

MEASUREMENT / TECHNICAL REPORT

ICP vortex Computersysteme GmbH

Fibre-Channel Controller GDT6529RD

FCC ID: MJLMONA65X9RD

May 11th, 1998

Equipment type: Fibre-Channel Controller
Tested Type: GDT6529RD

Request issue of grant: ☒ Immediately upon completion of review
☐ Defer grant per 47 CFR 0.457(d)(1)(ii) until _____
date _____. Company Name agrees to notify the
Commission by _____ date _____ of the intended
date of announcement of the product so that the
grant can be issued on that date.

Measurement procedure
used: ☒ ANSI C63.4-1992
☐ FCC/OET MP-4(1987)
☒ EN 55022:1994-08 / A:1995-05

Applicant for Certification
prepared by:

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Gustav-Hertz-Straße 35
94 315 Straubing
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Applicant for this device:

ICP vortex Computersysteme GmbH
Falterstrasse 51-53
74 223 Flein
Germany

Tel.: +49 (0)9643 / 18-351
Fax: +49 (0)9643 / 18-778

engineer:	date:
J. Luttner	May 11 th , 1998
no.:	sign: O.K.



Applicant for this device:	
ICP vortex Computersysteme GmbH	
Fibre-Channel Controller	
GDT6529RD	
FCC ID:	side:
MJLMONA65X9RD	1/29

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1 GENERAL INFORMATION

1.1 Description

Features:

- Hardware RAID Controllers with RAID 0, RAID 1, RAID 4, RAID 5 and RAID 10 Array Drives at controller level, completely independent of the computer system and the operating system. Several Array Drives can be operated simultaneously.
- "Private" (i. e, for one Array Drive) or "Pool" (i. e, for several Array Drives) Hot Fix Drives.
- Online Capacity Expansion. Add one or several new disk drives to an existing Array Drive to expand its capacity. During the Expansion all data are redundant.
- Online RAID Level Migration. Online change of an Array Drive's RAID Level e.g., from RAID 0 to RAID 5.
- Online Capacity Expansion and RAID Level migration can be performed simultaneously.
- Configuration Utility (GDTSETUP) in ROM. Express Setup option to easily setup Array Drives. Press „CTRL-G“ to load GDTSETUP, long before the operating system is booted.
- Advanced Multi-Processor RISC Technology.
- On-Board i960RD © intelligent I/O Processor. Completely offloads the host CPU.

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- 1, or 2 Fibre Channel Interfaces with HP Tachyon and onboard copper transceivers with 100 MB/s channel Support of Arbitrated Loop Technology
- Up to 25 meters with copper cable. Standard DB9 connectors.
- Support of MIAs for large cable length.
- 1 full-featured additional Wide/Ultra SCSI channel for legacy SCSI devices (hard disks, CD-ROMs, etc.) with third generation 32 SCSI RISC processors and an active, software-switchable termination. Dual connector system (50 pin and 68 pin connector). Synchronous data transfer rate up to 40 MB/sec.
- Cache RAM: 8MB, 16 MB, 32 MB, 64 MB or 128 MB. One standard 72 PIN, 32 Bit or 36 Bit PS/2 SIMM. FPM or EDO Dynamic-RAM technology. With EDO SIMMs increased performance. Automatic cache RAM detection.
- Intelligent multi-level cache-algorithm with adaptive delayed write and read ahead functions. This ensures an optimized cache for various load profiles and system requirements.
- On-Board PCI 2.x compatible BIOS (Plug & Play).
- BIOS, Firmware and GDTSETUP in Flash-RAM. Easy update through floppy disk or BBS-download.
- GDTMON. Monitor program for the diagnosis (also remote) of ICP Controllers & Array Drives.
The tool allows you to optimize existing configurations.
- Drivers for MS-DOS, Novell NetWare, SCO UNIX V/368, Interactive UNIX, UnixWare, Linux, Windows NT, Windows 95, and OS/2. ASPI-Manager for DOS, Windows and Novell NetWare. I₂O ready controller design.

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1.2 Related Submittal Grant

With this application no equipment authorization has been submitted for a grant.

