

**TEST REPORT**  
of the accredited test laboratory

TÜV Nr.:M/EMV-02/223

about  
the following EMC - test/- research

Division Medical  
Technology/  
Communication  
Technology/ EMC

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Notified Body 0408

**Applicant:** Skidata AG  
Untersbergstraße 40  
A-5083 Gartenau - St. Leonhard

**Product:** Ticketprinter; COx70iTX/BC

**Serial Number:** D023000010

**Standard:** 47 CFR Ch. I Part 15

TÜV Österreich  
Test laboratory for EMC

Deputy Supervisor of EMC-  
laboratory




Ing. Wilhelm Seier



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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 Skidata AG  
Department  
Address A-5083 Gartenau - St. Leonhard; Untersbergstraße 40  
Contact person Hr. Präauer

EUT received on 31<sup>st</sup> July 2002

Tests were performed on 31<sup>st</sup> July till 6<sup>th</sup> August 2002

## 2. Description of EUT

EUT	Ticketprinter; COx70iTX/BC
Serial Number	D023000010
Manufacturer	Skidata AG A-5083 Gartenau - St. Leonhard; Untersbergstraße 40
Description	Skidata AG provided the following configuration for the measurements:  Serial production model with parallel cable terminated with test mode selector
Operating mode	The measurements were carried out at the following running states:  Printing and checking cards

### 3. Standards / Final result

Name	Title	Deviation	Result
47 CFR Ch. I Part 15	Radio Frequency Devices	none	PASS
PASS EUT passed FAIL EUT failed			

## 4. Test results

### 4.1. Conducted emission

Limits according to 15.109

Frequency range	Limit	
	Quasi Peak	Average
0,150 - 0,5 MHz	66 - 56 dB $\mu$ V decreasing with the logarithm of frequency	56 - 46 dB $\mu$ V decreasing with the logarithm of frequency
0,5 - 5 MHz	56 dB $\mu$ V	46 dB $\mu$ V
5 - 30 MHz	60 dB $\mu$ V	50 dB $\mu$ V
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
Checking and printing of Cards; continuous and modulated carrier at 122,9 kHz, continuous and modulated carrier at 13,56 MHz	Measurement diagram 1

Test result:

4. 1.1.) Measurement with QP-Detector

Frequency MHz	Level dB $\mu$ V	Limit dB $\mu$ V	Margin dB	Exceed- Mark	Phase	PE
0,180	53,4	64,5	11,1		N	GND
13,560	80,0	60,0	-20,0	*	N	GND

\*) This part of emission is covered by 15.225 (a) see page 13

#### 4. 1.2.) Measurement with AV-Detector

Frequency MHz	Level dB $\mu$ V	Limit dB $\mu$ V	Margin dB	Exceed- Mark	Phase	PE
0,240	38,3	52,1	13,8		L1	GND
0,420	28,6	47,4	18,8		N	GND
0,475	38,6	46,4	7,8		N	GND
13,560	80,0	50,0	-30,0	*	N	GND

\*) This part of emission is covered by 15.225 (a) see page 13



#### 4. 2. Radiated emission

Limits according to 15.209 (15.225 (b) / 15.109)

Detector Quasi Peak		
Frequency range	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 20 dB per Decade.	

Operating mode	Measuring result
Checking and printing of Cards; continuous and modulated carrier at 122,9 kHz, continuous and modulated carrier at 13,56 MHz	Measurement diagram 2-4

Test result:

4. 2.1.) Measurement in the frequency range 9 kHz to 30 MHz

Frequency kHz	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Exceed- Mark
122,9	65,4	65,8	0,4	
13560	58,9	49,5	-9,4	This part of emission is covered by 15.225 (a) see page 13

