TÜV Rheinland

Technischer Überwachungs-Verein Rheinland

Certificate

of

Compliance

No. I-9663819-9606

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

A/D-, D/A- Cards
PCLD-788, PCL-728, PCL-813B, PCL-818H
PCL-711B, PCL-818HD, PCL-1800, PCL-818L

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
as described in the Technical Report P 9663819E01
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, 03.06.1996

Dipl.-Ing. K. Heinz
Certification Centre

Dipl.-Ing. U. Meyer
Testing Centre

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

TÜV Rheinland Product Safety

Am Grauen Stein

D-51105 Köln

TÜV Rheinland

Testreport No: P9663819E01

about

Electromagnetic Compatibility

Applicant:	**Advantech Co., Ltd. 4Fl., No. 108-3, Ming-Chuan Rd. Shin-Tien City, Taipei Hsien 231, Taiwan**
Kind of Equipment:	**A/D-, D/A- Cards**
Type Designation:	**PCLD-788, PCL-728, -813B, -818H, -711B, -818HD, -1800, -818L**
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:	**06.10.1995**
Date of Testing:	**16.12.1995**

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Test result: The above mentioned product has been tested and **passed.**

Der Sachverständige: tested by

31.05.96
Date, signature

Gesehen 04.06. 96
TÜV Rheinland Product Safety GmbH

überprüft: reviewed by

31.05.96
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.**

Content

1. Test Site

Electronics Testing Center, Taiwan

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 a 16-channel Relay Multiplexer Board (**M/N: PCLD-788**), an Isolated 2-channel D/A Output Card (**M/N: PCL-728**), a 32-channel S.E. Isolated A/D Card (**M/N: PCL-813B**), a High-Performance DAS Cards (**M/N: PCL-818H, -818HD, -818L**), a PC-Multilab (**M/N: PCL-711B**) and a 330 kHz High-Speed DAS Card (**M/N: PCL-1800**).

The PCLD-788 multiplexes 16 channels into a single I/O channel of an A/D converter. The PCL-728 provides two double-buffered 12-bit digital-to-analog outputs. The PCL-813B is a 32-channel A/D card, offering high-voltage isolation on each analog input. The PCL-818H, -818HD and -818L Cards are containing a 12-bit A/D conversion, D/A-conversion, digital input, digital output and timer/counter functions. The PCL-711B is a fully-integrated package that offers four popular I/O functions for the PC/AT and compatible systems: A/D conversion, D/A conversion, digital input and digital output. The PCL-1800 card is a very-high-speed, high-performance multifunction plug-in DAS card. It features a 330 kHz, 12-bit analog-to-digital converter, on board 1 Kword FIFO buffer, two 12-bit D/A output channels, 16 digital input channels, 16 digital output channels and one 16-bit counter channel. It also includes a 16-channel, 8-bit analog comparator which you can use as an analog watchdog to monitor the card's 16 analog input signals.

2.2. Rating and Physical Characteristics

Model No.	Description of Card	Ratings	Protection Class
PCLD-788	16-channel Relay Multiplexer Board	5V / 380 mA	III
PCL-728	Isolated 2-channel D/A Output Card	5V / 800 mA	III
PCL-813B	32-channel S.E. Isolated A/D Card	5V / 660 mA 12V / 140 mA	III
PCL-818H PCL-818HD PCL-818L	High-Performance Multi-Function DAS Cards	5V / 240 mA (max) 12V / 140 mA (max) -12V / 14 mA	III
PCL-1800	330kHz High-Speed DAS Card	5V / 600 mA 12V / 200 mA -12V / 15 mA	III
PCL-711B	PC-Multilab	not defined	III

2.3. Sources of Interference

1. Switching frequency of Power Supply in completely tested PC.
2. Pulses on clock or other lines of board under test, CPU card or peripheral cards.

2.4. Noise Suppression Parts

None for the A/D-, D/A- 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 indiviual EUTs with their combinations were tested on 4 operation modes listed as belows:

Mode 1	**PCLD-788** + HP Computer and PCL-720
Mode 2	**PCL-728** + HP Computer
Mode 3	**PCL-813B** + HP Computer and PCLD-881
Mode 4	**PCL-818H** + HP Computer + PCLD-780 + PCL-10503 and PCLD-880
Mode 5	**PCL-711B** + HP Computer + PCLD-7115 + PCL-10503 and PCLD-880
Mode 6	**PCL-818HD** + HP Computer + PCLD-8115 + PCL-10503 and PCLD-880
Mode 7	**PCL-1800** + HP Computer + PCLD-8115 + PCL-10503 and PCLD-880
Mode 8	**PCL-818L** + HP Computer + PCLD-8115 + PCL-10503 and PCLD-880

A test program ('PCLSTEST.EXE' except for model No. PCLD-788 which was run by '788.EXE') was used during all tests as described herein and which was set up by the applicant.

3.2. Additional Equipment

For EMC Testing the A/D-, D/A- Boards were set up with the following additional equipment:

"HP" PC, type Vectra VE4/66

"Packard Bell" Monitor, type 1402S or CTX (for immunity)

"IBM" Monitor, type 8512-001 (for emission)

"HP" Keyboard, type C1405 #AB0 (for immumity) or type C3757B#ABO (for emission)

3.3. Test Setup

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The test setup was realized on a table of 40 cm height during all EMI tests. An unshielded power cabel 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

For Emission Tests:

Kind of Equipment	Manufacturer	Type	Calibrat. Date
RF Test Receiver	Rohde and Schwarz	ESH3	Oct. 26, 1995
Line Impedance	Rohde and Schwarz	ESH2-Z5	N/A
Stabilization Network		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

4.1.1. Conducted Emission (AC Mains)

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

Result:	PASS

Test Setup

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

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

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

Settings

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

Model No. PCLD-788

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.178	39.0	42.2	----	----	0.0	79.0	66.0	39.0	42.2	----	----
0.200	38.6	42.6	----	----	0.0	79.0	66.0	38.6	42.6	----	----
0.270	42.0	42.8	----	----	0.0	79.0	66.0	42.0	42.8	----	----
1.000	33.2	34.8	----	----	0.0	73.0	60.0	33.2	34.8	----	----
11.975	32.0	31.4	----	----	0.0	73.0	60.0	32.0	31.4	----	----
15.979	34.0	34.2	----	----	0.0	73.0	60.0	34.0	34.2	----	----

Model No. PCL-728

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.185	43.6	48.4	----	----	0.0	79.0	66.0	43.6	48.4	----	----
0.207	40.8	46.2	----	----	0.0	79.0	66.0	40.8	46.2	----	----
0.270	44.4	47.2	----	----	0.0	79.0	66.0	44.4	47.2	----	----
0.411	36.0	39.4	----	----	0.0	79.0	66.0	36.0	39.4	----	----
1.599	37.0	38.0	----	----	0.0	73.0	60.0	37.0	38.0	----	----
15.979	33.6	33.4	----	----	0.0	73.0	60.0	33.6	33.4	----	----

Model No. PCL-813B

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.181	51.0	46.1	----	----	0.0	79.0	66.0	51.0	46.1	----	----
0.207	51.3	47.9	----	----	0.0	79.0	66.0	51.3	47.9	----	----
0.270	51.3	51.0	----	----	0.0	79.0	66.0	51.3	51.0	----	----
1.130	43.8	41.8	----	----	0.0	73.0	60.0	43.8	41.8	----	----
1.726	43.4	41.6	----	----	0.0	73.0	60.0	43.4	41.6	----	----
20.000	37.8	38.9	----	----	0.0	73.0	60.0	37.8	38.9	----	----

Model No. PCL-818H

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.185	37.9	41.2	----	----	0.0	79.0	66.0	37.9	41.2	----	----
0.212	38.1	41.9	----	----	0.0	79.0	66.0	38.1	41.9	----	----
0.273	51.6	51.7	----	----	0.0	79.0	66.0	51.6	51.7	----	----
1.821	43.4	44.2	----	----	0.0	73.0	60.0	43.4	44.2	----	----
15.978	51.7	52.3	----	----	0.0	73.0	60.0	51.7	52.3	----	----
20.012	47.5	47.6	----	----	0.0	73.0	60.0	47.5	47.6	----	----

Model No. PCL-711B

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.185	48.3	51.9	----	----	0.0	79.0	66.0	48.3	51.9	----	----
0.205	46.2	51.7	----	----	0.0	79.0	66.0	46.2	51.7	----	----
0.273	52.3	52.1	----	----	0.0	79.0	66.0	52.3	52.1	----	----
1.813	41.8	44.5	----	----	0.0	73.0	60.0	41.8	44.5	----	----
15.960	37.5	34.3	----	----	0.0	73.0	60.0	37.5	34.3	----	----
20.000	49.6	52.4	----	----	0.0	73.0	60.0	49.6	52.4	----	----

Model No. PCL-818HD

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.176	45.3	48.2	----	----	0.0	79.0	66.0	45.3	48.2	----	----
0.223	42.1	46.7	----	----	0.0	79.0	66.0	42.1	46.7	----	----
0.276	45.3	48.5	----	----	0.0	79.0	66.0	45.3	48.5	----	----
1.813	37.1	37.3	----	----	0.0	73.0	60.0	37.1	37.3	----	----
11.975	34.0	32.3	----	----	0.0	73.0	60.0	34.0	32.3	----	----
15.970	33.8	34.6	----	----	0.0	73.0	60.0	33.8	34.6	----	----

Model No. PCL-1800

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.185	45.8	48.0	----	----	0.0	79.0	66.0	45.8	48.0	----	----
0.203	42.0	56.6	----	----	0.0	79.0	66.0	42.0	56.6	----	----
0.270	45.6	47.4	----	----	0.0	79.0	66.0	45.6	47.4	----	----
1.131	37.6	36.6	----	----	0.0	73.0	60.0	37.6	36.6	----	----
17.260	38.2	39.2	----	----	0.0	73.0	60.0	38.2	39.2	----	----
15.979	35.6	35.6	----	----	0.0	73.0	60.0	35.6	35.6	----	----

