

TÜV Rheinland
Technischer Überwachungs-Verein Rheinland

Certificate of Compliance

No. I-9663453-9603

Regarding the certification of products which are in the scope of the
Council Directive 89/336/EEC
the applicant

Advantech Co., Ltd.
4Fl., No. 108-3, Ming-Chuan Rd., Shin-Tien City, Taipei Hsien 231,
Taiwan, R.O.C.

has successfully demonstrated that its product

Digital I/O Cards
PCL-725, PCL-724, PCL-833, PCL-730, PCL-720, PCLD-7216

is in compliance with
prEN 50 082-2:1992, EN 55 022:1994 Class A, EN 60 555-2:1987
EN 60 555-3:1987/A1:1991, IEC 801-2:1984, IEC 801-3:1984, IEC 801-4:1988

as described in the Technical Report P 9663453E01

This Certificate is based on a single evaluation of one sample of the above mentioned product.
It does not imply an assessment of the whole production and does not permit the use of a
licenced test mark of TÜV Rheinland.
TÜV Rheinland Product Safety GmbH.
Taipei, 21.03.1996

Dipl.-Ing. K. Heinz
Certification Centre

Dipl.-Ing. U. Meyer
Testing Centre



The CE marking may only be used if all relevant and effective EC Directives are complied with.





Testreport No: P9663453E01

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about

Electromagnetic Compatibility

Applicant: Advantech Co., Ltd. 4Fl., No. 108-3, Ming-Chuan Rd. Shin-Tien City, Taipei Hsien 231, Taiwan

Kind of Equipment: Digital I/O Cards

Type Designation: PCL-725, PCL-724, PCL-833, PCL-730, PCL-720, PCLD-7216

Trade Mark: Advantech

Standard: prEN 50 082-2:1992 EN 55 022:1994 Class A
IEC 801-2:1984 EN 60 555-2:1987
IEC 801-3:1984 EN 60 555-3:1987/A1:1991
IEC 801-4:1988

Date of Receipt of Test Item: 16.11.1995

Date of Testing: 13.12.1995

Gesehen
den 13.12.1995
TÜV Rheinland Product Safety GmbH
[Signature]
passed.

Test result: The above mentioned product has been tested and

Der Sachverständige:
tested by

überprüft:
reviewed by

13.03.96 *[Signature]*
Date, signature

TÜV Rheinland
Product Safety GmbH
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13.03.96 *[Signature]*
Date, signature

Other aspects: This equipment is tested against the requirements for apparatus intended to be used in the industrial environment. However, this equipment requires a special permit by the competent authorities if used in residential or light industrial environment.

This test report may be distributed only in its complete unabridged form. This report summarizes the results of a single investigation performed on the described test object. Unless validated by a EMC license bearing the same report number, this test report alone does not entitle the applicant the EMC-mark or any other test mark of approval on their products.

This report displays the emission and the immunity against disturbances of the tested product. If the tested product will be used with additional equipment other than those mentioned in this report or if the tested product will be used against the manufacturers description, the compliance with relevant standards for the system has to be ensured. Any mentioning of TÜV Rheinland or testing done by TÜV Rheinland in connection with distribution or use of the product described in this report must be approved by TÜV Rheinland in writing. A valid license is regarded as such an approval.



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1. Test Site

Electronics Testing Center, Taiwan

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EMS Test Site:

No. 8 Lane 29, Wen-Ming Rd., Lo-Shan Tsun, Kuei-Shan Hsiang, Taoyuan, Taiwan, R.O.C.

EMI Test Site:

No. 34, Neighborhood 5, Ding Fu Tsuen, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

All tests were conducted by a TÜV Rheinland appointed inspector.

2. Description of the Test Samples

2.1. General Description of Equipment

The test samples are Digital I/O-, Counter- and Module Carrier- Cards with the model numbers **PCL-725, PCL-724, PCL-833, PCL-730, PCL-720, PCLD-7216** for general use in the Industrial Environment.

The PCL-series is consisting of cards handling digital I/O channels and providing flexible timer/counter channels. Therefore, different electro-mechanical relays are used. The PCLD-7216 is a module carrier board that holds any combination of up to 16 SSR I/O modules.

2.2. Rating and Physical Characteristics

Model No.	Description of Card	Ratings	Protection Class
PCL-725	Relay Actuator and Iso. D/I-Card	5V / 270mA	III
PCL-724	24-bit Digital I/O-Card	5V / 800mA	III
PCL-833	3-axis quadr. Encoder and Count. Card	not specified	III
PCL-730	32-channel isolated Dig. I/O-Card	not specified	III
PCL-720	Digital I/O and Counter Card	5V / 500mA	III
PCLD-7216	High-Speed DIO & Vector Inter. Card	not specified	III

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2.3. Sources of Interference

Switching frequency of Power Supply in completely tested PC.

2.4. Noise Suppression Parts

None for the Digital I/O Cards as the units under test.

2.5. Submitted Documents

- 1) Information in the User / Installation Manual contains no information which are in the scope of this report.
- 2) Construction drawings
- 3) Photographic documentation

3. Measurement Conditions

3.1. Modes of Operation

All individual EUTs were tested on 6 operation modes with their accessory equipment and as listed below:

Mode 1	PCL-725 + PC (HP, VECTRA VE4/66) + PCLD-880
Mode 2	PCL-724 + PC (HP, VECTRA VE4/66) + PCLD-7224Q + PCLM-SSR
Mode 3	PCLD-7216 + PC (HP, VECTRA VE4/66) + PCL-724
Mode 4	PCL-833 + PC (HP, VECTRA VE4/66) + PCLD-839
Mode 5	PCL-730 + PCLD-880
Mode 6	PCL-720 + PC (HP, VECTRA VE4/66) + PCLD-782 + PCLD-782B + PCLD-785 + PCLD-785B

A test program was run during all tests as described herein and which was set up by the applicant.

3.2. Additional Equipment

For EMC Testing the Digital I/O Cards were set up with the following additional equipment:

- “HP” PC, type Vectra VE4/66
- “Packard Bell” Monitor, type 1402S for Immunity testing
- “IBM” Monitor, type 8512-001 for Emission testing
- “HP” Keyboard, type C3757B#AB

3.3. Test Setup

The test setup was realized on a table of 40 cm height during all EMI tests. An unshielded power cable of about 2 m length was used. The following cable lengths were used:

PC	1.5 m unshielded	power cord
Keyboard	1.2 m shielded with core	signal cable
Monitor	1.5 m shielded	signal cable

3.4. List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

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For Emission Tests:

Equipment	Manufacturer	Model No.	Cal. Date
RF Test Receiver	Rohde and Schwarz	ESH3	Oct. 26, 1995
Line Impedance Stabilization Network	Rohde and Schwarz	ESH2-Z5	N/A
		KNW-407	N/A
Shield Room	Riken		N.C.R.
RF Test Receiver	Rohde and Schwarz	ESVP	Nov. 28, 1995
Spectrum Analyzer	Hewlett-Packard	8568B	Nov. 18, 1995
Pre-amplifier	Hewlett-Packard	8447D	Oct. 30, 1995
Pre-selector	Hewlett-Packard	85685A	Nov. 18, 1995
Log Periodic Antenna	EMCO	3146	Apr. 17, 1995
High Power Bicon. Ant.	EMCO	3108	Apr. 13, 1995
Spectrum Monitor	Rohde and Schwarz	EZM	N.C.R.

For ESD-, RS- and EFT/Burst Test:

Kind of Equipment	Manufacturer	Type	Calibrat. Date
ESD Simulator	Keytek	2000 (with DN1&DT1)	May 18, 1995
SMGL Generator	R & S	801.0001.52	Nov. 30, 1995
Metering Unit & Probe	EMCO	7122	Nov. 17, 1995
Data Processing	EMCO	7110	N.C.R.
Amplifier	IFI	IFI5540	N.C.R.
Controller	IBM	23YLBFW	N.C.R.
GTEM Cell	Emco	5317	N.C.R.
Printer	Epson	LQ-870	N.C.R.
EFT/Burst Gener.	KEYTEK	801-4	May 18, 1995

3.5. Abbreviations

PASS means 'complied with requirement'	N/A means 'not applicable'
FAIL means 'not complied'	? means 'open item'
N.C.R. means 'no calibration required'	

4. Test Results EMISSION

Result:

PASS

4.1. Continuous Interferences

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4.1.1. Conducted Emission (AC Mains)

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Port: AC Mains
Basic Standard: EN 55 022:1994, clause 5.1
Frequency Range: 0.15 - 30MHz
Limits: Mains Terminal, table 1 (Class A)

Result:

PASS

Test Setup

Input Voltage: AC 230V, 50Hz
Operational mode: ON
Earthing: through power cord

If the result of the measurement with the Quasi Peak detector is below the Average limit the measurement with Average detector can be omitted.



