

# EMC UPDATE TEST REPORT

for

## PANEL PC

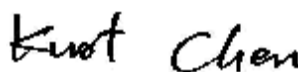
**Applicant** : Advantech Co., Ltd.  
**Applicant Address** : 4th FL., No. 108-3 Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.  
**Trade Name** : ADVANTECH  
**Model Number** : PPC-150T  
**Report Number** : 000762-E (990300-E Update)  
**Date** : October 19, 2000  
**Date of test** : October 13~16, 2000  
**Reference Standard** :

Standards	Results (Pass/Fail)
EN 55022: 1994 + A1: 1995 + A2: 1997	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998	PASS
EN 61000-3-3: 1995	PASS
EN 50082-1: 1997	PASS
- EN 61000-4-2: 1995	PASS
- EN 61000-4-3: 1995	PASS
- ENV 50204 : 1995	PASS
- EN 61000-4-4: 1995	PASS
- EN 61000-4-5: 1995	PASS
- EN 61000-4-6: 1996	PASS
- EN 61000-4-8: 1993	N/A
- EN 61000-4-11: 1994	PASS

### Update Description

1. Applicant add one Panel. (please refer have \*\* mark items on this report).
2. Other information please refers to the 990300-E Rev.00, Rev.01 and this (000762-E) test report.

Approved by Authorized Signatory:



Kurt Chen / Q. A. Manager

## PRODUCT INFORMATION

<b>Housing Type:</b>	Coated Plastic	
<b>EUT Power Rating:</b>	85 ~ 264Vac, 50/60Hz, 80W	
<b>AC power during Test:</b>	230VAC/50Hz	
<b>Power Supply Manufacturer:</b>	SKYNET	
<b>Power Supply Model Number:</b>	SNP-8086	
<b>AC Power Cord Type:</b>	Unshielded, 1.8m (Non-detachable)	
<b>DC Power Cable Type:</b>	N/A	
<b>Memory Capacity:</b>	<b>Max:</b> 128MB	<b>Installed:</b> 32MB
<b>CPU Manufacturer:</b>	Intel	<b>Model:</b> Pentium 233MMX
<b>CPU Board Manufacturer:</b>	ACL	<b>Model:</b> PCM-5868 B2 01-2
<b>Hard Drive Manufacturer:</b>	IBM	<b>Model:</b> DYKA-23240
<b>Floppy Drive Manufacturer:</b>	Y-E DATA	<b>Model:</b> YD-702J
<b>CD-ROM Drive Manufacturer:</b>	Toshiba	<b>Model:</b> XM-1702B
<b>15" TFT LCD Panel Manufacturer:</b>	Toshiba	<b>Model:</b> LTM15C151A
	Samsung	<b>Model:</b> LT150X1-051
	**CHUNGHWA	<b>Model:</b> **CLAA150XA03
<b>LCD Inverter Manufacturer:</b>	TDK	<b>Model:</b> TAD233-1/TAD282
<b>VGA Card Manufacturer:</b>	On Board	<b>Model:</b> 65555 (chips)
<b>Sound Card Manufacturer:</b>	On Board	<b>Model:</b> ES1869FC (chips)
<b>T/S Board Manufacturer:</b>	ELO	<b>Model:</b> E281-2310/E271-2210
<b>T/S Sensor Manufacturer:</b>	ELO	<b>Model:</b> 7512EF15/65661-000

**I/O Port of EUT:**

I/O PORT TYPES	Q'TY	TESTED WITH
1). Parallel Port	1	1
2). Serial Port	4	4
3). Video Port	1	1
4). PS/2 Keyboard / Mouse Port	1	1
5). Game Port	1	1
6). Microphone Port	1	1
7). Line -In Port	1	1
8). Line -Out Port	1	1
9). LAN Port	1	1
10). USB Port	2	2

**Note:** According to customer request, the LAN port just connect an open loop UTP Cable during all test.

## SUPPORT EQUIPMENT

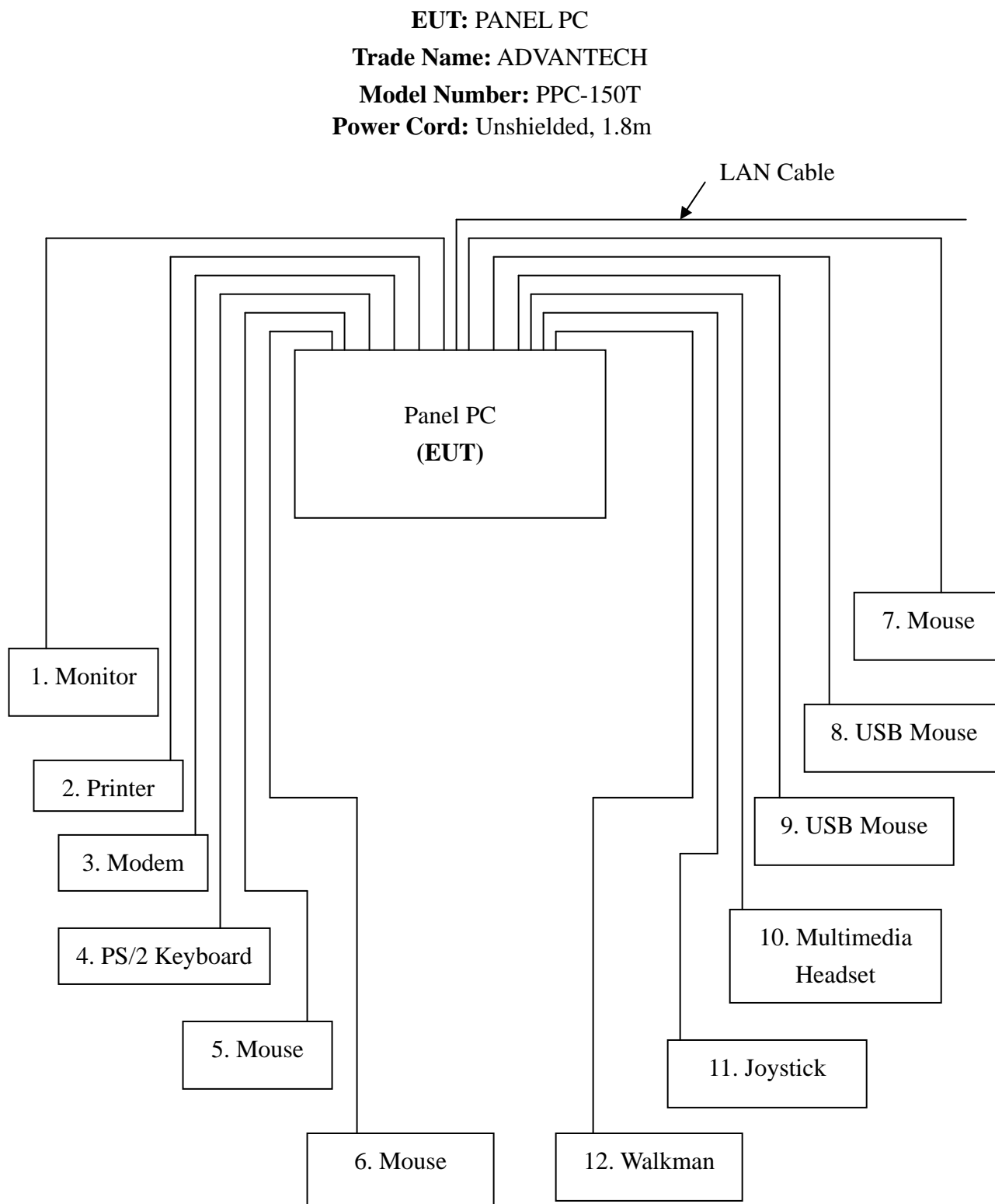
No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	GDM-17SE2T	7145529	AK8GDM17SE2T	SONY	Shielded, 1.8m	Unshielded, 1.8m
2.	Printer	2225C	3125S98198	DSI6XU2225	HP	Shielded, 1.8m	Unshielded, 1.8 m
3.	Modem	2400	94-364-176272	DK467GSM24	Computer Peripherals	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	E03633YLTW3-C	3731	CIGE03633	HP	Shielded, 1.8m with a core	N/A
5.	Mouse	M-MM43	LZE93352988	DoC	Logitech	Shielded, 1.8m	N/A
6.	Mouse	M-MM43	LZE93353024	DoC	Logitech	Shielded, 1.8m	N/A
7.	Mouse	M-MM43	LZE93353074	DoC	Logitech	Shielded, 1.8m	N/A
8.	USB Mouse	M-BB48	LZE93050165	FCC DoC	Logitech	Shielded, 1.8m	N/A
9.	USB Mouse	M-BB48	LZE93050187	FCC DoC	Logitech	Shielded, 1.8m	N/A
10.	Multimedia Headset	SX-M	A5-2	N/A	TOKYO	Unshielded, 1.8m	N/A
11.	Joy Stick	WINGMAN	LZB83457172	DZL211071	Logitech	Unshielded, 1.8m	N/A
12.	Walkman	YX-328	W7	N/A	YING-KO	Unshielded, 1.8m	N/A