4. 2.2.) Measurement in the frequency range 30 MHz to 200 MHz

Frequency MHz	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Exceed-Mark	Height cm	Azimuth deg	Polarization
37,55	28,7	40,0	11,3		103	299	VERTICAL
40,70	37,9	40,0	2,1		112	276	VERTICAL
137,75	14,5	43,5	29,0		128	255	VERTICAL
152,65	13,1	43,5	30,4		109	230	VERTICAL
160,60	14,0	43,5	29,5		175	299	HORIZONTAL
162,35	13,3	43,5	30,2		178	179	HORIZONTAL

4. 2.3.) Measurement in the frequency range 200 MHz to 1000 MHz

Frequency MHz	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
671,75	25,0	46,0	21,0		103	105	VERTICAL
679,75	24,3	46,0	21,7		118	228	VERTICAL
701,35	25,4	46,0	20,6		209	59	VERTICAL
716,20	25,4	46,0	20,6		174	79	VERTICAL
725,30	25,7	46,0	20,3		173	145	HORIZONTAL
731,05	26,0	46,0	20,0		100	143	VERTICAL

4.3. Field strength at 13,56 MHz

Limits according to 15.225 (a):

The field strength of any emissions within this band shall not exceed 10.000 microvolts/meter (80 dB $\mu$ V/m) at 30 meters.

Measurement results:

The field strength at 3m distance was measured as 58,9 dB $\mu$ V/m. Extrapolated with 20 dB per decade to 30 meters distance it would be 38,9 dB $\mu$ V/m or 88,1  $\mu$ V/m.

*M*

4.4. Frequency variation at extreme test voltages and extreme temperatures

Limits according to 15.225 (c):

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	$V_{min}$ ( 93,5 )V	13,560015
$T_{nom}$ ( 20 )°C	$V_{nom}$ ( 126,5 )V	13,560015
$T_{min}$ ( -20 )°C	$V_{nom}$ ( 110 )V	13,560860
$T_{max}$ ( 50 )°C	$V_{nom}$ ( 110 )V	13,560004
Maximum deviation from nominal frequency under extreme test conditions (%)		0,0063
Measurement uncertainty		$\pm 10$ Hz

Appendix 1  
Test equipment used

<input checked="" type="checkbox"/>	Anechoic Chamber with 3m measurement distance	NT-100	<input type="checkbox"/>	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
<input checked="" type="checkbox"/>	MA 240 - Antenna mast 1 - 4 m height	NT-110	<input checked="" type="checkbox"/>	ESI26 - Test receiver 20 Hz - 26,5 GHz	NT-207
<input checked="" type="checkbox"/>	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111	<input type="checkbox"/>	Digital Radio Tester CT555	NT-208
<input checked="" type="checkbox"/>	HD 100 Controller Mast+Turntable	NT-112	<input type="checkbox"/>	Noise-gen., ITU-R 559-2 20 Hz - 20 kHz	NT-209
<input type="checkbox"/>	HUF-Z2 - Bicon. Antenna 20 - 300 MHz	NT-120	<input type="checkbox"/>	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
<input type="checkbox"/>	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	<input type="checkbox"/>	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
<input checked="" type="checkbox"/>	HFH-Z2 - Loop Antenna. 9 kHz - 30 MHz	NT-122	<input type="checkbox"/>	Radiocommunication analyzer Marconi 2945A	NT-212
<input type="checkbox"/>	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	<input type="checkbox"/>	2855S - Communication analyzer	NT-213
<input type="checkbox"/>	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	<input type="checkbox"/>	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
<input type="checkbox"/>	3115 - Horn Antenna 1 - 18 GHz	NT-125	<input type="checkbox"/>	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
<input type="checkbox"/>	3116 - Horn Antenna 18 - 40 GHz	NT-126	<input type="checkbox"/>	3160-10 Horn Antenna 26,5 GHz - 40 GHz	NT-216
<input type="checkbox"/>	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127	<input type="checkbox"/>	Radiocommunication analyzer SWR 1180 MD	NT-217
<input type="checkbox"/>	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128	<input type="checkbox"/>	Mixer M19HWD 40 GHz - 60 GHz	NT-218
<input checked="" type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129	<input type="checkbox"/>	Mixer M12HWD 60 GHz - 90 GHz	NT-219
<input type="checkbox"/>	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130	<input type="checkbox"/>	TDS - 540 DSO Digital scope	NT-220
<input checked="" type="checkbox"/>	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131	<input type="checkbox"/>	PM97 Scopemeter	NT-221
<input type="checkbox"/>	Loop Antenna H-Field	NT-132	<input type="checkbox"/>	B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
<input type="checkbox"/>	Horn Antenna 500 MHz - 2900 MHz	NT-133	<input type="checkbox"/>	DFT 555 - Power and harmonics analyzer	NT-231
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	<input type="checkbox"/>	EFA-3 H-field- / E-field probe	NT-243
<input type="checkbox"/>	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	<input type="checkbox"/>	E-field measuring instrument EMR-200; 100 kHz - 3 GHz	NT-244
<input type="checkbox"/>	BiConiLog Antenna 26 MHz - 2000 MHz	NT-137	<input type="checkbox"/>	E-field probe 100 kHz - 3 GHz	NT-245
<input type="checkbox"/>	Conical Dipol Antenna PCD8250	NT-138	<input type="checkbox"/>	Magneticfield-Sensor 300 kHz - 30 MHz	NT-246
<input type="checkbox"/>	HZ-1 Antenna tripod	NT-150	<input type="checkbox"/>	E-field probe 10 MHz - 18 GHz	NT-247
<input checked="" type="checkbox"/>	BN 1500 Antenna tripod	NT-151	<input type="checkbox"/>	H-field probe 10 MHz - 1 GHz	NT-248
<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"/>	Switchbox	NT-202	<input type="checkbox"/>	FCC-203I EM Injection clamp	NT-251

