



## EMC COMPLIANCE TEST REPORT

for

**Pentium III/ Celeron based PCI/ISA single board computer**

**Trade Name** : ADVANTECH  
**Model Number** : PCA-6003V-00A1; PCA-6003VE-00A1;  
PCA-6003H-00A1  
**Serial Number** : N/A  
**Report Number** : 011112-E  
**Date** : December 10, 2001  
**Regulations** : See below

Standards	Results (Pass/Fail)
EN 55022: 1998(Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 +A14: 2000	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998	PASS
- IEC 61000-4-2: 1995 +A2: 2000	PASS
- IEC 61000-4-3: 1995	PASS
- IEC 61000-4-4: 1995	PASS
- IEC 61000-4-5: 1995	PASS
- IEC 61000-4-6: 1996	PASS
- IEC 61000-4-8: 1993	PASS
- IEC 61000-4-11: 1994	PASS

Prepared for:

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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** Pentium III/ Celeron based PCI/ISA single board computer  
**Trade Name:** ADVANTECH  
**Model Number:** PCA-6003V-00A1; PCA-6003VE-00A1; PCA-6003H-00A1  
**Serial Number:** N/A  
**Applicant:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3 Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.  
**Manufacturer:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3 Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.  
**Type of Test:** EMC Directive 89/336/EEC for CE Marking  
**Technical Standards:** EN 55022: 1998 (Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 +A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998  
IEC 61000-4-2: 1995 +A2: 2000; IEC 61000-4-3: 1995;  
IEC 61000-4-4: 1995; IEC 61000-4-5: 1995; IEC 61000-4-6: 1996;  
IEC 61000-4-8: 1993; IEC 61000-4-11:1994  
**File Number:** 011112-E  
**Date of test:** December 5 ~ 7, 2001  
**Deviation:** According to applicant's declaration this EUT is Class A product, and to  
be market industrial environment only.  
**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: \_\_\_\_\_

**Kurt Chen / Q.A. Manager**

## GENERAL INFORMATION

**Applicant:** Advantech Co., Ltd.  
4<sup>th</sup> FL., No. 108-3 Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.

**Contact Person:** John Chou

**Manufacturer:** Advantech Co., Ltd.  
4<sup>th</sup> FL., No. 108-3 Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.

**File Number:** 011112-E

**Date of Test:** December 5 ~ 7, 2001

**Equipment Under Test:** Pentium III/ Celeron based PCI/ISA single board computer

**Model Number:** PCA-6003V-00A1; PCA-6003VE-00A1; PCA-6003H-00A1

**Serial Number:** N/A

**Type of Test:** EMC Directive 89/336/EEC for CE Marking

**Technical Standards:** EN 55022: 1998 (Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998  
IEC 61000-4-2: 1995 + A2: 2000; IEC 61000-4-3: 1995;  
IEC 61000-4-4: 1995; IEC 61000-4-5: 1995; IEC 61000-4-6: 1996;  
IEC 61000-4-8: 1993; IEC 61000-4-11:1994

**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. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang  
Taoyuan, Taiwan, R.O.C.



## **SYSTEM DESCRIPTION**

### **EUT Test Program:**

- 1.EUT was installed at internal of metal chassis to simulate an IPC.
- 2.EMI test program was loaded and executed in Windows mode.
- 3.A communication software was loaded and executed to communicate between EUT and remote side.
- 4.EUT sends and receives data from Notebook PC on remote side via LAN cable.
- 5.Data was sent to monitor, filling the screen with upper case of “H” patterns.
- 6.Test program sequentially exercised all related I/O’s of EUT and send “H” patterns to all applicable output ports of EUT.
- 7.Repeat 3 to 5. Test program is self-repeating throughout the test.

## PRODUCT INFORMATION

<b>Housing Type:</b>	Plastic w/ metal Case		
<b>EUT Power Rating:</b>	DCV from Power Supply		
<b>AC Power during Test</b>	230VAC/50Hz to Power Supply		
<b>Power Supply Manufacturer:</b>	SKYNET		
<b>Power Supply Model Number:</b>	ADT-925C		
<b>AC Power Cord Type:</b>	Unshielded, 1.8m (Detachable) to Power Supply		
<b>CPU Manufacturer:</b>	Intel	<b>Type:</b>	Pentium III 1.13GHz
<b>OSC/Clock Frequencies:</b>	133MHz		
<b>Memory Capacity:</b>		<b>Install:</b>	256MB
<b>HDD Manufacturer:</b>	Seagate	<b>Model:</b>	ST36421A ATA-66
<b>CD-ROM Manufacturer:</b>	ASUS	<b>Model:</b>	CD-S400/A (40X)
<b>VGA Card Manufacturer:</b>	VIA	<b>Model:</b>	VT8601t on chipset
<b>CPU Board Manufacturer:</b>	ADVANTECH	<b>Model:</b>	PCA-6003
<b>Back Plane Manufacturer:</b>	ADVANTECH	<b>Model:</b>	PCA-611494

### I/O Port of EUT

I/O PORT TYPES	Q'TY	TESTED WITH
1. Parallel Port	1	1
2. Serial Port	2	2
3. Video Port (on VGA Card)	1	1
4. PS/2 Keyboard/ Mouse Port	1	1
5. Earphone Port (On CD-ROM)	1	1
6. LAN Port	1	1
7. USB Port	2	2
8. AT Keyboard Port (ON Chassis)	2	2

**Note:** 1. The differences between the three model Numbers are as the list:

Model Number	With VGA	With Ethernet	With ISA high Drive
PCA-6003V-00A1	V		
PCA-6003VE-00A1	V	V	
PCA-6003H-00A1	V	V	V

2. Client consigns only one sample to test (Model number: PCA-6003H-00A1).  
Therefore, testing Lab. just guarantees the units, which have been tested.





## SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	CPD-G200	2716046		SONY	Shielded, 1.8m With a Core	Unshielded, 1.8m
2.	Modem	231AA	A04231083662	DoC	Hayes	Shielded, 1.8m	Unshielded, 1.8m
3.	Printer	2225C	3233S10451	DSI6XU2225	HP	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	SK-2800C	B1C790BCPJCN6L	GYUR79SK	Compaq	Shielded, 1.8m	N/A
5.	AT Keyboard	KB-9000	KA5-2	LFCACEKEY1	ACEKEY	Shielded, 1.8m	N/A
6.	AT Keyboard	KB-9000	9809052512	LFCACEKEY1	ACEKEY	Shielded, 1.8m	N/A
7.	PS/2 Mouse	M-S43	LZE93401262	DZL211106	Logitech	Shielded, 1.8m	N/A
8.	USB Mouse	M-BB48	LZE01450726	DoC	Logitech	Shielded, 1.8m	N/A
9.	USB Mouse	M-BB48	LZE93050148	DoC	Logitech	Shielded, 1.8m	N/A
10.	Mouse	M-MM43	LZE93352988	DoC	Logitech	Shielded, 1.8m	N/A
11.	Earphone	SX-M	A5-2	N/A	TOKYO	Unshielded, 1.8m	N/A
12.	Notebook PC (Remote)	Valiant 6380i9TD	N/A	FCC DoC	KDS	LAN Cable: Unshielded, 5.0m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

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



## TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R. O. C.
- Description:** There are four 3/10m open area test sites and three line conducted labs for final test.  
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 BSMI 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 # 3 & # 4 Line Conducted Test Site:** At Shielding Room



## 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 9kHz to 1.0 / 2.0 GHz.

**Equipment used during the tests:**

### Open Area Test Site:

Open Area Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3132	91700456	02/21/2001	02/20/2002
EMI Test Receiver	R&S	ESVS10	846285/016	04/16/2001	04/15/2002
Precision Dipole	SCHWAZBECK	VHAP	998/999	05/17/2001	05/16/2002
Precision Dipole	SCHWAZBECK	UHAP	981/982	05/17/2001	05/16/2002
Bilog Antenna	CHASE	CBL 6112B	2462	01/16/2001	01/15/2002
Turn Table	Chance most	N/A	N/A	N.C.R	N.C.R
Antenna Tower	Chance most	N/A	N/A	N.C.R	N.C.R
Controller	Chance most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M51067	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	11/24/2001	11/23/2002

