

# MEASUREMENT / TECHNICAL REPORT

# SIEMENS PC SYSTEME GmbH & Co. KG

## Model: Personal Computer Scenic MT8

**FCC ID: HSSSCENIC8501**

**Aug. 18, 1999**

|  |  |                 |
|--|--|-----------------|
| This report concerns:  | <input type="checkbox"/> Original grant  | Class II change |
| Equipment type:  | Personal Computer  |                 |
| Request issue of grant:  | <input type="checkbox"/> Immediately upon completion of review<br><input type="checkbox"/> Defer grant per 47 CFR 0.457(d)(1)(ii) until _____<br>date _____. Company Name agrees to notify the<br>Commission by _____ date _____ of the intended<br>date of announcement of the product so that the<br>grant can be issued on that date. |                 |
| Measurement procedure<br>used:   | ANSI C63.4-1992<br><input type="checkbox"/> FCC/OET MP-4(1987)<br><input type="checkbox"/> other _____   |                 |
| Limits on compliance with: CISPR 22 resp. FCC class B  |  |                 |
| Application for Certification<br>prepared by:<br>Guenther Roesch<br>Siemens PC Systeme GmbH & Co. KG<br>Buergermeister-Ulrich-Str. 100<br>86199 Augsburg<br>Germany<br>Tel.: +49 821 804-2821<br>Fax: +49 821 804 2675 | Applicant for this device:<br><br>Siemens PC Systeme GmbH & Co. KG<br>Buergermeister-Ulrich-Str. 100<br>86199 Augsburg<br>Germany<br>Tel.: +49 821 804-0   |                 |

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|---|--|------------------------|
| S | <p>Engineer: _____</p> <p>Martin Heuser<br/>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/>HSSSCENIC8501</p> | Date: Aug. 18,<br>1999 |
|---|--|------------------------|

# Table of Contents

|   |         |
|---|---------|
| 1 GENERAL INFORMATION   | 4       |
| 1.1 Product Description   | 4 - 6   |
| 1.2 Related Submittal(s)/Grant(s)   | 7       |
| 1.3 Tested System Details   | 7 - 9   |
| 1.4 Test Methodology  | 10      |
| 1.5 Test Facility   | 10      |
| 1.6 Referenced Rules Sections   | 10      |
| 2 PRODUCT LABELING  | 11      |
| Figure 2.1 FCC ID Label: see original grant,<br>date: Mar. 10, 1999             | 11      |
| Figure 2.2 Location of Label on EUT: see original grant,<br>date: Mar. 10, 1999 | 11      |
| 3 SYSTEM TEST CONFIGURATION   | 12      |
| 3.1 Justification   | 12 - 13 |
| 3.2 Video Mode Justification  | 14      |
| 3.3 EUT Exercise Software   | 15      |
| 3.4 Special Accessories   | 15      |
| 3.5 Equipment Modifications   | 16      |
| 3.6 Configuration of Tested System  | 16      |
| Figure 3.1 Configuration of Tested System                                       | 17      |
| 4 BLOCK DIAGRAM OF EQUIPMENT UNDER TEST   | 18      |
| 4.1 Block Diagram Description   | 18      |
| 4.2 Clockfrequencies of the EUT   | 19      |
| 4.3 Theory of Operation   | 19      |
| Figure 4.1 Block Diagram  | 20      |
| 5 CONDUCTED EMISSION DATA   | 21      |
| 5.1 Test Procedure  | 21      |
| 5.2 Measured Data: see attached file  | 21 - 23 |
| 5.3 Referenced Rules  | 24      |
| 5.4 Test Instrumentation Used, Conducted Measurement                            | 24      |

|          |  |   |
|----------|--|---|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG</b><br><b>Personal Computer Scenic MT8</b><br><br><b>FCC Identifier:</b><br><b>HSSSCENIC8501</b> | <b>Date: Aug. 18,</b><br><b>1999</b><br><br><b>Page:</b><br><b>2/38</b> |
|----------|--|---|

|   |         |
|---|---------|
| 6 RADIATED EMISSION DATA  | 25      |
| 6.1 Test Procedure  | 25      |
| 6.2 Measured Data: see attached file                                | 26 - 28 |
| 6.3 Reference Rules Sections  | 29      |
| 6.4 Test Instrumentation Used, Radiated Measurement                 | 29      |
| 6.5 Field Strength Calculation                                      | 30      |
| 6.6 Table of Correction Factors                                     | 31 - 34 |
| 7 CONDUCTED AND RADIATED MEASUREMENT PHOTOS:<br>see attached files  | 35      |
| 8 EXTERNAL PHOTOS OF EUT:<br>see original grant, date Mar. 10, 1999 | 36      |
| 9 INTERNAL PHOTOS OF EUT:<br>see attached files                     | 37      |
| 10 USER MANUAL:<br>see original grant, date Mar. 10, 1999           | 38      |

|          |   |                                |
|----------|---|--------------------------------|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: <b>Aug. 18,<br/>1999</b> |
|          |   | Page:<br><b>3/38</b>           |

# 1 GENERAL INFORMATION

## 1.1 Product Description

The Siemens Computer Scenic 850 is a mini tower personal computer. The system board integrates the Pentium Processor, memory, and I/O-technologies. The system now can be assembled with Processor Intel Pentium III 600 MHz.

