

TÜV Rheinland Product Safety GmbH
(TRPS)
Am Grauen Stein
Konstantin-Wille-Str. 1
51105 Köln
Fed. Rep. of Germany



Certificate of Compliance

No. 9764861-9710

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 Road, Shin-Tien City, Taipei Hsien 231,
Taiwan, R.O.C.

has successfully demonstrated that its product

CPU Card
PCA-6167, PCA-6135

is in compliance with
EN 50 082-2:1995, EN 55 022:1994/A1:1995 Class A
as described in the Technical Report P 9764861E01.

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.

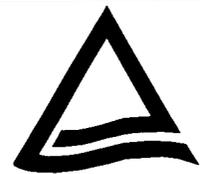
Taipei, 06.10.1997



Certification Body

Dipl.-Ing. A. Klinker

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



Testreport No: P9764861E01

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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, R.O.C.

Kind of Equipment: CPU Card

Type Designation: PCA-6167, PCA-6135

Standard: EN 50 082-2:1995 EN 55 022:1994/A1:1995 Class A

Date of Testing: 23.08. - 02.09.1997

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

Der Sachverständige:
tested by

überprüft:
reviewed by

07.10.97 *Saul Lu* den 6.10 1997
Date, signature TÜV Rheinland Product Safety GmbH

02.10.97 *Ree Gos*
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

Advance Data Technology (ADT) Corporation

No. 47, 14 Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei, 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 All -in-One CPU Cards with the model designations **PCA-6135** and **PCA-6167**, intended for use as a peripheral card composing of the Industrial Workstation in a light and heavy industry environment.

On -board ALI M6117 - 386SX-40 CPU and on - board SVGA/LCD controller mounted on the **PCA-6135** CPU board; Intel Pentium series - Pro 150/166/180/200/266MHz types of CPU can be plugged into the **PCA-6167** CPU board.

Since the EUTs are all called CPU card but have different design for each CPU card, all mentioned models are following all the necessary tests as described hereafter.

2.2. Rating and Physical Characteristics

Input Voltage:	+5 Vdc (4.75-5.25V)
Protection Class:	Class III

2.3. Sources of Interference

1. Fundamental operating frequencies on CPU cards.
2. Switch. frequ. of the internal Power Supply of IPC-610 (A) (access. equipm. during testing).
3. Pulses on clock or other lines of peripheral cards in IPC 610 (A) (access. equipm. during testing).

2.4. Noise Suppression Parts

1. Only within switching power supply of the IPC-610 (A).

2.5. Submitted Documents

- 1) Specification
- 2) Construction drawings
- 3) Photographic documentation

3. Measurement Conditions

3.1. Modes of Operation

The subject EUTs were plugged into an Industrial PC and set up as described in the next paragraph. A test program (set up by the manufacturer) was run during all tests to activate the printer and the modem, respectively.

The each EUT was tested with the following configurations:

Model PCA-6167

Peripherals	Brand Name	Model Number
Chassis	Advantech	IPC-610 (A)
Backplane	Advantech	13 slots PCI/ISA
Power Supply	Syknet	ADT-930C (300W)
HDD	Conner	CCCVX98 (210MB)
FDD	Teac	FD-235HF
CPU on PCA-6167	Intel	Pentium Pro 200
Video Display Card	Cirrus Logic	CL-GD5429-86QC-B

Model PCA-6135

Peripherals	Brand Name	Model Number
Chassis	Advantech	IPC-610 (A)
Backplane	Advantech	13 slots PCI/ISA
Power Supply	Syknet	ADT-930C (300W)
HDD	Conner	CCCVX98 (210MB)
FDD	Teac	FD-235HF
CPU on PCA-6135	ALI	M6117B
Video Display Card	N/A	N/A

3.2. Additional Equipment

The EUT was tested together with the following additional equipment:

FOR EMISSION TEST

Product	Manufacturer	Model No.	Serial No.	I/O Cable
PERSONAL COMPUTER	ADVANTECH	INDUSTRIAL PC-610	N/A	Nonshielded Power
MONITOR	OPTIQUEST	4500DC	3651700126	Shielded Signal Nonshielded Power
KEYBOAR D	TATUNG	FDA-102A	4001379	Shielded Signal
PRINTER	HP	2225C	2949S63865	Shielded Signal Nonshielded Power
MODEM	HAYES	231AA	A00531003166	Shielded signal Nonshielded Power
MODEM	DATATRONICS	1200CK	07-503069	Shielded signal Nonshielded Power

FOR IMMUNITY TEST

Product	Manufacturer	Model No.	Serial No.	I/O Cable
MONITOR	ACTION	MV-0951	N/A	Shielded Signal Nonshielded Power
KEYBOARD	HP	C3758A	C3758-60223	Shielded Signal
PRINTER	HP	C2145A	SG59N16035	N/A
MODEM	HP	C3758A	C3758-60223	Shielded Signal
MODEM	GVC	F-1128V+/R6	N/A	Shielded Signal

3.3. Test Setup

The test setup was realized on a table of 80 cm and 10 cm height, respectively, during all tests as described herein.

