



Test report

CO239_01.DOC

EUT: Industrial Power Supply
Type: FP-050PSM184
Tested type: TCL 060-124C

Production level: 09/2002
S/N: 0229 690

Manufacturer: Convertec Ltd.
Whitemill Industrial Estate
Wexford
Republic of Ireland

Measurement procedure: EMC review of the EUT according to the conformity with the provisions of 89/336/EEC Directive related standards:
EN 55011:1998 + A1:1999

The standards were : ☒ kept
☐ not kept

Applicant: Convertec Ltd.
Whitemill Industrial Estate
Wexford
Republic of Ireland

Contact person: Mr. Kevin Burke

Arrival of EUT: 09/11/2002

ID of EUT: PR237_10

Date(s) of test of EUT: 09/27/2002

Remark:

The test results effects only to the relate items tested. The test report shall not be reproduced except in full without the written approval of the testing laboratory



Test laboratory: EMCE GmbH Ingenieurbüro für EMV-Prüfungen
und Schaltungsentwicklung
Laupheimer-Str. 25d
88483 Burgrieden / Germany
DAR-Registrierungsummer: TTI-P-G164/98
FCC Registration No. 90568

Test engineer: Mr. Chr. Vogelmann
EMCE GmbH Ingenieurbüro für EMV-Prüfungen
und Schaltungsentwicklung

EUT description: Industrial power supply with single fixed output voltage 24V_{dc} at
max. output current 2.5A. Input supply range 100-240VAC.

EUT size: 105x45x75 mm (LxWxH)

Used accessories:

Designation	Type	Manufacturer	S/N
Variable resistor	13Ω/650W	Frizlen	Inv.Nr. 541
Multimeter	Fluke 77A	Fluke	Inv.Nr. 506
Multimeter	Protek 506	Protek	Inv.Nr. 573

EUT configuration:

Harness	Type	Length	Remarks
Mains cord	H05VV-F 3G0.75mm ²	1.4m	L/N/PE
DC	H03VVH2-F 0.75mm ²	1.4m	+/-

Additional information: According customer request, only the radiation was tested.



List of valid equipment

<input checked="" type="checkbox"/>	Inv-Nr.	Designation	Type	Manufacturer	S/N
<input checked="" type="checkbox"/>	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	002	Probe	ESH2-Z3	Rohde & Schwarz	-
<input checked="" type="checkbox"/>	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
	008	Antenna 9kHz - 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
	009	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
<input checked="" type="checkbox"/>	010	Antenna 250 - 1200MHz	UHALP 9108A	Schwarzbeck	108
<input checked="" type="checkbox"/>	011	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
	012	Antenna 250 - 1200MHz	UHALP 9108A	Schwarzbeck	166
	013	Antenna 9kHz - 30MHz	Loop antenna 1.5m	EMCE GmbH	-
	014	Open area test site	3m	EMCE GmbH	-
<input checked="" type="checkbox"/>	015	Open area test site	10m	EMCE GmbH	-
	019	Burst generator	PEFT / PHV 41.2	Haefely	082948-50
	020	Coupling clamp	IP4A	Haefely	082672-13
	022	ESD-Gun	NSG 435	Schaffner	577
	024	HF-Generator	SMY01	Rohde & Schwarz	844146/046
	025	Current clamp BCI	F-120-2	FCC	47
	026	Coupling device network	CDN 801-M3-25	FCC	92
	027	Surge Generator	Transient 1000	EMC-Partner AG	TRA1000-85
	029	HF Amplifier	10W1000	Amplifier Research	10576
	030	Coupling device network	CDN-S9	EMCE GmbH	-
	031	Coupling device network	CDN-S9	EMCE GmbH	-



<input checked="" type="checkbox"/>	Inv-Nr.	Designation	Type	Manufacturer	S/N
	032	HF Amplifier	75A250	Amplifier Research	22789
	033	Coupling device network	CDN-AF2	EMCE GmbH	
	034	Coupling device network	CDN-AF2	EMCE GmbH	
	035	3-Phase Coupling network	CDN-1000	EMC-Partner AG	CDN-1000-45
	036	Coupling device network	CDN-M5-25	EMCE GmbH	
	037	Coupling device network	CDN-S1	EMCE GmbH	
	038	Helmholtz coil	Rectangular 1x1m	EMCE GmbH	
	039	Helmholtz coil	Rectangular 1x1m	EMCE GmbH	
	040	Current transformer		EMCE GmbH	
	041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020
	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/0 0501
	xx	Susceptibility test equipment according EN 61000-4-3	Full anechoic chamber 3m test site	Siemens	xx



Scope:

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1 EMC - Test(s)

