TEST REPORT

of the accredited test laboratory

TÜV Nr.:M/EMV-02/136

about

the following EMC - test/- research

Division Medical Technology/ Communication Technology/ EMC

Testing Body for Communication Technology/ EMC

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

Notified Body 0408

Applicant:	Corinex Global a.s. Klukatá 6 82108 Bratislava, Slovakia
Product:	Corinex Powernet PCI
Serial Number:	---
Standard:	EN 55022:1998; EN 55024:1998; EN 61000-3-2/A14:2001; EN 61000-3-3:1995; CISPR 22:1997

TÜV Österreich
Test laboratory for EMC

Deputy Supervisor of EMC-laboratory

Official seal

Checked by

Ing. Wilhelm Seier

22.05.2002

Ing. Klaus Rötsch

Copy Nbr.:_____

The results of this test report only refer to the provided equipment.

Contents

1. Applicant

Company	Corinex Global a.s.
Department	
Address	82108 Bratislava, Slovakia; Klukatá 6
Contact person	Mr. Hradilek

EUT received on	May 16th 2002
Tests were performed on	May 16th till 21st 2002

2. Description of EUT

EUT	Corinex Powernet PCI
Serial Number	---
Manufacturer	Corinex Global a.s. 82108 Bratislava, Slovakia; Klukatá 6
Description	Corinex Global a.s. provided the following configuration for the measurements: PCI-Powernetadapter installed in a PC PC: “forte” CE marked (not for US market) Noname-Keypad made in Thailand with FCC statements Microsoft-mouse FCC-ID: C3KSS1
Operating mode	The measurements were carried out at the following running states: transmit/receive data

3. Standards / Final result

Name	Title	Deviation	Result
EN 55022:1998	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	none	PASS
EN 55024:1998	Information technology equipment - Immunity characteristics - Limits and methods of measurement	none	PASS
EN 61000-3-2/A14:2001	Electromagnetic compatibility (EMC) Part 3: Limits Section 2: Limits for harmonic current emissions (equipment input current up to and including 16A per phase)	none	PASS
EN 61000-3-3:1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 2: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16A	none	PASS
CISPR 22:1997	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	none	PASS

PASS EUT passed
FAIL EUT failed

4. Test results

4. 1. Conducted emission

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	0dB
IF- Bandwidth	9 kHz	9 kHz	Preamplifier	0 dB	0 dB

Operating mode	Measuring result
transmit/receive data	Measurement diagram 1

Test result:

4. 1.1.) Measurement with QP-Detector

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Exceed-Mark	Phase	PE
0,290	58,8	60,6	1,8		N	GND
0,370	51,6	58,5	6,9		N	GND
4,690	49,6	56,0	6,4		L1	GND
4,885	50,2	56,0	5,8		L1	GND
16,195	49,7	60,0	10,3		L1	GND
19,930	51,0	60,0	9,0		L1	GND

4. 1.2.) Measurement with AV-Detector

Frequency MHz	Level dBµV	Limit dBµV	Margin dB	Exceed-Mark	Phase	PE
4,485	39,4	46,0	6,6		L1	GND
4,695	40,3	46,0	5,7		L1	GND
4,885	41,3	46,0	4,7		L1	GND
19,720	41,5	50,0	8,5		L1	GND
19,920	40,2	50,0	9,8		L1	GND
20,500	43,5	50,0	6,5		N	GND

4. 2. Radiated emission

Limits :

Frequency range	Limit (quasi peak)
30 - 230 MHz	39,6 dBµV/m
230 - 1000 MHz	46,6 dBµV/m

Measuring apparatus parameters:

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	30 MHz	30 MHz	Detector	Max Peak	Quasi Peak
Stop frequency	1000 MHz	1000 MHz	Measuring time	10 ms	1 s
Stepsize	50 kHz	50 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	120 kHz	120 kHz	Preamplifier	20 dB	20 dB

Operating mode	Measuring result
transmit/receive data	Measurement diagram 2, 3

Test result:

4. 2.1.) Measurement with QP-Detector (30 MHz - 200 MHz)

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed-Mark	Height cm	Azimuth deg	Polarization
32,75	30,3	39,6	9,3		100	160	Vertical
143,05	29,9	39,6	9,7		200	250	Horizontal
144,75	32,2	39,6	7,4		217	239	Horizontal
146,50	27,5	39,6	12,1		223	226	Horizontal
149,95	27,0	39,6	12,6		227	264	Horizontal

4. 2.2.) Measurement with QP-Detector (200 MHz - 1000 MHz)

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed-Mark	Height cm	Azimuth deg	Polarization
200,00	38,3	39,6	1,3		164	275	Horizontal
286,35	41,9	46,6	4,7		231	300	Vertical
572,75	43,4	46,6	3,2		243	223	Horizontal
600,05	36,5	46,6	10,1		260	184	Horizontal
715,95	44,8	46,6	1,8		100	110	Vertical
750,00	44,4	46,6	2,2		108	0	Vertical

4. 3. Harmonic current emission:

Because of the low power consumption of this equipment (the AC mains port is only used as data port), no measurement was performed.

4. 4. Voltage fluctuations and flicker

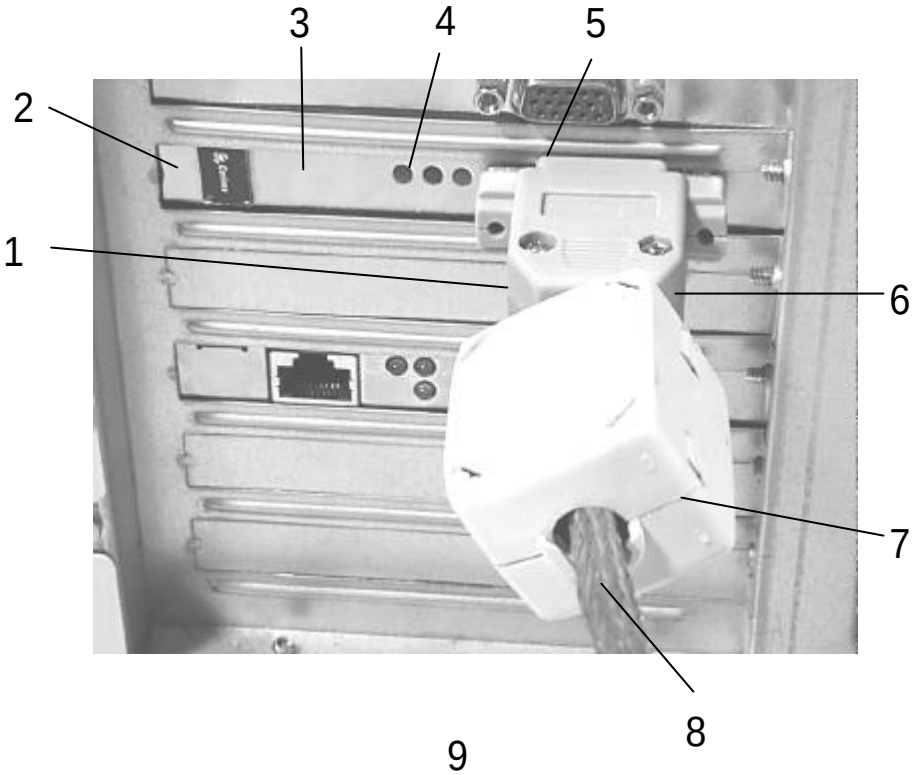
Because the equipment has a very low power consumption (the AC mains port is olny used as data port), it is unlikely to produce significant voltage fluctuations or flicker and therefor no measurement was performed.