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# Appendix 1 (continued)

## Test equipment used

<input type="checkbox"/>	FCC-203I-DCN Ferrite decoupling network	NT-252	<input type="checkbox"/>	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
<input type="checkbox"/>	PR50 Current Probe	NT-253	<input type="checkbox"/>	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
<input type="checkbox"/>	Model 2000 Digital Multimeter	NT-261	<input type="checkbox"/>	Preamplifier 1 GHz - 4 GHz	NT-335
<input type="checkbox"/>	Fluke 97 Digital Multimeter	NT-262	<input type="checkbox"/>	2-97201 Electronic load	NT-341
<input type="checkbox"/>	Fluke 97 Digital Multimeter	NT-263	<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"/>	FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
<input type="checkbox"/>	MidiStar Telephone exchange	NT-306	<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"/>	FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
<input type="checkbox"/>	PM 5518 TXVPS Video generator	NT-311	<input type="checkbox"/>	IP 6.2 Coupling filter for data lines (Surge)	NT-403
<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"/>	PEFT - Burst generator up to 4 kV	NT-320	<input type="checkbox"/>	HV-Attenuator 54,5 dB (Burst)	NT-420
<input type="checkbox"/>	PSD - ESD generator up to 25 kV	NT-321	<input type="checkbox"/>	RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
<input type="checkbox"/>	ESD-Pistol	NT-322	<input type="checkbox"/>	RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
<input type="checkbox"/>	Vacuum-Relais up to 8 kV	NT-323	<input type="checkbox"/>	RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
<input type="checkbox"/>	PSURGE 4.1 Surge generator	NT-324	<input type="checkbox"/>	RF-Attenuator 30 dB	NT-424
<input type="checkbox"/>	TRANSIENT 1000 Immunity test system	NT-325	<input type="checkbox"/>	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
<input type="checkbox"/>	VCS 500-M6 Surge-Generator	NT-326	<input type="checkbox"/>	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426
<input type="checkbox"/>	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	<input type="checkbox"/>	Voltage-divider 1:100	NT-427
<input type="checkbox"/>	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332	<input type="checkbox"/>	RF-Attenuator 6 dB	NT-428

