

TEST REPORT
of the accredited test laboratory

TÜV Nr.:M/FG-03/102

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

Tested Product: Identification system

Type: MOBY U SLG U92 RS422
tested in combination with MOBY U MDS U 524

Manufacturer: Siemens AG Österreich
A-1030 Wien; Erdberger Lände 26

Output power / field strength: 4,6 mV/m @ 3m **Spannungsversorgung:** 20 – 30 VDC
distance

Frequency range: 2400 – 2483,5 MHz **Channel separation:** 819,2 kHz

Standard: FCC: 47 CFR 15.249

Geschäftsbereich
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Nachrichtentechnik
und EMV

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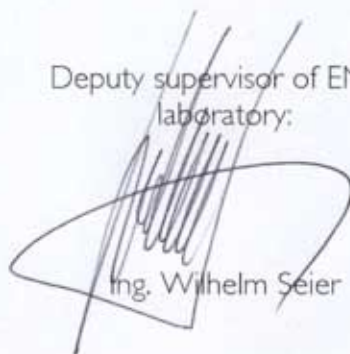
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23. 1. 2003
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The results of this test report only refer to the provided equipment.

LIST OF MEASUREMENTS

The complete list of measurements called for in 47 CFR 15.249 is given below.

SUBCLAUSE	PARAMETER TO BE MEASURED	PAGE
	Intentional Radiators	
15.249 a	Field strength	3-5
15.249 c	Radiated emissions	6
	Unintentional Radiators	
15.109	Radiated emissions	7
	Additional information	8



FIELD STRENGTH (Intentional Radiator)

§ 15.249/a

Measured on channel 0 / 13 (see page 8 for details)

Field strength at a distance of 3m						
f (MHz)	Bandwidth (MHz)	Limit (µV/m) (Average)	Average detector		Peak detector	
			dBµV/m	µV/m	dBµV/m	µV/m
2401,11	1	50000	63,14	1435,49	85,92	19769,70
2411,76	1	50000	73,32	4634,47	86,82	21928,05
4802,22	1	500	41,9	124,45	60,4	1047,13
4823,52	1	500	52,4	416,87	62,3	1303,17
7203,33	1	500	43,5	149,62	61,7	1216,19
7235,28	1	500	53,2	457,09	64,8	1737,80
9604,44	1	500	43,7	153,11	59,8	977,24
9647,04	1	500	51,6	380,19	62,8	1380,38
12058,8	1	500	47,6	239,88	59,9	988,55
14470,56	1	500	49,9	312,61	61,5	1188,50
16882,32	1	500	51,2	363,08	63,2	1445,44
Measurement uncertainty ± 6 dB						

Bandwidth: this refers to the bandwidth of the measurement receiver

LIMIT

§ 15.249/a

f (MHz)	Bandwidth (MHz)	Field strength at a distance of 3 m	
		of fundamental emissions (mV/m)	of harmonic emissions (µV/m)
2400-2483,5	1	50	500

The above standing field strength limit is based on average limits.

Reference numbers of test equipment used:

NT-100; NT-110; NT-111; NT-112; NT-125; NT-126; NT-150; NT-207; NT-500; NT-520; NT-550

FIELD STRENGTH (Intentional Radiator)

§ 15.249/a

Measured on channel 44 / 57 (see page 8 for details)

Field strength at a distance of 3m						
f (MHz)	Bandwidth (MHz)	Limit (µV/m) (Average)	Average detector		Peak detector	
			dBµV/m	µV/m	dBµV/m	µV/m
2437,15	1	50000	54,42	526,02	83,89	15649,48
2447,8	1	50000	68,81	2757,40	84,1	16032,45
4874,3	1	500	39,24	91,62	57,6	758,58
4895,6	1	500	52,4	416,87	62,3	1303,17
7311,45	1	500	39,1	90,16	56,4	660,69
7343,4	1	500	52,8	436,52	61,2	1148,15
9748,6	1	500	43,4	147,91	61,3	1161,45
9791,2	1	500	51,2	363,08	60,4	1047,13
17134,6	1	500	47,1	226,46	60,8	1096,48
Measurement uncertainty ± 6 dB						

Bandwidth: this refers to the bandwidth of the measurement receiver

LIMIT

§ 15.249/a

f (MHz)	Bandwidth (MHz)	Field strength at a distance of 3 m	
		of fundamental emissions (mV/m)	of harmonic emissions (µV/m)
2400-2483,5	1	50	500

The above standing field strength limit is based on average limits.

