4. 6.) Electrostatic discharge requirements (ESD) EPOSA 04.00

Type of test	charging voltage	Basic standard	Test set-up	Comment	Performance criteria
Electrostatic discharge Air discharge	20 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B
Electrostatic discharge Contact discharge	8 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B

Operating mode	Test positions	Criteria of compliance
Normal operation with looping of signals	The 33 test positions are shown in the following graphic.	Before, during and after the test the equipment shall operate as intended, no loss of function or loss of voice links shall occur. Short disturbances on the voice link during the test are allowed. After the test there shall be no degradation of performance.

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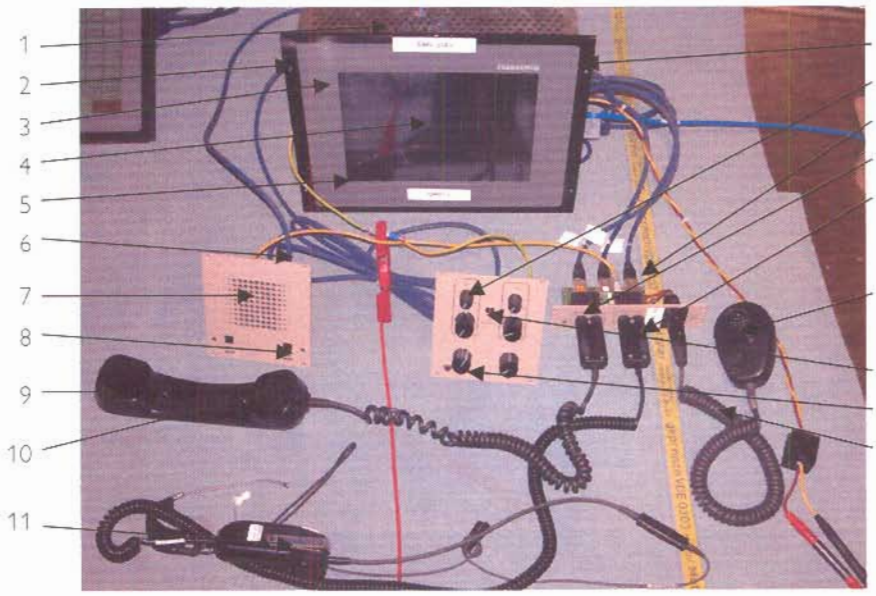
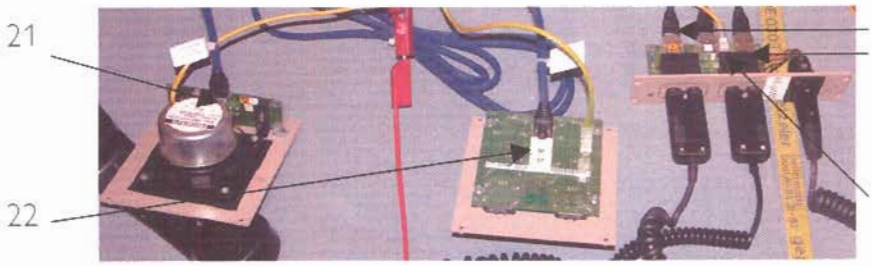
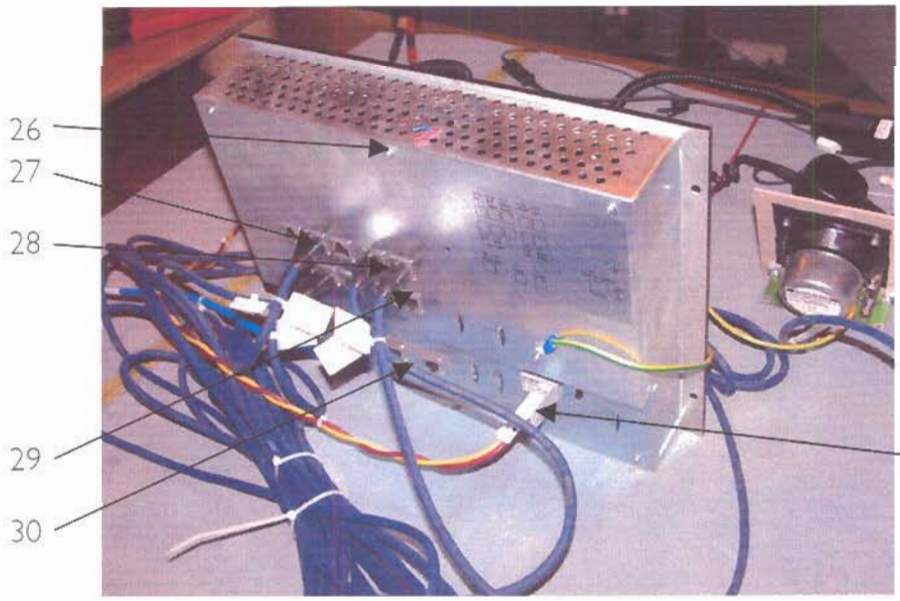
Test positions for ESD on the EPOSA 04.00







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Test result for the EPOSA 04.00

Test position	Charging voltage	Type of discharge	Positive discharge	Negative discharge
1	8 kV	contact	OK	OK
2	8 kV	contact	OK	OK
3	20 kV	air	OK	OK
4	20 kV	air	OK	OK
5	20 kV	air	OK	OK
6	20 kV	air	OK	OK
7	20 kV	air	OK	OK
8	20 kV	air	OK	OK
9	20 kV	air	OK	OK
10	20 kV	air	OK	OK
11	20 kV	air	OK	OK
12	20 kV	air	OK	OK
13	20 kV	air	OK	OK
14	8 kV	contact	OK	OK
15	20 kV	air	OK	OK
16	20 kV	air	OK	OK
17	20 kV	air	OK	OK
18	20 kV	air	OK	OK
19	20 kV	air	OK	OK
20	20 kV	air	OK	OK

OK EUT passed
NOK EUT failed

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Test result for the EPOSA 04.00 continued

Test position	Charging voltage	Type of discharge	Positive discharge	Negative discharge
21	8 kV	contact	OK	OK
22	8 kV	contact	OK	OK
23	8 kV	contact	OK	OK
24	8 kV	contact	OK	OK
25	8 kV	contact	OK	OK
26	8 kV	contact	OK	OK
27*	8 kV	contact	OK	OK
28*	8 kV	contact	OK	OK
29*	8 kV	contact	OK	OK
30*	8 kV	contact	OK	OK
31	20 kV	air	OK	OK
32	8 kV	Indirect HCP	OK	OK
33	8 kV	Indirect VCP	OK	OK

OK EUT passed
NOK EUT failed
* The connectors at these positions need to be better conducted with the case. For the tests this was done with adhesive metal foil.

4. 7.) Electrostatic discharge requirements (ESD) C-POS 01

Type of test	charging voltage	Basic standard	Test set-up	Comment	Performance criteria
Electrostatic discharge Air discharge	20 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B
Electrostatic discharge Contact discharge	8 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B

Operating mode	Test positions	Criteria of compliance
Normal operation with looping of signals	The 24 test positions are shown in the following graphic.	Before, during and after the test the equipment shall operate as intended, no loss of function or loss of voice links shall occur. Short disturbances on the voice link during the test are allowed. After the test there shall be no degradation of performance.

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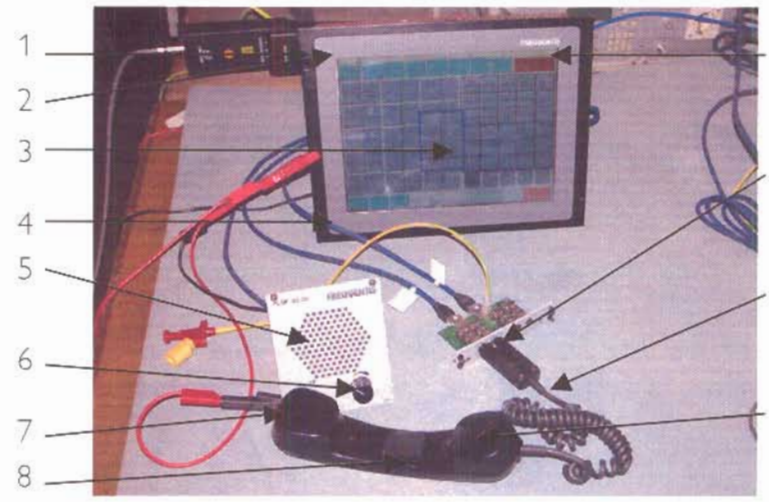
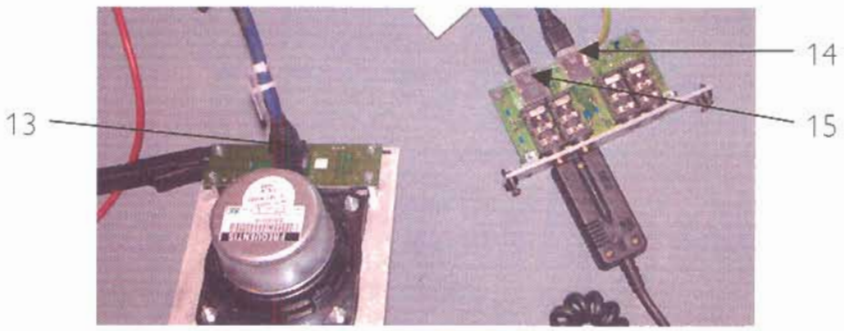
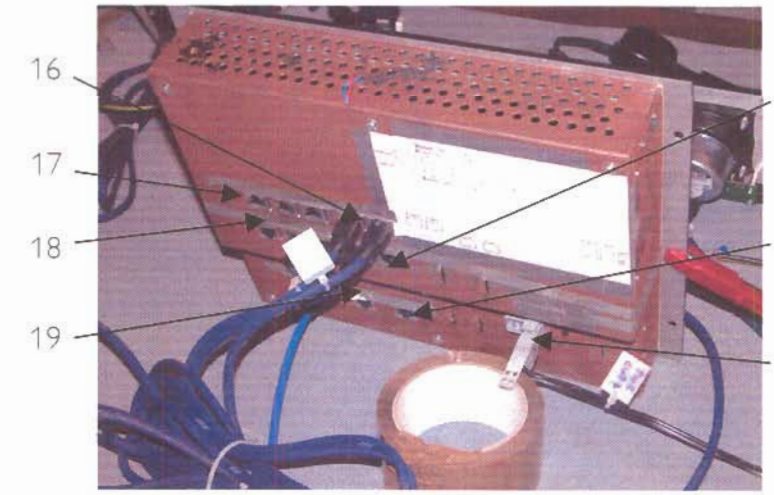
Test positions for ESD on the C-POS 01







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Test result for the C-POS 01

Test position	Charging voltage	Type of discharge	Positive discharge	Negative discharge
1	8 kV	contact	OK	OK
2	20 kV	air	OK	OK
3	20 kV	air	OK	OK
4	20 kV	air	OK	OK
5	20 kV	air	OK	OK
6	20 kV	air	OK	OK
7	20 kV	air	OK	OK
8	20 kV	air	OK	OK
9	20 kV	air	OK	OK
10	20 kV	air	OK	OK
11	20 kV	air	OK	OK
12	20 kV	air	OK	OK
13	20 kV	air	OK	OK
14	8 kV	contact	OK	OK
15	8 kV	contact	OK	OK
16*	8 kV	contact	OK	OK
17*	8 kV	contact	OK	OK
18*	8 kV	contact	OK	OK
19*	8 kV	contact	OK	OK
20*	8 kV	contact	OK	OK
21*	8 kV	contact	OK	OK
22	20 kV	air	OK	OK
23	8 kV	Indirect HCP	OK	OK
24	8 kV	Indirect VCP	OK	OK

OK EUT passed
NOK EUT failed
* The connectors at these positions need to be better conducted with the case. For the tests this was done with adhesive metal foil.

