

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

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

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

Serial Number: ---

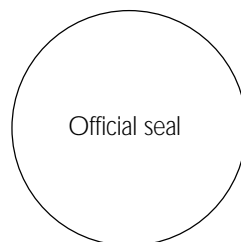
Standard: CFR 47 Part 15 (FCC Part 15)

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

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

DVR 0047 333
UID ATU 37086005

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1. Applicant

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

EUT received on December 19th 2001

Tests were performed on December 19th 2001

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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

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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

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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

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

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Test equipment used

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

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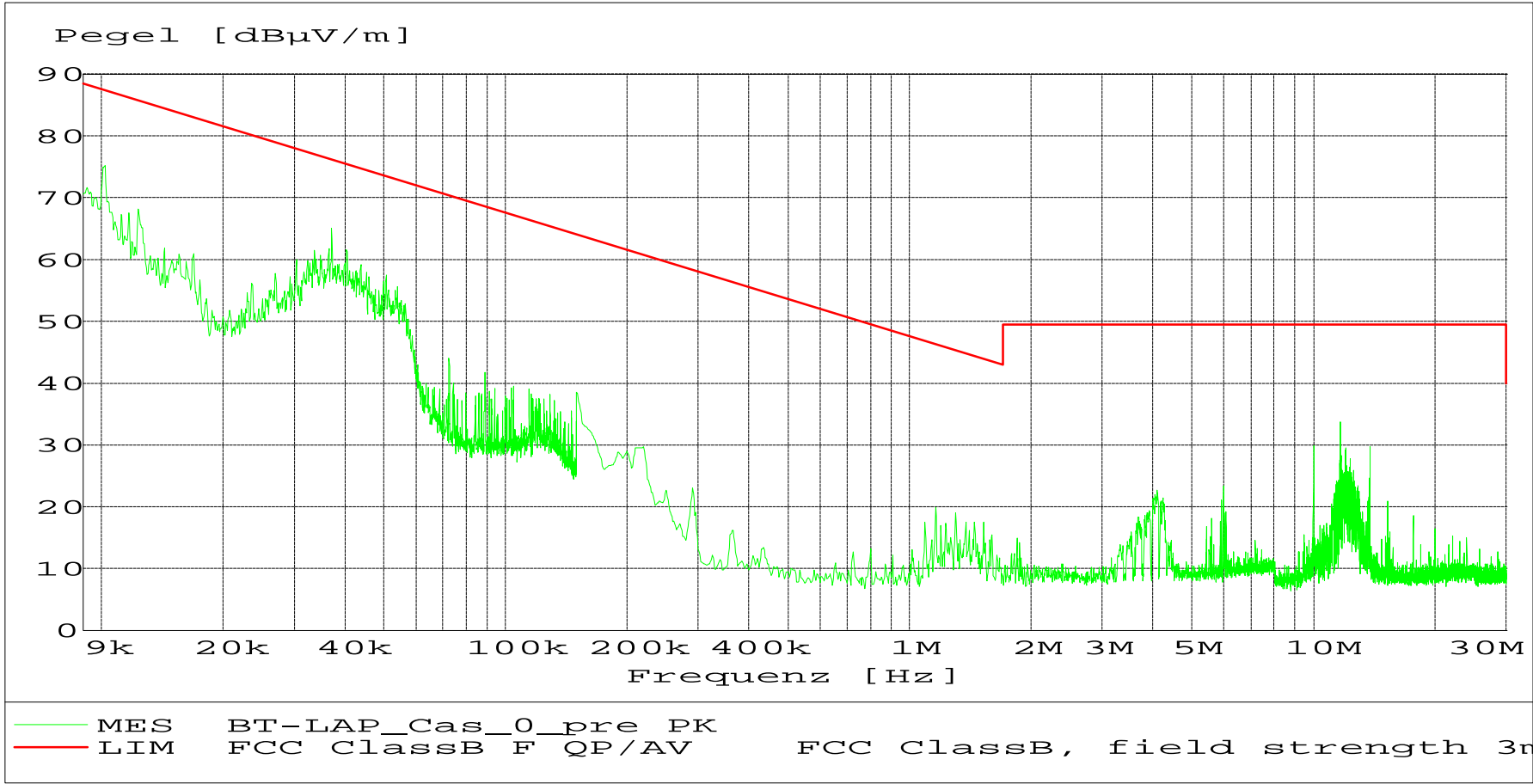
Date: 20. 12. 2001

