0.374	I_RMS (Amps): 0.231
I_Fund (Amps): 0.230	Crest Factor: 1.634
Power (Watts): 51.5	Power Factor: 0.973

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.142	0.459	31.02	OK
3	0.541	2.065	26.18	OK
4	0.107	0.459	23.34	OK
5	0.050	0.918	5.47	OK
6	0.138	0.459	30.02	OK
7	0.056	0.688	8.18	OK
8	0.037	0.459	8.06	OK
9	0.024	0.459	5.32	OK
10	0.035	0.459	7.71	OK
11	0.015	0.229	6.41	OK
12	0.021	0.229	9.11	OK
13	0.020	0.229	8.63	OK
14	0.019	0.229	8.09	OK
15	0.014	0.229	6.03	OK
16	0.020	0.229	8.67	OK
17	0.013	0.229	5.85	OK
18	0.017	0.229	7.39	OK
19	0.009	0.229	4.02	OK
20	0.018	0.229	7.78	OK
21	0.009	0.229	3.76	OK
22	0.013	0.229	5.80	OK
23	0.008	0.229	3.65	OK
24	0.008	0.229	3.69	OK
25	0.008	0.229	3.64	OK
26	0.011	0.229	4.68	OK
27	0.007	0.229	3.19	OK
28	0.007	0.229	3.05	OK
29	0.008	0.229	3.33	OK
30	0.006	0.229	2.70	OK
31	0.004	0.229	1.85	OK
32	0.007	0.229	3.25	OK
33	0.007	0.229	2.84	OK
34	0.005	0.229	2.36	OK
35	0.003	0.229	1.33	OK
36	0.004	0.229	1.92	OK
37	0.006	0.229	2.43	OK
38	0.004	0.229	1.74	OK
39	0.005	0.229	2.25	OK
40	0.005	0.229	2.31	OK

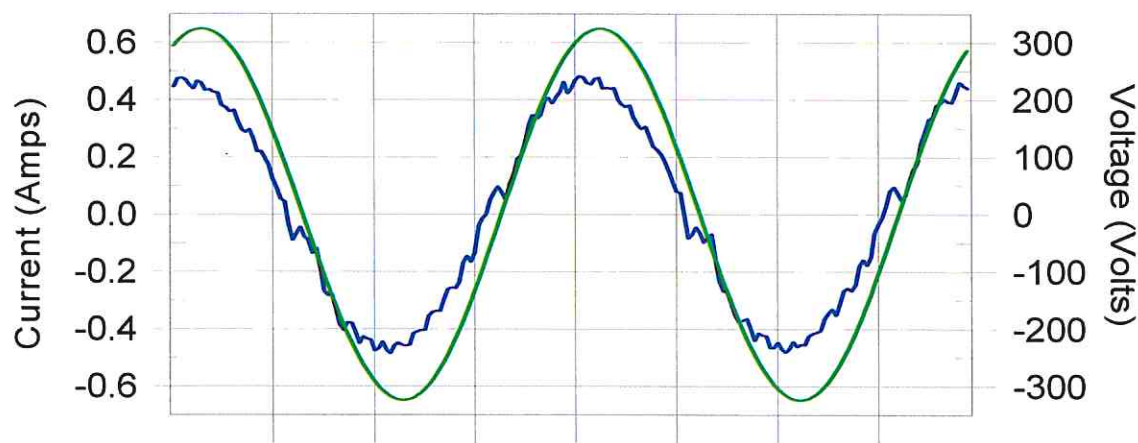
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Harmonics – Class-C per EN/IEC61000-3-2

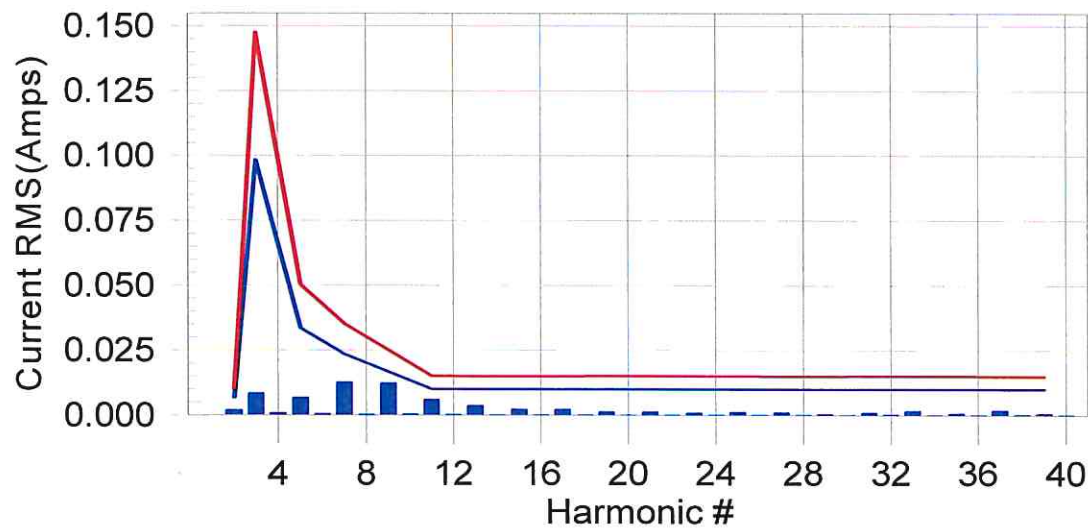
EUT: Marut M G2
Test category: Class-C

Test Result: Pass
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line
European Limits



Test result: Pass
Worst harmonic was #9 with 49.22% of the limit.