3.4. List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

For Conducted Emission:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
TEST RECEIVER	ROHDE & SCHWARZ	ESH3	833495/006	JULY 23, 1998
SPECTRUM MONITOR	ROHDE & SCHWARZ	EZM	893787/013	JULY 24, 1998
ARTIFICIAL MAINS NETWORK	ROHDE & SCHWARZ	ESH2-Z5	892107/003	JULY 22, 1998
L.I.S.N.	EMCO	3825/2	9204-1964	JULY 22, 1998

For Radiated Emission:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
SPECTRUM ANALYZER	HP	8594A	3144A00308	SEPT. 1, 1998
PREAMPLIFIER	HP	8447D	2944A08119	JULY 27, 1998
TEST RECEIVER	ROHDE & SCHWARZ	ESVP	893496/030	JULY 17, 1998
TUNABLE DIPOLE ANTENNA	SCHWARZBECK	VHA 9103 UHA 9105	E101051 E101055	NOV. 29, 1997
BILOG ANTENNA	CHASE	CBL6112	2086	DEC. 27, 1997
TURN TABLE	EMCO	1060	1195	N/A
TOWER	EMCO	1051	1263	N/A

For ESD:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
ESD TEST SYSTEM	KEYTEK	2000	9105240/41	AUG. 10, 1998
ESD SIMULATOR	KEYTEK	MZ-15/EC	92022232	JUNE 11, 1998

For Radiated/Conducted Susceptibility:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
SIGNAL GENERATOR	ROHDE & SCHWARZ	SMY01	840490/009	SEPT. 30, 1997
POWER AMPLIFIER	KALMUS	LA1000V	091995-1	N/A
POWER AMPLIFIER	KALMUS	757LC	091995-2	N/A
FIELD PROBE	HOLADAY	HI-4422	89915	SEPT. 11, 1997
BICONILOG ANTENNA	EMCO	3143	1116	N/A
COMPACT FULL ANECHOIC	COMTEST	CFAC	ADT-S01	AUG. 4, 1998

For EFT:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
EFT GENERATOR	KEYTEK	CE-40	9508257	SEPT. 11, 1997

For Magnetic Field Immunity:

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
MAGNETIC FIELD TESTER	HAFEELY	MAG 100.1	083794-06	N/A
MAGNETIC FIELD METER	COMBINOVA	MFM10	224	June 5, 1998

3.5. Abbreviations

PASS means 'complied with requirement'	N/A means 'not applicable'
FAIL means 'not complied'	N.C.R. means 'no calibration required'
A.M.N. means 'Artificial Mains Network'	L.I.S.N. means 'Line Impedance Stability Network'

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 into IPC
Operational mode: 'On'-mode, refer also to para.: 3.1 & 3.2
Earthing: through power cord of IPC

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

Settings

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

Model : PCA-6167

Freq. [MHz]	L1 Level [dB (µV)]		N Level [dB (µV)]		Limit [dB (µV)]		Margin [dB (µV)]			
	QP	AV	QP	AV	QP	AV	L1		N	
0.193	43.9	---	43.0	---	79.0	66.0	35.1	---	36.0	---
0.390	35.8	---	34.9	---	79.0	66.0	43.2	---	44.1	---
0.974	38.6	---	38.1	---	73.0	60.0	34.4	---	34.9	---
1.168	37.4	---	36.7	---	73.0	60.0	35.6	---	36.3	---
6.298	36.2	---	34.6	---	73.0	60.0	36.8	---	38.4	---
12.801	23.7	---	24.8	---	73.0	60.0	49.3	---	48.2	---

