



EMC COMPLIANCE TEST REPORT

for

Isolated RS-232 Module & 4-Port RS-232 Module

Trade Name : ADVANTECH
Model Number : PCM-3610, PCM-3640
Serial Number : N/A
Report Number : 980218-E
Date: August 24, 1998
Regulations: See below

Standards	Results (Pass/Fail)
EN 50081-1: 1992	PASS
EN 55022: 1994 (Class A)	PASS
EN 61000-3-2 (=IEC 1000-3-2): 1995	PASS
EN 61000-3-3 (=IEC 1000-3-3): 1995	PASS
EN 50082-2: 1995	PASS
IEC 1000-4-2: 1995	PASS
IEC 1000-4-3: 1995	PASS
IEC 1000-4-4: 1995	PASS
IEC 1000-4-6: 1996	PASS

Prepared for :

ADVANTECH CO., LTD.
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City
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C&C Laboratory Co., Ltd.



EC-Declaration of Conformity

For the following equipment:

Isolated RS-232 Module & 4 -Port RS-232 Module

(Product Name)

PCM-3610, PCM-3640 / ADVANTECH

(Model Designation / Trade name)

ADVANTECH CO., LTD.

(Manufacturer Name)

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

(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 checked="" 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 checked="" type="checkbox"/> IEC1000-3-3 |
| <input checked="" type="checkbox"/> EN55022:1994 | <input type="checkbox"/> IEC801-4:1988 | <input checked="" type="checkbox"/> IEC1000-4-4 | <input type="checkbox"/> EN60555-2:1987 |
| <input type="checkbox"/> EN60555-3:1987/A1:1991 | | <input checked="" 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: Isolated RS-232 Module & 4 -Port RS-232 Module
Trade Name: ADVANTECH
Model Number: PCM-3610, PCM-3640
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, Taiwan, R.O.C.
Manufacturer: ADVANTECH CO., LTD.
4F., No. 108-3, Ming-Chuan Road, Shing-Tien City,
Taipei, Taiwan, R.O.C.
Type of Test: EMC Directive 89/336/EEC for CE Marking
Technical Standards: EN 50081-1: 1992 (EN 55022: 1994 (Class A), EN61000-3-2:1995,
EN 61000-3-3:1995)
EN 50082-2: 1995 (IEC 1000-4-2: 1995, IEC 1000-4-3: 1995,
IEC 1000-4-4: 1995, IEC 1000-4-6: 1996)
File Number: 980218-E
Date of test: August 17 / 20, 1998
Tested by: Clare Chou
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, 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, Taiwan, R.O.C.

File Number: 980218-E

Date of Test: August 17 / 20, 1998

Equipment Under Test: Isolated RS-232 Module & 4 -Port RS-232 Module

Model Number: PCM-3610, PCM-3640

Serial Number: N/A

Technical Standards: EN 50081-1: 1992 (EN 55022: 1994 (Class A), EN61000-3-2:1995,
EN 61000-3-3:1995)
EN 50082-2: 1995 (IEC 1000-4-2: 1995, IEC 1000-4-3: 1995,
IEC 1000-4-4: 1995, IEC 1000-4-6: 1996)

**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. The communication program was loaded and executed in Dos mode of Windows environment.
2. Data was sent and receiver from port to port, both ports are install on the EUT.
3. EMI test program was loaded and executed in Windows mode.
4. Test program sequentially exercised all related I/O's of Host PC and sent "H" patterns to all applicable output ports of Host PC.
5. Repeat 2 to 4. Test program is self-repeating throughout the test.

PRODUCT INFORMATION

Housing Type: Other
EUT Power Rating: DVC from slot of Host PC
AC Power during Test 230VAC/50Hz
AC Power Cord Type: Unshielded, 1.8m (To Host PC)
DC Power Cable Type: N/A
OSC/Clock Frequencies : 1) 1.8432 MHz

I/O PORT TYPES	Q'TY	TESTED WITH
1). Serial Port	6	6

I/O Port	PCM-3610	PCM-3640
1). Serial Port	2	4

SUPPORT EQUIPMENT

Equipment	Model #	Serial #	FCC ID	Manufacturer	Data Cable	Power Cord
PC	VL SERIES 5 5/166	SG74903048	FCC DoC	HP	Shielded, 1.4m x 2 Shielded, 3m x 1	Unshielded, 1.8m
Monitor	GDM-17SE2T	7145529	AK8GDM17SE2T	SONY	Shielded, 1.6m with two ferrite core	Unshielded, 1.8m
Modem	2400SE	94-364- 176268	DK467GSM24	Computer Peripheral	Shielded, 2m	Unshielded, 2.2m
Printer	DJ-400C	MY8261C964	B94C2642X	Hewlett Packard Co.	Shielded, 1.8m	AC I/P Unshielded, 1m DC O/P Unshielded, 2m
Keyboard	K288	H803151753	FKD46AK288	GENUINE	Shielded, 1.4m	N/A
Mouse	M-S34	LZR8030653 0	DZL211029	Logitech	Shielded, 1.8m	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 test sites 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 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.
- Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.
- 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 & #3 Line Conducted Test Site:** Vertical ground plane (2.2m x 2.2m)
Horizontal ground plane (2.5m 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	QP	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	06/06/1998	06/05/1999
Precision Dipole (300-1000MHz)	ROHDE & SCHWARZ	HZ-13	846556/0008	06/16/1998	06/15/1999
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	04/04/1998	04/03/1999
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2309	03/14/1998	03/13/1999
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	12/16/1998
Pre-Amplifier (100kHz-1300MHz)	HP	8447D	2944A09173	01/14/1998	01/13/1999
Receiver (20MHz-1GHz)	ROHDE & SCHWARZ	ESVS10	846285/016	12/04/1997	12/03/1998
Precision Dipole (30-300MHz)	ROHDE & SCHWARZ	HZ-12	846932/0004	06/06/1998	06/05/1999
Precision Dipole (300-1000MHz)	ROHDE & SCHWARZ	HZ-13	846556/0008	06/16/1998	06/15/1999
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	04/04/1998	04/03/1999
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2179	11/29/1997	11/28/1998
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	Aug. 10, 1998	Aug. 9, 1999
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 mode(s) were scanned during the preliminary test:

Mode(s):

1. Isolated RS-232 Module add 4 -Port RS-232 Module

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

Mode(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 limits, with at least 2dB margin limits, so no further recheck.

LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
150kHz-500kHz	79dBuV	66dBuV
500kHz-5MHz	73dBuV	60dBuV
5MHz-30MHz	73dBuV	60dBuV

*** 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 mode(s) were scanned during the preliminary test:

Mode(s):

1. Isolated RS-232 Module add 4 -Port RS-232 Module

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

Mode(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 Data (dB)	Corr. Factor (dBuV)	Emiss. Level (dBuV/m)	Limits	Margin (dB)	Det ector	Ant. Heig. (cm)	Turn Table (°)
xx.xx	12.20	10.88	23.08	30.0	-6.92	Pk	150	180

Freq.	= Emission frequency in MHz
Raw Data dB	= Uncorrected analyzer/Receiver reading
Corr. Factor dBuV	= Correction factors of antenna factor and cable loss
Emiss. Level dBuV/m	= Raw reading converted to dBuV and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit
Detector	= Detector function (Peak or Q.P.)
Ant. Heig.	= Antenna height above ground plane
Turn Table	= EUT placement in reference to antenna

RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBu V/m/ Q.P.)
30-230	10	40
230-1000	10	47

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

BLOCK DIAGRAM OF TEST SETUP

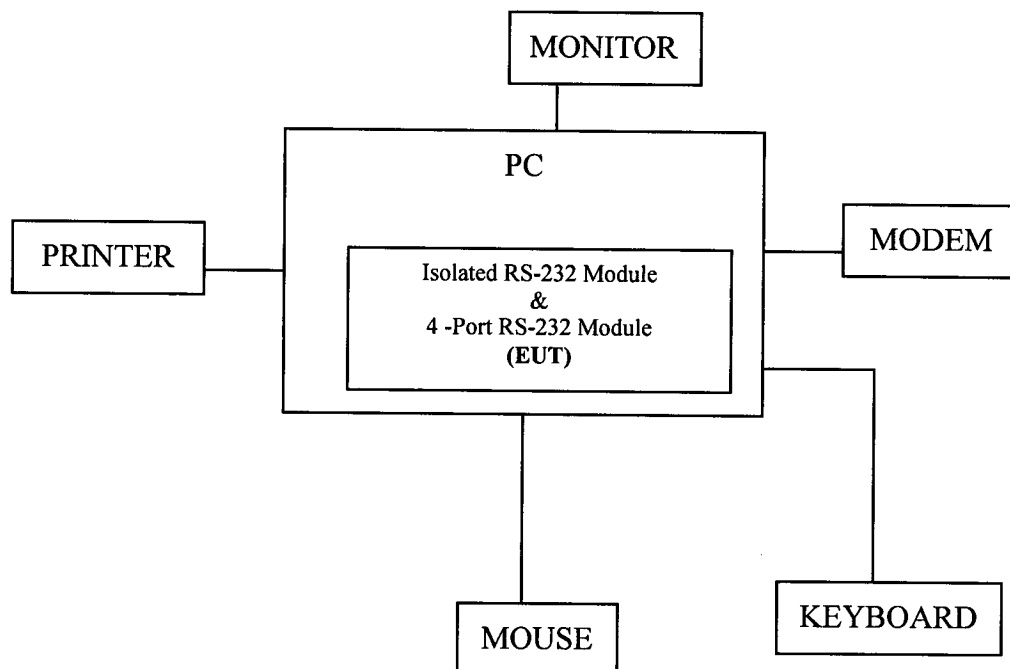
SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

