

**TEST REPORT**  
of the accredited test laboratory

**TÜV Nr.:M/EMV-08/137**

about  
the following EMC - test/- research

**Applicant:** KEBA AG  
Gewerbepark Urfahr  
A-4041 Linz

**Product:** IE 160/ A

**Serial Number:** ---

**FCC ID:** U870004

**Standard:** 47 CFR Ch. I Part 15 (September 20, 2007)  
RSS-210 Issue 7 (June 2007)



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Inspection Body,  
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IC 4413**

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**TÜV AUSTRIA SERVICES GMBH**  
Test laboratory for EMC

Supervisor of EMC-laboratory

Ing. Wilhelm Seier



11.04.2008

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:** KEBA AG

**Department:** Development center

**Address:** Gewerbepark Urfahr  
A-4041 Linz

**Contact person:** Mr. Dipl.-Ing. (FH) Michael Höllerschmid

**EUT received on:** 17.03.2008

**Tests were performed on:** 18.03.2008 to 26.03.2008

## 2. Description of EUT

**EUT:** IE 160/ A

**Serial Number:** ---

**Manufacturer:** KEBA AG  
Gewerbepark Urfahr  
A-4041 Linz

**Description:** Keba 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 (September 20, 2007)	Radio Frequency Devices	none	PASS
RSS-210 Issue 7 (June 2007)	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)	none	PASS
PASS EUT passed FAIL EUT failed			

## 4. Test results

### 4.1. Radiated emission

Limits according to 15.209 and A2.7 (Table 2+3)

Frequency range	Detector Quasi Peak	
	Limit	Measurement distance
0,009 – 0,490 MHz	2400 $\mu$ V / f(kHz)	300 m
0,490 – 1,705 MHz	24000 $\mu$ 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
Normal operation	Measurement diagram 1-3

**Test result:**

**4. 1.1.) Measurement in the frequency range 9 kHz to 1000 MHz**

Frequency MHz	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
40,7	29,7	40	10,3		100	135	Vertical
45,1	31,8	40	8,2		110	315	Vertical
48,25	27	40	13		126	135	Vertical

**4.2. 15.225 Operation within the band 13,110 – 14,010 MHz**  
**RSS-210 A2.6 13,110 – 14,010 MHz**

**Limits:**

**15.225 (a) + A2.6 (a):**

The field strength of any emissions within the band 13,553 – 13,567 MHz shall not exceed 15.848 microvolts/meter (84 dB $\mu$ V/m) at 30 meters.