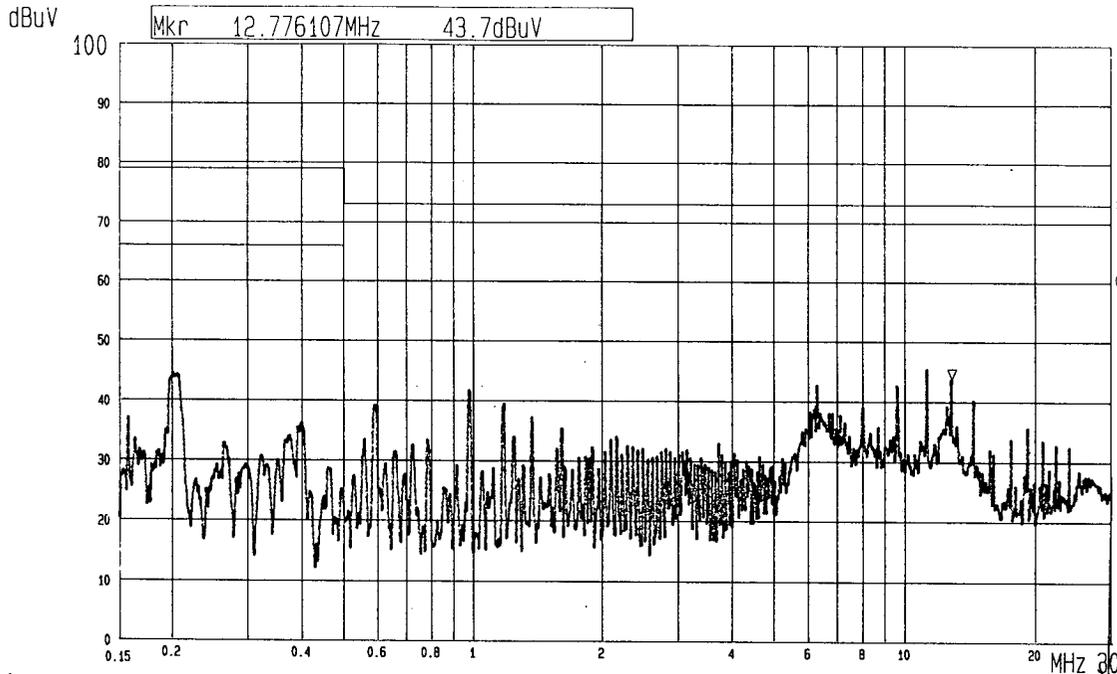
Model : PCA-6135

Freq. [MHz]	L1 Level [dB (µV)]		N Level [dB (µV)]		Limit [dB (µV)]		Margin [dB (µV)]			
	QP	AV	QP	AV	QP	AV	L1		N	
0.192	42.0	---	42.5	---	79.0	66.0	37.0	---	36.5	---
0.388	37.5	---	36.3	---	79.0	66.0	41.5	---	42.7	---
0.583	39.1	---	39.0	---	73.0	60.0	33.9	---	34.0	---
0.973	39.2	---	31.9	---	73.0	60.0	33.8	---	41.1	---
1.171	40.4	---	41.1	---	73.0	60.0	32.6	---	31.9	---
6.437	32.6	---	30.2	---	73.0	60.0	40.4	---	42.8	---

Remark: “---” means that the QP- values were found not to exceed the AV- limit, therefore no any AV- measurements were carried out.

Refer to next figures for Peak- Measurements in details.

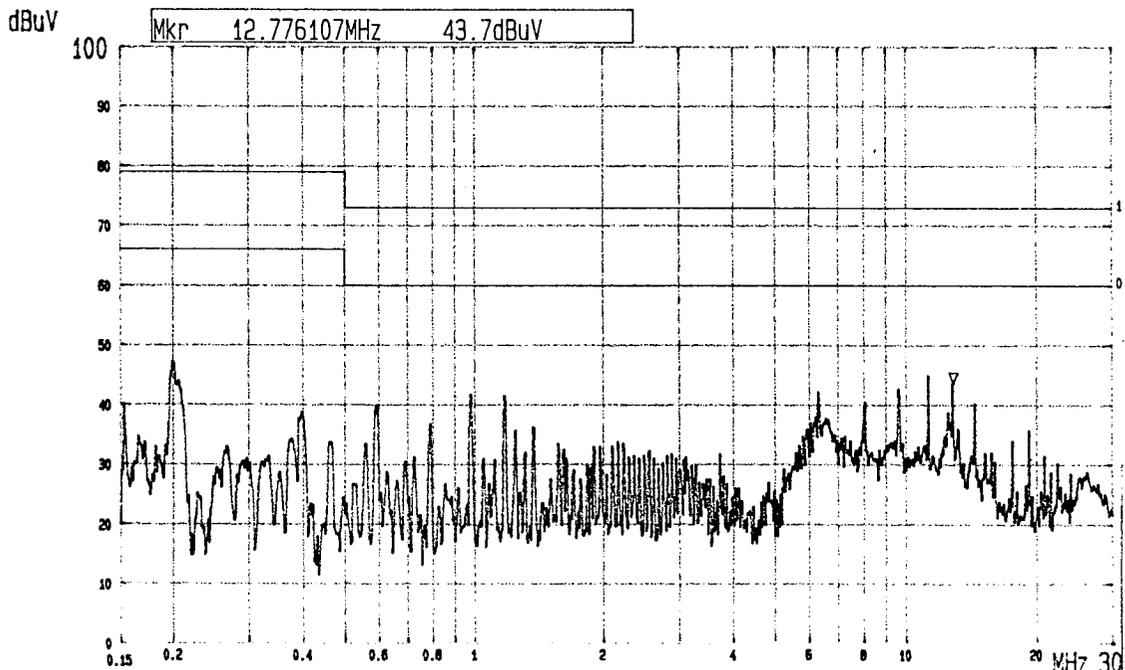
Figure 1: Conducted Emission, AC Mains; 0.15 - 30MHz (PCA-6167)



--- Date 23.AUG '97 Time 14:09:02
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: PCA-6167