1.3 Tested System Details

The FCC IDs for all equipment, plus description of all cables used in the tested system are:

Model Number (Serial Number)	FCC ID	Description	Cable Description
SONY CPD-1791 (510449)	AK8CPD1604S	17" monitor	Unshielded power cord shielded video cable
SIEMENS SCENIC PRO C6 (FR62163245)	HSSSCENICC601	PC	Unshielded power cord
HP P/N: C3751A (LTC43908285)	DZL210472	Mouse	Shielded power cord
HP P/N: C3754A (E03633LXGR)	CIGE03614	Keyboard	Shielded power cord
HP 2225C (3210S05807)	DSI6XU2225	Printer, parallel I/F	unshielded power cord shielded centronics parallel cable

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1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in EN 55022:1994-08 class B. Radiated testing was performed at an antenna to EUT distance of 10 meters at an open area test site.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is recognized by the FCC Sampling and Measurements Branch, 7435 Oakland Mills Road, Columbia, MD 21046. This site has been fully described in a report dated December 02, 1993 submitted to your office, and accepted in a letter dated January 24, 1994 (31040/SIT).

After three years the update is accepted in a letter dated August 08th, 1997 (31040/SIT 1300F2).

1.6 Referenced Rules Sections

N/A

engineer:		date:	
J. Luttner		May 11 th , 1998	
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2 PRODUCT LABELING

2.1 FCC Label

This label is only a copy.

**FCC ID:
MJLMONA65X9RD**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.2 Location of Label on EUT

The label is located on the solder side of the EUT!

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J. Luttner		May 11 th , 1998		ICP vortex Computersysteme GmbH	
no.:	sign:		O.K.	Fibre-Channel Controller	
				GDT6529RD	
				FCC ID:	
				MJLMONA65X9RD	
				side:	
				8/29	

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a maximum fashion (as a customer can use it). All external ports were connected with a peripheral unit (e.g. serial port connected to a serial printer, keyboard port connected to a ext. keyboard and so on). The monitor was powered from the wall outlet.

3.2 Video mode Justification

The system was tested in the standard VGA-video mode 640 x 480 pixel, 70 Hz vertical frequency and 35 kHz horizontal frequency.

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				FCC ID:	
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3.3 Equipment Modifications

To achieve compliance to Class B levels, the following modifications were made by EMV Testhaus GmbH during compliance testing:

no modifications were carried out during testing.

The above modifications will be implemented in all production models of this equipment.

Applicant Signature _____ N/A _____ Date _____

Typed/Printed Name _____ Position _____

engineer:		date:	
J. Luttner		May 11 th , 1998	
no.:	sign:	O.K.	

Applicant for this device:	
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FCC ID:	side:
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3.4 Configuration of Tested System

All necessary tests were carried out like figure 3.1.

The system was used according to paragraph 1.1.

The PC-system was connected to the first LISN.

All peripherals, e.g. parallel printer, the subsystem and the monitor were supplied by a second LISN.

