

# MEASUREMENT / TECHNICAL REPORT

## SIEMENS NIXDORF AG

**Model: Personal Computer Scenic Mobile 800**

**FCC ID: HSSMOB80001**

**July 08, 1998**

This report concerns:  Original grant  Class II change  
Equipment type: Personal Computer (Notebook)

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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**NIXDORF**

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Heinz Zenkner

Siemens Nixdorf Informationssysteme AG  
Personal Computer Scenic Mobile 800

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<b>SIEMENS NIXDORF</b>	Engineer: <u>Heinz Zenkner</u> Heinz Zenkner	Date: Jul 08, 1998
	Siemens Nixdorf Informationssysteme AG Personal Computer Scenic Mobile 800	
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# 1 GENERAL INFORMATION

## 1.1 Product Description

The Siemens Nixdorf Computer Scenic Mobile 800 is a notebook with a removable keyboard and easily changeable displays.

The system board integrates the Pentium Processor, memory and I/O-technologies. The system can be assembled with Processors Intel Pentium II 233 MHz and Pentium II 266 MHz.

### *Description of the power supply:*

- AC- / DC- adapter:  
ASTEC, model SA65-3115  
S26113-E428-V30

### *Features Overview:*

- microprocessor-module with Tillamook or Mobile - Deschutes - Core, Cache on Board and North-Bridge
- up to 192 Mbytes main memory, EDO-DRAM or SDRAM (not mixable), three banks, three SO-DIMMs with altogether 24 chips
- ATI RAGE LT PRO VGA-controller with 4 MB-video memory, FBAS or Y/C output, PAL or NTSC
- ext. VGA - out
- TI 1250A card-bus-controller
- 2 x PC-card type II or 1 x type II and 1 x type III
- power management: (APM 1.2 and ACPI 1.0) with PIIX4 and super I/O
- connection for removeable IR-keyboard (with touchpad, status display, charge circuit)
- interface for 2 multi bays

- interface for the smart card reader
- 114 + 142 = 256 bytes CMOS RAM for RTC and setup parameters
- floppy interface with floppy support
- enhanced busmaster IDE, two IDE connectors for up to three IDE devices, supports Win 95™
- flash EPROM 4 Mbit for system- and VGA- BIOS, save to disc, PCU-BIOS
- BIOS (PCU, system and VGA) upgradable in flash EPROM
- 1 serial port
- 1 parallel port
- external mini DIN keyboard connector
- external mini DIN mouse connector
- external USB connector
- serial fast IRdA interface
- microphone in
- line in
- speaker out
- midi- & gameport
- remote on
- soundblaster™ compatible soundsystem on board, 3D-sound
- intel hot docking concept
- PC'97 compliant

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 Mobile 800	HSSMOB80001	Notebook (266 MHz) EUT	unshielded power cord [292]
2	Siemens Nixdorf MCM 1703 NTD	A3KM053	Monitor	unshielded power cord [175] shielded video cable [168]
3	Siemens Nixdorf S26381-K210-V120	HSS01TASTK210	Keyboard	shielded keyboard cable [143]
4	Microsoft MS 2.1A	C3KKMP3	Mouse	shielded mouse cable [183]
5	Hewlett Packard HP 2225C+ (3019S70991)	894C2655X	Printer, parallel I/F	unshielded AC ca- ble [180], shielded centronics cable [190]



Pos	Model Number (Serial Number)	FCC ID	Description	Cable Description (length in [cm])
6	Hewlett Packard HP 2225D+ (3012S70819)	DSI6XU2225	Printer, serial I/F	unshielded power cord [185], shiel- ded serial cable [190]
7	Siemens FC301 V6	N/A	Television set	unshielded 2 wire AC power cable [190]
8	SNI SA65-3115 S26113-E428-V30	N/A	AC- / DC- Adapter	unshielded AC cable [152] shielded DC cable [149]
9	Escom	N/A	Microphone	shielded cable [142]
10	Power beat P10	N/A	Loud- speakers	shielded cable [166 + 124]
11	Microsoft Side Winder 3D Pro Part no 63545	C3KMJ1	Joystick	shielded cable
12	Siemens	N/A	USB cable	shielded cable, terminated [86]
	<b>Pos 1 contains:</b>			
a <sub>1</sub>	NEC NL10276B26-01 S26391-F198-V411	N/A	Display TFT 14,1"	N/A

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Pos	Model Number (Serial Number)	FCC ID	Description	Cable Description (length in [cm])
a <sub>2</sub>	Mitsubishi AA142XC01 S26391-F198-V423	N/A	Display TFT 14,2"	N/A
b	3COM Etherlink III PCMCIA 2.0/2.1	DF63C589D	LAN PC card	for 10Base-T and Coax (with adapter)
c	SNI S26391-F128-L870	N/A	Accumulator pack	N/A
d	SNI S26391-F203-L100	N/A	CD-ROM drive	N/A
e	SNI S26391-F201-L100	N/A	Floppy disk drive	N/A
f	SNI S26391-F202-E100	N/A	ZIP disk drive	N/A
g	IBM DMCA-21440	N/A	Hard disk drive	N/A
h	SNI S26361-D999-A12 GS 3	N/A	System board	N/A
i	Intel MMO N09477563	N/A	Processor module	N/A
k	SNI S26361-D1057-V1	N/A	Chip card reader	N/A
l	SNI S26361-D292-V1	N/A	Remote module	N/A

Pos	Model Number (Serial Number)	FCC ID	Description	Cable Description (length in [cm])
m	SNI S26361-D1049-A11	N/A	Periphery module	N/A
n	SNI S26361-D1050-A12	N/A	Upper connection board	N/A
o	SNI Ve-20127036C 94V-0	N/A	PCMCIA bay	N/A
p	SEC KMM466S823BT3-F0	N/A	SDRAM	
q	SNI S26381-H43	N/A	Keyboard for Mobile 800	N/A
	<b>Pos 1a, contains:</b>			
a	SNI LINFINITY SGE2617X MWS 2943 LSM1610.3000 9x4	N/A	DC- / DC- converter board	N/A
	<b>Pos 1a, contains:</b>			
a	SNI IM8806 S26113-D1012-V24 E / S1	N/A	DC- / DC- converter board	N/A

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Pos	Model Number (Serial Number)	FCC ID	Description	Cable Description (length in [cm])
	<u>Pos q contains:</u>			
a	SNI S26381-D293	N/A	Keyboard controller board	N/A
b	Synaptics inc. TM41PUG134-2 IJ805-041	N/A	Touch pad	N/A
c	Minebea C26192-Y95-C1	N/A	Keyboard matrix	N/A
d	Data module C26192-Y94-C1	N/A	LCD	N/A

Remark: position 1a<sub>1</sub> / 1a<sub>2</sub> optional

## 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

## 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). The notebook can be equipped either with floppy- / CD-ROM drives or with accumulators. Both combinations were tested.

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

66,66 MHz clock: Pentium II 266 MHz

The system can be provided with two kinds of displays:

- NEC                      14,1" TFT display                      SNI: S26391-F398-V411
- Mitsubishi            14,2" TFT display                      SNI: S26391-F398-V423

Both kinds of displays in the corresponding video resolution were measured.