**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.

## BLOCK DIAGRAM OF TEST SETUP

### SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS



## TEST EQUIPMENT LIST

**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 ; ☐ # 2 ; ☒ # 3 ; ☐ # 4

Open Area Test Site # 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Q.P Adaptor	HP	85650A	2811A01399	05/05/2000	05/04/2001
RF Pre-selector	HP	85685A	2947A01064	05/05/2000	05/04/2001
Spectrum Analyzer	HP	8568B	3001A05004	05/05/2000	05/04/2001
S.P.A Display	HP	8568B	3014A18846	05/05/2000	05/04/2001
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL6112A	2309	02/13/2000	02/12/2001
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2604	N.C.R	N.C.R
Controller	EMCO	2090	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M54367	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	11/10/1999	11/09/2000

Open Area Test Site # 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261A	N/A	03/08/2000	03/07/2001
Pre-Amplifier	HP	8447D	2944A08432	11/16/1999	11/15/2000
EMI Test Receiver	R&S	ESVS10	834468/006	03/24/2000	03/23/2001
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL 6112B	2635	09/30/2000	09/29/2001
Turn Table	Chance Most	CM-T003-1	T807-6	N.C.R	N.C.R
Antenna Tower	Chance Most	CM-A003-1	A807-6	N.C.R	N.C.R
Controller	Chance Most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M76890	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	11/13/1999	11/12/2000

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261C	71720533	10/25/1999	10/24/2000
Pre-Amplifier	HP	8447D	2944A09173	02/01/2000	01/31/2001
EMI Test Receiver	R&S	ESVS20	838804/004	12/24/1999	12/23/2000
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL6112A	2179	11/27/1999	11/26/2000
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	01/30/2000	01/29/2001

Open Area Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261C	81720301	09/02/2000	09/01/2001
Pre-Amplifier	HP	8447F	2944A03748	10/22/1999	10/21/2000
EMI Test Receiver	R&S	ESCS30	845552/030	12/04/1999	12/03/2000
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL 6112B	2462	01/13/2000	01/12/2001
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	12/26/1999	12/25/2000

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	ESCS30	847793/012	11/06/1999	11/05/2000
LISN	EMCO	3825/2	9003-1628	07/12/2000	07/11/2001
LISN	R&S	ESH3-Z5	848773/014	10/22/1999	10/21/2000

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 Harmonic & Flicker Tester	PHF 555	080 419-25	Oct. 16, 2000	Oct. 15, 2001

### For ESD test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY/TRENCH ESD Generator	PESD 1600	H710203	Sep. 02, 2000	Sep. 01, 2001

### For Radiated Electromagnetic Field immunity Measurement:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi /Signal Generator	2022D	119246/003	Aug. 21, 2000	Aug. 20, 2001
M2S / Power Amplifier	A00181/1000	9801-112	N/A	N/A
M2S / Power Amplifier	AC8113/800-250A	9801-179	N/A	N/A
Wandel & Goltormann/ EM-Radiation Meter	EMR-30	L-0013	02/25/2000	02/24/2001
EMCO Power Antenna	93141	9712-1083	N/A	N/A

### For Fast Transients/Burst test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH/ Fast Transients/Burst Generator	PEFT-JUNIOR	583 333-117	Aug. 21, 2000	Aug. 20, 2001

### For Surge Immunity test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH/ Surge Tester	PSURGE 4010	583 334-71	Sep. 01, 2000	Aug. 31, 2001

### For CS test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi /Signal Generator	2022D	119246/003	Aug. 21, 2000	Aug. 20, 2001
MEB / CDN M3	M3	3683	Sep. 11, 2000	Sep. 10, 2001
M2S / Power Amplifier	A00181/1000	9801-112	N/A	N/A

### For Voltage Dips/Short Interruption and Voltage Variation Immunity test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH/ Dips/Interruption and Variations Simulator	PLINE 1610	080 344-05	Jan. 31, 2000	Jan. 30, 2001



## **EUT Configuration during measurement:**

1) Pre-test mode are list as below:

### **Mode(s):**

- 1. 1024 x 768 Resolution**
- 2. 800 x 600 Resolution**
- 3. 640 x 480 Resolution**

2) After Pre-test, found mode 1 producing the highest emission level, therefore used this mode for all final test.

## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** PPC-150T

**Location:** # 3

**Tested by:** Gimmy Tsai

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 64%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
0.186	50.1	---	64.21	54.21	-14.1	---	L1
0.190	52.7	47.9	64.04	54.04	-11.3	-6.1	L1
0.246	44.2	---	61.89	51.89	-17.7	---	L1
17.321	42.3	---	60.00	50.00	-17.7	---	L1
21.640	37.6	---	60.00	50.00	-22.4	---	L1
25.970	35.8	---	60.00	50.00	-24.2	---	L1
0.185	50.1	---	64.26	54.26	-14.2	---	L2
0.190	52.5	47.5	64.04	54.04	-11.5	-6.5	L2
0.251	46.3	---	61.72	51.72	-15.4	---	L2
0.309	37.8	---	60.00	50.00	-22.2	---	L2
17.324	42.3	---	60.00	50.00	-17.7	---	L2
21.650	37.6	---	60.00	50.00	-22.4	---	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

### (RADIATED EMISSION TEST)

**Model Number:** PPC-150T

**Location:** Site # 3

**Tested by:** Gimmy Tsai

**Test Mode:** Mode 1

**Polar:** Vertical -- 10m

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 67%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)
79.24	15.7	8.9	24.6	30.0	-5.4
111.65	14.0	13.5	27.5	30.0	-2.5
150.80	12.6	13.5	26.1	30.0	-3.9
201.43	15.3	11.7	27.0	30.0	-3.0
359.52	13.0	20.0	33.0	37.0	-4.0
392.77	12.0	20.7	32.7	37.0	-4.3

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PPC-150T

**Location:** Site # 3

**Tested by:** Gimmy Tsai

**Test Mode:** Mode 1

**Polar:** Horizontal -- 10m

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 67%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)
117.74	12.1	14.3	26.4	30.0	-3.6
137.98	10.4	14.3	24.7	30.0	-5.3
201.29	14.7	11.7	26.4	30.0	-3.6
228.43	11.6	14.0	25.6	30.0	-4.4
392.78	9.9	20.7	30.6	37.0	-6.4
503.01	4.9	23.3	28.2	37.0	-8.8

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

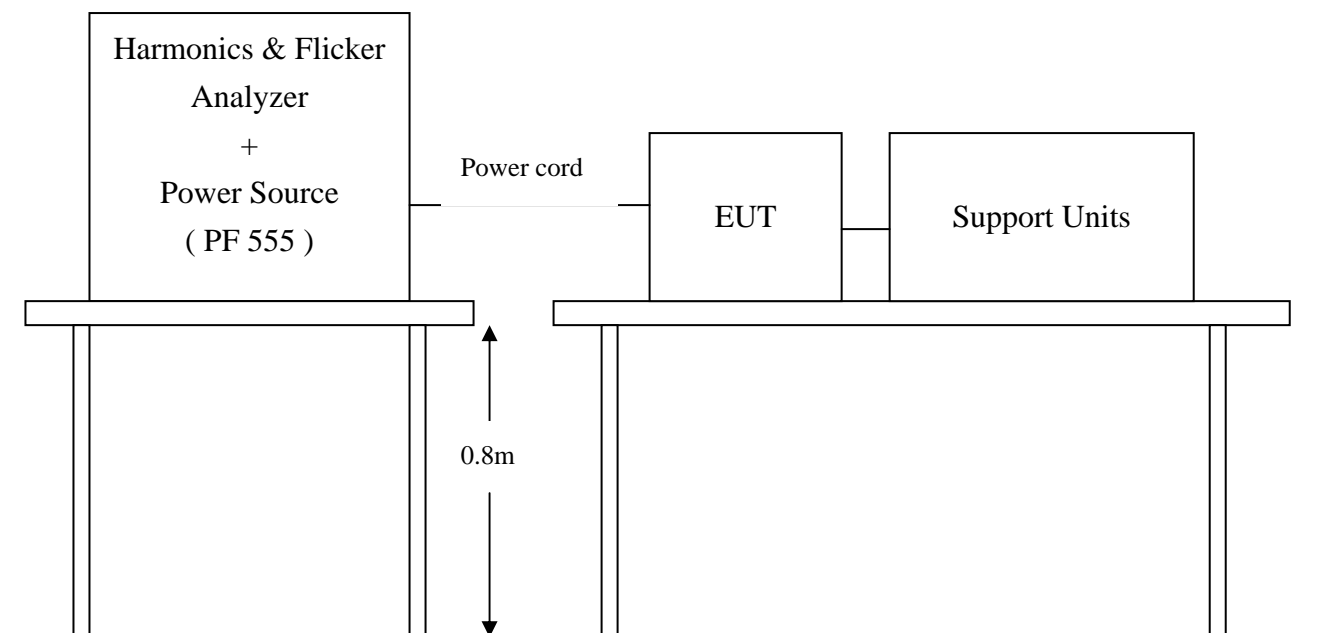
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2: 1995 + A1: 1998 + A2: 1998  
**Limits** : ☒ Class A, ☐ Class D  
**Tester** : Jimmy Tsai  
**Temperature** : 22 degree C  
**Humidity** : 43%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : §5 of EN 61000-3-3  
**Tester** : Jimmy Tsai  
**Temperature** : 22 degree C  
**Humidity** : 43%

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.

-----  
EN 61000-3-2 TEST REPORT 2000/10/15 02:28 PM  
-----

Unit: PANEL PC

Serial No.: PPC-150T

Remarks: Temp: 22°C Humidity: 43%

Operator: GIMMY TSAI

=====

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: IEC-725 STD. REF.

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

MAX WATTS:57.1W

TEST DATA

-----

Result: PASS

Harmonic Current Results

-----

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.246	NaN	NaN	PASS
2	0.002	1.080	1.080	PASS
3	0.220	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.196	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.167	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.134	0.400	0.400	PASS
10	0.001	0.184	0.184	PASS
11	0.101	0.330	0.330	PASS
12	0.000	0.153	0.153	PASS
13	0.071	0.210	0.210	PASS
14	0.000	0.131	0.131	PASS
15	0.045	0.150	0.150	PASS
16	0.000	0.115	0.115	PASS
17	0.028	0.132	0.132	PASS
18	0.000	0.102	0.102	PASS
19	0.018	0.118	0.118	PASS
20	0.000	0.092	0.092	PASS
21	0.012	0.107	0.107	PASS
22	0.000	0.084	0.084	PASS
23	0.009	0.098	0.098	PASS



24	0.000	0.077	0.077	PASS
25	0.006	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.004	0.083	0.083	PASS
28	0.000	0.066	0.066	PASS
29	0.004	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.005	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.005	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.004	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.003	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.003	0.058	0.058	PASS
40	0.000	0.046	0.046	PASS

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT 2000/10/15 02:42 PM  
-----

Unit: PANEL PC

Serial No.: PPC-150T

Remarks: Temp: 22°C Humidity: 43%

Operator: GIMMY TSAI

=====

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: IEC-725 STD. REF.