**15.225 (b) and A2.6 (b):**

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

**15.225 (c) and A2.6 (c):**

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

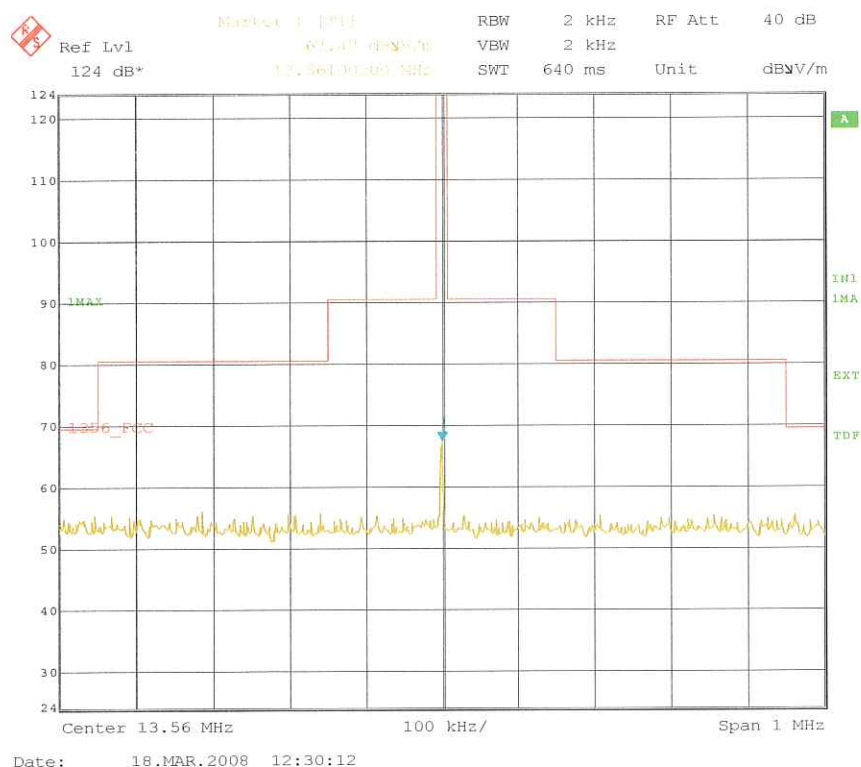
**15.225 (d) and A2.6 (d):**

30 microvolts/m at 30 m, outside the band 13.110-14.010 MHz

**Test result:**

**IE 160/ A**

The field strength at 13,56 MHz in 3 m distance was measured as 67,0 dB $\mu$ V/m.  
Extrapolated with 40 dB per decade to 30 meters distance it would be 27,0 dB $\mu$ V/m.





**15.225 (e) and A2.6:**

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0,01$  % of the operating frequency over a temperature variation of  $-20$  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:**

Test conditions		Transmitter frequency
		13,56 MHz
$T_{nom}$ ( 20 )°C	$V_{nom}$ ( USB powered )	13,560284 MHz
$T_{min}$ ( -20 )°C	$V_{nom}$ ( USB powered )	13,560320 MHz
$T_{max}$ ( 50 )°C	$V_{nom}$ ( USB powered )	13,560256 MHz
Maximum deviation from nominal frequency under extreme test conditions (%)		0,000320 MHz
Measurement uncertainty		$\pm 10$ Hz

# Appendix 1

## Test equipment used

<input checked="" type="checkbox"/>	Anechoic Chamber with 3m measurement distance	NT-100	<input checked="" type="checkbox"/>	Spectrum analyzer – FSP7 9 kHz – 7 GHz	NT-200
<input type="checkbox"/>	Stripline according to ISO 11452-5	NT-108	<input type="checkbox"/>	ESVP - Test receiver 20 - 1000 MHz	NT-201
<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 checked="" 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. Antenna 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"/>	Radiocommunication analyzer Marconi 2945A	NT-212
<input type="checkbox"/>	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	<input type="checkbox"/>	2855S - Communication analyzer	NT-213
<input type="checkbox"/>	3115 - Horn Antenna 1 - 18 GHz (immunity)	NT-125	<input type="checkbox"/>	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
<input 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. Antenna 20 MHz - 300 MHz	NT-127	<input checked="" type="checkbox"/>	RubiSource T&M Timing reference	NT-216
<input type="checkbox"/>	AT-1080 - Log. Per. Antenna 80 - 1000 MHz	NT-128	<input type="checkbox"/>	Radiocommunication analyzer SWR 1180 MD	NT-217
<input checked="" type="checkbox"/>	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-129	<input type="checkbox"/>	Mixer M19HWD 40 GHz – 60 GHz	NT-218
<input type="checkbox"/>	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-130	<input type="checkbox"/>	Mixer M12HWD 60 GHz – 90 GHz	NT-219
<input checked="" type="checkbox"/>	3146 - Log. Per. Antenna 200 – 1000 MHz	NT-131	<input type="checkbox"/>	TDS - 540 DSO Digital scope	NT-220
<input type="checkbox"/>	Loop Antenna H-Field	NT-132	<input type="checkbox"/>	TPS 2014 Digital scope	NT-222
<input type="checkbox"/>	Horn Antenna 500 MHz - 2900 MHz	NT-133	<input type="checkbox"/>	Artificial Ear according to IEC 60318	NT-224
<input type="checkbox"/>	Horn Antenna 500 MHz - 6000 MHz	NT-133/1	<input type="checkbox"/>	1 kHz Sound calibrator	NT-225
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	<input type="checkbox"/>	B10 - Harmonics and flicker analyzer	NT-232
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	<input type="checkbox"/>	SRM-3000 Spectrum analyzer	NT-233
<input type="checkbox"/>	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	<input type="checkbox"/>	E-field probe SRM 75 MHz – 3 GHz	NT-234
<input type="checkbox"/>	Conical Dipol Antenna PCD8250	NT-138	<input type="checkbox"/>	Hall-Teslameter ETM-1	NT-241
<input type="checkbox"/>	HF 906 - Horn Antenna 1 - 18 GHz (emission)	NT-139	<input type="checkbox"/>	EFA-3 H-field- / E-field probe	NT-243
<input type="checkbox"/>	HZ-1 Antenna tripod	NT-150	<input type="checkbox"/>	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
<input type="checkbox"/>	BN 1500 Antenna tripod	NT-151	<input type="checkbox"/>	E-field probe 100 kHz – 3 GHz	NT-245
<input type="checkbox"/>	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156	<input type="checkbox"/>	Magnetic field-Sensor 300 kHz – 30 MHz	NT-246
<input type="checkbox"/>	Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-172	<input type="checkbox"/>	E-field probe 3 MHz – 18 GHz	NT-247

