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

TÜV Rheinland

Certificate

of

Compliance

No. 9764628-9708

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-6151, PCA-6153, PCA-6144S

is in compliance with
EN 50 082-2:1995, EN 55 022:1994/A1:1995 Class A
as described in the Technical Report P 9764628E01.
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, 01.08.1997

Product Safety · Quality Assurance
TÜV Rheinland
Approved

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

Quality Assurance and Control, Industrial Safety, Consumer Product Safety,
Environmental Protection, Nuclear Safety, Road Traffic Safety

TÜV Rheinland

Advantech Co., Ltd.

Mr. Albert Li, Manager
Quality Assurance Dept.

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

Date : 01.08.1997
Our ref. : SL-T9731929
Your ref.: AL
(Taipei)

Certificate of Compliance

Dear Mr. Li

We herewith confirm that the product : CPU Card

Type designation : PCA-6151, PCA-6153, PCA-6144S

has been tested for compliance with

Test requirement : EN 50 082-2:1995 *EN 55 022:1994/A1:1995 Class A*

Enclosed please find the Certificate of Compliance and copy of test report for the above mentioned equipment.

Please contact our office for approval of your new products.

We appreciate your kind support and would like to offer our assistance and continuous services in the future.

Yours sincerely

TÜV RHEINLAND TAIWAN LTD.
Certification Department

Dipl.-Ing. A. Klinker
Manager

Saul Lu
Project Engineer
EMC-Services

Enclosure

TÜV Rheinland Product Safety GmbH

Am Grauen Stein

D-51105 Köln

TÜV Rheinland

Testreport No: P9764628E01

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-6151, PCA-6153, PCA-6144S**
Standard:	**EN 50 082-2:1995** **EN 55 022:1994/A1:1995** **Class A**
Date of Testing:	**12.06. - 09.07.1997**

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

Der Sachverständige:
tested by

30.07.97 ..... Date, signature

Gesehen
den 01.08.1997
TÜV Rheinland Product Safety GmbH

überprüft:
reviewed by

31.07.97 ..... 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.

TÜV Rheinland

Content

1. Test Site

Taiwan Tokin EMC Eng. Corp.
No. 53-11, Tin-Fu Tsun, Lin-Kou 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 All -in-One CPU Cards with the model designations **PCA-6151**, **PCA-6153** and **PCA-6144S**. They are intended for use as a peripheral card composing of the Industrial Workstation in a light and heavy industry environment.

Intel Pentium series / AMDK5 / Cyrix6x86 types of CPU can be plugged into the **PCA-6151** CPU board, Intel Pentium series / P55C / 5K86 / Cyrix6x86 types of CPU can be plugged into the **PCA-6153** CPU board and Intel / AMD / TI / Cyrix 80486 types of CPU can be plugged into the **PCA-6144S** CPU board.

Through they are all called CPU card but with different design for each CPU card. All mentioned models are following all the necessary tests and as described hereafter.

2.2. Rating and Physical Characteristics

Input Voltage:	+5 Vdc (4.75-5.25V)
Input Current:	5.5 A
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 (access. equipm. during testing).
3. Pulses on clock or other lines of peripheral cards in IPC 610 (access. equipm. during testing).

2.4. Noise Suppression Parts

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

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:

Peripherals	Brand Name	Model Number
Industrial PC	Advantech	IPC-610
CPU on PCA-6151 & PCA-6153	Intel	Pentium 166
CPU on PCA-6144S	AMD 5x86	AMD-X5-133ADY
Video Display Card incorporated with testing on PCA-6144S	N/A	N/A Chip no. F65530 B09023X-01XX

3.2. Additional Equipment

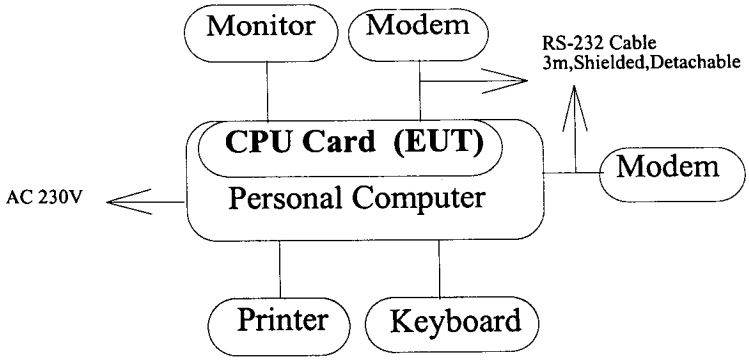
The EUT was tested together with the following additional equipment:

Description	Manufacturer	Model No.	Serial Nunmer	Remark
Monitor	Funai Electric	PM36A	W70205049A	N/A
Keyboard	BTC	BTC-5139	73B304241	N/A
Printer	Hewlett Packard	2225C	2615S40752	N/A
Modem	Acceex	1414	950110300	N/A
Modem	Acceex	1414	950098203	N/A

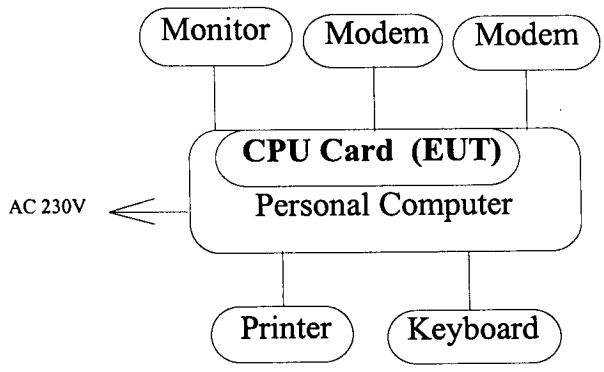
3.3. Test Setup

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

(1) Radiation and EFT Clamp Test Setup



(2) EMS Test Setup :



3.4. List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

For EMI/Radiation Measurement (Anechoic Chamber)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	HP	8593A	3212A01727	Jul. 15, 97'
2	Pre-Amplifier	HP	8447D	3944A06305	Jun. 07, 98'
3	Computer	--	PC-AT386	N/A	N.C.R
4	Printer	NEC	P5200	N/A	N.C.R
5	Antenna Turn Table Controller	Tokin	5906	N/A	N.C.R
6	Antenna Turn Table Driver	Tokin	5907	88Y465	N.C.R
7	Broadband Antenna	Schwarzbeck	BBA 9106	A3L	Jun. 1998
8	Broadband Antenna	Schwarzbeck	UHALP 9107	A3H	Jun. 1998