4. 8.) Radiated electromagnetic field requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Radiated electromagnetic field 19" cabinet	80 MHz - 1000 MHz Fieldstrength: 10 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	EN 61000-4-3	EN 61000-4-3		A
Radiated electromagnetic field operator positions	80 MHz - 1000 MHz Fieldstrength: 3 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	EN 61000-4-3	EN 61000-4-3		A

Operating mode	Criteria of compliance
Normal operation with looping of signals For the operator positions: Only the handset was connected (No headset)	Before, dunng and after the test the equipment shall operate as intended. A minimum SNR of the voice link of 40 dB shall be maintained. After the test there shall be no degradation of performance.

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Test result

Type of test	Test parameters	Performance criteria	Result
Radiated electromagnetic field 19" cabinet	80 MHz - 1000 MHz Fieldstrength: 10 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	A	OK
Radiated electromagnetic field operator positions	80 MHz - 1000 MHz Fieldstrength: 3 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	A	OK
OK EUT passed NOK EUT failed			

4. 9.) Induced RF-field requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
RF-current common mode	0,15 MHz - 80 MHz 10 Vrms (unmodulated) Modulation 80%/1 kHz AM Stepsize 1 % Source impedance 150 Ohm	EN 61000-4-6	EN 61000-4-6		A

Operating mode	Criteria of compliance
Normal operation with looping of signals For the operator positions: There must be a ferrite on the Headset-line to keep the compliance criteria.	Before, during and after the test the equipment shall operate as intended. A minimum SNR of the voice link of 40 dB shall be maintained. After the test there shall be no degradation of performance.

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Test result

Measured line	Type of coupling	Performance criteria	Result
AC-mains supply (1-phase)	M5	A	OK
ERIF 03.00 line	Clamp Injection	A	OK
GPIF 03.01 line	Clamp Injection	A	OK
T0 03.00 line	Clamp Injection	A	OK
BCB 03.00 line	Clamp Injection	A	OK
BCA 03.00 line	Clamp Injection	A	OK
LB 03.00 line	Clamp Injection	A	OK
TMCS line	Clamp Injection	A	OK
Operator positions line	Clamp Injection	A	OK
OK EUT passed NOK EUT failed			

4. 10.) Electrical fast transients/burst requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Electrical fast transients common mode	5/50 ns t_r/t_h 5kHz Burst frequency 15 ms Burst time 3 Hz Repetition frequency Polarity: positive/negative	EN 61000-4-4	EN 61000-4-4 Coupling clamp		B

Operating mode	Criteria of compliance
Normal operation with looping of signals	Before, during and after the test the equipment shall operate as intended, no loss of function or loss of voice links shall occur. Short disturbances on the voice link during the test are allowed. After the test there shall be no degradation of performance.

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Test result

4. 10. 1.) Measurement on other lines (coupling clamp)

Measured line	Test voltage	Performance criteria	Positive pulse	Negative pulse
ERIF 03.00 line	1 kV	B	OK	OK
GPIF 03.01 line	1 kV	B	OK	OK
T0 03.00 line	1 kV	B	OK	OK
BCB 03.00 line	1 kV	B	OK	OK
BCA 03.00 line	1 kV	B	OK	OK
LB 03.00 line	1 kV	B	OK	OK
TMCS line	1 kV	B	OK	OK
Operator positions line	1 kV	B	OK	OK
OK EUT passed NOK EUT failed				

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4. 11.) Surge requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Surge, common mode, signal lines	1 kV Test level 1,2/50 µs t_r/t_h Polarity: positive/negative	EN 61000-4-5	EN 61000-4-5		B

Operating mode	Criteria of compliance
Normal operation with looping of signals	Before, during and after the test the equipment shall operate as intended, no loss of function or loss of voice links shall occur. Short disturbances on the voice link during the test are allowed. After the test there shall be no degradation of performance.

Test result

4. 11.1.) Measurement on shielded signal lines - common mode

Combination	Test voltage	Performance criteria	Positive pulse	Negative pulse
ERIF 03.00 line	1 kV	B	OK	OK
GPIF 03.01 line	1 kV	B	OK	OK
T0 03.00 line	1 kV	B	OK	OK
BCB 03.00 line	1 kV	B	OK	OK
BCA 03.00 line	1 kV	B	OK	OK
LB 03.00 line	1 kV	B	OK	OK
TMCS line	1 kV	B	OK	OK
Operator positions line	1 kV	B	OK	OK
OK EUT passed NOK EUT failed				

Appendix 1
Test equipment used

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☒	Anechoic Chamber with 3m measurement distance	NT-100
☒	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	NT-125
☐	3116 - Horn Antenna 18 - 40 GHz	NT-126
☐	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127
☐	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128
☒	HK-116 - bicon Ant. 20 MHz - 300 MHz	NT-129
☐	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130
☒	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131
☐	Loop Antenna H-Field	NT-132
☐	Horn Antenna 500 MHz - 2900 MHz	NT-133
☐	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
☐	HZ-1 Antenna tripod	NT-150
☐	BN 1500 Antenna tripod	NT-151
☒	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156
☐	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
☐	PM97 Scopemeter	NT-221
☐	TPS 2014 Digital scope	NT-222
☐	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

Medizintechnik/
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Department: EMV

Test report number:
M/EMV-05/141

Date: 31.05.2005

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Appendix 1 (continued)
Test equipment used

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☐	E-field probe 10 MHz – 18 GHz	NT-247
☐	H-field probe 10 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 79 Digital Multimeter	NT-262
☐	Fluke 79 Digital Multimeter	NT-263
☐	ESH2-Z5 Artificial mains network 4x25A	NT-300
☐	ESH3-Z5 Artificial mains network 2x10A	NT-301
☐	ESH3-Z6 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
☒	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 T1241	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
☐	FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
☐	PHE 4500 - Mains impedance network	NT-401
☐	IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☒	IP 4 - Capacitive clamp (Burst)	NT-411
☐	Highpass-Filter 100 MHz – 4 GHz	NT-412
☐	Highpass-Filter 600 MHz – 4 GHz	NT-413
☐	Highpass-Filter 1250 MHz – 4 GHz	NT-414

Appendix 1 (continued)
Test equipment used

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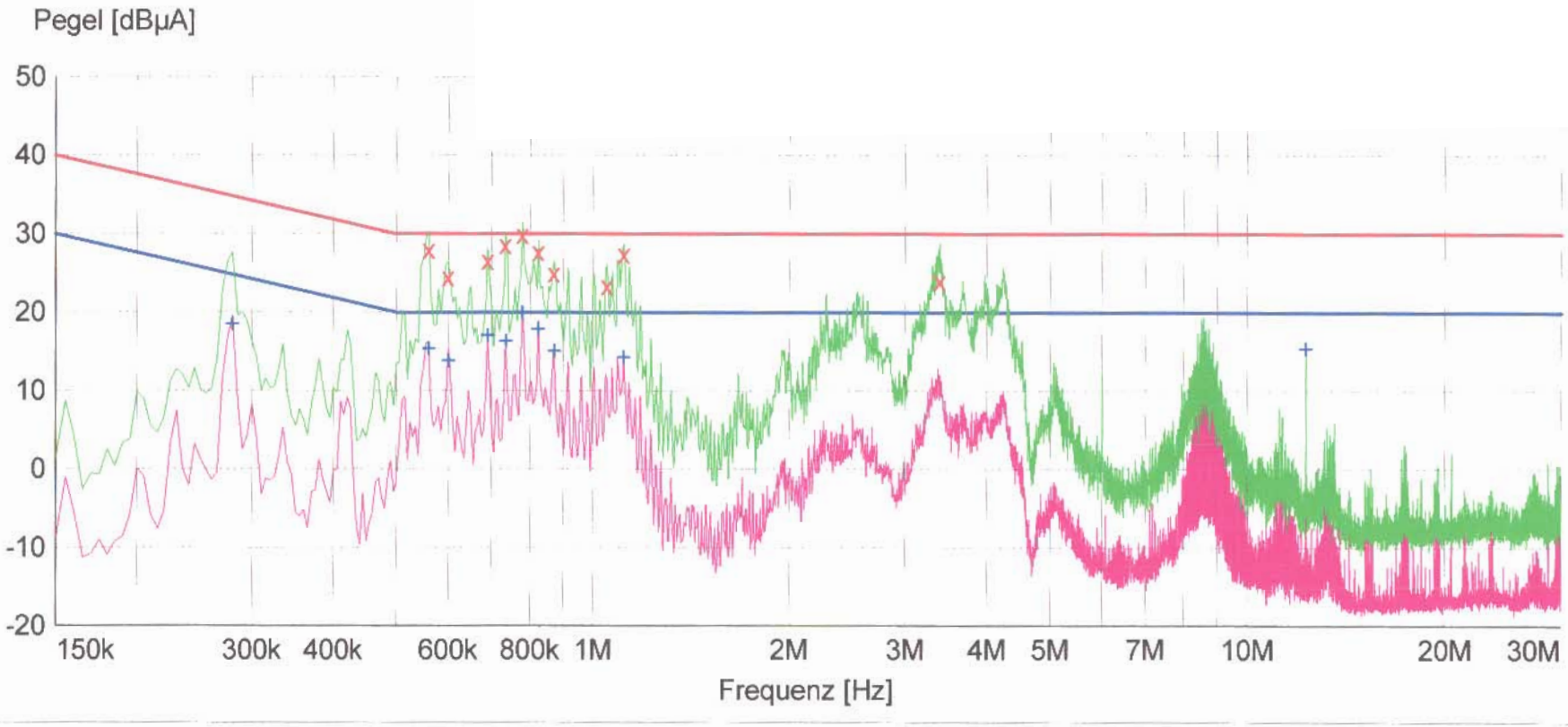
☐	Highpass-Filter 1800 MHz – 18 GHz	NT-415
☐	Highpass-Filter 3500 MHz – 18 GHz	NT-416
☐	RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
☐	RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
☐	RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
☐	RF-Attenuator 30 dB	NT-424
☐	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
☐	RF-Attenuator 6 dB 0,1 - 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
☒	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 Test software	NT-520
☐	SRM-TS Version 1.2.3 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 -55°C to +180°C	M-512
☐	Control and simulation equipment for EUT	---



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LIM EN 55022 C AV

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Medizintechnik/Nachrichtentechnik/EMV
Department: EMC
Test report reference: M/EMV-05/141
Measurement diagram 11 of 16
Date: 31.05.2005
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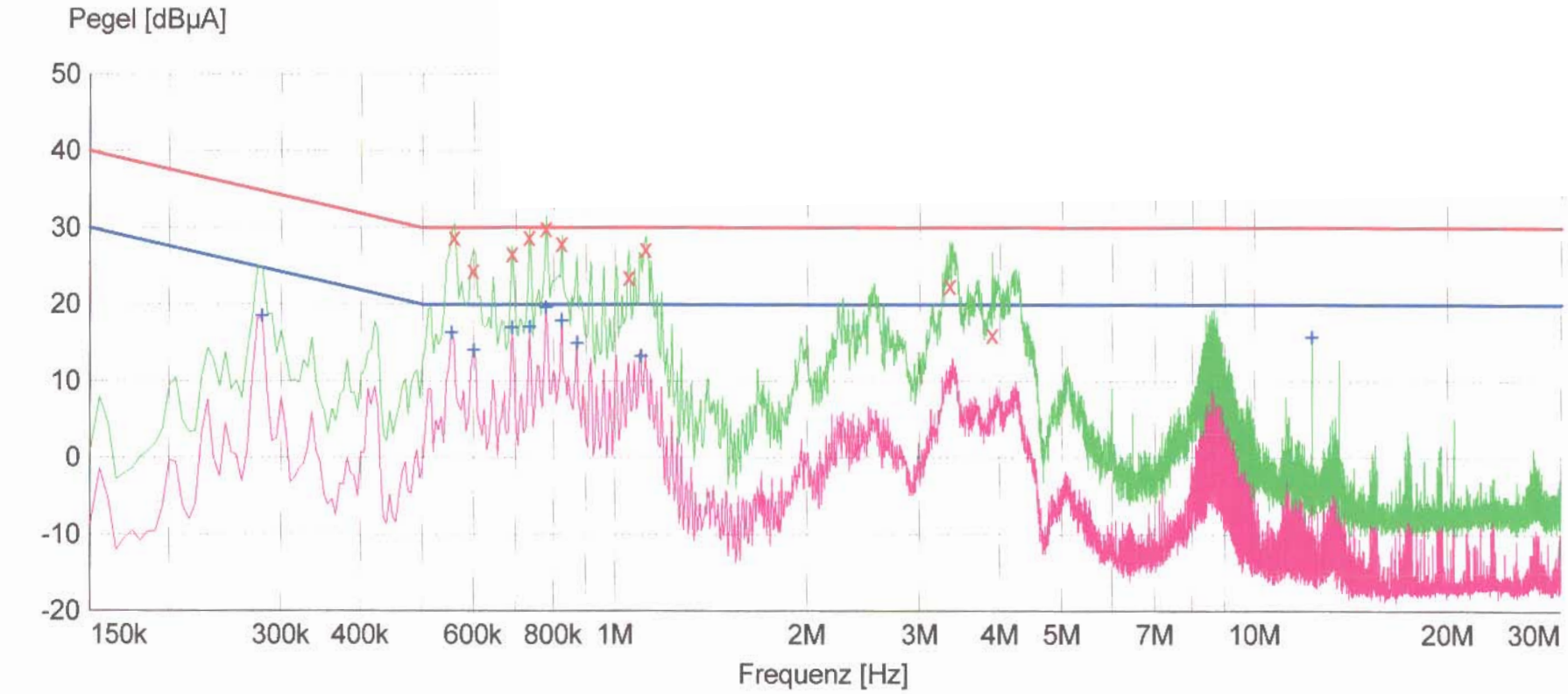