EUT: Isolated RS-232 Module and 4 -Port RS-232 Module

Trade Name: ADVANTECH

Model Number: PCM-3610, PCM-3640

Power Cord: Unshielded, 1.8m (To Host PC)



SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: PCM-3610, PCM3640

Location: Site # 3

Tested by: Clare Chou

Test Mode: Isolated RS-232 Module add 4 -Port RS-232 Module

Test Results: Passed

Temperature: 25°C

Humidity: 50%RHS

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

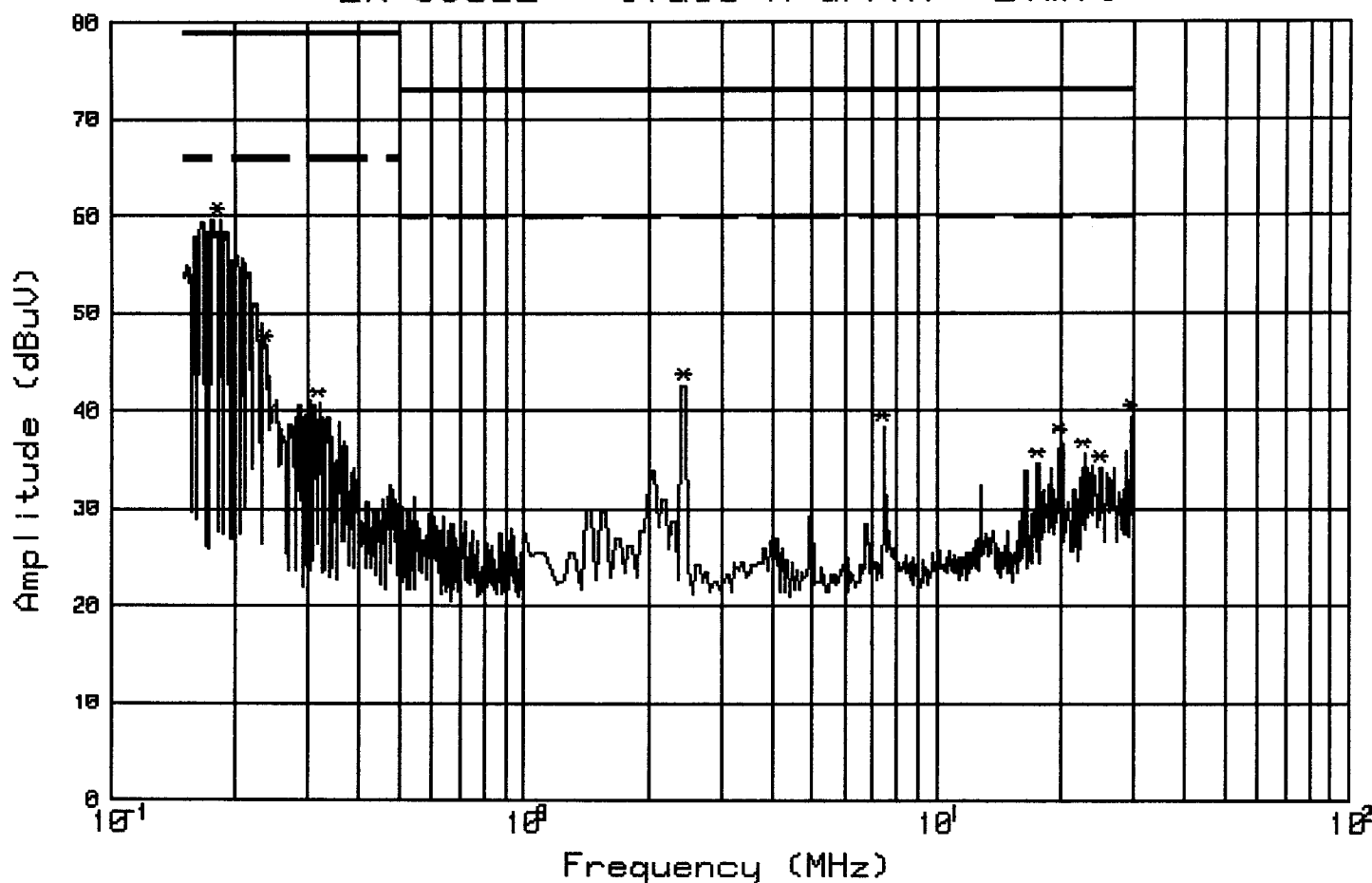
FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.183	59.6	---	---	79.0	66.0	-19.4	-6.4	L1
0.237	46.6	---	---	79.0	66.0	-32.4	-19.4	L1
2.450	42.6	---	---	73.0	60.0	-30.4	-17.4	L1
7.463	38.4	---	---	73.0	60.0	-34.6	-21.6	L1
20.099	37.0	---	---	73.0	60.0	-36.0	-23.0	L1
29.793	39.4	---	---	73.0	60.0	-33.6	-20.6	L1
0.172	59.8	---	---	79.0	66.0	-19.2	-6.2	L2
0.236	47.4	---	---	79.0	66.0	-31.6	-18.6	L2
2.450	36.6	---	---	73.0	60.0	-36.4	-23.4	L2
10.860	37.2	---	---	73.0	60.0	-35.8	-22.8	L2
20.057	37.6	---	---	73.0	60.0	-35.4	-22.4	L2
29.793	37.8	---	---	73.0	60.0	-35.2	-22.2	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 #3

EN 55022 - Class A QP/AV Limit



Model: PCM-3610/PCM-3640

No. 1

Test Date: 20 Aug 1998 07:47:56

Remark: ISOLATED RS-232 MODULE ADD 4-PORT RS-232 MODULE

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

LISN= L1

Tester:

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

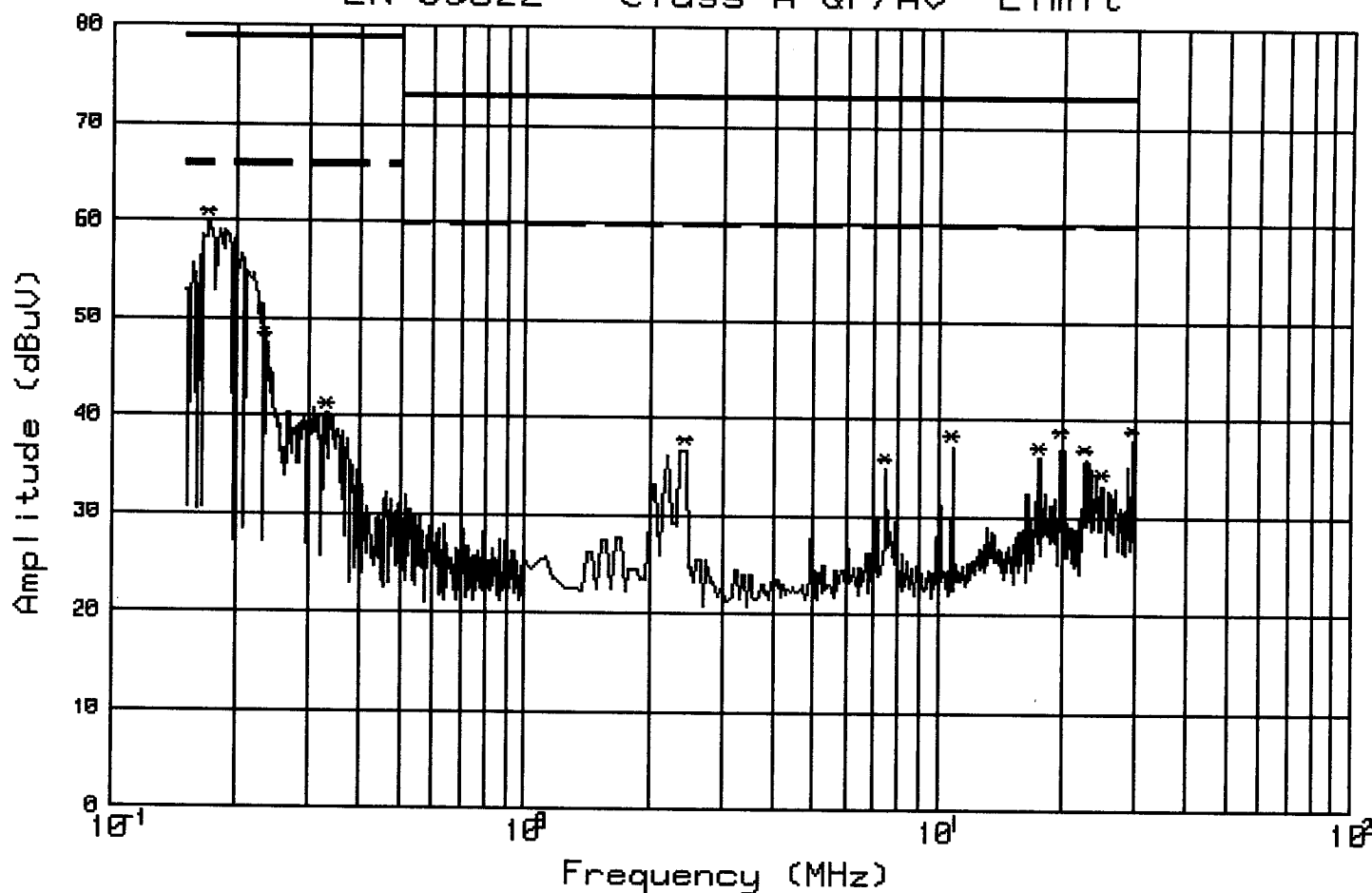
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	AV.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.183	59.6	-	59.6	66.0	-6.4	
2	.237	46.6	-	46.6	66.0	-19.4	
3	.321	40.8	-	40.8	66.0	-25.2	
4	2.450	42.6	-	42.6	60.0	-17.4	
5	7.463	38.4	-	38.4	60.0	-21.6	
6	17.613	34.6	-	34.6	60.0	-25.4	
7	20.099	37.0	-	37.0	60.0	-23.0	
8	22.957	35.6	-	35.6	60.0	-24.4	
9	25.029	34.2	-	34.2	60.0	-25.8	
10	29.793	39.4	-	39.4	60.0	-20.6	

