EMCE GmbH
Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung

Test report

TA129_01.DOC

EUT:	Matrix Needleprinter
Tested type:	T2280C
Production level:	UCL No. 0
S/N:	2913186
Manufacturer:	Tally GmbH Glockeraustr. 4 89275 Elchingen Germany
Measurement procedure:	FCC rules part 15, limit class B The regulations were ☒ kept ☐ not kept
Applicant:	Tally GmbH Glockeraustr. 4 89275 Elchingen Germany
Contact person:	Mr. Böhm, Mr. Winterhalder
Arrival of EUT:	07/19/2001
ID of EUT:	PR129_06
Date(s) of test of EUT:	07/20/2001

Remarks:

The test results effects only to the relate items tested. The test report shall not be reproduced except in full without the written approval of the testing laboratory

Test laboratory: EMCE GmbH Ingenieurbüro für EMV-Prüfungen
und Schaltungsentwicklung
Laupheimer-Str. 25d
88483 Burgrieden / Germany
FCC Registration Nr. 90568
DAR-Registration Nr: TTI-P-G164/98

Test engineer: Mr. Chr. Vogelmann
EMCE GmbH Ingenieurbüro für EMV-Prüfungen
und Schaltungsentwicklung

EUT description: Colour matrix needle printer, with parallel and serial I/F.

EUT size: 630x430x280mm (LxWxH)

EUT configuration: Printer with attached serial I/F.

Used accessories:

Designation	**S/N**	**FCC-ID**	**Manufacturer**
PC SCENIC 5T/90 PCI	S26361-K345-V711	-	Siemens Nixdorf Informationssysteme AG
Monitor MCM 1702	S26361-K373-V318 S/N BU 908484	FCC-ID ARFKDM1788	Siemens Nixdorf Informationssysteme AG
Keyboard MF2 LC	S26381-K252-V120		Siemens Nixdorf Informationssysteme AG
Mouse Serial Mouse 2.0A	0222829	FCC-ID C3KSMP1	Microsoft Corp.
Additional Printer HP Deskjet 850C	S/N US545110NX	FCC-ID B94C2145X	Hewlett Packard

Additional information: xx

List of valid equipment

	Inv-Nr.	Designation	Type	Manufacturer	S/N
☒	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	002	Probe	ESH2-Z3	Rohde & Schwarz	-
☒	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
	008	Antenna 9kHz - 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
	009	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
☒	010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108
☒	011	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
	012	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	166
	013	Antenna 9kHz - 30MHz	Loop antenna 1.5m	EMCE GmbH	-
☒	014	Open area test site	3m	EMCE GmbH	-
	015	Open area test site	10m	EMCE GmbH	-
	019	Burst generator	PEFT / PHV 41.2	Haefely	082948-50
	020	Coupling clamp	IP4A	Haefely	082672-13
	022	ESD-Gun	NSG 435	Schaffner	577
	024	HF-Generator	SMY01	Rohde & Schwarz	844146/046
	025	Current clamp BCI	F-120-2	FCC	47
	026	Coupling device network	CDN 801-M3-25	FCC	92
	027	Surge Generator	Transient 1000	EMC-Partner AG	TRA1000-85
	029	HF Amplifier	10W1000	Amplifier Research	10576
	030	Coupling device network	CDN 801-S1/9pol.DSUB	EMCE GmbH	-
	031	Coupling device network	CDN 801-S1/9pol.DSUB	EMCE GmbH	-

	Inv-Nr.	Designation	Type	Manufacturer	S/N
	032	HF Amplifier	75A250	Amplifier Research	22789
	033	Coupling device network	CDN AF2	EMCE GmbH	
	034	Coupling device network	CDN AF2	EMCE GmbH	
	035	3-Phase Coupling network	CDN-1000	EMC-Partner AG	CDN-1000-45
	036	Coupling device network	CDN 801-M5-25	EMCE GmbH	
	037	Coupling device network	CDN 801-T1	EMCE GmbH	
	038	Helmholtz coil	1x1m	EMCE GmbH	
	039	Helmholtz coil	1x1m	EMCE GmbH	
	040	Current transformer		EMCE GmbH	
	041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020
☒	042	AC-Source / Analyzer / Normimpedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/0 0501
	xx	Susceptibility test equipment according DIN EN 61000-4-3	Full anechoic chamber 3m test site	Siemens	xx

Contents:

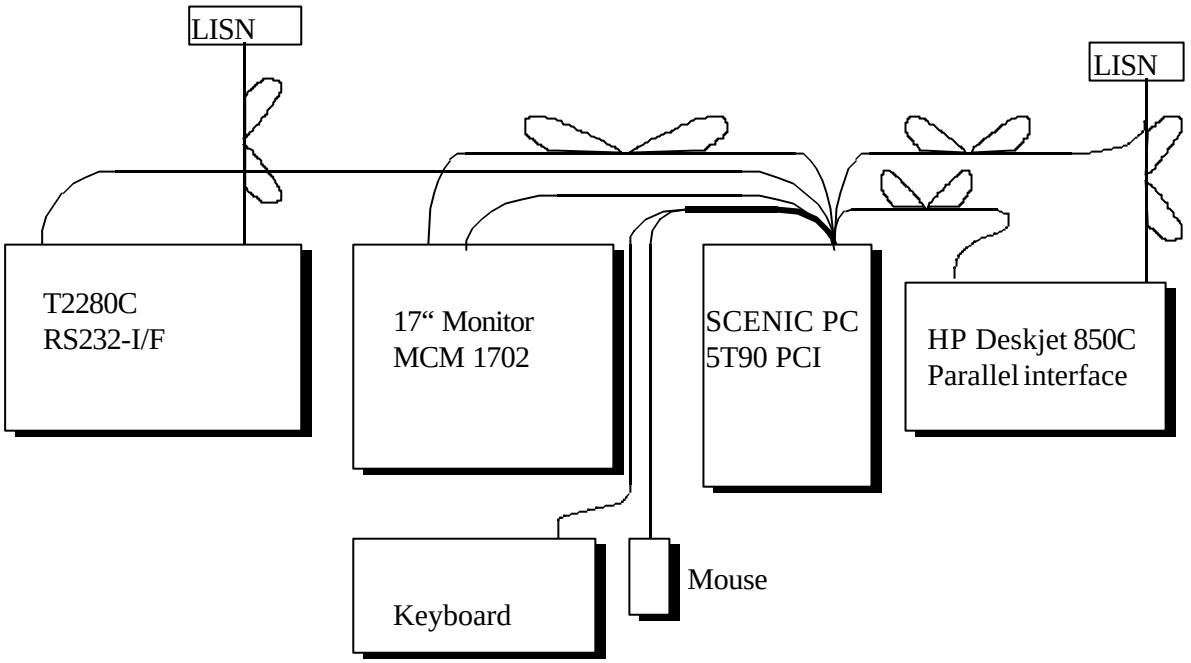
1 Report

1.1 EMI Report FCC part 15 limit class B

1.1.1 Conducted Emissions

1.1.1.1 Test Configuration

ANSI C63.4-1992
T2280C serial RS232 I/F



Test set up

1.1.1.2 Test Procedure

Regulations:

