

TEST REPORT

of the accredited test laboratory

TÜV Nr.:M/EMV-01/260
about
the following EMC - test/- research

Division Medical
Technology/
Communication
Technology/ EMC

Testing Body for
Communication
Technology/ EMC

Prüfzentrum Wien
A-1230 Wien
Deutschstraße 10

Tel.: +43 1 / 610 91
Fax: Ext. 6505
Mail: office@tuev.or.at

Applicant: Siemens AG Österreich
Erdberger Lände 26
A -1030 Wien

Product: Bluetooth LAN access point; BT-LAP (CasSI)

Serial Number: ---

Standard: CFR 47 Part 15 (FCC Part 15)

Accredited Testing
Laboratory,
Inspection Body,
Certification Body,
Calibration Body

Notified Body 0408

TÜV Österreich
Test laboratory for EMC

Deputy Supervisor of EMC-
laboratory

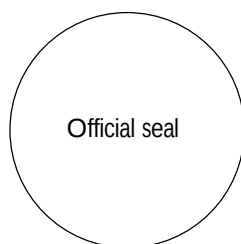
Checked by

Ing. Wilhelm Seier

20. 12. 2001

Ing. Michael Emminger

Copy Nbr.: _____



A publication of this test report is only permitted literally.
Copying or reproduction of partial sections needs a written permission of TÜV Österreich.

The results of this test report only refer to the provided equipment.

DVR 0047 333
UID ATU 37086005

Contents

	Designation	page
1.	Applicant	3
2.	Description of EUT	4
3.	Standards / Final result	5
4.	Test results	6-9
Appendix	Designation	pages
1	Test equipment used	3
2	Photodocumentation	10
3	Measurement diagrams	4

1. Applicant

Company	Siemens AG Österreich
Department	
Address	A -1030 Wien; Erdberger Lände 26
Contact person	Mr. Günther Asperger

EUT received on	December 19 th 2001
-----------------	--------------------------------

Tests were performed on	December 19 th 2001
-------------------------	--------------------------------

2. Description of EUT

EUT	Bluetooth LAN access point; BT-LAP (CasSI)
Serial Number	---
Manufacturer	Siemens AG Österreich A -1030 Wien; Erdberger Lände 26
Description	Siemens AG Österreich provided the following configuration for the measurements: pre production model
Operating mode	The measurements were carried out at the following running states: Data transmission at full rate

Test report number:
M/EMV-01/260

Date:
20. 12. 2001

3. Standards / Final result

Name	Title	Deviation	Result
47 CFR Part 15	Radio Frequency devices	none	PASS
PASS EUT passed FAIL EUT failed			

4. Test results

4. 1. Radiated emission §15.209

Limits :

Frequency MHz	Field strength limit ($\mu\text{V}/\text{m}$)	Measurement distance (meters)
0,009 – 0,490	$2400/f(\text{kHz})$	300
0,490 – 1,705	$24000/f(\text{kHz})$	30
1,705 – 30,0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
above 960	500	3

Measuring apparatus parameters:

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	0,009 MHz	0,009 MHz	Detector	Max Peak	Quasi Peak
Stop frequency	0,15 MHz	0,15 MHz	Measuring time	50 ms	1 s
Stepsize	100 Hz	100 Hz	RF-attenuation	0dB	0dB
IF- Bandwidth	200 Hz	200 Hz	Meas. Distance	3 m	3 m

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	0,15 MHz	0,15 MHz	Detector	Max Peak	Quasi Peak
Stop frequency	30 MHz	30 MHz	Measuring time	10 ms	1 s
Stepsize	5 kHz	5 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	9 kHz	9 kHz	Meas. Distance	3 m	3 m

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	30 MHz	30 MHz	Detector	Max Peak	QP/PK/AV
Stop frequency	2000 MHz	2000 MHz	Measuring time	10 ms	1 s / 100ms
Stepsize	50 kHz	50 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	120 kHz	120 kHz	Meas. Distance	3 m	3 m

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	2000 MHz	2000 MHz	Detector	Max Peak	Quasi Peak
Stop frequency	25000 MHz	25000 MHz	Measuring time	10 ms	1 s
Stepsize	50 kHz	50 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	120 kHz	120 kHz	Meas. Distance	1 m / < 1 m*	1 m / < 1 m*

* see photodocumentation

Operating mode	Measuring result
Data transmission at full rate	Measurement diagram 1-4

Test result:

4. 1.1.) Measurement with QP-Detector (0,009 – 30 MHz)

Due to the large margin of the pre-measurement results, no final measurement was performed.