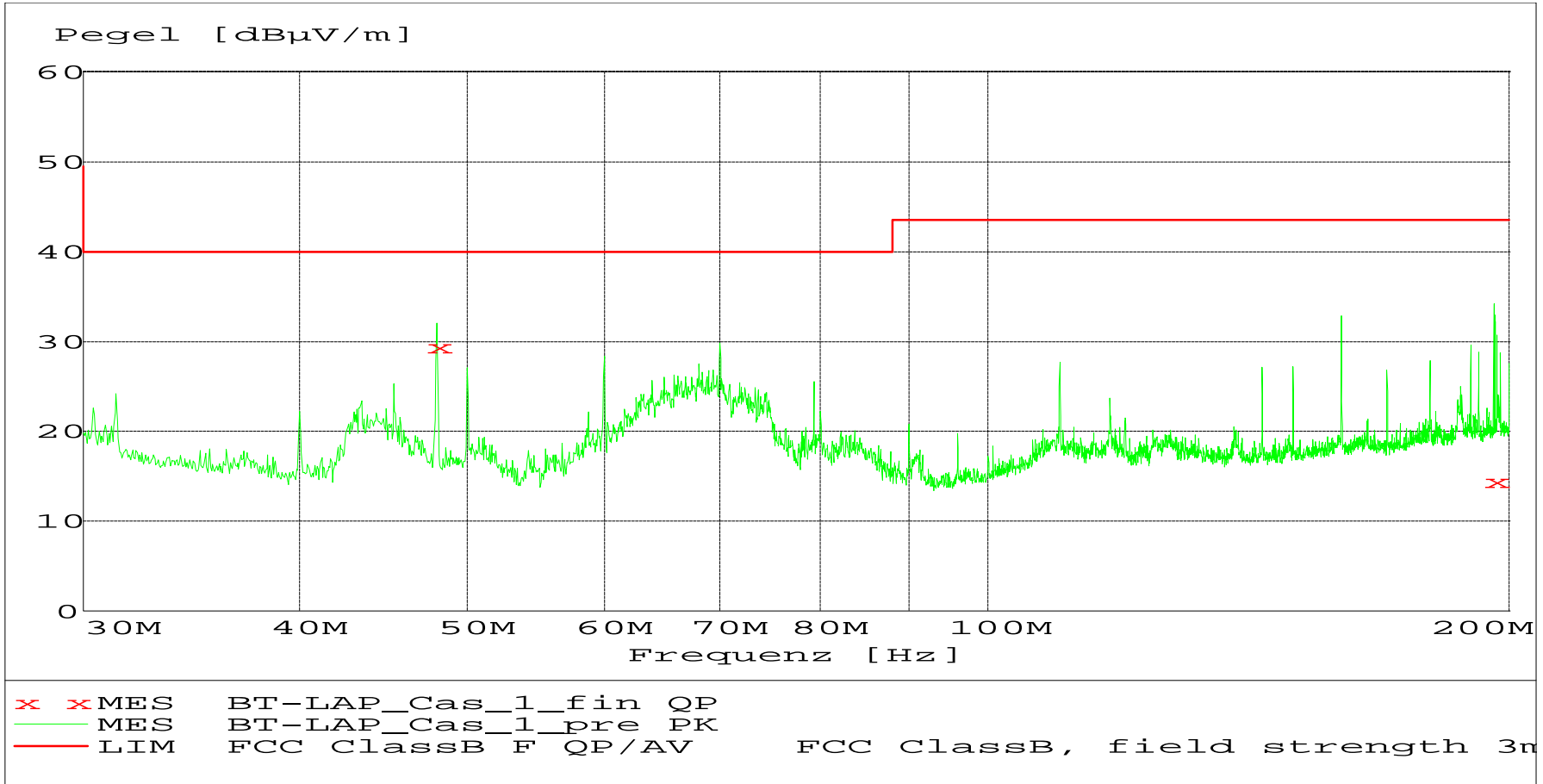
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