

EMC TEST REPORT

Type of equipment: LED luminarie
Model: Ledlamp Spot Led 90W
Sub Model: -
Serial number: ID_59 (assigned by LEITC)
Applicant: SIA "International Center for Quality Certification - ICQC"
Manufacturer: OOO «ИЕМ ГАЗ»
Test standards: LVS EN 55015:2013 *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*
LVS EN 61547:2010 *Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009)*
LVS EN 61000-3-2:2015 *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions equipment input current ≤ 16 A per phase*

Test report no.: LEITC-TR-15-66
Testing laboratory: LEITC
Test result: Pass

The result (pass/fail) applies only to the sample tested, according to the carried tests, which are included in this test report. This report shall not be reproduced except in full, without the written approval of EMC compliance Laboratory.

Test responsible: Aivis Ašmanis
Laboratory responsible: Uldis Stūre
Date of issue: 02.09.2015



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1. REVISION HISTORY

Revision No.	Description	Date	File name	Pages revised
00	None	-	-	-

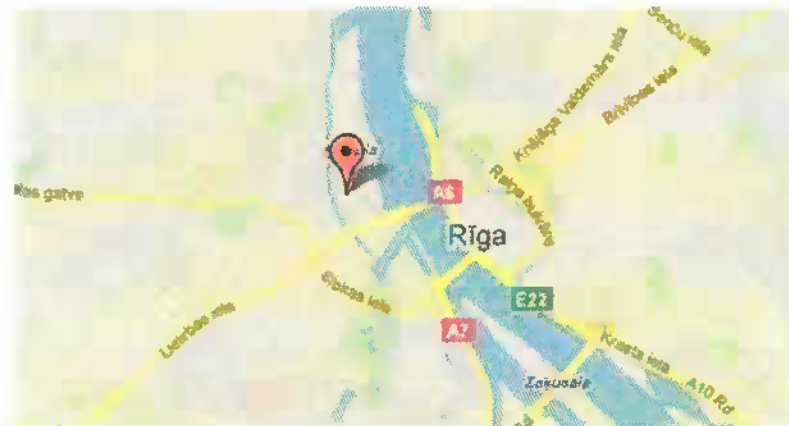
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2. LABORATORY INFORMATION



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Accreditation No: LATAK-T397-06-2009

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3. CLIENT INFORMATION

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4. SUMMARY OF TEST RESULTS

Standard:	LVS EN 61547:2010			
Title:	Equipment for general lighting purposes - EMC immunity requirements (IEC 61547:2009)			
Immunity				
	Measurement type	Reference standard	Applicability	Result
	Radiated radio frequency fields	EN 61000-4-3	Y	Pass
	Power frequency magnetic fields	EN 61000-4-8	Y	Pass
	Electrostatic discharge	EN 61000-4-2	Y	Pass
	Conducted common mode radio frequency fields	EN 61000-4-6	Y	Pass
	Electric fast transients/Burst	EN 61000-4-4	Y	Pass
	Surge	EN 61000-4-5	Y	Pass
	Voltage dips/ interruptions	EN 61000-4-11	Y	Pass
<i>Notes:</i> Y- applied				
Deviations from standard specification				

Standard:	LVS EN 55015:2013			
Title:	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment			
Emissions				
	Measurement type	Reference standard	Applicability	Result
	Radiated emissions	EN 55022	Y	Pass
	Conducted emissions	EN 55022	Y	Pass
<i>Notes:</i> Y- applied				
Deviations from standard specification				


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Standard:	LVS EN 61000-3-2:2015			
Title:	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)			
Emissions				
	Measurement type	Reference standard	Applicability	Result
	Harmonic	EN 61000-3-2	Y	Pass
<i>Notes</i>				
Deviations from standard specification				

Evaluation of immunity test results	
The test results are classified in terms of loss of the function or degradation of performance of the EUT:	
A	normal performance within limits specified by manufacturer, requestor or purchaser
B	temporary loss of function or degradation of performance, which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention
C	temporary loss of function or degradation of performance, the correction which requires operator intervention
D	temporary loss of function or degradation of performance which is not recoverable, owing damage to hardware or software, or loss of data

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5. DESCRIPTION OF EQUIPMENT UNDER TEST

5.1 Description of EUT						
LED luminarie						
No.	Description	Model	Serial No.	Manufacturer		
1.	Ledlamp	Ledlamp Spot Led 90W	ID_59 (assigned by LEITC)	OOO «ПЕМ ГАЗ»		
5.2 Peripherals and associated equipment						
No.	Description	Model	Serial No.	Manufacturer		
1.	-	-	-	-		
5.3 Cables used during the testing						
No.	Cable type	Shield	Ferrite	Length	Connection1	Connection2
1.	AC power supply (L;N; PE)	No	No	1,2m	EUT AC port	Mains
2.						
5.4 EUT configuration						
The equipment under test (EUT) was functioning correctly during all tests, according to user's manual. The EUT was installed within the test site and was configured to simulate a typical user installation.						
5.4.1 Operating modes/load						
1.	Turned ON in full power mode.					
5.4.2 Modification state						
1.	No modifications made.					
Block diagram 1						
						

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6. INSTRUMENTATION AND CALIBRATION

Equipment and EUT during the tests are operated in temperature range of 18,5^o to 22,0^oC, humidity range of 30%-40%, pressure 985 hPa, if not mentioned more precisely next to measurement data.