C & C Lab. Co. Ltd.

File No. 98028E

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C&C Lab.(Taiwan) Cond. Test Site #3
EN 55022 - Class A QP/AV Limit



Model: PCM-3610/PCM-3640 No. 2 Test Date: 20 Aug 1998 07:49:00
Remark: ISOLATED RS-232 MODULE ADD 4-PORT RS-232 MODULE
Auto-Marking; RBW=VBW=10 KHz; SWEEP TIME AUTO LISN= L2
Tester: Detector=Peak(R3261C S.P.A.)

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	AV.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.172	59.8	-	59.8	66.0	-6.2	
2	.236	47.4	-	47.4	66.0	-18.6	
3	.332	40.2	-	40.2	66.0	-25.8	
4	2.450	36.6	-	36.6	60.0	-23.4	
5	7.504	34.8	-	34.8	60.0	-25.2	
6	10.860	37.2	-	37.2	60.0	-22.8	
7	17.613	36.0	-	36.0	60.0	-24.0	
8	20.057	37.6	-	37.6	60.0	-22.4	
9	22.957	35.8	-	35.8	60.0	-24.2	
10	25.029	33.2	-	33.2	60.0	-26.8	
11	29.793	37.8	-	37.8	60.0	-22.2	

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: PCM-3610, PCM-3640

Location: Site # 3

Tested by: Clare Chou

Test Mode: Isolated RS-232 Module add 4 -Port RS-232 Module

Test Results: Passed

Polar: Vertical--10m

Temperature: 27°C

Humidity: 50%RH

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

Freq. (MHz)	Raw Data (dB)	Corr. Factor (dBuV)	Emiss. Level (dBuV/m)	Limits	Margin (dB)	Det ector	Ant. Heig. (cm)	Turn Table (°)
47.18	16.5	11.7	28.2	40.0	-11.8	Pk	100.0	279.0
139.10	14.4	15.1	29.5	40.0	-10.5	Pk	100.0	151.9
248.47	15.9	15.9	31.8	47.0	-15.2	Pk	100.0	168.1
447.57	10.3	22.2	32.5	47.0	-14.5	Pk	318.7	98.4
547.85	8.2	24.8	33.0	47.0	-14.0	Pk	269.3	299.4
746.51	8.1	25.6	33.7	47.0	-13.3	Pk	190.0	10.4

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: PCM-3610, PCM-3640

Location: Site # 3

Tested by: Clare Chou

Test Mode: Isolated RS-232 Module add 4 -Port RS-232 Module

Test Results: Passed

Polar: Horizontal--10m

Temperature: 27°C

Humidity: 50%RH

Freq. (MHz)	Raw Data (dB)	Corr. Factor (dBuV)	Emiss. Level (dBuV/m)	Limits	Margin (dB)	Det ector	Ant. Heig. (cm)	Turn Table (°)
48.12	12.5	11.4	23.9	40.0	-16.1	Pk	400.0	206.3
137.27	10.9	14.1	25.0	40.0	-15.0	Pk	400.0	259.0
248.26	17.3	16.3	33.6	47.0	-13.4	Pk	400.0	87.6
448.95	11.9	21.4	33.3	47.0	-13.7	Pk	295.9	290.5
548.69	6.5	23.6	30.1	47.0	-16.9	Pk	237.1	192.9
745.24	7.5	26.6	34.1	47.0	-12.9	Pk	205.0	68.9

SECTION 2 EN61000-3-2 & EN61000-3-3 (POWER HARMONICS & VOLTAGE FLUCTUATION/FLICKER)

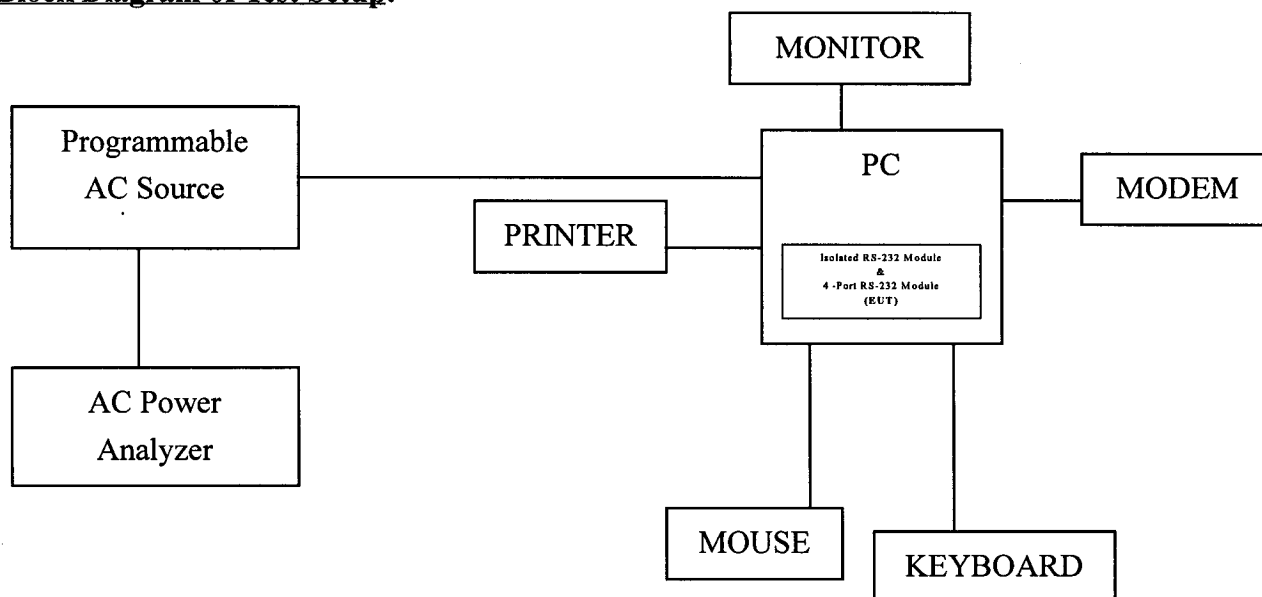
POWER HARMONICS MEASUREMENT

Port : AC mains
Basic Standard : EN 1000-3-2 (1995)
Limits : ☒ Class A, ☐ Class B
Temperature : 25°C
Humidity : 50%

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-3 (1995)
Limits : § 5 of EN 61000-3-3
Temperature : 25°C
Humidity : 50%

Block Diagram of Test Setup:



Result:

Please see the attached test data.