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Current Test Result Summary

EUT: Marut M G2
Test category: Class-C

Test Result: Pass Source qualification: Normal
THC(A): 0.02 I-THD(%): 6.52 POHC(A): 0.003 POHC Limit(A): 0.032

Highest parameter values during test:

V_RMS (Volts):	229.40	Frequency(Hz):	50.00
I_Peak (Amps):	0.525	I_RMS (Amps):	0.336
I_Fund (Amps):	0.335	Crest Factor:	1.575
Power (Watts):	75.5	Power Factor:	0.980

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.007	19.9	0.002	0.010	19.39	Pass
3	0.007	0.098	7.3	0.009	0.148	5.80	Pass
4	0.001						
5	0.007	0.033	19.4	0.007	0.050	13.59	Pass
6	0.000						
7	0.012	0.023	53.0	0.013	0.035	36.26	Pass
8	0.000						
9	0.012	0.017	72.5	0.012	0.025	49.22	Pass
10	0.000						
11	0.006	0.010	59.2	0.006	0.015	40.19	Pass
12	0.000						
13	0.003	0.010	34.8	0.004	0.015	24.72	Pass
14	0.000						
15	0.002	0.010	21.8	0.002	0.015	15.61	Pass
16	0.000						
17	0.002	0.010	21.5	0.002	0.015	15.42	Pass
18	0.000						
19	0.001	0.010	12.7	0.001	0.015	9.02	Pass
20	0.000						
21	0.001	0.010	11.7	0.001	0.015	8.56	Pass
22	0.000						
23	0.001	0.010	9.3	0.001	0.015	6.62	Pass
24	0.000						
25	0.001	0.010	11.9	0.001	0.015	8.38	Pass
26	0.000						
27	0.001	0.010	10.2	0.001	0.015	7.46	Pass
28	0.000						
29	0.000	0.010	3.1	0.000	0.015	2.51	Pass
30	0.000						
31	0.001	0.010	9.7	0.001	0.015	6.77	Pass
32	0.000						
33	0.002	0.010	16.6	0.002	0.015	11.39	Pass
34	0.000						
35	0.001	0.010	6.7	0.001	0.015	4.72	Pass
36	0.000						
37	0.002	0.010	17.1	0.002	0.015	12.10	Pass
38	0.000						
39	0.000	0.010	4.8	0.001	0.015	3.67	Pass
40	0.000						

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

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Voltage Source Verification Data**EUT: Marut M G2****Test category: Class-C****Test Result: Pass****Source qualification: Normal****Highest parameter values during test:**

Voltage (Vrms): 229.40

I_Peak (Amps): 0.525

I_Fund (Amps): 0.335

Power (Watts): 75.5

Frequency(Hz): 50.00

I_RMS (Amps): 0.336

Crest Factor: 1.575

Power Factor: 0.980

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.141	0.459	30.65	OK
3	0.536	2.064	25.95	OK
4	0.106	0.459	23.08	OK
5	0.046	0.917	5.04	OK
6	0.110	0.459	24.01	OK
7	0.051	0.688	7.37	OK
8	0.036	0.459	7.89	OK
9	0.025	0.459	5.54	OK
10	0.036	0.459	7.76	OK
11	0.013	0.229	5.66	OK
12	0.022	0.229	9.67	OK
13	0.020	0.229	8.83	OK
14	0.012	0.229	5.38	OK
15	0.013	0.229	5.64	OK
16	0.020	0.229	8.86	OK
17	0.013	0.229	5.72	OK
18	0.018	0.229	7.71	OK
19	0.009	0.229	3.88	OK
20	0.017	0.229	7.50	OK
21	0.008	0.229	3.67	OK
22	0.014	0.229	5.96	OK
23	0.009	0.229	3.99	OK
24	0.008	0.229	3.67	OK
25	0.009	0.229	3.98	OK
26	0.011	0.229	5.01	OK
27	0.008	0.229	3.50	OK
28	0.007	0.229	3.11	OK
29	0.008	0.229	3.32	OK
30	0.007	0.229	3.20	OK
31	0.005	0.229	2.36	OK
32	0.008	0.229	3.41	OK
33	0.007	0.229	3.12	OK
34	0.005	0.229	2.38	OK
35	0.004	0.229	1.82	OK
36	0.005	0.229	2.01	OK
37	0.005	0.229	2.30	OK
38	0.005	0.229	2.04	OK
39	0.005	0.229	2.39	OK
40	0.006	0.229	2.48	OK

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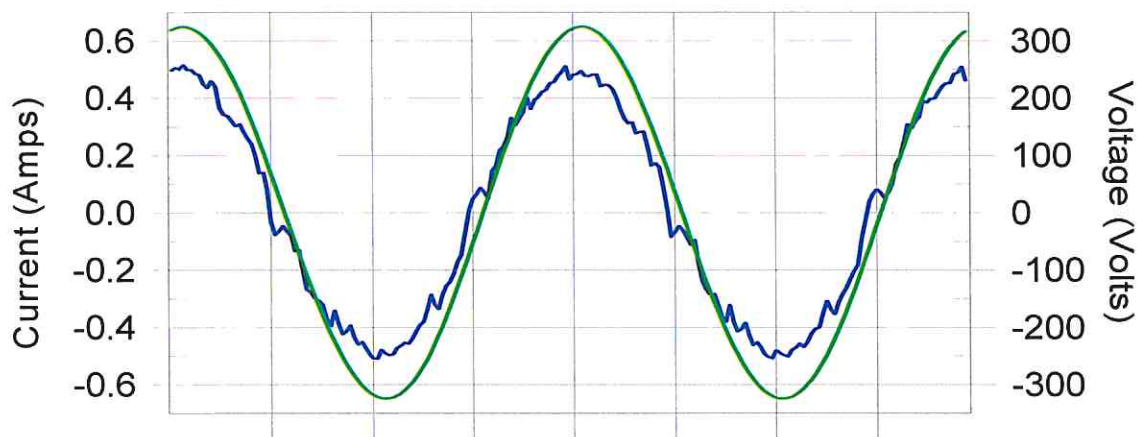
Harmonics – Class-C per EN/IEC61000-3-2

