

Test report

EMC test report



265.135

Avery Dennison

Printer

ALX926 / DPM6 / PEM6

prototype

Applicant:

Avery Dennison

Deutschland GmbH

Ohmstrasse 3

D-85386 Eching

Tel.: +49 (0) 8165 / 925 -0

Fax.: +49 (0) 8165 / 3143



The test result refer exclusively
to the model tested.

This report must not be copied without
the written authorization by the lab.



TTI-P-G 101/95-20 / RegTP-CAB-02/21-02

EMV Testhaus GmbH

Gustav-Hertz-Strasse 35
94315 Straubing
Tel.: +49 9421 / 923033
Fax: +49 9421 / 923035
Email: company@emv-testhaus.com

Accreditation:



Registration number: TTI-P-G 101/95-20
Valid until 08.06.2006

CAB (EMC) registration number: RegTP-CAB-02/21-02
Valid until 27.11.2005

FCC facility registration number: 221458
Valid until 23.07.2005

Place of Inspection:

EMV Testhaus GmbH
Gustav-Hertz-Strasse 35
94315 Straubing

The technical accuracy is guaranteed through the quality management of the
EMV Testhaus GmbH.



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1. Test regulation

Regulation:	United States Code of Federal Regulations 47, Part 15 – Digital Devices, Subpart B – Unintentional Radiators, Class A (9 / 21 / 04).
Standard:	ANSI C63.4-2003 Methods of Measurement of Radio- Noise Emissions from Low Voltage Electrical Equipment in the Range of 9 kHz to 40 GHz.
Limit:	DIN EN 55022:1999-05 Information Technology Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement

Including:

- ☒ Measurement of the conducted emission in the frequency
range from 150 kHz to 30 MHz (generated frequency more than 9 kHz)
- ☒ Measurement of the radiated emission in the frequency
range from 30 MHz to 1GHz. (generated frequency: 1.705 – 108.0 MHz)
- ☐ Measurement of the radiated emission in the frequency
range from 30 MHz to 2GHz. (generated frequency: 108.0 – 500.0 MHz)

Deviation of Regulations and Standards: No



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2. Equipment under test

Responsible Party:	Avery Dennison Deutschland GmbH
(Manufacturer)	Ohmstrasse 3 D-85386 Eching Germany
Device name:	Printer
Tested Model Number:	ALX926 / DPM6 / PEM6
Other Model (Option):	ALX924, ALX925, DPM4, DPM5, PEM4, PEM5
Serial Number:	prototype
Remark:	The EUT is an industrial printer with integrated RFID radio module



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Photo documentation of EUT



picture 2.1: equipment under test

3. Product labeling

FCC Label and Location

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference,
and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information to the user:

Class A Statement:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception.



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4. Equipment modifications

To achieve compliance with the regulations, modifications were made by a responsible employee of the manufacturer:

This modifications will be implemented in all production models of this equipment.

Applicant Signature _____ Date _____

Typed / Printed Name _____ Position _____



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5. Test configuration and mode of operation

Test configuration devices

Numbers:	Description: (type / name / remarks)	Serial No.:
1	EUT: ALX926 / DPM6 / PEM6	prototype

Mode of operation

The EUT was tested in the following mode of operation:

Settings:

The EUT was permanently printing in endless mode.



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6. Measurement of conducted emission

according to CFR 47 Part 15 Subpart B Class A

Location of measurement

Description	Manufacturer	Inventory Nr.
Shielded chamber	Siemens - Matsushita	200016

Measurement equipment

	Description	Manufacturer	Inventory Nr.
☒	ESH 3	Rohde & Schwarz	100002
☐	ESCS 30	Rohde & Schwarz	100072
☐	EZ – 10	Rohde & Schwarz	100006
☐	TK 9430	Rohde & Schwarz	300089
☒	ESH3 Z2	Rohde & Schwarz	200051
☒	ESH 2-Z5	Rohde & Schwarz	100040
☐	ESH 2-Z5	Rohde & Schwarz	100041
☐	ENY 41	Rohde & Schwarz	100084
☐	ENY 22	Rohde & Schwarz	100086
☐	ISN LAN	EMV Testhaus	100087

Test related measurement inaccuracies have to be taken into consideration when evaluation the test results.
All used test instrument as well as the test accessories are calibrated at regular intervals.