### Conducted Emission Test Site: # 3

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	R&S	ESHS10	843743/015	12/15/2000	12/14/2001
LISN	R&S	ESH2-Z5	843285/010	12/10/2001	12/09/2002
LISN	EMCO	3825/2	9003-1628	07/16/2001	07/15/2002
2X2 WIRE ISN	R&S	ENY22	830661/027	04/06/2001	04/05/2002
FOUR WIRE ISN	R&S	ENY41	830663/024	04/04/2001	04/03/2002

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

Power Harmonic & Voltage Fluctuation/Flicker Measurement (61000-3-2&-3-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Harmonic & Flicker Tester	HAEFELY TRENCH	PHF555	080 419-25	10/12/2001	10/11/2002

ESD test (61000-4-2)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
ESD Generator	HAEFELY TRENCH	PESD 1600	H710203	09/01/2001	08/31/2002

Radiated Electromagnetic Field immunity Measurement (61000-4-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Signal Generator	Maconi	2022D	119246/003	08/20/2001	08/19/2002
Power Amplifier	M2S	A00181/ 1000	9801-112	N/A	N/A
Power Amplifier	M2S	AC8113/ 800-250A	9801-179	N/A	N/A
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
EM PROBE	GW	EMR-30	L-0013	03/13/2001	03/12/2002

Fast Transients/Burst test (61000-4-4)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT- JUNIOR	583 333-117	08/21/2001	08/20/2002
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N/A	N/A

Surge Immunity test (61000-4-5)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	09/01/2001	08/31/2002
CDN	HAEFELY TRENCH	IP6.2	148342	03/22/2001	03/21/2002
CDN	HAEFELY TRENCH	DEC1A	148050	01/17/2001	01/16/2002



CS test (61000-4-6)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Signal Generator	Maconi	2022D	119246/003	08/20/2001	08/19/2002
CDN	MEB	M3	3683	09/14/2001	09/13/2002
CDN	Lüthi	801-M3	1879	03/05/2001	03/04/2002
CDN	MEB	M2	A3002010	04/17/2001	04/16/2002
Power Amplifier	M2S	A00181/ 1000	9801-112	N/A	N/A
Clamp	MEB	KEMZ-801	13 602	N/A	N/A

Power Frequency Magnetic Field Immunity test (61000-4-8)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
TRIAX ELF Magnetic Field Meter	F.W.BELL	4090	9711	10/30/2001	10/29/2002
Magnetic Field Tester	HAEFELY TRENCH	MAG 100.1	080 938-01	N/A	N/A

Voltage Dips/Short Interruption and Voltage Variation Immunity test (61000-4-11)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Dips/Interruption and Variations Simulator	HAEFELY TRENCH	PLINE 1610	080 344-05	02/08/2001	02/07/2002



## 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 (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.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source of and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer / Receiver 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 / Receiver 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 / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 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. **1600 x 1200 Resolution (PCA-6003H-00A1)**
2. **1200 x 1024 Resolution (PCA-6003H-00A1)**
3. **1024 x 768 Resolution (PCA-6003H-00A1)**

- 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 Q.P. mode, then the emission signal was re-checked using an A.V. detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. MHz	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	---	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 (COMMON MODE CONDUCTED EMISSION MEASUREMENT)

- 1) Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
- 2) The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
- 3) Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
- 4) 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.
- 5) In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.
- 6) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. MHz	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	---	74	64	-30.05	---	

Freq.

Raw dBuV

Limit dBuV

Margin dB

Note

“---“

= Emission frequency in MHz

= Uncorrected Analyzer / Receiver reading

= Limit stated in standard

= Reading in reference to limit

= Current carrying line of reading

= The emission level complied with the Average limits, with at least 2 dB margin, so no further recheck.

## COMMON MODE CONDUCTED EMISSION LIMIT AT TELECOMMUNICATION PORTS

<input checked="" type="checkbox"/> CE-Mark ( EN 55022:1998 )					
CLASS	Measuring Band	Voltage limit dB(uV)		Current limit dB(uA)	
		Q.P.	AV	Q.P.	AV
A	150kHz-500kHz	97-87	84-74	53-43	40-30
	500kHz-30MHz	87	74	43	30

**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 (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.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 4) The EUT received AC power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable, if any.
- 5) The antenna was placed at 10 meter away from the EUT as stated in EN 55022. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. 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. 1600 x 1200 Resolution (PCA-6003H-00A1)**
- 2. 1200 x 1024 Resolution (PCA-6003H-00A1)**
- 3. 1024 x 768 Resolution (PCA-6003H-00A1)**

- 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 RADIATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The Analyzer / Receiver 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 and only Q.P. reading is presented.
- 4) The test data of the worst-case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. (MHz)	Raw Data ( dBuV/m )	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)
xx.xx	14.0	11.2	26.2	30	-3.8

Freq.	= Emission frequency in MHz
Raw Data (dBuV/m)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB)	= Correction factors of antenna factor and cable Loss
Emiss. Level	= Raw reading converted to dBuV and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit



## RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/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

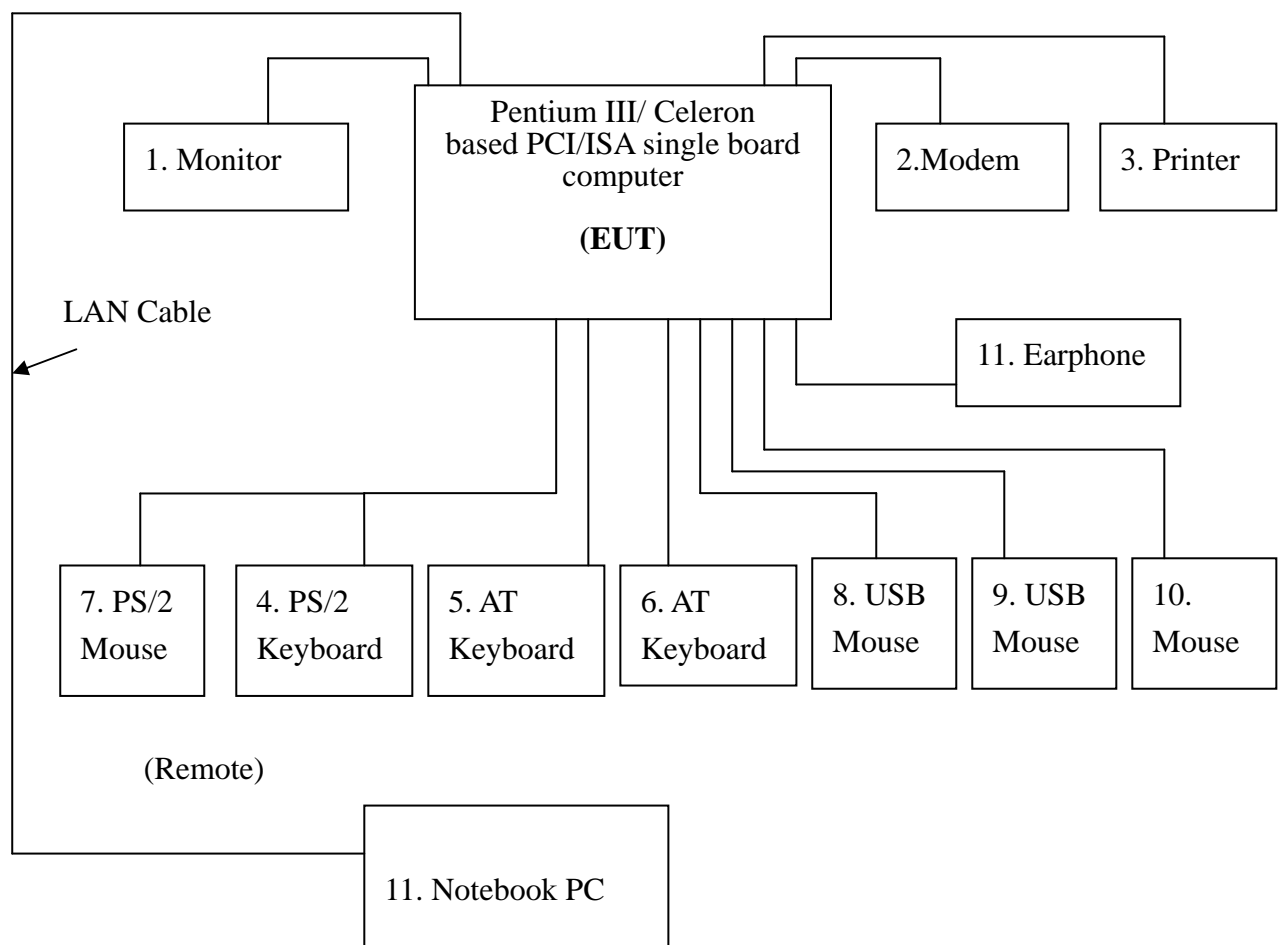
### System Diagram of Connections between EUT and Simulators

