Test Report

Documentation for Conformity Purposes

Equipment under Test:	SC 1

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Test Report No: 080022

1 Companies

1.1 Client

Name and address of client (if different from manufacturer)

Lumi – Con

Dr. Karl Schrödinger

Setheweg 12

14089 Berlin

1.2 Manufacturer

(for conformity purposes)::

Lumi – Con

Dr. Karl Schrödinger

Setheweg 12

14089 Berlin

1.3 Test laboratory

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1.4 Signature

12 May 2008

Reichl
Dipl.- Ing.
Test engineer

Reichl
Reichl Dipl.- Ing
Laboratory manager

Electronic documents without manual signature

2 Equipment under Test

2.1 Description

2.1.1.1 Type of equipment:
LED control unit

2.1.1.2 Model:
SC 1

2.1.1.3 SN

2.1.1.4 Indice
2.1.1.4.1 Hardware
1.14

2.1.1.4.2 Software
1.14

2.1.1.5 Date of production
February 2008

2.2 Test parameters

2.2.1.1 Data

EUT arrived: 6 February 2008	EUT shipped: 6 February 2008

Date of tests

Emission: 6 February 2008	Susceptibility: 6 February 2008

2.2.1.2 climatic conditions

	range	measured
temperature / °C	15 to 35	22
relat. humidity / %	45 to 75	50
air pressure /hPa	860 to 1060	1010

2.2.1.3 Condition of EUT

ok

2.2.1.4 Sample

EUT selected and shipped by customer

2.2.1.5 Test report in use

Englische Protokollvorlage November 2007

2.2.1.6 Documentation

stored as 08002201

3 Harmonized European Standards

3.1 Product Standards

3.1.1.1 EN 55015; 06.2007
Titel: Grenzwerte und Meßverfahren für Funkstörungen von elektrischen Beleuchtungseinrichtungen und ähnlichen Elektrogeräten

3.1.1.2 EN 61547; 5.2004
Titel: Einrichtungen für allgemeine Beleuchtungszwecke – EMV- Störfestigkeitsanforderungen

informative

3.2 Basic standards

3.2.1.1 EN 61000-4-2:2001
3.2.1.2 EN 61000-4-3: 2006
3.2.1.3 EN 61000-4-4:2005
3.2.1.4 EN 61000-4-5:2007
3.2.1.5 EN 61000-4-6:2003
3.2.1.6 EN 61000-4-7:2004
3.2.1.7 EN 61000-4-8:2001
3.2.1.8 EN 61000-4-11:2005

3.3 Publication

3.3.1 Standard published in:
3.3.1.1 ABl. EG/Official Journal 2007/C225 vom 25.Sept.2007 bzw Amtsbl.Vfg 60/ 2007 BNA

4 Description of quality

4.1 Evaluation

4.1.1 Criteria of evaluation

criterion A: No change in performance during test.

criterion B.: No change in performance after completion of test

criterion C: temporary change in performance that either restores itself automatically or can be manually restored.

4.2 Test criteria
The intended use of the device is
LED control unit

4.2.1 Specification of characteristic faulty behaviour
Correct control of LEDs

4.2.2 Supervision during test
Visually

4.2.3 Test on:
No loss of programme
No loss of parameters

4.3 Minimum quality
The EUT behaves correctly with neither failure nor change of programme or parameters even during the application of test quantities.

5 Electrical lighting and similar equipment

5.1 Results - summary

5.1.1 Emission: Product standard : EN 55015

Mains	0.009 - 30 MHz	Limits are kept
Housing	0.009 - 30 MHz	Limits are kept
Housing	30 - 1000 MHz	Limits are kept
Harmonics of mains	0 bis 2 kHz	Limits are kept

5.1.2 Susceptibility: product standard EN 61547

	Housing	I/O- lines Signal- and Control lines	AC/ DC mains AC	Basic standard
ESD	passed	no demands	no demands	EN 61000-4-2
HF radiated 80 – 1000 MHz	passed	no demands	no demands	EN 61000-4-3
Burst	no demands	< 3 m	passed	EN 61000-4-4
Surge	no demands	< 30 m	passed	EN 61000-4-5
RF conducted 0.15- 80 MHz	no demands	< 3 m	passed	EN 61000-4-6
H- field 50 Hz	no demands	no demands	no demands	EN 61000-4-8
10.2.1.3 Changes of mains voltage	no demands	no demands	passed	EN 61000-4-11