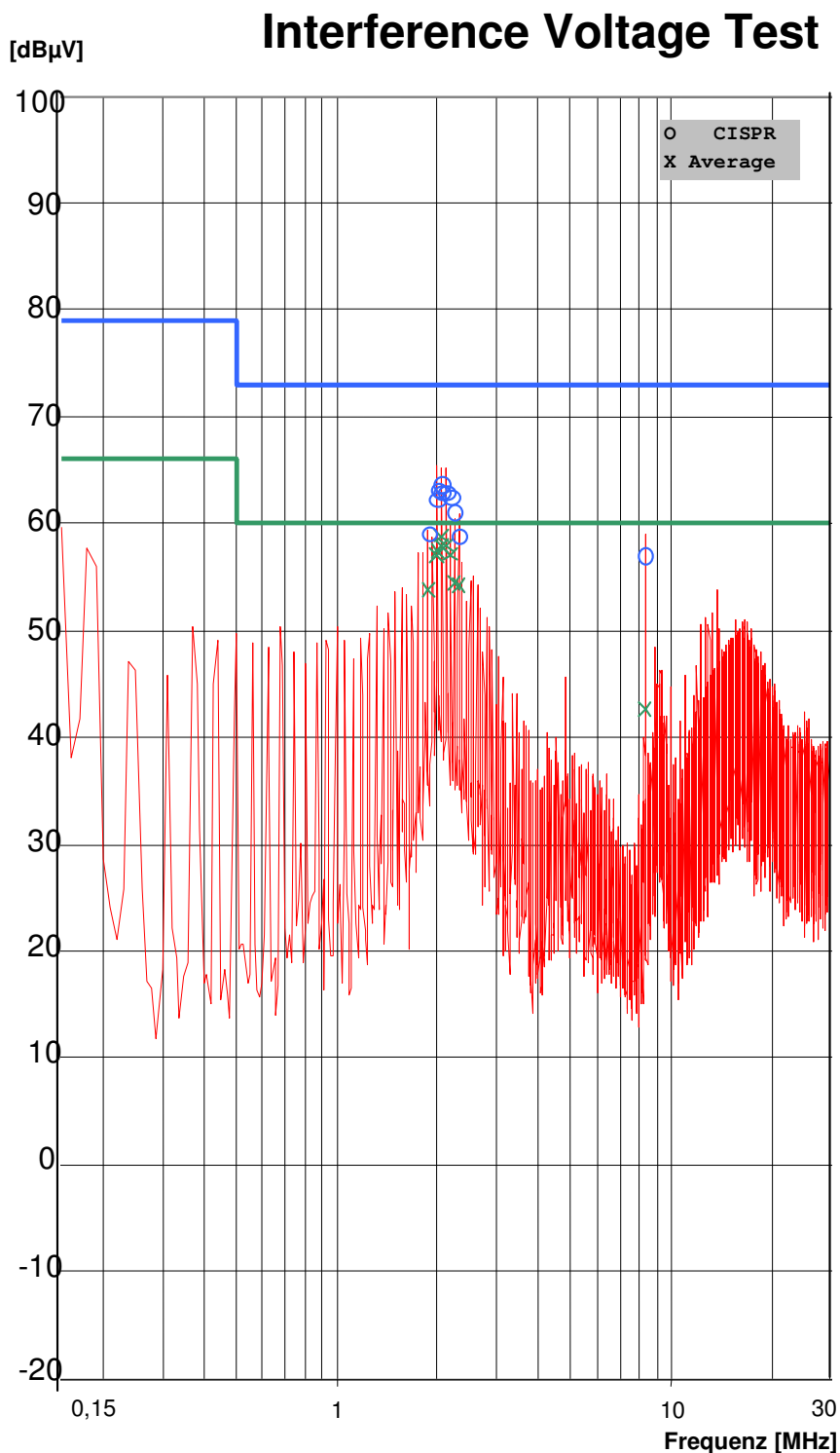
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graph 4.1: conducted emission at line 1

