



# EMC COMPLIANCE TEST REPORT

for

## DIGITAL I/O CARD

**Trade Name** : ADVANTECH  
**Model Number** : PCI-1750 and PCI-1751  
**Serial Number** : N/A  
**Report Number** : 980105-E  
**Date:** June 15, 1998  
**Regulations:** See below

Standards	Results (Pass/Fail)
EN 50081-1: 1992	PASS
EN 55022: 1994	PASS
EN 61000-3-2 (=IEC 1000-3-2): 1995	N/A
EN 61000-3-3 (=IEC 1000-3-3): 1995	N/A
EN 50082-2: 1995	PASS
IEC 1000-4-2: 1995	PASS
IEC 1000-4-3: 1995	PASS

Prepared for :

**ADVANTECH CO., LTD.**  
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei Hsien,  
TAIWAN, R.O.C.

Prepared by :

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C&C Laboratory Co., Ltd.**



## EC-Declaration of Conformity

For the following equipment:

DIGITAL I/O CARD

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( Product Name )

PCI-1750 and PCI-1751 / ADVANTECH

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( Model Designation / Trade name )

ADVANTECH CO., LTD.

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( Manufacturer Name )

4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei Hsien, Taiwan, R.O.C.

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(Manufacturer Address)

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC + 93/68/EEC), For the evaluation regarding the Electromagnetic Compatibility (89/336/EEC + 93/68/EEC), the following standards are applied:

- |  |  |   |   |
|--|--|---|---|
| <input checked="" type="checkbox"/> EN50081-1:1992 | <input type="checkbox"/> IEC801-2:1991 | <input checked="" type="checkbox"/> IEC1000-4-2 | <input type="checkbox"/> IEC1000-3-2    |
| <input checked="" type="checkbox"/> EN50082-2:1995 | <input type="checkbox"/> IEC801-3:1984 | <input checked="" type="checkbox"/> IEC1000-4-3 | <input type="checkbox"/> IEC1000-3-3    |
| <input checked="" type="checkbox"/> EN55022:1994   | <input type="checkbox"/> IEC801-4:1988 | <input type="checkbox"/> IEC1000-4-4            | <input type="checkbox"/> EN60555-2:1987 |
| <input type="checkbox"/> EN60555-3:1987/A1:1991    |  | <input type="checkbox"/> IEC1000-4-6            |   |

The following manufacturer / importer or authorized representative established within the EU is responsible for this declaration:

---

( Company Name )

---

( Company Address )

Person responsible for making this declaration:

---

( Name, Surname )

---

( Position / Title )

---

( Place )

( Date )

( Legal Signature )

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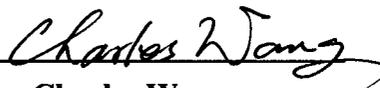
## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** DIGITAL I/O CARD  
**Trade Name:** ADVANTECH  
**Model Number:** PCI-1750 and PCI-1751  
**Serial Number:** N/A  
**EUT Powered during test:** 230VAC/50Hz  
**Applicant:** ADVANTECH CO., LTD.  
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei, Hsien,  
Taiwan, R.O.C.  
**Manufacturer:** ADVANTECH CO., LTD.  
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei, Hsien,  
Taiwan, R.O.C.  
**Type of Test:** EMC Directive 89/336/EEC for CE Marking  
**Technical Standards:** EN 50081-1: 1992 (EN 55022: 1994)  
EN 50082-2: 1992 (IEC 1000-4-2: 1995, IEC 1000-4-3: 1995 )  
**File Number:** 980105-E  
**Date of test:** June 3-8, 1998  
**Tested by:** Jeff Lee  
**Deviation:** None  
**Condition of Test Sample:** Normal

The above equipment was tested by C&C Laboratory Co., Ltd. for compliance with the requirements set forth in EMC Directive 89/336/EEC and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Approved by Authorized Signatory: \_\_\_\_\_



Charles Wang

Director

## GENERAL INFORMATION

**Applicant:** ADVANTECH CO., LTD.  
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei, Hsien,  
Taiwan, R.O.C.

**Contact Person:** Albert Lee

**Phone Number:** (02)2218-4567

**Fax Number:** (02)2218-0045

**Manufacturer:** ADVANTECH CO., LTD.  
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei, Hsien,  
Taiwan, R.O.C.

**File Number:** 980105-E

**Date of Test:** June 3-8, 1998

**Equipment Under Test:** DIGITAL I/O CARD

**Model Number:** PCI-1750 and PCI-1751

**Serial Number:** N/A

**Technical Standards:** EN 50081-1: 1992 (EN 55022: 1994)  
EN 50082-2: 1995 (IEC 1000-4-2: 1995, IEC 1000-4-3: 1995)

**Frequency Range  
(EN 55022):** 150kHz to 30MHz for Line Conducted Test  
30MHz to 1000MHz for Radiated Emission Test

**Test Site**  
C & C LABORATORY CO., LTD.  
No. 15, 14 Lin, Chi Twu Chi, Lu-Chu Hsiang  
Taoyuan, Taiwan, R. O. C.

## SYSTEM DESCRIPTION

### EUT Test Program:

1. PCI-1750 and PCI-1751 install to PC and output connect to simulate circuit.
2. EMI test program was loaded from Host PC and executed under Windows 95.
3. Test program sequentially exercised all related I/O's of Host PC and sent "H" patterns to all applicable output ports of Host PC.
4. The communication program was loaded from Host PC and executed then communicated through the serial port two EUT to each other through the I/O simulator.
5. Repeat 2 to 4. Test program is self-repeating throughout the test.

## PRODUCT INFORMATION

**Housing Type:** N/A  
**EUT Power Rating:** 5Vdc from PCI bus of PC  
**AC power during Test:** 230VAC/50Hz  
**Power Supply Power Rating:** N/A  
**AC Power Cord Type:** Unshielded, 2m (To Host PC)

M/N	Description	Connector
PCI-1750	32 bit Isolated Digital I/O Card	D-Sub 37 pin
PCI-1751	48 bit Digital I/O Card	SCSI- II 68 pin

## SUPPORT EQUIPMENT

### EMS

Equipment	Model #	Serial #	FCC ID	Manufacturer	Data Cable	Power Cord
PC	Vectra VE 4/66	SG52902164	HCJVECTRAVE4	HP	Shielded, 1.1m	Unshielded, 2m
Monitor	GDM-17SE2T	7145529	AK8GDM17SE2T	SONY	Shielded, 1.83m	Unshielded, 2m
Modem	2400SE	94-364-176275	DK467GSM24	Computer Peripheral	Shielded, 2m	Unshielded, 2m
Printer	P870A	C16013005UE	N/A	EPSON	Shielded, 2m	Unshielded, 1.86m
Keyboard	6511-T	K6568070068P	JVP6511-T	Acer Peripherals	Shielded, 1.2m	N/A
Mouse	M-S34	N/A	DZL210472	Compaq	Shielded, 1.76m	N/A
I/O simulator	N/A	N/A	N/A	ADVANTECH	Shielded, 1.1m and 1.2m	N/A

### EMI

Equipment	Model #	Serial #	FCC ID	Manufacturer	Data Cable	Power Cord
PC	Vectra VE 4/66	SG52902164	HCJVECTRAVE4	HP	Shielded, 1.1m	Unshielded, 2m
Monitor	D2813	HU64553890	A3KM043	HP	Shielded, 1.5m	Unshielded, 1.8m
Modem	Super Modem 2400	108643	DK467GSM24	GVC	Shielded, 2m	Unshielded, 2m
Printer	2225C+	2621S40315	DS16XU2225	HP	Shielded, 2m	Unshielded, 2m
Keyboard	6511-T	K6568070065P	JVP6511-T	Acer Peripherals	Shielded, 1.2m	N/A
Mouse	33G5430	23-398992	DZL33G5430	IBM	Shielded, 2.74m	N/A
I/O simulator	N/A	N/A	N/A	ADVANTECH	Shielded, 1.1m and 1.2m	N/A

All the above equipment/cables were placed in worse case positions to maximize emission signals.

**Grounding:** Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

## TEST FACILITY (EN 55022)

**Location:** No. 15, 14 Line, Chin Twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.

**Description:** There are two 3/10m open area tests site and two line conducted labs for final test, and one 3/10m open area test site for engineering lab. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.

**Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Registration also was made with Voluntary Control Council for Interference (VCCI).

Site is also approved by Ministry of Commerce of New Zealand.

**Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission.

Also accredited by BCIQ for the product category of Information Technology Equipment.

**Measurement Uncertainty:**

Radiated Emission Test	$\pm 4\text{dB}$
Line Conducted Emission Test	$\pm 2\text{dB}$

(This includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.)

**Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

**Site #1 & Site #3 Line Conducted Test Site:** Vertical ground plane (2.2m x 2.5m)  
Horizontal ground plane (2.2m x 2.5m)

## TEST EQUIPMENT

### MEASURING INSTRUMENT SETTING

TEST TYPE	DETECTOR	FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH
Conducted	Peak/Avg	10kHz-150kHz	300Hz	100kHz
Conducted	Peak/QP/Avg	150kHz-30MHz	9kHz	100kHz
Radiated	Peak	30MHz-1GHz	100kHz	100kHz
Radiated	Q.P.	30MHz-1GHz	120kHz	120kHz
Radiated	Peak/Avg	Above 1GHz	1MHz	1MHz

Note: All readings on data pages are taken with the detector in peak mode unless otherwise stated.

### UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dBuV/m, at a specified distance. The indicated readings on the spectrum analyzer are converted to dBuV/m by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dBuV.

## TEST EQUIPMENT LIST ( EMISSION )

**Instrumentation:** The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 1.0 / 2.0 GHz.

**Equipment used during the tests:**

Open Area Test Site:                     # 1 ;    #3

Open Area Test Site # 1					
EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer (100Hz-1.5GHz)	HP	8568B	3001A05004 3014A18846	03/25/1998	03/24/1999
Quasi-Peak Adapter	HP	85650A	2811A01399	03/25/1998	03/24/1999
RF Preselector (20Hz-2GHz)	HP	85685A	2947A01064	03/25/1998	03/24/1999
Precision Dipole (30-300MHz)	ROHDE & SCHWARZ	HZ-12	846932/0004	06/06/1997	06/06/1998
Precision Dipole (300-1000MHz)	ROHDE & SCHWARZ	HZ-13	846556/0008	06/16/1997	06/16/1998
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	04/04/1998	04/04/1999
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2309	03/14/1998	03/14/1999
Site Information	C&C	N/A	N/A	03/07/1998	03/06/1999

Open Area Test Site # 3					
EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer (9kHz-2.6GHz)	ADVANTEST	R3261C	71720533	12/17/1997	12/17/1998
Pre-Amplifier (100kHz-1300MHz)	HP	8447D	2944A09173	01/14/1998	01/14/1999
Receiver (20MHz-1GHz)	ROHDE & SCHWARZ	ESVS10	846285/016	12/04/1997	12/03/1998
Precision Dipole (30-300MHz)	ROHDE & SCHWARZ	HZ-12	846932/0004	06/06/1997	06/06/1998
Precision Dipole (300-1000MHz)	ROHDE & SCHWARZ	HZ-13	846556/0008	06/16/1997	06/16/1998
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	04/04/1998	04/04/1999
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2179	07/03/1997	07/02/1998
Site Information	C&C	N/A	N/A	01/21/1998	01/20/1999

Conducted Emission Test Site:  # 1 ;  #3

Conducted Emission Test Site # 1					
EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer (100Hz-1.5GHz)	HP	8568B	3001A05004 3014A18846	03/25/1998	03/24/1999
Quasi-Peak Adapter	HP	85650A	2811A01399	03/25/1998	03/24/1999
RF Preselector (20Hz-2GHz)	HP	85685A	2947A01064	03/25/1998	03/24/1999
LISN (10kHz-100MHz)	EMCO	3825/2	9106-1809	03/13/1998	03/12/1999
LISN (10kHz-100MHz)	EMCO	3825/2	9106-1810	03/13/1998	03/12/1999

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Receiver (9kHz-2.75GHz)	ROHDE & SCHWARZ	ESCS30	844793/012	12/19/1997	12/18/1998
LISN (10kHz-100MHz)	EMCO	3825/2	9003-1628	04/29/1998	04/28/1999
LISN (10kHz-100MHz)	ROHDE & SCHWARZ	ESH3-Z5	848773/014	05/04/1998	05/03/1999

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

## TEST EQUIPMENT LIST

**For Power Harmonic & Voltage Fluctuation/Flicker Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH	PHF 555	080 419-25	Oct. 27, 1997	Oct. 26, 1998

**For ESD Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH	PESD 1600	H710203	Sep. 18, 1997	Sep. 17, 1998

**For Radiated Electromagnetic Field Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi Signal Generator	2022D	119246/003	Jun. 03, 1997	Jun. 02, 1998
M2S Power Amplifier	A00181/1000	9801-112	Jan. 27, 1998	Jan. 26, 1999
M2S Power Amplifier	AC8113/800-250A	9801-179	Jan. 27, 1998	Jan. 26, 1999
Wandel & Goltormann EM-Radiation Meter	EMR-30	L-0013	Dec. 12, 1997	Dec. 11, 1999
Wandel & Goltormann E- Field Sensor	TYP-8	H-0014	May. 6, 1997	May. 5, 1999
EMCO Power Antenna	3141	9712-1083	Dec. 17, 1997	Jun. 16, 1999

**For Fast Transients/Burst Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH	PEFT-JUNIOR	583 333-117	Sep. 9, 1997	Sep. 8, 1998

**For CS:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
M2S Power Amplifier	A00181/1000	9801-112	Jan. 27, 1998	Jan. 26, 1999

## SECTION 1 EN 55022 (LINE CONDUCTED & RADIATED EMISSION)

### MEASUREMENT PROCEDURE (PRELIMINARY LINE CONDUCTED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55022: 1994 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per EN 55022: 1994.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022: 1994.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source of 230VAC/50Hz and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to analyzer and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the analyzer.
- 7) Analyzer scanned from 150kHz to 30MHz for emissions in each of the test modes. Analyzer settings were stated on the Measuring Instrument Settings page.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test model(s) were scanned during the preliminary test:

**Model(s):**

1. PCI-1750 and PCI-1751 communicated

- 10) After the preliminary scan, we found the following test model(s) producing the highest emission level.

**Model(s):** 1

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

## MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in peak mode, then the emission signal was re-checked using a Quasi-Peak and Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

**Data Sample:**

Freq. MHz	Peak Raw dBuV	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.xx	43.95	---	---	56	46	-12.05	-2.05	L1

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer/Receiver reading
Limit dBuV	= Limit stated in standard
Margin dB	= Reading in reference to limit
Note	= Current carrying line of reading
“---“	= The emission level complied with the Average limit, with at least 2dB margin limits, so no further recheck.

## LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
150kHz-500kHz	66-56dBuV	56-46dBuV
500kHz-5MHz	56dBuV	46dBuV
5MHz-30MHz	60dBuV	50dBuV

**Note:** The lower limit shall apply at the transition frequency.

## MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55022: 1994 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per EN 55022: 1994.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022: 1994.
- 4) The EUT received 230VAC/50Hz power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable.
- 5) The antenna was placed at 10 meter away from the EUT as stated in EN 55022: 1994. The antenna connected to the analyzer via a cable and at times a pre-amplifier would be used.
- 6) The analyzer quickly scanned from 30MHz to 1000MHz. Analyzer settings were stated on the Measuring Instrument Settings page. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test model(s) were scanned during the preliminary test:

**Model(s):**

1. **PCI-1750 and PCI-1751 communicated**

- 8) After the preliminary scan, we found the following test model(s) producing the highest emission level.

**Model(s): 1**

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for final testing.

## MEASUREMENT PROCEDURE (FINAL RAIDATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The analyzer scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the limit in peak mode, then the emission signal was re-checked using a Quasi-Peak detector, and only Q.P. reading will record in this test report.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

**Data Sample:**

Freq. MHz	Raw dBuV	Site CF dB	Corr'd dBuV/m	Limit dBuV/m	Margin dB	Antenna Height (cm)	Table Pos. (deg)	Detector	Note
xx.xx	14.0	7.2	21.2	30	-8.8	102	17.0	Peak	Vert

- Freq. = Emission frequency in MHz
- Raw dBuV = Uncorrected Analyzer/Receiver reading
- Site CF = Correction factors of antenna factor and cable loss
- Corr'd dBuV/m = Raw reading converted to dBuV and CF added
- Limit dBuV/m = Limit stated in standard
- Margin dB = Reading in reference to limit
- Antenna Height = Antenna height above ground plane
- Table Position = EUT placement in reference to antenna
- Detector = Detector function (Peak, Q.P.)
- Note = Antenna polarization

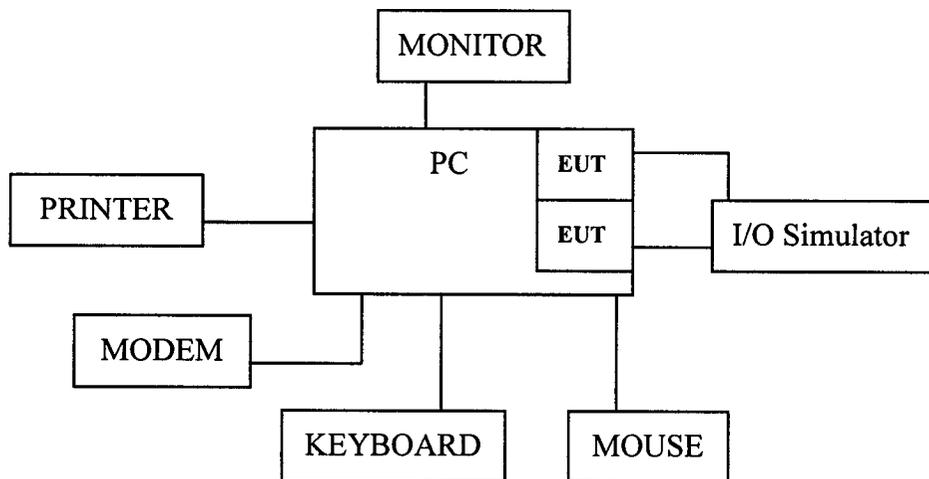
## RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30-230	10	30
230-1000	10	37