Reference numbers of test equipment used:

NT-100; NT-110; NT-111; NT-112; NT-125; NT-126; NT-150; NT-207; NT-500; NT-520; NT-550

FIELD STRENGTH (Intentional Radiator)

§ 15.249/a

Measured on channel 86 / 99 (see page 8 for details)

Field strength at a distance of 3m						
f (MHz)	Bandwidth (MHz)	Limit (µV/m) (Average)	Average detector		Peak detector	
			dBµV/m	µV/m	dBµV/m	µV/m
2471,56	1	50000	55,96	628,06	82,09	12720,38
2482,21	1	50000	69,6	3019,95	84,33	16462,66
4943,12	1	500	42,7	136,46	61	1122,02
4964,42	1	500	53,7	484,17	64,4	1659,59
7414,68	1	500	44,7	171,79	63,8	1548,82
7446,63	1	500	53	446,68	61,4	1174,90
9886,24	1	500	44,8	173,78	62,7	1364,58
9928,84	1	500	53	446,68	63,3	1462,18
12411,05	1	500	47	223,87	60,8	1096,48
14893,26	1	500	53,2	457,09	62,2	1288,25
17375,47	1	500	51,1	358,92	64,1	1603,25
Measurement uncertainty ± 6 dB						

Bandwidth: this refers to the bandwidth of the measurement receiver

LIMIT

§ 15.249/a

f (MHz)	Bandwidth (MHz)	Field strength at a distance of 3 m	
		of fundamental emissions (mV/m)	of harmonic emissions (µV/m)
2400-2483,5	1	50	500

The above standing field strength limit is based on average limits.

Reference numbers of test equipment used:

NT-100; NT-110; NT-111; NT-112; NT-125; NT-126; NT-150; NT-207; NT-500; NT-520; NT-550



RADIATED EMISSIONS (Intentional Radiator)

§ 15.249/c

Radiated Emissions at a distance of 3 m				
No other emissions additional to the harmonics were found above noise level.				
Measurement uncertainty ± 6 dB				

Bandwidth: this refers to the bandwidth of the measurement receiver

LIMIT

§ 15.249/c according to § 15.209

f (MHz)	Bandwidth (kHz)	Meas. distance (m)	Field strength ($\mu\text{V}/\text{m}$)
0,009-0,150	0,2	300	2400/f (kHz)
0,150-0,490	9	300	2400/f (kHz)
0,490-1,705	9	30	24000/f (kHz)
1,705-30,0	9	30	30
30-88	120	3	100
88-216	120	3	150
216-960	120	3	200
960-1000	120	3	500
1000-2400	1000	3	500
above 2483,5	1000	3	500

The above standing field strength limits in the frequency band 9-90kHz, 110-490 kHz and above 1 GHz are based on average limits. All other above standing limits are based on quasi peak limits.

Reference numbers of test equipment used:

01-04, 34, 59, 65



RADIATED EMISSIONS (Unintentional Radiator)

§ 15.109/a

Radiated Emissions at a distance of 3 m				
f (MHz)	BW (kHz)	Limit (µV/m)	Field strength (dBµV/m) QP	Field strength (µV/m) QP
149,9	120	150	27,5	23,71
491,55	120	200	37,1	71,61
Measurement uncertainty ± 6 dB				

Bandwidth: this refers to the bandwidth of the measurement receiver

LIMIT (Class B digital device)

§ 15.109/a

f (MHz)	Bandwidth (kHz)	Meas. distance (m)	Field strength (µV/m)
30-88	120	3	100
88-216	120	3	150
216-960	120	3	200
960-1000	120	3	500
above 1000	1000	3	500

The above standing field strength limits in the frequency band above 1 GHz are based on average limits. All other above standing limits are based on quasi peak limits.

