

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 **Channel separation:** 819,2 kHz
MHz

Standard: FCC: 47 CFR 15.249

Geschäftsbereich
Medizintechnik,
Nachrichtentechnik
und EMV

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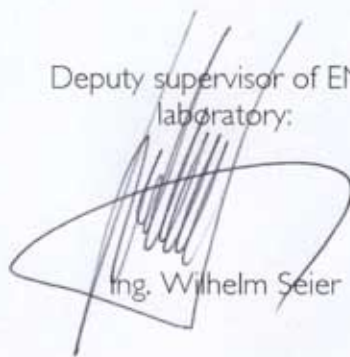
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Ing. Wilhelm Seier



23. 1. 2003
Copy Nbr.: 11

checked by:


Ing. Klaus Röttsch

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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				

Bandwith: this refers to the bandwith of the measurement receiver

LIMIT § 15.249/c according to § 15.209

f (MHz)	Bandwith (kHz)	Meas. distance (m)	Field strength (μ V/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 more 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

<input type="checkbox"/>	Anechoic Chamber with 3m measurement distance	NT-100	<input type="checkbox"/>	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
<input type="checkbox"/>	MA 240 - Antenna mast 1 - 4 m height	NT-110	<input type="checkbox"/>	ESI26 - Test receiver 20 Hz - 26,5 GHz	NT-207
<input type="checkbox"/>	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	<input type="checkbox"/>	Digital Radio Tester CTS55	NT-208
<input type="checkbox"/>	HD 100 Controller Mast+Turntable	NT-112	<input type="checkbox"/>	Noise-gen., ITU-R 559-2 20 Hz - 20 kHz	NT-209
<input type="checkbox"/>	HUF-Z2 - Bicon. Antenna 20 - 300 MHz	NT-120	<input type="checkbox"/>	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
<input type="checkbox"/>	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	<input type="checkbox"/>	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
<input type="checkbox"/>	HFH-Z2 - Loop Antenna. 9 kHz - 30 MHz	NT-122	<input type="checkbox"/>	Radiocommunicationanalyzer Marconi 2945A	NT-212
<input type="checkbox"/>	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	<input type="checkbox"/>	28555 - Communication analyzer	NT-213
<input type="checkbox"/>	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	<input type="checkbox"/>	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
<input type="checkbox"/>	3115 - Horn Antenna 1 - 18 GHz	NT-125	<input type="checkbox"/>	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
<input type="checkbox"/>	3116 - Horn Antenna 18 - 40 GHz	NT-126	<input type="checkbox"/>	3160-10 Horn Antenna 26,5 GHz - 40 GHz	NT-216
<input type="checkbox"/>	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127	<input type="checkbox"/>	Radiocommunicationanalyzer SWR 1180 MD	NT-217
<input type="checkbox"/>	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128	<input type="checkbox"/>	Mixer M19HWD 40 GHz - 60 GHz	NT-218
<input type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129	<input type="checkbox"/>	Mixer M12HWD 60 GHz - 90 GHz	NT-219
<input type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130	<input type="checkbox"/>	TDS - 540 DSO Digital scope	NT-220
<input type="checkbox"/>	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131	<input type="checkbox"/>	PM97 Scopemeter	NT-221
<input type="checkbox"/>	Loop Antenna H-Field	NT-132	<input type="checkbox"/>	B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
<input type="checkbox"/>	Horn Antenna 500 MHz - 2900 MHz	NT-133	<input type="checkbox"/>	DFT 555 - Power and harmonics analyzer	NT-231
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	<input type="checkbox"/>	EFA-3 H-field- / E-field probe	NT-243
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	<input type="checkbox"/>	E-field measuring instrument EMR-200; 100 kHz - 3 GHz	NT-244
<input type="checkbox"/>	BiConiLog Antenna 26 MHz - 2000 MHz	NT-137	<input type="checkbox"/>	E-field probe 100 kHz - 3 GHz	NT-245
<input type="checkbox"/>	Conical Dipol Antenna PCD8250	NT-138	<input type="checkbox"/>	Magneticfield-Sensor 300 kHz - 30 MHz	NT-246
<input type="checkbox"/>	HZ-1 Antenna tripod	NT-150	<input type="checkbox"/>	E-field probe 10 MHz - 18 GHz	NT-247
<input type="checkbox"/>	BN 1500 Antenna tripod	NT-151	<input type="checkbox"/>	H-field probe 10 MHz - 1 GHz	NT-248
<input type="checkbox"/>	ESVP - Test receiver 20 - 1000 MHz	NT-201	<input type="checkbox"/>	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
<input type="checkbox"/>	Switchbox	NT-202	<input type="checkbox"/>	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

