

#### 4. 12.) 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
Setup Nr. 5 Setup Nr. 6 Setup Nr. 7 (see appendix 4)  For the operator positions: Only the handset was connected (No headset)	Before, during and after the test the equipment shall operate as intended. A minimum SNR of the voice link of 20 dB shall be maintained. After the test there shall be no degradation of performance.

Test result

Measured line	Type of coupling	Performance criteria	Result
ERIF 04.00 line	Clamp Injection	A	OK
GPIF 04.0 line	Clamp Injection	A	OK
PCM 30 lines Operator Positions	Clamp Injection	A	OK
OK                      EUT passed NOK                    EUT failed			

#### 4. 13.) 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 $t_r/t_f$ 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	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. 13. 1.) Measurement on other lines (coupling clamp)

Measured line	Test voltage	Performance criteria	Positive pulse	Negative pulse
ERIF 04.00 line	2 kV	B	OK	OK
GPIF 04.00 line	2 kV	B	OK	OK
PCM30 - cPOS 02.00	2 kV	B	OK	OK
PCM30 - cPOS 02.10	2 kV	B	OK	OK
PCM30 - PP 04.H.64	2 kV	B	OK	OK
PCM30 - EPOSA 04.50	2 kV	B	OK	OK
PCM30 - EPOSA 04.40	2 kV	B	OK	OK
<div>OK</div> <div>EUT passed</div> <div>NOK</div> <div>EUT failed</div>				

#### 4. 14.) 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 $\mu$ s $t_r/t_n$ Polarity: positive/negative	EN 61000-4-5	EN 61000-4-5		B

Operating mode	Criteria of compliance
Normal operation	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. 14.1.) Measurement on shielded signal lines - common mode

Combination	Test voltage	Performance criteria	Positive pulse	Negative pulse
ERIF 04.00 line	1 kV	B	OK	OK
GPIF 04.00 line	1 kV	B	OK	OK
OK NOK				
EUT passed EUT failed				

# Appendix 1

## Test equipment used

<input checked="" type="checkbox"/>	Anechoic Chamber with 3m measurement distance	NT-100	<input checked="" type="checkbox"/>	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
<input type="checkbox"/>	Stripline according to ISO 11452-5	NT-108	<input type="checkbox"/>	Digital Radio Tester CTS55	NT-208
<input checked="" type="checkbox"/>	MA 240 - Antenna mast 1 - 4 m height	NT-110	<input type="checkbox"/>	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
<input checked="" type="checkbox"/>	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	<input type="checkbox"/>	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
<input checked="" type="checkbox"/>	HD 100 Controller Mast+Turntable	NT-112	<input type="checkbox"/>	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
<input type="checkbox"/>	HUF-Z2 - Bicon. Antennna 20 - 300 MHz	NT-120	<input type="checkbox"/>	Radiocommunicationanalyzer Marconi 2945A	NT-212
<input type="checkbox"/>	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	<input type="checkbox"/>	2855S - Communication analyzer	NT-213
<input type="checkbox"/>	HFH-Z2 - Loop Antenna. 9 kHz - 30 MHz	NT-122	<input type="checkbox"/>	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
<input type="checkbox"/>	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	<input type="checkbox"/>	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
<input type="checkbox"/>	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	<input checked="" type="checkbox"/>	RubiSource T&M Timing reference	NT-216
<input checked="" type="checkbox"/>	3115 - Horn Antenna 1 - 18 GHz	NT-125	<input type="checkbox"/>	Radiocommunicationanalyzer SWR 1180 MD	NT-217
<input type="checkbox"/>	3116 - Horn Antenna 18 - 40 GHz	NT-126	<input type="checkbox"/>	Mixer M19HWD 40 GHz – 60 GHz	NT-218
<input type="checkbox"/>	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127	<input type="checkbox"/>	Mixer M12HWD 60 GHz – 90 GHz	NT-219
<input checked="" type="checkbox"/>	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128	<input type="checkbox"/>	TDS - 540 DSO Digital scope	NT-220
<input checked="" type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129	<input type="checkbox"/>	PM97 Scopemeter	NT-221
<input type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130	<input type="checkbox"/>	TPS 2014 Digital scope	NT-222
<input checked="" type="checkbox"/>	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131	<input type="checkbox"/>	B10 - Harmonics and flicker analyzer	NT-232
<input type="checkbox"/>	Loop Antenna H-Field	NT-132	<input type="checkbox"/>	SRM-3000 Spectrumanalyzer	NT-233
<input type="checkbox"/>	Horn Antenna 500 MHz - 2900 MHz	NT-133	<input type="checkbox"/>	E-field probe SRM 75 MHz – 3 GHz	NT-234
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	<input type="checkbox"/>	Hall-Teslameter ETM-1	NT-241
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	<input type="checkbox"/>	EFA-3 H-field- / E-field probe	NT-243
<input type="checkbox"/>	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	<input type="checkbox"/>	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
<input type="checkbox"/>	Conical Dipol Antenna PCD8250	NT-138	<input type="checkbox"/>	E-field probe 100 kHz – 3 GHz	NT-245
<input type="checkbox"/>	HZ-1 Antenna tripod	NT-150	<input type="checkbox"/>	Magneticfield-Sensor 300 kHz – 30 MHz	NT-246
<input type="checkbox"/>	BN 1500 Antenna tripod	NT-151	<input type="checkbox"/>	E-field probe 3 MHz – 18 GHz	NT-247
<input checked="" type="checkbox"/>	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156	<input type="checkbox"/>	H-field probe 27 MHz – 1 GHz	NT-248
<input type="checkbox"/>	Spectrumanalyzer – FSP7 9 kHz – 7 GHz	NT-200	<input type="checkbox"/>	ELT-400 1 Hz – 400 kHz	NT-249
<input type="checkbox"/>	ESVP - Test receiver 20 - 1000 MHz	NT-201	<input type="checkbox"/>	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
<input type="checkbox"/>	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203	<input checked="" type="checkbox"/>	FCC-2031 EM Injection clamp	NT-251


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# Appendix 1 (continued)