For EMS/ESD Measurement

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Discharger	Keytek	ESD-1	9508190	Sep. 02, 97'
2	Power Supply	Keytek	PSC-1	9507471	Sep. 02, 97'
3	Discharge Network	Keytek	DN-10	9505431	Sep. 02, 97'
4	Current Injection Adapter	Keytek	CIA/V	9508177	Sep. 02, 97'
5	Cable	Keytek	EC-1	9310273	Sep. 02, 97'

For EMS/RF Field Strength Susceptibility Measurement

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Maconi	2031	119530/015	Jan.28, 98'
2	Power Amplifier	A & R	100A100	13037	N.C.R
3	Power Amplifier	A & R	25W1000M7	13261	N.C.R
4	Field Monitor	A & R	FM2000	13605	Aug. 1997
5	Field Sensor	A & R	FP2000	13126	Aug. 1997
6	Power Antenna	A & R	AT1080	13002	N.C.R
7	Power Antenna	EMCO	3108	9305-2482	N.C.R

For EMS/EFT Measurement

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Control Center	Keytek	E103	9506267	Jun. 26, 98'
2	EFT Generator	Keytek	E411	9506182	Jun. 26, 98'
3	EFT Coupler / Decoupler	Keytek	E4551	9506216	Jun. 26, 98'
4	Capacitive Clamp	Keytek	CCL-4/S	9506190	Jun. 26, 98'

For EMS/Injected Currents Susceptibility Measurement

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Maconi	2031	119530/015	Jan. 28, 98'
2	Power Amplifier	A & R	100A250	17811	N.C.R
3	Power Meter	HP	436A	2236A13620	Jan. 1998
4	CDN-M3	Fischer	FCC-801-M3-25	104	Apr. 22, 97'

3.5. Abbreviations

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

4. Test Results E M I S S I O N

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:	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.

4.1.2. 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

QP-Measurements were carried out at frequencies where the highest levels for Peak-Measurements were monitored. It was found that Peak- Measurements are well below the limit for QP-measurements and no further levels for QP- Measurements were recorded.

Table 2: Radiated Emission, 30 - 1000 MHz

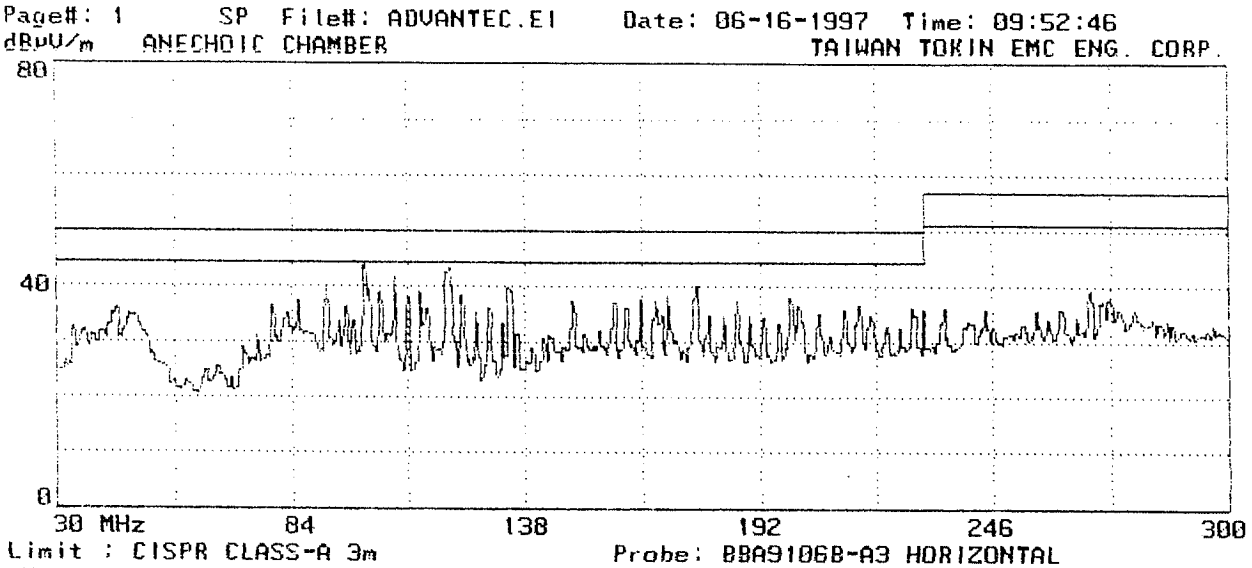
Settings

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

Frequeny (MHz)	Result (dBuV/m)		Limit	Margin (dBuV/m)	
	Hor.	Ver.	(dBuV/m)	Hor.	Ver.
---	---	---	---	---	---

Remark: The "---" means that no QP- Measurements were carried out in this program.
Refer to next figures for Peak- Measurements in details.

Figure 1: Radiated Emission, 30 - 300 MHz (PCA-6151)