4. 5. Electrostatic discharge requirements (ESD)

Type of test	charging voltage	Basic standard	Test set-up	Comment	Performance criteria
Electrostatic discharge Air discharge	8 kV charging voltage	EN 61000-4-2:1995	EN 61000-4-2:1995		B
Electrostatic discharge Contact discharge	4 kV charging voltage	EN 61000-4-2:1995	EN 61000-4-2:1995		B

Operating mode	Test positions	Criteria of compliance
transmit/receive data	The 14 test positions are shown in the following graphic	During the test the communications link shall be maintained. However short interruptions are allowed. After the test the equipment shall operate normally without user-interaction.

Test positions for ESD



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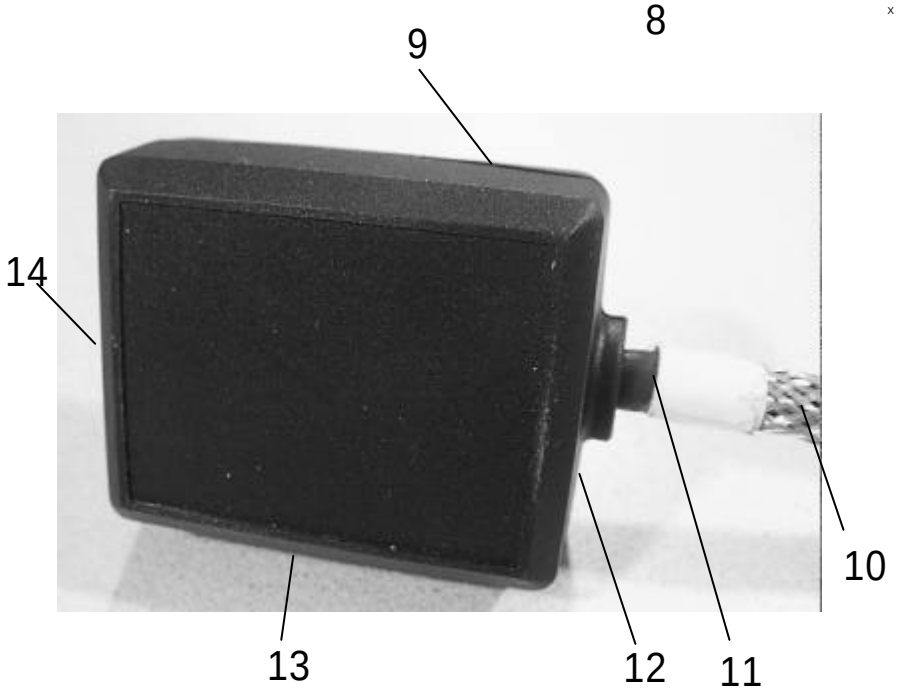


Test result:

Test position	Charging voltage	Type of discharge	Positive discharge	Negative discharge
1	8 kV	Air	PASS	PASS
2	4 kV	Contact	PASS	PASS
3	4 kV	Contact	PASS	PASS
4	4 kV	Contact	PASS	PASS
5	4 kV	Contact	PASS	PASS
6	8 kV	Air	PASS	PASS
7	8 kV	Air	PASS	PASS
8	4 kV	Contact	PASS	PASS
9	8 kV	Air	PASS	PASS
10	4 kV	Contact	PASS	PASS
11	8 kV	Air	PASS	PASS
12	8 kV	Air	PASS	PASS
13	8 kV	Air	PASS	PASS
14	8 kV	Air	PASS	PASS

PASS EUT passed
FAIL EUT failed

4. 6. Radiated electromagnetic field requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Radiated electromagnetic field	80 MHz - 1000 MHz Feldstärke: 3 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	EN 61000-4-3:1996	EN 61000-4-3:1996		A

Operating mode	Criteria of compliance
transmit/receive data	During the test the communications link must be maintained. However the datarate may decrease. After the test the equipment must operate normally.

