TEST REPORT

of the accredited test laboratory

TÜV Nr.:M/EMV-08/141

about

the following EMC - test/- research

Applicant:	KEBA AG Gewerbepark Urfahr A-4041 Linz
Product:	IC 140/ A
Serial Number:	---
FCC ID:	U870002
Standard:	47 CFR Ch. I Part 15 (September 20, 2007) RSS-210 Issue 7 (June 2007)

TÜV AUSTRIA SERVICES GMBH

Test laboratory for EMC

Supervisor of EMC-laboratory

Ing. Wilhelm Seier

Official seal

11.04.2008

Checked by

Ing. Michael Emminger

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Department:
Testing Body for Communication Technology/ EMC

TÜV ®

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Inspection Body,
Certification Body,
Calibration Laboratory

Notified Body 0408
IC 4413

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UID ATU63240488
DVR 3002476

Contents

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:	IC 140/ 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 Radiocommunuication Devices (All Frequency Bands)	none	PASS
PASS EUT passed FAIL EUT failed			

4. Test results

4. 1. Conducted emission on the DC line

Limits

Frequeny range	Limit	
Detector	Quasi Peak	Average
0,150 - 0,5 MHz	66 - 56 dBµV decreasing with the logarithm of frequency	56 - 46 dBµV decreasing with the logarithm of frequency
0,5 - 5 MHz	56 dBµV	46 dBµV
5 - 30 MHz	60 dBµV	50 dBµV
Remark:	Quasi Peak and Average limits must be both met	

Measuring apparatus parameters:

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	150 kHz	150 kHz	Detector	MP/AV	QP/AV
Stop frequency	30 MHz	30 MHz	Measuring time	10 ms	1 s
Stepsize	5 kHz	5 kHz	RF-attenuation	0dB	0 dB
IF- Bandwidth	9 kHz	9 kHz	Preamplifier	0 dB	0 dB

Operating mode	Measuring result
Normal operation	Measurement diagram 1

Test result:

4. 1.1.) Measurement with QP-Detector

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Exceed-Mark	Phase	PE
13,525	54,8	60	5,2		+	FLO
13,56	78,4	60	-18,4	**	+	FLO
13,59	58,3	60	1,7		+	FLO

4. 1.2.) Measurement with AV-Detector

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Exceed-Mark	Phase	PE
13,52	38,3	50	11,7		+	FLO
13,56	78,4	50	-28,4	**	+	FLO
13,59	38	50	12		+	FLO
13,615	37	50	13		+	FLO
27,12	41,2	50	8,8		+	FLO

** This part of emission is coverd by 15.225 (a) and A2.6.(a)

4. 2. Radiated emission

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

	Detector Quasi Peak	
Frequency range	Limit	Measurement distance
0,009 – 0,490 MHz	2400µV / f(kHz)	300 m
0,490 – 1,705 MHz	24000µV / 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 2-4

Test result:

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

Due to the large margin to the limit, no final measurement was performed.

4.3. 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 dBµV/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):