REGULATION

DIN EN 55022 Klasse A
PEAK / CISPR / AV

TEST

R&S ESH3 (100002)
R&S ESH2-Z5 (100040)
R&S Pulse Limiter (200051)

ORDER

265.135

EUT:

AVERY DENNISON
Printer
ALX92x / DPM
Prototype

OPERATION

EUT is printing

Mains 230V AC /50Hz
Phase

TEST

EMV TESTHAUS GmbH
Gustav-Hertz-Straße 35
94315 Straubing

DATE /

17.03.2005
21,3 °C 28 %H

TEST

Biberger Markus

135 ss L1.E10



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Interference Voltage Test

Freq. [MHz]	U_CISPR [dBμV]	Limit [dBμV]	delta_U [dB]	U_AV [dBμV]	Limit [dBμV]	delta_U [dB]	Corr. [dB]	Remark
2,06	63,7	73,0	9,3	58,9	60,0	1,1	0,0	
2,00	63,1	73,0	9,9	57,5	60,0	2,5	0,0	
2,05	63,0	73,0	10,0	57,9	60,0	2,1	0,0	
2,12	63,0	73,0	10,0	58,0	60,0	2,0	0,0	
2,18	62,6	73,0	10,4	57,1	60,0	2,9	0,0	
1,99	62,4	73,0	10,6	57,0	60,0	3,0	0,0	
2,24	61,1	73,0	11,9	54,5	60,0	5,5	0,0	
1,87	59,1	73,0	13,9	53,8	60,0	6,2	0,0	
2,31	58,9	73,0	14,1	54,3	60,0	5,7	0,0	
8,33	57,0	73,0	16,0	42,6	60,0	17,4	0,0	

