FUJITSU COMPUTERS SIEMENS

Deutscher Akkreditierungs Rat
DAR
Reg. No.: DAT-P-155/94-02

Center for Tests and Compliance

EMC Test Report

Product Type:	**System board**
Model:	**D2703**
Product Name:	**S26361-D2703**
Manufacturer:	**Fujitsu Siemens Computers**
Applicant:	Fujitsu Siemens Computers GmbH Mr. Mertes Bürgermeister-Ulrich-Strasse 100 86199 Augsburg
Report No.:	CER+1SB07-0014+E01

Applicable Standard	EN 55022: 1998 EN 61000-3-2: 2000+A2: 2005 EN 61000-3-3: 1995 + A1: 2001+A2: 2005 EN 55024: 1998 + A1:2001 + A2:2003	☒ Original report ☐ Add on report	Class B

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Date:	December 17, 2007	

2. Table of contents for EMC Test-Report

EUT: S26361-D2703 (D2703)

3. Summary of standards and results:

The EMI tests required within the scope of CE-mark are listed below. The system was tested

according to requirements demanded by customer	
according to all EMC requirements necessary for CE-mark	X

3.1 Emission

3.1.1 Limits acc. to EN 55022: 1998

	Standard	Test specification	passed	failed	not required by customer
Conducted emission on AC power port	EN 55022: 1998 class B	0.15 MHz...30 MHz	X		
Conducted emission on telecom lines	EN 55022: 1998 class B	0.15 MHz...30 MHz	X		
Radiated emission	EN 55022: 1998 class B	30 MHz... 1 GHz	X		

Remark:

3.1.2 Limits acc. to EN 61000-3-2: 2000+A2: 2005

	Standard	Test specification	passed	failed	not required by customer
Harmonic current emission	EN 61000-3-2: 2000+A2: 2005	0.1 kHz...2 kHz			X

Remark:

3.1.3 Limits acc. to EN 61000-3-3: 1995 + A1: 2001+A2: 2005

	Standard	Test specification	passed	failed	not required by customer
Voltage fluctuations and flicker	EN 61000-3-3: 1995 + A1: 2001+A2: 2005	$P_{st} \leq 1.0$; $P_{et} \leq 0.65$; $d_c \leq 3.3\%$; $d_{max} \leq 4\%$; $d_{(t)} \leq 3.3\%$ (t = 500 ms)			X

Remark:

EUT: S26361-D2703 (D2703)

3.2 Immunity

3.2.1 Limits acc. to EN 55024: 1998 + A1:2001 + A2:2003

	Standard	Test specification	passed	failed	not required by customer
Electrostatic discharge	EN 61000-4-2: 1995	4 / 8 kV	X		
Immunity to radiated field	EN 61000-4-3: 1996	80 - 1000 MHz 3 V/m 80% AM (1 kHz)	X		
Electrical fast transients	EN 61000-4-4: 1995	0.5 / 1 kV	X		
Surge immunity test	EN 61000-4-5: 1995	0.5 / 1 / 2 kV	X		
Immunity to radio frequency common mode	EN 61000-4-6: 1996	0.15 - 80 MHz 3 V 80% AM (1 kHz)	X		
Immunity to power frequency magnetic field	EN 61000-4-8: 1993	50 Hz 1 A/m	X		
Voltage dips, short interruptions and voltage variations	EN 61000-4-11: 1994	> 95% Red. 10 ms 30% Red. 500 ms >95% Red. 5000 ms	X		

Remarks:

Statement: The test results reported herein apply only to the units actually tested, and to substantially identical units.

EUT: S26361-D2703 (D2703)

4. Equipment under test:

4.1 Description of tested system

Receipt date: 31.10.2007

Configuration description
The EUT was measured in a fully configured and functionally complete system with all ports connected to appropriate peripheral devices.

The system received power from a 230 V / 50 Hz source via a 3-wire power cable. A second configuration using an external AC/DC adapter (MPI-815H) have been tested in radiated emission.

Component	Model	Manufacturer	Part No.	Serial no.	Rev.	Remark
System board	S26361-D2703	Fujitsu Siemens Computers	S26361-D2703-S11	25423715	GS51	**EUT**
Base Unit	DSM Panel PC	DSM Computer AG				
CPU	Processor AMD Turion TL66	AMD				
RAM	Memory	Samsung				512MB 1Rx16 PC2-5300U-555-12-C3
HDD	Harddisk	Maxtor				
AC/DC Adapter (optional)	MPI-815H	MAGIC POWER TECHNOLOGY				
HDD	MHV2080BH	Fujitsu				
LCD	GH001A	Green-C&C				

Table 1: Content of EUT

EUT: S26361-D2703 (D2703)

Description	Model	Manufacturer	Serial No.	cable	cable length	Remark
Monitor 35	P19-2	FSC	YENL034111			
DVI cable 15				shielded	180	
Keyboard PS2 26	KBPC SX D	FSC	YKKB070509P89543	shielded	200	
Mouse PS2 15	M-SBF96	Logitech	HCA60100235	shielded	180	
Printer serial 03	2225D	HP	2952S61298			
Serial cable 03				shielded	300	
Mouse USB 08	M-UAE96	Logitech	LZ615BT0C35	shielded	180	
Mouse USB 13	M-UAE96	Logitech	LZ615BT0C1E	shielded	180	
Headset 01	AP-210 pro	Terratec		shielded	240	
Cam USB 04	DC 2120	FSC	0301007372	shielded	205	
Cam USB 06	V-UH9	Logitech	LZA31103787	shielded	180	
HDD FW 22	Storage Bird	FSC	3732650082			
Fire Wire cable [6/6] 03				shielded	150	
LAN cable 32	CAT. 7			shielded	120	
Switch 01 (100/1000)	switch 2724	HP				Outside SAC

Table 2: Support Units: configuration for emission tests

EUT: S26361-D2703 (D2703)

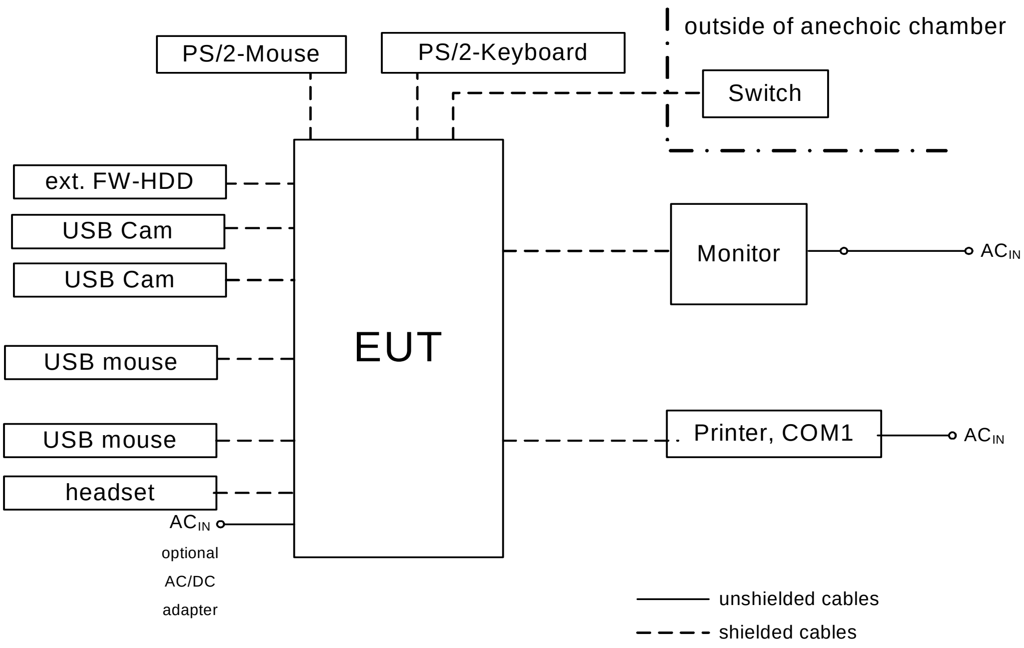
Description	**Model**	**Manufacturer**	**Serial No.**	**cable**	**cable length**	**Remark**
Monitor 34	P19-2	FSC	YENL026856			
DVI cable 15				shielded	180	
Keyboard PS2 16	KBPC SX D	FSC	YBKB060731P53146	shielded	200	
Mouse PS2 10	M-SBF96	Logitech	HCA60100245	shielded	180	
Mouse USB 07	M-UAE96	Logitech	LZ615BT08GP	shielded	180	
Printer serial 05	P170A	Epson	CLCY296653			
Serial cable 07				shielded	300	
Cam USB 02	V-UB2	Logitech	LZA02807120	shielded	170	
Cam USB 08	V-UH9	Logitech	LZA31104236	shielded	180	
HDD FW 08	Storage Bird	FSC	0004382			
Fire Wire cable [6/6] 03				shielded	150	
HDD USB 28	Storage Bird	FSC	0004394			
USB cable A/B 16				shielded	150	
Klinke cable 09				shielded	200	
Klinke cable 10				shielded	180	
LAN cable 32	CAT. 7			shielded	120	
Switch 01 (100/1000)	switch 2724	HP				Outside SAC

Table 3: Support Units: configuration for immunity tests

EUT: S26361-D2703 (D2703)

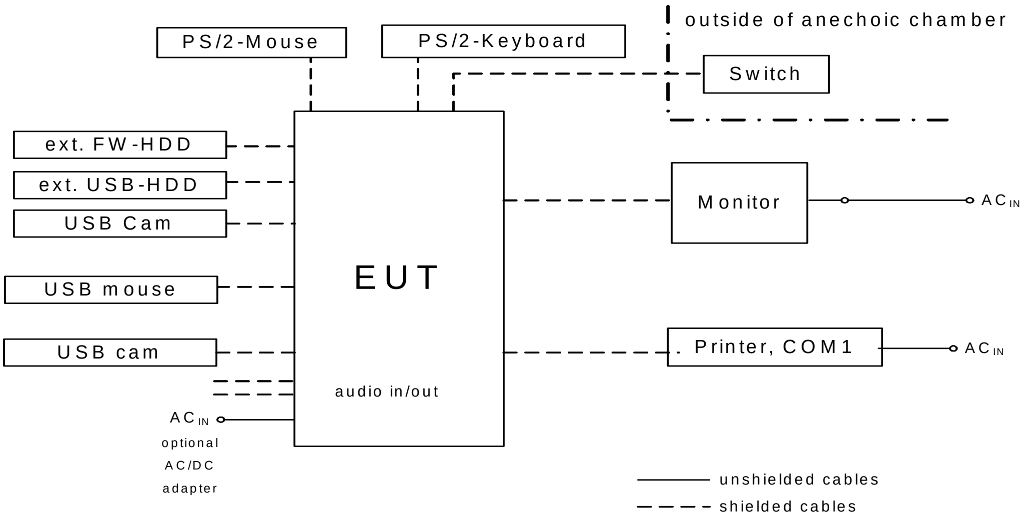
4.2 Block diagram of tested system

4.2.1 Block diagram for emission tests



EUT: S26361-D2703 (D2703)

4.2.2 Block diagram for immunity tests



4.3 Operating condition

The EUT was measured in a fully configured and functionally complete system with all ports connected to appropriate peripheral devices. The system was put on a table with a height of 80 cm above ground and received power from a power source via a 3-wire power cable. The tested video modes - see test results - reflect the most commonly used resolutions.

The EUT exercise program used during radiated and conducted testing is representative for worst case use and able to produce system stress for the highest disturbance.

Operating system:	Windows Vista
IDE and/or SCSI controller (if applicable):	Read/write operation to hard disk read cycles of the CD-ROM drive
Graphic controller:	Scrolling H with the respective resolution
Peripheral devices:	Sending H-pattern
LAN controller	Data transfer to client

EUT: S26361-D2703 (D2703)

5. Results of emission tests:

5.1 Conducted emission

The conducted emission was measured in the frequency range from 0.150 MHz to 30 MHz. The bandwidth of the EMI-Receiver was set to 9 kHz and the detector was set to “peak”. During the final measurement the detector was set to “average” respectively to “CISPR quasi-peak”.

The measurements were done on the phase and neutral line of the EUT`s power cable.

During the final measurement the cables and the equipment were placed and moved within the range of positions likely to find the maximum emission.

All measurements were done inside the shielded rooms.

For further data see enclosed test results.