Reference numbers of test equipment used:

01-04, 34, 59, 65



Additional information supplementary to the test report

The „Moby U“ system is intended to be used for identification purposes. It uses one or more SLGs (writing and reading station) and one or multiple MDSs (mobile data memory).

The SLG operates, also during the test, as follows:

Two signals are transmitted in the downlink mode (writing data from SLG to MDS). The lower is a CW carrier without modulation. The data carrier, modulated with a 384 ksym/s GMSK modulation, is situated 10.6496 MHz (13 channels) above the CW carrier.

During the uplink only the CW carrier will get transmitted.

Every SLG is able to handle more than one MDS at a time. The maximum number is 12, minimum 6. This number is depending on the number of timeslots used. During the test 6 timeslots were used, to get the minimal transmit interval. The manufacturer declared that for every MDS communicating with the SLG another channel is used, so there is no need to use more than one MDS during testing and measuring emissions on one radio channel.

The MDS does not contain any RF generation, the MDS uses the RF energy of the two transmitted channels of the SLG to demodulate and receive data from SLG. It uses the unmodulated carrier from SLG for transmitting an answer back. Because of this, the MDS and SLG were tested together and all test results contained in this report refer to both products.

Measurement diagrams:

Page No.		Remarks
1	9 kHz – 30 MHz	Mode of operation as declared above on channels 44/57
2	30 – 200 MHz	Mode of operation as declared above on channels 44/57
3	200 – 1000 MHz	Mode of operation as declared above on channels 44/57
4	1 – 3 GHz	Mode of operation as declared above on channels 44/57

Because there were nothing to see in the spectrum above 3 GHz above noise level, except the harmonics, we didn't plot graphs, although we measured to the 10th harmonic.



Appendix 1

Test equipment used

☐ Anechoic Chamber with 3m measurement distance	NT-100	☐ ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
☐ MA 240 - Antenna mast 1 - 4 m height	NT-110	☐ ESI26 - Test receiver 20 Hz - 26,5 GHz	NT-207
☐ DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	☐ Digital Radio Tester CTS55	NT-208
☐ HD 100 Controller Mast+Turntable	NT-112	☐ Noise-gen., ITU-R 559-2 20 Hz - 20 kHz	NT-209
☐ HUF-Z2 - Bicon. Antenna 20 - 300 MHz	NT-120	☐ CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐ HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	☐ 3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐ HFH-Z2 - Loop Antenna 9 kHz - 30 MHz	NT-122	☐ Radiocommunication analyzer Marconi 2945A	NT-212
☐ HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	☐ 2855S - Communication analyzer	NT-213
☐ 3121C - Dipole Antenna 28 - 1000 MHz	NT-124	☐ Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐ 3115 - Horn Antenna 1 - 18 GHz	NT-125	☐ Diode Detector 0,01 GHz - 26,5 GHz	NT-215
☐ 3116 - Horn Antenna 18 - 40 GHz	NT-126	☐ 3160-10 Horn Antenna 26,5 GHz - 40 GHz	NT-216
☐ SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127	☐ Radiocommunication analyzer SWR 1180 MD	NT-217
☐ AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128	☐ Mixer M19HWD 40 GHz - 60 GHz	NT-218
☐ HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129	☐ Mixer M12HWD 60 GHz - 90 GHz	NT-219
☐ HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130	☐ TDS - 540 DSO Digital scope	NT-220
☐ 3146 - Log. Per. Ant. 200 - 1000MHz	NT-131	☐ PM97 Scopemeter	NT-221
☐ Loop Antenna H-Field	NT-132	☐ B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
☐ Horn Antenna 500 MHz - 2900 MHz	NT-133	☐ DFT 555 - Power and harmonics analyzer	NT-231
☐ Log. per. Antenna 800 MHz - 2500 MHz	NT-134	☐ EFA-3 H-field- / E-field probe	NT-243
☐ Log. per. Antenna 800 MHz - 2500 MHz	NT-135	☐ E-field measuring instrument EMR-200; 100 kHz - 3 GHz	NT-244
☐ BiConiLog Antenna 26 MHz - 2000 MHz	NT-137	☐ E-field probe 100 kHz - 3 GHz	NT-245
☐ Conical Dipol Antenna PCD8250	NT-138	☐ Magneticfield-Sensor 300 kHz - 30 MHz	NT-246
☐ HZ-1 Antenna tripod	NT-150	☐ E-field probe 10 MHz - 18 GHz	NT-247
☐ BN 1500 Antenna tripod	NT-151	☐ H-field probe 10 MHz - 1 GHz	NT-248
☐ ESVP - Test receiver 20 - 1000 MHz	NT-201	☐ MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
☐ Switchbox	NT-202	☐ FCC-2031 EM Injection clamp	NT-251