1.1 *Emission according EN 55011:1998 + A1:1999*

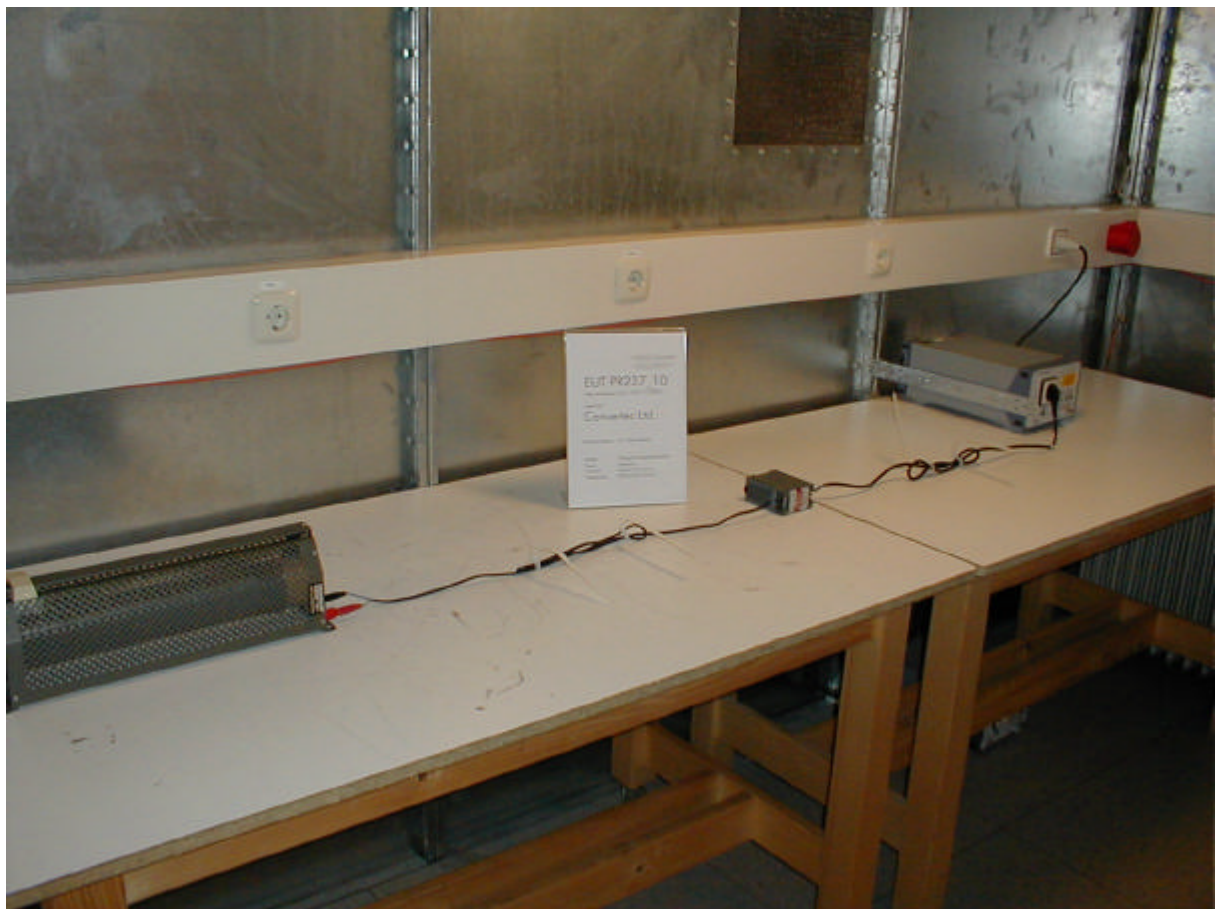
1.1.1 Conducted emission according EN 55011:1998 + A1:1999

1.1.1.1 *Test setup*

According EN 55011:1998 + A1:1999

Test location: ☒ Shielded room ☐ Laboratory
☐ _____

☒ The test equipment was checked and complied to the requirements.





1.1.1.2 Test

Regulation:

EN 55011:1998 + A1:1999

☐ 9kHz - 30MHz
 ☒ 150kHz - 30MHz

ISM-Classification ☒ Group 1* ☐ Group 2**
 Limits: ☒ Class B ☐ Class A

*Group 1 comprises all ISM appliances, which use rf energy for internal functions.

**Group 2 comprises all ISM appliances, which use rf energy for tooling material.

Operation mode:

EUT arrangement: ☒ Tabletop ☐ Floor standing

Port #	Lead	Remarks
#1	Mains supply	L1/N/PE
#2		
#3		

Continuous operation with different load conditions on the secondary side. The EUT was tested with maximum load current 2.6A and with medium load current 1.6A.

Environmental conditions:

Temperature: 15 - 35 °C
 Humidity: 30 - 60 %
 Air pressure: 860 - 1060 hPa

The environmental conditions during the test:
 ☒ were kept
☐ were not kept



Test results:

Measurements are made with a CISPR receiver. If the emanation is closer than 6dB to the limits or more, the receiver will stop and measure the exact value with quasipeak or average. The frequency, the maximum quasipeak value and the limit will be printed out.