Table of used instruments

Shielded room SK2 (C-2053; T176):

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	Receiver	Rohde&Schwarz	ESAI	826098/015	May 07
X	LISN	Rohde&Schwarz	ESH3-Z5	100226	May 07
X	Pulse Limiter	Rohde&Schwarz	ESH3-Z2	357.8810.52	May 07
O	ISN	FSC	shielded LAN	---	May 07
O	ISN (4 wire)	Rohde&Schwarz	ENY41	100031	May 07
X	Test-Software	Rohde&Schwarz	ES-K1 Vers. 1.60 SP2	---	---

EUT: S26361-D2703 (D2703)

5.1.1 Test set-up, conducted emission

Figure 1 : Test set up conducted emissions; front view

EUT: S26361-D2703 (D2703)

Figure 2 : Test set up conducted emissions; side view

EUT: S26361-D2703 (D2703)

5.1.2 Measurement results, conducted emission

Operation modus	Video resolution	Power	passed	failed
Monitor power from peripheral device LISN	1280x1024/75Hz	230V/50 Hz	X	
Shielded LAN	1280x1024/75Hz	230V/50 Hz	X	

EUT: S26361-D2703 (D2703)

Conduted noise according to:

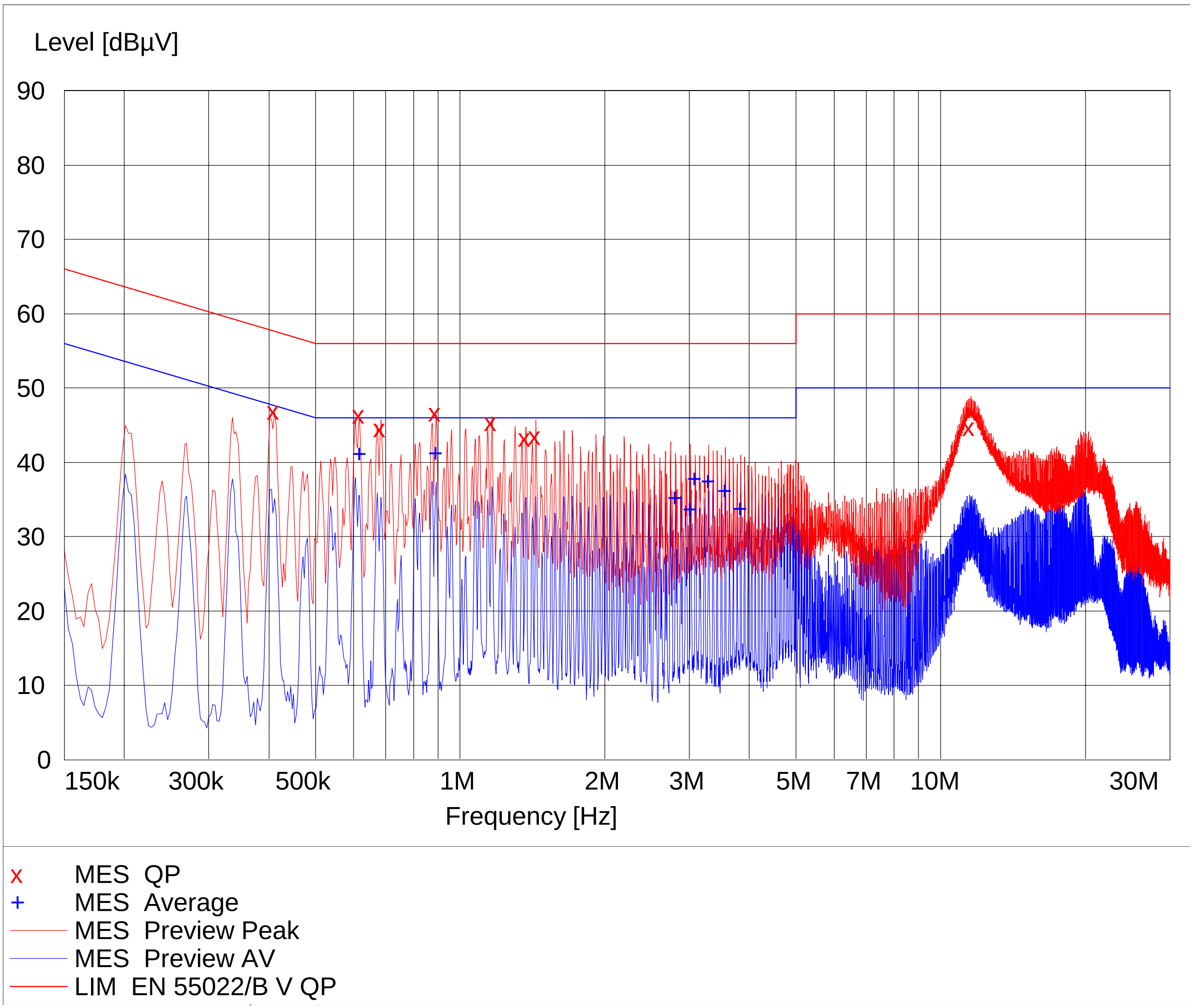
EN 55022 class B

```
EUT:                  D2703 WGS2 (S26361-D2703)
Manufacturer:         Fujitsu Siemens Computers
Operating Condition:  scr."H"; 1280x1024/75Hz; ext.monitor; HD/LAN-test
Test Site:            Fujitsu Siemens Augsburg (shielded room # 2)
Operator:             M.Rothtauscher
Configuration:        full;
Comment:              mains:230V/50Hz
Start of Test:        19.11.2007 / 10:23:31
```

SCAN TABLE: "V_55022_Mains"

Short Description: EN 55022/11 Mains

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	3.0 kHz	MaxPeak Average	10.0 ms	10 kHz	ESH3-Z5



EUT: S26361-D2703 (D2703)

MEASUREMENT RESULT: "QP"

19.11.2007 10:56

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.414000	46.90	10.2	58	10.7	N	GND
0.624000	46.40	10.2	56	9.6	N	GND
0.690000	44.60	10.2	56	11.5	N	GND
0.900000	46.70	10.2	56	9.3	N	GND
1.176000	45.40	10.2	56	10.6	N	GND
1.383000	43.30	10.2	56	12.7	N	GND
1.452000	43.50	10.2	56	12.5	L1	GND
11.619000	44.70	10.7	60	15.3	L1	GND

MEASUREMENT RESULT: "Average"

19.11.2007 10:56

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.624000	41.20	10.2	46	4.9	N	GND
0.900000	41.30	10.2	46	4.7	N	GND
2.835000	35.20	10.3	46	10.8	L1	GND
3.042000	33.70	10.3	46	12.3	L1	GND
3.114000	37.80	10.4	46	8.2	L1	GND
3.321000	37.50	10.4	46	8.5	L1	GND
3.597000	36.20	10.4	46	9.8	L1	GND
3.873000	33.80	10.4	46	12.2	L1	GND

EUT: S26361-D2703 (D2703)

Conducted noise according to:

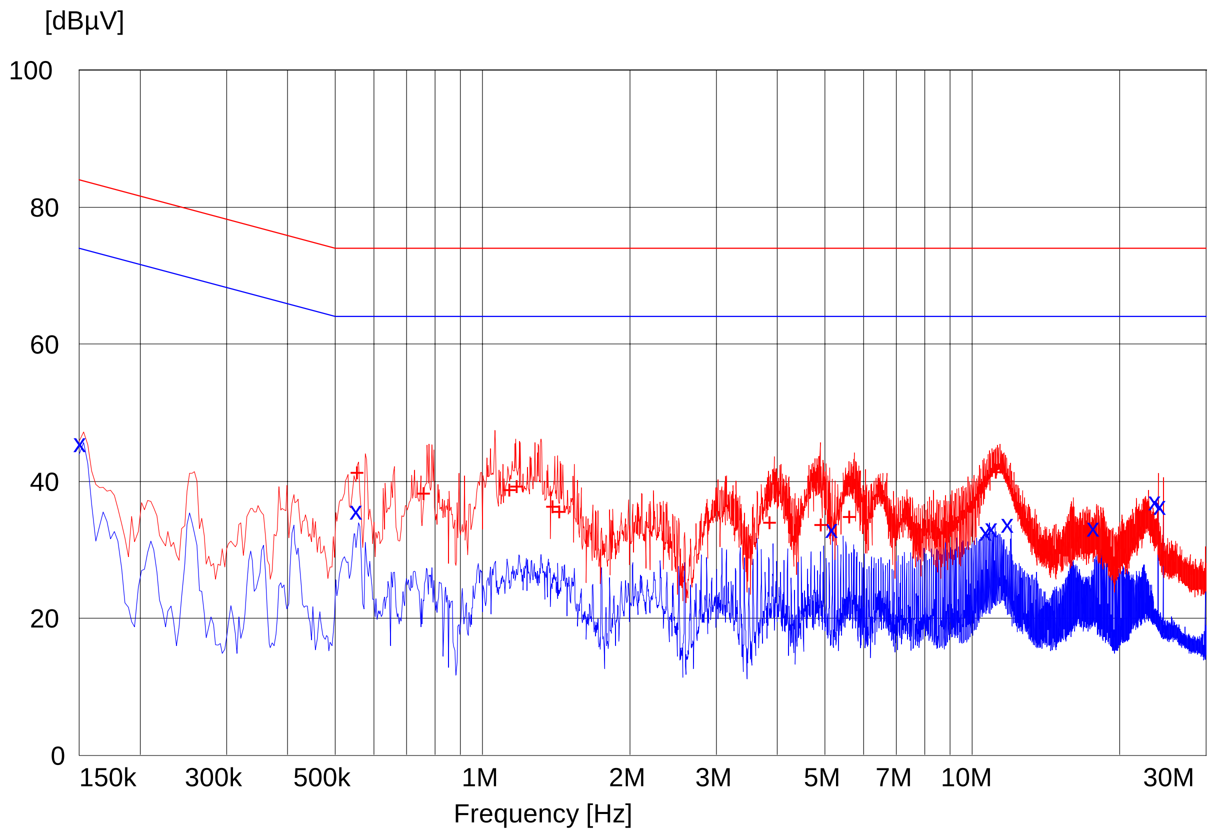
EN 55022 class B on Telecom-Lines

EUT:	D2703 WGS2 (S26361-D2703)
Manufacturer:	Fujitsu Siemens Computers
Operating Condition:	scr."H"; 1280x1024/75Hz; ext.monitor; HD/LAN-test
Test Site:	Fujitsu Siemens Augsburg (shielded room # 2)
Operator:	M.Rothtauscher
Configuration:	full;
Comment:	mains:230V/50Hz
Start of Test:	19.11.2007 / 12:40:39

SCAN TABLE: "V_55022_TK_Shield"

Short Description: EN55022 Telekom shielded

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	3.0 kHz	MaxPeak Average	10.0 ms	10 kHz	ISN shielded LAN



+ MES Quasi Peak Data
x MES Average Data
MES Preview Peak Data
MES Preview AV Data
LIM EN 55022/B dat QP Limit Telekom Line class B

EUT: S26361-D2703 (D2703)

MEASUREMENT RESULT: "Quasi Peak Data"

19.11.2007 12:56

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.561000	41.30	9.7	74	32.7	1	---
0.768000	38.30	9.8	74	35.7	1	---
1.149000	38.80	9.8	74	35.2	1	---
1.188000	39.30	9.8	74	34.8	1	---
1.407000	36.40	9.9	74	37.6	1	---
1.455000	35.60	9.8	74	38.4	1	---
3.903000	34.00	10.0	74	40.0	1	---
4.974000	33.70	10.1	74	40.3	1	---
5.682000	34.90	10.1	74	39.1	1	---
11.328000	41.40	10.3	74	32.6	1	---

MEASUREMENT RESULT: "Average Data"

19.11.2007 12:56

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.153000	45.60	9.7	74	28.2	1	---
0.561000	35.80	9.7	64	28.2	1	---
5.244000	33.10	10.1	64	30.9	1	---
10.842000	32.70	10.4	64	31.3	1	---
11.121000	33.20	10.3	64	30.9	1	---
12.006000	33.90	10.3	64	30.1	1	---
17.940000	33.30	10.6	64	30.7	1	---
24.012000	37.10	10.6	64	26.9	1	---
24.576000	36.50	10.6	64	27.5	1	---

5.2 Radiated emission

The radiated emission was measured 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 the final measurement the detector was set to “CISPR quasi-peak” and values above the acceptance line were measured automatically.

The tests were performed in a distance of 10 meters between antenna and the EUT in an anechoic chamber. During the tests the EUT was turned 360°, the receiving antenna was moved from 1 to 4 meters above the ground plane and the polarisation was changed from horizontal to vertical to find the maximum emission.

After automatic measurements 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. The selected frequency points were those with less then 3 dB margin to the actual limit.

For further data see enclosed test results.