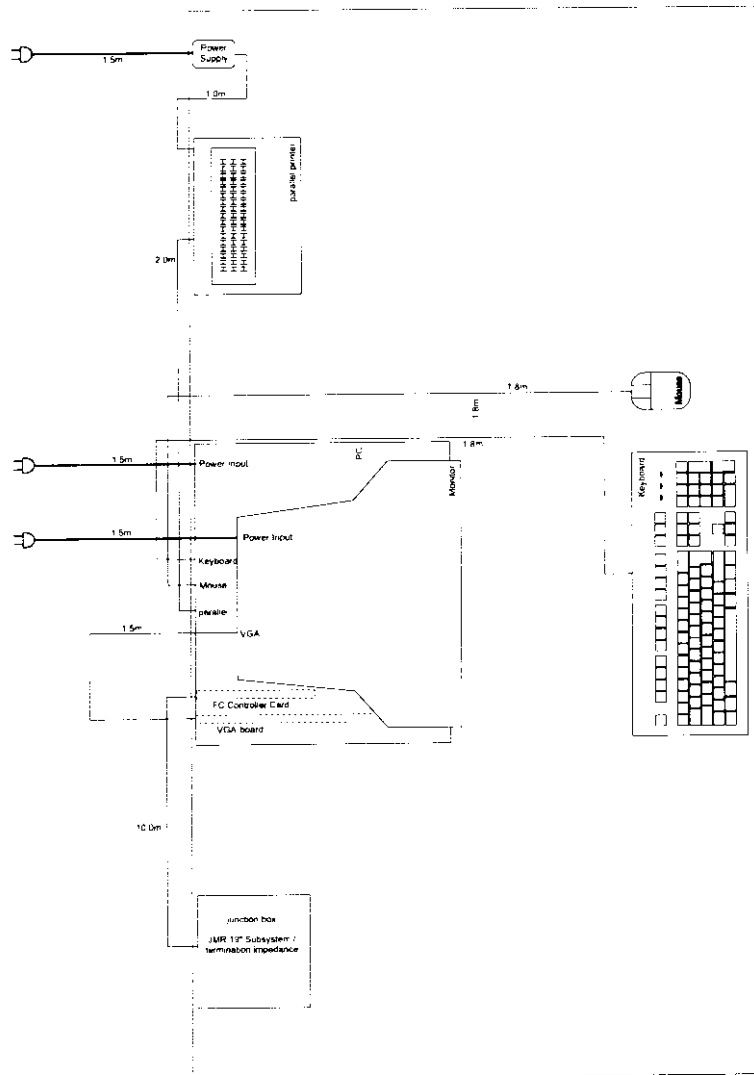
The EUT (FC-controller card) was connected to a PCI-slot of the PC and with a FC copper cable to the JMR 19" subsystem or termination impedance.

The equipment was configured according to ANSI C63.4-1992 Fig 11

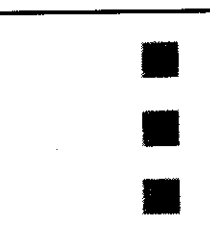
(Page 45).

engineer:		date:		Applicant for this device:	
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				GDT6529RD	
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Figure 3.1 Configuration of Tested System