With the first model (original grant, date: Mar. 10, 1999) two standard PSUs (Astec, model AA20660 and Minebea, model SPW 1562) were equipped, now the PSU Minebea, model SPW 1562-1 has been added.

*Description of the power supplies:*

- Power supplies:

|                |                              |
|----------------|------------------------------|
| ASTEC, model   | AA20660<br>S26113-E427-V30   |
| Minebea, model | SPW1562<br>S26113-E427-V20   |
| Minebea, model | SPW1562-1<br>S26113-E427-V20 |

*Features Overview:*

Chip Set – Intel 440BX/ZX and PII4E

- 2 IDE ports for up to 4 IDE devices  
support enhanced bus master ATA33 IDE with WIN98<sup>TM</sup> and NT<sup>TM</sup>
- 2 USB ports with 12 Mbits/s

Super I/O – SMCS FDC37M807

- One internal floppy port for one floppy and one floppy tape drive  
support up to 2,88 Mbyte floppy
- 2 external PS2 ports - support keyboard and mouse connector exchange

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|----------|---|--|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: <b>Aug. 18,<br/>1999</b><br><br>Page:<br><b>4/38</b> |
|----------|---|--|

- 1 external parallel port
- 1 external serial port (COM1)
- 1 internal connector for chipcardreader or external serial (COM2) port via wire

#### Main memory

- Two 3,3 V DIMM sockets for 16 Mbyte up to 768 Mbyte support only unbuffered SDRAMs

#### Security features

- Floppy write protection by BIOS and by switch
- System and BIOS password
- Flash write protection against virus
- SPD EEPROM protection against virus
- Intrusion check

#### Power management

- ACPI and APM
- On/Sleep/Off by power switch
- On/Sleep/Off by keyboard
- On/Off by SNI desk software
- On by real time clock (RTC)
- On by chip card reader
- On by external serial port 1
- Wake on LAN (WOL)
- Wake on PCI and AGP cards
- Wake on chip card reader
- Monitor power switch control

#### BIOS features

- Flash EPROM 2 Mbit
- System BIOS
- USB legacy support
- InCom LAN boot support
- Intel LAN desk Service Agent (LSA) support

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|----------|---|--|
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|----------|---|--|

Environmental protection

- Battery on socket for recycling

Form factor and slots

- Micro ATX
- 1 AGP slot
- 2 PCI slots
- 1 shared PCI-Bus / ISA-Bus slot

The personal computer is assembled by Siemens PC Systeme GmbH & Co. KG,  
Bürgermeister-Ulrich-Str. 100, 86199 Augsburg.

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| <b>S</b> | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSSCENIC8501</b></p> | <p>Date: <b>Aug. 18, 1999</b></p> <p>Page: <b>6/38</b></p> |
|----------|--|--|

## 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<br>(Serial Number)              | FCC ID               | Description              | Cable Description<br>(length in [cm])                                 |
|-----|--|----------------------|--------------------------|---|
| 1   | Siemens<br>Scenic 860 (MT8)                  | HSSSCENIC8501        | PC<br>EUT                | unshielded power<br>cord [292]  |
| 2   | Siemens<br>MCM 1705 NTD                      | A3LCGH760            | Monitor                  | unshielded power<br>cord [175]<br>shielded video<br>cable [168]       |
| 3   | Siemens<br>S26381-K240                       | HSS01TASTK240        | Keyboard                 | shielded keyboard<br>cable [143]                                      |
| 4   | Microsoft<br>MS 2.1A                         | C3KKMP3              | Mouse                    | shielded mouse<br>cable [183]   |
| 5   | Microsoft<br>Intelli mouse 1.1A              | DOC:<br>PN X03-29688 | USB mouse                | shielded mouse<br>cable [197]   |
| 6   | Hewlett Packard<br>HP 2225C+<br>(3019S70991) | DSI6XU2225           | Printer,<br>parallel I/F | unshielded AC ca-<br>ble [180], shielded<br>centronics cable<br>[190] |

|          |   |   |
|----------|---|---|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | <b>Date: Aug. 18,<br/>1999</b><br><br><b>Page:<br/>7/38</b> |
|----------|---|---|

