

MEASUREMENT / TECHNICAL REPORT

SIEMENS NIXDORF AG

Model: Personal Computer Scenic Pro M7

FCC ID: HSSSCENICM701

April 29, 1998

This report concerns:
Equipment type:

Original grant
Personal Computer

Class II change

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)
 other _____

Limits on compliance with: CISPR 22 resp. FCC class B

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Personal Computer Scenic Pro M7

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Attachment A: User Manual

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- Expansion slots (on board):
5 x PCI
2 x AT
1 x AGP

The personal computer is assembled by Siemens Nixdorf Informationssysteme AG, Buergermeister-Ulrich-Str. 100, 86199 Augsburg.

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1.2 Related Submittal Grant

N/A

1.3 Tested System Details

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

| Pos | Model Number (Serial Number) | FCC ID | Description | Cable Description (length in [cm]) |
|-----|--|---------------|-------------|---|
| 1 | Siemens Nixdorf Scenic Pro M7 S26361-K510-V1** | HSSSCENICM701 | PC EUT | unshielded power cord [292] |
| 2a | Siemens Nixdorf MCM 2108 NTD S26361-K479-V150 | M9U9703C97BMD | Monitor | unshielded power cord [175] shielded video cable [168] |
| 2b | Siemens Nixdorf MCM 1703 NTD | A3KM053 | Monitor | unshielded power cord [175] shielded video cable [168] |
| 3 | Siemens Nixdorf S26381-K210 | HSS01TASTK210 | Keyboard | shielded keyboard cable [143] |
| 4 | Microsoft MS 2.1A | C3KKMP3 | Mouse | shielded mouse cable [183] |

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| Pos | Model Number (Serial Number) | FCC ID | Description | Cable Description (length in [cm]) |
|-----|--|------------|--------------------------|---|
| 5 | Hewlett Packard HP 2225C+ (3019S70991) | DSI6XU2225 | Printer, parallel I/F | unshielded AC ca- ble [180], shielded centronics cable [190] |
| 6 | Hewlett Packard HP 2225D+ (3012S70819) | DSI6XU2225 | Printer, serial I/F | unshielded power cord [185], shiel- ded serial cable [190] |
| 7 | Hewlett Packard HP 2225D+ (2952S61299) | DSI6XU2225 | Printer, serial I/F | unshielded power cord [185], shiel- ded serial cable [190] |
| 8 | Siemens | N/A | USB cable | shielded cable, terminated [192] |
| 9 | Siemens | N/A | USB cable | shielded cable, terminated [192] |
| | Pos 1 contains: | | | |
| a | ASTEC (UK), AA20050 SNI S26113-E413-V30 | N/A | Power supply | |
| b | SNI S26361-D1064-A11 | N/A | System board | |
| c | SNI S26361-D960-V1 GS 4 | N/A | Chip card reader | |

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| Pos | Model Number (Serial Number) | FCC ID | Description | Cable Description (length in [cm]) |
|-----|--|--------------|----------------------|---------------------------------------|
| d | SECKMM966G512 BQN-G8 | N/A | Video RAM | |
| e | SECKMM366S203 CT-GL (2x) SECKMM366S823 BT-GL (1x) | N/A | SDRAM | |
| f | Intel Pentium II 80523/PY400512 Q434ES | N/A | Processor module | |
| g | NEC CDR-1900A | A3DCDR-1900A | CD-ROM drive | |
| h | Quantum Fireball 2340 AT | N/A | Hard disk drive | |
| i | Mitsumi D359T5 | N/A | Floppy disk drive | |

Remark: positions 2a / 2b optional

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1.4 Test Methodology

Both, conducted and radiated tests were performed according to the procedures in ANSI C63.4-1992. Radiated testing below 1 GHz was performed at an antenna to EUT distance of 10 meters above 1 GHz at an antenna to EUT distance of 3 meters. All radiated emission measurements were done in an anechoic chamber. Limits for radiated and conducted are in compliance with CISPR 22 resp FCC class B.

1.5 Test Facility

The anechoic chamber and conducted measurement facility used to collect the emission data is located at Siemens Nixdorf Informationssysteme AG, Bürgermeister Ulrich Str. 100, 86199 Augsburg, Germany. This site has been fully described in a report dated January 24, 1997 submitted to your office, and accepted in a letter dated March 03, 1997 (31040/SIT).

1.6 Referenced Rules Sections

N/A

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3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a maximum fashion (as a customer can use it). Each type of external ports was connected with a peripheral unit (e.g. serial port connected to a serial printer, external keyboard port connected to a keyboard and so on). As the system can be provided alternatively either with a chip card reader or with a second serial port, both configurations were tested. During radiated emission the monitor was powered via system unit, during conducted emission also the external monitor supply was tested.

The clock frequency is 100 MHz, the system was tested with the highest possible processor:

100 MHz clock: Intel Pentium II 400 MHz

The system is provided with one kind of power supply:

– ASTEC AA20050 SNI: S26113-E413-V30

The power supply has been measured in each video resolution.

Referring to radiated emission the following (worst case) results are applicable:

ASTEC PSU:

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Pentium II 400 MHz, video resolution 1280 x 1024/100 Hz

Frequency range 1 GHz - 3 GHz:

100 MHz clock/Pentium II 400 MHz, video resolution 1280 x 1024/100 Hz

Referring to conducted emission the following (worst case) result is applicable:

ASTEC PSU:

100 MHz clock/Pentium II 400 MHz, video resolution 1600 x 1200/85 Hz
monitor power via system unit

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3.2 Video mode Justification

The system was tested in video graphic modes 1024 x 768, 1280 x 1024, 1600 x 1200 and 1920 x 1200. To get comparable results when measuring different video resolutions it is necessary to carry out the test with one monitor which is capable to drive all high resolutions. Such a high performance monitor has a special ferrite loaded video cable. To prove the compliance of the EUT without ferrite on the host side, we additionally tested the system with a representative standard 17" monitor provided with a cable without any ferrite in a video resolution which is usual for standard monitors (1024 x 768). The worst case combination (with clock frequency, video mode and power supply) of the system was used to collect the included data.