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with manufacturer's recommendations or quality manager deliverance and it is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

The following list contains measurement equipment used for testing. The equipment conforms to the requirements of CISPR 16-1 and other standard requirements.

The measurement uncertainties were calculated according to guidelines given in CISPR-16-4 and LAB 34. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manuals.

Conducted emissions				
Device	Manufacturer	Model	Serial number	Notes
LISN	R&S	ESH225	100163	
AMN	R&S	ENV216	100266	
ISN	R&S	ENV22	100183	
Receiver	R&S	ESIB26	1088.7490K26	
Test site	Franconia	SAC3	-	

Note: Uncertainty of measurement is less than $\pm 4,6$ dB. Reported expanded uncertainty is based on a combined standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a level of confidence of approximately 95%

Radiated emissions				
Device	Manufacturer	Model	Serial number	Notes
Antenna	R&S	HL362	4041.3000.02	
Antenna	R&S	IIF906	100448	
Preamplifier	Bonn	BLMA 0118-1M	066396D	
Receiver	R&S	ESIB26	1088.7490K26	
Antenna mast	Franconia	FCTAM03	-	
Turntable	Franconia	FCTAM01	-	
Test site	Franconia	SAC3	-	

Note: Uncertainty of measurement is less than $\pm 4,4$ dB. Reported expanded uncertainty is based on a combined standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a level of confidence of approximately 95%

Disturbance power emissions				
Device	Manufacturer	Model	Serial number	Notes
Absorbing clamp	R&S	MDS21	3041.3010.23	
Receiver	R&S	ESIB26	1088.7490K26	
Slide bar	InnCo	KMS5000	-	
Test site	Franconia	SAC3	-	

Note: Uncertainty of measurement is less than $\pm 4,4$ dB. Reported expanded uncertainty is based on a combined standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a level of confidence of approximately 95%

Harmonic current emissions and voltage fluctuation/flicker measurements				
Device	Manufacturer	Model	Serial number	Notes
Harmonic and flicker analyzer	EM Test	DPA 500	V0629101635	
Single phase AC voltage	EM test	ACS 500	V0629101636	

Note: Uncertainty of measurement is less than $\pm 5,6$ dB. Reported expanded uncertainty is based on a combined standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a level of confidence of approximately 95%

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Radio frequency radiated electromagnetic field immunity				
Device	Manufacturer	Model	Serial number	Notes
Generator	R&S	IMS	1502.0009.02	
Amplifier	Bonn	BLMA 1040-60/3D	066396C	
Amplifier	Bonn	BSA 0125-251	066396B	
Antenna	R&S	JIL046E	4065.5960.02	
Power meter	R&S	NRP-Z91	1000015	
Field Sensor	ETS-LINDGREN	HI 6005	00074579	
Test site	Franconia	SAC3	-	
Note:				

Radio frequency common mode immunity				
Device	Manufacturer	Model	Serial number	Notes
Generator	R&S	IMS	1502.0009.02	
Amplifier	Bonn	BSA 0125-150	066396A	
Power meter	R&S	NRP-Z91	1000015	
CDN	Liithi	L-801 M2/3	2241	
CDN	Liithi	L-801 T8	2248	
Ferrite clamp	R&S	EZ-24	100051	
BCI probe	FCC	F-120-9A	474	
EM injection clamp	Liithi	EM101	35804	
RF current probe	FCC	F-52	302	
Test site	Franconia	SAC3	-	
Note:				

Electrostatic discharge				
Device	Manufacturer	Model	Serial number	Notes
ESD simulator	EMTEST	DITO	V0629101637	
Vertical coupling plane	EMTEST	DITO	-	
Note:				

Electric fast transients EFT/Burst				
Device	Manufacturer	Model	Serial number	Notes
Burst/ Surge generator	EMTEST	UCS500-M	V0629101638	
Motor variac	EMTEST	MV 2616	V0629101639	
Capacitive coupling clamp	EMTEST	HFK	0906-06	
Note:				

Surge				
Device	Manufacturer	Model	Serial number	Notes
Burst/ Surge generator	EMTEST	UCS500-M	V0629101638	
Motor variac	EMTEST	MV 2616	V0629101639	
CDN	EMTEST	CNV 504A	V0629101640	
Note:				

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Power frequency magnetic field				
Device	Manufacturer	Model	Serial number	Notes
Burst/Surge generator	EMTEST	UCS500-M	V0629101638	
Antenna	EMTEST	MS 100	080613	
Current transformer	EMTEST	MC 2603	0506-51	
Note:				

Voltage dips/interruptions				
Device	Manufacturer	Model	Serial number	Notes
Burst/Surge generator	EMTEST	UCS500-M	V0629101638	
Note:				

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7. TEST PROCEDURES

Conducted emissions

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a wooden turntable with a height of 0,8m is used which is placed in a distance of 0,4m from vertical conductive plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation support in a distance of 0,4m from vertical conductive plane.

