

TEST REPORT
of the accredited test laboratory

TÜV Nr.:M/FG-03/132

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

Tested Product: Identification system

Type: MOBY U SLG U92 RS 232
tested in combination with MOBY U MDS U 313

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

Output power / field strength: 13,5 mV/m @ 3m distance **Spannungsversorgung:** 20 – 30 VDC

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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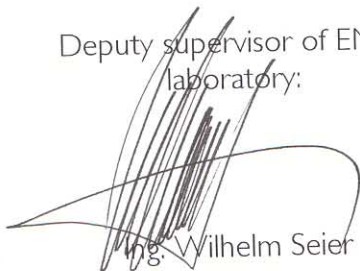
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4. 12. 2003

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checked by:


Ing. Michael Emminger

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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
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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	74,3	5188,0	83,7	15310,9
2411,76	1	50000	80,3	10351,4	88,5	26607,3
4802,22	1	500	37,3	73,3	46,	199,5
4823,52	1	500	49,2	288,4	56,3	653,1
7235,28	1	500	52,0	398,1	63,3	1462,2
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	73,5	4731,5	85,8	19498,4
2447,8	1	50000	82,6	13489,6	88,5	26607,3
4874,3	1	500	38,4	83,2	48,7	272,3
4895,6	1	500	52,4	416,9	60,3	1035,1
7343,4	1	500	52,5	421,7	64,5	1678,8
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	72,4	4168,7	84,4	16595,9
2482,21	1	50000	82,2	12882,5	88,2	25704,0
4943,12	1	500	38,7	86,1	49,2	288,4
4964,42	1	500	53,4	467,7	60,7	1083,9
7446,63	1	500	51,1	358,9	63,7	1531,1
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

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 value, how much MDSs can be handled at a time is selectable. The maximum number is 12, minimum 1. This number is depending on the number of timeslots used for one MDS. During the test all timeslots were used, to get the minimal transmit interval. 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. Antennna 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	☐ Radiocommunicationanalyzer 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	☐ Radiocommunicationanalyzer 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
☐ Ant. tripod for EN61000-4-3 Model TP1000A	NT-156	☐ ELT-400 1 Hz - 400 kHz	NT-249
☐ ESVP - Test receiver 20 - 1000 MHz	NT-201	☐ MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
☐ Switchbox	NT-202		

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Appendix 1 (continued)

Test equipment used

☐ FCC-203I EM Injection clamp	NT-251	☐ T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331
☐ FCC-203I-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	☐ Preamplifier for GPS MKU 152 A	NT-336
☐ ESH2-Z5 Artificial mains network 4x25A	NT-300	☐ Preamplifier 100 MHz – 23 GHz	NT-337
☐ ESH3-Z5 Artificial mains network 2x10A	NT-301	☐ DC Block 10 MHz – 18 GHz Model 8048	NT-338
☐ ESH3-Z6 Artificial mains network 1x100A	NT-302	☐ 2-97201 Electronic load	NT-341
☐ ESH3-Z4 T-Artificial network	NT-303	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐ PHE 4500/B Power amplifier	NT-304	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐ EZ10 T-Artificial network	NT-305	☐ VDS 200 Mobil-impuls-generator	NT-350
☐ MidiStar Telephone exchange	NT-306	☐ LD 200 Mobil-impuls-generator	NT-351
☐ SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐ MPG 200 Mobil-Impuls-Generators	NT-352
☐ PM 5518 TXVPS Video generator	NT-311	☐ EFT 200 Mobil-impuls-generator	NT-353
☐ RefRad Reference generator	NT-312	☐ FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
☐ SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐ PHE 4500 - Mains impedance network	NT-401
☐ 40 MHz Arbitrary Generator T1241	NT-315	☐ FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
☐ PEFT - Burst generator up to 4 kV	NT-320	☐ IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐ PSD - ESD generator up to 25 kV	NT-321	☐ ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐ ESD-Pistol	NT-322	☐ IP 4 - Capacitive clamp (Burst)	NT-411
☐ Vacuum-Relais up to 8 kV	NT-323	☐ HV-Attenuator 54,5 dB (Burst)	NT-420
☐ PSURGE 4.1 Surge generator	NT-324	☐ RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
☐ TRANSIENT 1000 Immunity test system	NT-325	☐ RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
☐ VCS 500-M6 Surge-Generator	NT-326	☐ RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
☐ BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	☐ RF-Attenuator 30 dB	NT-424