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Table 1: Conducted Emission, AC Mains; 0.15 - 30MHz

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Settings

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Frequency			Settings		
Start	Stop	Step Size	IF Bandwidth	Detector	Meas. Time
0.15 MHz	30MHz		10kHz	QP	20 ms

Model No. PCL-720

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.183	40.4	43.6	----	----	0.0	79.0	66.0	40.4	43.6	----	----
0.207	38.4	43.6	----	----	0.0	79.0	66.0	38.4	43.6	----	----
0.270	39.8	42.2	----	----	0.0	79.0	66.0	39.8	42.2	----	----
3.458	35.6	40.2	----	----	0.0	73.0	60.0	35.6	40.2	----	----
6.725	30.2	33.6	----	----	0.0	73.0	60.0	30.2	33.6	----	----
13.314	34.8	36.0	----	----	0.0	73.0	60.0	34.8	36.0	----	----

Model No. PCLD-7216

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.178	38.8	42.2	----	----	0.0	79.0	66.0	38.8	42.2	----	----
0.203	39.2	41.6	----	----	0.0	79.0	66.0	39.2	41.6	----	----
0.270	42.0	41.2	----	----	0.0	79.0	66.0	42.0	41.2	----	----
0.336	33.6	33.6	----	----	0.0	79.0	66.0	33.6	33.6	----	----
11.975	33.0	33.2	----	----	0.0	73.0	60.0	33.0	33.2	----	----
15.979	33.0	33.0	----	----	0.0	73.0	60.0	33.0	33.0	----	----

Model No. PCL-724

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.178	38.6	42.2	----	----	0.0	79.0	66.0	38.6	42.2	----	----
0.207	38.8	41.8	----	----	0.0	79.0	66.0	38.8	41.8	----	----
0.269	41.8	41.8	----	----	0.0	79.0	66.0	41.8	41.8	----	----
1.004	32.6	34.4	----	----	0.0	73.0	60.0	32.6	34.4	----	----
11.975	33.4	33.2	----	----	0.0	73.0	60.0	33.4	33.2	----	----



Model No. PCL-725

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.178	38.4	42.2	----	----	0.0	79.0	66.0	38.4	42.2	----	----
0.207	38.8	41.4	----	----	0.0	79.0	66.0	38.8	41.4	----	----
0.270	41.8	41.8	----	----	0.0	79.0	66.0	41.8	41.8	----	----
11.975	35.2	32.8	----	----	0.0	73.0	60.0	35.2	32.8	----	----
14.543	34.0	34.4	----	----	0.0	73.0	60.0	34.0	34.4	----	----
15.980	34.4	34.0	----	----	0.0	73.0	60.0	34.4	34.0	----	----

Model No. PCL-730

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.178	37.8	42.4	----	----	0.0	79.0	66.0	37.8	42.4	----	----
0.208	38.8	41.4	----	----	0.0	79.0	66.0	38.8	41.4	----	----
0.270	41.8	41.8	----	----	0.0	79.0	66.0	41.8	41.8	----	----
1.130	32.6	34.6	----	----	0.0	73.0	60.0	32.6	34.6	----	----
1.799	32.8	34.4	----	----	0.0	73.0	60.0	32.8	34.4	----	----
11.975	33.2	33.6	----	----	0.0	73.0	60.0	33.2	33.6	----	----
15.979	32.2	33.4	----	----	0.0	73.0	60.0	32.2	33.4	----	----

Model No. PCL-833

Freq. (MHz)	Meter Reading (dBuV)				Factor (dB)	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P. Value	AVE. Value	Q.P. Value		AVE. Value	
	N	L1	N	L1				N	L1	N	L1
0.183	38.6	43.8	----	----	0.0	79.0	66.0	38.6	43.8	----	----
0.203	38.6	44.2	----	----	0.0	79.0	66.0	38.6	44.2	----	----
0.269	39.2	40.4	----	----	0.0	79.0	66.0	39.2	40.4	----	----
0.941	34.6	33.4	----	----	0.0	73.0	60.0	34.6	33.4	----	----
11.975	32.6	33.4	----	----	0.0	73.0	60.0	32.6	33.4	----	----
15.979	31.8	33.4	----	----	0.0	73.0	60.0	31.8	33.4	----	----

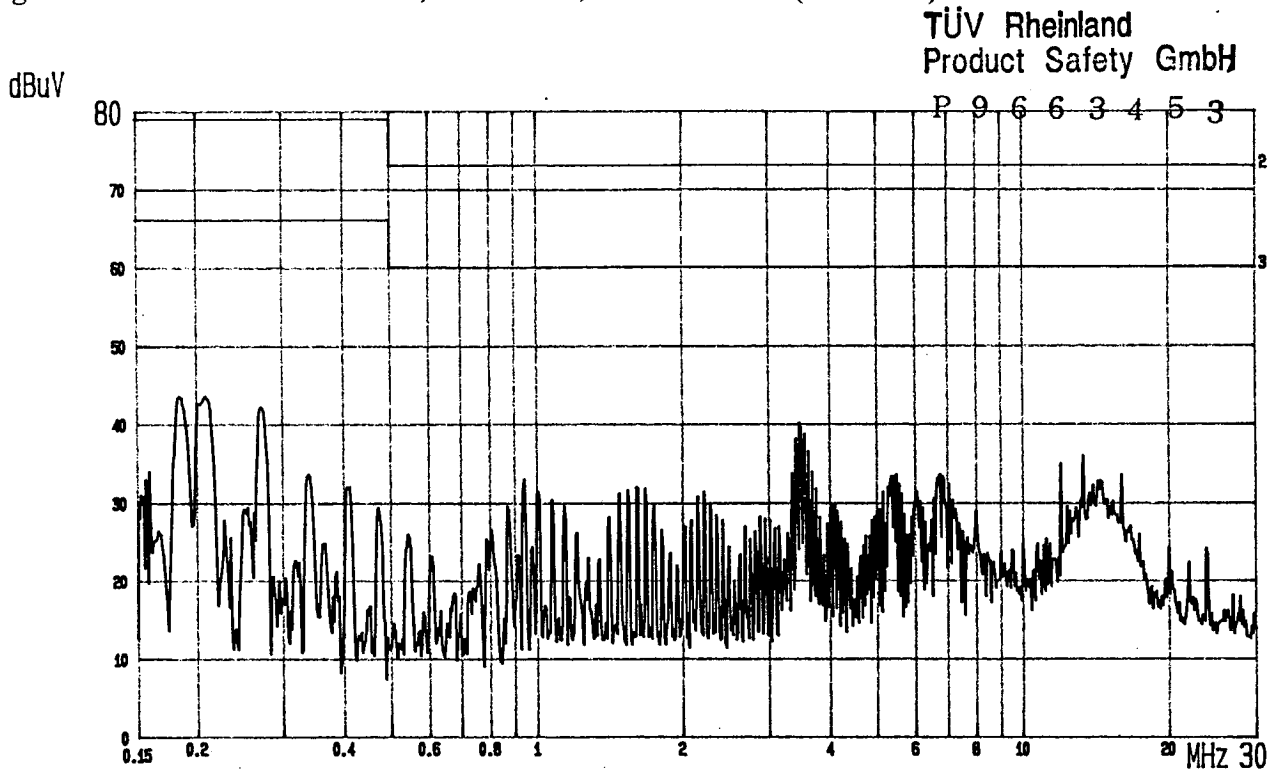
Notes : 1) Place of Measurement : ETC's Shielded Room, 40 cm table height

2) N : One end & Ground,
L1 : The other end & Ground

3) Calculation: Meter Reading + Factor = Result

4) The symbol "----" means that the Q.P. is under A.V.G limit, therefore no need to measure the A.V.G value.

Figure 1: Conducted Emission, AC Mains; 0.15 - 30MHz (PCL-720)

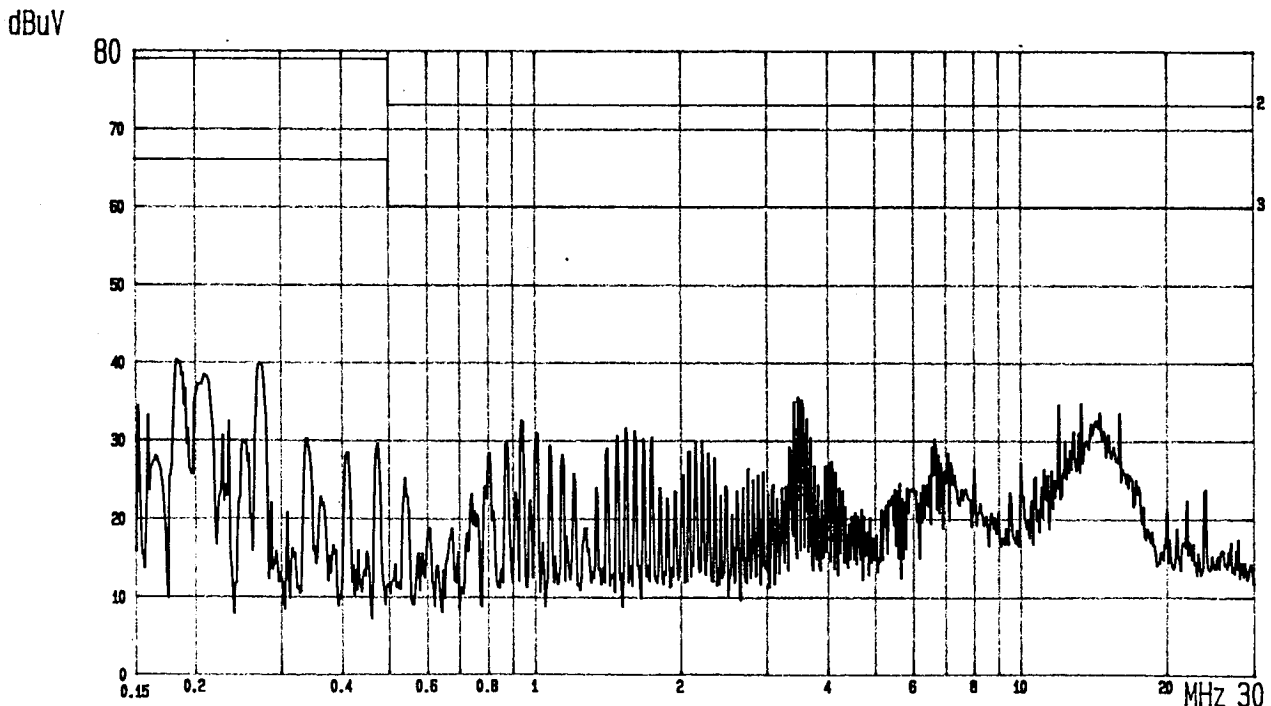


--- Date 13.DEC.'95 Time 19:34:20
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-720+PCLD-782/782B/785/785B

POWER: 230V/50Hz

2: QP 3: AVG
LISN: L1

CLASS A LIMIT
ETC EMI LAB.



