

MEASUREMENT / TECHNICAL REPORT

SIEMENS NIXDORF AG

Model: Personal Computer Scenic Pro D6

FCC ID: HSSSCENICD603

July 10, 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

Application for Certification prepared by:
Peter Rost
Siemens Nixdorf
Informationssysteme AG
Buergermeister-Ulrich-Str. 100
86199 Augsburg
Germany
Tel.: +49 821 804-2821
Fax: +49 821 804 2675

Applicant for this device:

Siemens Nixdorf
Informationssysteme AG
Buergermeister-Ulrich-Str. 100
86199 Augsburg
Germany
Tel.: +49 821 804-0

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Engineer: Heinz Zenkner
Heinz Zenkner
Siemens Nixdorf Informationssysteme AG
Personal Computer Scenic Pro D6

Date: Jul 10, 1998

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1 GENERAL INFORMATION

1.1 Product Description

The Siemens Nixdorf Computer Scenic Pro D6 is a compact desktop personal computer.

The system board integrates the Pentium Processor, memory, and I/O-technologies. The main system unit is assembled with Processors Intel Pentium II up to 333 MHz.

Description of the power supplies:

- Power supplies:

ASTEC, model	AA20050
	S26113-E413-V30
Minebea, model	ML145S2CCE311
	S26113-E412-V20

Features Overview:

- System board in ATX format
- Intel Pentium II processor with MMX technology and 512 Kbyte second - level cache in the processor cache module
- Processor cache module with SEC contact technology for Intel Slot 1 processor slot (SEC = Single Edge Contact)
- 16 to 256 Mbytes main memory (SDRAM)
- 256 to 768 Mbytes main memory (SDRAM)
- Error identification and error recognition via ECC

- Flash BIOS
- AGP slot for AGP graphics controller (AGP = Accelerated Graphics Port)
- 4 PCI slots (all with busmaster capability)
- 3 ISA slots
- IDE hard disk controller connected to PCI bus for up to four IDE drives (e.g. IDE hard disk drives, ATAPI CD ROM drive), (ultra DMA33 mode capable)
- Real-time clock/calendar with integrated battery backup
- Parallel interface (ECP- and EPP compatible)
- 2 serial ports (16C550 compatible with FIFO)
- PS/2 mouse port
- PS/2 keyboard port
- USB (Universal Serial Bus)
- Connector for chip card reader
- Prepared for system monitoring
- Cover detection

The personal computer is assembled by Siemens Nixdorf AG, Bürgermeister-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 D6	HSSSCENICD603	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)	894C2655X	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 ₁	ASTEC (UK), AA20050 SNI: S26113-E413-V30	N/A	Power supply	
a ₂	Minebea ML145S2CCE311 SNI: S26113-E412-V20	N/A	Power supply	

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Pos	Model Number (Serial Number)	FCC ID	Description	Cable Description (length in [cm])
b	Siemens Nixdorf S26361-D1085-A10 GS 1	N/A	System board	
c	SNI S26361-D960-V1 GS 4	N/A	Chip card reader	
d	NEC ML-454AD645F-A10 (3x)	N/A	SDRAM	
e	Matrox MAG G100 AGP	DOC: G100A/4/OEM	Graphic controller board	
f	Intel Pentium II 80523/PX333512 SL2KA	N/A	Processor module	
g	Hitachi CDR-8430 S26361-H341-V500	A3DCDR-1900A	CD-ROM drive	
h	Quantum Fireball SE 4,3 AT	N/A	Hard disk drive	
i	TEAC FD-235HF SNI: 3777526	N/A	Floppy disk drive	

Remark: position 2a / 2b / 1a₁ / 1a₂ 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 emission 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). During radiated emission the monitor was powered via system unit, during conducted emission also the external monitor supply was tested.

The system clock is 66 MHz, the clock frequency was tested with the highest possible processor:

66,6 MHz clock: Intel Pentium II 333 MHz

The system is provided with two kinds of power supplies:

- ASTEC, AA20050 SNI: S26113-E413-V30
- Minebea, ML145S2CCE311 SNI: S26113-E412-V20

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:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1024 x 768/120 Hz

Frequency range 1 GHz - 3 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1024 x 768/120 Hz

Minebea PSU:

Frequency range 30 MHz - 1 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz

Frequency range 1 GHz - 3 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz

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

ASTEC PSU:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1600 x 1200/85 Hz
monitor power external

Minebea PSU:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz
monitor power external

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:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1024 x 768/120 Hz

Frequency range 1 GHz - 3 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1024 x 768/120 Hz

Minebea PSU:

Frequency range 30 MHz - 1 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz

Frequency range 1 GHz - 3 GHz:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz

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conducted emission:

ASTEC PSU:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1600 x 1200/85 Hz
monitor power external

Minebea PSU:

66,6 MHz clock/Pentium II 333 MHz, video resolution 1280 x 1024/100 Hz
monitor power external