**EUT:** Pentium III/ Celeron based PCI/ISA single board computer

**Trade Name:** ADVANTECH

**Model Number:** PCA-6003H-00A1

**Power Cord:** Unshielded, 1.8m to Power Supply



## SUMMARY DATA (LINE CONDUCTED TEST)

**Model Number:** PCA-6003H-00A1

**Location:** Site # 3

**Tested by:** Lung Tsai

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 24°C

**Humidity:** 70% RH

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

FREQ MHz	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.173	45.4	---	79.0	66.0	-33.6	---	L1
5.914	38.7	---	73.0	60.0	-34.3	---	L1
7.781	47.9	---	73.0	60.0	-25.1	---	L1
19.448	43.9	---	73.0	60.0	-29.1	---	L1
23.337	37.6	---	73.0	60.0	-35.4	---	L1
27.221	43.0	---	73.0	60.0	-30.0	---	L1
0.173	44.1	---	79.0	66.0	-34.9	---	L2
5.608	37.8	---	73.0	60.0	-35.2	---	L2
7.781	46.5	---	73.0	60.0	-26.5	---	L2
19.448	42.9	---	73.0	60.0	-30.1	---	L2
23.337	38.7	---	73.0	60.0	-34.3	---	L2
27.224	42.0	---	73.0	60.0	-31.0	---	L2

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

**\*\*NOTE: “---” denotes the emission level was or more than 2dB below the Average limit,  
so no re-check anymore.**

## SUMMARY DATA

### (COMMON MODE CONDUCTED EMISSION MEASUREMENT)

(LAN Port)

**Model Number:** PCA-6003H-00A1

**Location:** Site # 3

**Tested by:** Lung Tsai

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 24°C

**Humidity:** 70% RH

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

FREQ MHz	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
5.004	63.4	---	87.0	74.0	-23.6	---	10 Base
7.691	61.8	---	87.0	74.0	-25.2	---	10 Base
10.004	71.9	---	87.0	74.0	-15.1	---	10 Base
10.174	63.1	---	87.0	74.0	-23.9	---	10 Base
23.128	61.4	---	87.0	74.0	-25.6	---	10 Base
27.285	61.7	---	87.0	74.0	-25.3	---	10 Base
10.063	63.1	---	87.0	74.0	-23.9	---	100 Base
11.891	62.8	---	87.0	74.0	-24.2	---	100 Base
13.427	64.3	---	87.0	74.0	-22.7	---	100 Base
19.714	64.7	---	87.0	74.0	-22.3	---	100 Base
23.033	65.9	---	87.0	74.0	-21.1	---	100 Base
26.618	63.4	---	87.0	74.0	-23.6	---	100 Base

**\*\*NOTE:** “---” denotes the emission level was less –2 dB to the Average limit, so no re-check anymore.



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PCA-6003H-00A1

**Location:** Site # 4

**Tested by:** Lung Tsai

**Test Mode:** Mode 1

**Polar:** Vertical -- 10m

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 24°C

**Humidity:** 70%RH

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

Freq. (MHz)	Raw Data (dBuV/m)	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)
42.02	22.2	14.6	36.8	40.0	-3.2
46.55	24.5	13.3	37.8	40.0	-2.2
73.73	27.3	7.0	34.3	40.0	-5.7
84.77	27.0	8.8	35.8	40.0	-4.2
112.58	19.3	12.7	32.0	40.0	-8.0
933.85	13.0	24.5	37.5	47.0	-9.5



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PCA-6003H-00A1

**Location:** Site # 4

**Tested by:** Lung Tsai

**Test Mode:** Mode 1

**Polar:** Horizontal -- 10m

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 24°C

**Humidity:** 70%RH

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

Freq. (MHz)	Raw Data (dBuV/m)	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)
74.23	23.2	7.1	30.3	40.0	-9.7
133.23	22.6	12.2	34.8	40.0	-5.2
200.26	20.0	10.6	30.6	40.0	-9.4
226.59	21.0	11.6	32.6	40.0	-7.4
503.29	16.6	20.8	37.4	47.0	-9.6
902.59	15.6	24.4	40.0	47.0	-7.0



## SECTION 2 EN 61000-3-2 & EN 61000-3-3 (POWER HARMONICS & VOLTAGE FLUCTUATION / FLICKER)

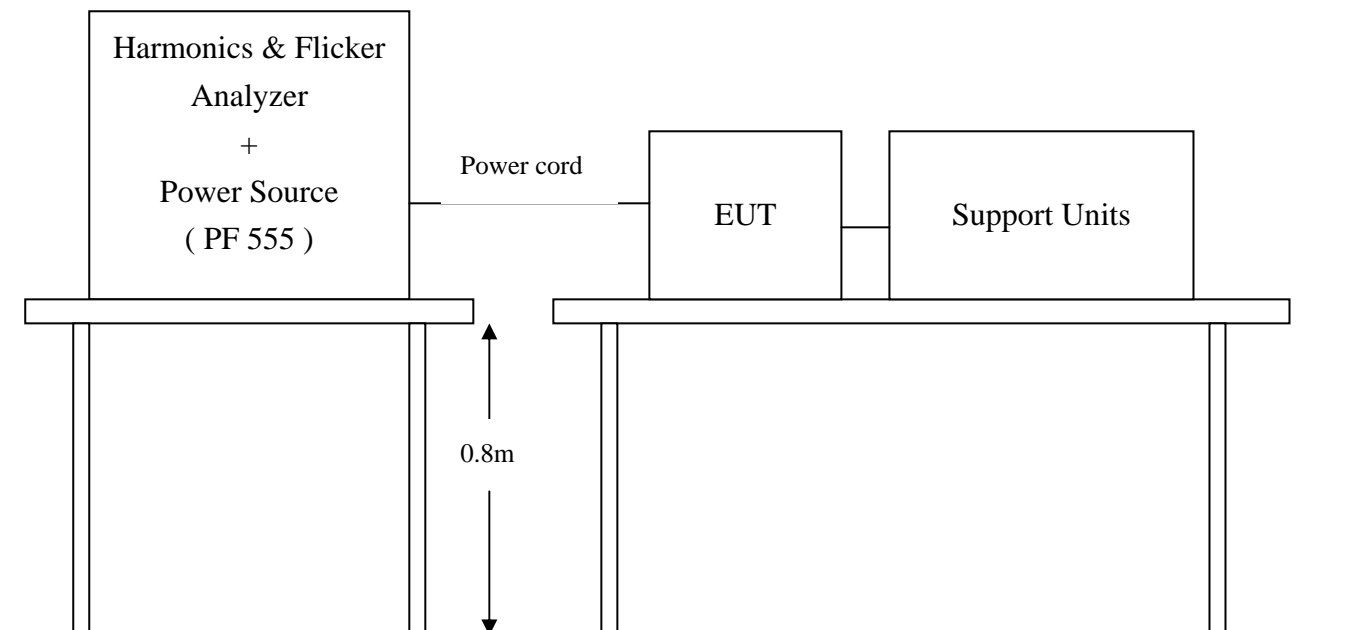
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 +A14: 2000)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Tester** : Markba Lee  
**Temperature** : 24°C  
**Humidity** : 51%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : §5 of EN 61000-3-3  
**Tester** : Markba Lee  
**Temperature** : 24°C  
**Humidity** : 51%

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.