--- Date 13.DEC.'95 Time 19:38:41
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-720+PCLD-782/782B/785/785B

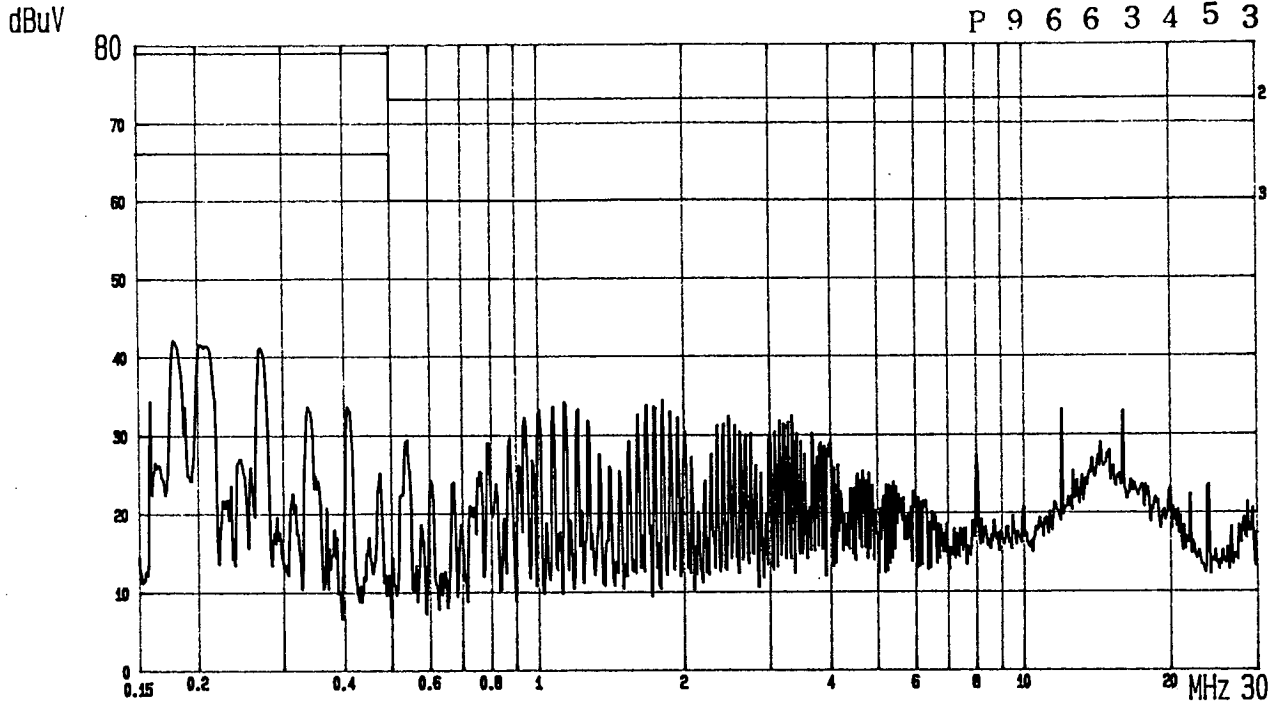
POWER: 230V/50Hz

2: QP 3: AVG
LISN: N

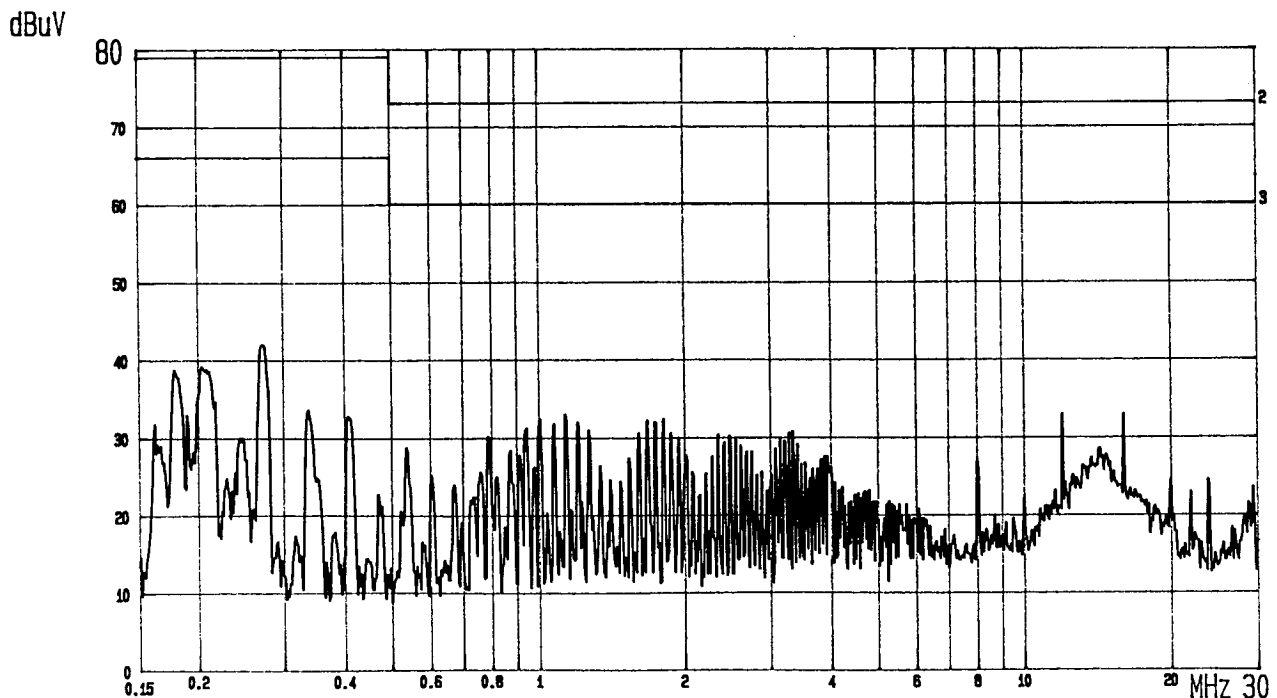
CLASS A LIMIT
ETC EMI LAB.

Figure 2: Conducted Emission, AC Mains; 0.15 - 30MHz (PCLD-7216)

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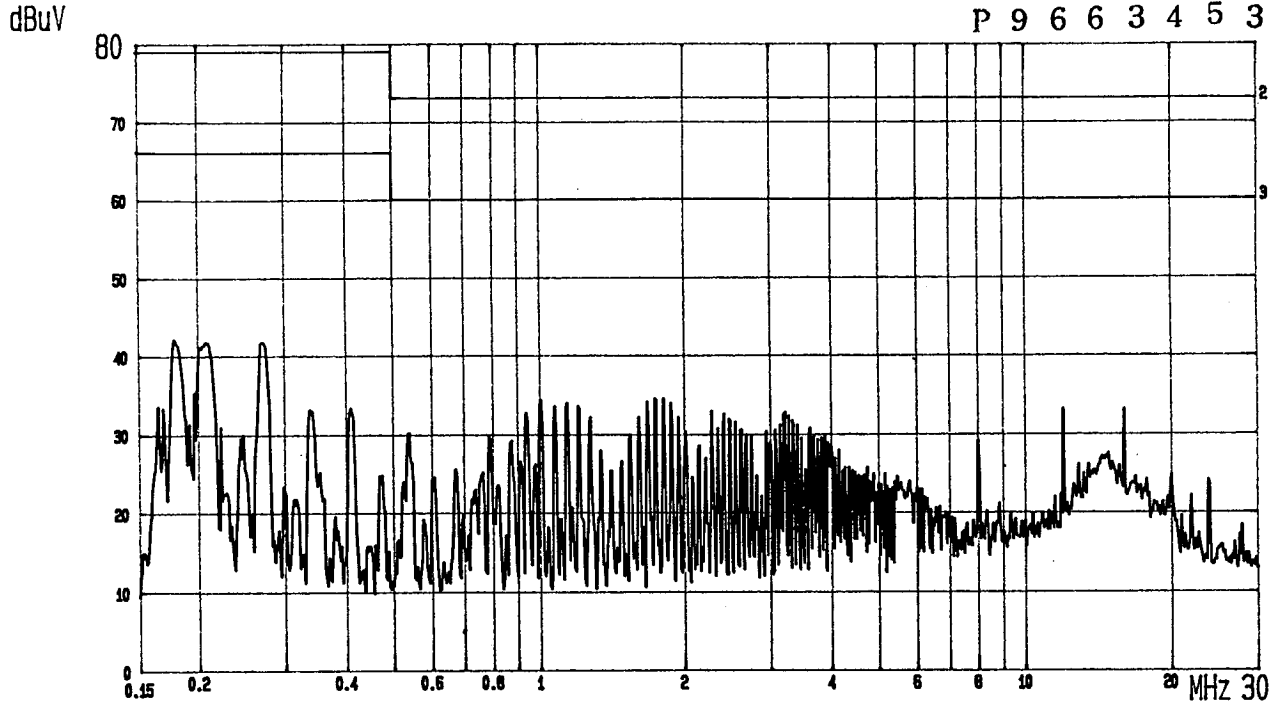
--- Date 13.DEC.'95 Time 19:00:33
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 MODEL: PCL-724+PCLD-7216 POWER: 230V/50Hz LISN: L1 ETC EMI LAB.