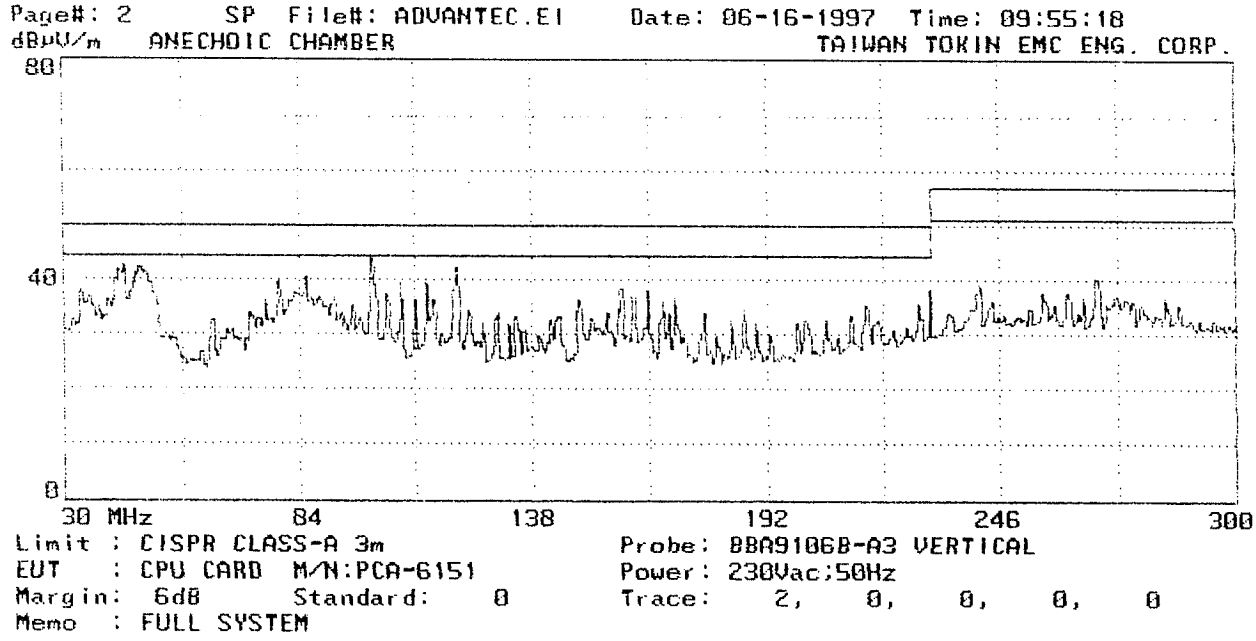
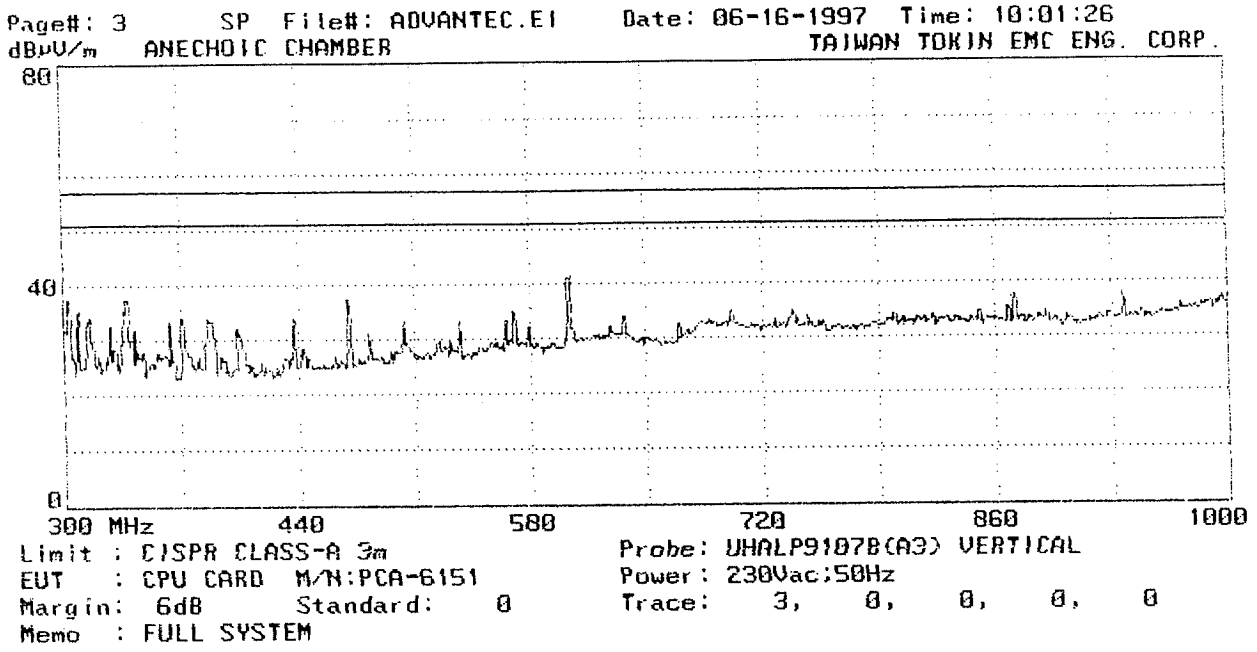


Figure 2: Radiated Emission, 300 - 1000 MHz (PCA-6151)



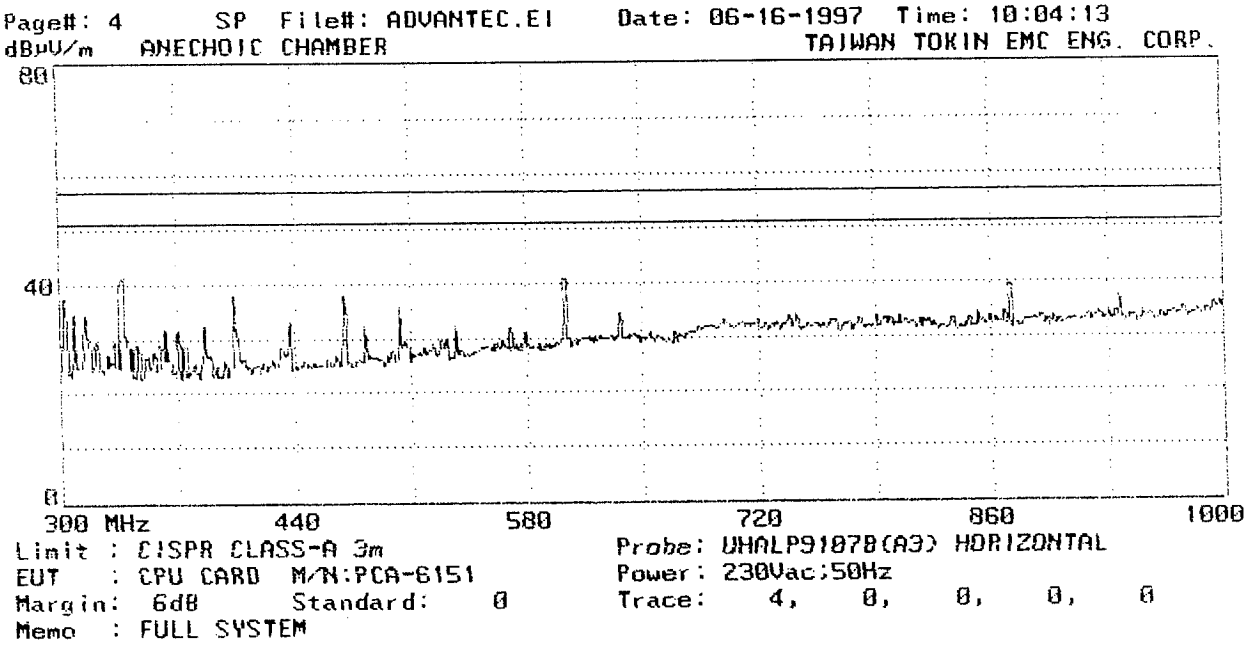
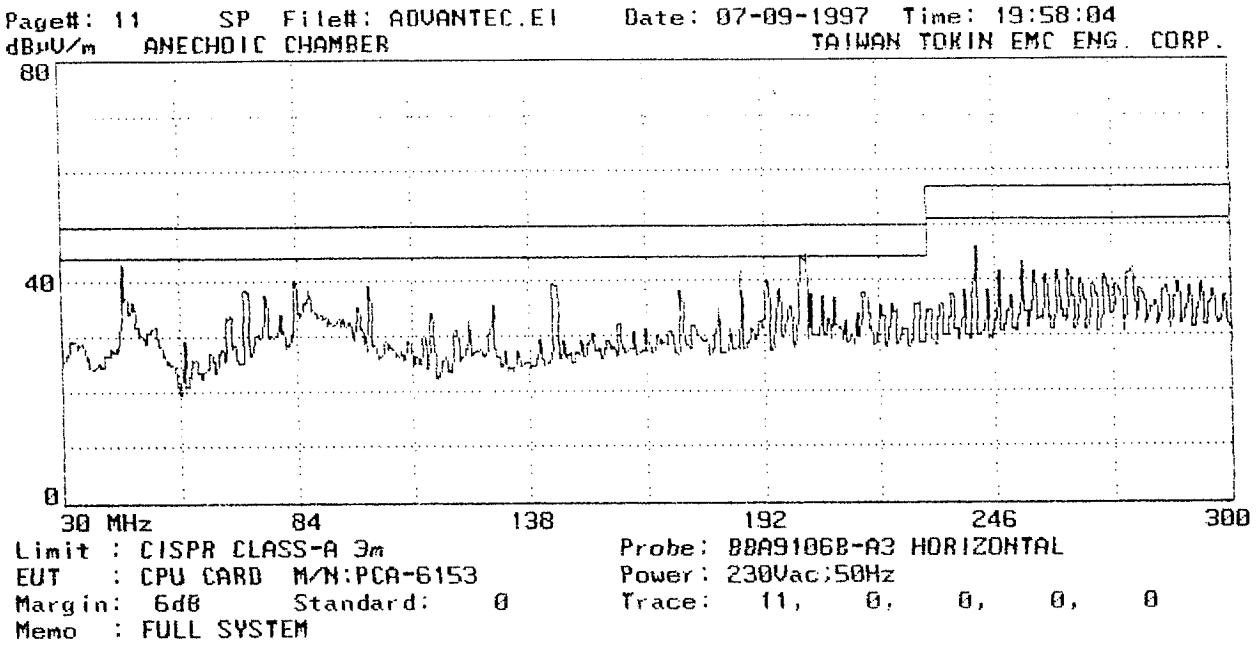