Table of used instruments

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	Antenna Bilog	Schwarzbeck	VULB9163	9163-273	July 07
O	Antenna Bilog	Chase	CBL 6112B	2790	June 07
O	Antenna Loop	Rohde&Schwarz	HFH2-Z2	881057/31	May 07
X	Receiver	Rohde&Schwarz	ESMI	840607/006	May 07
O	Receiver	Rohde&Schwarz	ESAI	826098/015	May 07
O	Receiver	Rohde&Schwarz	FSU46	10014/046	May 07
O	Antenna Array (40 GHz)	Rohde&Schwarz	HL025/3160	---	June 07
O	RF-cable (40 GHz)	Rosenberger	Microcoax	---	May 07
X	Test-Software	Rohde&Schwarz	ES-K1 Vers. 1.71 SP2	---	---

EUT: S26361-D2703 (D2703)

5.2.1 Test set-up, radiated emission

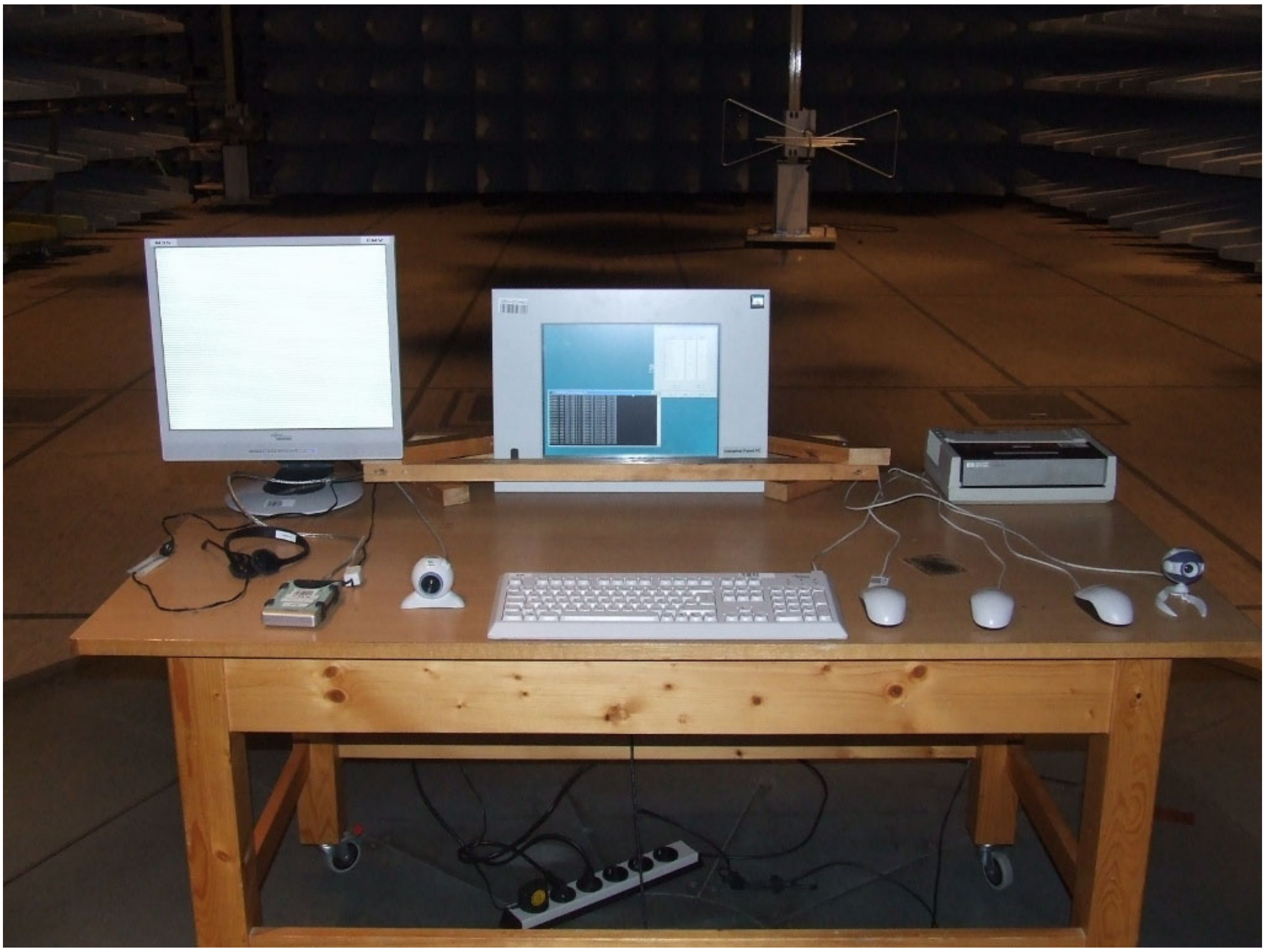


Figure 3 : Test set up radiated emission AC power supply front view

EUT: S26361-D2703 (D2703)

Figure 4 : Test set up radiated emission AC power supply rear view

EUT: S26361-D2703 (D2703)

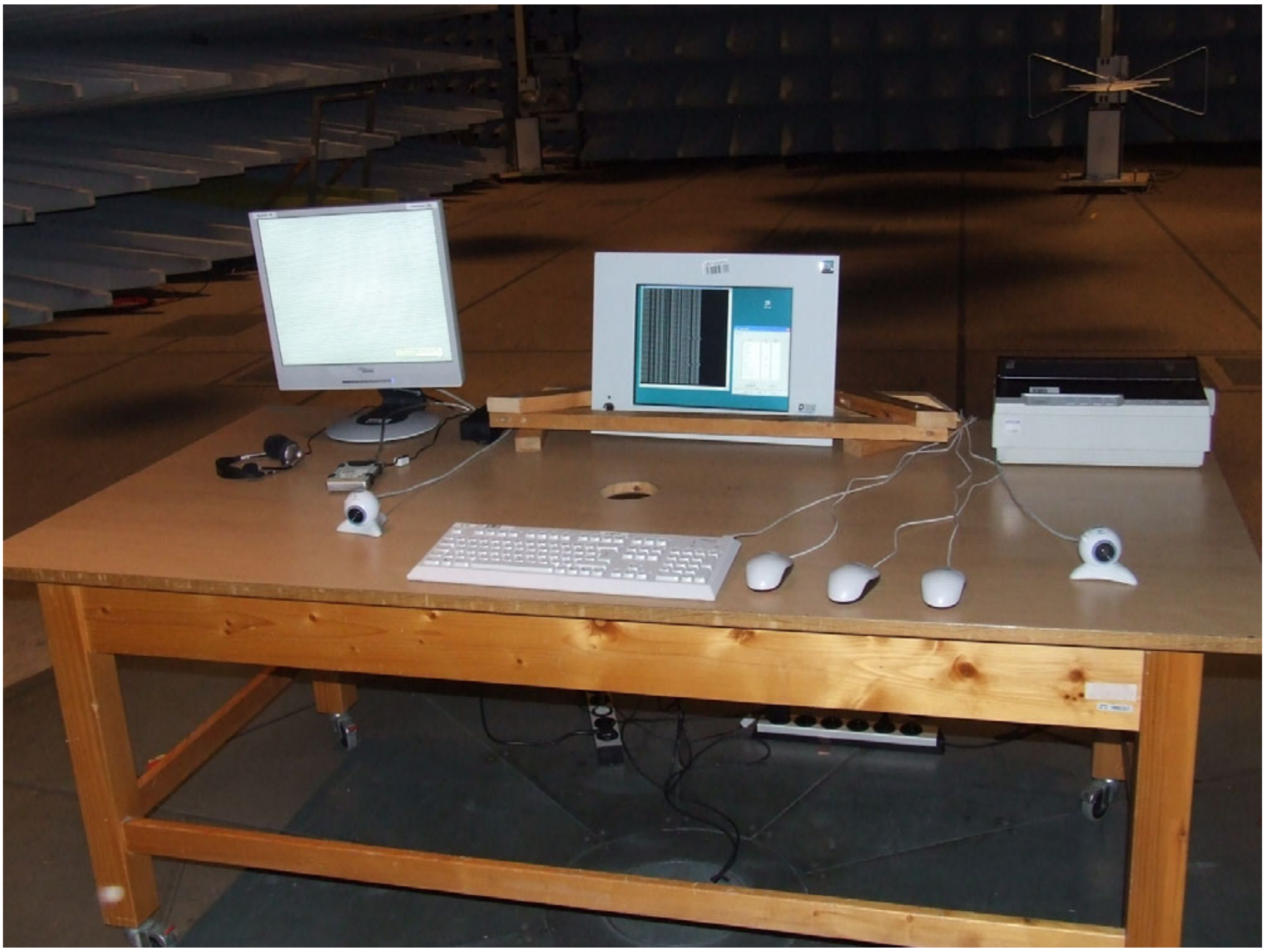


Figure 5 : Test set up radiated emission with AC/DC adapter front view

EUT: S26361-D2703 (D2703)

Figure 6 : Test set up radiated emission with AC/DC adapter rear view

EUT: S26361-D2703 (D2703)

5.2.2 Measurement results, radiated emission

Frequency range	Video resolution	Power	passed	failed
30 MHz – 1000 MHz	1280x1024/75Hz	230V/50 Hz	X	
30 MHz – 1000 MHz	1280x1024/75Hz	24V DC via AC/DC adapter	X	

EUT: S26361-D2703 (D2703)

Radiated Emission according to:

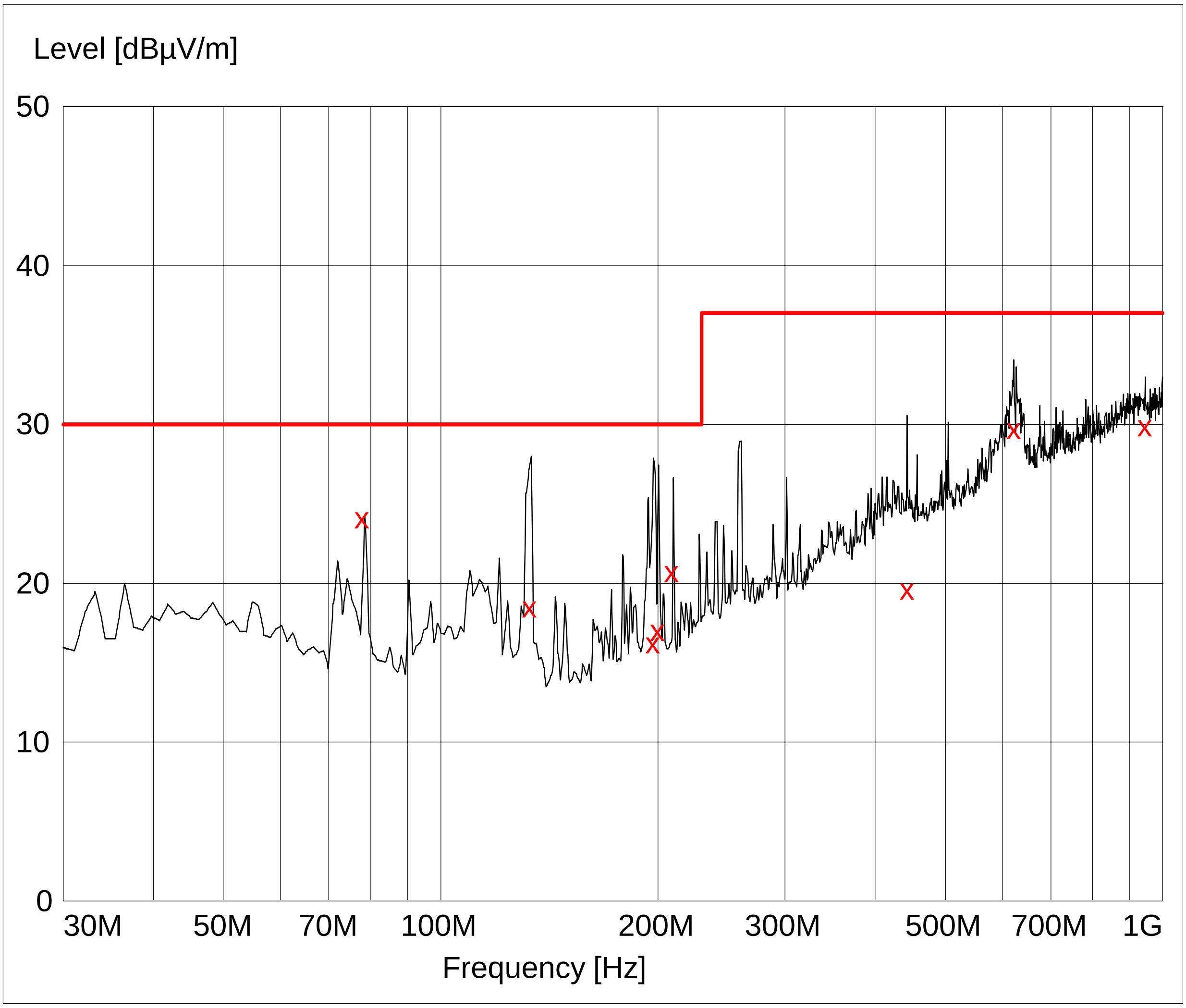
EN 55022 class B

```
EUT:                 D2703 WGS2 (S26361-D2703)
Manufacturer:        Fujitsu Siemens Computers
Operating Condition: scr. H; 1280x1024/75Hz ext.monitor; HD/LAN-test
Test Site:           Fujitsu Siemens Augsburg (10 m Semi Anechoic Chamber)
Operator:            M.Girstenbrei
Test Specification:  full;
Comment:             Mains: 230V/50Hz;
Start of Test:       19.11.2007 / 07:58:56
```

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

Short Description: 10m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	30.0 kHz	QuasiPeak	10.0 ms	120 kHz	VULB9163 cal. 7/07



EUT: S26361-D2703 (D2703)

MEASUREMENT RESULT: "Quasi Peak"