5.2 Standards and demands
5.2.1 Electrical lighting and similar equipment
5.2.1.1 Emission: product standardEN 55015

5.2.1.2 Susceptibility: product standard EN 61547

demands
5.2.1.2.1 Electrostatic discharge

Housing	Criterion B	8 kV Air discharge
Housing	Criterion B	4 kV Current injection

5.2.1.2.2 Radiated RF

Housing	Criterion A	3 V/m, 80 - 1000 MHz; 80 % AM, 1 kHz
Housing	Criterion A	3 V/m, 900 MHz; Pulse modulation, 50 % , 200 Hz Repetition frequency

5.2.1.2.3 Bursts

AC mains	Criterion B	1 kV
I/O- and DC- Lines, ground	Criterion B	0,5 kV

5.2.1.2.4 Surges: (Hybrid pulse 1,2/ 50 µs resp. 8/ 20 µs)

AC mains	Criterion C	1 kV diff. mode/ 2 kV common mode
DC- Lines	Criterion C	0,5 kV diff. mode, 0,5 kV common mode

5.2.1.2.5 RF conducted

AC/ DC mains	Criterion A	3 V, 80 % AM, 1 kHz
I/O- lines	Criterion A	3 V, 80 % AM, 1 kHz
Ground	Criterion A	3 V, 80 % AM, 1 kHz

5.2.1.2.6 H- field at 50 Hz

Housing	Criterion A	50 Hz, 3 A/m

5.2.1.2.7 10.2.1.3 Changes of mains voltage

AC mains	Criterion C	Voltage reduction to 70 % for 200 ms
AC mains	Criterion B	Voltage reduction to 0 % for 10 ms

5.3 Test set- up
5.3.1 Emission
5.3.1.1 Function test
EUT and test equipment were checked before tests.
5.3.1.2 Configuration
EUT active

5.3.1.3 RF voltage on lines
The EUT is connected to a line impedance stabilising network (50 Ohm/ 50µH + 5 Ohm).Length of mains line is about 0,8m. Standardized test set- up. .
EUT active

5.3.1.4 Open area test site
EUT standind on a wooden support 0,8 m above ground. Mains line and I/O- lines hanging down vertically.
EUT active