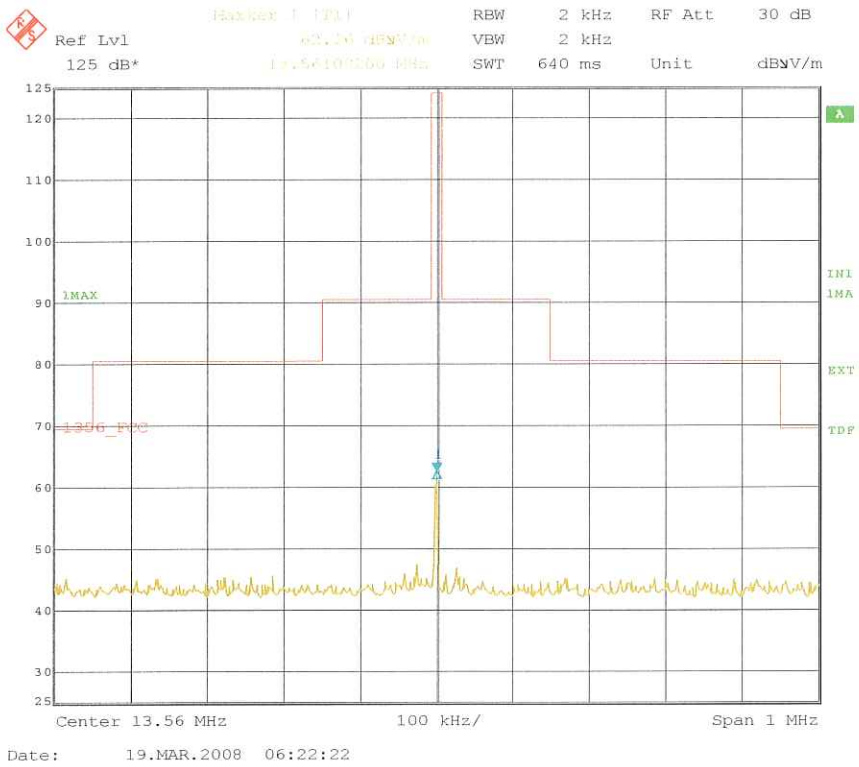
Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

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

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

Test result:

The field strength at 13,56 MHz in 3 m distance was measured as 61,7 dBµV/m.
Extrapolated with 40 dB per decade to 30 meters distance it would be 21,7 dBµV/m.



15.225 (e) and A2.6:

The frequency tolerance of the carrier signal shall be maintained within ± 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} (24)VDC	13,560256 MHz
T_{nom} (20)°C	V_{min} (20,4)VDC	13,560252 MHz
T_{nom} (20)°C	V_{max} (27,6)VDC	13,560254 MHz
T_{min} (-20)°C	V_{nom} (24)VDC	13,560208 MHz
T_{max} (50)°C	V_{nom} (24)VDC	13,560210 MHz
Maximum deviation from nominal frequency under extreme test conditions (%)		0,000256 MHz
Measurement uncertainty		± 10 Hz

Appendix 1
Test equipment used

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☒	Anechoic Chamber with 3m measurement distance	NT-100
☐	Stripline according to ISO 11452-5	NT-108
☒	MA 240 - Antenna mast 1 - 4 m height	NT-110
☒	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111
☒	HD 100 Controller Mast+Turntable	NT-112
☐	HUF-Z2 - Bicon. Antennna 20 - 300 MHz	NT-120
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121
☒	HFH-Z2 - Loop Antenna 9 kHz - 30 MHz	NT-122
☐	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123
☐	3121C - Dipole Antenna 28 - 1000 MHz	NT-124
☐	3115 - Horn Antenna 1 - 18 GHz (immunity)	NT-125
☐	3116 - Horn Antenna 18 - 40 GHz	NT-126
☐	SAS-200/543 - Bicon. Antenna 20 MHz - 300 MHz	NT-127
☐	AT-1080 - Log. Per. Antenna 80 - 1000 MHz	NT-128
☒	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-129
☐	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-130
☒	3146 - Log. Per. Antenna 200 – 1000 MHz	NT-131
☐	Loop Antenna H-Field	NT-132
☐	Horn Antenna 500 MHz - 2900 MHz	NT-133
☐	Horn Antenna 500 MHz - 6000 MHz	NT-133/1
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-134
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-135
☐	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137
☐	Conical Dipol Antenna PCD8250	NT-138
☐	HF 906 - Horn Antenna 1 - 18 GHz (emission)	NT-139
☐	HZ-1 Antenna tripod	NT-150
☐	BN 1500 Antenna tripod	NT-151
☐	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156
☐	Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-172
☒	Spectrumanalyzer – FSP7 9 kHz – 7 GHz	NT-200
☐	ESVP - Test receiver 20 - 1000 MHz	NT-201
☐	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
☒	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
☐	Digital Radio Tester CTS55	NT-208
☐	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐	Radiocommunicationanalyzer Marconi 2945A	NT-212
☐	2855S - Communication analyzer	NT-213
☐	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
☒	RubiSource T&M Timing reference	NT-216
☐	Radiocommunicationanalyzer SWR 1180 MD	NT-217
☐	Mixer M19HWD 40 GHz – 60 GHz	NT-218
☐	Mixer M12HWD 60 GHz – 90 GHz	NT-219
☐	TDS - 540 DSO Digital scope	NT-220
☐	TPS 2014 Digital scope	NT-222
☐	Artificial Ear according to IEC 60318	NT-224
☐	1 kHz Sound calibrator	NT-225
☐	B10 - Harmonics and flicker analyzer	NT-232
☐	SRM-3000 Spectrumanalyzer	NT-233
☐	E-field probe SRM 75 MHz – 3 GHz	NT-234
☐	Hall-Teslameter ETM-1	NT-241
☐	EFA-3 H-field- / E-field probe	NT-243
☐	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
☐	E-field probe 100 kHz – 3 GHz	NT-245
☐	Magneticfield-Sensor 300 kHz – 30 MHz	NT-246
☐	E-field probe 3 MHz – 18 GHz	NT-247