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

**NEC display:**

Frequency range 30 MHz - 1 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

Frequency range 1 GHz - 3 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

**MIT display:**

Frequency range 30 MHz - 1 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

Frequency range 1 GHz - 3 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

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

**NEC display:**

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

**MIT display:**

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

## 3.2 Video mode Justification

The system was tested in video graphic mode 1024 x 768/85 Hz. Two different displays were tested. The worst case combination (with accu pack or CD-ROM drive and floppy disk drive) of the system was used to collect the included data.

The following data is applicable:

### **radiated emission:**

#### **NEC display:**

##### Frequency range 30 MHz - 1 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

##### Frequency range 1 GHz - 3 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

#### **MIT display:**

##### Frequency range 30 MHz - 1 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

##### Frequency range 1 GHz - 3 GHz:

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped



**conducted emission:**

**NEC display:**

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

**MIT display:**

66,66 MHz clock/Pentium II 266 MHz, video resolution 1024 x 768/85 Hz  
Floppy disk drive and CD-ROM drive equipped

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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 port
- signals to video and audio periphery
- accumulator is charged
- LAN communication via PCMCIA

## 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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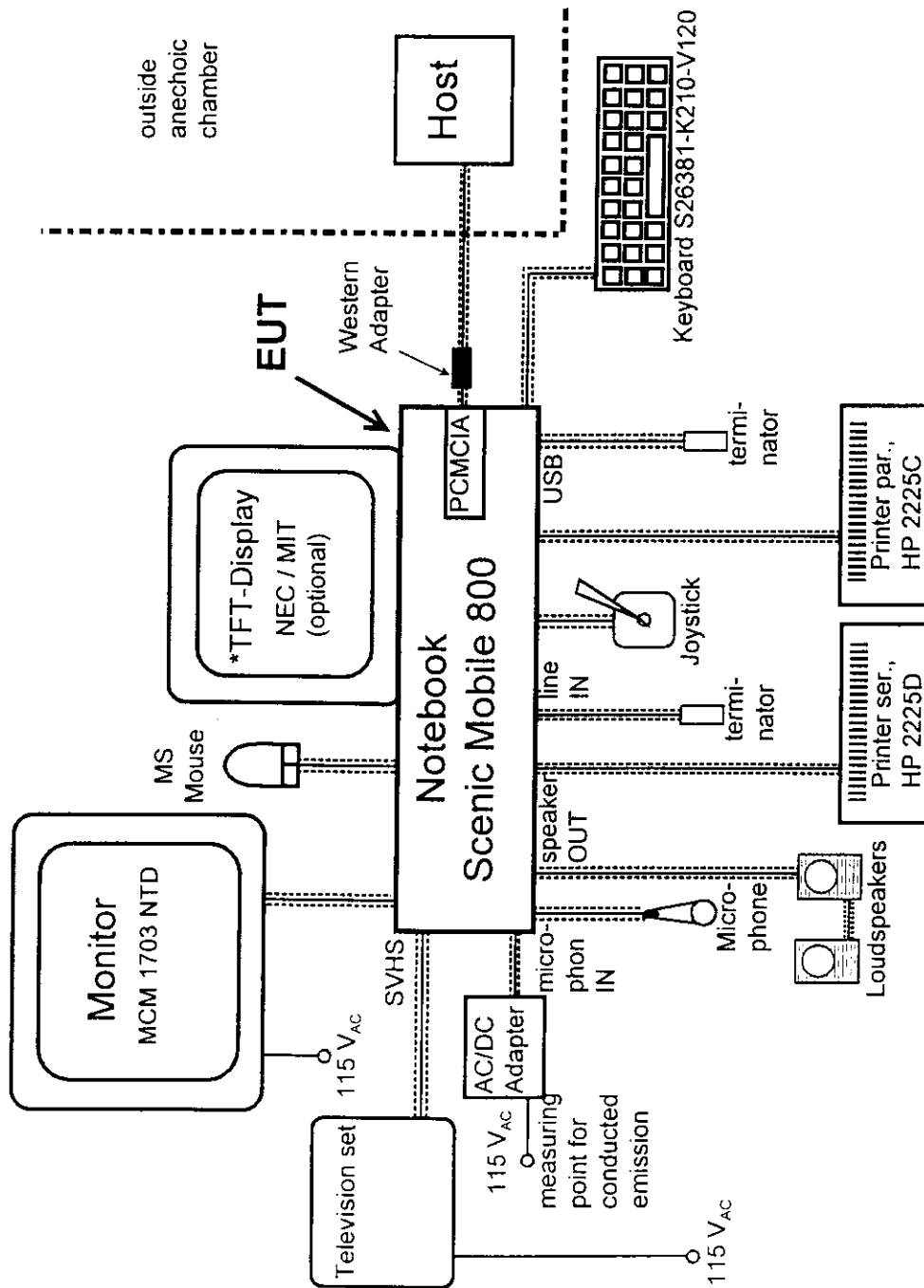
Siemens Nixdorf Informationssysteme AG  
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Figure 3.1 Configuration of Tested System



## 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
- MMO module (processor module)
- Accumulator
- Floppy disk drive
- Hard disk drive
- Keyboard communication module
- CD-ROM drive
- PCMCIA bay
- Chip card reader
- Upper connection board
- Peripheral connector area (keyboard, mouse, ser., parallel, video, USB, SVHS, joystick, microphone, speakers, line out and PCMCIA)

The detailed diagram of the system board is shown in fig 4.1  
The personal computer works exactly like a traditional PC.

## 4.2 Clockfrequencies of EUT

Clock synthesizer	14,318 MHz
Memory	66,66 MHz
PCI-bus	33,33 MHz
PIIX4 to IDE	33,33 MHz
ISA Bus	8,25 MHz
I/O controller	14,3 MHz
USB	48 MHz
VGA controller	29,498 MHz
Chip card controller	9,8304 MHz
Keyboard controller	3,579545 MHz
Infrared controller	3,58 MHz

## 4.3 Theory of Operation

The notebook works exactly like a traditional PC.

The processor runs internally with 233 or 266 MHz, the system clock is in each case the same - 66,66 MHz and is multiplied by the processors internally by 3,5 or 4,0.