ADT CORP.
LISN: L

Page
Tested by Joe King

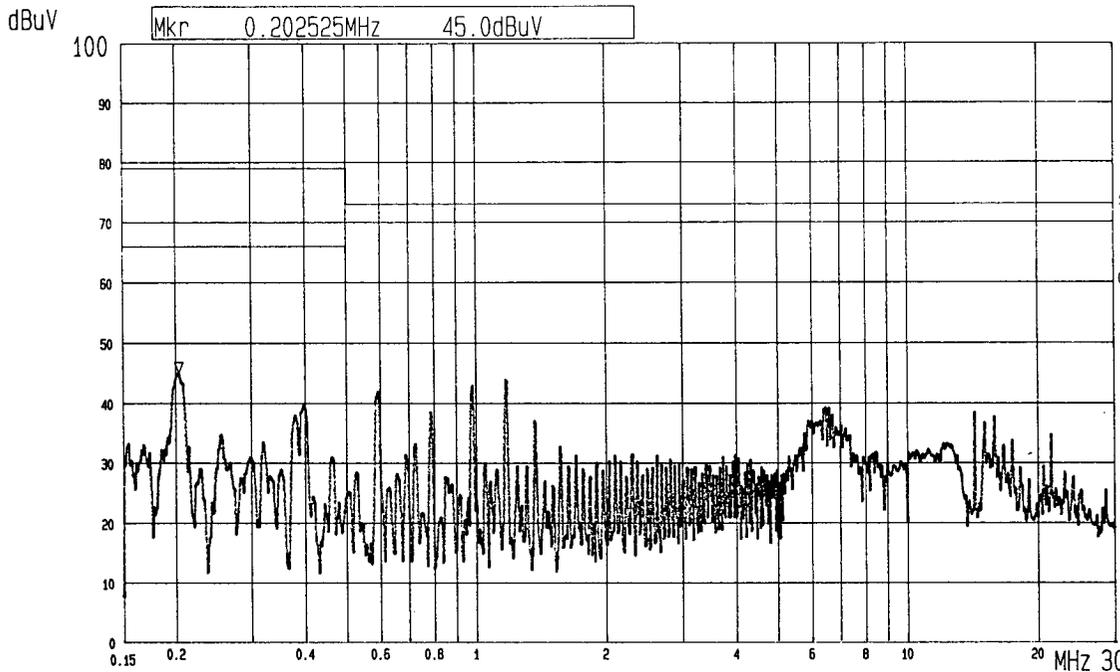


--- Date 23.AUG '97 Time 14:05:46
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: PCA-6167

ADT CORP.
LISN: N

Page
Tested by Joe King

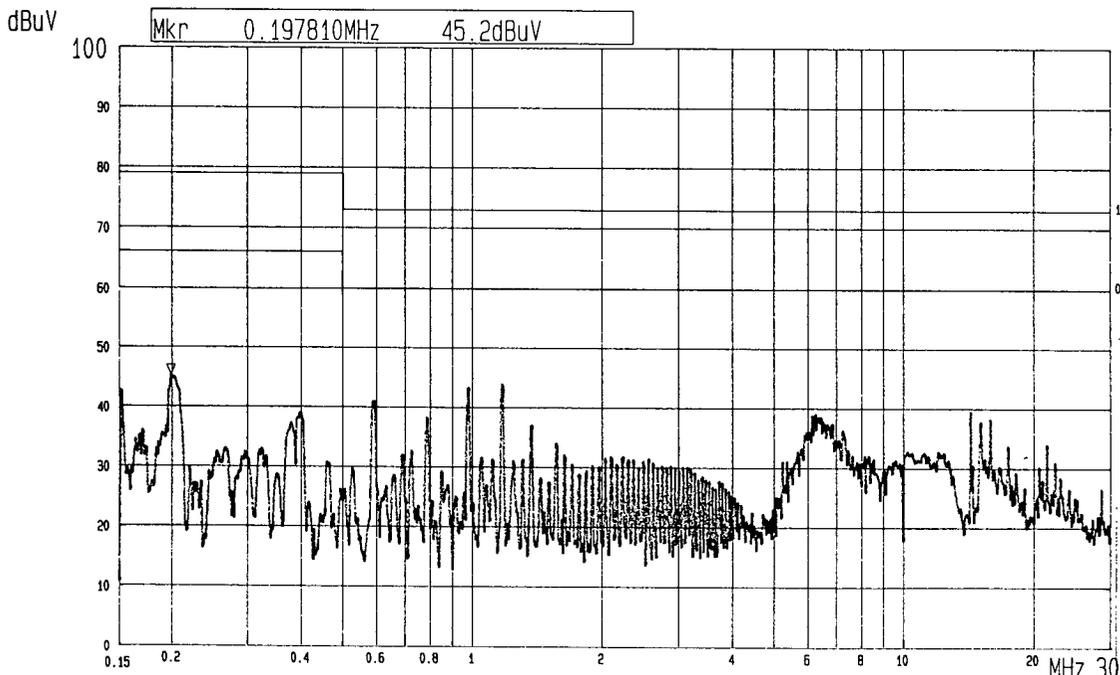
Figure 2: Conducted Emission, AC Mains; 0.15 - 30MHz (PCA-6135)



Page
Tested by *Joe Ay*

--- Date 23.AUG '97 Time 14:27:10
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: PCA-6135

ADT CORP.
LISN: L



Page
Tested by *Joe Ay*

--- Date 23.AUG '97 Time 14:33:51
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: PCA-6135

ADT CORP.
LISN: N

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 into IPC
Operational mode: 'On'-mode, refer also to para.: 3.1 & 3.2

Earthing: through power cord of IPC

Table 2: Radiated Emission, 30 - 1000 MHz

Settings

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

Model : PCA-6167

Frequency (MHz)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dBuV/m)	
	Hor.	Ver.		Hor.	Ver.
38.11	17.8	---	40.0	22.2	---
76.99	20.9	---	40.0	19.1	---
120.01	18.0	---	40.0	22.0	---
140.01	18.8	---	40.0	21.2	---
226.67	17.7	---	40.0	22.3	---
285.49	21.7	---	47.0	25.3	---
300.02	21.4	---	47.0	25.6	---
38.49	---	23.2	40.0	---	16.8
52.95	---	20.8	40.0	---	19.2
76.97	---	24.3	40.0	---	15.7
120.01	---	25.8	40.0	---	14.2
140.02	---	20.2	40.0	---	19.8
194.06	---	19.0	40.0	---	21.0
226.49	---	19.2	40.0	---	20.8