Division Medical Technology/ Communication Technology/ EMC

Department: EMC

Test report number: M/EMV-08/141

Date: 11.04.2008

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Appendix 1 (continued)
Test equipment used

TÜV AUSTRIA

☐	H-field probe 27 MHz – 1 GHz	NT-248
☐	ELT-400 1 Hz – 400 kHz	NT-249
☐	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
☐	FCC-203I EM Injection clamp	NT-251
☐	FCC-203I-DCN Ferrite decoupling network	NT-252
☐	PR50 Current Probe	NT-253
☐	PR630 Current Probe	NT-254
☐	Fluke 87 V True RMS Multimeter	NT-260
☐	Model 2000 Digital Multimeter	NT-261
☐	Fluke 87 V Digital Multimeter	NT-262/1
☒	ESH2-Z5-U1 Artificial mains network 4x25A	NT-300
☐	ESH3-Z5-U1 Artificial mains network 2x10A	NT-301
☐	ESH3-Z6-U1 Artificial mains network 1x100A	NT-302
☐	ESH3-Z4 T-Artificial network	NT-303
☐	PHE 4500/B Power amplifier	NT-304
☐	EZ10 T-Artificial Network	NT-305
☐	ENY22 Artificial Network	NT-308
☐	ENY41 Artificial Network	NT-309
☐	SMG - Signal generator 0,1 - 1000 MHz	NT-310
☐	PM 5518 TXVPS Video generator	NT-311
☐	RefRad Reference generator	NT-312
☐	SMP 02 Signal generator 10 MHz - 20 GHz	NT-313
☐	40 MHz Arbitrary Generator TGA1241	NT-315
☐	PEFT - Burst generator up to 4 kV	NT-320
☐	ESD 30 System up to 25 kV	NT-321
☐	PSURGE 4.1 Surge generator	NT-324
☐	TRANSIENT 1000 Immunity test system	NT-325
☐	VCS 500-M6 Surge-Generator	NT-326
☐	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330
☐	T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331
☐	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
☐	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
☐	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
☐	Preamplifier 1 GHz - 4 GHz	NT-335
☐	Preamplifier for GPS MKU 152 A	NT-336
☐	Preamplifier 100 MHz – 23 GHz	NT-337
☐	DC Block 10 MHz – 18 GHz Model 8048	NT-338
☐	2-97201 Electronic load	NT-341
☐	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐	VDS 200 Mobil-impuls-generator	NT-350
☐	LD 200 Mobil-impuls-generator	NT-351
☐	MPG 200 Mobil-Impuls-Generators	NT-352
☐	EFT 200 Mobil-impuls-generator	NT-353
☐	AN 200 S1 Artificial Network	NT-354
☐	FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1
☐	PHE 4500 - Mains impedance network	NT-401
☐	IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐	TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409
☐	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐	IP 4 - Capacitive clamp (Burst)	NT-411
☐	Highpass-Filter 100 MHz – 3 GHz	NT-412
☐	Highpass-Filter 600 MHz – 4 GHz	NT-413
☐	Highpass-Filter 1250 MHz – 4 GHz	NT-414
☐	Highpass-Filter 1800 MHz – 16 GHz	NT-415
☐	Highpass-Filter 3500 MHz – 18 GHz	NT-416
☐	RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417
☐	RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418