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# Appendix 1 (continued)

## Test equipment used

<input type="checkbox"/>	H-field probe 27 MHz – 1 GHz	NT-248	<input type="checkbox"/>	T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331
<input type="checkbox"/>	ELT-400 1 Hz – 400 kHz	NT-249	<input type="checkbox"/>	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
<input type="checkbox"/>	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250	<input type="checkbox"/>	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
<input type="checkbox"/>	FCC-203I EM Injection clamp	NT-251	<input type="checkbox"/>	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
<input type="checkbox"/>	FCC-203I-DCN Ferrite decoupling network	NT-252	<input type="checkbox"/>	Preamplifier 1 GHz - 4 GHz	NT-335
<input type="checkbox"/>	PR50 Current Probe	NT-253	<input type="checkbox"/>	Preamplifier for GPS MKU 152 A	NT-336
<input type="checkbox"/>	PR630 Current Probe	NT-254	<input type="checkbox"/>	Preamplifier 100 MHz – 23 GHz	NT-337
<input type="checkbox"/>	Fluke 87 V True RMS Multimeter	NT-260	<input type="checkbox"/>	DC Block 10 MHz – 18 GHz Model 8048	NT-338
<input type="checkbox"/>	Model 2000 Digital Multimeter	NT-261	<input type="checkbox"/>	2-97201 Electronic load	NT-341
<input type="checkbox"/>	Fluke 87 V Digital Multimeter	NT-262/1	<input type="checkbox"/>	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
<input type="checkbox"/>	ESH2-Z5-U1 Artificial mains network 4x25A	NT-300	<input type="checkbox"/>	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
<input type="checkbox"/>	ESH3-Z5-U1 Artificial mains network 2x10A	NT-301	<input type="checkbox"/>	VDS 200 Mobil-impuls-generator	NT-350
<input type="checkbox"/>	ESH3-Z6-U1 Artificial mains network 1x100A	NT-302	<input type="checkbox"/>	LD 200 Mobil-impuls-generator	NT-351
<input type="checkbox"/>	ESH3-Z4 T-Artificial network	NT-303	<input type="checkbox"/>	MPG 200 Mobil-Impuls-Generators	NT-352
<input type="checkbox"/>	PHE 4500/B Power amplifier	NT-304	<input type="checkbox"/>	EFT 200 Mobil-impuls-generator	NT-353
<input type="checkbox"/>	EZ10 T-Artificial Network	NT-305	<input type="checkbox"/>	AN 200 S1 Artificial Network	NT-354
<input type="checkbox"/>	ENY22 Artificial Network	NT-308	<input type="checkbox"/>	FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1
<input type="checkbox"/>	ENY41 Artificial Network	NT-309	<input type="checkbox"/>	PHE 4500 - Mains impedance network	NT-401
<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"/>	TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409
<input type="checkbox"/>	RefRad Reference generator	NT-312	<input type="checkbox"/>	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
<input type="checkbox"/>	SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	<input type="checkbox"/>	IP 4 - Capacitive clamp (Burst)	NT-411
<input type="checkbox"/>	40 MHz Arbitrary Generator TGA1241	NT-315	<input type="checkbox"/>	Highpass-Filter 100 MHz – 3 GHz	NT-412
<input type="checkbox"/>	PEFT - Burst generator up to 4 kV	NT-320	<input type="checkbox"/>	Highpass-Filter 600 MHz – 4 GHz	NT-413
<input type="checkbox"/>	ESD 30 System up to 25 kV	NT-321	<input type="checkbox"/>	Highpass-Filter 1250 MHz – 4 GHz	NT-414
<input type="checkbox"/>	PSURGE 4.1 Surge generator	NT-324	<input type="checkbox"/>	Highpass-Filter 1800 MHz – 16 GHz	NT-415
<input type="checkbox"/>	TRANSIENT 1000 Immunity test system	NT-325	<input type="checkbox"/>	Highpass-Filter 3500 MHz – 18 GHz	NT-416
<input type="checkbox"/>	VCS 500-M6 Surge-Generator	NT-326	<input type="checkbox"/>	RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417
<input type="checkbox"/>	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	<input type="checkbox"/>	RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418

