

**MEASUREMENT/TECHNICAL REPORT****SK-NET FDDI-LP 64 DAS****FCC ID: K3S5844****April 09, 1998****Equipment Under Test**

Type: SK-NET FDDI-LP 64 DAS  
Serial No: L6DEOS8470010  
Equipment Category: FDDI PCI Network Card

**Relevant Standard:** 47 CFR Part 15

This report concerns: ☒ Original grant ☐ Class II change

**Request issue of grant:**

- ☒ Immediately upon completion of review.  
☐ Defer grant per 47 CFR 0.457(d)(ii) until ..... Company Name agrees to notify the Commission by ..... 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) ☐ Other

If other describe .....

Application for Certification  
prepared by:

Siegfried Guntermann  
EMCC DR. RASEK  
Moggast  
D-91320 Ebermannstadt  
Germany  
Phone: +49 9194 9016  
Fax: +49 9194 8125  
e-mail: 106111.2702@compuserve.com

Applicant for this device:

Thomas Ruf  
SysKonnct (a business unit of  
Schneider & Koch & Co. Datensysteme GmbH)  
Von-Drais-Straße 1  
D-77855 Achern  
Germany  
Phone: + 49 7841 6008 34  
Fax: + 49 7841 6008 49



Dr. Werner G. Rašek  
- President -

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## **1 GENERAL INFORMATION**

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### **1.1 Product Description**

Equipment Under Test (EUT)

The following describes the function of the EUT and the general operation:

Product name: SK-NET FDDI-LP 64 DAS

The SK-NET FDDI-LP 64 DAS is a Fiber optic/PCI network card uses FDDI class A fiber optic cable connection to integrate PC, PowerPC systems, SUN and RS/6000 workstations with PCI Bus architecture direct into the dual FDDI ring or allow dual homing.

The general operation is to send and receive data, between the host PCI-System and the connected FDDI network.

### **1.2 Related Submittal(s)/Grant(s)**

None.

### 1.3 Tested System Details

| DEVICE                                                                                        | FCC ID       |
|-----------------------------------------------------------------------------------------------|--------------|
| HP Vectra VL4 5/100<br>Product Number D3672B<br>S/N FR62661336S                               | HCLVECTRAVL5 |
| SK-NET FDDI-LP 64 DAS*1                                                                       | K3S5844      |
| Monitor Siemens Nixdorf Informationssysteme(SNI)<br>Product Number MCM 1551 (N)<br>S/N 735911 | A3LCSU597    |
| HP Keyboard<br>Product Number C3754A #ABD<br>S/N E03633LXGR                                   | CIGE03614    |
| HP Mouse<br>Product Number C3751B<br>S/N LZBG1213594                                          | DZL210582    |
| HP Deskjet 600<br>Product Number C2184A<br>S/N ES64U140VT                                     | B94C2184X    |
| Modem<br>Hayes ACCURA 288 FAX<br>Model Number 5901US<br>S/N A57759013811                      | BFJ5901US    |
| Bypass AMP FDDI DUAL SWITCH MODULE<br>Product Number 501016-1<br>S/N 0490041                  | -            |

Simulator: Network Client:

| DEVICE                                                        | FCC ID       |
|---------------------------------------------------------------|--------------|
| HP Vectra XM2 4/66<br>Product Number D3221B<br>S/N 3516F54650 | B94VECTRASM2 |
| Network Adapter:<br>SK-NET FDDI-LP DAS                        | K3S5544      |
| Monitor Dell<br>Product Number D1528-LS<br>S/N 90628H0362C5   | H4ICM15006   |
| HP Keyboard<br>Product Number C3758A<br>S/N C3758A-6020       | CIGE03633    |
| HP Mouse<br>Product Number C3751A<br>S/N LCA50900627          | DLZ210472    |

\*1 EUT submitted for grant.