| Pos            | Model Number<br>(Serial Number)                   | FCC ID     | Description            | Cable Description<br>(length in [cm])                               |
|----------------|---|------------|------------------------|---|
| 7              | Hewlett Packard<br>HP 2225D+<br>(2952S61299)      | DSI6XU2225 | Printer,<br>serial I/F | unshielded power<br>cord [185], shiel-<br>ded serial cable<br>[190] |
| 8              | Siemens   | N/A        | USB cable              | shielded cable,<br>terminated [192]                                 |
|                |   |            |                        |   |
|                | <b><u>Pos 1 contains:</u></b>                     |            |                        |   |
| a <sub>1</sub> | ASTEC (UK),<br>AA20660<br>SNI:<br>S26113-E427-V30 | N/A        | Power<br>supply        |   |
| a <sub>2</sub> | Minebea<br>SPW1562<br>SNI:<br>S26113-E427-V20     | N/A        | Power<br>supply        |   |
| a <sub>3</sub> | Minebea<br>SPW1562-1<br>SNI:<br>S26113-E427-V20   | N/A        | Power<br>supply        |   |
| b              | Siemens<br>S26361-D1107-A11<br>WGS 2              | N/A        | System<br>board        |   |
| c              | Hyundai<br>PC100-322-620                          | N/A        | SDRAM                  |   |

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|----------|---|--------------------------------|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: <b>Aug. 18,<br/>1999</b> |
|          |   | Page:<br><b>8/38</b>           |

| Pos | Model Number<br>(Serial Number)         | FCC ID                 | Description                    | Cable Description<br>(length in [cm]) |
|-----|---|------------------------|--------------------------------|---------------------------------------|
| d   | Intel Pentium III<br>80525/PY600512     | N/A                    | Processor<br>module            |                                       |
| e   | Matrox<br>G200 AGP                      | DOC:<br>G2+/MILA/8B/20 | Graphic<br>controller<br>board |                                       |
| f   | S26361-D960-V1                          | N/A                    | Cheap card<br>reader           |                                       |
| g   | Fujitsu<br>MPB3043AT                    | N/A                    | Hard disk<br>drive             |                                       |
| h   | Toshiba<br>XM-6302B<br>S26361-H402-V500 | CJ6AT98-032            | CD-ROM<br>drive                |                                       |
| i   | Teac<br>FD235-HF235-7376                | N/A                    | Floppy disk<br>drive           |                                       |

Remark: position 1a<sub>1</sub> / 1a<sub>2</sub> / 1a<sub>3</sub> optional

|          |   |                                      |
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|          |   | Page:<br><b>9/38</b>                 |

## 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 PC Systeme GmbH & Co. KG, 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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|----------|--|--|

## 2 PRODUCT LABELING

### 2.1 FCC ID Label

see original grant, date: Mar. 10, 1999

### 2.2 Location of Label on EUT

see original grant, date: Mar. 10, 1999

|   |  |  |
|---|--|--|
| S | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSSCENIC8501</b></p> | <p>Date: Aug. 18,<br/>1999</p> <p>Page:<br/><b>11/38</b></p> |
|---|--|--|

# 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 100 MHz, the clock frequency was tested with the corresponding worst case processor:

100 MHz clock: Intel Pentium III 600 MHz

The system is provided with three kinds of power supplies:

- ASTEC, AA20660 SNI: S26113-E427-V30
- Minebea, SPW1562 SNI: S26113-E427-V20
- Minebea, SPW1562-1 SNI: S26113-E427-V20

According both worst case results concerning the test report of the original grant (dated: Mar. 10, 1999) the following configuration has been tested:

|          |   |                                |
|----------|---|--------------------------------|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: <b>Aug. 18,<br/>1999</b> |
|          |   | Page:<br><b>12/38</b>          |

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

**Minebea PSU, model SPW1562-1:**

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz

Frequency range 1 GHz - 5 GHz:

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz

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

**Minebea PSU, model SPW1562-1:**

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz  
monitor power via system unit

|   |   |   |
|---|---|---|
| S | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/>HSSSCENIC8501</p> | <p>Date: Aug. 18,<br/>1999</p> <p>Page:<br/>13/38</p> |
|---|---|---|

## 3.2 Video mode Justification

The system was tested in video graphic modes 1024 x 768. The worst case combination according the test results of the original grant (date: Mar. 10, 1999) have been tested the configuration is:

The following data are applicable:

### **radiated emission:**

#### **Minebea PSU, model SPW1562-1:**

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

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz

##### Frequency range 1 GHz - 5 GHz:

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz

### **conducted emission:**

#### **Minebea PSU, model SPW1562-1:**

100 MHz clock/Pentium III 600 MHz, video resolution 1024 x 768/100 Hz  
monitor power via system unit

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|---|--|--|
| S | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br>HSSSCENIC8501 | Date: Aug. 18,<br>1999<br><br>Page:<br>14/38 |
|---|--|--|