chart 4.1: conducted emission at line 1



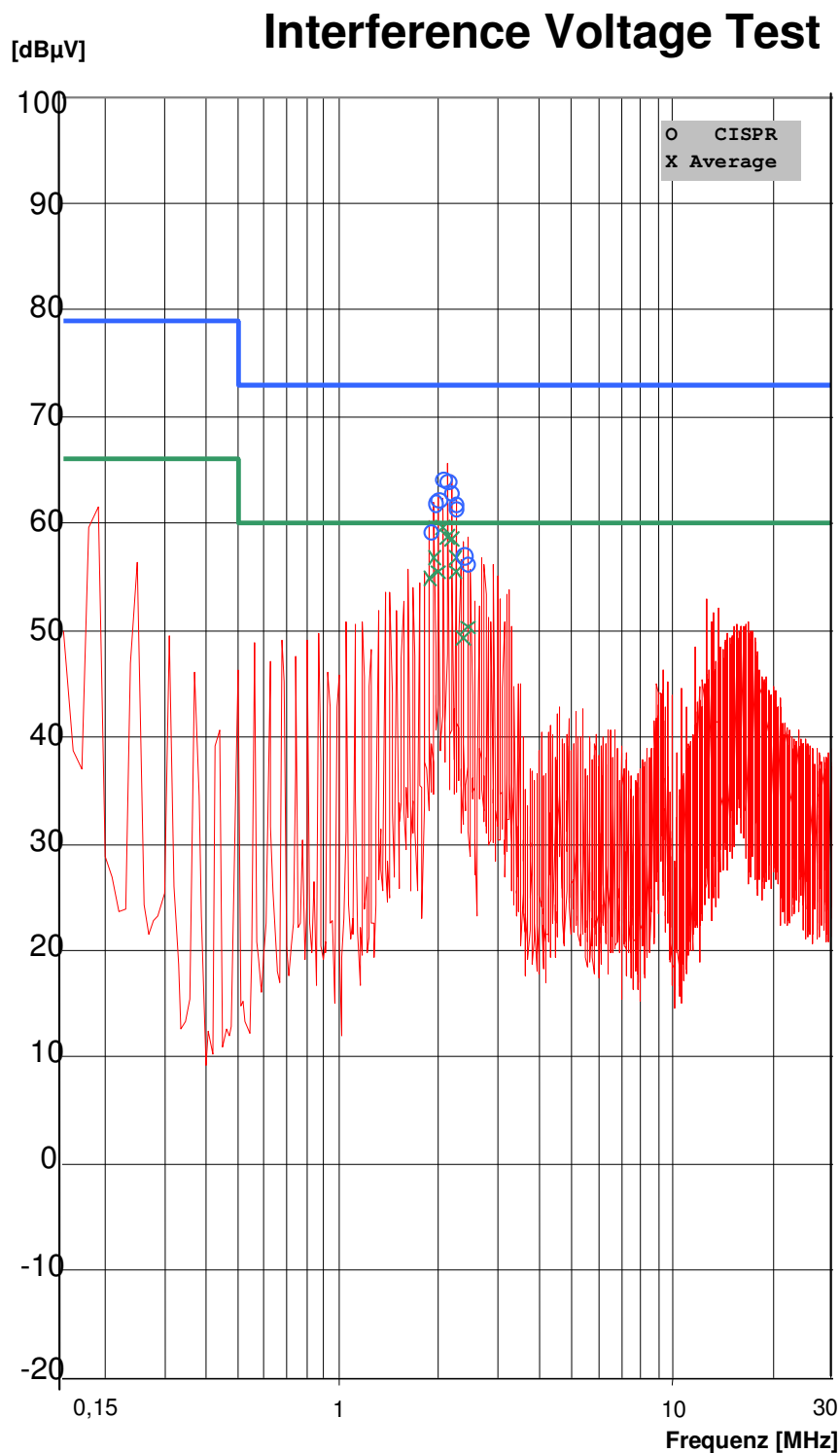
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graph 4.2: conducted emission at line 2

REGULATION

DIN EN 55022 Klasse A
PEAK / CISPR / AV

TEST

R&S ESH37 (100002)
R&S ESH2-Z5 (100040)
R&S Pulse Limiter (200051)

ORDER

265.135

EUT:

AVERY DENNISON
Printer
ALX92x / DPM
Prototype

OPERATION

EUTs printing

Mains 230V AC /50Hz
Neutral

TEST

EMV TESTHAUS GmbH
Gustav-Hertz-Straße 35
94315 Straubing

DATE /

17.03.2005
21,3 °C 28 %H

TEST

Biberger Märkus

135 ss N.E10



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Interference Voltage Test

Freq. [MHz]	U_CISPR [dBμV]	Limit [dBμV]	delta_U [dB]	U_AV [dBμV]	Limit [dBμV]	delta_U [dB]	Corr. [dB]	Remark
2,06	64,3	73,0	8,7	59,6	60,0	0,4	0,0	
2,12	64,0	73,0	9,0	58,8	60,0	1,2	0,0	
2,18	62,9	73,0	10,1	58,6	60,0	1,4	0,0	
1,99	62,4	73,0	10,6	55,5	60,0	4,5	0,0	
1,93	62,0	73,0	11,0	56,8	60,0	3,2	0,0	
2,24	61,9	73,0	11,1	55,5	60,0	4,5	0,0	
2,25	61,5	73,0	11,5	56,8	60,0	3,2	0,0	
1,87	59,3	73,0	13,7	54,9	60,0	5,1	0,0	
2,37	57,0	73,0	16,0	49,3	60,0	10,7	0,0	
2,43	56,3	73,0	16,7	50,3	60,0	9,7	0,0	