The highest possible frequencies and the corresponding processors are:

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

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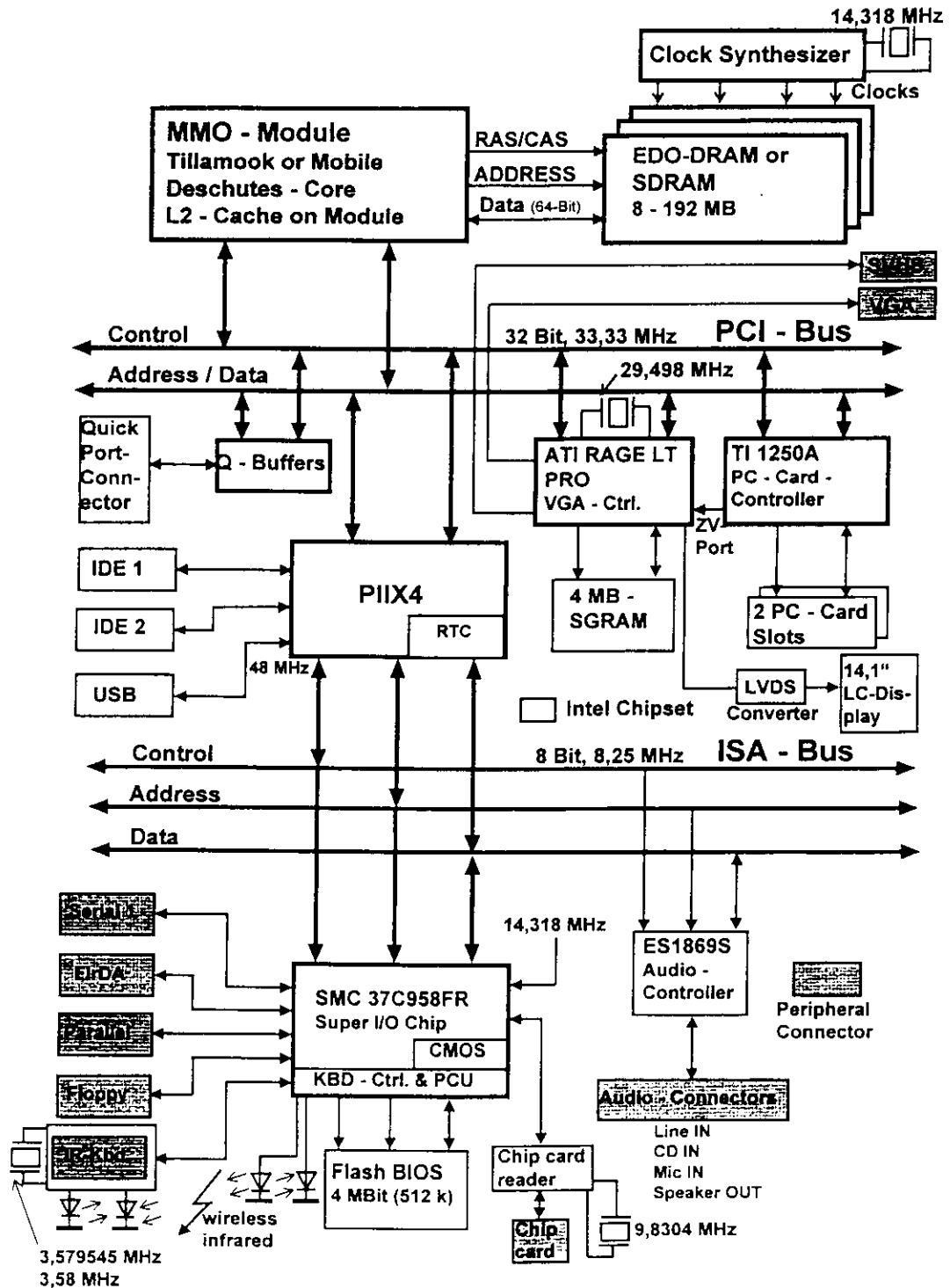
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Figure 4.1 Block Diagram of the EUT



## 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 worst case results of the corresponding configuration (display type and operation modus) is given next:

- a) Configuration with NEC display, CD-ROM and floppy disk drives equipped
- b) Configuration with MIT display, CD-ROM and floppy disk drives equipped



Judgement: Passed by

	Frequency [MHz]	Measured [dB(μV)]	Kind of value	Limit [dB(μV)]	Configuration
neutral	0,540	41,63	QP	56	a
neutral	0,582	40,82	QP	56	a
phase	0,192	42,88	AV	54	a
neutral	0,384	37,75	AV	48	a
neutral	0,558	37,88	AV	46	a
neutral	0,984	35,47	AV	46	a
neutral	1,074	35,68	AV	46	a
neutral	0,390	44,58	QP	58	b
phase	0,192	42,35	AV	54	b
neutral	0,390	36,82	AV	48	b
neutral	0,558	38,17	AV	46	b
neutral	0,984	35,56	AV	46	b
neutral	1,074	35,45	AV	46	b

AV: average

QP: quasi peak

Test Personnel:

Tester Signature: *H. Zenkner* Date: *July 8, 1998*

Printed Name: H. Zenkner

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# Measurement Protocols

	Page No
Scenic Mobile 800 with NEC display with CD-ROM and floppy disk drives Pentium II (266 MHz), 1024 x 768/85Hz	34 - 36
Scenic Mobile 800 with MIT display with CD-ROM and floppy disk drives Pentium II (266 MHz), 1024 x 768/85Hz	37 - 39

Conducted noise according to:

EN55022/B

EUT: Mobile 800 with NEC-Display  
Manufacturer: SNI  
Operating Condition: Scr."H" 1024\*768, 85Hz, HD/CD-Test  
Test Site: EMC CENTER Augsburg, SK1  
Operator: H. Zenkner  
Configuration: full configuration, CD-Rom and FD-drives equipped  
Supply: PSU: S26113-E428-V30  
Start of Test: 23.06.1998 / 11:29:24

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"

23.06.1998 11:52

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.204000	40.20	63	23.2		L1	GND
0.288000	47.86	61	12.7		N	GND
0.390000	44.48	58	13.6		N	GND