### 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
- LAN data communication

### 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.

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| <b>S</b> | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSSCENIC8501</b></p> | <p>Date: Aug. 18,<br/>1999</p> <p>Page:<br/><b>15/38</b></p> |
|----------|--|--|

## 3.5 Equipment Modifications

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

**no modifications**

Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_

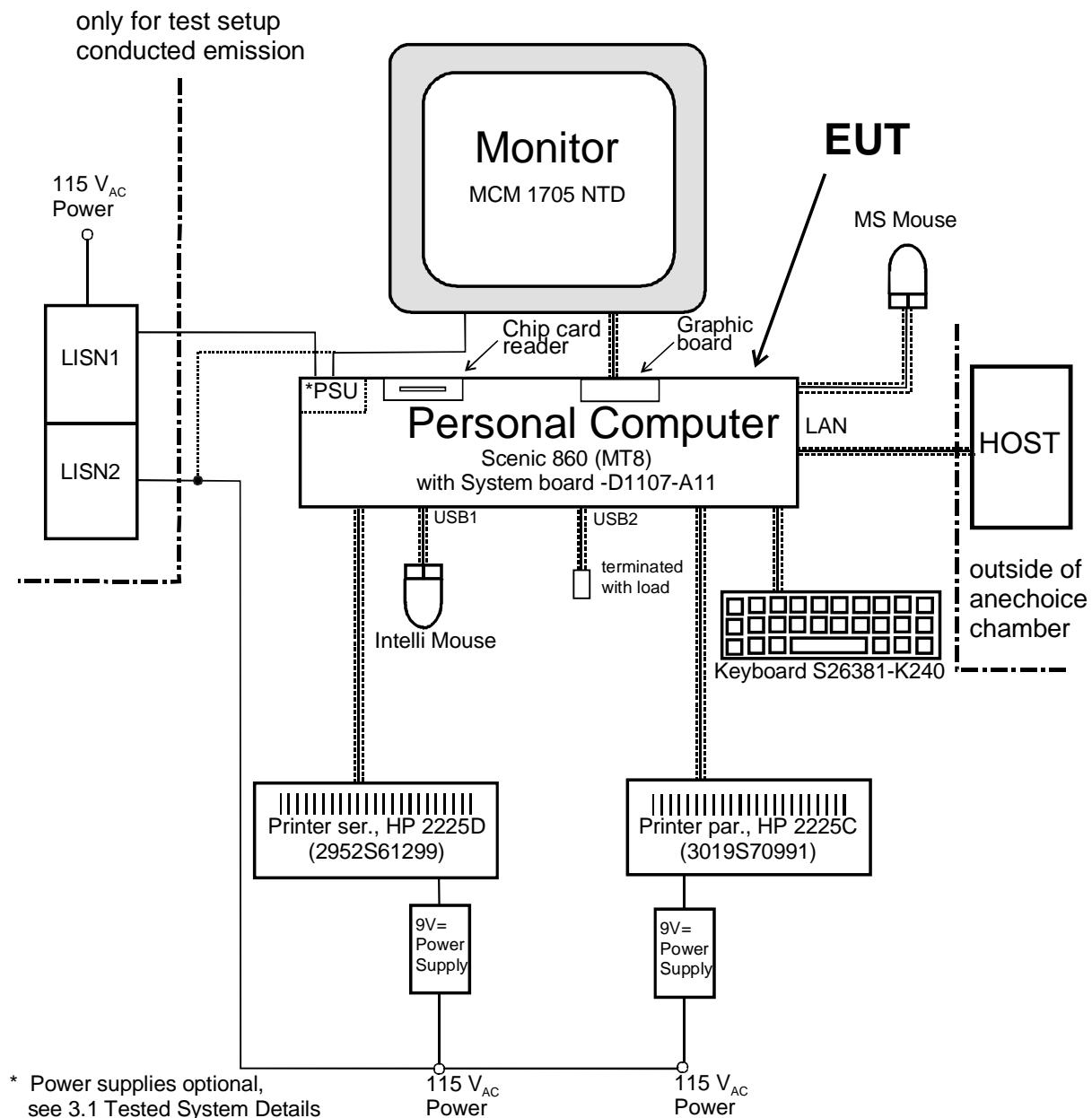
Typed/Printed Name \_\_\_\_\_ Position \_\_\_\_\_

## 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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|---|--|--|
| S | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br>HSSSCENIC8501 | Date: Aug. 18,<br>1999<br><br>Page:<br>16/38 |
|---|--|--|

Figure 3.1 Configuration of Tested System



S

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Personal Computer Scenic MT8

FCC Identifier:  
HSSCENIC8501

Date: Aug. 18,  
1999

Page:  
17/38

## 4 BLOCK DIAGRAM OF EUT

see fig 4.1 page 20

### 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, Parallel Port, LAN 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..