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

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Department: FG

Test report number:
MFG-03/102

Page: 2 of 3

Date: 23. 1. 2003

Checked by: 



Appendix 1 (continued)

Test equipment used

<input type="checkbox"/>	RF-Attenuator 6 dB	NT-428	<input type="checkbox"/>	BSR-V1 - Video transmission system (optical fiber link)	NT-512
<input type="checkbox"/>	RF-Attenuator 0 dB - 81 dB	NT-429	<input type="checkbox"/>	ES-K1 Test software	NT-520
<input type="checkbox"/>	WRU 27 - Band blocking 27 MHz	NT-430	<input type="checkbox"/>	ESPC-K1 Test software	NT-521
<input type="checkbox"/>	WHJ450C9 AA - High pass 450 MHz	NT-431	<input type="checkbox"/>	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
<input type="checkbox"/>	WHJ250C9 AA - High pass 250 MHz	NT-432	<input type="checkbox"/>	SPS_EM - Test software for PHE 4500/B	NT-527
<input type="checkbox"/>	RF-Load 150 W	NT-433	<input type="checkbox"/>	Noise power test apparatus according to EN 55014	NT-530
<input type="checkbox"/>	Impedance transducer 50 Ohm – 800 Ohm	NT-435	<input type="checkbox"/>	Vertical coupling plane (ESD)	NT-531
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Equipment for ESD-pulse verification.	NT-532
<input type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	TEM-Zelle	NT-533
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	ESV-24 Plotter adapter	NT-540
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input type="checkbox"/>	Test cables	NT-550
<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 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 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 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 P4 1700 MHz 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			

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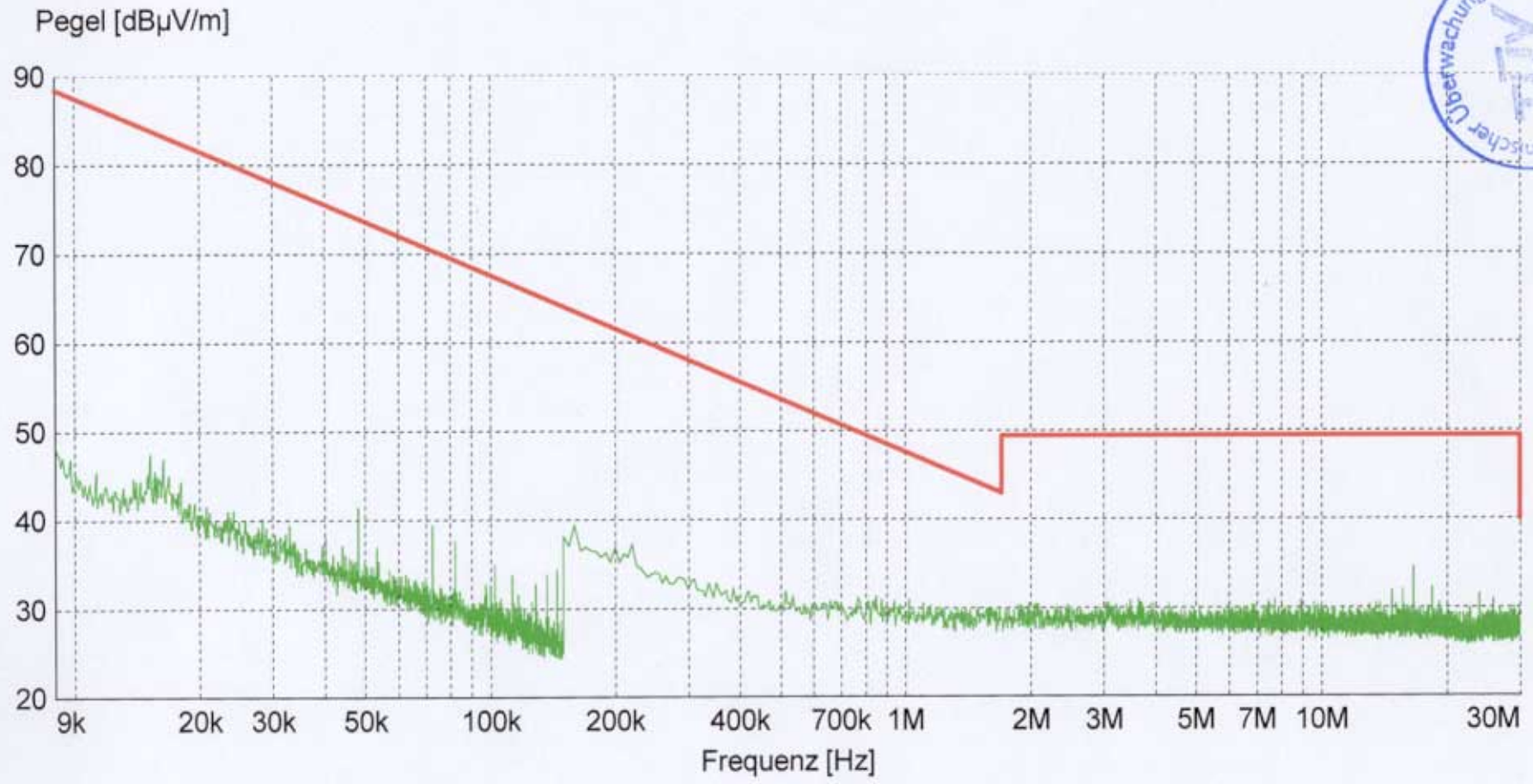
Test report number:
MFG-03/102