Appendix 1 (continued)
Test equipment used

TÜV AUSTRIA

Division Medical Technology/ Communication Technology/ EMC

Department: EMC

Test report number: M/EMV-08/141

Date: 11.04.2008

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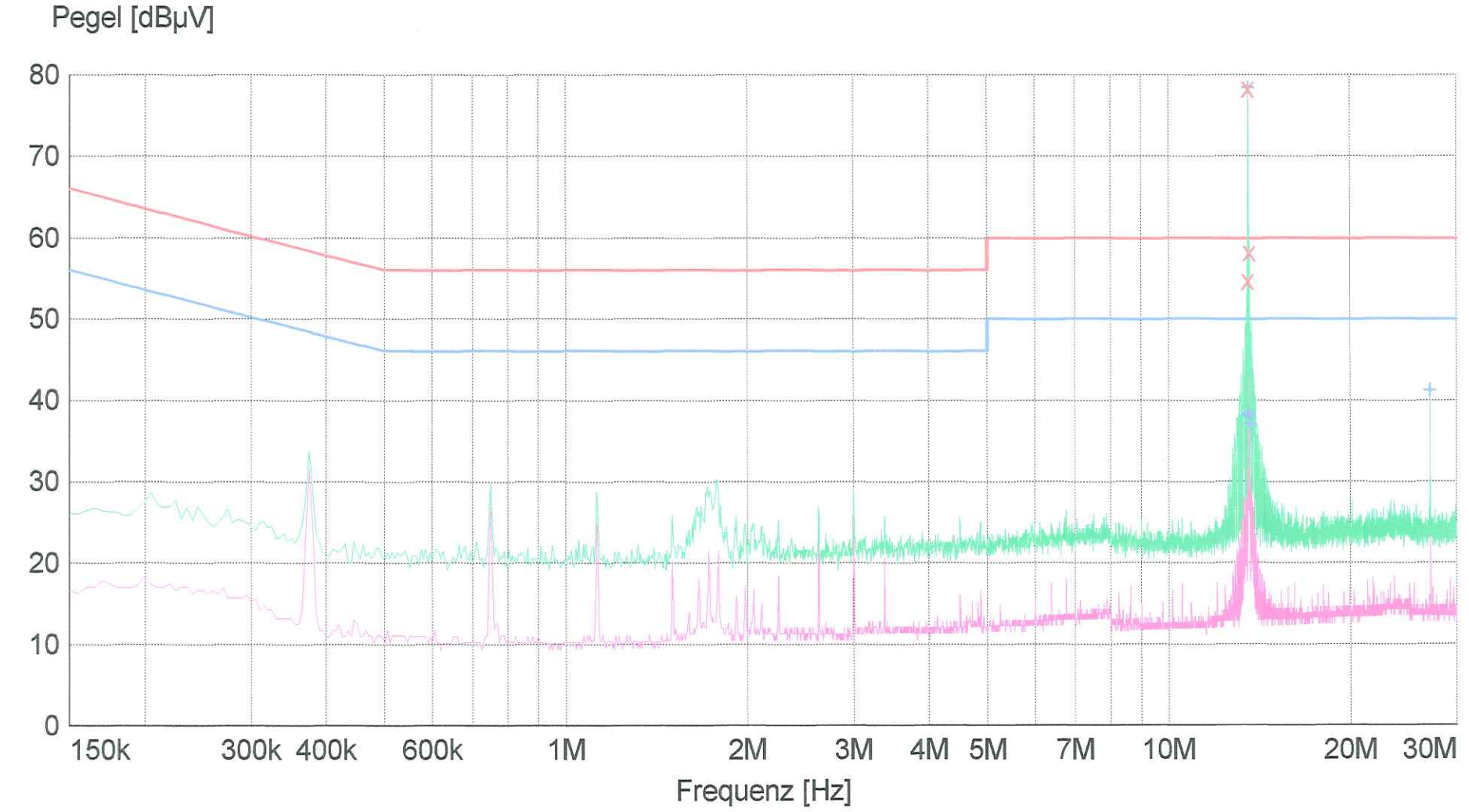
☐	RF-Attenuator 3 dB DC – 18 GHz / 50 W	NT-419
☐	RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421
☐	RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423
☐	RF-Attenuator 30 dB	NT-424
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426
☐	RF-Attenuator 6 dB	NT-428
☐	RF-Attenuator 0 dB - 81 dB	NT-429
☐	WRU 27 - Band blocking 27 MHz	NT-430
☐	WHJ450C9 AA - High pass 450 MHz	NT-431
☐	WHJ250C9 AA - High pass 250 MHz	NT-432
☐	RF-Load 150 W	NT-433
☐	Impedance transducer 1:4 ; 1:9 ; 1:16	NT-435
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-436
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-437
☐	RF-Attenuator DC – 18 GHz 10 dB	NT-438
☐	RF-Attenuator DC – 18 GHz 20 dB	NT-439
☐	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440
☐	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441
☐	Power Divider 6 dB/1 W/50 Ohm	NT-443
☐	Directional coupler 0,1 MHz – 70 MHz	NT-444
☐	Directional coupler 0,1 MHz – 70 MHz	NT-445
☐	Tube imitations according to EN 55015	NT-450
☐	FCC-801-M2-50A Coupling decoupling network	NT-459
