# MEASUREMENT / TECHNICAL REPORT

## SIEMENS AG

## Model: Personal Computer Scenic DT6

## FCC ID: HSSSCENIC6501

## Feb. 10, 1999

| | | |
|---|---|---|
| This report concerns: | Original grant | ☐ Class II change |
| Equipment type: | Personal Computer | |

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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Applicant for this device:

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# Table of Contents

# 1 GENERAL INFORMATION

## 1.1 Product Description

The Siemens Computer Scenic DT6 is a compact desktop personal computer. The system board integrates the Pentium Processor, memory, and I/O-techno-logies. The main system unit is assembled with the Processor Intel Pentium II.

*Description of the power supplies:*

- Power supplies:

| | |
|---|---|
| ASTEC, model | AA20650<br>S26113-E425-V30 |
| Minebea, model | SPW1553<br>S26113-E425-V20 |

*Features Overview:*

CPU – Intel Pentium II
- 100 MHz Slot 1 specification
- Onboard voltage regulator VRM 8.2

Chip Set – Intel 440BX/ZX and PIIX4E
- 2 IDE ports for up to 4 IDE devices
  support enhanced bus master ATA33 IDE with WIN98™ and NT™
- 2 USB ports with 12 Mbits/s

Super I/O – SMCS FDC37M807
- One internal connector for external serial (COM2) port via wire
- One internal floppy port for one floppy and one floppy tape drive
  support up to 2,88 Mbyte floppy

- 2 external PS2 ports for keyboard and mouse
  support connector exchange
- 1 external parallel port
- 1 external serial (COM1) port

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

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 AG, Bürgermeister-Ulrich-Str. 100, 86199 Augsburg.

## 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<br>Scenic 650 (DT6) | HSSSCENIC6501 | PC<br>**EUT** | unshielded power cord [292] |
| 2a | Siemens<br>MCM 2110 NTD<br>S26361-K500-V150 | M9U9705C97BMD | Monitor | unshielded power cord [175]<br>shielded video cable [168] |
| 2b | Siemens<br>MCM 1707 NTD | A3LCS762 | Monitor | unshielded power cord [175]<br>shielded video cable [168] |
| 2c | Siemens<br>MCM 1705 NTD | A3LCGH760 | Monitor | unshielded power cord [175]<br>shielded video cable [168] |
| 3 | Siemens<br>S26381-K210 | HSS01TASTK210 | Keyboard | shielded keyboard cable [143] |

| Pos | Model Number (Serial Number) | FCC ID | Description | Cable Description (length in [cm]) |
|---|---|---|---|---|
| 4 | Microsoft<br>MS 2.1A | C3KKMP3 | Mouse | shielded mouse cable [183] |
| 5 | Microsoft<br>Intelli mouse 1.1A | DOC:<br>PN X03-29688 | USB mouse | shielded mouse cable [197] |
| 6 | Hewlett Packard<br>HP 2225C+<br>(3019S70991) | 894C2655X | Printer, parallel I/F | unshielded AC cable [180], shielded centronics cable [190] |
| 7 | Hewlett Packard<br>HP 2225D+<br>(2952S61299) | DSI6XU2225 | Printer, serial I/F | unshielded power cord [185], shielded serial cable [190] |
| 8 | Siemens | N/A | USB cable | shielded cable, terminated [192] |
| | | | | |
| | **Pos 1 contains:** | | | |
| $a_1$ | ASTEC (UK),<br>AA20650<br>SNI:<br>S26113-E425-V30 | N/A | Power supply | |
| $a_2$ | Minebea<br>SPW1553<br>SNI:<br>S26113-E425-V20 | N/A | Power supply | |

| Pos | Model Number (Serial Number) | FCC ID | Description | Cable Description (length in [cm]) |
|---|---|---|---|---|
| b | Siemens S26361-D1106-A11 WGS 2 | N/A | System board | |
| c | Hyundai HYM7V75A400 PC100-322-620 | N/A | SDRAM | |
| d | Intel Pentium II 80525/PY500512 | N/A | Processor module | |
| e | Matrox G100 AGP | DOC: G100A/4/OEM | Graphic controller board | |
| f | S26361-D960-V1 | N/A | Cheap card reader | |
| g | Fujitsu MPC3064AT | N/A | Hard disk drive | |
| h | Toshiba XM-6302B S26361-H402-V500 | CJ6AT98-032 | CD-ROM drive | |
| i | SONY MPF920-C | N/A | Floppy disk drive | |