Model No. PCL-818L

Freq.	Meter Reading (dBuV)				Factor	Limit (dBuV)		Result (dBuV)			
	Q.P. Value		AVE. Value			Q.P.	AVE.	Q.P. Value		AVE. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.185	40.8	43.6	----	----	0.0	79.0	66.0	40.8	43.6	----	----
0.207	36.8	41.6	----	----	0.0	79.0	66.0	36.8	41.6	----	----
0.270	40.6	41.6	----	----	0.0	79.0	66.0	40.6	41.6	----	----
1.810	32.6	33.4	----	----	0.0	73.0	60.0	32.6	33.4	----	----
11.975	33.0	32.2	----	----	0.0	73.0	60.0	33.0	32.2	----	----
15.980	34.0	34.8	----	----	0.0	73.0	60.0	34.0	34.8	----	----

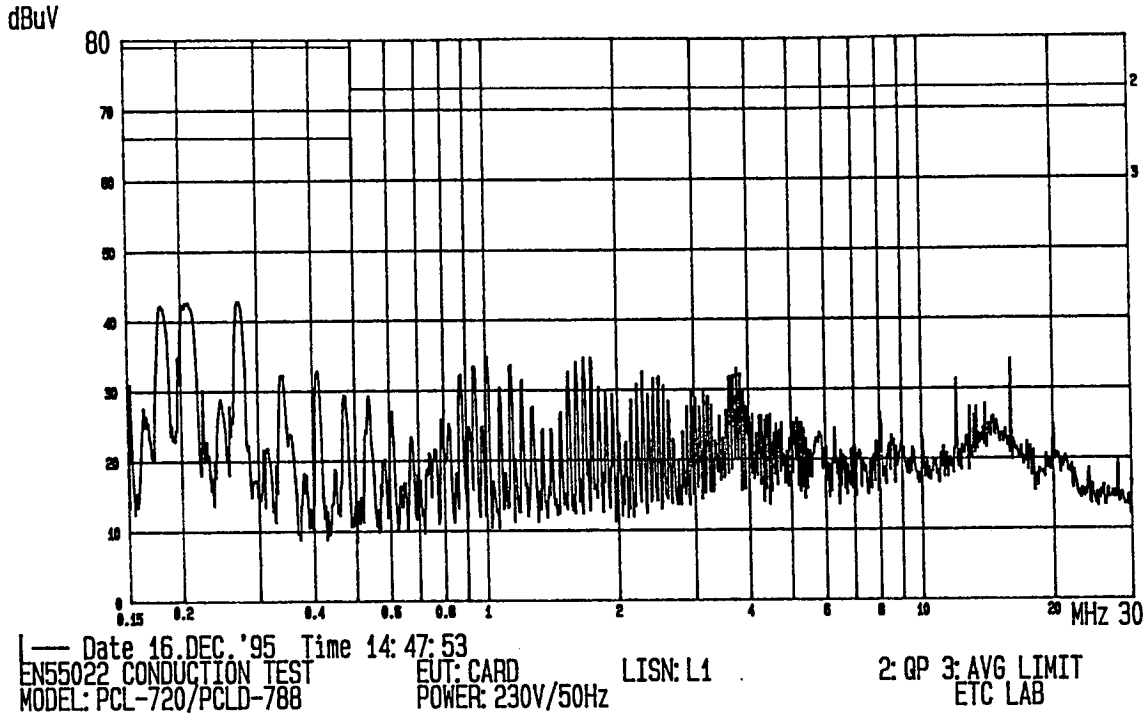
Notes : 1) Place of Measurement : ETC's Shielded Room, 40 cm table height

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 - 30 MHz (PCLD-788)



Date 16.DEC.'95 Time 14:47:53
EN55022 CONDUCTION TEST
MODEL: PCL-720/PCLD-788
EUT: CARD
POWER: 230V/50Hz
LISN: L1
2: QP 3: AVG LIMIT
ETC LAB

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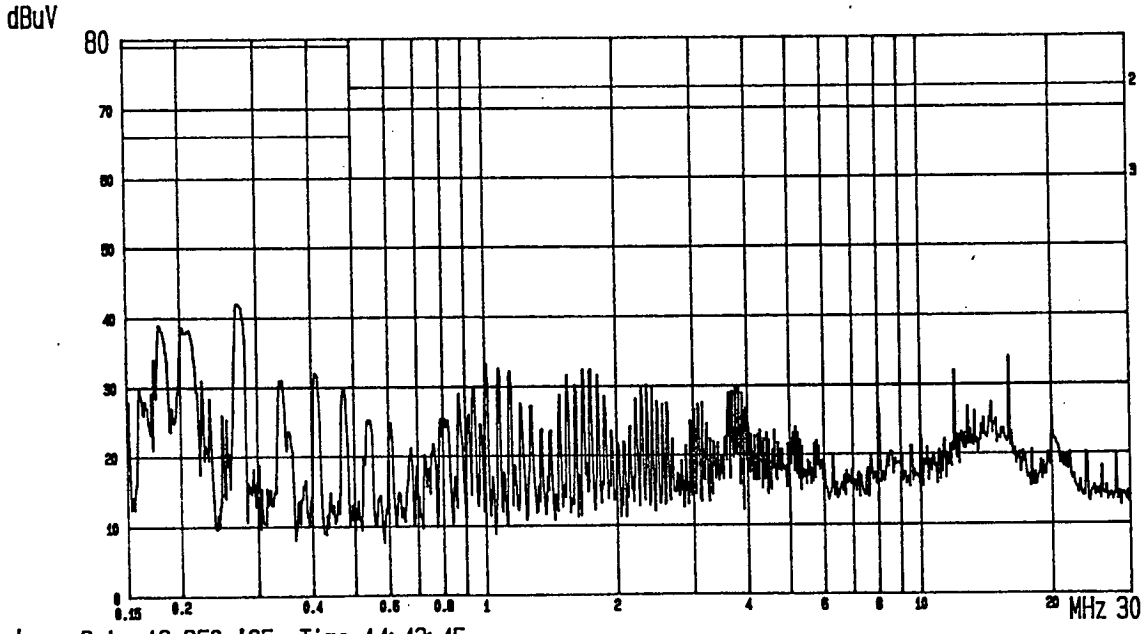
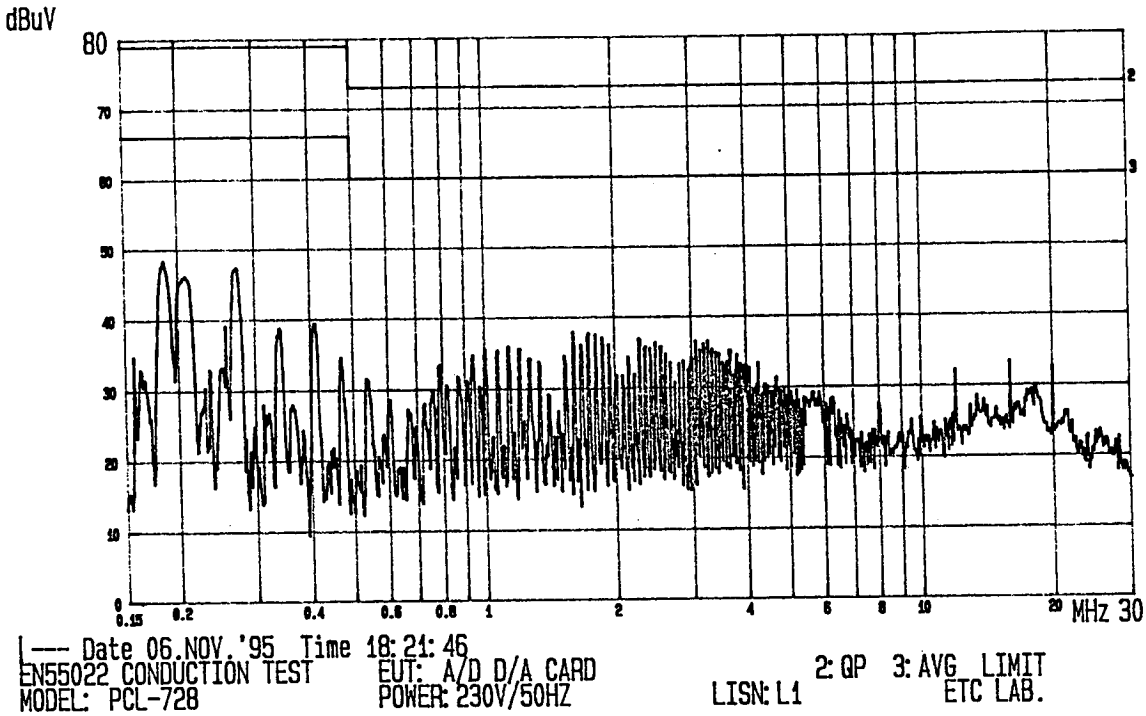


Date 16.DEC.'95 Time 14:43:45
EN55022 CONDUCTION TEST
MODEL: PCL-720/PCLD-788
EUT: CARD
POWER: 230V/50Hz
LISN: N
2: QP 3: AVG LIMIT
ETC LAB

Figure 2: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-728)



|--- Date 06.NOV.'95 Time 18:21:46
EN55022 CONDUCTION TEST EUT: A/D D/A CARD 2:QP 3:AVG LIMIT
MODEL: PCL-728 POWER: 230V/50HZ LISN: L1 ETC LAB.