The following data is applicable:

radiated emission:

ASTEC PSU:

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Pentium II 400 MHz, video resolution 1280 x 1024/100 Hz

Frequency range 1 GHz - 3 GHz:

100 MHz clock/Pentium II 400 MHz, video resolution 1280 x 1024/100 Hz

conducted emission:

ASTEC PSU:

100 MHz clock/Pentium II 400 MHz, video resolution 1600 x 1200/85 Hz
monitor power via system unit

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3.3 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The used sequence is:

- scrolling "H" with applicable video mode (see 3.2)
- internal Floppy drive writes to the HD and reads back
- internal CD-ROM writes to the HD
- "H`s" are sent to the printer ports
- data is sent to USB ports

3.4 Special Accessories

As shown in Figure 3.1, all interface cables used for compliance testing are shielded like normally supplied by the manufacturer. All cable connectors feature integral metal hoods for shielding.

3.5 Equipment Modifications

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

no modifications

Applicant Signature _____ Date _____

Typed/Printed Name _____ Position _____

3.6 Configuration of Tested System

All necessary tests were carried out like figure 3.1. The system was used according to paragraph 1.1. During test for conducted emission the EUT was connected to a LISN. All peripherals were supplied by a second LISN. The equipment was configured according to ANSI C63.4-1992 Fig 11.

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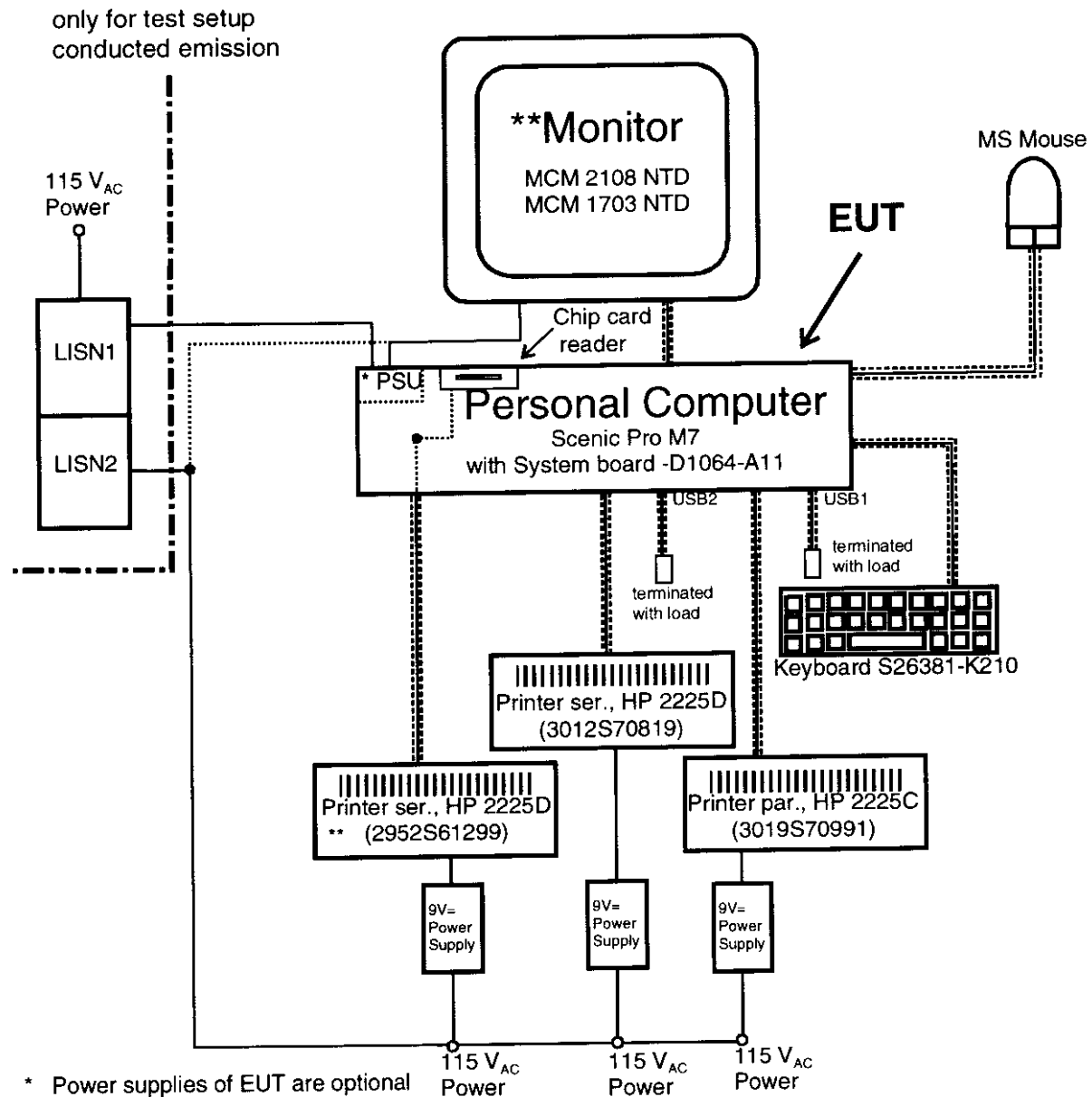
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Figure 3.1 Configuration of Tested System



* Power supplies of EUT are optional
 ** Monitors are optional
 see 1.3 Tested system details

4 BLOCK DIAGRAM OF EUT

see fig 4.1 page 24

4.1 Block Diagram Description (see fig. 4.1)

The major parts of the system are (fig 4.1).

- System board
- Power supply
- Floppy disk drive
- Hard disk drive
- CD-ROM drive
- Chip card reader
- Peripheral connector area (Keyboard, Mouse, Ser. 1, Ser. 2, Video, Parallel Port and USB)

The detailed diagram of the system board is shown in fig 4.1

The personal computer works exactly like a traditional PC.