Summary:

Limits for continuous disturbances:

☒
☐

kept
not kept

| Remarks: xx

Protocol scope:

☒
☒

Readings
Diagram continuous emanations



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

27. Sep 02 17:51

EUT: 050PSM184C
Manuf: Convertec Ltd.
Op Cond: Half load 1.6A
Operator: Mr. Hauser
Test Spec: EN 55011 ISM-Appliances Class B
Comment: Test_ID EUT PR237_10
CO239L01, Phase L1

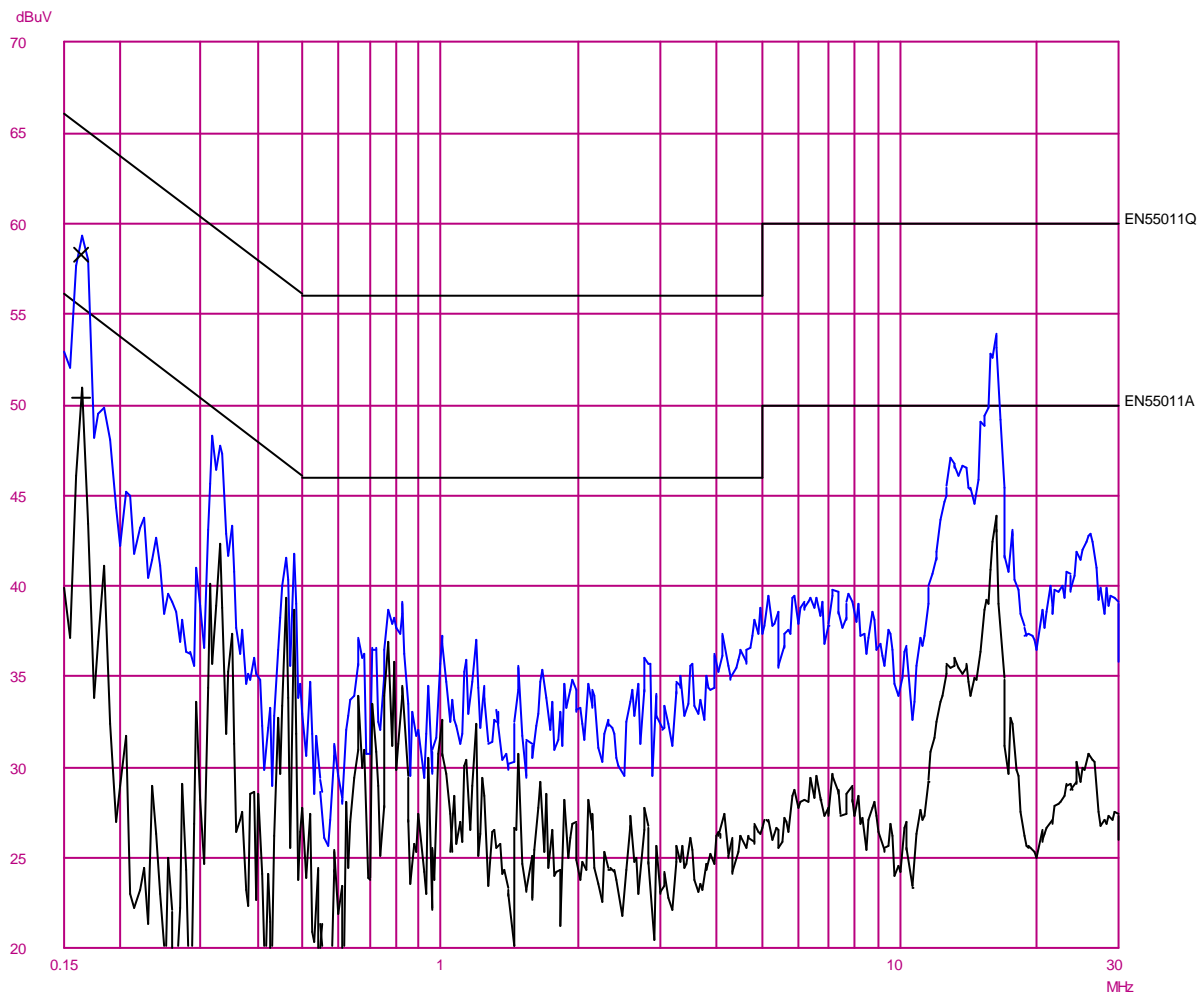
Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV

Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m





EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

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CO239L01, Phase L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV
0.16500	58.2	65.2

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV
0.16500	50.4	55.2

*v1S * limit exceeded*v0S



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

27. Sep 02 18:11

EUT: 050PSM184C
Manuf: Convertec Ltd.
Op Cond: Half load 1.6A
Operator: Mr. Hauser
Test Spec: EN 55011 ISM-Appliances Class B
Comment: Test_ID EUT PR237_10
CO239N01, Phase N