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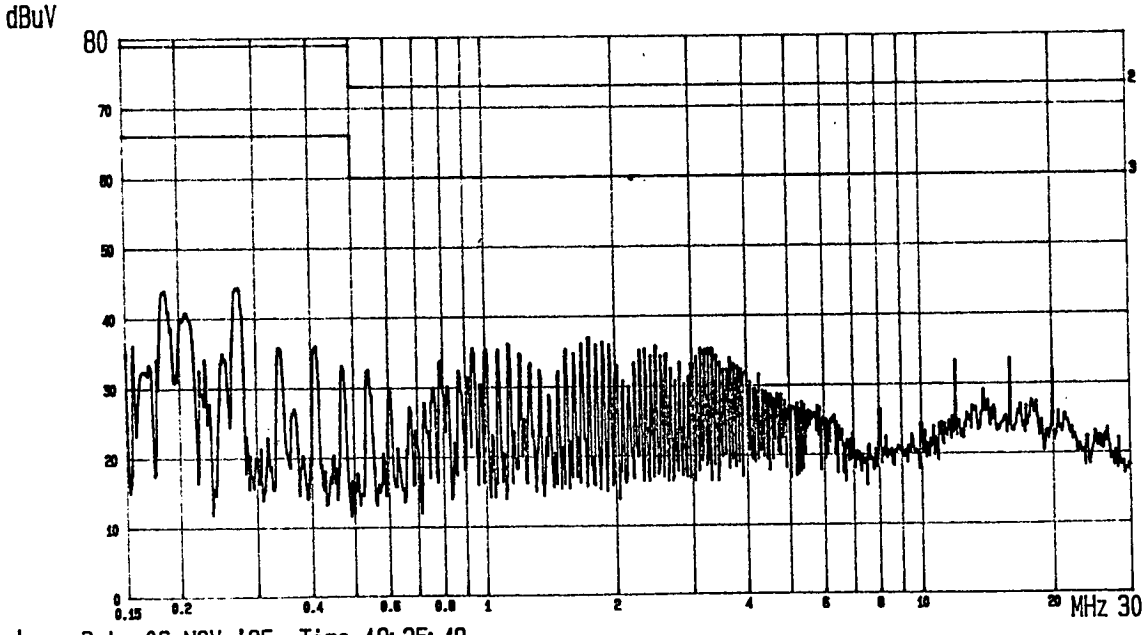
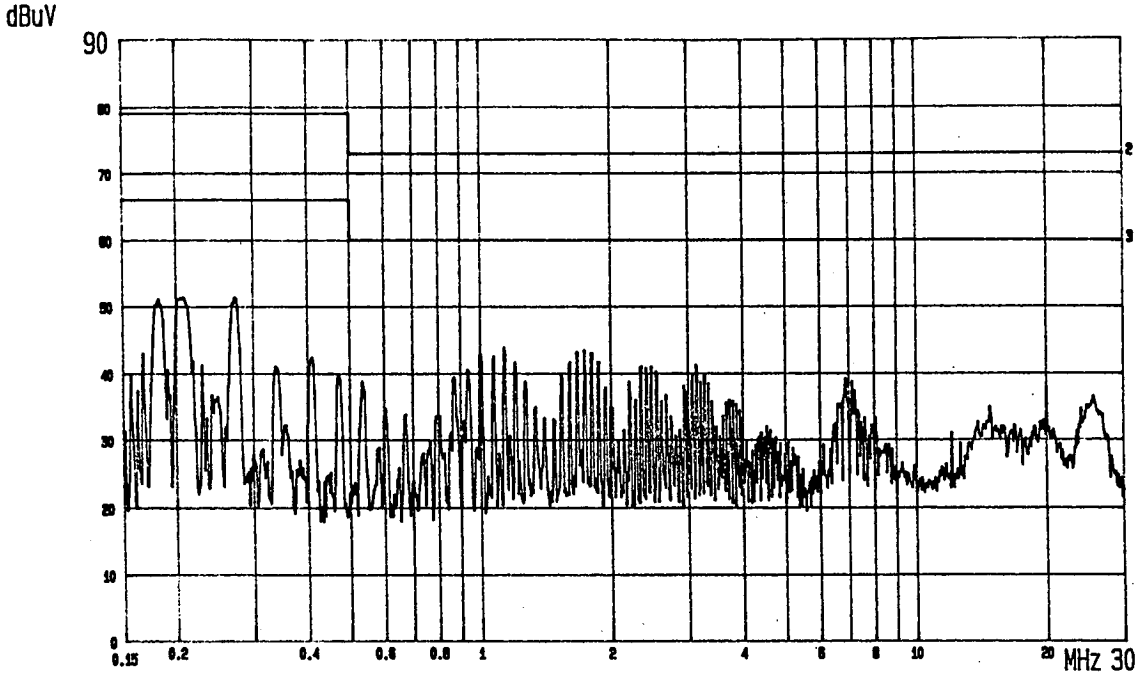


|--- Date 06.NOV.'95 Time 18:25:48
EN55022 CONDUCTION TEST EUT: A/D D/A CARD 2:QP 3:AVG LIMIT
MODEL: PCL-728 POWER: 230V/50HZ LISN: N ETC LAB.

Figure 3: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-813B)



|--- Date 27.OCT '95 Time 19:56:01
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-813B+881 POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: L1 ETC LAB

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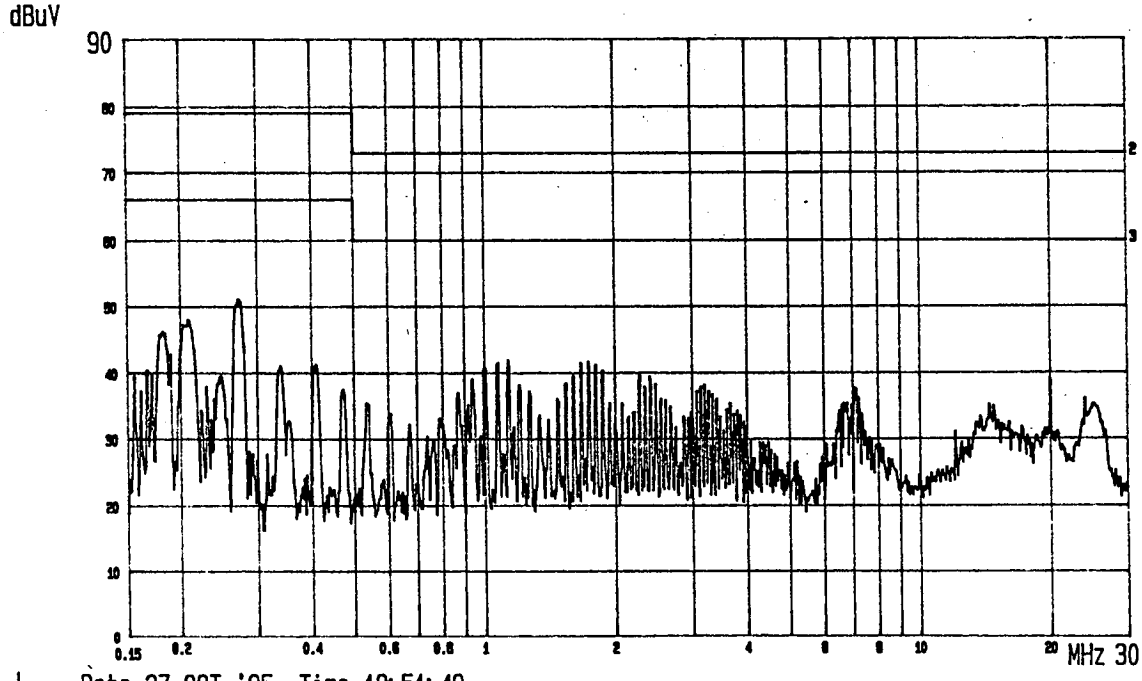
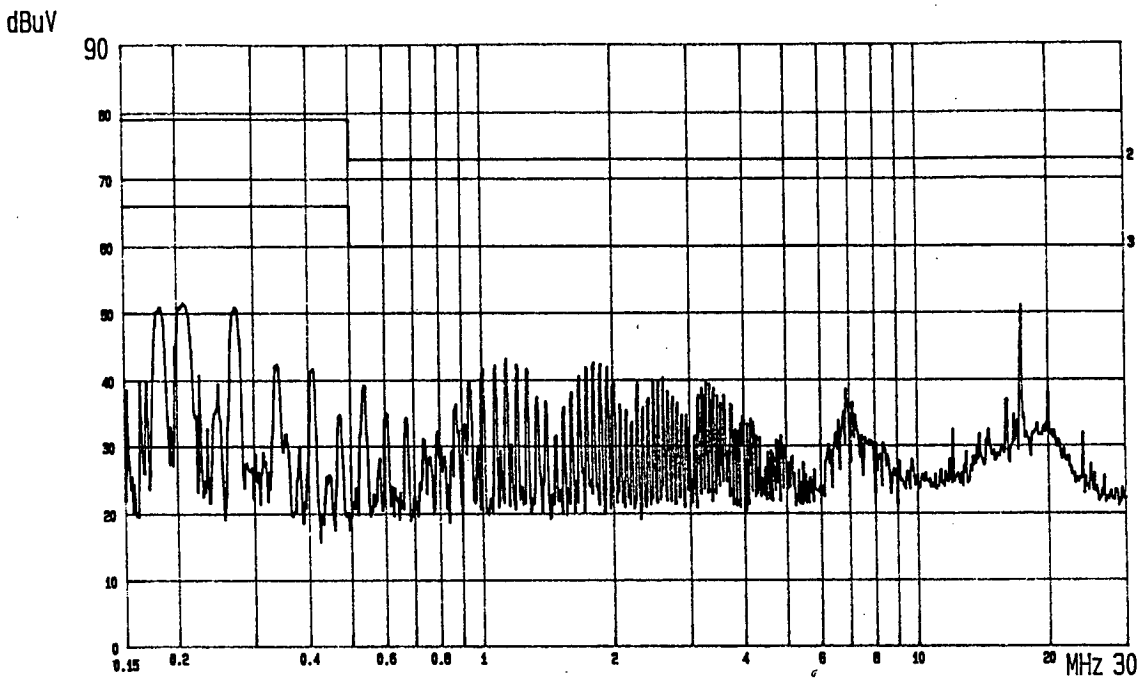


|--- Date 27.OCT '95 Time 19:51:49
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-813B+881 POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: N ETC LAB