Figure 3: Radiated Emission, 30 - 300 MHz (PCA-6153)



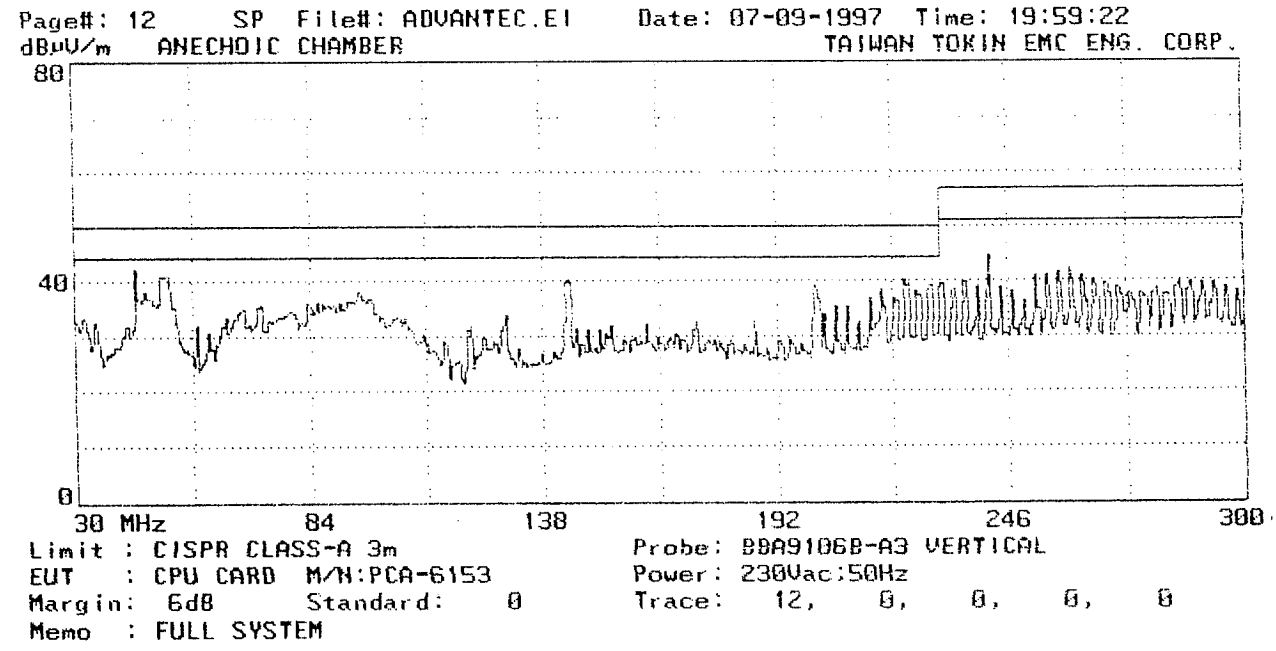
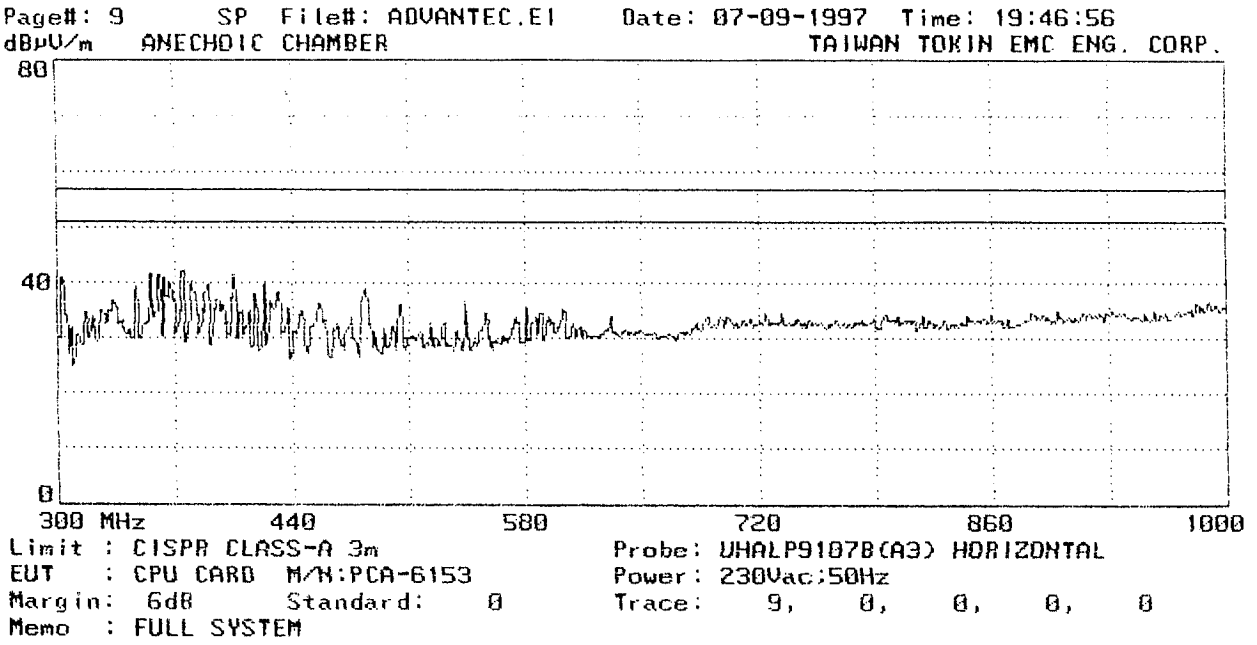