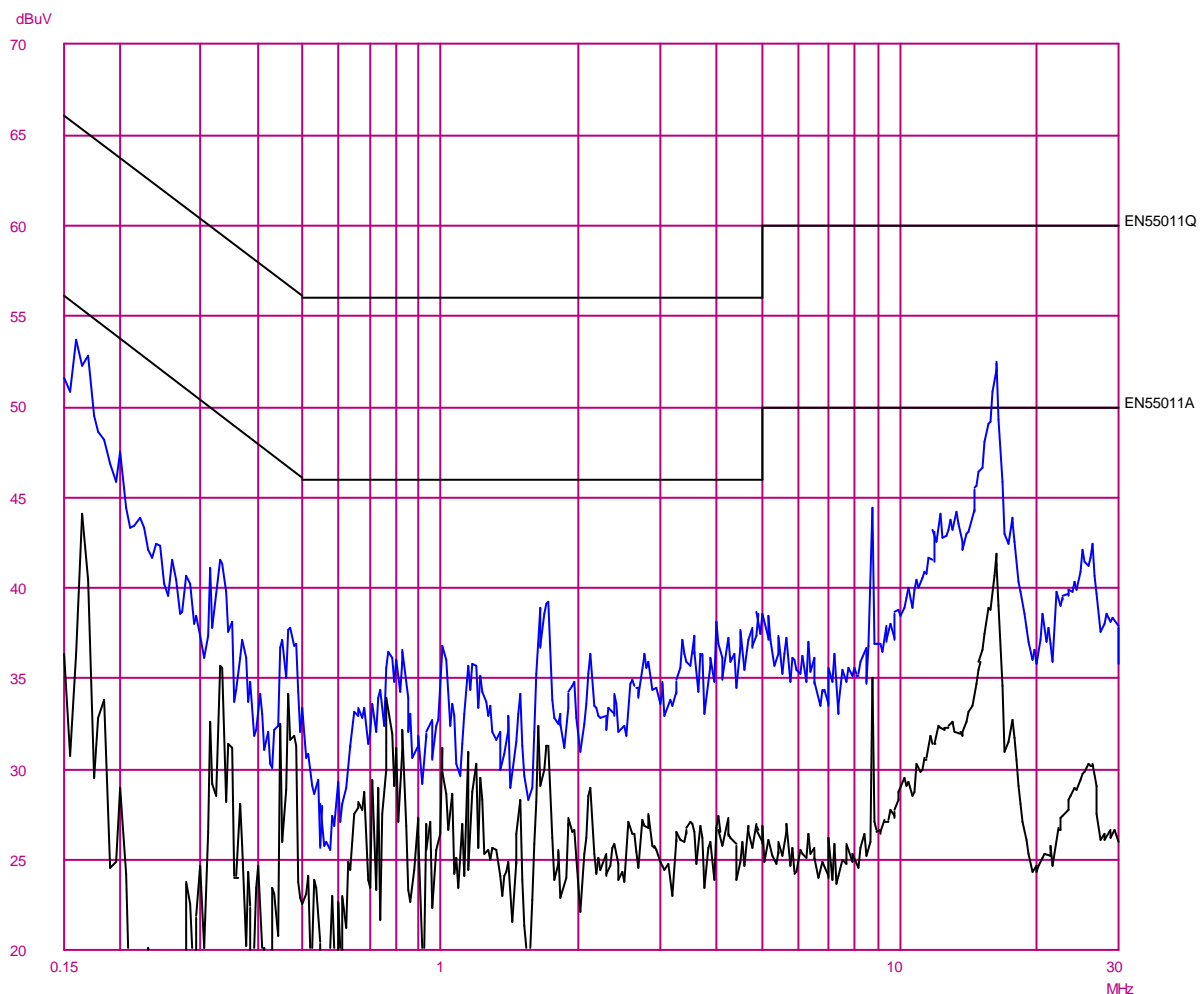
Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV

Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m





EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

27. Sep 02 18:11

EUT: 050PSM184C
Manuf: Convertec Ltd.
Op Cond: Half load 1.6A
Operator: Mr. Hauser
Test Spec: EN 55011 ISM-Appliances Class B
Comment: Test_ID EUT PR237_10
CO239N01, Phase N

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

no Results



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

27. Sep 02 11:29

EUT: 050PSM184C + Stray cap shorted
Manuf: Convertec Ltd.
Op Cond: max load 2.6 A
Operator: Mr. Vogelmann
Test Spec: EN 55011 ISM-Appliances Class B
Comment: Test_ID EUT PR237_10
CO239_11, Phase L / LISN #003