## BLOCK DIAGRAM OF TEST SETUP

### SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

**EUT: DIGITAL I/O CARD**  
**Trade Name: ADVANTECH**  
**Model Number: PCI-1750 and PCI-1751**  
**Power Cord: Unshielded, 2m**



## SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: PCI-1750 and PCI-1751

Location: Site # 1

Tested by: Jeff Lee

Test Mode: PCI-1750 and PCI-1751 communicated

Test Results: Passed

Temperature: 27.5°C

Humidity: 64%RHS

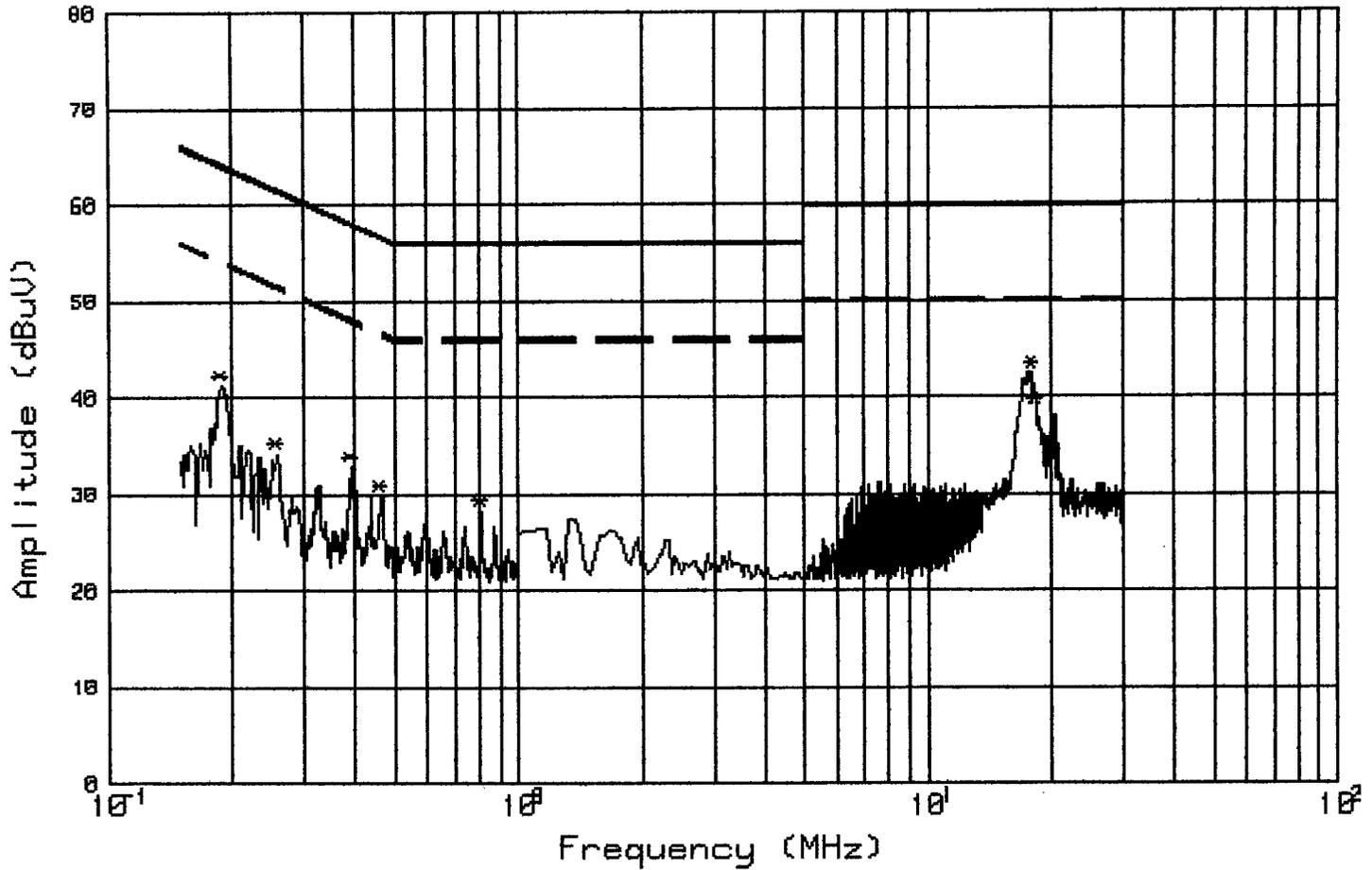
(The chart below shows the highest readings taken from the final data)

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.189	41.2	---	---	64.1	54.1	-22.9	-12.9	L1
0.258	34.2	---	---	61.5	51.5	-27.3	-17.3	L1
0.392	32.8	---	---	58.0	48.0	-25.2	-15.2	L1
0.809	28.2	---	---	56.0	46.0	-27.8	-17.8	L1
18.069	42.4	---	---	60.0	50.0	-17.6	-7.6	L1
18.483	38.6	---	---	60.0	50.0	-21.4	-11.4	L1
0.191	41.6	---	---	64.0	54.0	-22.4	-12.4	L2
0.394	32.4	---	---	58.0	48.0	-25.6	-15.6	L2
0.594	27.0	---	---	56.0	46.0	-29.0	-19.0	L2
1.704	27.4	---	---	56.0	46.0	-28.6	-18.6	L2
12.103	32.0	---	---	60.0	50.0	-28.0	-18.0	L2
18.483	41.0	---	---	60.0	50.0	-19.0	-9.0	L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

**\*\*NOTE:** "----" denotes the emission level complied with the Average limit, with at least 2dB margin, so no further re-check .

**C&C Lab. (Taiwan) Cond. Test Site #1**  
**EN 55022 - Class B QP/AV Limit**



Model: PCI-1750  
 Remark: PCI-1751

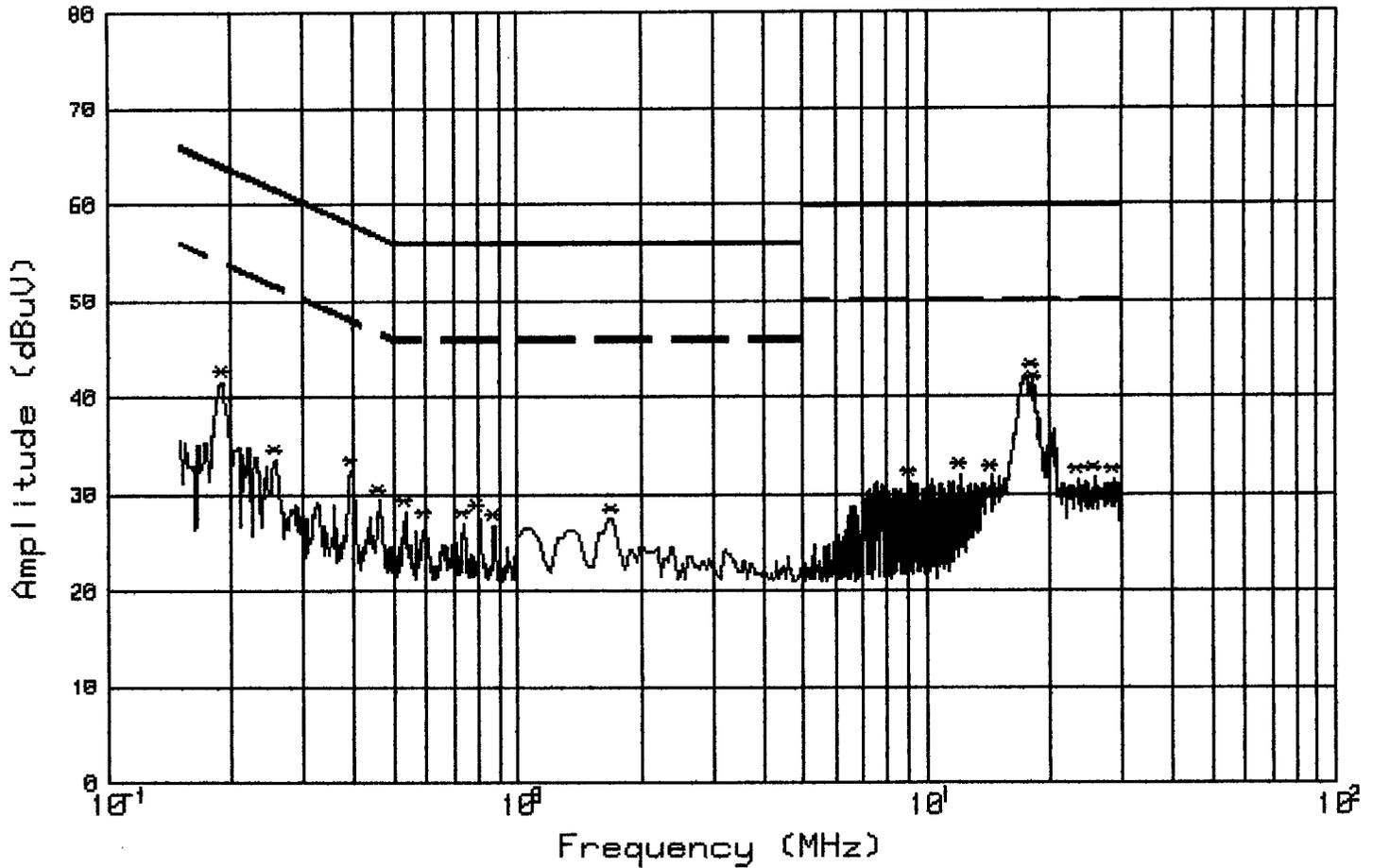
No. 2 Test Date: 5 Jun 1998 09:34:06

Auto-Marking; RBW=VBW=10 KHz; SWEEP TIME AUTO LISN= L1  
 Tester: JEFF Detector=Peak (R3261C S.P.A.)

