SGS-TÜV Saarland Forster GmbH
Ein Unternehmen der SGS-Gruppe

DAkkS
Deutsche Akkreditierungsstelle
D-PL-12103-01-01

EMC Test Report

E. u. T.:	IR Illuminator Helios
Type:	IR-294-M/90-850
Alternative Modell:	IR-30M/90-850
S/N:	1404 NK 001011
Applicant:	JSC Videocom 100/2 Dmitrovskoe Shosse, Moscow 127591 Russia
Date of tests:	04 / 10 / 2014 to 04 / 24 / 2014
Place of tests:	Perl - Sinz
Project No.:	50911_10042014_IR294_2
Date of Report	04 / 28 / 2014
Pages complete	35

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D-PL-12103-01-01

Contents

1. Identification of test laboratory

Company name	SGS-TÜV Saarland Forster GmbH
Address	Saarbruecker Strasse 1 66706 Perl Germany
Laboratory accreditation	D-PL-12103-01-01 Registration FCC 90572 KBA-P-00029-98
Name for contact purposes	MR. Karl-Heinz Forster
Telephone	(+49)-6866-93200
Fax	(+49)-6866-93201
E-mail	emv-forster@t-online.de

Personel involved in this test report

Responsible for test report:	Mr K.-H. Forster
Responsible for testing:	Mr Dipl.-Ing. (FH) S.E. Weber Mr K.-H. Forster

Head of test laboratory: K.-H. Forster

Signature: _____ Stamp:

2. Standards and requirements

Tests and limits follow at:

DIN EN55015:2009
DIN EN61547:2009

DIN EN61000-3-2:2006+A1:2009+ A2:2009
DIN EN61000-3-3:2009

DIN EN61000-4-2:2009
DIN EN61000-4-3:2006+A1:2008+A2:2010
DIN EN61000-4-4:2012
DIN EN61000-4-5:2006
DIN EN61000-4-6:2009
DIN EN61000-4-8:2010
DIN EN61000-4-11:2004

Test environmental

Temperature	21,2° C
Rel. humidity	52 %
Air pressure	930-1060 hPa
Power Supply	12V DC

3. Interpretation and overview of test results

E. u. T.:	IR Illuminator Helios
Type:	IR294-M/90-850
Date of tests:	04 / 10 / 2014 to 04 / 24 / 2014
Power supply:	12V DC

Emissions:

	IR294-M/90-850
Conducted Emission EN 55015	**Passed**
Field Strength EN 55015	**Passed**
Harmonics EN 61000-3-2	**Not applicable** DC-supply
Flicker EN 61000-3-3	**Not applicable** DC-supply

Immunity:

Electrostatic Discharge EN 61000-4-2	**Passed**
RF electromagnetic fields EN61000-4-3	**Passed**
Fast transients (Burst) EN 61000-4-4	**Passed**
Surge EN 61000-4-5	**Not applicable** DC-supply
Conducted RF disturbance EN 61000-4-6	**Passed**
Magnetic Fields EN 61000-4-8	**Not applicable** No sensitive Parts inside
Voltage dips and interruptions EN 61000-4-11	**Not applicable** DC-supply

4. Test results Emissions

4.1. Test setup and results conducted emission

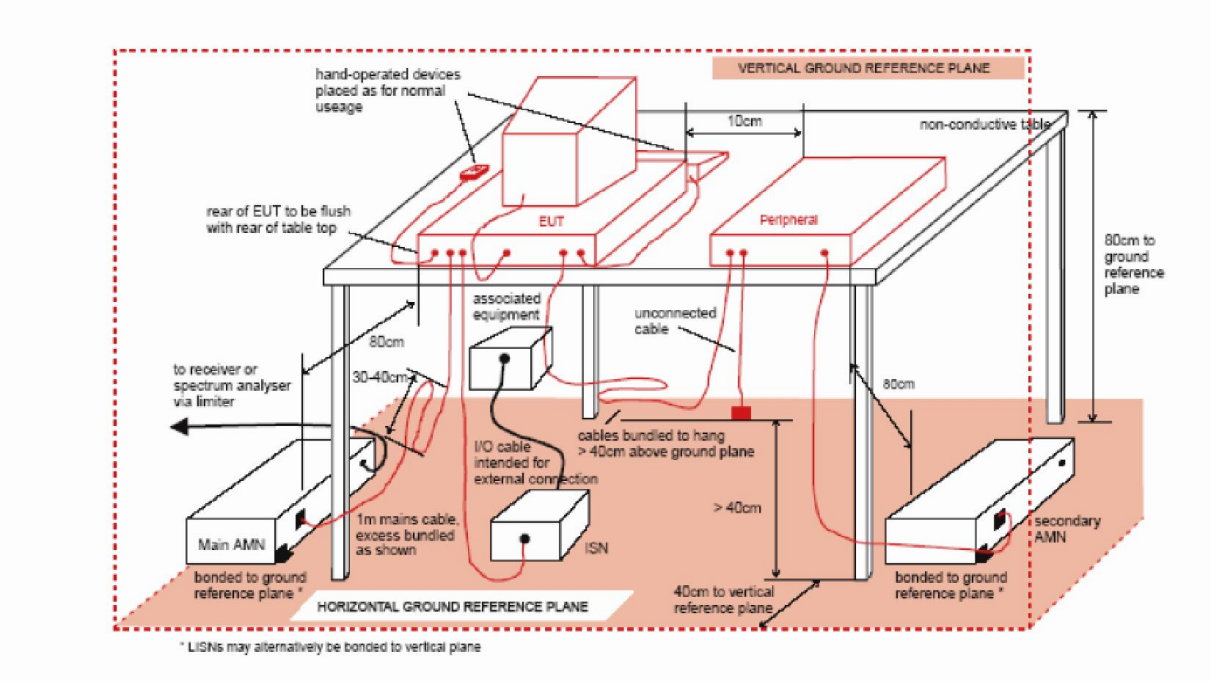


Photo test setup:

23 Apr 2014 11:00

SGS-TÜV Saarland Forster GmbH

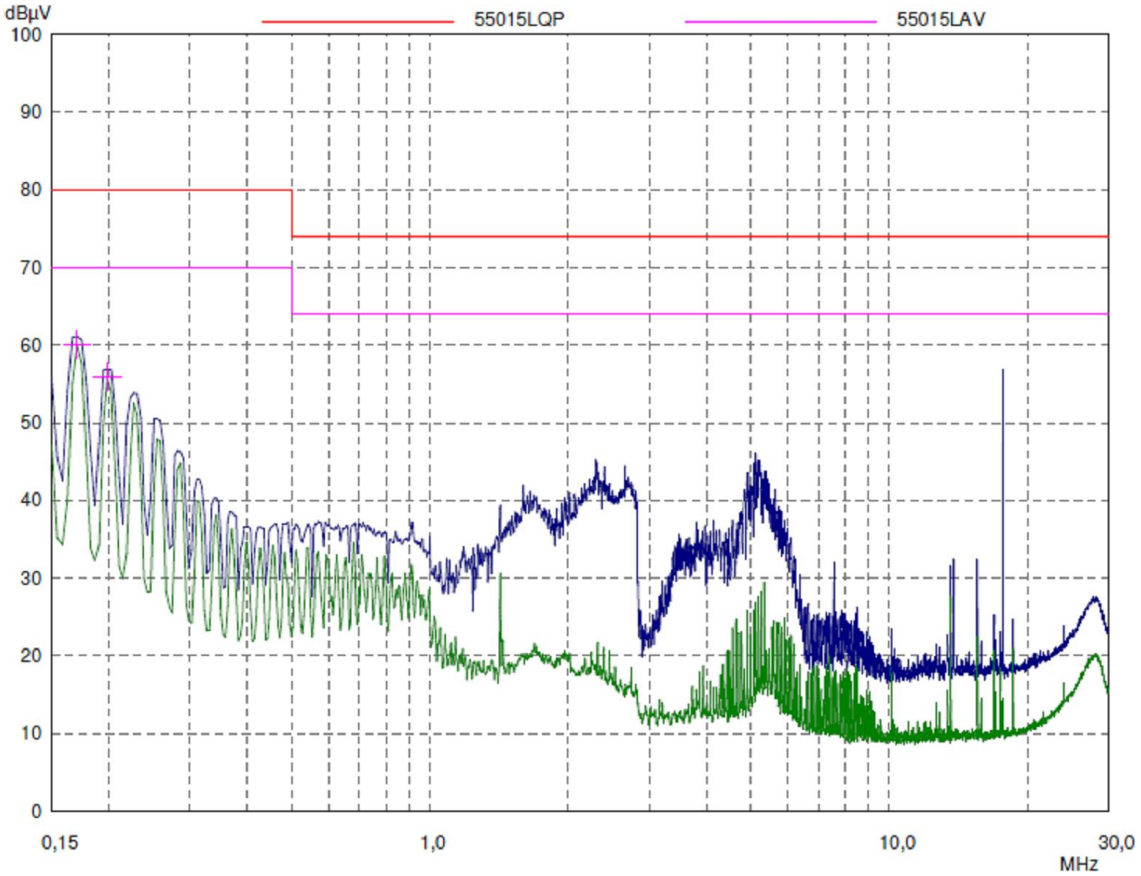
Conducted emissions on power-supply

EUT:	IR Illuminator Helios
Manuf:	Micorlight Security UG
Op Cond:	Light-Mode
Operator:	SEW
Test Spec:	DIN EN55015:2006+A1:2007+A1:2009 (Table 2b)
Comment:	Type: IR-294-M/90-850 S/N: 1404 NK001011 HW: 04/2014
	DC-Line 12V over external power-supply modified
File:	ir294c2.dat : Cond. Emission -EN55015 - Powerline DC Line