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## Test equipment used

<input type="checkbox"/>	RF-Attenuator 3 dB DC – 18 GHz / 50 W	NT-419	<input type="checkbox"/>	95242-1 – Current probe 10 MHz – 400 MHz	NT-468
<input type="checkbox"/>	RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421	<input type="checkbox"/>	94106-1L-1 – Current probe 20 Hz – 450 MHz	NT-471
<input type="checkbox"/>	RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423	<input checked="" type="checkbox"/>	PC P4 3 GHz Test computer	NT-500
<input type="checkbox"/>	RF-Attenuator 30 dB	NT-424	<input type="checkbox"/>	PC P4 1700 MHz Notebook	NT-505
<input type="checkbox"/>	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425	<input type="checkbox"/>	PC Intel Centrino 1600 MHz Notebook	NT-506
<input type="checkbox"/>	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426	<input type="checkbox"/>	Monitoring camera with Monitor	NT-511
<input type="checkbox"/>	RF-Attenuator 6 dB	NT-428	<input checked="" type="checkbox"/>	ES-K1 Version 1.71 SP2 Test software	NT-520
<input type="checkbox"/>	RF-Attenuator 0 dB - 81 dB	NT-429	<input type="checkbox"/>	SRM-TS Version 1.3 software for SRM-3000	NT-522
<input type="checkbox"/>	WRU 27 - Band blocking 27 MHz	NT-430	<input type="checkbox"/>	SPS-PHE Test software V2.32 voltage fluctuations/harmonics	NT-525
<input type="checkbox"/>	WHJ450C9 AA - High pass 450 MHz	NT-431	<input type="checkbox"/>	SPS-EM Test software V2.32 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 1:4 ; 1:9 ; 1:16	NT-435	<input type="checkbox"/>	Test cable #4 for EN 61000-4-6	NT-553
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-436	<input type="checkbox"/>	Test cable #3 for conducted emission	NT-554
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-437	<input type="checkbox"/>	Test cable #5 ESD-cable (2x470k)	NT-555
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 10 dB	NT-438	<input type="checkbox"/>	Test cable #6 ESD-cable (2x470k)	NT-556
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 20 dB	NT-439	<input type="checkbox"/>	Test cable #8 Sucoflex 104EA	NT-559
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Test cable #9 (for outdoor measurements)	NT-580
<input type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	Test cable #10 (for outdoor measurements)	NT-581
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	Test cable #13 Sucoflex 104PE	NT-584
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input type="checkbox"/>	Test cable #21 for SRM-3000	NT-592
<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	M-1200
<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			
<input type="checkbox"/>	FCC-801-C1 Coupling decoupling network	NT-464			
<input type="checkbox"/>	F-16A - Current probe 1kHz - 70MHz	NT-465			