19.11.2007 08:38

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
77.760000	24.10	8.6	30.0	5.9	QP	220.0	29.00	HORIZONTAL
132.690000	18.50	9.7	30.0	11.5	QP	340.0	210.00	HORIZONTAL
196.620000	16.20	12.8	30.0	13.8	QP	280.0	180.00	VERTICAL
199.800000	17.00	12.5	30.0	13.0	QP	400.0	119.00	HORIZONTAL
208.950000	20.70	12.2	30.0	9.3	QP	280.0	300.00	HORIZONTAL
442.800000	19.60	18.4	37.0	17.4	QP	220.0	300.00	VERTICAL
622.050000	29.70	22.3	37.0	7.3	QP	400.0	150.00	HORIZONTAL
945.390000	29.90	25.5	37.0	7.1	QP	160.0	90.00	VERTICAL

EUT: S26361-D2703 (D2703)

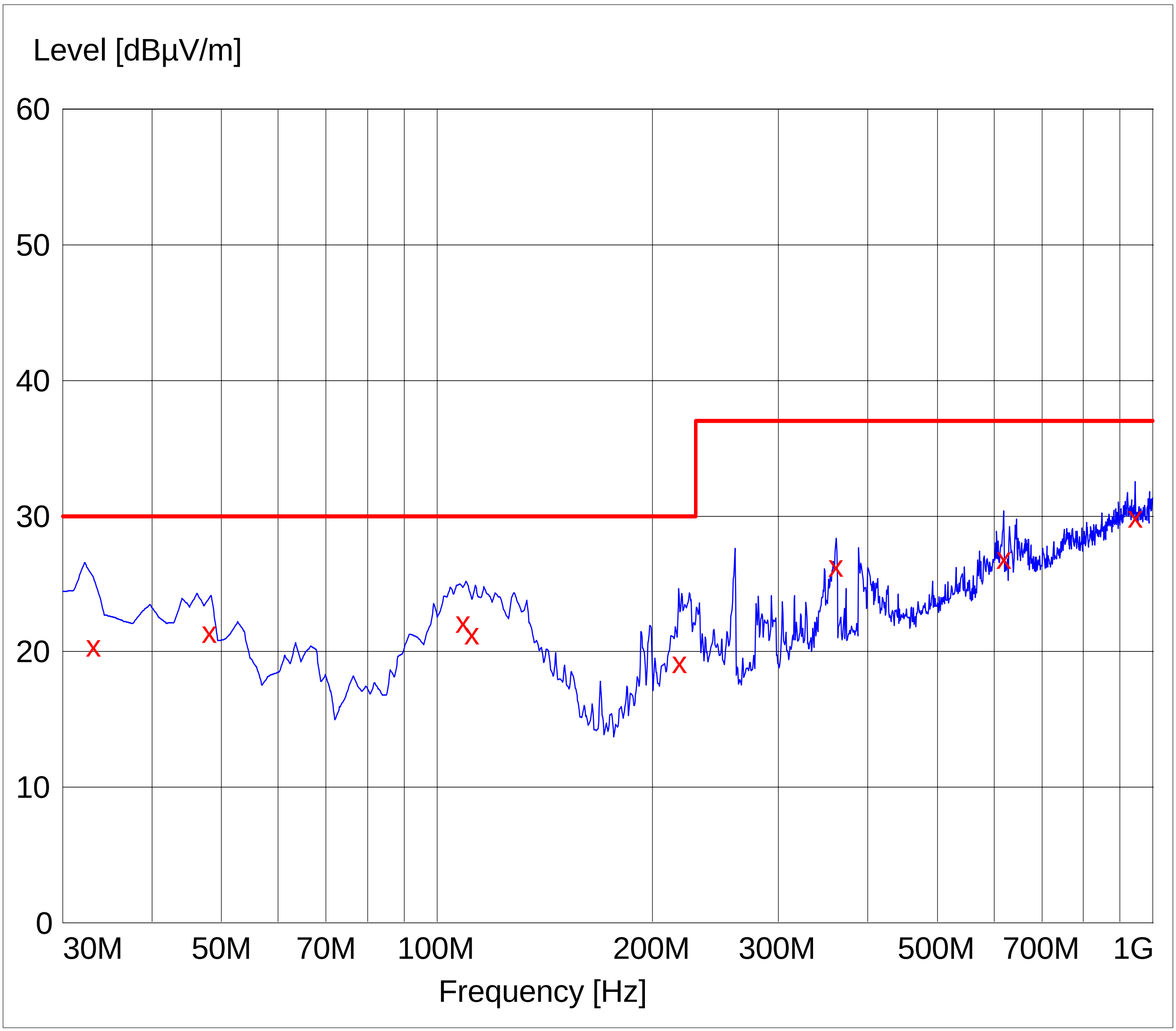
Radiated Emission according to:

EN 55022 class B

```
EUT:                   D2703 WGS2 (S26361-D2703)
Manufacturer:          Fujitsu Siemens Computers
Operating Condition:   scr."H"; 1280x1024/75Hz  (DVI); HD/LAN-Test
Test Site:             Fujitsu Siemens Augsburg (10 m Semi Anechoic Chamber)
Operator:              R. Schaufler
Test Specification:    full
Comment:               mains: 230V/50Hz
Start of Test:         10.12.2007 / 15:10:33
```

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

```
  Short Description:            10m Field Strength
  Start       Stop        Step        Detector   Meas.     IF      Transducer
  Frequency   Frequency   Width                  Time      Bandw.
  30.0 MHz    1.0 GHz     30.0 kHz    QuasiPeak  2.0 s     120 kHz VULB9163 cal. 7/07
```



EUT: S26361-D2703 (D2703)

MEASUREMENT RESULT: "Quasi Peak"

10.12.2007 15:44

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.090000	20.40	13.2	30.0	9.6	QP	100.0	59.00	VERTICAL
48.030000	21.40	15.0	30.0	8.6	QP	100.0	90.00	VERTICAL
108.780000	22.20	13.0	30.0	7.8	QP	100.0	180.00	VERTICAL
111.720000	21.30	12.5	30.0	8.7	QP	100.0	180.00	VERTICAL
217.920000	19.20	12.6	30.0	10.8	QP	300.0	210.00	HORIZONTAL
360.330000	26.30	16.6	37.0	10.7	QP	400.0	180.00	VERTICAL
618.420000	26.90	22.2	37.0	10.1	QP	200.0	180.00	VERTICAL
944.550000	29.90	25.6	37.0	7.1	QP	100.0	59.00	HORIZONTAL

EUT: S26361-D2703 (D2703)

6. Performance criteria for immunity

Performance Criterion	Read/Write and storage of data	Data display	Data input	Data processing	LAN
A	Normal, inclu-ding stand-by mode.	Flicker, color, focus and jitter shall operate with no change. For power fre-quency magne-tic field test, the jitter limit shall be met.	No unintended input. Specified quality image maintained.	Failures do not influence the specified operation and prevent recovery.	Operate without errors, requests for retry. Speed of data transmission rate beyond the figure defined by the manufac-turer. No protocol failure, no loss of link.
B	Recovers data with temporary delay, selfreco-very immediate-ly.	Screen distur-bance.	Keyboard/ mouse lock up is not allowed. Errors can be recognized by the operator and easily corrected for manually in-put data equipment.	Failure self-recovered with temporary delay.	Error rate, re-quests for retry, speed or data transmission rate may be de-graded during test but should be selfrecover-able to the con-dition before the application of the test.
C	Delay in proces-sing after distur-bance removed, system abort can be reset or reboot. Reinitialise by operator after the test.	Reset or reboot.	Delay in proces-sing after distur-bance removed, system abort can be reset or reboot.	Delay in proces-sing after distur-bance removed, system abort can be reset or reboot. Manual recoverable for alarming failure.	Error rate, re-quests for retry, speed of data transmission rate may be de-graded during test but should be selfrecover-able to the con-dition before the application of the test or can be restored after the test by the operator.

EUT: S26361-D2703 (D2703)

7. Results of immunity tests:

During immunity tests the EUT was set to a continuous standard testing operation. The tests were carried out using test programs which could repeat the sequences of functions of equipment. In case of failure, the operator was able to recognize the type of failure by monitoring. For testing immunity to radiated field the tests were done in an anechoic chamber and the result was controlled on a monitor via a video camera.

EUT: S26361-D2703 (D2703)

7.1 Electrostatic discharge

Test specification to EN 61000-4-2: 1995
Test level to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

Test levels: 4 kV / 8 kV

Temperature:	15 °C...35 °C	
Rel. humidity:	30%...60%	Tested by: A. Luck
Pressure:	86 kPa...106 kPa	Test date: 06.12.07

7.1.1 Measurement procedure

The EUT was tested in two configurations:

- basic system configuration
- all auxiliary equipment connected to EUT

7.1.1.1 Immunity to electrostatic contact discharge

The EUT was exposed to at least 200 discharges, 100 of each polarity at a minimum of 4 test points to conductive surfaces. One of the selected test points was additionally exposed to indirect discharge (HCP), at least 50 shots were applied.
In case of non conductive housings, where no contact discharge is applicable 200 indirect discharges to a VCP were applied.

7.1.1.2 Immunity to electrostatic air discharge

The static electricity discharges were applied to such non conductive surfaces of the EUT that are accessible to personnel during normal use. At least 10 discharges of each polarity was applied to selected points (see figures). Additionally discharges according customers request were done at all touchable conductive parts (see figures).

EUT: S26361-D2703 (D2703)

7.1.2 Measurement results

Test set-up: basic system configuration					
Test level voltage (kV)	Air discharge	Contact discharge			Comments
		Direct	Indirect		
			vertical	horizontal	
1	-	A	A	A	
2	A	A	A	A	
4	A	A	A	A	
5	A	A	A	A	
6	A	-	-	-	
8	A	-	-	-	
9	A	-	-	-	

Test set-up: all auxiliary equipment connected to EUT					
Test level voltage (kV)	Air discharge	Contact discharge			Comments
		Direct	Indirect		
			vertical	horizontal	
1	-	A	A	A	
2	A	A	A	A	
4	A	A	A	A	
5	A	A	A	A	
6	A	-	-	-	
8	A	-	-	-	
9	A	-	-	-	

Table of used instruments

	Type	Manufacturer	Model	Serial-No.
O	ESD Generator	Schaffner	NSG 435	1010
X	ESD Generator	Schaffner	NSG 435	1820
O	ESD Generator	Schaffner	NSG 435	5214
O	ESD Generator	Schaffner	NSG 435	5215

EUT: S26361-D2703 (D2703)

7.1.3 Test setup and application of contact and air discharges to the EUT

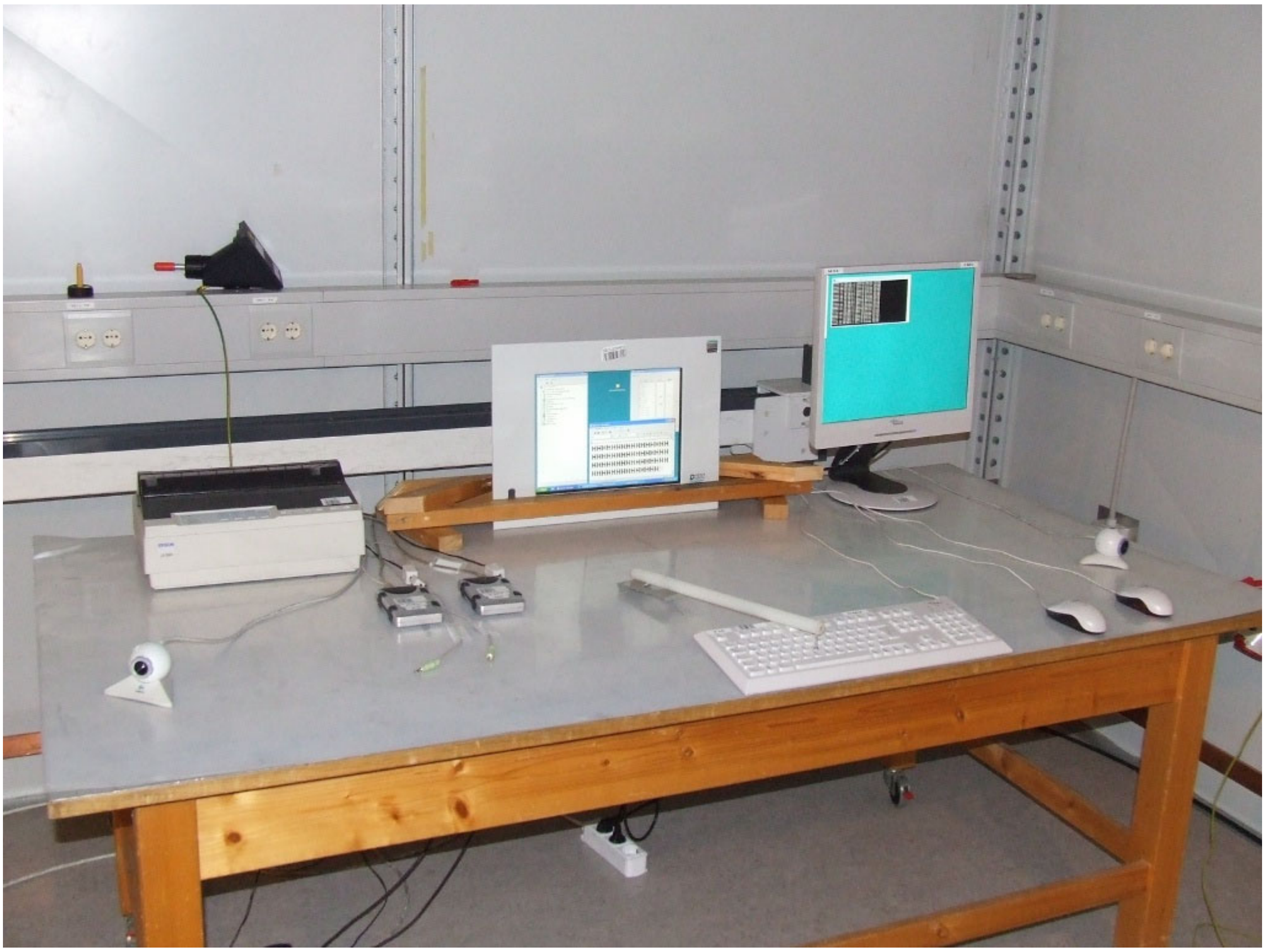


Figure 7 : Test set up ESD - EUT with peripherals -

EUT: S26361-D2703 (D2703)