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Department: FG

Test report number:
M/FG-03/102

Page: 1 of 3

Date: 23. 1. 2003

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Appendix 1 (continued) Test equipment used

☐ FCC-2031-DCN Ferrite decoupling network	NT-252	☐ 500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
☐ PR50 Current Probe	NT-253	☐ AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
☐ Model 2000 Digital Multimeter	NT-261	☐ APA01 - RF-Amplifier 0,5 GHz - 2,5 GHz	NT-334
☐ Fluke 97 Digital Multimeter	NT-262	☐ Preamplifier 1 GHz - 4 GHz	NT-335
☐ Fluke 97 Digital Multimeter	NT-263	☐ 2-97201 Electronic load	NT-341
☐ ESH2-Z5 Artificial mains network 4x25A	NT-300	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐ ESH3-Z5 Artificial mains network 2x10A	NT-301	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐ ESH3-Z6 Artificial mains network 1x100A	NT-302	☐ VDS 200 Mobil-impuls-generator	NT-350
☐ ESH3-Z4 T-Artificial network	NT-303	☐ LD 200 Mobil-impuls-generator	NT-351
☐ PHE 4500/B Power amplifier	NT-304	☐ MPG 200 Mobil-Impuls-Generators	NT-352
☐ EZ10 T-Artificial network	NT-305	☐ EFT 200 Mobil-impuls-generator	NT-353
☐ MidiStar Telephone exchange	NT-306	☐ FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
☐ SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐ PHE 4500 - Mains impedance network	NT-401
☐ PM 5518 TXVPS Video generator	NT-311	☐ FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
☐ RefRad Reference generator	NT-312	☐ IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐ SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐ ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐ 40 MHz Arbitrary Generator T1241	NT-315	☐ IP 4 - Capacitive clamp (Burst)	NT-411
☐ PEFT - Burst generator up to 4 kV	NT-320	☐ HV-Attenuator 54,5 dB (Burst)	NT-420
☐ PSD - ESD generator up to 25 kV	NT-321	☐ RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
☐ ESD-Pistol	NT-322	☐ RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
☐ Vacuum-Relais up to 8 kV	NT-323	☐ RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
☐ PSURGE 4.1 Surge generator	NT-324	☐ RF-Attenuator 30 dB	NT-424
☐ TRANSIENT 1000 Immunity test system	NT-325	☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
☐ VCS 500-M6 Surge-Generator	NT-326	☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426
☐ BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	☐ Voltage-divider 1:100	NT-427

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Department: FG

Test report number:
M/FG-03/102

Page: 2 of 3

Date: 23. 1. 2003

Checked by: 



Appendix 1 (continued)

Test equipment used

☐ RF-Attenuator 6 dB	NT-428	☐ BSR-V1 - Video transmission system (optical fiber link)	NT-512
☐ RF-Attenuator 0 dB - 81 dB	NT-429	☐ ES-K1 Test software	NT-520
☐ WRU 27 - Band blocking 27 MHz	NT-430	☐ ESPC-K1 Test software	NT-521
☐ WHJ450C9 AA - High pass 450 MHz	NT-431	☐ SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
☐ WHJ250C9 AA - High pass 250 MHz	NT-432	☐ SPS_EM - Test software for PHE 4500/B	NT-527
☐ 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 P4 1700 MHz 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		