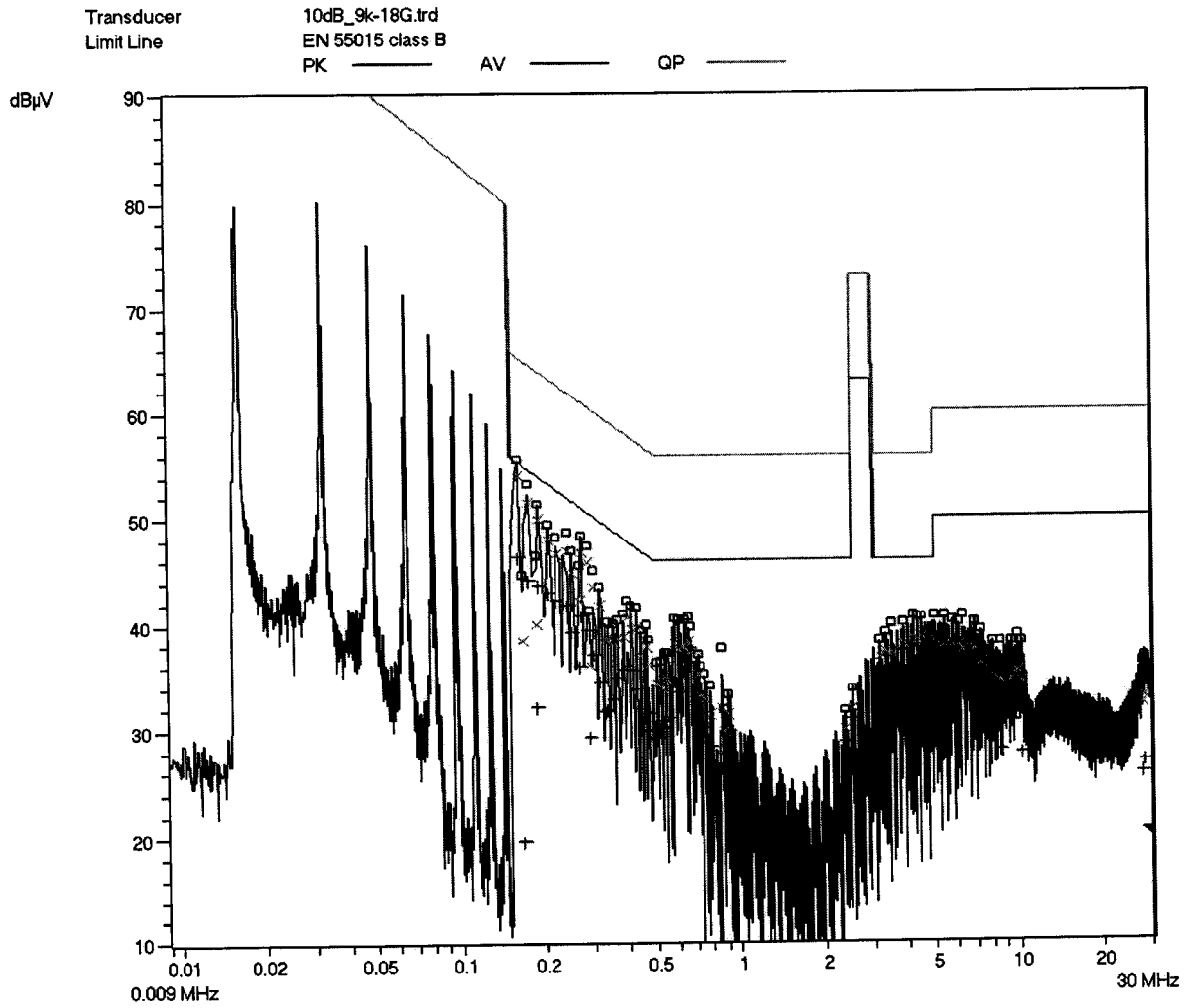
5.3.2 Susceptibility
5.3.2.1 Function test
EUT and test equipment were checked before tests.
5.3.2.2 Configuration
EUT active