**MEASUREMENT RESULT: "Quasi Peak"**

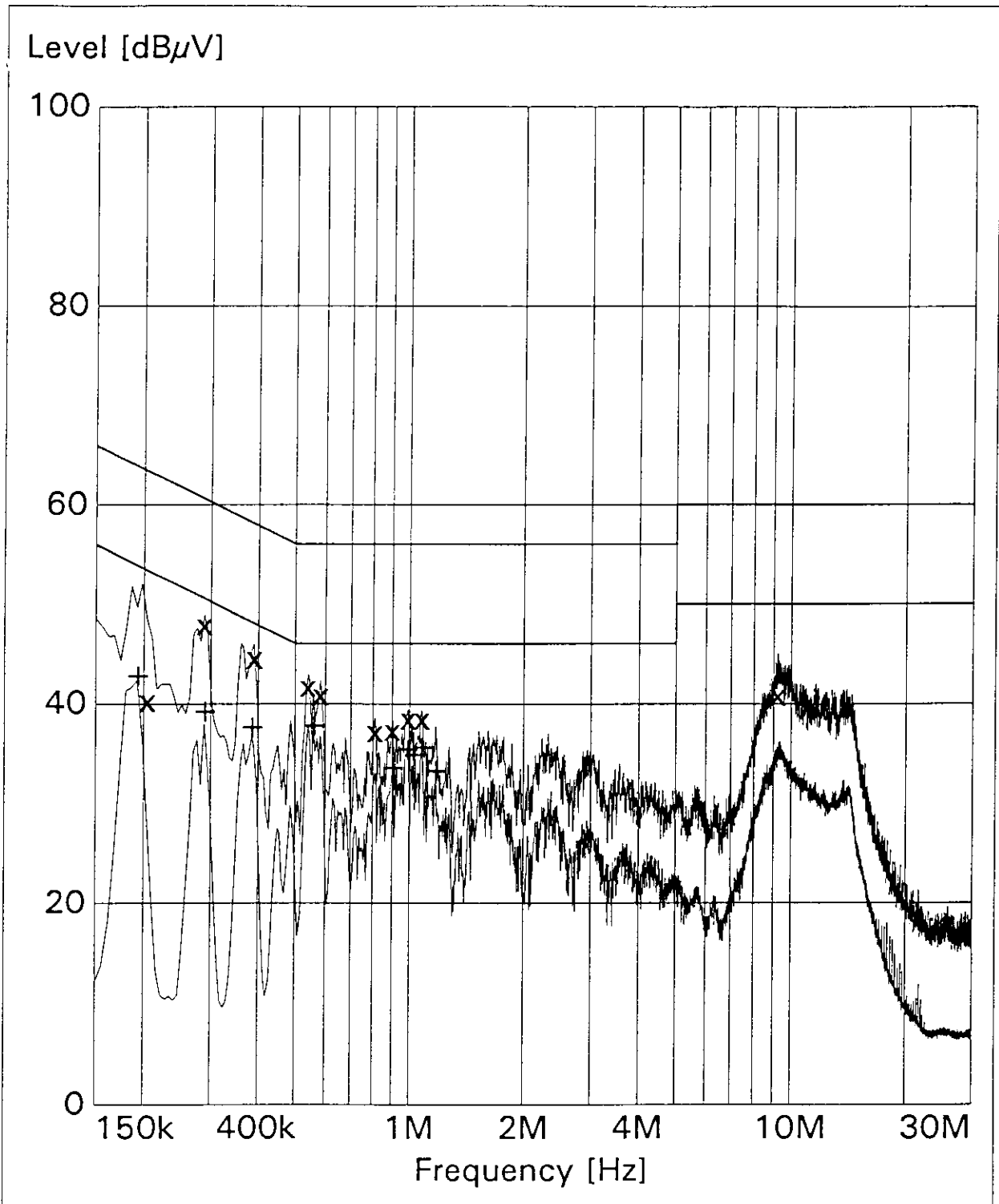
(continued)

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.540000	41.63	56	14.4		N	GND
0.582000	40.82	56	15.2		N	GND
0.810000	37.18	56	18.8		N	GND
0.900000	37.34	56	18.7		N	GND
0.990000	38.46	56	17.5		N	GND
1.074000	38.43	56	17.6		N	GND
9.222000	40.74	60	19.3		N	GND

**MEASUREMENT RESULT: "Average"**

23.06.1998 11:52

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.192000	42.88	54	11.1		L1	GND
0.288000	39.29	51	11.3		N	GND
0.384000	37.75	48	10.4		N	GND
0.558000	37.88	46	8.1		N	GND
0.900000	33.63	46	12.4		N	GND
0.984000	35.47	46	10.5		N	GND
1.026000	34.91	46	11.1		N	GND
1.074000	35.68	46	10.3		N	GND
1.170000	33.34	46	12.7		N	GND



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: Mobile 800 with MIT-Display  
 Manufacturer: SNI  
 Operating Condition: Scr."H" 1024\*768, 85Hz, HD/CD-Test  
 Test Site: EMC CENTER Augsburg, SK1  
 Operator: H. Zenkner  
 Configuration: full configuration, CD-Rom and FD-drives equipped  
 Supply: PSU: S26113-E428-V30  
 Start of Test: 23.06.1998 / 10:55:13

SCAN TABLE: "Volt\_015-30MHZ"

Unit: dBuV

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"

23.06.1998 11:18

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBuV	dBuV	dB	Mark		
0.186000	45.66	64	18.6		L1	GND
0.288000	47.22	61	13.4		N	GND
0.366000	44.34	59	14.3		N	GND

**MEASUREMENT RESULT: "Quasi Peak"**

(continued)

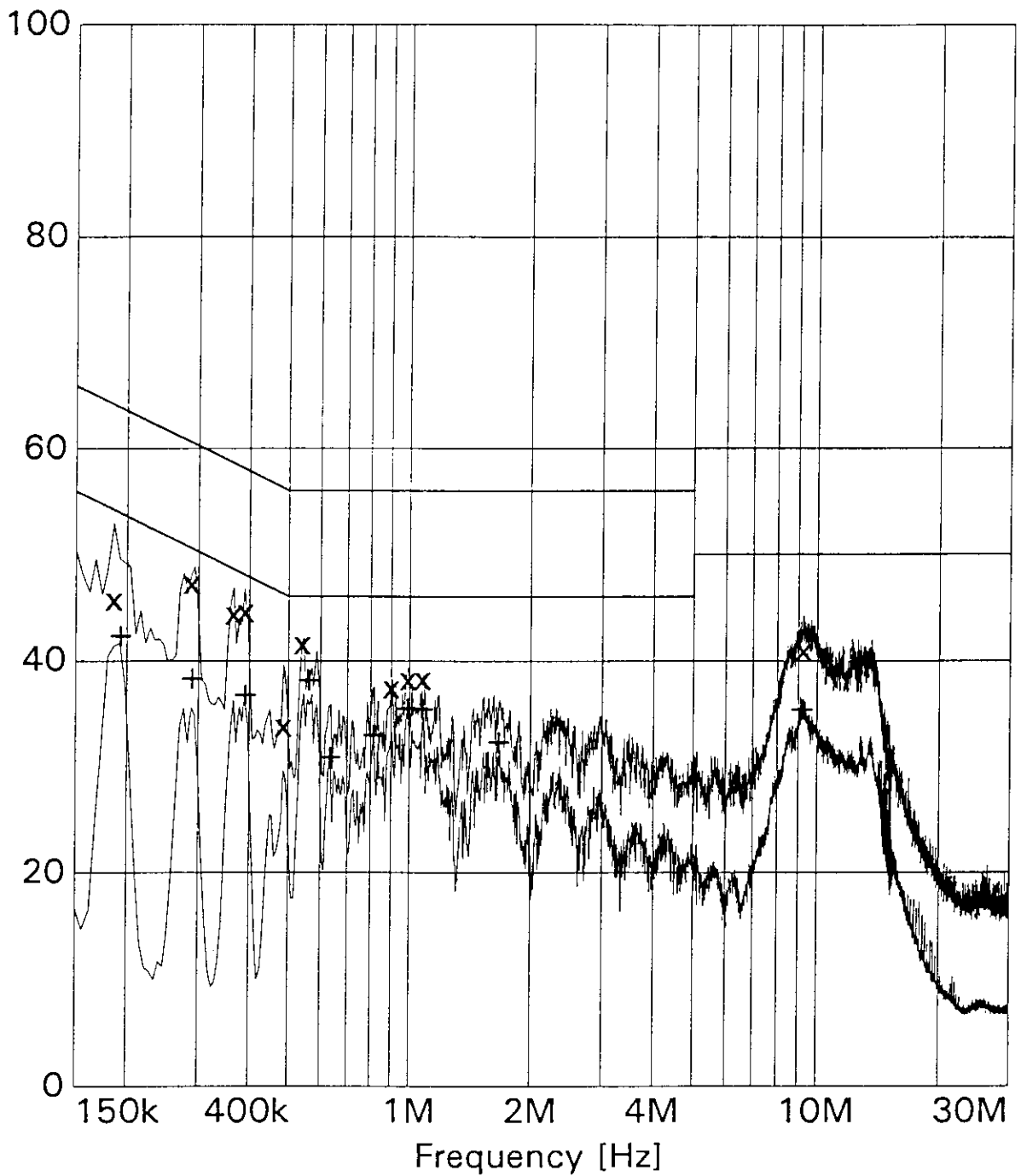
Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.390000	44.58	58	13.5		N	GND
0.486000	33.74	56	22.5		L1	GND
0.540000	41.55	56	14.5		N	GND
0.900000	37.44	56	18.6		N	GND
0.990000	38.20	56	17.8		N	GND
1.074000	38.21	56	17.8		N	GND
9.240000	40.92	60	19.1		N	GND