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Appendix 1 (continued)

Test equipment used

☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425	☐ PC P450 - Test computer	NT-500
☐ RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426	☐ PC P4 1700 MHz Notebook	NT-505
☐ Voltage-divider 1:100	NT-427	☐ PC PIII 933 MHz Notebook	NT-506
☐ RF-Attenuator 6 dB	NT-428	☐ Monitoring camera with Monitor	NT-511
☐ RF-Attenuator 0 dB - 81 dB	NT-429	☐ BSR-V1 - Video transmission system (optical fiber link)	NT-512
☐ WRU 27 - Band blocking 27 MHz	NT-430	☐ ES-K1 Test software	NT-520
☐ 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
☐ RF-Attenuator DC - 18 GHz 6 dB	NT-436	☐ Equipment for ESD-pulse verification.	NT-532
☐ RF-Attenuator DC - 18 GHz 6 dB	NT-437	☐ TEM-Zelle	NT-533
☐ RF-Attenuator DC - 18 GHz 10 dB	NT-438	☐ Test cables	NT-550
☐ RF-Attenuator DC - 18 GHz 20 dB	NT-439	☐ Test cable #4 for EN 61000-4-6	NT-553
☐ I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	☐ Test cable #3 for conducted emission	NT-554
☐ ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	☐ Test cable #5 ESD-cable (2x470k)	NT-555
☐ Power Divider 6 dB/1 W/50 Ohm	NT-443	☐ Test cable #6 ESD-cable (2x470k)	NT-556
☐ Directional coupler 0,1 MHz - 70 MHz	NT-444	☐ Serial data - fiber optic link	NT-557
☐ Directional coupler 0,1 MHz - 70 MHz	NT-445	☐ Test cable #8 Sucoflex 104EA	NT-559
☐ Tube imitations according to EN 55015	NT-450	☐ Test cable #9 (for outdoor measurements)	NT-580
☐ FCC-801-M2-50A Coupling decoupling network	NT-459	☐ Test cable #10 (for outdoor measurements)	NT-581
☐ FCC-801-M5-25 Coupling decoupling network	NT-460	☐ Test cable #13 Sucoflex 104PE	NT-584
☐ FCC-801-AF10 Coupling decoupling network	NT-461	☐ Shield chamber	NT-600
☐ FCC-801-S25 Coupling decoupling network	NT-462	☐ Climatic chamber -55°C to +180°C	M-512
☐ FCC-801-T4 Coupling decoupling network	NT-463	☐ Control and simulation equipment for EUT	
☐ FCC-801-C1 Coupling decoupling network	NT-464		
☐ F-16A - Current probe 1kHz - 70MHz	NT-465		