135 ss N.E10

chart 4.2: conducted emission at line 2



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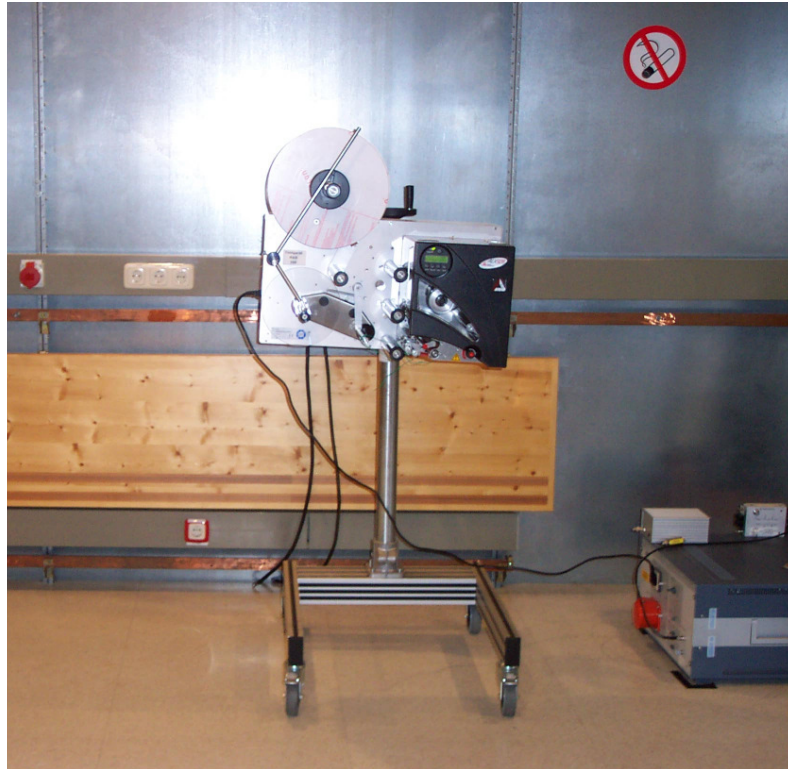
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Photo documentation



picture 4.1: setup of conducted emission

Test result

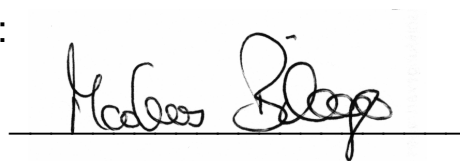
The requirements according to CFR 47 Part 15 Subpart B Class A are

☒ **Kept**

Kept with the closest margin of 0.4 dB at 2.060 MHz.

Test Personnel:

Signature:



test date: 17.03.2005

Printed Name: Markus Biberger

Expanded Uncertainty (9kHz to 150kHz):

$$U_{(y)} = (y \pm 4,3) \text{ dB}\mu\text{V}; k=2,00$$

y = Indicated value

Expanded Uncertainty (150kHz to 30MHz):

$$U_{(y)} = (y \pm 3,9) \text{ dB}\mu\text{V}; k=2,00$$

y = Indicated value

Comments:



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7. Measurement of radiated emission

according to CFR 47 Part 15 Subpart B Class A

Procedure of radiated emission measurement:

- ☒ Scan with peak detector in 3 m CDC
- ☒ Final CISPR measurement with quasi peak detector on open site area.

Location of measurement

Description	Manufacturer	Inventory Nr.
CDC	Albatross Projects	100089
Open site area	EMV Testhaus	200017

Measurement equipment

	Description	Manufacturer	Inventory Nr.
☒	ESCS 30 (CDC)	Rohde & Schwarz	100072
☒	ESVP (FF)	Rohde & Schwarz	100001
☒	VULB 9163 (CDC)	Rohde & Schwarz	100077
☒	VULB 9160 (FF)	Rohde & Schwarz	100064

Test related measurement inaccuracies have to be taken into consideration when evaluation the test results.
All used test instrument as well as the test accessories are calibrated at regular intervals.