4. 1.2.) Measurement with QP-Detector (30 - 200 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
48,00	29,4	40,0	10,6		135	136	vertical
195,90	14,5	43,5	29,0		387	226	horizontal

4. 1.3.) Measurement with QP-Detector (200 MHz - 1000 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
480,00	30,8	46,0	15,2		160	313	vertical
528,00	31,8	46,0	14,2		121	174	vertical
624,00	40,4	46,0	5,6		105	158	vertical
666,85	29,4	46,0	16,6		104	210	vertical
816,00	40,1	46,0	5,9		104	198	vertical
912,00	39,7	46,0	6,3		164	183	vertical

4. 1.4.) Measurement with AV-Detector (1000 – 2000 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed-Mark	Height cm	Azimuth deg	Polarization
1220,50	38,1	53,0	14,9		100	171	vertical
1235,50	41,3	53,0	11,7		100	171	vertical
1240,50	36,5	53,0	16,5		100	171	vertical

4. 1.4.) Measurement with PK-Detector (1000 – 2000 MHz)

The Peak should be 20dB above the AV Limit at maximum.

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed-Mark	Height cm	Azimuth deg	Polarization
1220,50	50,2	73,0	22,8		100	171	vertical
1235,50	56,4	73,0	16,6		100	171	vertical
1240,50	54,0	73,0	19,0		100	171	vertical

4. 1.5.) Measurement with PK-Detector (2000 - 25000 MHz)

No emission were found above noise level in the whole frequency range except for the fundamental of the bluetooth module located at 2,4 to 2,4835 GHz.

Appendix 1

Test equipment used

☒	Anechoic Chamber with 3m measurement distance	NT-100	☐	Switchbox	NT-202
☒	MA 240 - Antenna mast 1 - 4 m height	NT-110	☐	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
☒	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	☐	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
☒	HD 100 Controller Mast+Turntable	NT-112	☐	Digital Radio Tester CTS55	NT-208
☐	HUF-Z2 - Bicon. Antennna 20 - 300 MHz	NT-120	☐	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	☐	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☒	HFH-Z2 - Loop Antenna. 9 kHz - 30 MHz	NT-122	☐	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	☐	2945 - Radiocommunication analyzer ; 0,4 - 1000MHz	NT-212
☐	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	☐	2855S - Communication analyzer	NT-213
☒	3115 - Horn Antenna 1 - 18 GHz	NT-125	☐	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☒	3116 - Horn Antenna 18 - 40 GHz	NT-126	☐	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
☐	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127	☐	3160-10 Horn Antenna 26,5 GHz - 40 GHz	NT-216
☐	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128	☐	Radiocommunicationanalyzer SWR 1180 MD	NT-217
☒	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129	☐	TDS - 540 DSO Digital scope	NT-220
☐	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130	☐	PM97 Scopemeter	NT-221
☒	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131	☐	B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
☐	Loop Antenna H-Field	NT-132	☐	DFT 555 - Power and harmonics analyzer	NT-231
☐	Horn Antenna 500 MHz - 2900 MHz	NT-133	☐	EFA-3 H-field- / E-field probe	NT-243
☒	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	☐	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	☐	E-field probe (for use with EMR-200)	NT-245
☐	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	☐	Magneticfield-Sensor 300 kHz – 30 MHz	NT-246
☐	Conical Dipol Antenna PCD8250	NT-138	☐	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
☐	HZ-1 Antenna tripod	NT-150	☐	FCC-203I EM Injection clamp	NT-251
☒	BN 1500 Antenna tripod	NT-151	☐	FCC-203I-DCN Ferrite decoupling network	NT-252
☐	ESH3 - Test receiver 9 kHz - 30 MHz	NT-200	☐	PR50 Current Probe	NT-253
☐	ESVP - Test receiver 20 - 1000 MHz	NT-201	☐	Model 2000 Digital Multimeter	NT-261

Medizintechnik/
Nachrichtentechnik/EMV

Department: EMV

Test report number:
M/EMV-01/260

Page: 1 of 3

Date: 20. 12. 2001

Checked by: _____

Appendix 1 (continued)