Model : PCA-6135

Frequency (MHz)	Result (dBuV/m)		Limit (dBuV/m)	Margin (dBuV/m)	
	Hor.	Ver.		Hor.	Ver.
39.69	20.6	---	40.0	19.4	---
80.19	31.9	---	40.0	8.1	---
200.48	18.7	---	40.0	21.3	---
302.08	23.8	---	47.0	23.2	---
327.23	27.0	---	47.0	20.0	---
334.16	27.3	---	47.0	19.7	---
400.98	37.3	---	47.0	20.0	---
601.41	27.7	---	47.0	19.7	---
39.69	---	28.5	40.0	---	11.5
80.20	---	32.3	40.0	---	7.7
110.26	---	26.1	40.0	---	11.5
200.47	---	19.2	40.0	---	7.7
207.66	---	20.5	40.0	---	13.9
327.24	---	29.4	47.0	---	20.8
400.99	---	30.9	47.0	---	13.9
604.42	---	28.9	47.0	---	20.8

Remark: The “---” means that no QP- Measurements were carried out in this program.

4.2. Disturbances in Supply Systems

4.2.1. Harmonics

Port: Mains
Basic Standard: EN 61 000-3-2
Limits: EN 61 000-3-2, clause 7

Result:

N/A

As the subject tested samples are supplied by a DC source from SPS in a personal computer, this requirement is not applicable to this item.

4.2.2. Voltage Fluctuations

Port: Mains
Basic Standard: EN 61 000-3-3
Limits: EN 61 000-3-3, clause 5

Result:

N/A

As the subject tested samples are supplied by a DC source from SPS in a personal computer, this requirement is not applicable to this item.



5. Test Results IMMUNITY

Result:

PASS

5.1. Enclosure Port

5.1.1. Radio-Frequency Electromagnetic Field

Port:	Enclosure	
Basic Standard:	ENV 50 140	ENV 50 204
Performance Criteria:	A	
Test Specification:	EN 50 082-2	
	Frequency Range:	80 - 1000 MHz 900 ± 5 MHz
	Field Strength:	10 V/m (unmodulated) 10 V/m (unmodulated)
		(= level 3 of ENV 50 140)
	Modulation:	1 kHz AM 80% 200 Hz Pulse
		50 % duty cycle

Result:

PASS

Test Setup

Input Voltage:	AC 230 V, 50 Hz into IPC
Operational mode:	'On'-mode, refer also to para.: 3.1 & 3.2
Earthing:	through power cord of IPC
Temperature:	22 °C
Humidity:	52 %RH

Table 3: Radio-Frequency Electromagnetic Field

A. Frequency range : 80 MHz - 1 GHz

Severity level (V/m)	EN 50 082-2 Requirement	Performance Verification (Criteria)	Test results
10	A	A	PASS

No degradation in performance was monitored during and directly after application of the H.F. electromagnetic interference field on the subject samples.

B. Frequency : 900 MHz +/- 5 MHz

Severity level (V/m)	EN 50 082-2 Requirement	Performance Verification (Criteria)	Test results
10	A	A	PASS

No degradation in performance was monitored during and directly after application of the H.F. electromagnetic interference field on the subject samples.



5.1.2. Power Frequency Magnetic Field Immunity

Port: Enclosure
 Basic Standard: EN 61 000-4-8
 Performance Criteria: A

Test Specification: EN 50 082-2
 Frequency: 50 Hz
 Magnetic Field Strength 30 A/m Level 4

Result:

PASS

Test Setup

Input Voltage: AC 230 V, 50 Hz into IPC
 Operational mode: 'On'-mode, refer also to para.: 3.1 & 3.2
 Earthing: through power cord of IPC
 Temperature: 24 °C
 Humidity: 54 %RH

Severity level (A/m)	EN 50 082-2 Requirement	Performance Verification (Criteria)	Test results
30	A	A	PASS

5.1.3. Electrostatic Discharge

Port: Enclosure
 Basic Standard: EN 61 000-4-2
 Performance Criteria: B
 Test Specification: EN 50 082-2
 Voltage: 8 kV (Air Discharge)
 (= level 3 of EN 61 000-4-2)
 4 kV (Contact Discharge)
 (= level 2 of EN 61 000-4-2)

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

Test Setup

Input Voltage: AC 230 V, 50 Hz into IPC
 Operational mode: 'On'-mode, refer also to para.: 3.1 & 3.2
 Earthing: through power cord of IPC
 Temperature: 22 °C
 Humidity: 50 %RH

Table 4: Electrostatic Discharge

Severity level	EN 50 082-2 requirement			Performance criteria			Test results
	Air discharge	Contact discharge	HCP/VCP discharge	Air discharge	Contact discharge	HCP/VCP discharge	
4 KV	NR	B	B	NR	A	A	PASS
8 KV	B	NR	NR	A	NR	A	PASS

Note:

- 1) NR means there is no requirement.
- 2) Test Points: Air Discharge for non-conducted parts
 Contact Discharge for conducted parts

No degradation in performance was monitored during and directly after application of the electrostatic discharges on the subject samples.