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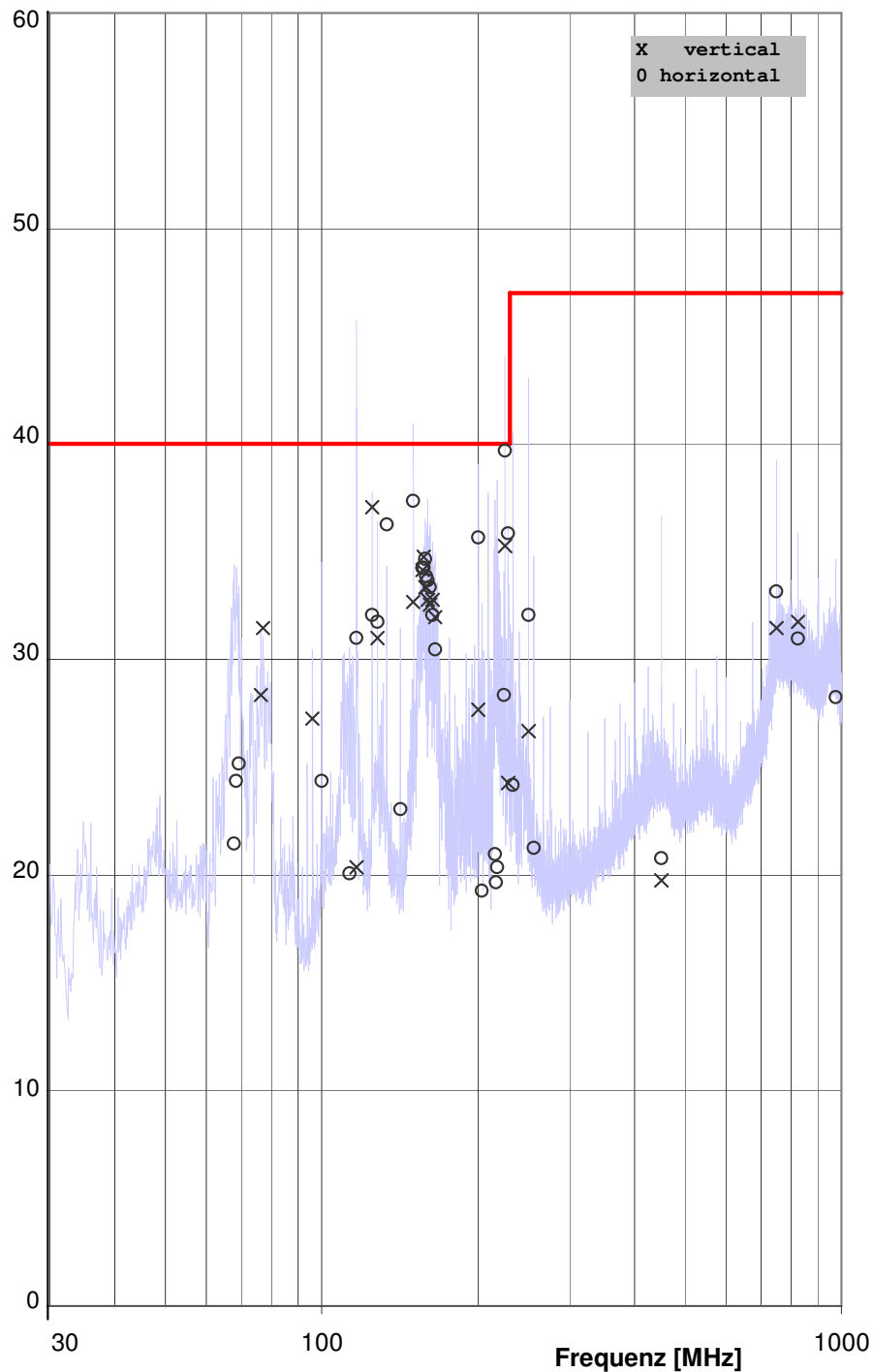
ALX926 / DPM6 / PEM6