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LIM EN 55022 C AV

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Medizintechnik/Nachrichtentechnik/EMV
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Measurement diagram: 2 of 16
Date: 31.05.2005
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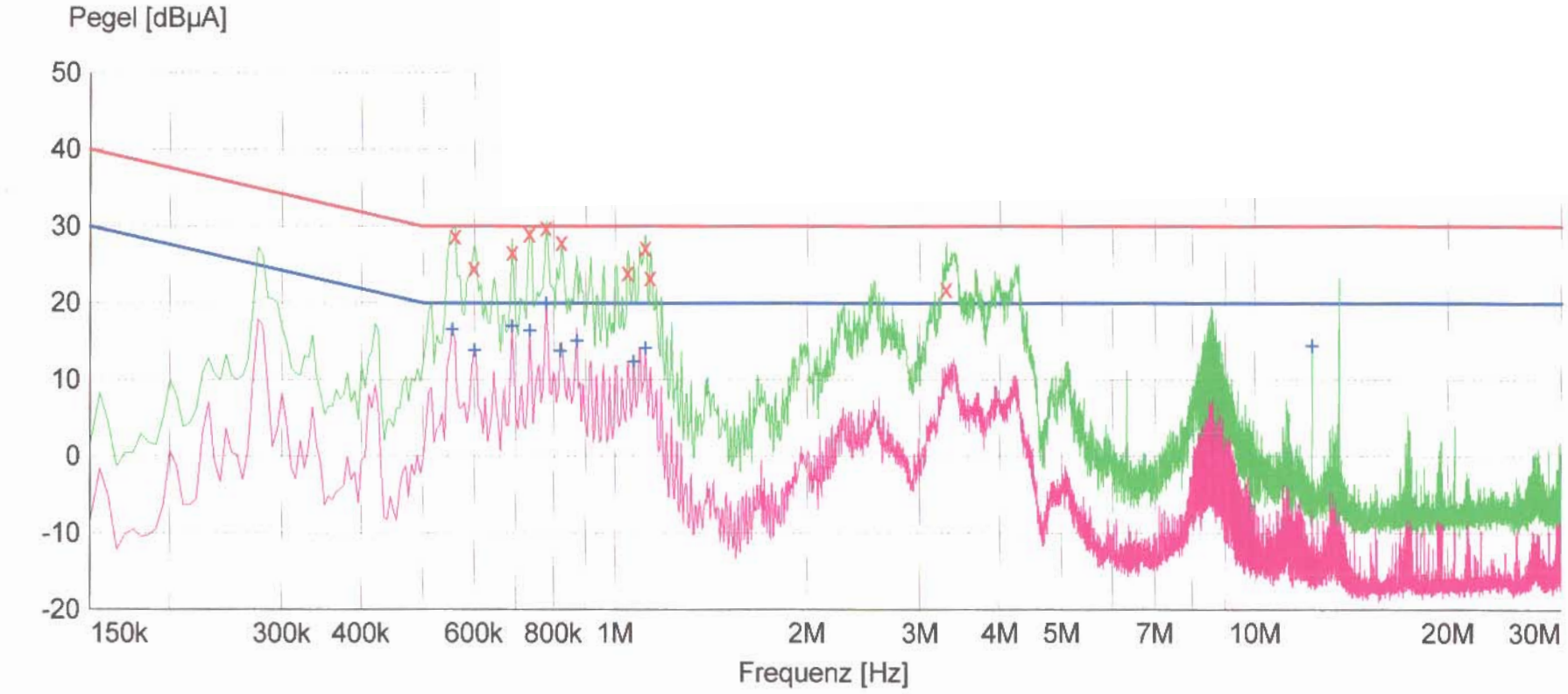

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MES VCS3020XM_C3_pre2
LIM EN 55022 C QP
LIM EN 55022 C AV

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Department: EMC

Test report reference: M/EMV-05/141

Measurement diagram: 3 of 16

Date: 31.05.2005

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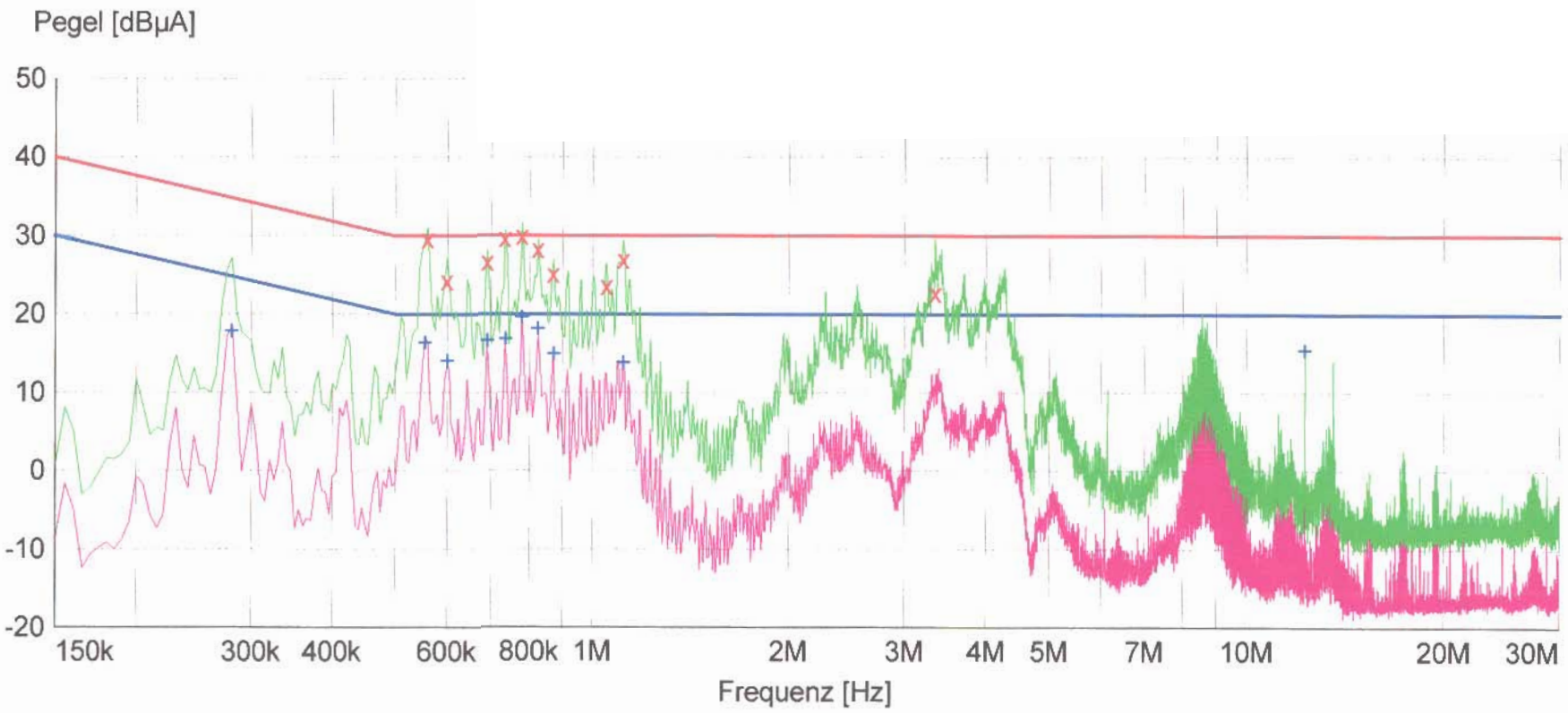

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MES VCS3020XM_C4_pre
MES VCS3020XM_C4_pre2
LIM EN 55022 C QP
LIM EN 55022 C AV

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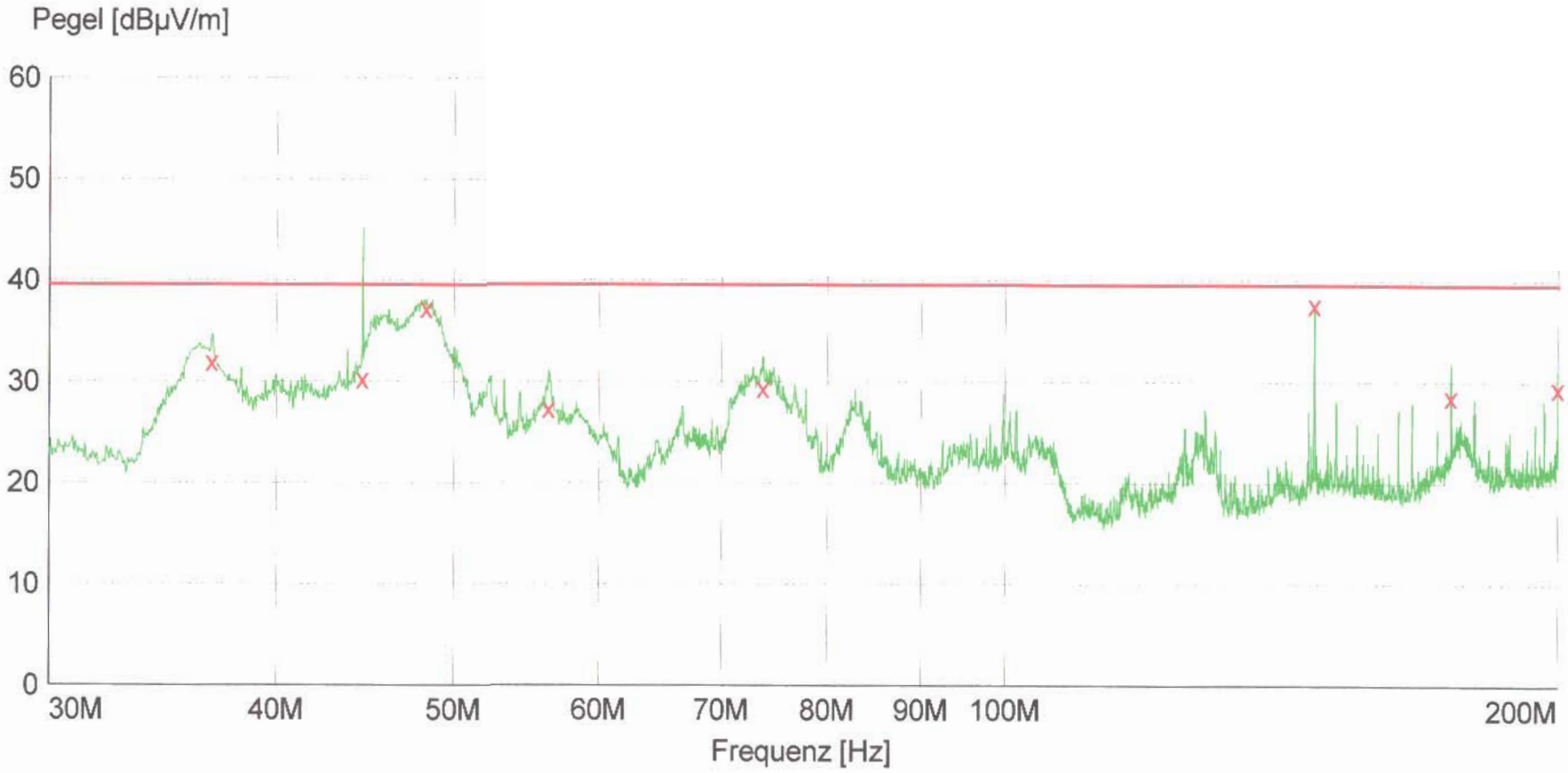
Department: EMC
Test report reference: MtEMV-05/141
Measurement diagram: 4 of 16
Date: 31.05.2005
checked by:



