Test Report

No. 300055.001
for KFMxx_e

Test Laboratory:	Kontron embedded computers GmbH
	Oskar von Miller Straße 1 85386 Eching Germany
Applicant:	Kontron embedded computers GmbH
Purpose of Testing:	To show compliance with
CE	EN 55022: 1998
CE	EN 61000-3-2: 1995 + A1:1999 + A2: 1998
CE	EN 61000-3-3: 1994
CE	EN 61000-4-3: 1998
CE	EN 61000-4-2: 1995
CE	EN 61000-4-4: 1995
CE	EN 61000-4-5: 1995
CE	EN 61000-4-6: 1997
CE	EN 61000-4-8: 1993
CE	EN 61000-4-11: 1995
Special Measurement:	
	(see section "Reference Standards" for identical national standards)

Note:
The test data of this report relate only to the individual item tested.
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1. Table of Contents

2.0 Administrative Data

Equipment under test:	Flat monitor KFM15_e ; KFM18_e
optional Equipment under test:	
Options/accessories:	
Serial number:	
Version of EUT:	
Applicant (full address):	Kontron embedded computers GmbH
Contract identification:	
Contact person:	Wagner R., -160
Manufacturer:	Kontron embedded computers GmbH
Receipt of EUT:	07/01/2002
Date of test:	07/01/2002
Date of report	11/19/2002
Tested by:	Novak H.
Test report by:	Novak H.

3. Summary of Test Results

The tested sample fully complies with the requirements set forth in

EN 55022: 1994 (conducted) +
EN 55022/A1: 1995

EN 61000-3-2: 1995 + A1:1999 + A2:1998

EN 61000-3-3: 1995

EN 61000-4-2: 1995

EN 61000-4-3: 1998

EN 61000-4-4: 1995

EN 61000-4-5: 1995

EN 61000-4-6: 1996

EN 61000-4-8: 1993

EN 61000-4-11 1995

(see section "Reference Standards" for identical national standards)

Riegert M.
Technical Manager

Novak H.
Test Engineer

4. Data of Operation Mode and Configuration of EUT

4.2 Operation Mode

Special Susceptibility tests:	
Susceptibility tests:	TSCAD, H - Pattern

9.1 Configuration of Cables of EUT

Shielded data cables connected.

Aren´t applicable (All tests were performed with Eupen EMC power cable).

9.2 Configuration of EUT

Reference System	(1U) MBx101
CPU-Board	ASUS CUW-FX
CPU:	Pentium III 850MHz
Memory:	256 MB
Hard disk drive:	Maxtor 2B020H1
CD-ROM:	Toshiba XM-1602B
Floppy disk drive:	Panasonic JU226A
VGA	on Board
SCSI-Controller:	on board
Power supply:	MPW-6150F
Operating-System	WIN 98
Soundcard	On Board
EUT Power supply:	SNP-Z10

4.5 Configuration of Peripherals of EUT

PCI optional card 1	none
PCI optional card 2	none
VGA cable optional:	none
Power optional	none
VGA (shielded):	≤ 13m
Ethernet (shielded):	none
LPT1:	none
COM1:	≤ 1,5m
COM2:	none
COM3:	none
TV (56-1035)	≤ 1m
USB 1:	≤ 1m
USB 2:	none
Headset:	none
SCSI:	none
PC-Card (PCMCIA)	none
Keyboard (< 1m):	PM-EM-9599.01
Mouse (≤ 1m):	PM-EM-8524.01; -8525.01
Monitor:	KFM15”
Monitor optional:	KFM18”
Configuration optional	none

5. Performed Tests and Results

Test	Classification/Result-CE	Note
EN 55022: 1998	The requirements are fulfilled for CE certification see point 6.	KFM18_e Class A KFM15_e Class B
EN 61000-3-2: 1995 + A1: 1999 + A2: 1998	The requirements are fulfilled for CE certification see point 6.	PASS Class D
EN 61000-3-3: 1995	The requirements are fulfilled for CE certification see point 6.	PASS
EN 61000-4-2: 1995	The requirements are fulfilled for CE certification see point 6.	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)
EN 61000-4-4: 1995	The requirements are fulfilled for CE certification see point 6.	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)
EN 61000-4-5: 1995	The requirements are fulfilled for CE certification see point 6.	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)
EN 61000-4-6: 1996	The requirements are fulfilled for CE certification see point 6.	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
EN 61000-4-8: 1993	The requirements are fulfilled for CE certification see point 6.	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
EN 61000-4-11: 1994	The requirements are fulfilled for CE certification see point 6.	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)

6. Annotations to Performed Tests and to CE certification

EMC-CE Basic Standard EN 50081 / EN 50082

Generic Standard for Immunity-Product Standard for Information technology equipment EN 50082-2 March.95 (published Sept.1995 in the OJ)

IEC 61000-3-2 (EN 61000-3-2) do 01.07.2001

Limits for harmonic currents emissions (Equipment input current less than or equal to 16 A per phase; ≤75W) PowerFactorCorrector

IEC 61000 PT3-3 (EN 61000-3-3) do 01.07.2001

Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A/≤75W PowerFactorCorrector

IEC 61000 PT4-2, ESD (EN 61000-4-2)

4kV Contact, 8 kV Air, Criterion B

IEC 61000 PT4-3, Radiated Field (EN 61000-4-3 and ENV 50204)

10V/m, 80-1000 MHz, 80% AM, Criterion A (87-108 MHz & 174-230 MHz & 470-790 MHz only 3V/m), 900±5 MHz pulse modulated

IEC 61000 PT4-4, BURST (EN 61000-4-4)

1 kV data cables, Criterion B

2 kV power supply and control-cables, Criterion B

power supply and control-cables longer than 3 m

IEC 61000 PT4-5, SURGE (EN61000-4-5) do 01.07.2001

With AC input/output lines, the EUT undergoes three positive as well as three negative impulses

DC In/Output 0,5 kV common and differential mode

AC Input port: 1kV common/2 kV differential mode

data cables: 2kV all cables longer than 3 m

1.2/50µs, Criterion B

(symmetrically and asymmetrically) at 90°, the same at 180° and at 270°.

IEC 61000 PT4-6, Radio-frequency common mode (EN 61000-4-6)

Refers to the conducted immunity requirements of electrical and electronic equipment to electromagnetic disturbance from intended radio-frequency (RF) transmitters in frequency range 9kHz to 80MHz. Does not include equipment not having at least one conducting cable (i.e. mains supply, signal line or earth connection) which can couple the equipment to the disturbing RF.

on power supply and data lines: 10V, 0,15-80 MHz, (47-68 MHz, 3V), 80% AM, 150 Ω, Criterion A

IEC 61000 PT4-8, Magnetic field (EN 61000-4-8)

50 Hz, 30 A/m only for system which have parts, they can be influenced by magnetic field. Criterion A (for Monitor H>3A/m Criterion B)

IEC 61000 PT4-11, Voltage dips (EN61000-4-11) **do 01.07.2001**

Voltage dips, short interruptions and voltage immunity tests AC Input: 30%—10ms and 60%—100ms reduction, Criterion B for 10ms, Criterion C for 100ms

EN 55022 Sept.98 (published 1999 in the OJ)

Conducted Emission (at the mains)