FCC part 15 limit class B
0.45 - 30MHz

Test Operation:

During the tests, the system was exercised using a Microsoft Word for Windows document which provided for complete system operation. Data were displayed on the monitor and then transferred to the printers on the parallel port (HP Deskjet 850C) and the serial port (T2280C), where it was printed. These tests represented a continuous display-transfer-print program operation which is a worst case mode and provided for a worst case emanated profile. The printed characters were "HHHHH…", 80 character per line, LQ print quality and the printer was configured with its default parameters.

PC:	SCENIC 5T90/PCI
Monitor	MCM 1702
T2280C	2913186
Additional printer	HP Deskjet 850C
Parallel I/F cable:	Shielded cable
Serial I/F cable:	Shielded cable
Fanfold paper for the	T2280C
Single sheet for the	HP Deskjet 850C
Supply voltage:	120VAC/60Hz

Test results:

Measurements are made with a CISPR receiver with the detector in peak mode. If the emanation is closer than 6dB to the limit or more, the receiver will stop and measure the exact value with quasipeak. The frequency, the maximum quasipeak value and the limit will be printed out.

Summary:

Limits for continuous disturbances: ☒ kept
☐ not kept

Remarks:

Protocol scope:

☒ Readings
☒ Diagram continuous emanations

Conducted emission of the T2280C serial I/F on L1- and N-Phase
Conducted emission of the PC + Monitor on L1- and N-Phase (the monitor was supplied via the PC)
Conducted emission of the HP Deskjet 850C parallel I/F on L1- and N-Phase

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:28

Conducted emission

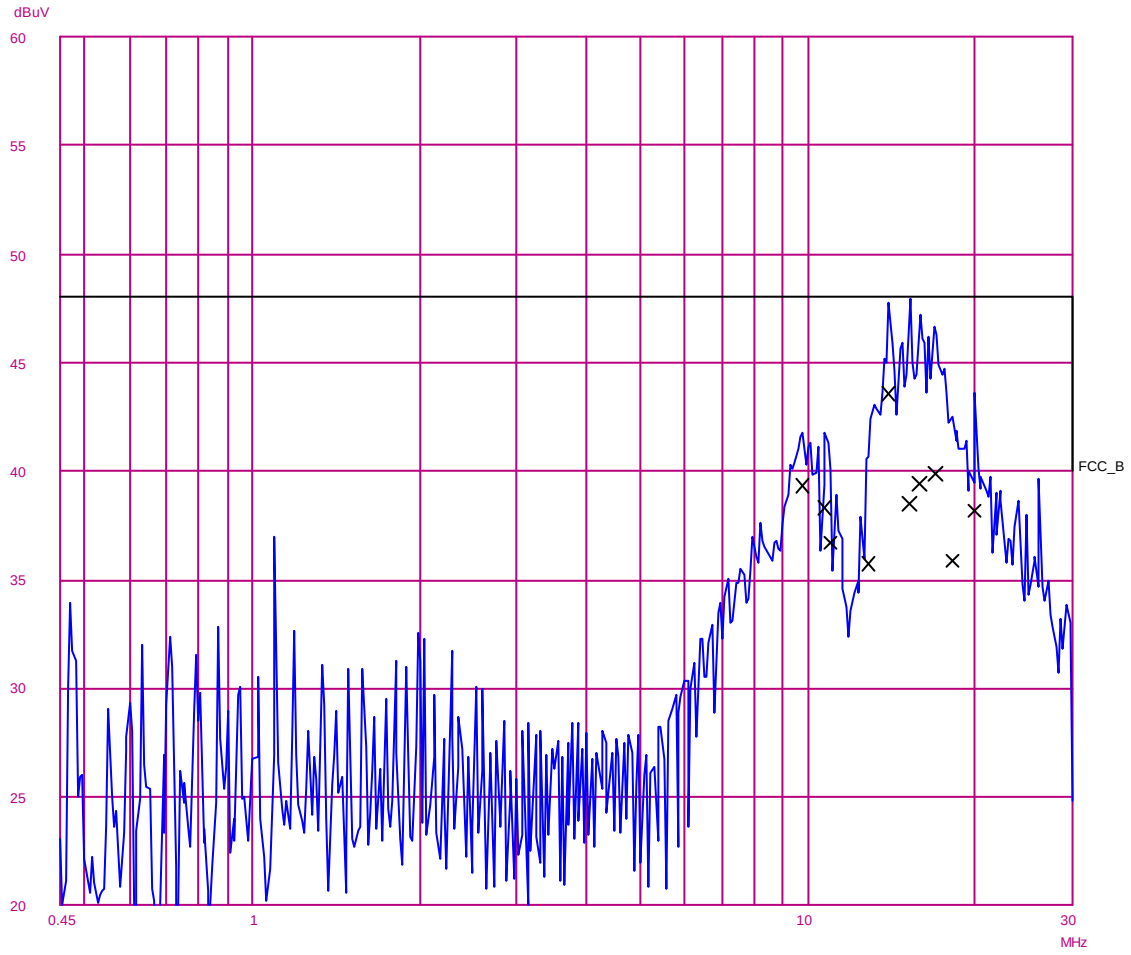
EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_01, Phase L - T2280C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



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Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_01, Phase L - T2280C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
9.78500	39.3	46.0
10.73000	38.3	46.0
10.96500	36.6	46.0
12.88500	35.7	46.0
13.98000	43.5	46.0
15.28000	38.5	46.0
15.87500	39.4	46.0
16.97500	39.9	46.0
18.22500	35.9	46.0
19.97000	38.1	46.0