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[dB μ V/m]

Interference Radiation Test



graph 5.1: radiated emission

REGULATIONS:

DIN EN 55022 Class A
PEAK / CISPR

TEST EQUIPMENT:

R & S ESVP (100001)
VULB 9160 (100064)
Suhner (200024)

ORDER NO.:

265.135

EUT:

AVERY DENNISON
Printer
ALX92x / DPM
Prototype

OPERATION MODE:

EUT is printing
Original RFID

TEST FACILITY:

EMV TESTHAUS GmbH
Gustav-Hertz-Straße 35
94315 Straubing

DATE / TIME:

07.04.2005
22,2 °C 27 %H

TEST ENGINEER:

Biberger Markus

135 cdc 10.E10



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Interference Radiation Test

Freq. [MHz]	U_Rec [dBµV/m]	Limit [dBµV/m]	Corr. [dB]	U_Ant. [dBµV]	delta_U [dB]	Turn- table	Antenna	Pol.	Remark
67,80	21,5	40,0	11,2	10,3	18,5	131°	250 cm	H	ukw
68,50	24,4	40,0	11,1	13,3	15,6	129°	250 cm	H	
69,30	25,2	40,0	11,0	14,2	14,8	111°	250 cm	H	
76,40	28,4	40,0	9,4	19,0	11,6	285°	110 cm	V	
77,00	31,5	40,0	9,3	22,2	8,5	283°	110 cm	V	
96,00	27,3	40,0	10,8	16,5	12,7	344°	110 cm	V	
100,00	24,4	40,0	11,2	13,2	15,6	249°	250 cm	H	
113,00	20,1	40,0	12,3	7,8	19,9	288°	250 cm	H	
116,67	20,4	40,0	12,8	7,6	19,6	17°	100 cm	V	
116,70	31,0	40,0	12,8	18,2	9,0	101°	250 cm	H	
125,00	37,1	40,0	13,6	23,5	2,9	357°	110 cm	V	
125,00	32,1	40,0	13,6	18,5	7,9	58°	250 cm	H	
128,00	31,0	40,0	13,7	17,3	9,0	39°	110 cm	V	
128,00	31,8	40,0	13,7	18,1	8,2	352°	250 cm	H	
133,30	36,3	40,0	13,9	22,4	3,7	97°	250 cm	H	
141,70	23,1	40,0	14,2	8,9	16,9	92°	250 cm	H	
150,00	32,7	40,0	14,7	18,0	7,3	196°	110 cm	V	
150,00	37,4	40,0	14,7	22,7	2,6	0°	391 cm	H	
156,40	34,2	40,0	15,0	19,2	5,8	263°	110 cm	V	
156,40	34,3	40,0	15,0	19,3	5,7	14°	250 cm	H	
157,20	34,8	40,0	15,0	19,8	5,2	230°	110 cm	V	
157,20	34,3	40,0	15,0	19,3	5,7	11°	250 cm	H	
158,10	33,4	40,0	15,0	18,4	6,6	249°	110 cm	V	
158,10	34,7	40,0	15,0	19,7	5,3	22°	250 cm	H	
159,00	33,4	40,0	15,0	18,4	6,6	221°	110 cm	V	
159,00	33,9	40,0	15,0	18,9	6,1	12°	250 cm	H	
159,80	32,8	40,0	15,0	17,8	7,2	264°	110 cm	V	
159,80	33,7	40,0	15,0	18,7	6,3	16°	250 cm	H	
161,60	32,6	40,0	15,0	17,6	7,4	240°	110 cm	V	
161,60	33,4	40,0	15,0	18,4	6,6	8°	250 cm	H	
163,40	32,8	40,0	14,9	17,9	7,2	53°	110 cm	V	
163,40	32,1	40,0	14,9	17,2	7,9	20°	250 cm	H	
165,10	32,0	40,0	14,8	17,2	8,0	25°	110 cm	V	
165,10	30,5	40,0	14,8	15,7	9,5	8°	250 cm	H	
200,00	27,7	40,0	11,8	15,9	12,3	360°	110 cm	V	
200,00	35,7	40,0	11,8	23,9	4,3	174°	250 cm	H	
203,50	19,3	40,0	11,8	7,5	20,7	59°	250 cm	H	
215,40	21,0	40,0	12,0	9,0	19,0	78°	250 cm	H	
216,30	19,7	40,0	12,0	7,7	20,3	59°	250 cm	H	
217,70	20,4	40,0	12,1	8,3	19,6	74°	250 cm	H	