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	AV.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.189	41.2	-	41.2	54.1	-12.9	
2	.258	34.2	-	34.2	51.5	-17.3	
3	.392	32.8	-	32.8	48.0	-15.2	
4	.463	29.8	-	29.8	46.6	-16.8	
5	.809	28.2	-	28.2	46.0	-17.8	
6	18.069	42.4	-	42.4	50.0	-7.6	
7	18.483	38.6	-	38.6	50.0	-11.4	

**C & C Lab. Co. Ltd.**  
 File No. 980105-E

C&C Lab. (Taiwan) Cond. Test Site #1  
 EN 55022 - Class B QP/AV Limit



Model: PCI-1750

No. 1 Test Date: 5 Jun 1998 09:32:48

Remark: PCI-1751

Auto-Marking; RBW=VBW=10 KHz; SWEEP TIME AUTO

LISN= L2

Tester: JEFF

Detector=Peak (R3261C S.P.A.)

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	AV.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.191	41.6	-	41.6	54.0	-12.4	
2	.258	33.6	-	33.6	51.5	-17.9	
3	.394	32.4	-	32.4	48.0	-15.6	
4	.462	29.4	-	29.4	46.7	-17.3	
5	.534	28.2	-	28.2	46.0	-17.8	
6	.594	27.0	-	27.0	46.0	-19.0	
7	.740	27.0	-	27.0	46.0	-19.0	
8	.805	27.8	-	27.8	46.0	-18.2	
9	.877	26.8	-	26.8	46.0	-19.2	
10	1.704	27.4	-	27.4	46.0	-18.6	
11	9.120	31.2	-	31.2	50.0	-18.8	
12	12.103	32.0	-	32.0	50.0	-18.0	
13	14.423	31.8	-	31.8	50.0	-18.2	
14	18.234	42.2	-	42.2	50.0	-7.8	
15	18.483	41.0	-	41.0	50.0	-9.0	

C & C Lab. Co. Ltd.

File No. 980105-E

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PCI-1750 and PCI-1751

**Location:** Site #1

**Tested by:** Jeff Lee

**Test Model:** PCI-1750 and PCI-1751 communicated

**Test Results:** Passed

**Temperature:** 28°C

**Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

FREQ MHz	RAW dBuV/m	SITE CF	CORR'D dBuV/m	Q.P. LIMIT (dBuV/m)	Q.P. MARGIN dB	Antenna Height (cm)	Table Pos. (deg)	Detector	NOTE
34.86	10.6	16.8	27.4	30.0	-2.6	100.0	159.5	PEAK	Vert
105.06	12.1	13.7	25.8	30.0	-4.2	100.0	280.2	PEAK	Vert
125.00	12.4	14.5	26.9	30.0	-3.1	108.6	226.7	PEAK	Vert
133.30	10.6	14.2	24.8	30.0	-5.2	108.6	332.2	PEAK	Vert
167.40	11.7	14.1	25.8	30.0	-4.2	100.1	194.0	PEAK	Vert
200.48	13.2	13.0	26.2	30.0	-3.8	100.1	118.0	PEAK	Vert
217.00	10.0	13.6	23.6	30.0	-6.4	100.1	42.3	PEAK	Vert
301.40	11.6	16.3	27.9	37.0	-9.1	400.0	284.8	PEAK	Vert
366.30	13.0	19.7	32.7	37.0	-4.3	346.2	260.6	PEAK	Vert
466.30	12.5	21.4	33.9	37.0	-3.1	335.3	128.2	PEAK	Vert
501.20	10.3	22.5	32.8	37.0	-4.2	302.1	0.0	PEAK	Vert
601.30	10.2	24.2	34.4	37.0	-2.6	259.1	175.6	PEAK	Vert
801.40	8.3	25.6	33.9	37.0	-3.1	201.2	338.0	PEAK	Vert
866.60	6.6	27.7	34.3	37.0	-2.7	156.9	187.0	PEAK	Vert

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PCI-1750 and PCI-1751

**Location:** Site #1

**Tested by:** Jeff Lee

**Test Model:** PCI-1750 and PCI-1751 communicated

**Test Results:** Passed

**Temperature:** 28°C

**Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

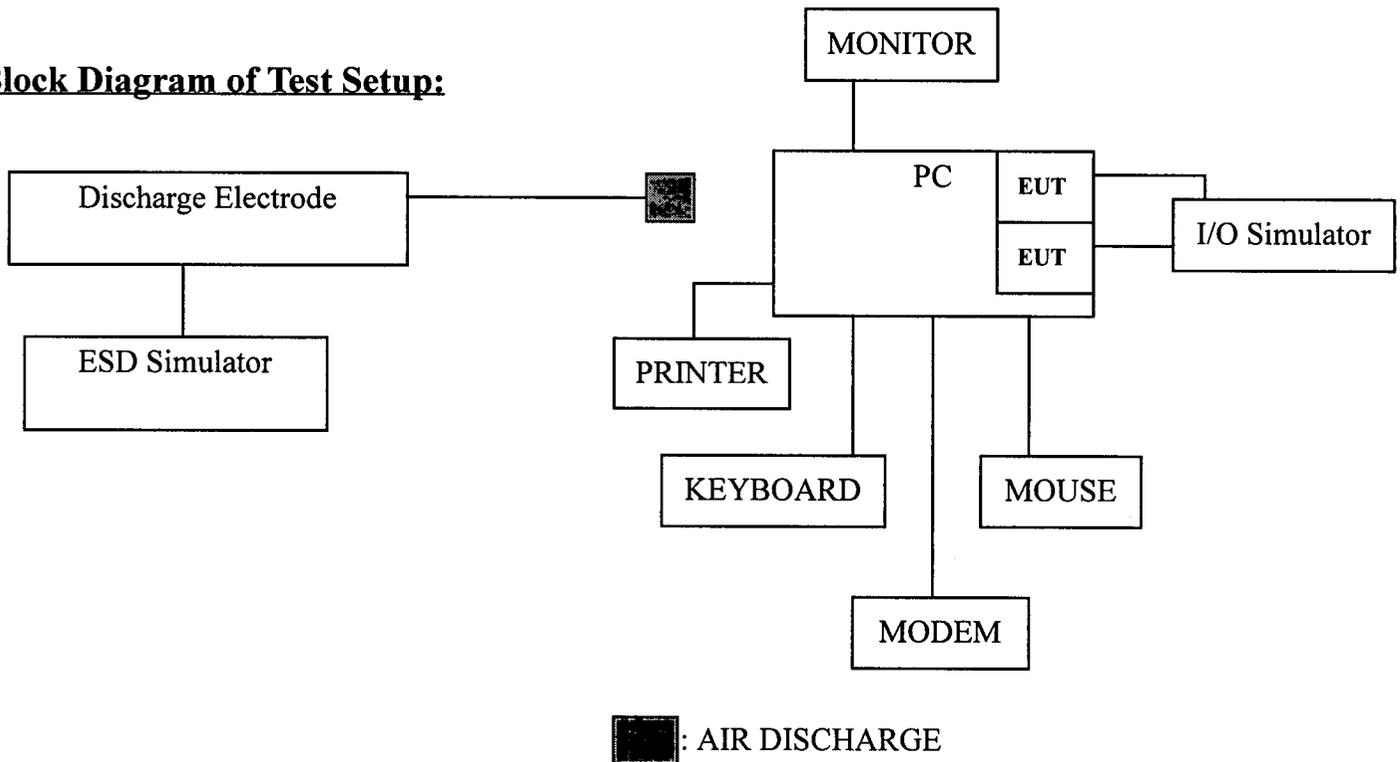
FREQ MHz	RAW dBuV/m	SITE CF	CORR'D dBuV/m	Q.P. LIMIT (dBuV/m)	Q.P. MARGIN dB	Antenna Height (cm)	Table Pos. (deg)	Detector	NOTE
33.60	8.3	17.4	25.7	30.0	-4.3	387.4	201.2	PEAK	Horz
66.72	12.0	7.9	19.9	30.0	-10.1	361.6	114.9	PEAK	Horz
105.40	11.3	13.5	24.8	30.0	-5.2	400.0	12.9	PEAK	Horz
125.30	8.9	14.3	23.2	30.0	-6.8	400.0	87.1	PEAK	Horz
133.34	10.3	13.7	24.0	30.0	-6.0	400.0	162.4	PEAK	Horz
200.46	12.6	12.7	25.3	30.0	-4.7	400.0	281.2	PEAK	Horz
210.30	9.6	12.9	22.5	30.0	-7.5	400.0	355.9	PEAK	Horz
334.30	12.8	17.9	30.7	37.0	-6.3	358.8	128.5	PEAK	Horz
366.50	7.6	19.2	26.8	37.0	-10.2	335.1	242.9	PEAK	Horz
401.30	12.0	20.9	32.9	37.0	-4.1	233.2	340.2	PEAK	Horz
500.80	10.4	23.1	33.5	37.0	-3.5	201.1	19.5	PEAK	Horz
534.20	9.8	23.6	33.4	37.0	-3.6	201.1	45.5	PEAK	Horz
601.30	8.6	24.2	32.8	37.0	-4.2	165.4	166.8	PEAK	Horz
666.00	6.0	24.5	30.5	37.0	-6.5	159.5	360.0	PEAK	Horz