Figure 4: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-818H)



|--- Date 27.OCT '95 Time 19:29:04
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-818H POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: L1 ETC LAB

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Product Safety GmbH
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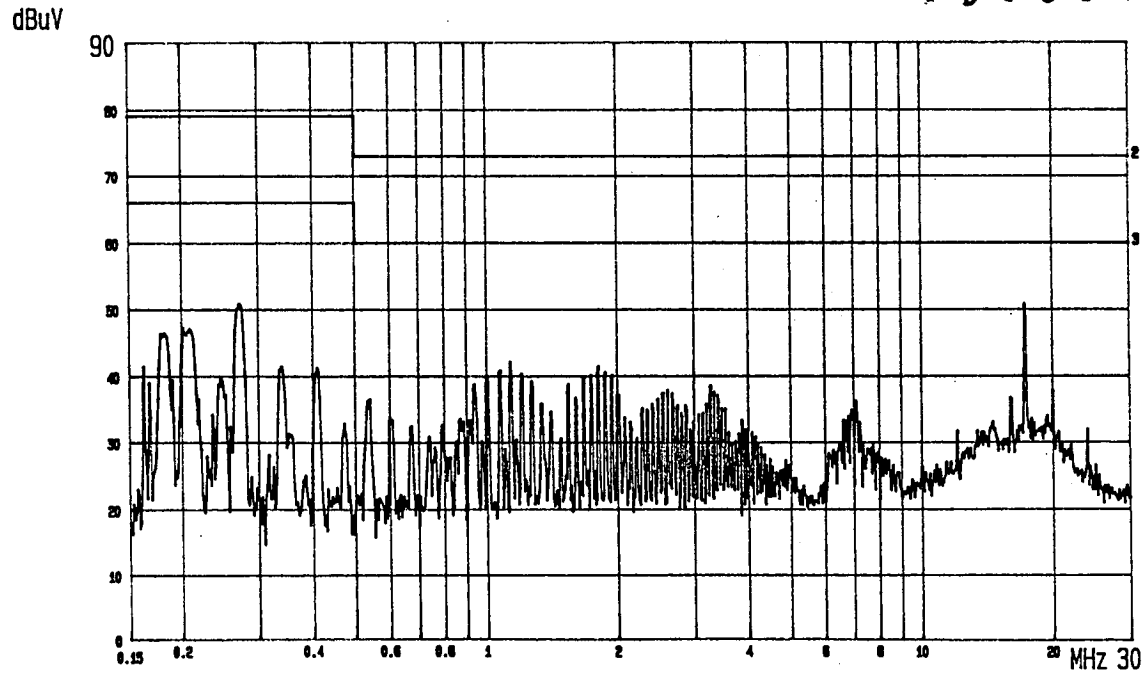
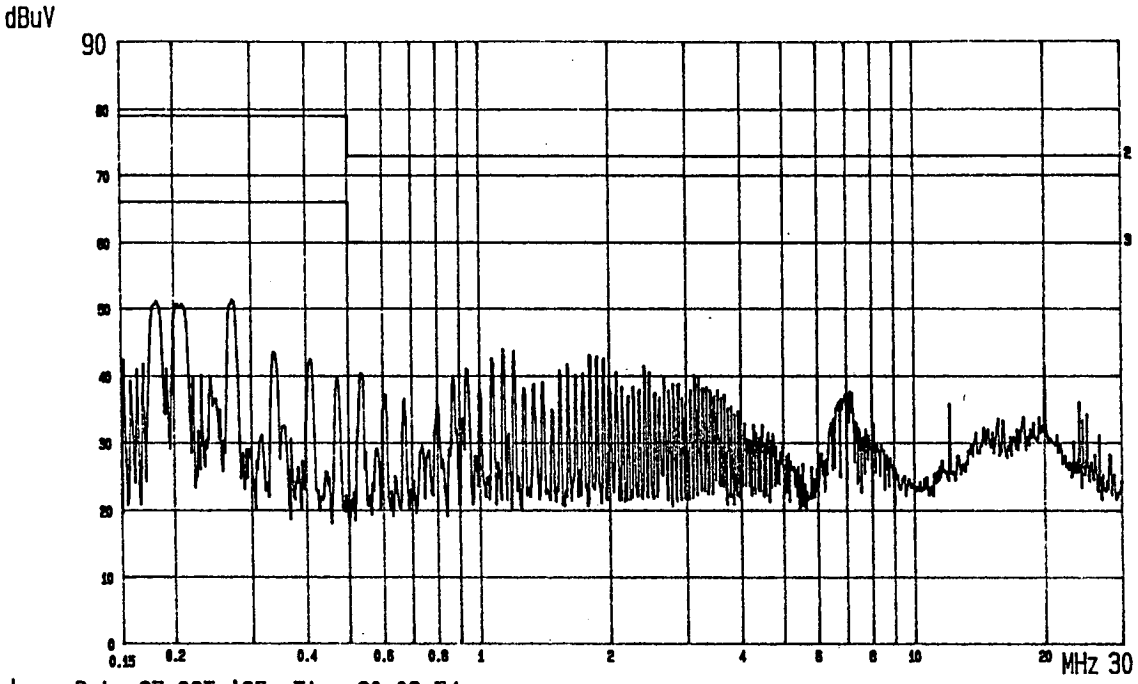


|--- Date 27.OCT '95 Time 19:33:24
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-818H POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: N ETC LAB

Figure 5: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-711B)



|--- Date 27.OCT '95 Time 20:03:54
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-711B+7115 POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: L1 ETC LAB

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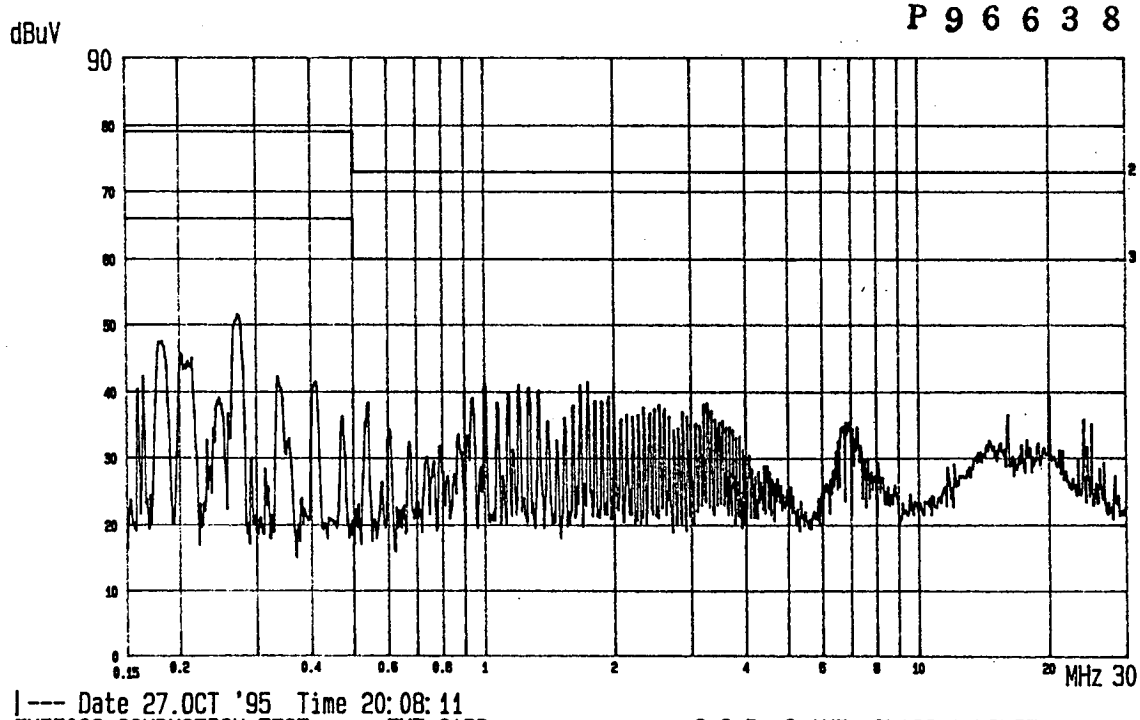
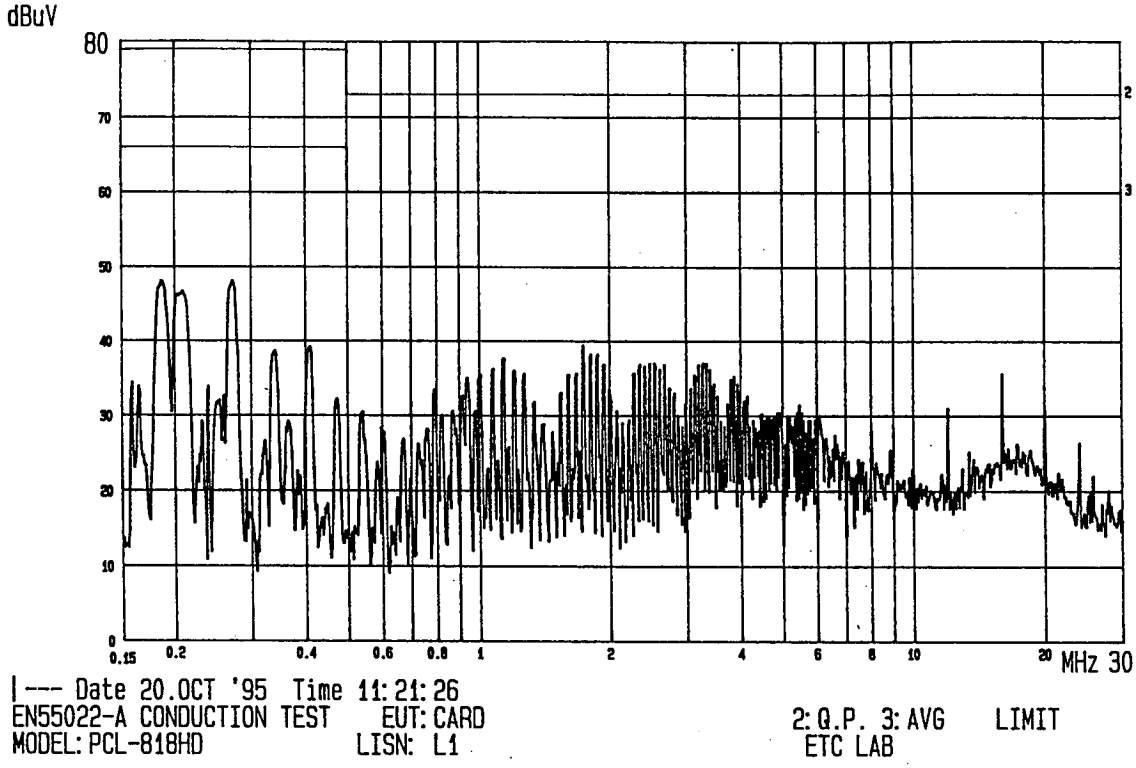