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge
150kHz	30MHz	4kHz	10kHz	PK+AV	20msec	Auto	60dB

Prescan Measurement: X PK / + AV
Meas Time: see scan settings
Subranges: 25
Acc Margin: 15 dB



23 Apr 2014 11:00

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Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge
150kHz	30MHz	4kHz	10kHz	PK+AV	20msec	Auto	60dB

Prescan Measurement: X PK / + AV
Meas Time: see scan settings
Subranges: 25
Acc Margin: 15 dB

Peak Search Results:

Frequency MHz	PK Level dBµV	PK Limit dBµV	PK Delta dB	Phase -	PE -

No results

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
0,17	60,08	70,00	9,92	L1	gnd
0,198	55,86	70,00	14,14	L1	gnd

4.2. Test setup and results field strength

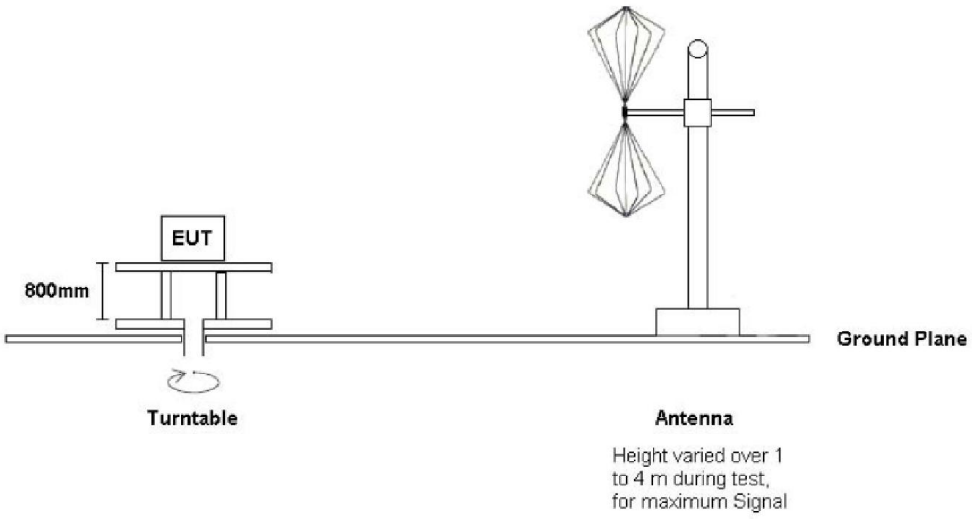
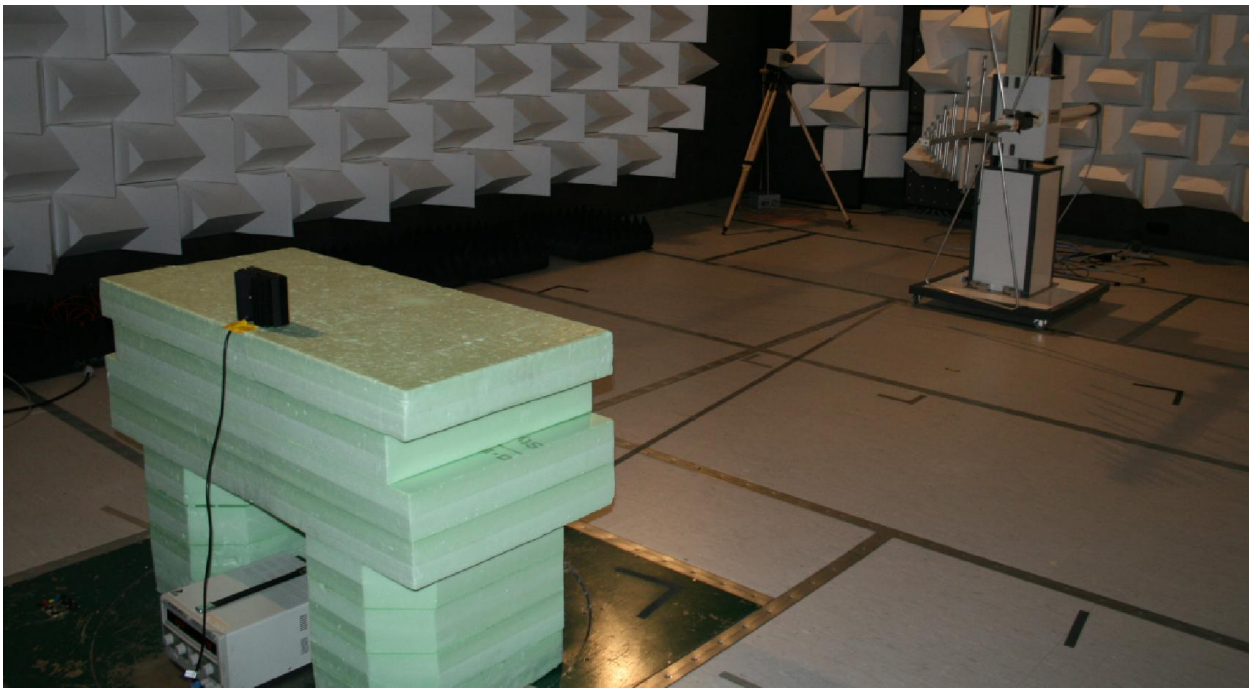


Photo test setup:



Test Report

EUT Information

EUT Name:	IR Illuminator Helios
Manufacturer:	Microlight Security UG
Type:	IR-294M/90-850
S/N:	1404NK001011
HW.-Rev.	04/2014
SW/FW Rev:	None
Operating cond.:	Light-Mode (Full)
Operator:	Dipl. -Ing. (FH) Sven Eric Weber
Test Spec.:	EN55015:2006+A1:2007+A2:2009
Test Side:	SAC 1
Supply:	DC12V over external power supply
Polarisation:	Vertical/Horizontal
Project No.:	50911_10042014_IR294_2
Connected Devices:	None
Comment:	None

EMI Auto Test Template: EN55015 (30M-300M)

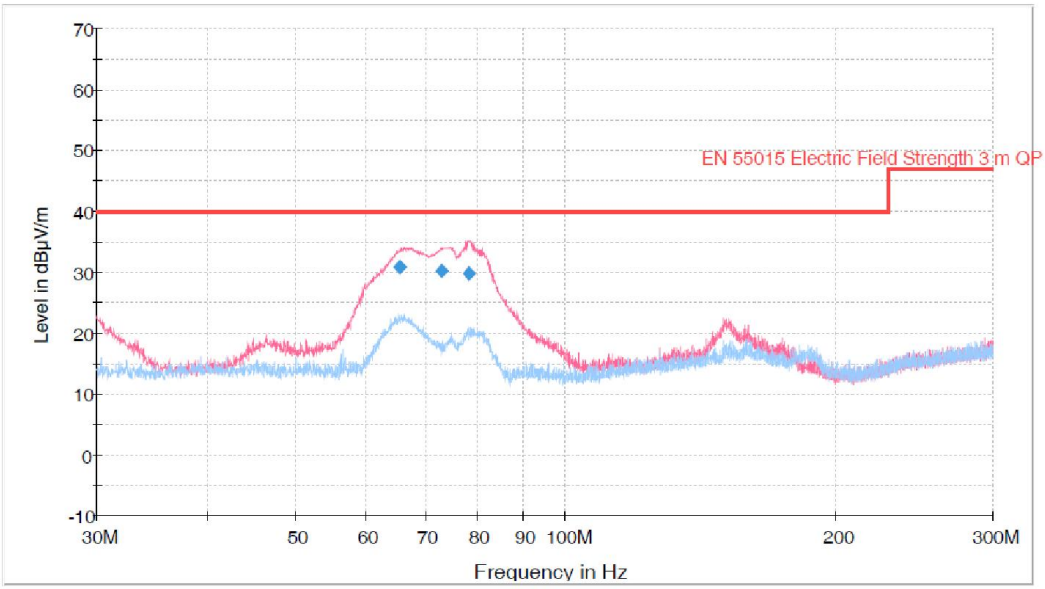
Hardware Setup:	ElectricField Strength VULB
Measurement Type:	Open-Area-Test-Site
Frequency Range:	30 MHz - 300 MHz
Graphics Level Range:	-10 dBµV/m - 70 dBµV/m
Preview Measurements:	
Graphics Display:	Show separate traces for horizontal and vertical polarization
Scan Test Template:	Prescan Field Strength VULB
Data Reduction:	
Limit Line #1:	EN 55015 Electric Field Strength 3 m QP
Peak Search:	6 dB , Maximum Results: 15
Subrange Maxima:	0 Subranges , Maxima per Subrange: 1
Acceptance Offset:	-10 dB
Maximum Number of Results:	15
After Data Reduction:	Interactive data reduction
Before the Final Meas.:	Interactive data reduction
Maximization Measurements:	
Template for Single Meas.:	Max Field Strength VULB
Adjustment:	
Template for Single Meas.:	Max Field Strength VULB
Final Measurements:	
Template for Single Meas.:	Final Field Strength VULB