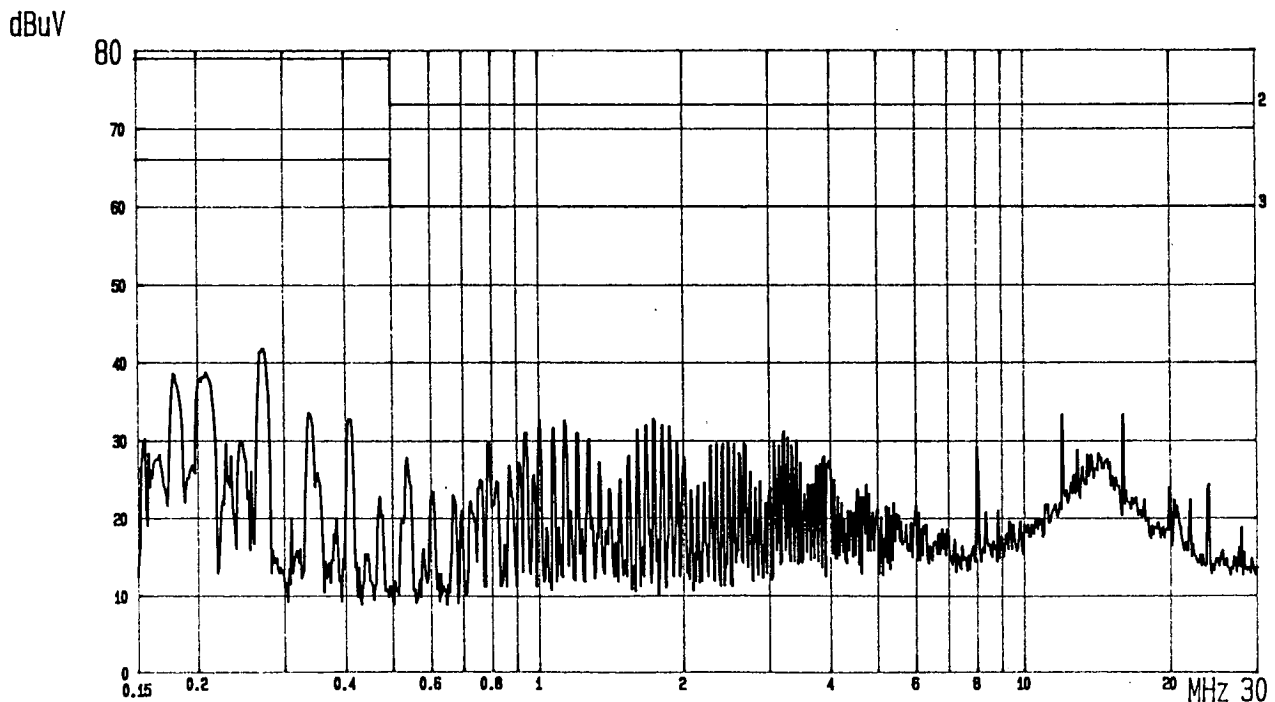
--- Date 13.DEC.'95 Time 18:56:23
 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-724+PCLD-7216 POWER: 230V/50Hz LISN: N ETC EMI LAB.

Figure 3: Conducted Emission, AC Mains; 0.15 - 30MHz (PCL-724)

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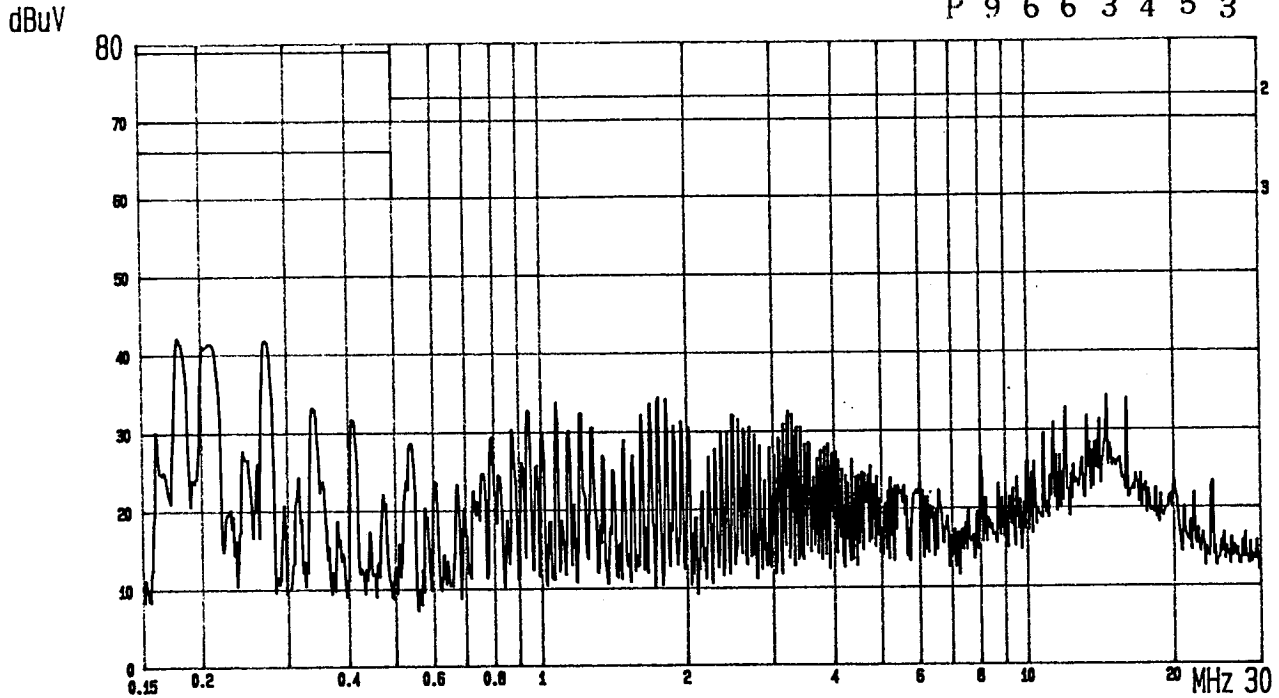
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 MODEL: PCL-724+PCLD-7224Q POWER: 230V/50Hz LISN: L1 ETC EMI LAB.



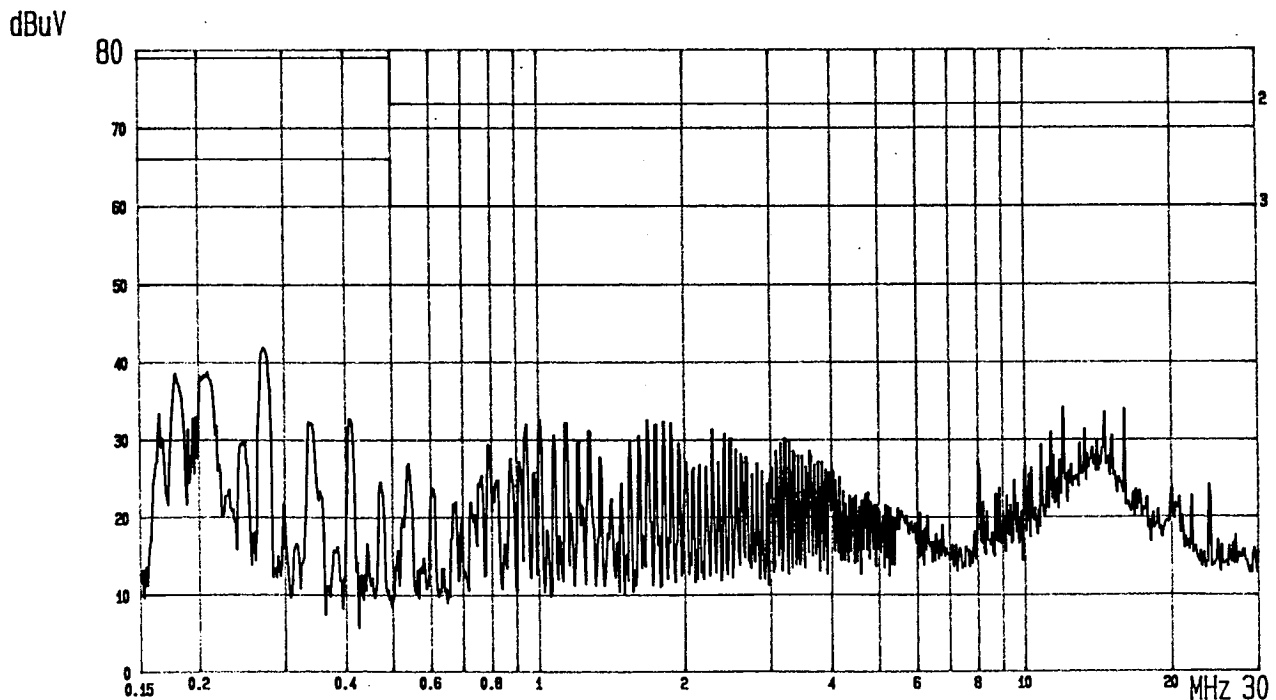
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 MODEL: PCL-724+PCLD-7224Q POWER: 230V/50Hz LISN: N ETC EMI LAB.