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## Test equipment used

<input type="checkbox"/>	RF-Attenuator 0 dB - 81 dB	NT-429	<input checked="" type="checkbox"/>	ES-K1 Test software	NT-520
<input type="checkbox"/>	WRU 27 - Band blocking 27 MHz	NT-430	<input type="checkbox"/>	ESPC-K1 Test software	NT-521
<input type="checkbox"/>	WHJ450C9 AA - High pass 450 MHz	NT-431	<input type="checkbox"/>	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
<input type="checkbox"/>	WHJ250C9 AA - High pass 250 MHz	NT-432	<input type="checkbox"/>	SPS_EM - Test software for PHE 4500/B	NT-527
<input type="checkbox"/>	RF-Load 150 W	NT-433	<input type="checkbox"/>	Noise power test apparatus according to EN 55014	NT-530
<input type="checkbox"/>	Impedance transducer 50 Ohm – 800 Ohm	NT-435	<input type="checkbox"/>	Vertical coupling plane (ESD)	NT-531
<input type="checkbox"/>	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	<input type="checkbox"/>	Equipment for ESD-pulse verification.	NT-532
<input checked="" type="checkbox"/>	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	<input type="checkbox"/>	TEM-Zelle	NT-533
<input type="checkbox"/>	Power Divider 6 dB/1 W/50 Ohm	NT-443	<input type="checkbox"/>	ESV-24 Plotter adapter	NT-540
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-444	<input checked="" type="checkbox"/>	Test cables	NT-550
<input type="checkbox"/>	Directional coupler 0,1 MHz – 70 MHz	NT-445	<input type="checkbox"/>	Test cable #4 for EN 61000-4-6	NT-553
<input type="checkbox"/>	Tube imitations according to EN 55015	NT-450	<input checked="" type="checkbox"/>	Test cable #3 for conducted emission	NT-554
<input type="checkbox"/>	FCC-801-M5-25 Coupling decoupling network	NT-460	<input type="checkbox"/>	Test cable #5 ESD-cable (2x470k)	NT-555
<input type="checkbox"/>	FCC-801-AF10 Coupling decoupling network	NT-461	<input type="checkbox"/>	Test cable #6 ESD-cable (2x470k)	NT-556
<input type="checkbox"/>	FCC-801-S25 Coupling decoupling network	NT-462	<input type="checkbox"/>	Serial data - fiber optic link	NT-557
<input type="checkbox"/>	FCC-801-T4 Coupling decoupling network	NT-463	<input type="checkbox"/>	Test cable #8 Sucoflex 104EA	NT-559
<input type="checkbox"/>	FCC-801-C1 Coupling decoupling network	NT-464	<input type="checkbox"/>	Test cable #9 (for outdoor measurements)	NT-580
<input type="checkbox"/>	F-16A - Current probe 1kHz - 70MHz	NT-465	<input type="checkbox"/>	Test cable #10 (for outdoor measurements)	NT-581
<input checked="" type="checkbox"/>	PC P450 - Test computer	NT-500	<input type="checkbox"/>	Test cable #13 PBA-33PBC-10	NT-584
<input type="checkbox"/>	SE 284 GPIB - Plotter	NT 502	<input type="checkbox"/>	Shield chamber	NT-600
<input type="checkbox"/>	PC P133 Test computer #2	NT-504	<input type="checkbox"/>	Climatic chamber -55°C to +180°C	M-512
<input type="checkbox"/>	PC P200 MMX Notebook	NT-505	<input type="checkbox"/>	Control and simulation equipment for EUT	--
<input type="checkbox"/>	PC PIII 933 MHz Notebook	NT-506			
<input type="checkbox"/>	7110 - Controlling device for E-Field probe	NT-510			
<input type="checkbox"/>	Monitoring camera with Monitor	NT-511			
<input type="checkbox"/>	BSR-V1 - Video transmission system (optical fiber link)	NT-512			

