

TEST REPORT
of the accredited test laboratory

TÜV Nr.:M/EMV-04/137

about
the following EMC - test/- research

Division Medical
Technology/
Communication
Technology/ EMC

Testing Body for
Communication
Technology/ EMC

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Applicant: SKIDATA AG
Untersbergstraße 40
A-5083 Gartenau - St. Leonhard

Product: Coder "MC BASIC 400"

Serial Number: ---

Standard: 47 CFR Ch. I Part 15
RSS-210 Issue 5

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

Notified Body 0408
Canada: IC4413

TÜV Österreich
Test laboratory for EMC

Deputy Supervisor of EMC-
laboratory



Ing. Wilhelm Seier



27.10.2004

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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.

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1. Applicant

Company SKIDATA AG

Department

Address A-5083 Gartenau – St. Leonhard; Untersbergstraße 40

Contact person Mr. Sonderegger

EUT received on 13. 02. 2004

Tests were performed on 13. 02. 2004

2. Description of EUT

EUT	Coder "MC BASIC 400"
Serial Number	---
Manufacturer	SKIDATA AG A-5083 Gartenau – St. Leonhard; Untersbergstraße 40
Description	SKIDATA AG provided the following configuration for the measurements: Serial production
Operating mode	The measurements were carried out at the following running states: normal use

3. Standards / Final result

Name	Title	Deviation	Result
47 CFR Ch. I Part 15	Radio Frequency Devices	none	PASS
RSS-210 Issue 5	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)	none	PASS
PASS EUT passed FAIL EUT failed			

4. Test results

4.1. Conducted emission

The equipment is DC operated and an AC/DC converter is not a part of the equipment under test.

4.2. Radiated emission

Limits according to 15.209 and 6.2.1.

Frequency range	Detector Quasi Peak	
	Limit	Measurement distance
0,009 – 0,490 MHz	2400 μ V / f(kHz)	300 m
0,490 – 1,705 MHz	24000 μ V / f(kHz)	30 m
1,705 - 30 MHz	30	30 m
30 – 88 MHz	100	3 m
88 – 216 MHz	150	3 m
216 – 960 MHz	200	3 m
Above 960 MHz	500	3 m
Remark:	The Limit was increased for a constant measurement distance of 3m with a factor of 40 dB per Decade.	

Operating mode	Measuring result
continuous and modulated carrier at 122,9 kHz and 13,56 MHz	Measurement diagram 1-3

Test result:

4. 2.1.) Measurement in the frequency range 9 kHz to 1000 MHz

Frequency kHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark
122,9	71,2	105,8	34,6	

4.3. 15.225 Operation within the band 13,110 – 14,010 MHz
RSS-210 6.2.2.(e) 13,553 – 13,567 MHz

15.225 (a):

The field strength of any emissions within this band shall not exceed 15.848 microvolts/meter (84 dB μ V/m) at 30 meters.

Measurement results:

The field strength at 3m distance was measured a 50,5 dB μ V/m (at 13,5600 MHz). Extrapolated with 40 dB per decade to 30 meters distance it would be 10,5 dB μ V/m (at 13,5600 MHz).

6.2.2.(e)

The field strength of any emissions within this band shall not exceed 15.500 microvolts/meter (84 dB μ V/m) at 30 meters.

Measurement results:

The field strength at 3m distance was measured as 50,5 dB μ V/m (at 13,5600 MHz). Extrapolated with 40 dB per decade to 30 meters distance it would be 10,5 dB μ V/m (at 13,5600 MHz).

15.225 (b) and 6.2.2.(e): internal and external antenna

Frequency range MHz	Level dB μ V/m	Limit dB μ V/m
13,410 – 13,553	< 70	90,5
13,567 – 13,710	< 70	90,5

The Limit was increased for a constant measurement distance of 3m with a factor of 40 dB per Decade.