## 1.4 Interface Cables

| Function / Type     | Shielded<br>or Non Shielded | Length |
|---------------------|-----------------------------|--------|
| AC Power            | unshielded                  | 2,0 m  |
| DC Power            | unshielded                  | 1,5 m  |
| Video               | shielded                    | 1,1 m  |
| Keyboard            | shielded                    | 1,5 m  |
| Mouse               | shielded                    | 2,0 m  |
| I/O Data (parallel) | shielded                    | 3,0 m  |
| I/O Data (serial)   | shielded                    | 3,0 m  |
| Fiber Optic         | -                           | 10,0 m |
| Optical Bypass      | unshielded                  | 0,5 m  |

## 1.5 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C 63.4 - 1992.

Conducted emissions were measured to demonstrate compliance with the alternative standards contained in CISPR 22:1985 (with Draft CISPR/G 2, 5, 9, 11, 12, 13 and 14) as described in CFR 47 § 15.107 (e).

Radiated emissions were measured to demonstrate compliance with the alternative standards contained in CISPR 22: 1985 (with Draft CISPR/G 2, 5, 9, 11, 12, 13 and 14) as described in CFR 47 § 15.109 (g). Radiated testing was performed at an antenna to EUT distance of 10 meters.

## 1.6 Test Facility

The open area test site and conducted measurement facility used to collect the conducted and radiated emission data are located in Moggast, D-91320 Ebermannstadt, Germany. This site has been fully described in a report submitted to the FCC, and accepted in the letter dated Jan. 15, 1997 (31040/SIT - 1300 F2).

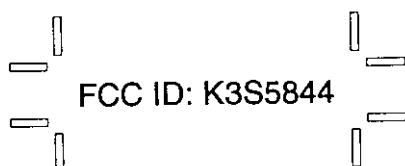
## 2 PRODUCT LABELING

### 2.1 FCC ID Label

#### Label Definition

|                    |                                                                   |
|--------------------|-------------------------------------------------------------------|
| Art.-Nr.           | 50-75-103-131                                                     |
| Rev.:              | 1.0                                                               |
| Description:       | Certification Label , FCC ID for SK-NET FDDI-LP <sup>64</sup> DAS |
| Revision:          | 1.0                                                               |
| Status:            | VALID                                                             |
| Filename:          | label-certif.fcc_id.K3S5844.doc                                   |
| Date:              | 3/20/98                                                           |
| Owner:             | mehrenfried                                                       |
| Partname:          | LABEL-CERTIF                                                      |
| Package:           |                                                                   |
| Property:          | FCC_ID_K3S5844                                                    |
| Size [mm]:         | 38.1 x 6.35 ( 1.5" x 0.25" )                                      |
| Material:          | white vinyl, Brady B-607                                          |
| Color of Printing: | black                                                             |
| Adhesive:          | permanent, not removable                                          |
| Content (Text):    | FCC ID: K3S5844                                                   |
| Content (Marks):   |                                                                   |
| File:              | none                                                              |
| Specifics:         | none                                                              |

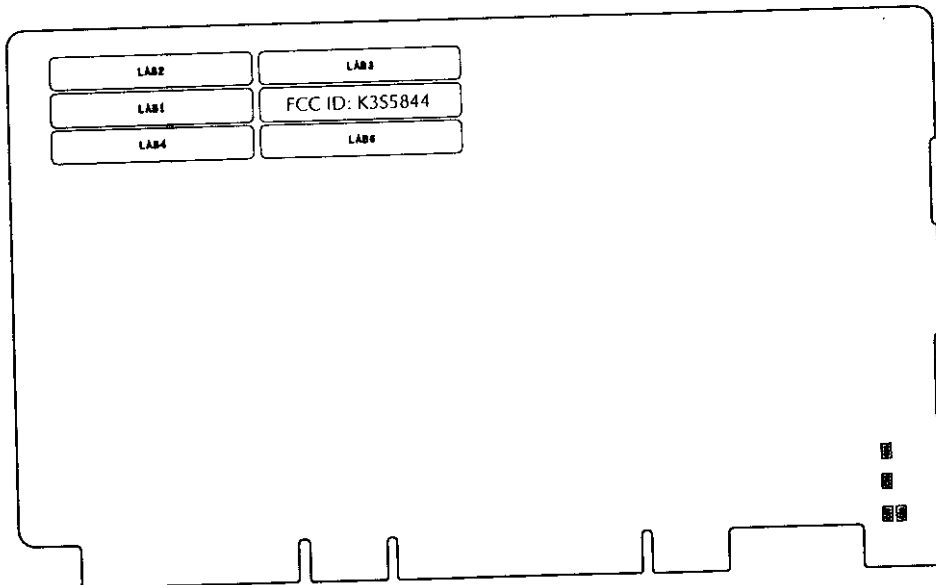
#### Drawing:



## 2.2 Location of Label on EUT

The drawing below, shows the placement of the FCC ID Label on the solder-side of PCB.