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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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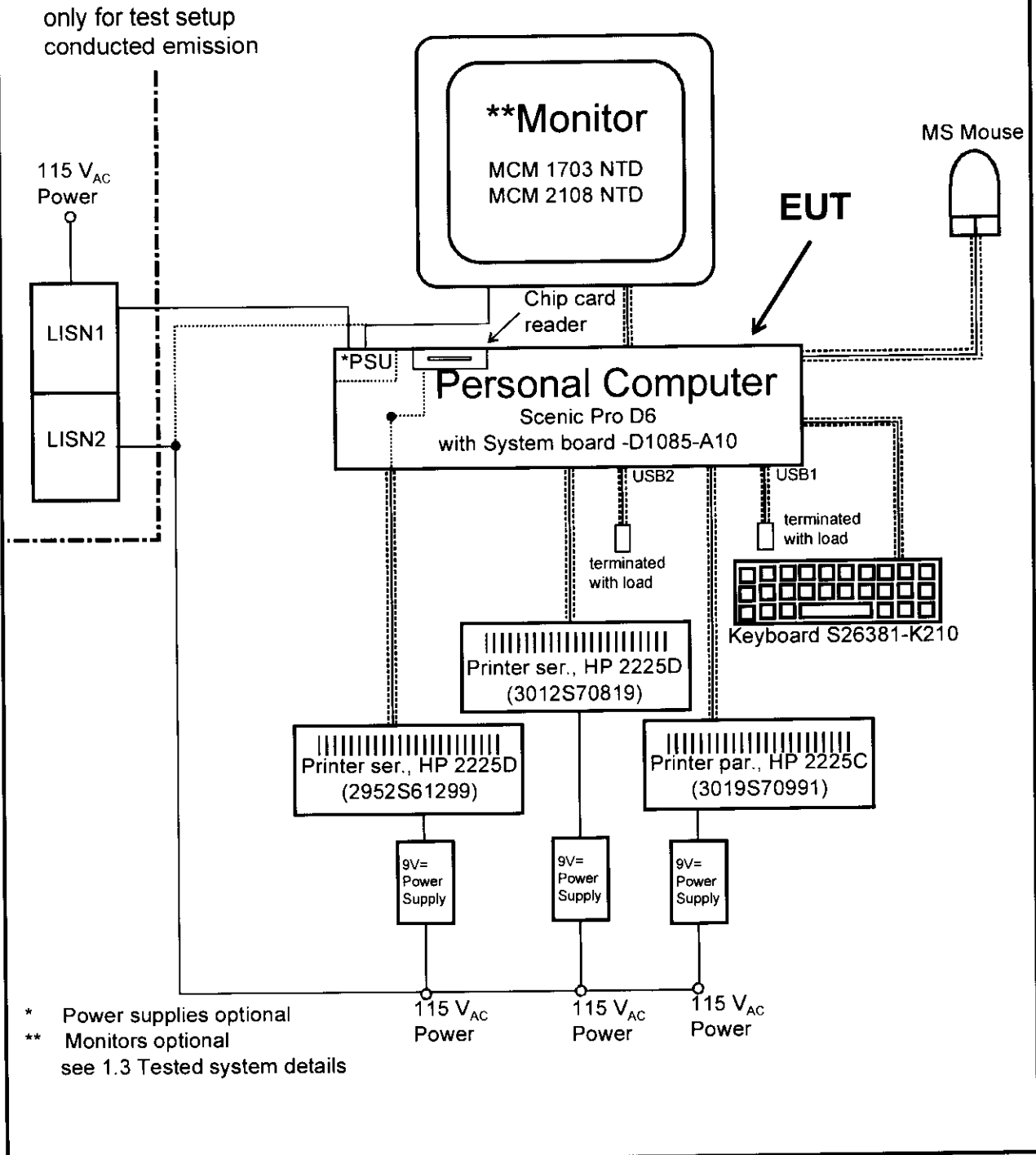
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Figure 3.1 Configuration of Tested System



* Power supplies optional
 ** Monitors optional
 see 1.3 Tested system details

4 BLOCK DIAGRAM OF EUT

see fig 4.1 page 22

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, 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 P.C..

4.2 Clockfrequencies of EUT

Clock synthesizer	14,318 MHz
Memory	66,6 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 desktop PC works exactly as a traditional PC.

The processors run internally at 233 and 333 MHz, the type is selected by switches, the system clock is in each case the same - 66,6 MHz and is multiplied by the processors internally by 3,5, 4,0, 4,5 or 5,0.