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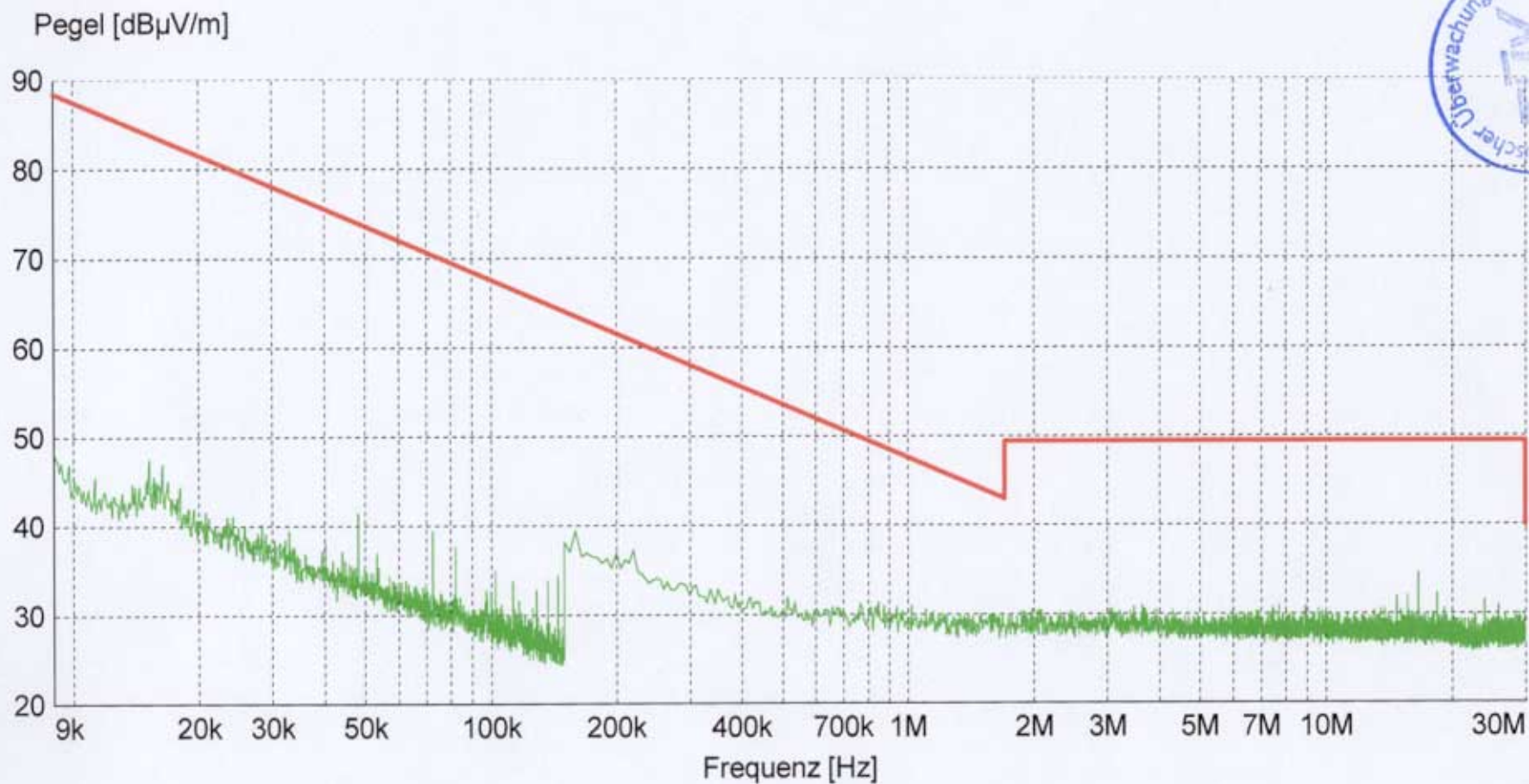
Test report number:
M/FG-03/102

