

## MEASUREMENT / TECHNICAL REPORT

ICP vortex Computersysteme GmbH

SCSI-Controller GDT6518RD

FCC ID: MJLMONA6X18RD

December 19<sup>th</sup>, 1998

Equipment type: SCSI-Controller

Tested Type: GDT6518RD

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:

EMV Testhaus GmbH  
 Gustav-Hertz-Straße 35  
 94 315 Straubing  
 Germany

Tel.: +49 (0)9421 / 923033  
 Fax: +49 (0)9421 / 923035

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	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



Applicant for this device:

ICP vortex Computersysteme GmbH  
 SCSI-Controller GDT6518RD

FCC ID:	side:
MJLMONA6X18RD	1/30

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J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.
		
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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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no.:	sign:	O.K.		<b>SCSI-Controller GDT6518RD</b>
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				side: <b>4/30</b>

- 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.  
I<sub>2</sub>O ready controller design.

engineer:	date:
J. Luttner	December 19 <sup>th</sup> , 1998
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**SCSI-Controller GDT6518RD**

FCC ID:

side:

**MJLMONA6X18RD**

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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
HP VECTRA 510 (FR62163245)	HCJVECTRAVL5	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
HP 2225D (3210S05807)	DSI6XU2225	Printer, parallel I/F	unshielded power cord shielded centronics parallel cable

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no.:	sign:	O.K.	FCC ID:	side:
			MJLMONA6X18RD	6/30

## 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

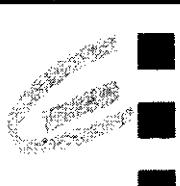
The open area test site and conducted measurement facility used to collect the radiated data is recognized by the FCC Sampling and Measurements Branch, 7435 Oakland Mills Road, Columbia, MD 21046. This site has been fully described in a report dated December 02, 1993 submitted to your office, and accepted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

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

## 1.6 Referenced Rules Sections

N/A

engineer:	date:
J. Luttner	December 19 <sup>th</sup> , 1998
no.:	sign:
	O.K.



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ICP vortex Computersysteme GmbH SCSI-Controller GDT6518RD	
FCC ID:	side:
MUL MONASX18RD	7/30

## 3 SYSTEM TEST CONFIGURATION

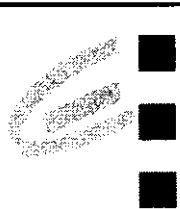
### 3.1 Justification

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.

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



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<b>ICP vortex Computersysteme GmbH</b>	
<b>SCSI-Controller GDT6518RD</b>	
FCC ID:	side:
<b>MJLMONA6X18RD</b>	

### 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	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.




Applicant for this device:	
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FCC ID:	side:
MJLMONA6X18RD	