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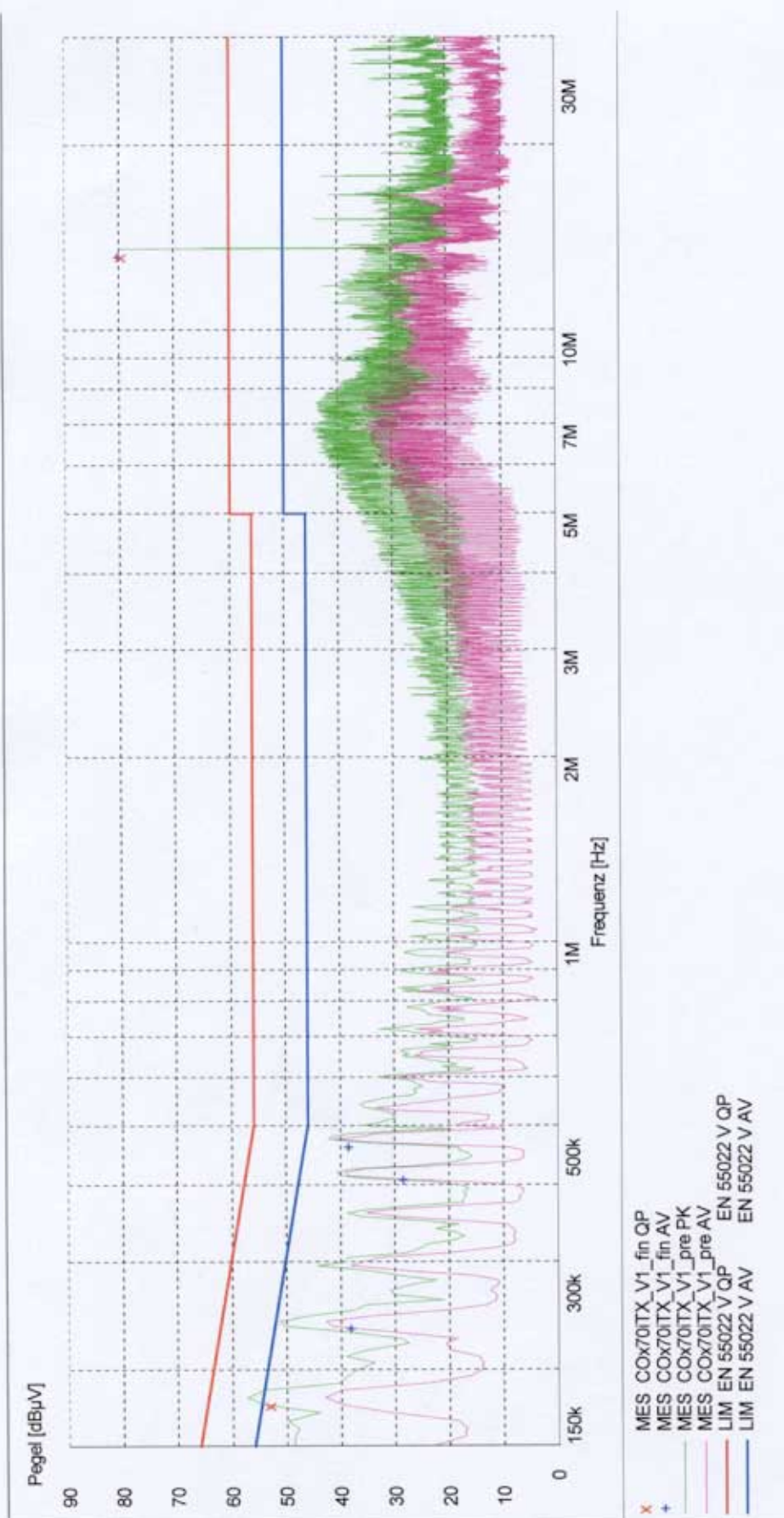
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- x MES COx701TX V1\_fin QP
- + MES COx701TX V1\_fin AV