☐	FCC-801-M5-25 Coupling decoupling network	NT-460
☐	FCC-801-AF10 Coupling decoupling network	NT-461
☐	FCC-801-S25 Coupling decoupling network	NT-462
☐	FCC-801-T4 Coupling decoupling network	NT-463
☐	FCC-801-C1 Coupling decoupling network	NT-464
☐	F-16A - Current probe 1kHz - 70MHz	NT-465
☐	95242-1 – Current probe 10 MHz – 400 MHz	NT-468
☐	94106-1L-1 – Current probe 20 Hz – 450 MHz	NT-471
☒	PC P4 3 GHz Test computer	NT-500
☐	PC P4 1700 MHz Notebook	NT-505
☐	PC Intel Centrino 1600 MHz Notebook	NT-506
☐	Monitoring camera with Monitor	NT-511
☒	ES-K1 Version 1.71 SP2 Test software	NT-520
☐	SRM-TS Version 1.3 software for SRM-3000	NT-522
☐	SPS-PHE Test software V2.32 voltage fluctuations/harmonics	NT-525
☐	SPS-EM Test software V2.32 for PHE 4500/B	NT-527
☐	Noise power test apparatus according to EN 55014	NT-530
☐	Vertical coupling plane (ESD)	NT-531
☐	Test cable #4 for EN 61000-4-6	NT-553
☒	Test cable #3 for conducted emission	NT-554
☐	Test cable #5 ESD-cable (2x470k)	NT-555
☐	Test cable #6 ESD-cable (2x470k)	NT-556
☐	Test cable #8 Sucoflex 104EA	NT-559
☐	Test cable #9 (for outdoor measurements)	NT-580
☐	Test cable #10 (for outdoor measurements)	NT-581
☐	Test cable #13 Sucoflex 104PE	NT-584
☐	Test cable #21 for SRM-3000	NT-592
☐	Shield chamber	NT-600
☒	Climatic chamber	M-1200
☐	Control and simulation equipment for EUT	---