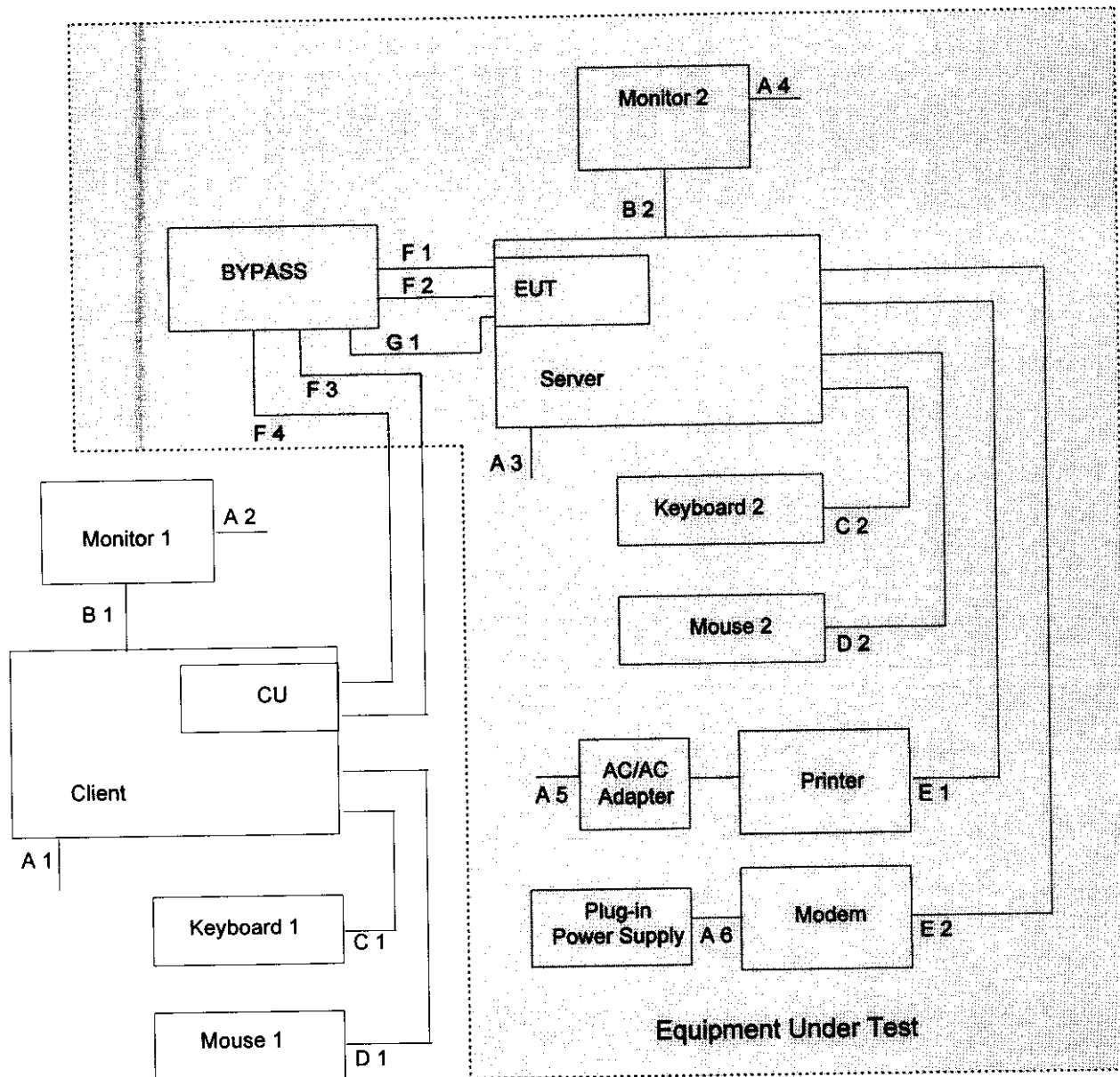
|                                                                                                                                                                                                                              |                   |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|
| Title: MONALISA                                                                                                                                                                                                              | Rev.: 1.0         | Date: 09/24/97 |
| 60-10-060-000                                                                                                                                                                                                                | Components Bottom |                |
| <br>a business unit of<br>Schneider & Koch & Co. Datensysteme GmbH<br>Stromschiff, 24<br>D-72270 Gillingen / Germany<br>all rights reserved |                   |                |
| Product: SK-NET FDDI xP64                                                                                                                                                                                                    | Engineer:         | Feldmeth       |