## 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.

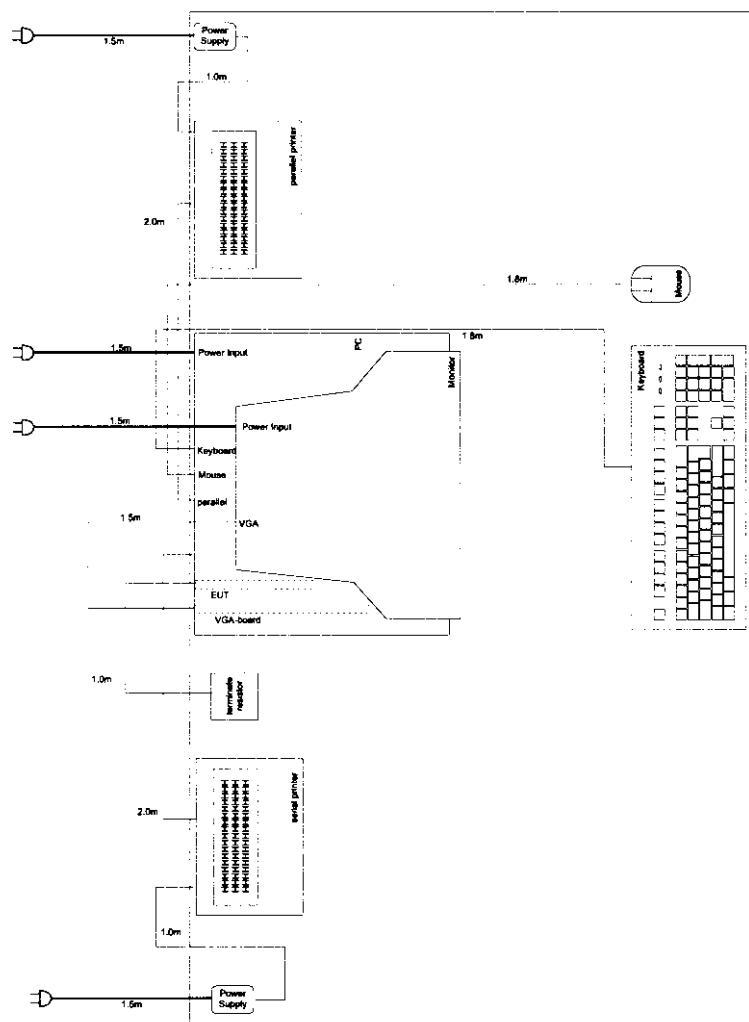
All peripherals, e.g. parallel printer, the subsystem and the monitor were supplied by a second LISN.

The EUT was connected to a PCI-slot of the PC and the external SCSI- bus was terminated, cable length 1m.

The equipment was configured according to ANSI C63.4-1992 Fig 11  
(Page 45).

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.
 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Applicant for this device:		
<b>ICP vortex Computersysteme GmbH</b> <b>SCSI-Controller GDT6518RD</b>		
FCC ID:		side:
<b>MJLMONA6X18RD</b>		<b>11/30</b>

## Figure 3.1 Configuration of Tested System



engineer:	date:		Applicant for this device:		
J. Luttner	December 19 <sup>th</sup> , 1998		ICP vortex Computersysteme GmbH		
no.:	sign:	O.K.	SCSI-Controller GDT6518RD		
FCC ID:			side:		
MJLMONA6X18RD			12/30		

## 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 15.40 dB( $\mu$ V)

	Frequency [MHz]	Measured* [dB( $\mu$ V)]	Limit [dB( $\mu$ V)]
phase	15.98	43.90	60.00
neutral	15.98	44.60	60.00

\*All readings are quasi-peak

Test Personnel:

Tester Signature:



Date: December 19<sup>th</sup>, 1998

Printed Name:

Jürgen Luttner

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.