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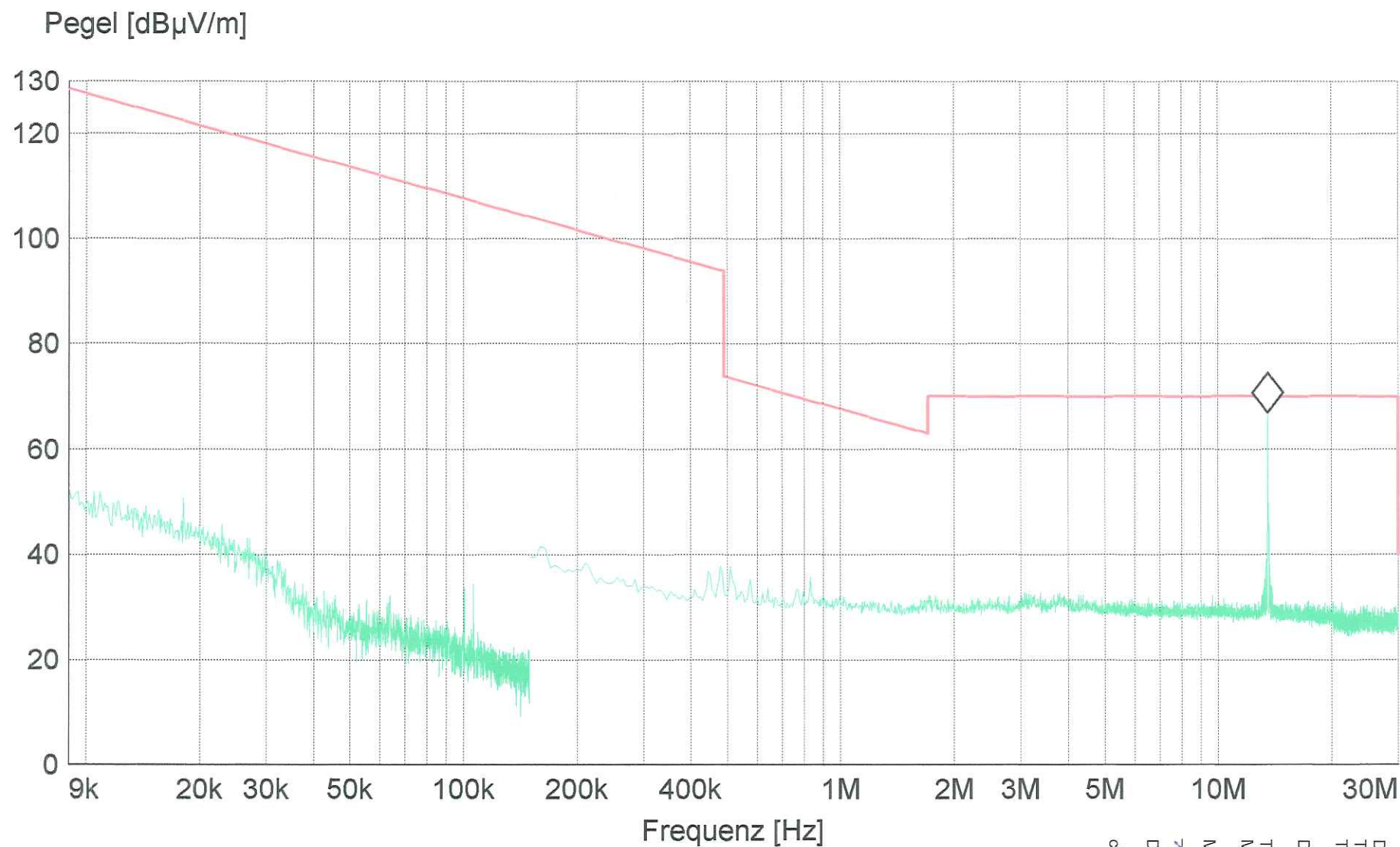
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