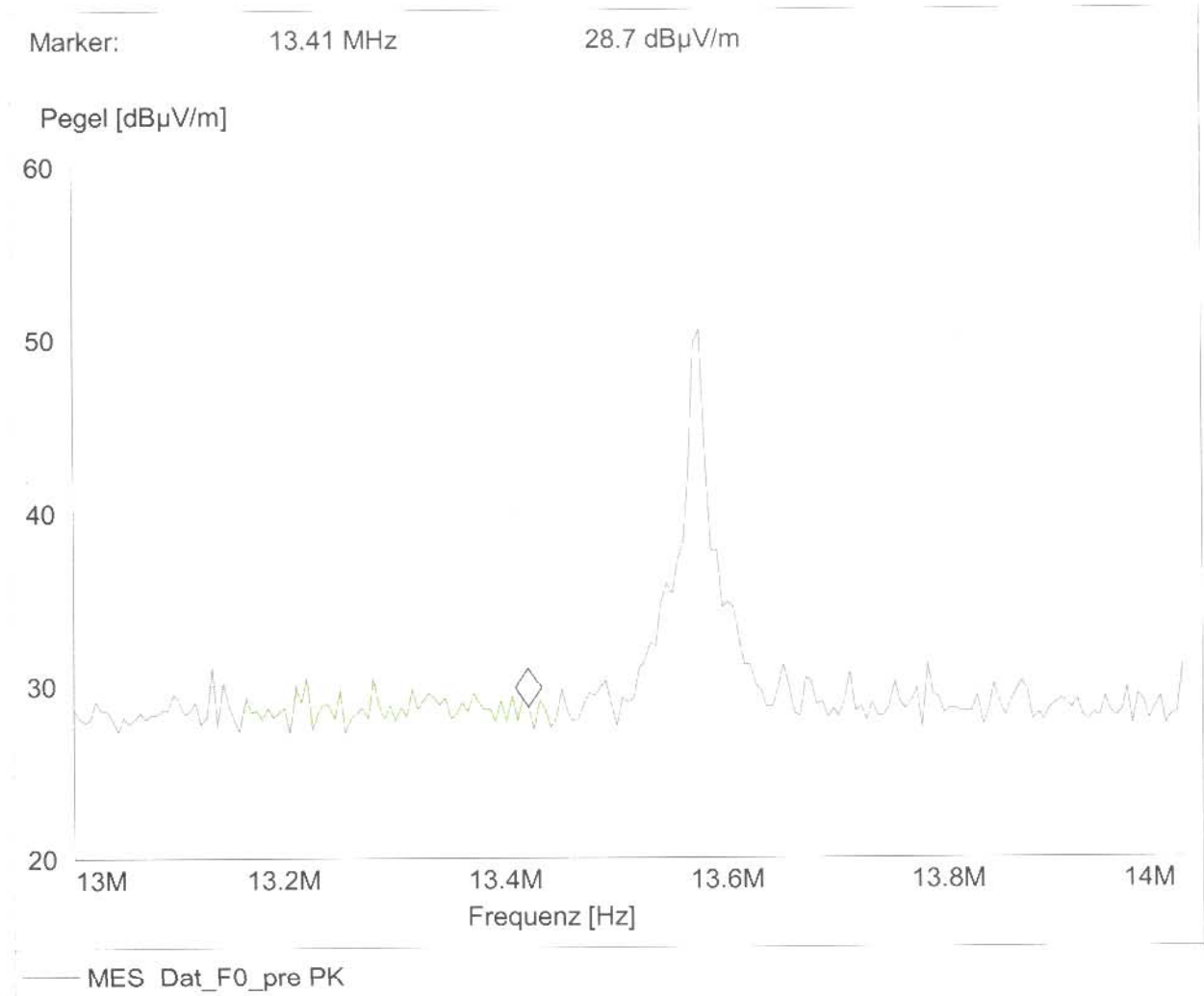
15.225 (c) and 6.2.2.(e): internal and external antenna

Frequency range MHz	Level dB μ V/m	Limit dB μ V/m
13,110 – 13,410	< 50	80,5
13,710 – 14,010	< 50	80,5

The Limit was increased for a constant measurement distance of 3m with a factor of 40 dB per Decade.