## Test equipment used

<input checked="" type="checkbox"/> FCC-2031-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 79 Digital Multimeter	NT-262	<input type="checkbox"/> TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
<input checked="" type="checkbox"/> ESH2-Z5 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 Artificial mains network 2x10A	NT-301	<input type="checkbox"/> VDS 200 Mobil-impuls-generator	NT-350
<input type="checkbox"/> ESH3-Z6 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 Artificial Network	NT-354
<input type="checkbox"/> ENY22 Artificial Network	NT-308	<input type="checkbox"/> FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
<input type="checkbox"/> ENY41 Artificial Network	NT-309	<input type="checkbox"/> PHE 4500 - Mains impedance network	NT-401
<input checked="" type="checkbox"/> SMG - Signal generator 0,1 - 1000 MHz	NT-310	<input checked="" 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"/> ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
<input type="checkbox"/> RefRad Reference generator	NT-312	<input checked="" type="checkbox"/> IP 4 - Capacitive clamp (Burst)	NT-411
<input type="checkbox"/> SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	<input type="checkbox"/> Highpass-Filter 100 MHz – 3 GHz	NT-412
<input type="checkbox"/> 40 MHz Arbitrary Generator T1241	NT-315	<input type="checkbox"/> Highpass-Filter 600 MHz – 4 GHz	NT-413
<input checked="" type="checkbox"/> PEFT - Burst generator up to 4 kV	NT-320	<input type="checkbox"/> Highpass-Filter 1250 MHz – 4 GHz	NT-414
<input checked="" type="checkbox"/> ESD 30 System up to 25 kV	NT-321	<input type="checkbox"/> Highpass-Filter 1800 MHz – 16 GHz	NT-415
<input checked="" type="checkbox"/> PSURGE 4.1 Surge generator	NT-324	<input type="checkbox"/> Highpass-Filter 3500 MHz – 18 GHz	NT-416
<input type="checkbox"/> TRANSIENT 1000 Immunity test system	NT-325	<input type="checkbox"/> RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
<input type="checkbox"/> VCS 500-M6 Surge-Generator	NT-326	<input type="checkbox"/> RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
<input checked="" type="checkbox"/> BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	<input type="checkbox"/> RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
<input type="checkbox"/> T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331	<input type="checkbox"/> RF-Attenuator 30 dB	NT-424
<input checked="" type="checkbox"/> 500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332	<input type="checkbox"/> RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
<input type="checkbox"/> AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333	<input type="checkbox"/> RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426
<input type="checkbox"/> APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334	<input type="checkbox"/> RF-Attenuator 6 dB	NT-428


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# Appendix 1 (continued)

## Test equipment used

<input type="checkbox"/>	RF-Attenuator 0 dB - 81 dB	NT-429	<input type="checkbox"/>	SPS-PHE Test software V2.32 voltage fluctuations/harmonics	NT-525
<input type="checkbox"/>	WRU 27 - Band blocking 27 MHz	NT-430	<input type="checkbox"/>	SPS-EM Test software V2.32 for PHE 4500/B	NT-527
<input type="checkbox"/>	WHJ450C9 AA - High pass 450 MHz	NT-431	<input type="checkbox"/>	Noise power test apparatus according to EN 55014	NT-530
<input type="checkbox"/>	WHJ250C9 AA - High pass 250 MHz	NT-432	<input type="checkbox"/>	Vertical coupling plane (ESD)	NT-531
<input type="checkbox"/>	RF-Load 150 W	NT-433	<input checked="" type="checkbox"/>	Test cable #4 for EN 61000-4-6	NT-553
<input type="checkbox"/>	Impedance transducer 1:4 ; 1:9 ; 1:16	NT-435	<input checked="" type="checkbox"/>	Test cable #3 for conducted emission	NT-554
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-436	<input type="checkbox"/>	Test cable #5 ESD-cable (2x470k)	NT-555
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 6 dB	NT-437	<input type="checkbox"/>	Test cable #6 ESD-cable (2x470k)	NT-556
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 10 dB	NT-438	<input type="checkbox"/>	Test cable #8 Sucoflex 104EA	NT-559
<input type="checkbox"/>	RF-Attenuator DC – 18 GHz 20 dB	NT-439	<input type="checkbox"/>	Test cable #9 (for outdoor measurements)	NT-580
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Test cable #10 (for outdoor measurements)	NT-581
<input checked="" type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	Test cable #13 Sucoflex 104PE	NT-584
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	Test cable #21 for SRM-3000	NT-592
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input type="checkbox"/>	Shield chamber	NT-600
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-445	<input type="checkbox"/>	Climatic chamber -55°C to +180°C	M-512
<input type="checkbox"/>	Tube imitations according to EN 55015	NT-450	<input type="checkbox"/>	Control and simulation equipment for EUT	---
<input type="checkbox"/>	FCC-801-M2-50A Coupling decoupling network	NT-459			
<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			
<input type="checkbox"/>	95242-1 – Current probe 10 MHz – 400 MHz	NT-468			
<input checked="" type="checkbox"/>	PC P4 3 GHz Test computer	NT-500			
<input type="checkbox"/>	PC P4 1700 MHz Notebook	NT-505			
<input type="checkbox"/>	PC Intel Centrino 1600 MHz Notebook	NT-506			
<input type="checkbox"/>	Monitoring camera with Monitor	NT-511			
<input checked="" type="checkbox"/>	ES-K1 Version 1.71 Test software	NT-520			
<input type="checkbox"/>	SRM-TS Version 1.3 software for SRM-3000	NT-522			