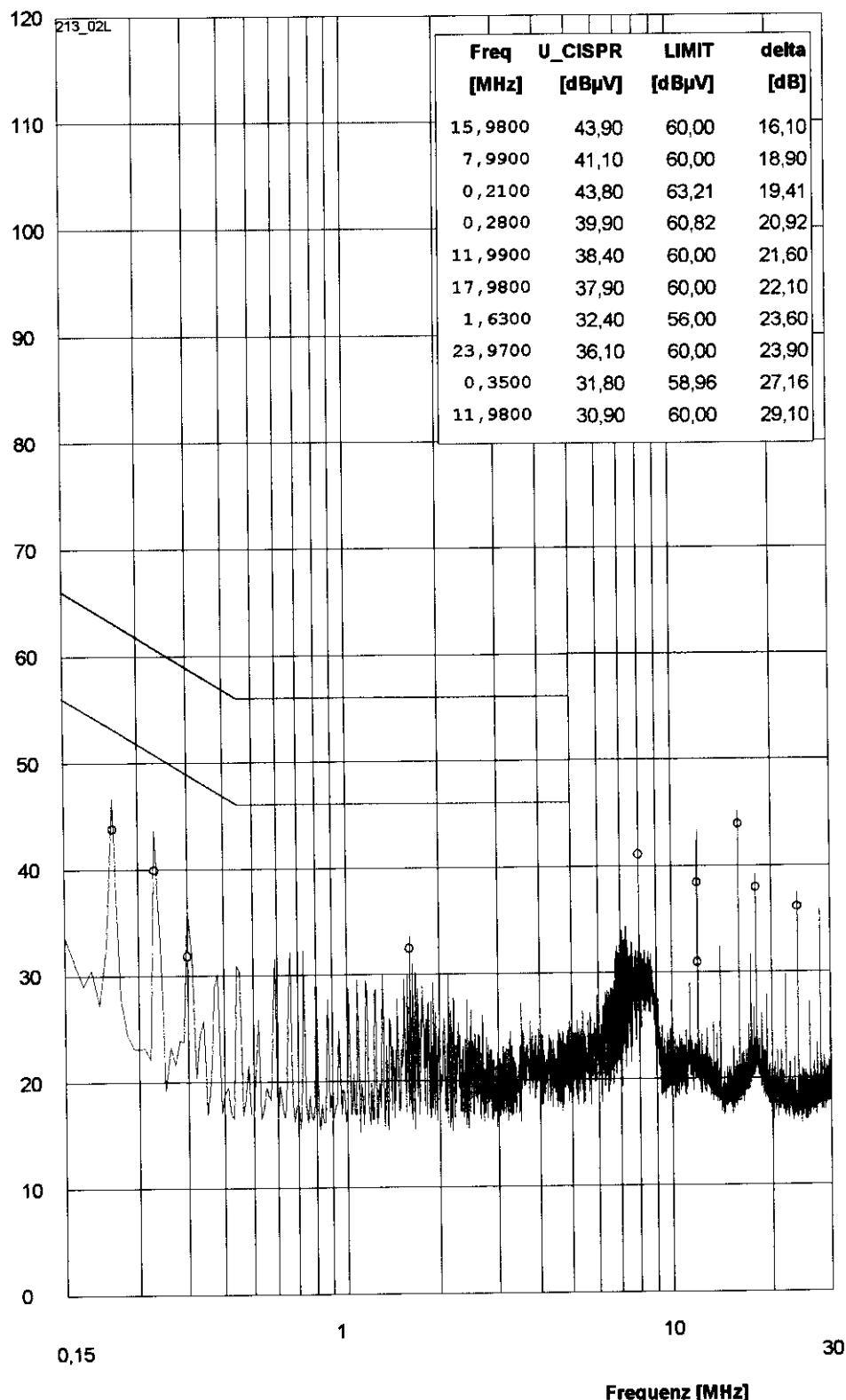


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# Interference-Voltage-Test

Voltage [dB $\mu$ V]



## REGULATIONS:

EN 55 022 Klasse B

PEAK / CISPR

## TEST EQUIPMENT:

R&S ESPC (100052)

R&S ESH2-Z5

Kabel 20026 und 20041

## ORDER NO.:

258213

ICP vortex Computersysteme GmbH

SCSI-Controller

GDT6518RD

SN: 78170000

## OPERATION MODE:

MS DOS

ser. and par. printer HP ThinkJet

PC: HP VECTRA 510

Monitor: SONY CPD-1791

both ext. SCSI-Connectors are terminated with cable length 1m

Mains 230 V / 50 Hz

Phase

## TEST FACILITY:

EMV Testhaus GmbH

Gustav-Hertz-Straße 35

94315 Straubing

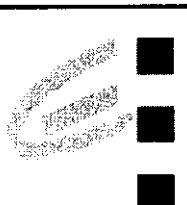
## DATE / TIME:

25.06.98 14:36

## TEST ENGINEER

Luttner Jürgen

engineer:	date:
J. Luttner	December 19 <sup>th</sup> , 1998
no.:	sign:
	O.K.