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	QPK	120 kHz	10 s	20 dB

Receiver:	[ESU 26]
Report Settings:	
Report Template:	SGS Auto Test Report
Create Electronic Report:	PDF

SGS-TÜV Saarland Forster GmbH 14.04.2014

EN55015 (30M-300M)



EN 55015 Electric Field Strength 3 m QP [..\EMI radiated\]
Preview Result 1V-PK+ [Preview Result 1V.Result:1]
Preview Result 1H-PK+ [Preview Result 1H.Result:1]
Final Result 1-QPK [Final Result 1.Result:1]

Page: 3 Time: 12:56:39

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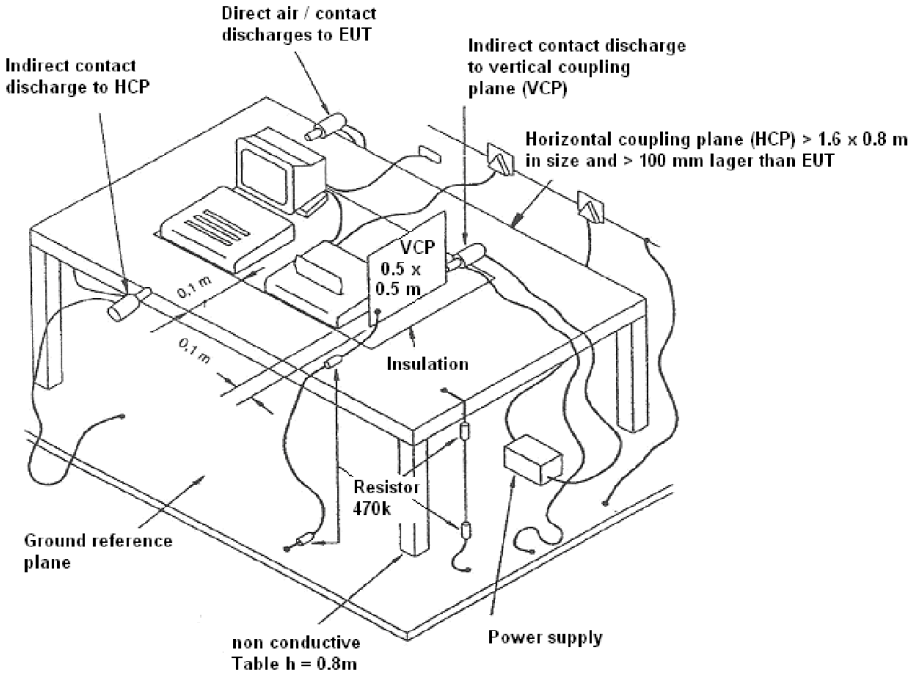
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
65.480000	30.8	10000.0	120.000	100.0	V	175.0	10.9	9.2	40.0	
72.920000	30.1	10000.0	120.000	201.0	V	230.0	9.6	9.9	40.0	
78.160000	29.9	10000.0	120.000	117.0	V	140.0	8.7	10.1	40.0	

5. Test results Immunity

5.1. Test setup and results electrostatic discharge



Photos discharing-points

Contact discharge (CD) *Air discharge (AD)*

E. u. T.: IR Illuminator Helios

Model: IR-294-M/90-850

Applicant: JSC Videocom

Requirements: EN61000-4-2
EN61547

Test Parameter	Required	Tested
Shape of Impulse	1/30 ns	1/30 ns
Amplitude	4kV CD / 8kV AD	4kV CD / 8kV AD
Polarity/ time	+/- /per 1s	+/-/per 1s
Number	10 CD 10 AD	25 CD 10 AD
Kind of discharge (contact/air)	CD/AD	CD/AD

Discharge points: Direct discharge Contact / Air (see picture)
Indirect discharge on HCP (see picture)

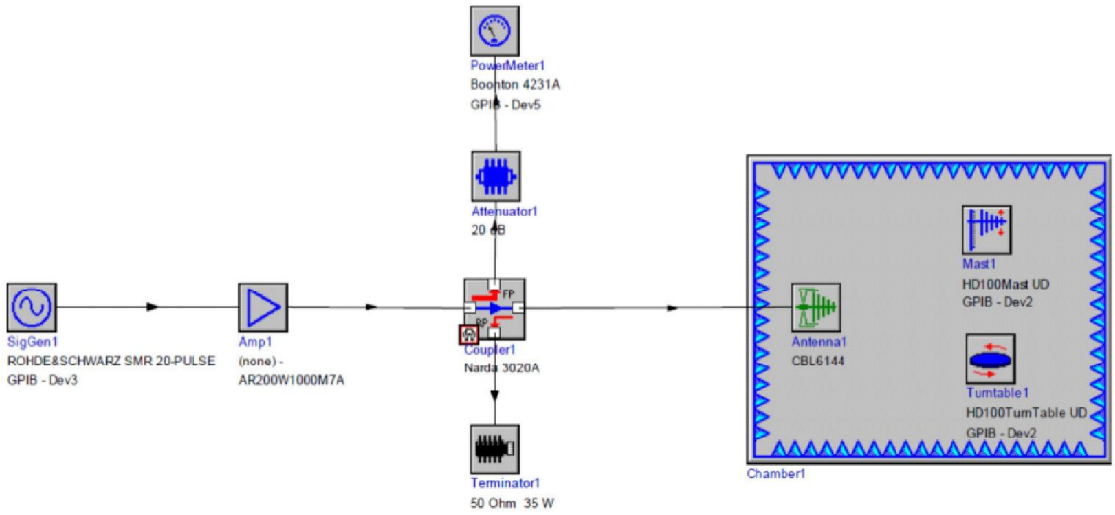
RESULTS: **Passed** (Class "A")
No degradation of performance

5.2. Test setup and results electromagnetic Rf-fields

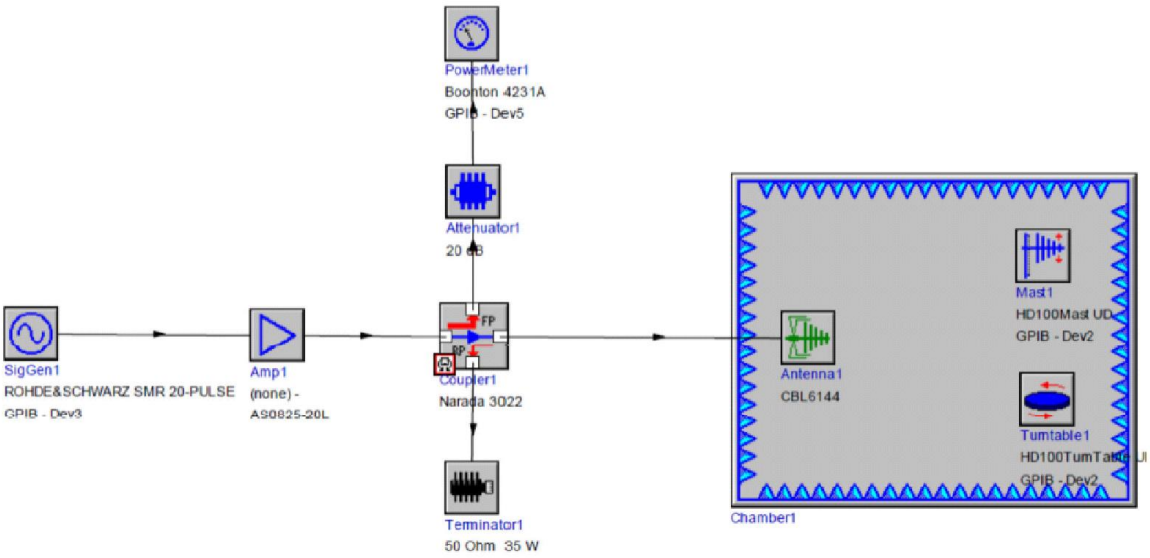
EN61000-4-3 (RF-Fields Immunity) Test-setup