15.225 (d):

See measurement diagram.



15.225 (e) and 6.2.2.(e):

The frequency tolerance of the carrier signal shall be maintained within $\pm 0,01$ % of the operating frequency over a temperature variation ov -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation of the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Measurement results:

For this test we have used an linear power supply (not a part of the equipment under test):

Test conditions		Transmitter frequency
		13,56 MHz
T_{nom} (20)°C	V_{min} (93,5)V	13,56121
T_{nom} (20)°C	V_{nom} (126,5)V	13,56124
T_{min} (-20)°C	V_{nom} (110)V	13,56125
T_{max} (50)°C	V_{nom} (110)V	13,56123
Maximum deviation from nominal frequency under extreme test conditions (%)		0,00922
Measurement uncertainty		± 10 Hz

Appendix 1

Test equipment used

<input checked="" type="checkbox"/>	Anechoic Chamber with 3m measurement distance	NT-100	<input type="checkbox"/>	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
<input checked="" type="checkbox"/>	MA 240 - Antenna mast 1 - 4 m height	NT-110	<input checked="" type="checkbox"/>	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
<input checked="" type="checkbox"/>	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	<input type="checkbox"/>	Digital Radio Tester CTS55	NT-208
<input checked="" 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. Antennna 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 checked="" type="checkbox"/>	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
<input checked="" 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"/>	2855S - 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 checked="" 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 checked="" 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"/>	B10 - Harmonics and flicker 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 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 100 kHz – 3 GHz	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"/>	E-field probe 10 MHz – 18 GHz	NT-247
<input type="checkbox"/>	HZ-1 Antenna tripod	NT-150	<input type="checkbox"/>	H-field probe 10 MHz – 1 GHz	NT-248
<input checked="" type="checkbox"/>	BN 1500 Antenna tripod	NT-151	<input type="checkbox"/>	ELT-400 1 Hz – 400 kHz	NT-249
<input type="checkbox"/>	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156	<input type="checkbox"/>	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
<input type="checkbox"/>	ESVP - Test receiver 20 - 1000 MHz	NT-201			

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Appendix 1 (continued)

Test equipment used

<input type="checkbox"/>	FCC-203I EM Injection clamp	NT-251	<input type="checkbox"/>	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
<input type="checkbox"/>	FCC-203I-DCN Ferrite decoupling network	NT-252	<input type="checkbox"/>	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
<input type="checkbox"/>	PR50 Current Probe	NT-253	<input type="checkbox"/>	Preamplifier 1 GHz - 4 GHz	NT-335
<input type="checkbox"/>	PR630 Current Probe	NT-254	<input type="checkbox"/>	Preamplifier for GPS MKU 152 A	NT-336
<input type="checkbox"/>	Model 2000 Digital Multimeter	NT-261	<input type="checkbox"/>	Preamplifier 100 MHz – 23 GHz	NT-337
<input type="checkbox"/>	Fluke 97 Digital Multimeter	NT-262	<input type="checkbox"/>	DC Block 10 MHz – 18 GHz Model 8048	NT-338
<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"/>	SMG - Signal generator 0,1 - 1000 MHz	NT-310	<input type="checkbox"/>	FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
<input type="checkbox"/>	PM 5518 TXVPS Video generator	NT-311	<input type="checkbox"/>	PHE 4500 - Mains impedance network	NT-401
<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"/>	Highpass-Filter 100 MHz – 4 GHz	NT-412
<input type="checkbox"/>	ESD 30 System up to 25 kV	NT-321	<input type="checkbox"/>	Highpass-Filter 600 MHz – 4 GHz	NT-413
<input type="checkbox"/>	PSURGE 4.1 Surge generator	NT-324	<input type="checkbox"/>	Highpass-Filter 1250 MHz – 4 GHz	NT-414
<input type="checkbox"/>	TRANSIENT 1000 Immunity test system	NT-325	<input type="checkbox"/>	Highpass-Filter 1800 MHz – 18 GHz	NT-415
<input type="checkbox"/>	VCS 500-M6 Surge-Generator	NT-326	<input type="checkbox"/>	Highpass-Filter 3500 MHz – 18 GHz	NT-416
<input type="checkbox"/>	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	<input type="checkbox"/>	HV-Attenuator 54,5 dB (Burst)	NT-420
<input type="checkbox"/>	T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331	<input type="checkbox"/>	RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
<input type="checkbox"/>	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332	<input type="checkbox"/>	RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422