*v1S * limit exceeded*v0S

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:21

Conducted emission

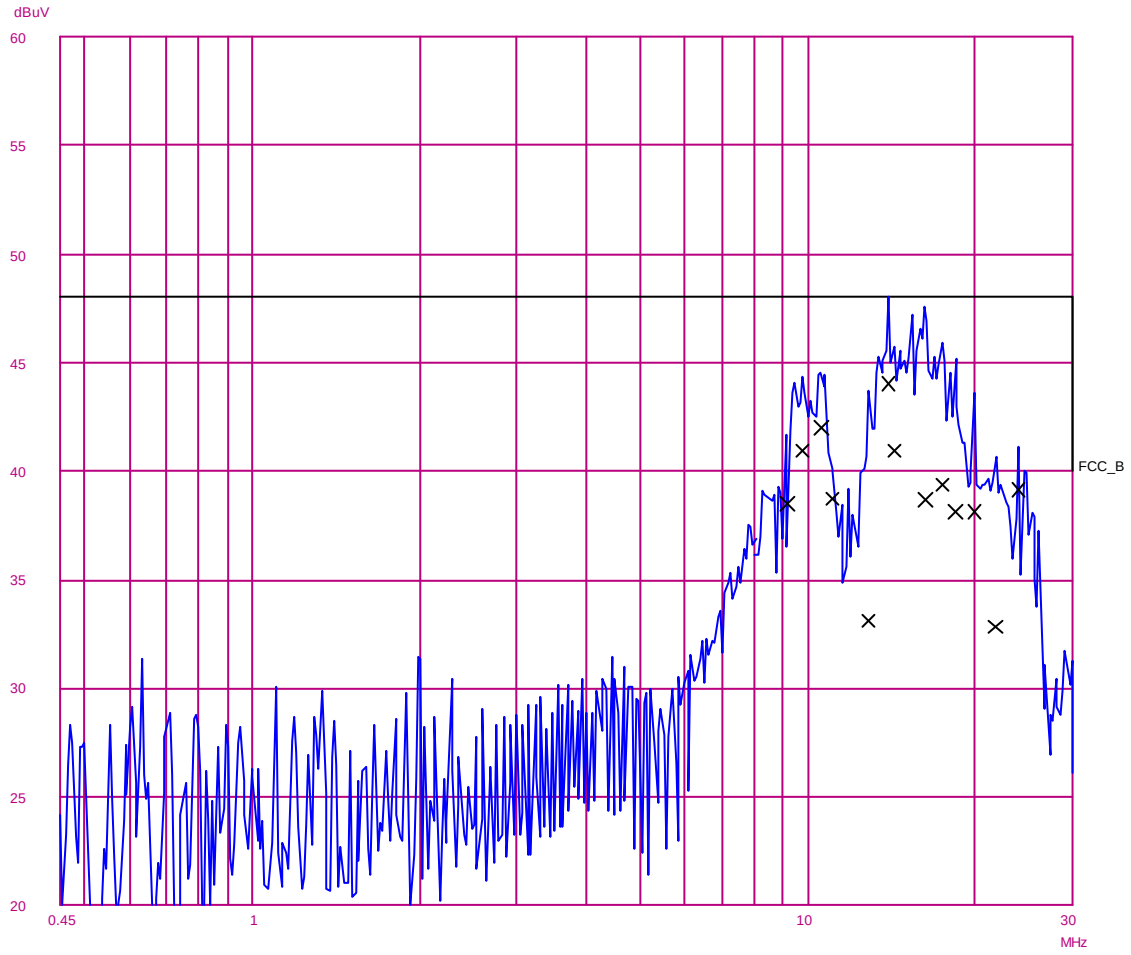
EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_02, Phase N - T2280C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:21

Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_02, Phase N - T2280C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
9.15500	38.4	46.0
9.78500	40.9	46.0
10.57500	42.0	46.0
11.04500	38.7	46.0
12.89000	33.1	46.0
13.98000	44.0	46.0
14.28000	40.9	46.0
16.28000	38.6	46.0
17.47000	39.4	46.0
18.47000	38.1	46.0
19.96500	38.1	46.0
21.77000	32.8	46.0
24.00500	39.1	46.0

*v1S * limit exceeded*v0S

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:35

Conducted emission

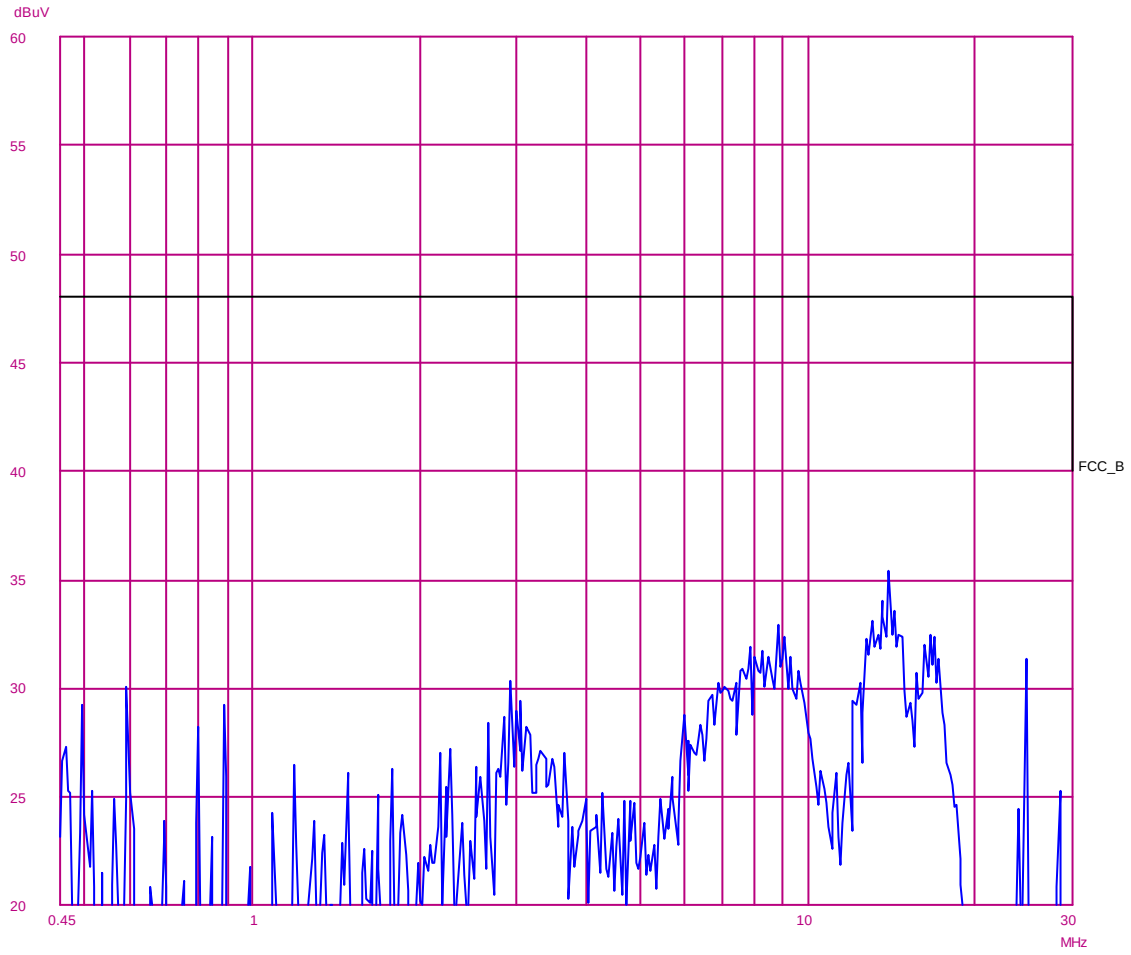
EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_03, Phase L - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:35

Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_03, Phase L - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV

*v1S * limit exceeded*v0S

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:40

Conducted emission

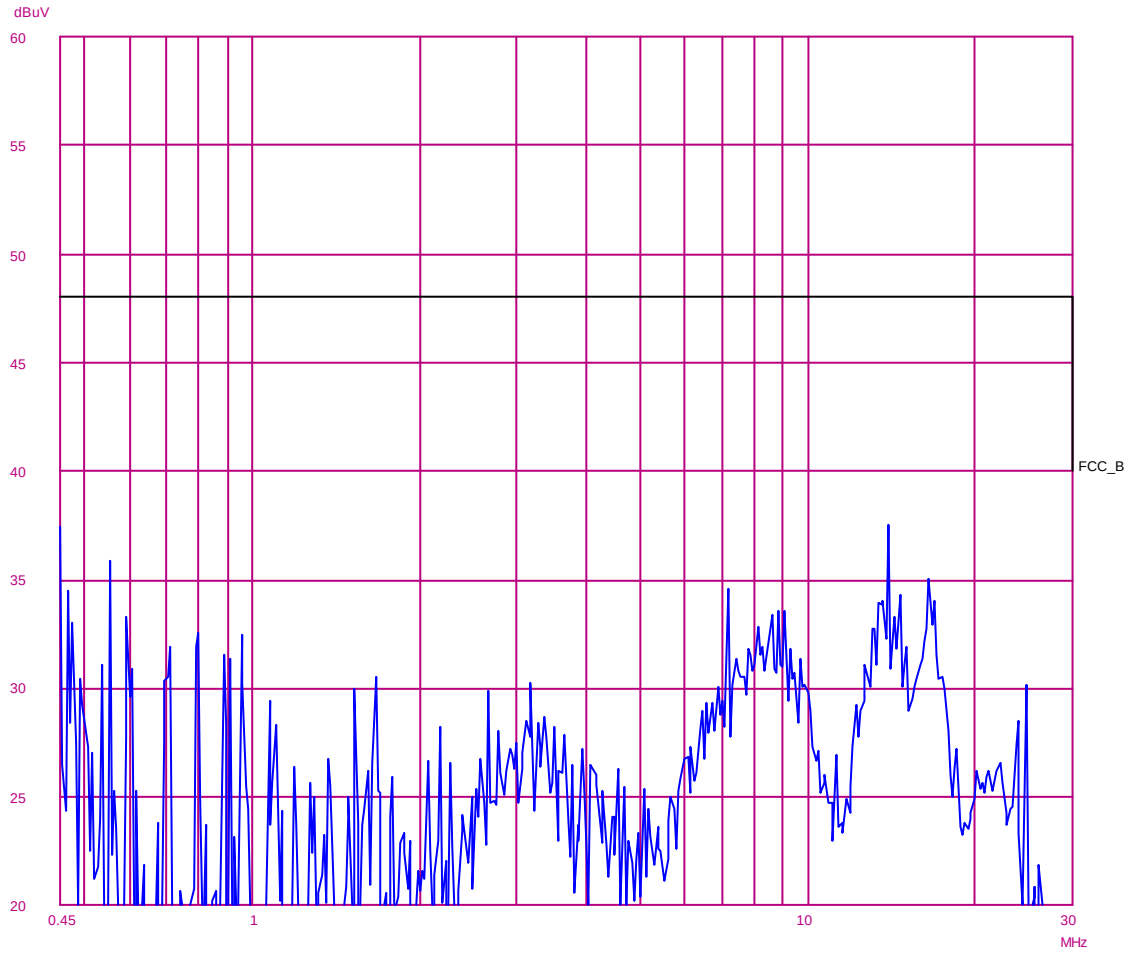
EUT: Needle printer T2280C, SN 2913186
Manuf: Tally GmbH Computerdrucker
Op Cond: "HHHH...", 10cpi, fanfold paper
Operator: Mr. Vogelmann
Test Spec: FCC Part 15 class B
Comment: Test ID PR129_06
TA129_04, Phase N - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:40

Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_04, Phase N - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