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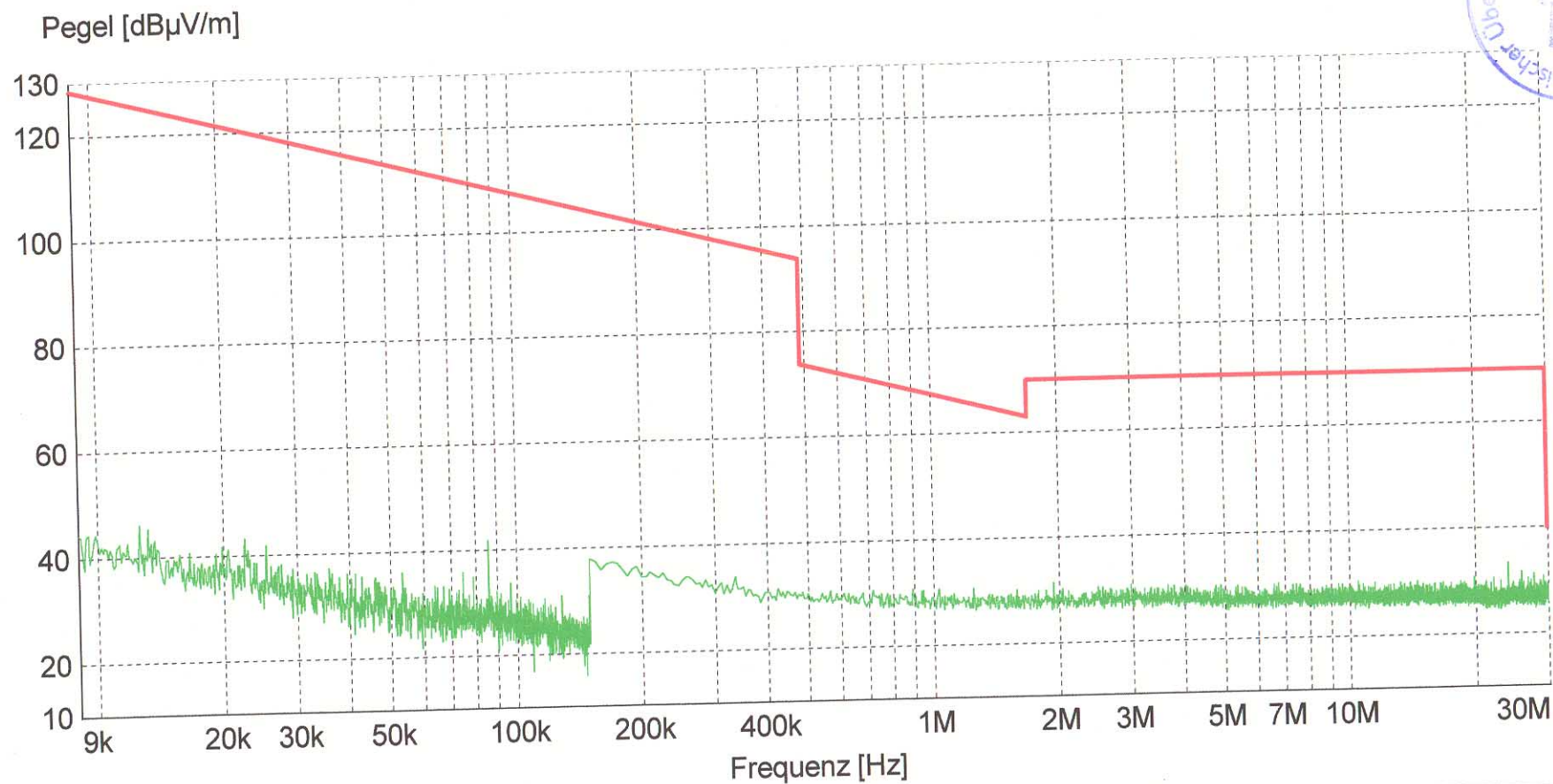