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Test equipment used

<input type="checkbox"/>	RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423	<input type="checkbox"/>	FCC-801-C1 Coupling decoupling network	NT-464
<input type="checkbox"/>	RF-Attenuator 30 dB	NT-424	<input type="checkbox"/>	F-16A - Current probe 1kHz - 70MHz	NT-465
<input type="checkbox"/>	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425	<input checked="" type="checkbox"/>	PC P450 - Test computer	NT-500
<input type="checkbox"/>	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426	<input type="checkbox"/>	PC P4 1700 MHz Notebook	NT-505
<input type="checkbox"/>	Voltage-divider 1:100	NT-427	<input type="checkbox"/>	PC PIII 933 MHz Notebook	NT-506
<input type="checkbox"/>	RF-Attenuator 6 dB	NT-428	<input type="checkbox"/>	Monitoring camera with Monitor	NT-511
<input type="checkbox"/>	RF-Attenuator 0 dB - 81 dB	NT-429	<input checked="" type="checkbox"/>	ES-K1 Test software	NT-520
<input type="checkbox"/>	WRU 27 - Band blocking 27 MHz	NT-430	<input type="checkbox"/>	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
<input type="checkbox"/>	WHJ450C9 AA - High pass 450 MHz	NT-431	<input type="checkbox"/>	SPS_EM - Test software for PHE 4500/B	NT-527
<input type="checkbox"/>	WHJ250C9 AA - High pass 250 MHz	NT-432	<input type="checkbox"/>	Noise power test apparatus according to EN 55014	NT-530
<input type="checkbox"/>	RF-Load 150 W	NT-433	<input type="checkbox"/>	Vertical coupling plane (ESD)	NT-531
<input type="checkbox"/>	Impedance transducer 50 Ohm – 800 Ohm	NT-435	<input type="checkbox"/>	TEM-Zelle	NT-533
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-436	<input type="checkbox"/>	Test cable #4 for EN 61000-4-6	NT-553
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-437	<input type="checkbox"/>	Test cable #3 for conducted emission	NT-554
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 10 dB	NT-438	<input type="checkbox"/>	Test cable #5 ESD-cable (2x470k)	NT-555
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 20 dB	NT-439	<input type="checkbox"/>	Test cable #6 ESD-cable (2x470k)	NT-556
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Test cable #8 Sucoflex 104EA	NT-559
<input type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	Test cable #9 (for outdoor measurements)	NT-580
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	Test cable #10 (for outdoor measurements)	NT-581
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input type="checkbox"/>	Test cable #13 Sucoflex 104PE	NT-584
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-445	<input type="checkbox"/>	Shield chamber	NT-600
<input type="checkbox"/>	Tube imitations according to EN 55015	NT-450	<input checked="" type="checkbox"/>	Climatic chamber -55°C to +180°C	M-512
<input type="checkbox"/>	FCC-801-M2-50A Coupling decoupling network	NT-459	<input type="checkbox"/>	Control and simulation equipment for EUT	---
<input type="checkbox"/>	FCC-801-M5-25 Coupling decoupling network	NT-460			
<input type="checkbox"/>	FCC-801-AF10 Coupling decoupling network	NT-461			
<input type="checkbox"/>	FCC-801-S25 Coupling decoupling network	NT-462			
<input type="checkbox"/>	FCC-801-T4 Coupling decoupling network	NT-463			