no Results

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:50

Conducted emission

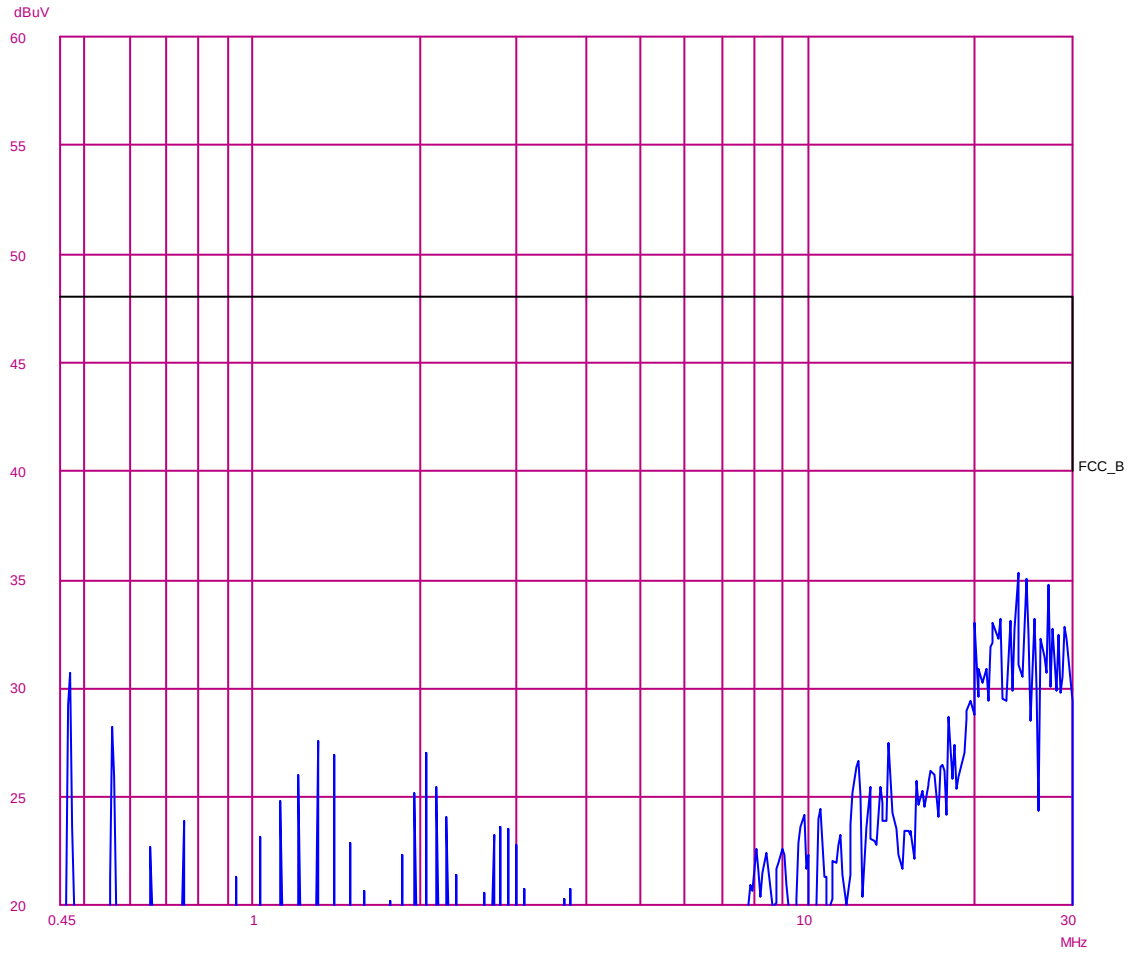
EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_05, Phase L - HP Deskjet 850C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:50

Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_05, Phase L - HP Deskjet 850C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

no Results

EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:53

Conducted emission

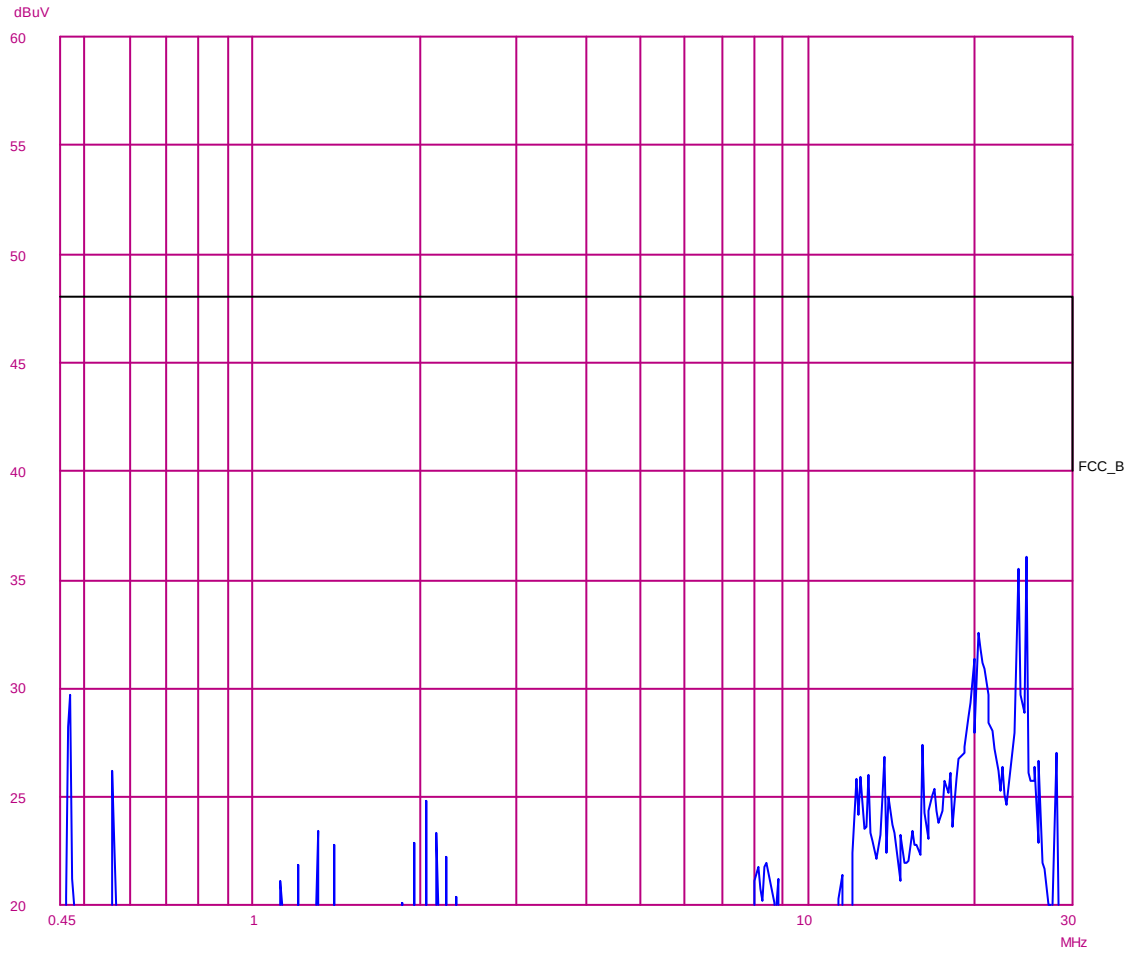
EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_06, Phase N - HP Deskjet 850C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen 20. Jul 01 10:53

Conducted emission

EUT:	Needle printer T2280C, SN 2913186
Manuf:	Tally GmbH Computerdrucker
Op Cond:	"HHHH...", 10cpi, fanfold paper
Operator:	Mr. Vogelmann
Test Spec:	FCC Part 15 class B
Comment:	Test ID PR129_06
	TA129_06, Phase N - HP Deskjet 850C