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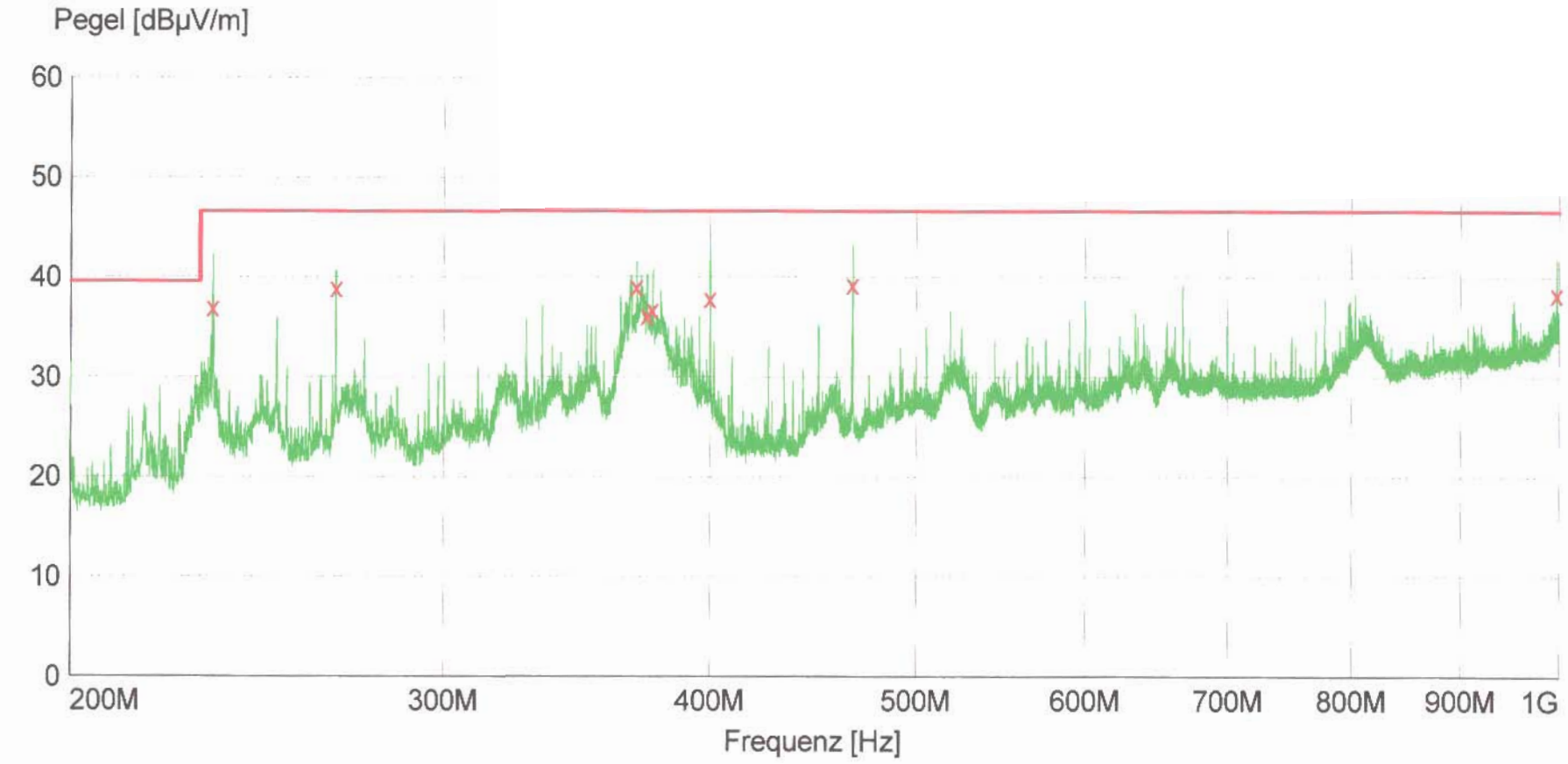
Seite 1 30.05.2005 12:12

Medizintechnik/Nachrichtentechnik/EMV
Department: EMC
Test report reference: M/EMV-05/*41
Measurement diagram: 5 of 16
Date: 31.05.2005
checked by:

TÜV ÖSTERREICH



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ÖSTERREICH

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Department: EMC

Test report reference
M/EMV-05/141

Measurement diagram
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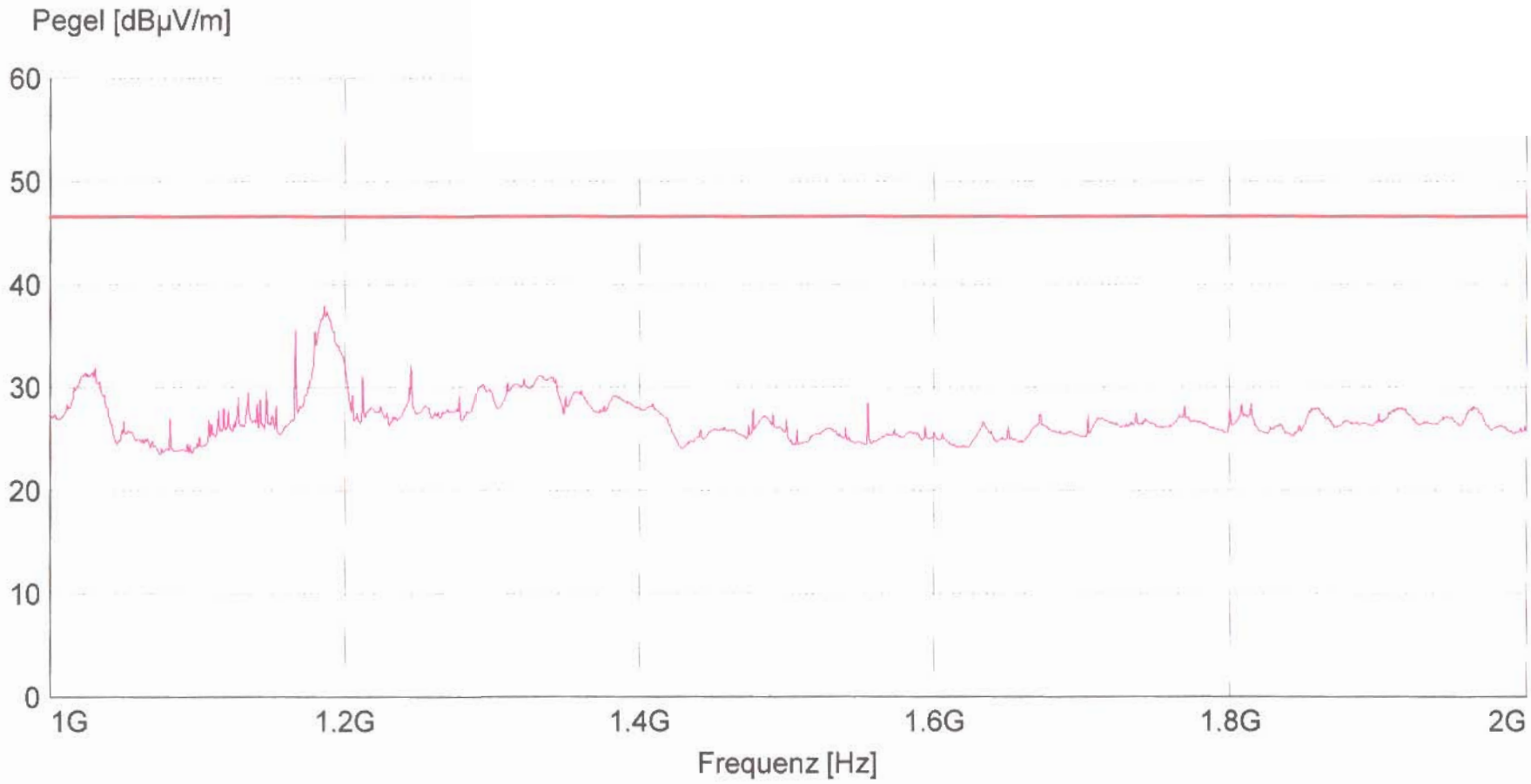
Date: 31.05.2005

checked by



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TÜV ÖSTERREICH
Medizintechnik/Nachrichtentechnik/EMV
Department: EMC
Test report reference: M:EMV-05/141
Measurement diagram: 2 of 15
Date: 31.05.2005
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Department: EMC

Test report reference: M/EMV-05/141

Measurement diagram: 8 of 16

Date: 31.05.2005

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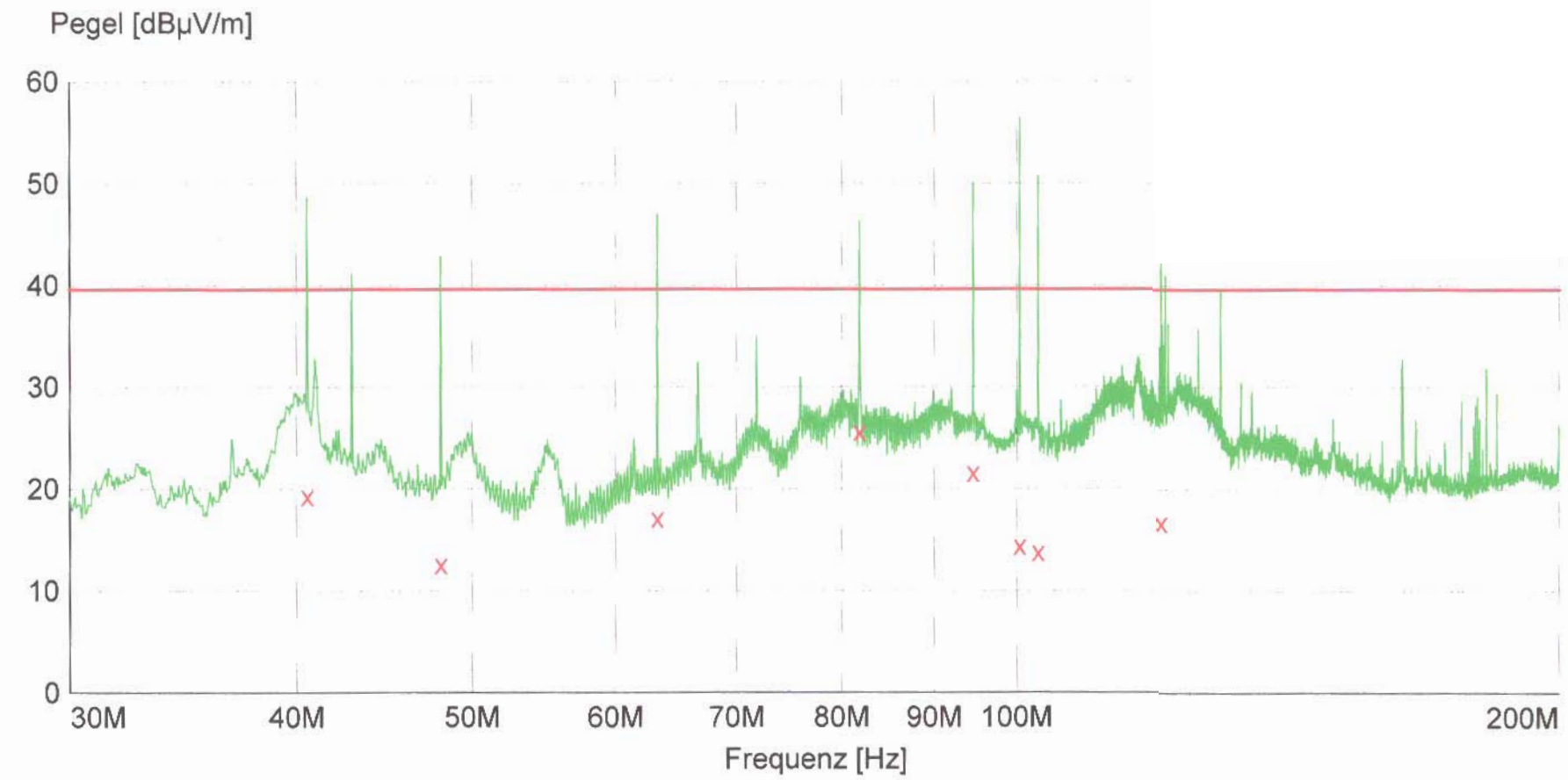