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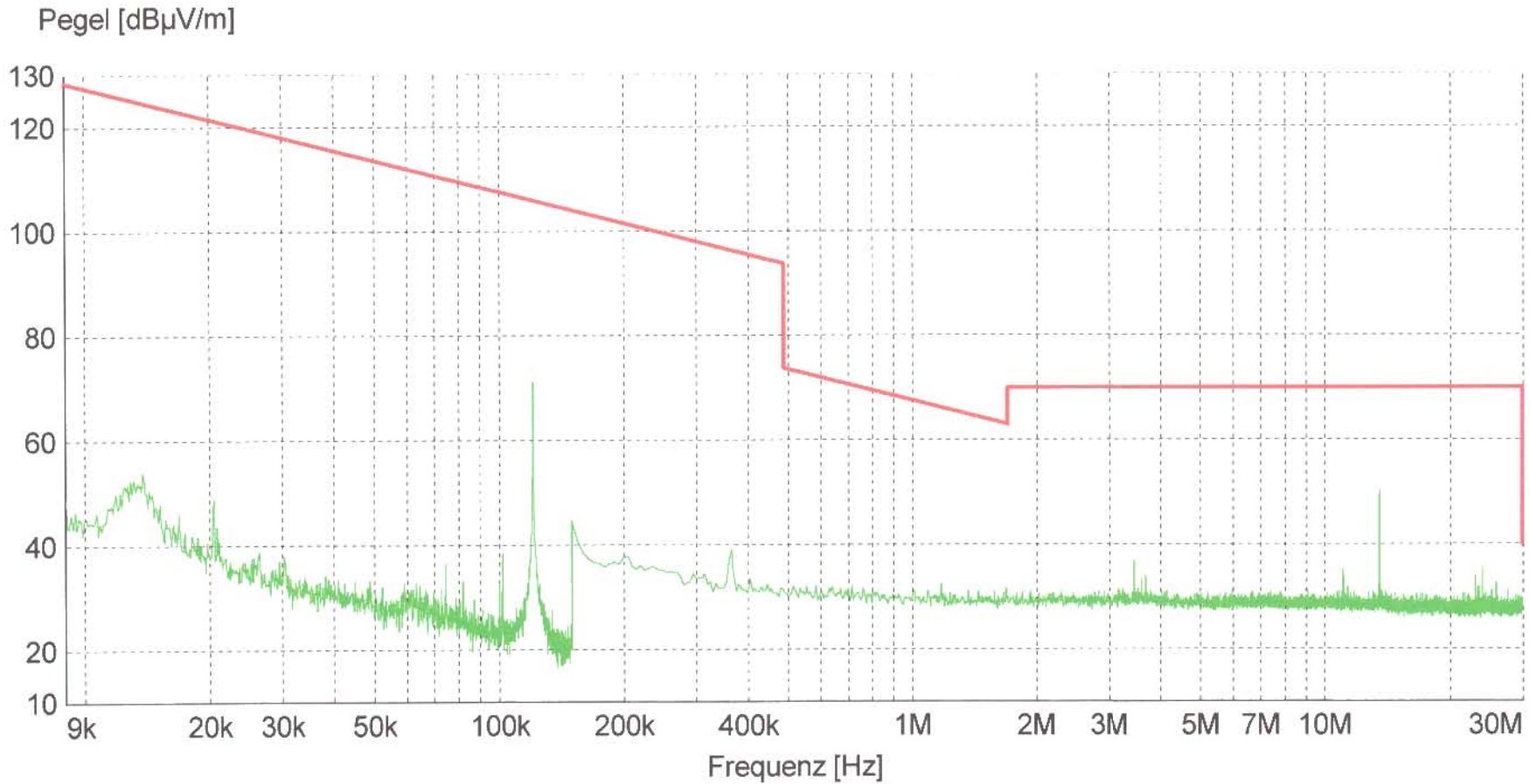
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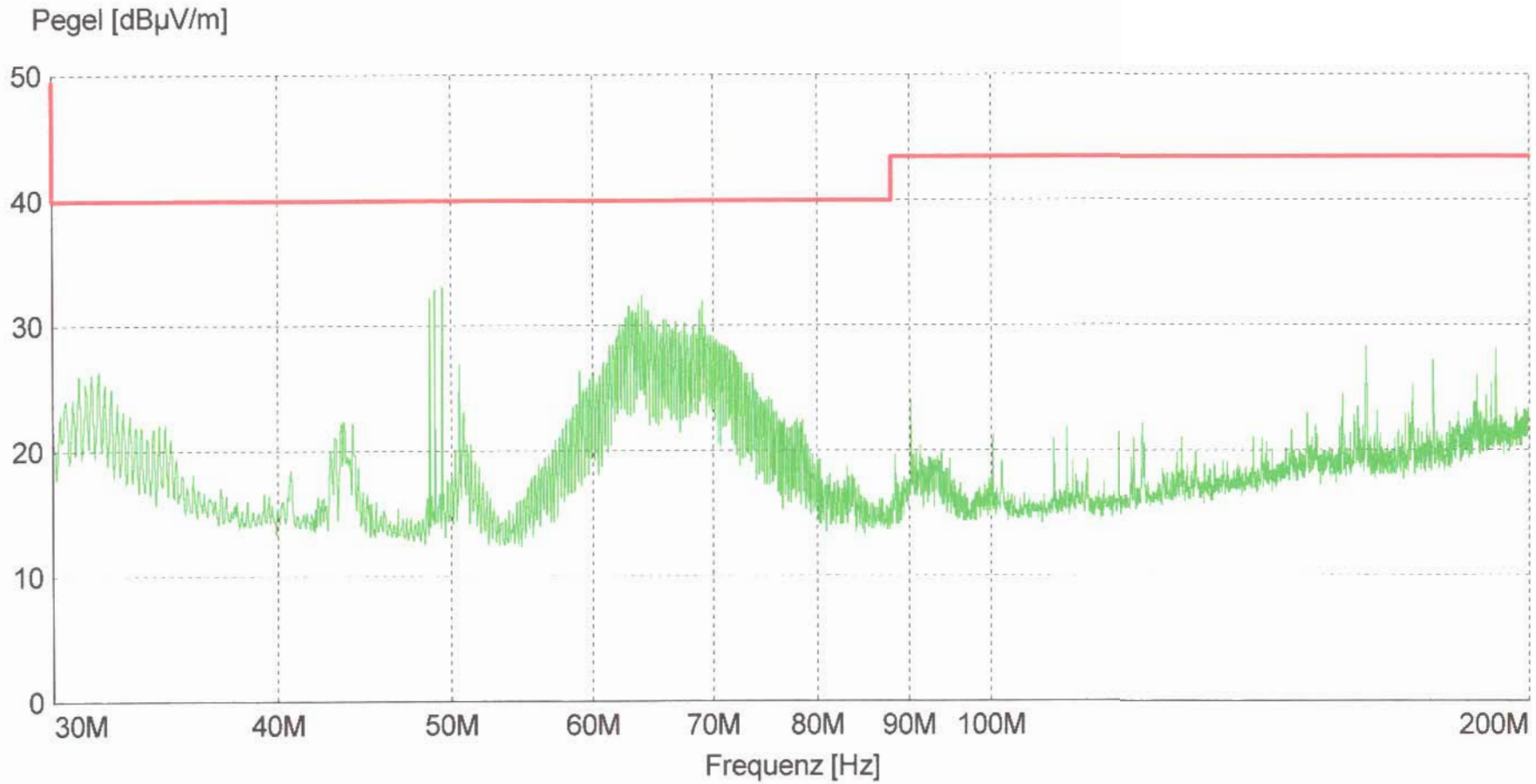