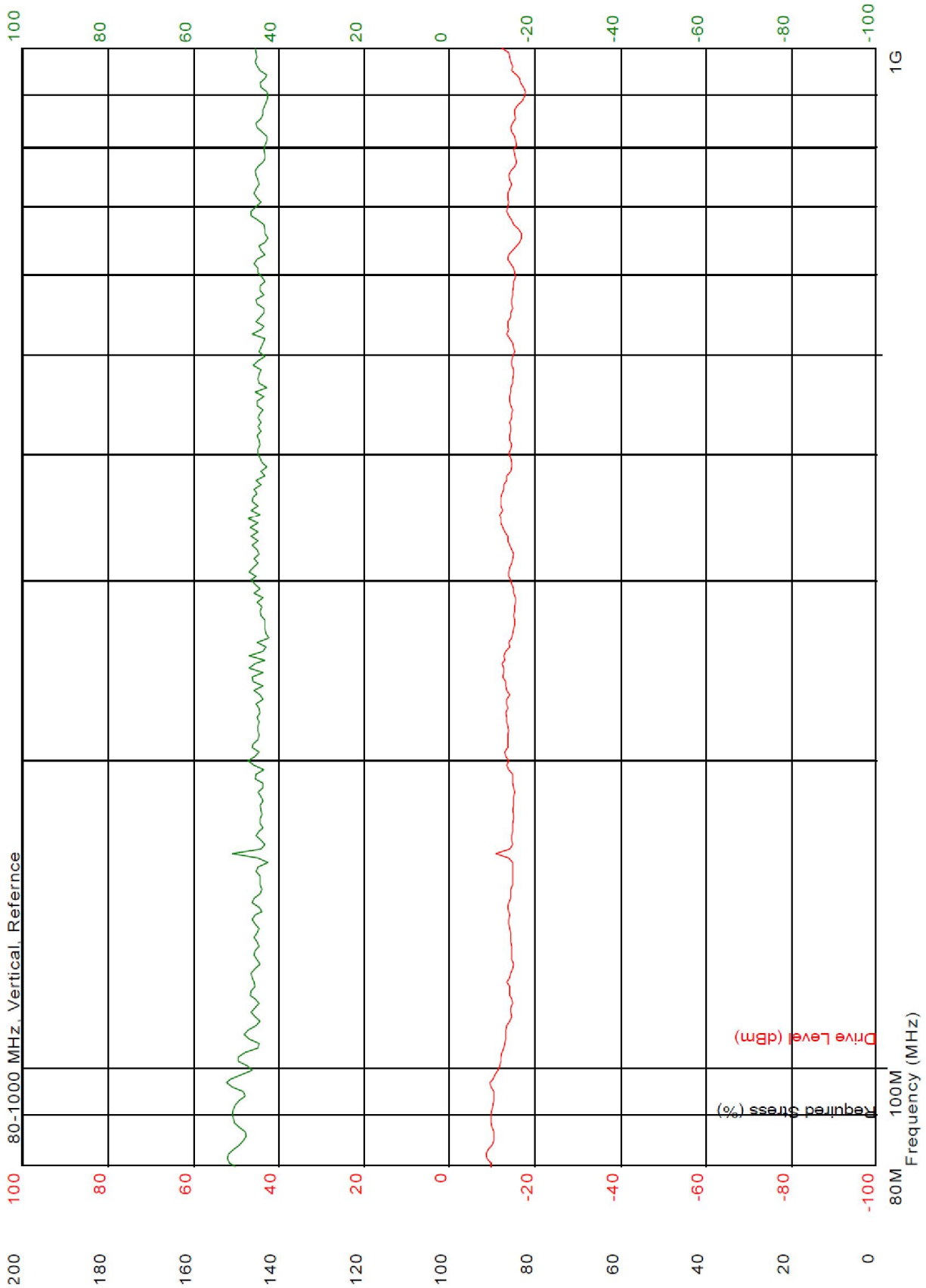
Frequency-range 80MHz - 2700MHz

1. Immunity against radiated electromagnetic RF-fields from 80MHz to 1000MHz



2. Immunity against radiated electromagnetic RF-fields from 1000MHz to 2700MHz




80-1000 MHz, Vertical, Refernce
Required Stress (%)
Drive Level (dBm)
Frequency (MHz)
80M
100M
1G
100
80
60
40
20
0
-20
-40
-60
-80
-100
200
180
160
140
120
100
80
60
40
20
0

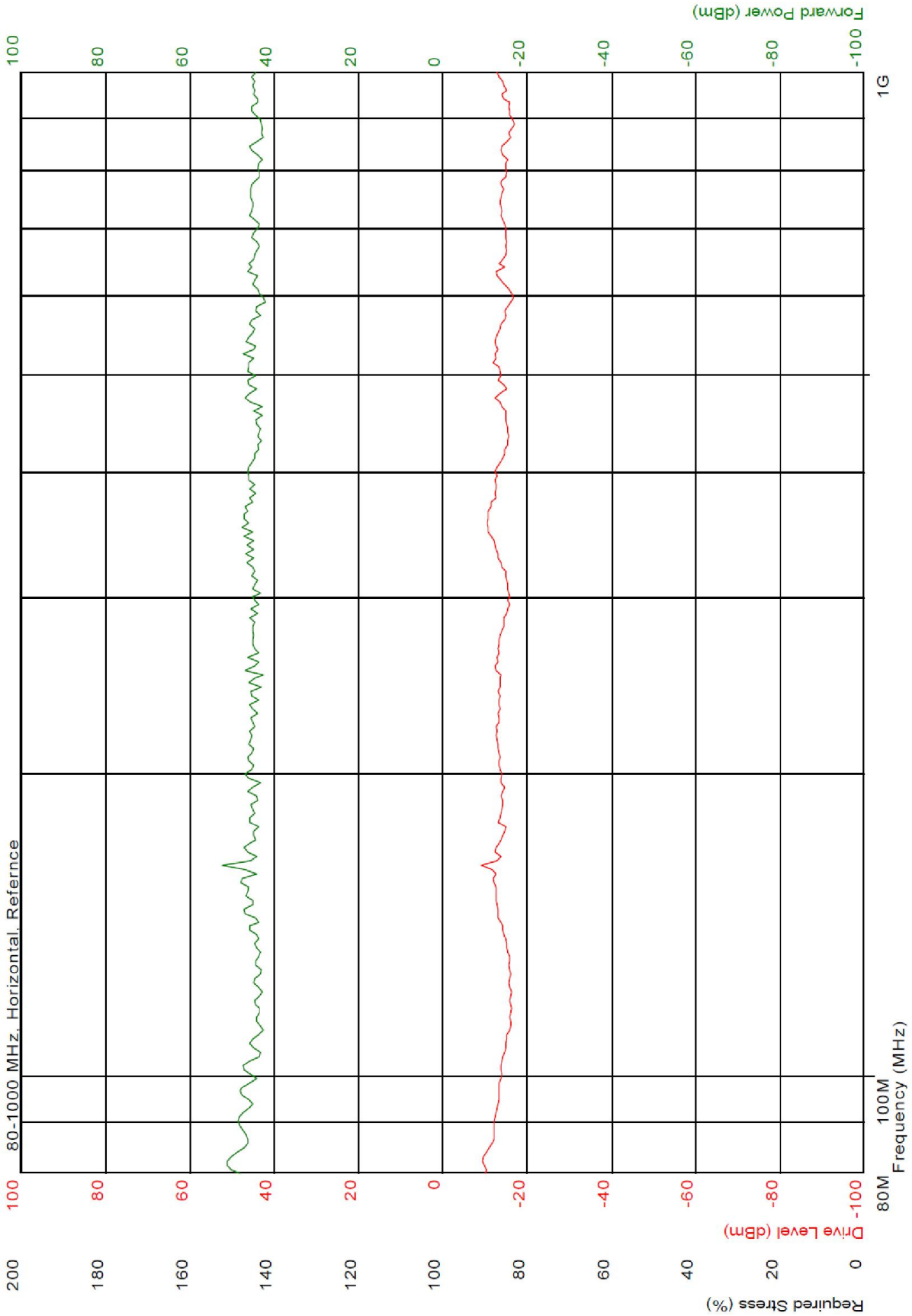

80-1000 MHz, Horizontal, Refernce
Forward Power (dBm)
Drive Level (dBm)
Required Stress (%)
Frequency (MHz)
80M
100M
1G
100
80
60
40
20
0
-20
-40
-60
-80
-100
200
180
160
140
120
100
80
60
40
20
0

Photo test setup

Test setup 80-1000MHz:

E. u. T.: IR Illuminator Helios

Model: IR-294-M/90-850

Applicant: JSC Videocom

Requirements: EN 61000-4-3
EN 61547

System observed with CCD Camera

Test parameter	Required	Tested
Frequency	80-1000 MHz	80-1000 MHz
Test Amplitude	3 V/m	10 V/m
Modulation	AM, 1kHz/80%	AM, 1kHz/80%
Frequency step	1%/ 2s	1%/ 2s
Distance (EUT – Antenna)	1 to 3 meter	1,5 meter

Tested Side: Front-Side: Vertical and Horizontal (see picture)