## SECTION 2 IEC 1000-4-2 (ELECTROSTATIC DISCHARGE)

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port : Enclosure  
Basic Standard : IEC 1000-4-2  
Requirements :  $\pm 8$  kV (level 3)  
Performance Criteria : B  
Temperature/Humidity : 24°C/55%

#### Block Diagram of Test Setup:



## **Test Procedure:**

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
≥ 10/Point	+4kv	Contact Discharge	Pass
≥ 10/Point	-4kV	Contact Discharge	Pass
≥ 10/Point	+8kV	Air Discharge	Pass
≥ 10/Point	-8kV	Air Discharge	Pass

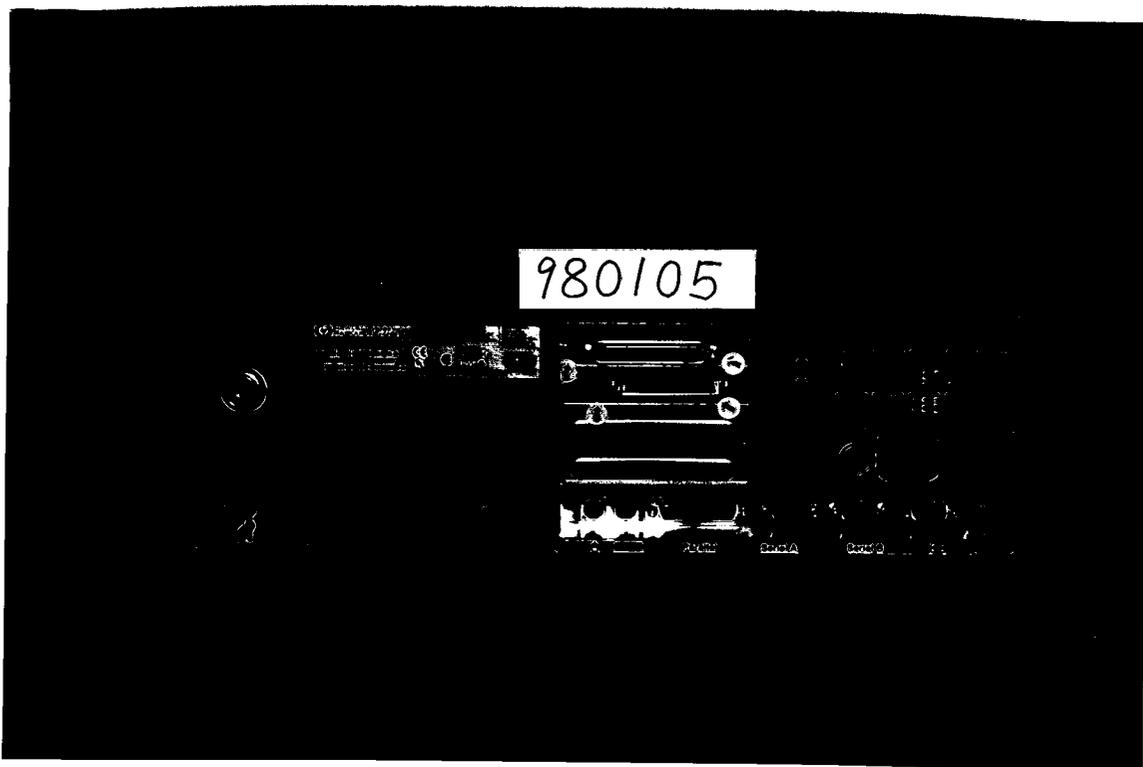
**Note:** The tested points, please refer to attached page.

## **Performance & Result:**

- Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- Criteria C:** Temporary loss of function is allowed, provided the functions self-recoverable or can be restored by the operation of controls.

**Observation:** No any performance degraded during the tests.

**ESD Tested Points:**

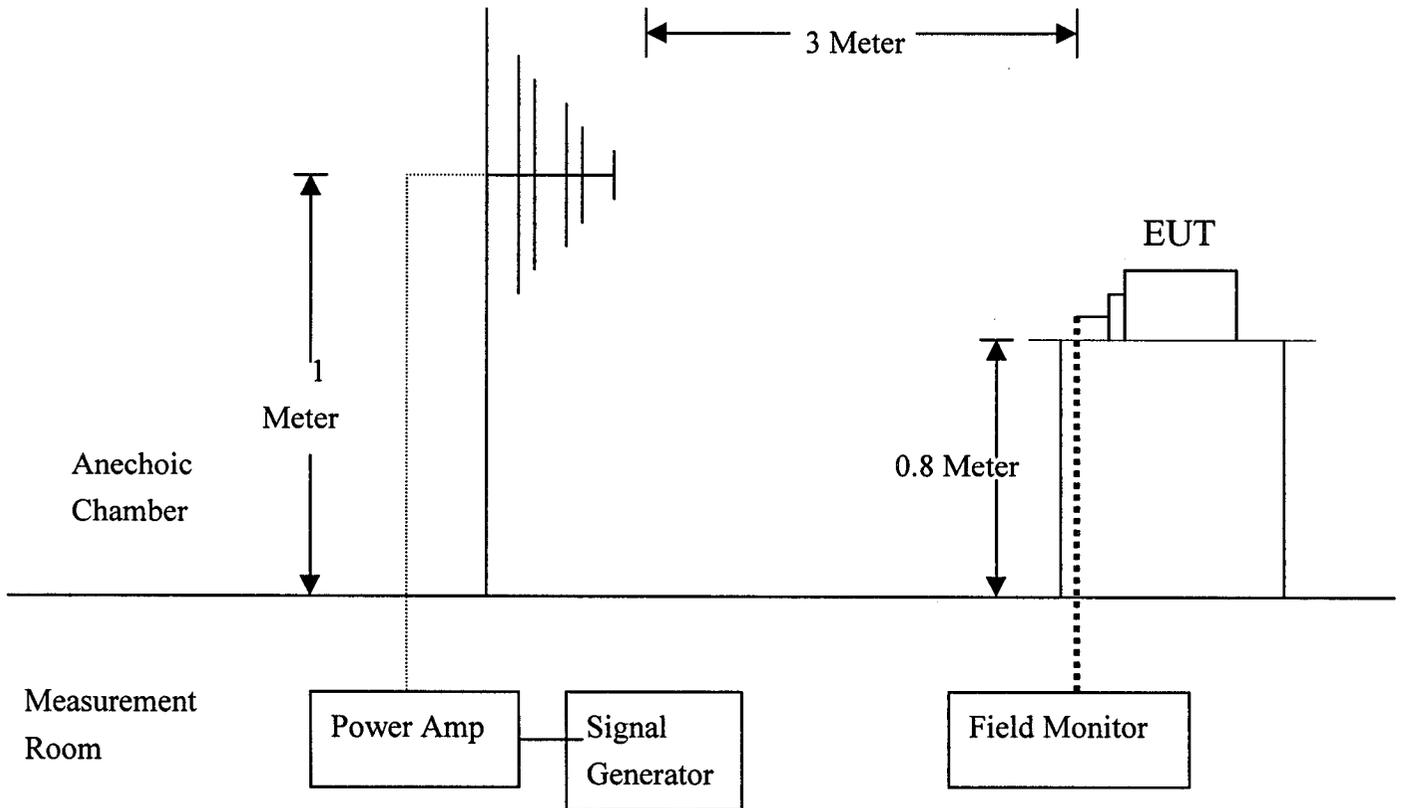


### SECTION 3 IEC 1000-4-3 (RADIATED ELECTROMAGNETIC FIELD )

#### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port : Enclosure  
Basic Standard : IEC 1000-4-3  
Requirements : 10 V/m / with modulated  
Performance Criteria : A  
Temperature : 24°C  
Humidity : 65%