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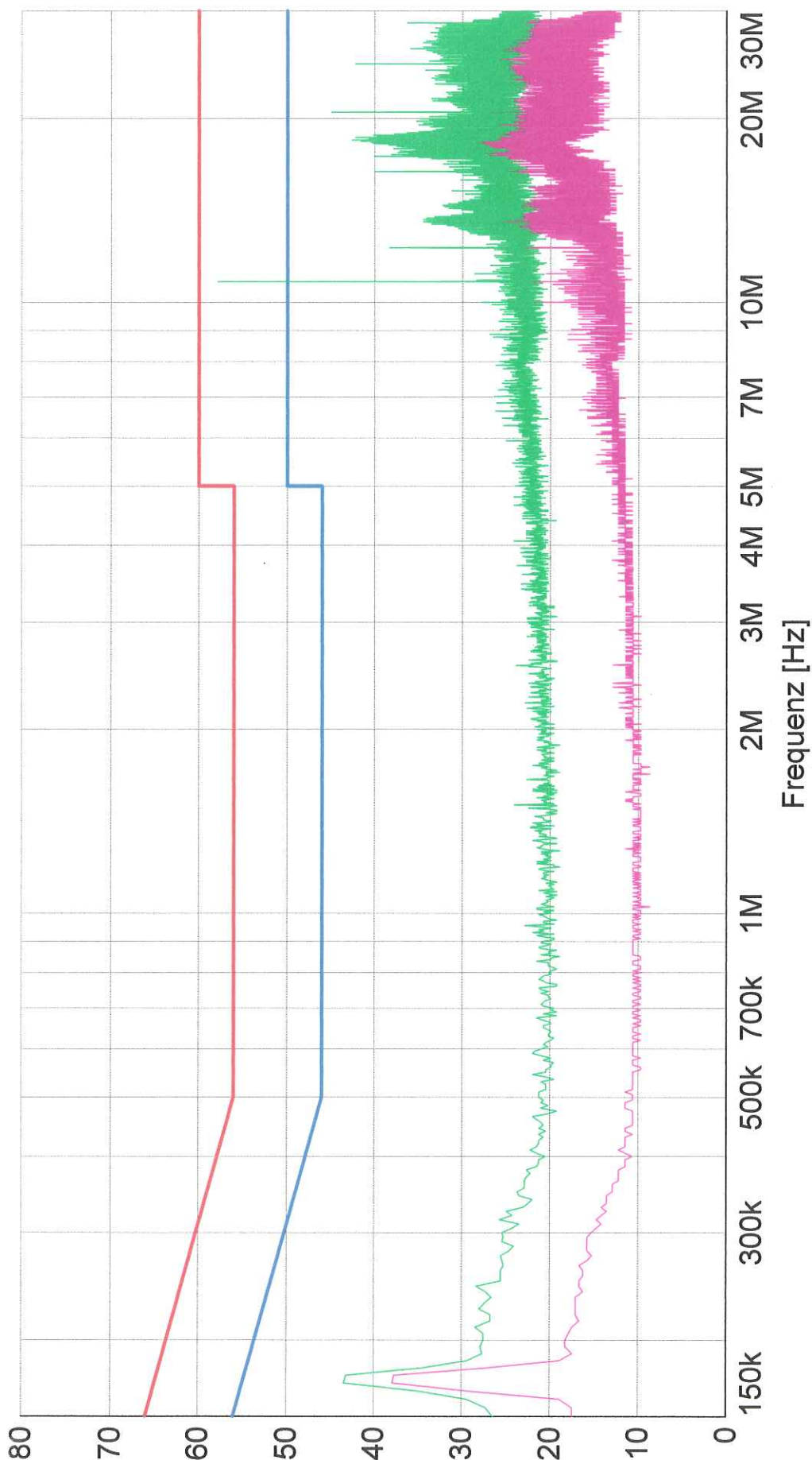
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