Remark: position 2a / 2b / 2c / $1a_1$ / $1a_2$ 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 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

# 2 PRODUCT LABELING

## 2.1 FCC ID Label

FCC ID: HSSSCENIC6501

This device complies with part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing-Equipment Regulations. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 2.2 Location of Label on EUT: see attached files

# 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 II 500 MHz

The system is provided with two kinds of power supplies:

– ASTEC, AA20650 SNI: S26113-E425-V30

– Minebea, SPW1553 SNI: S26113-E425-V20

Each power supply has been measured with each video resolution (worst case).
**Referring to radiated emission the following (worst case) results are applicable:**
**ASTEC PSU:**
Frequency range 30 MHz - 1 GHz:
100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz
100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:
100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz

**Minebea PSU:**
Frequency range 30 MHz - 1 GHz:
100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz
100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:
100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

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

**ASTEC PSU:**
100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz
monitor power via system unit
100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz
monitor power via system unit

**Minebea PSU:**
100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz
monitor power via system unit
100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz
monitor power via system unit

# 3.2 Video mode Justification

The system was tested in video graphic modes 1024 x 768 and 1600 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 21" monitor provided with a cable without any ferrite in a video resolution which is usual for standard monitors (1600 x 1200). 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 are applicable:

**radiated emission:**

**ASTEC PSU:**

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz

100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:

100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz

**Minebea PSU:**

Frequency range 30 MHz - 1 GHz:

100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz

100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:

100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz

**conducted emission:**

**ASTEC PSU:**

100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz monitor power via system unit

100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz monitor power via system unit