Class A:	**0,15 - 0,50 MHz**	**QP: 79**	**AV: 66 dBµV**
	0,50 - 30,0 MHz	**QP: 73**	**AV: 60 dBµV**
Class B:	**0,15 - 0,50 MHz**	**QP: 66-56**	**AV: 56-46 dBµV**
	0,50 - 5,0 MHz	**QP: 56**	**AV: 46 dBµV**
	5,0 - 30,0 MHz	**QP: 60**	**AV: 50 dBµV**

Conducted Emission (at the telecom terminal port))

Class A:	**0,15 - 0,50 MHz**	**QP: 97-87**	**AV: 84-74 dBµV**
	0,50 - 30,0 MHz	**QP: 87**	**AV: 74 dBµV**
Class B:	**0,15 - 0,50 MHz**	**QP: 84-74**	**AV: 74-64 dBµV**
	0,50 - 30,0 MHz	**QP: 74**	**AV: 64 dBµV**

Radiated Emission (for the 1m KONTRON distance, hitt with +10 dB(µV/m) **)**

Class A:	**30 - 230 MHz**	**40 dB(µV/m)/58,5**	**10m/1m**
	230 - 1000 MHz	**47 dB(µV/m)/58,5**	**10m/1m**
Class B:	**30 - 230 MHz**	**30 dB(µV/m)/48,5**	**10m/1m**
	230 - 1000 MHz	**37 dB(µV/m)/48,5**	**10m/1m**

Performed

ESD

At each test point 10 positive and 10 negative pulses are applied with a recovery time of at least 1 s.

Burst

Each AC/DC input/output line of the EUT undergoes with each single line and also all lines together of one port (N, L1, PE, GND, +XXV) positive as well as negative impulses for 2 minutes each.

Each DATA line of the EUT undergoes positive as well as negative impulses for 2 minutes each.

The test procedure is executed for every test level up to the highest test level. Test is executed up to the highest specified test level (250 V or 500 V or 1000 V or 2000 V or 4000 V). Higher levels include all lower levels, i.e. if a 2000 V test is performed, a 250 V, a 500 V and a 1000 V test must also be performed.

Surge

With AC input/output lines, the EUT undergoes three positive as well as three negative impulses (symmetrically and asymmetrically) at 90°, the same at 180° and at 270°.

DC input/output lines, data lines and shielded lines, undergo five positive as well as five negative impulses. DC input/output lines and data lines are tested symmetrically and asymmetrically.

The test procedure is executed for every test level up to the highest test level. Test is executed up to the highest specified test level (500 V or 1000 V or 2000 V or 4000 V). Higher levels include all lower levels, i.e. if a 2000 V test is performed, a 500 V and a 1000 V test must also be performed. Recovery time between the pulses is 60 seconds.

7. Referenced Regulations

(see section "Reference Standards" for identical national standards)

Regulation	Comment
EN 55022: 1998	Limits & methods of measurement of radio disturbance characteristics of information technology equipment
EN 61000-3-2: 1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 2: Limits for harmonic current emissions (Equipment input current less than or equal to 16 A per phase) PowerFactorCorrector
EN 61000-3-3: 1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A PowerFactorCorrector
EN 61000-4-2: 1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 2: Electrostatic discharge immunity test
EN 61000-4-4: 1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 4: Electrical fast transient/Burst immunity test
EN 61000-4-5: 1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 5: Surge immunity test
EN 61000-4-6: 1996	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 6: Immunity to conducted disturbances, induced by radio frequency fields
EN 61000-4-8: 1993	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 8: Power frequency magnetic field immunity
EN 61000-4-11: 1994	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 11:Voltage dips, short interruption, and voltage variations immunity
Special standard	

8. List of Test Equipment

8.1 Radio Interference Emission Testing

	Type	Model	Equipment No.	Calibration valid until	Manufacturer
✓	EMI test receiver	ESMI	PM-EM-3158-1	Aug. 03	Rohde & Schwarz
✓	LISN	ESH3-Z5	PM-EM-3142-1	Aug. 03	Rohde & Schwarz
	LISN	ESH3-Z5	PM-EM-7561-1	Aug. 03	Rohde & Schwarz
	LISN	ESH3-Z6	PM-EM-3136-1	Aug. 03	Rohde & Schwarz
	LISN	ESH3-Z6	PM-EM-3137-1	Aug. 03	Rohde & Schwarz
	LISN	ENV4200	PM-EM-7562-1	Aug. 03	Rohde & Schwarz
✓	Pulse limiter	ESH3-Z2	PM-EM-3180-1	none	Rohde & Schwarz
	Pulse limiter	ESH3-Z2	PM-EM-7563-1	none	Rohde & Schwarz
	Current clamp	ESH2-Z1	PM-EM-3140-1	Aug. 03	Rohde & Schwarz
	Current clamp	ESV-Z1	PM-EM-3140-1	Aug. 03	Rohde & Schwarz
	Current clamp	F-61	PM-EM-7554-1	none	FCC
	Current clamp	F-65-A	PM-EM-8543-1	none	FCC
	Current clamp	F-36-4	PM-EM-6173-1	none	FCC
	Current clamp	F-2000	PM-EM-6171-1	none	FCC
✓	RF relays matrix	PSU	PM-EM-6101-1	Aug. 03	Rohde & Schwarz
✓	HF room 10 kHz to 18 GHz	Shielded room	PM-EM-6172-1	none	Siemens Matsushita
	Drive quali comp.	----------	PM-EM-8500-1	--------	Kontron Elektronik

✓ (check mark in 1st column) = tested

8.2 Immunity Testing

	Type	Model	Equipment No.	Calibration valid until	Manufacturer
✓	Hybrid generator	NSG 650	PM-EM-3148-1	Jul.2003	Schaffner
✓	Coupling/decoupling network for NSG 650	CDN 110	PM-EM-3149-1	Jul.2003	Schaffner
✓	Coupling network for NSG 650 & CDN110	INA 202	PM-EM-4134-1	Jul.2003	Schaffner
✓	Coupling network for NSG 650 & CDN110	INA 204	PM-EM-4136-1	Jul.2003	Schaffner
✓	Coupling network for NSG 650 & CDN110	INA 206	PM-EM-4138-1	Jul.2003	Schaffner
	Coupling/decoupling network for NSG 650 (data line)	CDN 115	PM-EM-4140-1	Jul.2003	Schaffner
	40 Ω resistor for NSG 650 & CDN115	INA 110-40	PM-EM-7519-1	Jul.2003	Schaffner
✓	HF room 10 kHz to18 GHz	Shielded room	PM-EM-6172-1	----------	Siemens Matsushita
✓	ESD generator	NSG 435	PM-EM-9014	Mai. 03	Schaffner
✓	19" Rack EN61000- 3-2/3-3/ 4-8/4-11/4-13	PHE5000/ PAS	PM-EM-6519-1	none	Spitzenberger & SPIES
✓	Burst generator	NSG 2025	PM-EM-6162-1	Mai.03	Schaffner
✓	Capacitive coupling clamp	CDN 8014	PM-EM-3147-1	Mai. 03	Schaffner
	Oscilloscope	HM203-7	PM-EM-3184-1	Sept. 03	Hameg
	Digital multimeter	Fluke 83	PM-EM-7560-1	Sept. 03	FLUKE
	Coupling/decoupling network, coaxial lines	FCC-801-C1-N-50	PM-EM-7527-1	Jul. 2003	FCC
	Coupling/decoupling network, coaxial lines	FCC-801-C1-N-50	PM-EM-7529-1	Jul. 2003	FCC
	Coupling/decoupling network, single pole	FCC-801-M1-25	PM-EM-7531-1	Jul. 2003	FCC