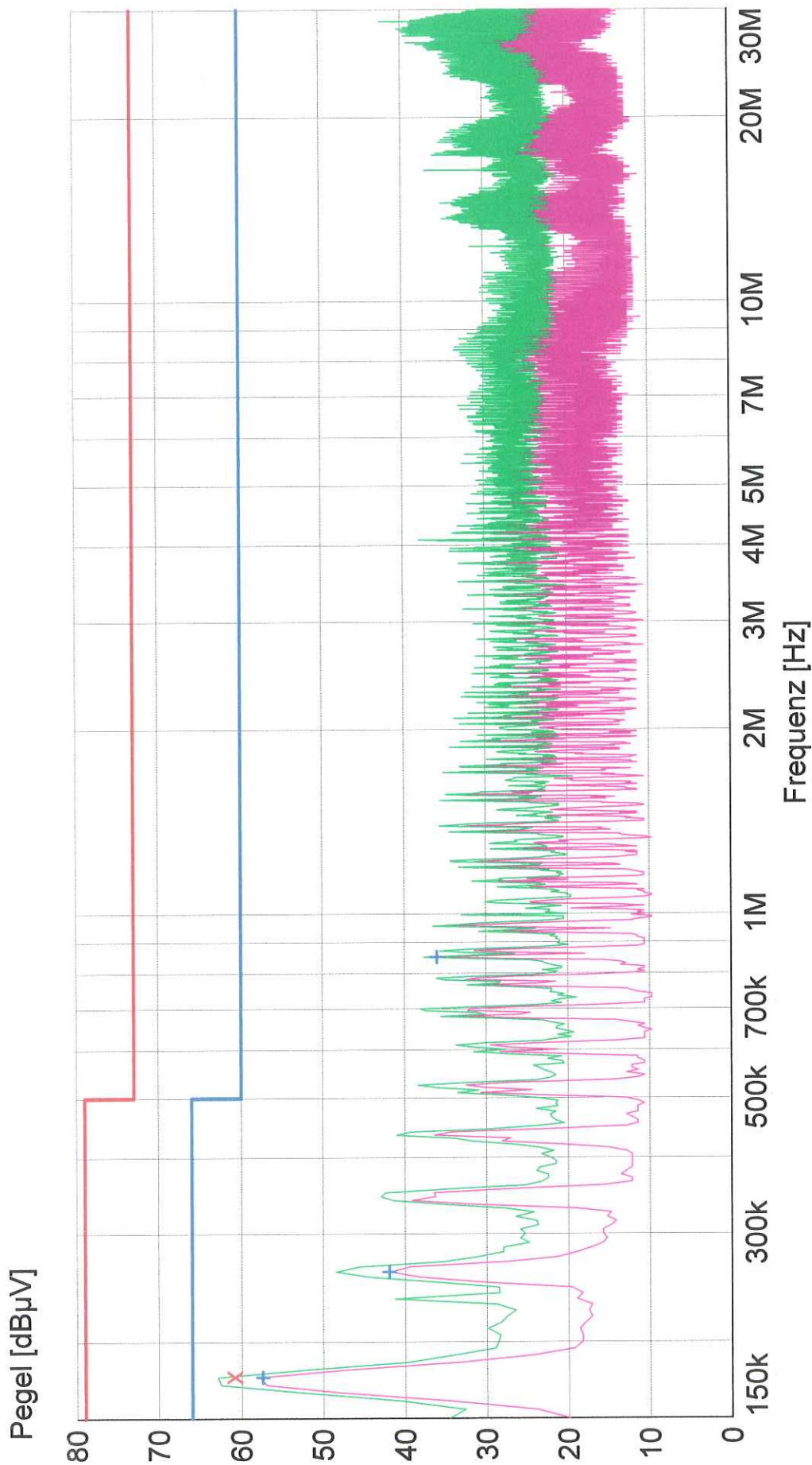
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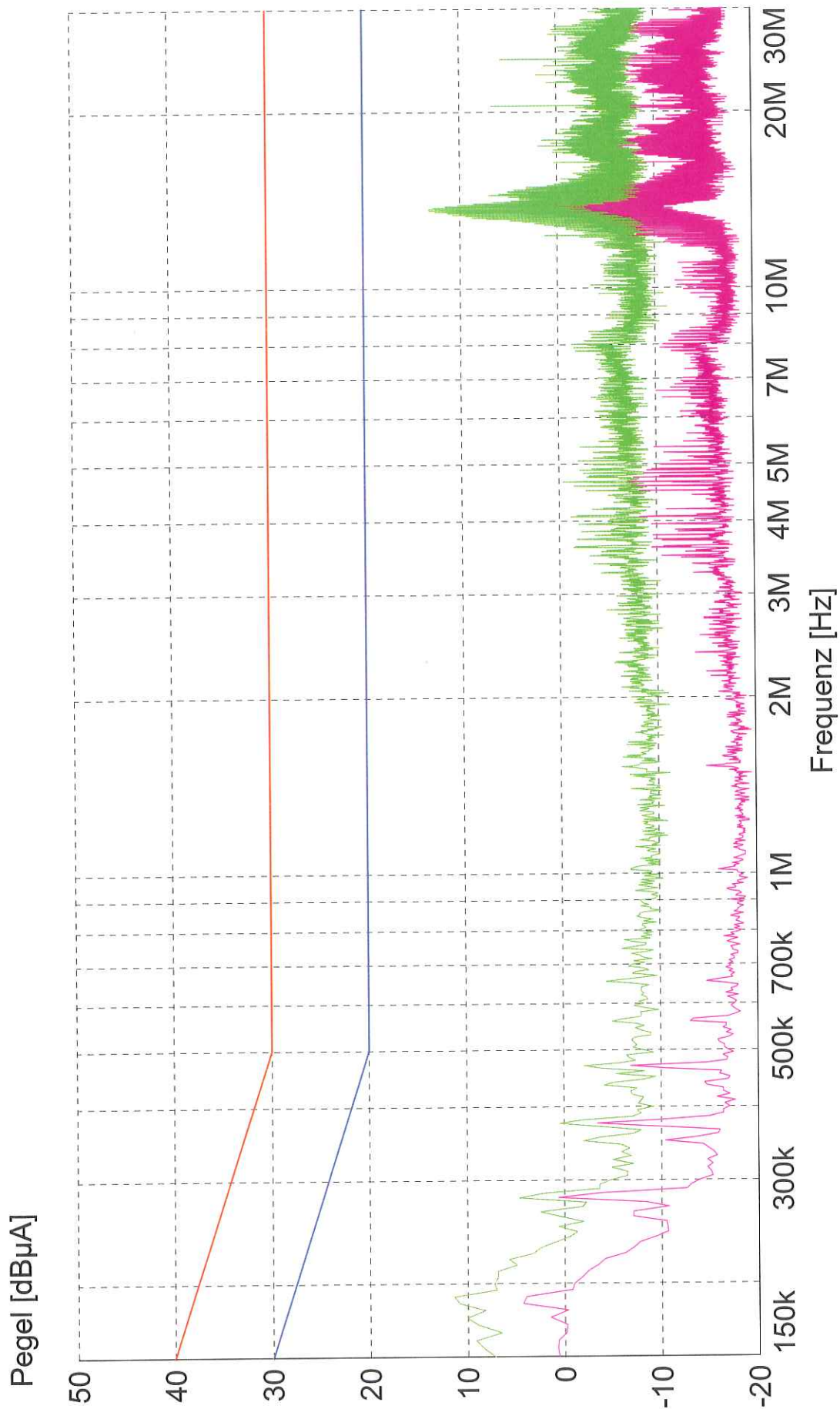