|--- Date 27.OCT '95 Time 20:08:11
EN55022 CONDUCTION TEST EUT: CARD
MODEL: PCL-711B+7115 POWER: 230V/50HZ

2: Q.P. 3: AVE CLASS A LIMIT
LISN: N ETC LAB

Figure 6: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-818HD)



|--- Date 20.OCT '95 Time 11:21:26
EN55022-A CONDUCTION TEST EUT: CARD
MODEL: PCL-818HD LISN: L1

2: Q.P. 3: AVG LIMIT
ETC LAB

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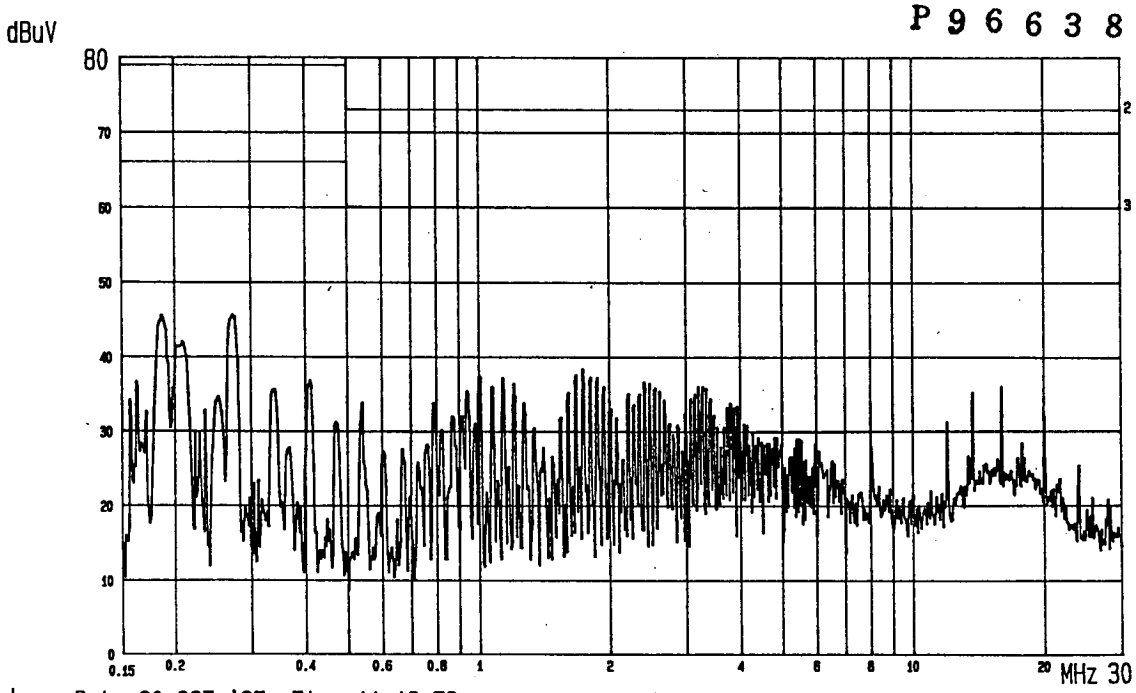
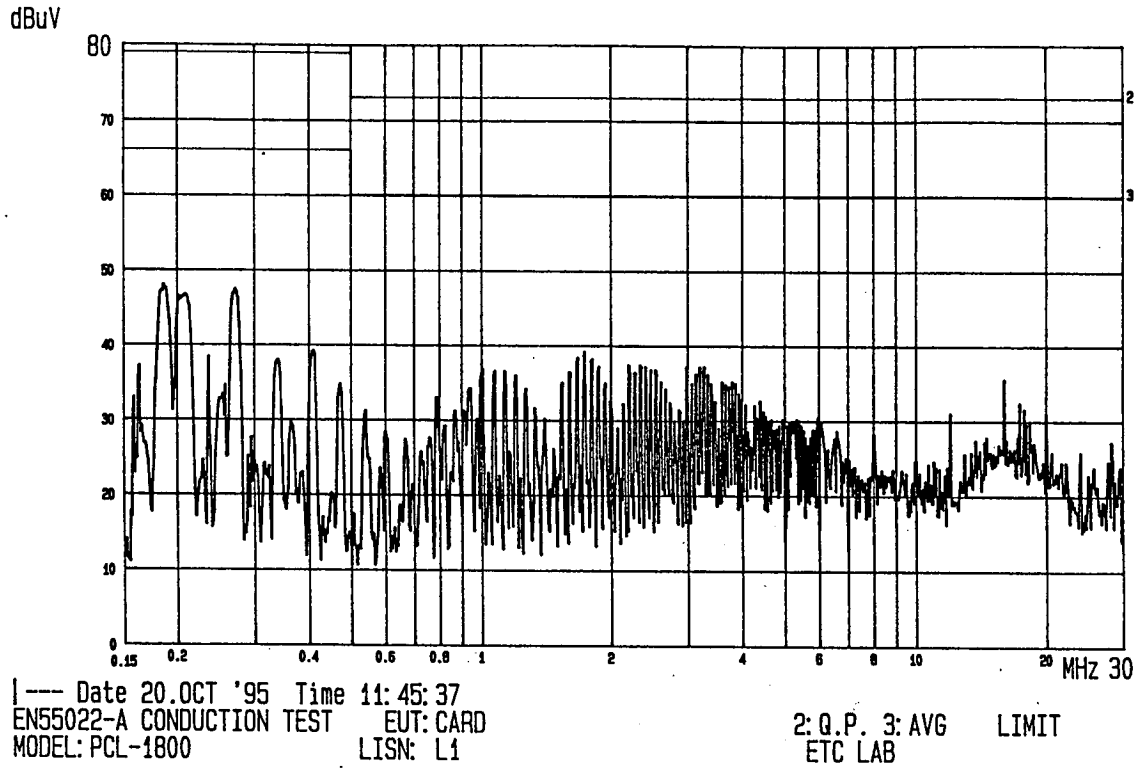


|--- Date 20.OCT '95 Time 11:16:53
EN55022-A CONDUCTION TEST EUT: CARD
MODEL: PCL-818HD LISN: N

2: Q.P. 3: AVG LIMIT
ETC LAB

Figure 7: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-1800)



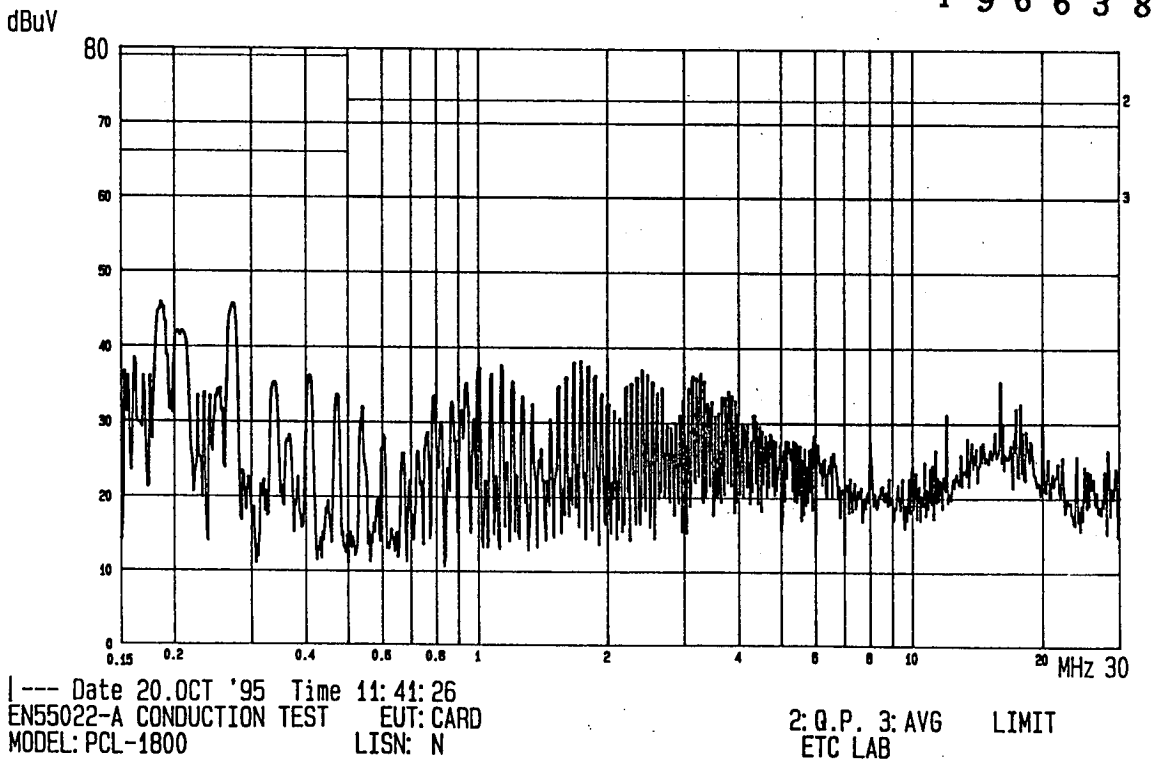
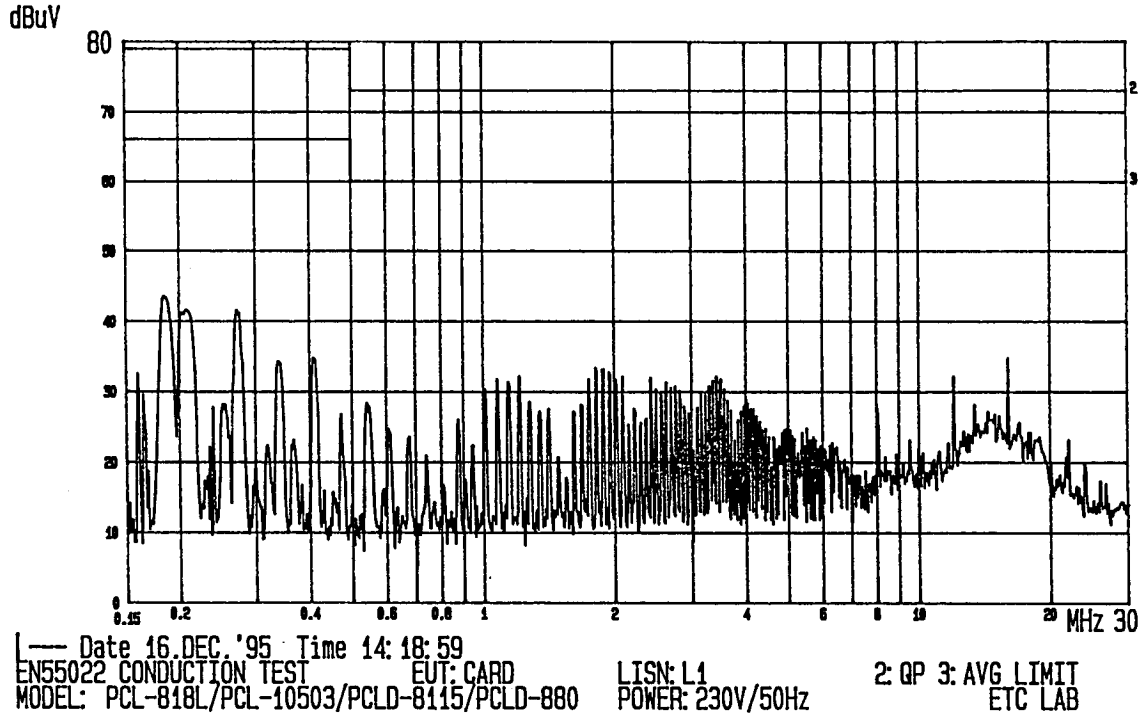