Figure 4: Conducted Emission, AC Mains; 0.15 - 30MHz (PCL-725) TÜV Rheinland
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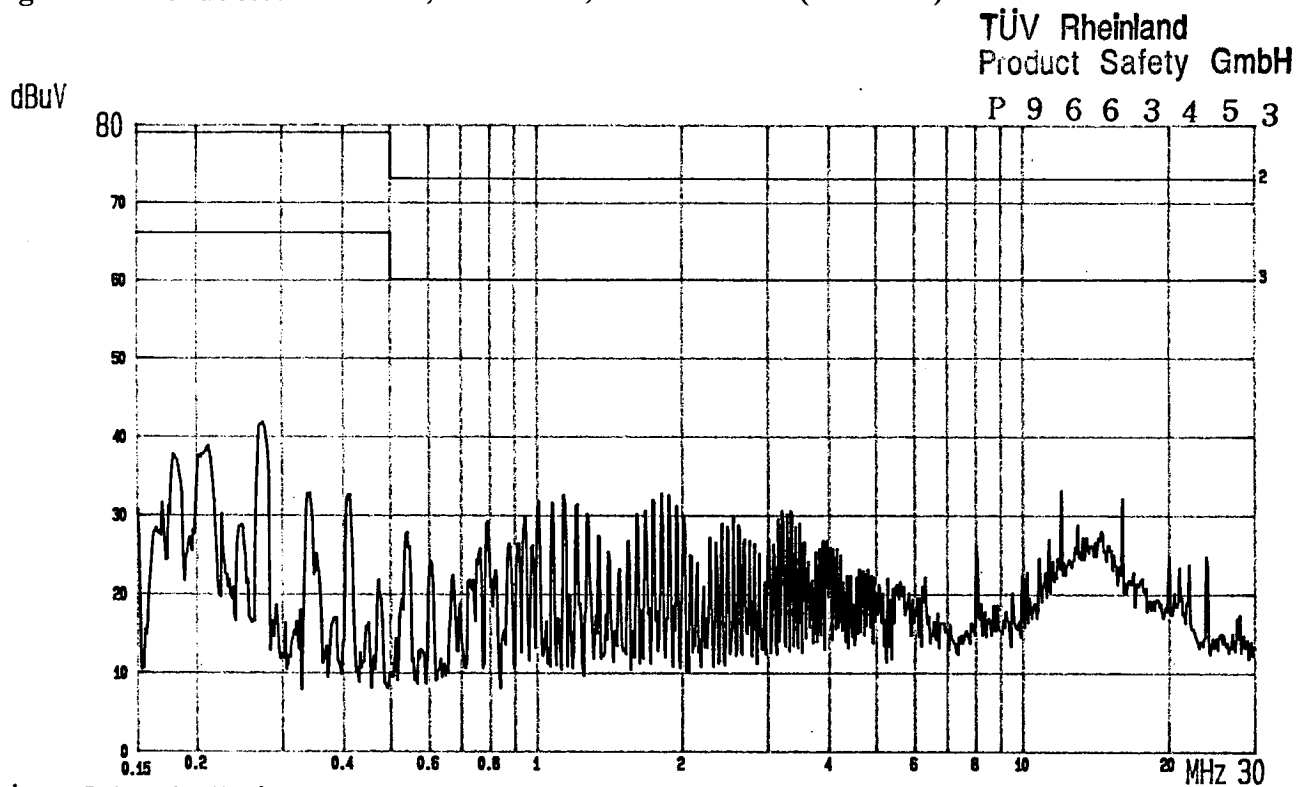


--- Date 13.DEC.'95 Time 17:25:50
 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-725+PCLD-880 POWER: 230V/50Hz LISN: L1 ETC EMI LAB.

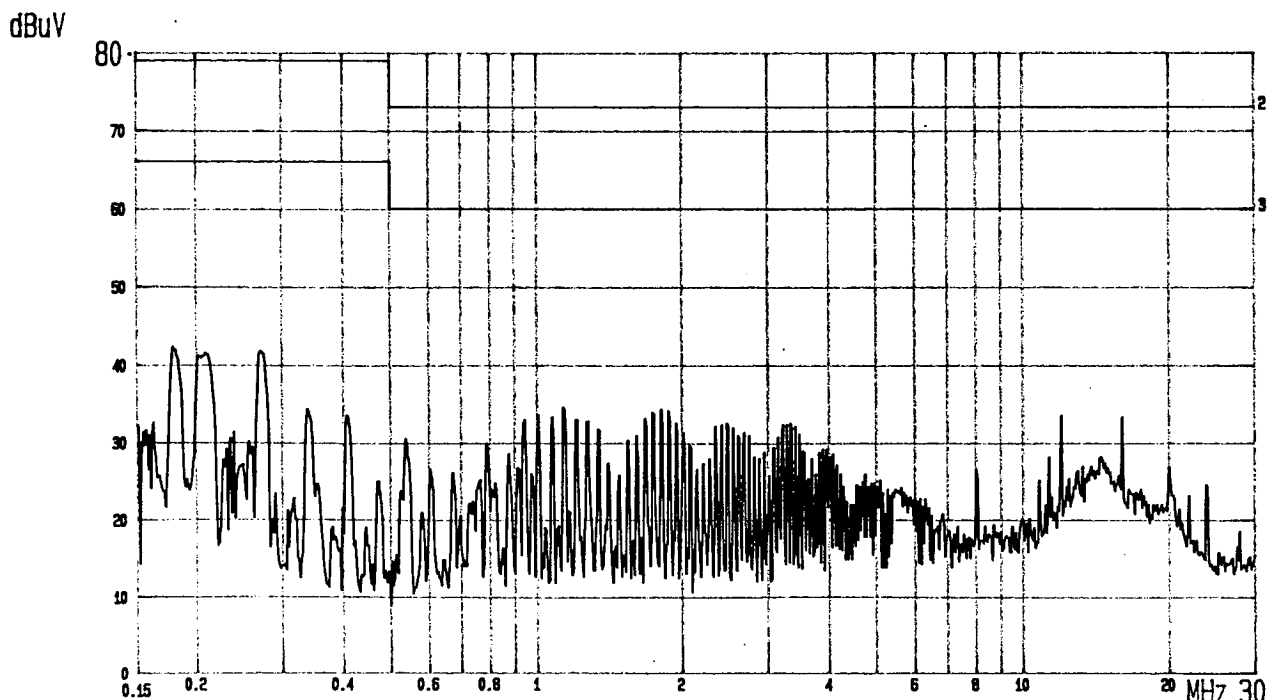


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 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-725+PCLD-880 POWER: 230V/50Hz LISN: N ETC EMI LAB.

Figure 5: Conducted Emission, AC Mains; 0.15 - 30MHz (PCL-730)

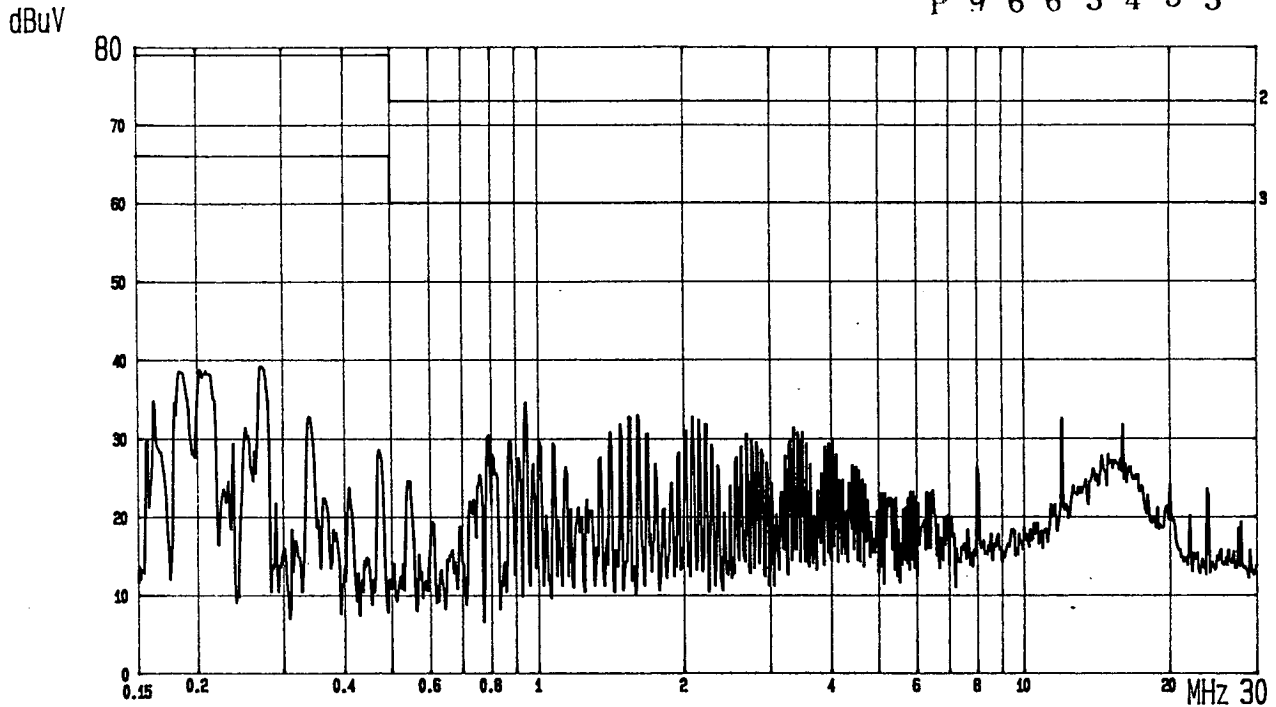


Date 13.DEC.'95 Time 17:51:36
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 MODEL: PCL-730+PCLD-880 POWER: 230V/50Hz LISN: N ETC EMI LAB.