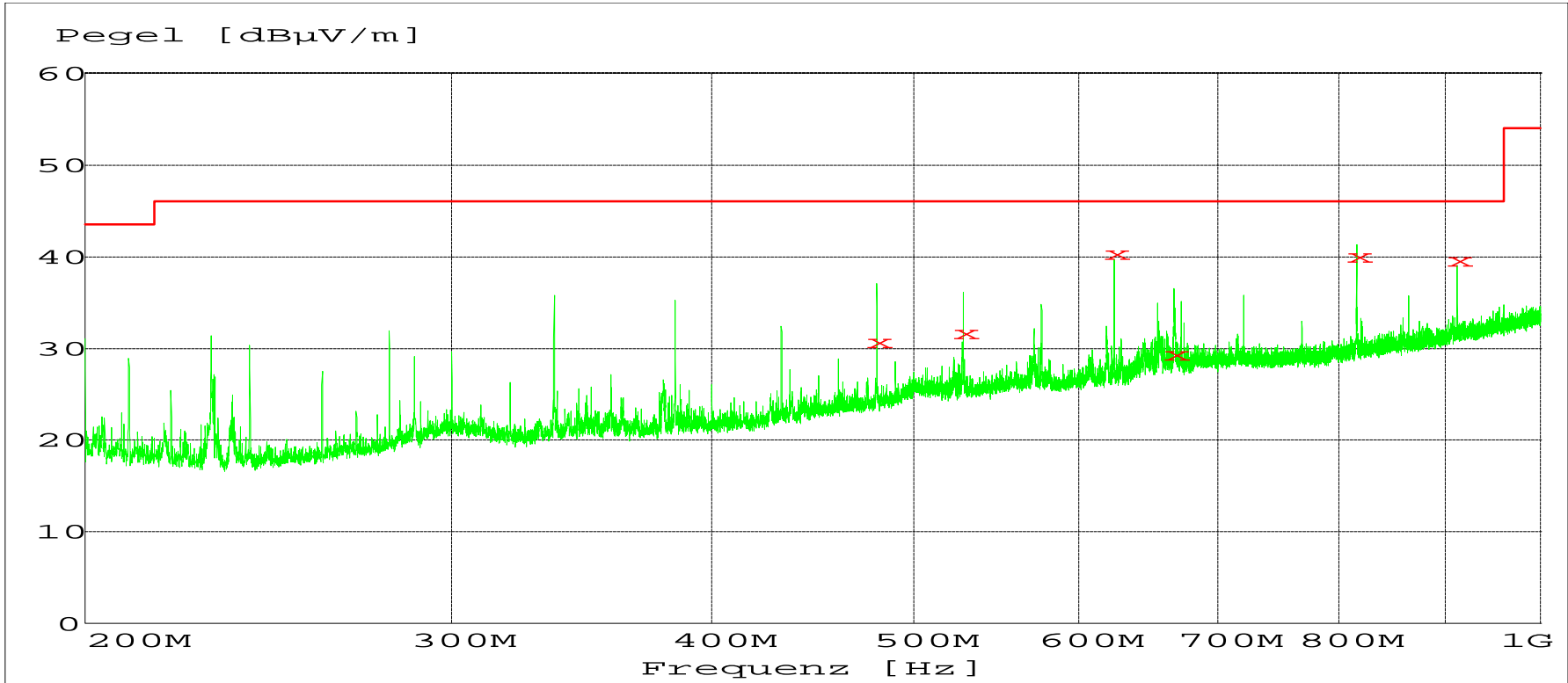
Appendix 1 (continued)