Applicant for this device:

ICP vortex Computersysteme GmbH  
SCSI-Controller GDT6518RD

FCC ID:

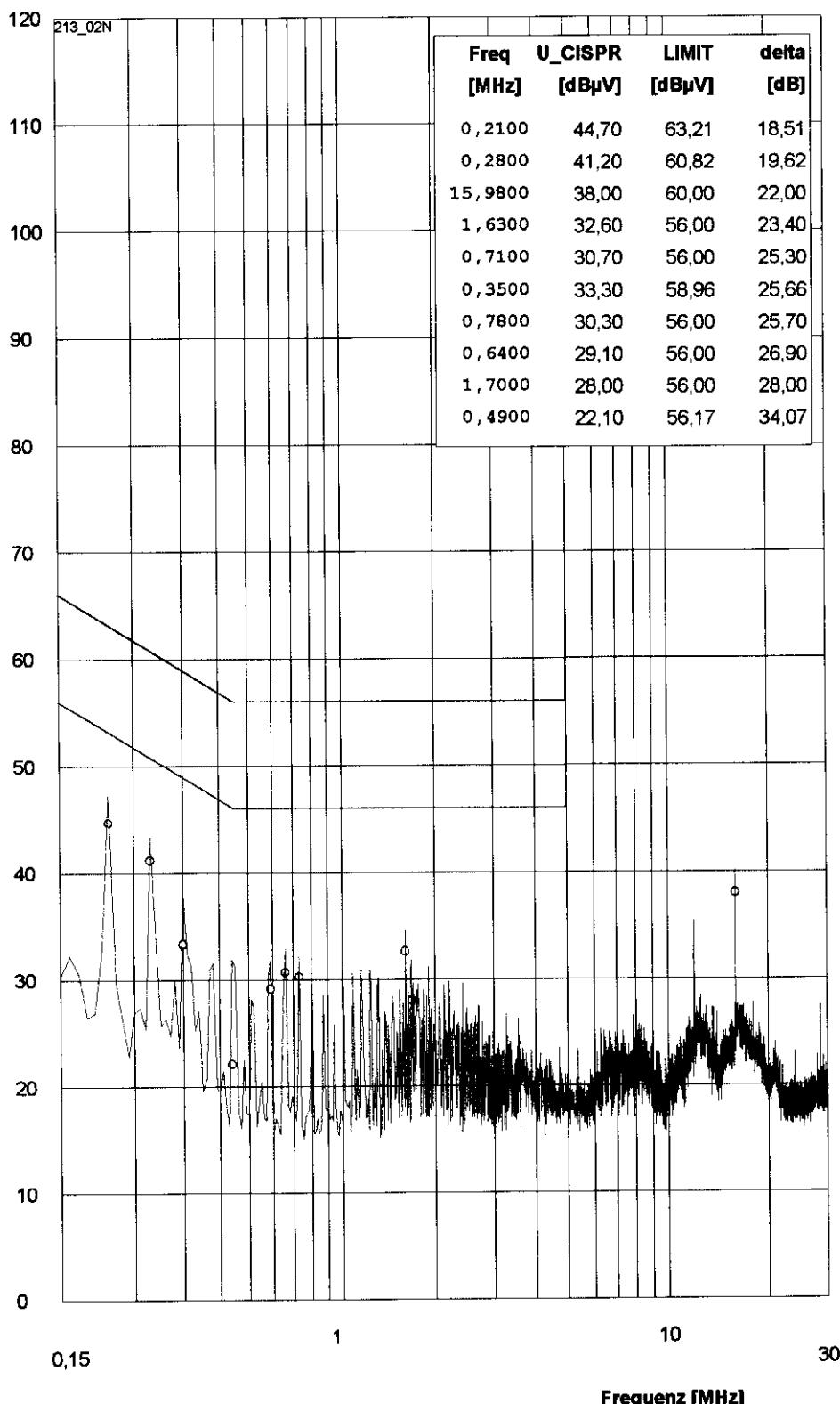
side:

MJLMONA6X18RD

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# Interference-Voltage-Test

Voltage [dB $\mu$ V]



## REGULATIONS:

EN 55 022 Klasse B

PEAK / CISPR

## TEST EQUIPMENT:

R&S ESPC (100052)