The highest possible frequencies and the corresponding processors are:

System clock	Processor	factor
66,6 MHz	233 MHz	3,5
66,6 MHz	266 MHz	4,0
66,6 MHz	300 MHz	4,5
66,6 MHz	333 MHz	5,0

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 results of the corresponding configuration (video resolution, supply modus) is given next:

- a) Configuration with ASTEC PSU
- b) Configuration with Minebea PSU

Judgement: Passed by

	Frequency [MHz]	Measured [dB(μV)]	Kind of value	Limit [dB(μV)]	Configuration
neutral	0,4980	29,85	AV	46	a

	Frequency [MHz]	Measured [dB(μV)]	Kind of value	Limit [dB(μV)]	Configuration
neutral	0,570	28,85	AV	46	a
neutral	0,852	30,09	AV	46	a
neutral	1,134	26,91	AV	46	a
phase	1,206	28,27	AV	46	a
phase	0,864	41,27	AV	46	b
phase	0,990	42,00	AV	46	b
phase	1,482	42,17	AV	46	b
phase	1,608	43,06	AV	46	b
phase	1,734	39,44	AV	46	b

AV: average

QP: quasi peak

Test Personnel:

Tester Signature: Michael Bosse Date: July 11, 1998

Printed Name: M. Bosse

Test Personnel:

Tester Signature: H. Zenkner Date: July 11, 1998

Printed Name: H. Zenkner

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Measurement Protocols

	Page No
ASTEC PSU: 66,6 MHz clock/Pentium II 333 MHz video resolution 1600 x 1200/85 Hz monitor power external	31 - 33
Minebea PSU: 66,6 MHz clock/Pentium II 333 MHz video resolution 1280 x 1024/100 Hz monitor power external	34 - 36

Conducted noise according to:

EN55022/B

EUT: Scenic Pro D6/D1085-A10 LX/66 MHz PII/333
 Manufacturer: SNI
 Operating Condition: Scr."H"1600x1200/85 Hz, HD/CD-Test
 Test Site: EMC CENTER Augsburg, SK1
 Operator: H. Zenkner
 Configuration: full configuration
 Supply: Astec E413-V30 PSU, Monitor MCM2108 external
 Start of Test: 10.06.1998 / 14:08:08

SCAN TABLE: "Volt_015-30MHZ"

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: ESHS Transducer: ESH2-Z5
 Signal Path: None System Transducer: None
 Meas. Mode: Lin Add. Transd. 1: ESH3-Z2
 Tracking Gen.: -- Add. Transd. 2: None
 Input: -- Add. Transd. 3: None

Preamplifier: Off Demodulation: A3
 RF Att.: 0 dB Volume: --
 Ref. Level: -- Squelch: --
 Min. RF Att.: 10 dB Option: None
 IF Att.: LowNoise
 Autorange: On

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

MEASUREMENT RESULT: "Quasi Peak"

10.06.1998 14:32

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.498000	32.43	56	23.6	N	FLO	
0.570000	31.92	56	24.1	N	FLO	
0.852000	32.96	56	23.0	N	FLO	

MEASUREMENT RESULT: "Quasi Peak"

(continued)

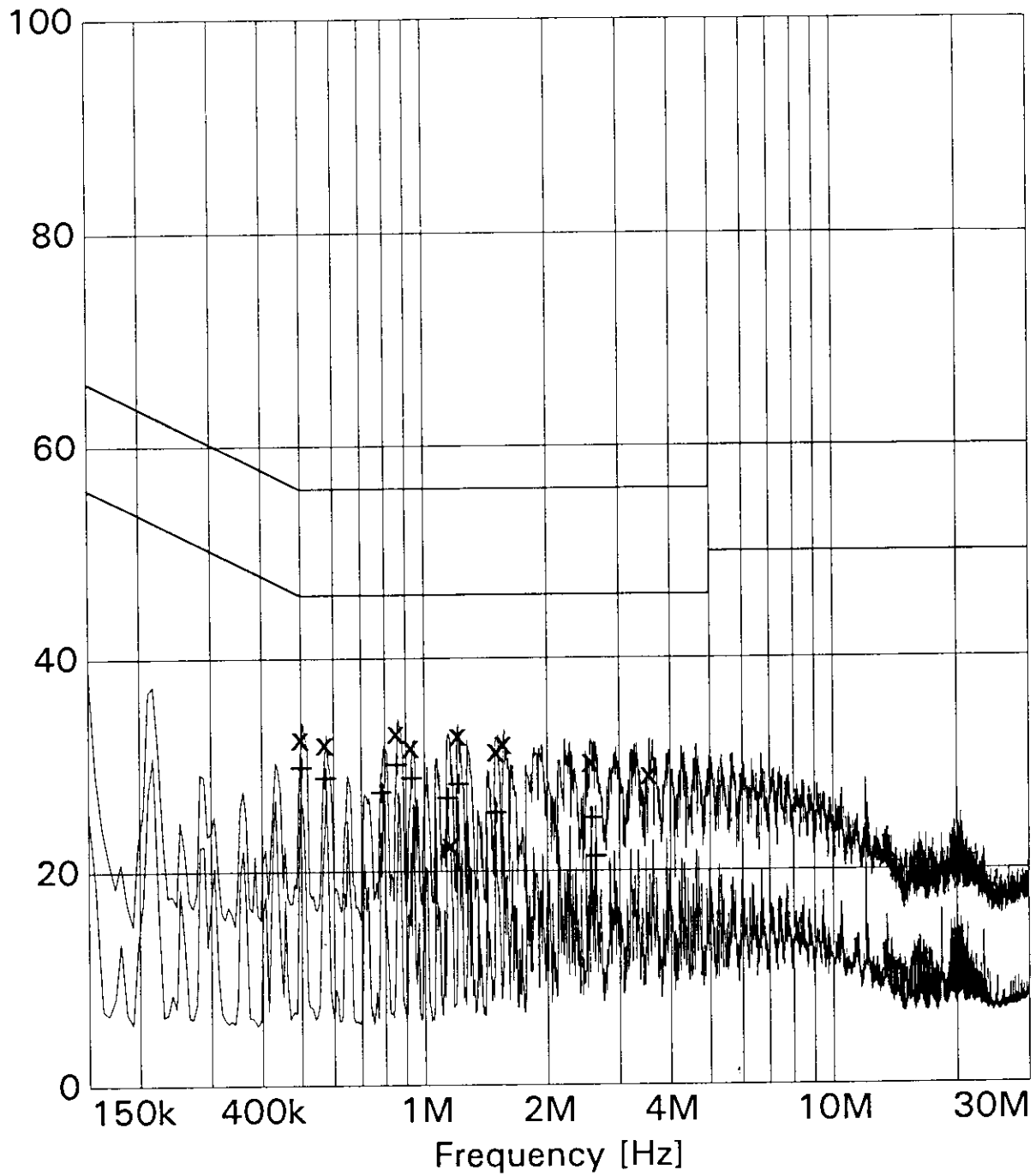
Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.924000	31.65	56	24.4		N	GND
1.158000	22.40	56	33.6		N	GND
1.206000	32.74	56	23.3		L1	GND
1.494000	31.23	56	24.8		L1	FLO
1.560000	31.89	56	24.1		L1	FLO
2.550000	30.18	56	25.8		L1	GND
3.546000	28.98	56	27.0		L1	GND