**MEASUREMENT RESULT: "Average"**

23.06.1998 11:18

Frequency	Level	Limit	Margin	Exceed	Line	PE
MHz	dBµV	dBµV	dB	Mark		
0.192000	42.35	54	11.6		L1	GND
0.288000	38.37	51	12.2		N	GND
0.390000	36.82	48	11.2		N	GND
0.558000	38.17	46	7.8		N	GND
0.630000	30.86	46	15.1		L1	GND
0.810000	32.96	46	13.0		N	GND
0.984000	35.56	46	10.4		N	GND
1.074000	35.45	46	10.6		N	GND
1.662000	32.33	46	13.7		N	GND
9.120000	35.44	50	14.6		N	GND

Level [dB $\mu$ 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

# 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.

**SIEMENS**  
**NIXDORF**

Siemens Nixdorf Informationssysteme AG  
Personal Computer Scenic Mobile 800

FCC Identifier:  
HSSMOB80001

Date: Jul 08, 1998

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## 7.2 Measured Data

The EUT was measured with the Processor Pentium II 266 MHz in video mode 1024 x 768 with two different displays. The test results below reflect the worst case with:

### NEC display:

66,66 MHz clock / Pentium II 266 MHz, video resolution: 1024 x 768/85 Hz, CD-ROM drive and floppy disk drive equipped

### 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
66.66000	25.90	30.000	-4.1	ver	4.0000	160.000
200.01000	26.47	30.000	-3.5	ver	1.0000	280.000
478.41000	32.53	37.000	-4.5	ver	2.8000	0.000
717.66000	33.04	37.000	-4.0	hor	2.2000	120.000
866.67000	33.84	37.000	-3.2	ver	2.8000	0.000

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	39.04	54.0	15.0		100.0	119.00	hor
1036.30000	33.59	54.0	20.4		150.0	29.00	hor
1116.40000	35.82	54.0	18.2		100.0	180.00	hor
1133.20000	38.29	54.0	15.7		200.0	0.00	hor
1866.70000	35.24	54.0	18.8		100.0	210.00	hor

all levels are average levels

**SIEMENS**  
**NIXDORF**

Siemens Nixdorf Informationssysteme AG  
Personal Computer Scenic Mobile 800

FCC Identifier:  
HSSMOB80001

Date: Jul 08, 1998

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**MIT display:**

66,66 MHz clock / Pentium II 266 MHz, video resolution: 1024 x 768/85 Hz, CD-ROM drive and floppy disk drive equipped

**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
118.26000	26.89	30.000	-3.1	ver	1.0000	90.000
199.98000	26.16	30.000	-3.8	ver	1.0000	90.000
600.00000	33.93	37.000	-3.1	ver	4.0000	180.000
797.37000	33.08	37.000	-3.9	hor	1.6000	60.000
866.67000	33.43	37.000	-3.6	hor	3.4000	180.000

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
1066.90000	28.27	54.0	25.7		100.0	300.00	hor
1118.50000	28.89	54.0	25.1		150.0	180.00	hor
2530.90000	25.15	54.0	28.8		400.0	210.00	hor
2532.40000	25.17	54.0	28.8		400.0	210.00	hor
2985.10000	26.40	54.0	27.6		200.0	330.00	hor
3000.00000	26.67	54.0	27.3		200.0	330.00	hor

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.

Test Personnel:

Tester Signature: *M. Borrmann* Date: *July 8, 1998*

Printed Name: M. Borrmann

Test Personnel:

Tester Signature: *H. Zenkner* Date: *July 8, 1998*

Printed Name: H. Zenkner

**SIEMENS**  
**NIXDORF**

Siemens Nixdorf Informationssysteme AG  
Personal Computer Scenic Mobile 800

FCC Identifier:

Date: Jul 08, 1998

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# Measurement Protocols

Page No

## **Scenic Mobile 800 with NEC display:**

Frequency range 30 MHz - 1 GHz:  
with CD-ROM and floppy disk drives  
Pentium II (266 MHz), 1024 x 768/85Hz

46 - 48

Frequency range 1 GHz - 3 GHz:  
with CD-ROM and floppy disk drives  
Pentium II (266 MHz), 1024 x 768/85Hz

49 - 51

## **Scenic Mobile 800 with MIT display:**

Frequency range 30 MHz - 1 GHz:  
with CD-ROM and floppy disk drives  
Pentium II (266 MHz), 1024 x 768/85Hz

52 - 54

Frequency range 1 GHz - 3 GHz:  
with CD-ROM and floppy disk drives  
Pentium II (266 MHz), 1024 x 768/85Hz

55 - 57

# Radiation Test according to:

## EN 55022/B

EUT: Mobile 800 / 266MHz; 14,1" NEC display  
Manufacturer: SNI  
Operating Condition: scr. "H" 1024 x 768 and periph. operation  
Test Site: EMC Center Augsburg  
Operator: H. Zenkner  
Job No: PDM8E013  
Comment : fully configured  
Comment: (FD, CD-ROM)

### SCAN TABLE: "10m/30-1000"

Unit: dB $\mu$ 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"