#### Block Diagram of Test Setup:



**Test Procedure:**

Frequency Range : 80MHz-1000MHz

Frequency Step : 1% of fundamental

Range (MHz)	Field	Modulation	Polarity	Position (° )	Result (Pass/Fail)
80-1000	10V	Yes	H	0	Pass
80-1000	10V	Yes	V	0	Pass
80-1000	10V	Yes	H	90	Pass
80-1000	10V	Yes	V	90	Pass
80-1000	10V	Yes	H	180	Pass
80-1000	10V	Yes	V	180	Pass
80-1000	10V	Yes	H	270	Pass
80-1000	10V	Yes	V	270	Pass

**Performance & Result:**

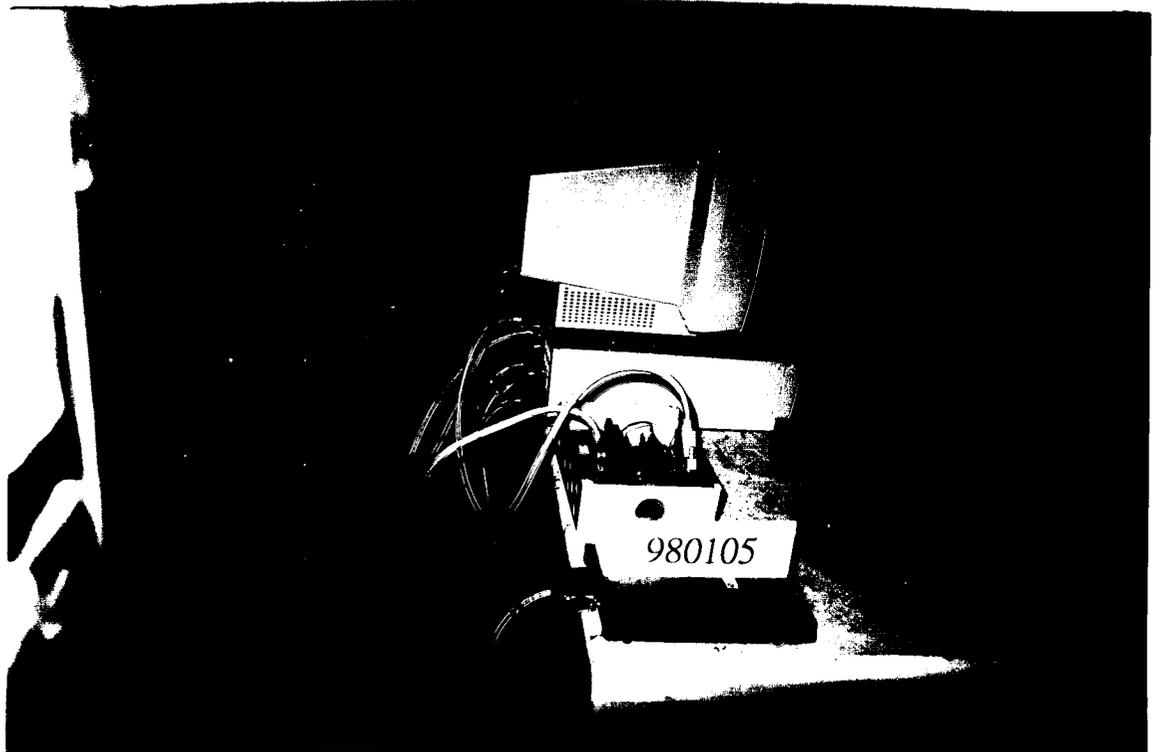
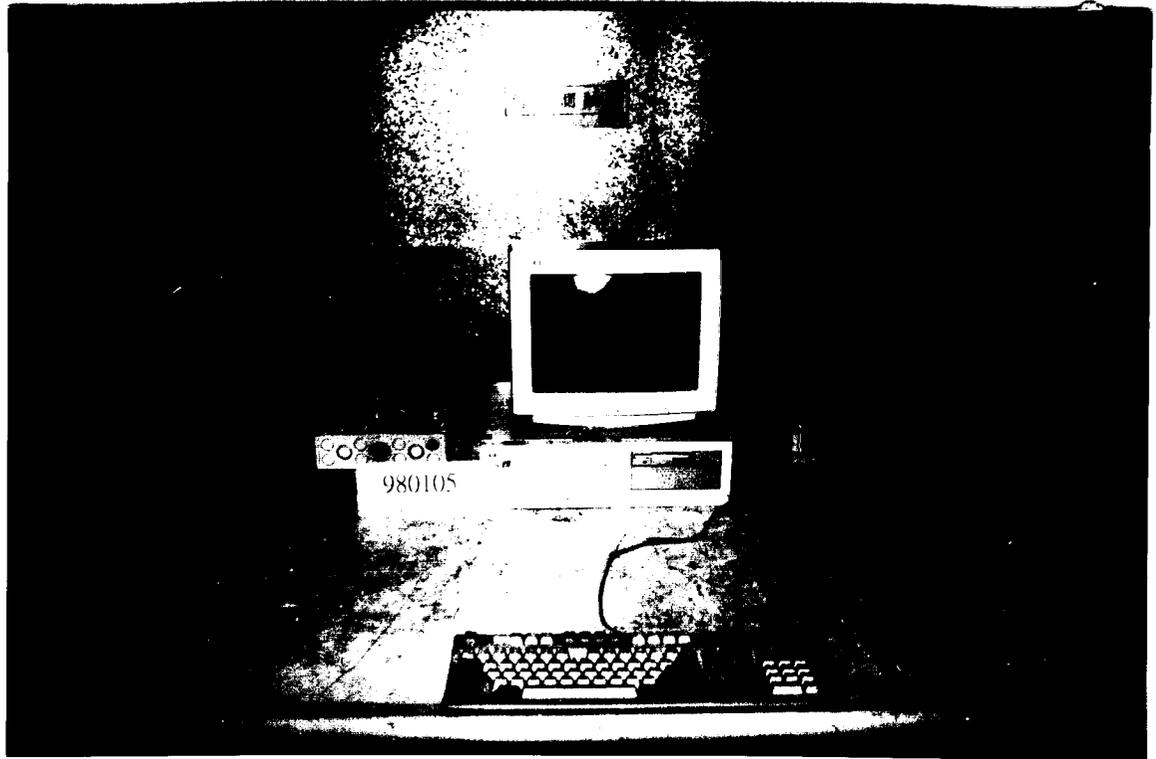
- Criteria A:** The apparatus continues to operate as intended. Yes degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- Criteria B:** The apparatus continues to operate as intended after the test. Yes degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- Criteria C:** Temporary loss of function is allowed, provided the functions self-recoverable or can be restored by the operation of controls.