EUT: Marut LG2
Test category: Class-C

Test Result: Pass

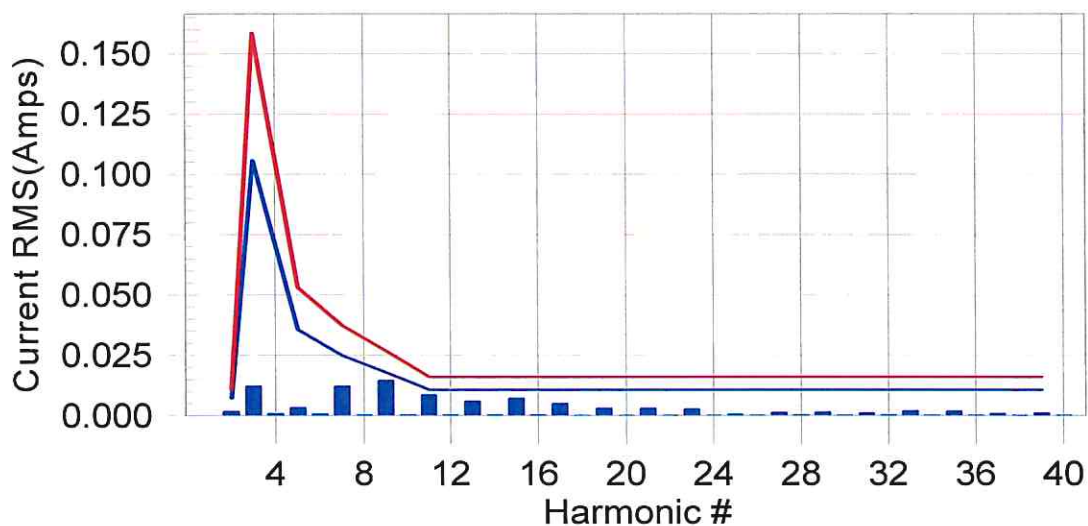
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line

European Limits



Test result: Pass Worst harmonic was #9 with 54.97% of the limit.

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Current Test Result Summary (Run time)

EUT: Marut L G2
Test category: Class-C

Test Result: Pass Source qualification: Normal
THC(A): 0.03 I-THD(%): 7.40 POHC(A): 0.005 POHC Limit(A): 0.034

Highest parameter values during test:

V_RMS (Volts):	229.46	Frequency(Hz):	50.00
I_Peak (Amps):	0.534	I_RMS (Amps):	0.357
I_Fund (Amps):	0.356	Crest Factor:	1.498
Power (Watts):	81.2	Power Factor:	0.992

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.007	18.7	0.002	0.011	15.90	Pass
3	0.011	0.106	10.2	0.012	0.159	7.73	Pass
4	0.001						
5	0.003	0.036	7.7	0.003	0.053	6.28	Pass
6	0.001						
7	0.012	0.025	47.5	0.012	0.037	32.64	Pass
8	0.000						
9	0.014	0.018	80.9	0.015	0.027	54.83	Pass
10	0.000						
11	0.008	0.011	78.9	0.009	0.016	53.86	Pass
12	0.000						
13	0.006	0.011	53.6	0.006	0.016	37.13	Pass
14	0.000						
15	0.007	0.011	64.6	0.007	0.016	44.23	Pass
16	0.000						
17	0.005	0.011	45.6	0.005	0.016	31.21	Pass
18	0.000						
19	0.003	0.011	27.4	0.003	0.016	18.90	Pass
20	0.000						
21	0.003	0.011	27.1	0.003	0.016	19.15	Pass
22	0.000						
23	0.003	0.011	25.5	0.003	0.016	17.49	Pass
24	0.000						
25	0.000	0.011	3.6	0.001	0.016	3.23	Pass
26	0.000						
27	0.001	0.011	11.0	0.001	0.016	8.19	Pass
28	0.000						
29	0.001	0.011	12.6	0.001	0.016	9.33	Pass
30	0.000						
31	0.001	0.011	9.3	0.001	0.016	6.72	Pass
32	0.000						
33	0.002	0.011	17.9	0.002	0.016	12.40	Pass
34	0.000						
35	0.002	0.011	16.0	0.002	0.016	11.08	Pass
36	0.000						
37	0.001	0.011	5.9	0.001	0.016	5.07	Pass
38	0.000						
39	0.001	0.011	9.4	0.001	0.016	6.68	Pass
40	0.000						

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

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Voltage Source Verification Data

EUT: Marut L G2
Test category: Class-C

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 229.46	Frequency(Hz): 50.00
I_Peak (Amps): 0.534	I_RMS (Amps): 0.357
I_Fund (Amps): 0.356	Crest Factor: 1.498
Power (Watts): 81.2	Power Factor: 0.992

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.142	0.459	31.01	OK
3	0.550	2.065	26.63	OK
4	0.080	0.459	17.51	OK
5	0.046	0.918	5.03	OK
6	0.143	0.459	31.11	OK
7	0.053	0.688	7.67	OK
8	0.041	0.459	8.88	OK
9	0.024	0.459	5.26	OK
10	0.028	0.459	6.01	OK
11	0.014	0.229	6.17	OK
12	0.021	0.229	8.95	OK
13	0.020	0.229	8.66	OK
14	0.022	0.229	9.58	OK
15	0.011	0.229	4.59	OK
16	0.024	0.229	10.31	OK
17	0.014	0.229	6.31	OK
18	0.018	0.229	7.97	OK
19	0.010	0.229	4.26	OK
20	0.013	0.229	5.56	OK
21	0.011	0.229	4.58	OK
22	0.010	0.229	4.23	OK
23	0.010	0.229	4.45	OK
24	0.007	0.229	3.04	OK
25	0.009	0.229	4.12	OK
26	0.011	0.229	4.71	OK
27	0.007	0.229	2.93	OK
28	0.009	0.229	4.05	OK
29	0.007	0.229	3.00	OK
30	0.007	0.229	3.06	OK
31	0.006	0.229	2.51	OK
32	0.006	0.229	2.65	OK
33	0.006	0.229	2.52	OK
34	0.004	0.229	1.81	OK
35	0.004	0.229	1.57	OK
36	0.004	0.229	1.79	OK
37	0.005	0.229	2.22	OK
38	0.003	0.229	1.30	OK
39	0.004	0.229	1.59	OK
40	0.005	0.229	2.32	OK