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+ + : MES IC140A_VAC_fin2
MES IC140A_VAC_pre
MES IC140A_VAC_pre2
LIM EN 55022 V QP EN 55022 V QP
LIM EN 55022 V AV EN 55022 V AV

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Department: EMC

Test report reference:
M/EMV-08/144

Measurement diagram:
1 of 4

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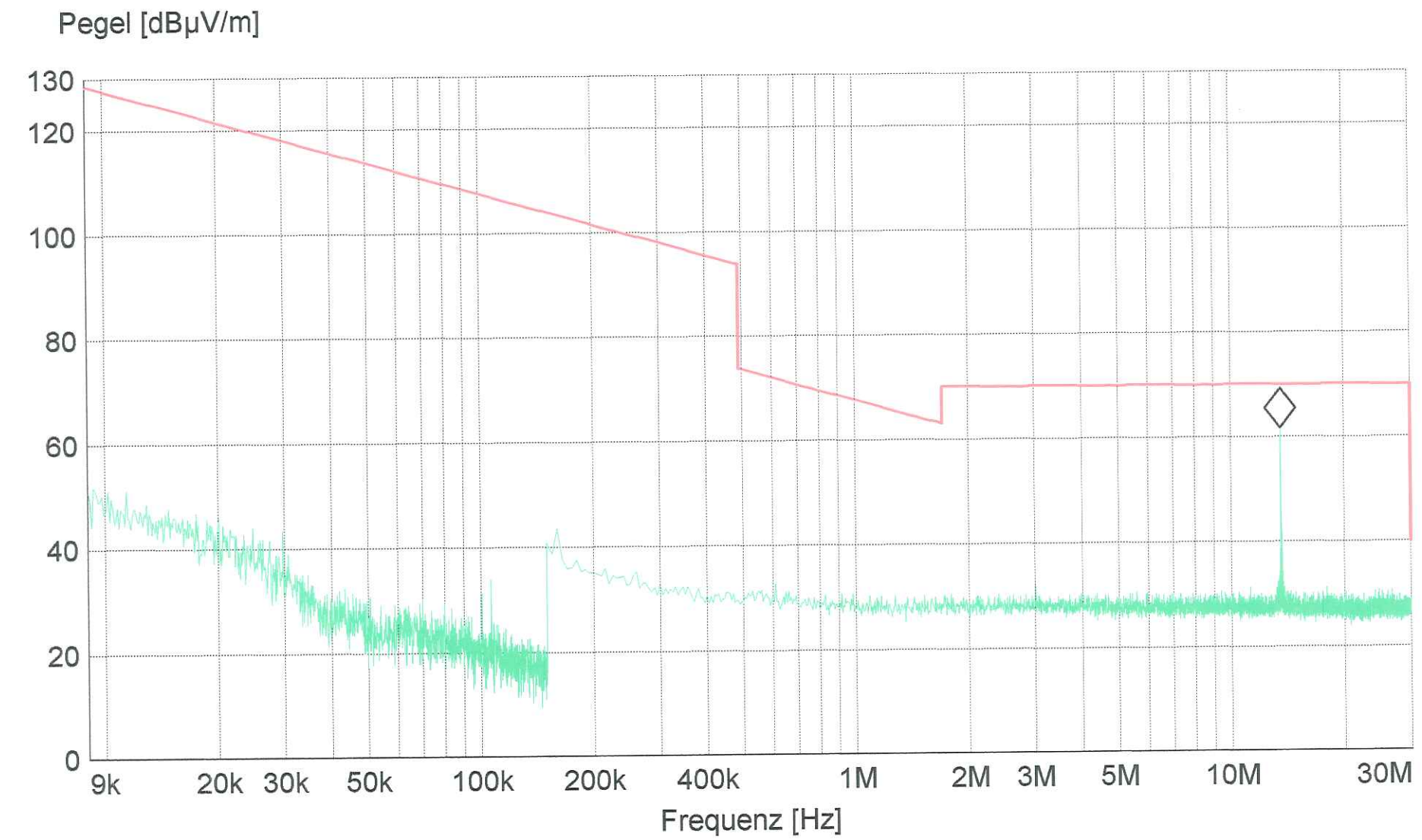
Marker: 13.56 MHz 61.7 dBµV/m