5.4 Emission - Test results

5.4.1 RF voltage on lines

5.4.1.1 Mains, 0.15- 30 MHz; „N" (identical to „L")

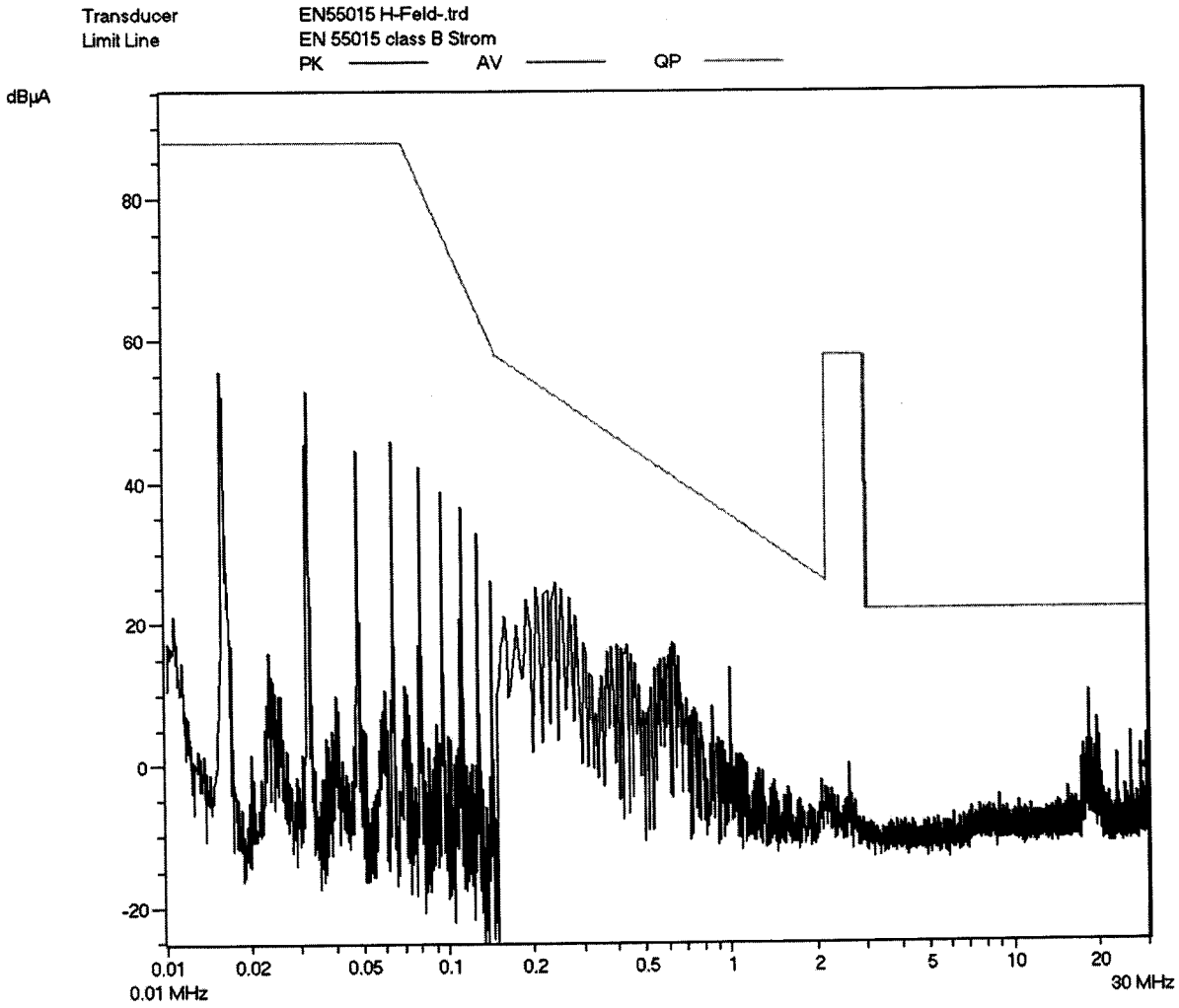
peak detector, evaluated results marked by „x" and „+"



Frequency	Level AV	Level QP	Limit AV	Limit QP
0.1600	46.3	54.1	55.5	65.5
0.1750	44.2	51.6	54.7	64.7
0.1850	32.2	40.0	54.3	64.3
0.1900	43.8	50.0	54.0	64.0
0.2050	43.1	48.2	53.4	63.4
0.2200	42.4	46.8	52.8	62.8
0.2400	41.8	47.0	52.1	62.1
0.2500	39.2	44.9	51.8	61.8
0.2650	36.0	42.3	51.3	61.3
0.2700	40.8	46.8	51.1	61.1
0.2850	39.4	45.9	50.7	60.7
0.2900	29.4	36.1	50.5	60.5
0.3000	37.1	43.6	50.2	60.2
0.3150	34.5	41.9	49.8	59.8
0.3300	31.8	38.5	49.5	59.5
0.3500	32.8	38.3	49.0	59.0
0.3650	34.9	38.6	48.6	58.6
0.3800	35.7	38.8	48.3	58.3
0.3950	36.0	40.7	48.0	58.0
0.4100	35.7	39.7	47.6	57.6
0.4250	33.7	39.7	47.3	57.3
0.4400	31.9	37.1	47.1	57.1
0.4600	31.6	37.9	46.7	56.7
0.5200	30.1	33.9	46.0	56.0
0.5350	30.7	35.1	46.0	56.0
0.5500	31.2	34.7	46.0	56.0
0.5850	34.5	38.2	46.0	56.0
0.6000	33.5	37.6	46.0	56.0
0.6300	35.5	37.8	46.0	56.0
0.6500	37.6	38.4	46.0	56.0
0.6650	36.2	37.4	46.0	56.0
0.7100	31.4	35.1	46.0	56.0
0.7250	30.6	33.3	46.0	56.0
0.7450	30.1	32.9	46.0	56.0
0.7750	28.5	31.4	46.0	56.0
0.9000	29.8	31.4	46.0	56.0
2.5100	30.9	31.9	46.0	56.0
3.1700	35.6	36.7	46.0	56.0
3.3450	36.9	37.5	46.0	56.0
3.5050	36.0	37.3	46.0	56.0
3.8350	37.4	38.0	46.0	56.0
4.1500	37.9	38.6	46.0	56.0
4.3250	37.6	38.4	46.0	56.0
4.4800	37.9	38.6	46.0	56.0
4.9700	37.8	38.4	46.0	56.0
5.4600	36.7	37.9	50.0	60.0
5.7900	37.2	37.9	50.0	60.0
6.1050	36.7	37.8	50.0	60.0
6.9250	36.5	37.5	50.0	60.0
7.2350	30.6	36.1	50.0	60.0
8.0450	33.2	35.0	50.0	60.0
9.3700	30.6	34.6	50.0	60.0
9.8550	31.9	35.4	50.0	60.0
27.5850	25.8	32.2	50.0	60.0