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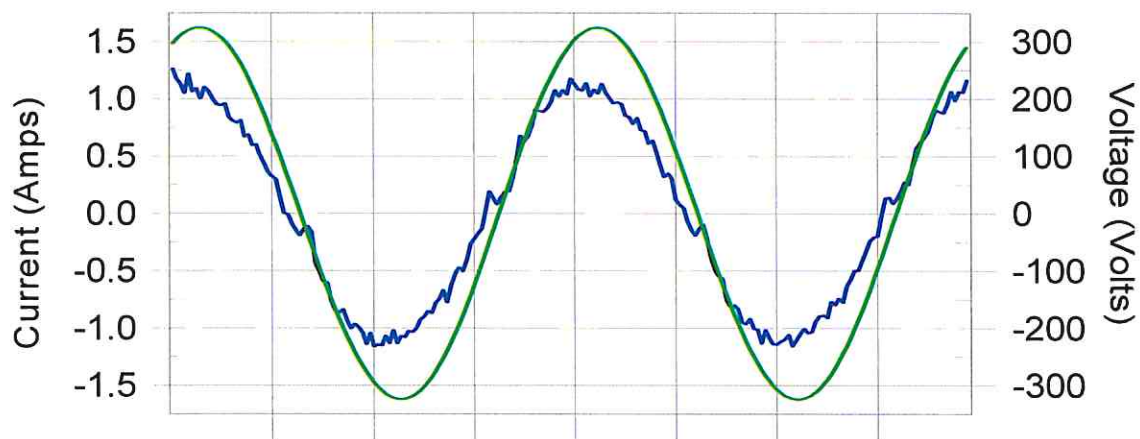
Harmonics – Class-C per EN/IEC61000-3-2

EUT: Marut XL G2
Test category: Class-C

Test Result: Pass

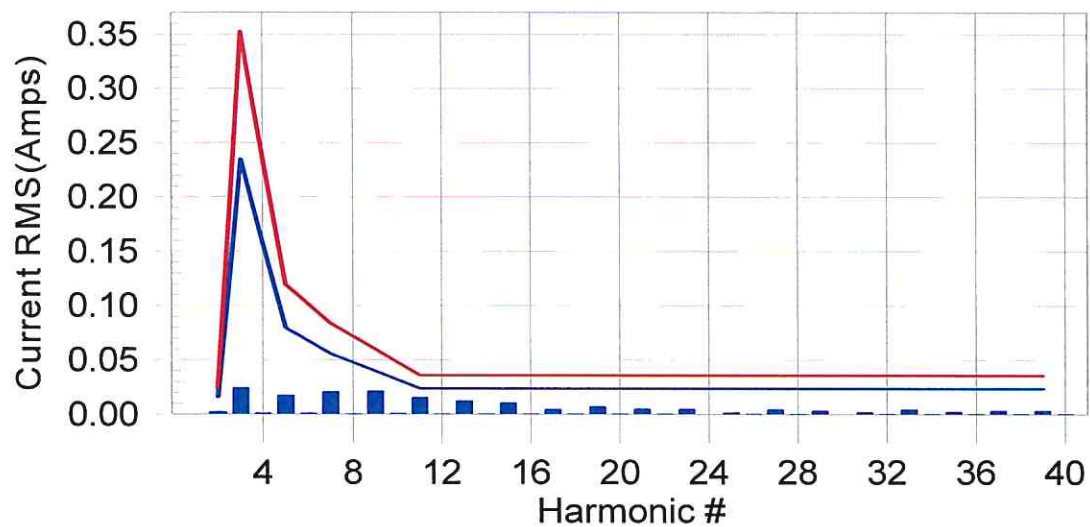
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class C limit line

European Limits



Test result: Pass Worst harmonic was #11 with 43.01% of the limit.

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Current Test Result Summary

EUT: Marut XL G2
Test category: Class-C

Test Result: Pass Source qualification: Normal
THC(A): 0.05 I-THD(%): 5.94 POHC(A): 0.010 POHC Limit(A): 0.075

Highest parameter values during test:

V_RMS (Volts):	229.40	Frequency(Hz):	50.00
I_Peak (Amps):	1.273	I_RMS (Amps):	0.800
I_Fund (Amps):	0.796	Crest Factor:	1.601
Power (Watts):	180.5	Power Factor:	0.985

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.016	7.5	0.002	0.024	8.33	Pass
3	0.022	0.235	9.3	0.024	0.353	6.85	Pass
4	0.001						
5	0.016	0.080	20.7	0.017	0.119	14.65	Pass
6	0.001						
7	0.020	0.056	35.2	0.021	0.084	24.87	Pass
8	0.000						
9	0.020	0.040	51.4	0.021	0.060	35.54	Pass
10	0.001						
11	0.015	0.024	61.1	0.015	0.036	42.84	Pass
12	0.000						
13	0.012	0.024	50.8	0.012	0.036	34.84	Pass
14	0.000						
15	0.010	0.024	43.0	0.011	0.036	29.69	Pass
16	0.000						
17	0.004	0.024	18.2	0.004	0.036	12.54	Pass
18	0.000						
19	0.007	0.024	28.5	0.007	0.036	19.90	Pass
20	0.000						
21	0.005	0.024	19.6	0.005	0.036	13.89	Pass
22	0.000						
23	0.004	0.024	18.2	0.005	0.036	12.93	Pass
24	0.000						
25	0.001	0.024	5.1	0.002	0.036	4.20	Pass
26	0.000						
27	0.004	0.024	16.4	0.004	0.036	11.88	Pass
28	0.000						
29	0.003	0.024	13.4	0.003	0.036	9.29	Pass
30	0.000						
31	0.002	0.024	6.5	0.002	0.036	5.12	Pass
32	0.000						
33	0.004	0.024	17.0	0.004	0.036	11.86	Pass
34	0.000						
35	0.002	0.024	8.6	0.002	0.036	6.37	Pass
36	0.000						
37	0.003	0.024	13.3	0.003	0.036	9.33	Pass
38	0.000						
39	0.003	0.024	12.2	0.003	0.036	8.79	Pass
40	0.000						