Figure 4: Radiated Emission, 300 - 1000 MHz (PCA-6153)



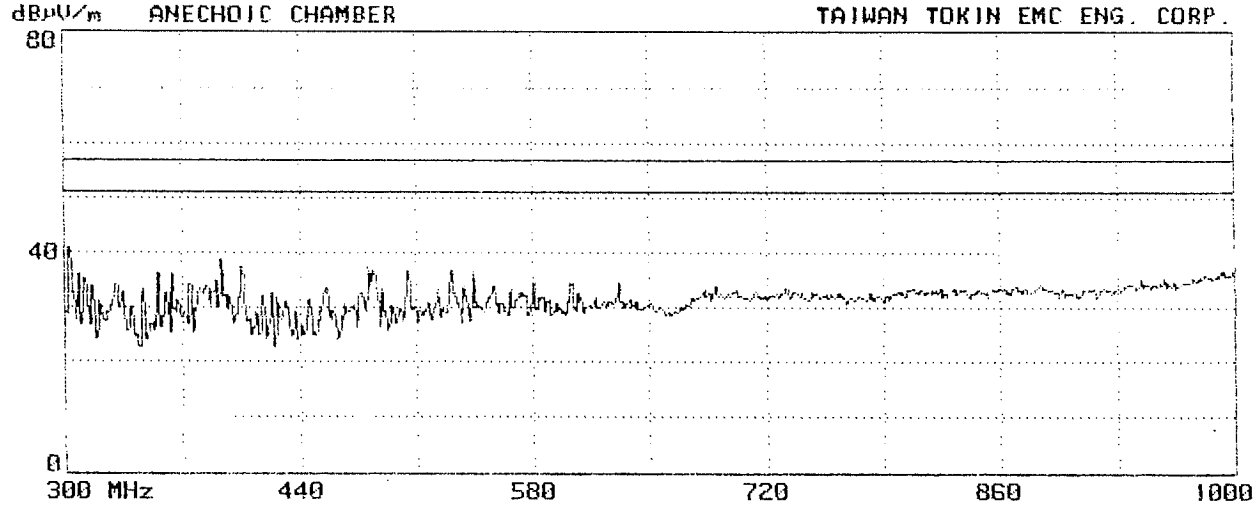


Figure 5: Radiated Emission, 30 - 300 MHz (PCA-6144S)