-----  
EN 61000-3-2 TEST REPORT 2001/12/5 07:03 PM  
-----

Unit: Pentium III/ Celeron based PCI/ISA single board computer

Model No.: PCA-6003H-00A1

Remarks: Temp: 24°C Humid: 51%

Operator: Markba Lee

=====

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

MAX WATTS:50.7W



TEST DATA

-----

Result: PASS

Harmonic Current Results

-----

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.222	NaN	NaN	PASS
2	0.001	1.080	1.080	PASS
3	0.199	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.181	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.163	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.140	0.400	0.400	PASS
10	0.001	0.184	0.184	PASS
11	0.114	0.330	0.330	PASS
12	0.001	0.153	0.153	PASS
13	0.087	0.210	0.210	PASS
14	0.001	0.131	0.131	PASS
15	0.062	0.150	0.150	PASS
16	0.001	0.115	0.115	PASS
17	0.040	0.132	0.132	PASS
18	0.001	0.102	0.102	PASS
19	0.023	0.118	0.118	PASS
20	0.001	0.092	0.092	PASS



21	0.010	0.107	0.107	PASS
22	0.001	0.084	0.084	PASS
23	0.010	0.098	0.098	PASS
24	0.000	0.077	0.077	PASS
25	0.016	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.018	0.083	0.083	PASS
28	0.000	0.066	0.066	PASS
29	0.017	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.014	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.010	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.006	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.002	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.005	0.058	0.058	PASS
40	0.000	0.046	0.046	PASS

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT 2001/11/27 11:20 AM  
-----

Unit: Pentium III/ Celeron based PCI/ISA single board computer

Model No.: PCA-6003H-00A1 (Continue)

Remarks: Temp: 24°C Humid: 51%

Operator: Markba Lee

=====

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

-----

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.001	1.00	PASS	true
Plt max	0.001	0.65	PASS	true
dc %	0.00	3.00	PASS	true
dmax %	0.00	4.00	PASS	true
d(t) sec.	0.00	0.20	PASS	true

Power Source Data

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

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT 2001/11/27 11:35 AM  
-----

Unit: Pentium III/ Celeron based PCI/ISA single board computer

Model No.: PCA-6003H-00A1 (Manual Switch)

Remarks: Temp: 24°C Humid: 51%

Operator: Markba Lee

=====

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

-----

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.277	1.00	PASS	true
Plt max	0.277	0.65	PASS	true
dc %	0.00	3.00	PASS	true
dmax %	0.65	4.00	PASS	true
d(t) sec.	0.00	0.20	PASS	true

Power Source Data

Source Pst max	0.021	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT



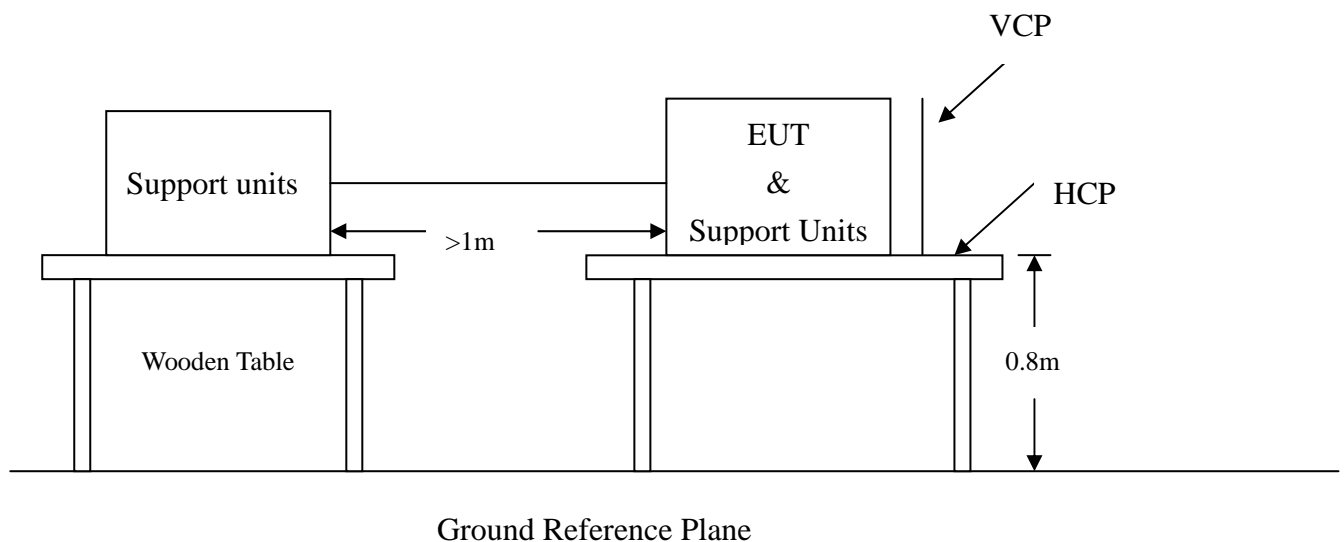
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-2  
**Test Level** :  $\pm 8$  kV (Air Discharge)  
                   $\pm 4$  kV (Contact Discharge)  
                   $\pm 4$  kV (Indirect Discharge)  
**Performance Criteria** : B ( Standard require )  
**Tester** : Markba Lee  
**Temperature/Humidity**: 21°C/50%

#### Block Diagram of Test Setup:

( The 470 k ohm resistors are installed per standard requirement )





### **Test Procedure:**

1. The Host PC (included EUT) was located 0.1 m minimum from all side of the HCP.
2. The support units were located 1 m minimum away from the Host PC (included EUT).
3. A scroll 'H' test program was loaded and executed in Windows mode.
4. Host PC (included EUT) sent above message to Monitor and related peripherals through the test.
5. Selecting appropriate points of EUT for Contact/Air discharge and put a mark on EUT to show tested points.
6. The following test condition was followed during the tests.

**Note:** As per the A2 to IEC61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
Mini 10 /Point	±8kV	Air Discharge	Pass
Mini 25 /Point	±4kV	Contact Discharge	Pass
Mini 25 /Point	±4kV	Indirect Discharge HCP (Front)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Left)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Back)	N/A
Mini 25 /Point	±4kV	Indirect Discharge VCP (Right)	Pass

\*\*\* The tested points to EUT please refer to attach pages.

(Blue arrow mark for contact discharge, red arrow mark for air discharge.)