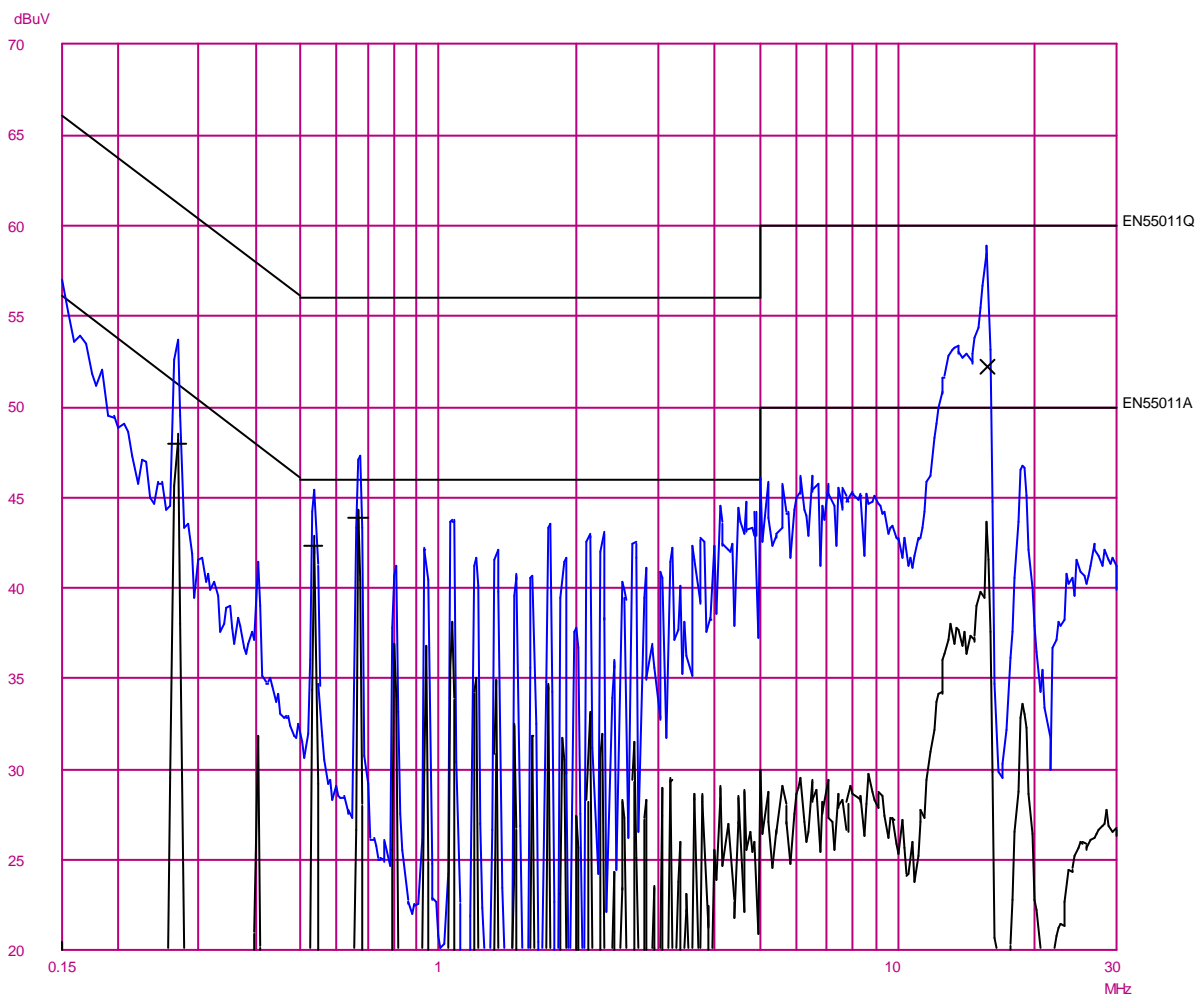
Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV

Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m





EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

27. Sep 02 11:29

EUT: 050PSM184C + Stray cap shorted
 Manuf: Convertec Ltd.
 Op Cond: max load 2.6 A
 Operator: Mr. Vogelmann
 Test Spec: EN 55011 ISM-Appliances Class B
 Comment: Test_ID EUT PR237_10
 CO239_11, Phase L / LISN #003

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV
15.69500	52.1	60.0

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV
0.27000	47.9	51.1
0.53500	42.3	46.0
0.67000	43.8	46.0

*v1S * limit exceeded*v0S



EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

27. Sep 02 11:41

EUT: 050PSM184C + Stray cap shorted
Manuf: Convertec Ltd.
Op Cond: max load 2.6 A
Operator: Mr. Vogelmann
Test Spec: EN 55011 ISM-Appliances Class B
Comment: Test_ID EUT PR237_10
CO239_12, Phase N / LISN #003