Auxiliary equipment and/or support equipment, if needed was placed as per EN 55022 recommendations.

All input/output cables were positioned to simulate typical usage as per EN 55022.

EUT mains power port was connected to LISN/AMN which is placed in a distance of 0,8m. Each EUT power lead, except ground (safety), was connected through a LISN/AMN to power source. All lines and neutral of power cord where measured.

All telecommunication and signal cables are connected through ISN which is located in distance of 0,8m. Each cable lead is measured according to used connection type.

Radiated emissions

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a wooden turntable with a height of 0,8m is used which is placed on the ground plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation support.

Auxiliary equipment and/or support equipment, if needed was placed as per EN 55022 recommendations.

All input/output cables were positioned to simulate typical usage as per EN 55022.

The EUT was connected to AC mains 230V/50Hz under the turntable shucko type socket, all other equipment was connected to the other shucko type socket under the turntable.

The antenna was placed at 3m away from EUT. Antenna height was changed in range 1-4m and EUT rotation angle in range of -180° to 180° maximize measured emissions.

Disturbance power emissions

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a wooden table with a height of 0,8m is used which is placed in a distance of 0,4m from other metallic objects. When EUT is floor standing equipment, it is placed on the 0,1m insulation support in a distance of 0,4m from other metallic objects.

The mains lead is stretched in a straight line for a distance sufficient to accommodate the absorbing clamp, and to permit the necessary measuring adjustment of position tuning. The clamp is placed around the lead so as to measure a quantity proportional to the disturbance power on the lead. If not marked in test data the straight portion of cable is 6m long and it is placed on slide bar 0,8 above the ground floor.

If original lead of appliance is shorter than the necessary length it is extended or replaced by similar lead.

Any plug or socket that doesn't pass through the absorbing clamp due to its size is removed.

Harmonic current emissions and voltage fluctuation/flicker measurements

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

The equipment is supplied in series with shunts resistance from a source having the same nominal voltage and frequency as the rated supply voltage, and frequency of the equipment.

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Radio frequency radiated electromagnetic field immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is a table top equipment, a wooden table with a height of 0,8m is used. When EUT is floor standing equipment, it is placed on the 0,1m insulation support.

Radio frequency common mode immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

Coupling decoupling devices specified in test results.

The frequency range is swept, using the signal levels defined in test data with in disturbance signal 80% amplitude modulation within a 1kHz sine wave, pausing to adjust the RF signal level or to switch coupling devices as necessary. The rate of sweep shall not exceed 1,5e-3 decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value. The dwell time at each frequency is not less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequencies and harmonics or frequencies of dominant interest shall be analyzed separately.

Electrostatic discharge immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

Electrostatic discharges are applied as contact discharge and air discharge, discharge to vertical and horizontal coupling plane. The discharges are applied only to such points and surfaces of the EUT which are accessible to personnel during normal usage.

Test is performed as single discharges on preselected points at least ten single discharges on both polarities. Between successive discharges a time interval of 1s is used. In case of contact discharge the tip of discharge electrode touch the EUT before the discharge switch is operated. In case of air discharge, the round tip of the discharge electrode is approached as fast as possible (without causing mechanical damage) to touch the EUT discharge switch is operated before the tip is approached.

At least ten single contact discharges are applied to horizontal and vertical coupling plate.

Electric fast transients EFT/Burst immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

On AC mains power ports built-in coupling decoupling network is used to couple EFT/Burst disturbance voltage. For DC/telecommunication/signal ports capacitive clamp is used. Polarity of EFT/Burst disturbance voltage is changed during the test. Duration of test is not less than 1min, however, to avoid synchronization, the test time may be broken down into six 10s burst separated by a 10s pause. It is not intended that the burst is synchronized with EUT signals.

Surge immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

Surge generator was connected to reference ground plane via low impedance connection. If not mentioned, for DC power ports and interconnection lines and signal/telecommunication lines five positive and five negative surge pulses applied, for AC power line ports five negative and five positive pulses applied each at 0°, 90°, 180°, 270° phase angle. Time between successive pulses was 1min or less if not otherwise specified.

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Power frequency magnetic field immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

EUT is exposed to magnetic field in all axes. EUT is placed inside magnetic dipole antenna of 1m x1m dimensions. Duration of test is defined in test results.