**\*\* Observation:** Yes any performance degraded during the tests.

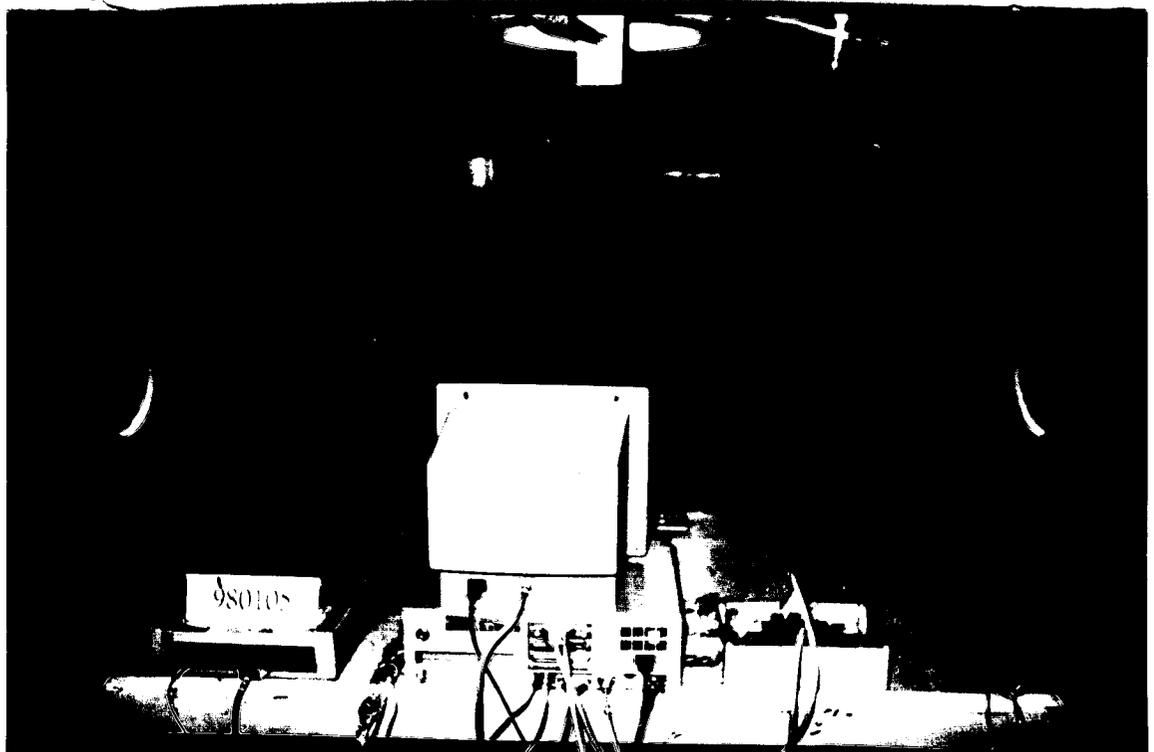
## APPENDIX A

### PHOTOGRAPHS OF TEST SETUP

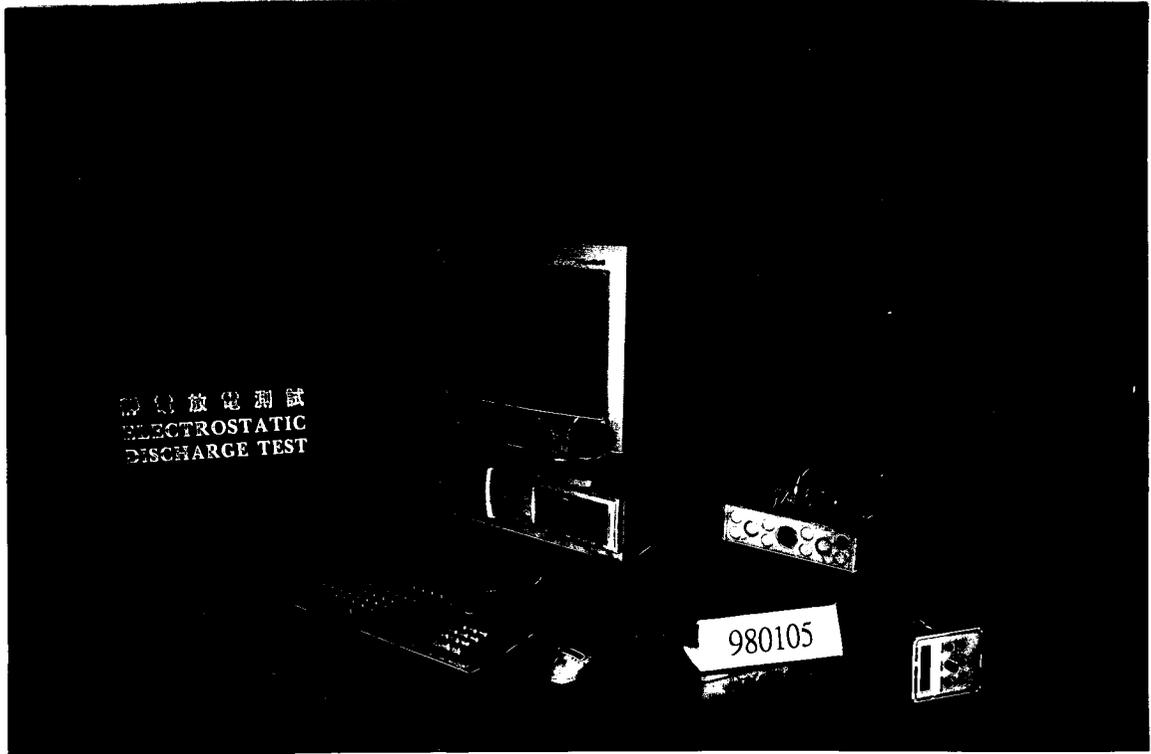
# LINE CONDUCTED EMISSION TEST (EN 55022)



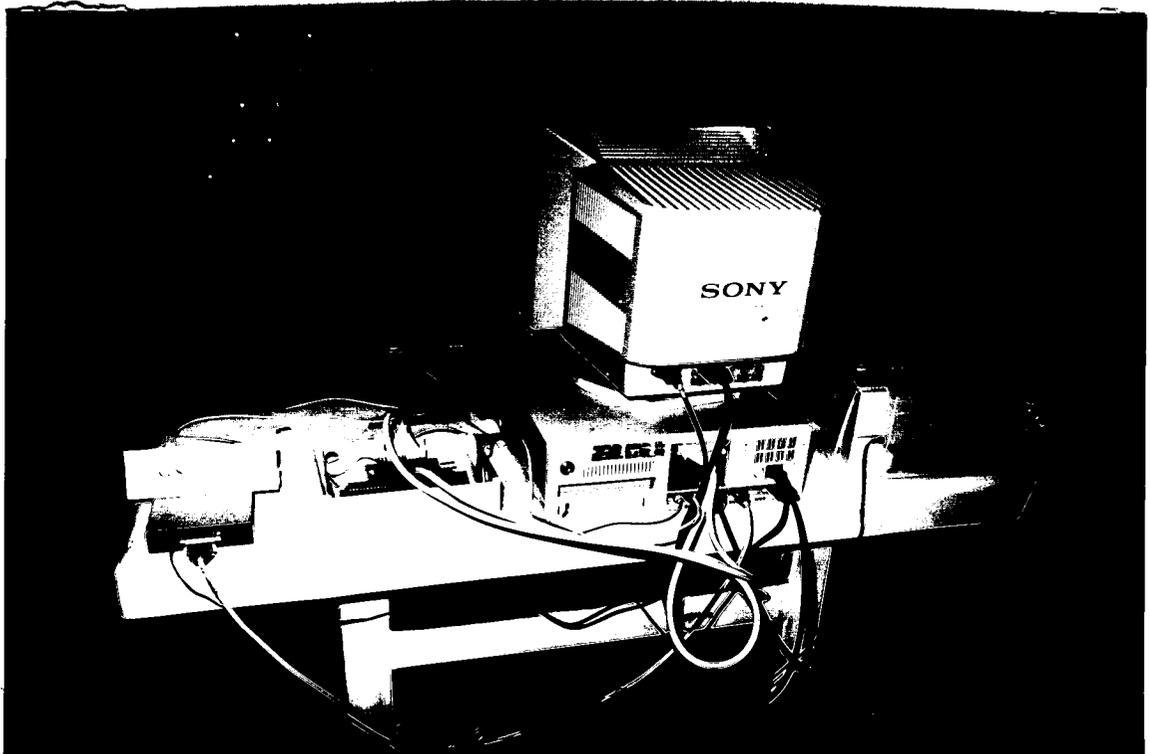
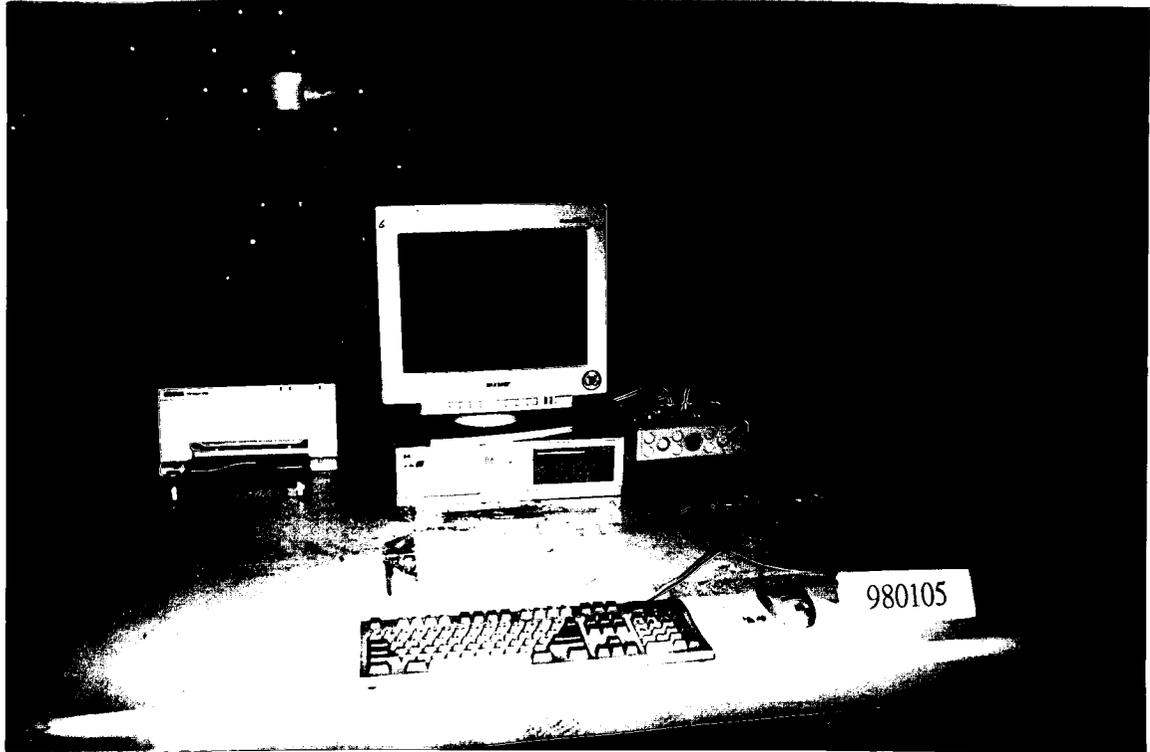
### RADIATED EMISSION TEST (EN 55022)