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4.2 Clock frequencies of EUT

| | |
|----------------------|------------|
| Clock synthesizer | 14,318 MHz |
| Memory | 100 MHz |
| PCI-bus | 33,3 MHz |
| PIIX4 to IDE and USB | 33,3 MHz |
| ISA Bus | 8,2 MHz |
| I/O controller | 33,3 MHz |
| USB | 48 MHz |

4.3 Theory of Operation

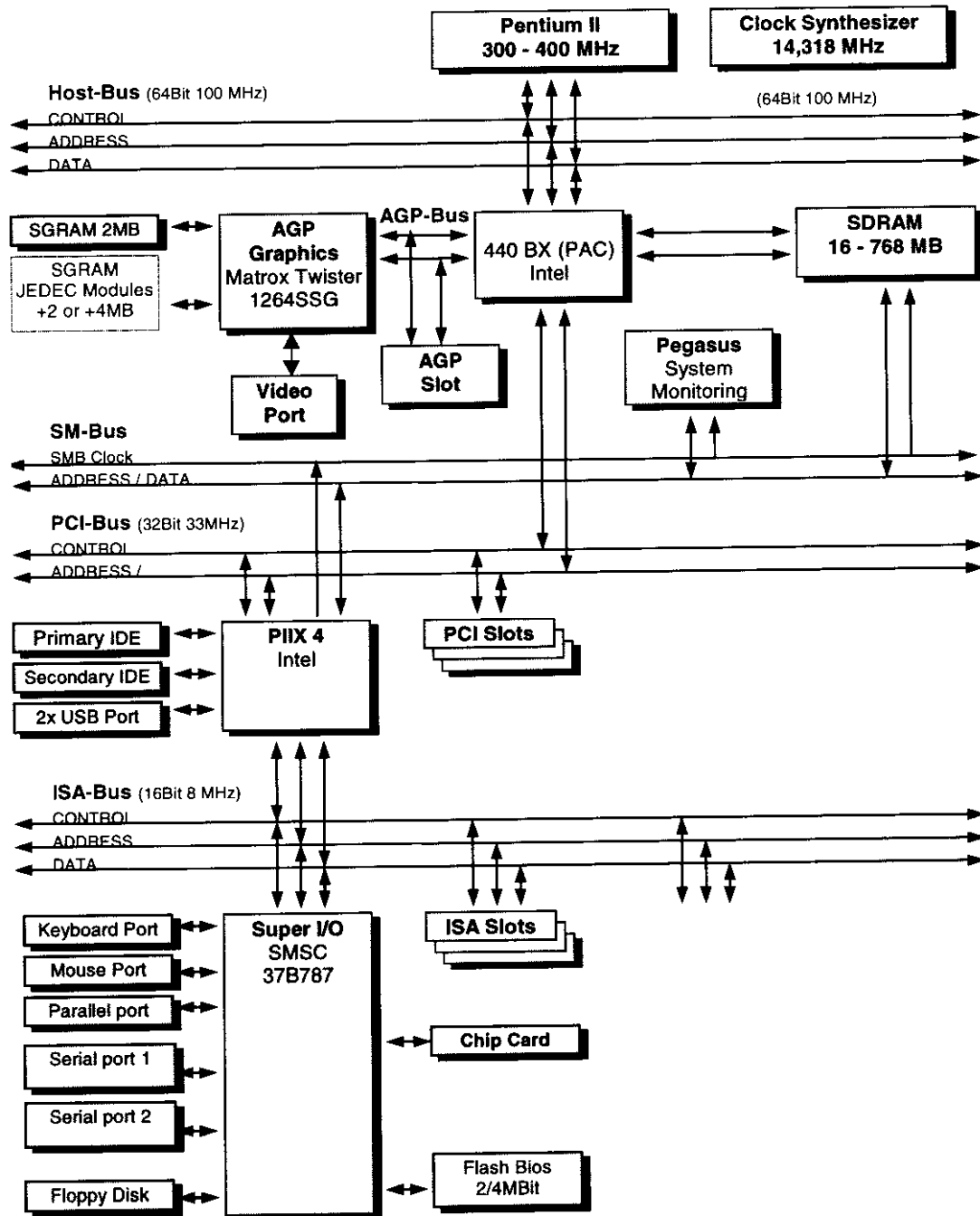
The compact mini tower PC works exactly as a traditional PC.

The processors run internally between 300 and 400 MHz, the type is selected by switches, the system clock is in each case the same - 100 MHz and is multiplied by the processors internally.

The highest possible frequencies and the corresponding processors are:

| System clock | Processor | factor |
|--------------|-----------|--------|
| 100 MHz | 300 MHz | 3,0 |
| 100 MHz | 350 MHz | 3,5 |
| 100 MHz | 400 MHz | 4,0 |

Figure 4.1 Block Diagram of the EUT



6 CONDUCTED EMISSION DATA

6.1 Test Procedure

The initial step in collecting conducted emission data is a Rohde & Schwarz Test Receiver (ESHS10). During first scan all data in peak mode is measured, then all significant peaks are explored either in quasi-peak mode or in average mode. In case of low noise (no peak value reaches the quasi peak limit), only average checks are done.

6.2 Measured Data

The conducted emission was measured the following way:

1. Peak noise on L
2. Peak noise on N

During the emission measurement the printers are supplied with power via a second LISN, the monitor was either powered via the system unit or separately.

The worst case result of the corresponding configuration (video resolution, supply modus) is given next:

Judgement: Passed by

| Line | Frequency [MHz] | Measured Level [dB(μ V)] | Kind of value | Limit [dB(μ V)] |
|---------|-----------------|-------------------------------|---------------|----------------------|
| phase | 0.480000 | 29.70 | QP | 56 |
| neutral | 0.546000 | 31.30 | QP | 56 |
| phase | 0.822000 | 28.10 | QP | 56 |
| neutral | 2.106000 | 30.40 | QP | 56 |
| neutral | 12.012000 | 35.60 | QP | 60 |
| neutral | 0.474000 | 28.70 | AV | 46 |
| neutral | 0.546000 | 27.10 | AV | 46 |
| phase | 0.816000 | 28.30 | AV | 46 |
| phase | 1.836000 | 22.80 | AV | 46 |
| neutral | 12.012000 | 35.80 | AV | 50 |

AV: average

QP: quasi peak

Test Personnel:

Tester Signature: W. Richter Date: May 7, 1998

Printed Name: W. Richter

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Measurement Protocols

Page No

ASTEC PSU:

100 MHz clock/Pentium II 400 MHz
video resolution 1600 x 1200/85 Hz
monitor power via system unit

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Conducted noise according to:

EN55022/B

EUT: Scenic Pro M7, 400 MHz ; D1064-A11, WGS2
 Manufacturer: SNI
 Operating Condition: scr. "H" 1600*1200/85 Hz, HD+CD-ROM-Test
 Test Site: EMC CENTER Augsburg ; SK2
 Operator: W. Richter
 Comment : full configuration with Astec AA20050 (E413-V30)
 Comment: Monitor MCM 2108
 Start of Test: 07.04.1998 / 07:41:26

SCAN TABLE: "Volt_015-30av"