**Minebea PSU:**

100 MHz clock/Pentium II 500 MHz, video resolution 1024 x 768/100 Hz monitor power via system unit

100 MHz clock/Pentium II 500 MHz, video resolution 1600 x 1200/70 Hz monitor power via system unit

## 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.

## 3.5 Equipment Modifications

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

**no modifications**

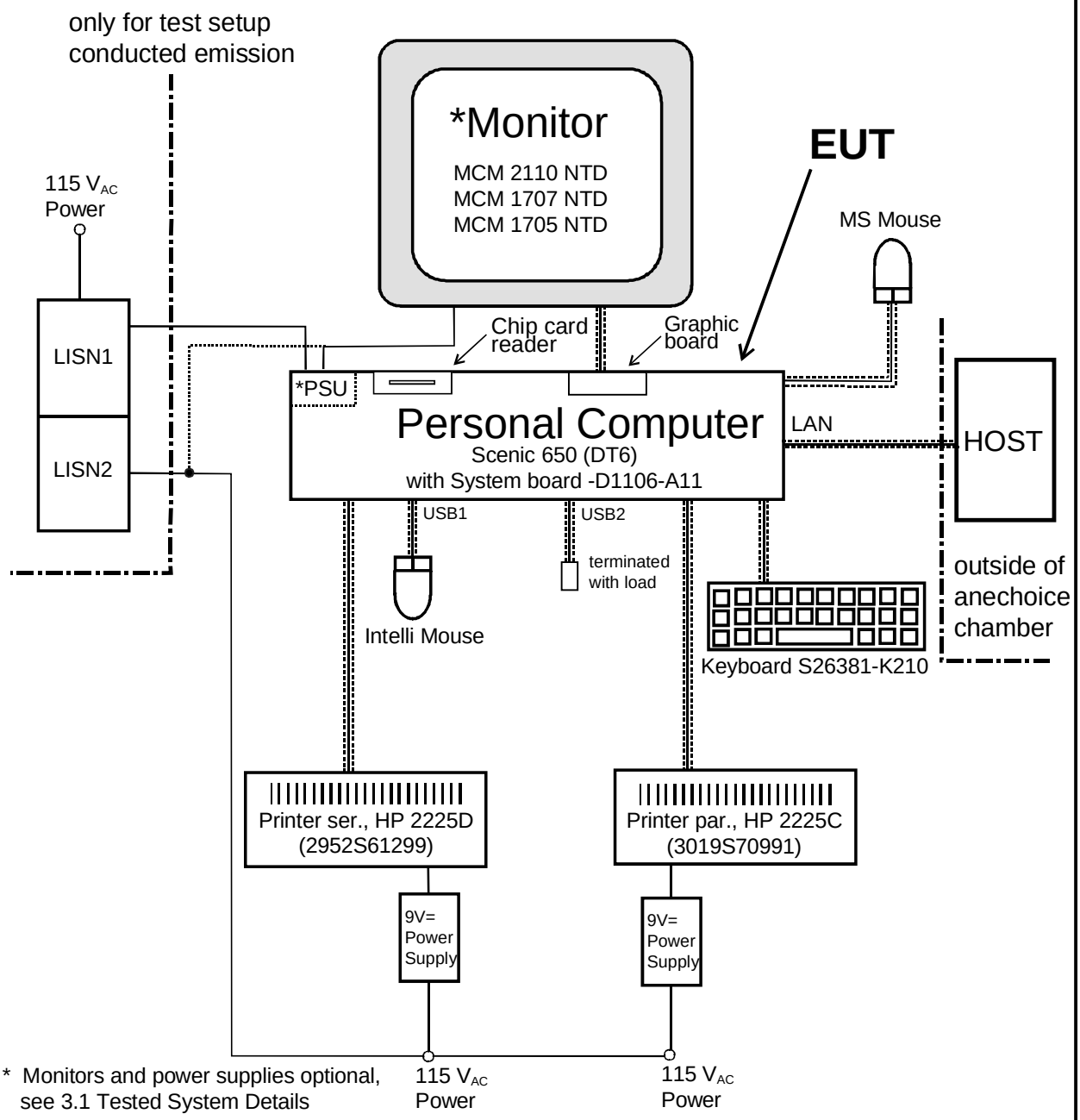
Applicant Signature _____ Date _____

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.