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|----------|--|--|

## 4.2 Clockfrequencies of EUT

|                      |                |
|----------------------|----------------|
| Clock synthesizer    | 14,318 MHz     |
| Front side bus       | 66,6 / 100 MHz |
| Memory               | 66,6 / 100 MHz |
| PCI-bus              | 33,3 MHz       |
| PIIX4 to IDE and USB | 33,3 MHz       |
| ISA Bus              | 8,2 MHz        |
| I/O controller       | 14,3 MHz       |
| USB                  | 48 MHz         |
| AGP bus              | 66,6 MHz       |

## 4.3 Theory of Operation

The mini tower PC works exactly as a traditional PC.

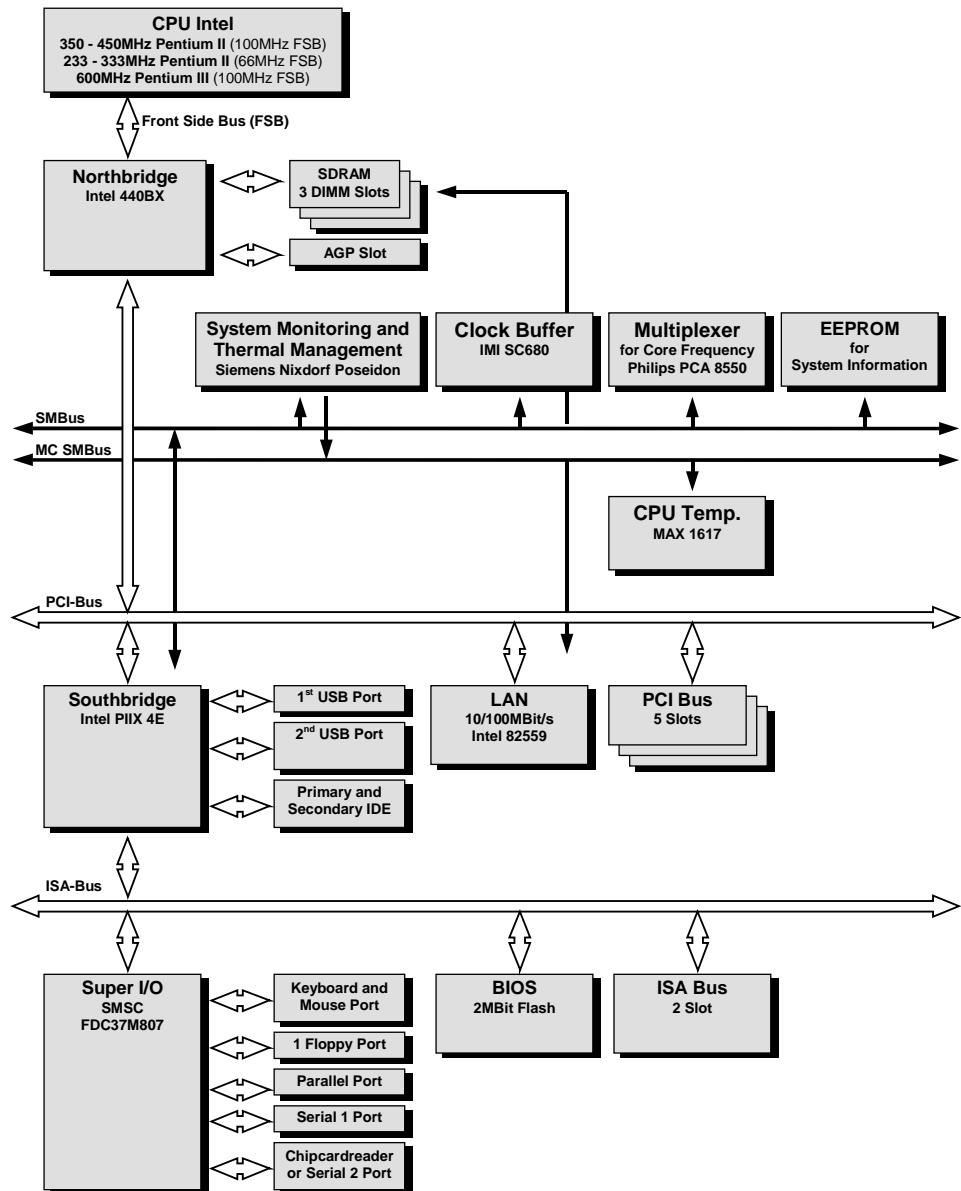
The processors run internally between 233 and 600 MHz, the system clock is 66,6 MHz or 100 MHz and is multiplied by the processors internally by 3,5, 4,0, 4,5, 5,0, 5,5 or 6,0.