IEC 1000-3-2 TEST REPORT 1998 年 8 月 17 日 07:17 PM

Customer: ADVANTECH

Model No.: PCM-3610 / PCM-3640

Remarks: Temp: 25 °C Hum: 50 %

Tester: Clare

=====

TEST SETUP

Test Freq.:	50.00 Hz.	Test Voltage:	230.0 vac
Waveform :	SINE	Test Time:	2.5 min.
Classification :	CLASS A	Test Type:	STEADY-STATE

Prog. Zo Enabled:	YES	Prog. Zo:	0.000
-------------------	-----	-----------	-------

Motor Driven with Phase Angle Control:	NO
Impedance selected:	DIRECT

Synthetic R+L Enabled:	NO
Resistance: 0.380 Ohms	Inductance: 460.000 uH

PAGE 1

TEST DATA

Result: PASS

Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit
0	0.000	0.000	0.000
1	0.185	NaN	NaN
2	0.002	1.080	1.080
3	0.164	2.300	2.300
4	0.002	0.430	0.430
5	0.153	1.140	1.140
6	0.002	0.300	0.300
7	0.140	0.770	0.770
8	0.001	0.230	0.230
9	0.125	0.400	0.400
10	0.001	0.184	0.184
11	0.108	0.330	0.330
12	0.001	0.153	0.153
13	0.090	0.210	0.210
14	0.001	0.131	0.131
15	0.073	0.150	0.150
16	0.001	0.115	0.115
17	0.056	0.132	0.132
18	0.001	0.102	0.102
19	0.042	0.118	0.118
20	0.001	0.092	0.092
21	0.030	0.107	0.107
22	0.001	0.084	0.084
23	0.022	0.098	0.098

24	0.001	0.077	0.077
25	0.016	0.090	0.090
26	0.001	0.071	0.071
27	0.014	0.083	0.083
28	0.001	0.066	0.066
29	0.012	0.078	0.078
30	0.000	0.061	0.061
31	0.011	0.073	0.073
32	0.000	0.058	0.058
33	0.009	0.068	0.068
34	0.000	0.054	0.054
35	0.007	0.064	0.064
36	0.000	0.051	0.051
37	0.005	0.061	0.061
38	0.000	0.048	0.048
39	0.003	0.058	0.058
40	0.000	0.046	0.046

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END OF REPORT

IEC 1000-3-3 TEST REPORT 1998 年 8 月 17 日 07:06 PM

Customer: ADVANTECH

Model No.: PCM-3610 / PCM-3640

Remarks: Temp: 25 °C Hum: 50 %

Tester: Clare
=====

TEST SETUP

Test Freq.:	50.00 Hz.	Test Voltage:	230.0 vac
Waveform :	SINE		
Test Time:	10.0 min.	Tshort:	10.0 min.

Prog. Zo Enabled:	YES	Prog. Zo:	0.000
-------------------	-----	-----------	-------

Voltage Change less than once per Hour:	NO
Impedance selected:	DIRECT

Synthetic R+L Enabled:	NO
Resistance: 0.380 Ohms	Inductance: 460.000 uH

TEST DATA

C & C Lab. Co. Ltd.	
File No.	980718-E

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.420	1.00	PASS	true
Plt max	0.220	0.65	PASS	true
dc %	0.62	3.00	PASS	true
dmax %	0.73	4.00	PASS	true
d(t) sec.	0.06	0.20	PASS	true

Power Source Data

Source Pst max	0.020	0.400	PASS	true
% THD	0.03	3.00	PASS	true

PAGE 1

END OF REPORT

C & C Lab. Co. Ltd	
File No.	980-18-E
Page	24-5

SECTION 3 IEC 1000-4-2 (ELECTROSTATIC DISCHARGE)

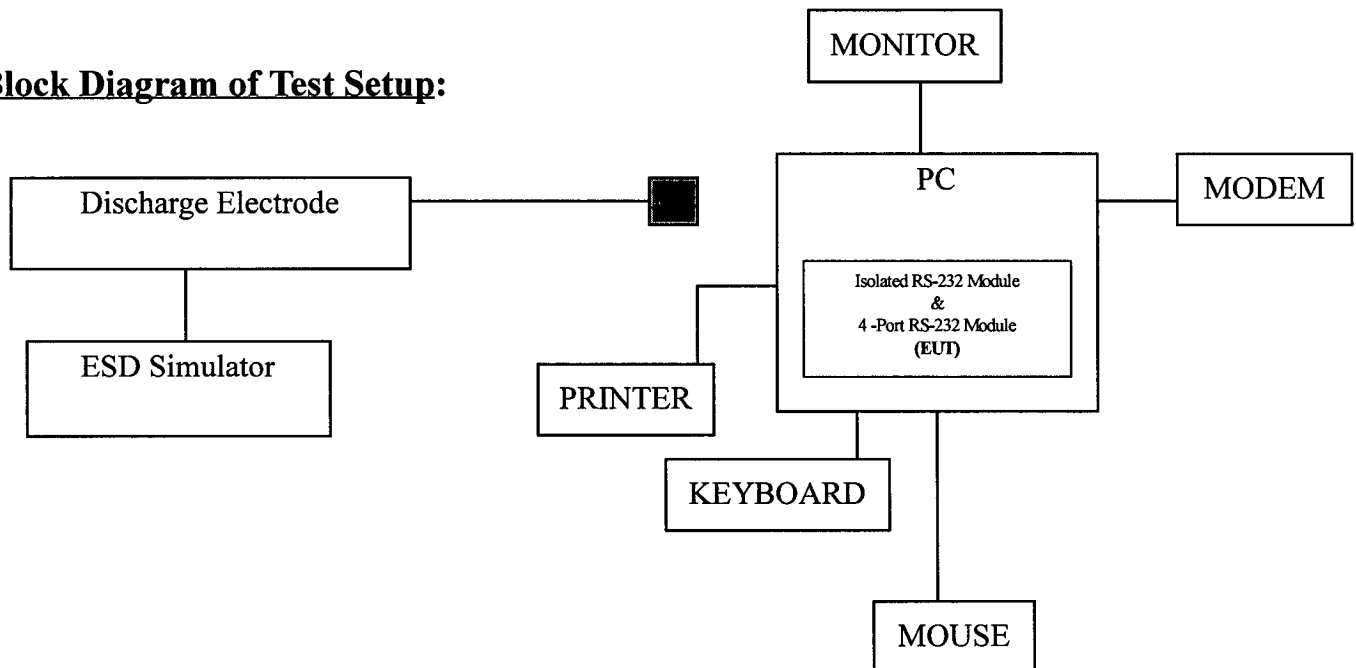
ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port : Enclosure
Basic Standard : IEC 1000-4-2
Requirement : ± 8 kV (Air Discharge)
: ± 4 kV (Contact Discharge)
: ± 4 kV (Indirect Discharge)

Performance Criteria : B

Temperature/Humidity : 25°C/50%

Block Diagram of Test Setup:



Test Procedure:

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
≥ 10/Point	+8kV	Air Discharge	Pass
≥ 10/Point	-8kV	Air Discharge	Pass
≥ 10/Point	+4kV	Contact Discharge	Pass
≥ 10/Point	-4kV	Contact Discharge	Pass
≥ 10/Point	+4kV	Indirect Discharge HCP	Pass
≥ 10/Point	-4kV	Indirect Discharge HCP	Pass
≥ 10/Point	+4kV	Indirect Discharge VCP (Front)	Pass
≥ 10/Point	-4kV	Indirect Discharge VCP (Front)	Pass
≥ 10/Point	+4kV	Indirect Discharge VCP (Left)	Pass
≥ 10/Point	-4kV	Indirect Discharge VCP (Left)	Pass
≥ 10/Point	+4kV	Indirect Discharge VCP (Back)	Pass
≥ 10/Point	-4kV	Indirect Discharge VCP (Back)	Pass
≥ 10/Point	+4kV	Indirect Discharge VCP (Right)	Pass
≥ 10/Point	-4kV	Indirect Discharge VCP (Right)	Pass