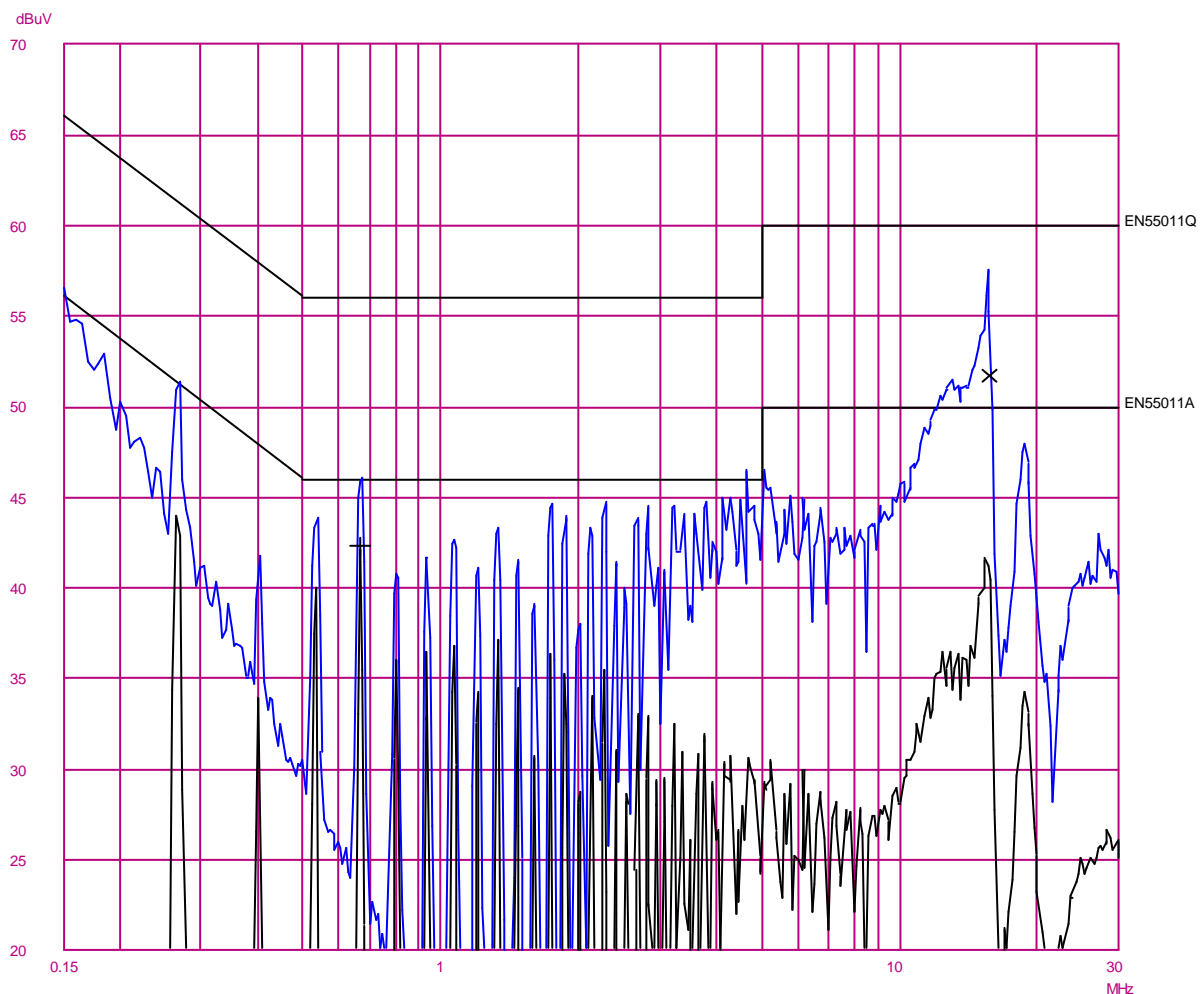
Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV

Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m





EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

27. Sep 02 11:41

EUT: 050PSM184C + Stray cap shorted
 Manuf: Convertec Ltd.
 Op Cond: max load 2.6 A
 Operator: Mr. Vogelmann
 Test Spec: EN 55011 ISM-Appliances Class B
 Comment: Test_ID EUT PR237_10
 CO239_12, Phase N / LISN #003

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV
15.62000	51.6	60.0

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV
0.67000	42.2	46.0

*v1S * limit exceeded*v0S



1.1.2 Radio disturbances according EN 55011:1998 + A1:1999

1.1.2.1 Test setup

According EN 55011:1998 + A1:1999

Test location:

Precompliance

☐

Shielded room

☐

Laboratory

Full compliance

☐

Anechoic chamber

☐

OATS 3m

☒

OATS 10m

☒

The test equipment was checked and complied to the requirements.





1.1.2.2 Test

Regulation:

EN 55011:1998 + A1:1999

☐

9kHz - 30MHz

☐

150kHz - 30MHz

☒

30MHz - 1000MHz

☐

11,7 – 12,7GHz

ISM-Classification

☒

Group 1*

☐

Group 2**

Limits:

☒

Class B

☐

Class A

*Group 1 comprises all ISM appliances, which use rf energy for internal functions.

**Group 2 comprises all ISM appliances, which use rf energy for tooling material.

Operation mode:

EUT arrangement:

☒

Tabletop

☐

Floor standing

Continuous operation with maximum load current 2.6A as worst case.

Environmental conditions:

Temperature: 15 - 35 °C

Humidity: 30 - 60 %

Air pressure: 860 - 1060 hPa

The environmental conditions during the test:

☒

were kept

☐

were not kept

Test results:

Measurements are made with a CISPR receiver. If the emanation is closer than 6dB to the limits or more, the receiver will stop and measure the exact value with quasipeak or average. The frequency, the maximum quasipeak value and the limit will be printed out.



Summary:

Limits for continuous disturbances:



kept



not kept

Remarks: xx

Protocol scope:



Readings - Antenna horizontal polarized.



Diagram radio disturbances - Antenna horizontal polarized.



Readings - Antenna vertical polarized.