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

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Voltage Source Verification Data

EUT: Marut XL G2
Test category: Class-C

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 229.40	Frequency(Hz): 50.00
I_Peak (Amps): 1.273	I_RMS (Amps): 0.800
I_Fund (Amps): 0.796	Crest Factor: 1.601
Power (Watts): 180.5	Power Factor: 0.985

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.142	0.459	30.85	OK
3	0.545	2.064	26.40	OK
4	0.106	0.459	23.18	OK
5	0.057	0.917	6.25	OK
6	0.108	0.459	23.51	OK
7	0.057	0.688	8.28	OK
8	0.033	0.459	7.18	OK
9	0.025	0.459	5.46	OK
10	0.039	0.459	8.42	OK
11	0.013	0.229	5.54	OK
12	0.024	0.229	10.57	OK
13	0.021	0.229	9.22	OK
14	0.013	0.229	5.54	OK
15	0.013	0.229	5.51	OK
16	0.021	0.229	9.16	OK
17	0.014	0.229	6.10	OK
18	0.020	0.229	8.64	OK
19	0.011	0.229	4.92	OK
20	0.018	0.229	7.94	OK
21	0.007	0.229	3.21	OK
22	0.014	0.229	6.12	OK
23	0.011	0.229	4.61	OK
24	0.009	0.229	3.99	OK
25	0.009	0.229	4.13	OK
26	0.013	0.229	5.85	OK
27	0.011	0.229	4.74	OK
28	0.009	0.229	3.82	OK
29	0.011	0.229	4.72	OK
30	0.008	0.229	3.34	OK
31	0.006	0.229	2.44	OK
32	0.008	0.229	3.70	OK
33	0.012	0.229	5.37	OK
34	0.005	0.229	2.21	OK
35	0.007	0.229	3.21	OK
36	0.006	0.229	2.76	OK
37	0.006	0.229	2.41	OK
38	0.006	0.229	2.50	OK
39	0.009	0.229	4.12	OK
40	0.007	0.229	3.03	OK

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Flicker Test Summary per EN/IEC61000-3-3

EUT: Marut S G2

Test category: All parameters (European limits)

Test Result: Pass

Status: Test Completed

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.44			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	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):	0.000	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.000	Test limit:	0.650	Pass

EUT: MARUT M G2

Test category: All parameters (European limits)

Test Result: Pass

Status: Test Completed

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.27			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	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):	0.000	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.000	Test limit:	0.650	Pass

EUT: Marut L G2

Test category: All parameters (European limits)

Test Result: Pass

Status: Test Completed

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.30			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	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):	0.000	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.000	Test limit:	0.650	Pass

EUT: Marut XL G2

Test category: All parameters (European limits)

Test Result: Pass

Status: Test Completed

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.09			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	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):	0.000	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.000	Test limit:	0.650	Pass

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Electrostatic discharge

EUT: Luminaire for road and street lighting
Type: MARUT G2 , (class I)
Mode of operation: under a normal operating conditions
Standard: STN EN 61547 (EN 61000 – 4 – 2)

MARUT S G2 (class I) :

Direct contact discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Metal cover	+/- 2kV; +/-4 kV	A	B
Air discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Plastic cover	+/- 2kV; +/-4 kV, +/-6 kV, +/-8 kV	A	B

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT M G2 (class I) :

Direct contact discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Metal cover	+/- 2kV; +/-4 kV	A	B
Air discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Plastic cover	+/- 2kV; +/-4 kV, +/-6 kV, +/-8 kV	A	B

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT L G2 (class I) :

Direct contact discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Metal cover	+/- 2kV; +/-4 kV	A	B
Air discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Plastic cover	+/- 2kV; +/-4 kV, +/-6 kV, +/-8 kV	A	B

RESULT: No changes were observed. The EUT verifies criterion A.

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MARUT XL G2 (class I) :

Direct contact discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Metal cover	+/- 2kV; +/-4 kV	A	B
Air discharge			
The application site	The level of electrostatic discharge	Performance criteria	
		Fulfilled	Required
Plastic cover	+/- 2kV; +/-4 kV, +/-6 kV, +/-8 kV	A	B

RESULT: No changes were observed. The EUT verifies criterion A.

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Immunity to radio-frequency electromagnetic field

EUT: Luminaire for road and street lighting
 Type: MARUT G2 , (class I)
 Mode of operation: under a normal operating conditions
 Standard: STN EN 61547 (EN 61000 – 4 – 3)

MARUT S G2 (class I) :

Setting		Performance criteria	
		Fulfilled	Required
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Horizontal 0°,90 °,180 °,270 °	A	A
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Vertical 0°,90 °,180 °,270 °	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT M G2 (class I) :

Setting		Performance criteria	
		Fulfilled	Required
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Horizontal 0°,90 °,180 °,270 °	A	A
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Vertical 0°,90 °,180 °,270 °	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

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MARUT L G2 (class I) :

Setting		Performance criteria	
		Fulfilled	Required
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Horizontal 0°,90 °,180 °,270 °	A	A
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Vertical 0°,90 °,180 °,270 °	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT XL G2 (class I) :

Setting		Performance criteria	
		Fulfilled	Required
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Horizontal 0°,90 °,180 °,270 °	A	A
Intensity of field: Amplitude modulation: Frequency range: Polarization of antenna: Orientation of EUT:	3 V/m 80%, 1 kHz 80 – 1000 MHz Vertical 0°,90 °,180 °,270 °	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

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Fast transients (Bursts)

EUT: Luminaire for road and street lighting
 Type: MARUT G2 , (class I)
 Mode of operation: under a normal operating conditions
 Standard: STN EN 61547 (EN 61000 – 4 – 4)

MARUT S G2 (class I) :

Simulator settings		Performance criteria							Required
		Fulfilled							
		L	N	PE	L+N	L+PE	N+PE	L+N+PE	
Voltage:	+/-1 kV								
Burst duration:	15 ms	A	A	A	A	B	B	B	B
Burst frequency:	5 kHz								
Power lines:	AC Power								

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT M G2 (class I) :

Simulator settings		Performance criteria							
		Fulfilled							Required
		L	N	PE	L+N	L+PE	N+PE	L+N+PE	
Voltage:	+/-1 kV								
Burst duration:	15 ms	A	A	A	A	B	A	B	B
Burst frequency:	5 kHz								
Power lines:	AC Power								

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT L G2 (class I) :

Simulator settings		Performance criteria							
		Fulfilled							Required
		L	N	PE	L+N	L+PE	N+PE	L+N+PE	
Voltage:	+/-1 kV								
Burst duration:	15 ms	A	A	A	A	A	A	B	B
Burst frequency:	5 kHz								
Power lines:	AC Power								

RESULT: Were observed flashes off. The EUT verifies criterion B.