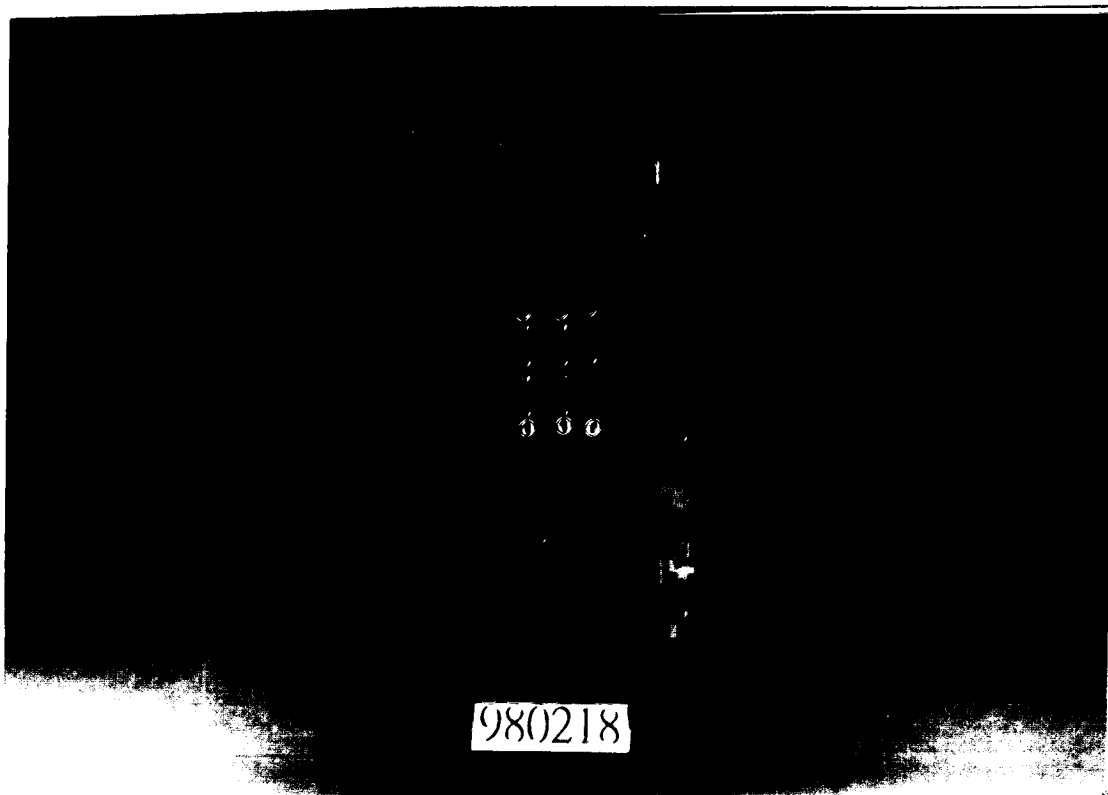
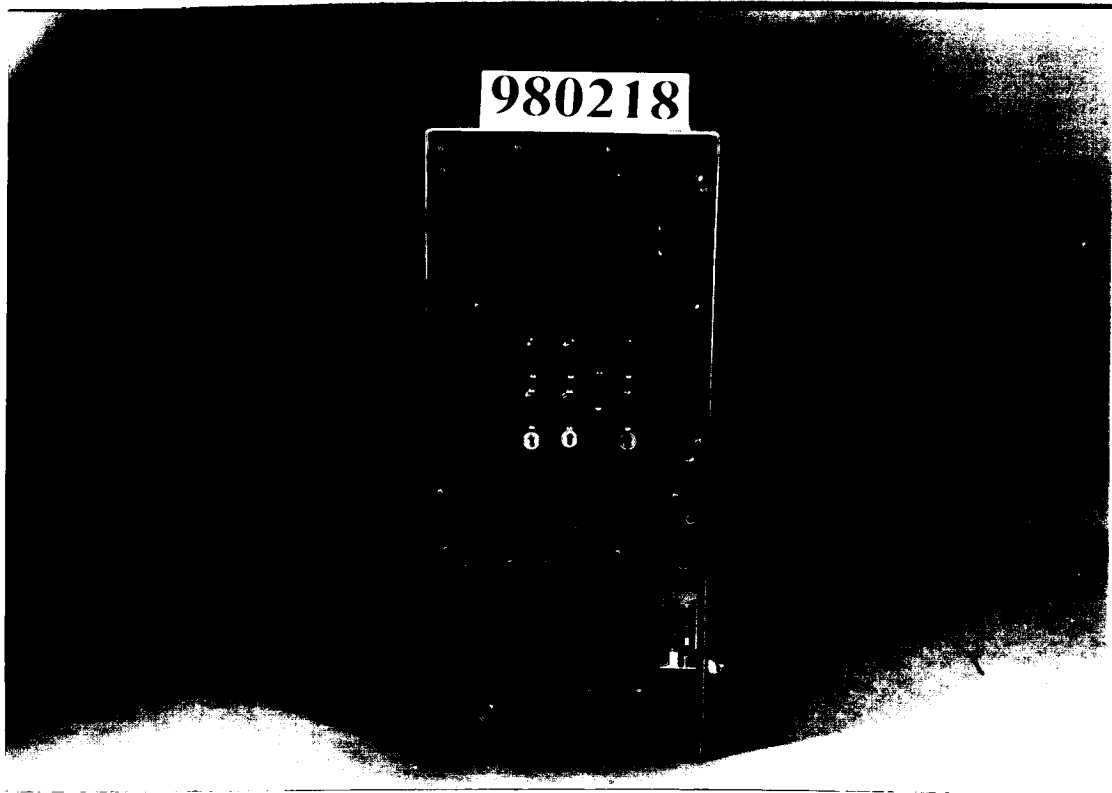
Note: The tested points, please refer to attached page.

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:



Test Procedure:

Frequency Range : 80MHz-1000MHz

Frequency Step : 1% of fundamental

Dwell Step : 1 Sec

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:** No any performance degraded during the tests.

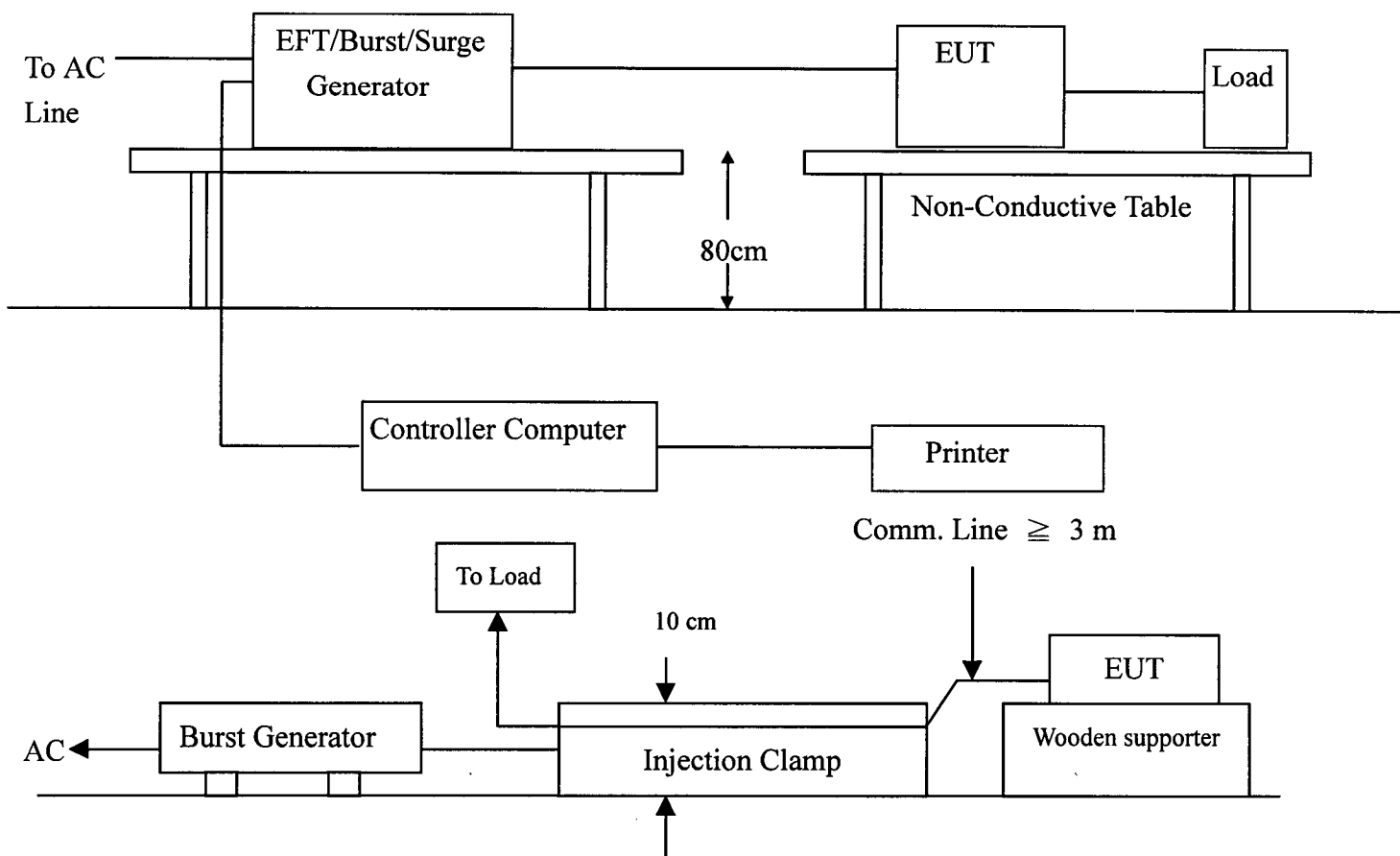
SECTION 5 IEC 1000-4-4 (FAST TRANSIENTS/BURST)

FAST TRANSIENTS/BURST IMMUNITY TEST

Port	: On Power Supply Lines, LAN Cable
Basic Standard	: IEC 1000-4-4
Requirements	: $\pm 2\text{kV}$ for Power Supply Lines (Direct) : $\pm 2\text{kV}$ for LAN Cable (Clamp)
Performance Criteria	: B
Temperature	: 25°C
Humidity	: 50%

Block Diagram of Test Setup:

Same as Section 1 EN 55022 Test.