✓ (check mark in 1st column) = tested

List of Test Equipment: Immunity Testing (continued)

	Type	Model	Equipment No.	Calibration valid until	Manufacturer
	Coupling/decoupling network, single pole	FCC-801-M2-25	PM-EM-7543-1	Jul. 2003	FCC
✓	Coupling/decoupling network, single pole	FCC-801-M3-25	PM-EM-7544-1	Jul. 2003	FCC
	EM clamp	F-203I-32mm	PM-EM-7534-1	Jul. 2003	FCC
	Decoupling clamp for EM clamp	F-203I-DCN-32mm	PM-EM-7535-1	Jul. 2003	FCC
✓	Current clamp 100 kHz to 230 MHz	F-120-9A	PM-EM-7546-1	Jul. 2003	FCC
✓	19" rack test system EN 61000-4-6	61000-4-6	PM-EM-7542-1	Jul. 2003	NeWeTec
	Current clamp	F-61	PM-EM-7554-1	none	FCC
	Current clamp	F-65A	PM-EM-7554-1	none	FCC
	Drive quali comp.	----------	PM-EM-8500-1	--------	Kontron Elektronik

✓ (check mark in 1st column) = tested

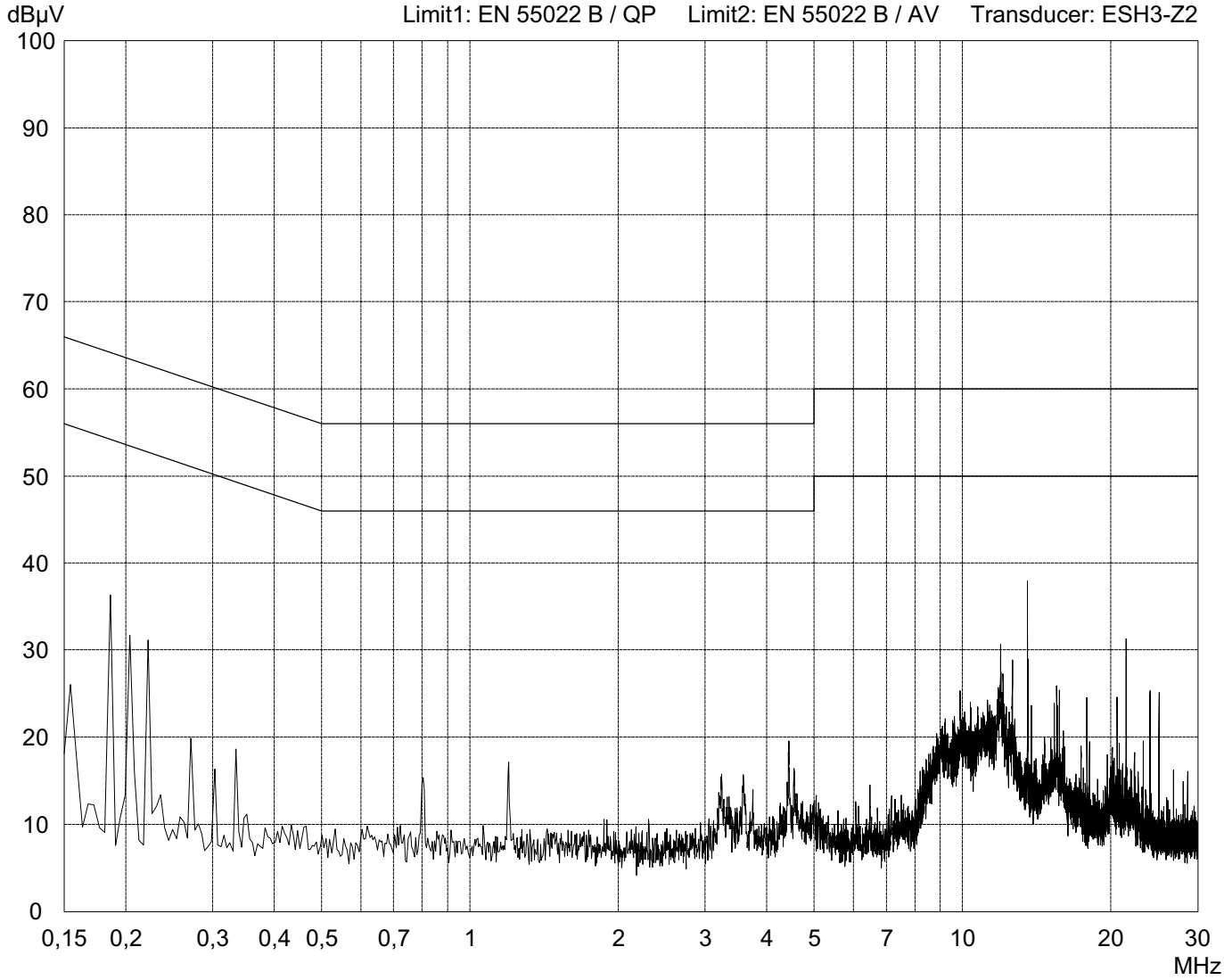
9. Test Report (Forms)

9.1 Test report EN 55022

Conducted Emission Test 150 kHz - 30 MHz
acc. to KE_150kHz-1gHz

Model: KFM15_e	Comment: WIN 98/screesaver VGA Cables 13 m
Serial no.: test	
Applicant: Wagner R.	
Test site: Shielded room PM-EM-6172-1	
Tested on: Linecord Phase L1	
Date of test: 11/18/2002 / Operator: H. Novak	
Test performed: automatically / File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin / 25 Subranges