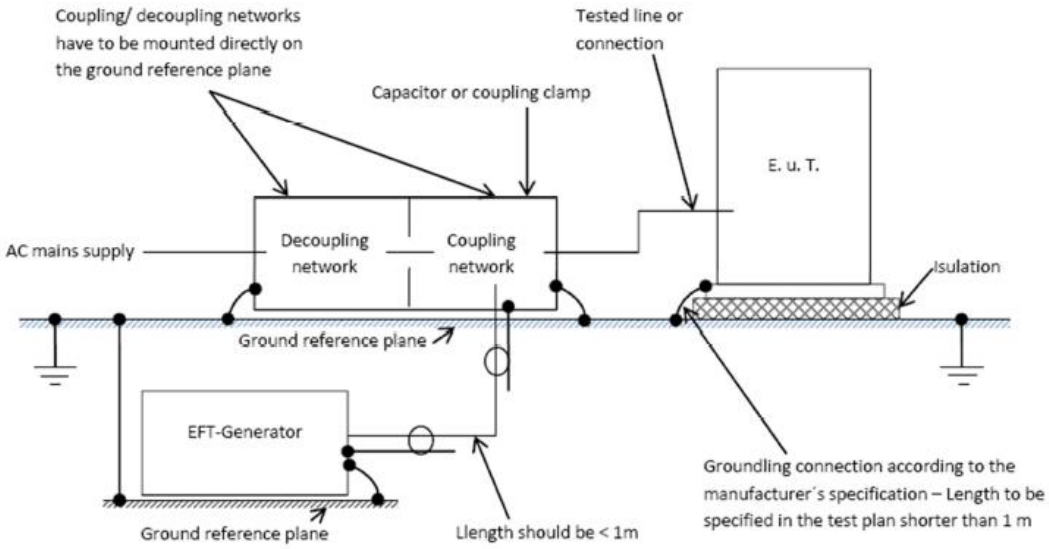
TEST RESULT: **Passed** (Class "A")
No degradation of performance

5.3. Test setup and results fast transients (Burst)

EN61000-4-4 (Fast Transients) Test-setup

Coupling network / Coupling clamp

1. **Schematic set-up for immunity using coupling/ decoupling networks**



2. **General principle of a test set-up using a capacitive coupling clamp**

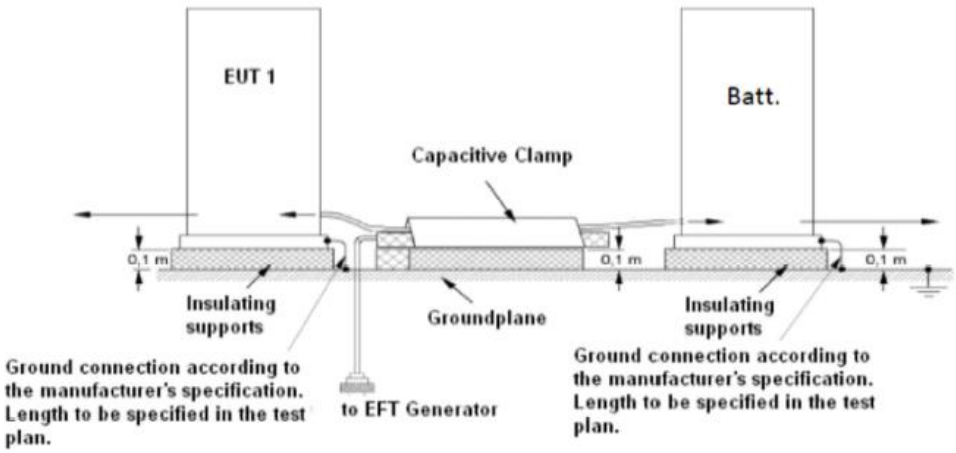
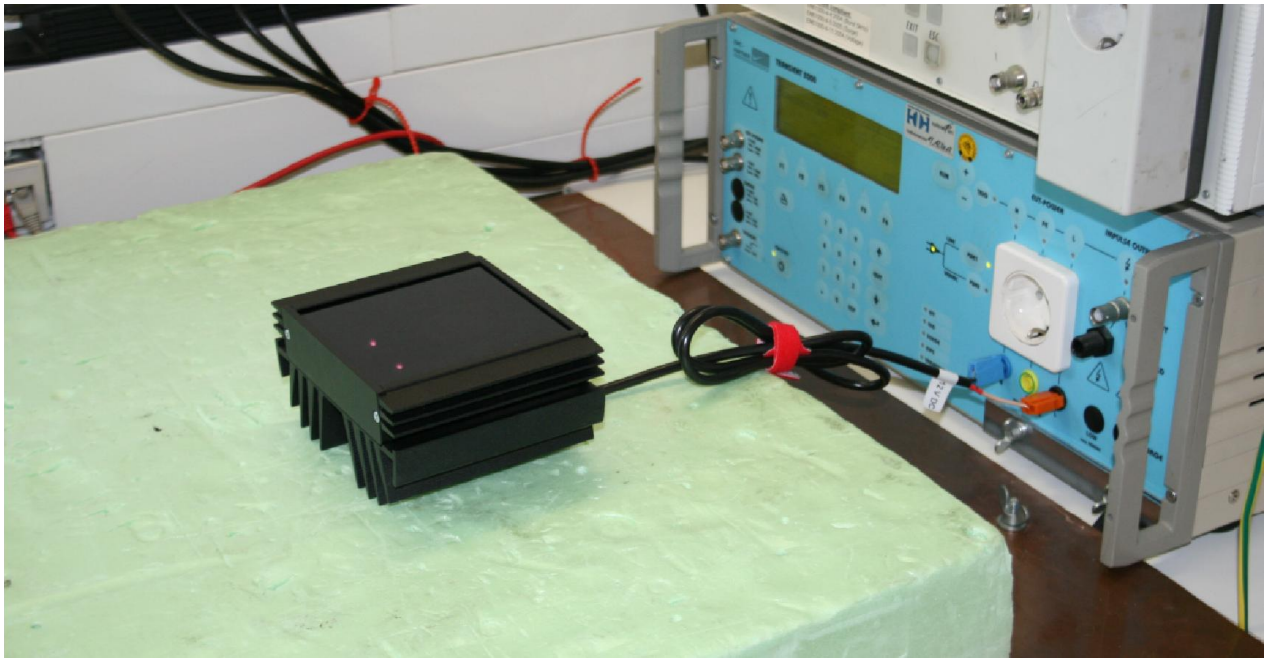


Photo test setup:

Coupling on DC-Line with direct coupling:



E. u. T.: IR Illuminator Helios

Model: IR-294-M/90-850

Applicant: JSC Videocom

Requirements: EN61000-4-4
EN61547

Test parameter	Required	Tested
Shape of Impulse	5/50ns	5/50ns
Test Amplitude	0,5 kV	1,0 kV
Polarity	+/-	+/-
Coupling	Direct	Direct
Duration **Rep.rate**	each 1 min. 5kHz	each 1 min 5kHz

Tested-Lines: DC-Line with 1kV, direct coupling

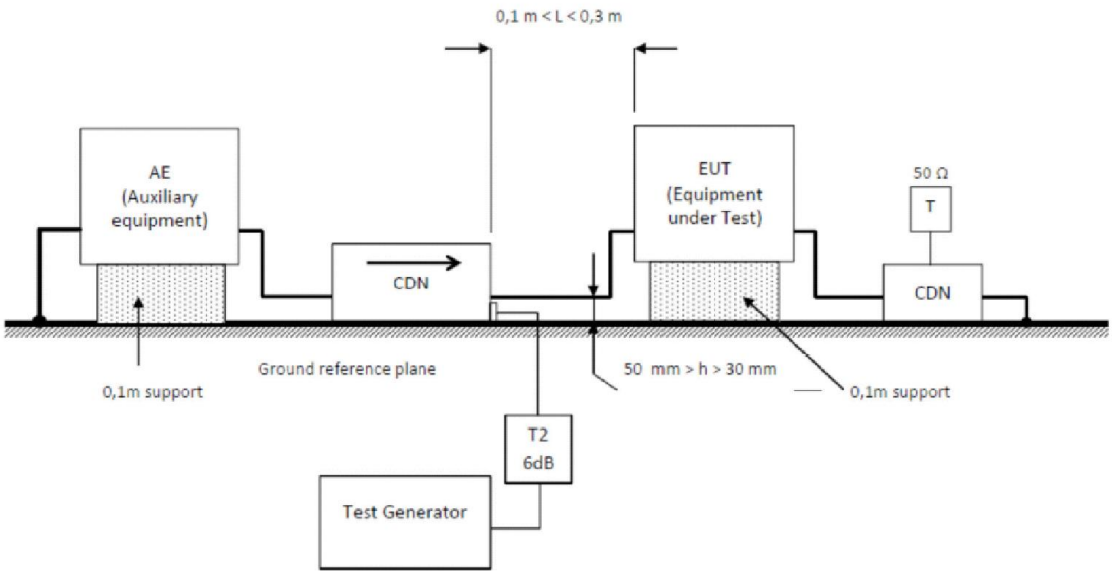
TEST RESULT: **Passed** (Class “A”)
No degradation of performance