Page: 3 of 3

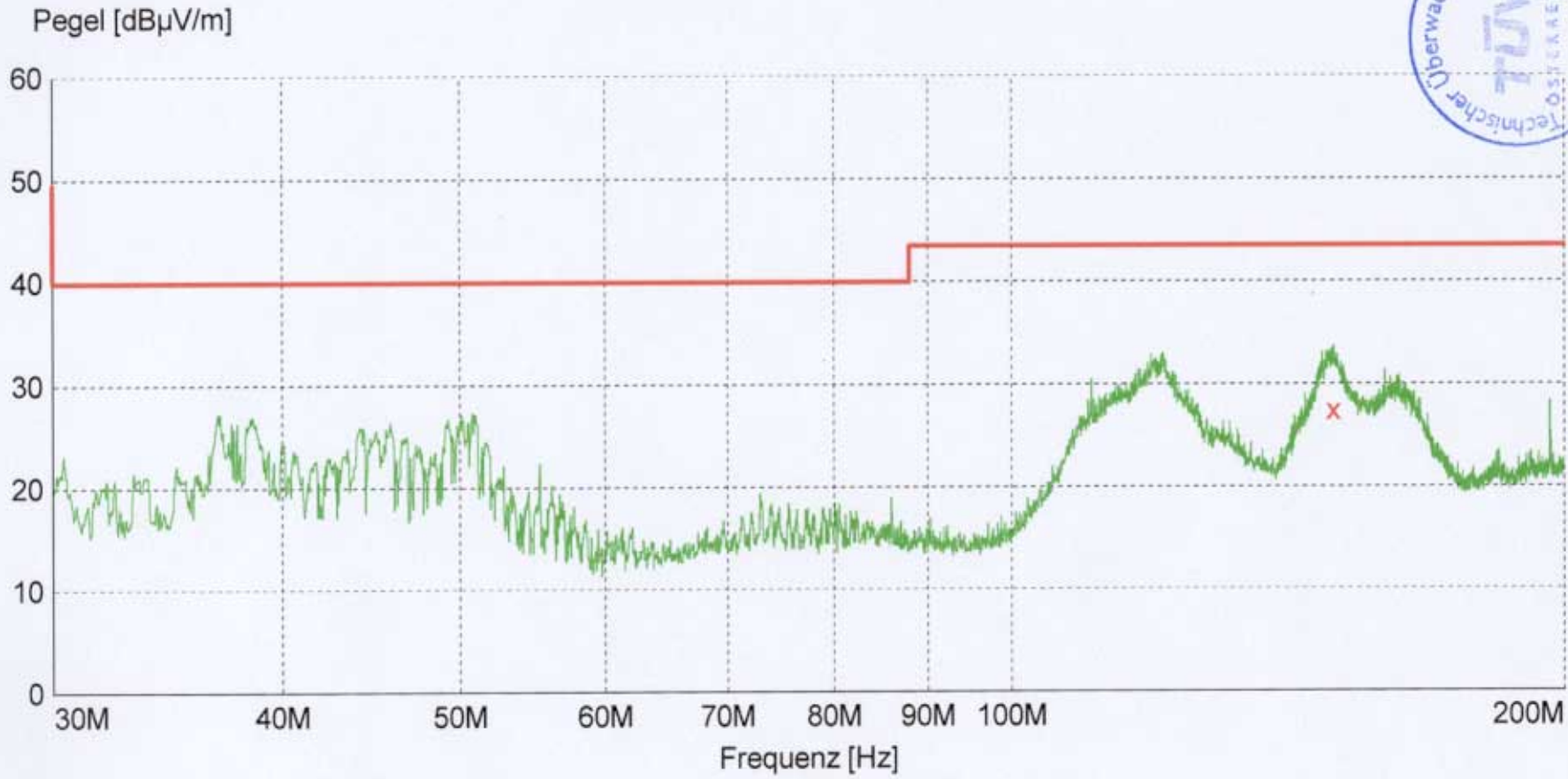