chart 5.1: radiated emission



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Interference Radiation Test

Freq. [MHz]	U_Rec [dBµV/m]	Limit [dBµV/m]	Corr. [dB]	U_Ant. [dBµV]	delta_U [dB]	Turn- table	Antenna	Pol.	Remark	135 cdc 10.E10
224,00	28,4	40,0	12,4	16,0	11,6	54°	250 cm	H	Fremdstörer	
225,00	35,3	40,0	12,5	22,8	4,7	74°	110 cm	V		
225,00	39,7	40,0	12,5	27,2	0,3	92°	258 cm	H		
228,50	24,3	40,0	12,7	11,6	15,7	58°	110 cm	V		
228,50	35,9	40,0	12,7	23,2	4,1	82°	250 cm	H		
233,30	24,2	47,0	13,0	11,2	22,8	77°	250 cm	H		
250,00	26,7	47,0	13,6	13,1	20,3	163°	110 cm	V		
250,00	32,1	47,0	13,6	18,5	14,9	39°	250 cm	H		
256,00	21,3	47,0	13,8	7,5	25,7	230°	250 cm	H		
450,00	19,8	47,0	19,9	-0,1	27,2	301°	110 cm	V		
450,00	20,8	47,0	19,9	0,9	26,2	219°	250 cm	H		
750,00	31,5	47,0	25,5	6,0	15,5	178°	110 cm	V		
750,00	33,2	47,0	25,5	7,7	13,8	301°	250 cm	H		
825,00	31,8	47,0	26,5	5,3	15,2	229°	110 cm	V		
825,00	31,0	47,0	26,5	4,5	16,0	287°	250 cm	H		
975,00	28,3	47,0	28,4	-0,1	18,7	283°	250 cm	H		

chart 5.2: radiated emission



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Photo documentation



picture 5.1: setup of radiated emission

Test result

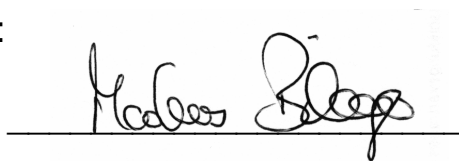
The requirements according to CFR 47 Part 15 Subpart B Class A are

☒ **Kept**

Kept with the closest margin of 0.3 dB at 225.0 MHz.

Test Personnel:

Signature:



test date: 07.04.2005

Printed Name: Markus Biberger

Expanded uncertainty (30MHz to 300MHz):

$U_{(y)} = (y \pm 5,4) \text{ dB}\mu\text{V/m}; k=2,00$

y = Indicated value

Expanded uncertainty (300MHz to 1000MHz):

$U_{(y)} = (y \pm 4,7) \text{ dB}\mu\text{V/m}; k=2,00$

y = Indicated value

Comments: : A modification was necessary.



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8. Summary

The measurements of the equipment under test show compliance with the above mentioned test regulation.

Place and date of issuance of this test report:

Straubing, July 18th, 2005



EMI/EMC Test Engineer



EMV Testhaus GmbH Coordinator

The equipment shall be retested to demonstrate continued compliance with the applicable requirements if any modifications or changes that could adversely affect the emanation characteristics of the equipment are made. The responsible party bears responsibility for the continued compliance of subsequently produced equipment.

Official of responsible party



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