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	0.016	1.00	PASS	true
Plt max	0.016	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

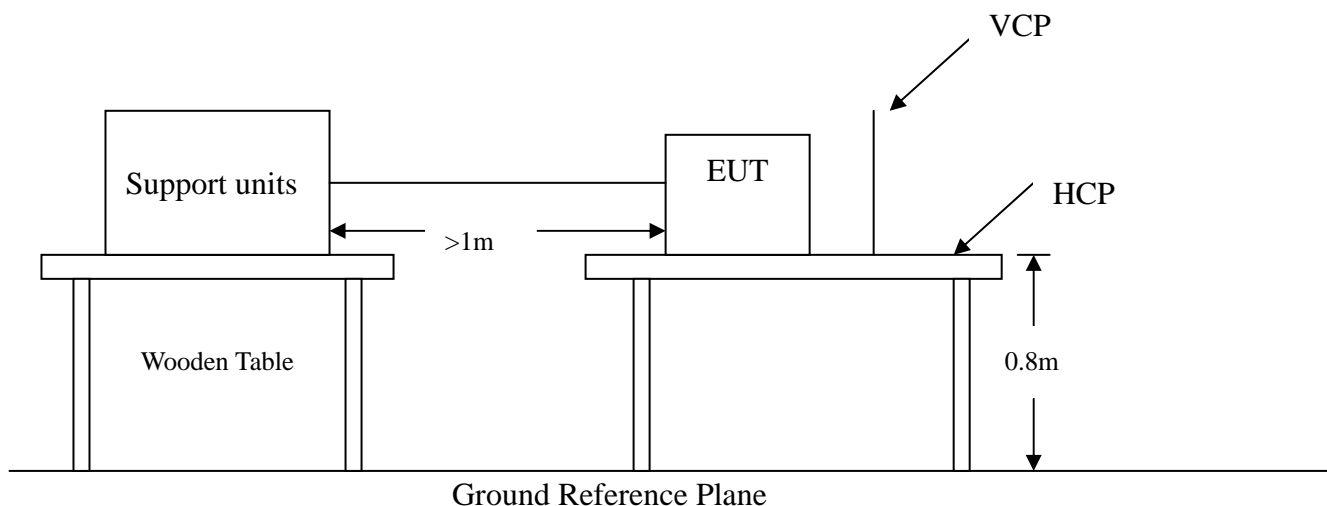
## SECTION 3 EN 61000-4-2 (ELECTROSTATIC DISCHARGE)

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : EN 61000-4-2  
**Requirements** :  $\pm 8$  kV (Air Discharge)  
                           $\pm 4$  kV (Contact Discharge)  
                           $\pm 4$  kV (Indirect Discharge)  
**Performance Criteria** : B (Standard require)  
**Tester** : Gimmy Tsai  
**Temperature/Humidity**: 25°C/44%

#### Block Diagram of Test Setup:

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



## Test Procedure:

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

The electrostatic discharges were applied as follows:

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

**\*\* The tested points to EUT, 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.

☒ **PASS**

☐ **FAILED**

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

*The Tested Points of EUT*

*(Photo 1 of 2)*



*(Photo 2 of 2)*

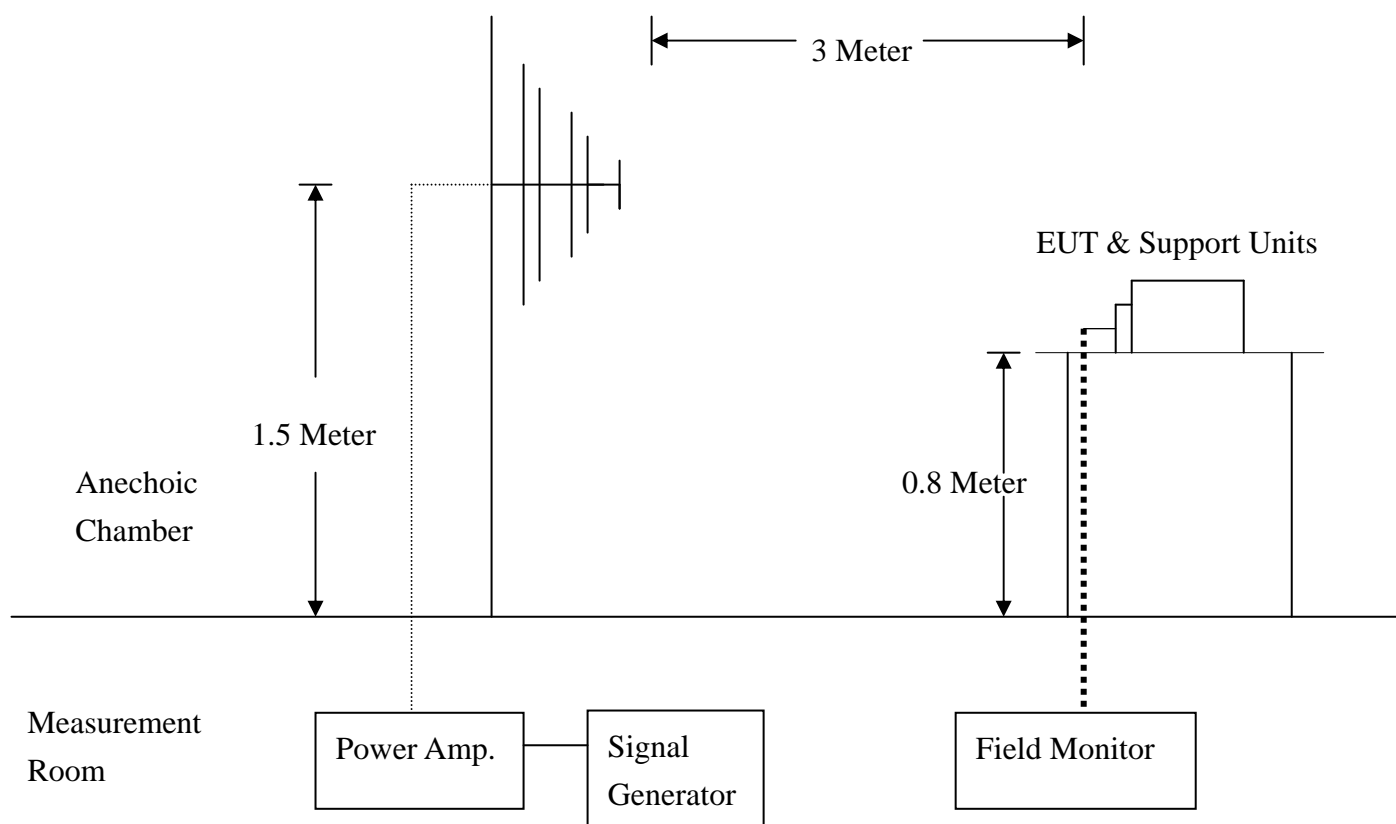


## SECTION 4 EN 61000-4-3 & EN 50204 (RADIATED ELECTROMAGNETIC FIELD)

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : EN 61000-4-3 & ENV 50204  
**Requirements** : 3 V/m / with 80% AM. 1kHz Modulation. (EN 61000-4-3)  
with 200Hz  $\pm$  1% modulation (ENV 50204)  
**Performance Criteria** : A (Standard require)  
**Tester** : Gimmy Tsai  
**Temperature** : 25°C  
**Humidity** : 44%

#### Block Diagram of Test Setup:



## **Test Procedure:**

1. The 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 EN 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 EUT to the other side and repeat step 3 to 7, until 4 sides of EUT were verified.
10. For ENV 50204 tested at  $900 \pm 5$  MHz individually and keep same set up as EN 61000-4-3 testing.