- MES COx701TX V1\_pre PK
- MES COx701TX V1\_pre AV
- LIM EN 55022 V QP
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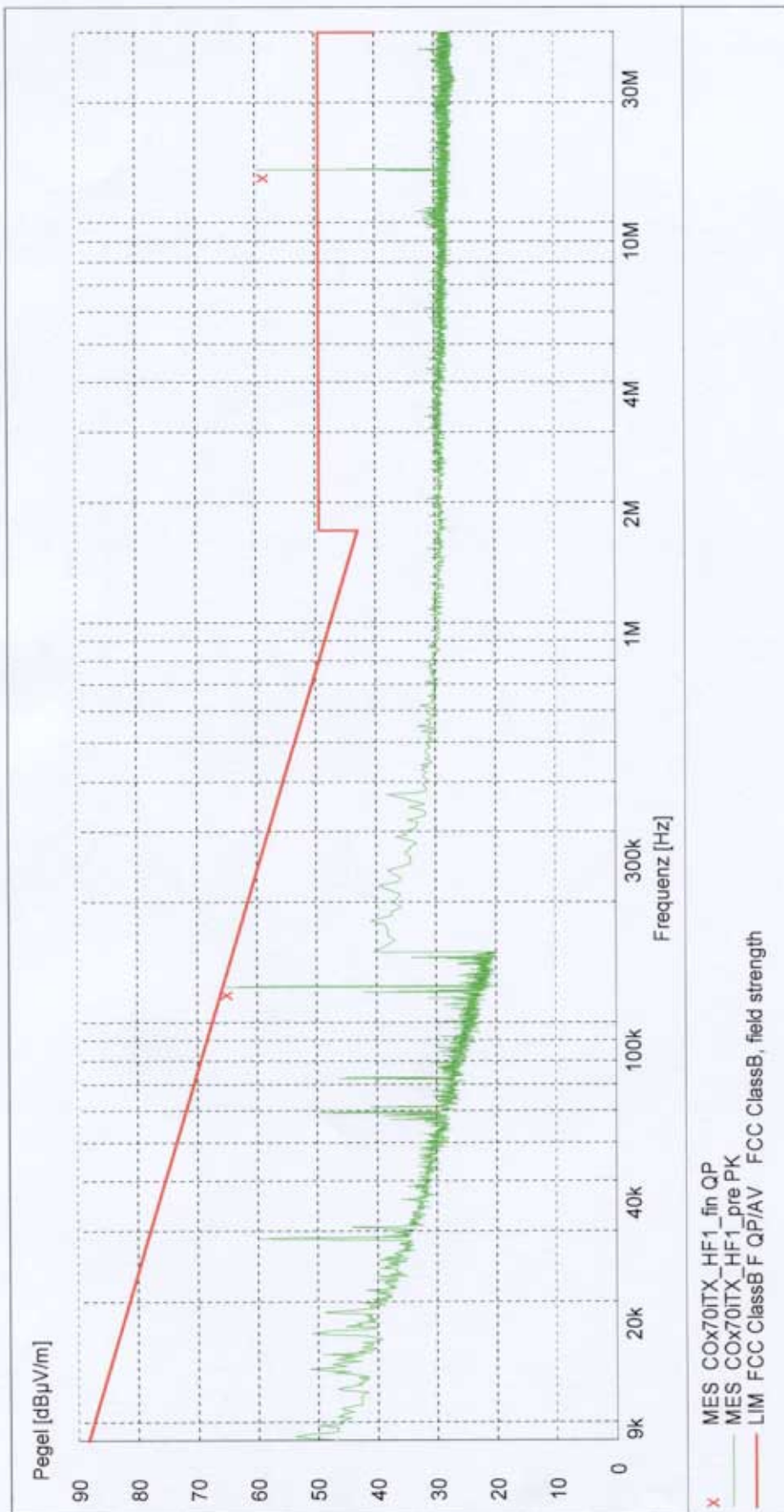
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