# Figure 3.1 Configuration of Tested System



# 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, 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..

# 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

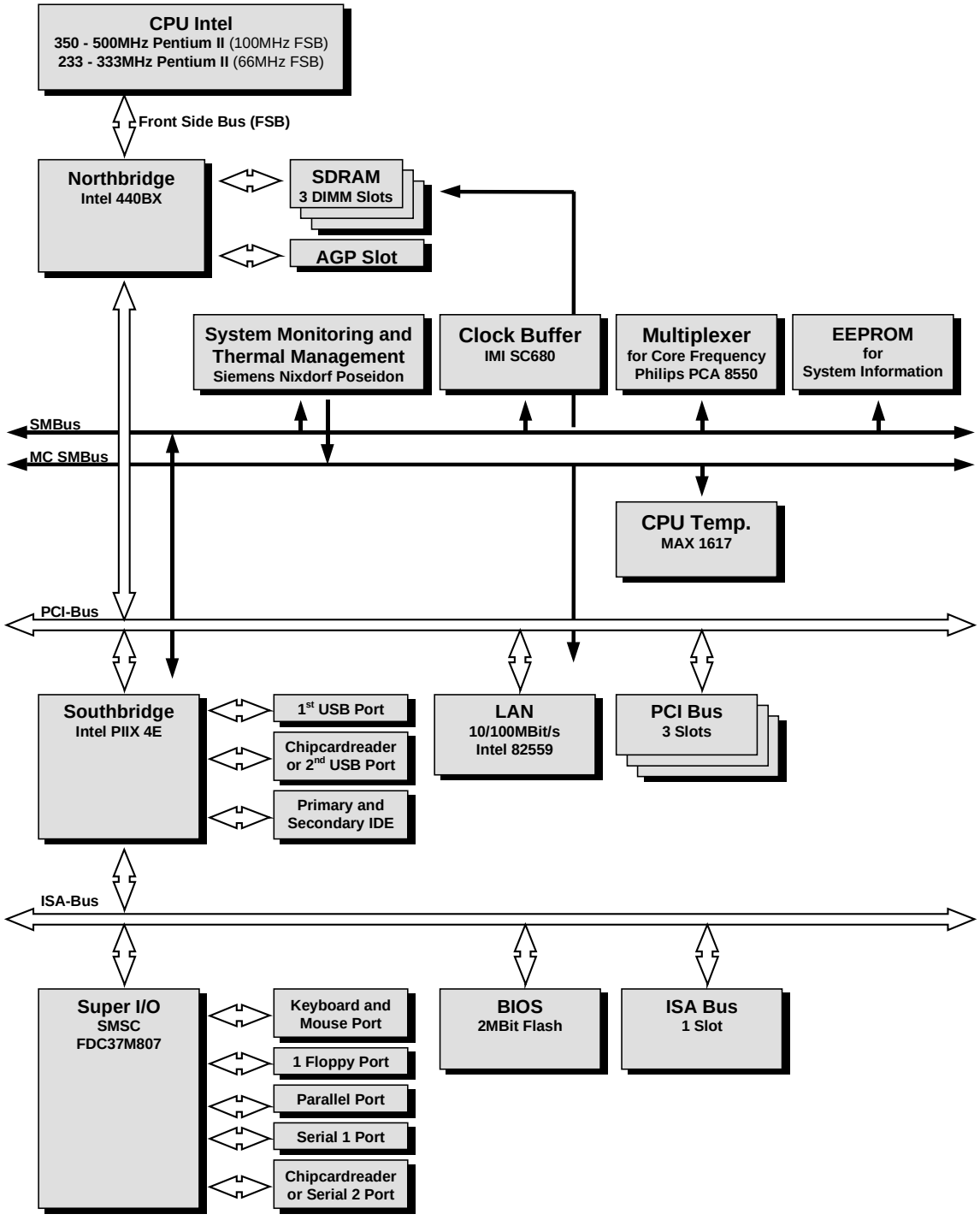
The compact desktop PC works exactly as a traditional PC.

The processors run internally between 233 and 500 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 or 5,5 (only with 66,6 MHz clock).

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 |

# Figure 4.1 Block Diagram of the EUT



# 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 either powered via the system unit or separately.

The worst case results of the corresponding configuration (video resolution, supply modus: monitor via system unit or external) is given next:

**ASTEC PSU**
a) video resolution 1024 x 768/100 Hz, monitor power via system unit
b) video resolution 1600 x 1200/70 Hz, monitor power via system unit

Judgement: Passed by

| | Frequency [MHz] | Measured [dB(µV)] | Kind of value | Limit [dB(µV)] | Configuration |
|---|---|---|---|---|---|
| neutral | 0,240 | 46,30 | QP | 62,0 | a |

Judgement: Passed by

| | Frequency [MHz] | Measured [dB(µV)] | Kind of value | Limit [dB(µV)] | Configuration |
|---|---|---|---|---|---|
| phase | 0,306 | 49,30 | QP | 60,0 | a |
| phase | 0,180 | 43,70 | AV | 54,4 | a |
| phase | 0,186 | 41,60 | AV | 54,2 | a |
| phase | 0,246 | 41,50 | AV | 51,8 | a |
| phase | 0,306 | 45,90 | AV | 50,0 | a |
| phase | 0,486 | 33,60 | AV | 46,2 | a |
| neutral | 0,186 | 48,20 | QP | 64,2 | b |
| neutral | 0,240 | 46,00 | QP | 62,0 | b |
| neutral | 0,306 | 49,50 | QP | 60,0 | b |
| neutral | 0,180 | 44,00 | AV | 54,4 | b |
| phase | 0,246 | 41,60 | AV | 51,8 | b |
| neutral | 0,306 | 46,00 | AV | 50,0 | b |
| neutral | 0,486 | 33,50 | AV | 46,2 | b |

AV: average
QP: quasi peak

**Minebea PSU**
a) video resolution 1024 x 768/100 Hz, monitor power via system unit
b) video resolution 1600 x 1200/70 Hz, monitor power via system unit