### 3 CONFIGURATION OF TESTED SYSTEM

#### 3.1 Test Setup

This Block Diagram displays the Test Setup. Client, monitor 1, keyboard 1 and mouse 1 are remotely located devices according to ANSI C 63.4-1992. paragraph 6.1.2.1 and do not contribute to the measured level.



AC Power = 115 V / 60 Hz

| Cable    | Function / Type     | Length |
|----------|---------------------|--------|
| A1 - A5  | AC Power            | 2.0 m  |
| A6       | DC Power            | 1.5 m  |
| B1 - B2  | Video               | 1.1 m  |
| C1 - C2  | Keyboard            | 1.5 m  |
| D1 - D2  | Mouse               | 2.0 m  |
| E1       | I/O Data (parallel) | 3.0 m  |
| E2       | I/O Data (serial)   | 3.0 m  |
| F1 - F 4 | Fiber Optic         | 10.0 m |
| G1       | Optical Bypass      | 0.5 m  |

### 3.2 Justification

The system was configured for testing in a typical fashion. The only inserted I/O card is the SK-NET FDDI-Network Adapter. The second serial port was tested (Serial B) in addition to the first port (Serial A) during preliminary emissions tests. The simultaneous testing of this identical port did not increase emissions significantly. Therefore, the final qualification testing was completed with only one port connected (Serial A).

### 3.3 Equipment Modifications

To achieve compliance to Class B levels no changes were made during compliance testing.

### 3.4 Operation Mode of the EUT

The EUT is running Novell Netware 3.12.

The server's monitor tool displays Link Errors and Ring Op Changes.

The CU is connected to the server and starts a performance test and transfers frames of different sizes between the server and the client.

The software is started as following:

- EUT (Server, HP Vectra VL4 5/100)  
server  
load monitor -ns (without screen blanker)  
select menu item "LAN/WAN Informations"
- CU (Client, HP Vectra XM2 4/66)  
lsl  
uppsfp  
uppsmlid  
ipxodi  
netx.exe  
f: (change to the server drive)  
login test  
pmax.bat