5.4. Test setup and results conducted RF- disturbance

EN61000-4-6 (HF-disturbances) Test-setup

Coupling network / Injection clamp

1. Schematic set-up for immunity using coupling/ decoupling networks



2. General principle of a test set-up using injection clamps

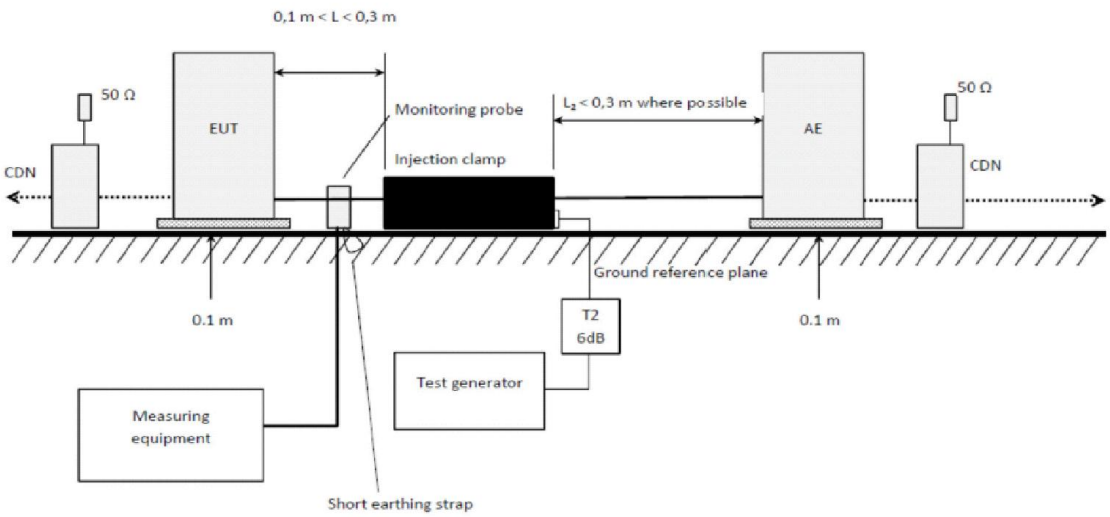


Photo test setup

Coupling on DC-Line with CDN-M2:

SGS-TÜV Saarland Forster GmbH 23.04.2014 12:26:44

Test Report

EUT Information

Description:

EUT Name:	IR Illuminator Helios
Manufacturer:	Microlight Security UG
Typ:	IR294-M/90-850
S/N:	1404NK001011
HW Rev:	04/2014
SW/FW Rev:	None
Operating cond.:	Light-Mode
Operator:	SEW
Test Spec.:	EN61000-4-6:2009
Connected Line	DC-Power-Line (CDN-M2)
Supply:	DC12V over external power supply
Ambient cond.	Temp: 21°C ; Humidity: 52% ; Pressure: 1020hPa
Project No.:	50911_1042014_IR294_2
Comment:	None
Result File Name:	DC-Line.res

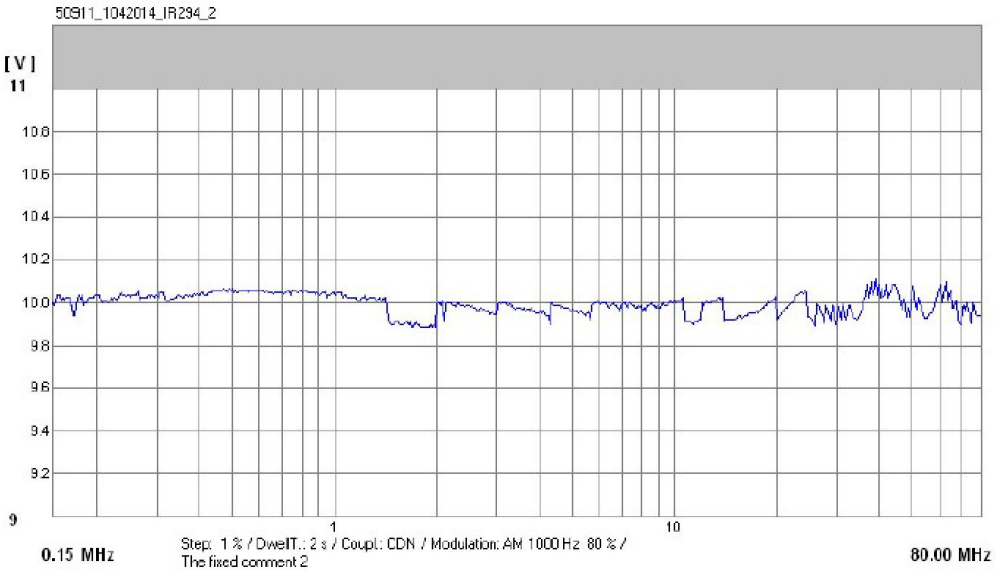
Setup: Conducted Disturbances

Hardware Setup: NSG 4070 - CDN / EM-CLAMP / CIP

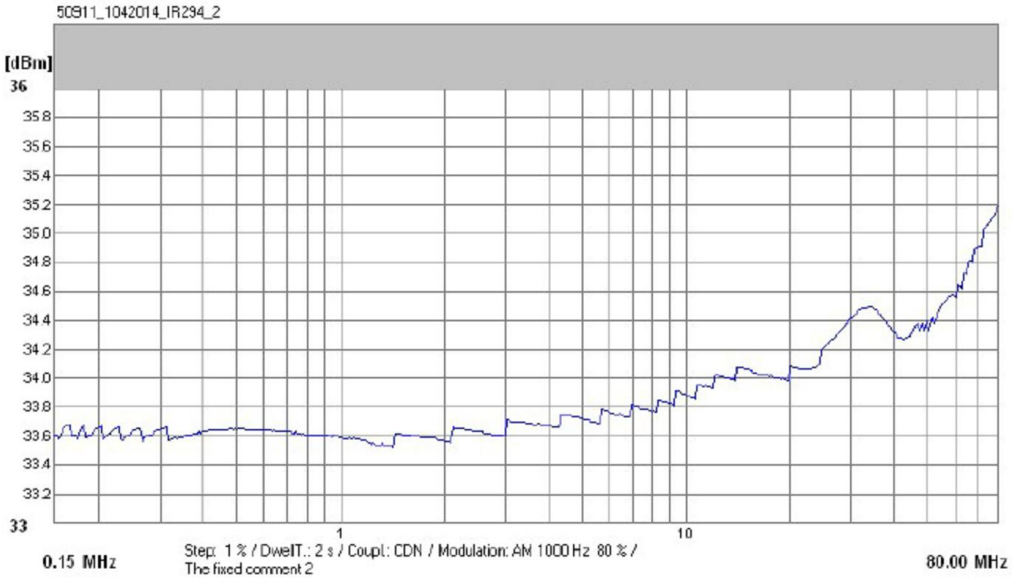
Subrange	Test Level	Freq. Step	Dwell Time	Coupling Device
0.15 - 80 MHz	10...10 V	1 %	2.000 ms	CDN