Unit: dBµV

Detector: Mode:

Curve 1: MaxPeak MaxHold
 Curve 2: Average MaxHold

Subrange 1:

Start Frequency: 150.0 kHz Step Size: 6.0 kHz
 Stop Frequency: 30.0 MHz
 Measure Time: 10.0 ms
 IF Bandwidth: 10 kHz

Receiver: ESH3 Transducer: ESH3-Z5
 Signal Path: None System Transducer: None
 Meas. Mode: Lin Add. Transd. 1: ESH3-Z2
 Tracking Gen.: Off Add. Transd. 2: None
 Input: -- Add. Transd. 3: None

Preamplifier: -- Demodulation: A3
 RF Att.: 0 dB Volume: --
 Ref. Level: -- Squelch: --
 Min. RF Att.: -- Option: None
 IF Att.: LowDistortion
 Autorange: On

Curve 1: On Repetition: 0
 Curve 2: On Stop Mark: Off
 Stop Message: Off
 Stop Message:

MEASUREMENT RESULT: "Quasi Peak"

07.04.1998 08:44

| Frequency | Level | Limit | Margin | Exceed | Line | PE |
|-----------|-------|-------|--------|--------|------|-----|
| MHz | dBµV | dBµV | dB | Mark | | |
| 0.480000 | 29.70 | 56 | 26.6 | | L1 | GND |
| 0.546000 | 31.30 | 56 | 24.7 | | N | GND |
| 0.822000 | 28.10 | 56 | 27.9 | | L1 | GND |

MEASUREMENT RESULT: "Quasi Peak"

(continued)

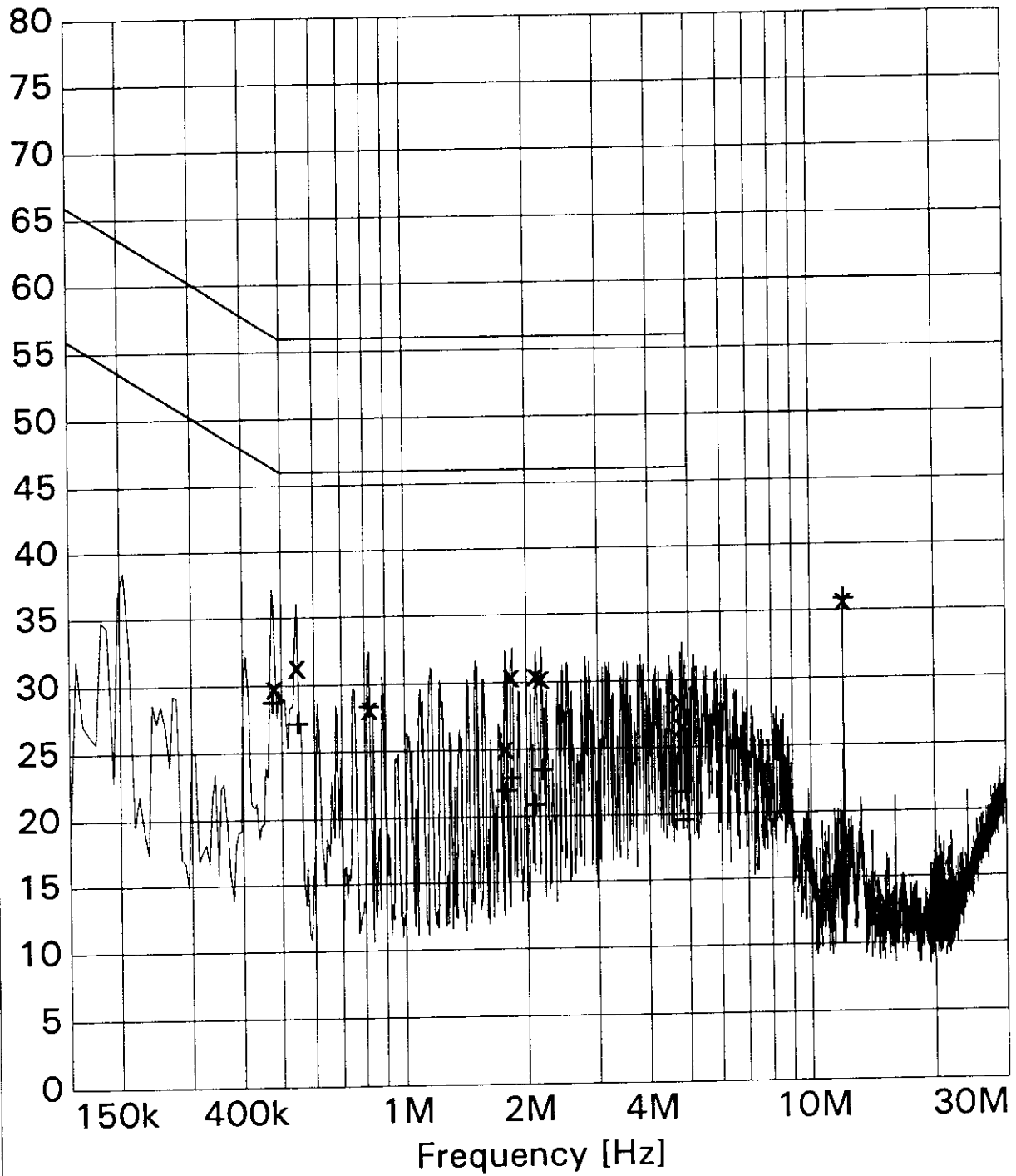
| Frequency | Level | Limit | Margin | Exceed | Line | PE |
|-----------|-------|-------|--------|--------|------|-----|
| MHz | dBµV | dBµV | dB | Mark | | |
| 1.776000 | 25.00 | 56 | 31.0 | | L1 | GND |
| 1.836000 | 30.30 | 56 | 25.7 | | N | GND |
| 2.106000 | 30.40 | 56 | 25.6 | | N | GND |
| 2.172000 | 30.20 | 56 | 25.8 | | N | GND |
| 4.764000 | 28.30 | 56 | 27.7 | | N | GND |
| 4.812000 | 26.50 | 56 | 29.5 | | N | GND |
| 12.012000 | 35.60 | 60 | 24.4 | | N | GND |

MEASUREMENT RESULT: "Average"