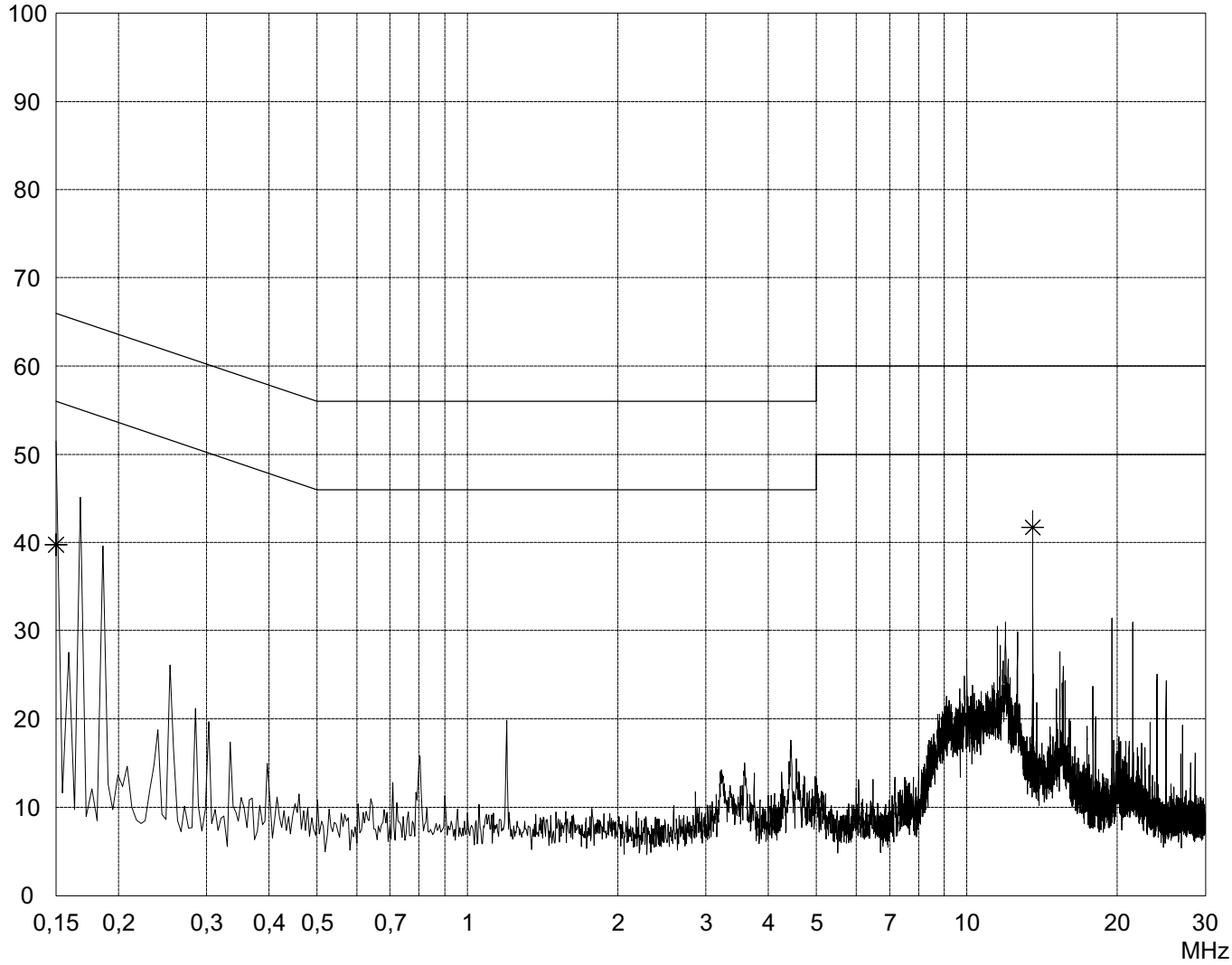
Result: PASS	Project file: 300055.001 / Page 16 of 40

Conducted Emission Test 150 kHz - 30 MHz
acc. to KE_150kHz-1gHz

Model: KFM15_e	Comment: WIN 98/screesaver VGA Cables 13 m
Serial no.: test	
Applicant: Wagner R.	
Test site: Shielded room PM-EM-6172-1	
Tested on: Linecord Phase N	
Date of test: 11/18/2002 / Operator: H. Novak	
Test performed: automatically / File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin 25 Subranges

dBµV Limit1: EN 55022 B / QP Limit2: EN 55022 B / AV Transducer: ESH3-Z2



Result: PASS	Project file: 300055.001

Kontron Embedded Computers AG / Oskar-von-Miller-Strasse 1 / D-85386 Eching bei Muenchen / Tel. +49 8165 77-0 / Fax +49 8165 77-222

Conducted Emission Test 150 kHz - 30 MHz
acc. to KE_150kHz-1gHz

Model: KFM15_e	Comment: WIN 98/screesaver VGA Cables 13 m
Serial no.: test	
Applicant: Wagner R.	
Test site: Shielded room PM-EM-6172-1	
Tested on: Linecord Phase N	
Date of test: 11/18/2002 / Operator: H. Novak	
Test performed: automatically / File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin / 25 Subranges

Frequency [MHz]	*Reading [dBµV]*	*Correction factor [dB]*	*Value [dBµV]*	*Limit [dBµV]*	*Limit exceeded*
0,150000	29,59	10,17	39,76	66,00	
13,560000	31,24	10,45	41,69	60,00	

Result: PASS	Project file: 300055.001

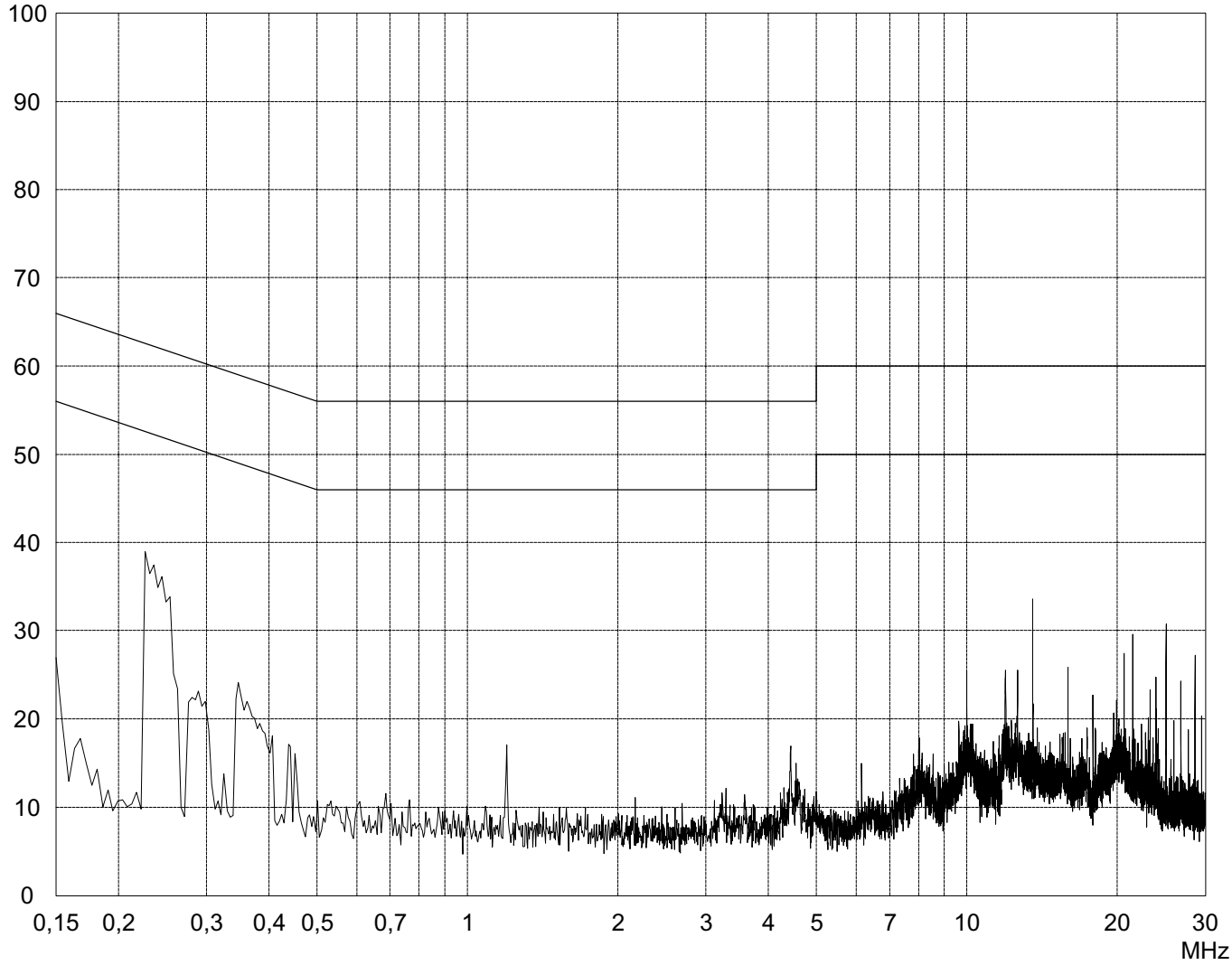
Kontron Embedded Computers AG / Oskar-von-Miller-Strasse 1 / D-85386 Eching bei Muenchen / Tel. +49 8165 77-0 / Fax +49 8165 77-222