MEASUREMENT RESULT: "Average"

10.06.1998 14:33

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.498000	29.85	46	16.2		N	GND
0.570000	28.85	46	17.2		N	FLO
0.780000	27.49	46	18.5		N	FLO
0.852000	30.09	46	15.9		N	FLO
0.924000	28.80	46	17.2		N	GND
1.134000	26.91	46	19.1		L1	FLO
1.206000	28.27	46	17.7		L1	FLO
1.488000	25.55	46	20.5		L1	FLO
2.556000	25.02	46	21.0		L1	GND
2.622000	21.40	46	24.6		L1	FLO

Level [dB μ V]



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

Conducted noise according to:

EN55022/B

EUT: Scenic Pro D6/D1085-A10 LX/66 MHz PII/333
Manufacturer: SNI
Operating Condition: Scr."H"1280*1024/100 Hz, HD/CD-Test
Test Site: EMC CENTER Augsburg, SK1
Operator: M.Bosse
Configuration: full configuration
Supply: Minebea E412-V20 PSU,MCM2108 external supply
Start of Test: 16.06.1998 / 08:50:38

SCAN TABLE: "Volt_015-30MHZ"

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: ESHS Transducer: ESH2-Z5
Signal Path: None System Transducer: None
Meas. Mode: Lin Add. Transd. 1: ESH3-Z2
Tracking Gen.: -- Add. Transd. 2: None
Input: -- Add. Transd. 3: None

Preamplifier: Off Demodulation: A3
RF Att.: 0 dB Volume: --
Ref. Level: -- Squelch: --
Min. RF Att.: 10 dB Option: None
IF Att.: LowNoise
Autorange: On

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

MEASUREMENT RESULT: "Quasi Peak"

16.06.1998 09:13

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.372000	40.94	58	17.5		N	GND
0.744000	40.43	56	15.6		L1	GND
0.864000	41.74	56	14.3		L1	GND

MEASUREMENT RESULT: "Quasi Peak"

(continued)