Modulation	Amplifier int.-/ext.	Nr. of Steps
AM 1000 Hz 80 %	internal	633

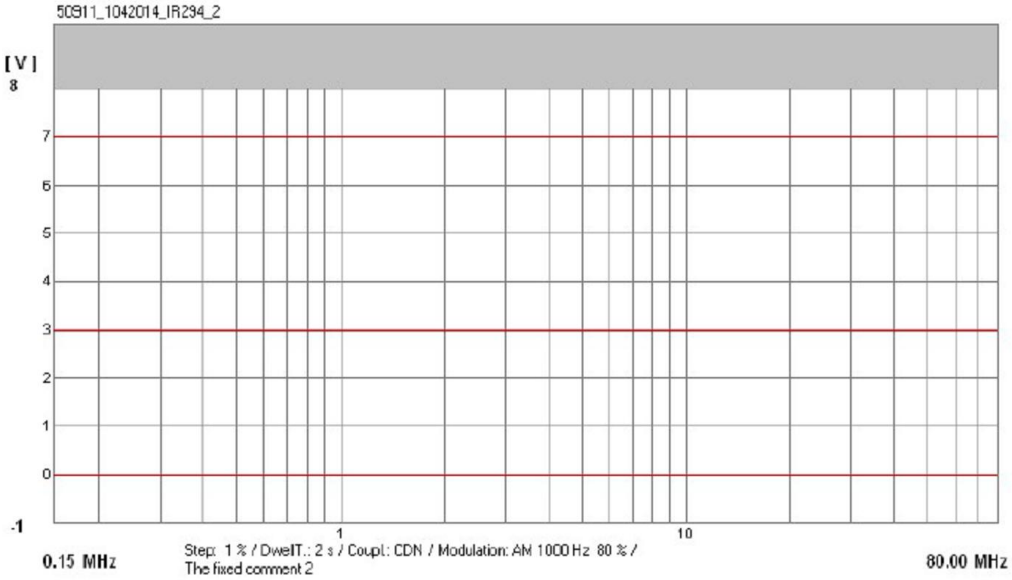
Test Level



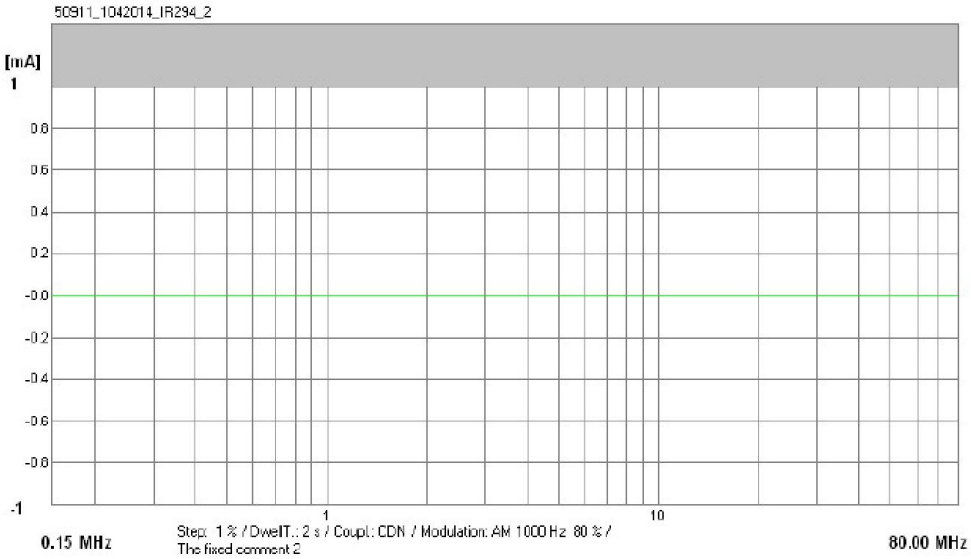
Forward Power



Analog Input Monitoring Port



Monitoring Probe Current



TEST RESULT: **Passed** (Class “A”)
No degradation of performance

6. List of test instruments

Conducted Emission

INV #	Test equipment	Type	Manufacturer	S/N #
# A 1	Test receiver with Opt. B 2 und ESK 1	ESPC	Rhode & Schwarz	843820/014
# A 5	LISN	ESH 2-Z5	Rhode & Schwarz	843285/008
# A 19	Coax cable 2 x 5m	BNC/50 Ω	Suhner	001-002
# A 20	Coax cable 2 x 2m	BNC/50 Ω	Suhner	001-002
# A 39	Handnachbildung	HNB	Fo	001
# A 95	Impulsbegrenzer	ESH3-Z2	Rhode & Schwarz	357.8810.52
# A 139	Microwave cable	AK9515H	Schwarzbeck	9515200
# S 1	Software	ESPC-K1 V2.02.06C	Rhode & Schwarz	-

Field Strength (30MHz to 18GHz)

INV #	Test equipment	Type	Manufacturer	S/N #
# A 10	Antenna Mast	HD	Deisel	-
# A 12	Turntable	DS 420	Deisel	-
# A 13	Controller	MCU	Maturo GmbH	1131108
#A83	EMI Test Receiver	ESU26	Rohde & Schwarz	100325
# A 99	Coax cable SAC	Sucoflex 106	Sucoflex	MFR65474
# A 100	Coax cable SAC	Sucoflex 106	Sucoflex	MFR65474
# A 138	Double Ridge Horn Antenna	BBHA9120D	Schwarzbeck	9120D-374
# A 196	Biko Log Per Antenna	VULB 9160	Schwarzbeck	-
# S 137	Software	EMC 32 V8.51.0 mit USB- Dongle	Rhode & Schwarz	-

Electro static discharge

INV #	Test equipment	Type	Manufacturer	S/N #
# A 27	ESD Resistors	HTE 102	Powertron	Keine
# A 40	Coupling Plate	VCP	Eigen	Keine
# A 164	ESD Generator	SESD30000	Schlöder	507146
# S 164	ESD-Software	SESD30000 V5.01	Schlöder	-

Electromagnetic RF-field 80MHz – 8GHz

INV #	Test equipment	Type	Manufacturer	S/N #
# A 10	Antenna Mast	HD	Deisel	-
# A 12	Turntable	DS 420	Deisel	-
# A 13	Controller	MCU	Maturo GmbH	1131108
# A 37	Electrical Field Probe	EMC 300	NARDA	W-0032/ C0013
# A 52	Bidirectional Coupler	3020A	NARDA	36045
# A 58	RF Power Amplifier	AS0820-100	MILMEGA	973029
# A 99	Coax cable SAC	Sucoflex 106	Sucoflex	MFR65474
# A 100	Coax cable SAC	Sucoflex 106	Sucoflex	MFR65474
# A 103	CCD- Camera	Pontis Imago	Pontis	1
# A 138	Double Ridge Horn Antenna	BBHA9120D	Schwarzbeck	9120D-374
# A 144	Power Amplifier	AS0825-20L	MILMEGA	1005708
# A 177	Attenuator	20dB-10W	Schaffner	001-002
# A186	Power Amplifier	AR1000M7A	AR	23666
# A 209	Power Amplifier	VZS6951K1	VARIAN	6030
# A 216	BiLog Antenna	CBL6144	TESEQ	28099
# A 217	Bidirectional Coupler	3022	NARDA	50171
# A 218	Bidirectional Coupler	3004-20	NARDA	3086
# A 220	Signal Generator	SMR20	Rhode & Schwarz	834671/004
# A 221	Power Meter	4231A-30	Boonton	40101
# A 221-1	Power Sensor + Sensor Data Adapter	51013-4E	Boonton	20984
# A 222	Power Amplifier	CR601-1	AIKEN-KELTEC	4976-002
# S 0	Software	Compliance 3 Immunity V4.01.0 mit USB-Dongle	Teseq	-

Burst (5kHz, 100kHz)

INV #	Test equipment	Type	Manufacturer	S/N #
# A 24	Immunity Test System	UCS500	EM-Test	A446801
# A 30	1-phase coupling-network	CNI	EM- Test	-
# A 61	Cap. Coupling Clamp	HFK	EM- Test	-
# A 62	Cap. Coupling Clamp	TRA2000 CC	H + H	-
# A 170	Cap. Coupling Clamp	HFK	EM- Test	1
# A 198	Burst Generator	TRA2000	H + H	665
# S 62	Generator Controlling Software	TRA2000	EMC-Partner AG	-

Conducted RF Disturbance (150kHz – 80MHz)

INV #	Test equipment	Type	Manufacturer	S/N #
# A 26	Immunity Test System	NSG4070	TESEQ	24433
# A 28	Attenuator	ATT6/75W	EM- Test	0206-23
# A 29	Coupling Network	CDN-M2	EM- Test	9605005B
# A 31	Coupling Network	CDN-AF4	EM- Test	9607009B
# A 32	Coupling Clamp	EM101	EM- Test	35352
# A 33	Attenuator	ATT6/75	EM- Test	9606009A
# A 41	R.F. current probe	6741-1	Solar Electronics	839708
# A 53	Current Probe – Clamp-on	CIP9136	Schaffner	
# A 63	Coupling Network	CDN-M1	Schlöder	A3001029
# A 84	Coupling Network	CDN-M3	Fiedler	06K003
# S 26	Control Program	NSG 4070 V1.1.2	TESEQ	