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MES	VCS_V02_pre2	EN	55022	V	AV
LIM	EN 55022 V QP				
LIM	EN 55022 V AV				



x x MES VCS\_V01\_fin  
 + + -MES VCS\_V01\_fin2  
 — MES VCS\_V01\_pre  
 — MES VCS\_V01\_pre2  
 — LIM EN\_55022\_V\_QP\_A  
 — LIM EN\_55022\_V\_AV\_A





MES ERIF\_C1\_pre  
MES ERIF\_C1\_pre2  
LIM EN 55022 C QP  
LIM EN 55022 C AV

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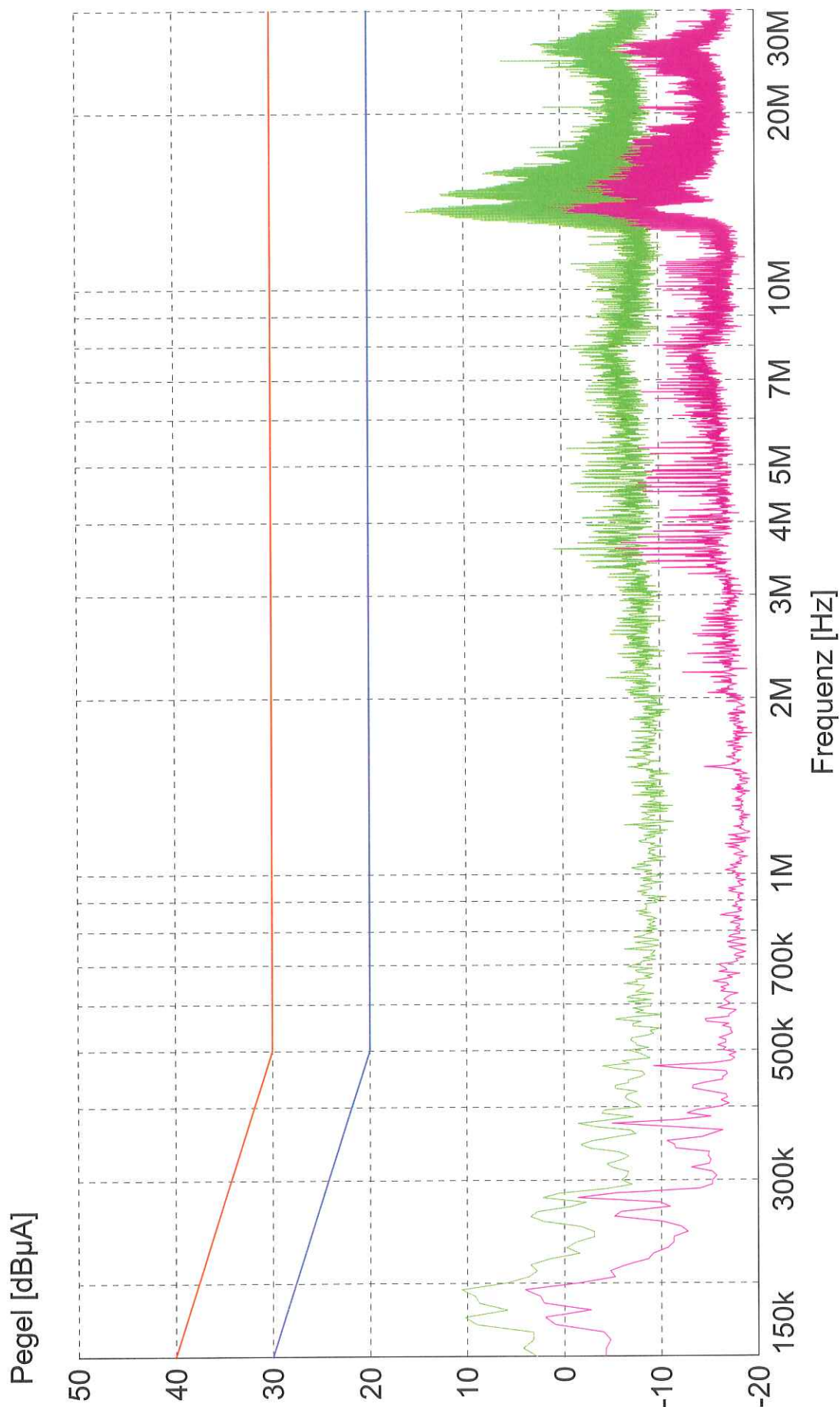
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Test report reference:  
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Measurement diagram:  
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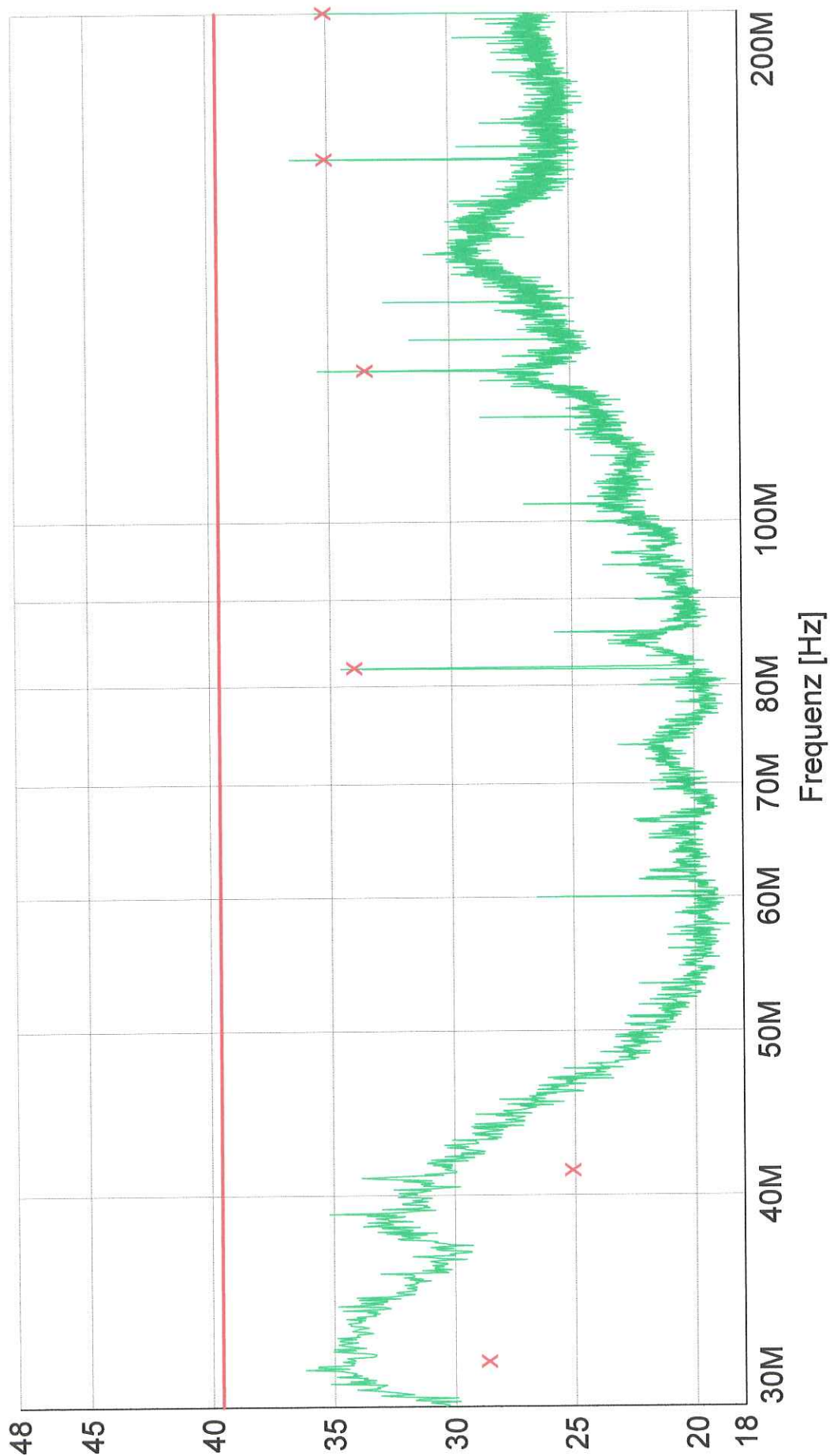
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MES GPIF\_C1\_pre  
MES GPIF\_C1\_pre2  
LIM EN 55022 C QP  
LIM EN 55022 C AV