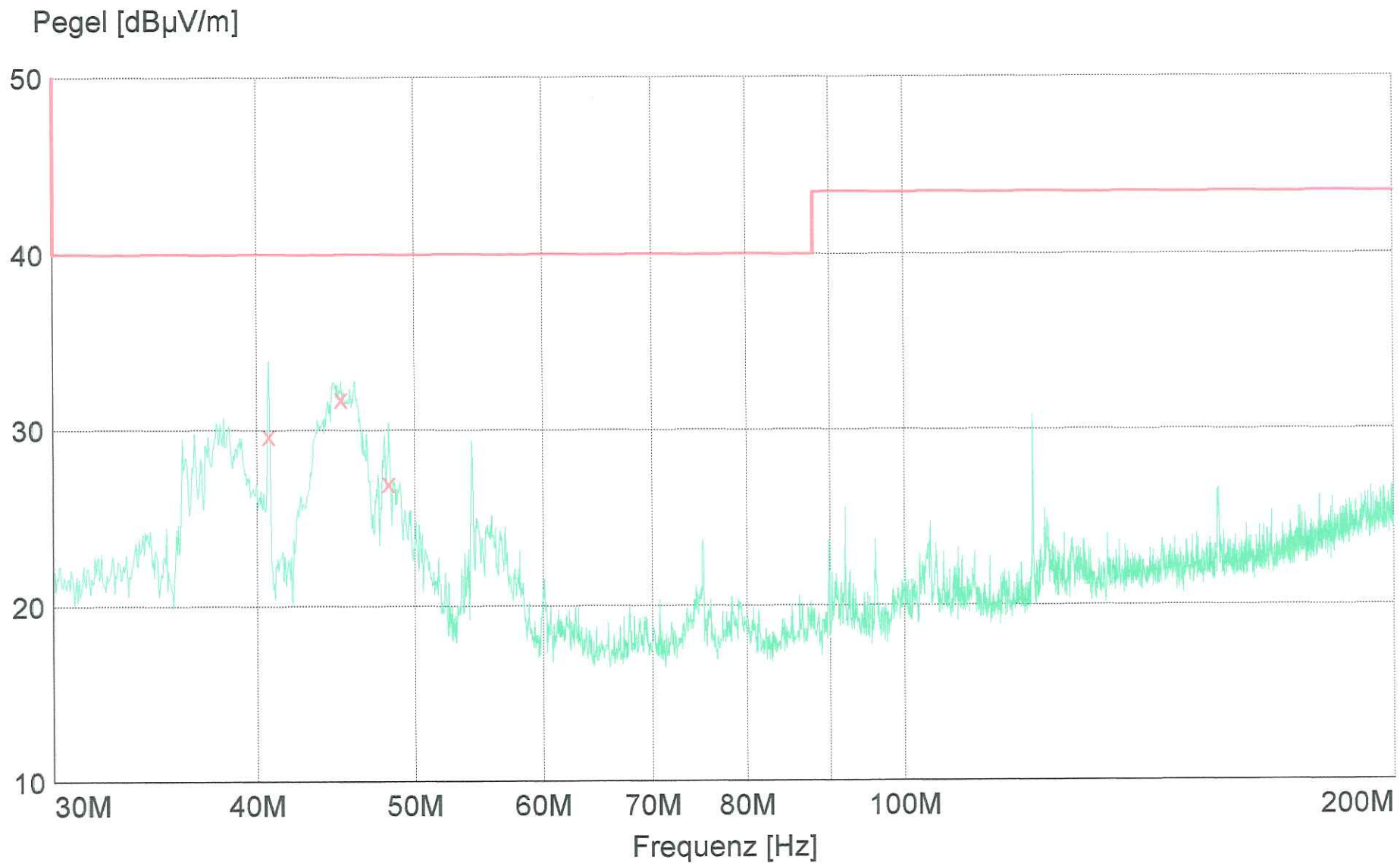
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Marker: 13.56 MHz 66.98 dB $\mu$ V/m