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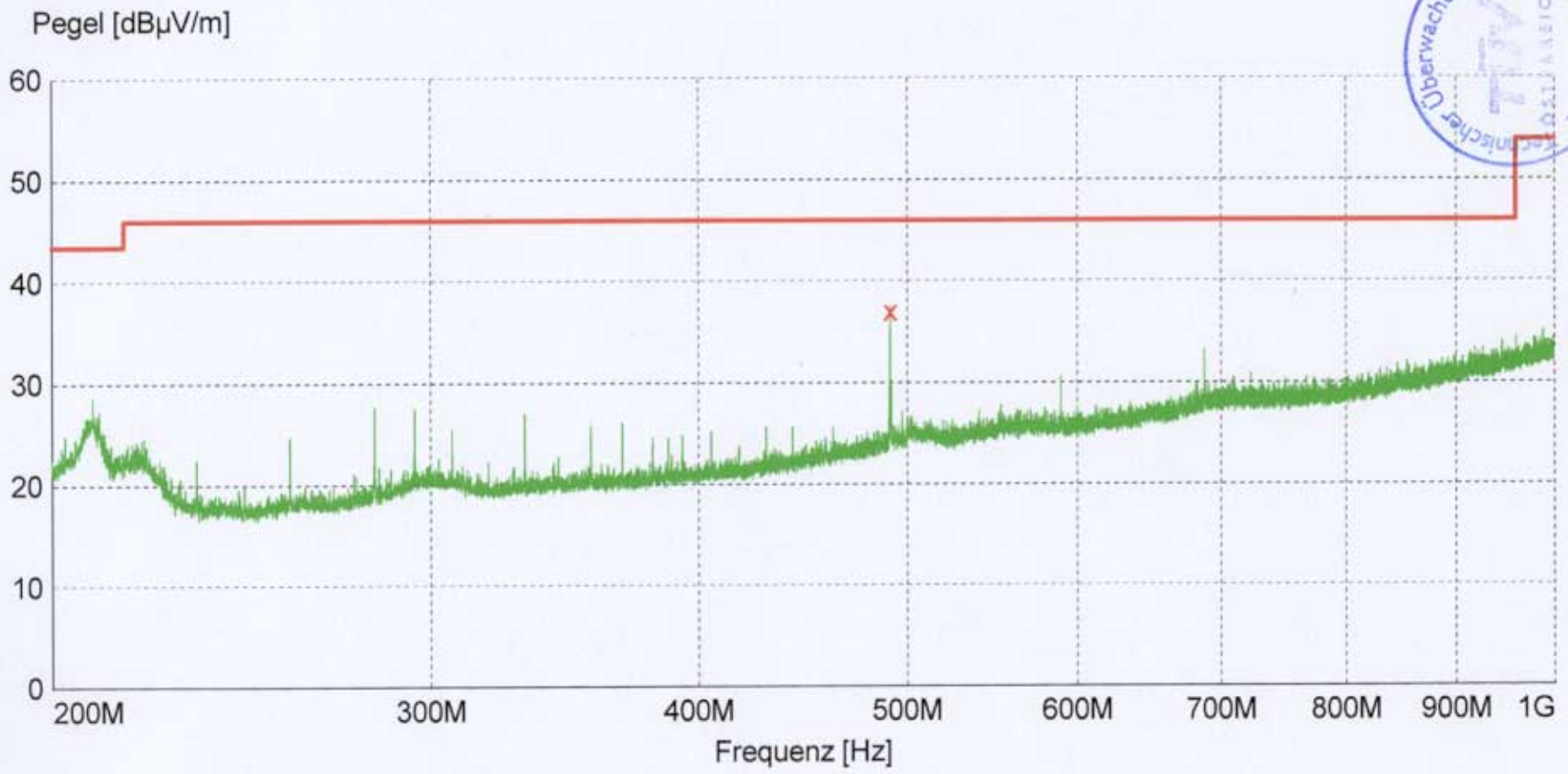