Test equipment used

<input type="checkbox"/>	RF-Load 150 W	NT-433	<input type="checkbox"/>	Noise power test apparatus according to EN 55014	NT-530	Medizintechnik/ Nachrichtentechnik/EMV
<input type="checkbox"/>	Impedance transducer 50 Ohm – 800 Ohm	NT-435	<input type="checkbox"/>	Vertical coupling plane (ESD)	NT-531	Department: EMV
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Equipment for ESD-pulse verification.	NT-532	Test report number: M/EMV-01/260
<input checked="" type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	TEM-Zelle	NT-533	Page: 3 of 3
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	ESV-24 Plotter adapter	NT-540	Date: 20. 12. 2001
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input checked="" type="checkbox"/>	Test cables	NT-550	Checked by: _____
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-445	<input type="checkbox"/>	Test cable #4 for EN 61000-4-6	NT-553	
<input type="checkbox"/>	Tube imitations according to EN 55015	NT-450	<input checked="" type="checkbox"/>	Test cable #3 for conducted emission	NT-554	
<input type="checkbox"/>	FCC-801-M5-25 Coupling decoupling network	NT-460	<input type="checkbox"/>	Test cable #5 ESD-cable (2x470k)	NT-555	
<input type="checkbox"/>	FCC-801-AF10 Coupling decoupling network	NT-461	<input type="checkbox"/>	Test cable #6 ESD-cable (2x470k)	NT-556	
<input type="checkbox"/>	FCC-801-S25 Coupling decoupling network	NT-462	<input type="checkbox"/>	Serial data - fiber optic link	NT-557	
<input type="checkbox"/>	FCC-801-T4 Coupling decoupling network	NT-463	<input checked="" type="checkbox"/>	Test cable #8 Sucoflex 104EA	NT-559	
<input type="checkbox"/>	FCC-801-C1 Coupling decoupling network	NT-464	<input type="checkbox"/>	Test cable #9 (for outdoor measurements)	NT-580	
<input type="checkbox"/>	F-16A - Current probe 1kHz - 70MHz	NT-465	<input type="checkbox"/>	Test cable #10 (for outdoor measurements)	NT-581	
<input checked="" type="checkbox"/>	PC P450 - Test computer	NT-500	<input type="checkbox"/>	Test cable #13 PBA-33PBC-10	NT-584	
<input type="checkbox"/>	SE 284 GPIB - Plotter	NT 502	<input type="checkbox"/>	Shield chamber	NT-600	
<input type="checkbox"/>	PC P133 Test computer #2	NT-504	<input type="checkbox"/>	Climatic chamber -55°C to +180°C	M-512	
<input type="checkbox"/>	PC P200 MMX Notebook	NT-505	<input type="checkbox"/>	Control and simulation equipment for EUT	---	
<input type="checkbox"/>	PC PIII 933 MHz Notebook	NT-506				
<input type="checkbox"/>	7110 - Controlling device for E-Field probe	NT-510				
<input type="checkbox"/>	Monitoring camera with Monitor	NT-511				
<input type="checkbox"/>	BSR-V1 - Video transmission system (optical fiber link)	NT-512				
<input checked="" type="checkbox"/>	ES-K1 Test software	NT-520				
<input type="checkbox"/>	ESPC-K1 Test software	NT-521				
<input type="checkbox"/>	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525				
<input type="checkbox"/>	SPS_EM - Test software for PHE 4500/B	NT-527				







x	MES	BT-LAP_Cas_2_fin	QP	
—	MES	BT-LAP_Cas_2_pre	PK	
—	LIM	FCC ClassB	F QP/AV	FCC ClassB, field strength 3m