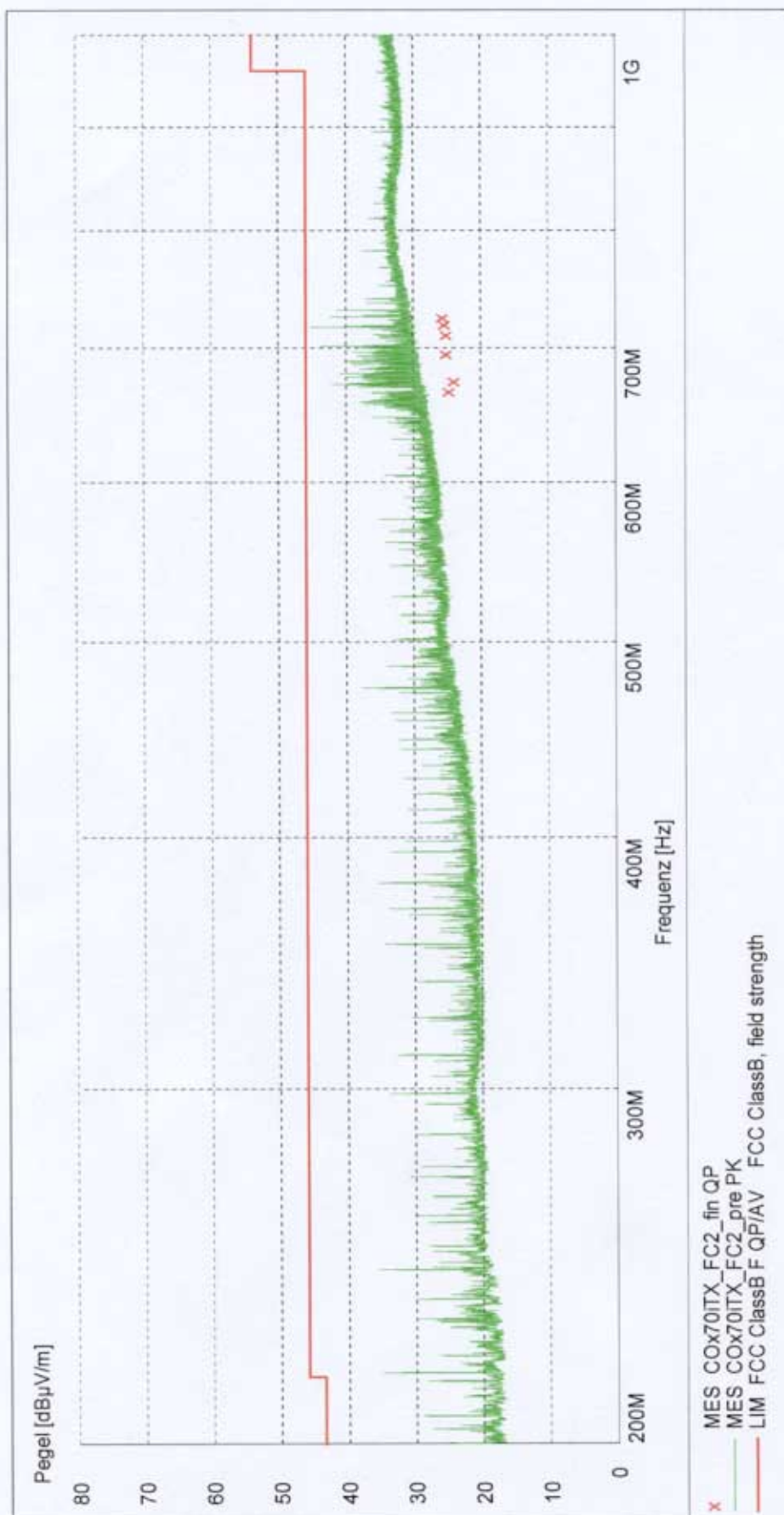
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x MES COx70ITX\_FC2\_fin QP  
 MES COx70ITX\_FC2\_pre PK  
 LIM FCC ClassB F QP/AV FCC ClassB, field strength