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	5k	10k	PK	20ms	AUTO	LN OFF	60dB

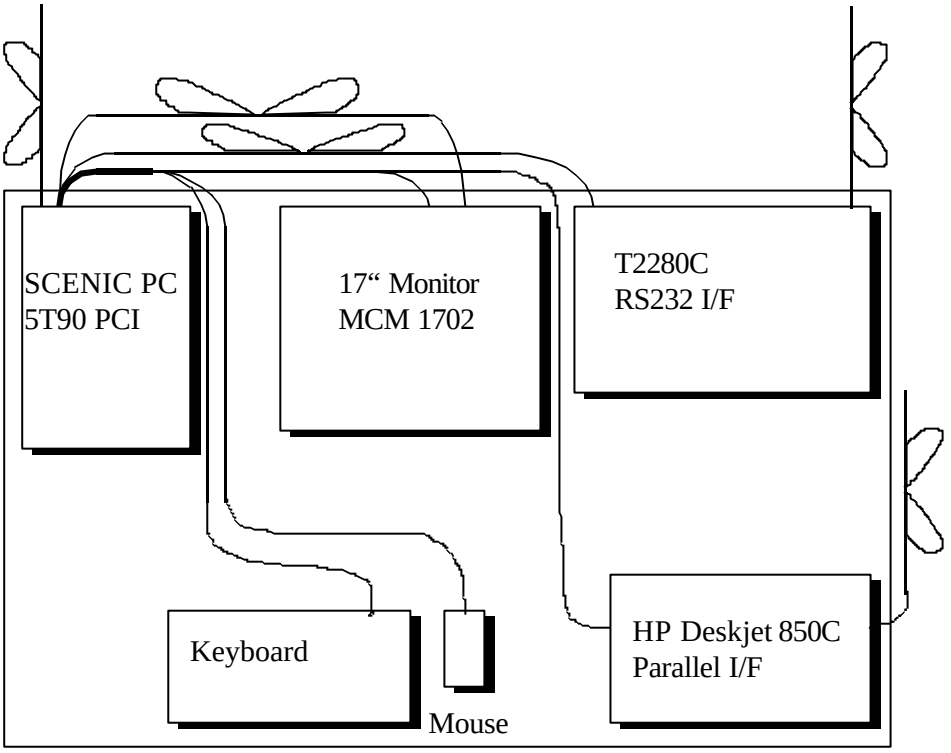
Final Measurement Results:

no Results

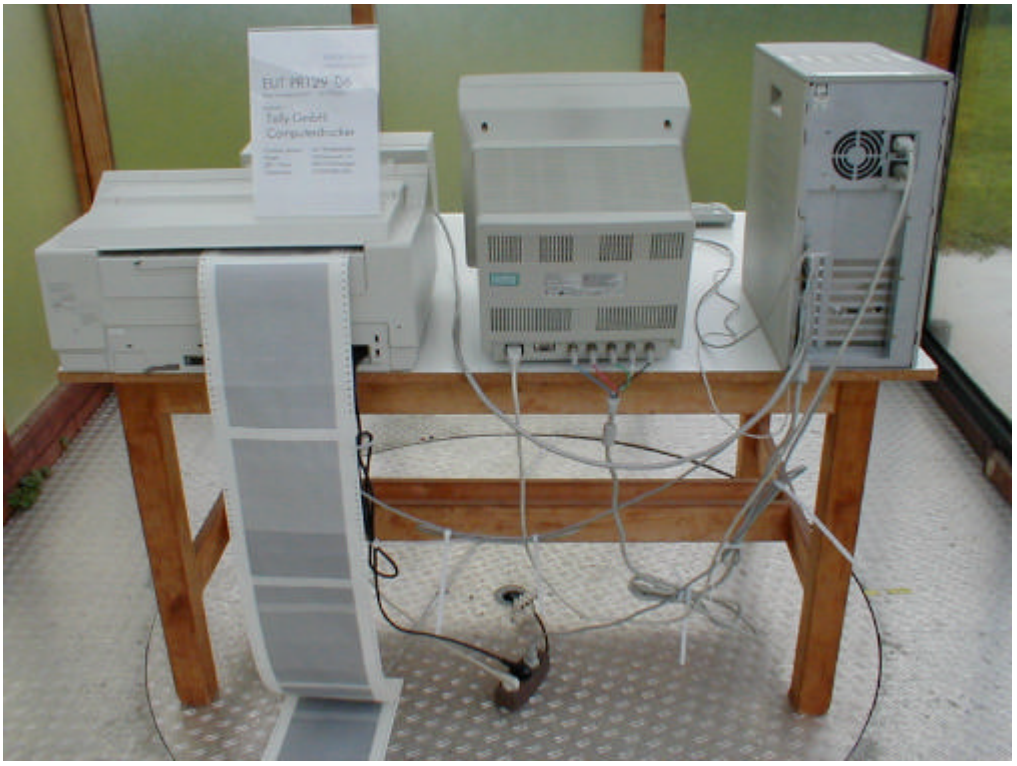
1.1.2 Radiated Emissions

1.1.2.1 Test Configuration

ANSI C63.4-1992
T2280C serial RS232 I/F



Open field test configuration



1.1.2.2 Test Procedure

Regulations:

FCC part 15 limit class B
30 - 1000MHz

Test Operation:

During the tests, the system was exercised using a Microsoft Word for Windows document which provided for complete system operation. Data were displayed on the monitor and then transferred to the printers on the parallel port (HP Deskjet 850C) and the serial port (T2280C), where it was printed. These tests represented a continuous display-transfer-print program operation which is a worst case mode and provided for a worst case emanated profile. The printed characters were "HHHHH…", 80 character per line, LQ print quality and the printer was configured with its default parameters.