Judgement: Passed by

| | Frequency [MHz] | Measured [dB(µV)] | Kind of value | Limit [dB(µV)] | Configuration |
|---|---|---|---|---|---|
| phase | 0,204 | 48,00 | QP | 63,4 | a |

| | Frequency [MHz] | Measured [dB(µV)] | Kind of value | Limit [dB(µV)] | Configuration |
|---|---|---|---|---|---|
| neutral | 0,612 | 39,40 | QP | 56,0 | a |
| phase | 4,980 | 39,40 | QP | 56,0 | a |
| phase | 4,572 | 36,30 | AV | 46,0 | a |
| phase | 4,674 | 36,90 | AV | 46,0 | a |
| phase | 4,776 | 37,40 | AV | 46,0 | a |
| phase | 4,878 | 37,60 | AV | 46,0 | a |
| phase | 4,980 | 37,70 | AV | 46,0 | a |
| phase | 0,216 | 46,10 | QP | 62,9 | b |
| phase | 0,306 | 41,40 | QP | 60,0 | b |
| phase | 0,606 | 39,60 | QP | 56,0 | b |
| phase | 4,572 | 37,80 | QP | 56,0 | b |
| phase | 4,674 | 38,00 | QP | 56,0 | b |
| phase | 4,776 | 38,70 | QP | 56,0 | b |
| neutral | 4,872 | 37,50 | QP | 56,0 | b |
| phase | 4,980 | 39,40 | QP | 56,0 | b |
| neutral | 5,184 | 40,10 | QP | 60,0 | b |
| neutral | 5,286 | 39,90 | QP | 60,0 | b |
| phase | 0,216 | 42,20 | AV | 52,9 | b |
| neutral | 0,612 | 35,50 | AV | 46,0 | b |
| phase | 4,572 | 36,80 | AV | 46,0 | b |

| | Frequency [MHz] | Measured [dB(µV)] | Kind of value | Limit [dB(µV)] | Configuration |
|---|---|---|---|---|---|
| phase | 4,674 | 37,10 | AV | 46,0 | b |
| neutral | 4,776 | 37,60 | AV | 46,0 | b |
| phase | 4,878 | 37,90 | AV | 46,0 | b |
| phase | 4,980 | 38,30 | AV | 46,0 | b |
| neutral | 5,082 | 37,80 | AV | 50,0 | b |
| phase | 5,184 | 38,10 | AV | 50,0 | b |
| phase | 5,280 | 38,20 | AV | 50,0 | b |

AV: average
QP: quasi peak

Test Personnel:

Tester Signature: _____ Date: _____

Printed Name: H. Zenkner

# Measurement Protocols: see attached file

**ASTEC PSU:**
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1024 x 768/100 Hz

100 MHz clock/Intel Pentium II 500 MHz
video resolution 1600 x 1200/70 Hz

**Minebea PSU:**
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1024 x 768/100 Hz

100 MHz clock/Intel Pentium II 500 MHz
video resolution 1600 x 1200/70 Hz

## 5.3 Referenced Rules Sections

N/A

## 5.4 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 | 8126160 | May 98 | 12 months |
| LISN | ESHS-Z5 Rohde&Schwarz | 871884/004 | May 98 | 12 months |
| Pulse limiter | ESH3-Z2 Rohde&Schwarz | 357.8810.52 | May 98 | 12 months |

# 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.

For further data see the test results in attachment 3.

# 6.2 Measured Data

The EUT was measured with the Processor Pentium II 500 MHz in video modes 1024 x 768 and 1600 x 1200. The test results below reflect the worst case with:

**ASTEC PSU:**
a) 100 MHz clock/Intel Pentium II 500 MHz,
video resolution 1024 x 768/100 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 |
|---|---|---|---|---|---|---|
| 96.69000 | 24.60 | 30.000 | -5.3 | hor | 3.4000 | 90.000 |
| 100.02000 | 24.80 | 30.000 | -5.1 | ver | 1.0000 | 119.000 |
| 145.02000 | 20.30 | 30.000 | -9.6 | ver | 1.0000 | 150.000 |
| 225.00000 | 22.40 | 30.000 | -7.5 | hor | 4.0000 | 270.000 |
| 516.99000 | 27.60 | 37.000 | -9.4 | ver | 3.4000 | 29.000 |
| 618.84000 | 26.90 | 37.000 | -10.1 | hor | 3.4000 | 29.000 |