5.2.2. Fast Transients Common Mode

Port: AC supply terminals of IPC Signal and control lines

Basic Standard: EN 61 000-4-4

Performance B

Criteria:

Test Specification: EN 50 082-2 Power Lines Control Lines

Peak Voltage: 2 kV 1 kV
(= level 3) (= level 3)

T_r/T_n 5/50 ns
Rep. frequency 5 kHz

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

Test Setup

Input Voltage: AC 230 V, 50 Hz into IPC

Operational mode: 'On'-mode, refer also to para.: 3.1 & 3.2

Earthing: through power cord of IPC

Temperature: 23 °C

Humidity: 52 %RH

Table 6: Fast Transients Common Mode

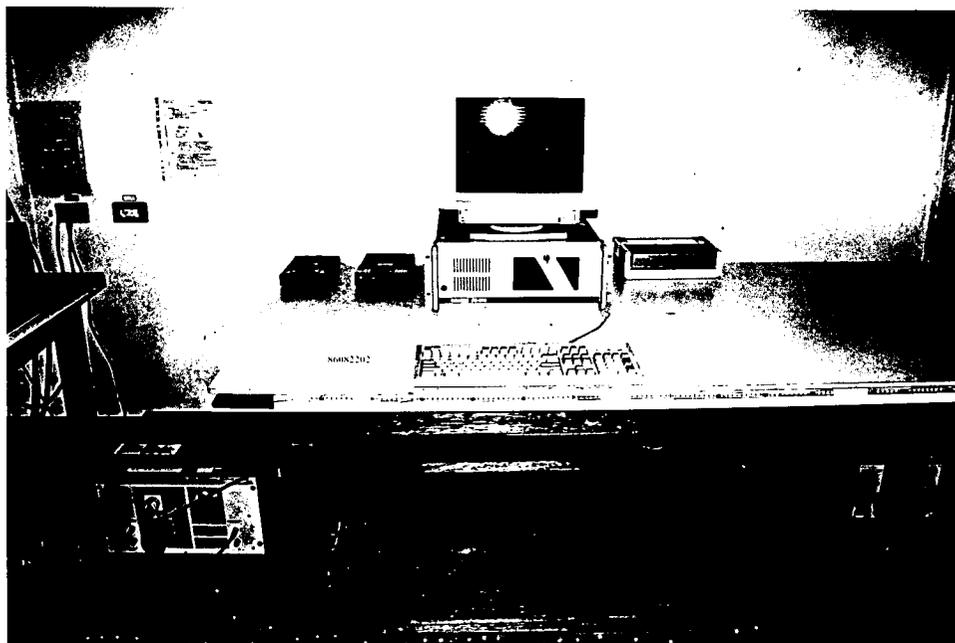
Severity level	EN 50 082-2 requirement		Performance Verification (Criteria)		Test Results
	AC line	I/O line	AC line	I/O line	
1 kV clamp	NR	NR*	NR	NR*	N/A
2 kV direct	B	NR	A	NR	PASS

Remark: NR means there is no requirement.
NR* means there was no requirement as in the configuration submitted for signal lines not longer than 3 m

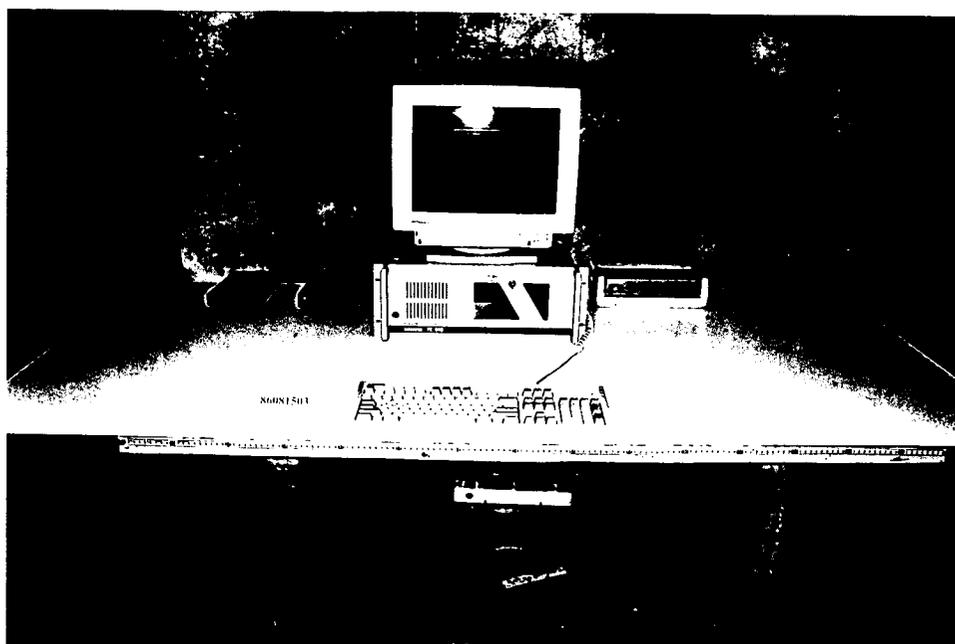
No degradation in performance was monitored during and directly after application of the electrical fast transients on the subject samples.