Test result:

Type of test	Test parameters	Performance criteria	Result
Radiated electromagnetic field	80 MHz - 1000 MHz Feldstärke: 3 V/m Modulation 80%/1 kHz AM Polarisation H/V Stepsize 1%	A	PASS
PASS EUT passed FAIL EUT failed			

4. 7. 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 3 Vrms (unmoduliert) Modulation 80%/1 kHz AM Stepsize $1{,}5*10^{-3}$ Dec/s Source impedance 150 Ohm	EN 61000-4-6:1996	EN 61000-4-6:1996		A

Operating mode	Criteria of compliance
transmit/receive data	During the test the communications link must be maintained. However the datarate may decrease. After the test the equipment must operate normally.

Test result:

Measured line	Type of coupling	Performance criteria	Result
AC-mains supply (1-phase)	M5	A	PASS
PASS EUT passed FAIL EUT failed			

4. 8. Electical 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 61000-4-4:1995	EN 61000-4-4:1995		B

Operating mode	Criteria of compliance
transmit/receive data	During the test the communications link shall be maintained. However short interruptions are allowed. After the test the equipment shall operate normally without user-interaction.

Test result:

4. 8. 1.) Measurement on the mains supply line (direct injection)

Combination	Test voltage	Performance criteria	Positive pulse	Negative pulse
Coupling path L1	1 kV	B	PASS	PASS
Coupling path N	1 kV	B	PASS	PASS
Coupling path PE	1 kV	B	PASS	PASS
Coupling path L1/N	1 kV	B	PASS	PASS
Coupling path L1/PE	1 kV	B	PASS	PASS
Coupling path N/PE	1 kV	B	PASS	PASS
Coupling path L1/N/PE	1 kV	B	PASS	PASS
PASS EUT passed FAIL EUT failed				

4. 9. Surge requirements

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Surge, differential mode	1 kV Test level 1,2/50 µs t_r/t_n Polarity: positive/negative	EN 61000-4-5:1995	EN 61000-4-5:1995		B
Surge, common mode	2 kV Test level 1,2/50 µs t_r/t_n Polarity: positive/negative	EN 61000-4-5:1995	EN 61000-4-5:1995		B

Operating mode	Criteria of compliance
transmit/receive data	During the test the communications link shall be maintained. However short interruptions are allowed. After the test the equipment shall operate normally without user-interaction.

Test result:

4. 9.1.) Measurement on the mains supply - differential mode

Combination	Test voltage	Performance criteria	Positive pulse	Negative pulse
L1/N	1 kV	B	PASS	PASS

PASS EUT passed
FAIL EUT failed

4. 9.2.) Measurement on the mains supply - common mode

Combination	Test voltage	Performance criteria	Positive pulse	Negative pulse
N/PE	2 kV	B	PASS	PASS
L1/PE	2 kV	B	PASS	PASS

PASS EUT passed
FAIL EUT failed

4. 10. Voltage dips and interrupts

Type of test	Test parameters	Basic standards	Test set-up	Comment	Performance criteria
Voltage - Dips	>95% Reduction for 10 ms	EN 61000-4-11	EN 61000-4-11	1)	B
Voltage - Dips	30% Reduction for 500 ms	EN 61000-4-11	EN 61000-4-11	2)	C
Voltage - Interruption	>95% Reduction for 5000 ms	EN 61000-4-11	EN 61000-4-11	2)	C

Operating mode	Criteria of compliance
transmit/receive data	1) During the test the communications link shall be maintained. However short interruptions are allowed. After the test the equipment shall operate normally without user-interaction. 2) During the test the communications link may be lost. After the test the equipment shall operate normally maybe after user-interaction.