MES 160A\_kf0\_pre  
LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

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x x : MES 160A\_kf1\_fin  
 — MES 160A\_kf1\_pre  
 — LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

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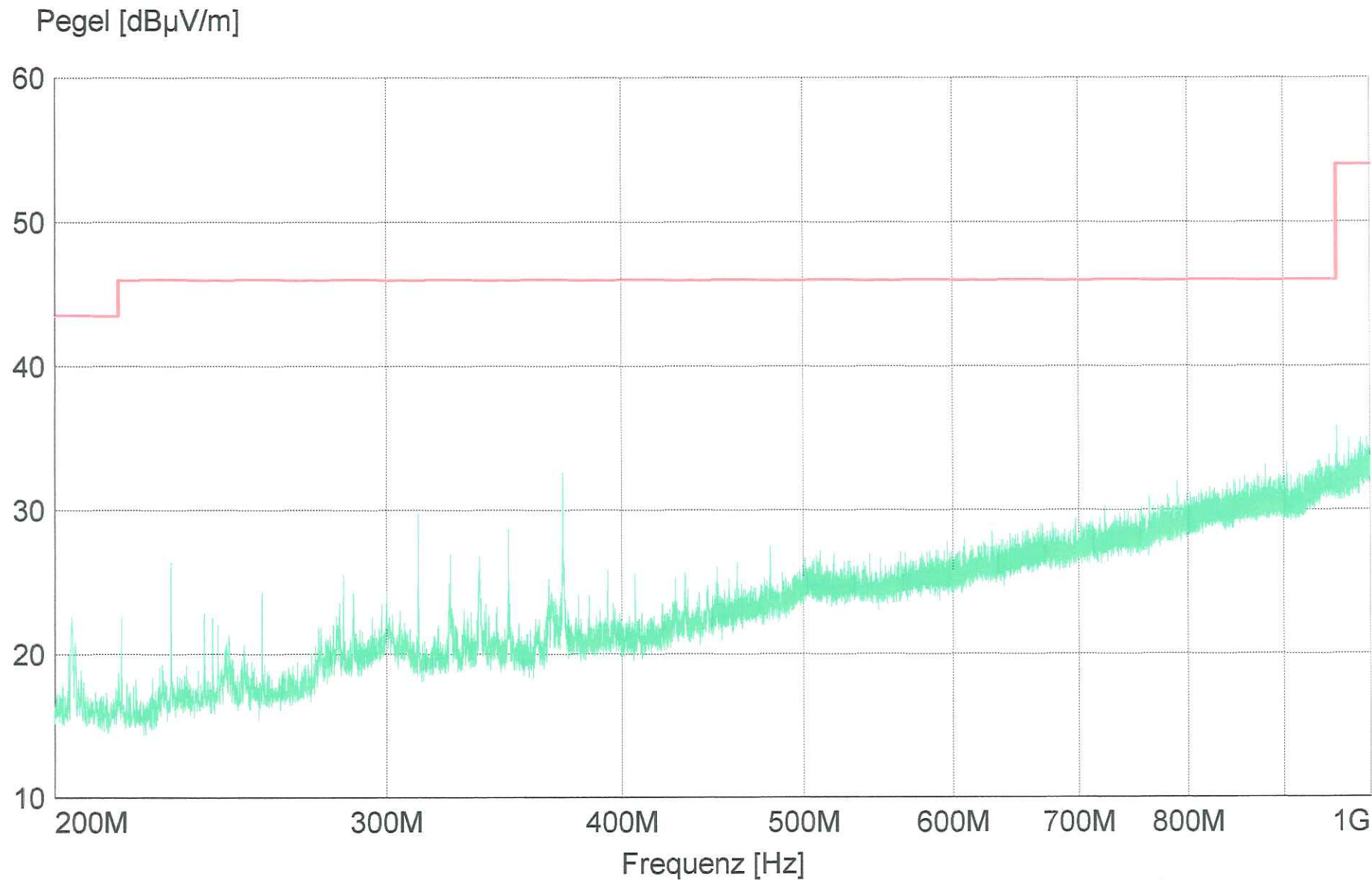
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MES 160A\_f2\_pre  
LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

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