6. Photographs of the Test Set-up

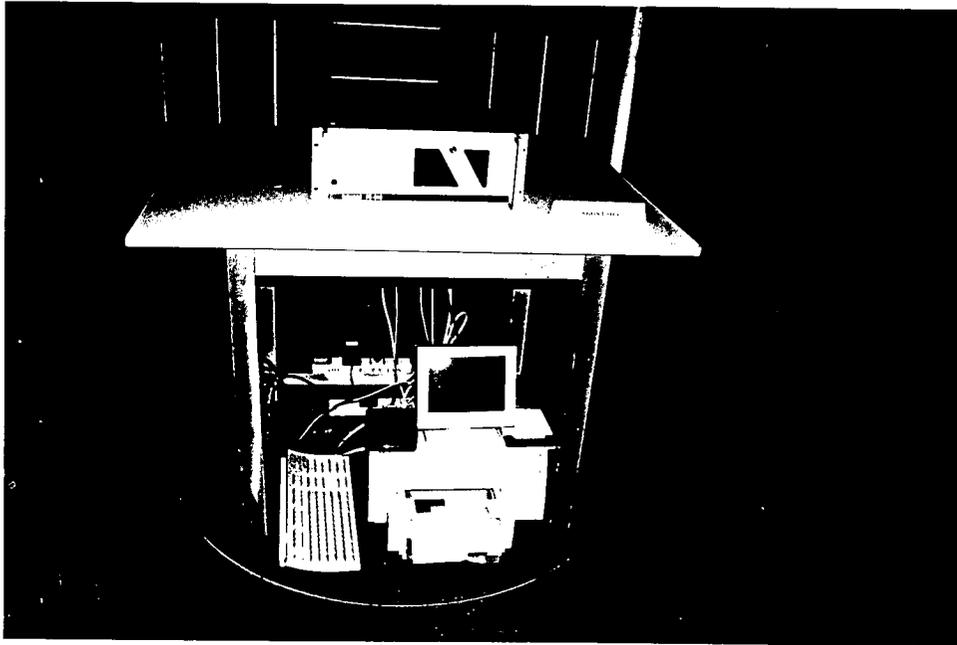
Picture 1: Conducted Emission



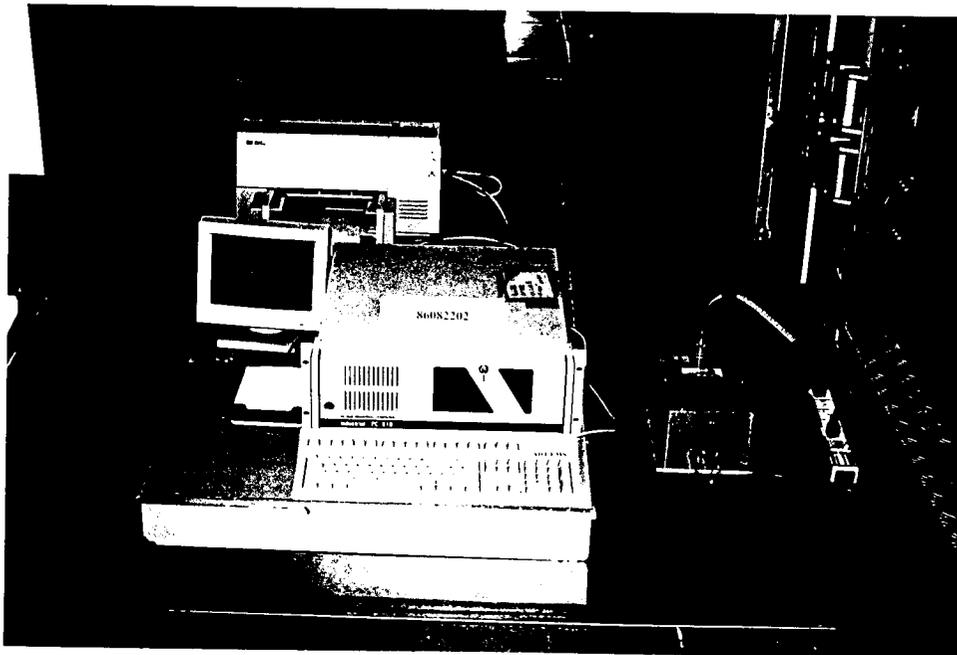
Picture 2: Radiated Emission



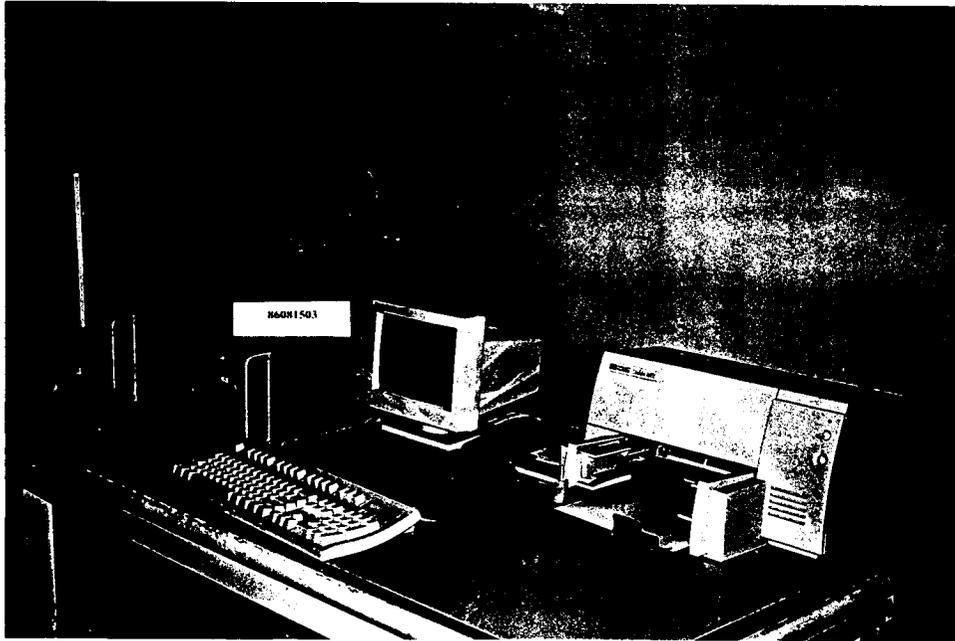
Picture 3: Radiated Susceptibility, Frequency Range 80 MHz to 1000 MHz