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MES FAAAPL_LB_F1_pre

LIM EN 55022 F QP EN 55022 F QP

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Medizintechnik/Nachrichtentechnik/EMV

Department: EMC

Test report reference: M/EMV-05/141

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Date: 31.05.2005

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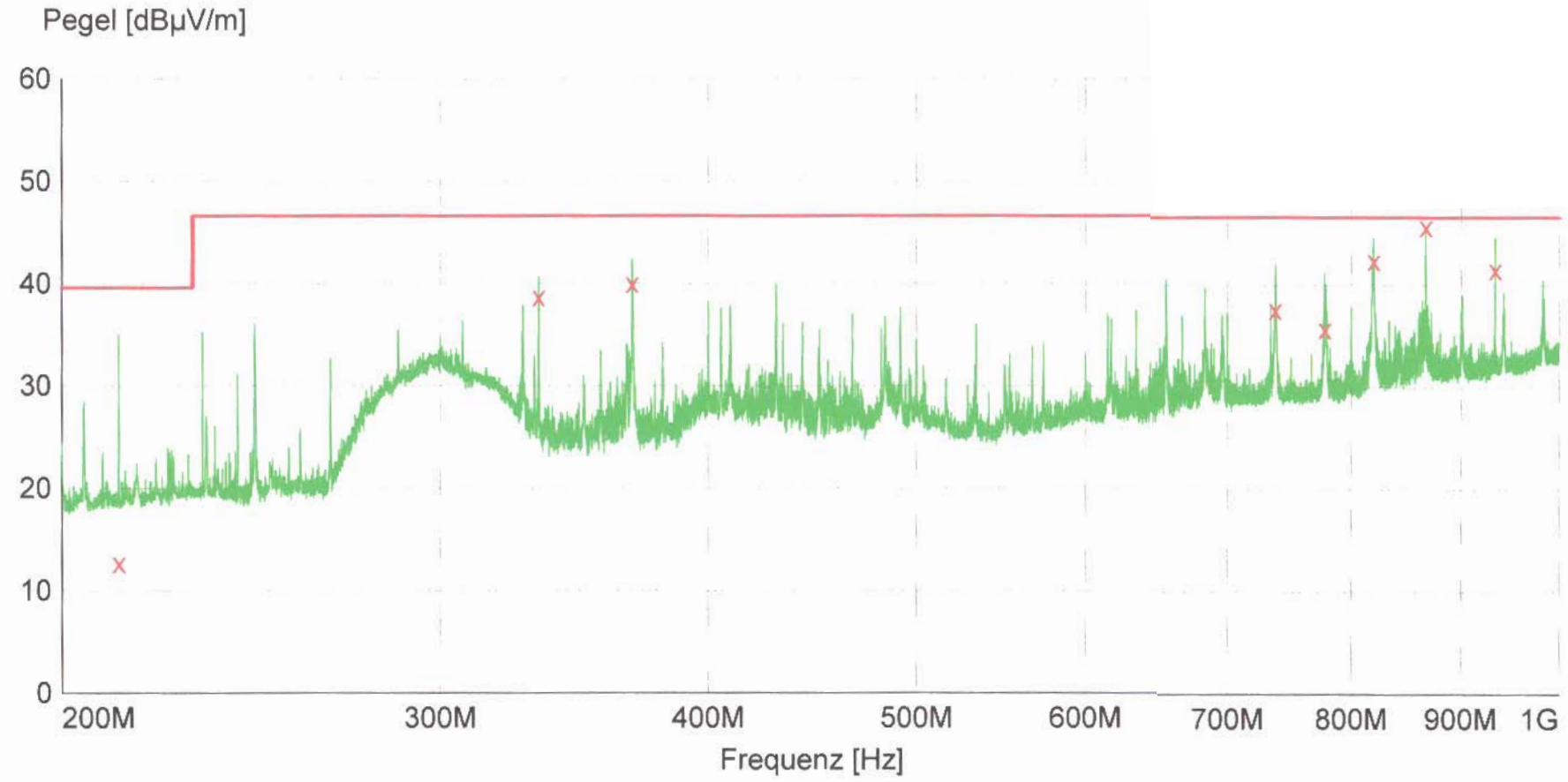

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Medizintechnik/Nachrichtentechnik/EMV

Department: EMC

Test report reference: M/EMV-05/141

Measurement diagram: 10 of 16

Date: 31.05.2005

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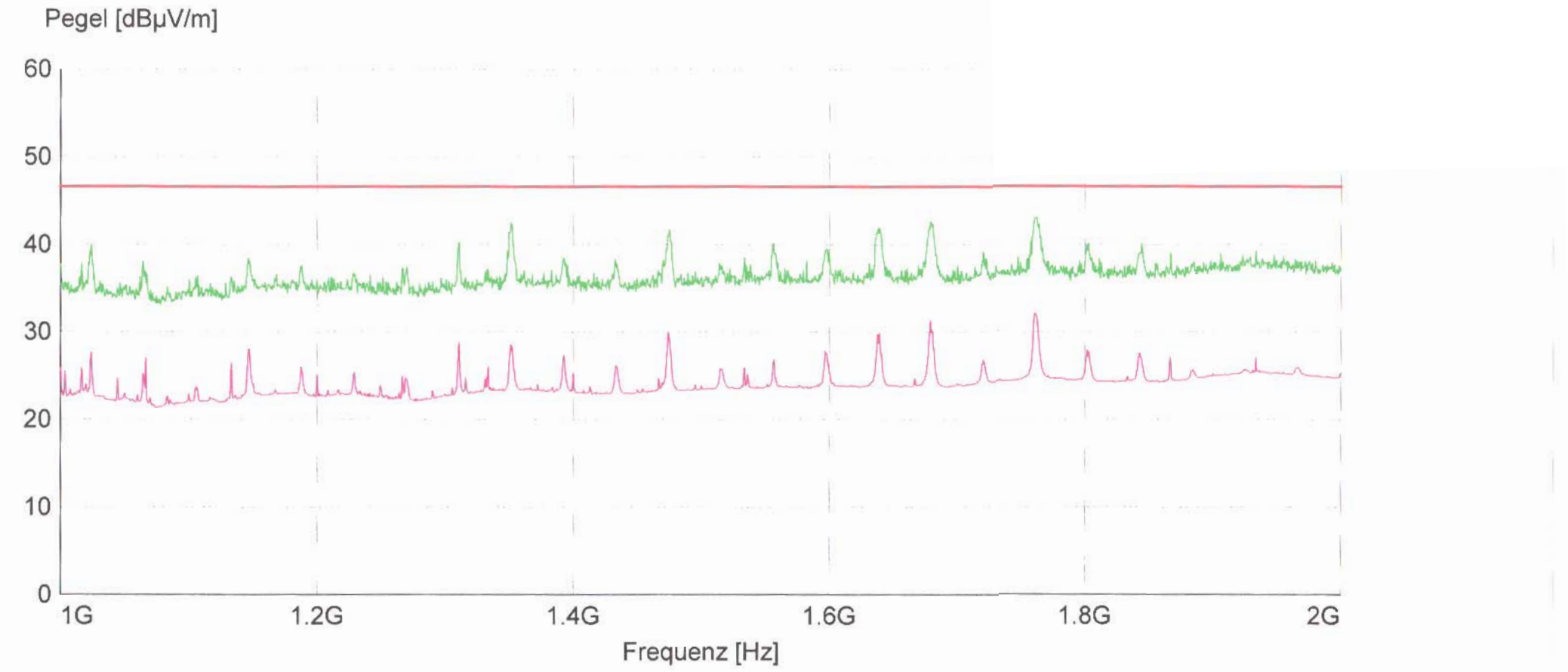

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MES FAAAPL_LB_F3_pre2

LIM EN 55022 F QP EN 55022 F QP

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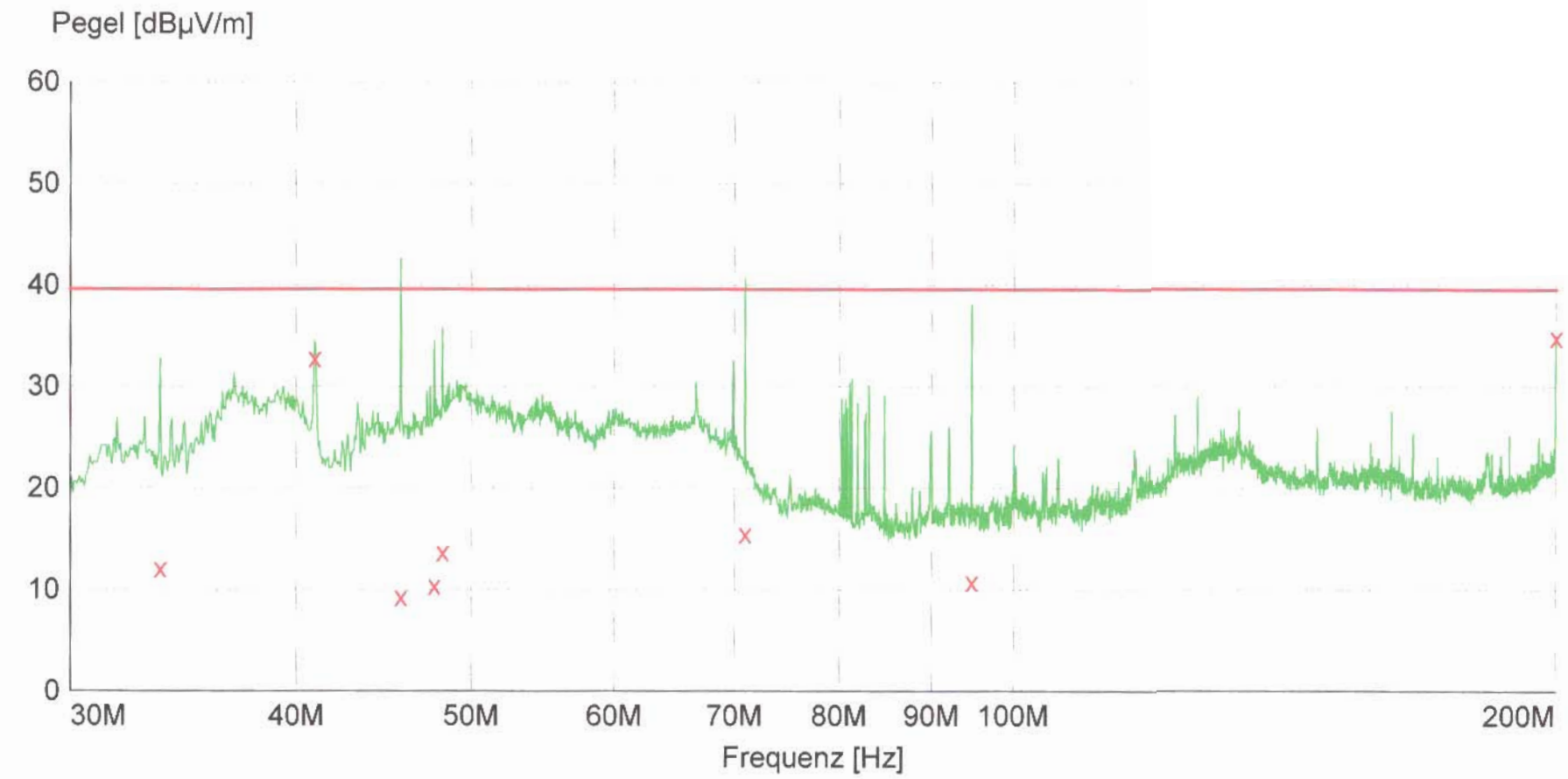
Department: EMC