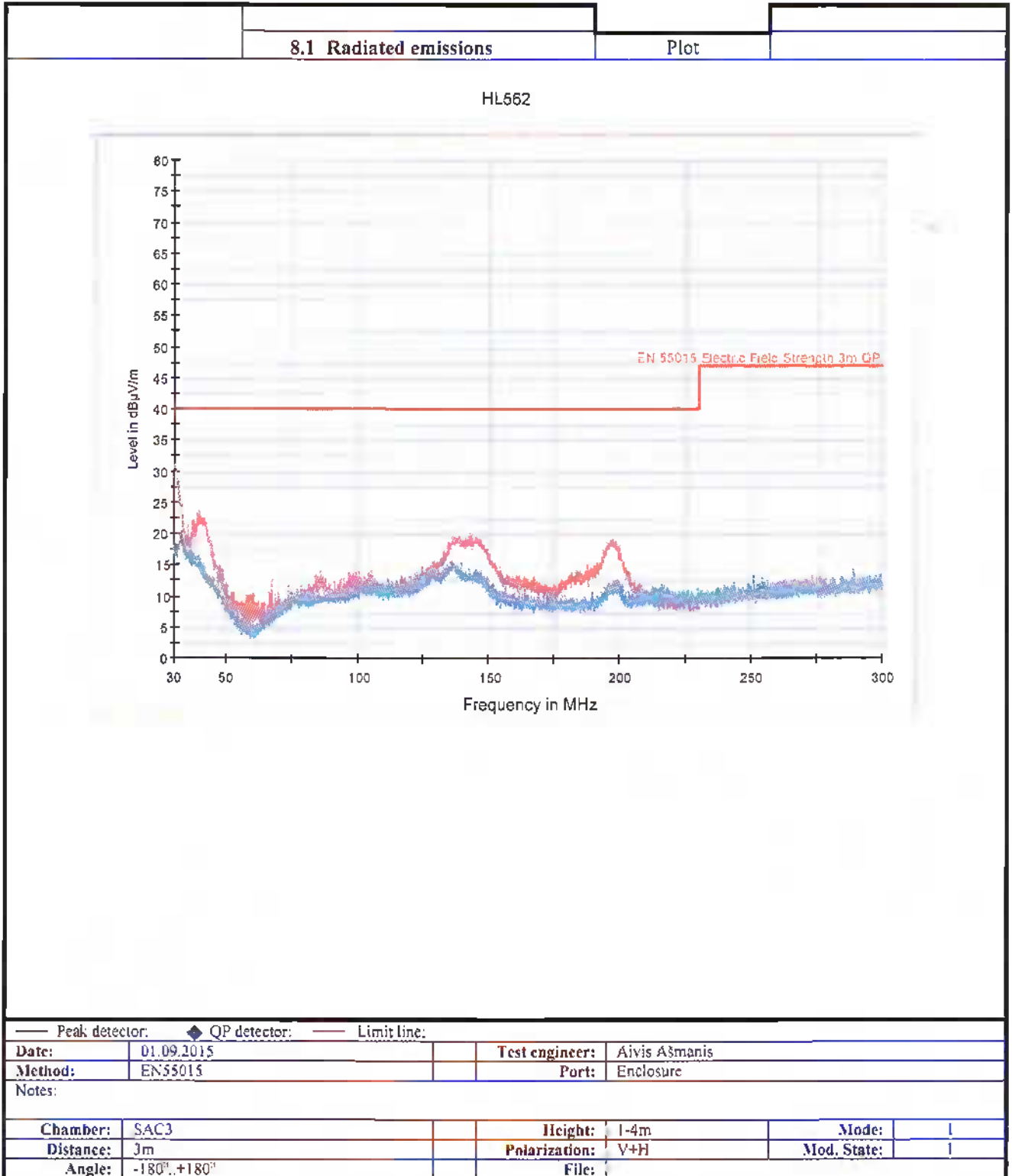
Voltage dips/interruptions immunity

The equipment was set up as per the test configuration to simulate typical usage per user's manual. When the EUT is table top equipment, it is placed on table 0,1m above ground reference plane. When EUT is floor standing equipment, it is placed on the 0,1m insulation above the ground reference plane.