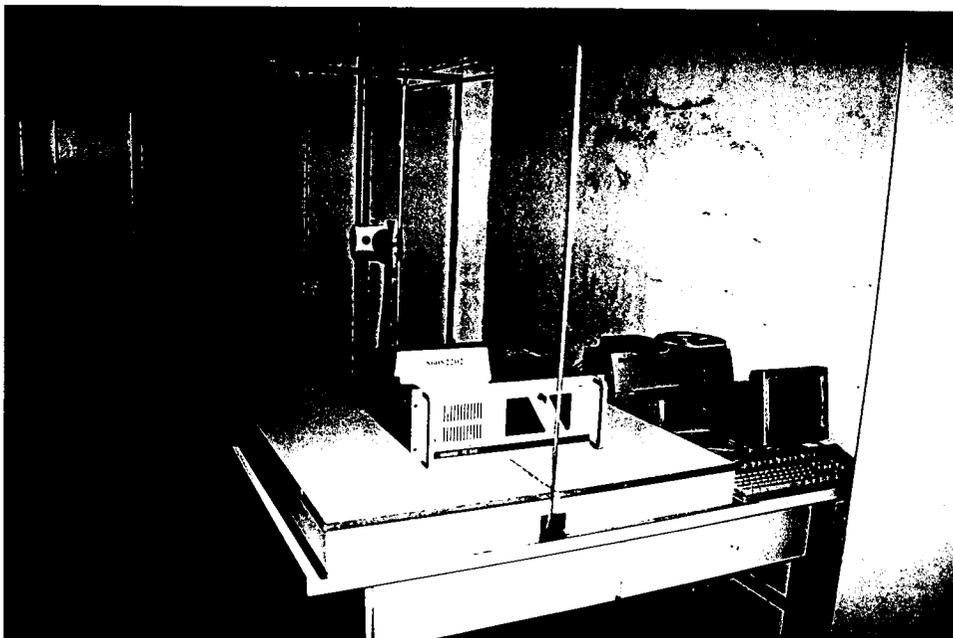
Picture 4: R.F. Conducted Susceptibility



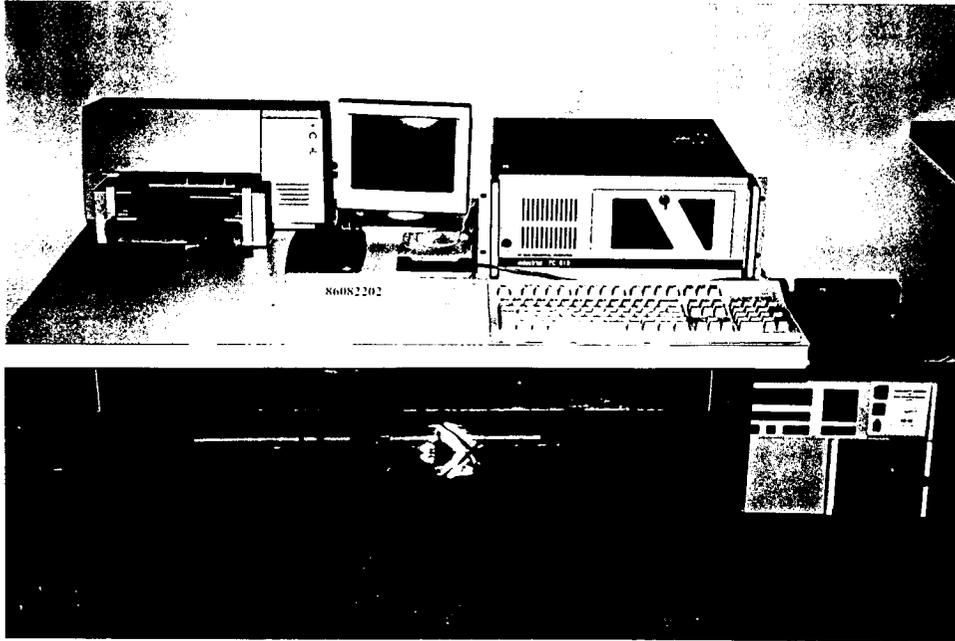
Picture 5: Electrostatic Discharge



Picture 6: Power Frequency Magnetic Field



Picture 7: Fast Transients on AC Mains



7. List of Tables

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