Pegel [dBµV/m]



x x : MES VCS3020x\_F01\_fin  
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 LIM EN 55022\_F QP

EN 55022 F QP

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Department: EMC

Test report reference:  
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Measurement diagram:

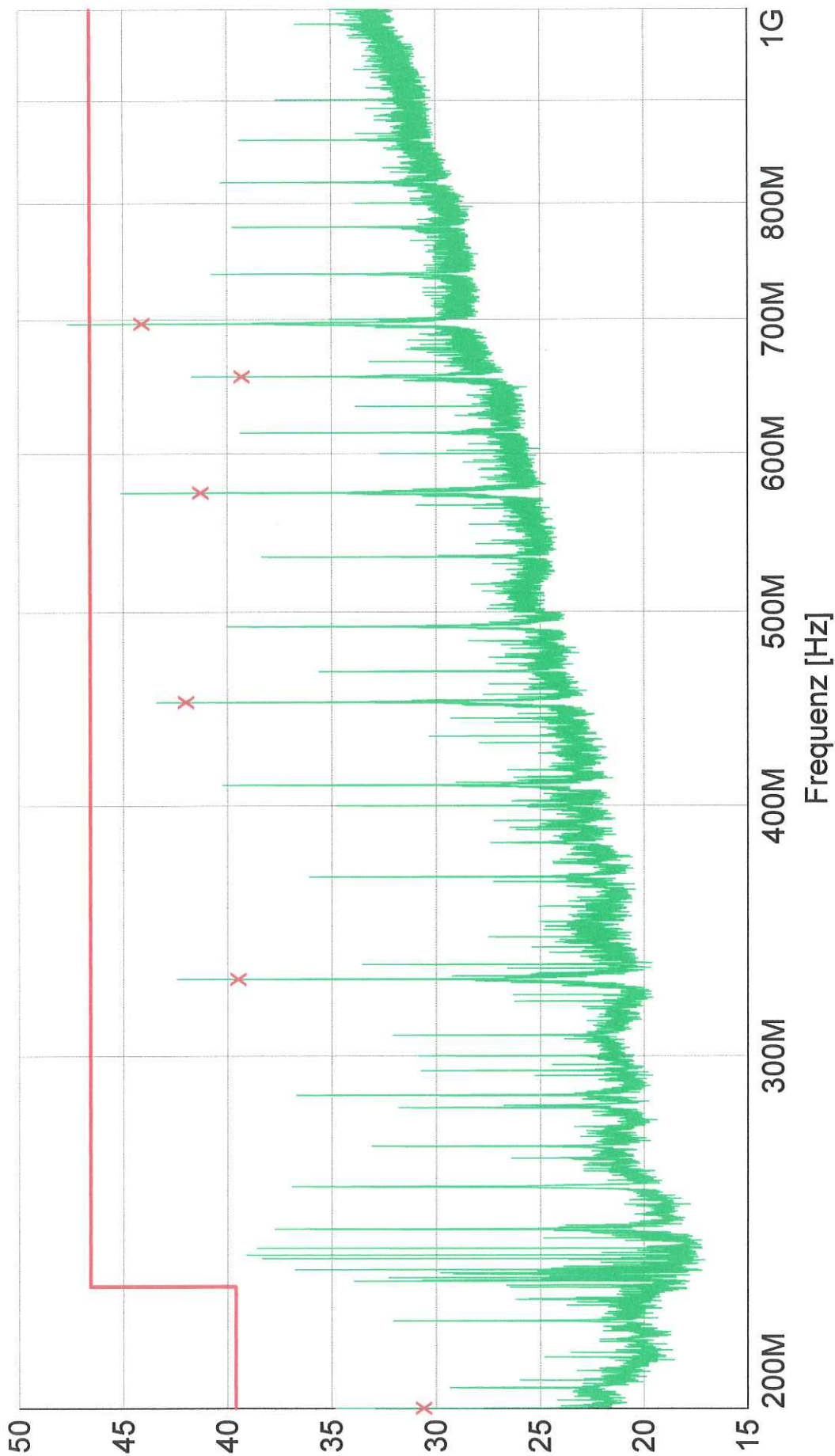
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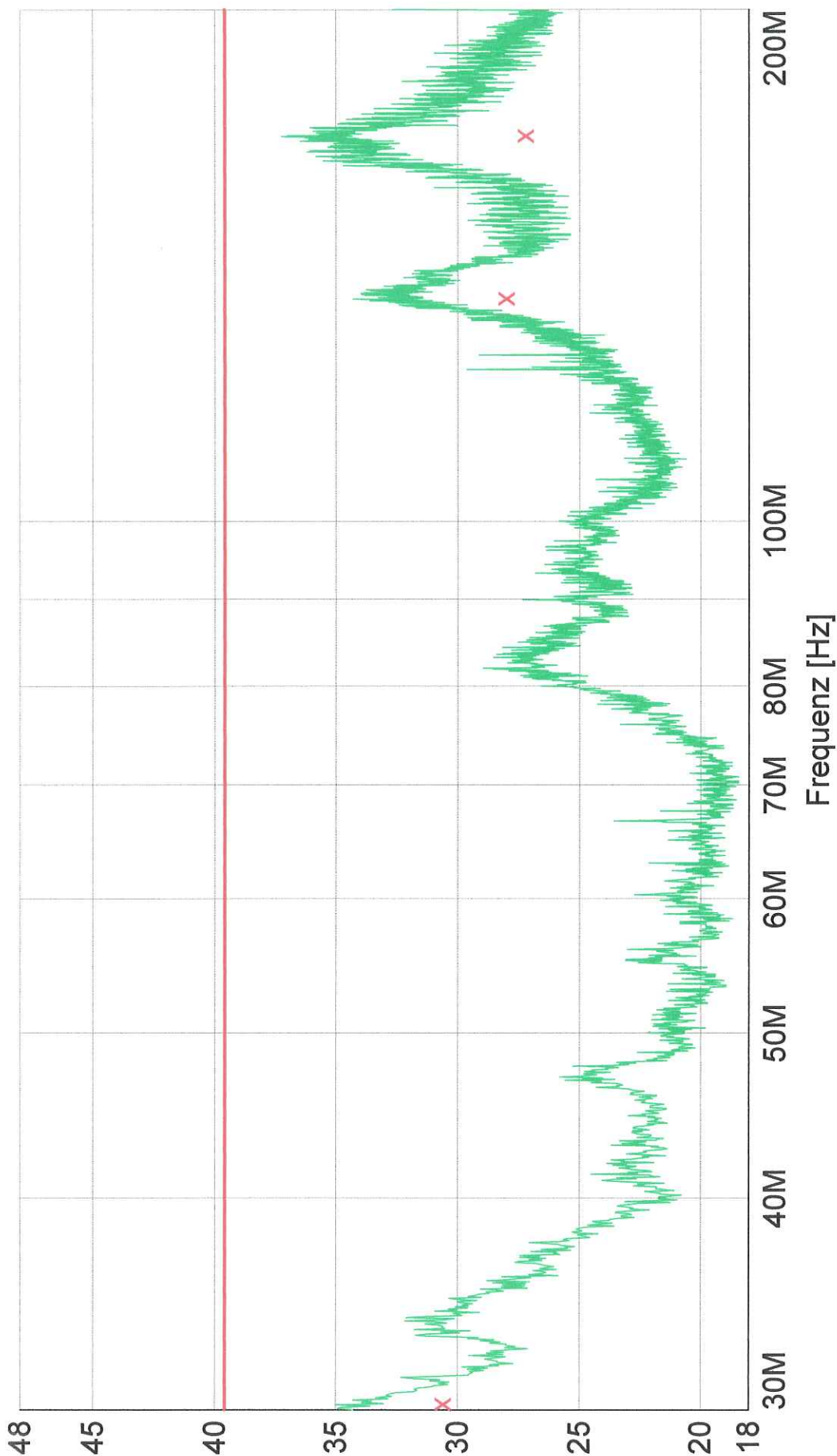
Pegel [dBµV/m]



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LIM EN 55022 F QP

EN 55022 F QP

Pegel [dBµV/m]