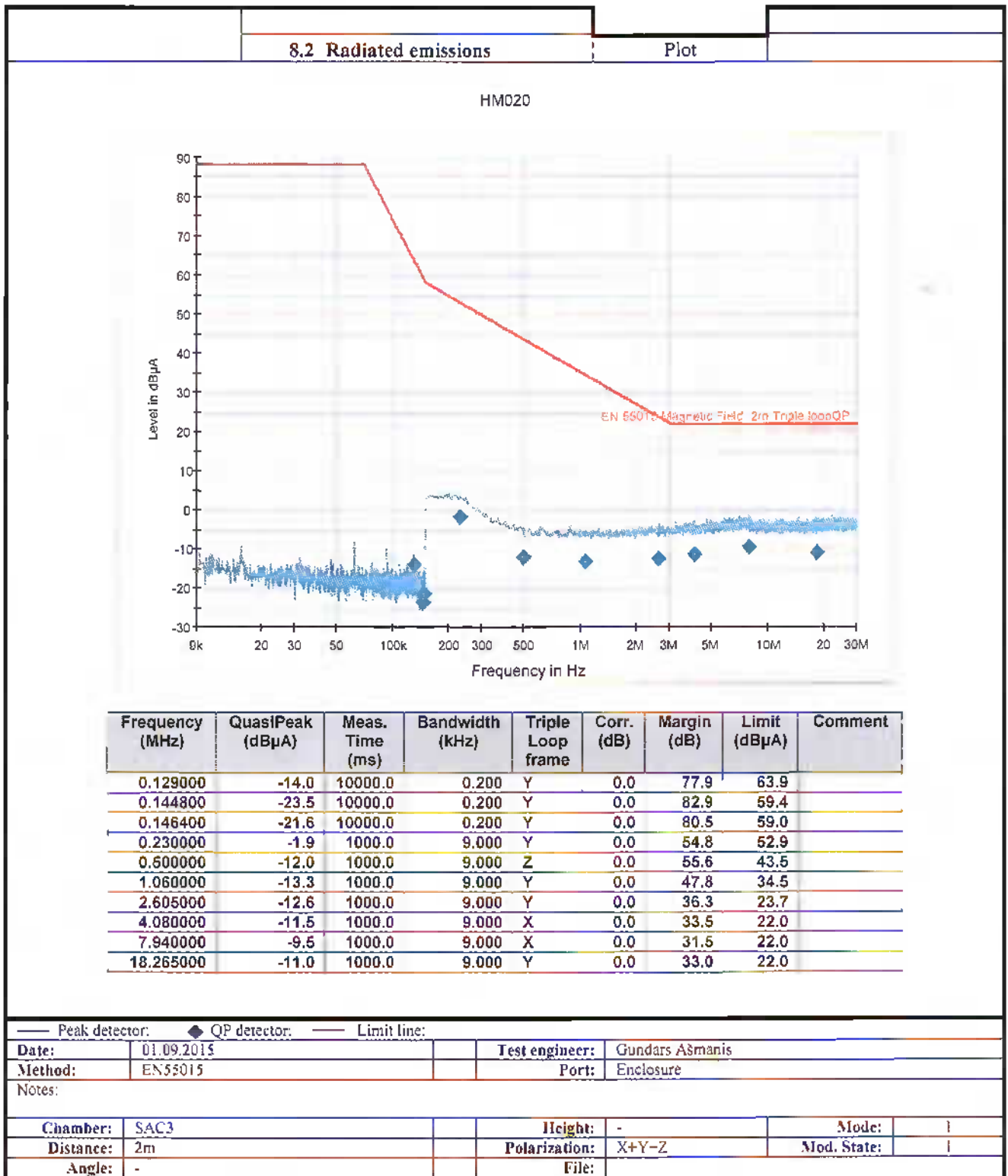
The EUT for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum time between each event. Each representative mode of operation is tested. The angle of applied dips/interruptions is defined 0° if not specified in test results. For EUT with more than one power cord, each power cord is tested individually.

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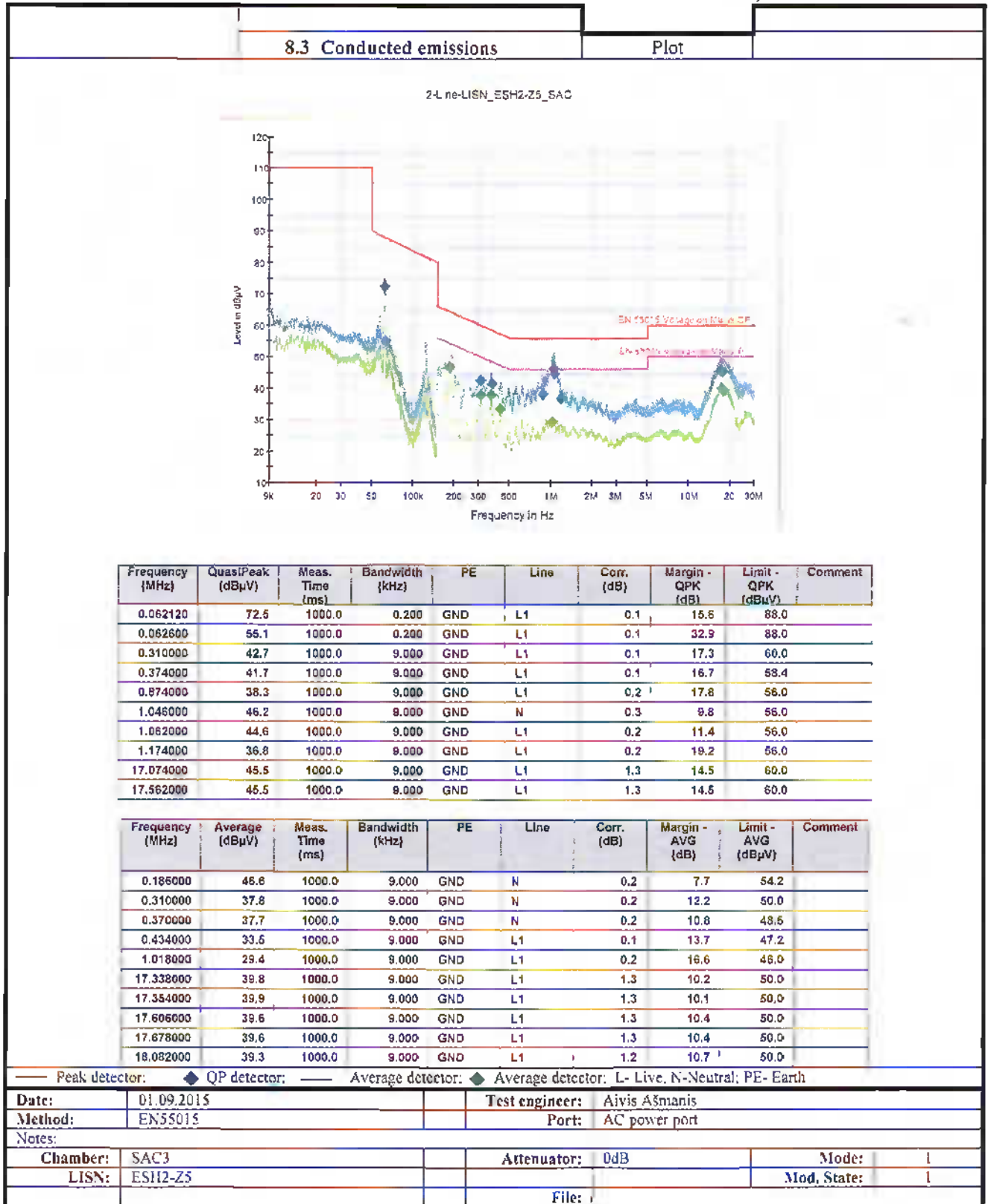
8. TEST RESULTS