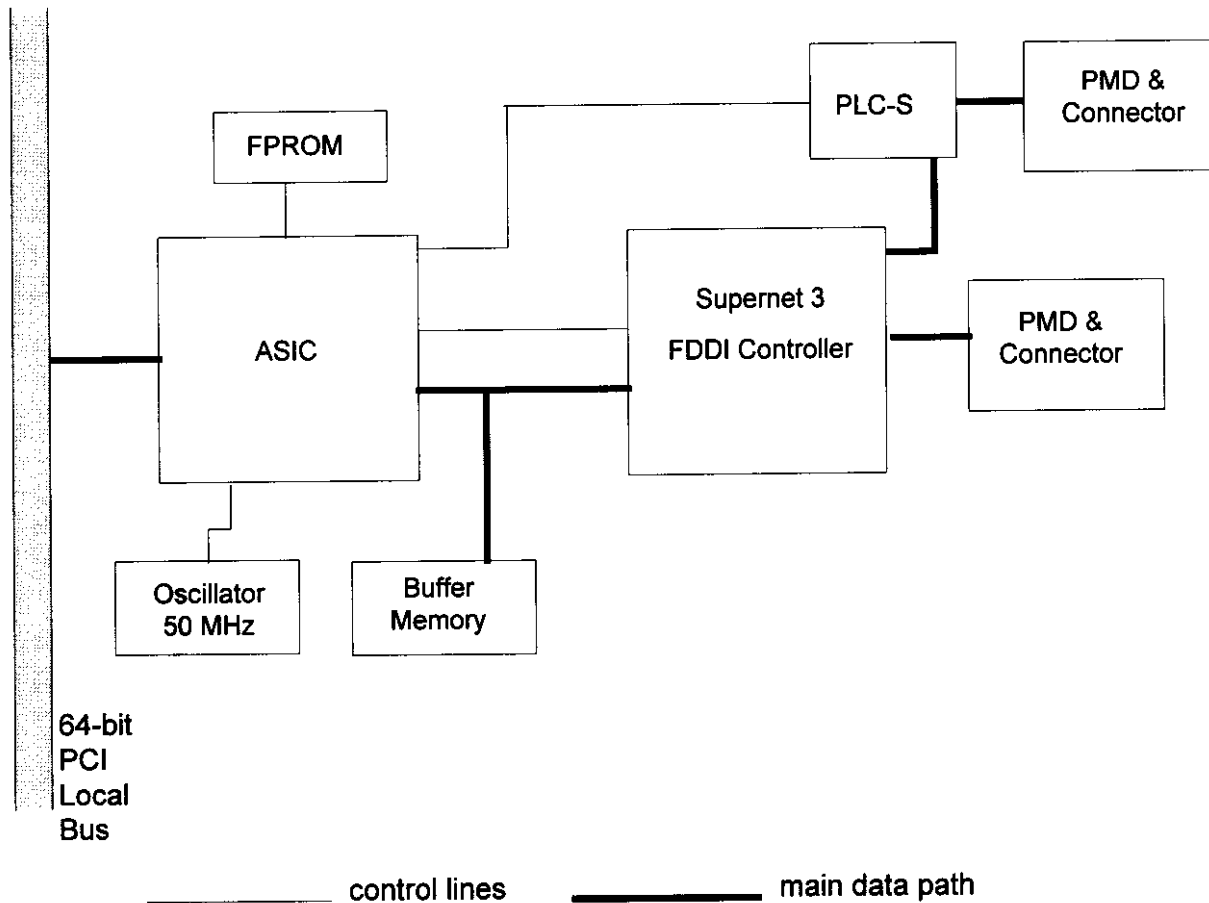
The batch-file "pmax.bat" starts the performance test "perform3.exe" with the following command line:

- perform3 tmax 120 100 65535 140

## 4 BLOCK DIAGRAM OF EQUIPMENT

### 4.1 Block Diagram of SK-NET FDDI-LP 64 DAS

The Block Diagram displays the controller's main devices.