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EN 55022 F QP

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Measurement diagram:  
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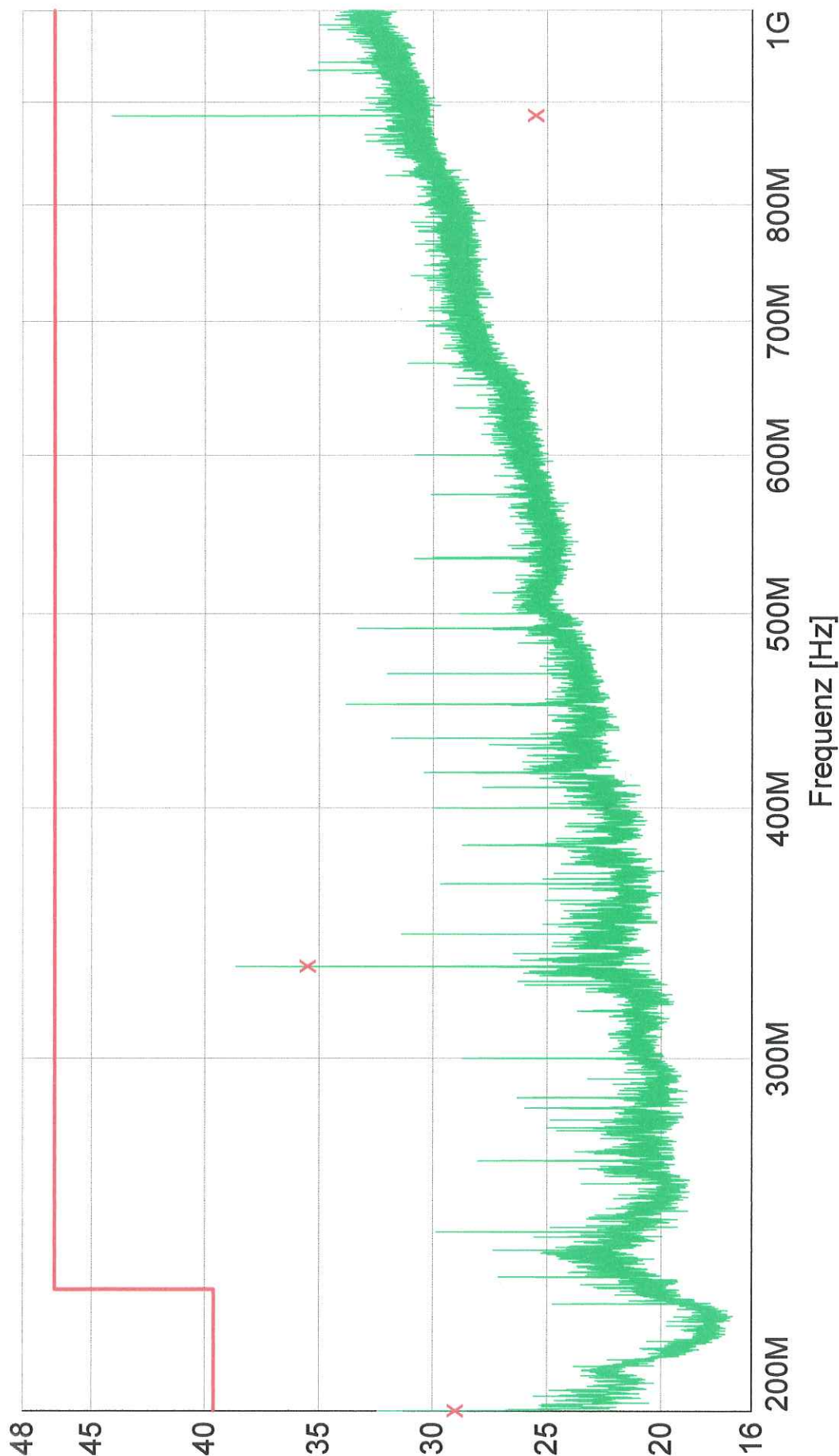
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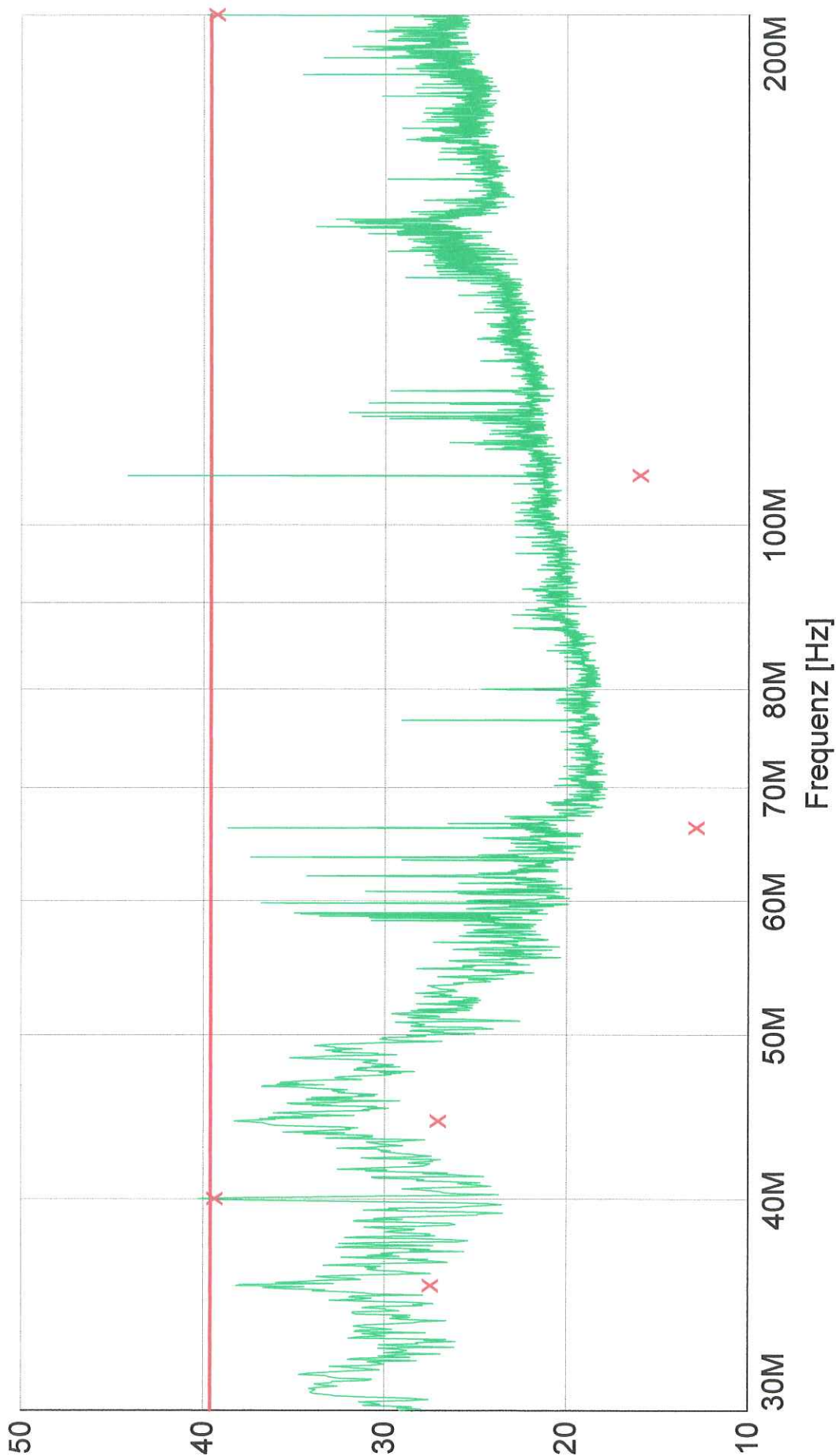
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Pegel [dBµV/m]



Pegel [dBµV/m]