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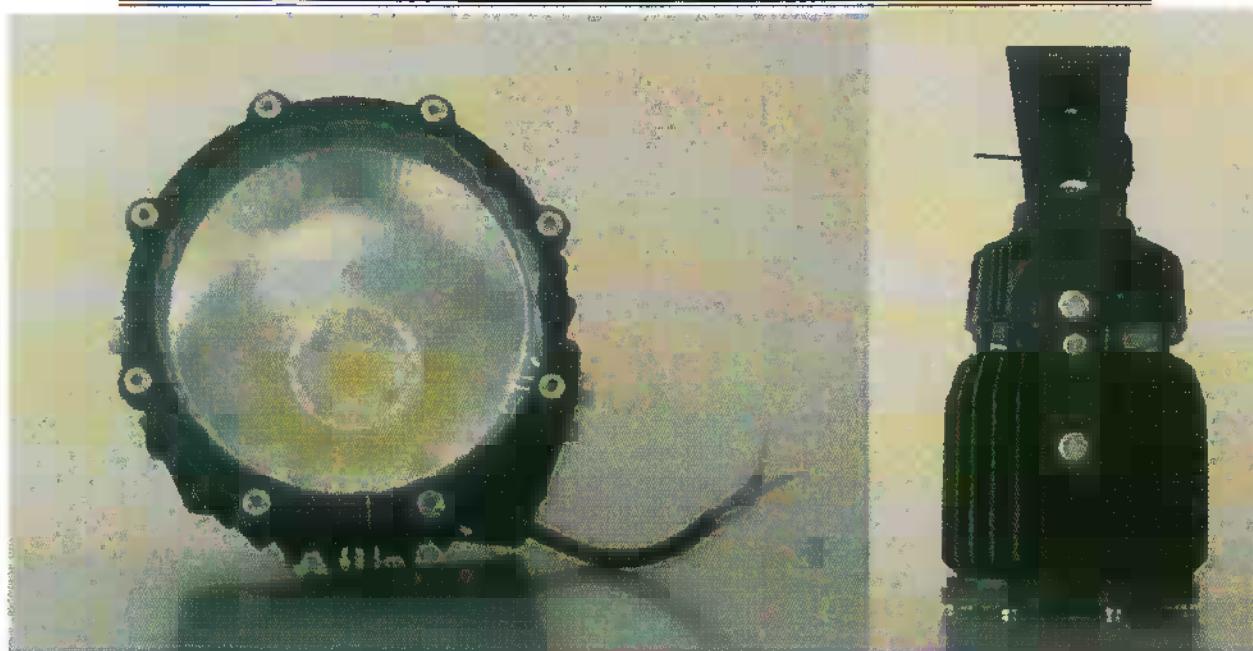
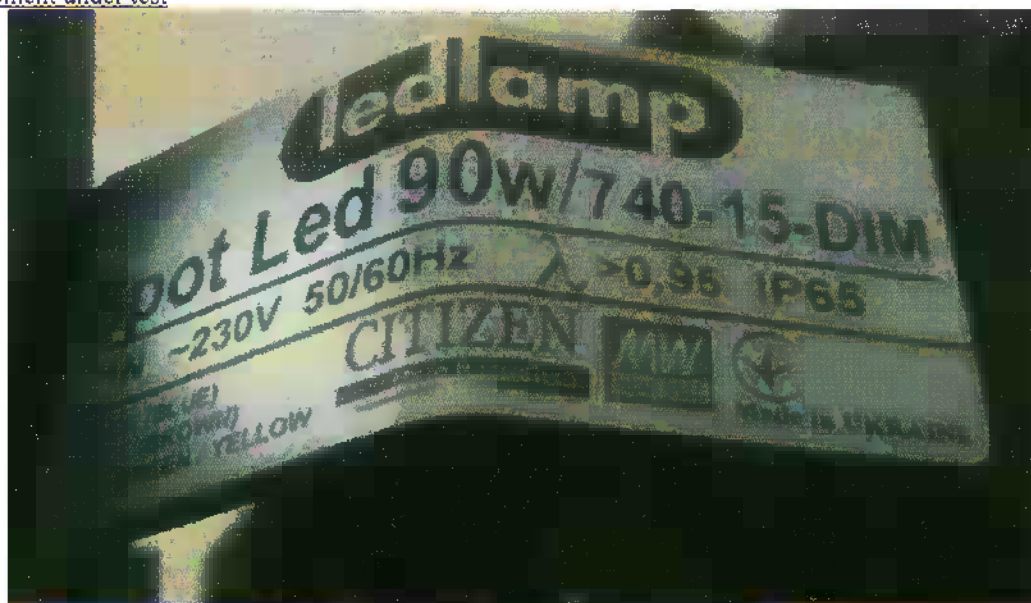
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		8.11 Harmonic current emissions		Plot		
Date:	01.09.2015					
Ports:	AC power					
Method:	EN61000-3-2					
Oper. mode	Mod. State	H _n	I _{rms} (A)	I _{rms} (%)	Limit I _{rms} (%)	Result
I	I	1	413.137E-3	99.954		
		2	500.413E-6	0.121	2.00	PASS
		3	33.463E-3	8.096	29.49	PASS
		4	2.505E-3	0.608		PASS
		5	24.046E-3	5.818	10.00	PASS
		6	669.940E-6	0.162		PASS
		7	16.880E-3	4.084	7.00	PASS
		8	755.812E-6	0.183		PASS
		9	10.158E-3	2.458	5.00	PASS
		10	800.517E-6	0.194		PASS
		11	5.518E-3	1.335	3.00	PASS
		12	665.912E-6	0.161		PASS
		13	3.616E-3	0.875	3.00	PASS
		14	746.146E-6	0.181		PASS
		15	1.571E-3	0.380	3.00	PASS
		16	685.007E-6	0.166		PASS
		17	1.788E-3	0.433	3.00	PASS
		18	1.010E-3	0.244		PASS
		19	2.405E-3	0.582	3.00	PASS
		20	619.793E-6	0.150		PASS
		21	2.645E-3	0.640	4.50	PASS
		22	0.998E-3	0.242		PASS
		23	2.894E-3	0.700	4.50	PASS
		24	649.294E-6	0.157		PASS
		25	2.328E-3	0.563	4.50	PASS
		26	959.381E-6	0.232		PASS
		27	1.212E-3	0.293	4.50	PASS
		28	658.386E-6	0.159		PASS
		29	1.220E-3	0.295	4.50	PASS
		30	705.401E-6	0.171		PASS
		31	1.954E-3	0.473	4.50	PASS
		32	695.718E-6	0.168		PASS
		33	2.001E-3	0.484	4.50	PASS
		34	680.817E-6	0.165		PASS
		35	2.165E-3	0.524	4.50	PASS
		36	689.200E-6	0.167		PASS
		37	1.418E-3	0.343	4.50	PASS
		38	608.617E-6	0.147		PASS
		39	1.356E-3	0.328	4.50	PASS
		40	723.841E-6	0.175		PASS