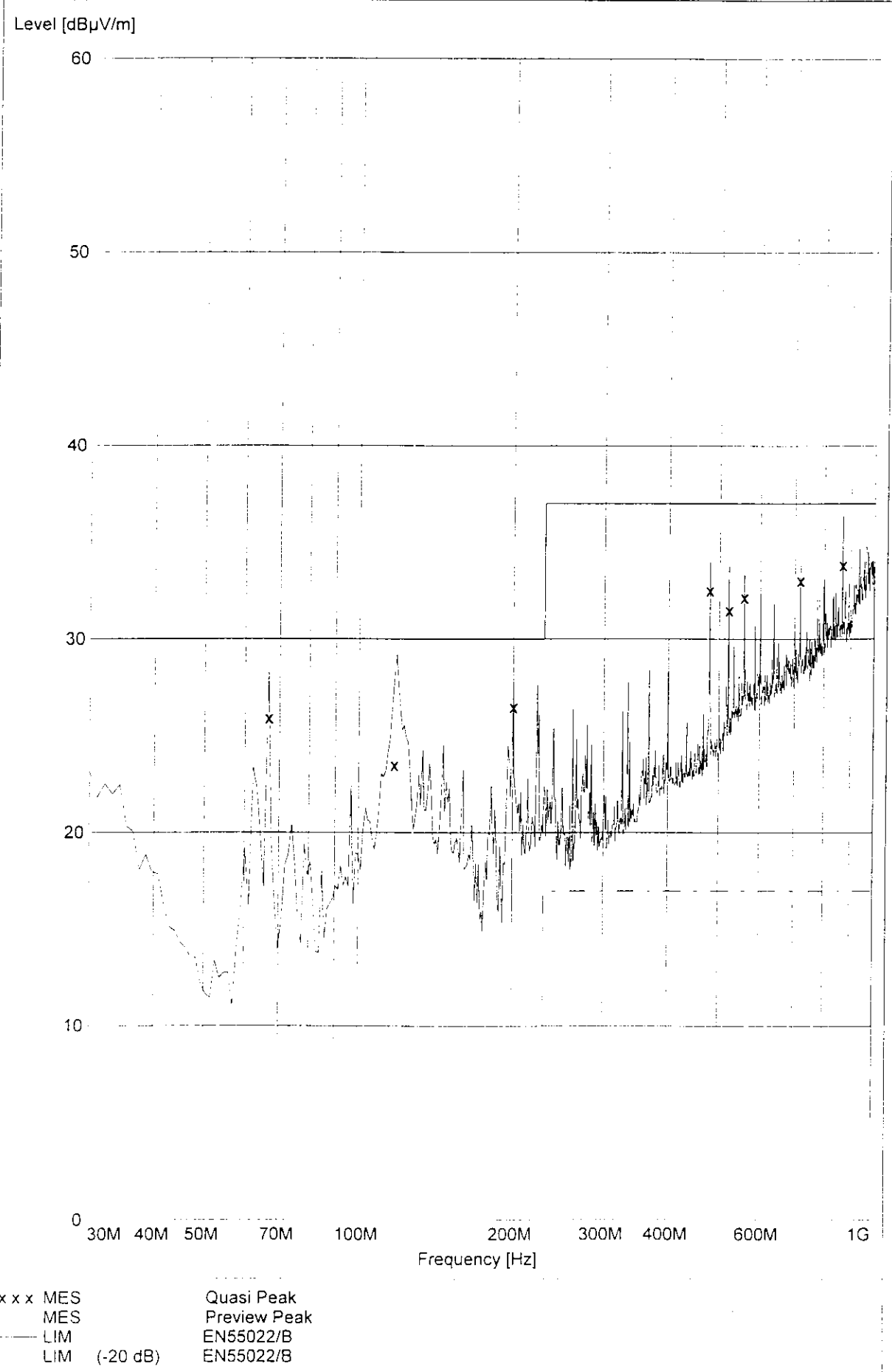
Frequency MHz	Level dB $\mu$ V/m	ANT POL	HEIGHT in [m]	ANGLE in deg
66.64444	29.24	VER	4.0000	160.00
118.37777	29.19	VER	1.0000	80.000

200.28888	27.79	VER	1.0000	280.00
479.43333	34.01	VER	2.8000	0.0000
521.46666	33.78	VER	2.8000	0.0000
559.18888	33.43	VER	2.8000	0.0000
718.70000	33.83	HOR	2.2000	120.00
867.43333	36.36	VER	2.8000	0.0000

**MEASUREMENT RESULT: "Quasi Peak"**

Frequency MHz	Level dB $\mu$ V/m	LIMIT dB $\mu$ V/m	EXCEEDING dB	ANT POL	HEIGHT in [m]	ANGLE in deg
66.66000	25.90	30.000	-4.102240	VER	4.0000	160.00
117.27000	23.48	30.000	-6.523356	VER	1.0000	80.000
200.01000	26.47	30.000	-3.534198	VER	1.0000	280.00
478.41000	32.53	37.000	-4.470419	VER	2.8000	0.0000
521.19000	31.50	37.000	-5.500601	VER	2.8000	0.0000
558.15000	32.17	37.000	-4.831224	VER	2.8000	0.0000
717.66000	33.04	37.000	-3.964129	HOR	2.2000	120.00
866.67000	33.84	37.000	-3.158239	VER	2.8000	0.0000





**Fieldstrength according to :**

**FCC class B**

EUT: Mobile 800 / 266MHz; 14.1" NEC Display  
Manufacturer: SNI  
Operating Condition: scr."H" 1024 x 768 and periph. operation  
Test Site: EMC Center Augsburg  
Operator: M. Borrmann  
Job No: PDM8E013  
Comment : full configured  
Start of Test: 16.06.1998 / 16:19:12

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

Unit: dB $\mu$ V/m

Detector: Mode:

Curve 1: Average MaxHold

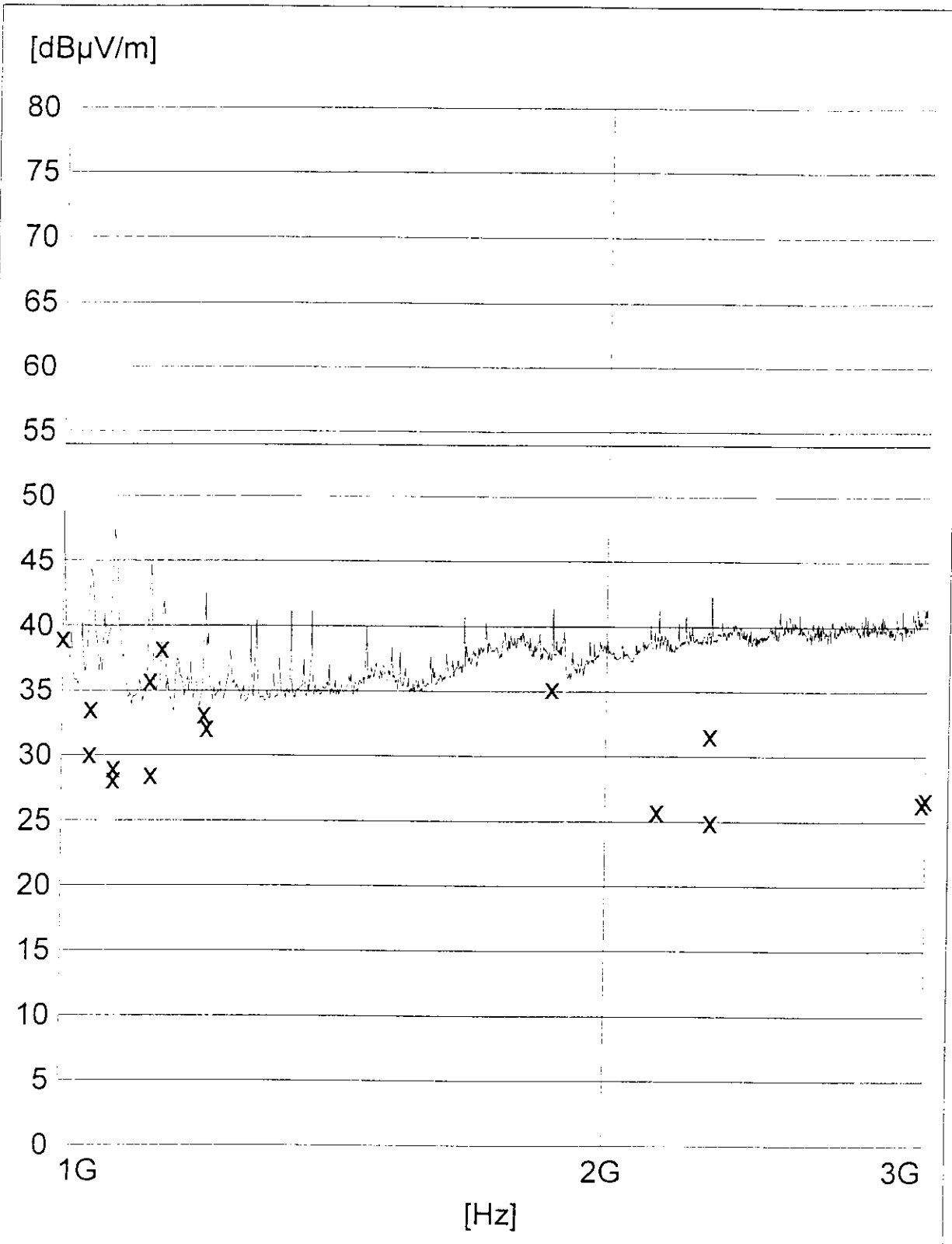
Subrange 1:

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"**

16.05.1998 17:16

Frequency	Level	Limit	Margin	Exceed	Height	Azimuth	Polarisation
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB	Mark	cm	deg	
1000.000000	39.04	54.0	15.0		100.0	119.00	HORIZONTAL
1035.400000	30.13	54.0	23.9		150.0	29.00	HORIZONTAL
1036.300000	33.59	54.0	20.4		150.0	29.00	HORIZONTAL
1066.600000	29.05	54.0	24.9		100.0	300.00	HORIZONTAL
1066.900000	28.19	54.0	25.8		100.0	300.00	HORIZONTAL
1116.400000	35.82	54.0	18.2		100.0	180.00	HORIZONTAL
1118.200000	28.54	54.0	25.5		100.0	180.00	HORIZONTAL
1133.200000	38.29	54.0	15.7		200.0	0.00	HORIZONTAL
1195.900000	33.20	54.0	20.8		100.0	180.00	HORIZONTAL
1200.100000	32.18	54.0	21.8		100.0	180.00	HORIZONTAL
1866.700000	35.24	54.0	18.8		100.0	210.00	HORIZONTAL
2133.100000	25.82	54.0	28.2		150.0	0.00	HORIZONTAL
2279.800000	31.67	54.0	22.3		100.0	180.00	HORIZONTAL
2282.500000	25.04	54.0	29.0		100.0	180.00	HORIZONTAL
2985.400000	26.45	54.0	27.6		100.0	330.00	HORIZONTAL
3000.000000	26.75	54.0	27.3		100.0	330.00	HORIZONTAL



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: Mobile 800 / 266MHz; 14,1" MIT display  
Manufacturer: SNI  
Operating Condition: scr. "H" 1024 x 768 and periph. operation  
Test Site: EMC Center Augsburg  
Operator: H. Zenkner  
Job No: PDM8E013  
Comment : fully configured  
Comment: (FD, CD-ROM)

## SCAN TABLE: "10m/30-1000"

Unit: dB $\mu$ 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

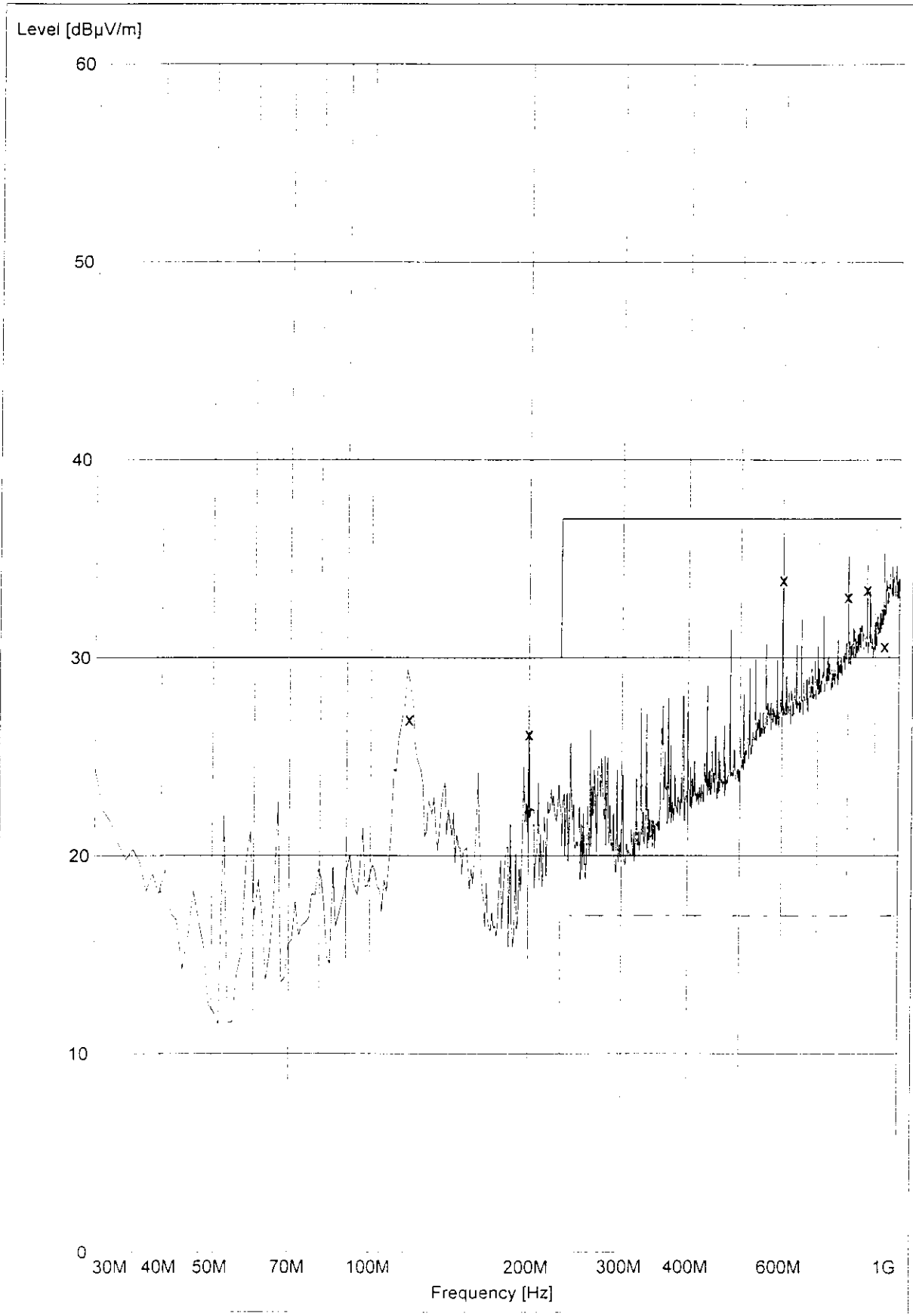
## MEASUREMENT RESULT: "Peak"