Page: 3 of 3

Date: 23. 1. 2003

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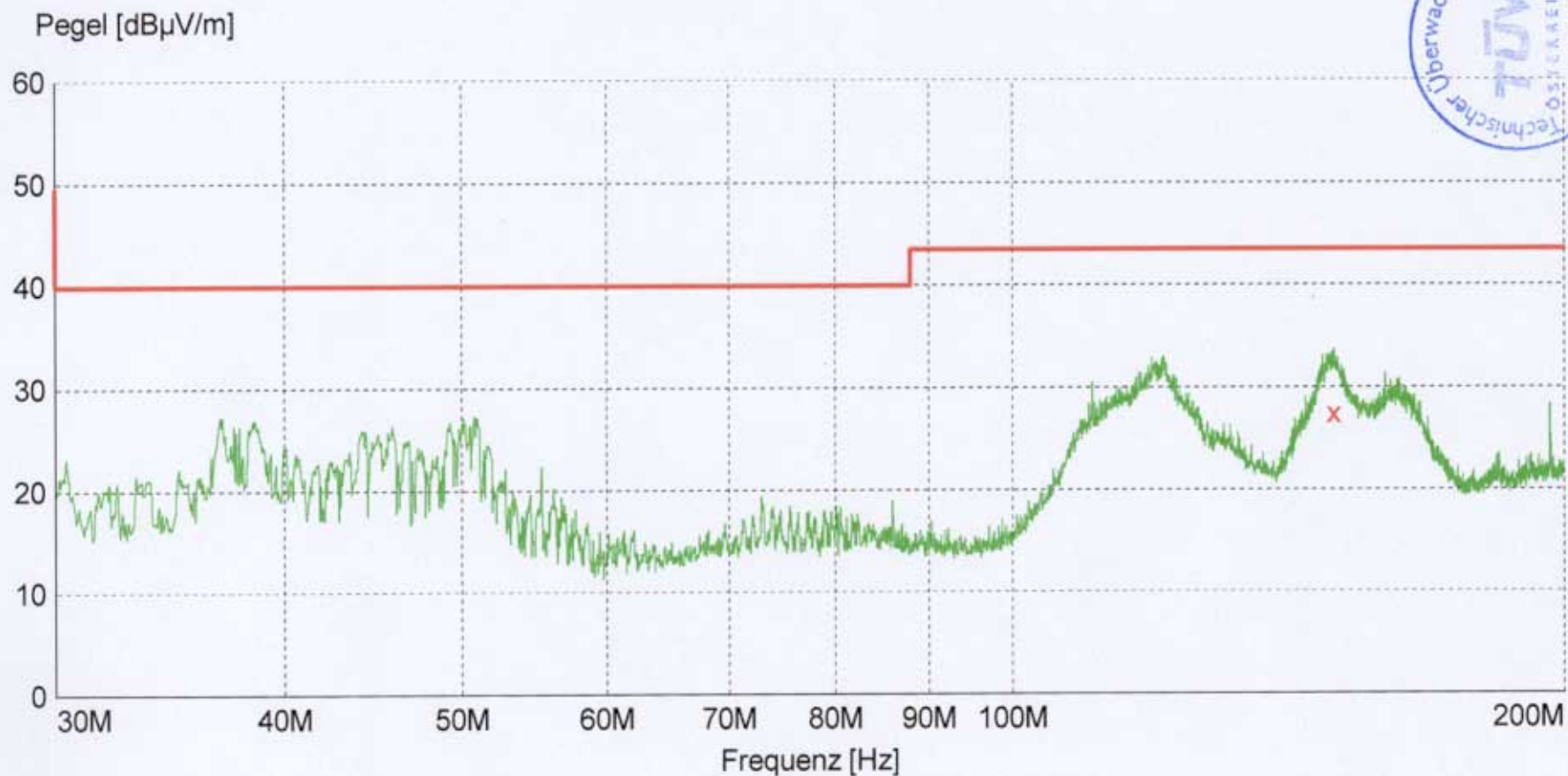