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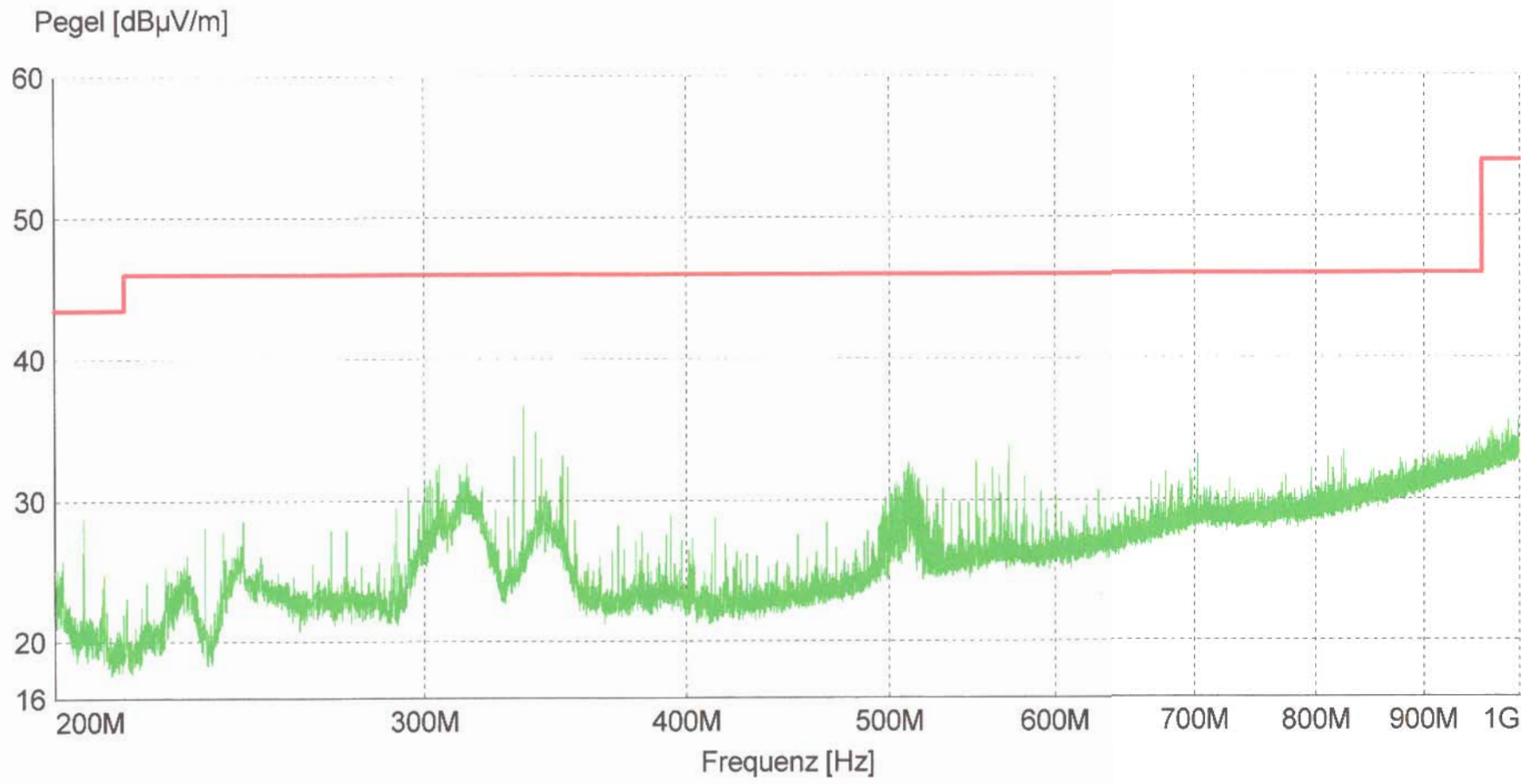


— MES Dat_F0_pre_PK
— LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m



— MES Dat F1_pre PK

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



— MES Dat_F2_pre PK
— LIM FCC ClassB F QP/AV FCC ClassB, field strength 3m