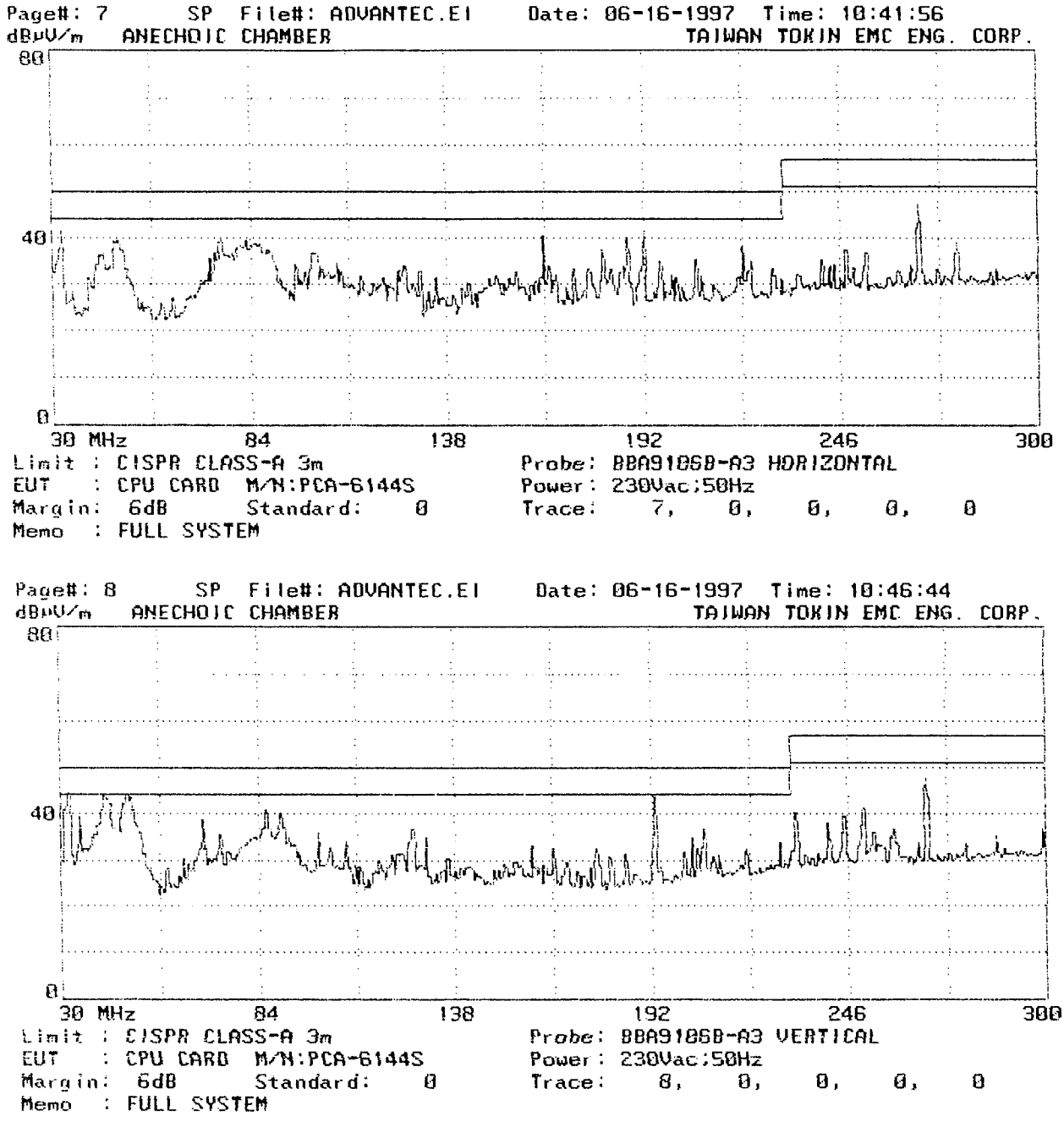
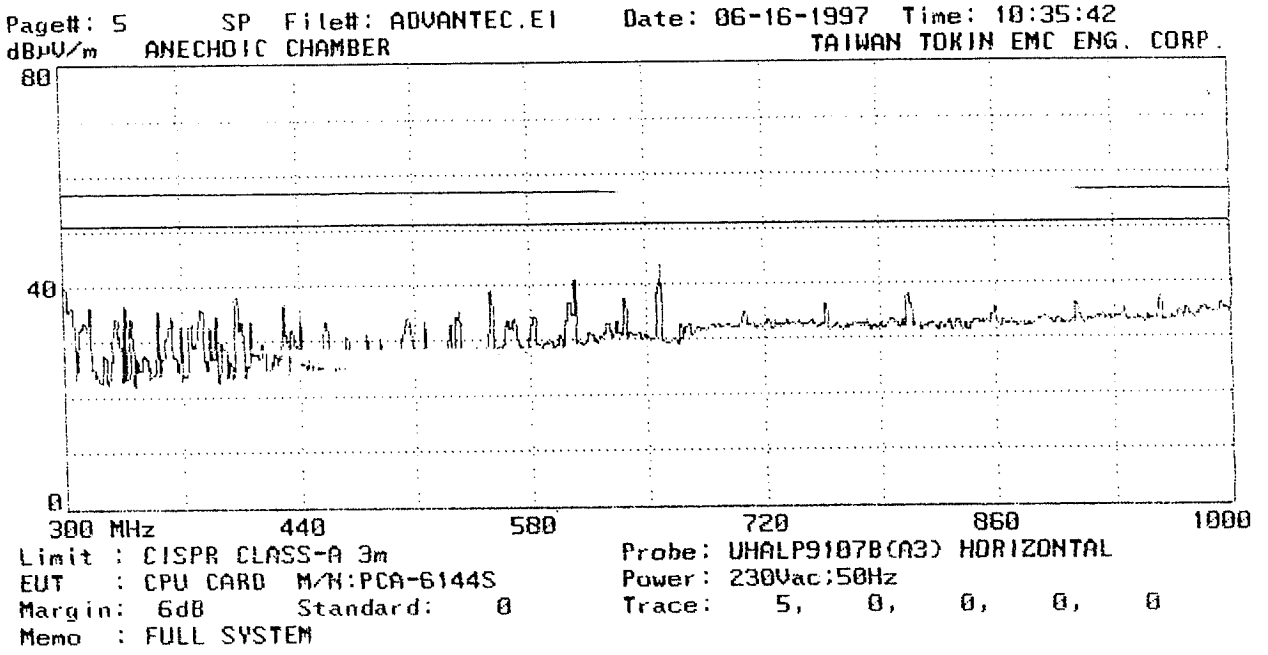
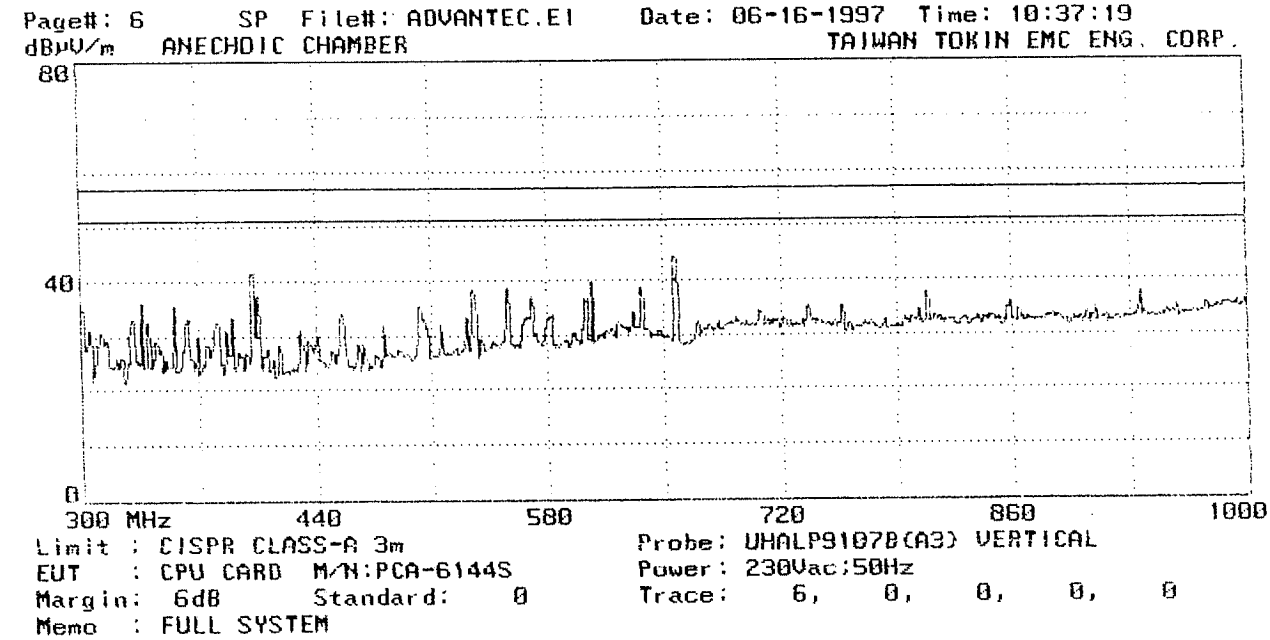


Figure 6: Radiated Emission, 300 - 1000 MHz (PCA-6144S)





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:	64 %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:	N/A

The EUTs are not containing any component that is susceptible to a 50 Hz or 60 Hz Magnetic Field. Therefore this requirement is not applicable to the EUTs.