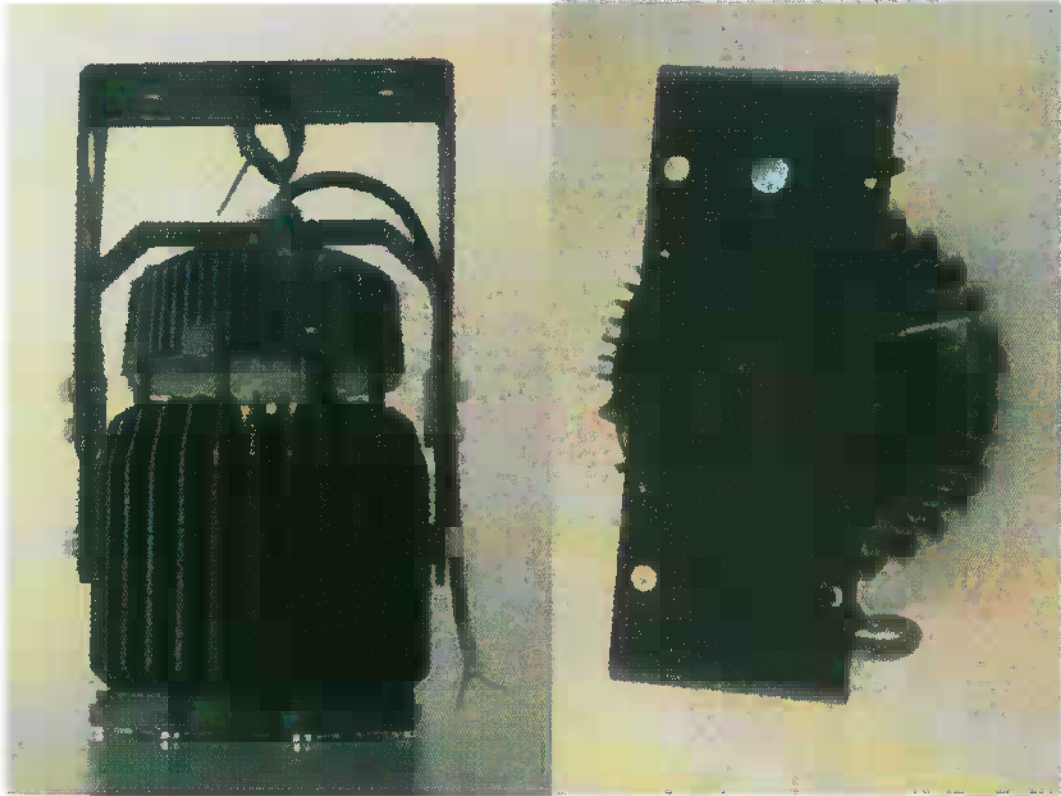
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9. TEST PHOTOGRAPHS