5.4.2 Radiated emission

5.4.2.1 0,09 – 30 NHz, H- field



5.4.2.2 30 to 1000 MHz, horizontally polarised

Frequency	Level QP	Limit QP
MHz	dBµV/m	dBµV/m
35.7000	13.4	30.0
69.1000	10.3	30.0
126.4000	23.9	30.0

5.4.2.3 30 to 1000 MHz, vertically polarised

Frequency	Level QP	Limit QP
MHz	dBµV/m	dBµV/m
41.8000	13.7	30.0
102.2000	12.5	30.0

5.4.3 Harmonics of mains

5.4.3.1 Harmonics of 50/ 60 Hz

Effective power P	21.1	W
Reactive power Q	10.2	VAr
Apparent power S	23.4	VAr
current	0.1	A

5.4.4 Flicker

No demands

5.5 Susceptibility - results

5.5.1 ESD

Susceptibility to Electrostatic discharge

Laboratory test set-up; +/- = polarity of test voltage

Location of discharges at EUT

5.5.1.1 Test of isolation at front cover:

No discharge into the EUTs interiour

Test performed

Number of discharges: 20 Tests, no discharge

Test voltage/kV	Result	
	-	+
ok	8	8

Result: no discharge

5.5.1.2 Direct discharge to EUT

5.5.1.2.1 Current injection +/- 4 kV

Number of discharges:

Isolating housing:

Test voltage/kV	Result	
	-	+
ok	4	4

Result: no discharge

5.5.1.3 Indirect discharge

Current injection +/- 4 kV

5.5.1.4 vertical coupling plane placed in front of EUT

Number of discharges: ea 20

Test voltage/kV	Result	
	-	+
ok	4	4

Result: no change of EUTs behaviour during single discharge

5.5.1.4.1 horizontal coupling plane placed below EUT

Number of discharges: ea 20

Test voltage/kV	Result	
	-	+
ok	4	4

Result: no change of EUTs behaviour during single discharge

5.5.1.5 Result:

no change of EUTs behaviour

Evaluation

Test criterion is kept

5.5.2 HF radiated
Susceptibility to Radiated RF

5.5.2.1 Frequency range
HF radiated 80 - 1000 MHz; modulated

1. Start frequency 80 MHz, Frequency variation 1% of last frequency. Test time: 2 s;
2. 900 MHz; Pulse modulation, 50 % , 200 Hz Repetition frequency; ea 20 s

Positioning
Field application in two planes subsequently
Lines connected:
1. Mains
2. I/O- lines

5.5.2.2 Test performed

5.5.2.3 Result
no change of EUTs behaviour

Evaluation

Test criterion is kept

5.5.3 Burst
Fast transients and bursts

5.5.3.1 Test performed
+/- =pulse polarity

Mains
Network coupling; test duration: ea 60 s; L, N = mains; PE = protection earth