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MARUT XL G2 (class I) :

Simulator settings		Performance criteria							
		Fulfilled							Required
		L	N	PE	L+N	L+PE	N+PE	L+N+PE	
Voltage:	+/-1 kV								
Burst duration:	15 ms								
Burst frequency:	5 kHz	A	A	A	A	A	A	B	B
Power lines:	AC Power								

RESULT: Were observed flashes off. The EUT verifies criterion B.

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Surge immunity

EUT: Luminaire for road and street lighting
 Type: MARUT G2 , (class I)
 Mode of operation: under a normal operating conditions
 Standard: STN EN 61547 (EN 61000 – 4 – 5)

MARUT S G2 (class I) :

Settings					Performance criteria	
		Phase shift:	Polarity:	Score:	Fulfilled	Required
Power lines: Test level:	L-N 1 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	PE 2 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	L – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	L – N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT M G2 (class I) :

Settings					Performance criteria	
		Phase shift:	Polarity:	Score:	Fulfilled	Required
Power lines: Test level:	L-N 1 kV	90 °	+	5	B	C
		270 °	-	5	A	C
Power lines: Test level:	PE 2 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	L – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	L – N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

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MARUT L G2 (class I) :

Settings					Performance criteria	
		Phase shift:	Polarity:	Score:	Fulfilled	Required
Power lines: Test level:	L-N 1 kV	90 °	+	5	A	C
		270 °	-	5	B	C
Power lines: Test level:	PE 2 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	L – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	L – N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT XL G2 (class I) :

Settings					Performance criteria	
		Phase shift:	Polarity:	Score:	Fulfilled	Required
Power lines: Test level:	L-N 1 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	PE 2 kV	90 °	+	5	A	C
		270 °	-	5	A	C
Power lines: Test level:	L – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C
Power lines: Test level:	L – N – PE 2 kV	90 °	+	5	B	C
		270 °	-	5	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

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Immunity to conducted disturbances, induced by radio-frequency fields

EUT: Luminaire for road and street lighting
Type: MARUT G2 , (class I)
Mode of operation: under a normal operating conditions
Standard: STN EN 61547 (EN 61000 – 4 – 6)

MARUT S G2 (class I) :

Setting (power cable)		Performance criteria	
		Fulfilled	Required
Signal level: Amplitude modulation: Frequency range :	3 V 80 %, 1 kHz 150 kHz – 80 MHz	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT M G2 (class I) :

Setting (power cable)		Performance criteria	
		Fulfilled	Required
Signal level: Amplitude modulation: Frequency range :	3 V 80 %, 1 kHz 150 kHz – 80 MHz	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT L G2 (class I) :

Setting (power cable)		Performance criteria	
		Fulfilled	Required
Signal level: Amplitude modulation: Frequency range :	3 V 80 %, 1 kHz 150 kHz – 80 MHz	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

MARUT XL G2 (class I) :

Setting (power cable)		Performance criteria	
		Fulfilled	Required
Signal level: Amplitude modulation: Frequency range :	3 V 80 %, 1 kHz 150 kHz – 80 MHz	A	A

RESULT: No changes were observed. The EUT verifies criterion A.

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Voltage dips, short interruptions and voltage variations immunity

EUT: Luminaire for road and street lighting
 Type: MARUT G2 , (class I)
 Mode of operation: under a normal operating conditions
 Standard: STN EN 61547 (EN 61000 – 4 – 11)

MARUT S G2 (class I) :

Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	100 % 0,5 3	B	B
Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	30 % 10 3	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT M G2 (class I) :

Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	100 % 0,5 3	B	B
Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	30 % 10 3	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

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MARUT L G2 (class I) :

Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	100 % 0,5 3	B	B
Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	30 % 10 3	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

MARUT XL G2 (class I) :

Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	100 % 0,5 3	B	B
Simulator setting		Performance criteria	
		Fulfilled	Required criteria
Voltage dips: Number of periods: Number of voltage dips per test:	30 % 10 3	B	C

RESULT: Were observed flashes off. The EUT verifies criterion B.

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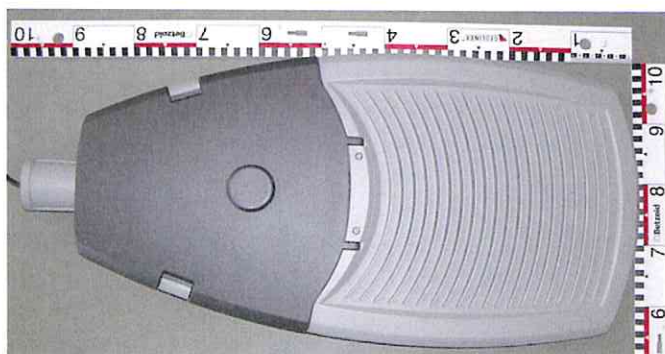
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8. Photo documentation