MES 140A_f0_pre
LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

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Date: 11.04.2008

Measurement diagram: 2 of 4

Test report reference: M/EMV-08/14,1

Department: EMC

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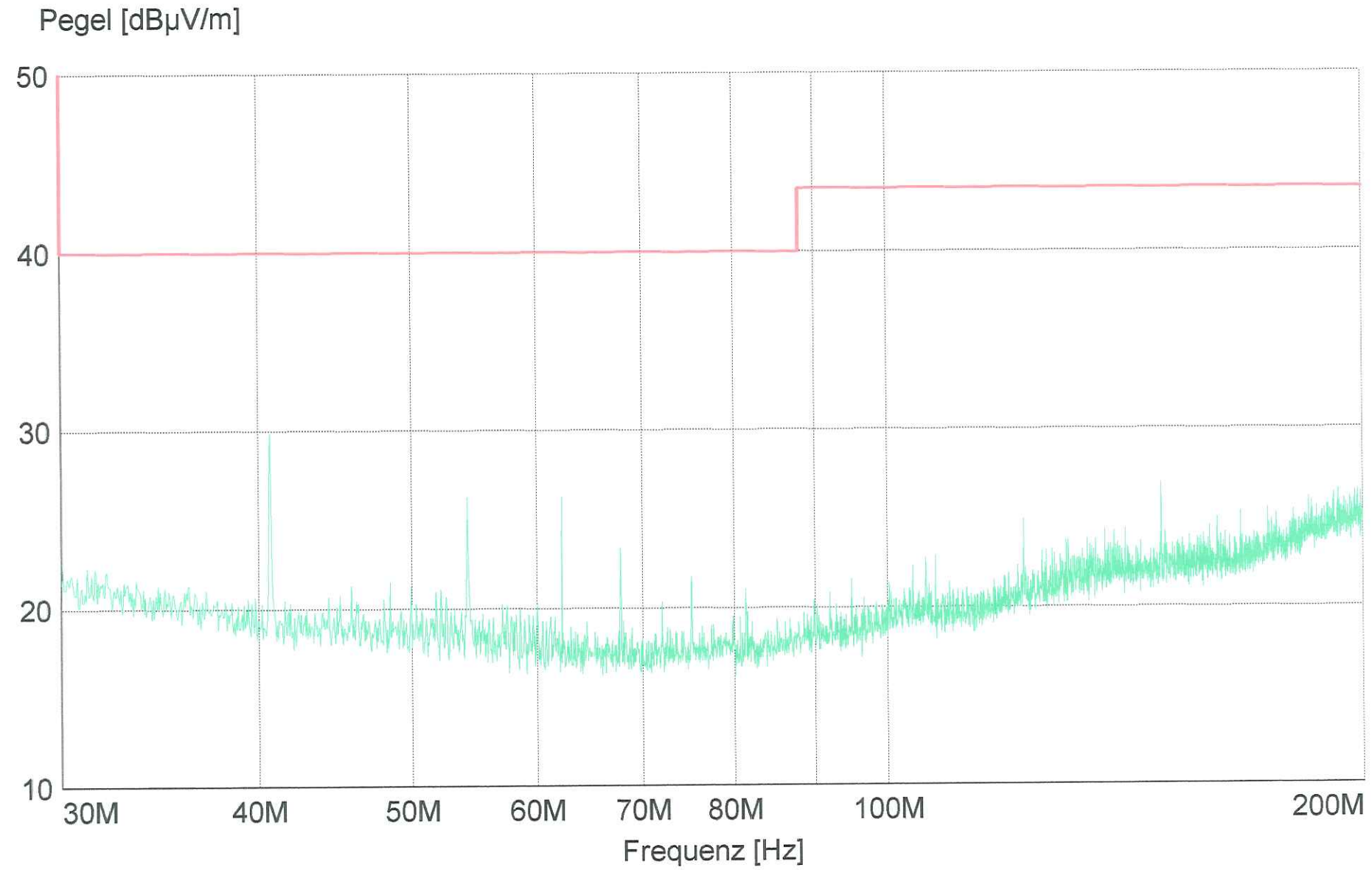