PC:	SCENIC 5T90/PCI
Monitor	MCM 1702
T2280C	2913186
Additional printer	HP Deskjet 850C
Parallel I/F cable:	Shielded cable
Serial I/F cable:	Shielded cable
Fanfold paper for the	T2280C
Single sheet for the	HP Deskjet 850C
Supply voltage:	120VAC/60Hz

Summary:

Limits for continuous disturbances: ☒ kept
☐ not kept

Remarks:

Protocol scope:

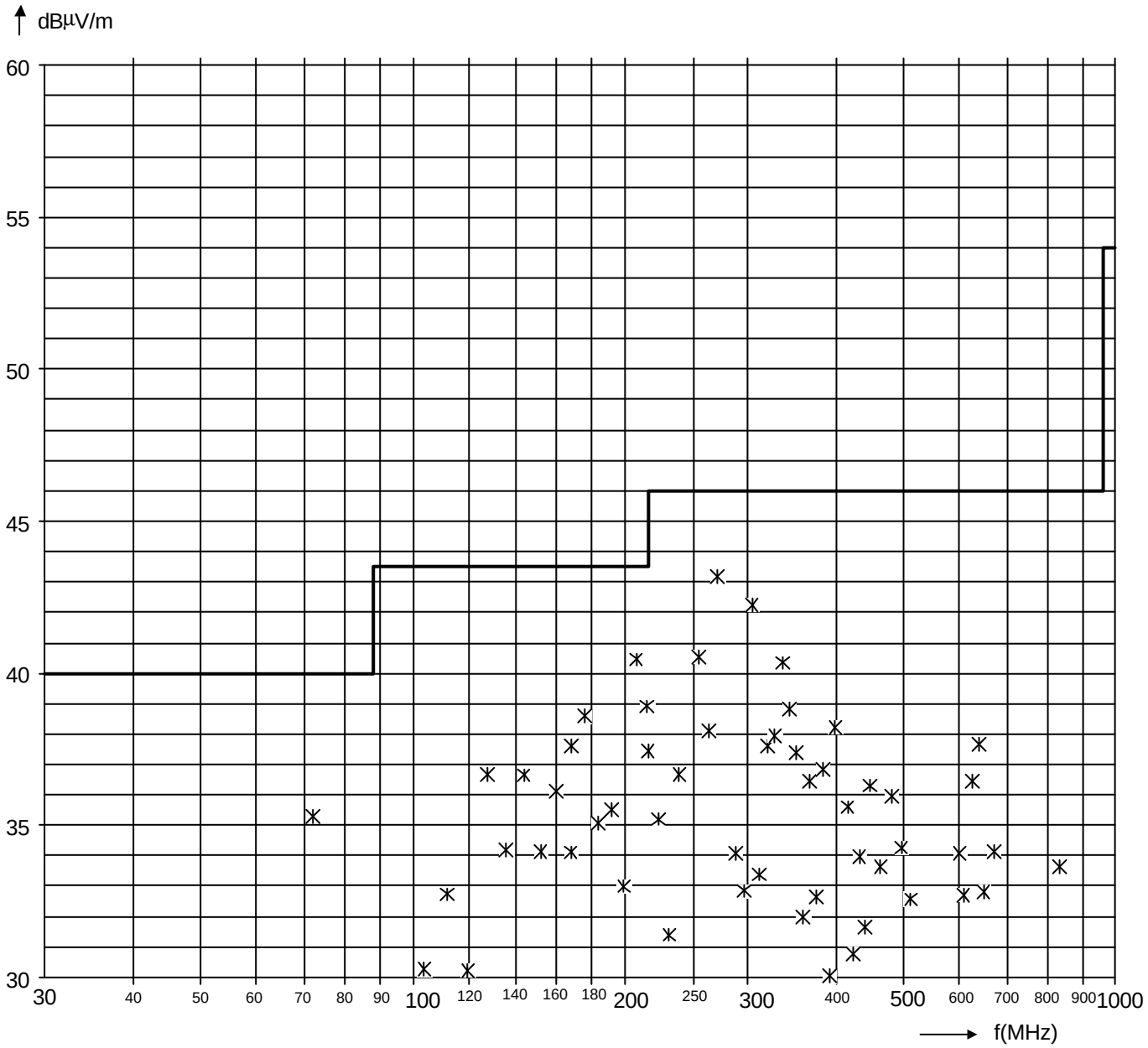
☒ Readings - Antenna horizontal polarised (margin to the limits <10dB).
☒ Diagram - Antenna horizontal polarised.
☒ Readings - Antenna vertical polarised (margin to the limits <10dB)
☒ Diagram - Antenna vertical polarised.
☐ Precompliance measurement(s).

Readings - Antenna horizontal polarised

Frequency	Measured	+ AF	+ KF	Emission	Limit	Difference	Ant.-	Ant.-
MHz	value	dB/m	dB		dBµV/m	dBµV	Height	Polar.
	dBµV	Antenna	Cable	dBµV/m			meter	H/V
72.000	25.0	8.6	1.7	35.3	40.0	4.7	3.7	H
127.813	23.0	11.3	2.3	36.7	43.5	6.8	2.5	H
135.801	20.0	11.7	2.4	34.2	43.5	9.3	2.2	H
143.789	22.0	12.1	2.5	36.7	43.5	6.8	2.0	H
151.778	19.0	12.6	2.6	34.1	43.5	9.4	2.0	H
159.766	20.5	13.0	2.7	36.1	43.5	7.4	1.8	H
167.754	18.0	13.4	2.7	34.1	43.5	9.4	1.8	H
168.042	21.5	13.4	2.7	37.6	43.5	5.9	2.5	H
175.742	22.0	13.8	2.8	38.6	43.5	4.9	1.7	H
183.731	18.0	14.2	2.9	35.1	43.5	8.4	1.7	H
191.719	18.0	14.6	2.9	35.5	43.5	8.0	1.7	H
207.696	22.0	15.4	3.1	40.5	43.5	3.0	1.5	H
215.684	20.0	15.8	3.1	38.9	43.5	4.6	1.5	H
216.054	18.5	15.8	3.1	37.4	46.0	8.6	2.0	H
239.649	17.0	16.4	3.3	36.7	46.0	9.3	1.3	H
255.625	20.0	17.1	3.4	40.5	46.0	5.5	1.3	H
264.066	17.0	17.6	3.5	38.1	46.0	7.9	1.0	H
271.602	21.5	18.2	3.5	43.2	46.0	2.8	1.0	H
303.556	25.0	13.5	3.7	42.2	46.0	3.8	1.0	H
319.532	20.0	13.8	3.8	37.6	46.0	8.4	1.0	H
327.518	20.0	14.1	3.8	37.9	46.0	8.1	1.0	H
335.507	22.0	14.5	3.9	40.3	46.0	5.7	1.0	H
343.495	20.0	14.9	3.9	38.8	46.0	7.2	1.0	H
351.483	18.0	15.4	4.0	37.4	46.0	8.6	1.0	H
367.460	17.0	15.4	4.1	36.4	46.0	9.6	1.0	H
383.436	17.0	15.7	4.1	36.8	46.0	9.2	1.0	H
399.413	18.0	16.0	4.2	38.2	46.0	7.8	1.0	H
447.343	15.0	16.9	4.5	36.3	46.0	9.7	1.0	H
479.296	14.0	17.4	4.6	36.0	46.0	10.0	1.0	H
624.157	12.0	19.3	5.2	36.4	46.0	9.6	1.0	H
639.062	13.0	19.5	5.2	37.7	46.0	8.3	1.3	H