Test result:

Type of test	Test parameters	Performance criteria	Result
Voltage - Dips	>95% Reduction for 10 ms	B	PASS
Voltage - Dips	30% Reduction for 500 ms	C	PASS
Voltage - Interruption	>95% Reduction for 5000 ms	C	PASS

PASS EUT passed
FAIL EUT failed

Appendix 1
Test equipment used

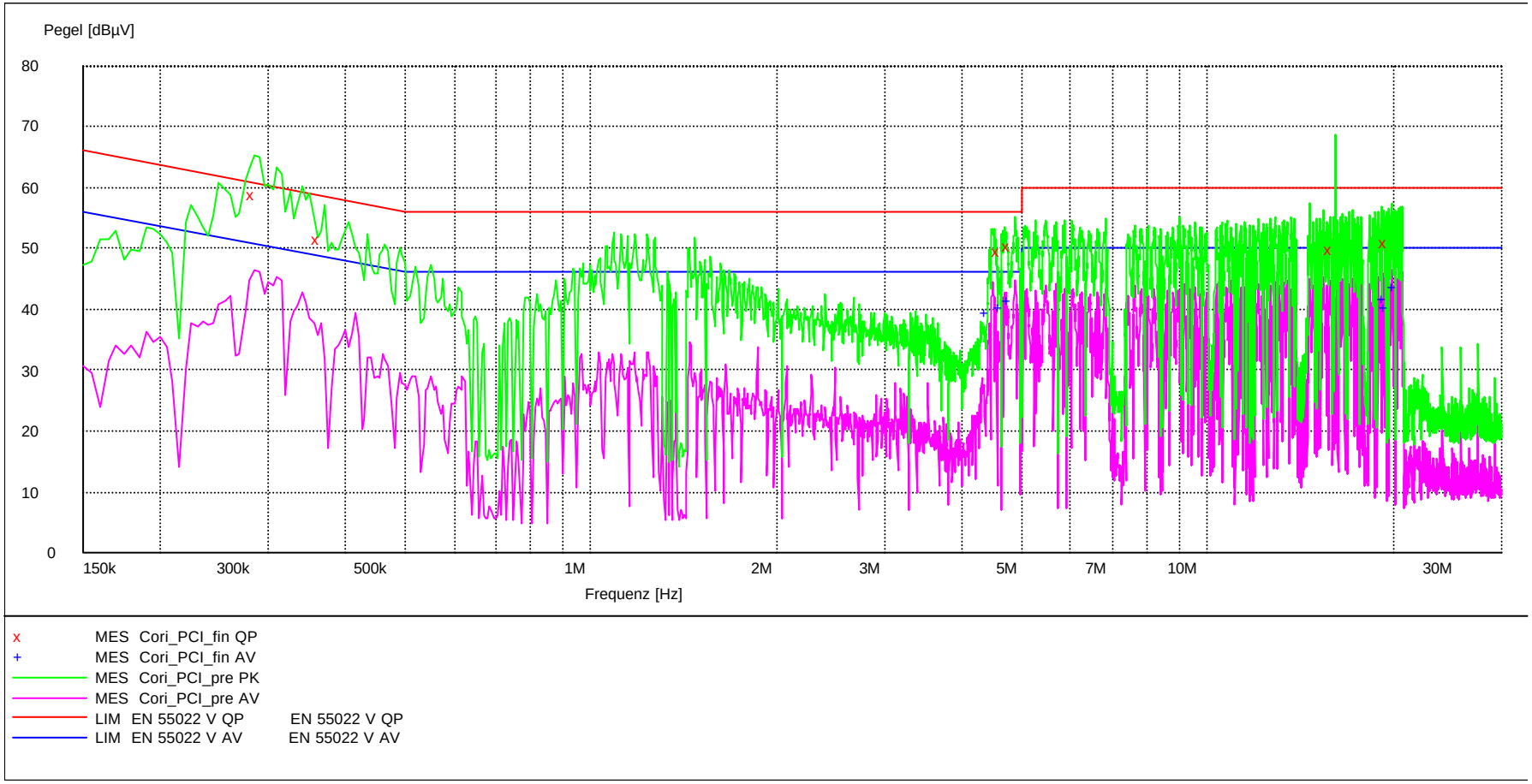
☒	Anechoic Chamber with 3m measurement distance	NT-100
☒	MA 240 - Antenna mast 1 - 4 m height	NT-110
☒	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111
☒	HD 100 Controller Mast+Turntable	NT-112
☐	HUF-Z2 - Bicon. Antennna 20 - 300 MHz	NT-120
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121
☐	HFH-Z2 - Loop 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
☐	ESVP - Test receiver 20 - 1000 MHz	NT-201
☐	Switchbox	NT-202
☐	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
☐	3160-10 Horn Antenna 26,5 GHz - 40 GHz	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
☐	B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
☐	DFT 555 - Power and harmonics analyzer	NT-231
☐	EFA-3 H-field- / E-field probe	NT-243
☐	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
☐	E-field probe (for use with EMR-200)	NT-245
☐	Magneticfield-Sensor 300 kHz – 30 MHz	NT-246
☐	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