Diagram radio disturbances - Antenna vertical polarized.



Precompliance measurement(s).



Readings - Antenna horizontal polarized

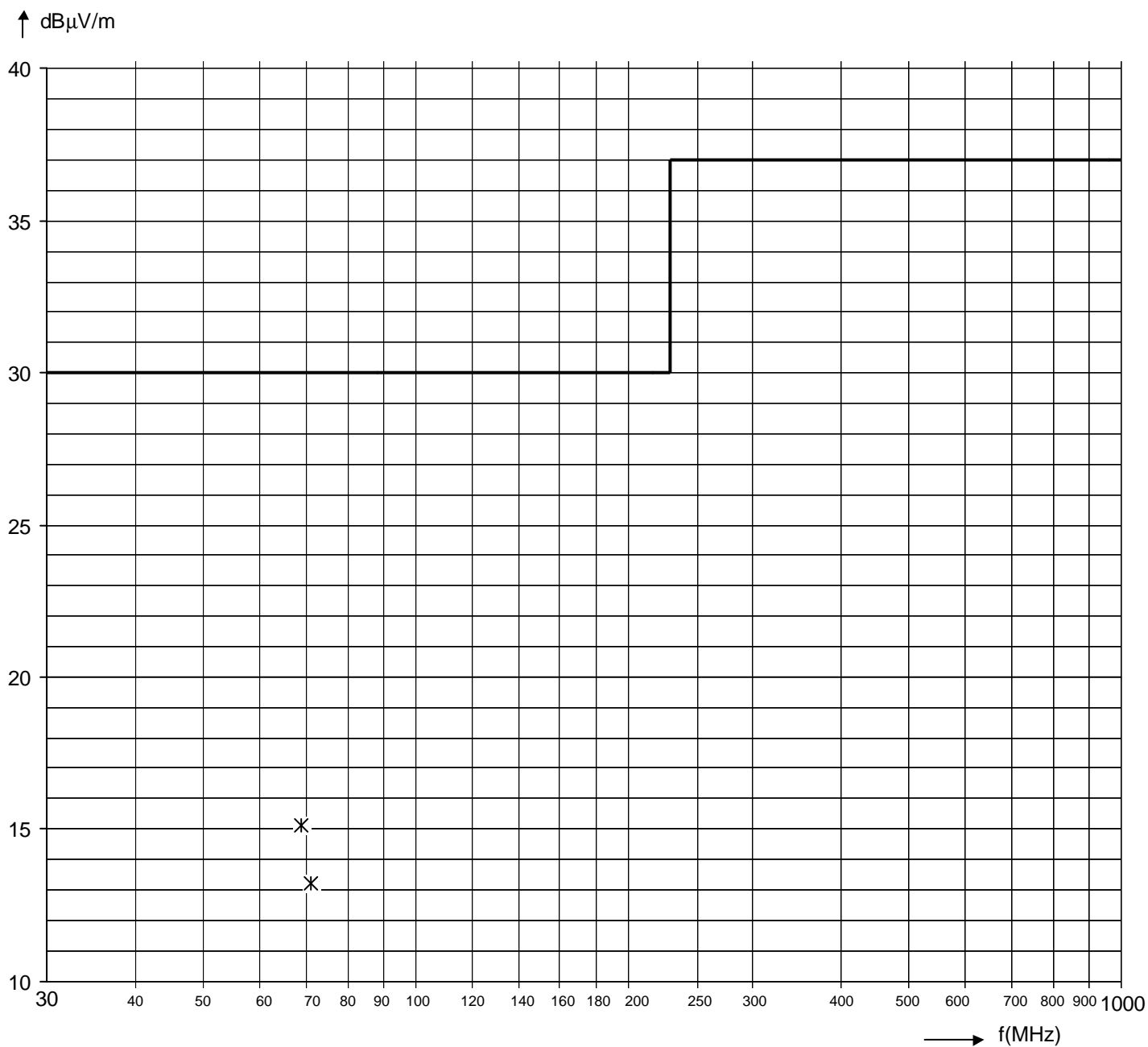
Frequency	Measured	+ AF	+ KF	Emission	Limit	Difference	Ant.-	Ant.-
MHz	value	dB/m	dB		dB μ V/m	dB μ V	Height	Polar.
	dB μ V	Antenna	Cable	dB μ V/m			meter	H/V
69.000	5.0	8.5	1.6	15.1	30.0	14.9	3.5	H
71.000	3.0	8.6	1.7	13.2	30.0	16.8	3.5	H