Label of EUT



Equipment under test

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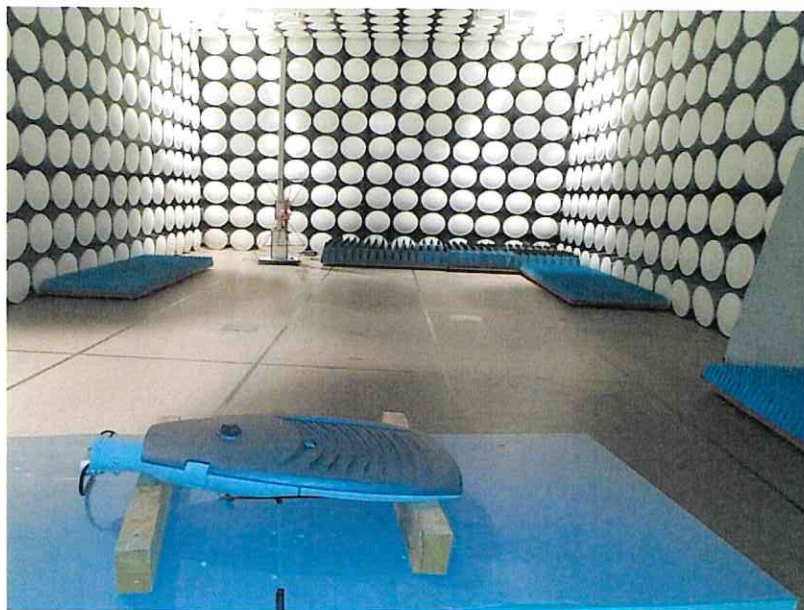
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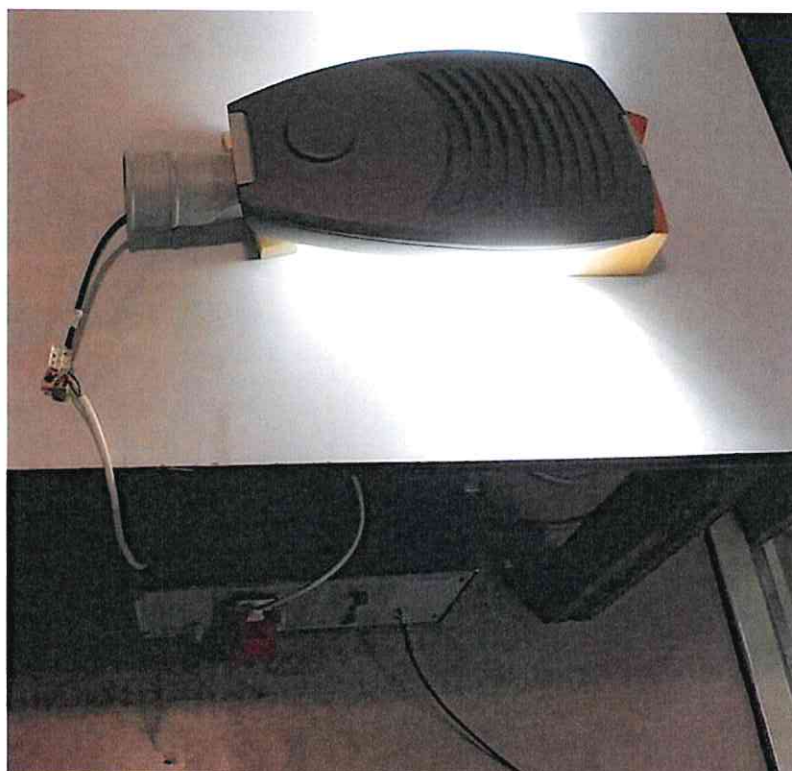
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Electromagnetic field measurement



Conducted emissions measurement

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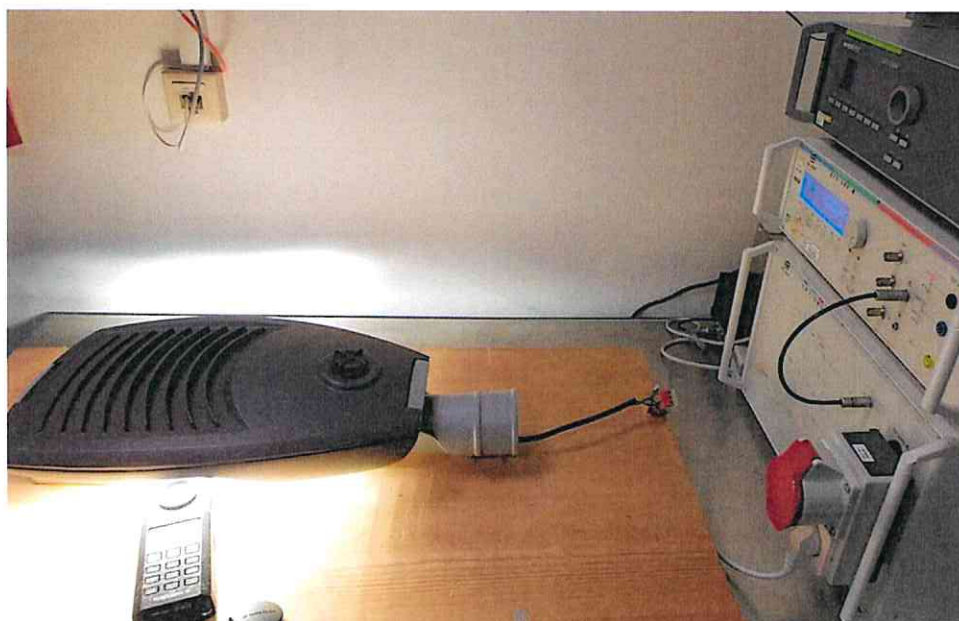
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Low frequency emission and flicker test