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    |
| 66,6 MHz     | 366 MHz   | 5,5    |
| 100 MHz      | 350 MHz   | 3,5    |
| 100 MHz      | 400 MHz   | 4,0    |
| 100 MHz      | 450 MHz   | 4,5    |
| 100 MHz      | 500 MHz   | 5,0    |
| 100 MHz      | 600 MHz   | 6,0    |

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|----------|---|------------------------|
| <b>S</b> | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: Aug. 18,<br>1999 |
|          |   | Page:<br><b>19/38</b>  |

Figure 4.1 Block Diagram of the EUT



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Personal Computer Scenic MT8

FCC Identifier:  
HSSCENIC8501

Date: Aug. 18,  
1999

Page:  
20/38

# 5 CONDUCTED EMISSION DATA

## 5.1 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.

## 5.2 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 powered both, via the system unit or separately.

The worst case results of the measurement is given next:

### **Minebea PSU, model SPW1562-1**

video resolution 1024 x 768/100 Hz, monitor power via system unit

Judgement: Passed by

|       | Frequency<br>[MHz] | Measured<br>[dB(µV)] | Kind of<br>value | Limit<br>[dB(µV)] |
|-------|--------------------|----------------------|------------------|-------------------|
| phase | 0,162              | 51,1                 | QP               | 65,1              |
| phase | 0,228              | 47,5                 | QP               | 62,5              |
| phase | 1,968              | 40,5                 | QP               | 56,0              |

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|---|--|--|
| S | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br>HSSSCENIC8501 | Date: Aug. 18,<br>1999<br><br>Page:<br>21/38 |
|---|--|--|

Judgement: Passed by

|         | Frequency<br>[MHz] | Measured<br>[dB(µV)] | Kind of<br>value | Limit<br>[dB(µV)] |
|---------|--------------------|----------------------|------------------|-------------------|
| phase   | 0,162              | 46,9                 | AV               | 55,3              |
| neutral | 0,786              | 37,4                 | AV               | 46,0              |
| phase   | 1,872              | 38,9                 | AV               | 46,0              |
| phase   | 1,968              | 39,4                 | AV               | 46,0              |
| phase   | 2,070              | 38,6                 | AV               | 46,0              |
| phase   | 2,166              | 38,6                 | AV               | 46,0              |

AV: average

QP: quasi peak

Test Personnel:

Tester Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: M. Heuser

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Personal Computer Scenic MT8

FCC Identifier:  
HSSSCENIC8501

Date: Aug. 18,  
1999

Page:  
22/38

## Measurement Protocols: see attached file

**Minebea PSU, model SPW1562-1:**  
100 MHz clock/Intel Pentium III 600 MHz  
video resolution 1024 x 768/100 Hz

**S**

Siemens PC Systeme GmbH & Co. KG  
Personal Computer Scenic MT8

FCC Identifier:  
**HSSSCENIC8501**

Date: Aug. 18,  
1999

Page:  
**23/38**

## 5.3 Referenced Rules Sections

N/A

## 5.4 Test Instrumentation Used, Conducted Measurement

| Type             | Manufacturer/<br>Model No. | Serial No. | Last Cal. | Cal. Interval |
|------------------|----------------------------|------------|-----------|---------------|
| Receiver         | ESHS10<br>Rohde&Schwarz    | 842884/011 | May 99    | 12 months     |
| LISN             | ESH2-Z5<br>Rohde&Schwarz   | 871884/004 | May 99    | 12 months     |
| LISN             | ESH3-Z5<br>Rohde&Schwarz   | 883650/027 | May 99    | 12 months     |
| Pulse<br>limiter | ESH3-Z2<br>Rohde&Schwarz   | ---        | May 99    | 12 months     |

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|----------|---|--|
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|----------|---|--|

# 6 RADIATED EMISSION DATA

## 6.1 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 5000 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 5000 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.

|          |   |   |
|----------|---|---|
| <b>S</b> | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSCENIC8501</b></p> | <p>Date: <b>Aug. 18, 1999</b></p> <p>Page:<br/><b>25/38</b></p> |
|----------|---|---|

## 6.2 Measured Data

The EUT was measured with the Processor Pentium III 600 MHz in video mode 1024 x 768. The test results below reflect the worst case with:

**Minebea PSU, model SPW1562-1:**  
100 MHz clock/Intel Pentium III 600 MHz,  
video resolution 1024 x 768/100 Hz

### Part 1: frequency range 30 MHz - 1000 MHz:

Judgement: Passed by

| Frequency<br>[MHz] | Level*<br>[dB( $\mu$ V/m)] | 10 Meter<br>Limit<br>[dB( $\mu$ V/m)] | Exceeding<br>[dB] | Ant<br>Pol | Height<br>in [m] | Angle<br>in deg |
|--------------------|----------------------------|---------------------------------------|-------------------|------------|------------------|-----------------|
| 89.277778          | 14.00                      | 30.000                                | -16.0             | ver        | 1.0000           | 0.000           |
| 145.322222         | 21.80                      | 30.000                                | -8.2              | ver        | 1.0000           | 239.000         |
| 157.177778         | 21.50                      | 30.000                                | -8.5              | ver        | 1.0000           | 210.000         |
| 161.488889         | 22.00                      | 30.000                                | -8.0              | ver        | 1.0000           | 210.000         |
| 596.911111         | 27.50                      | 37.000                                | -9.5              | ver        | 4.0000           | 90.000          |
| 900.844444         | 31.00                      | 37.000                                | -6.0              | hor        | 4.0000           | 29.000          |

all levels are quasi-peak levels

### Part 2: frequency range 1 GHz - 5 GHz:

Judgement: Passed by

| Frequency<br>[MHz] | Level*<br>[dB( $\mu$ V/m)] | Limit<br>[dB( $\mu$ V/m)] | Margin<br>[dB] | Exceed<br>Mark | Height<br>[cm] | Azimuth<br>[deg] | Ant<br>Pol |
|--------------------|----------------------------|---------------------------|----------------|----------------|----------------|------------------|------------|
| 1100.20000         | 36.90                      | 53.9                      | 17.0           |                | 180.0          | 0.00             | hor        |
| 1795.90000         | 30.20                      | 53.9                      | 23.7           |                | 100.0          | 29.00            | hor        |

|   |  |  |
|---|--|--|
| S | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br>HSSSCENIC8501 | Date: Aug. 18,<br>1999<br><br>Page:<br>26/38 |
|---|--|--|

| Frequency<br>[MHz] | Level*<br>[dB(µV/m)] | Limit<br>[dB(µV/m)] | Margin<br>[dB] | Exceed<br>Mark | Height<br>[cm] | Azimuth<br>[deg] | Ant<br>Pol |
|--------------------|----------------------|---------------------|----------------|----------------|----------------|------------------|------------|
| 2401.00000         | 30.80                | 53.9                | 23.1           |                | 100.0          | 0.00             | hor        |
| 3001.30000         | 32.40                | 53.9                | 21.5           |                | 100.0          | 150.00           | hor        |
| 4183.30000         | 33.90                | 53.9                | 20.0           |                | 100.0          | 330.00           | ver        |
| 4194.70000         | 36.20                | 53.9                | 17.7           |                | 100.0          | 330.00           | 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.

Test Personnel:

Tester Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: M. Heuser

Test Personnel:

Tester Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: M. Bosse

**S**

Siemens PC Systeme GmbH & Co. KG  
Personal Computer Scenic MT8

FCC Identifier:  
HSSCENIC8501

Date: Aug. 18,  
1999

Page:  
27/38

# Measurement Protocols: see attached files

**Minebea PSU, model SPW1562-1:**

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Intel Pentium III 600 MHz

video resolution 1024 x 768/100 Hz

Frequency range 1 GHz - 5 GHz:

100 MHz clock/Intel Pentium III 600 MHz

video resolution 1024 x 768/100 Hz

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|---|--|--|
| S | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSSCENIC8501</b></p> | <p>Date: Aug. 18,<br/>1999</p> <p>Page:<br/><b>28/38</b></p> |
|---|--|--|

## 6.3 Referenced Rules Sections

N/A

## 6.4 Test Instrumentation Used, Radiated Measurement

| Type                        | Manufacturer/<br>Model No.   | Serial No. | Last Cal. | Cal. Interval |
|-----------------------------|------------------------------|------------|-----------|---------------|
| Receiver                    | ESMI<br>Rohde&Schwarz        | 840607/006 | May 99    | 15 months     |
| Antenna                     | CBL 6111<br>Chase            | 1345       | May 99    | 12 months     |
| Antenna                     | CBL 6112<br>Chase            | 2041       | May 98    | 15 months     |
| Active<br>Ridged<br>antenna | Tensor 4105<br>Rohde&Schwarz | 2063       | May 98    | 15 months     |

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|----------|---|---|
| <b>S</b> | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: Aug. 18,<br>1999<br><br>Page:<br><b>29/38</b> |
|----------|---|---|

## 6.5 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 =

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

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

|          |  |                        |
|----------|--|------------------------|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSCENIC8501</b> | Date: Aug. 18,<br>1999 |
|          |  | Page:<br><b>30/38</b>  |