Figure 8 : Test set up for ESD - Standalone -

EUT: S26361-D2703 (D2703)

Figure 9 : Points of contact discharge on the front of the EUT

EUT: S26361-D2703 (D2703)

Figure 10 : Points of contact discharge on the rear of the EUT

EUT: S26361-D2703 (D2703)

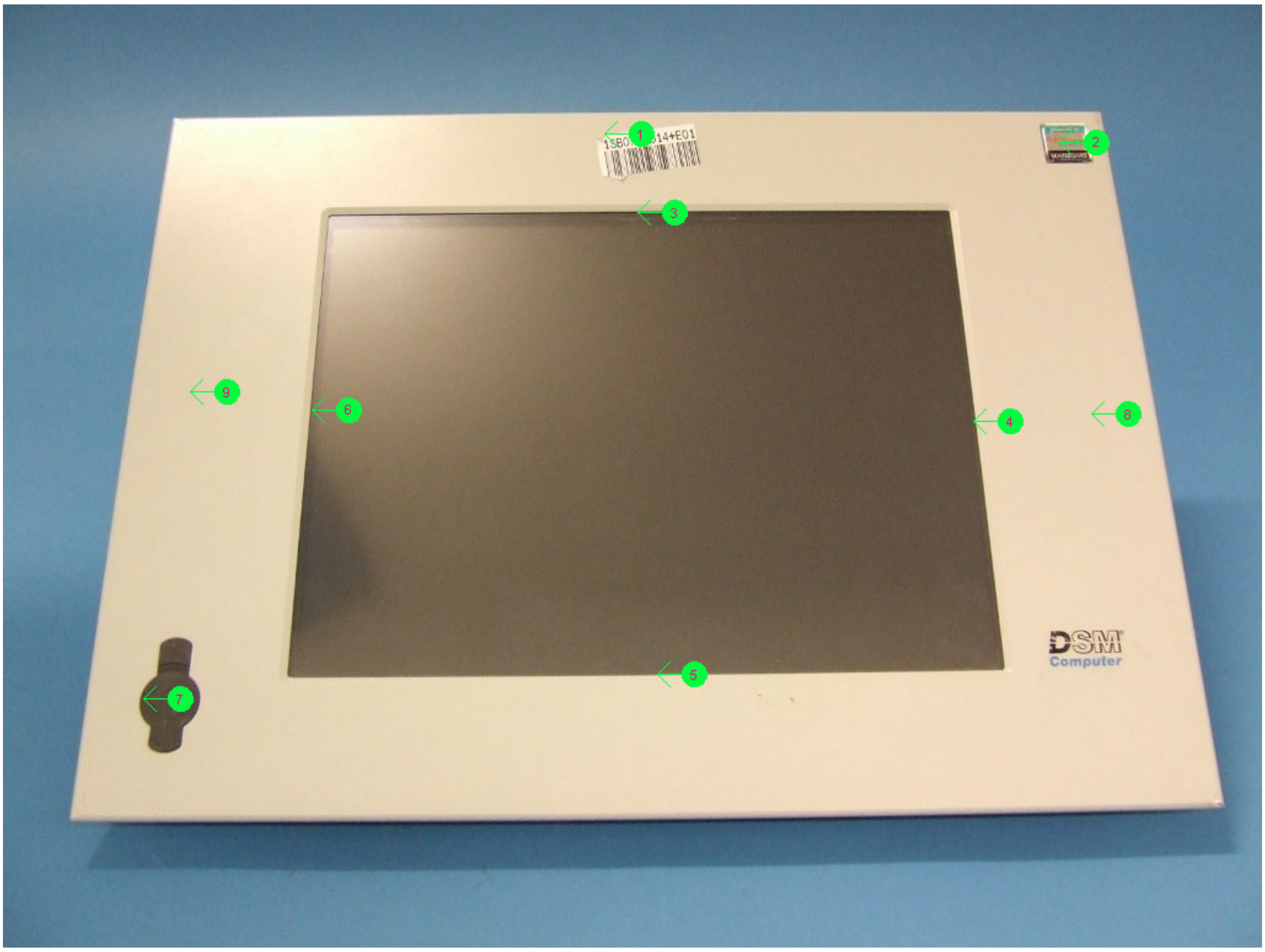


Figure 11 : Points of air discharge on the front of the EUT

EUT: S26361-D2703 (D2703)

Figure 12 : Points of air discharge on the rear of the EUT

EUT: S26361-D2703 (D2703)

7.2 Immunity to radio frequency field, amplitude modulated

The most sensitive sides of the EUT were exposed to a radiated field (see test point in table). In each position the performance of the EUT was monitored.

Test specifications to EN 61000-4-3: 1996
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

Tested by: M.Rothtauscher
Test date: 21.11.2007

Testparameters:

Frequency range: 80 MHz...1000 MHz
HF-Level: 3 V/m U_{rms} unmodulated
Modulation level: 80%
Modulation frequency: 1 kHz
Dwell time: 3.0 s
Steps: 1% log
Incr. level: 6 dB

Test point	Frequency (MHz)	Test level (V/m)	Performance-criteria	Comment
front side	80 - 1000	3	A	hor.
front side	80 - 1000	3	A	ver.
rear side	80 - 1000	3	A	hor.
rear side	80 - 1000	3	A	ver.

EUT: S26361-D2703 (D2703)

Immunity to radiated RF-Field

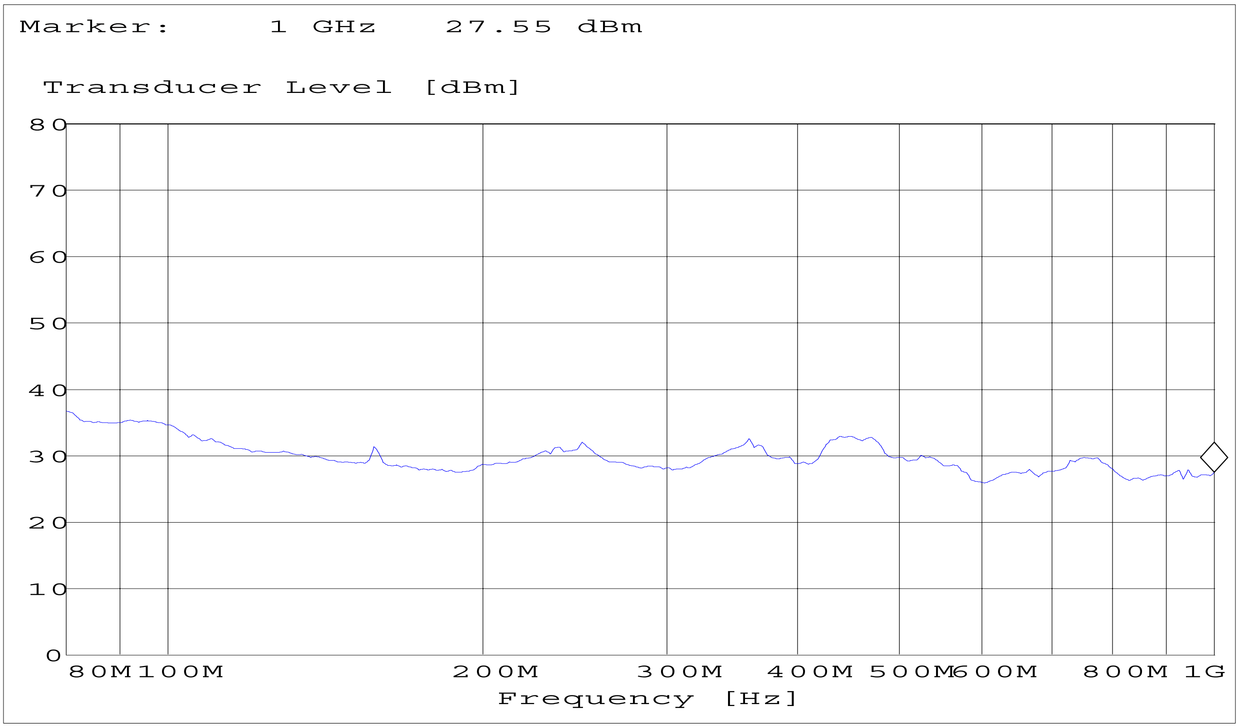
acc. EN 61000 - 4 - 3

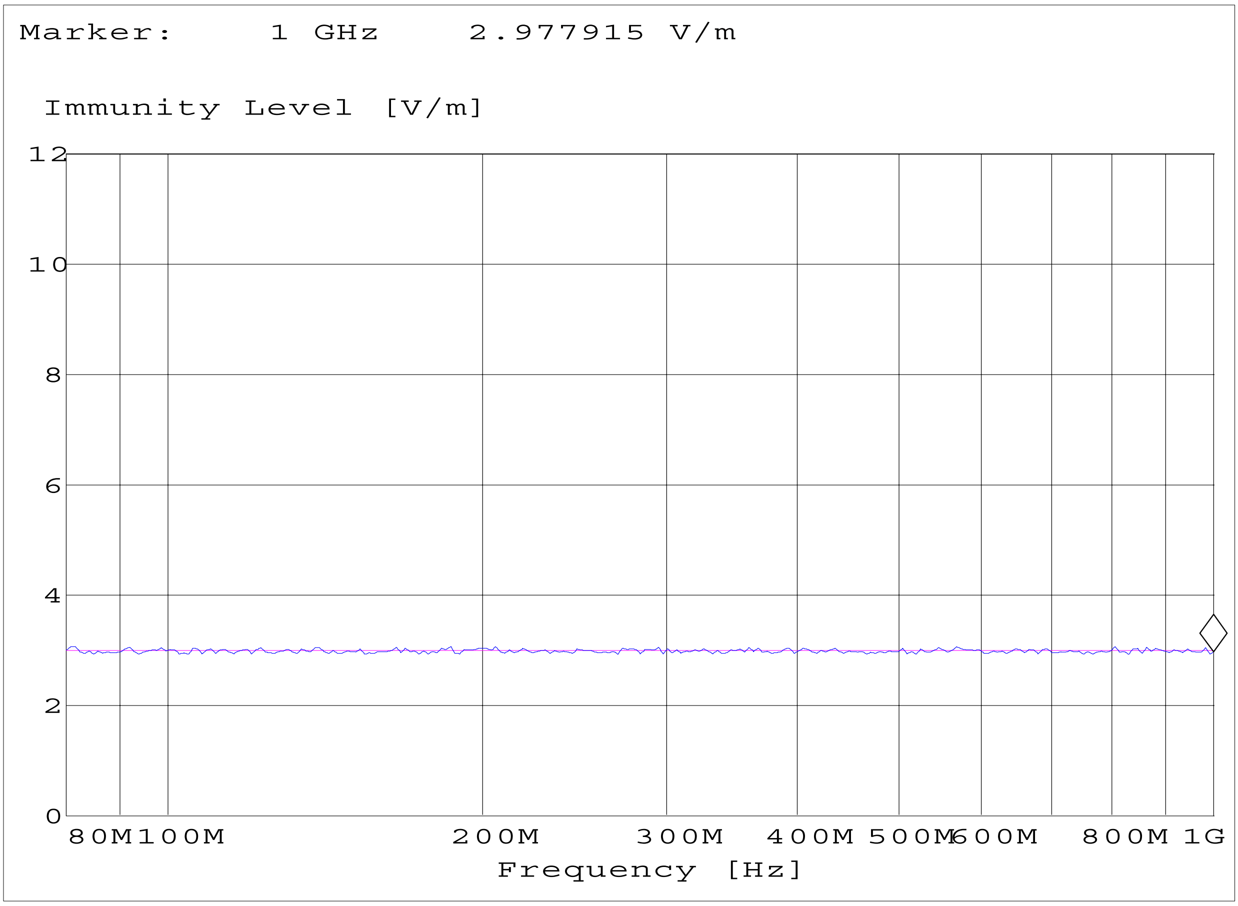
```
EUT:                   D2703 WGS2 (S26361-D2703)
Manufacturer:          Fujitsu Siemens Computers
Operating Condition: scr."H"; 1280x1024/75Hz ext. monitor; HD/LAN-Test
Test site:             FSC Compact Diagnostic Chamber (CDC)
Operator:              M. Rothtauscher
Test result:           normal function observed
Antenna Position:      CBL 6140 horizontal / frontside
Date of Measurement: 21.11.2007 12:42:58
```