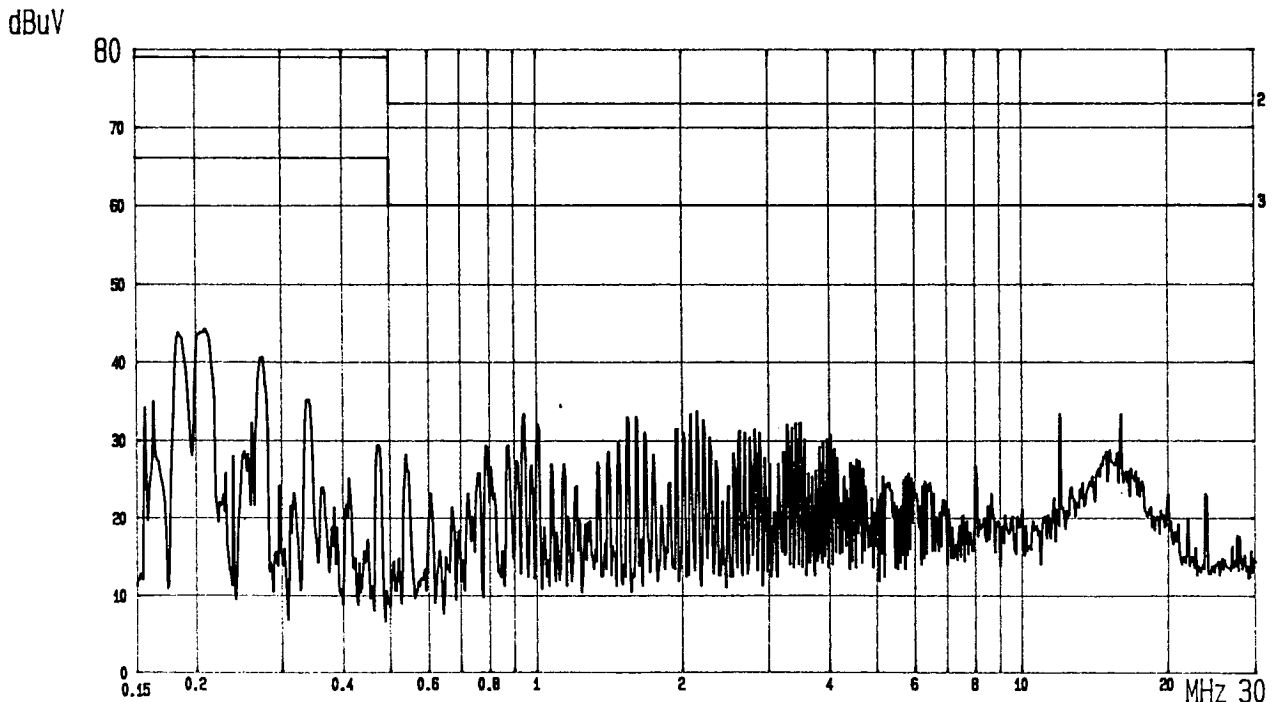


Date 13.DEC.'95 Time 17:47:34
 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-730+PCLD-880 POWER: 230V/50Hz LISN: L1 ETC EMI LAB.

Figure 6: Conducted Emission, AC Mains; 0.15 - 30MHz (PCL-833) TÜV Rheinland
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--- Date 13.DEC.'95 Time 18:34:39
 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-833+PCL-839 POWER: 230V/50Hz LISN: N ETC EMI LAB.



--- Date 13.DEC.'95 Time 18:38:39
 EN55022 CONDUCTION TEST EUT: CARD 2: QP 3: AVG CLASS A LIMIT
 MODEL: PCL-833+PCL-839 POWER: 230V/50Hz LISN: L1 ETC EMI LAB.

4.1.2. Radiated Emission

Port: Enclosure
Basic Standard: EN 55 022:1994, clause 6
Frequency Range: 30 - 1000MHz
Limits: clause 6, table 3, (class A)

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Result:

PASS

Test Setup

Input Voltage: AC 230V, 50Hz
Operational mode: ON
Earthing: through power cord

Disturbances other than those mentioned are small or not detectable.



Table 2: Radiated Emission, Mains; 30 - 1000MHz

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Settings

Frequency			Settings		
Start	Stop	Step Size	IF Bandwidth	Detector	Meas. Time
30MHz	1 GHz		120kHz	Quasi-Peak	20ms

Model No. PCL-720

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
55.98	43.5	50.5	-13.3	30.2	37.2	40.0	-2.8
59.10	48.4	48.2	-13.9	34.5	34.3	40.0	-5.5
62.50	52.2	37.9	-13.9	38.3	34.0	40.0	-1.7
129.80	42.0	41.0	-11.4	30.6	29.6	40.0	-9.4
143.03	46.3	39.4	-10.7	35.6	28.7	40.0	-4.4
176.78	37.2	33.8	-6.0	31.2	27.8	40.0	-8.8

Model No. PCLD-7216

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
116.25	32.0	34.2	-6.4	25.6	27.8	40.0	-12.8
118.01	30.2	31.2	-7.7	22.5	23.5	40.0	-16.5
122.04	29.4	28.3	-9.8	19.6	18.5	40.0	-20.4
133.48	38.2	41.4	-10.9	27.3	30.5	40.0	-9.5
223.73	41.8	36.8	-9.9	31.9	26.9	40.0	-8.1
225.52	45.5	38.6	-9.9	35.6	28.7	40.0	-4.4

Model No. PCL-724

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
64.0	40.0	35.3	-13.9	26.1	21.4	40.0	-13.9
109.75	36.2	36.8	-9.9	26.3	26.9	40.0	-13.1
116.95	36.5	38.0	-6.4	30.1	31.6	40.0	-8.4
123.63	37.0	44.8	-10.3	26.7	34.5	40.0	-5.5
126.42	40.1	42.0	-11.0	29.1	31.0	40.0	-9.0
135.85	37.9	38.9	-10.6	27.3	28.3	40.0	-11.7
225.53	44.5	38.5	-9.9	34.6	28.6	40.0	-5.4



Model No. PCL-725

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
32.34	44.0	38.5	-12.8	31.2	25.7	40.0	-8.8
62.26	48.4	41.5	-13.9	34.5	27.6	40.0	-5.5
72.30	43.9	49.9	-16.9	27.0	33.0	40.0	-7.0
92.10	43.9	41.8	-13.4	30.5	28.4	40.0	-9.5
110.09	42.1	47.4	-9.9	32.2	37.5	40.0	-2.5
141.41	39.5	39.6	-10.8	28.7	28.8	47.0	-11.2

Model No. PCL-730

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
58.68	37.3	44.0	-13.9	23.4	30.1	40.0	-9.9
80.74	42.1	46.0	-16.8	25.3	29.2	40.0	-10.8
148.61	42.2	40.3	-10.1	32.1	30.2	40.0	-7.9
157.61	36.4	37.4	-7.8	28.6	29.6	40.0	-10.4
168.77	35.2	40.4	-6.6	28.6	33.8	40.0	-6.2
177.05	35.5	39.8	-6.0	29.5	33.8	40.0	-6.2

Model No. PCL-833

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
116.2	34.1	35.2	-6.4	27.7	28.8	40.0	-11.2
134.1	33.2	31.6	-10.9	22.3	20.9	40.0	-17.7
145.0	30.0	31.2	-10.5	19.5	20.7	40.0	-19.3
150.0	28.0	32.1	-10.0	17.0	22.1	40.0	-17.9
160.3	28.1	26.2	-7.2	20.9	19.0	40.0	-19.1
167.4	30.1	32.1	-6.6	23.5	25.5	40.0	-14.5

Notes : 1) Place of Measurement : ETC's Measuring Site

2) Distance of Measurement : 10 m (30-1000MHz)

3) Height of table on which the EUT was placed : 0.8m

4) Height of Receiving Antenna : (30 - 1000MHz) 1 - 4 m

5) Calculation: Meter Reading + Factor = Result

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4.2. Disturbances in Supply Systems

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4.2.1. Harmonics

Port: Mains
Basic Standard: EN 60 555-2
Limits: EN 60 555-2, clause 4.1

Result:	N/A
----------------	-----

The harmonics on AC Mains in the frequency from 0 to 2kHz were not measured because the EUT as a Digital I/O Card for an industrial PC is not in the scope of EN 60 555-2.

4.2.2. Voltage Fluctuations

Port: Mains
Basic Standard: EN 60 555-3
Limits: EN 60 555-3, clause 6.2

Result:	N/A
----------------	-----

The voltage fluctuations on AC Mains were not measured because the EUT as a Digital I/O Card for an industrial PC is not in the scope of EN 60 555-3.

5. Test Results IMMUNITY

Result:

PASS

5.1. Enclosure port

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5.1.1. Radio-Frequency Electromagnetic Field

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Port: Enclosure
Basic Standard: IEC 801-3
Performance Criteria: A
Test Specification: prEN 50 082-2
Frequency. Range: 27 - 500MHz
Field Strength 10V/m (unmodulated)
(= level 3 of IEC 801-3)

Result:

PASS

Test Setup

Input Voltage: AC 230V, 50Hz
Operational mode: ON
Earthing: through power cord

Temperature 26 °C
Relative Humidity 55 %

Table 3: Radio-frequency electromagnetic field; 27 - 270MHz

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Settings

Frequency			Settings		
Start	Stop	Step Size	Field Strenght	Sweep mode	Meas. Time
27MHz	270MHz	73kHz	10V/m	auto	200ms

No abnormalities were observed during and directly after the test and when investigating all models as described on page 3 of this document.

Table 4: Radio-frequency electromagnetic field; 270 - 500MHz

Settings

Frequency			Settings		
Start	Stop	Step Size	Field Strenght	Sweep mode	Meas. Time
270MHz	500MHz	728kHz	10V/m	auto	200ms

No abnormalities were observed during and directly after the test and when investigating all models as described on page 3 of this document.