Conducted Emission Test 150 kHz - 30 MHz
acc. to KE_150kHz-1gHz

Model: KFM18_e	Comment: WIN 98/sreensaver VGA Cables 13 m
Serial no.: test	
Applicant: Wagner R.	
Test site: Shielded room PM-EM-6172-1	
Tested on: Linecord Phase L1	
Date of test: 11/12/2002 / Operator: H. Novak	
Test performed: automatically / File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin 25 Subranges

dBµV Limit1: EN 55022 B / QP Limit2: EN 55022 B / AV Transducer: ESH3-Z2



Result:PASS	Project file: 300055.001

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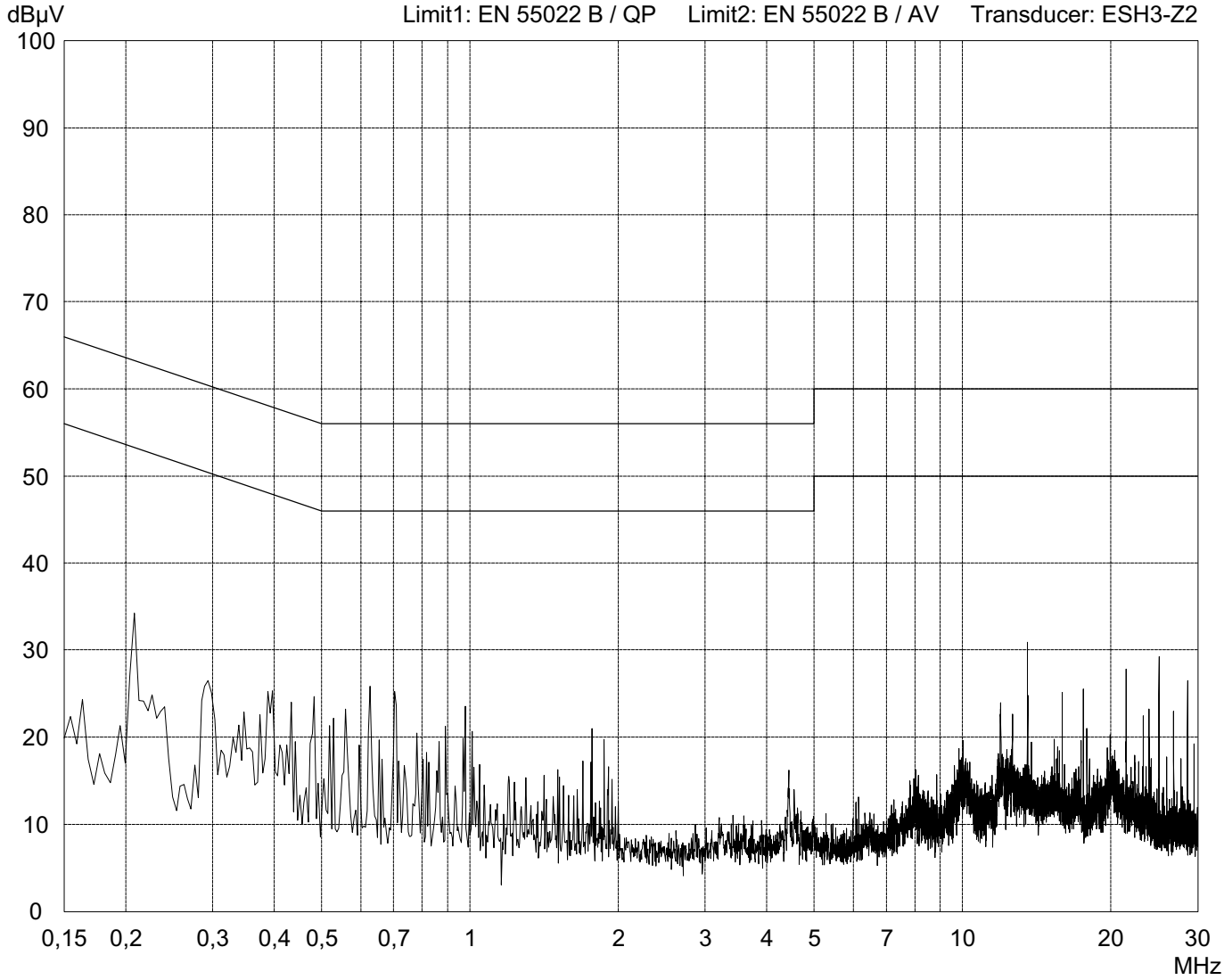
Conducted Emission Test 150 kHz - 30 MHz
acc. to KE_150kHz-1gHz

Model: KFM18_e	Comment: WIN 98/sreensaver VGA Cables 13 m
Serial no.: test	
Applicant: Wagner R.	
Test site: Shielded room PM-EM-6172-1	
Tested on: Linecord Phase N	
Date of test: 11/12/2002 / Operator: H. Novak	
Test performed: automatically / File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin / 25 Subranges



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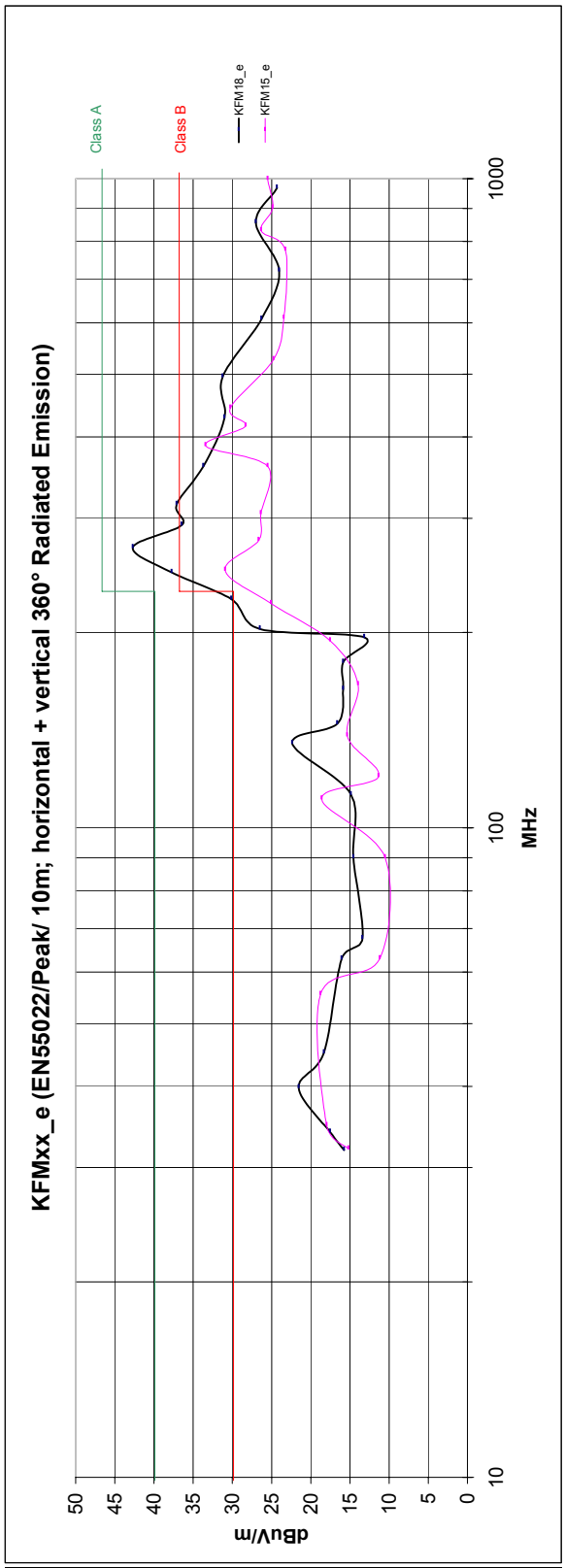