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:	25 °C
Humidity:	52 %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.

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5.2. Input and Output AC Power / Signal and Control Ports

5.2.1. Conducted Disturbances

Port:	AC mains input	Signal & Control lines
Basic Standard:	ENV 50 141	
Performance Criteria:	A	
Test Specification:	EN 50 082-2	
	Frequency Range:	0.15 - 80 MHz
	Voltage Level:	10 Vrms (unmodulated)
	Modulation:	AM 80 %, 1 kHz sine wave (= level 3 of ENV 50 141)

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:	64 %RH

Table 5: Conducted Current Injection

Severity level	EN 50 082-2 requirement		Performance Verification (Criteria)		Test Results
Coupling mode	AC line	I/O line	AC line	I/O line	
10V direct	NR	NR*	NR	NR*	N/A
10V direct	A	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 injected interferences on the subject samples.

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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 Criteria:		B	
Test Specification:	EN 50 082-2	Power Lines	Control Lines
	Peak Voltage:	2 kV (= level 3)	1 kV (= 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:	25 °C
Humidity:	58 %RH

Table 6: Fast Transients Common Mode

Severity level	EN 50 082-2 requirement		Performance Verification (Criteria)		Test Results
Coupling mode	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.

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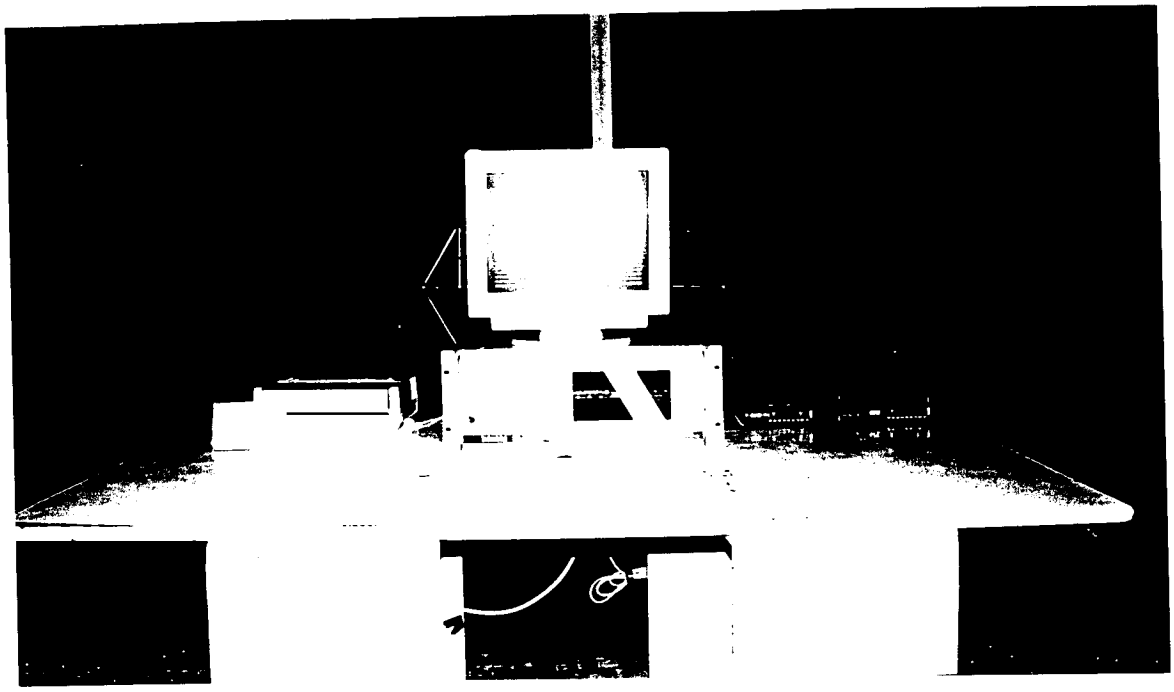
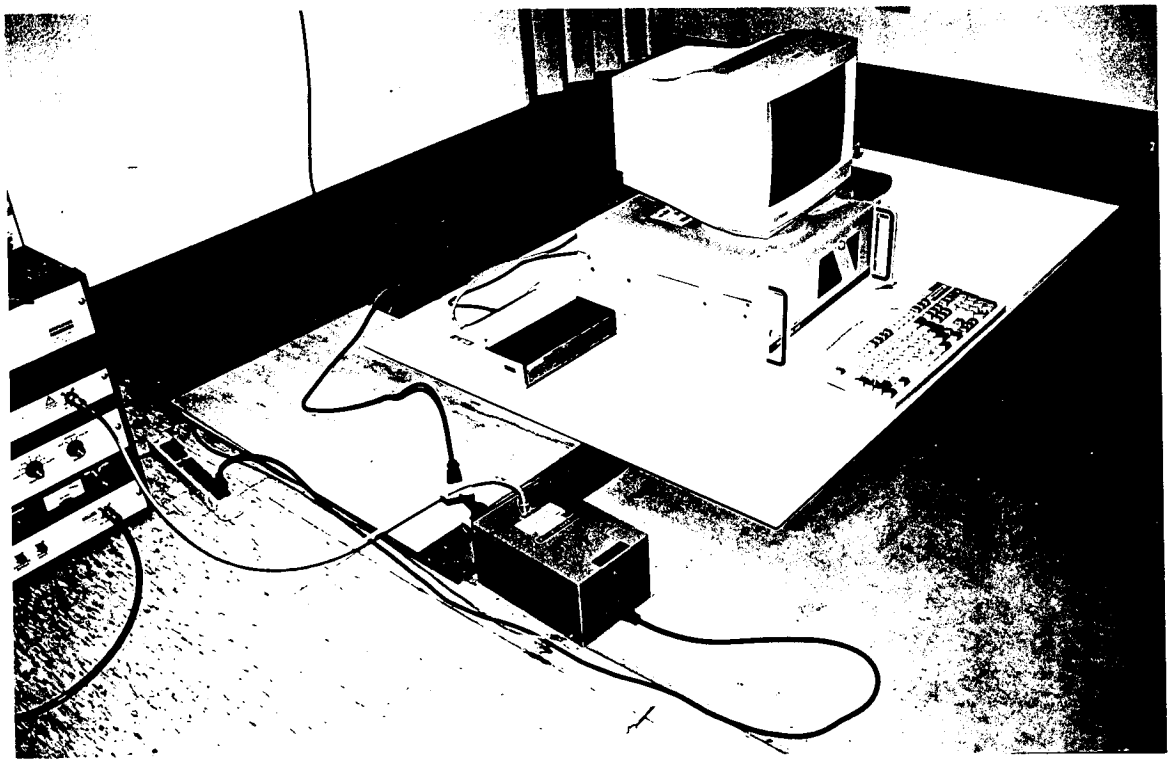
6. Photographs of the Test Set-up