Appendix 1 (continued)
Test equipment used

☐	Model 2000 Digital Multimeter	NT-261
☐	Fluke 97 Digital Multimeter	NT-262
☐	Fluke 97 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
☐	MidiStar Telephone exchange	NT-306
☒	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
☐	PEFT - Burst generator up to 4 kV	NT-320
☐	PSD - ESD generator up to 25 kV	NT-321
☐	ESD-Pistol	NT-322
☐	Vacuum-Relais up to 8 kV	NT-323
☐	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
☒	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
☐	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
☐	FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
☐	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
☐	HV-Attenuator 54,5 dB (Burst)	NT-420
☐	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
☐	Voltage-divider 1:100	NT-427
☐	RF-Attenuator 6 dB	NT-428
☐	RF-Attenuator 0 dB - 81 dB	NT-429
☐	WRU 27 - Band blocking 27 MHz	NT-430

Appendix 1 (continued)
Test equipment used

☐	WHJ450C9 AA - High pass 450 MHz	NT-431
☐	WHJ250C9 AA - High pass 250 MHz	NT-432
☐	RF-Load 150 W	NT-433
☐	Impedance transducer 50 Ohm – 800 Ohm	NT-435
☐	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-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 P450 - Test computer	NT-500
☐	SE 284 GPIB - Plotter	NT 502
☐	PC P133 Test computer #2	NT-504
☐	PC P200 MMX Notebook	NT-505
☐	PC PIII 933 MHz Notebook	NT-506
☐	7110 - Controlling device for E-Field probe	NT-510
☐	Monitoring camera with Monitor	NT-511
☐	BSR-V1 - Video transmission system (optical fiber link)	NT-512
☒	ES-K1 Test software	NT-520
☐	ESPC-K1 Test software	NT-521
☐	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
☐	SPS_EM - Test software for PHE 4500/B	NT-527
☐	Noise power test apparatus according to EN 55014	NT-530
☐	Vertical coupling plane (ESD)	NT-531
☐	Equipment for ESD-pulse verification.	NT-532
☐	TEM-Zelle	NT-533
☐	ESV-24 Plotter adapter	NT-540
☒	Test cables	NT-550
☒	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
☐	Serial data - fiber optic link	NT-557