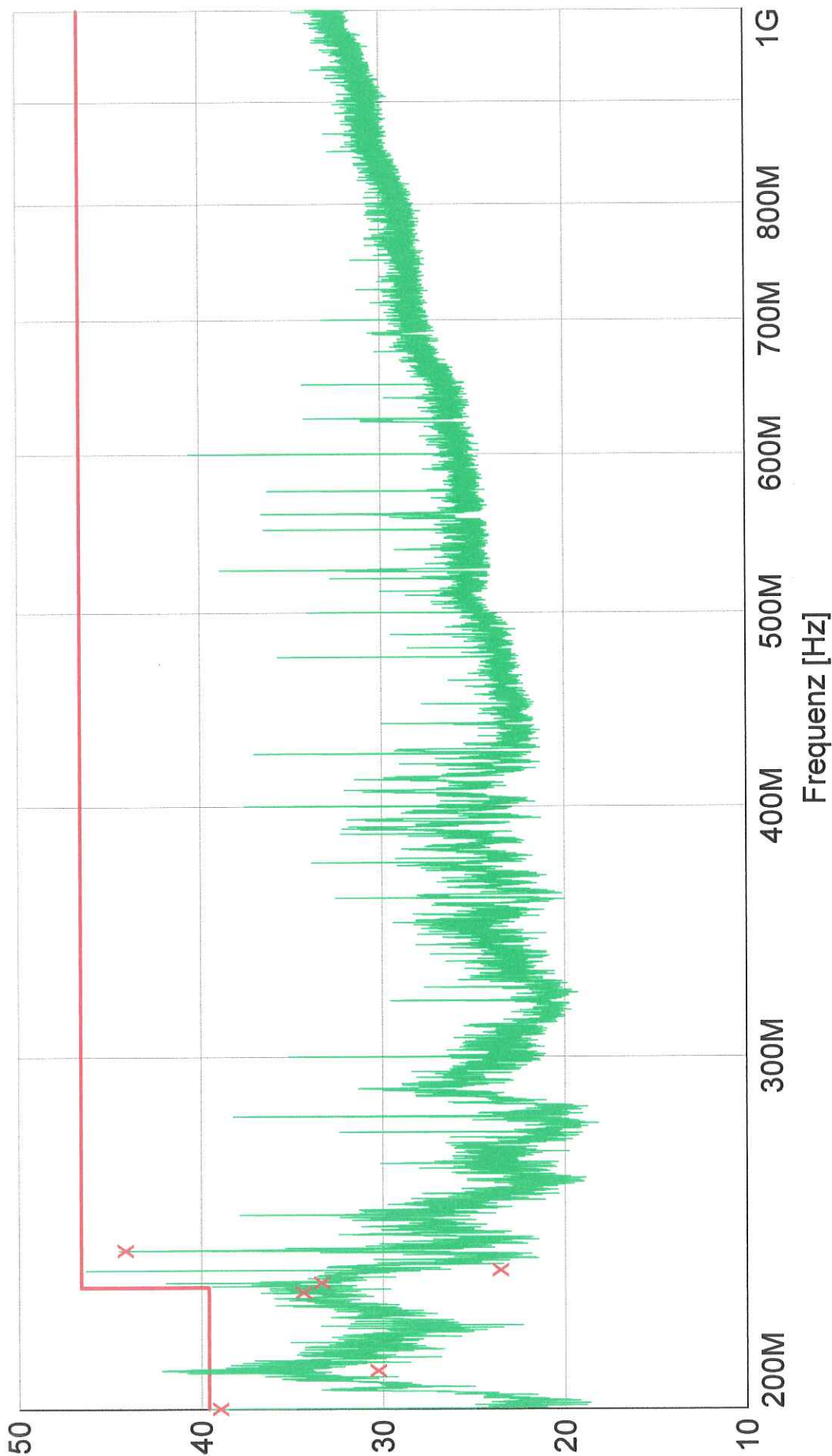


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EN 55022 F QP



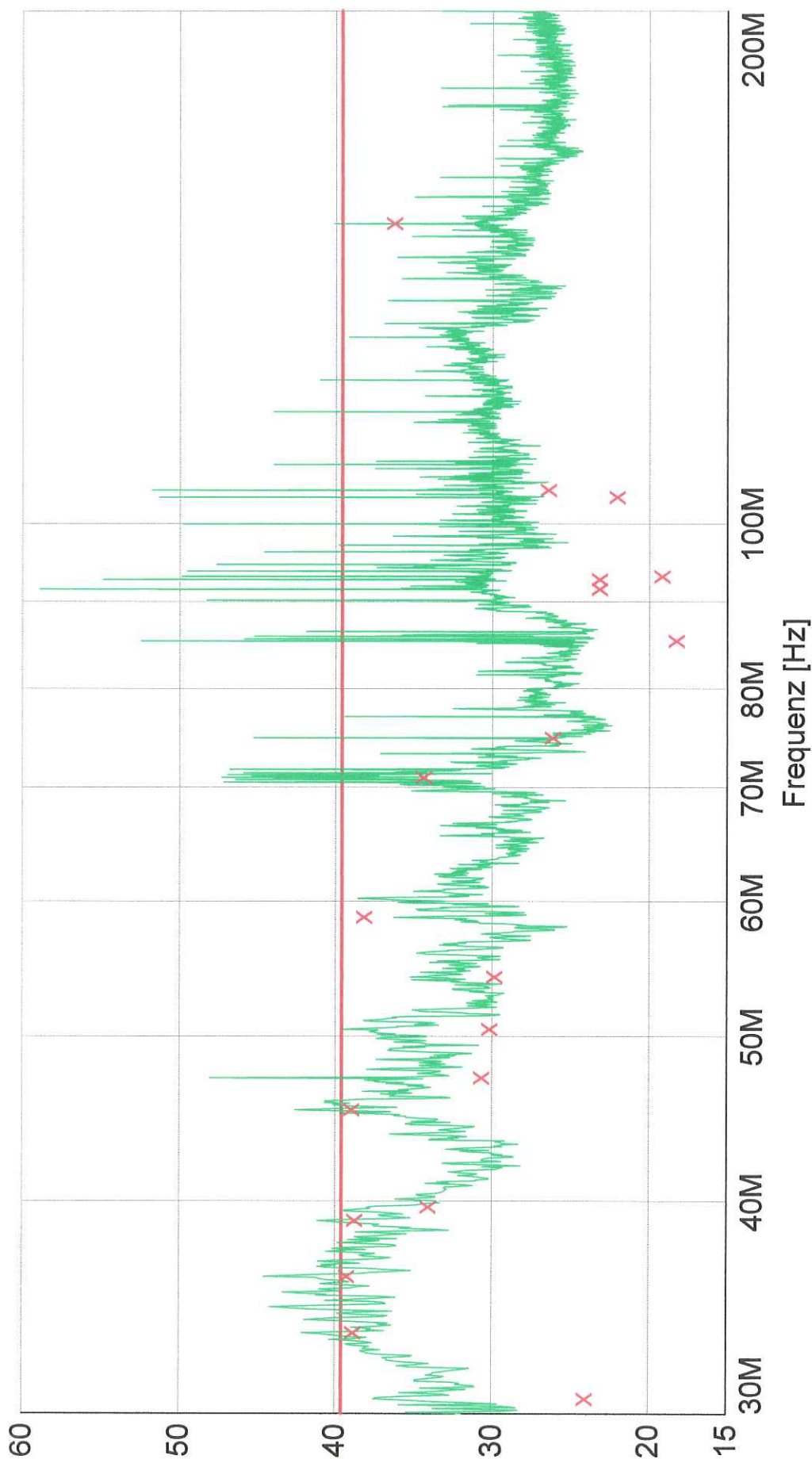
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EN 55022 F QP

Pegel [dBµV/m]



x x : MES VCS3020\_F31a\_fin  
 MES VCS3020x\_F31\_pre  
 LIM EN 55022\_F\_QP  
 x x : MES VCS3020x\_F31\_fin

EN 55022 F QP