R&S ESH2-Z5

Kabel 20026 und 20041

## ORDER NO.:

258213

ICP vortex Computersysteme GmbH

SCSI-Controller

GDT6518RD

SN: 78170000

## OPERATION MODE:

MS DOS

ser. and par. printer HP ThinkJet

PC: HP VECTRA 510

Monitor: SONY CPD-1791

both ext. SCSI-Connectors are terminated with cable length 1m

Mains 230 V / 50 Hz

Neutral

## TEST FACILITY:

EMV Testhaus GmbH

Gustav-Hertz-Straße 35

94315 Straubing

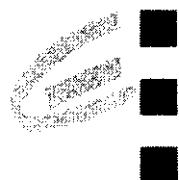
## DATE / TIME:

25.06.98 14:36

## TEST ENGINEER

Luttner Jürgen

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



Applicant for this device:

ICP vortex Computersysteme GmbH  
SCSI-Controller GDT6518RD

FCC ID:

side:

MJLMONA6X18RD

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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:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



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 6.8 dB( $\mu$ V)/m

Frequency [MHz]	Polarity [V/H]	Measured Corrected* [dB( $\mu$ V)]	Correction Factor [dB/m]	10 Meter Limit [dB( $\mu$ V/m)]
210.01	H	23.2	13.1	30.0
200.00	H	20.9	12.7	30.0
399.99	H	26.6	18.7	37.0
40.00	V	21.7	10.4	30.0
120.01	V	21.7	11.9	30.0
210.00	V	19.2	13.1	30.0

\*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: Dezember 19<sup>th</sup>, 1998

Printed Name:

Jürgen Luttner

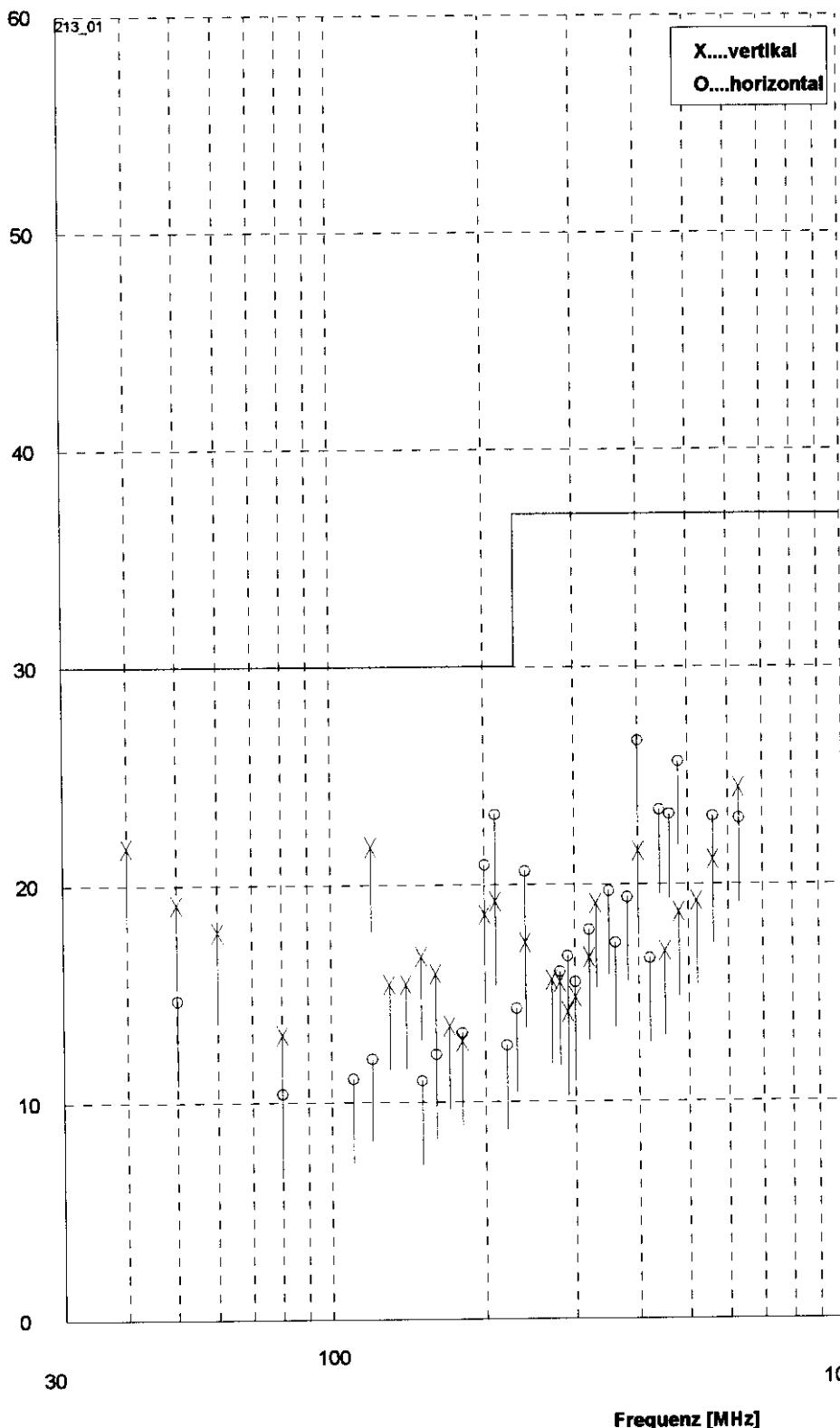
engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