Frequency MHz	Level dB $\mu$ V/m	ANT POL	HEIGHT in [m]	ANGLE in deg
117.30000	29.38	VER	1.0000	90.000
200.28888	27.34	VER	1.0000	90.000

600.14444	36.02	VER	4.0000	180.00
798.45555	35.11	HOR	1.6000	60.000
867.43333	34.69	HOR	3.4000	180.00
934.25555	35.29	HOR	4.0000	0.0000

**MEASUREMENT RESULT: "Quasi Peak"**

Frequency MHz	Level dB $\mu$ V/m	LIMIT dB $\mu$ V/m	EXCEEDING dB	ANT POL	HEIGHT in [m]	ANGLE in deg
118.26000	26.89	30.000	-3.109978	VER	1.0000	90.000
199.98000	26.16	30.000	-3.835558	VER	1.0000	90.000
600.00000	33.93	37.000	-3.072064	VER	4.0000	180.00
797.37000	33.08	37.000	-3.919548	HOR	1.6000	60.000
866.67000	33.43	37.000	-3.568239	HOR	3.4000	180.00
936.63000	30.60	37.000	-6.403795	HOR	4.0000	0.0000



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

**Fieldstrength according to :**

**FCC class B**

EUT: Mobile 800 / 266MHz; 14.1" MIT Display  
Manufacturer: SNI  
Operating Condition: scr."H" 1024 x 768 and periph. operation  
Test Site: EMC Center Augsburg  
Operator: M. Borrmann  
Job No: PDM8E013  
Comment : full configured  
Start of Test: 16.06.1998 / 17:23:55

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

Unit: dB $\mu$ 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

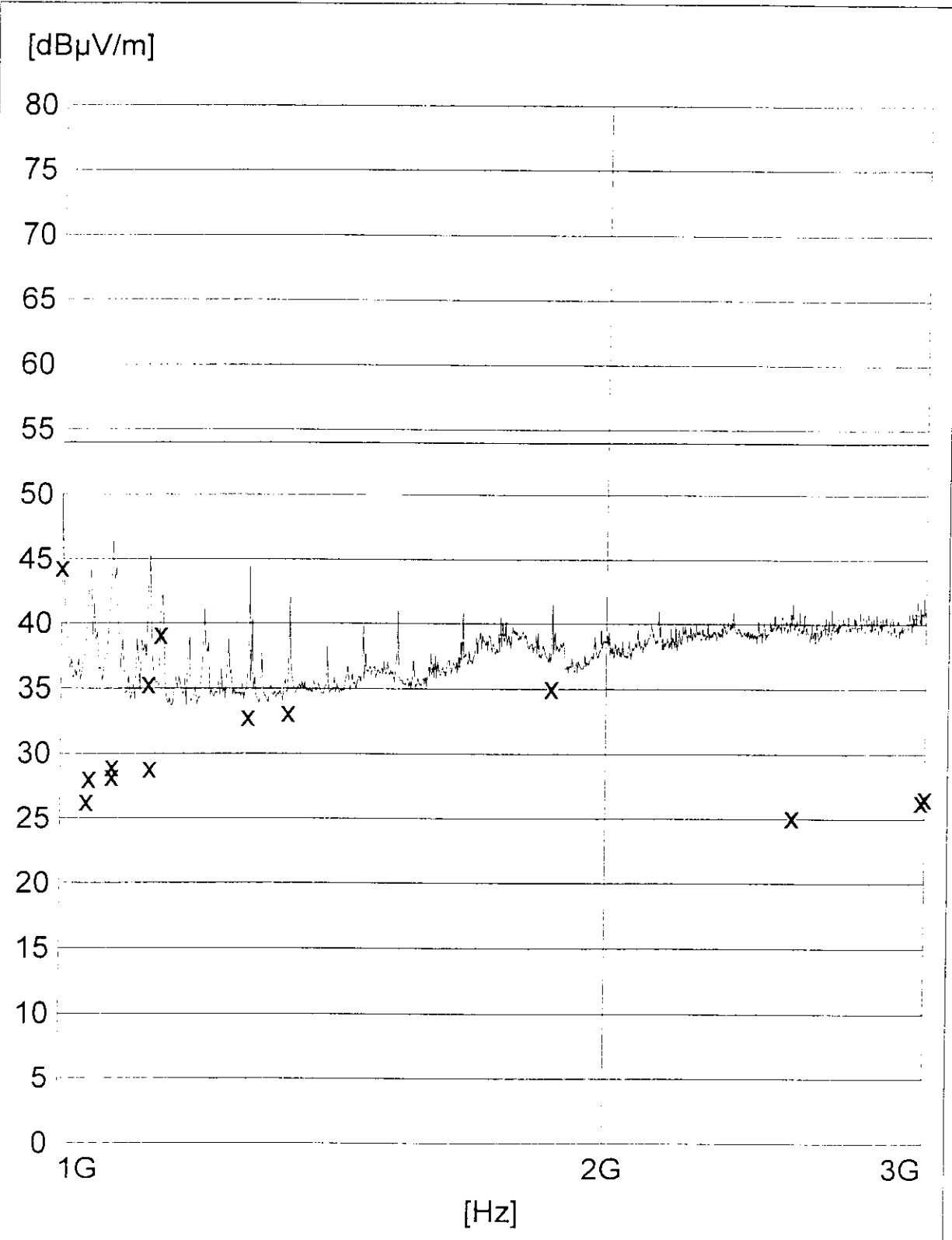
Curve 1: On Repetition: 0  
Stop Mark: Off  
Stop Message: Off  
Stop Message:



MEASUREMENT RESULT: "Final\_Average"

16.06.1998 18:24

Frequency	Level	Limit	Margin	Exceed	Height	Azimuth	Polarisation
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB	Mark	cm	deg	
1000.000000	44.40	54.0	9.6		150.0	330.00	VERTICAL
1033.300000	26.37	54.0	27.6		100.0	150.00	HORIZONTAL
1036.600000	28.12	54.0	25.9		100.0	150.00	HORIZONTAL
1066.600000	29.03	54.0	25.0		100.0	300.00	HORIZONTAL
1066.900000	28.27	54.0	25.7		100.0	300.00	HORIZONTAL
1116.400000	35.39	54.0	18.6		150.0	180.00	HORIZONTAL
1118.500000	28.89	54.0	25.1		150.0	180.00	HORIZONTAL
1133.200000	39.20	54.0	14.8		150.0	0.00	HORIZONTAL
1266.700000	32.86	54.0	21.1		100.0	0.00	HORIZONTAL
1333.600000	33.20	54.0	20.8		100.0	150.00	HORIZONTAL
1866.700000	35.09	54.0	18.9		100.0	210.00	HORIZONTAL
2530.900000	25.15	54.0	28.8		400.0	210.00	HORIZONTAL
2532.400000	25.17	54.0	28.8		400.0	210.00	HORIZONTAL
2985.100000	26.40	54.0	27.6		200.0	330.00	HORIZONTAL
3000.000000	26.67	54.0	27.3		200.0	330.00	HORIZONTAL



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 $\mu$ 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 =

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

**103,5  $\mu$ 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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