IMMUNITY PARAMETER: "CDC Feldstärke Daten"

```
Unit:                     V/m
Imm. Level Detector:      CARRIER
Frequency Sweep:          Ascending


Subrange 1:

    Power Gen.:         MW 1GHz             Start Freq.:        80.000 MHz
    Transducer:         CBL 6140            Stop Freq.:         1.000 GHz
    Sensor:             <internal>          Step Mode:          LOG
    Ref. Calib.:        MP61_H              Step Size:          1.000 %
    Levelling:          Ref. Calib.         Frq.Tbl.:           <none>
    Power Ctrl.:        Forward Power

    Imm.Shape:          <none>              Lower Tol.:         0.200 dB
    Lim.Shape:          <none>              Upper Tol.:         0.200 dB
    Imm.Level:          3.00 V/m            Dwell Time:         3.000 s

    Generator Settings:                     Level Sweep:

        Mod. Type:      AM:INT                  Step Mode:          Off
        Mod. Depth:     80.00                   Max. Lev. Shift:    0.000 dB
        Deviat.:        ---
        Mod. Freq.:     1000.00
        AF Wave:        <none>
```

EUT: S26361-D2703 (D2703)





EUT: S26361-D2703 (D2703)

Immunity to radiated RF-Field

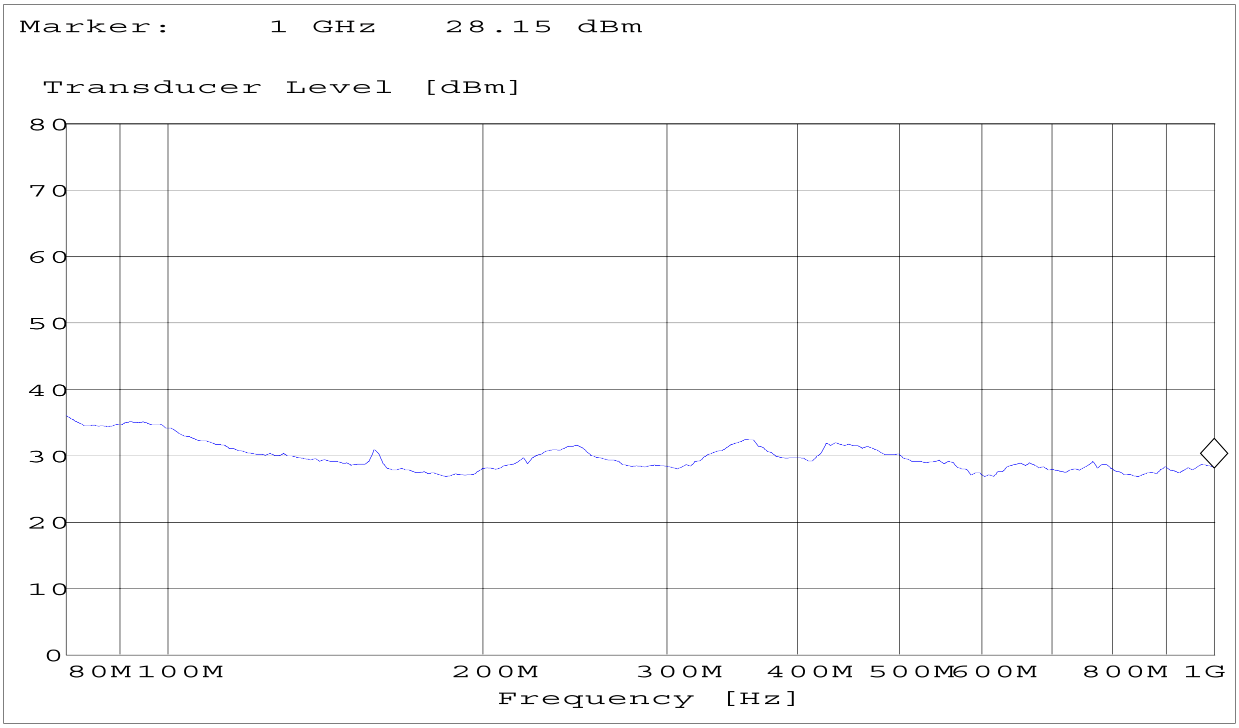
acc. EN 61000 - 4 - 3

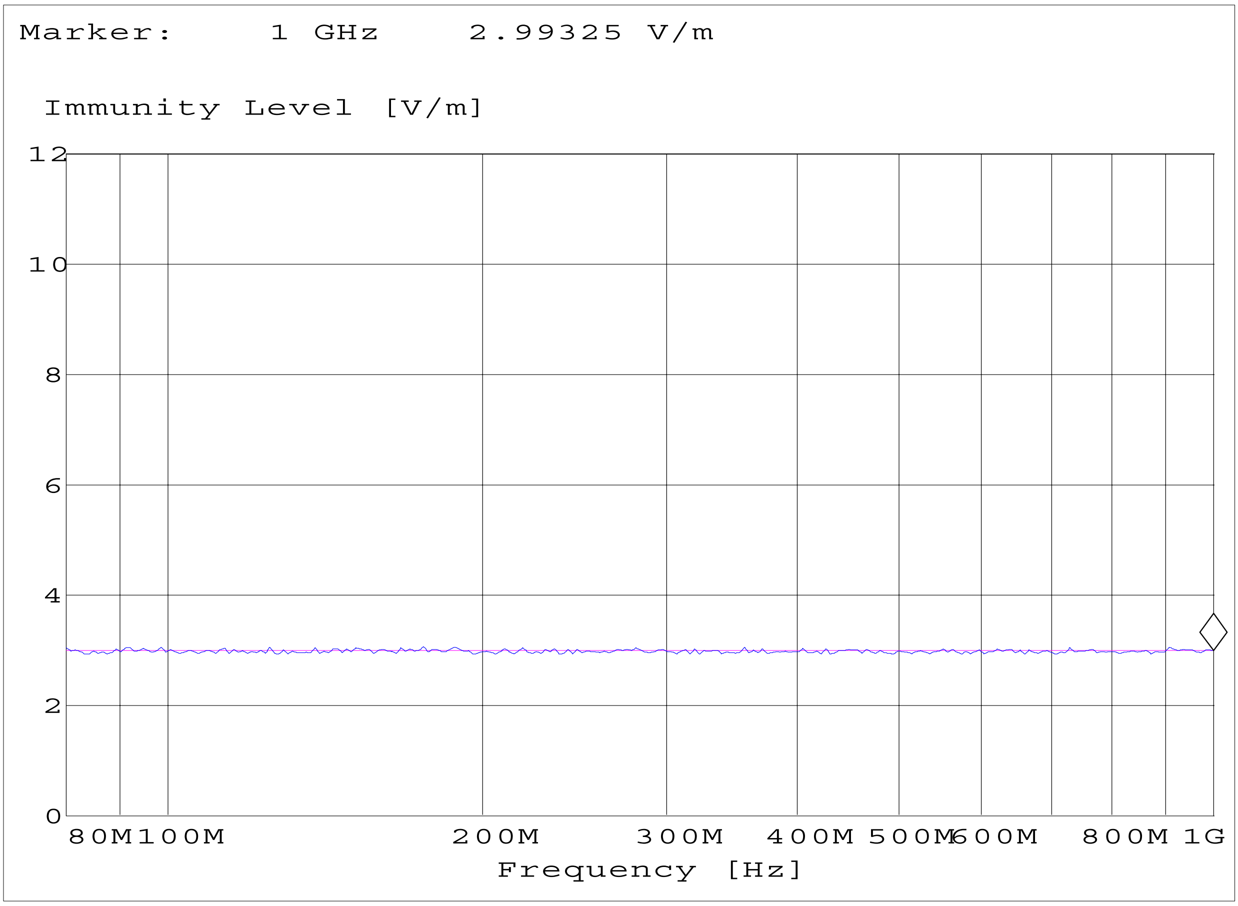
```
EUT:                   D2703 WGS2 (S26361-D2703)
Manufacturer:          Fujitsu Siemens Computers
Operating Condition: scr."H"; 1280x1024/75Hz ext. monitor; HD/LAN-Test
Test site:             FSC Compact Diagnostic Chamber (CDC)
Operator:              M. Rothtauscher
Test result:           normal function observed
Antenna Position:      CBL 6140 vertical / frontside
Date of Measurement: 21.11.2007 13:22:54
```

IMMUNITY PARAMETER: "CDC Feldstärke Daten"

```
Unit:                      V/m
Imm. Level Detector:       CARRIER
Frequency Sweep:           Ascending


Subrange 1:

    Power Gen.:          MW 1GHz              Start Freq.:          80.000 MHz
    Transducer:          CBL 6140             Stop Freq.:           1.000 GHz
    Sensor:              <internal>           Step Mode:            LOG
    Ref. Calib.:         MP61_V               Step Size:            1.000 %
    Levelling:           Ref. Calib.          Frq.Tbl.:             <none>
    Power Ctrl.:         Forward Power

    Imm.Shape:           <none>               Lower Tol.:           0.200 dB
    Lim.Shape:           <none>               Upper Tol.:           0.200 dB
    Imm.Level:           3.00 V/m             Dwell Time:           3.000 s

    Generator Settings:                       Level Sweep:

        Mod. Type:       AM:INT                   Step Mode:          Off
        Mod. Depth:      80.00                    Max. Lev. Shift:    0.000 dB
        Deviat.:         ---
        Mod. Freq.:      1000.00
        AF Wave:         <none>
```

EUT: S26361-D2703 (D2703)





EUT: S26361-D2703 (D2703)