Applicant for this device:	
ICP vortex Computersysteme GmbH	
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MJLMONA6X18RD	22/30

# Interference-Radiation Test

[dB $\mu$ V/m]



## REGULATIONS:

EN 55022 class B

PEAK / CISPR

## TEST EQUIPMENT:

R & S ESVG (100001)

VULB 9165 (100055)

## ORDER NO.:

258213

## EUT:

ICP vortex Computersysteme GmbH

SCSI-Controller

GDT6518RD

SN: 78170000

## OPERATION MODE:

MS-DOS

Monitor: SONY CDP-1791

PC: HP VECTRA 510

printer parallel and seriell: 2x HP ThinkJet

EUT terminated

## TEST FACILITY:

EMV Testhaus GmbH

Gustav-Hertz-Straße 35

94315 Straubing

## DATE / TIME:

24.06.98 16:07

## TEST ENGINEER:

Luttner J.

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.



Applicant for this device:

ICP vortex Computersysteme GmbH  
SCSI-Controller GDT6518RD

FCC ID:

side:

MJLMONA6X18RD

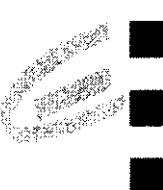
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## 7.3 Referenced Rules Sections

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 9160 Schwarzbeck	3050	Jul. 1998	12 months

engineer:	date:	
J. Luttner	December 19 <sup>th</sup> , 1998	
no.:	sign:	O.K.
		
Applicant for this device:		
ICP vortex Computersysteme GmbH		
SCSI-Controller GDT6518RD		
FCC ID:		side:
MJLMONA6X18RD		24/30

## 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 $\mu$ 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 $\mu$ V/m.

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

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

Level in  $\mu$ V/m =

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

**103,5  $\mu$ V/m**

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no.:	sign:	O.K.



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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	11.0	0.3	11.3
35.0	10.4	0.5	10.9
40.0	11.1	0.7	11.8
45.0	11.6	0.75	12.4
50.0	11.8	0.8	12.6
60.0	11.2	0.9	12.1
80.0	7.7	1.3	9.0
100.0	9.2	1.5	10.7
120.0	11.0	1.6	12.6
150.0	13.0	1.9	14.9
200.0	9.5	2.4	11.9
250.0	11.1	2.6	13.7
300.0	12.7	3.0	15.7
400.0	14.9	3.7	18.6
500.0	16.8	4.1	20.9
600.0	18.8	4.3	23.1
700.0	20.1	4.6	24.7
800.0	21.8	4.9	26.7
900.0	22.7	5.3	28.0
1000.0	23.5	5.4	28.9

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