07.04.1998 08:44

| Frequency | Level | Limit | Margin | Exceed | Line | PE |
|-----------|-------|-------|--------|--------|------|-----|
| MHz | dBµV | dBµV | dB | Mark | | |
| 0.474000 | 28.70 | 46 | 17.7 | | N | GND |
| 0.546000 | 27.10 | 46 | 18.9 | | N | GND |
| 0.816000 | 28.30 | 46 | 17.7 | | L1 | GND |
| 1.770000 | 21.90 | 46 | 24.1 | | L1 | GND |
| 1.836000 | 22.80 | 46 | 23.2 | | L1 | GND |
| 2.100000 | 20.80 | 46 | 25.2 | | N | GND |
| 2.178000 | 23.40 | 46 | 22.6 | | N | GND |
| 4.758000 | 21.60 | 46 | 24.4 | | N | GND |
| 4.818000 | 19.50 | 46 | 26.5 | | L1 | GND |
| 12.012000 | 35.80 | 50 | 14.2 | | N | GND |

Level [dB μ V]



| | | |
|-----|-----|-----------------|
| x x | MES | Quasi Peak |
| + | MES | Average |
| — | MES | Preview Peak |
| — | LIM | EN 55022/B V QP |
| — | LIM | EN 55022/B V AV |

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 | ESHS10 Rohde&Schwarz | 842884/011 | March 97 | 12 months |
| LISN | NSLK 8126 Schwarzbeck | KWA20870662 | March 97 | 12 months |
| LISN | ESHS-Z5 Rohde&Schwarz | 831.5518.52 | March 97 | 12 months |
| Pulse limiter | ESH3-Z2 Rohde&Schwarz | 60813 | March 97 | 12 months |

7 RADIATED EMISSION DATA

7.1 Test Procedure

The radiated emission was measured in two parts:

1. in the frequency range from 30 MHz to 1000 MHz. The bandwidth of the EMI-receiver was set to 120 kHz and the detector was set to peak. During pre-scan all data in peak mode are accumulated automatically. At final measurement the detector was set to CISPR quasi peak and values above the acceptance line were verified automatically.
2. in the frequency range from 1000 MHz to 3000 MHz. The bandwidth of the EMI-receiver was set to 1 MHz and the detector was set to peak. During pre-scan all data in peak mode are accumulated automatically. At final measurement the detector was set to average and values above the acceptance line were verified automatically.

Both tests were performed in a semi anechoic chamber, measurements below 1000 MHz in a distance of 10 meters between antenna and EUT, above 1 GHz with a distance of 3 meters between antenna and EUT. During tests the EUT was turned 360° and the actual used receiving antenna was moved from 1 to 4 meters and the antenna polarisation was changed from horizontal to vertical for finding the maximum levels of emission.

For each range one antenna for the whole span was used

1. 30 MHz to 1000 MHz: log.-per antenna
2. 1000 MHz to 3000 MHz: rigid tensor antenna

After automatic tests during manual verification the cables and the equipment were placed and moved within the range of position in order to find the maximum of emission.

For further data see enclosed test results.

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7.2 Measured Data

The EUT was measured with the Processor Pentium II 400 MHz in video modes 1024 x 768, 1280 x 1024, 1600 x 1200 and 1920 x 1200. The test results below reflect the worst case with:

ASTEC PSU:

100 MHz clock/Pentium II 400 MHz, video resolution: 1280 x 1024/100 Hz

Part 1: frequency range 30 MHz - 1000 MHz:

Judgement: Passed by

| Frequency [MHz] | Level* [dB(μV/m)] | Limit [dB(μV/m)] | Exceeding [dB] | Ant Pol | Height in [m] | Angle in deg |
|--------------------|----------------------|---------------------|-------------------|------------|------------------|-----------------|
| 700.26000 | 35.03 | 37.000 | -1.973861 | hor | 4.0000 | 330.00 |
| 800.25000 | 33.70 | 37.000 | -3.295020 | ver | 3.4000 | 180.00 |
| 827.22000 | 33.93 | 37.000 | -3.065130 | ver | 3.4000 | 180.00 |
| 863.16000 | 35.06 | 37.000 | -1.936865 | ver | 1.6000 | 180.00 |
| 972.06000 | 32.24 | 37.000 | -4.757073 | hor | 3.4000 | 180.00 |

all levels are quasi-peak levels

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Part 2: frequency range 1 GHz - 3 GHz:

System with chip card reader

Judgement: Passed by

| Frequency [MHz] | Level* [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Exceed Mark | Height [cm] | Azimuth [deg] | Ant Pol |
|--------------------|----------------------|---------------------|----------------|----------------|----------------|------------------|------------|
| 1000.000000 | 29.26 | 54.0 | 24.7 | | 200.0 | 180.00 | ver |
| 1099.900000 | 27.91 | 54.0 | 26.1 | | 150.0 | 180.00 | hor |
| 1114.900000 | 34.46 | 54.0 | 19.5 | | 200.0 | 180.00 | hor |
| 1191.700000 | 30.18 | 54.0 | 23.8 | | 100.0 | 180.00 | hor |
| 1194.700000 | 29.00 | 54.0 | 25.0 | | 100.0 | 180.00 | hor |
| 1588.900000 | 29.05 | 54.0 | 24.9 | | 150.0 | 315.00 | ver |
| 1600.300000 | 29.12 | 54.0 | 24.9 | | 150.0 | 315.00 | ver |

all levels are average levels

*The correction factor is considered automatically by the test receiver.
A table of correction factors is listed in paragraph 7.4.

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Test Personnel:

Tester Signature: H. Zenkner Date: May 7, 1998

Printed Name: H. Zenkner

Test Personnel:

Tester Signature: A. Siebenhütter Date: May 7, 1998

Printed Name: A. Siebenhütter

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Measurement Protocols

Page No

ASTEC PSU:

Frequency range 30 MHz - 1 GHz:
100 MHz clock/Pentium II 400 MHz
video resolution 1280 x 1024/100 Hz

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Frequency range 1 GHz - 3 GHz:
100 MHz clock/Pentium II 400 MHz
video resolution 1280 x 1024/100 Hz

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Radiation Test according to:

EN 55022/B

EUT: Scenic Pro M7 400MHz; D1064-A11,WGS=2
Manufacturer: SNI
Operating Condition: scr. "H" 1280 x 1024/100Hz; HD/CD-Test
Test Site: EMC Center Augsburg
Operator: H. Zenkner
Job No: PDP8E026
Comment : full configuration
Comment: USB running