MES 140A_f1_pre
LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

Division Medical Technology/ Communication Technology/ EMC

Department: EMC

Test report reference: M/EMV-08/14/1

Measurement diagram: 3 of 4

Date: 11.04.2008

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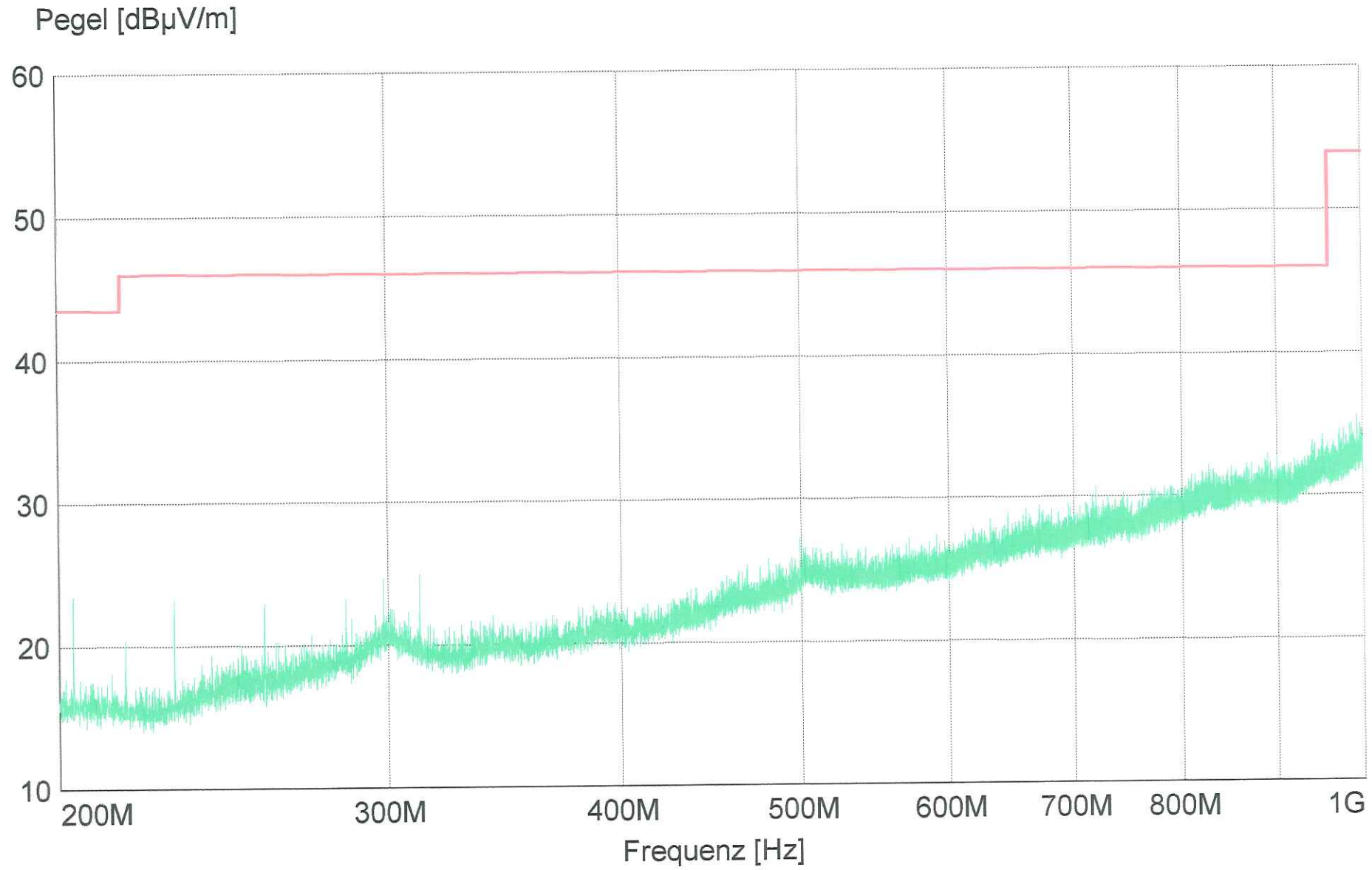

MES 140A_f2_pre
LIM FCC ClassB F QP 40dB FCC ClassB, field strength 3m

Division Medical Technology/ Communication Technology/ EMC
Department: EMC
Test report reference: M/EMV-08/141
Measurement diagram: 4 of 4
Date: 11.04.2008
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