Immunity to radiated RF-Field

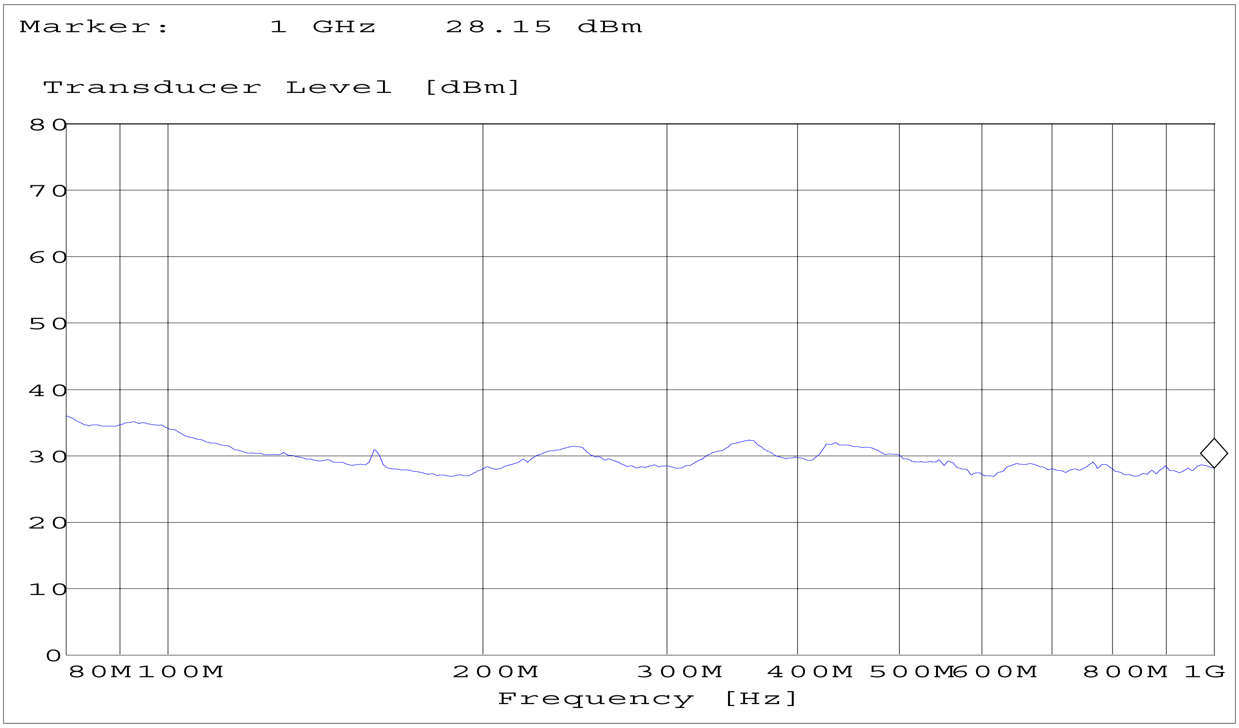
acc. EN 61000 - 4 - 3

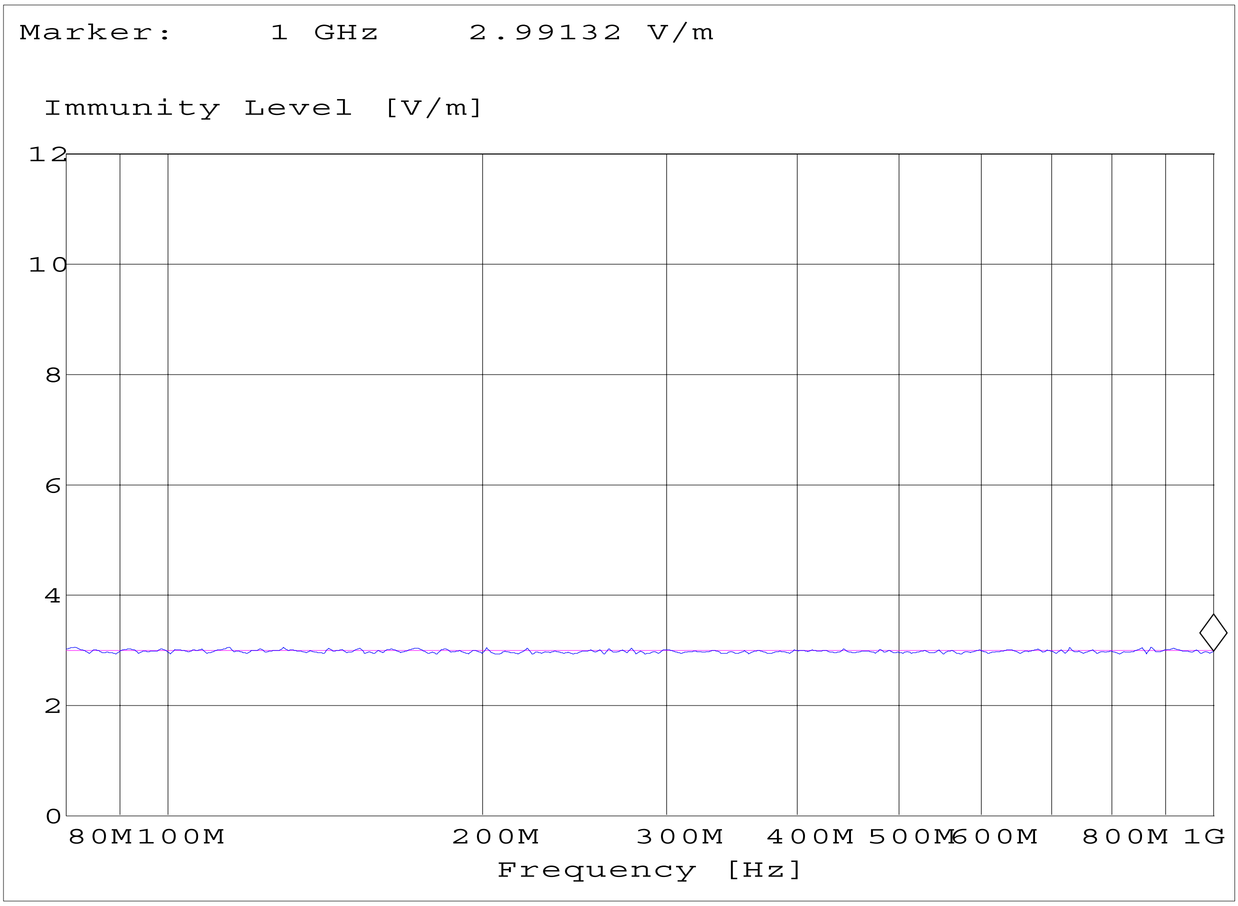
```
EUT:                   D2703 WGS2 (S26361-D2703)
Manufacturer:          Fujitsu Siemens Computers
Operating Condition: scr."H"; 1280x1024/75Hz ext. monitor; HD/LAN-Test
Test site:             FSC Compact Diagnostic Chamber (CDC)
Operator:              M. Rothtauscher
Test result:           normal function observed
Antenna Position:      CBL 6140 vertical / rearside
Date of Measurement: 21.11.2007 13:49:34
```

IMMUNITY PARAMETER: "CDC Feldstärke Daten"

```
Unit:                      V/m
Imm. Level Detector:       CARRIER
Frequency Sweep:           Ascending


Subrange 1:

    Power Gen.:          MW 1GHz              Start Freq.:         80.000 MHz
    Transducer:          CBL 6140             Stop Freq.:          1.000 GHz
    Sensor:              <internal>           Step Mode:           LOG
    Ref. Calib.:         MP61_V               Step Size:           1.000 %
    Levelling:           Ref. Calib.          Frq.Tbl.:            <none>
    Power Ctrl.:         Forward Power

    Imm.Shape:           <none>               Lower Tol.:          0.200 dB
    Lim.Shape:           <none>               Upper Tol.:          0.200 dB
    Imm.Level:           3.00 V/m             Dwell Time:          3.000 s

    Generator Settings:                       Level Sweep:

        Mod. Type:       AM:INT                   Step Mode:           Off
        Mod. Depth:      80.00                    Max. Lev. Shift:     0.000 dB
        Deviat.:         ---
        Mod. Freq.:      1000.00
        AF Wave:         <none>
```

EUT: S26361-D2703 (D2703)





EUT: S26361-D2703 (D2703)

Immunity to radiated RF-Field

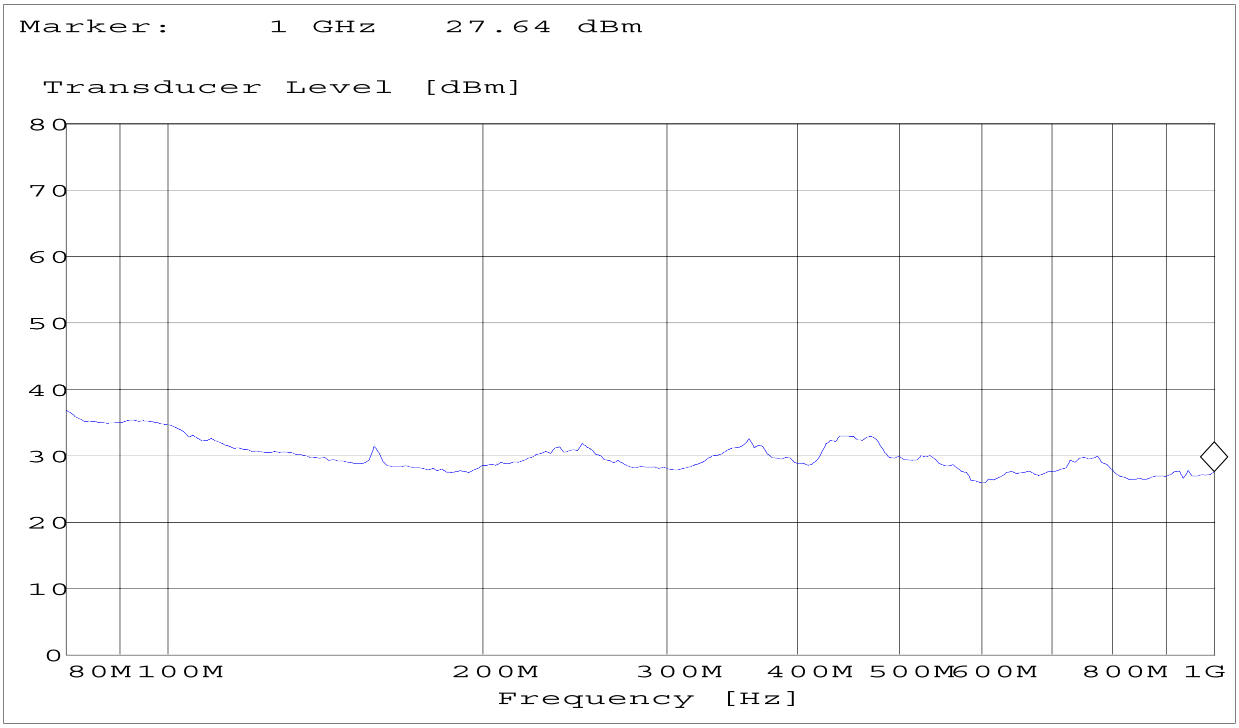
acc. EN 61000 - 4 - 3

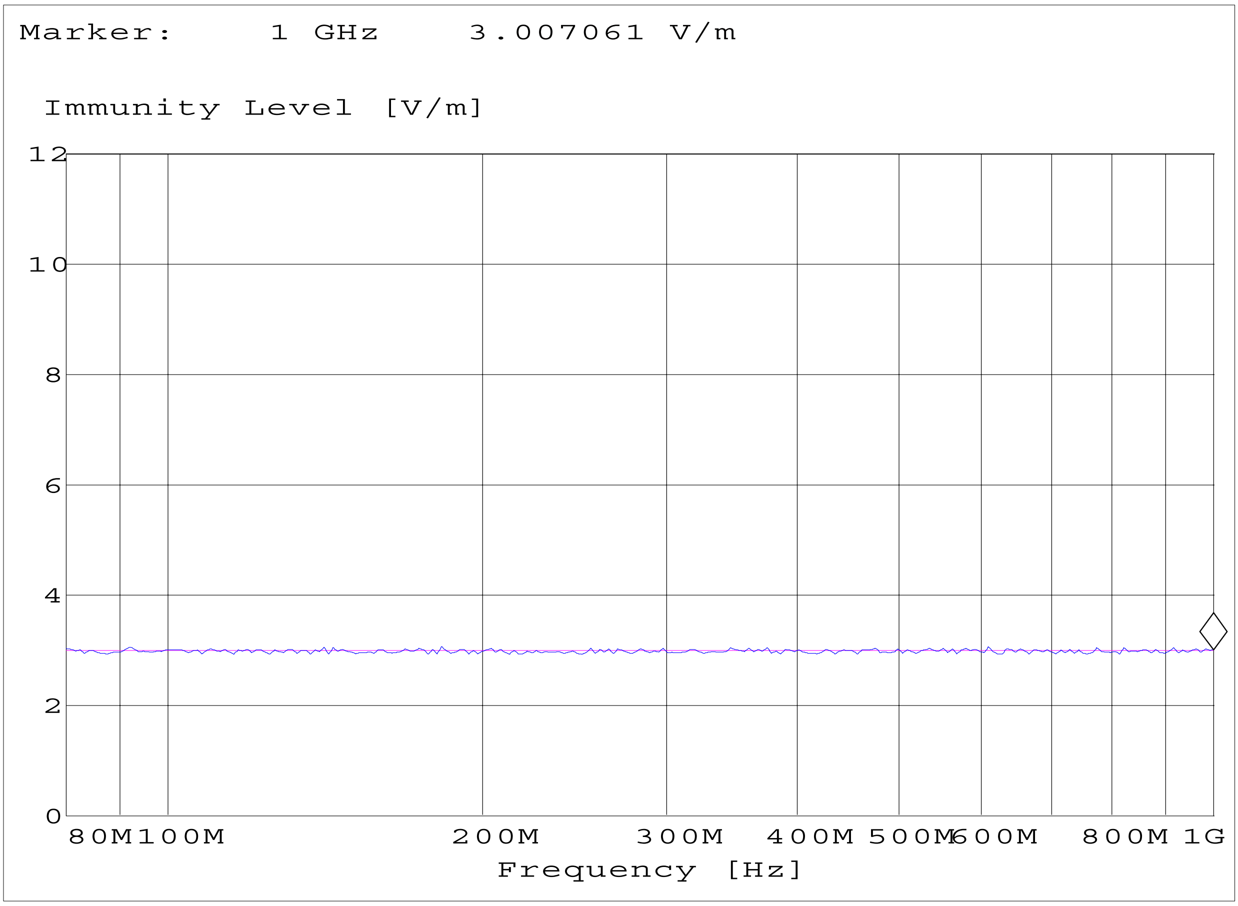
```
EUT:                 D2703 WGS2 (S26361-D2703)
Manufacturer:        Fujitsu Siemens Computers
Operating Condition: scr."H"; 1280x1024/75Hz ext. monitor; HD/LAN-Test
Test site:           FSC Compact Diagnostic Chamber (CDC)
Operator:            M. Rothtauscher
Test result:         normal function observed
Antenna Position:    CBL 6140 horizontal / rearside
Date of Measurement: 21.11.2007 14:10:31
```

IMMUNITY PARAMETER: "CDC Feldstärke Daten"

```
Unit:                    V/m
Imm. Level Detector:     CARRIER
Frequency Sweep:         Ascending


Subrange 1:

    Power Gen.:         MW 1GHz             Start Freq.:        80.000 MHz
    Transducer:         CBL 6140            Stop Freq.:         1.000 GHz
    Sensor:             <internal>          Step Mode:          LOG
    Ref. Calib.:        MP61_H              Step Size:          1.000 %
    Levelling:          Ref. Calib.         Frq.Tbl.:           <none>
    Power Ctrl.:        Forward Power

    Imm.Shape:          <none>              Lower Tol.:         0.200 dB
    Lim.Shape:          <none>              Upper Tol.:         0.200 dB
    Imm.Level:          3.00 V/m            Dwell Time:         3.000 s

    Generator Settings:                     Level Sweep:

        Mod. Type:      AM:INT                  Step Mode:          Off
        Mod. Depth:     80.00                   Max. Lev. Shift:    0.000 dB
        Deviat.:        ---
        Mod. Freq.:     1000.00
        AF Wave:        <none>
```

EUT: S26361-D2703 (D2703)





EUT: S26361-D2703 (D2703)

Table of used instruments

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	Signal Generator	Rohde&Schwarz	SMT03	100277	May 07
X	RF Voltmeter	Rohde&Schwarz	NRVS	100559	May 07
X	Probe	Rohde&Schwarz	URV5-Z4	100025/745	May 07
O	Amplifier	Bonn	BLMA1030-40	025226-03	May 07
X	Amplifier	Bonn	BLWA0810-200	045648	---
X	Directional Coupler	Bonn	BDC0842-40	025226-03	May 07
O	Antenna	Schwarzbeck	BBHA9120E	160	---
X	Antenna Bilog	Chase	CBL6140	1032	---
X	Test-Software	Rohde&Schwarz	EMS-K1 V1.20 SR10	---	---

EUT: S26361-D2703 (D2703)

7.3 Immunity to electrical fast transients (burst)

Test specification to EN 61000-4-4: 1995
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

0.5 kV, 5/50 nS, 5 kHz for lines and busses not involved in process control
1 kV, 5/50 nS, 5 kHz for all other tested lines.