KFM18_e		KFM15_e	
Frequency	Value	Frequency	Value
MHz	dBuV/m	MHz	dBuV/m
31,92	15,75	32,04	15,18
34,02	17,53	34,8	17,95
39,84	21,52	55,44	18,74
45,06	18,31	62,94	11,18
62,82	16,04	90	10,5
67,56	13,41	110,88	18,59
90,06	14,56	120,06	11,34
112,56	14,86	138,6	15,33
135,06	22,38	166,38	13,97
144,66	16,61	194,16	17,51
163,56	15,88	221,78	25,06
180,12	15,88	249,5	30,94
196,62	13,17	277,22	26,64
202,64	26,5	305	26,35
225,14	30,15	360,44	25,49
247,64	37,73	388,16	33,44
270,2	42,7	415,88	28,32
292,7	36,49	443,6	30,24
315,2	37,1	526,76	24,75
360,26	33,69	609,92	23,42
427,82	31	776,3	23,23
495,32	31,24	831,74	26,31
607,88	26,27	901,94	24,87
720,5	24,03	998,06	25,48
855,62	27,02		
967,22	24,32		

9.2 Test Report EN 61000-3-2

Limits for harmonic currents emissions

(Equipment input current less than or equal to 16 A per phase)
PowerFactorCorrector

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-3-2: 1995
Requirements:	Harmonic n = 40; Unit: _Arms
Test result:	PASS
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 01 year: 02
Tested by:	Novak H.

Spitzenberger + Spies
Viechtach

Name:	Novak Hugo	Serial no:	prototyp
Department:	RD - S	Operating modes:	normal
Company:	Kontron Elektronik GmbH	Comment1:	PSU: SNP-Z10 Bicker
Test report no:		Comment2:	100W
Device:	KFM 15" 18"	Comment3:	--
Specimen:		Comment4:	--
Manufacturer:	Kontron	Date:	01.07.2002
Type:	--	Test date:	01.07.2002

Maximum RMS current and corresponding values in timewindow 1:

Voltage:	229.91 Vrms		THD=0.06 %	THV=0.145 V	POHV=0.026 V
Current:	0.303 Arms	-0.475 Apk	THD=17.21 %	THC=0.052 A	POHC=0.005 A
Power:	65.8 W	P1=65.8 W	69.8 VA		
Powerfactor:	0.944	CosPhi1: 0.958			

Testconditions: EN 61000-3-2 / A14, f=50 Hz, Phase=1, Range=0.80 A, Rated power: 100.0 W

HARMONIC ANALYSIS: Test PASS
Tobs = entire measurement POHC: avg=0.005 A, limits=0.028 A Rated power exceeded and changed to 65.85 W

Ha	Entire measurement (0.320 s = 1 time window(s))						Worst 2.5 min		Average		PASS	FAIL
	Maximum	Window	EN61000-3-2 Class D 50W	Margin in MaxWin	100 to 150%	Ex-ceeded	100 to 150%	Ex-ceeded	Value	Ex-ceeded		
DC	0.0012 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	-0.0012 A	0	X	
1	0.2989 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.2989 A	0	X	
2	0.0002 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0002 A	0	X	
3	0.0418 A	1	0.2239 A	-81.3 %	0	0	n.e.	n.e.	0.0418 A	0	X	
4	0.0001 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0001 A	0	X	
5	0.0263 A	1	0.1251 A	-78.9 %	0	0	n.e.	n.e.	0.0263 A	0	X	
6	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
7	0.0141 A	1	0.0658 A	-78.6 %	0	0	n.e.	n.e.	0.0141 A	0	X	
8	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
9	0.0051 A	1	0.0329 A	-84.4 %	0	0	n.e.	n.e.	0.0051 A	0	X	
10	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
11	0.0007 A	1	0.0230 A	-97.1 %	0	0	n.e.	n.e.	0.0007 A	0	X	
12	0.0001 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0001 A	0	X	
13	0.0029 A	1	0.0195 A	-85.1 %	0	0	n.e.	n.e.	0.0029 A	0	X	
14	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
15	0.0033 A	1	0.0169 A	-80.3 %	0	0	n.e.	n.e.	0.0033 A	0	X	
16	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
17	0.0039 A	1	0.0149 A	-73.9 %	0	0	n.e.	n.e.	0.0039 A	0	X	
18	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
19	0.0018 A	1	0.0133 A	-86.9 %	0	0	n.e.	n.e.	0.0018 A	0	X	
20	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
21	0.0016 A	1	0.0121 A	-86.7 %	0	0	n.e.	n.e.	0.0016 A	0	X	
22	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
23	0.0015 A	1	0.0110 A	-86.4 %	0	0	n.e.	n.e.	0.0015 A	0	X	
24	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
25	0.0023 A	1	0.0101 A	-77.5 %	0	0	n.e.	n.e.	0.0023 A	0	X	
26	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
27	0.0019 A	1	0.0094 A	-80.0 %	0	0	n.e.	n.e.	0.0019 A	0	X	
28	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
29	0.0017 A	1	0.0087 A	-80.2 %	0	0	n.e.	n.e.	0.0017 A	0	X	
30	0.0001 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0001 A	0	X	
31	0.0009 A	1	0.0082 A	-88.5 %	0	0	n.e.	n.e.	0.0009 A	0	X	
32	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
33	0.0015 A	1	0.0077 A	-80.3 %	0	0	n.e.	n.e.	0.0015 A	0	X	
34	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	
35	0.0014 A	1	0.0072 A	-80.3 %	0	0	n.e.	n.e.	0.0014 A	0	X	
36	0.0001 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0001 A	0	X	
37	0.0013 A	1	0.0069 A	-80.6 %	0	0	n.e.	n.e.	0.0013 A	0	X	
38	0.0001 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0001 A	0	X	
39	0.0010 A	1	0.0065 A	-84.3 %	0	0	n.e.	n.e.	0.0010 A	0	X	
40	0.0000 A	1	-.- - - -	- - - . -	0	0	n.e.	n.e.	0.0000 A	0	X	

9.3 Test Report EN 61000-3-3

Reactive Effects in Low Voltage Supply Systems

Part 3: Voltage Fluctuations (Flicker)

Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A. PowerFactorCorrector

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-3-3: 1995
Requirements:	Short-time flicker Pst ≤ 1 (Observations 1x1 min) sliding Plt ≤ 0,65; DC ≤ 3,0 (%); Dmax ≤ 4 (%); Dt > 3% (Sec)
Test result:	PASS
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 01 year: 02
Tested by:	Novak H.