### **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.

☒ **PASS**

☐ **FAILED**

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

*The Tested Points of EUT*

*(Photo 1 of 1)*

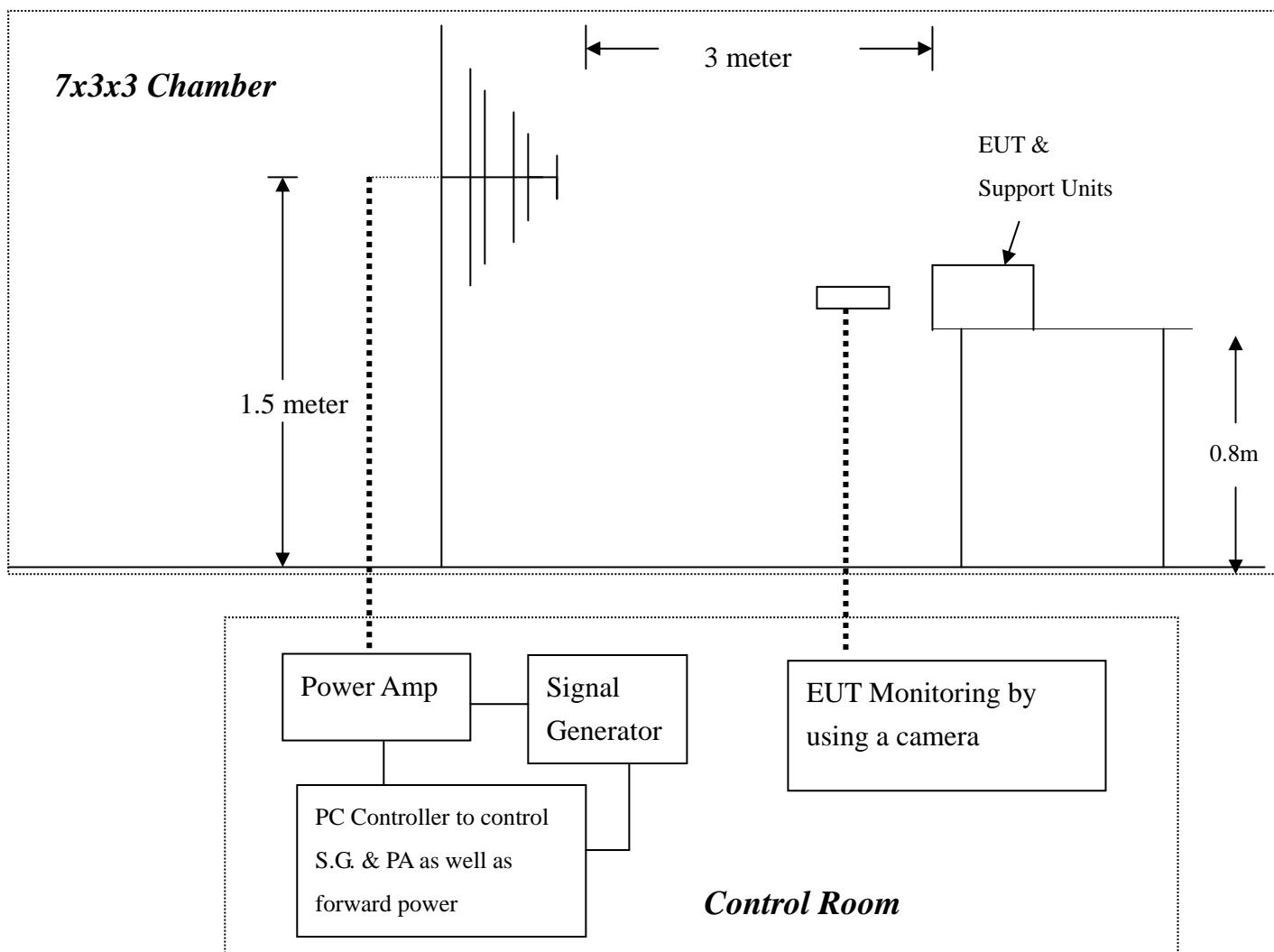


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD )

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-3  
**Requirements** : 3 V/m / with 80% AM. 1kHz Modulation.  
**Performance Criteria** : A ( Standard require )  
**Tester** : Lung Tsai  
**Temperature** : 23°C  
**Humidity** : 51%

#### Block Diagram of Test Setup:



## **Test Procedure:**

1. The Host PC (included EUT) and support units were located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity.
2. Adjusting the cables to be exposed to the electromagnetic field as possible.
3. Performing a Radiated Emission Scan in range of 30 to 1000 MHz prior to do RS test and records the more higher emission frequencies for the reference of RS test, due to antenna effectiveness.
4. A 'H' messages were displayed on Screen of Monitor.
5. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
6. Setting the testing parameters of RS test software per IEC 61000-4-3.
7. Referring to the tested data of step 3 to performing the RS test from 80 to 1000 MHz.
8. Recording the test result in following table.
9. Changing the Host PC (included EUT) to the other side and repeat step 3 to 7, until 4 sides of EUT were verified.
10. It is not necessary to perform test as per annex A of EN 55024:1998 if the EUT doesn't belong to TTE product.

### **IEC 61000-4-3 Preliminary test conditions:**

Test level : 6V/m

Steps : 4 % of fundamental;

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	6V	Yes	H	Front	Pass
80-1000	6V	Yes	V	Front	Pass
80-1000	6V	Yes	H	Right	Pass
80-1000	6V	Yes	V	Right	Pass
80-1000	6V	Yes	H	Back	Pass
80-1000	6V	Yes	V	Back	Pass
80-1000	6V	Yes	H	Left	Pass
80-1000	6V	Yes	V	Left	Pass

### **IEC 61000-4-3 Final test conditions:**

Test level : 3V/m

Steps : 1 % of fundamental;

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	3V	Yes	H	Back	Pass
80-1000	3V	Yes	V	Back	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.

☒ **PASS**

☐ **FAILED**

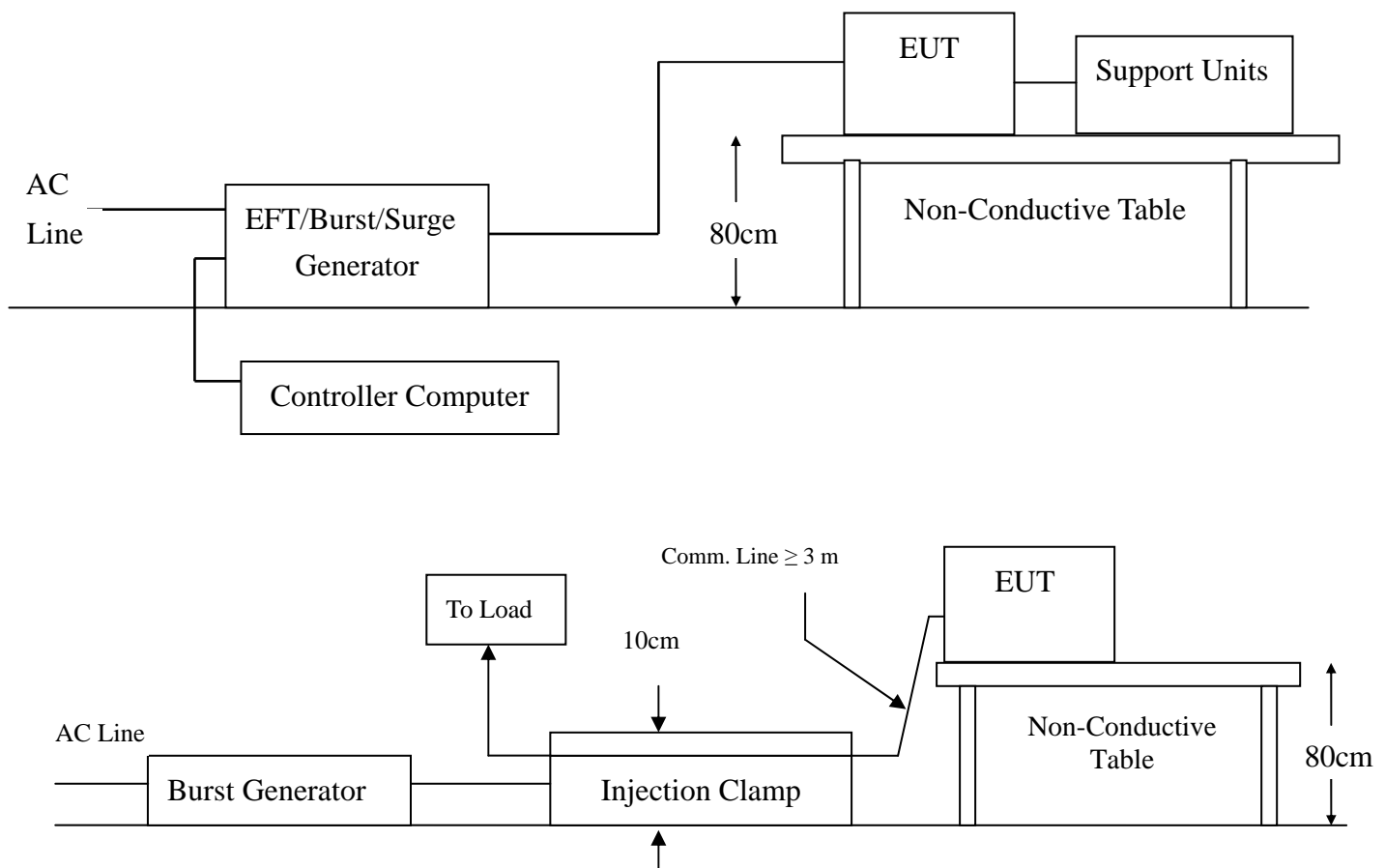
**Observation: No any function degraded during the tests.**

## SECTION 5 IEC 61000-4-4 (FAST TRANSIENTS/BURST)

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Lines and LAN Cable
<b>Basic Standard</b>	: IEC 61000-4-4
<b>Requirements</b>	: +/- 1kV for Power Supply Lines +/- 0.5kV for LAN Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Markba Lee
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 50%

#### Block Diagram of Test Setup:



### **Test Procedure:**

1. The Host PC (included EUT) and support units were located on a wooden table 0.8 m away from ground reference plane.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to the screen of Monitor and filling the screen with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Repeating step 3 to 4 through the test.
6. Recording the test result as shown in following table.