Test Procedure:

Impulse Frequency: 5kHz

Tr/Tn: 5/50ns

Burst Duration: 15ms \pm 20%

Burst Period: 300ms \pm 20%

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L1	± 2	Direct	Pass
N	± 2	Direct	Pass
PE	± 2	Direct	Pass
LAN	± 2	Clamp	Pass

Performance & Result:

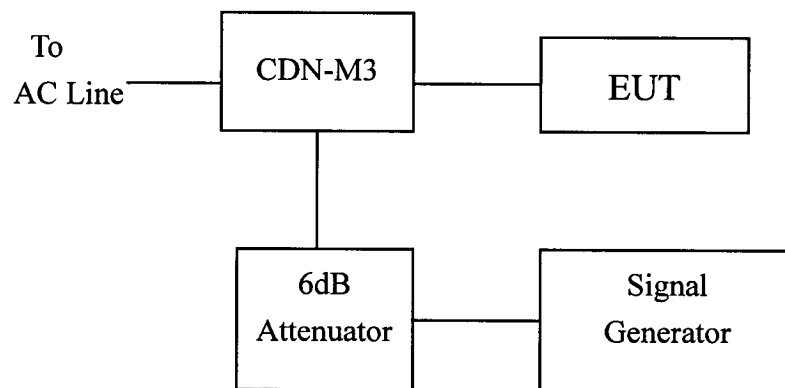
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of 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 function degraded during the tests.**

**SECTION 6 IEC 1000-4-6 (CONDUCTED DISTURBANCE/INDUCED BY
RADIO-FREQUENCY FIELD)**

Port : Power cord
Basic Standard : IEC 1000-4-6
Requirements : 10 V with modulated
Injection Method : CDN-M3
Performance Criteria : A
Temperature : 25°C
Humidity : 50%

Block Diagram of Test Setup:



Test Procedure:

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-230	10V	Yes	Pass

Performance & Result:

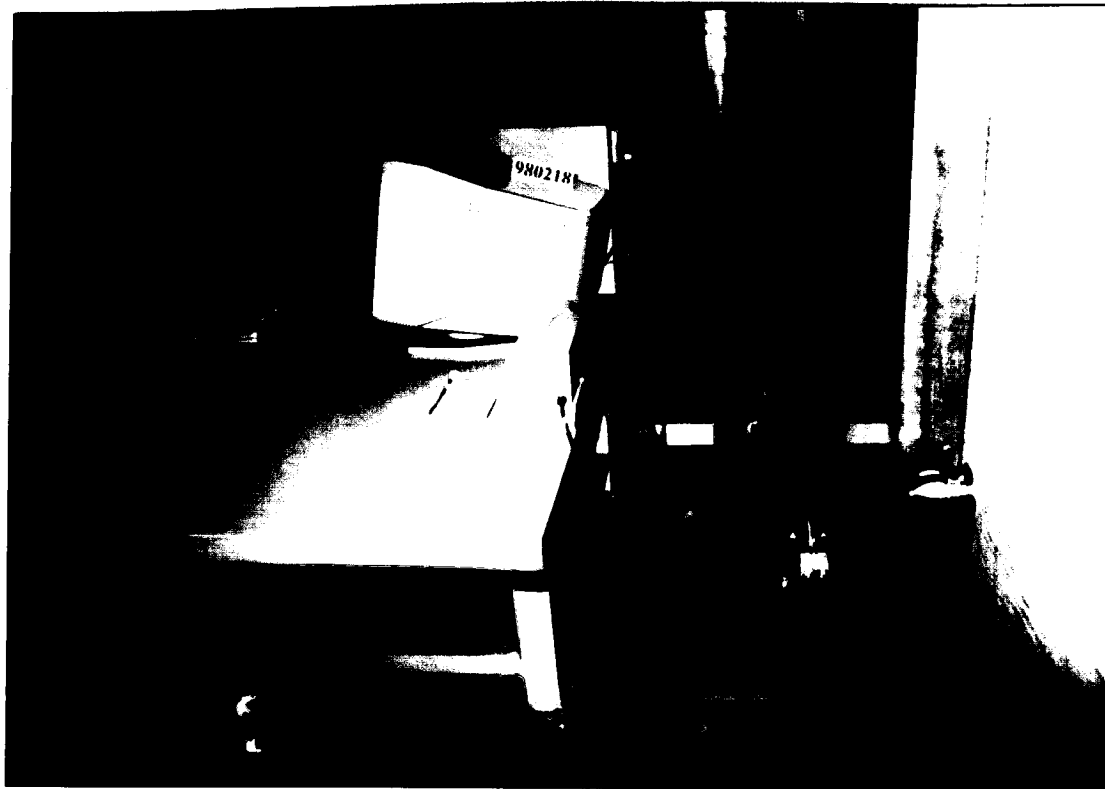
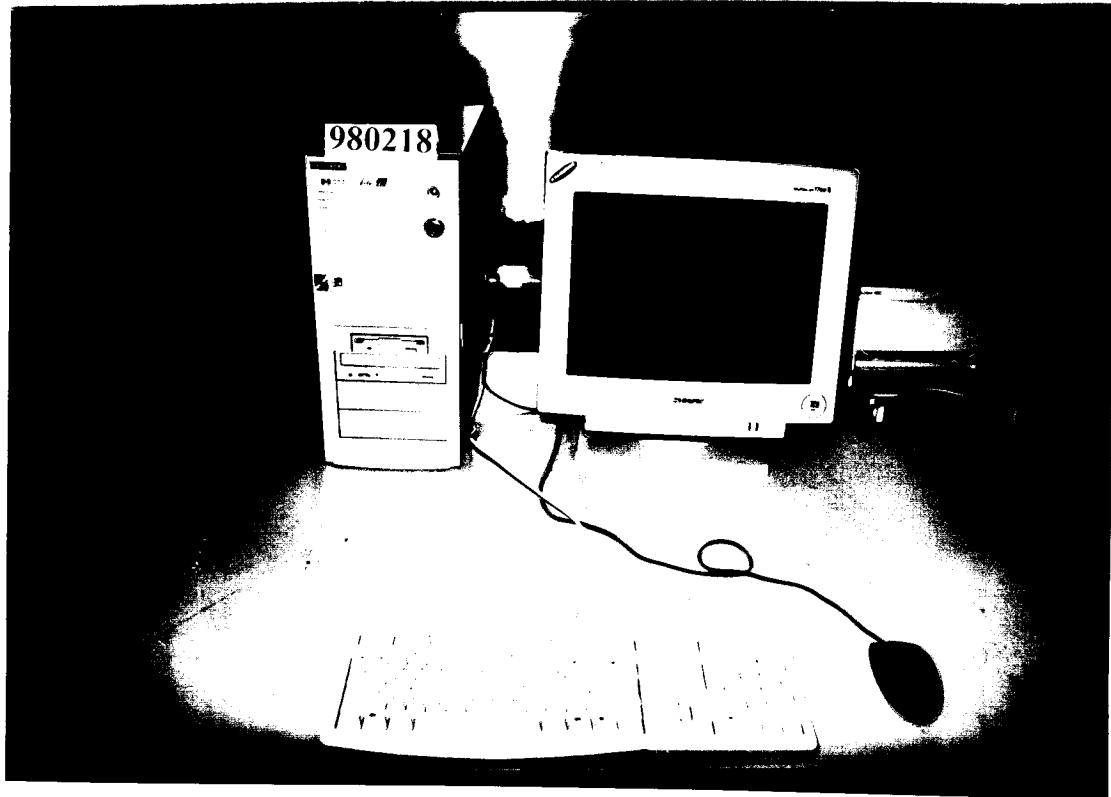
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of 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.