Diagram - Antenna horizontal polarised

Limits according FCC rules part 15 ☐ Class A
☒ Class B

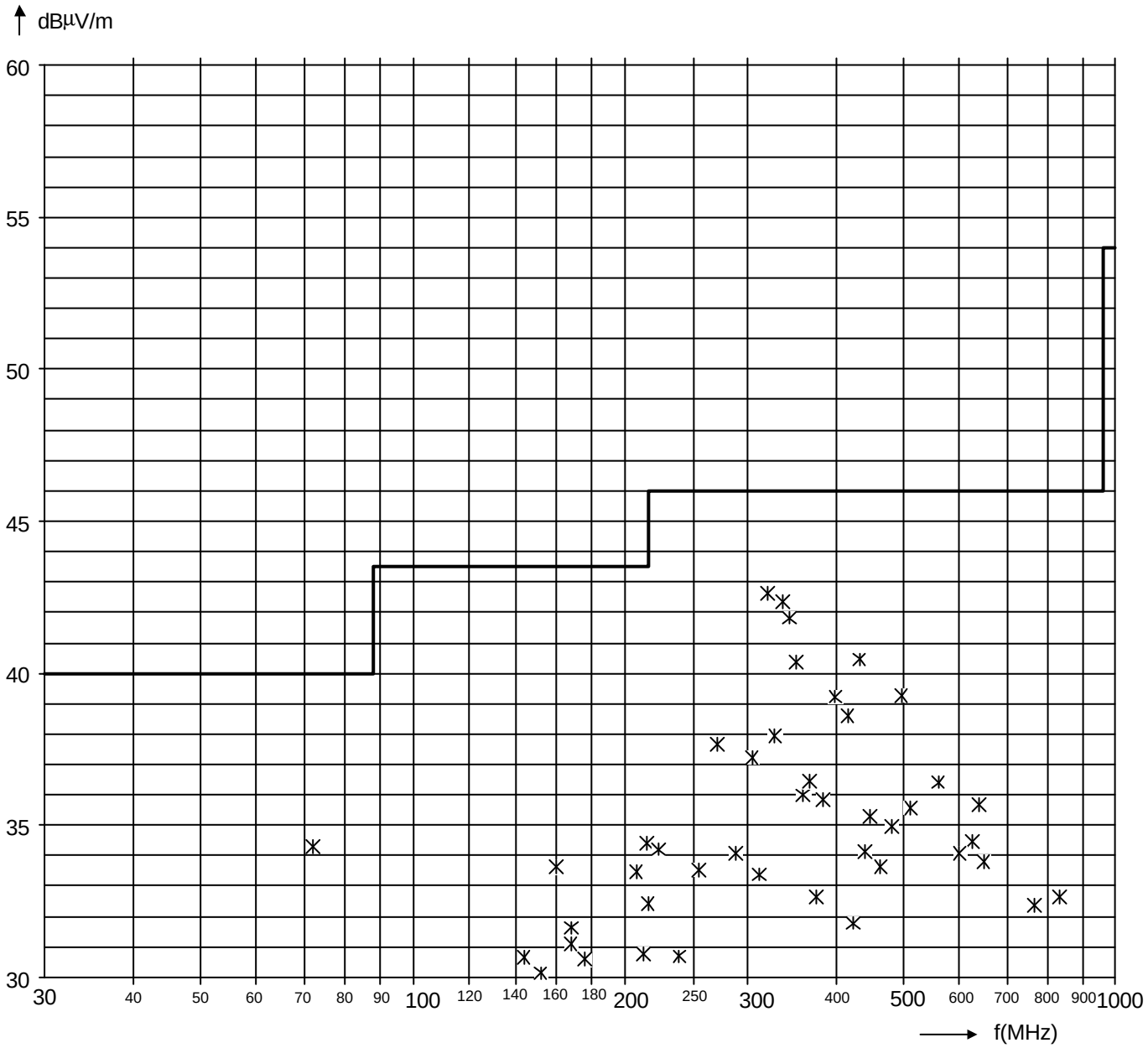


Readings - Antenna vertical polarised

Frequency	Measured	+ AF	+ KF	Emission	Limit	Difference	Ant.-	Ant.-
MHz	value	dB/m	dB		dBµV/m	dBµV	Height	Polar.
	dBµV	Antenna	Cable	dBµV/m			meter	H/V
72.019	24.0	8.6	1.7	34.3	40.0	5.7	1.0	V
159.765	18.0	13.0	2.7	33.6	43.5	9.9	1.0	V
215.684	15.5	15.8	3.1	34.4	43.5	9.1	1.0	V
271.602	16.0	18.2	3.5	37.7	46.0	8.3	1.0	V
303.555	20.0	13.5	3.7	37.2	46.0	8.8	1.4	V
319.531	25.0	13.8	3.8	42.6	46.0	3.4	1.4	V
327.520	20.0	14.1	3.8	37.9	46.0	8.1	1.4	V
335.508	24.0	14.5	3.9	42.3	46.0	3.7	1.4	V
343.496	23.0	14.9	3.9	41.8	46.0	4.2	1.4	V
351.484	21.0	15.4	4.0	40.4	46.0	5.6	1.4	V
359.472	16.0	16.0	4.0	36.0	46.0	10.0	1.4	V
367.461	17.0	15.4	4.1	36.4	46.0	9.6	1.4	V
399.414	19.0	16.0	4.2	39.2	46.0	6.8	1.3	V
415.391	18.0	16.3	4.3	38.6	46.0	7.4	1.3	V
431.367	19.5	16.6	4.4	40.5	46.0	5.5	1.3	V
495.273	17.0	17.61	4.66	39.27	46.0	6.73	1.3	V
559.180	13.0	18.5	4.9	36.4	46.0	9.6	1.3	V

Diagram - Antenna vertical polarised

Limits according FCC rules part 15 ☐ Class A
☒ Class B



2 Results

EMI:

Regulation	Class	Result	Remarks
FCC part 15 limit class B			
Conducted Emission 0.45 - 30MHz	B	kept	
Radiated Emission 30 -1000MHz	B	kept	

Burgrieden, 07/20/2001

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