### **Test conditions:**

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 3Hz

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L1	+/- 1	Direct	Pass
N	+/- 1	Direct	Pass
PE	+/- 1	Direct	Pass
L1+N	+/- 1	Direct	Pass
L1+PE	+/- 1	Direct	Pass
N+PE	+/- 1	Direct	Pass
L1 + N + PE	+/- 1	Direct	Pass
LAN Cable	+/- 0.5	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.

☒ **PASS**

☐ **FAILED**

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

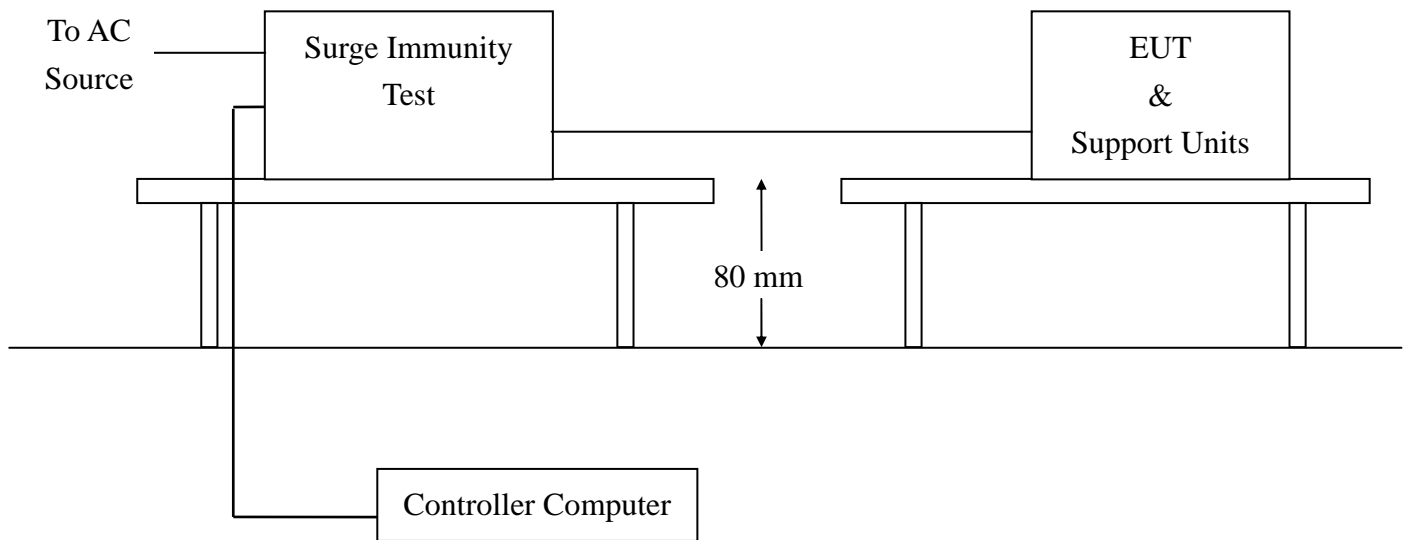


## SECTION 6 IEC 61000-4-5 ( SURGE IMMUNITY )

### SURGE IMMUNITY TEST

**Port** : Power Cord  
**Basic Standard** : IEC 61000-4-5  
**Requirements** : +/- 1kV (Line to Line)  
: +/- 2kV (Line to Ground)  
**Performance Criteria** : B ( Standard require )  
**Tester** : Markba Lee  
**Temperature** : 21°C  
**Humidity** : 50%

### Block Diagram of Test Setup:



### **Test Procedure:**

1. The Host PC (included EUT) and support units were located on a wooden table 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to the screen of Monitor and filling the screen with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Repeating step 3 to 4 through the test.
6. Recording the test result as shown in following table.

### **Test conditions:**

Voltage Waveform : 1.2/50  $\mu$ s  
Current Waveform : 8/20  $\mu$ s  
Polarity : Positive/Negative  
Phase angle : 0°, 90°, 270°  
Number of Test : 5

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
L1-L2	1	Positive	Capacitive	Pass
L1-PE	2	Positive	Capacitive	Pass
L2-PE	2	Positive	Capacitive	Pass
L1-L2	1	Negative	Capacitive	Pass
L1-PE	2	Negative	Capacitive	Pass
L2-PE	2	Negative	Capacitive	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.