all levels are quasi-peak levels

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

Judgement: Passed by

| Frequency [MHz] | Level* [dB(µV/m)] | Limit [dB(µV/m)] | Margin [dB] | Exceed Mark | Height [cm] | Azimuth [deg] | Ant Pol |
|---|---|---|---|---|---|---|---|
| 1339.00000 | 21.80 | 54.0 | 32.0 | | 140.0 | 59.00 | hor |
| 1489.60000 | 30.30 | 54.0 | 23.5 | | 100.0 | 330.00 | hor |
| 2305.90000 | 36.30 | 54.0 | 17.5 | | 100.0 | 29.00 | ver |

| Frequency [MHz] | Level* [dB(µV/m)] | Limit [dB(µV/m)] | Margin [dB] | Exceed Mark | Height [cm] | Azimuth [deg] | Ant Pol |
|---|---|---|---|---|---|---|---|
| 2334.10000 | 39.00 | 54.0 | 14.4 | | 100.0 | 29.00 | ver |
| 2362.00000 | 40.70 | 54.0 | 13.1 | | 140.0 | 29.00 | ver |
| 2390.50000 | 38.90 | 54.0 | 14.9 | | 140.0 | 29.00 | ver |
| 2446.60000 | 39.90 | 54.0 | 13.9 | | 140.0 | 29.00 | 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.

b) 100 MHz clock/Intel Pentium II 500 MHz,
video resolution 1600 x 1200/70 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 |
|---|---|---|---|---|---|---|
| 31.14000 | 16.60 | 30.000 | -13.3 | ver | 4.0000 | 180.000 |
| 96.66000 | 23.60 | 30.000 | -6.3 | hor | 2.8000 | 59.000 |
| 99.99000 | 26.50 | 30.000 | -3.4 | ver | 1.6000 | 59.000 |
| 132.93000 | 22.50 | 30.000 | -7.4 | hor | 3.4000 | 29.000 |
| 225.00000 | 21.80 | 30.000 | -8.1 | hor | 3.4000 | 29.000 |
| 988.98000 | 28.80 | 37.000 | -8.1 | hor | 1.6000 | 300.000 |

all levels are quasi-peak levels

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

**Minebea PSU:**
a) 100 MHz clock/Intel Pentium II 500 MHz,
video resolution 1024 x 768/100 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 |
|---|---|---|---|---|---|---|
| 77.97000 | 25.50 | 30.000 | -4.4 | ver | 1.0000 | 210.000 |
| 89.13000 | 22.50 | 30.000 | -7.5 | ver | 1.6000 | 180.000 |
| 96.66000 | 25.10 | 30.000 | -4.8 | hor | 4.0000 | 90.000 |
| 100.02000 | 24.40 | 30.000 | -5.5 | ver | 1.6000 | 59.000 |
| 517.41000 | 31.20 | 37.000 | -5.7 | ver | 4.0000 | 29.000 |
| 996.54000 | 29.60 | 37.000 | -7.3 | hor | 4.0000 | 210.000 |

all levels are quasi-peak levels

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

b) 100 MHz clock/Intel Pentium II 500 MHz,
video resolution 1600 x 1200/70 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 |
|---|---|---|---|---|---|---|
| 66.27000 | 21.70 | 30.000 | -8.2 | ver | 4.0000 | 210.000 |
| 96.66000 | 25.40 | 30.000 | -4.5 | hor | 4.0000 | 59.000 |
| 99.99000 | 24.80 | 30.000 | -5.1 | ver | 2.2000 | 119.000 |
| 132.90000 | 22.90 | 30.000 | -7.0 | ver | 1.0000 | 119.000 |
| 517.65000 | 28.90 | 37.000 | -8.0 | hor | 2.2000 | 29.000 |
| 995.88000 | 29.30 | 37.000 | -7.6 | ver | 2.8000 | 150.000 |