Figure 8: Conducted Emission, AC Mains; 0.15 - 30 MHz (PCL-818L)



Date 16.DEC.'95 Time 14:18:59
EN55022 CONDUCTION TEST EUT: CARD LISN: L1 2: QP 3: AVG LIMIT
MODEL: PCL-818L/PCL-10503/PCLD-8115/PCLD-880 POWER: 230V/50Hz ETC LAB

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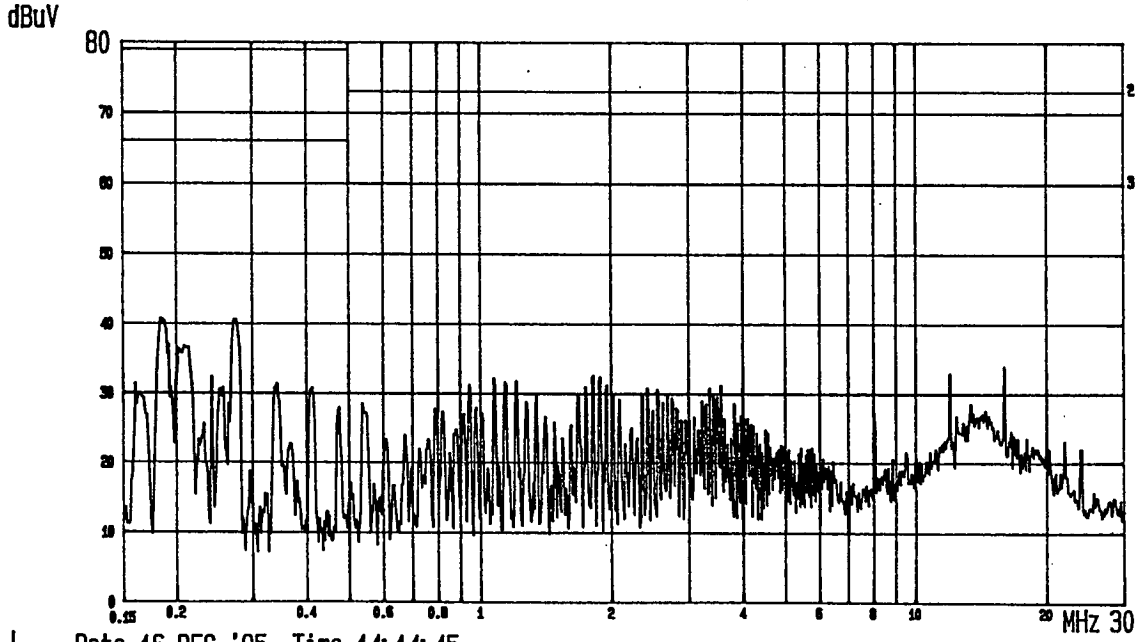


Date 16.DEC.'95 Time 14:14:45
EN55022 CONDUCTION TEST EUT: CARD LISN: N 2: QP 3: AVG LIMIT
MODEL: PCL-818L/PCL-10503/PCLD-8115/PCLD-880 POWER: 230V/50Hz ETC LAB

4.1.2. Radiated Emission

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

Result:	**PASS**

Test Setup

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

Disturbances other than those mentioned are small or not detectable.

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

Settings

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

Model No. PCLD-788

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
30.25	38.5	42.1	-12.7	25.8	29.4	40.0	-10.6
62.30	42.3	41.1	-13.9	28.4	27.2	40.0	-11.6
64.47	44.2	43.4	-13.9	30.3	29.5	40.0	-9.7
65.64	41.7	40.2	-13.9	27.8	26.3	40.0	-12.2
88.90	40.0	39.9	-13.7	26.3	26.2	40.0	-13.7
91.88	40.8	43.8	-13.4	27.4	30.4	40.0	-9.6

Model No. PCL-813B

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
126.93	35.2	37.8	-11.0	24.2	26.4	40.0	-13.2
130.17	39.4	39.8	-11.4	28.0	28.4	40.0	-11.6
135.03	41.7	44.5	-10.9	30.8	33.6	40.0	-6.4
143.13	38.1	35.9	-10.7	27.4	25.2	40.0	-12.6
151.77	35.5	35.9	-9.5	26.0	26.4	40.0	-13.6
158.79	33.6	34.0	-7.8	25.8	26.2	40.0	-13.8

Model No. PCL-728

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dB)
	Hor.	Vert.		Hor.	Vert.		
38.30	42.6	40.4	-13.6	29.0	26.8	40.0	-11.0
59.97	32.2	37.2	-14.0	18.2	23.2	40.0	-16.8
78.33	47.0	46.8	-17.0	30.0	29.8	40.0	-10.0
135.30	41.3	35.5	-10.9	30.4	24.6	40.0	-9.6
204.42	36.5	33.3	-9.9	26.6	23.4	40.0	-13.4
210.90	36.8	33.8	-10.6	26.2	23.2	40.0	-13.8
224.40	36.3	32.1	-9.9	26.4	23.2	40.0	-13.6

Model No. PCL-818H

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margmm (dB)
	Hor.	Vert.		Hor.	Vert.		
75.12	52.0	51.5	-17.2	34.8	34.3	40.0	-5.2
79.98	53.9	51.7	-16.8	37.1	34.9	40.0	-2.9
81.3	53.0	50.8	-16.8	36.2	34.0	40.0	-3.8
85.74	52.1	48.4	-15.8	36.3	32.6	40.0	-3.7
150.86	40.1	36.9	-10.0	30.1	26.9	40.0	-9.9
165.35	43.2	39.7	-6.6	36.6	33.1	47.0	-3.4

Model No. PCL-711B

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margmm (dB)
	Hor.	Vert.		Hor.	Vert.		
39.18	42.2	45.6	-13.8	28.4	31.8	40.0	-8.2
58.98	43.1	48.4	-13.9	29.2	34.5	40.0	-5.5
73.08	48.6	51.1	-17.2	31.4	33.9	40.0	-6.1
74.40	45.3	49.2	-17.2	28.1	32.0	40.0	-8.0
133.22	44.3	37.0	-10.9	33.4	26.1	40.0	-6.6
164.18	32.7	44.0	-6.7	26.0	37.3	40.0	-2.7

Model No. PCL-818HD

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margmm (dB)
	Hor.	Vert.		Hor.	Vert.		
55.26	37.4	40.3	-13.2	24.2	27.1	40.0	-12.9
73.77	45.0	44.9	-17.2	27.8	27.7	40.0	-12.2
133.66	30.4	32.0	-10.9	19.5	21.1	40.0	-18.9
136.34	31.5	33.2	-10.5	21.0	22.7	40.0	-17.3
144.08	39.7	36.0	-10.5	29.2	25.5	40.0	-10.8
146.10	33.5	37.1	-10.3	23.2	26.8	40.0	-13.2

Model No. PCL-1800

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margmm (dB)
	Hor.	Vert.		Hor.	Vert.		
47.88	40.8	44.9	-12.6	28.2	32.3	40.0	-7.7
66.60	40.4	46.7	-13.9	26.5	32.8	40.0	-7.2
70.86	43.9	49.6	-16.6	27.3	33.0	40.0	-7.0
72.78	46.6	64.9	-17.2	29.4	35.5	40.0	-4.5
85.98	41.4	48.3	-15.8	25.6	32.5	40.0	-7.5
133.63	35.6	44.6	-10.9	24.7	33.7	40.0	-6.3

Model No. PCL-818L

Emission Frequency (MHz)	Meter Reading (dBuV)		Corr'd Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)	Margmm (dB)
	Hor.	Vert.		Hor.	Vert.		
57.9	50.4	45.3	-13.7	36.7	31.6	40.0	-3.3
121.5	40.8	46.5	-9.8	31.0	36.7	40.0	-3.3
137.5	41.1	43.5	-10.6	30.5	33.0	40.0	-7.0
153.5	38.7	41.3	-8.9	29.8	32.4	40.0	-7.6
158.9	34.8	41.0	-7.8	27.0	33.2	40.0	-7.8
167.9	33.0	42.7	-6.6	26.4	36.1	40.0	-3.9

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

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

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

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

5) Calculation: Meter Reading + Factor = Result

4.2. Disturbances in Supply Systems

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 range from 0 to 2 kHz were not measured because the EUTs as A/D-, D/A- Boards for an industrial PC are 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 EUTs as A/D-, D/A- Boards for an industrial PC are not in the scope of EN 60 555-3.