### **Test conditions:**

Frequency Range : 80MHz-1000MHz for EN 61000-4-3, 900 MHz $\pm$ 5MHz for ENV 50204

Frequency Step : 1% of fundamental for EN 61000-4-3

Dwell Time : 3 sec

### **EN 61000-4-3**

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	3V	Yes	H	0	Pass
80-1000	3V	Yes	V	0	Pass
80-1000	3V	Yes	H	90	Pass
80-1000	3V	Yes	V	90	Pass
80-1000	3V	Yes	H	180	Pass
80-1000	3V	Yes	V	180	Pass
80-1000	3V	Yes	H	270	Pass
80-1000	3V	Yes	V	270	Pass

### **ENV 50204**

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
900 $\pm$ 5	3V	Yes	H	0	Pass
900 $\pm$ 5	3V	Yes	V	0	Pass
900 $\pm$ 5	3V	Yes	H	90	Pass
900 $\pm$ 5	3V	Yes	V	90	Pass
900 $\pm$ 5	3V	Yes	H	180	Pass
900 $\pm$ 5	3V	Yes	V	180	Pass
900 $\pm$ 5	3V	Yes	H	270	Pass
900 $\pm$ 5	3V	Yes	V	270	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.

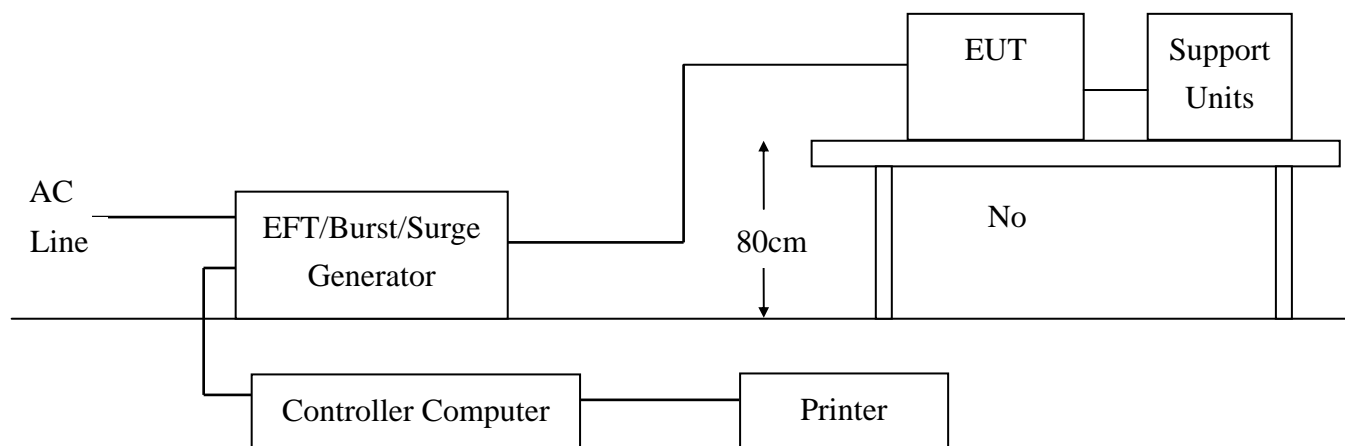


## SECTION 5 EN 61000-4-4 (FAST TRANSIENTS/BURST)

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Ports and Data Ports
<b>Basic Standard</b>	: EN 61000-4-4
<b>Requirements</b>	: $\pm 1\text{kV}$ for Power Port $\pm 0.5\text{kV}$ for LAN cable
<b>Performance Criteria</b>	: B (Standard require)
<b>Tester</b>	: Gimmy Tsai
<b>Temperature</b>	: $25^{\circ}\text{C}$
<b>Humidity</b>	: 44%
<b>Deviation</b>	: According to customer request, the LAN port just connected an open loop UTP cable during the test. Therefore, Test Lab. can not guarantees the unit when LAN port to do actual data transmission.

#### Block Diagram of Test Setup:



### **Test Procedure:**

1. The 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 monitor, filling the screens 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	$\pm 1$	Direct	Pass
N	$\pm 1$	Direct	Pass
PE	$\pm 1$	Direct	Pass
L1 + N	$\pm 1$	Direct	Pass
L1 + PE	$\pm 1$	Direct	Pass
N + PE	$\pm 1$	Direct	Pass
L1 + N + PE	$\pm 1$	Direct	Pass
LAN cable	$\pm 0.5$	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.

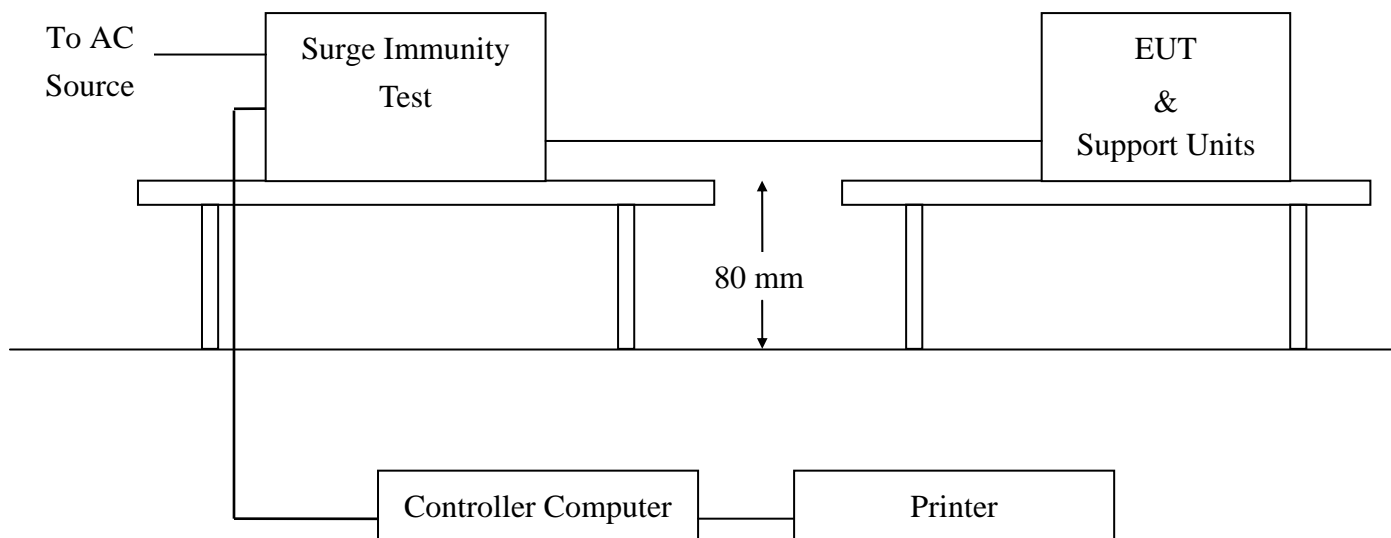
**\*\*Observation:** No any function degraded during the tests.