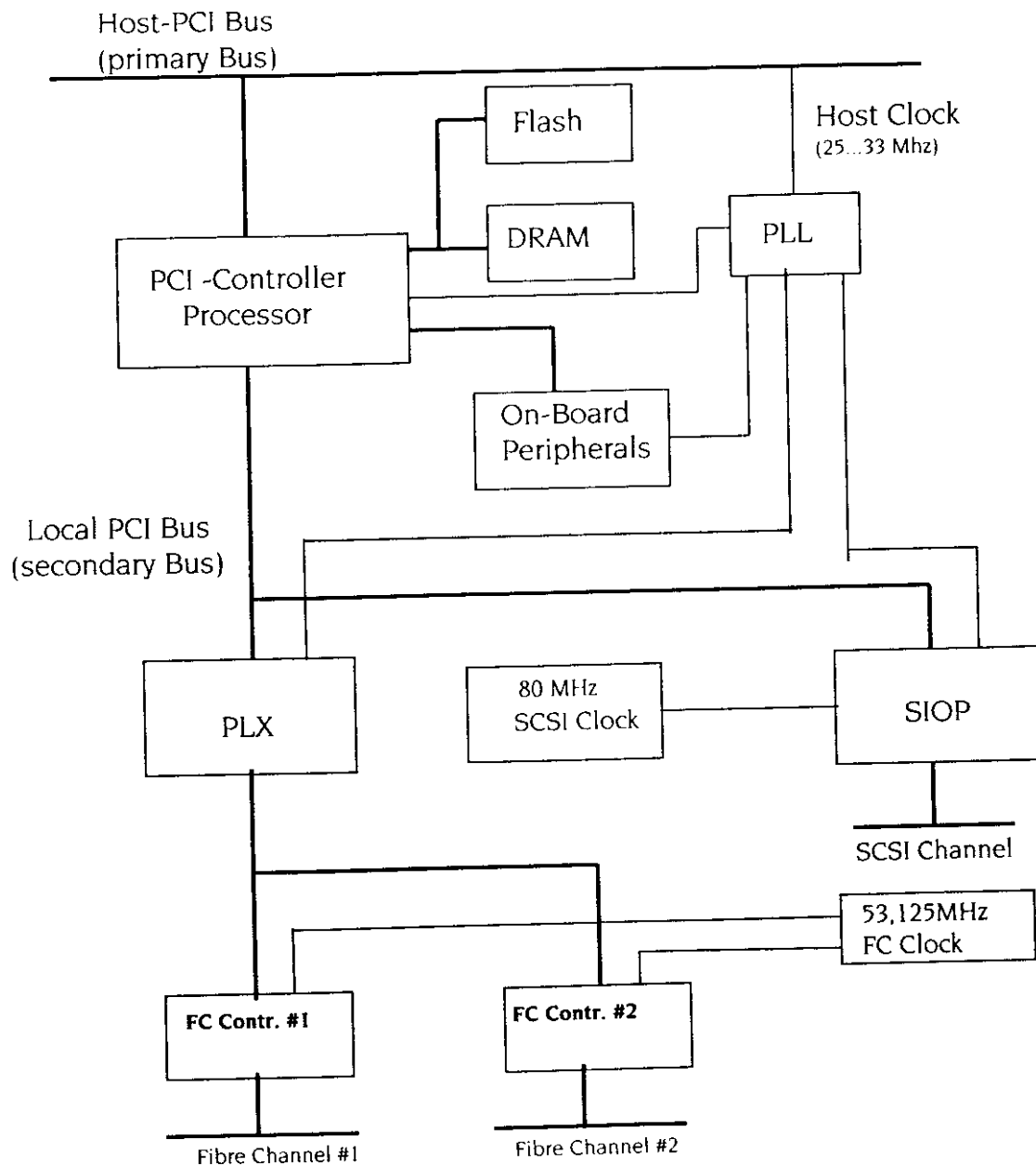


engineer:		date:	
J. Luttner		May 11 th , 1998	
no.:	sign:	O.K.	



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4 SCHEMATIC DIAGRAM OF EQUIPMENT



engineer:	date:
J. Luttner	May 11 th , 1998
no.:	sign: O.K.



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6 CONDUCTED EMISSION DATA

6.1 Test Procedure

The initial step in collecting conducted data is use of a Rhode & Schwarz Test Receiver (ESH3). First scan all data in peak mode. All significant peaks were explored in quasi-peak mode manually.

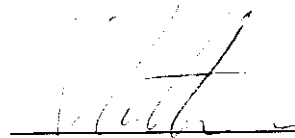
6.2 Measured Data

Judgment: Passed by 18.81 dB(μ V)

	Frequency [MHz]	Measured* [dB(μ V)]	Limit [dB(μ V)]
phase	0.21	44.40	63.21
neutral	0.21	43.40	63.21

*All readings are quasi-peak

Test Personnel:

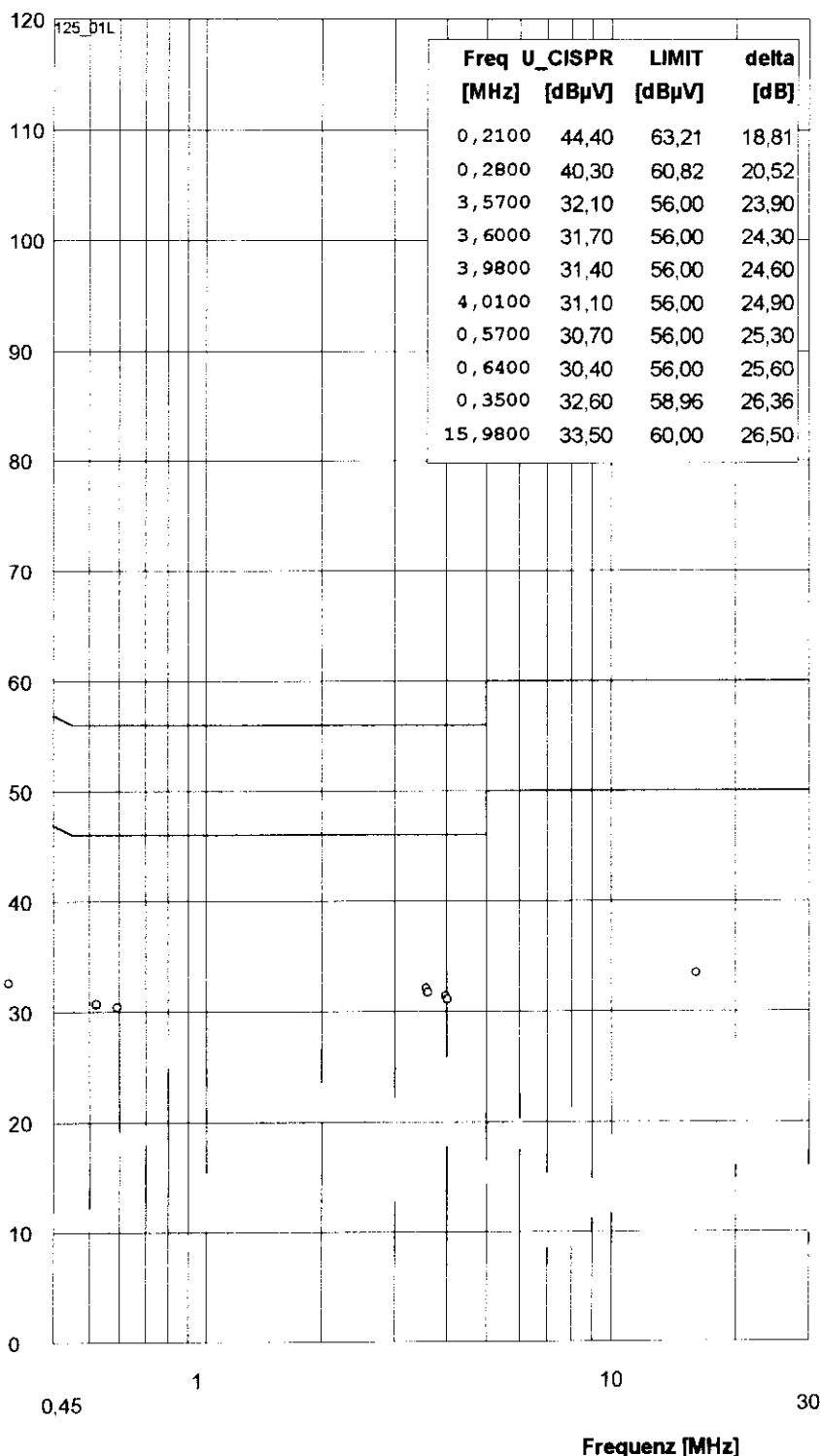
Tester Signature:  Date: May 11th, 1998

Printed Name: Jürgen Luttner

engineer:	date:	Applicant for this device:	
J. Luttner	May 11 th , 1998	ICP vortex Computersysteme GmbH	
no.:	sign:	O.K.	Fibre-Channel Controller
			GDT6529RD
			FCC ID:
			MJLMONA65X9RD
			side:
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Interference-Voltage-Test

Voltage [dBµV]



REGULATIONS:

EN 55 022 class B

PEAK / CISPR

TEST EQUIPMENT:

R&S ESH3 (100002)

R&S ESH2-Z5 (100040)

cable 200026 and 200041

Order No.:

258125

EUT:

ICP vortex Computersysteme GmbH

FC-Controller

GDT6529RD

SN: n/a

OPERATION MODE:

operating system: MS-DOS

copy one file to the HDD

Mains 230 V / 50 Hz

Phase

TEST FACILITY:

EMV Testhaus GmbH

Gustav-Hertz-Straße 35

94315 Straubing

DATE / TIME:

02.04.98

TEST ENGINEER

Luttner Jürgen

engineer:		date:	
J. Luttner		May 11 th , 1998	
no.:	sign:		O.K.