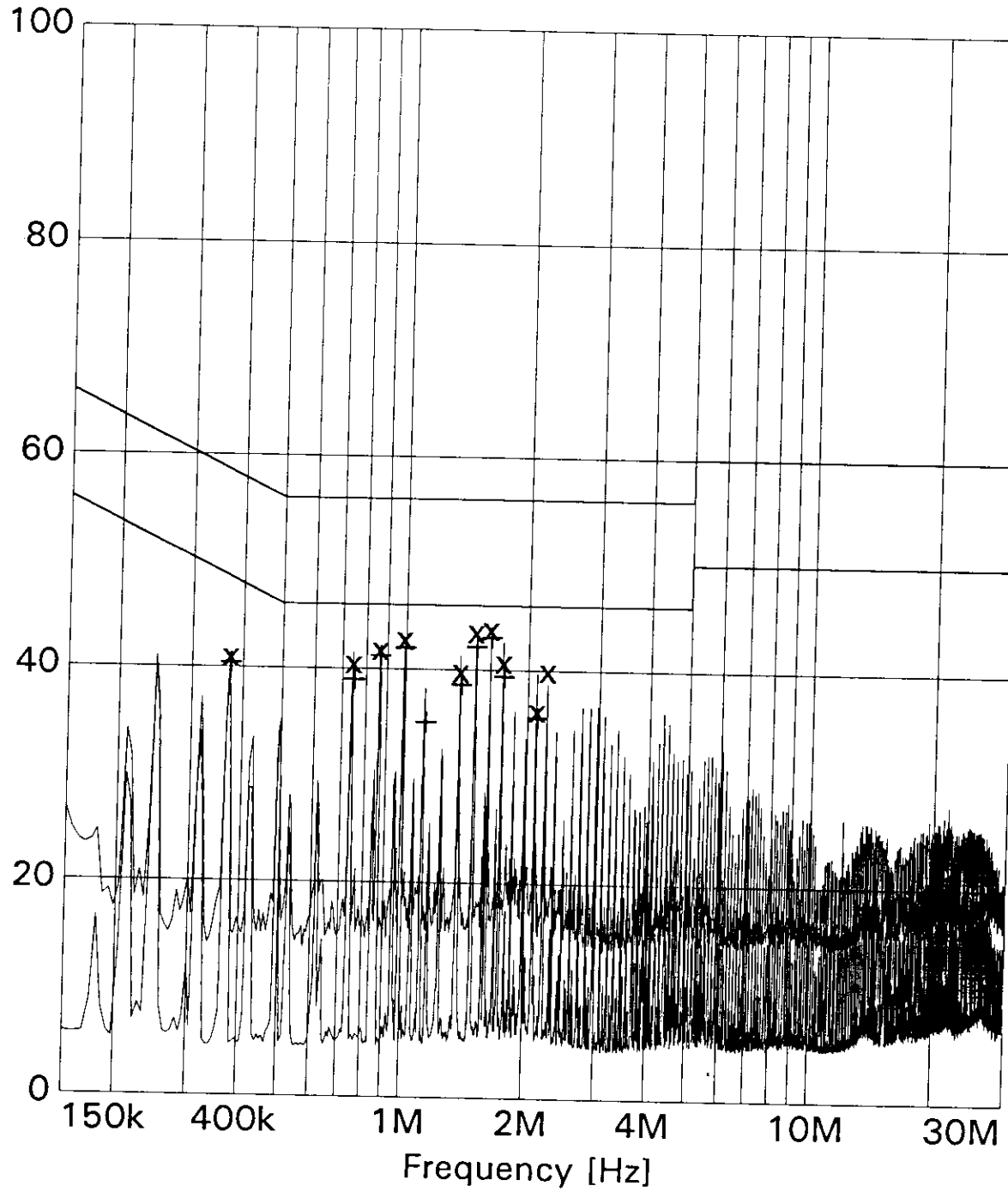
Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.990000	42.74	56	13.3		L1	GND
1.362000	39.76	56	16.2		L1	GND
1.482000	43.45	56	12.6		L1	GND
1.608000	43.72	56	12.3		L1	GND
1.734000	40.64	56	15.4		L1	GND
2.106000	36.19	56	19.8		L1	GND
2.226000	39.87	56	16.1		L1	GND

MEASUREMENT RESULT: "Average"

16.06.1998 09:14

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.372000	40.44	48	8.0		L1	GND
0.744000	39.05	46	7.0		L1	GND
0.864000	41.27	46	4.7		L1	GND
0.990000	42.00	46	4.0		L1	GND
1.116000	35.14	46	10.9		L1	GND
1.362000	38.67	46	7.3		L1	GND
1.482000	42.17	46	3.8		L1	GND
1.608000	43.06	46	2.9		L1	GND
1.734000	39.44	46	6.6		L1	GND
2.100000	35.62	46	10.4		L1	GND

Level [dB μ V]



x x	MES	Quasi Peak
+	MES	Average
—	MES	Preview Peak
—	MES	Preview AV
—	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	May 98	12 months
LISN	NSLK 8126 Schwarzbeck	KWA20870662	May 98	12 months
LISN	ESHS-Z5 Rohde&Schwarz	831.5518.52	May 98	12 months
Pulse limiter	ESH3-Z2 Rohde&Schwarz	60813	May 98	12 months

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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 prescan 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 prescan 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 333 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:

ASTECS PSU:

66,6 MHz clock/Pentium 333 MHz, video resolution: 1024 x 768/120 Hz

Part 1: frequency range 30 MHz - 1000 MHz:

Judgement: Passed by

Frequency [MHz]	Level* [dB(μV/m)]	10 Meter Limit [dB(μV/m)]	Exceeding [dB]	Ant Pol	Height in [m]	Angle in deg
133.62000	23.25	30.000	-6.7	ver	1.0000	180.000
200.43000	23.94	30.000	-6.1	hor	4.0000	0.000
334.08000	30.76	37.000	-6.2	ver	1.0000	30.000
601.35000	33.25	37.000	-3.7	hor	1.6000	300.000
735.00000	34.28	37.000	-2.7	ver	2.2000	0.000
868.65000	32.68	37.000	-4.3	ver	2.8000	0.000
953.28000	31.02	37.000	-6.0	hor	2.8000	120.000

all levels are quasi-peak levels

Part 2: frequency range 1 GHz - 3 GHz:

Judgement: Passed by

Frequency [MHz]	Level* [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Exceed Mark	Height [cm]	Azimuth [deg]	Ant Pol
1002.10000	42.01	54.0	12.0		100.0	180.00	hor
1135.90000	32.61	54.0	21.4		100.0	59.00	ver
1269.40000	34.73	54.0	19.3		100.0	29.00	ver
1436.50000	31.10	54.0	22.9		100.0	210.00	hor
1536.70000	34.39	54.0	19.6		100.0	330.00	ver

all levels are average levels

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Minebea PSU:

66,6 MHz clock/Pentium 333 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)]	10 Meter Limit [dB(μV/m)]	Exceeding [dB]	Ant Pol	Height in [m]	Angle in deg
200.43000	27.95	30.000	-2.0	hor	3.4000	240.000
334.08000	29.59	37.000	-7.4	hor	2.8000	0.000
601.35000	30.58	37.000	-6.4	hor	1.6000	240.000
735.00000	34.00	37.000	-3.0	ver	2.8000	200.000
987.45000	31.59	37.000	-5.4	hor	4.0000	40.000

all levels are quasi-peak levels

Part 2: frequency range 1 GHz - 3 GHz:

Judgement: Passed by

Frequency [MHz]	Level* [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Exceed Mark	Height [cm]	Azimuth [deg]	Ant Pol
1000.00000	35.99	54.0	18.0		100.0	180.00	hor
1002.10000	46.99	54.0	7.0		100.0	180.00	hor
1135.90000	38.25	54.0	15.8		300.0	0.00	hor
1536.70000	32.90	54.0	21.1		150.0	150.00	hor
2271.70000	34.55	54.0	19.5		100.0	0.00	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: Michael Bosse Date: July 17, 1998

Printed Name: M. Bosse

Test Personnel:

Tester Signature: Johannes Sommer Date: July 17, 1998

Printed Name: J. Sommer

Test Personnel:

Tester Signature: Hilmar Zenkner Date: July 17, 1998

Printed Name: H. Zenkner

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Measurement Protocols

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ASTEC PSU: <u>Frequency range 30 MHz - 1 GHz:</u> 66,6 MHz clock/Pentium II 333 MHz video resolution 1024 x 768/120 Hz	43 - 45
<u>Frequency range 1 GHz - 3 GHz:</u> 66,6 MHz clock/ Pentium II 333 MHz video resolution 1024 x 768/120 Hz	46 - 48
Minebea PSU: <u>Frequency range 30 MHz - 1 GHz:</u> 66,6 MHz clock/Pentium II 333 MHz video resolution 1280 x 1024/100 Hz	49 - 51
<u>Frequency range 1 GHz - 3 GHz:</u> 66,6 MHz clock/ Pentium II 333 MHz video resolution 1280 x 1024/100 Hz	52 - 54

Radiation Test according to:

EN 55022/B

EUT: Scenic Pro D6; D1085-A10 LX/66 MHz PII/333
Manufacturer: SNI
Operating Condition: scr. "H" 1024 x 768/120 Hz CD and HD-operating
Test Site: EMC Center Augsburg
Operator: J.Sommer
Job No: PDP8E048
Comment : fully configured
Comment: power supply: ASTEC E413-V30

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
134.54444	23.93	VER	1.0000	180.00
201.36666	24.56	HOR	4.0000	0.0000

335.01111	31.32	VER	1.0000	30.000
602.30000	33.68	HOR	1.6000	300.00
735.94444	35.24	VER	2.2000	0.0000
869.58888	34.03	VER	2.8000	0.0000
953.65555	34.84	HOR	2.8000	120.00

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
133.62000	23.25	30.000	-6.748060	VER	1.0000	180.00
200.43000	23.94	30.000	-6.057808	HOR	4.0000	0.0000
334.08000	30.76	37.000	-6.242917	VER	1.0000	30.000
601.35000	33.25	37.000	-3.747623	HOR	1.6000	300.00
735.00000	34.28	37.000	-2.716629	VER	2.2000	0.0000
868.65000	32.68	37.000	-4.324754	VER	2.8000	0.0000
953.28000	31.02	37.000	-5.979972	HOR	2.8000	120.00

Level [dB μ V/m]