Diagram radio disturbances - Antenna horizontal polarized

Limits according EN 55011:1998 + A1:1999

☐ Class A
☒ Class B





Readings - Antenna vertical polarized

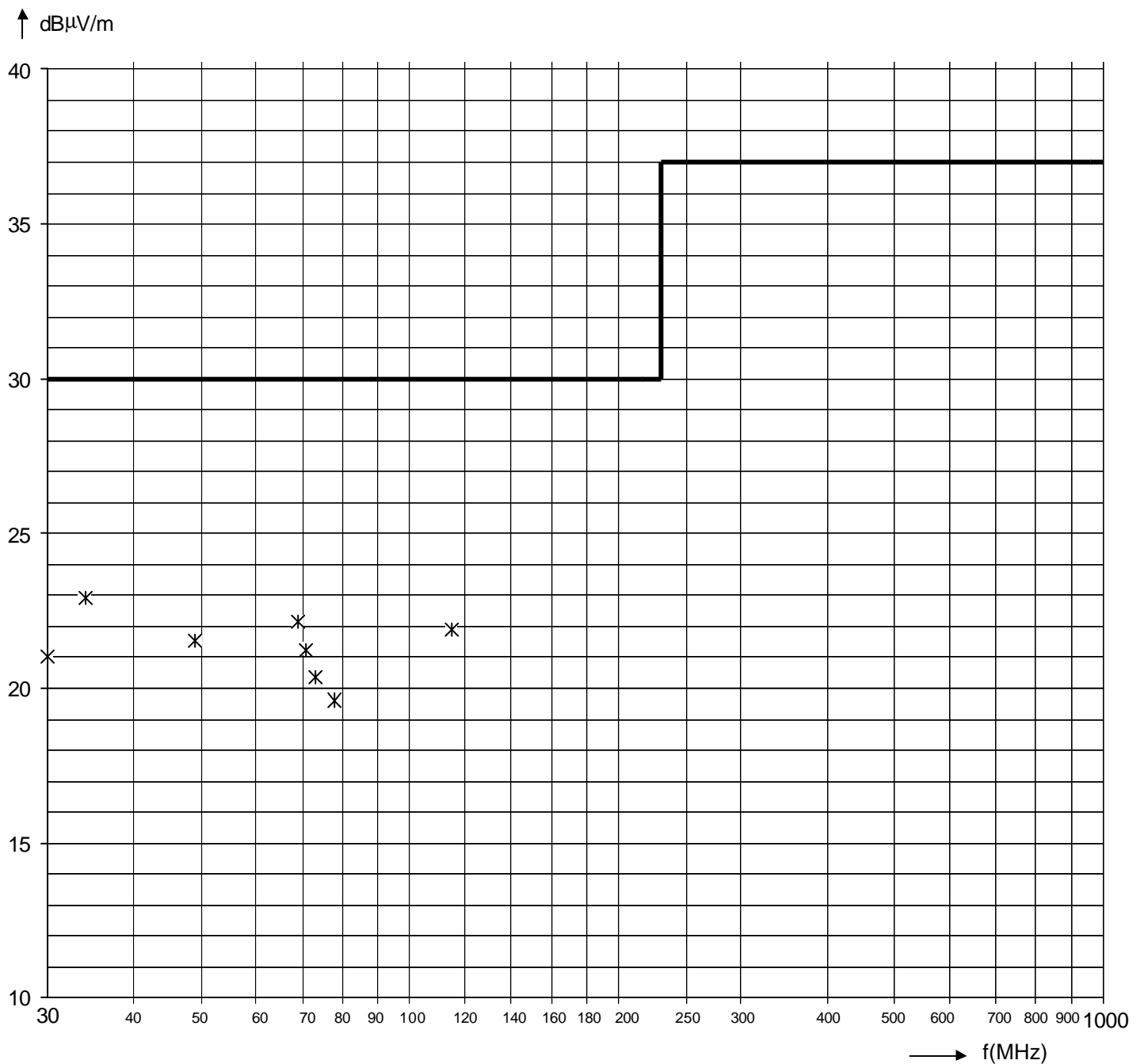
Frequency	Measured	+ AF	+ KF	Emission	Limit	Difference	Ant.-	Ant.-
MHz	value	dB/m	dB		dB μ V/m	dB μ V	Height	Polar.
	dB μ V	Antenna	Cable	dB μ V/m			meter	H/V
30.000	7.0	13.0	1.0	21.0	30.0	9.0	1.0	V
34.000	11.0	10.8	1.1	22.9	30.0	7.1	1.0	V
49.000	12.0	8.2	1.3	21.5	30.0	8.5	1.0	V
69.000	12.0	8.5	1.6	22.1	30.0	7.9	1.0	V
71.000	11.0	8.6	1.7	21.2	30.0	8.8	1.0	V
73.000	10.0	8.7	1.7	20.3	30.0	9.7	1.0	V
78.000	9.0	8.9	1.8	19.6	30.0	10.4	1.0	V
115.000	9.0	10.7	2.2	21.9	30.0	8.1	1.0	V



Diagram radio disturbances - Antenna vertical polarized

Limits according EN 55011:1998 + A1:1999

☐ Class A
☒ Class B





2 Summary

Regulation	Class / Test level	Result	Remark(s)
EN 55011:1998 + A1:1999			
Conducted emission [0.15-30MHz]	B	Limits kept	
Radiated emission [30-1000MHz]	B	Limits kept	

Burgrieden, 09/28/2002


 Dipl.Ing.(FH) Christian Vogelmann


 Dipl.Ing.(FH) Erik Felser