Test report reference: M/EMV-05/`41

Measurement diagram: 11 of 16

Date 31.05.2005

checked by



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TÜV ÖSTERREICH

Medizintechnik/Nachrichtentechnik/EMV

Department: EMC

Test report reference: MEMV-05/141

Measurement diagram: 2 of 16

Date: 31.05.2005

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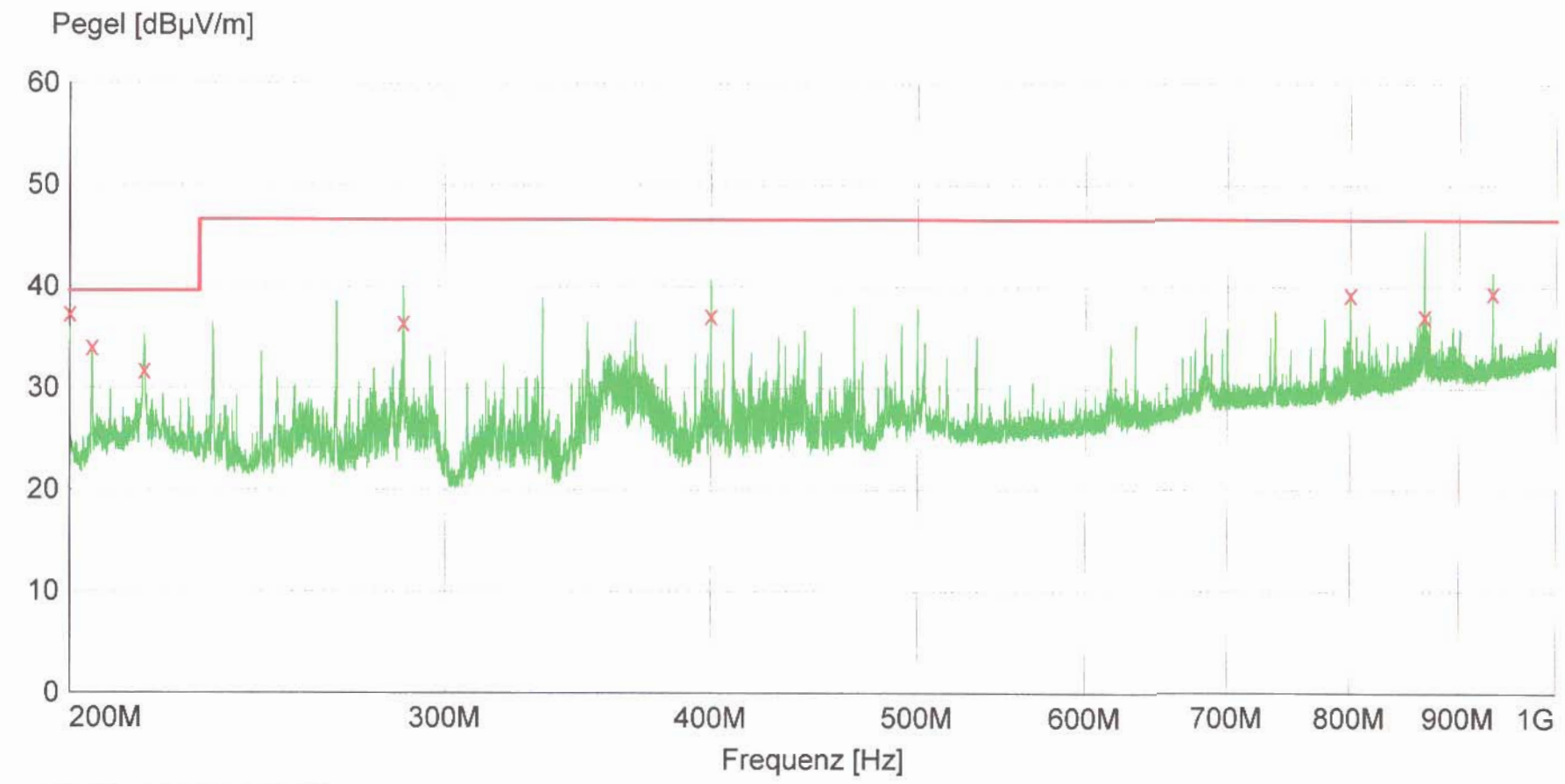

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Medizintechnik/Nachrichtentechnik/EMV

Department: EMC

Test report reference M/EMV-05/14

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Date 31.05.2005

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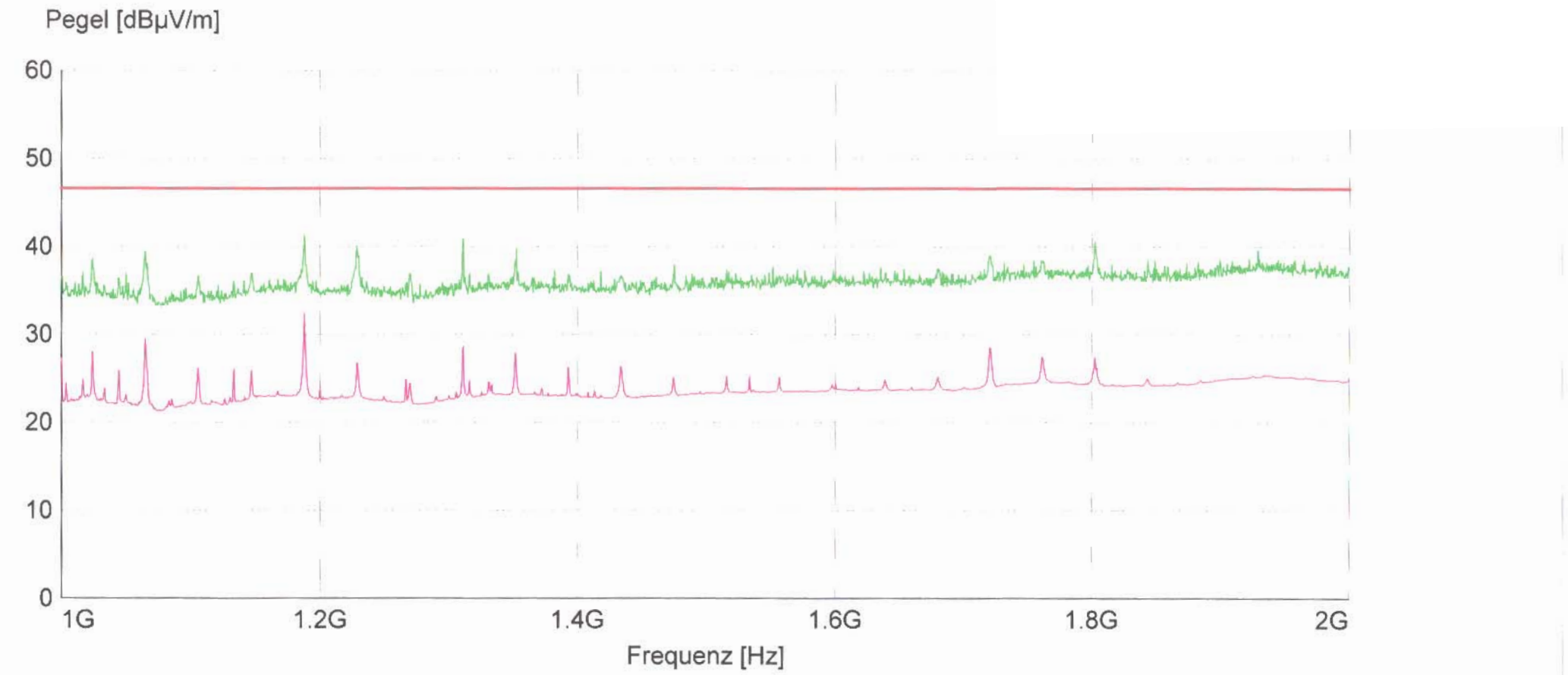

MES FAAAPL_HB_F3_pre

MES FAAAPL_HB_F3_pre2

LIM EN 55022 F QP EN 55022 F QP

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Department: EMC

Test report reference: M/EMV 05/141

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Date: 31.05.2005

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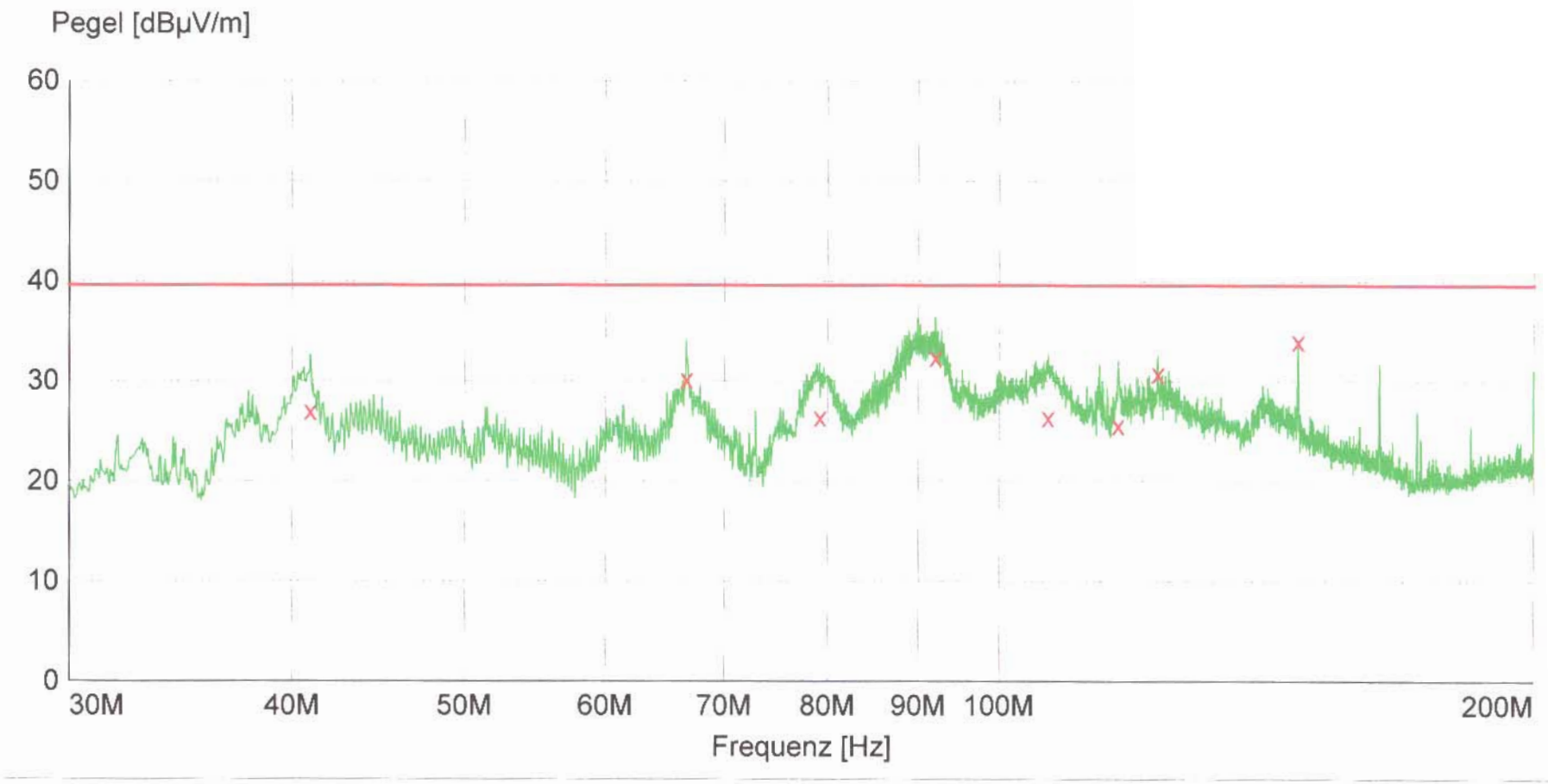