Spitzenberger + Spies
Viechtach

Name:	Novak Hugo	Serial no:	prototyp
Department:	RD - S	Operating modes:	normal
Company:	Kontron Elektronik GmbH	Comment1:	PSU: SNP-Z10 Bicker
Test report no:		Comment2:	100W
Device:	KFM 15" 18"	Comment3:	--
Specimen:		Comment4:	--
Manufacturer:	Kontron	Date:	01.07.2002
Type:	--	Test date:	01.07.2002

Testconditions: 230 V / 50 Hz / Phase: 1 / Observations: 1 x 10 min

FLICKER: Test PASS!

Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
09:46:29	0.000	0.0090	- . - - - -	0.000	0.049	- . - - -	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.009000							X	
Evaluated: PST, PLT, Sliding PLT, dc, dmax, d(t)								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
09:46:29	0.000	0.0080	- . - - - -	0.000	0.033	- . - - -	X	
Plt: 0.008000								
Evaluated: PST <= 0.4 dmax < 20% dmax1								

9.4 Test Report EN 61000-4-2, Air discharge

Immunity to Electrostatic Discharges

Model:	KFM																		
Applicant:	Kontron embedded computers GmbH																		
Operation mode:	Test software: see Point 4.1 (Operation Mode)																		
Regulation(s):	EN 61000-4-2: 1995																		
Performed test:	Direct air discharge										Indirect air discharge								
Locations of discharge:	All conductive parts of EUT accessible to normal user																		
Tested severity level/	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
voltage:	+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
Locations of discharge:	Several points close to EUT at horizontal coupling plate																		
Tested severity level/	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
voltage:	+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
Locations of discharge:	Several points close to EUT at vertical coupling plate																		
Tested severity level/	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
voltage:	+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)																		
Test result:	No errors detected.																		
Classification:	The requirements are fulfilled.																		
Date of test:	month: 07 day: 02 year: 02																		
Tested by:	Novak H.																		

1 tested 1 not tested

Test Report EN 61000-4-2, Contact discharge

Immunity to Electrostatic Discharges

Model:	KFM										
Applicant:	Kontron embedded computers GmbH										
Operation mode:	Test software: see Point 4.1 (Operation Mode)										
Regulation(s):	EN 61000-4-2: 1995										
Performed test:	Direct contact discharge					Indirect contact discharge					
Locations of discharge:	Whole surface of the EUT										
Tested severity level/	-	1	2	3	4	5	6	7	8		kV
voltage:	+	1	2	3	4	5	6	7	8		kV
Locations of discharge:	Several points close to EUT at horizontal coupling plate										
Tested severity level/	-	1	2	3	4	5	6	7	8		kV
voltage:	+	1	2	3	4	5	6	7	8		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)										
Test result:	No errors detected.										
Classification:	The requirements are fulfilled.										
Date of test:	month: 07 day: 02 year: 02										
Tested by:	Novak H.										

1	tested
1	not tested

9.5 Test Report EN 61000-4-4, Power Lines

Immunity to Fast Transients (Burst) (Coupling Filter)

Model:	KFM							
Applicant:	Kontron embedded computers GmbH							
Operation mode:	Test software: see Point 4.1 (Operation Mode)							
Regulation(s):	EN 61000-4-4: 1995							
Performed test:	Capacitive coupling with coupling/decoupling network							
Coupling via:	Coupling filter							
Coupling to:	Power Line: N							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude:	-		0.5	1.0	2.0	4.0		kV
Coupling to:	Power Line: L							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude:	-		0.5	1.0	2.0	4.0		kV
Coupling to:	Power Line: PE							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude	-		0.5	1.0	2.0	4.0		kV
Coupling to:	Power Line: N, L, PE							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude:	-		0.5	1.0	2.0	4.0		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)							
Test result:	No errors detected.							
Classification:	The requirements are fulfilled.							
Date of test:	month: 07 day: 03 year: 02							
Tested by:	Novak H.							
1 tested	1 not tested							

Test Report EN 61000-4-4, Data Lines

Immunity to Fast Transients (Burst) (Coupling Clamp)

Model:	KFM							
Applicant:	Kontron embedded computers GmbH							
Operation mode:	Test software: see Point 4.1 (Operation Mode)							
Regulation(s):	EN 61000-4-4: 1995							
Performed test:	Capacitive coupling with capacitive coupling clamp							
Coupling via:	Capacitive coupling clamp							
Coupling to:	Data Line: Coupling onto COM1 Test Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line: Coupling onto USB1 Test Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line: Coupling onto VGATest Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line:							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)							
Test result:	No errors detected.							
Classification:	The requirements are fulfilled.							
Date of test:	month: 07 day: 03 year: 02							
Tested by:	Novak H.							
1 tested	1 not tested							

9.6 Test Report EN 61000-4-5, Power Lines

Immunity to Surges

Model:	KFM							
Applicant:	Kontron embedded computers GmbH							
Operation mode:	Test software: see Point 4.1 (Operation Mode)							
Regulation(s):	EN 61000-4-5: 1995							
Performed test:	Capacitive coupling with coupling/decoupling network							
Coupling to:	Symmetrical coupling between L1 and L2							
Tested severity level/	+		0.5	1.0	2.0			kV
pulse amplitude:	-		0.5	1.0	2.0			kV
Coupling to:	Asymmetrical coupling onto L1							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude:	-		0.5	1.0	2.0	4.0		kV
Coupling to:	Asymmetrical coupling onto L2							
Tested severity level/	+		0.5	1.0	2.0	4.0		kV
pulse amplitude:	-		0.5	1.0	2.0	4.0		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)							
Test result:	No inadmissible errors detected.							
Classification:	The requirements are fulfilled.							
Date of test:	month: 07 day: 03 year: 02							
Tested by:	Novak H.							

1 tested 1 not tested

Test Report EN 61000-4-5, shielded Data Lines

Immunity to Surges

Model:	KFM							
Applicant:	Kontron embedded computers GmbH							
Operation mode:	Test software: see Point 4.1 (Operation Mode)							
Regulation(s):	EN 61000-4-5: 1995							
Performed test:	coupling direct onto shield							
Coupling to:	Data Line: Coupling onto COM1 Test Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line: Coupling onto USB1 Test Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line: Coupling onto VGA Test Cable							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Coupling to:	Data Line:							
Tested severity level/	+	0.25	0.5	1.0	2.0	4.0		kV
pulse amplitude:	-	0.25	0.5	1.0	2.0	4.0		kV
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)							
Test result:	No errors detected.							
Classification:	The requirements are fulfilled.							
Date of test:	month: 07 day: 04 year: 02							
Tested by:	Novak H.							