5. Test Results IMMUNITY

Result:	PASS

5.1. Enclosure port

5.1.1. Radio-Frequency Electromagnetic Field

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

Result:	PASS

Test Setup

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

Temperature	26 °C
Relative Humidity	55 %

Table 3: Radio-Frequency Electromagnetic Field; 27 - 270 MHz

Settings

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

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

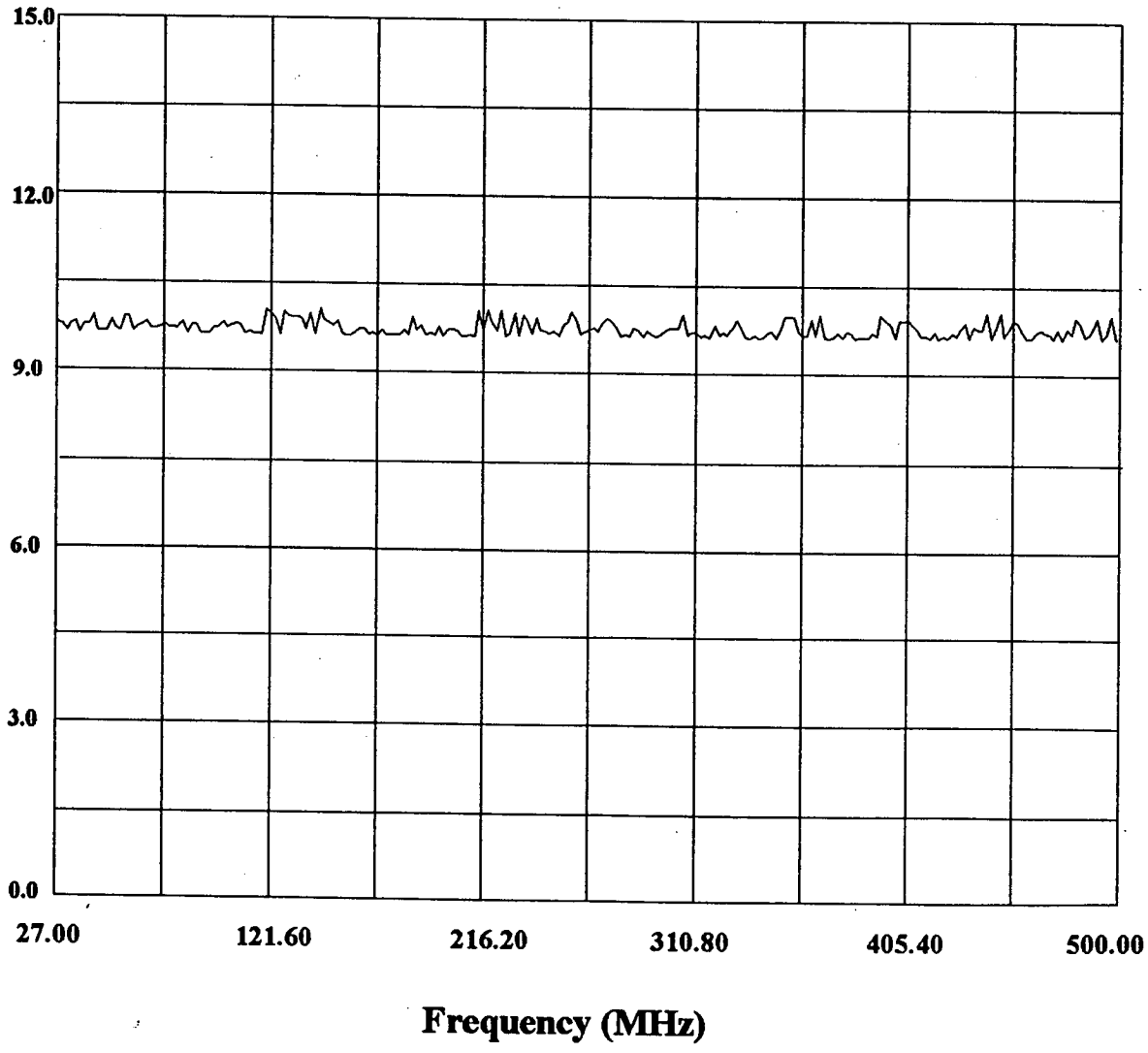
Table 4: Radio-Frequency Electromagnetic Field; 270 - 500 MHz

Settings

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

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

Figure 9: Radiated Susceptibility, Field Calibration



5.1.2. Electrostatic Discharge

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

Result:	**PASS**

Test Setup

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

The data displayed on the monitor screen for all boards tested, was found to be a little "noisy" (visually) during the test but recovered directly after the test.

5.2. Input and Output AC Power Ports

5.2.1. Fast Transients Common Mode

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

Result:	**PASS**

Test Setup

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

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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

A disturbance was shown on the monitor screen for all models tested and as described on page 3 of this document in form of a visual noise during the test, recovering itself directly after the test.

5.3. Ports for Signal Lines

5.3.1. Fast Transients Common Mode

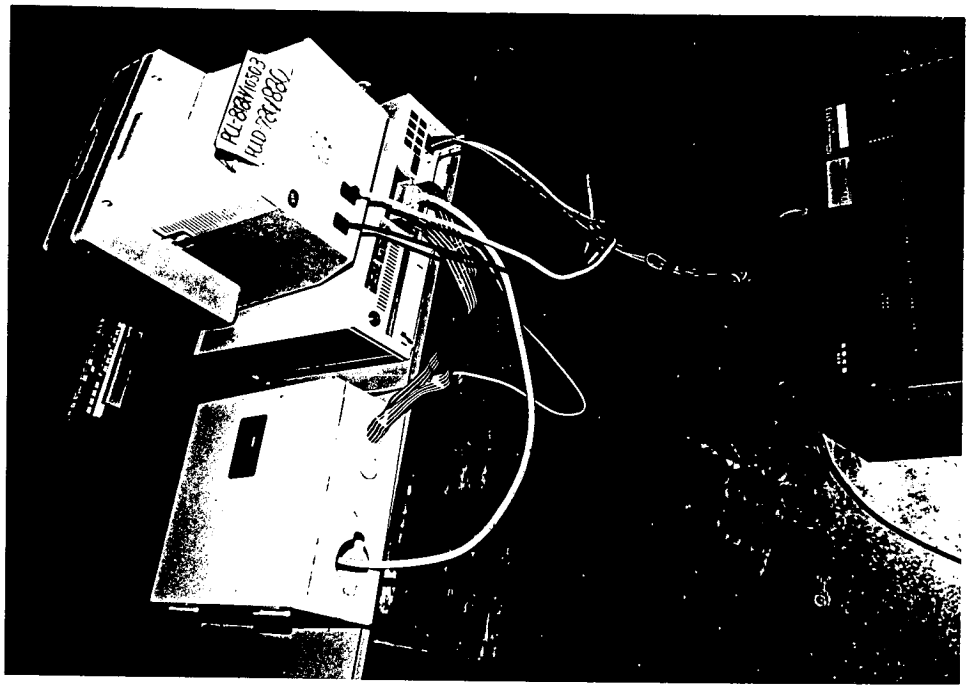
Port:	Signal Lines	
Basic Standard:	IEC 801-4	
Performance Criteria:	B	
Test Specification:	prEN 50 082-2	
	Peak Voltage:	1 kV (= level 2 of IEC 801-4)
	T_r/T_n	5/50 ns
	Burst Duration:	15 ms
	Rep. frequency:	5 kHz
	Coupling:	Capacitive Clamp

Result:	N/A

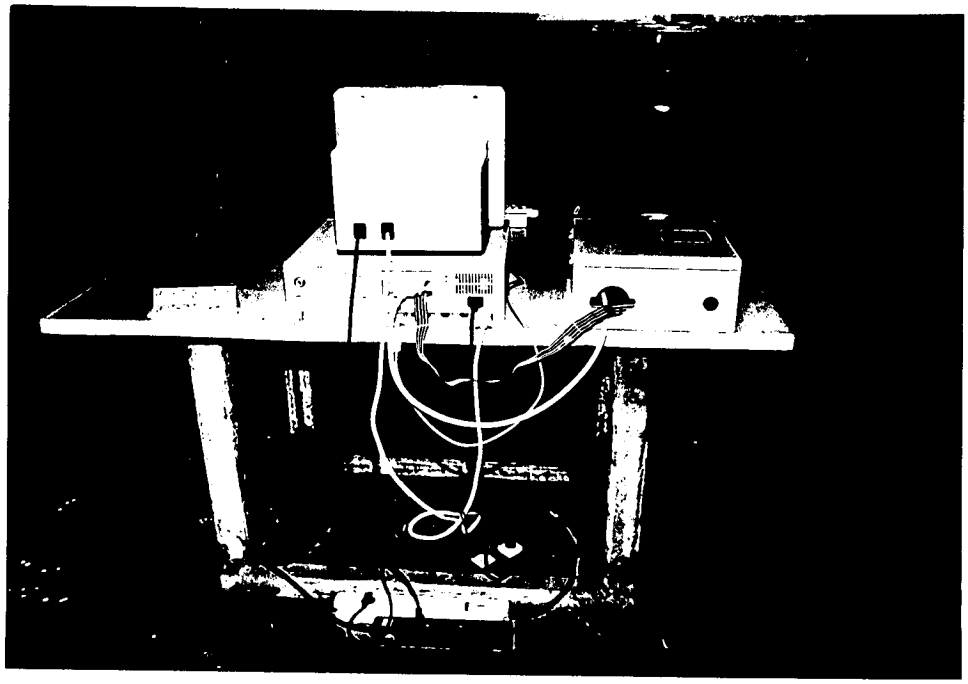
This test is not applicable to the signal lines since the interconnection cables and signal cables, respectively, have a length less than 3 m.