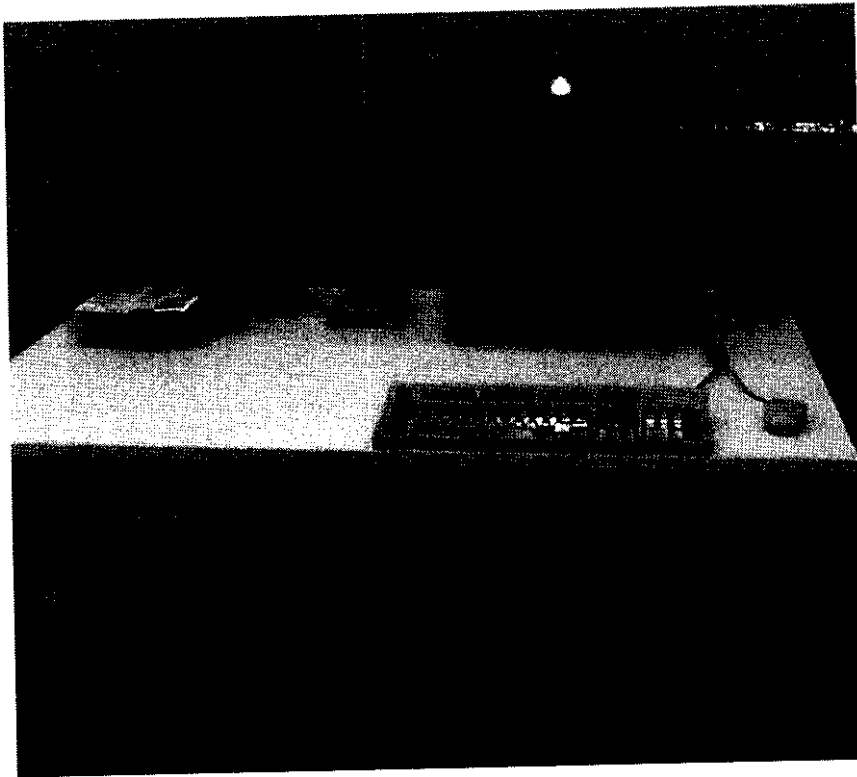


- Application Specific Integrated Circuit (ASIC)
- Reprogrammable Flash EPROM (FEPROM)
- Supernet 3 FDDI Controller
- 128 Kbyte Buffer Memory
- 2 PLC-Transceiver Units

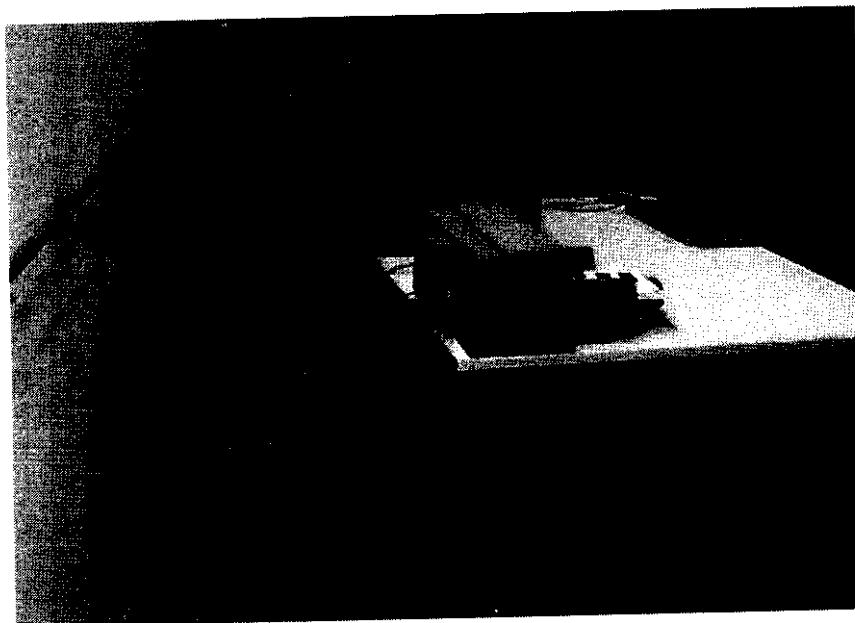
The PCI clock depends on the host PCI-System (in the tested system 33 MHz).  
The Crystal Oscillator on the adapter card operates at 50 MHz.

## 5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

### 5.1 Conducted Measurement Photos



Conducted Front



Conducted Rear / Side

## 6 CONDUCTED EMISSION DATA

### 6.1 Test Procedure

The initial step in collecting conducted data is a peak scan of the measurement range with an EMI test receiver. The significant peaks are then measured with quasi-peak detector.

### 6.2 Measured Data

Judgement: Passed by 20.2 dB

|         | Frequency<br>[ MHz ] | Measured*<br>[ dBμV ] | Limit QP<br>[ dBμV ] | Limit AV<br>[ dBμV ] |
|---------|----------------------|-----------------------|----------------------|----------------------|
| neutral | 0.205                | 35.9                  | 63.4                 | 53.4                 |
|         | 1.500                | 35.8                  | 56                   | 46                   |
|         | 1.705                | 35.2                  | 56                   | 46                   |
|         | 10.375               | 36.1                  | 60                   | 50                   |
|         | 12.010               | 35.7                  | 60                   | 50                   |
|         | 18.705               | 33.2                  | 60                   | 50                   |
|         | 21.160               | 34.7                  | 60                   | 50                   |
|         |                      |                       |                      |                      |
| line    | 0.205                | 33.7                  | 63.4                 | 53.4                 |
|         | 0.820                | 30.8                  | 56                   | 46                   |
|         | 2.390                | 29.8                  | 56                   | 46                   |
|         | 9.900                | 30.7                  | 60                   | 50                   |
|         | 12.010               | 34.2                  | 60                   | 50                   |
|         | 14.320               | 29.6                  | 60                   | 50                   |
|         | 15.975               | 30.5                  | 60                   | 50                   |
|         | 22.115               | 31.9                  | 60                   | 50                   |
|         | 24.580               | 27.1                  | 60                   | 50                   |
|         |                      |                       |                      |                      |

\* All readings are quasi-peak.