7. Antenna and correction factors

SGS TÜV

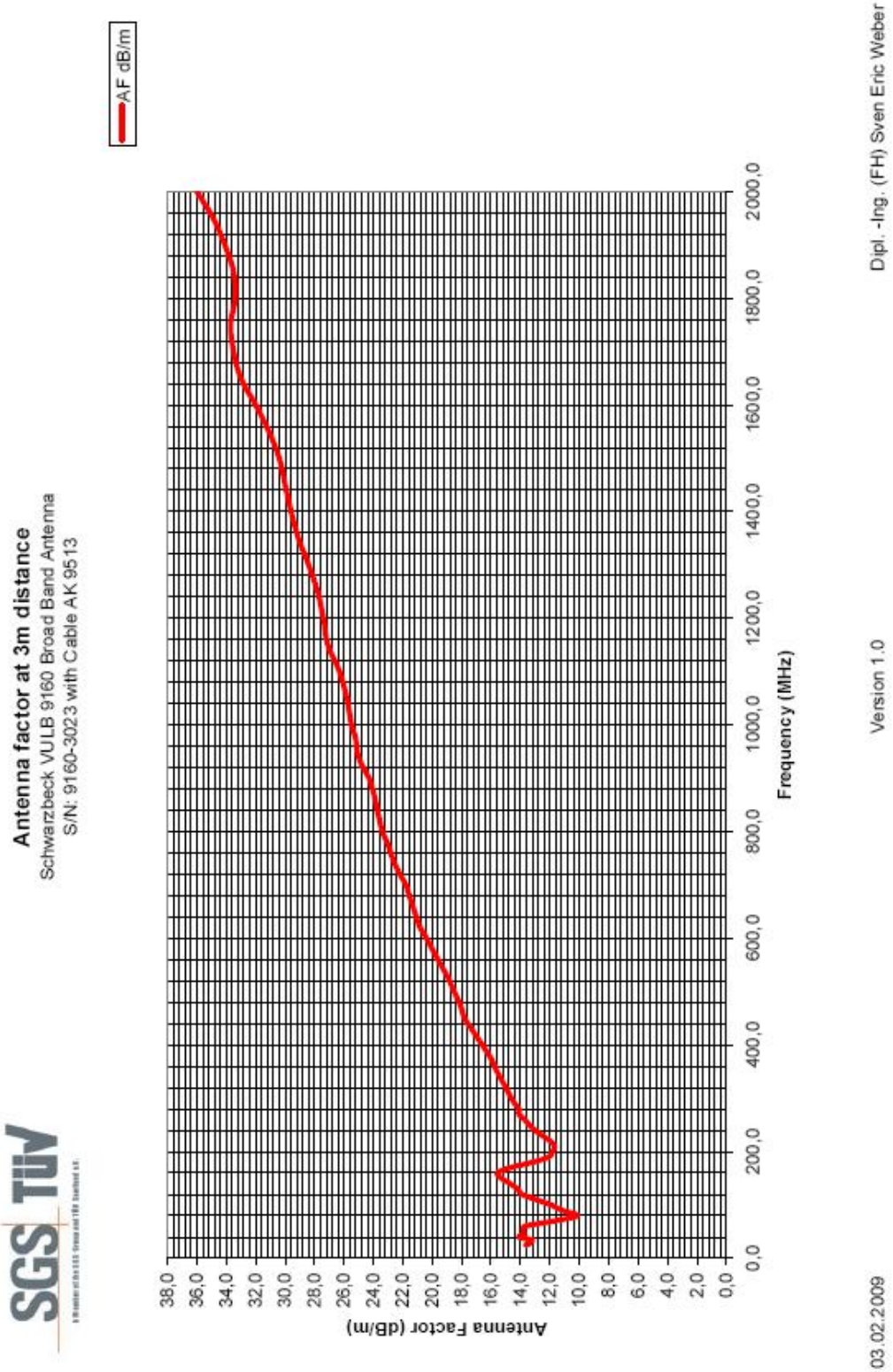
SGS - TÜV Saarland Forster GmbH
Saarbrückerstrasse 1
66706 Perl - Sinz

Antenna Factor

Schwarzbeck VULB 9160 TRILOG Broad Band Antenna
S/N.: 9160-3023 with cable AK 9513

Frequency	AF	Distance
MHz	*dB/m*	*m*
25,0	13,7	3
27,0	13,4	3
30,0	13,3	3
35,0	13,2	3
40,0	14,1	3
45,0	13,8	3
50,0	13,8	3
60,0	13,7	3
70,0	11,7	3
80,0	10,1	3
90,0	11,2	3
100,0	11,9	3
110,0	12,9	3
120,0	13,9	3
130,0	14,2	3
140,0	14,7	3
150,0	15,3	3
160,0	15,6	3
170,0	14,7	3
180,0	13,2	3
190,0	12,1	3
200,0	11,8	3
210,0	11,7	3
220,0	12,0	3
230,0	12,5	3
240,0	13,0	3
250,0	13,4	3
260,0	13,7	3
270,0	14,1	3
280,0	14,1	3
290,0	14,4	3
300,0	14,6	3
325,0	15,1	3
350,0	15,6	3
375,0	16,0	3
400,0	16,6	3
425,0	17,2	3
450,0	17,8	3
475,0	18,1	3
500,0	18,5	3

Frequency	AF	Distance
MHz	*dB/m*	*m*
525,0	18,9	3
550,0	19,4	3
575,0	19,9	3
600,0	20,4	3
625,0	20,9	3
650,0	21,2	3
675,0	21,5	3
700,0	21,8	3
725,0	22,3	3
750,0	22,7	3
775,0	23,0	3
800,0	23,4	3
825,0	23,6	3
850,0	23,8	3
875,0	24,0	3
900,0	24,3	3
925,0	24,8	3
950,0	25,1	3
975,0	25,2	3
1000,0	25,5	3
1050,0	25,8	3
1100,0	26,3	3
1150,0	27,1	3
1200,0	27,4	3
1250,0	27,8	3
1300,0	28,4	3
1350,0	29,1	3
1400,0	29,6	3
1450,0	30,0	3
1500,0	30,4	3
1550,0	31,1	3
1600,0	32,0	3
1650,0	33,0	3
1700,0	33,5	3
1750,0	33,5	3
1800,0	33,4	3
1850,0	33,5	3
1900,0	34,1	3
1950,0	34,9	3
2000,0	36,0	3


Antenna factor at 3m distance
Schwarzbeck VULB 9160 Broad Band Antenna
S/N: 9160-3023 with Cable AK 9513
AF dB/m
Antenna Factor (dB/m)
38,0
36,0
34,0
32,0
30,0
28,0
26,0
24,0
22,0
20,0
18,0
16,0
14,0
12,0
10,0
8,0
6,0
4,0
2,0
0,0
0,0
200,0
400,0
600,0
800,0
1000,0
1200,0
1400,0
1600,0
1800,0
2000,0
Frequency (MHz)
03.02.2009
Version 1.0
Dipl. -Ing. (FH) Sven Eric Weber

8. Measurement uncertainly

Übersicht der Messunsicherheiten

Nach CISPR 16-4, Teil 4 „Uncertainty in EMC measurements" und
"ISO Guide to the Expression of uncertainty in Measurements"
Stand: 09/2010, Dipl. –Ing. (FH) Sven Eric Weber

Störaussendungen/Emission:

Prüfung	Norm	Details	Betrag	Bemerkung
Messung der Störspannung	CISPR16/11/22	9kHz-150MHz (Band A)	3,32dB	Netznachbildung ESH3-2Z5 + ESPC
Messung der Störspannung	CISPR16/11/22	150kHz-30MHz (Band B)	3,35dB	Netznachbildung ESH3-2Z5 + ESPC
Messung der Störleistung	CISPR16/13/14	30MHz-300MHz (Band C)	3,74dB	MDS21 + ESPC
Messung der Störfeldstärke (SAC)	CISPR16/11/22	30MHz-1000MHz (Band C/D)	4,05dB	VULB9160 + ESBI
Messung von magnetischen Feldern	EN62233	10Hz bis 120kHz	6,04%	ELT-400
Messung von Oberschwingungen	EN61000-3-2	AC-Einphasig, 110-230V, 50Hz	4,65%	PAS5000 + ARS 16/1
Messung von Flicker	EN61000-3-3	AC-Einphasig, 110-230V, 50Hz	4,69%	PAS5000 + ARS 16/1

Störfestikeit/Immunity:

Prüfung	Norm	Details	Betrag	Bemerkung
Elektrostatische Entladung	EN61000-4-2	150pF, 330Ohm	6% I_{peak} ; 2,5% U	SESD3000
Einstrahlung elektromagnetisches Feld	EN61000-4-3	80MHz-6000MHz	2,44dB	SAC-Halle (0-6dB Feldhomogenität)
Schnelle Transienten	EN61000-4-4	5kHz Wiederholrate	10% U_{PK}	Kompaktgenerator UCS 500
Schnelle Transienten	EN61000-4-4	100kHz Wiederholrate	10% U_{PK}	Kompaktgenerator TRA 2000
Stoßspannungen	EN61000-4-5	HV Out, AC-Coupling	10% U,I	Kompaktgenerator UCS 500
Geleitete Hochfrequenz	EN61000-4-6:2009	150kHz bis 80MHz	1,16dB	CDN + NSG4070
Geleitete Hochfrequenz	EN61000-4-6:2009	150kHz bis 80MHz	3,11dB	EM101 + NSG4070
Geleitete Hochfrequenz	EN61000-4-6:2009	150kHz bis 80MHz	3,26dB	CIP + NSG4070
Immunität gegenüber Magnetfeldern	EN61000-4-8	50Hz, 60Hz	6,10%	Rahmen: d=1m
Netzunterbrechungen	EN61000-4-11	50Hz, 60Hz	3%-U; 5µs-T	PAS5000

Die Ermittlung der Gesamtunsicherheit wurde nach der „Ermittlungsmethode B" vorgenommen. Die ausführlichen Abschätzungen und Berechnungen wurden in einem gesonderten Dokument aufgestellt. Dieses kann beim Labor eingesehen werden.

Es wird angenommen, dass der Prüfling die Prüfung bestanden hat, wenn er die angegebenen Bewertungskriterien bei festgelegtem oder einem höherem Schärfegrad erfüllt. Die in den Grundnormen aufgeführte Messunsicherheit bei den Kalibierverfahren wurde berücksichtigt.

Für die Konformitätsbewertung kommt der in der Norm beschriebene Grenzwert ohne die Einhaltung eines Sicherheitsabstandes zur Anwendung. Danach hat der Prüfling bestanden, wenn der Messwert kleiner oder gleich dem Grenzwert ist.

9. Photo of E. u. T.