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

### SURGE IMMUNITY TEST

**Port** : Power Cord  
**Basic Standard** : EN 61000-4-5  
**Requirements** :  $\pm 1\text{kV}$  (Dif.) (Line to Line)  
 $\pm 2\text{kV}$  (Com.) (Line to Ground)  
**Performance Criteria** : B (Standard require)  
**Tester** : Gimmy Tsai  
**Temperature** :  $25^{\circ}\text{C}$   
**Humidity** : 44%

### Block Diagram of Test Setup:



## **Test Procedure:**

1. The 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 monitor, filling the screens 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 + N	1	Positive	Capacitive	Pass
L1+PE	2	Positive	Capacitive	Pass
N + PE	2	Positive	Capacitive	Pass
L1+N	1	Negative	Capacitive	Pass
L1 + PE	2	Negative	Capacitive	Pass
N + PE	2	Negative	Capacitive	Pass

## **Performance & Result:**

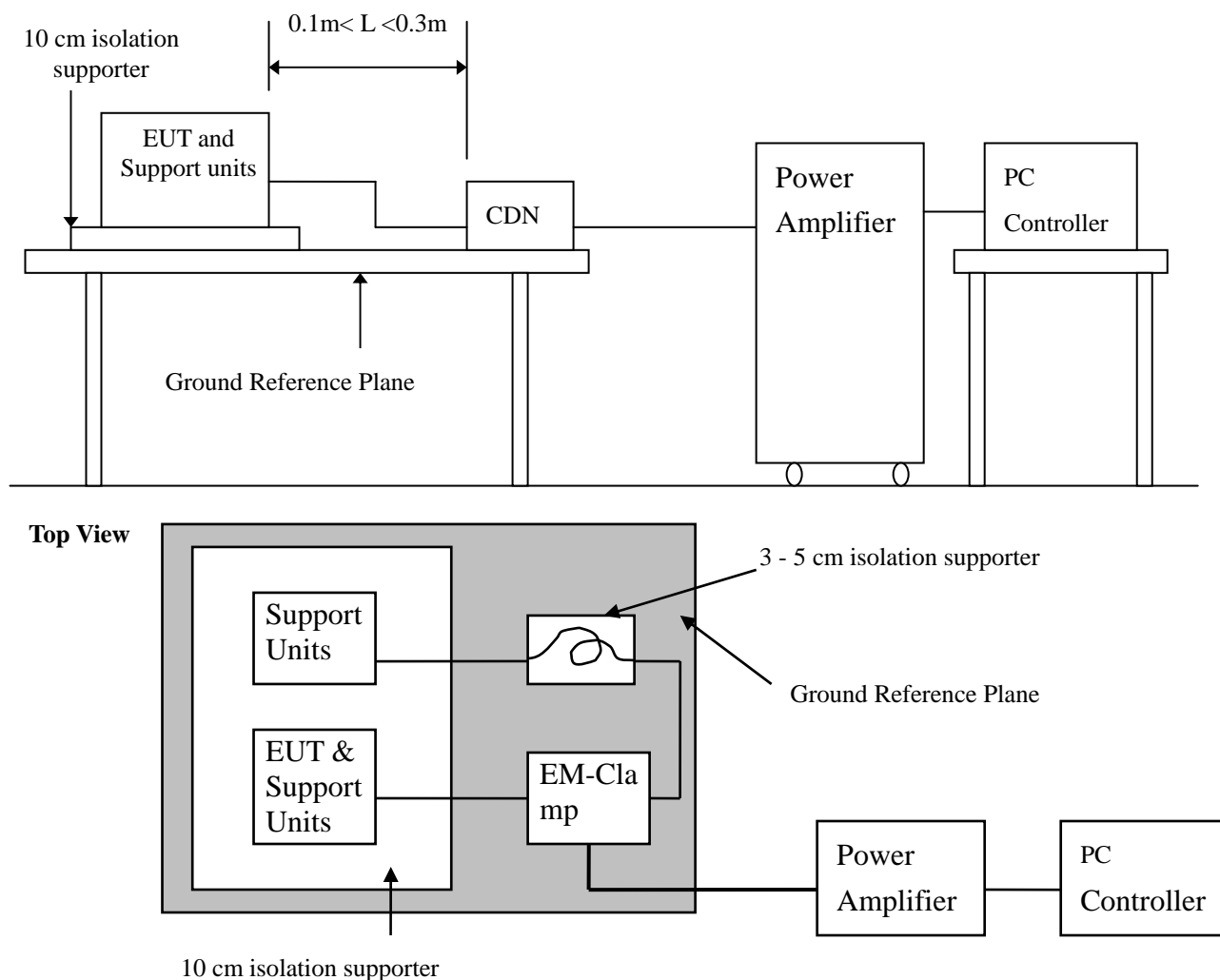
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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

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

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

<b>Port</b>	: Power cord and Data Cable
<b>Basic Standard</b>	: EN 61000-4-6
<b>Requirements</b>	: 3V with modulated
<b>Injection Method</b>	: CDN-M3 for Power Cordially EN-Clamp for LAN cable
<b>Deviation</b>	: N/A
<b>Performance Criteria</b>	: A (Standard require)
<b>Tester</b>	: Gimmy Tsai
<b>Temperature</b>	: 25°C
<b>Humidity</b>	: 44%
<b>Deviation</b>	: According to customer request, the LAN port just connected an open loop UTP cable during the test. Therefore, Test Lab. can not guarantees the unit when LAN port to do actual data transmission.

### Block Diagram of Test Setup:



## **Test Procedure:**

1. The 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 EN 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:**

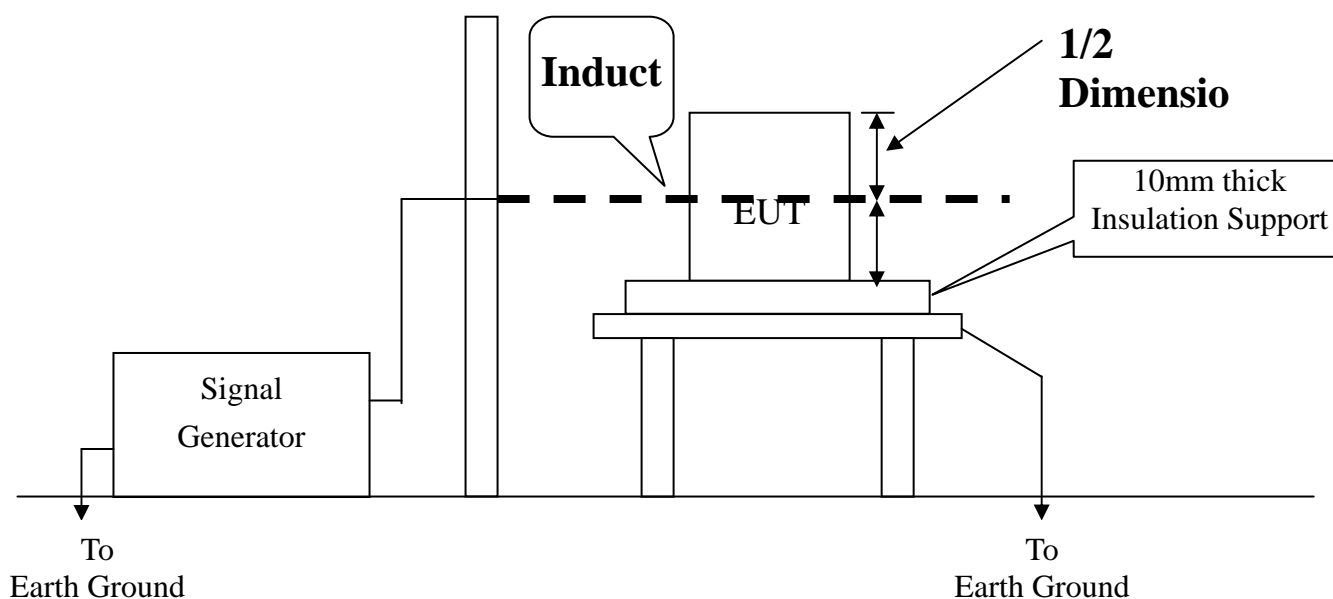
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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