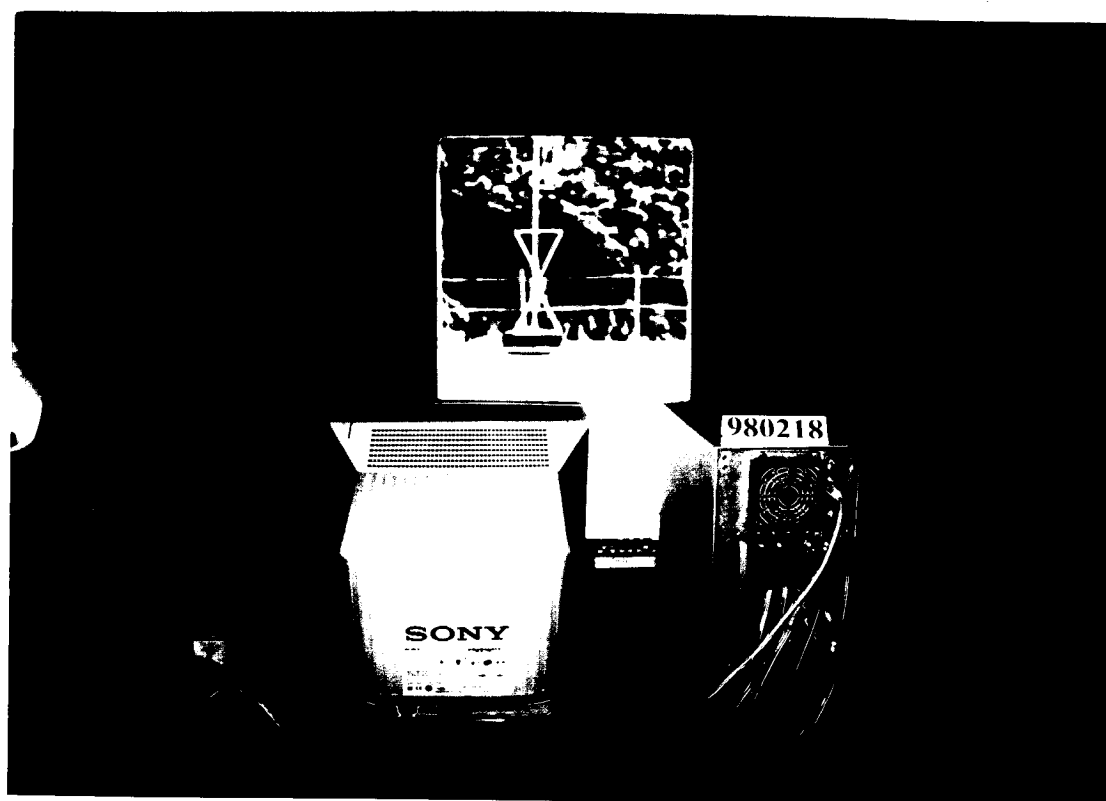
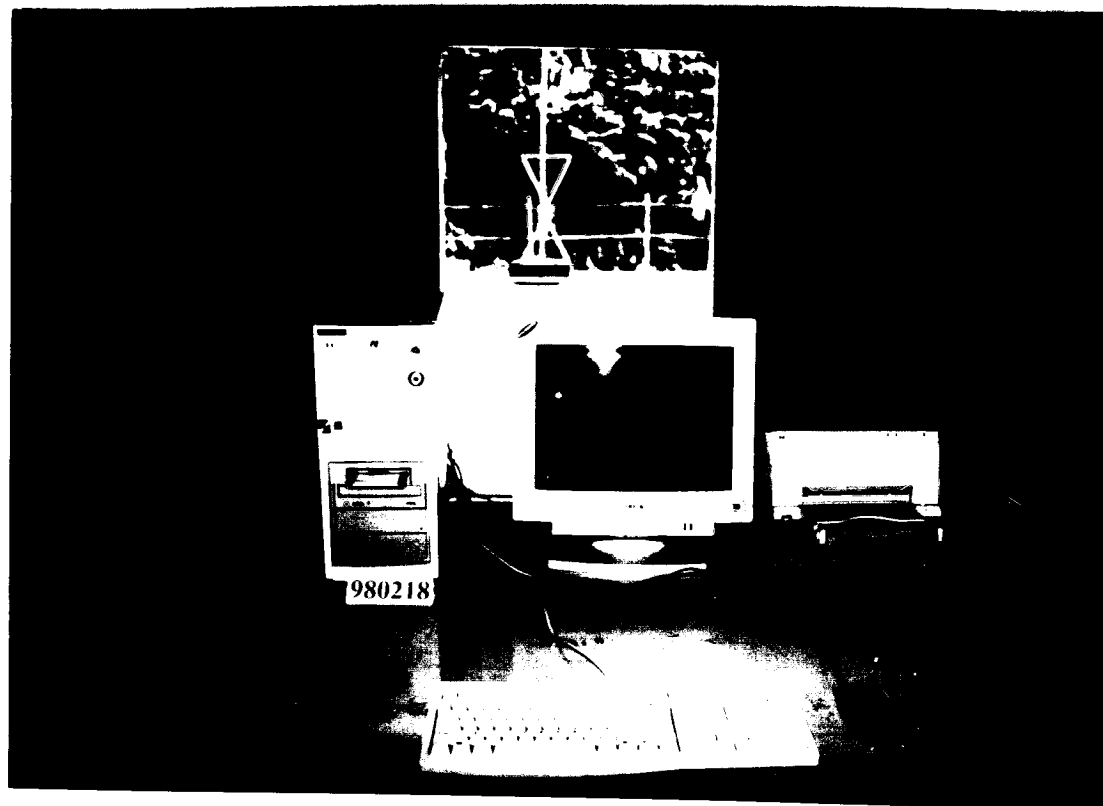
APPENDIX 1

PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST (EN 55022)



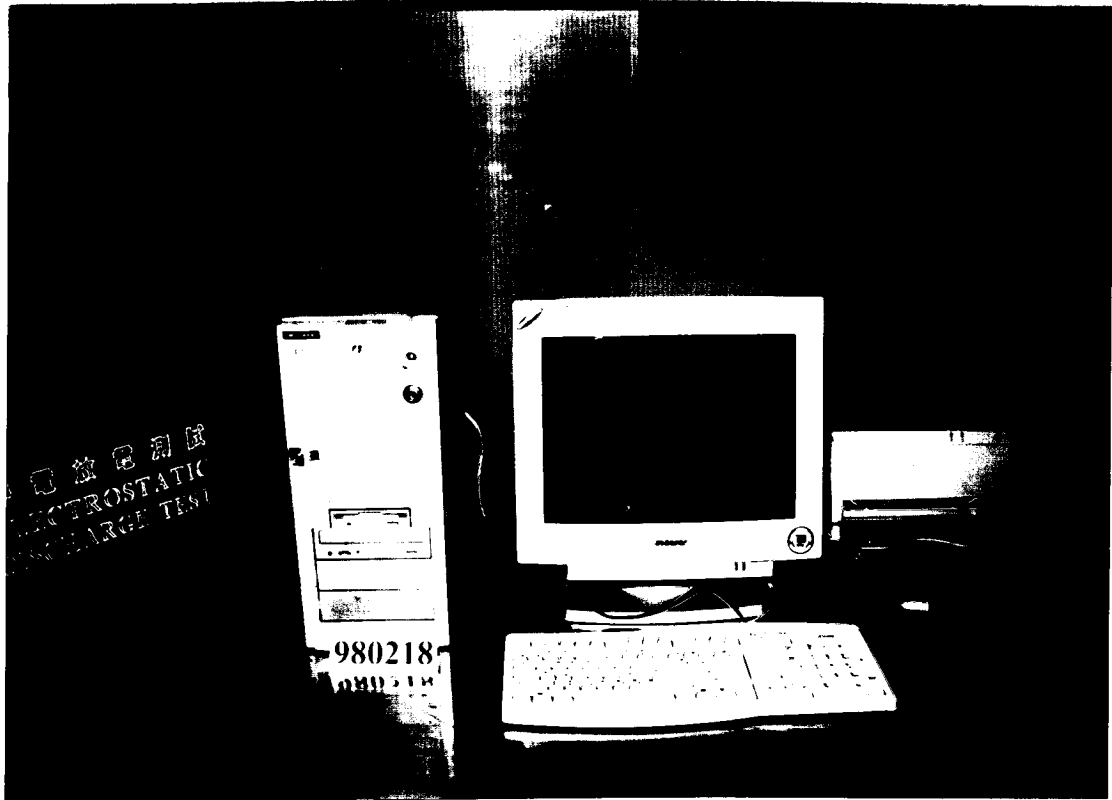
RADIATED EMISSION TEST (EN 55022)



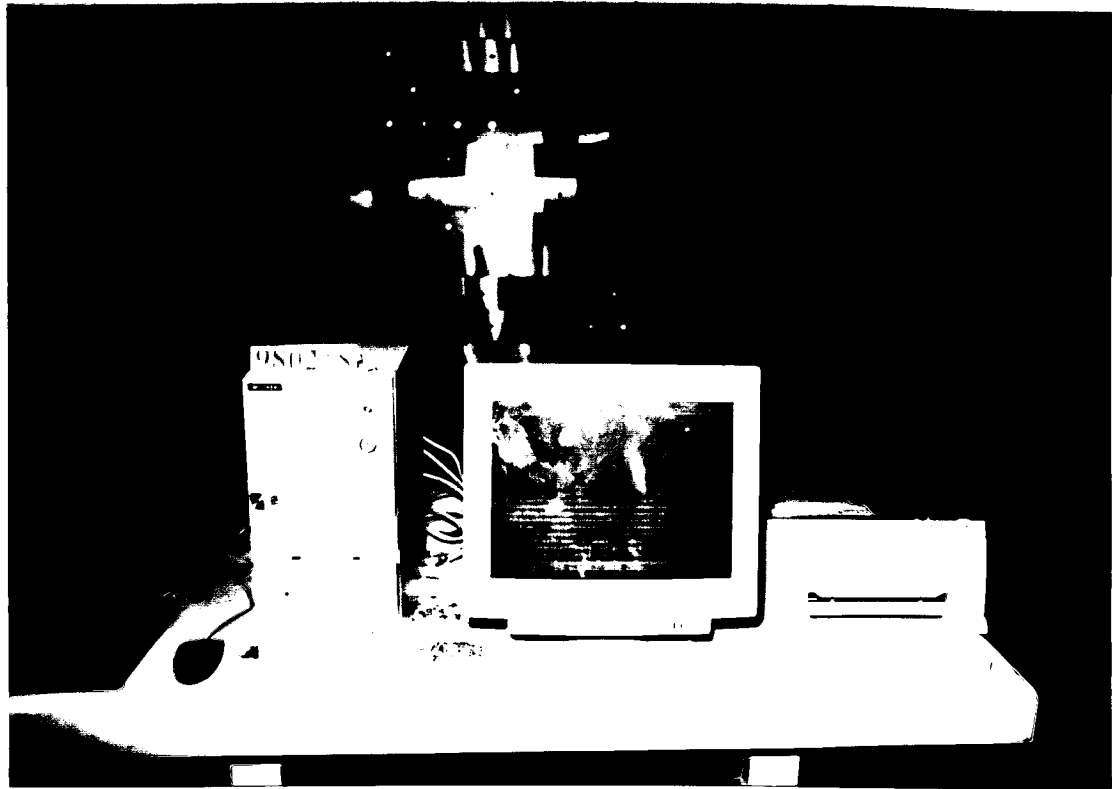
POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST
(EN 61000-3-2, EN 61000-3-3)