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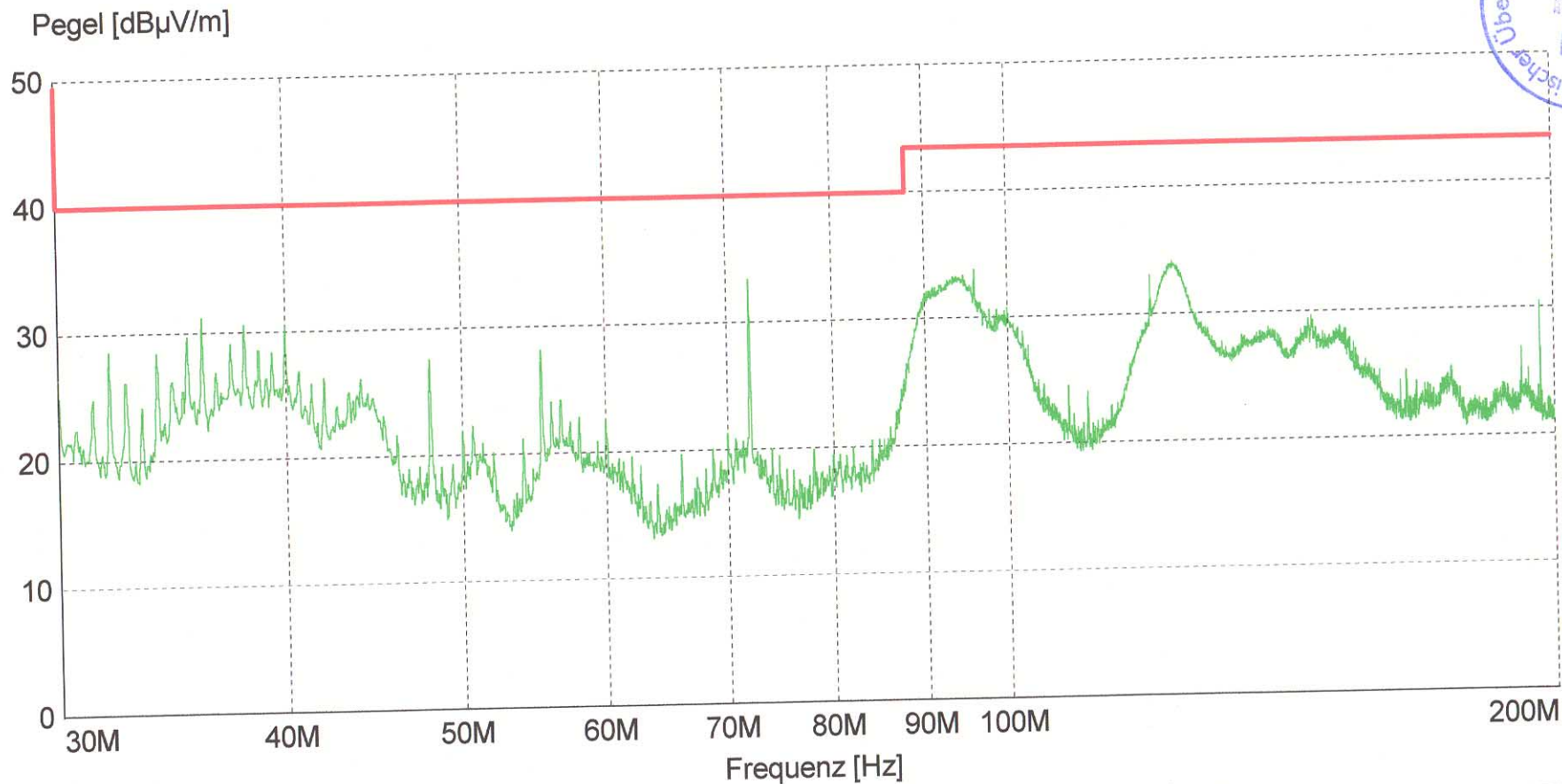