Temperature: 15 ^{o}C...35 ^{o}C
Rel. humidity: 30%...60%
Pressure: 86 kPa...106 kPa

Tested by: M.Rothtauscher
Test date: 22.11.2007

0.5 kV, 5/50 ns, 5 kHz for lines and busses not involved in process control
1 kV, 5/50 ns, 5 kHz for all other tested lines.

Temperature: 15 ^{o}C...35 ^{o}C
Rel. humidity: 30%...60%
Pressure: 86 kPa...106 kPa

Tested by:M.Rothtauscher
Test date: 22.11.2007

Tested lines					**Test level [kV]**				**Performance criteria**	**Comment**
AC-power line: (direct injection)					+/-					
L1	L2	L3	N	PE	0.5	1.0	2.0	4.0		
x					X	X	X	-	A	
			x		X	X	X	-	A	
				x	X	X	X	-	A	
x			x		X	X	X	-	A	
Data and signal lines: (capacitive clamp)										
LAN 1					X	X	-	-	A	
LAN 2					X	X	-	-	A	
COM 1					X	X	-	-	A	
USB rear 1					X	X	-	-	A	
USB rear 2					X	X	-	-	A	

EUT: S26361-D2703 (D2703)

Table of used instruments

	Type	Manufacturer	Model	Serial-No.
O	Burst Generator	Schaffner	NSG 2025-1	1156
X	Burst Generator	Schaffner	NSG 2025-4	1226
O	EFT Clamp	EM-Test	HFK	0691-10
X	EFT Clamp	EM-Test	HFK	1092-01
X	Test-Software	Schaffner	WIN 2025 Vers. 4.0	---

EUT: S26361-D2703 (D2703)

7.4 Surge immunity test

Test specification to EN 61000-4-5: 1995
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

1 kV common mode (line to ground)	Process, measurement and control lines
0.5 kV common mode (line to ground)	DC input, output power ports
1 kV diff. Mode (line to line)	AC input, output power ports
2 kV common mode (line to ground)	AC input, output power ports

Temperature: 15 °C...35 °C
Rel. humidity: 30%...60%
Pressure: 86 kPa...106k Pa

Test parameters:
Delay time [ms]: 0/5/15
Number of pulses (each polarity): 5
Test pulse: 1.2 / 50 µs
Repetition rate: ≥ 1 / min

Tested by: A.Luck
Test date: 13.12.2007

Tested lines					Test level [kV]				Performance criteria	Comment
AC-power line:					+/-					
L1	L2	L3	N	PE	0.5	1.2	2.2	4.4		
X			X		X	X	-	-	A	
X				X	X	X	X	-	A	
			X	X	X	X	X	-	A	

Table of used instruments

	Type	Manufacturer	Model	Serial-No.
X	Pulse Generator	Schaffner	NSG 2050	103-01
X	Impulse Network (1.2 / 50 – 8 / 20)	Schaffner	PNW 2050	103-01
O	Impulse Network (0.5 / 700 – 10 / 700)	Schaffner	PNW 2051	103-01
X	Pulse Coupling Network	Schaffner	CDN131/133	---
O	Signal Line Coupling Network	Schaffner	CDN117	---
O	Signal Line Coupling Network	Schaffner	CDN118	---
X	Test-Software	Schaffner	WIN 2050 Vers. 5.5	---

EUT: S26361-D2703 (D2703)

7.5 Immunity to radio frequency common mode

Test specification to EN 61000-4-6: 1996
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

Testparameters:

Frequency range: 0.15 MHz...80 MHz
HF-Level: 3 V U_{rms} unmodulated
Modulation level: 80% AM
Modulation frequency: 1 kHz
Dwell time: 3.0 s
Steps: 1% log.

Tested by: A.Luck
Test date: 06.12.2007

Tested point	Frequency (MHz)	Test level (V)	Performance criteria	Comment
Mains port	0.15 - 80	3.0	A	
COM	0.15 - 80	3.0	A	
LPT	0.15 - 80	3.0	A	
LAN	0.15 - 80	3.0	A	
USB	0.15 - 80	3.0	A	

EUT: S26361-D2703 (D2703)

Table of used instruments

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	Power Meter	Rohde&Schwarz	NRVD	100447	May 07
O	RF-Generator	Rohde&Schwarz	SMS2	879259/49	May 07
X	Power sensor	Rohde&Schwarz	URV5-Z2	100139	May 07
X	RF Amplifier	Amplifier Research	25A250	16208	
X	BI-Directional Coupler	Werlatone	1795	10901	
X	6dB Attenuator	NeWe-Tec	RFA60NFF6	0214	
O	Test-Software	RSUS	RSUS V2.134	---	---
O	Compact Continuous Wave Simulator	EM Test	CWS 500	1297-09	June 07
O	6dB Attenuator	EM Test	ATT 6	9812109A	
O	BCI Current clamp	FCC Inc.	F-120-9	21	June 07
O	LPT CDN	FCC Inc.	Fcc-801-S25	2009	June 07
O	LPT CDN	FCC Inc.	Fcc-801-S25	9902	June 07
X	COM CDN	FCC Inc.	Fcc-801-S9	2008	June 07
O	COM CDN	FCC Inc.	Fcc-801-S9	9901	June 07
O	MAINS CDN	FCC Inc.	Fcc-801-M3-16A	2026	June 07
X	MAINS CDN	FCC Inc.	Fcc-801-M3-16A	9905	June 07
O	MAINS CDN	FCC Inc.	Fcc-801-M3-16A	4049	June 07
O	MAINS CDN	FCC Inc.	Fcc-801-M3-16A	4050	June 07
O	2-Line CDN	FCC Inc.	Fcc-801-T2	9905	June 07
O	4-Line CDN	FCC Inc.	Fcc-801-T4	9906	June 07
O	Single line CDN	FCC Inc.	Fcc-801-M1-16A	4008	June 07
O	MAINS CDN	FCC Inc.	Fcc-801-M5-32A	9903	June 07
O	RJ45 CAT 6 CDN	FSC	Lan 2	2	June 07
X	RJ45 CAT 6 CDN	FSC	Lan 3	3	June 07
X	USB CDN	FSC	USB 1	1	June 07
O	USB CDN	FSC	USB 2	2	June 07
X	RF-Generator (Med.)	Rohde&Schwarz	SML01	101108	May 07

EUT: S26361-D2703 (D2703)

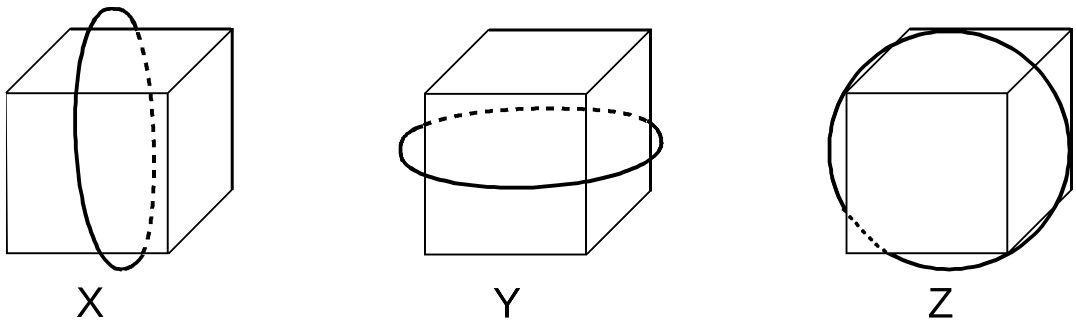
7.6 Immunity to power frequency magnetic field

Test specification to EN 61000-4-8: 1993
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

Temperature: 15 °C...35 °C
Rel. humidity: 25%...75%
Pressure: 86 kPa...106 kPa

Tested by: A. Luck
Test date: 06.12.2007



Axis	Field strength (A/m)	Frequency (Hz)	Performance criteria	Comment
X	3	50	A	
Y	3	50	A	
Z	3	50	A	

Table of used instruments

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	Induction Coil	FSC	---	N/A	---
X	Field meter	Combinova	MFM10	357	Oct. 06
X	Wave Form Generator	Spitzenberger & Spies	Sycore	A2736 12/0 0401	---

EUT: S26361-D2703 (D2703)

7.7 Immunity to voltage dips, short interruptions and voltage variations

Test specification to EN 61000-4-11: 1994
Test levels to EN 55024: 1998 + A1:2001 + A2:2003

passed	X
failed	

AC- input/output power ports:

		Required performance criteria	Achieved performance criteria	Remark
Voltage dips:	10 ms / > 95% Reduction	B	A	
	500 ms / 30% Reduction	C	A	
Voltage interruptions:	5000 ms/ > 95% Reduction	C	C	System reboot

Temperature: 15 °C...35 °C
Rel. humidity: 25%...75%
Pressure: 86 kPa...106 kPa

Tested by: M.Rothtauscher
Test date: 22.11.2007

The EUT was tested for each combination of test level and duration with a sequence of three dips / interruptions with intervals between each test event of ≥ 10 sec.

For further information see measurement results.

Table of used instruments

	Type	Manufacturer	Model	Serial-No.	Calibrated
X	4 Quadrant Amplifier	Spitzenberger & Spies	PAS 10000	A2736 01/0 0401	---
O	Power Amplifier	Spitzenberger & Spies	EP 6750/B	5875	---
O	Power Amplifier	Spitzenberger & Spies	EP 6750/B	5876	---
X	Wave Form Generator	Spitzenberger & Spies	Sycore	A2736 12/0 0401	---
X	Analyser Reference System	Spitzenberger & Spies	ARS 16/3	A263807/21100	July 06
O	Analyser Reference System	Spitzenberger & Spies	AIP 16/1J	A263807/11100	July 06
X	Test-Software	Spitzenberger & Spies	EMC Test Software V2.11	---	---

EUT: S26361-D2703 (D2703)

7.7.1 Measurement results, immunity to short interruptions and voltage dips

Operator:	M. Rothtauscher	Comment 1:	1280x1024/75Hz
Test site:	EMC Test Center	Comment 2:	
Company:	Fujitsu Siemens Computers	Comment 3:	
Job no.	1SB07-0014	Comment 4:	delivery state
Manufacturer:	Fujitsu Siemens Computers		
EUT:	D2703 WGS2		
Operating mode:	scr."H", HD/CD-Test	Test date:	22.11.2007

Test conditions: EN 61000-4-11 voltage dips, short interruptions and variations test

Voltage / frequency:	230.0 V / 50.0 Hz
Test phase:	1
Executed test:	standart
Test description:	--
Disturbances per step:	3 (per phase angle) / 10.5 sec delay between

Step	Disturbance	TestLevel	Duration	Phase angle(s) (Ref.Ph.1)
1	Voltage dip / short interruption	0 %	0.5 periods	0°
2	Voltage dip / short interruption	70 %	25 periods	0°
3	Voltage dip / short interruption	0 %	250 periods	0°

Test results:

- ○ Normal performance within the specified limits
- ○ Temporary degradation or loss of function or performance which is self-recoverable
- ● Temporary degradation or
  loss of function or performance which requires operator intervention or system reset
- ○ Degradation or loss of function which
  is not recoverable due to damage of equipment (components) or software, or data loss

Comments:

step 3: reboot

Tested with EMC test software V2.34 / PAS10000 by Spitzenberger + Spies GmbH & Co. KG, Schmidstr 32-34, D-94234 Viechtach, 22.11.2007