SCAN TABLE: "10m/30-1000"

Unit: dB μ V/m

Detector: Mode:

Curve 1: MaxPeak ClearWrite
Curve 2: QuasiPeak ClearWrite

Subrange 1:

Start Frequency: 30.0 MHz Step Size: 30.0 kHz
Stop Frequency: 1.0 GHz
Measure Time: 0.01 s
IF Bandwidth: 120 kHz

Receiver: ESMI Probe Transducer: CBL6111 cal. 4/95
Signal Path: 2DC-CP1X1 System Transducer: RFin2-CP1/X1
Scan Mode: Lin Add. Transd. 1: cable30-1000
Tracking Gen.: Off Add. Transd. 2: NONE
Input: 2DC Add. Transd. 3: NONE

Preamplifier: 10 dB Demodulation: AM
RF Att.: 0 dB Volume: 70.0 %
Ref. Level: -60 dBm Squelch: --
Min. RF Att.: 0 dB Option: None
IF Att.: --
Autorange: On

Curve 1: On Repetition: 1
Curve 2: On Stop Mark: Off
Stop Message: Off
Text: 1

MEASUREMENT RESULT: "Peak"

| Frequency MHz | Level dB μ V/m | ANT POL | HEIGHT in [m] | ANGLE in deg |
|------------------|-----------------------|------------|------------------|-----------------|
| 700.37777 | 35.96 | HOR | 4.0000 | 330.00 |
| 801.68888 | 34.92 | VER | 3.4000 | 180.00 |

| | | | | |
|-----------|-------|-----|--------|--------|
| 827.55555 | 36.80 | VER | 3.4000 | 180.00 |
| 864.20000 | 36.80 | VER | 1.6000 | 180.00 |
| 973.05555 | 36.12 | HOR | 3.4000 | 180.00 |

MEASUREMENT RESULT: "Quasi Peak"

| Frequency MHz | Level dB μ V/m | LIMIT dB μ V/m | EXCEEDING dB | ANT POL | HEIGHT in [m] | ANGLE in deg |
|------------------|-----------------------|-----------------------|-----------------|------------|------------------|-----------------|
| 700.26000 | 35.03 | 37.000 | -1.973861 | HOR | 4.0000 | 330.00 |
| 800.25000 | 33.70 | 37.000 | -3.295020 | VER | 3.4000 | 180.00 |
| 827.22000 | 33.93 | 37.000 | -3.065130 | VER | 3.4000 | 180.00 |
| 863.16000 | 35.06 | 37.000 | -1.936865 | VER | 1.6000 | 180.00 |
| 972.06000 | 32.24 | 37.000 | -4.757073 | HOR | 3.4000 | 180.00 |

Level [dB μ V/m]

60

50

40

30

20

10

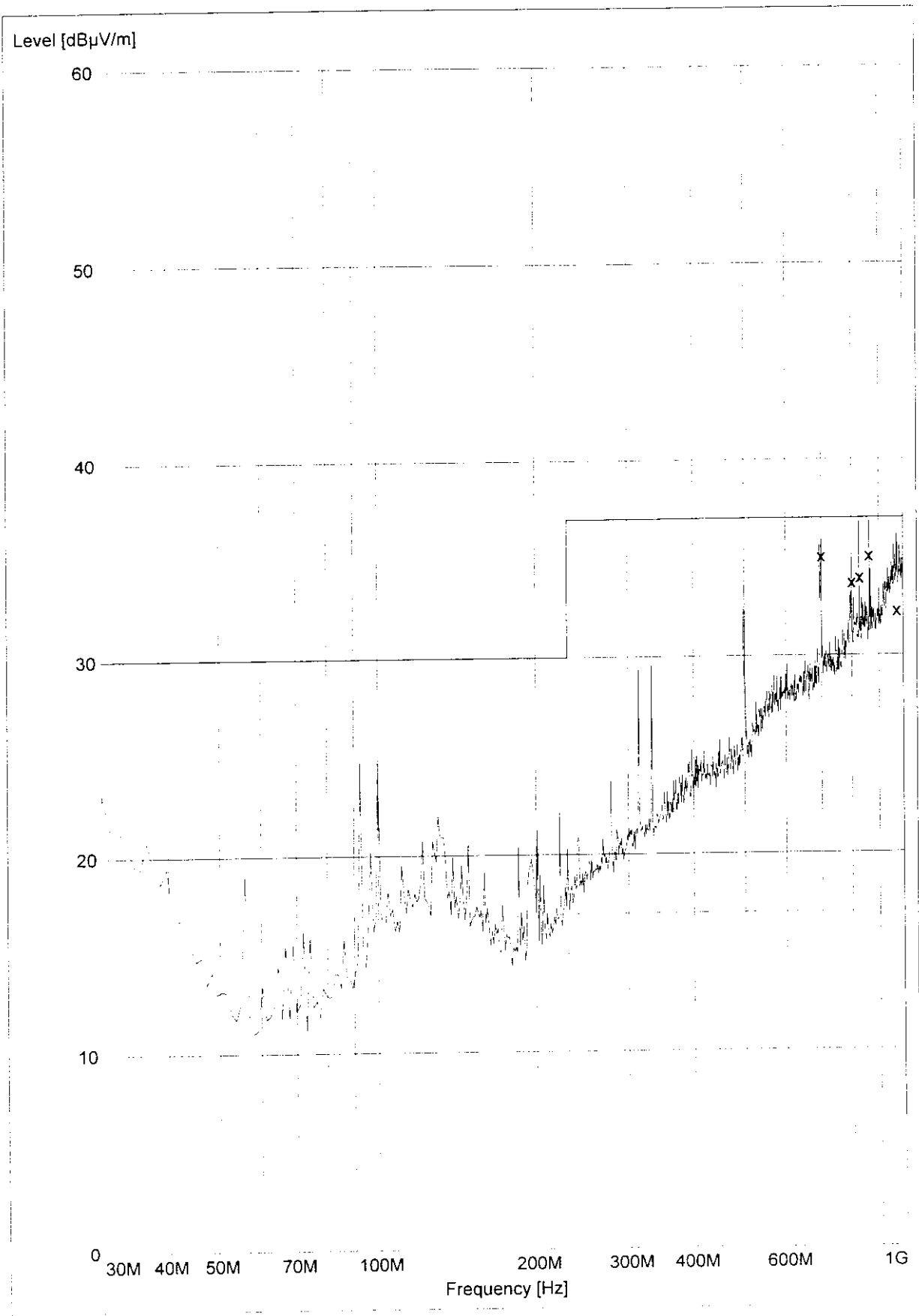
0

30M 40M 50M 70M 100M 200M 300M 400M 600M 1G

Frequency [Hz]

x x x MES
MES
— LIM
LIM (-20 dB)