all levels are quasi-peak levels

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

Judgement: Passed by

| Frequency [MHz] | Level* [dB(µV/m)] | Limit [dB(µV/m)] | Margin [dB] | Exceed Mark | Height [cm] | Azimuth [deg] | Ant Pol |
|---|---|---|---|---|---|---|---|
| 1489.60000 | 35.39 | 54.0 | 18.3 | | 100.0 | 0.00 | ver |
| 2334.10000 | 36.50 | 54.0 | 17.3 | | 100.0 | 29.00 | ver |
| 2362.30000 | 37.60 | 54.0 | 16.2 | | 100.0 | 0.00 | ver |
| 2390.50000 | 38.10 | 54.0 | 15.7 | | 100.0 | 0.00 | ver |
| 2418.40000 | 35.20 | 54.0 | 18.6 | | 100.0 | 0.00 | ver |
| 2446.60000 | 38.90 | 54.0 | 14.9 | | 140.0 | 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.

Test Personnel:

Tester Signature: _____ Date: _____

Printed Name: A. Siebenhütter

Test Personnel:

Tester Signature: _____ Date: _____

Printed Name: H. Zenkner

# Measurement Protocols: see attached files

**ASTEC PSU:**
Frequency range 30 MHz - 1 GHz:
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1024 x 768/100 Hz

100 MHz clock/Intel Pentium II 500 MHz
video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1024 x 768/100 Hz

**Minebea PSU:**
Frequency range 30 MHz - 1 GHz:
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1024 x 768/100 Hz

100 MHz clock/Intel Pentium II 500 MHz
video resolution 1600 x 1200/70 Hz

Frequency range 1 GHz - 5 GHz:
100 MHz clock/Intel Pentium II 500 MHz
video resolution 1600 x 1200/70 Hz

## 6.3 Referenced Rules Sections

N/A

## 6.4 Test Instrumentation Used, Radiated Measurement

| Type | Manufacturer/ Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|
| Receiver | ESMI Rohde&Schwarz | 840607/006 | May 98 | 15 months |
| Antenna | CBL 6112 Chase | 0003 | May 98 | 12 months |
| Active Ridged antenna | Tensor 4105 Rohde&Schwarz | 2063 | May 98 | 12 months |

# 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 dBµV is obtained. The Antenna Factor of 10,5 and a Cable Factor of 1,3 is added, giving a field strength of 40,3 dBµV/m.

FS = 28,5 + 10,5 + 1.3 = 40,3 dBµV/m

The 40,3 dBµV/m value can be mathematically converted to its corresponding level in µV/m.

Level in µV/m =
Common Antilogarithm [(40,3 dBµV/m)/20] =

**103,5 µV/m**

# 6.6 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 |

Frequency range: 1 GHz to 5 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 |
| 3,1 | 9,20 | 2,37 | 11,57 |
| 3,2 | 8,60 | 2,40 | 11,00 |

| Frequency [GHz] | Correction Tensor Antenna with Pre-amplifier [dB] | Correction Cable [dB] | Correction Antenna + Cable [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 |

# 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

# 8 External Photos of EUT: see attached files

8.1 Front side of EUT

8.2 Rear side of EUT

8.3 Opened case, inside view of EUT

# 9 Internal Photos of EUT: see attached files

9.1 Hard disk drive, top side view
9.2 Floppy disk drive, top side view
9.3 CD-ROM drive, top side view
9.4 System board, front side view, part one
9.5 System board, front side view, part two
9.6 System board, rear side view, part one
9.7 System board, rear side view, part two
9.8 Graphic controller board, front side view
9.9 Graphic controller board, rear side view
9.10 SDRAM module, front and rear side view
9.11 Chip card reader, front side view
9.12 Chip card reader, rear side view
9.13 Power supply ASTEC, closed case, top side view
9.14 Power supply ASTEC, opened case, inside view
9.15 Power supply ASTEC, regulator board, rear side view
9.16 Power supply ASTEC, rear side view
9.17 Power supply Minebea, closed case, top side view
9.18 Power supply Minebea, opened case, inside view
9.19 Power supply Minebea, regulator board, rear side view
9.20 Power supply Minebea, rear side view

# 10 User Manual: see attached files

For FCC statement please refer to user manual page 5.