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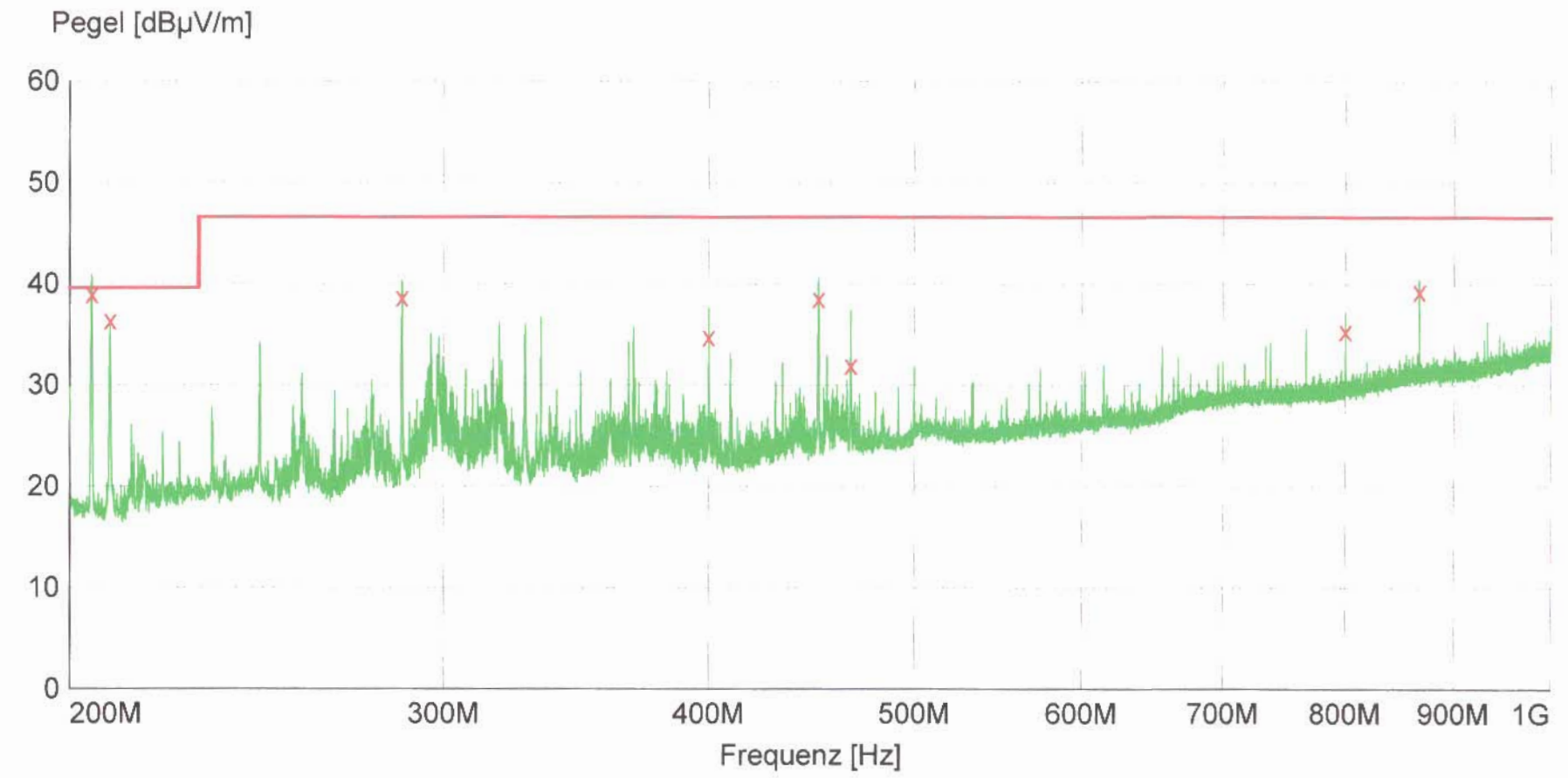
LIM EN 55022 F QP EN 55022 F QP



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MES C-POS_F2_pre
LIM EN 55022 F QP EN 55022 F QP

TÜV ÖSTERREICH

Medizintechnik/Nachrichtentechnik/EMV

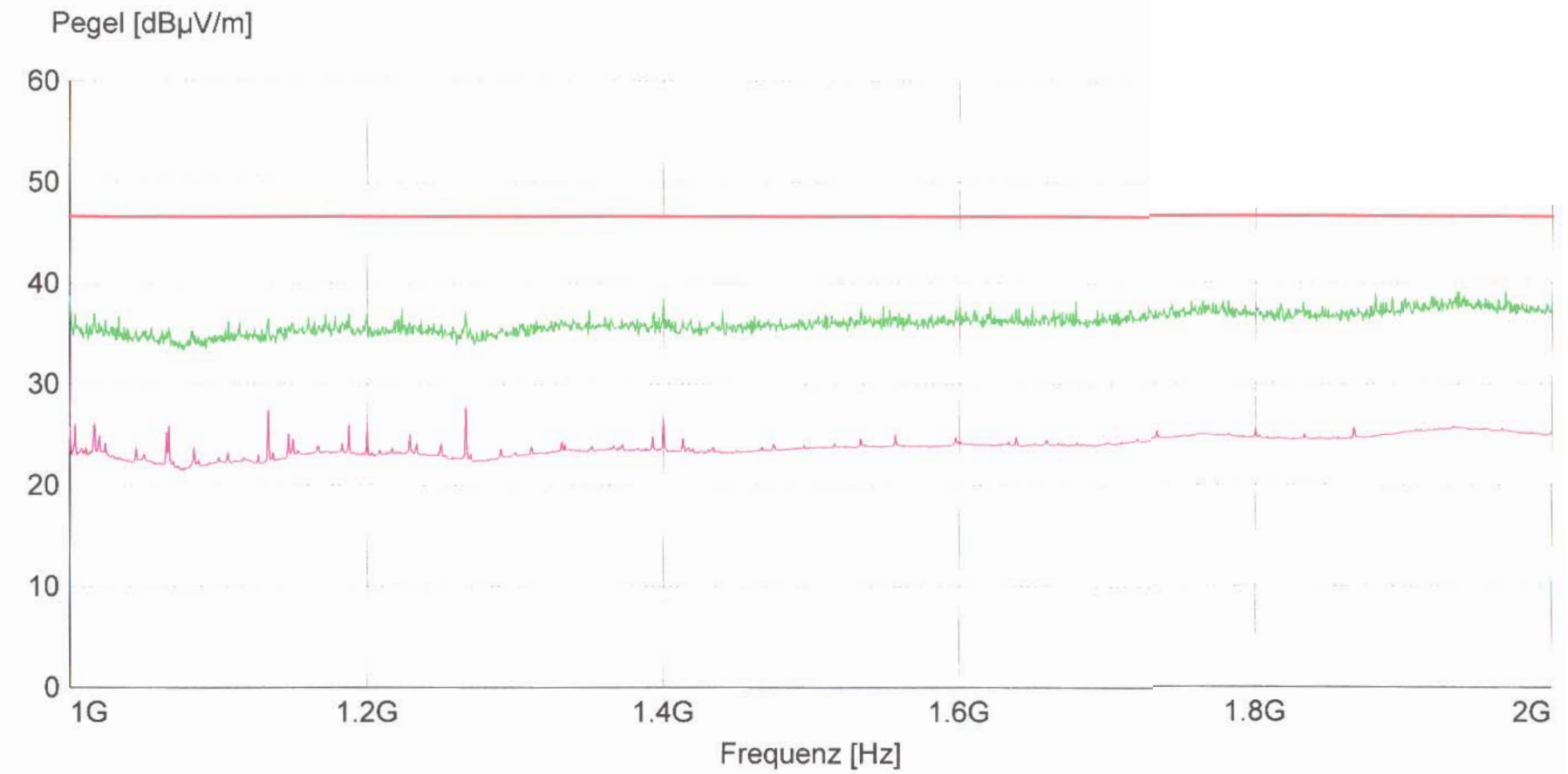
Department: EMC

Test report reference: M/EMV-05/14

Measurement diagram: 1 of 16

Date: 31.05.2005

checked by:



MES C-POS_F3_pre

MES C-POS_F3_pre2

LIM EN 55022 F QP EN 55022 F QP

VCS 3020X Rel. 4.x
Information in respect to EMC testing

Device Under Test:

VCS 3020X Rel. 4.x

Voice Communication System - series VCS 3020X Rel. 4.x, voice switch and interface part.

Short description:

The FREQUENTIS VCS 3020 voice/data switch and the connected operator positions form a fully digital, non-blocking voice communication system based on PCM technology. The FREQUENTIS VCS 3020 provides the possibility to integrate varous types of communication equipment by the use of different interface types.
The system is developed for operation in the fields of e.g. air traffic management, public safety, public transport, maritime etc.

Dimensions:

The system is designed in 19" technology for build in into 19" standard cabinets. Following a typical configuration the DUT was built into a 42 HE cabinet. The total cabinet weight depends on the amout of shelves and interfaces. The weigth of the DUT is approx. 150kg.

System configuration:

Provided with a typical system configuration, the DUT VCS 3020X Rel.4.x, including components as described bellow, was installed in a 42 HE cabinet.
Tests were carried out with JIF´s and CIF build in into BGT CIF. Four operator positions, a TMCS (Technical Monitoring and Control System) and interfaces for connection to telephone or radio equipment were used. For furthe details see „Test Setup" on page:6

The following hardware components were used during testing: (for locating hardware components see also drawing on next page). Immunity test on line interfaces were carried out for each interface type. Tested interfaces are marked in the serial number list.

2 x Rack BGT PS 01
3 x Rack BGT UIF
1 x Rack BGT PRI
1 x Rack BGT IF2000S
1 x Rack BGT CIF
3 x Rack EFORE Fan
1 x Rack Power Supply AC/DC

with following boards:

3 x BG PSU AC

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4 x BG PSU DC
8 x BG GPIF 03.01
2 x BG GPIF 03.01 (PRI)
10 x BG JIF 05
2 x BG CIF 05
4 x BG ERIF 03.00
1 x BG RSIF 03.00
2 x BG T0 03.00
1 x BG LB 03.00
2 x BG BCA 03.00
2 x BG BCB 03.00

The VCS 3020 operator positions (touch display, position electronic, handset, headset, footswitch etc.) and TMCS (Technical Monitoring and Control System) were connected by means of multi-wire shielded data cables. CAT 5 for TMCS and interfaces, CAT 7 for operator positions.