EUT-equipment under test



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Radiated emission

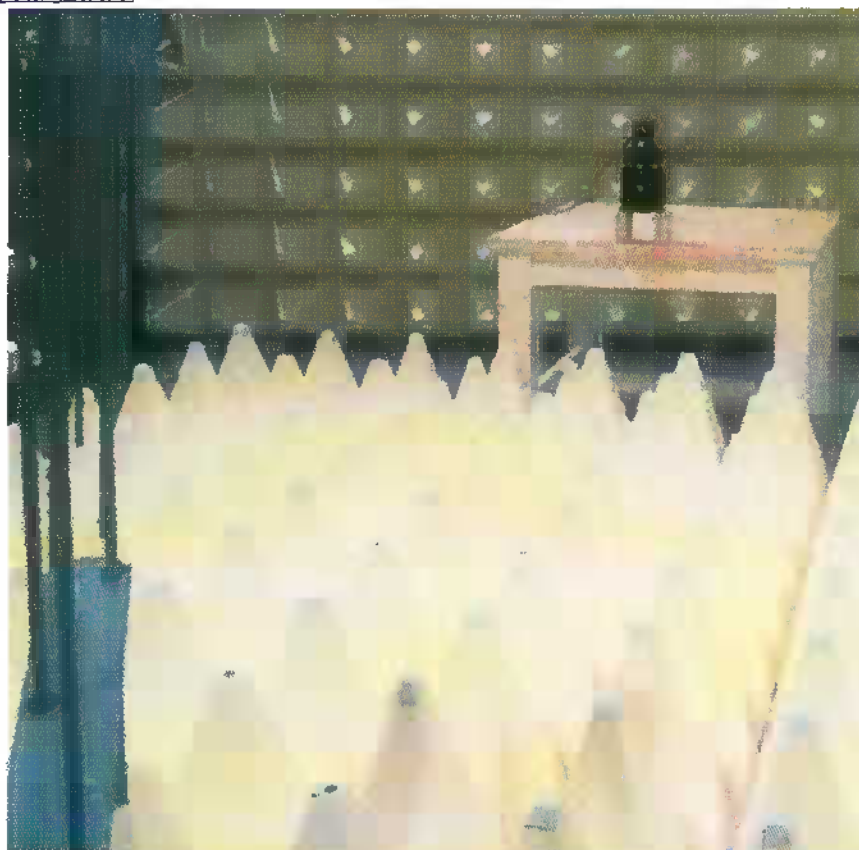


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Conducted emissions



Radiated radio frequency fields

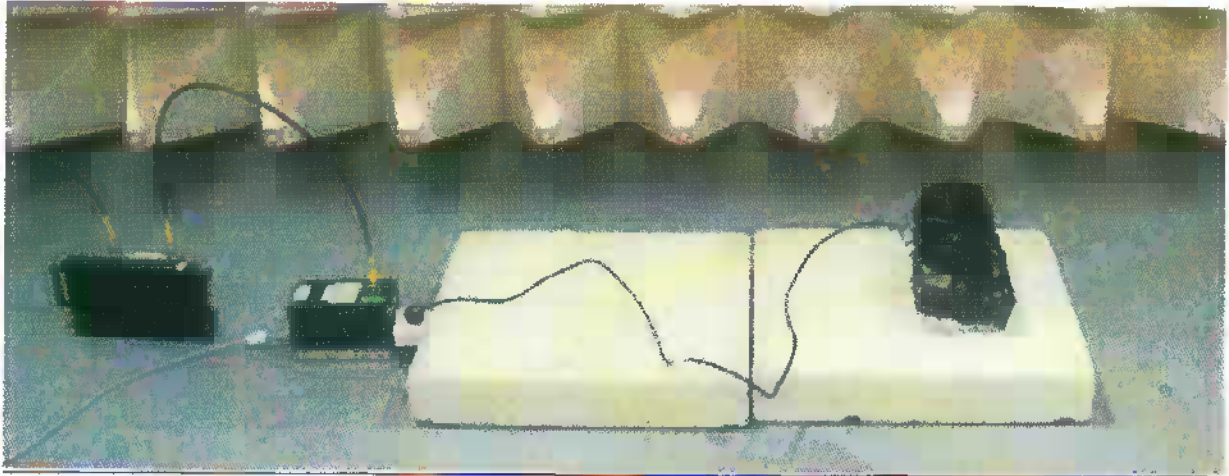


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Latvian Electronic Equipment Testing Center,

Report No.: LEITC-TR-15-66

Radio frequency common mode immunity



Power frequency magnetic fields



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ESD



Burst, surge, voltage dips/interruptions immunity



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