☒ **PASS**

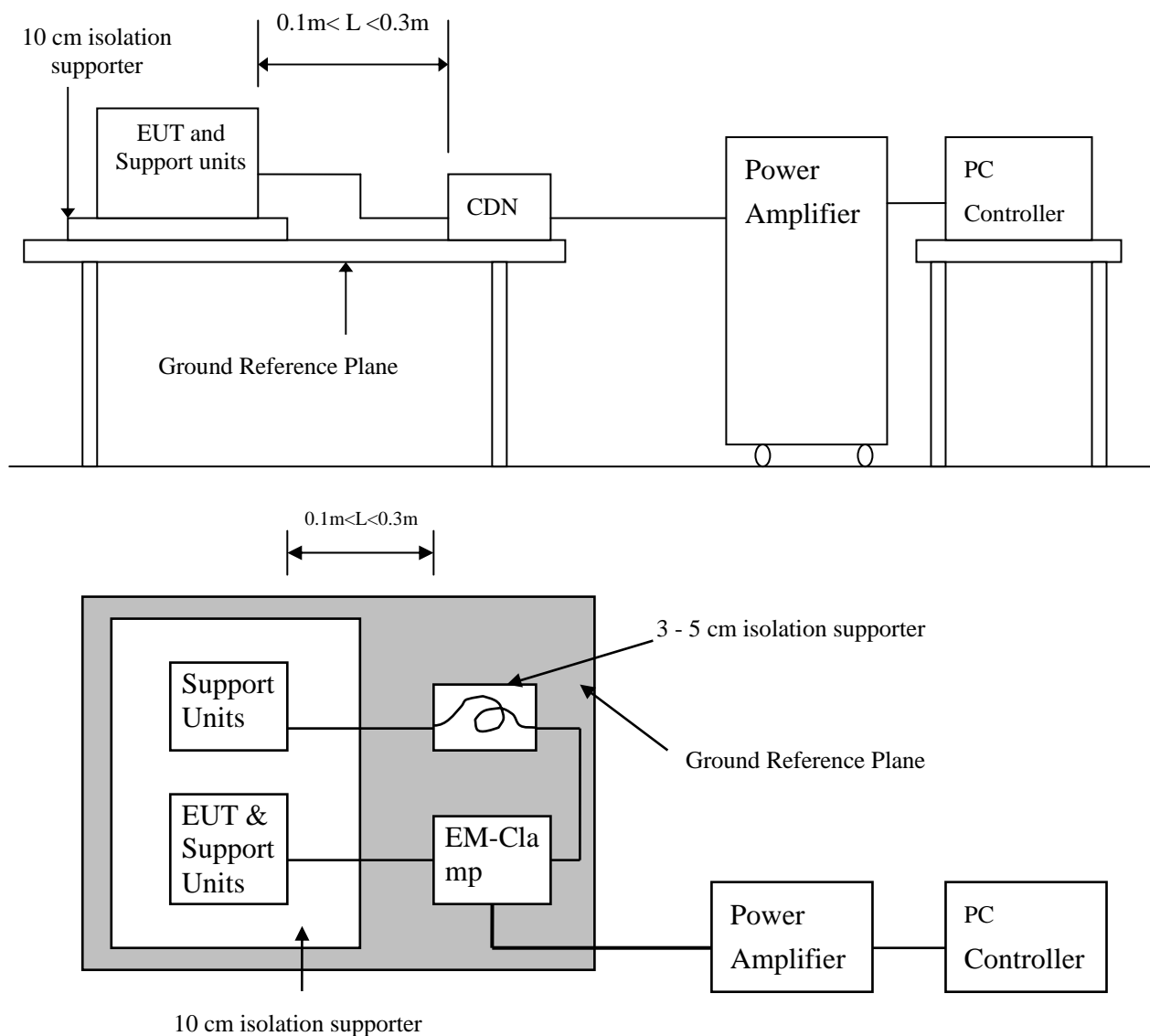
☐ **FAILED**

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

## SECTION 7 IEC 61000-4-6 (CONDUCTED DISTURBANCE/INDUCED BY RADIO-FREQUENCY FIELD)

**Port** : AC Port and LAN Cable  
**Basic Standard** : IEC 61000-4-6  
**Requirements** : 3V with modulated  
**Injection Method** : CDN-M3 for Power Cord  
 EM-Clamp for LAN Cable  
**Performance Criteria** : A (Standard require)  
**Tester** : Lung Tsai  
**Temperature** : 23°C  
**Humidity** : 51%

### Block Diagram of Test Setup:



### **Test Procedure:**

1. The Host PC (included EUT) and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
2. A 'H' messages were displayed on Screen of Monitor.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of CS test software per IEC 61000-4-6.
5. Recording the test result in following table.

### **Test conditions:**

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	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.

☒ **PASS**

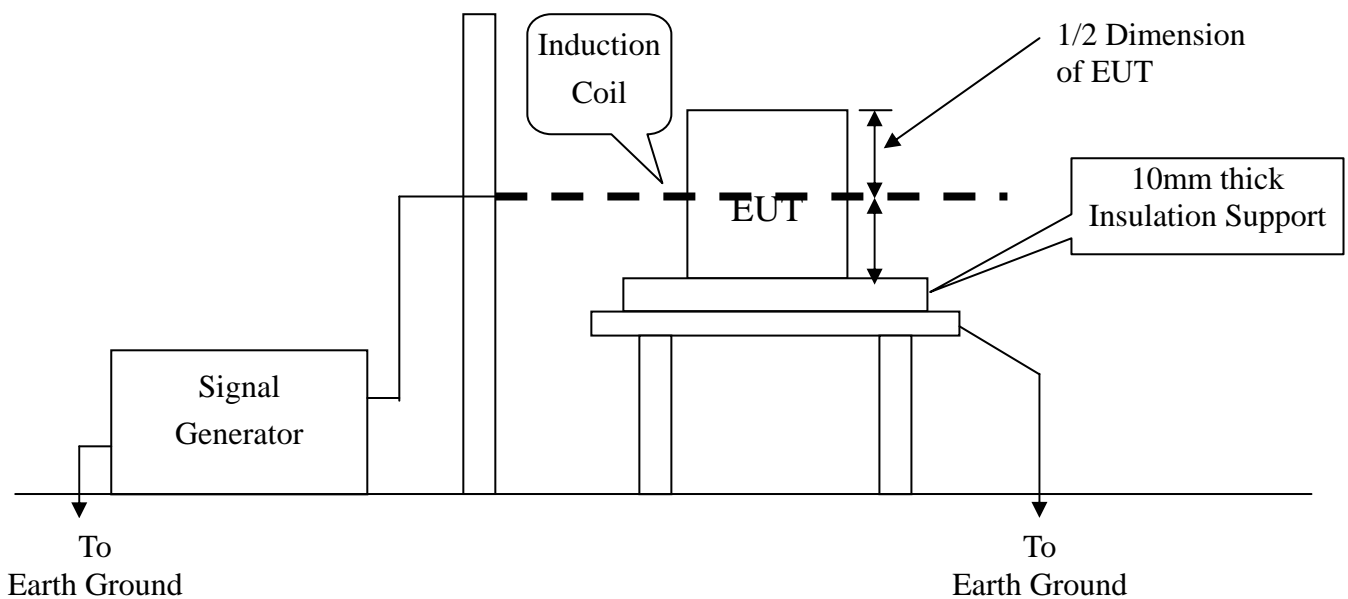
☐ **FAILED**

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

## SECTION 8 IEC 61000-4-8 (POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST)

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-8  
**Requirements** : 1 A/m  
**Performance Criteria** : A (Standard Required)  
**Tester** : Markba Lee  
**Temperature / Humidity** : 21°C / 50%

### Block Diagram of Test Setup:



## **Test Procedure:**

1. The EUT and support units were located on Ground Reference Plane with the interposition of a 0.1 m thickness insulation support.
2. Putting the induction coil on horizontal direction.( X direction )
3. A test program was loaded and executed in Windows mode.
4. The data was sent to the screen of EUT and filling the screen with upper case of “H” patterns.
5. The test program exercised related support units sequentially.
6. Repeating step 3 to 5 through the test.
7. Recording the test result as shown in following table.
8. Rotating the induction coil by 90° ( Y direction ) then repeat step 3 to 7.
9. Rotating the induction coil by 90° again ( Z direction ) then repeat step 3 to 7.

\*, Test conditions:

Field Strength: 1/m  
Power Freq.: 50Hz  
Orientation: X, Y, Z

Orientation	Field	Result (Pass/Fail)	Remark
X	1A	Pass	
Y	1A	Pass	
Z	1A	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.

☒ **PASS**

☐ **FAILED**

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

## SECTION 9 IEC 61000-4-11 (VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS )

### VOLTAGE DIPS / SHORT INTERRUPTIONS

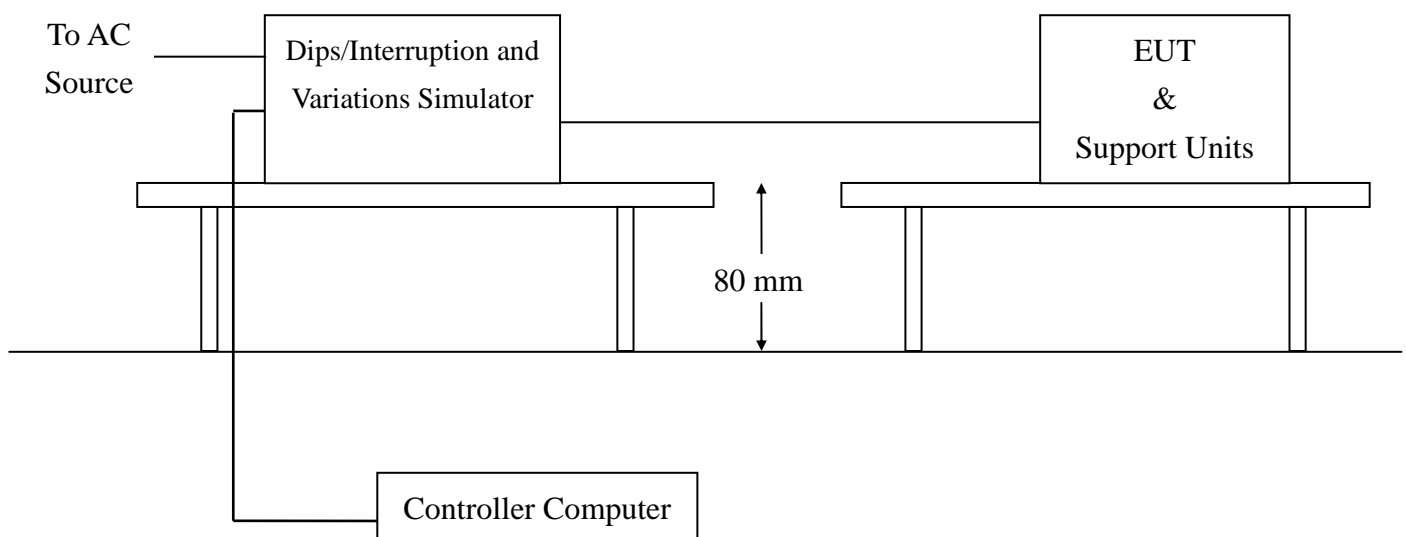
**Port** : AC mains  
**Basic Standard** : IEC 61000-4-11 (1994)  
**Requirement** : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

Voltage Dips	Test Level % $U_T$	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Interceptions	Test Level % $U_T$	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	250	C

**Test Interval** : Min. 10 sec.  
**Tester** : Markba Lee  
**Temperature** : 21°C  
**Humidity** : 50%

### Block Diagram of Test Setup:





### **Test Procedure:**

1. The Host PC (included EUT) and support units were located on a wooden table, 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to the screen of Monitor and filling the screen with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Setting the parameter of tests and then Perform the test software of test simulator.
6. Repeating step 3 to 4 through the test.
7. Recording the test result in test record form.