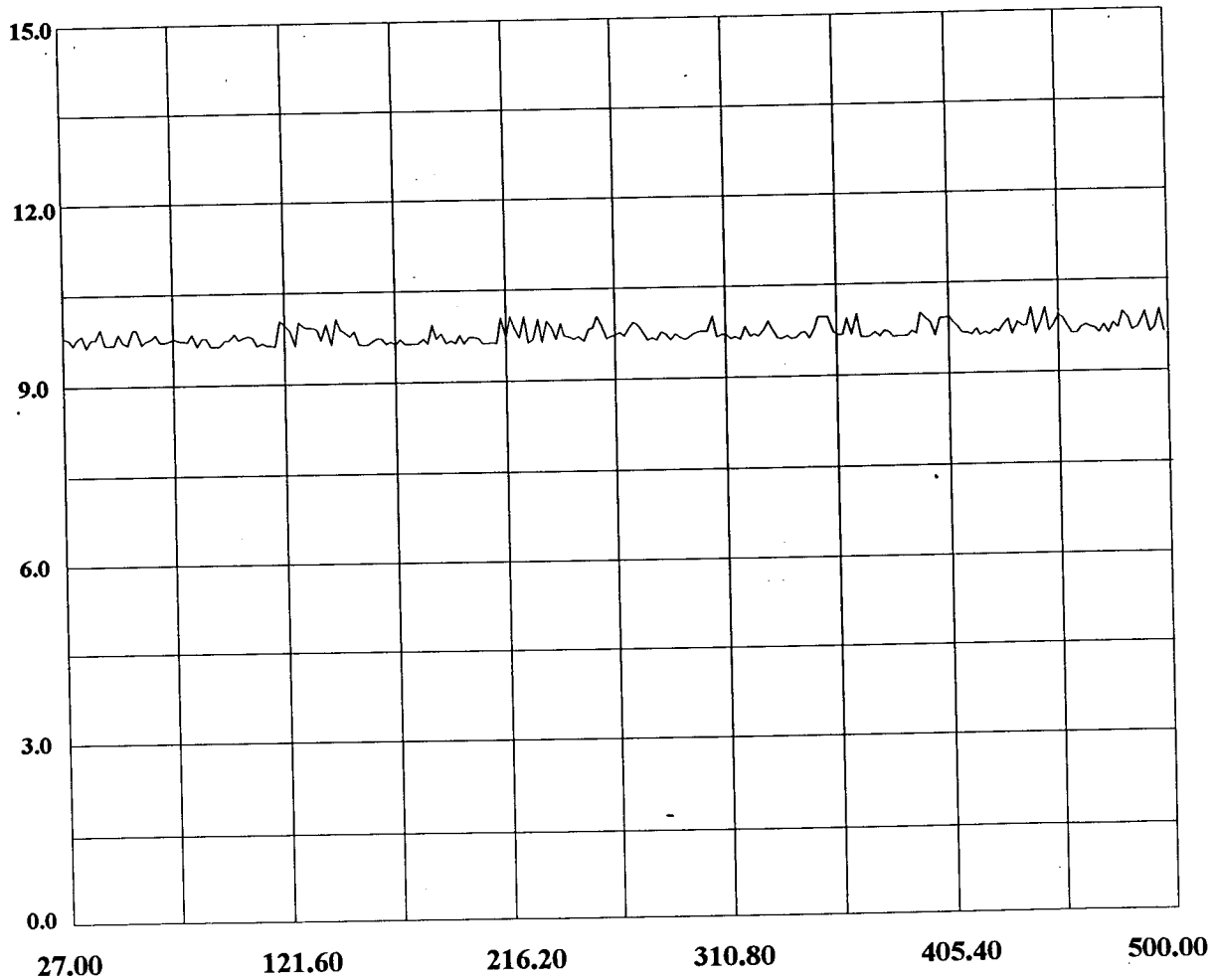
Figure 7: Radiated Susceptibility, Field Calibration

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RADIATED SUSCEPTIBILITY TEST GRAPH

Title : Calibration
Date : DEC, 6, 1995

Field (V/M)



Frequency (MHz)

5.1.2. Electrostatic Discharge

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Port: Enclosure
 Basic Standard: IEC 801-2
 Performance Criteria: B
 Test Specification: prEN 50 082-2
 Voltage: 8kV (Air Discharge)
 (= level 3 of IEC 801-2)

Result:	PASS
----------------	-------------

Test Setup

Input Voltage: AC 230V, 50Hz
 Operational mode: ON
 Earthing: through power cord

Temperature 26 °C
 Relative Humidity 55 %

Table 5: Electrostatic Discharge

Testpoint	Polarity	Number of Discharges	Observation	Result
Housing	+	10	normal function	PASS
Connectors (backside)	+	10	normal function	PASS

All models as described on page 3 of this document did not show any degradation in performance during and after the test.

5.2. Input and Output AC Power Ports

5.2.1. Fast Transients Common Mode

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Port: Mains Plug
 Basic Standard: IEC 801-4
 Performance B
 Criteria:
 Test Specification: prEN 50 082-2
 Peak Voltage: 2kV (= level 3 of IEC 801-4)
 T_r/T_n 5/50ns
 Burst Duration: 15ms
 Rep. frequency 5kHz

Result:

PASS

Test Setup

Input Voltage: AC 230V, 50Hz
 Operational mode: ON
 Earthing: through power cord
 Temperature 27 °C
 Relative Humidity 56 %
 Coupling: Coupling Network

Table 6: Fast transients common mode (Input and output AC power ports)

Testpoint	Polarity	Observation	Result
L	+/-	normal function	PASS
N	+/-	normal function	PASS
PE	+/-	normal function	PASS

The disturbance was shown on the monitor screen in form of a visual noise during the test (all models) but recovered itself directly after the test.

5.3. Ports for Signal Lines

5.3.1. Fast Transients Common Mode

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Port: Signal Lines
Basic Standard: IEC 801-4
Performance: B
Criteria:
Test Specification: prEN 50 082-2
Peak Voltage: 1kV (= level 2 of IEC 801-4)
 T_r/T_n : 5/50ns
Burst Duration: 15ms
Rep. frequency: 5kHz
Coupling: Capacitive Clamp

Result:

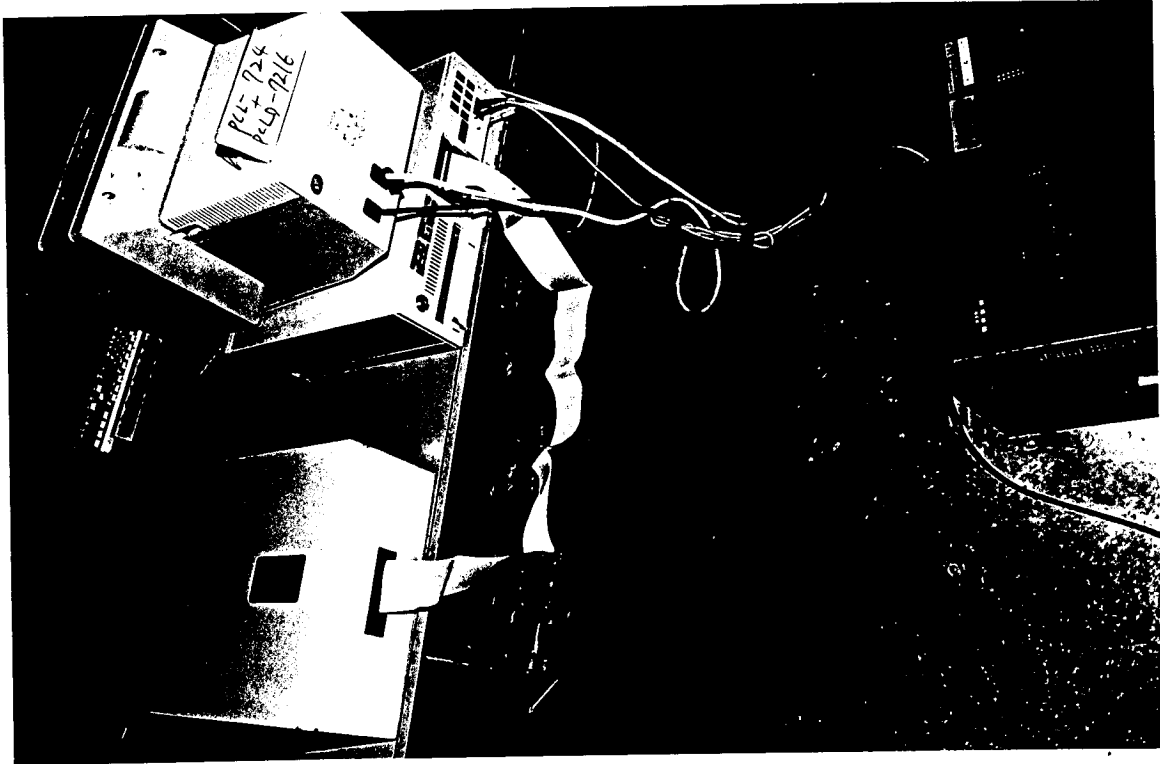
N/A

This test is not applicable to the signal lines since the interconnection cables and signal cables, respectively, have a length less than 3 m.