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

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

**Port** : Enclosure  
**Basic Standard** : EN 61000-4-8  
**Requirements** : 3 A/m  
**Performance Criteria** : A (Standard Required)  
**Temperature** : N/A  
**Humidity** : N/A

### Block Diagram of Test Setup:



## Test Procedure:

**Field Strength** : 3A/m  
**Power Freq.** : 50Hz  
**Orientation** : X, Y, Z

Orientation	Field	Result (Pass/Fail)	Remark

**\*\*Note:** Not applicable. Because no any component can be influenced by power magnetic fields.

## 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:** N/A



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

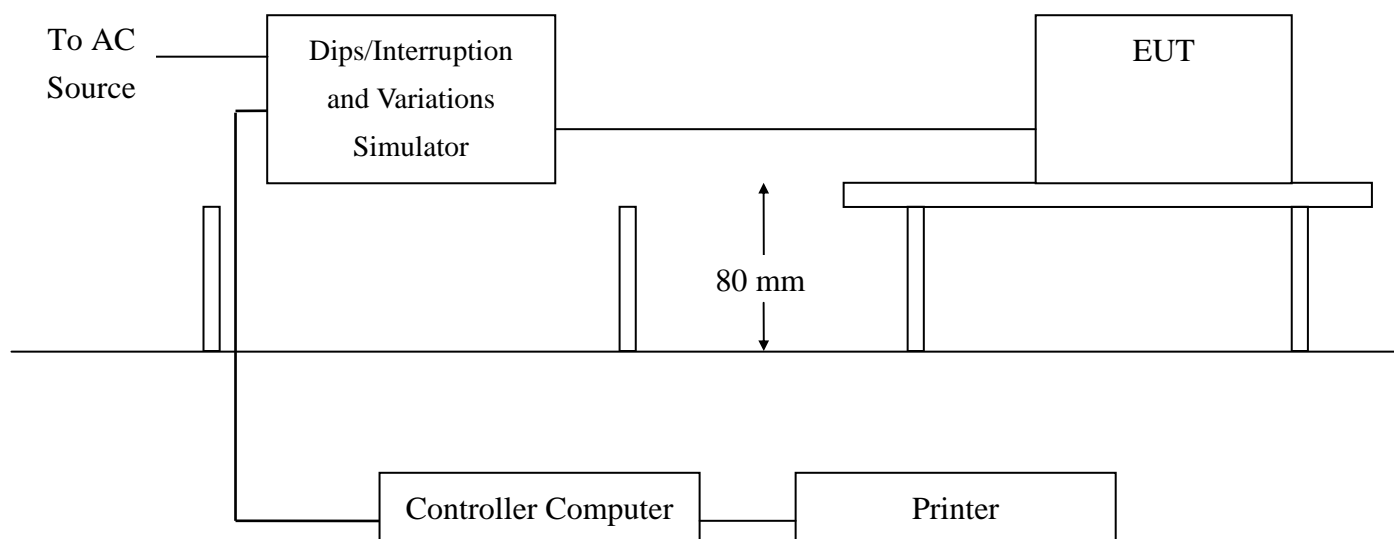
### VOLTAGE DIPS / SHORT INTERRUPTIONS

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

Test Level % $U_T$	Voltage Dip and Interrupt Reduction(%)	Duration ( ms )	Performance Criteria
<0	>95	5000	C
70	30	10	B
40	60	100	C

**Test Interval** : Min. 10 sec.  
**Tester** : Gimmy Tsai  
**Temperature** : 25°C  
**Humidity** : 54%

### Block Diagram of Test Setup:



## **Test Procedure:**

1. The 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 monitor, filling the screens 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 )

Test Level % U <sub>T</sub>	Voltage Dip and Interrupt Reduction(%)	Duration ( ms )	Observation	Meet Performance Criteria
<0	>95	5000	EUT Shot down, but can be recovered as the events disappear.	C
70	30	10	Normal	A
40	60	100	Normal	A

## **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.

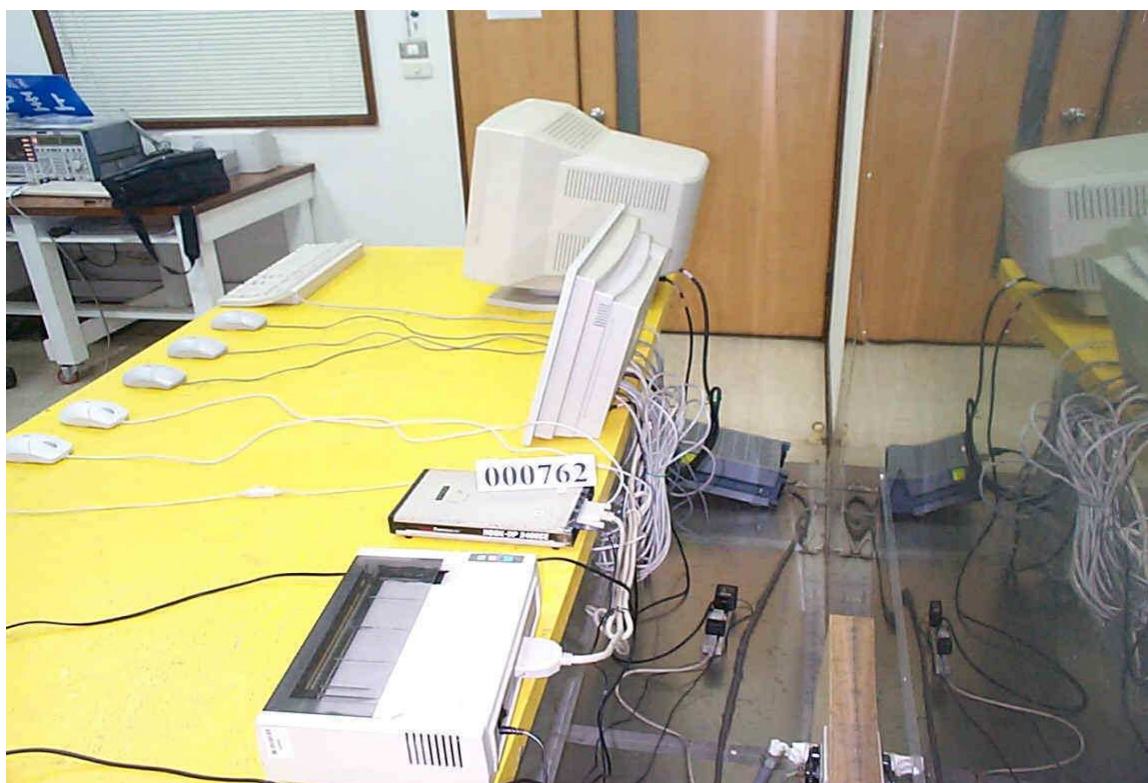
**Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FIALED</b>
---	--