Applicant for this device:	
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Fibre-Channel Controller	
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6.3 Referenced Rules Sections

N/A

6.4 Test Instrumentation Used, Conducted Measurement

Type	Manufacturer/ Model No.	Serial No.	Last Cal.	Cal. Interval
Receiver	ESH3 Rohde & Schwarz	880646/007	Feb. 98	12 months
LISN	ESH2-Z5 Rohde & Schwarz	893406/009	Mar. 98	12 months
LISN	ESH2-Z5 Rohde & Schwarz	881362/037	Mar. 98	12 months
Pulse limiter	ESH3-Z2 Rohde&Schwarz	357881052	Mar. 98	12 months

engineer:		date:		Applicant for this device:	
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				FCC ID:	side:
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7 RADIATED EMISSION DATA

7.1 Test Procedure

The measurement procedure is carried out manually by a test engineer. At all interference frequencies we vary the height of the antenna in horizontal and vertical alignment between 1m and 4m and turn the table from 0° to 360°.

7.2 Measured Data

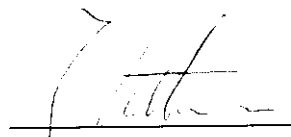
Judgment: Passed by 0.7 dB(μV)/m

Frequency [MHz]	Polarity [V/H]	Measured Corrected* [dB(μV)]	Correction Factor [dB/m]	10 Meter Limit [dB(μV/m)]
531.26	V	36.3	22.0	37.0
531.26	H	35.2	22.0	37.0
464.90	V	33.7	20.6	37.0
757.00	V	31.0	26.3	37.0
929.75	V	26.3	28.7	37.0
557.82	H	25.9	22.5	37.0

*All readings are quasi-peak. The correction factor is considered automatically by the test receiver. A table of correction factors is given in paragraph 7.6.

Test Personnel:

Tester Signature:



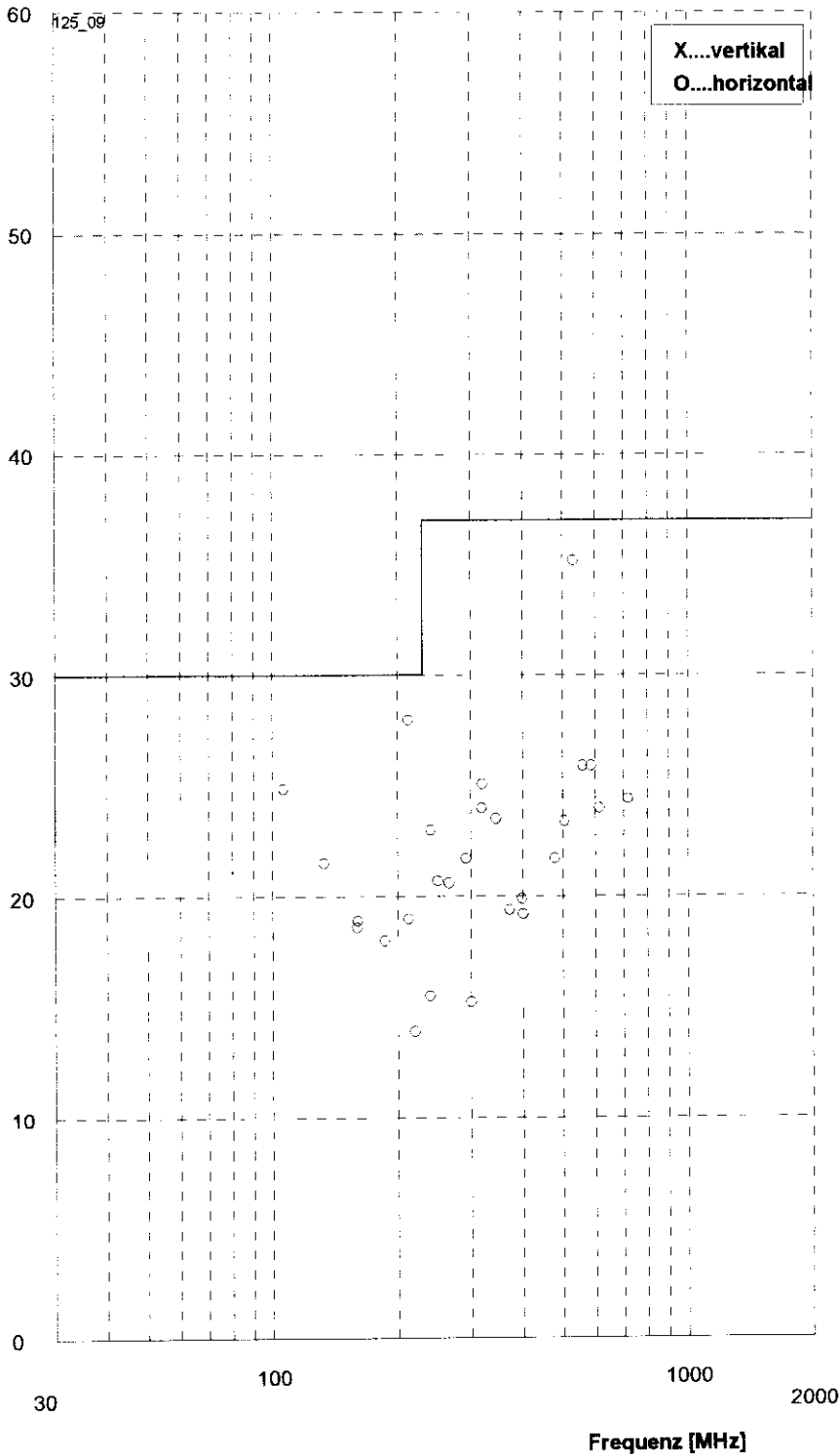
Date: May 11th, 1998

Printed Name: Jürgen Luttner

engineer:	date:		Applicant for this device:	
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no.:	sign:		Fibre-Channel Controller	
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Interference-Radiation Test

[dBµV/m]



REGULATIONS:

EN 55022 class B

CISPR

TEST EQUIPMENT:

R & S ESVP (100001)

VULB 9165 (100055)

ORDER NO.:

258125

EUT:

ICP vortex Computersysteme GmbH

FC-Controller

GDT6529RD

SN: n/a

OPERATION MODE:

operating system: MS-DOS

data transmission

cable terminated

R61,R142,R203R254 = 0 Ohm

TEST FACILITY:

EMV Testhaus GmbH

Gustav-Hertz-Straße 35

94315 Straubing

DATE / TIME:

09.04.98 09:02

TEST ENGINEER:

Luttner Jürgen

engineer:	date:
J. Luttner	May 11 th , 1998
no.:	sign:
	O.K.



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7.3 Referenced Rules Sections

N/A

7.4 Test Instrumentation Used, Radiated Measurement

Type	Manufacturer/ Model No.	Serial No.	Last Cal.	Cal. Interval
Receiver	ESVP Rohde & Schwarz	81190/024	Jan. 1998	12 months
Antenna	VULB 9165 Schwarzbeck	2005	Sep. 1997	12 months

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7.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor automatically to the measured value. The display of the Receiver shows the corrected value. The complete table of correction factors is given on next page. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 28,5 dB μ V is obtained. The Antenna Factor of 10,5 and a Cable Factor of 1,3 is added, giving a field strength of 40,3 dB μ V/m.

$$FS = 28,5 + 10,5 + 1,3 = 40,3 \text{ dB}\mu\text{V/m}$$

The 40,3 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

Level in μ V/m =

Common Antilogarithm $[(40,3 \text{ dB}\mu\text{V/m})/20] =$

103,5 μ V/m

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7.6 Table of Correction Factors

Frequency [MHz]	Correction Antenna [dB/m]	Correction Cable [dB/m]	Correction Antenna + Cable [dB/m]
30,0	9,2	0,3	9,5
35,0	9,5	0,5	10,0
40,0	9,7	0,7	10,4
50,0	9,5	0,8	10,3
60,0	9,2	0,9	10,1
80,0	7,5	1,3	8,8
100,0	9,5	1,5	11,0
120,0	10,3	1,6	11,9
150,0	11,3	1,9	13,2
200,0	10,3	2,4	12,7
300,0	13,0	3,0	16,0
400,0	15,0	3,7	18,7
500,0	17,4	4,1	21,5
600,0	18,8	4,3	23,1
700,0	20,6	4,6	25,2
800,0	22,2	4,9	27,1
900,0	23,1	5,3	28,4
1000,0	24,0	5,4	29,4

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