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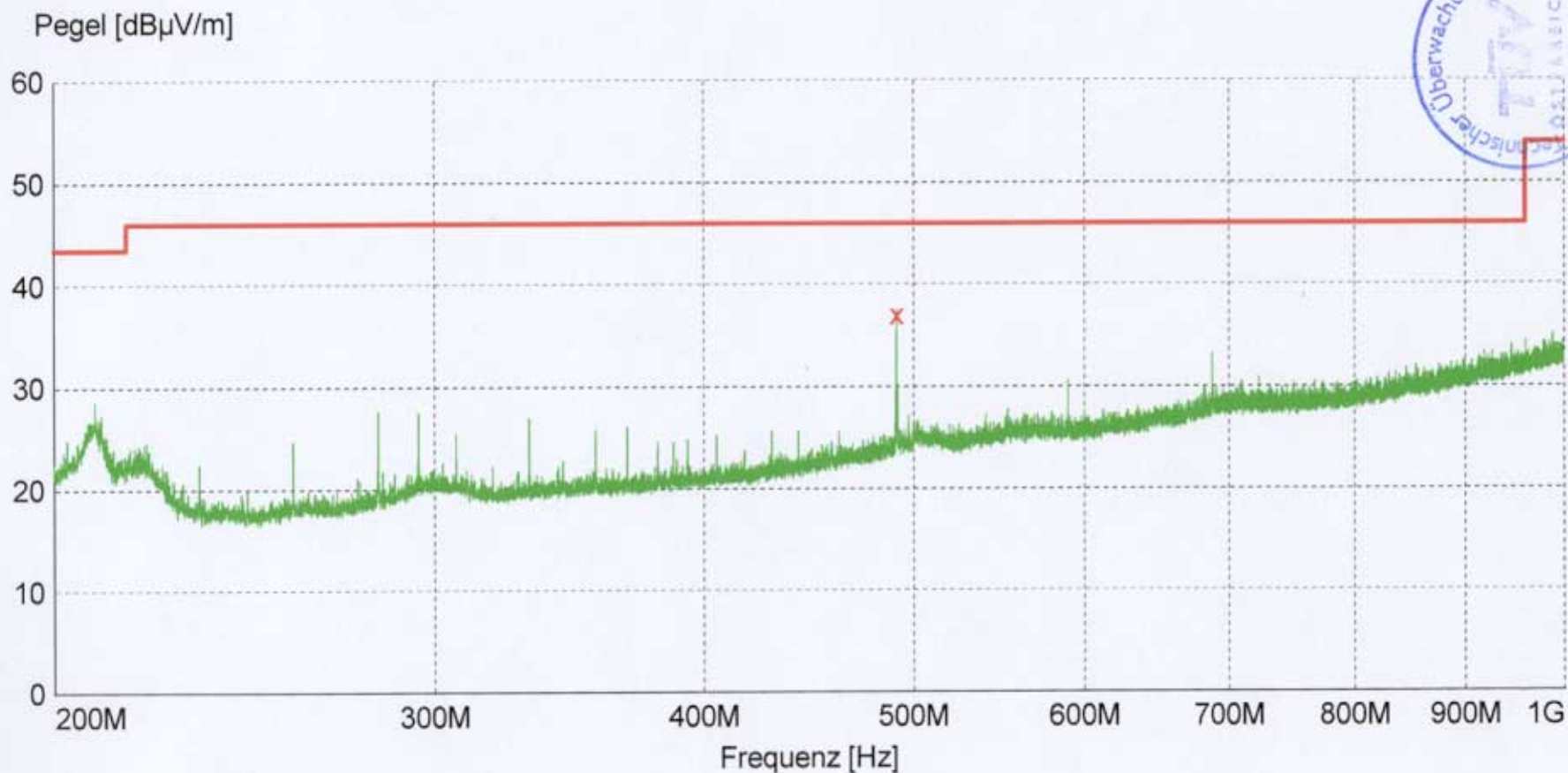
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FCC ClassB, field strength 3m