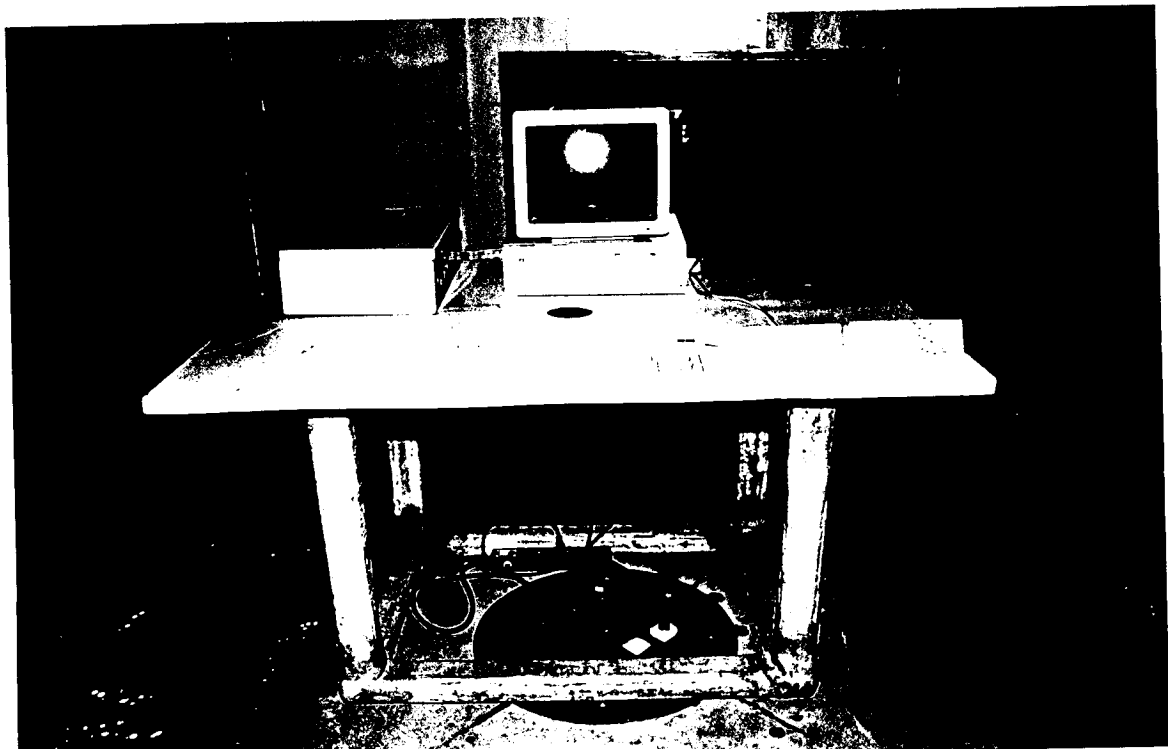
6. Photographs of the Test Set-up

Picture 1: Conducted Emission

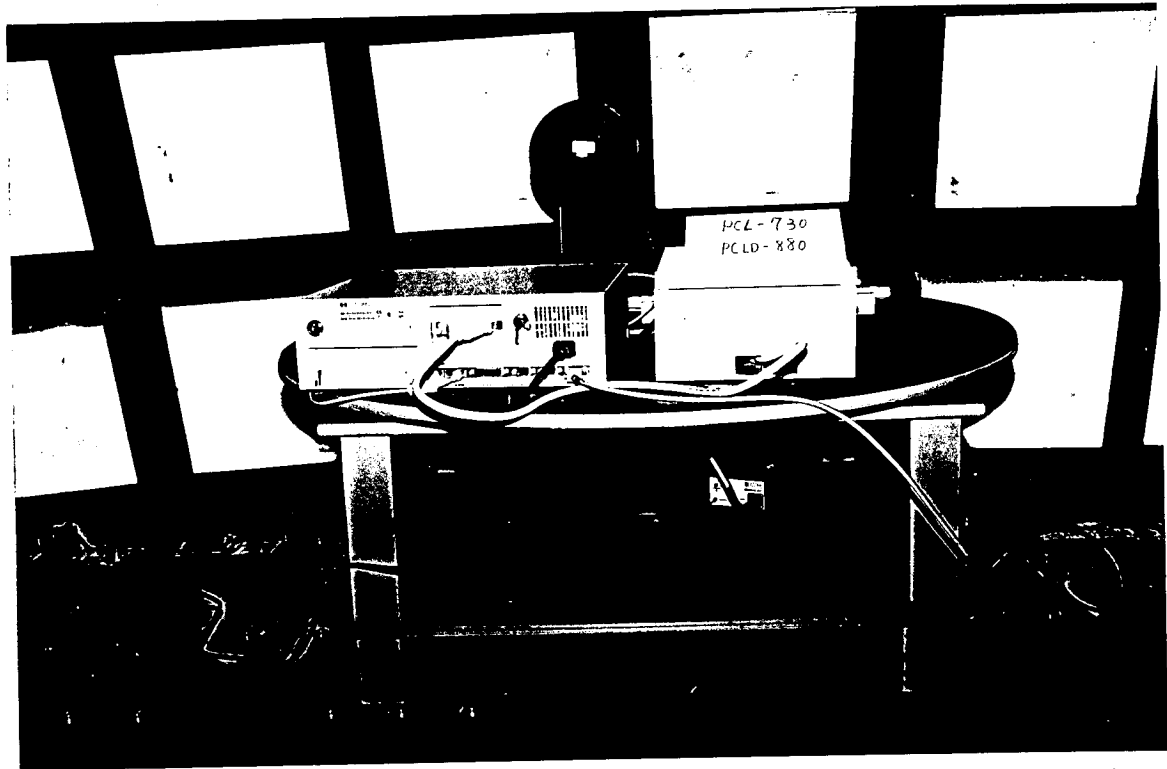
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Picture 2: Radiated Emission

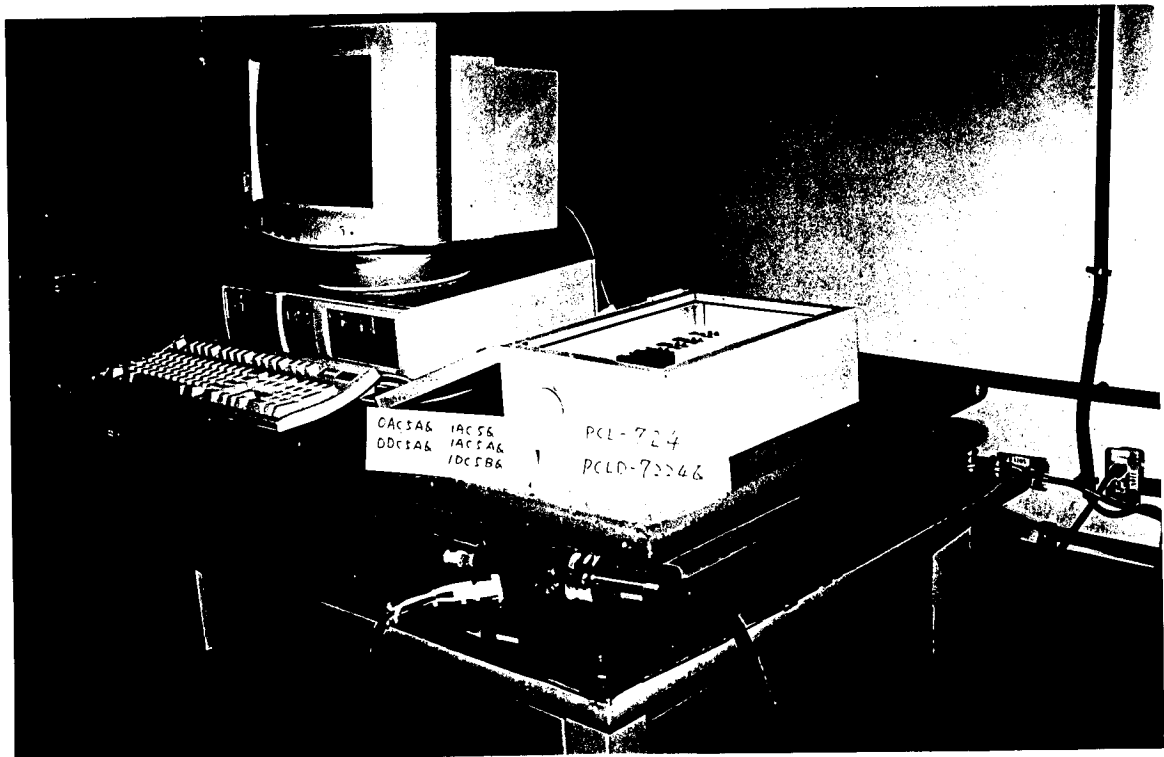


Picture 3: Radiated Susceptibility, Frequency Range 27MHz to 500Mhz

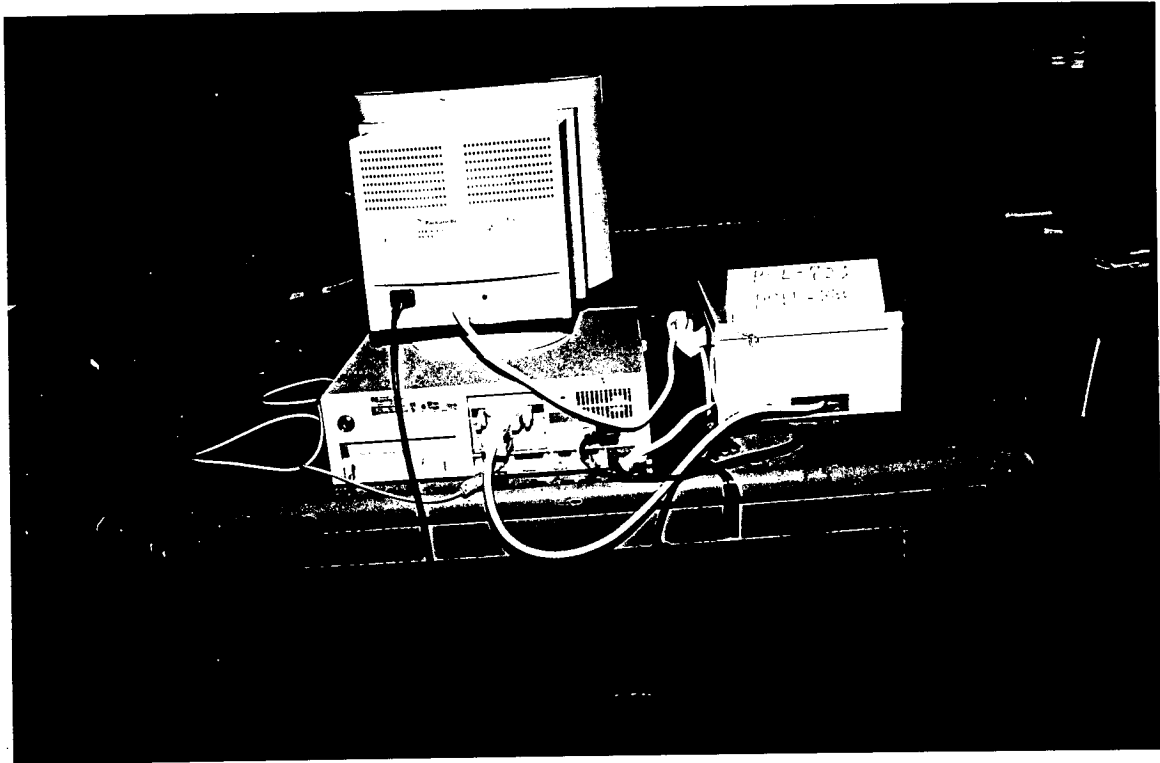


Picture 4: Electrostatic Discharge

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Picture 5: Fast Transients on AC Mains



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7. List of Tables

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26.03.1996

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