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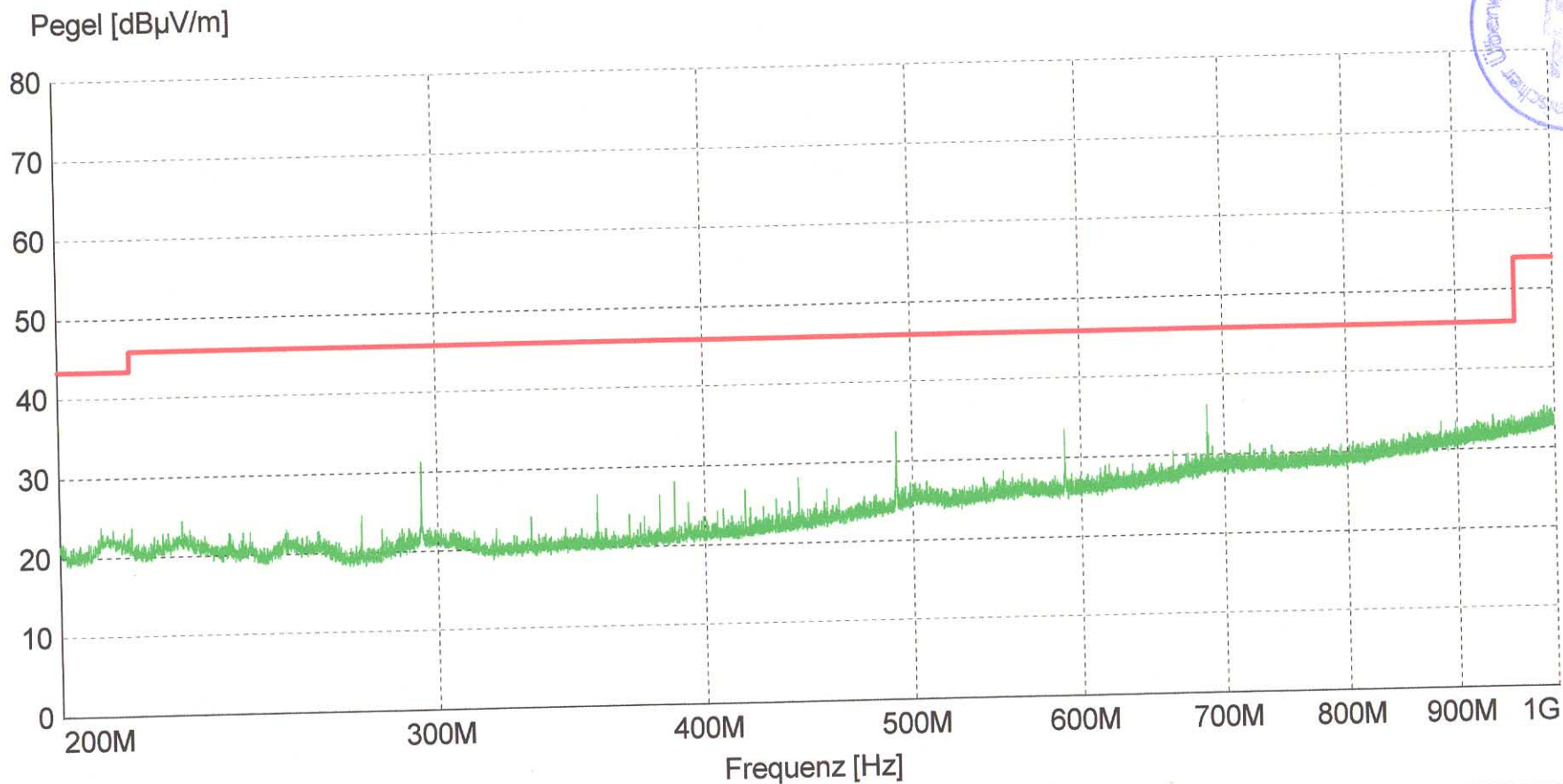