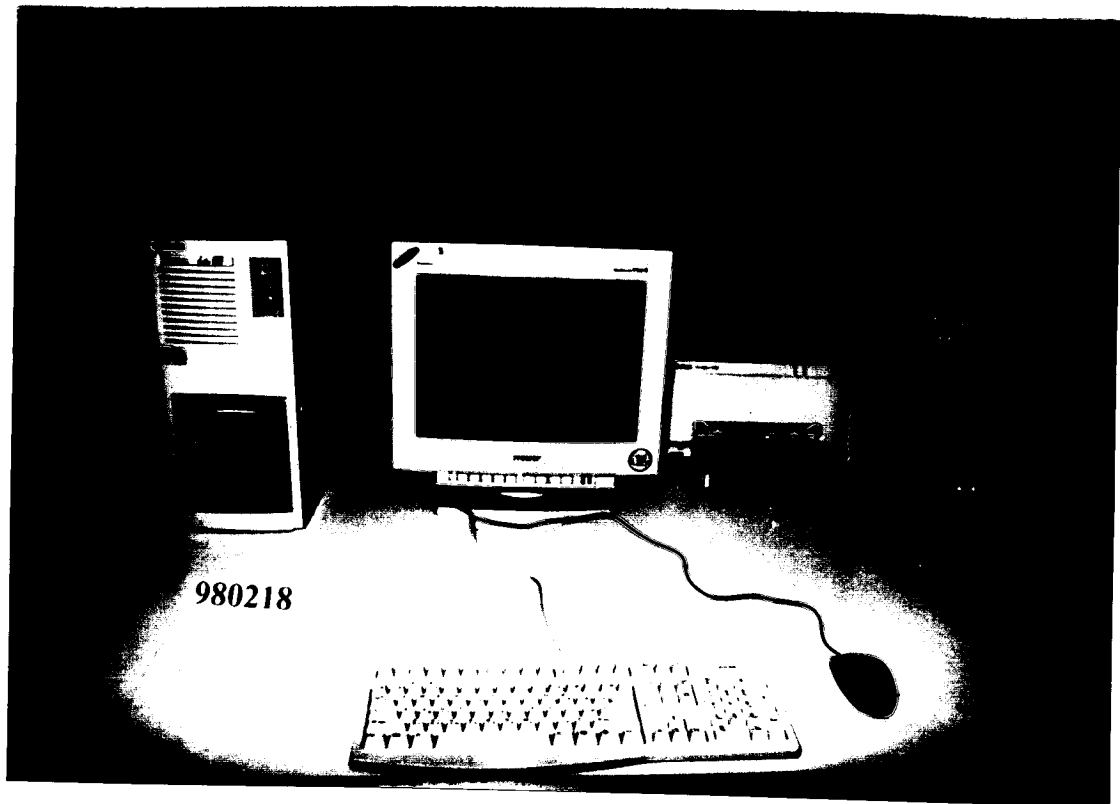
ELECTROSTATIC DISCHARGE TEST (IEC 1000-4-2)



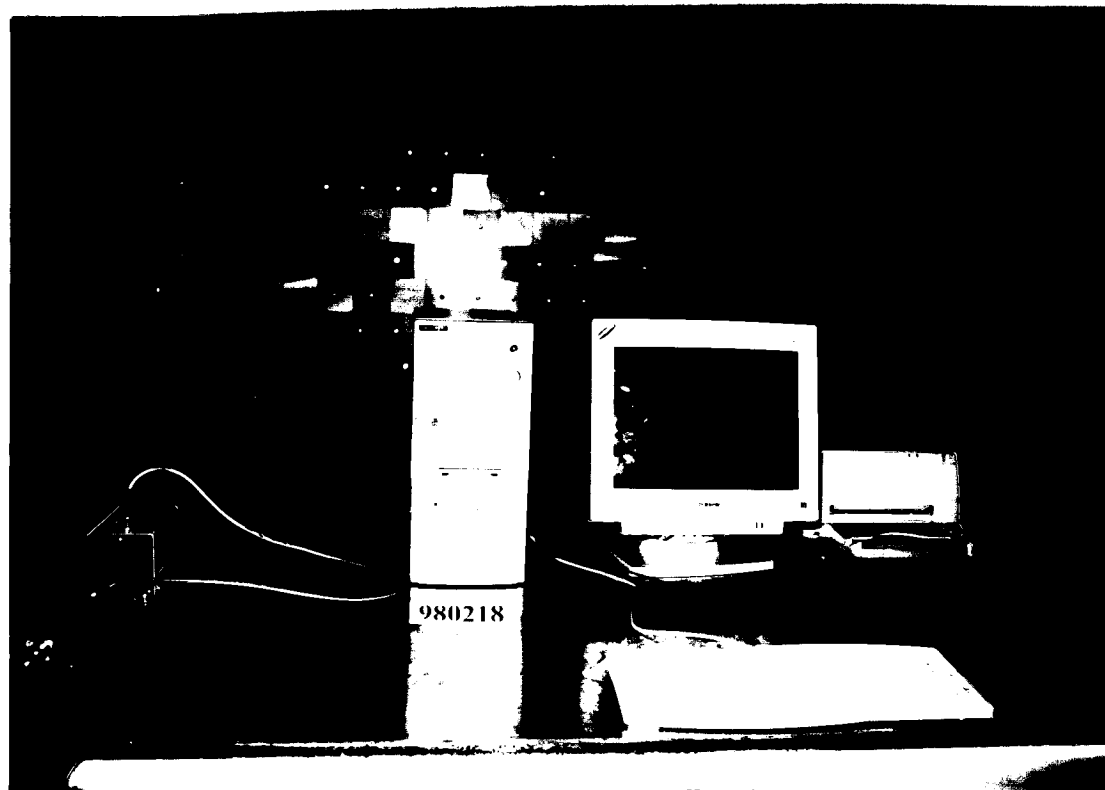
RADIATED ELECTROMAGNETIC FIELD (IEC 1000-4-3)



FAST TRANSIENTS/BURST TEST (IEC 1000-4-4)



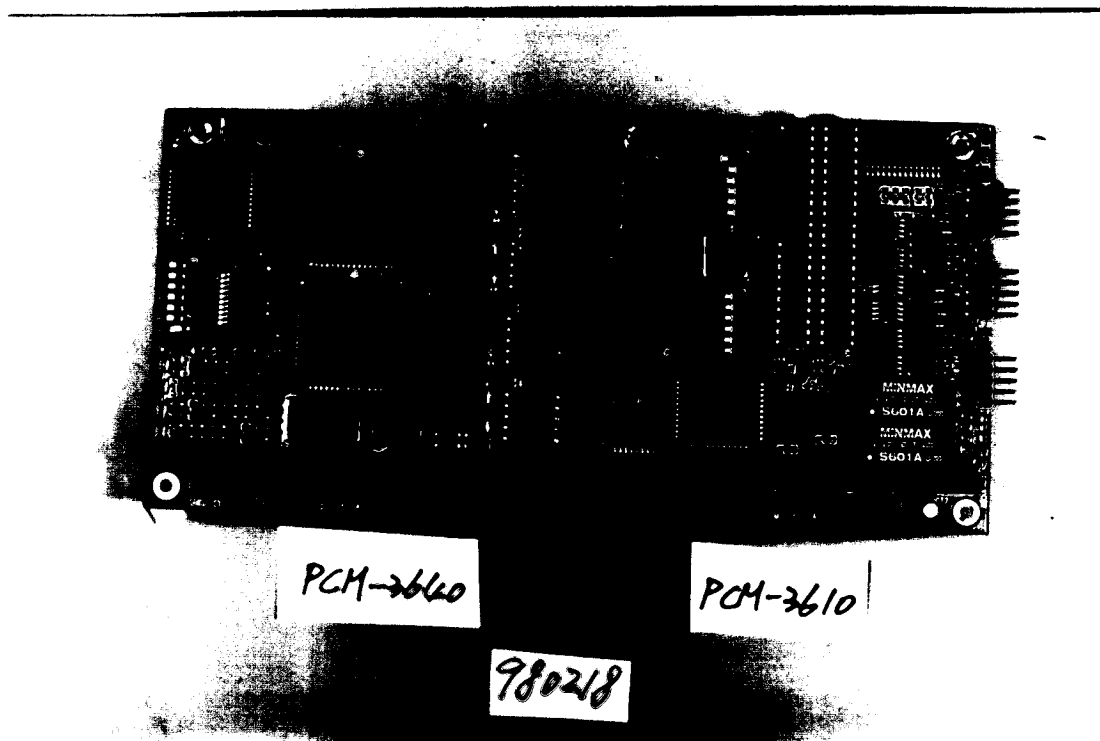
**CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS
(IEC 1000-4-6)**



APPENDIX 2

PHOTOGRAPHS OF EUT

Model # : PCM-3610, PCM-3640
The Front View of EUT



Model # : PCM-3610, PCM-3640
The Rear View of EUT