Quasi Peak
Preview Peak
EN55022/B
EN55022/B



Fieldstrength according to :

FCC class B

EUT: Scenic Pro M7 with D1064-A11/400MHz
Manufacturer: SNI
Operating Condition: scrolling "H" 1280 x 1024/100Hz + CD/HD-test
Test Site: EMC Center Augsburg
Operator: A. Siebenhütter
Job No: PDP8E026
Comment : full configuration. Power Supply: Astec E412-V30
Start of Test:

SCAN TABLE: "3m/1-3GHz"

Unit: dBµV/m

Detector: Mode:

Curve 1: Average MaxHold

Subrange 1:

Start Frequency: 1.0 GHz Step Size: 300.0 kHz
Stop Frequency: 3.0 GHz
Measure Time: 10.0 ms
IF Bandwidth: 1 MHz

Receiver: ESXI Transducer: Tensor 4105 h
Signal Path: 2DC-CP7X1 System Transducer: RFin2-CP7/X1
Meas. Mode: Lin Add. Transd. 1: Rosenberger 8m
Tracking Gen.: Off Add. Transd. 2: None
Input: 2DC Add. Transd. 3: None

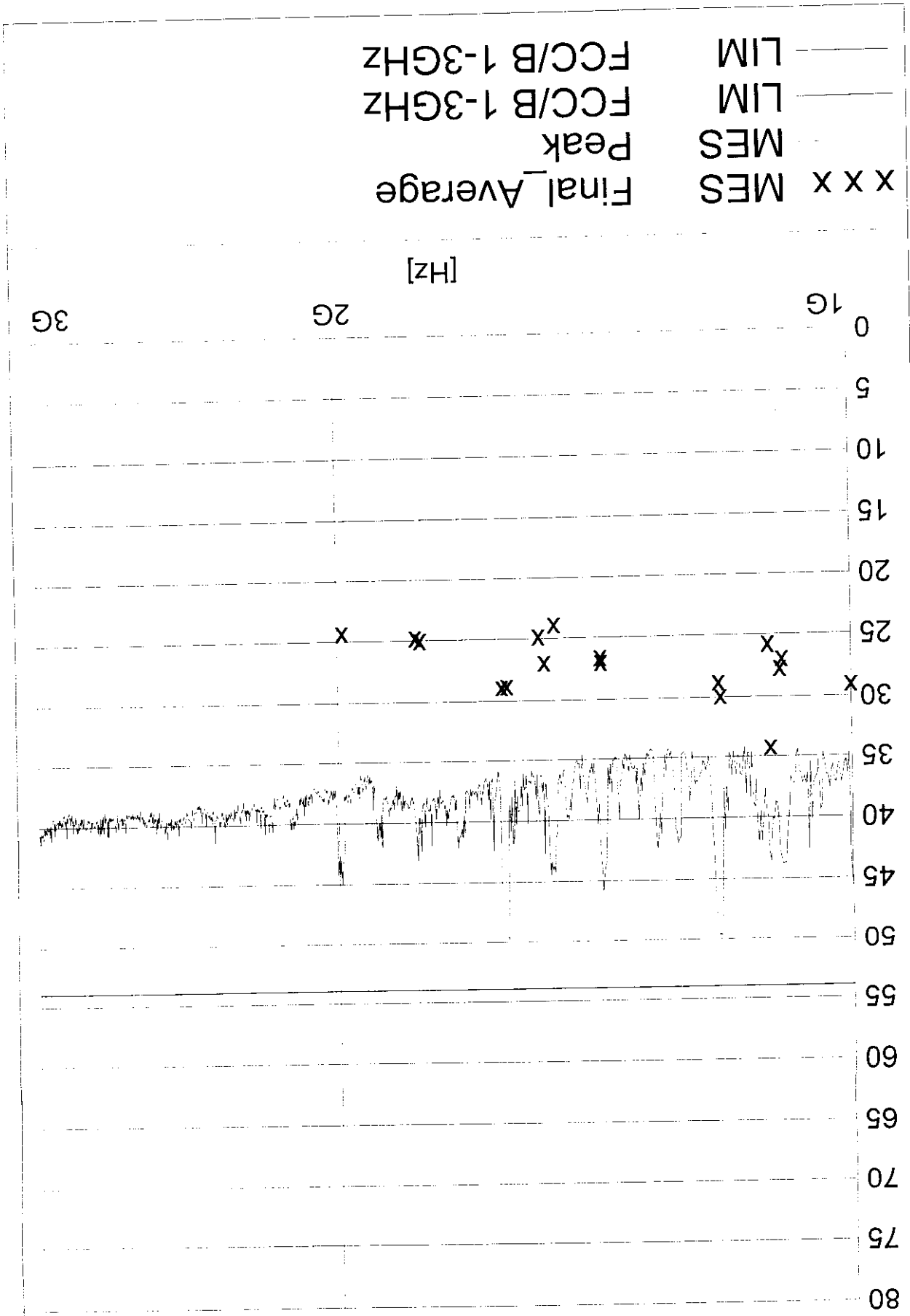
Preamplifier: 10 dB Demodulation: AM
RF Att.: Coupled Volume: 75 %
Ref. Level: -40.0 dBm Squelch: --
Min. RF Att.: 0 dB Option: None
IF Att.: --
Autorange: On

Curve 1: On Repetition: 0
Stop Mark: Off
Stop Message: Off
Stop Message:

MEASUREMENT RESULT: "Final_Average"