If the average limit is met when using a quasi-peak detector receiver, the test unit shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

Test Personnel:

Tester Signature S. Guntermann Date: March 30, 1998

Typed/Printed Name: Siegfried Guntermann

### 6.3 Test Instrumentation Used, Conducted Measurement

| Type     | Manufacturer/<br>Model No. | Serial No. | Last Calibration | Cal. Interval |
|----------|----------------------------|------------|------------------|---------------|
| Receiver | Rohde & Schwarz<br>ESS     | 825132/015 | March 27, 1998   | 12 months     |
| LISN     | Schwarzbeck<br>NSLK 8127   | 253        | January 15, 1998 | 12 months     |
| LISN     | Schwarzbeck<br>NSLK 8126   | 8126228    | January 15, 1998 | 12 months     |

## 7 RADIATED EMISSION DATA

### 7.1 Test Procedure

The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit. Explanation of the Correction Factor is given in paragraph 7.3.

The frequency range investigated was 30 MHz to 1000 MHz.

### 7.2 Measured Data

Judgement: Passed by 4 dB

| Frequency<br>( MHz ) | Receiver<br>Reading <sup>NOTE 1</sup><br>( dB $\mu$ V ) | Correction<br>Factor<br>( dB / m ) | Corrected<br>Reading<br>( dB $\mu$ V / m ) | 10 Meter<br>Limit<br>( dB $\mu$ V / m ) | Polarity<br>( v/h ) |
|----------------------|---------------------------------------------------------|------------------------------------|--------------------------------------------|-----------------------------------------|---------------------|
| 166.2                | 15.5                                                    | 10.5                               | 26                                         | 30                                      | h                   |
| 350                  | 3.1                                                     | 17.9                               | 21                                         | 37                                      | h                   |
| 398.8                | 4.4                                                     | 19.4                               | 23.8                                       | 37                                      | h                   |
| 400                  | 2.6                                                     | 19.4                               | 22                                         | 37                                      | h                   |
| 565                  | 8.1                                                     | 22.9                               | 31                                         | 37                                      | h                   |
| 600                  | 1.6                                                     | 23.4                               | 25                                         | 37                                      | h                   |
| 700                  | 1.8                                                     | 25.2                               | 27                                         | 37                                      | h                   |

Test Personnel:

Tester Signature:



Date: April 02, 1998

Typed/Printed Name: Siegfried Guntermann

### 7.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where

FS = Field Strength (dB $\mu$ V/m)

RA = Receiver Amplitude (dB $\mu$ V)

AF = Antenna Factor (dB/m)

CF = Cable Attenuation Factor (dB)

Assume a receiver reading of 23.5 dB $\mu$ V is obtained. The Antenna Factor of 7.4 dB/m and a Cable Factor of 1.1 dB is added, giving a field strength of 32 dB $\mu$ V/m. The 32 dB $\mu$ V/m value can be mathematically converted to its corresponding level in  $\mu$ V/m.

$$FS = 23.5 \text{ dB}\mu\text{V} + 7.4 \text{ dB/m} + 1.1 \text{ dB} = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

### 7.4 Test Instrumentation Used, Radiated Measurement

| Type     | Manufacturer/<br>Model No. | Serial No. | Last Calibration | Cal. Interval |
|----------|----------------------------|------------|------------------|---------------|
| Receiver | Rohde & Schwarz<br>ESS     | 825132/015 | March 27, 1998   | 12 months     |
| Antenna  | EMCO 3143                  | 9604-1269  | Feb. 20, 1998    | 12 months     |

## **8 PHOTOS OF TESTED EUT**

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The following photos are attached:

Photo 8.1: HP Vectra VL4 5/100, Top Cover Removed

Photo 8.2: SK-NET FDDI-LP 64 DAS, Component Side

Photo 8.3: SK-NET FDDI-LP 64 DAS, Foil Side