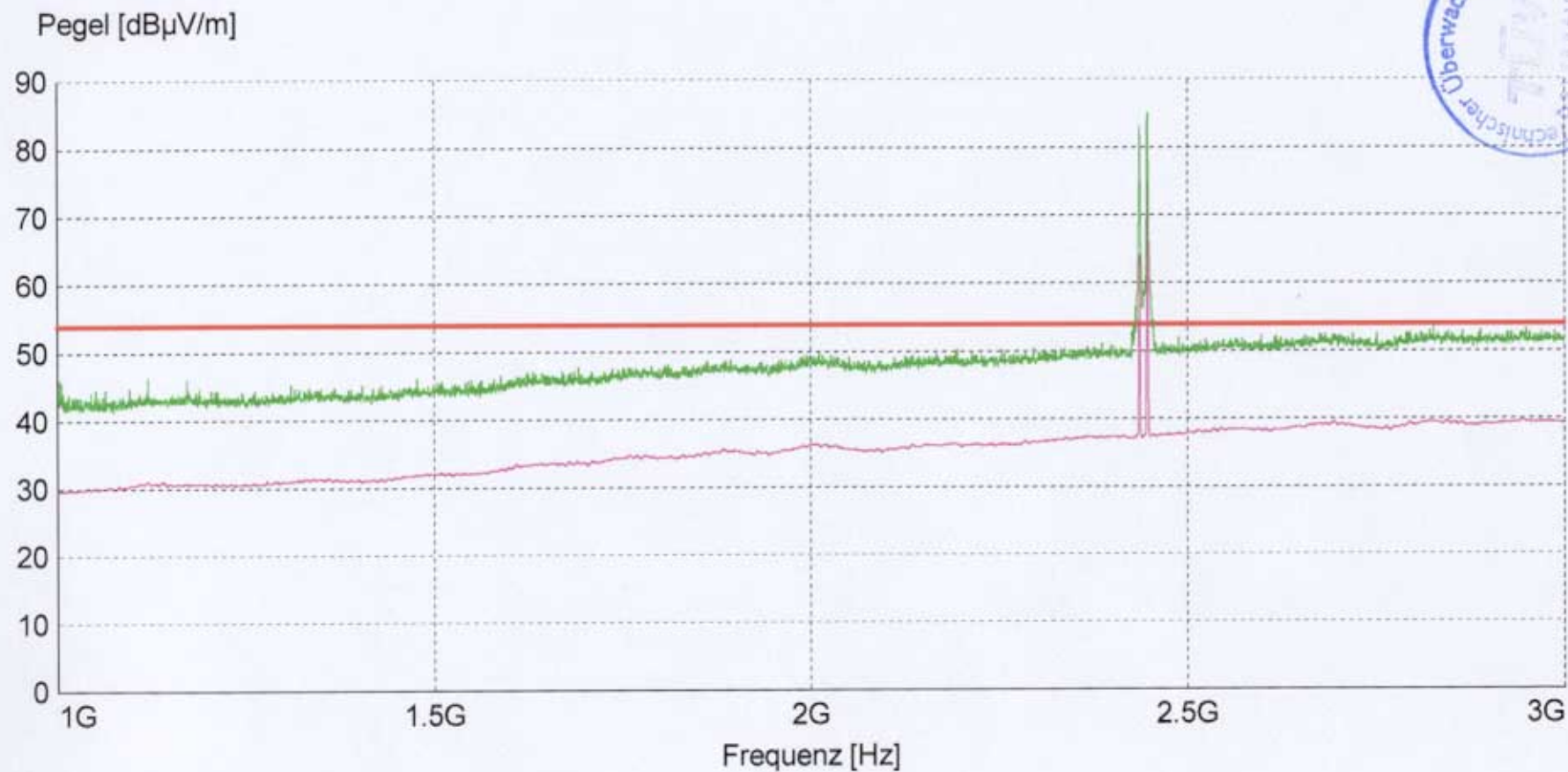
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FCC ClassB, field strength 3m



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FCC ClassB, field strength 3m



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— LIM FCC ClassB F QP/AV

FCC ClassB, field strength 3m