08.04.1998 10:58

| Frequency | Level | Limit | Margin | Exceed | Height | Azimuth | Polarisation |
|-------------|--------------|--------------|--------|--------|--------|---------|--------------|
| MHz | dB μ V/m | dB μ V/m | dB | Mark | cm | deg | |
| 1000.000000 | 29.26 | 54.0 | 24.7 | | 200.0 | 180.00 | VERTICAL |
| 1096.900000 | 27.15 | 54.0 | 26.9 | | 150.0 | 180.00 | HORIZONTAL |
| 1099.900000 | 27.91 | 54.0 | 26.1 | | 150.0 | 180.00 | HORIZONTAL |
| 1114.900000 | 34.46 | 54.0 | 19.5 | | 200.0 | 180.00 | HORIZONTAL |
| 1117.600000 | 25.99 | 54.0 | 28.0 | | 200.0 | 180.00 | HORIZONTAL |
| 1191.700000 | 30.18 | 54.0 | 23.8 | | 100.0 | 180.00 | HORIZONTAL |
| 1194.700000 | 29.00 | 54.0 | 25.0 | | 100.0 | 180.00 | HORIZONTAL |
| 1399.600000 | 27.21 | 54.0 | 26.8 | | 100.0 | 225.00 | HORIZONTAL |
| 1400.500000 | 26.82 | 54.0 | 27.2 | | 100.0 | 225.00 | HORIZONTAL |
| 1490.500000 | 24.19 | 54.0 | 29.8 | | 200.0 | 180.00 | HORIZONTAL |
| 1510.300000 | 27.17 | 54.0 | 26.8 | | 100.0 | 225.00 | HORIZONTAL |
| 1522.300000 | 25.11 | 54.0 | 28.9 | | 100.0 | 225.00 | HORIZONTAL |
| 1588.900000 | 29.05 | 54.0 | 24.9 | | 150.0 | 315.00 | VERTICAL |
| 1600.300000 | 29.12 | 54.0 | 24.9 | | 150.0 | 315.00 | VERTICAL |
| 1787.200000 | 25.29 | 54.0 | 28.7 | | 100.0 | 225.00 | HORIZONTAL |
| 1798.600000 | 25.07 | 54.0 | 28.9 | | 100.0 | 225.00 | HORIZONTAL |
| 1985.500000 | 24.63 | 54.0 | 29.4 | | 100.0 | 0.00 | VERTICAL |



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 | ESMI Rohde&Schwarz | 840607/006 | Jan. 97 | 12 months |
| Antenna | CBL 6111 Chase | 1345 | March 97 | 12 months |
| Active Ridged antenna | Tensor 4105 Rohde&Schwarz | 2063 | March 97 | 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 (incl. Preamplifier 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

7.6 Table of Correction Factors

Frequency range: 30 MHz to 1000 MHz

| Frequency [MHz] | Correction Bilog Antenna [dB] | Correction Cable [dB] | Correction Antenna + Cable [dB] |
|-----------------|-------------------------------|-----------------------|---------------------------------|
| 30,0 | 17,90 | 0,65 | 18,55 |
| 35,0 | 15,20 | 0,67 | 15,87 |
| 40,0 | 12,80 | 0,68 | 13,48 |
| 45,0 | 10,00 | 0,73 | 10,73 |
| 50,0 | 8,20 | 0,74 | 8,94 |
| 55,0 | 6,90 | 0,82 | 7,72 |
| 60,0 | 6,50 | 0,84 | 7,34 |
| 70,0 | 6,40 | 0,90 | 7,30 |
| 80,0 | 7,20 | 0,95 | 8,15 |
| 90,0 | 9,30 | 0,99 | 10,29 |
| 100,0 | 11,10 | 1,10 | 12,20 |
| 120,0 | 12,10 | 1,14 | 13,24 |
| 140,0 | 11,30 | 1,27 | 12,57 |
| 160,0 | 10,60 | 1,35 | 11,95 |
| 180,0 | 9,60 | 1,45 | 11,05 |
| 200,0 | 9,50 | 1,51 | 11,01 |
| 250,0 | 12,40 | 1,71 | 14,11 |
| 300,0 | 13,80 | 1,84 | 15,64 |
| 350,0 | 15,00 | 2,00 | 17,00 |
| 400,0 | 16,40 | 2,18 | 18,58 |
| 450,0 | 16,90 | 2,35 | 19,25 |
| 500,0 | 17,40 | 2,43 | 19,83 |

| Frequency [MHz] | Correction Bilog Antenna [dB] | Correction Cable [dB] | Correction Antenna + Cable [dB] |
|-----------------|-------------------------------|-----------------------|---------------------------------|
| 550,0 | 19,00 | 2,62 | 21,62 |
| 600,0 | 18,70 | 2,73 | 21,43 |
| 650,0 | 19,70 | 2,88 | 22,58 |
| 700,0 | 19,00 | 2,91 | 21,91 |
| 750,0 | 20,00 | 3,01 | 23,01 |
| 800,0 | 19,90 | 3,21 | 23,11 |
| 850,0 | 22,90 | 3,32 | 26,22 |
| 900,0 | 20,70 | 3,40 | 24,10 |
| 950,0 | 21,00 | 3,49 | 24,49 |
| 1000,0 | 25,00 | 3,69 | 28,69 |

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Frequency range: 1 GHz to 3 GHz

| Frequency [GHz] | Correction Tensor Antenna with Pre-amplifier [dB] | Correction Cable [dB] | Correction Antenna + Cable [dB] |
|-----------------|---|-----------------------|---------------------------------|
| 1,0 | 5,70 | 1,62 | 7,32 |
| 1,1 | 4,80 | 1,68 | 6,48 |
| 1,2 | 5,10 | 1,75 | 6,85 |
| 1,3 | 5,00 | 1,80 | 6,80 |
| 1,4 | 5,10 | 1,96 | 7,06 |
| 1,5 | 5,90 | 2,00 | 7,90 |
| 1,6 | 5,60 | 2,15 | 7,75 |
| 1,7 | 6,70 | 2,30 | 9,00 |
| 1,8 | 6,60 | 2,32 | 8,92 |
| 1,9 | 5,90 | 2,35 | 8,25 |
| 2,0 | 7,20 | 2,44 | 9,64 |
| 2,1 | 7,30 | 2,62 | 9,92 |
| 2,2 | 7,40 | 2,75 | 10,15 |
| 2,3 | 8,40 | 2,70 | 11,10 |
| 2,4 | 8,00 | 2,69 | 10,69 |
| 2,5 | 9,30 | 2,65 | 11,95 |
| 2,6 | 8,70 | 2,75 | 11,45 |
| 2,7 | 8,70 | 2,92 | 11,62 |
| 2,8 | 9,00 | 2,98 | 11,98 |
| 2,9 | 8,60 | 3,10 | 11,70 |
| 3,0 | 9,50 | 3,12 | 12,62 |

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