## 6.6 Table of Correction Factors

Frequency range: 30 MHz to 1000 MHz

| Frequency<br>[MHz] | Correction<br>Bilog<br>Antenna<br>[dB] | Correction<br>Cable<br>[dB] | Correction<br>Antenna +<br>Cable<br>[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                                    |

|          |   |   |
|----------|---|---|
| <b>S</b> | Siemens PC Systeme GmbH & Co. KG<br>Personal Computer Scenic MT8<br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: Aug. 18,<br>1999<br><br>Page:<br><b>31/38</b> |
|----------|---|---|

| Frequency<br>[MHz] | Correction<br>Bilog<br>Antenna<br>[dB] | Correction<br>Cable<br>[dB] | Correction<br>Antenna +<br>Cable<br>[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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|----------|---|--|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG</b><br><b>Personal Computer Scenic MT8</b><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | <b>Date: Aug. 18,<br/>1999</b><br><br><b>Page:<br/>32/38</b> |
|----------|---|--|

Frequency range: 1 GHz to 5 GHz

| Frequency<br>[GHz] | Correction<br>Tensor<br>Antenna<br>with Pre-<br>amplifier<br>[dB] | Correction<br>Cable<br>[dB] | Correction<br>Antenna +<br>Cable<br>[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                                    |
| 3,1                | 9,20  | 2,37                        | 11,57                                    |
| 3,2                | 8,60  | 2,40                        | 11,00                                    |

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|----------|---|--|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | <b>Date: Aug. 18,<br/>1999</b><br><br><b>Page:<br/>33/38</b> |
|----------|---|--|

| Frequency<br>[GHz] | Correction<br>Tensor<br>Antenna<br>with Pre-<br>amplifier<br>[dB] | Correction<br>Cable<br>[dB] | Correction<br>Antenna +<br>Cable<br>[dB] |
|--------------------|---|-----------------------------|--|
| 3,3                | 8,70  | 2,42                        | 11,12                                    |
| 3,4                | 9,70  | 2,43                        | 12,13                                    |
| 3,5                | 9,70  | 2,46                        | 12,16                                    |
| 3,6                | 10,40   | 2,43                        | 12,83                                    |
| 3,7                | 10,80   | 2,45                        | 13,25                                    |
| 3,8                | 11,50   | 2,47                        | 13,97                                    |
| 3,9                | 11,90   | 2,49                        | 14,39                                    |
| 4,0                | 10,90   | 2,46                        | 13,36                                    |
| 4,1                | 10,10   | 2,48                        | 12,58                                    |
| 4,2                | 8,80  | 2,49                        | 11,29                                    |
| 4,3                | 8,70  | 2,51                        | 11,21                                    |
| 4,4                | 8,50  | 2,53                        | 11,03                                    |
| 4,5                | 8,70  | 2,54                        | 11,24                                    |
| 4,6                | 9,50  | 2,57                        | 12,07                                    |
| 4,7                | 10,10   | 2,57                        | 12,67                                    |
| 4,8                | 11,10   | 2,59                        | 13,69                                    |
| 4,9                | 11,50   | 2,60                        | 14,10                                    |
| 5,0                | 11,60   | 2,62                        | 14,22                                    |

|          |   |  |
|----------|---|--|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG</b><br><b>Personal Computer Scenic MT8</b><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | <b>Date: Aug. 18,<br/>1999</b><br><br><b>Page:<br/>34/38</b> |
|----------|---|--|

## 7 Conducted And Radiated Emission Measurement Photos: see attached files

7.1 Test setup, conducted emission, front side view

7.2 Test setup, conducted emission, rear side view

7.3 Test setup, radiated emission, front side view

7.4 Test setup, radiated emission, rear side view

**S**

Siemens PC Systeme GmbH & Co. KG  
Personal Computer Scenic MT8

FCC Identifier:  
**HSSSCENIC8501**

Date: Aug. 18,  
1999

Page:  
**35/38**

## 8 External Photos of EUT

see original grant, date: Mar. 10, 1999

|   |  |   |
|---|--|---|
| S | <p>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</p> <p>FCC Identifier:<br/><b>HSSSCENIC8501</b></p> | <p>Date: <b>Aug. 18, 1999</b></p> <p>Page:<br/><b>36/38</b></p> |
|---|--|---|

## 9 Internal Photos of EUT: see attached files

- 9.1 Power supply Minebea (SPW1562-1), closed case, top side view
- 9.2 Power supply Minebea (SPW1562-1), opened case, inside view
- 9.3 Power supply Minebea (SPW1562-1), rear side view

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|----------|---|--------------------------------|
| <b>S</b> | <b>Siemens PC Systeme GmbH &amp; Co. KG<br/>Personal Computer Scenic MT8</b><br><br>FCC Identifier:<br><b>HSSSCENIC8501</b> | Date: <b>Aug. 18,<br/>1999</b> |
|          |   | Page:<br><b>37/38</b>          |

# 10 User Manual

see original grant, date: Mar. 10, 1999

**S**

Siemens PC Systeme GmbH & Co. KG  
Personal Computer Scenic MT8

FCC Identifier:  
**HSSSCENIC8501**

Date: **Aug. 18,**  
**1999**

Page:  
**38/38**