Test equipment used

☐ Fluke 97 Digital Multimeter	NT-262	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐ Fluke 97 Digital Multimeter	NT-263	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☒ ESH2-Z5 Artificial mains network 4x25A	NT-300	☐ VDS 200 Mobil-impuls-generator	NT-350
☐ ESH3-Z5 Artificial mains network 2x10A	NT-301	☐ LD 200 Mobil-impuls-generator	NT-351
☐ ESH3-Z6 Artificial mains network 1x100A	NT-302	☐ MPG 200 Mobil-Impuls-Generators	NT-352
☐ ESH3-Z4 T-Artificial network	NT-303	☐ EFT 200 Mobil-impuls-generator	NT-353
☐ PHE 4500/B Power amplifier	NT-304	☐ FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
☐ EZ10 T-Artificial network	NT-305	☐ PHE 4500 - Mains impedance network	NT-401
☐ MidiStar Telephone exchange	NT-306	☐ FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
☐ SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐ IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐ PM 5518 TXVPS Video generator	NT-311	☐ ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐ RefRad Reference generator	NT-312	☐ IP 4 - Capacitive clamp (Burst)	NT-411
☐ SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐ HV-Attenuator 54,5 dB (Burst)	NT-420
☐ PEFT - Burst generator up to 4 kV	NT-320	☐ RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
☐ PSD - ESD generator up to 25 kV	NT-321	☐ RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
☐ ESD-Pistol	NT-322	☐ RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
☐ Vacuum-Relais up to 8 kV	NT-323	☐ RF-Attenuator 30 dB	NT-424
☐ PSURGE 4.1 Surge generator	NT-324	☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
☐ TRANSIENT 1000 Immunity test system	NT-325	☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426
☐ VCS 500-M6 Surge-Generator	NT-326	☐ Voltage-divider 1:100	NT-427
☐ BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	☐ RF-Attenuator 6 dB	NT-428
☐ 500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332	☐ RF-Attenuator 0 dB - 81 dB	NT-429
☐ AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333	☐ WRU 27 - Band blocking 27 MHz	NT-430
☒ Preamplifier 20 MHz - 3000 MHz	NT-334	☐ WHJ450C9 AA - High pass 450 MHz	NT-431
☐ 2-97201 Electronic load	NT-341	☐ WHJ250C9 AA - High pass 250 MHz	NT-432

Medizintechnik/
Nachrichtentechnik/EMV

Department: EMV

Test report number:
M/EMV-01/260

Page: 2 of 3

Date: 20. 12. 2001

Checked by: _____

Appendix 1 (continued)

Test equipment used

☐	RF-Load 150 W	NT-433	☐	Noise power test apparatus according to EN 55014	NT-530
☐	Impedance transducer 50 Ohm – 800 Ohm	NT-435	☐	Vertical coupling plane (ESD)	NT-531
☐	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	☐	Equipment for ESD-pulse verification.	NT-532
☒	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	☐	TEM-Zelle	NT-533
☐	Power Divider 6 dB/1 W/50 Ohm	NT-443	☐	ESV-24 Plotter adapter	NT-540
☐	Directional coupler 0,1 MHz – 70 MHz	NT-444	☒	Test cables	NT-550
☐	Directional coupler 0,1 MHz – 70 MHz	NT-445	☐	Test cable #4 for EN 61000-4-6	NT-553
☐	Tube imitations according to EN 55015	NT-450	☒	Test cable #3 for conducted emission	NT-554
☐	FCC-801-M5-25 Coupling decoupling network	NT-460	☐	Test cable #5 ESD-cable (2x470k)	NT-555
☐	FCC-801-AF10 Coupling decoupling network	NT-461	☐	Test cable #6 ESD-cable (2x470k)	NT-556
☐	FCC-801-S25 Coupling decoupling network	NT-462	☐	Serial data - fiber optic link	NT-557
☐	FCC-801-T4 Coupling decoupling network	NT-463	☒	Test cable #8 Sucoflex 104EA	NT-559
☐	FCC-801-C1 Coupling decoupling network	NT-464	☐	Test cable #9 (for outdoor measurements)	NT-580
☐	F-16A - Current probe 1kHz - 70MHz	NT-465	☐	Test cable #10 (for outdoor measurements)	NT-581
☒	PC P450 - Test computer	NT-500	☐	Test cable #13 PBA-33PBC-10	NT-584
☐	SE 284 GPIB - Plotter	NT 502	☐	Shield chamber	NT-600
☐	PC P133 Test computer #2	NT-504	☐	Climatic chamber -55°C to +180°C	M-512
☐	PC P200 MMX Notebook	NT-505	☐	Control and simulation equipment for EUT	---
☐	PC PIII 933 MHz Notebook	NT-506			
☐	7110 - Controlling device for E-Field probe	NT-510			
☐	Monitoring camera with Monitor	NT-511			
☐	BSR-V1 - Video transmission system (optical fiber link)	NT-512			
☒	ES-K1 Test software	NT-520			
☐	ESPC-K1 Test software	NT-521			
☐	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525			
☐	SPS_EM - Test software for PHE 4500/B	NT-527			

Medizintechnik/
Nachrichtentechnik/EMV

Department: EMV

Test report number:
M/EMV-01/260

Page: 3 of 3

Date: 20. 12. 2001

Checked by: _____