☐	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 PBA-33PBC-10	NT-584
☐	Shield chamber	NT-600
☐	Climatic chamber -55°C to +180°C	M-512
☐	Control and simulation equipment for EUT	---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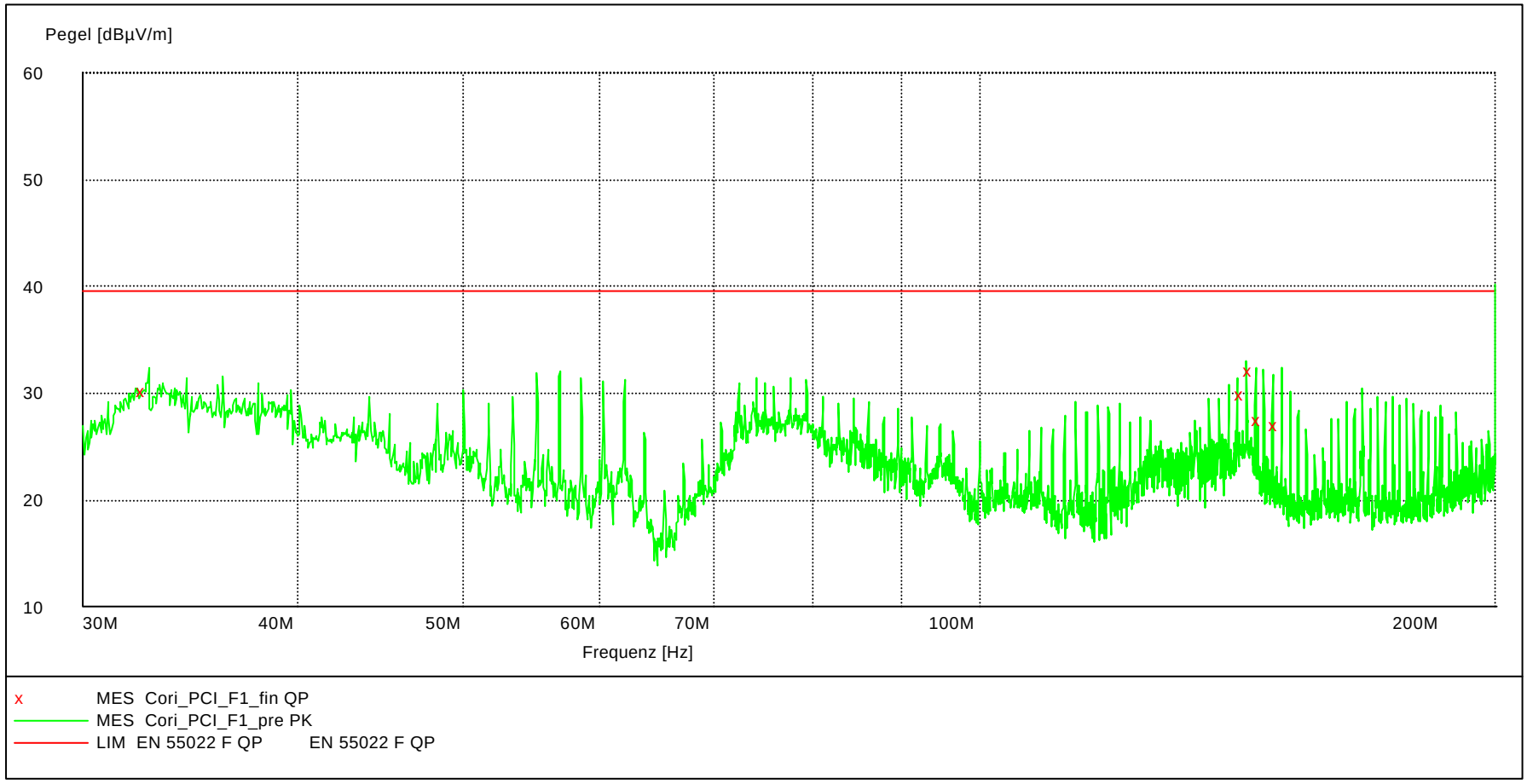
80
70
60
50
40
30
20
10
0
150k
300k
500k
1M
2M
3M
5M
7M
10M
30M
Frequenz [Hz]
x MES Cori_PCI_fin QP
+ MES Cori_PCI_fin AV
MES Cori_PCI_pre PK
MES Cori_PCI_pre AV
LIM EN 55022 V QP EN 55022 V QP
LIM EN 55022 V AV EN 55022 V AV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60
50
40
30
20
10
30M
40M
50M
60M
70M
100M
200M
Frequenz [Hz]
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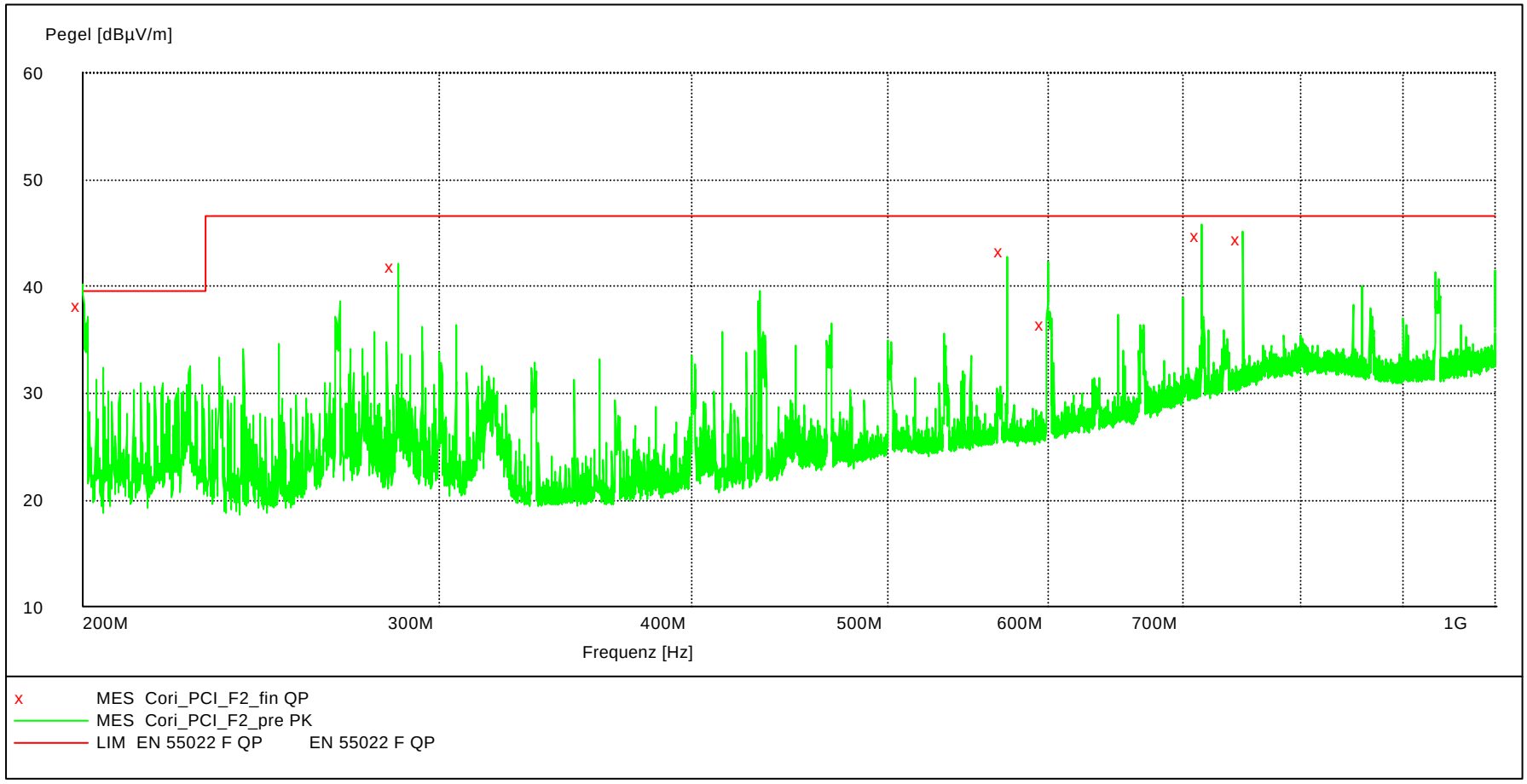
MES Cori_PCI_F1_pre PK
LIM EN 55022 F QP EN 55022 F QP


Pegel [dBµV/m]
60
50
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20
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200M
300M
400M
500M
600M
700M
1G
Frequenz [Hz]
x MES Cori_PCI_F2_fin QP
MES Cori_PCI_F2_pre PK
LIM EN 55022 F QP EN 55022 F QP