6. Photographs of the Test Set-up

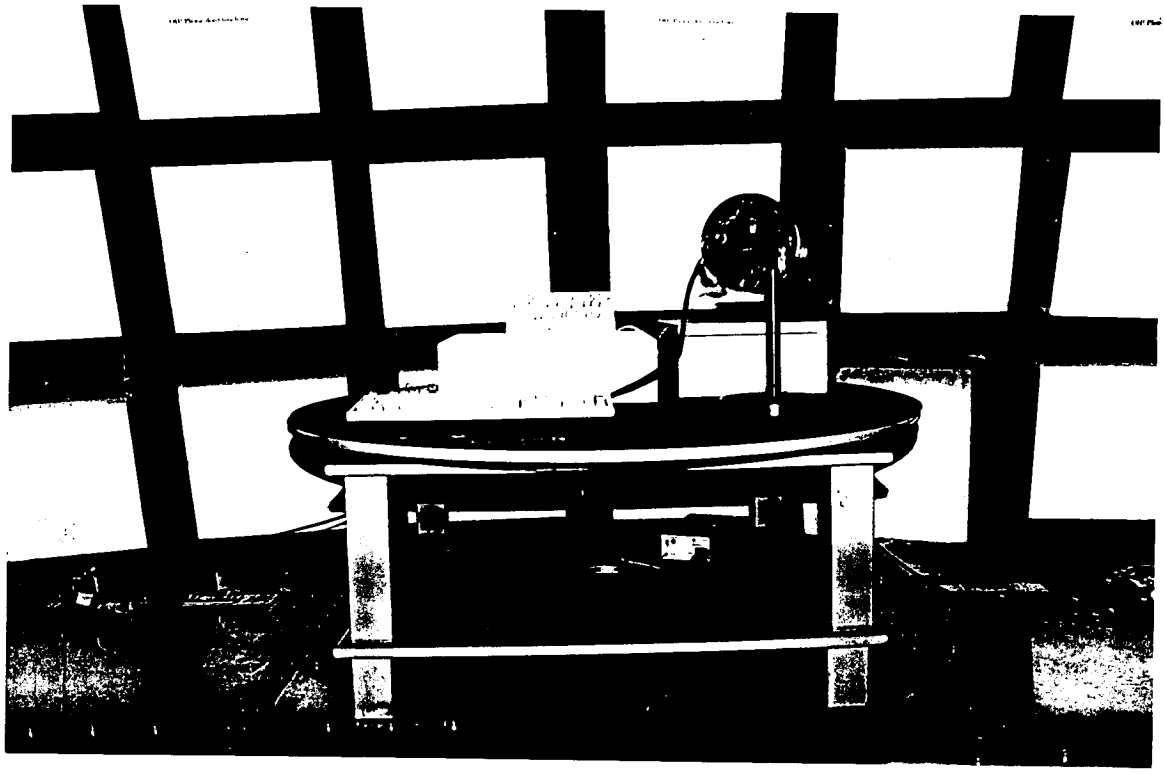
Picture 1: Conducted Emission



Picture 2: Radiated Emission



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



Picture 4: Electrostatic Discharge

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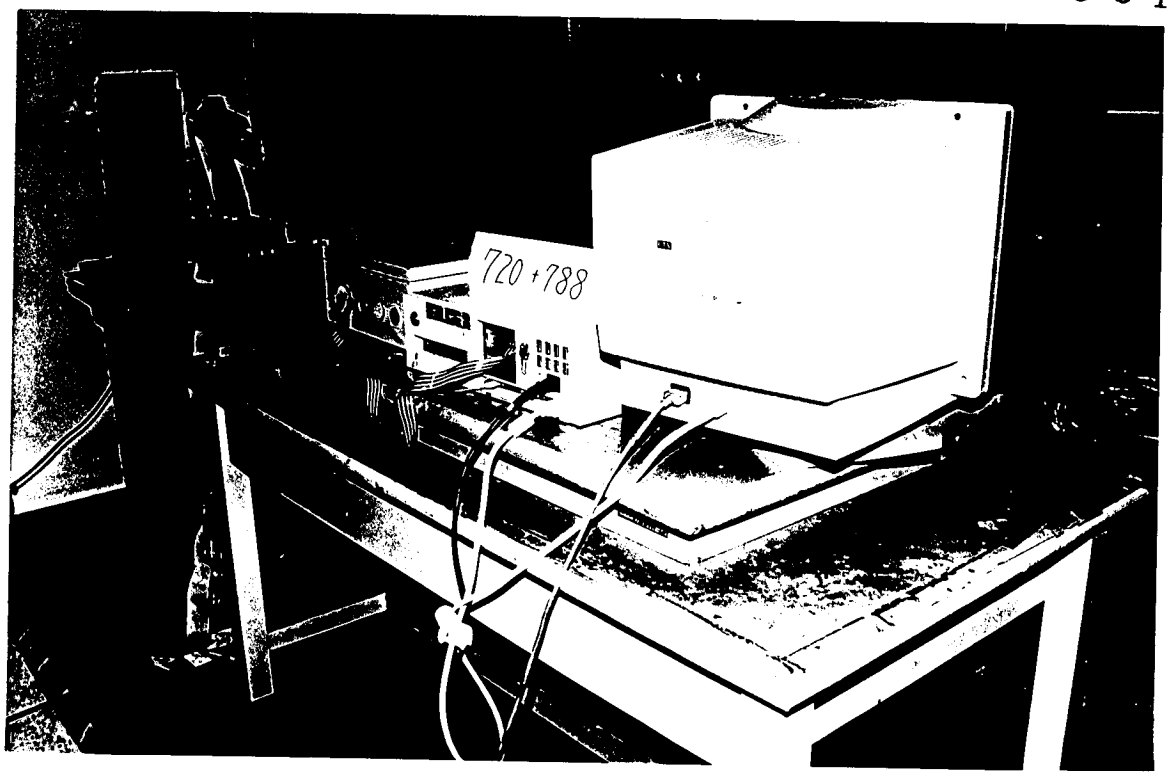
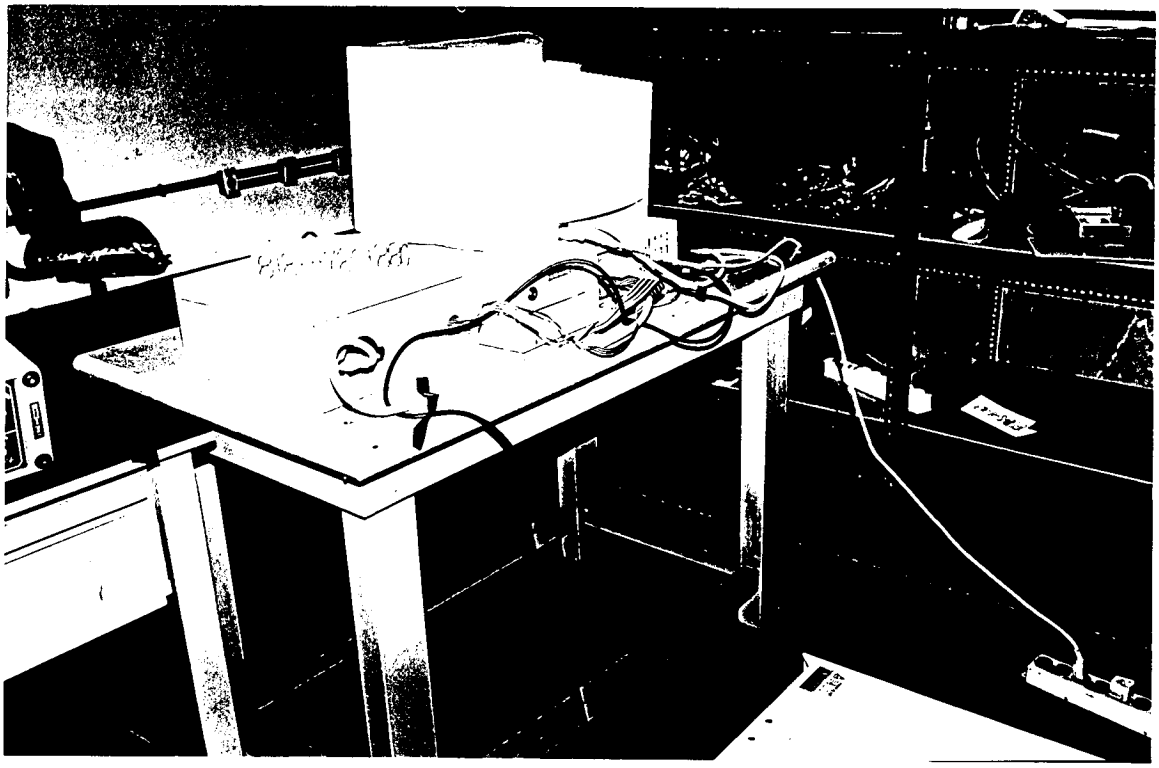


Picture 5: Fast Transients on AC Mains



7. List of Tables

8. List of Figures

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Segahon 04.06. 96
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