	L		N		L + N		L + PE		N + PE		PE		L + N + PE	
	-	+	-	+	-	+	-	+	-	+	-	+	-	+
ok	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0

5.5.3.2 Result
no change of EUTs behaviour

Evaluation

Mains:
Test criterion is kept

5.5.4 Surge
Susceptibility to surges: (Hybrid pulse 1,2/ 50 µs resp. 8/ 20 µs)

5.5.4.1 Test performed
Mains AC

	between N and L		between L and PE		between N and PE	
	Test level +/- 250 V		Test level +/- 500 V		Test level +/- 500 V	
Number of pulses	negative	positive	negative	positive	negative	positive
ea 5	passed	passed	passed	passed	passed	passed
	Test level +/- 500 V		Test level +/- 1000 V		Test level +/- 1000 V	
Number of pulses	negative	positive	negative	positive	negative	positive
ea 5	passed	passed	passed	passed	passed	passed
	Test level +/- 1000 V		Test level +/- 2000 V		Test level +/- 2000 V	
Number of pulses	negative	positive	negative	positive	negative	positive
ea 5	passed	passed	passed	passed	passed	passed

Delay between pulses: 60 s; Polarity: alternating; angle: 0°, 90°; 270°

5.5.4.2 Result
no change of EUTs behaviour

Evaluation

Mains:
Test criterion is kept

5.5.5 RF conducted
Susceptibility to conducted rf voltages

AM 80%, 1000 Hz applied to carrier

Application by CDN

Start frequency 0.15 MHz, Frequency variation 1% of last frequency.
Test time: 2 s

5.5.5.1 Test performed

Test port	Result
Mains AC	passed

5.5.5.2 Result
no change of EUTs behaviour

Evaluation

Test criterion is kept

5.5.6 H- field
Susceptibility to H- fields at 50/ 60 Hz

Application by coupling coil/ Helmholtz system

Frequency 50 Hz; Test time: s

5.5.6.1 Test performed

5.5.6.2 Result
no change of EUTs behaviour

Evaluation

no demands

5.5.7 Changes of AC mains voltage

Short- and long term changes of mains voltage

Test quantities generated by class A power amplifier

Frequency 50 Hz

5.5.7.1 Test performed
Voltage 230 V / 50 Hz

Reduction to	Duration	Result
70 %	10 ms/ positive half wave	passed
70 %	10 ms/ negative half wave	passed
40 %	100 ms	passed
< 5 %	5000 ms	passed

5.5.7.2 10.2.1.3 Changes of mains voltage

AC mains	Criterion C	Voltage reduction to 70 % for 200 ms
AC mains	Criterion B	Voltage reduction to 0 % for 10 ms

5.5.7.3 Result
no change of EUTs behaviour

Evaluation

Test criterion is kept

6 Test equipment

6.1 Emission – RF voltage on lines

Inv.-No	Type	Name	Manufacturer	SN
50032	Impulsbegrenzer	ESH 3-Z2	Rohde&Schwarz	833955/0020
50088	Schirmraum	HF-Kabine 1	Siemens	ohne
50105	Netznachbildung 4	ESH2-Z5	Rohde&Schwarz	872094/073
50145	Meßempfänger	SMR4518	Schaffner	013

6.2 Emission – Radiated emission

Inv.-No	Type	Name	Manufacturer	SN
50031	Antennenmeßkabel 10m	AK 9513	Schwarzbeck	ohne
50034	Antennenhltg/bikon.Antenne	VHBB 9124	Schwarzbeck	9124-0216
50035	Antenne/bikon. Elemente	BBA 9106, Paar	Schwarzbeck	ohne
50052	Meßplatz	Freifeld 3/10	Reichl	ohne
50053	Antennenmast	Mast 1	Reichl	ohne
50054	Drehteller	Drehteller 1	Reichl	ohne
50061	LogPer- Meßantenne	VULP 9118-A(0,2-1,2GHz)	Schwarzbeck	VULP 9118 - A - 317
50145	Meßempfänger	SMR4518	Schaffner	013