# ELECTROSTATIC DISCHARGE TEST (IEC 1000-4-2)



# RADIATED ELECTROMAGNETIC FIELD (IEC 1000-4-3)

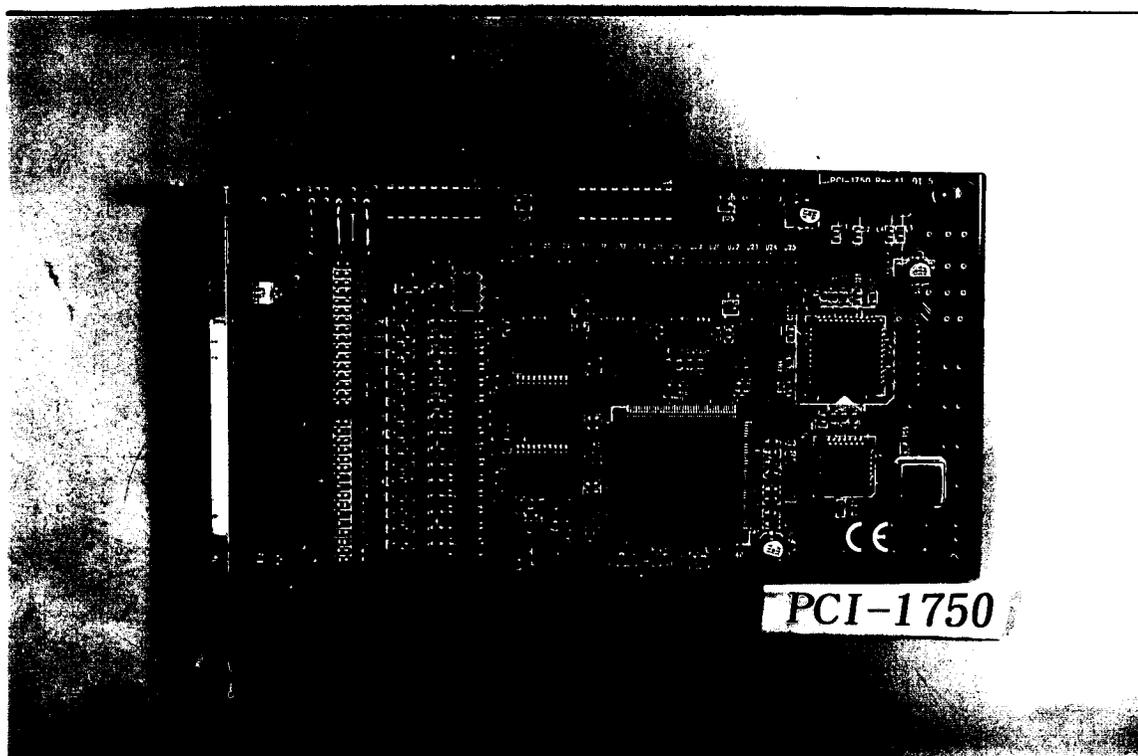


## APPENDIX B

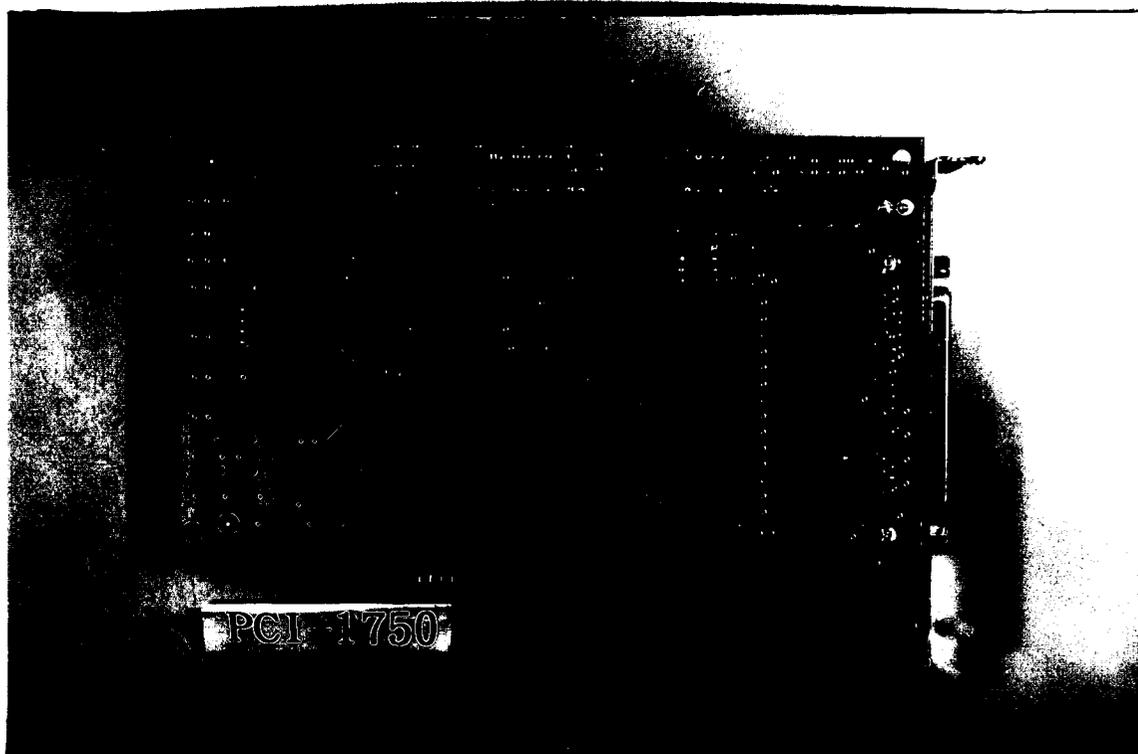
### PHOTOGRAPHS OF EUT

Model # : PCI-1750

The Front View of EUT

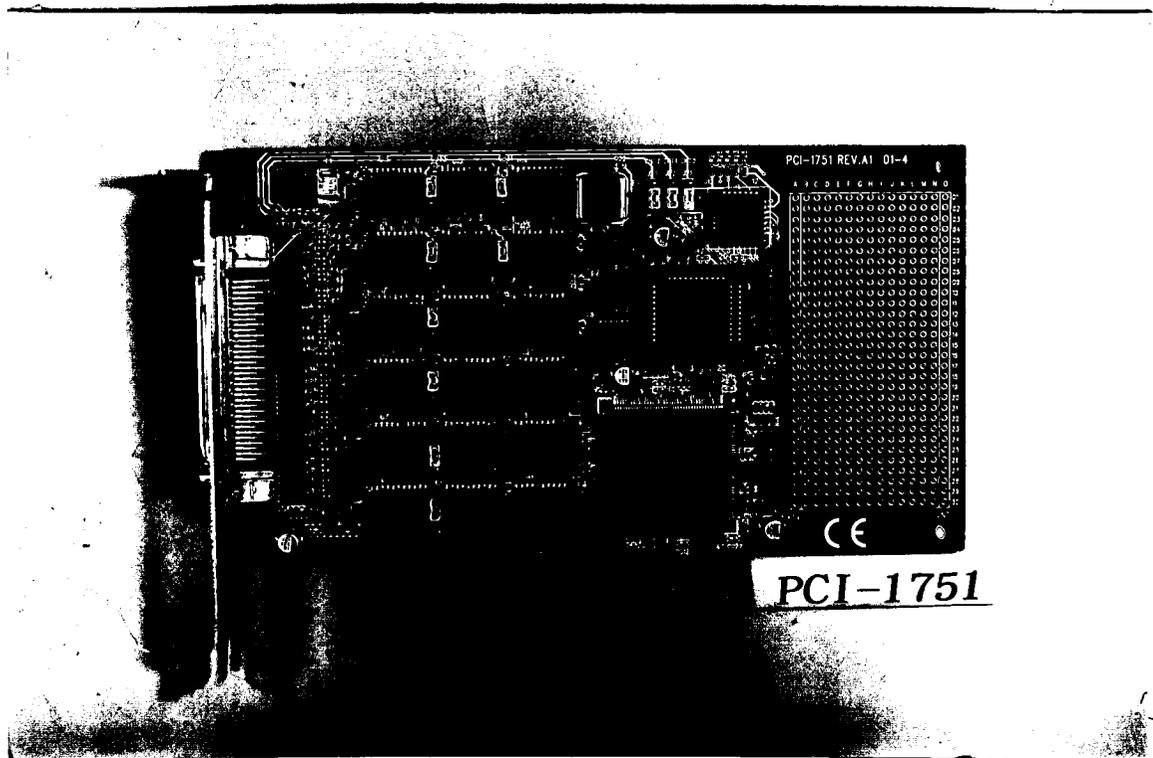


The Rear View of EUT



Model # : PCI-1751

The Front View of EUT



The Rear View of EUT