Burst and surge immunity test

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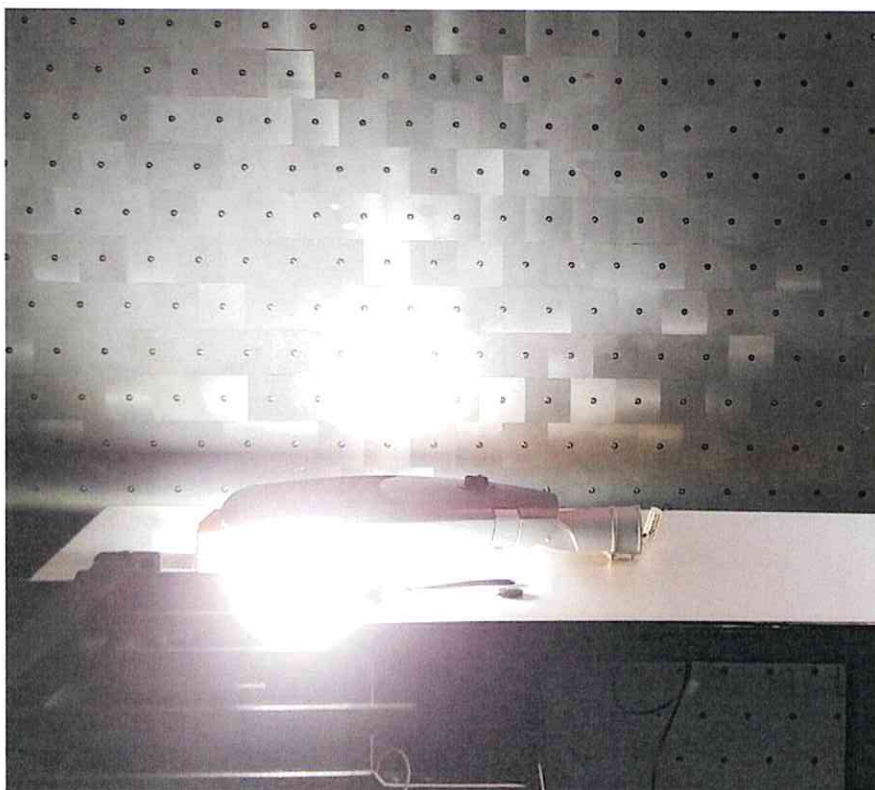
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Test of immunity to Electrostatic discharge



Test of immunity to radio-frequency electromagnetic field

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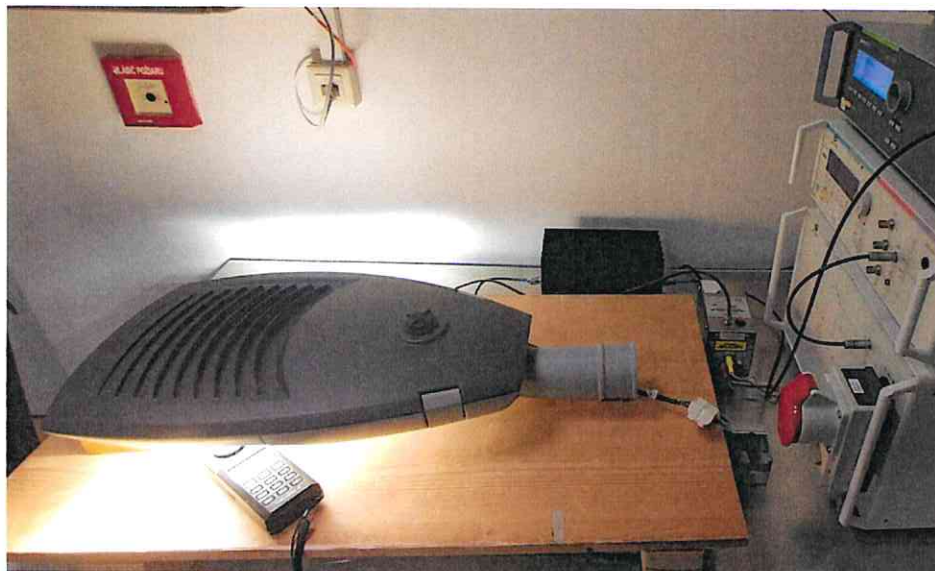
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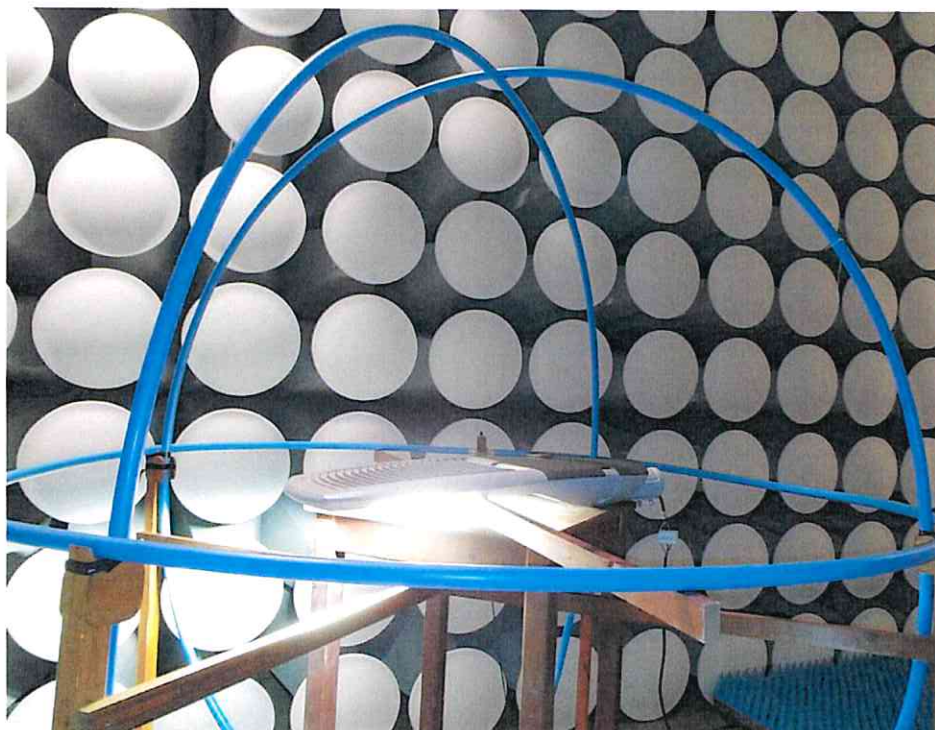
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Test of immunity to conducted disturbances



Radiated electromagnetic disturbances

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