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— LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

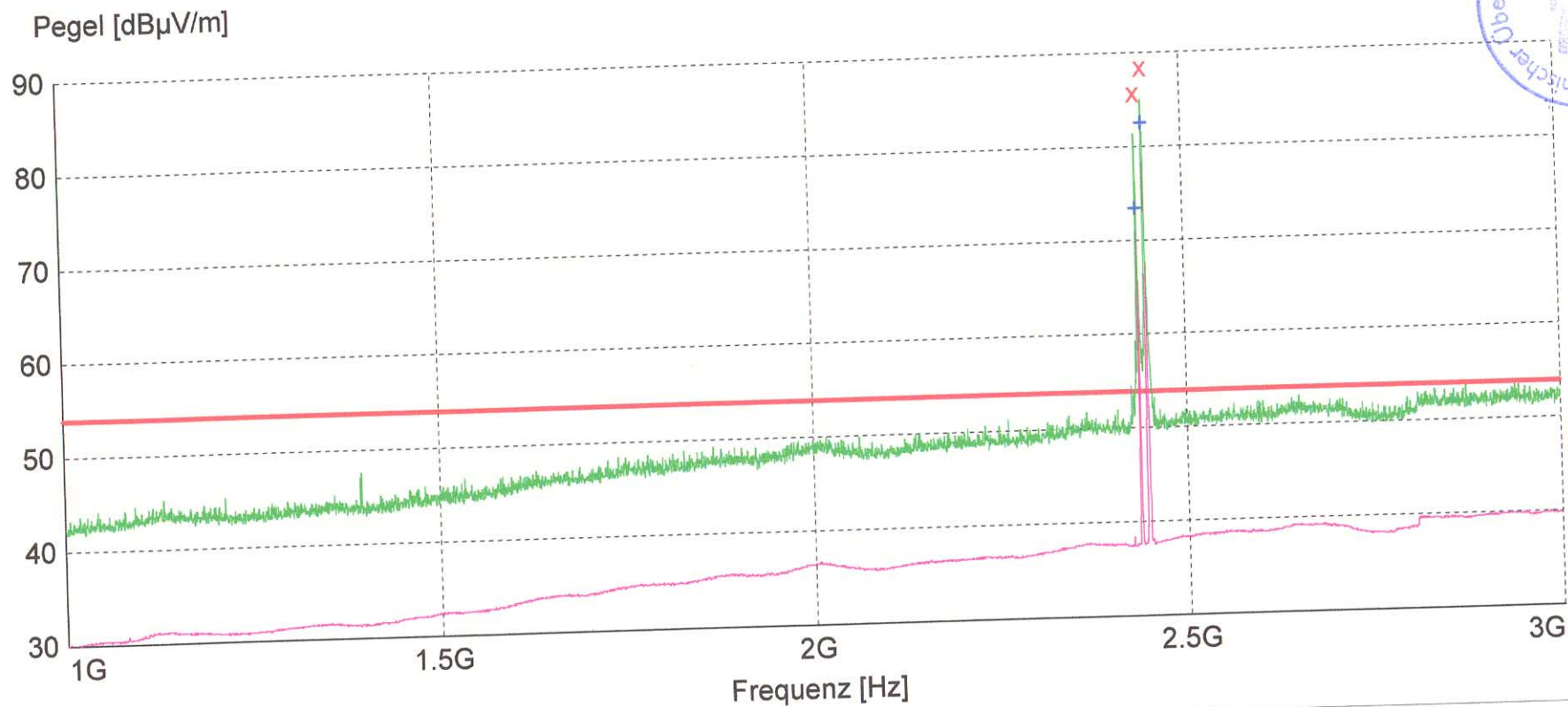


MES MOBY_4_C2_F2_pre PK
 LIM FCC ClassB F QP/AV

FCC ClassB, field strength 3m



— MES MOBY_4_C2_F3_pre PK
— LIM FCC ClassB F QP/AV FCC ClassB, field strength 3m



x x MES MOBY_4_C2_F4_fin PK
 + + MES MOBY_4_C2_F4_fin AV
 — MES MOBY_4_C2_F4_pre PK
 — MES MOBY_4_C2_F4_pre AV
 — LIM FCC ClassB F QP/AV

FCC ClassB, field strength 3m