6.3 Emission -Harmonics of 50/ 60 Hz

Inv.-No	Type	Name	Manufacturer	SN
50062	Leistungsverstärker NF	FM 1295	FM Peter Feucht	9651-0213
50063	Funktionsgenerator	FG 42-1	FM Peter Feucht	9651-040
50107	PC	Meßrechner 2	IB Schrade	
50149	Netzanalysator	DPA 500	EM- Test	0802-05

6.4 Electrostatic discharge

Inv.-No	Type	Name	Manufacturer	SN
50036	Koppelplatte for ESD	ohne	IRB	ohne
50041	Widerstand for ESD	1 MOhm	Reichl	41
50042	Widerstand for ESD	1 MOhm	Reichl	42
50051	Schirmraum	HF-Kabine 2	SIEMENS	ohne
50139	ESD-Generator	ESD 30 C	EM-Test	1101-10
50140	Entladepistole for ESD	P 30 C	EM-Test	1101-10

6.5 Radiated RF

Inv.-No	Type	Name	Manufacturer	SN
50034	Antennenhltg/bikon.Antenne	VHBB 9124	Schwarzbeck	9124-0216
50035	Antenne/bikon. Elemente	BBA 9106, Paar	Schwarzbeck	ohne
50051	Schirmraum	HF-Kabine 3	SIEMENS	ohne
50061	LogPer- Meßantenne	VULP 9118-A(0,2-1,2GHz)	Schwarzbeck	VULP 9118 - A - 317
50080	HF-Generator	SMT03	Rohde&Schwarz	841733/025
50158	Leistungsverstärker	CBA 9413B; 80-1000MHz/100W	Schaffner	T43527

6.6 Fast transients and bursts

Inv.-No	Type	Name	Manufacturer	SN
50051	Schirmraum	HF-Kabine 2	SIEMENS	ohne
50106	BURST-Generator	EFT 800	EM - Test	48

6.7 Surges

Inv.-No	Type	Name	Manufacturer	SN
50013	Surge-Generator	VCS 500	EM-Test	0594 - 02
50055	Meßplatz	Surge 1	Reichl	ohne

6.8 Conducted rf voltages

Inv.-No	Type	Name	Manufacturer	SN
50029	Koppelnetzwerk	CDN 801-M3 /230 V	MEB	10470
50051	Schirmraum	HF-Kabine 2	SIEMENS	ohne
50104	Strominjektionszange	KEMZ 801	Schaffner	19784
50107	PC	Meßrechner 2	IB Schrade	
50156	Generator/Verstärker	NSG 4070	Teseq	23

6.9 Changes of mains voltage

Inv.-No	Type	Name	Manufacturer	SN
50062	Leistungsverstärker NF	FM 1295	FM Peter Feucht	9651-0213
50063	Funktionsgenerator	FG 42-1	FM Peter Feucht	9651-040
50107	PC	Meßrechner 2	IB Schrade	

6.10 Uncertainty and calibration

6.10.1 Emission

Typ	Uncertainty
6.10.1.1 V- or T- lisn	±2dB
6.10.1.2 Absorption clamp	±3 dB
6.10.1.3 Open area test site	±4 dB
6.10.1.4 Mains harmonics	±0,1 %

6.10.2 Susceptibility

Typ	Uncertainty
6.10.2.1 Electrostatic discharge	Test voltage ±10 %
6.10.2.2 Radiated RF	Up to + 6 dB
6.10.2.3 Bursts	Test voltage ±10 %.
6.10.2.4 Surges (Hybrid pulse 1,2/ 50 µs resp 8/ 20 µs)	Voltage 1,2/ 50 µs: ±10 %; current 8/ 20 µs: ∓ 10 %; voltages selected: ±10 %; voltages measured: ±10 V, currents measured ±10 A
6.10.2.5 RF voltage conducted	Up to + 1 dB
6.10.2.6 H- field	Up to + 2 dB
6.10.2.7 Changes of mains voltage	Up to: ± 0,1 V

6.10.3 Date of last calibration or instrument check

October 2004
September 2005
March 2006
August 2006
March 2007
June 2007
November 2007

7 Content

gespeichert unter 08002201