Picture 1: Radiated Emission

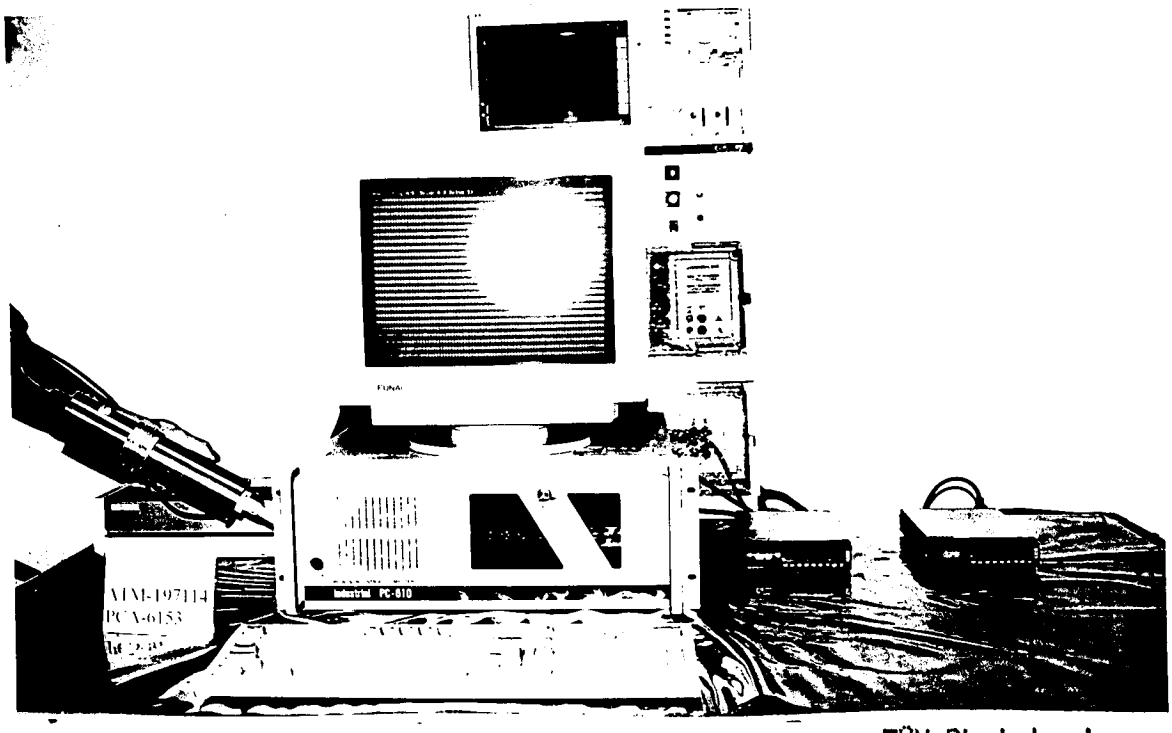


Picture 2: Radiated Susceptibility, Frequency Range 80 MHz to 1000 MHz

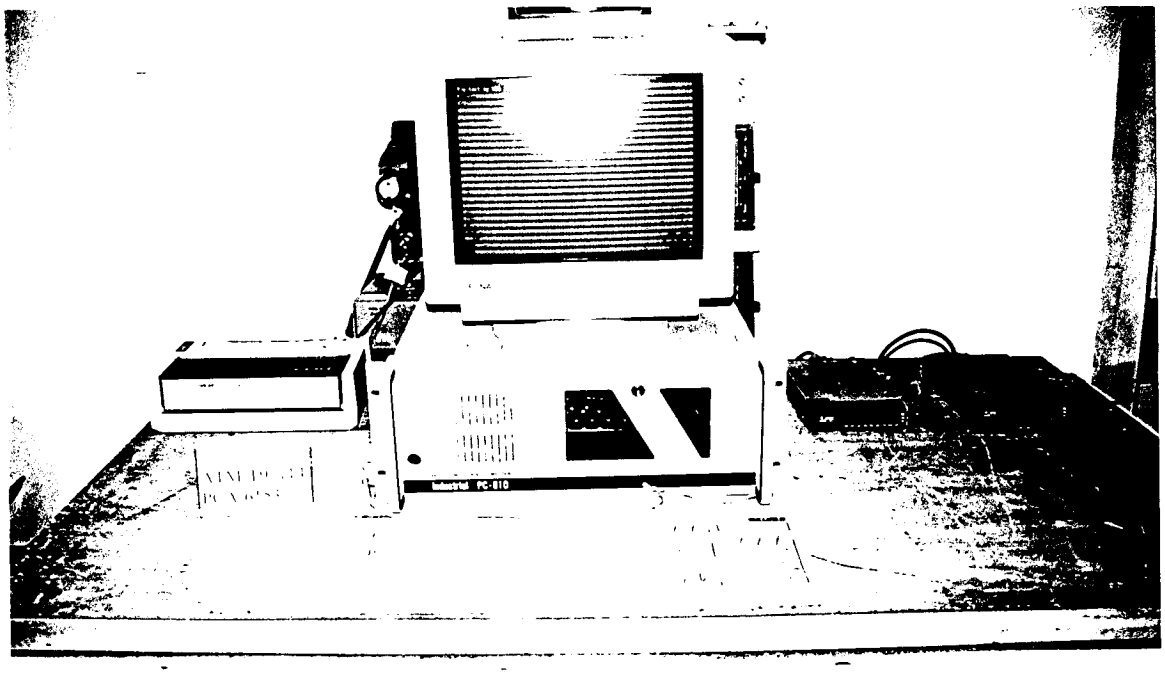
Picture 3: R.F. Conducted Susceptibility



Picture 4: Electrostatic Discharge



Picture 5: Fast Transients on AC Mains



7. List of Tables

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9. List of Pictures