### **Test conditions:**

The duration with a sequence of three dips/interruptions with interval of 10 s minimum  
( Between each test event )

### **Voltage Dips:**

Test Level % $U_T$	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A

### **Voltage Interruptions:**

Test Level % $U_T$	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	250	EUT shut down but can be auto recovered, as the events disappear.	B

**Normal:** No any functions degrade during and after the test.

### **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.

☒ **PASS**      ☐ **FAILED**



## **APPENDIX 1**

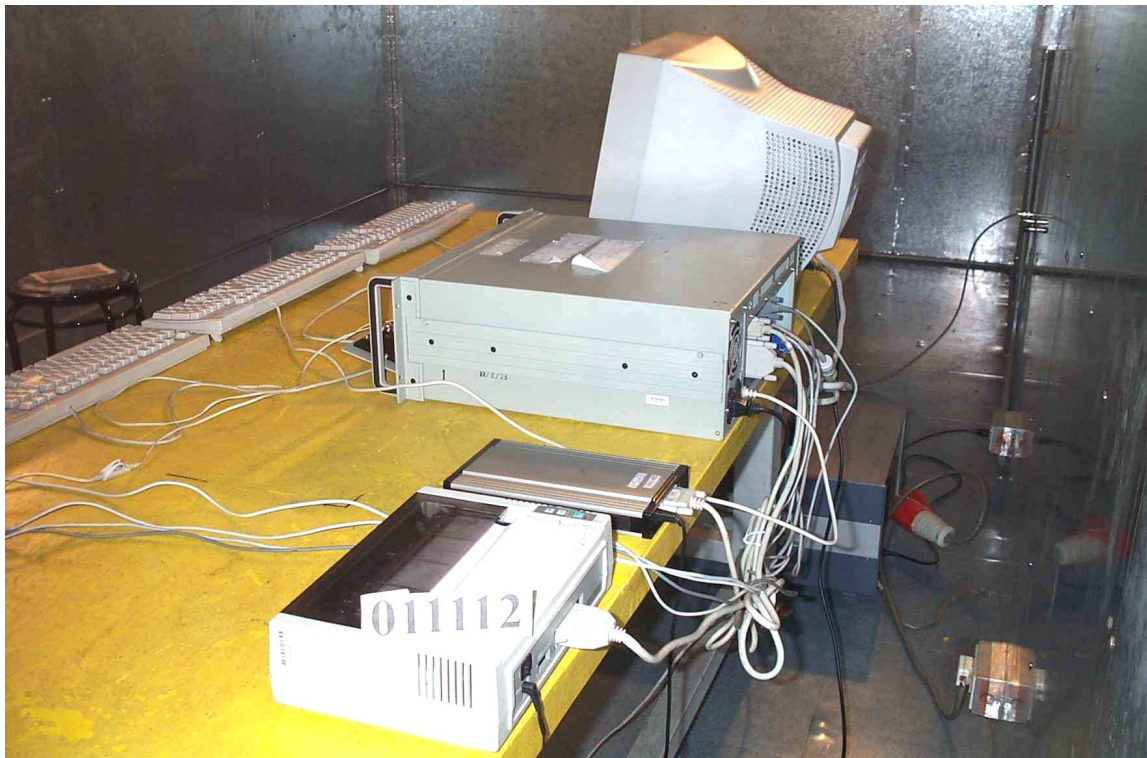
### **PHOTOGRAPHS OF TEST SETUP**

## LINE CONDUCTED EMISSION TEST (EN55022)

*Front View*



*Back View*



## COMMON MODE CONDUCTED EMISSION TEST

### *LAN Port*





## RADIATED EMISSION TEST (EN55022)

*Front View*



*Back View*



## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (IEC 61000-3-2; IEC 61000-3-3)





## ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2)



## RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3)





## FAST TRANSIENTS/BURST TEST (IEC 61000-4-4)



## SURGE IMMUNITY TEST (IEC 61000-4-5)





## CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (IEC 61000-4-6)



## POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST (IEC 61000-4-8)





## VOLTAGE DIPS / INTERRUPTION TEST (IEC 61000-4-11)





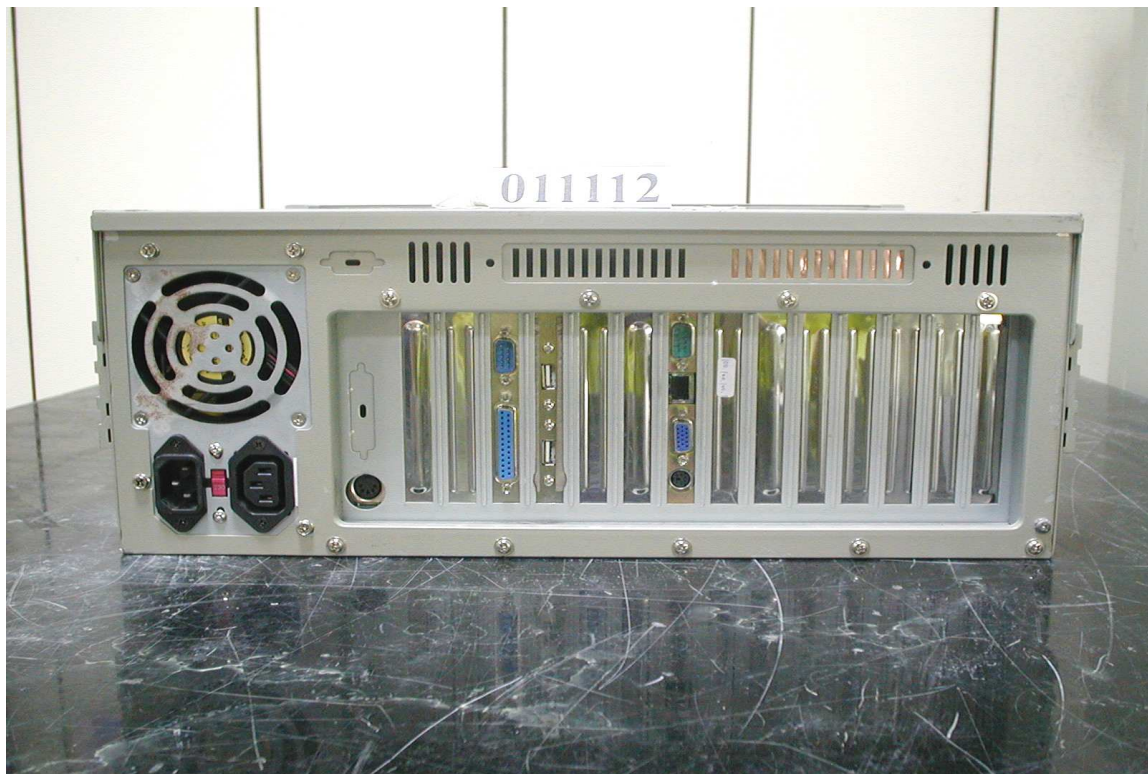
## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

Front view of IPC



Back view of IPC





### Open view of IPC





Front view of EUT



Back view of EUT





**I/O Port of EUT**



**I/O Port of EUT**