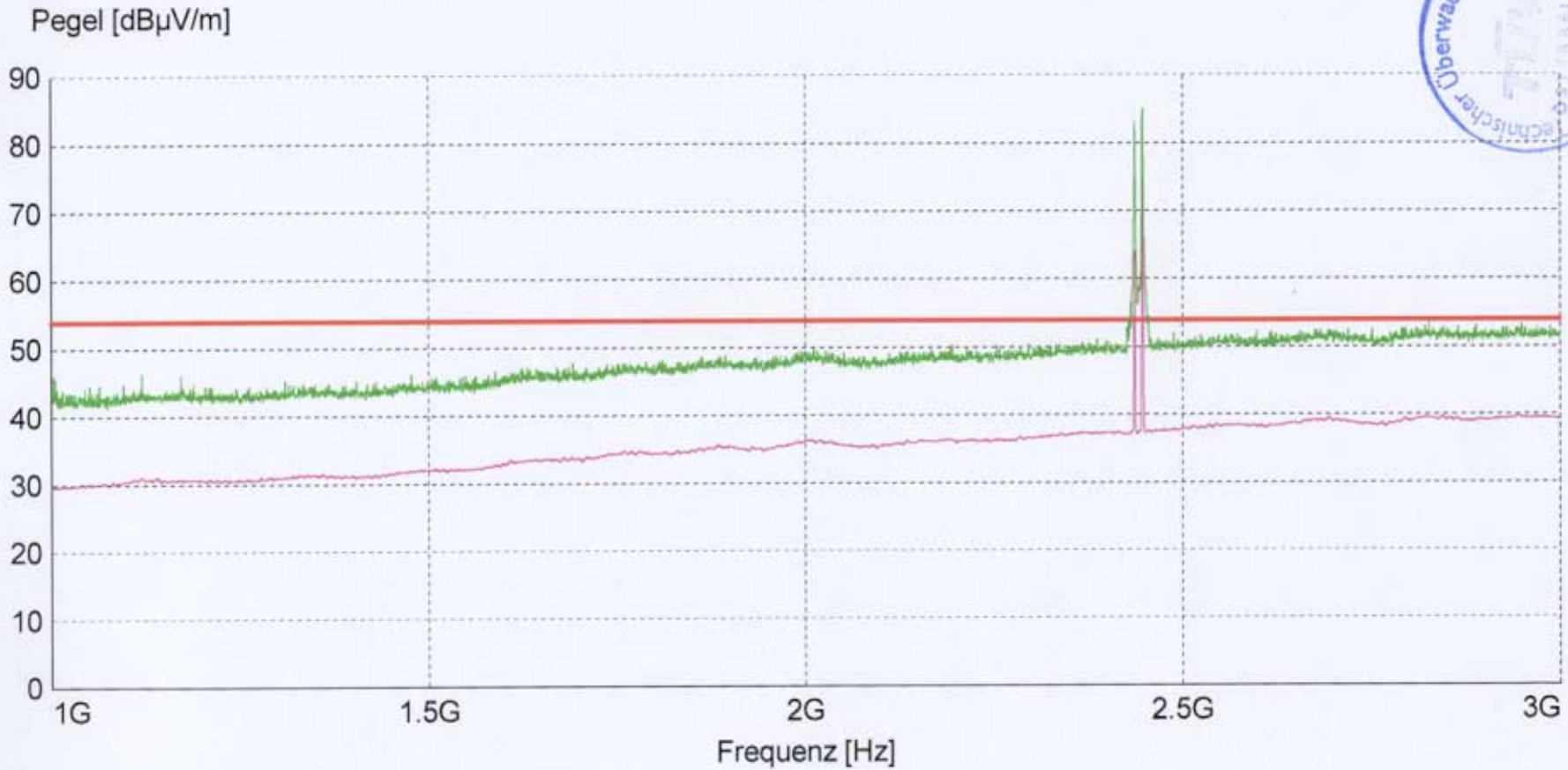
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