1	tested
1	not tested

9.7 Test Report EN 61000-4-6

Immunity to Conducted Disturbances Induced by Radio Frequency Fields

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-4-6: 1996
Requirements:	150 kHz to 230 MHz : 10 V_{eff}
Interfering signal:	Modulation: AM Modulation depth: 80 % Modulation frequency: 1 kHz Step size: 1 % Dwell time: 1 s
Coupling to:	Power cords
Coupling with:	CDN: FCC-M3; S/N: 9720; PM-EM-7544-41
Performance criteria:	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
Test result:	No errors detected.
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 04 year: 02
Tested by:	Novak H

Immunity to Conducted Disturbances Induced by Radio Frequency Fields

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-4-6: 1996
Requirements:	150 kHz to 230 MHz : 10 V_{eff}
Interfering signal:	Modulation: AM Modulation depth: 80 % Modulation frequency: 1 kHz Step size: 1 % Dwell time: 1 s
Coupling to:	COM1 RS 232 Test Cable
Coupling with:	F 120-9A; S/N: 20; PM-EM-7546-1
Performance criteria:	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
Test result:	No inadmissible errors detected.
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 04 year: 02
Tested by:	Novak H

Immunity to Conducted Disturbances Induced by Radio Frequency Fields

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-4-6: 1996
Requirements:	150 kHz to 230 MHz : 10 V_{eff}
Interfering signal:	Modulation: AM Modulation depth: 80 % Modulation frequency: 1 kHz Step size: 1 % Dwell time: 1 s
Coupling to:	VGA Test Cable
Coupling with:	F 120-9A; S/N: 20; PM-EM-7546-1
Performance criteria:	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
Test result:	No inadmissible errors detected.
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 04 year: 02
Tested by:	Novak H

9.8 Test Report EN 61000-4-8

Magnetic Fields Test

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-4-8: 1993
Requirements:	50 Hz; 30 A/m
Performance criteria:	No temporary degradation or loss of function or performance (criterion A according to EN 50082-1:1992/EN 50082-2:1995)
Test result:	No inadmissible errors detected.
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 05 year: 02
Tested by:	Novak H.

9.9 Test Report EN 61000-4-11 Voltage Interruption

Model:	KFM
Applicant:	Kontron embedded computers GmbH
Operation mode:	Test software: see Point 4.1 (Operation Mode)
Regulation(s):	EN 61000-4-11: 1994
Requirements:	AC input: 30% - 10ms reduction
Performance criteria:	Temporary degradation or loss of function or performance (criterion B according to EN 50082-1:1992/EN 50082-2:1995)
Test result:	PASS
Classification:	The requirements are fulfilled.
Date of test:	month: 07 day: 05 year: 02
Tested by:	Novak H.

10 Measurement Uncertainty Values:

10.1 Emission Testing

Used measuring instrument	Unit	Tolerance
Test Receiver ESMI		< 1,5dB
LISN ESH3-Z5		≤ ± 20%
LISN ESH3-Z6		≤ ± 20%
LISN ENV4200		≤ ± 20%
Pulse Limiter ESH3-Z3		≤ ± 0,2dB
Cable attenuation incl. PSU 10kHz - 30MHz 30MHz - 200MHz 200MHz - 1GHz		 ≤ ± 0,5dB ≤ ± 1,5dB ≤ ± 2,7dB
Pre Amplifier ESMI-Z7		max. + 2dB/-1dB
Current Clamp -ESH2-Z1	uA	≤ ± 1dB
Current Clamp -ESV-Z1	uA	≤ ± 0,5dB
Current Clamp -F61	uA	≤ ± 1,8dB
Current Clamp F-65A	uA	≤ ± 1,8dB
Current Clamp F-36-4	uA	≤ ± 1,8dB
Current Clamp F-2000	uA	≤ ± 1,8dB

10.2 Immunity Testing

Used measuring instrument	Unit	Tolerance
Harmonics current PHE5000/PAS	Measured current	± 1 %
Flicker PHE5000/PAS	Higher than specified by IEC868 + AMD 1	
PHE5000/PAS	Adjusted voltage	± 1 %
ESD generator NSG 435	Air discharge Contact discharge	± 5 % ± 5 %
Burst generator NSG 2025	Test level voltage Frequency Phase angle Pulse rise time: BNC output below 1500V BNC output above 1500V Mains output Pulse width: Generator impedance:	± 10 % ± 2 % ± 2° ± 30 % ± 20 % ± 30 % ± 30 % ± 10 %
Surge generator NSG 650	Test level voltage Phase angle	± 10 % V ≤ 4 kV ± 15° V > 4 kV ± 25°
Current Clamp -F61	uA	≤ ± 1,8dB
Current Clamp F-65A	uA	≤ ± 1,8dB
Current Clamp F-120-9A	uA	≤ ± 1,8dB
EM-Clamp	uA	≤ ± 1,8dB
19“ Rack EN61000-4-6	Frequency Output Level	≤ ± 0,1Hz ≤ ± 2dB

11 Reference Standards

Tested standard	Reference Standard (identical/similar to)
EN 55022: 1998	DIN EN 55022: 1998 CISPR 22: 1997 NBN EN 55022: 1998 NEN EN 55022: 1995 NFC 91-022: 1987 NF EN 55022: 1994 + (AMD 1: 1996) SS EN 55022: 1994 + (AMD 1: 1995) VDE 0878(PT22): 1995 + (AMD 1: 1995)
EN 61000-3-2: 1995	BS EN 61000 PT3-2: 1995 DIN EN 61000 PT3-2: 1996 IEC 1000 PT3-2: 1995 NEN 11000-3-2: 1995 NF EN 61000-3-2: 1995 SS EN 61000-3-2: 1996 VDE 0838(PT2): 1996
EN 61000-3-3: 1995	BS EN 61000 PT3-3: 1995 DIN EN 61000 PT3-3: 1996 IEC 1000 PT3-3: 1994 NEN 11000-3-3: 1995 NF EN 61000-3-3: 1995 SS EN 61000-3-3: 1995 VDE 0838(PT3): 1996
EN 61000-4-2: 1995	IEC 1000-4-2: 1995 BS EN 61000-4-2: 1995 N EN 11000-4-2: 1995 NF EN 61000-4-2: 1995 DIN EN 61000-4-2: 1996 VDE 0847-4-2: 1996
EN 61000-4-4: 1995	BS EN 61000 PT4-4: 1995 DIN EN 61000 PT4-4: 1996 IEC 1000 PT4-4: 1995 NEN 11000-4-4: 1995 NF EN 61000-4-4: 1995 SS EN 61000-4-4: 1996 VDE 0847(PT4-4)+ AMD 1: 1997

Tested standard continued	Reference standard (identical to) continued
EN 61000-4-5: 1995	IEC 1000-4-5: 1995 BS EN 61000-4-5: 1996 N EN 11000-4-5: 1995 NF EN 61000-4-5: 1995 SS EN 61000-4-5: 1996 DIN EN 61000-4-5: 1996 VDE 0847-4-5: 1996
EN 61000-4-6: 1996	BS EN 61000 PT4-6: 1997 DIN EN 61000 PT4-6: 1997 IEC 1000 PT4-6: 1996 NF EN 61000-4-6: 1997 SS EN 61000-4-6: 1996 VDE 0847(PT4-6): 1997
EN 61000-4-8: 1993	BS EN 61000 PT4-8: 1994 DIN EN 61000 PT4-8: 1994 IEC 1000 PT4-8: 1993 NBN EN 61000-4-8: 1995 NEN 11000-4-8: 1994 NF EN 61000-4-8: 1994 SS EN 61000-4-8: 1994 VDE 0847(PT4-8): 1994
EN 61000-4-11: 1994	BS EN 61000 PT4-11: 1994 DIN EN 61000 PT4-11: 1995 IEC 1000 PT4-11: 1994 NBN EN 61000-4-11: 1995 NF EN 61000-4-11: 1995 SS EN 61000-4-11: 1995 VDE 0847(PT4-11): 1995