60

50

40

30

20

10

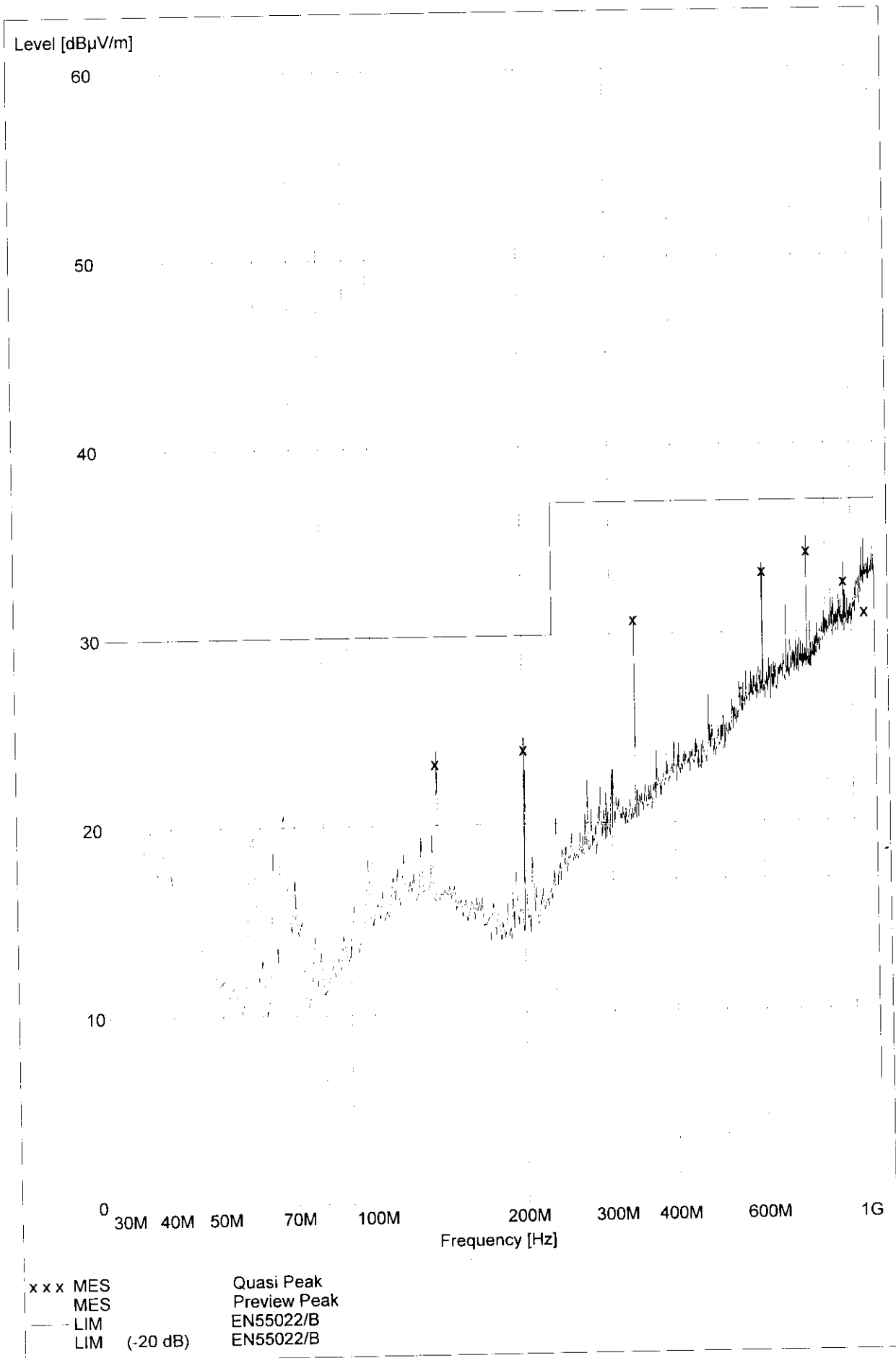
0

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 D6 with D1085-A10/333MHz
Manufacturer: SNI
Operating Condition: scrolling "H" 1024 x 768/ 120Hz + CD/HD-test
Test Site: EMC Center Augsburg
Operator: M.Bosse
Job No: PDP8E045
Comment : full configuration, ASTEC PSU: E413-V30
Start of Test: 09.06.1998 / 10:48:01

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

Unit: dB μ V/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"

09.06.1998 10:57

Frequency	Level	Limit	Margin	Exceed	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB μ V/m	dB	Mark	cm	deg	
1000.000000	32.08	54.0	21.9		100.0	180.00	HORIZONTAL
1002.100000	42.01	54.0	12.0		100.0	180.00	HORIZONTAL
1135.900000	32.61	54.0	21.4		100.0	59.00	VERTICAL
1269.400000	34.73	54.0	19.3		100.0	29.00	VERTICAL
1336.300000	28.38	54.0	25.6		100.0	0.00	VERTICAL
1436.500000	31.10	54.0	22.9		100.0	210.00	HORIZONTAL
1490.200000	30.04	54.0	24.0		150.0	29.00	VERTICAL
1493.800000	24.99	54.0	29.0		150.0	29.00	VERTICAL
1536.700000	34.39	54.0	19.6		100.0	330.00	VERTICAL
2971.000000	26.31	54.0	27.7		100.0	210.00	HORIZONTAL
2986.000000	26.38	54.0	27.6		100.0	210.00	HORIZONTAL