The VCS 3020 operator position consists of the following components:

1 x cPOS 01
2 x EPOSA 04.00
1 x EPOSA 04.10
2 x MOD PLSP 03.00
2 x MOD POT 03.00
2 x MOD PIPA 04.00
1 x MOD PIPS 05.00
3 x Handset
2 x Headset
1 x Handmic

(Operator Position outside absorber chamber - not tested)

1 x PP 04.02
1 x MOD XM-EPOS AC
1 x Handset
1 x PIPS 05.00

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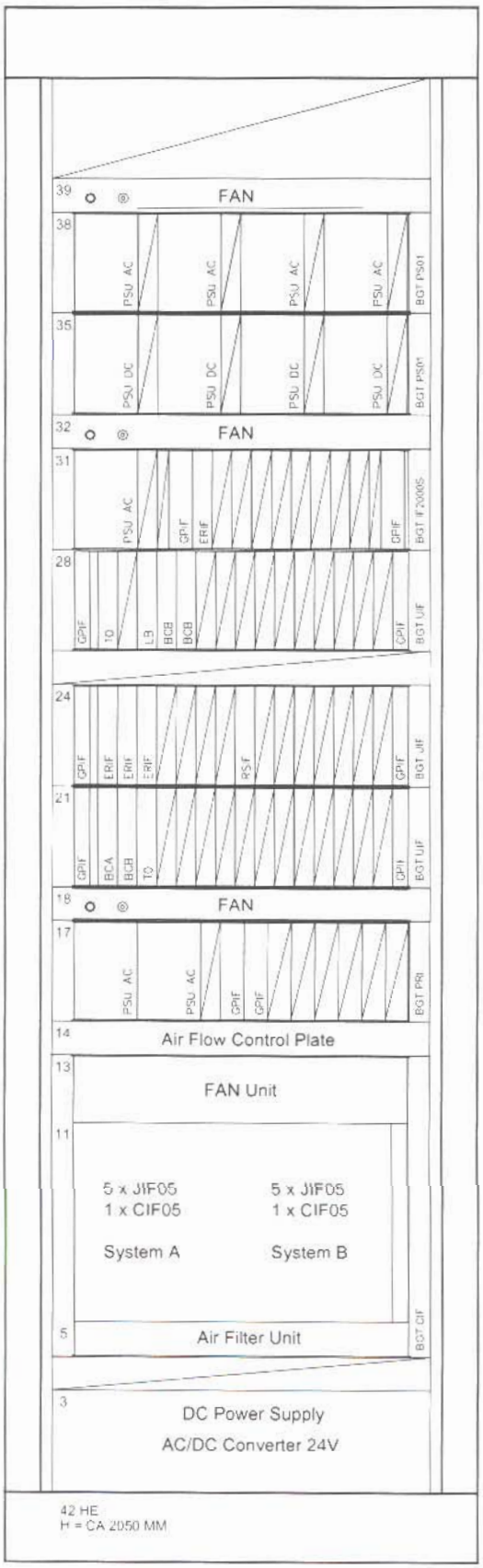

Drawing of DUT: Location of used hardware components

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Serial numbers and software of the used hardware:

Test item (cabinet with racks, components and interfaces)

Unit	Softwarelevel	Serial Number
BG GPIF 03.01	Rel. 4.1	30-0006600-00400
BG GPIF 03.01	Rel. 4.1	30-0006600-00367
BG GPIF 03.01	Rel. 4.1	30-0006608-00382
BG GPIF 03.01	Rel. 4.1	30-0006610-Proto
BG GPIF 03.01	Rel. 4.1	30-0006610-Proto
BG GPIF 03.01	Rel. 4.1	30-0006610-Proto
BG GPIF 03.01	Rel. 4.1	30-0006610-Proto
BG GPIF 03.01	Rel. 4.1	30-0006610-Proto
BG GPIF 03.01 (PRI)	Rel. 4.1	30-0006608-**00449**
BG GPIF 03.01 (PRI)	Rel. 4.1	30-0006608-00382
BG JIF5 01.00	Rel. 4.1	30-0112402-**Proto**
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112402-Proto
BG JIF5 01.00	Rel. 4.1	30-0112400-Proto
BG JIF5 01.00	Rel. 4.1	30-0112400-Proto
BG CIF5 01.00	Rel. 4.1	30-0112300-**00059**
BG CIF5 01.10	Rel. 4.1	30-0112303-**Proto**
BG ERIF 03.00	Rel. 4.1	30-9909700-**07202**
BG ERIF 03.00	Rel. 4.1	30-9909700-**07464**
BG ERIF 03.00	Rel. 4.1	30-9909700-08410
BG ERIF 03.00	Rel. 4.1	30-9909700-07195
BG RSIF 03.00	Rel. 4.1	30-0000000-00523
BG T0 03.00	Rel. 4.1	30-0011800-**00381**
BG T0 03.00	Rel. 4.1	30-0011800-00257
BG BCB 03.00	Rel. 4.1	30-0001500-**01378**
BG BCB 03.00	Rel. 4.1	30-0001500-00572
BG BCA 03.00	Rel. 4.1	30-0000800-**00207**
BG BCA 03.00	Rel. 4.1	30-0000800-00004
BG LB 03.00	Rel. 4.1	30-9909800-**00120**
BG LB 03.00	Rel. 4.1	30-9909800-00112
BG PSU AC	---	SN: H2140410
BG PSU AC	---	SN: H3442483
BG PSU AC	---	SN: H3442504
BG PSU AC	---	SN: DE0470768
BG PSU DC	---	SN: E4400300
BG PSU DC	---	SN: E4400301
BG PSU DC	---	SN: E4400302
BG PSU DC	---	SN: E4400299
BGT CIF2	---	30-0400100-**Proto**
BGT UIF	---	30-0203300-**00230**
BGT UIF	---	30-0203300-**00224**

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BGT UIF	---	30-0203300-**00039**
BGT PRI	---	30-0102501-**00006**
BGT IF2000S	---	30-9612600-**00796**
BGT PS01 AC	---	30-9407700-**00339**
BGT PS01 DC	---	30-9407701-**00229**
BGT 1 HU Switch	Rel. 4.1	30-0403600-00400
BGT EFORE Fan AC	---	20-0000832 ---
BGT EFORE Fan DC	---	20-0000559 ---
BGT EFORE Fan DC	---	20-0000831 ---
Power Distrubution	PSM Rittal	7.856.020
Power Distrubution	PSM Rittal	7.856.100
42HE Cabinet	Rittal	Flex Rack

Components of VCS 3020 Operator Position

Unit	Softwarelevel	Serial Number
MOD cPOS 01	Rel. 4.1	30-0403800-Prototype
MOD EPOSA 04.00	Rel. 4.1	30-0400200-Prototype
MOD EPOSA 04.10	Rel. 4.1	30-0400201-Prototype
MOD PLSP 03.00	---	VS-0401200-00003
MOD PLSP 03.00	---	VS-0401200-00002
MOD POT 03.00	---	VS-0401400-00005
MOD POT 03.00	---	VS-0401400-00004
MOD PIPA 04.00	---	30-0401000-Prototype
MOD PIPA 04.00	---	30-0401000-Prototype
PIPS 05.00	---	30-0008800-00237
Headset Plantronics	Supra	20-0000554
Headset VRM100	---	---
Handset TAS	---	30-0013802
Headset FAA	---	---
Handset HA11	---	30-0305101
Handmic FAA	---	---

Components of VCS 3020 Operator Position (Outside absorber camber)

Unit	Softwarelevel	Serial Number
MOD XM-EPOS AC	Rel. 4.1	30-0008900-00007
MOD PP 04.02	Rel. 4.1	30-9810402-00927
PIPS 05.00	---	30-0008800-00237
Handset	---	TAS
Handset	---	TAS
TMCS	---	Personal Computer

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Seld diagnostic:

The FREQUENTIS VCS 3020 system is supervised via a PC based Technical Monitoring and Control System (TMCS) developed by FREQUENTIS.

The TMCS has two main tasks to perform:

1. Providing the possibility to configure and control the VCS 3020.

2. Monitor the status (e.g. ok, not ok) of the VCS HW and SW modules.

For self-diagnostic purposes the VCS 3020 reports state changes (e.g. "ok -> not ok" or "not ok -> ok") to the TMCS which displays the actual state and documents the occurred events in log files.

Test Setup:

The proper function ot the DUT during testing was monitored by VCS 3020 operator positions and the TMCS. In order to evaluate the performance of the system and the interface boards during testing, active connections were set up. Using the VCS 3020 operator positions and TMCS outside the absorber room, active calls and data connections were monitored. These connections were not to be interrupted nor affected. For immunity testing the active voice path was additionally monitored with Rhode&Schwarz Radio Communication Analyser CMTA84. Therfore a "test-box" was connected to the operator position (PIP) instead of the handset. The test box provides connectors to apply or measure singnals. The level on the voice output port of the operator position was measured.

The following connections were set up:

1) Active TMCS connection

   The Technical Monitoring and Control System (outside the absorber room) was permanently connected via shielded CAT 5 cable with the VCS 3020X Rel.4.x switch. (max. length > 30m). The TMCS shows the current system status. The system status was montitored before, during and after testing

2) Active Call: Operator Position No.:1(OP1) to Operator Position No.:2 (OP2)

   Operator Positions were connected to the VCS 3020 switch via shielded CAT 7 cables. (max. length > 30m)
   Active call connection from OP1 (inside absorber chamber) to OP2 (outside absorber chamber) was set up from outside the absorber room via the operator positions (touch panels). During test the call was routed from OP1 trough the system switch to OP2. The active connection was monitored.

3) Active radio connection 1: ERIF 03.00 to ERIF 03.00

   Both ERIF interfaces (4 wire analogue) were connected via shielded CAT5 loop back cable >10m, inside the absorber room. (Rx-Tx, Tx-Rx). An active call was set up from outside the absorber room via operator positions (and PTT) and monitored during testing.

4) Active radio connection 2: ERIF 03.00 to Radio Simulator

   The ERIF interface was connected via shielded CAT5 cable to the radio simulator box inside the absorber room. An active call (1kHz tone) was generated in the simulator box and routed through

the switch to the operator position outside the absorber room. The call (tone) was monitored during testing.

5) Active digital connection: GPIF 03.01 (ISDN PRI)

   Both interfaces (4 wire 2MB/s) were connected via shielded CAT 5 loop back cable, >10m, inside the absorber room. The connection was monitored during tests via TMCS status view and log file.

6) Active digital connection: T0 03.00 (ISDN BRI)

   Both interfaces (4 wire 64kb/s) were connected via shielded CAT 5 loop back cable, >10m, inside the absorber room. The connection was monitored during tests via TMCS status view and log file.

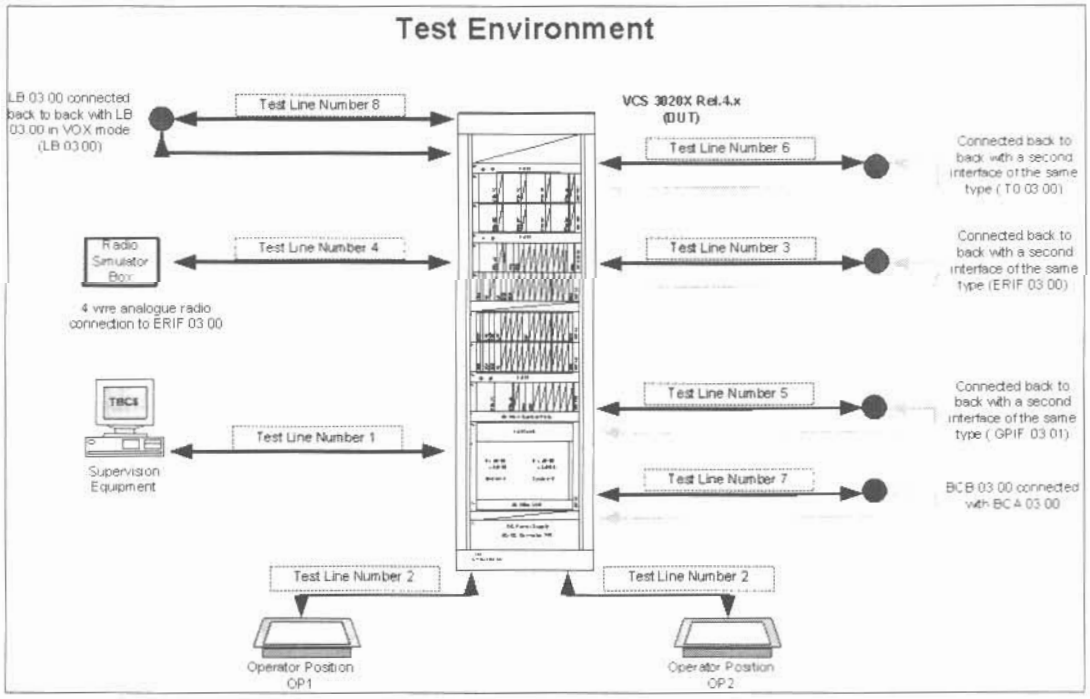
7) Active analog connection: BCB 03.00 to BCA 03.00

   Both interfaces were connected together where the BCA feeds the BCB interface. An active call connection was established and routed trough the system to the operator position. The active call was monitored during testing.

8) Active analog connection: LB 03.00

   Two LB 03.00 interfaces were connected via loop back cable inside the absorber room. An active connection was established and monitored during testing.

Block diagramm – test configuration - active connections:



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