[dB μ V/m]

80

75

70

65

60

55

50

45

40

35

30

25

20

15

10

5

0

1G

2G

3G

[Hz]

x x x	MES	Final_Average
	MES	Peak
---	LIM	FCC/B 1-3GHz
---	LIM	FCC/B 1-3GHz

Radiation Test according to:

EN 55022/B

EUT: Scenic Pro D6; D1085-A10 LX/66 MHz PII/333
Manufacturer: SNI
Operating Condition: scr. "H" 1280 x 1024 / 100Hz, CD/HD-operating
Test Site: EMC Center Augsburg
Operator: H. Zenkner
Job No: PDP8E048
Comment : fully configured
Comment: power supply: MINEBEA E412-V20

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
30.00000	22.18	VER	4.0000	80.000
128.07777	22.56	VER	1.0000	320.00

134.54444	22.33	VER	1.6000	0.0000
138.85555	22.16	VER	1.6000	200.00
164.72222	25.17	VER	2.2000	0.0000
201.36666	28.70	HOR	3.4000	240.00
335.01111	29.31	HOR	2.8000	0.0000
468.65555	29.98	VER	1.0000	0.0000
602.30000	32.28	HOR	1.6000	240.00
735.94444	33.80	VER	2.8000	200.00
985.98888	34.69	HOR	4.0000	40.000

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
30.09000	16.84	30.000	-13.15524	VER	4.0000	80.000
127.41000	18.80	30.000	-11.20406	VER	1.0000	320.00
133.62000	21.29	30.000	-8.708060	VER	1.6000	0.0000
138.36000	21.71	30.000	-8.289885	VER	1.6000	200.00
163.80000	20.18	30.000	-9.821831	VER	2.2000	0.0000
200.43000	27.95	30.000	-2.047808	HOR	3.4000	240.00
334.08000	29.59	37.000	-7.412917	HOR	2.8000	0.0000
467.70000	28.68	37.000	-8.317511	VER	1.0000	0.0000
601.35000	30.58	37.000	-6.417623	HOR	1.6000	240.00
735.00000	34.00	37.000	-2.996629	VER	2.8000	200.00
987.45000	31.59	37.000	-5.406795	HOR	4.0000	40.000

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	Quasi Peak
	MES	Preview Peak
—	LIM	EN55022/B
	LIM (-20 dB)	EN55022/B

Fieldstrength according to :

FCC class B

EUT: Scenic Pro D6 with D1085-A10/333MHz
Manufacturer: SNI
Operating Condition: scrolling "H" 1280 x 1024/ 100Hz CD/HD-test
Test Site: EMC Center Augsburg
Operator: M.Bosse
Job No: PDP8E045
Comment : full configuration, MINEBEA PSU
Start of Test: 09.06.1998 / 10:48:01

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"

09.06.1998 12:10

Frequency	Level	Limit	Margin	Exceed	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB μ V/m	dB	Mark	cm	deg	
1000.000000	35.99	54.0	18.0		100.0	180.00	HORIZONTAL
1002.100000	46.99	54.0	7.0		100.0	180.00	HORIZONTAL
1135.900000	38.25	54.0	15.8		300.0	0.00	HORIZONTAL
1441.600000	25.78	54.0	28.2		150.0	90.00	VERTICAL
1447.600000	27.11	54.0	26.9		150.0	90.00	VERTICAL
1503.400000	24.92	54.0	29.1		150.0	150.00	HORIZONTAL
1536.700000	32.90	54.0	21.1		150.0	150.00	HORIZONTAL
1670.500000	32.19	54.0	21.8		150.0	150.00	HORIZONTAL
1804.000000	33.94	54.0	20.1		150.0	29.00	VERTICAL
2271.700000	34.55	54.0	19.5		100.0	0.00	VERTICAL
2274.100000	24.52	54.0	29.5		100.0	0.00	VERTICAL
2539.000000	25.36	54.0	28.6		100.0	0.00	HORIZONTAL
2558.200000	24.91	54.0	29.1		100.0	0.00	HORIZONTAL
2957.200000	26.11	54.0	27.9		400.0	150.00	VERTICAL
2971.900000	26.41	54.0	27.6		400.0	150.00	VERTICAL

[dB μ V/m]

80
75
70
65
60
55
50
45^x
40
35^x
30
25
20
15
10
5
0

1G

2G

3G

[Hz]

x x x MES Final_Average
MES Peak
— LIM FCC/B 1-3GHz
— LIM FCC/B 1-3GHz

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	15 months
Antenna	CBL 6111 Chase	1345	May 98	12 months
Active Ridged antenna	Tensor 4105 Rohde&Schwarz	2063	May 98	12 months

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 dB μ 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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