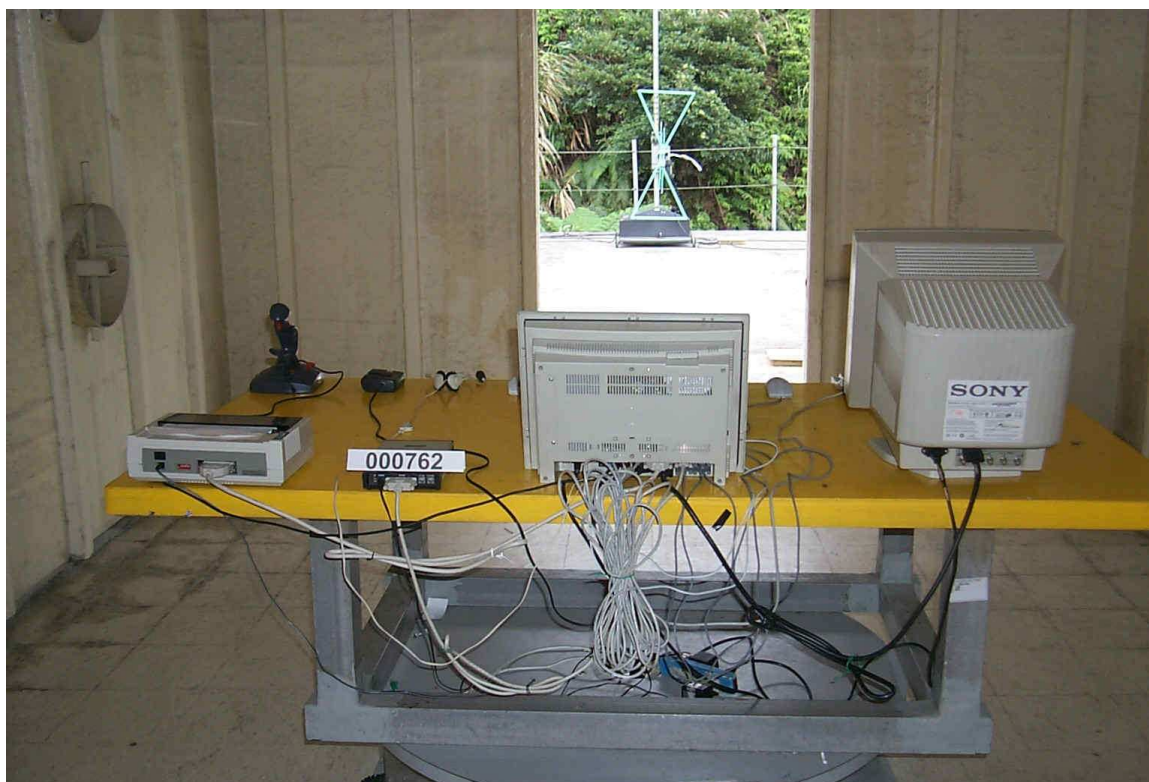
## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

## LINE CONDUCTED EMISSION TEST (EN 55022)



## RADIATED EMISSION TEST (EN 55022)

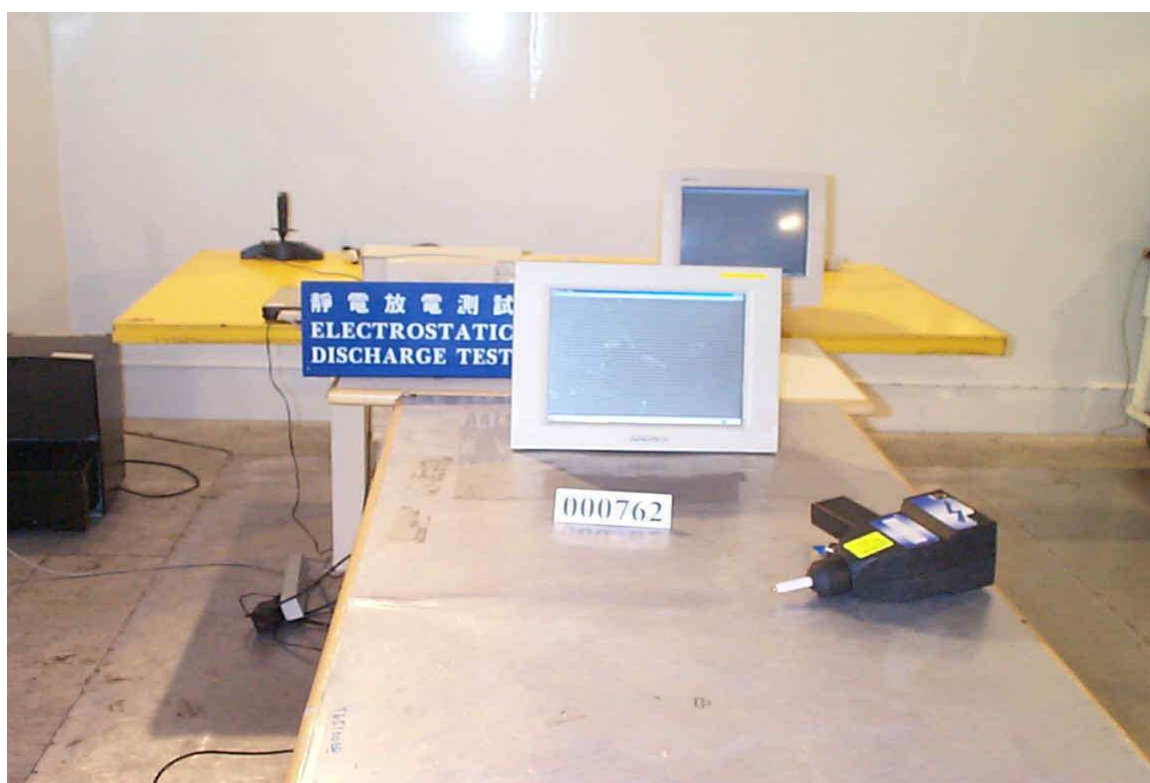




## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2, EN 61000-3-3)



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



## RADIATED ELECTROMAGNETIC FIELD (EN 61000-4-3 & ENV 50204)





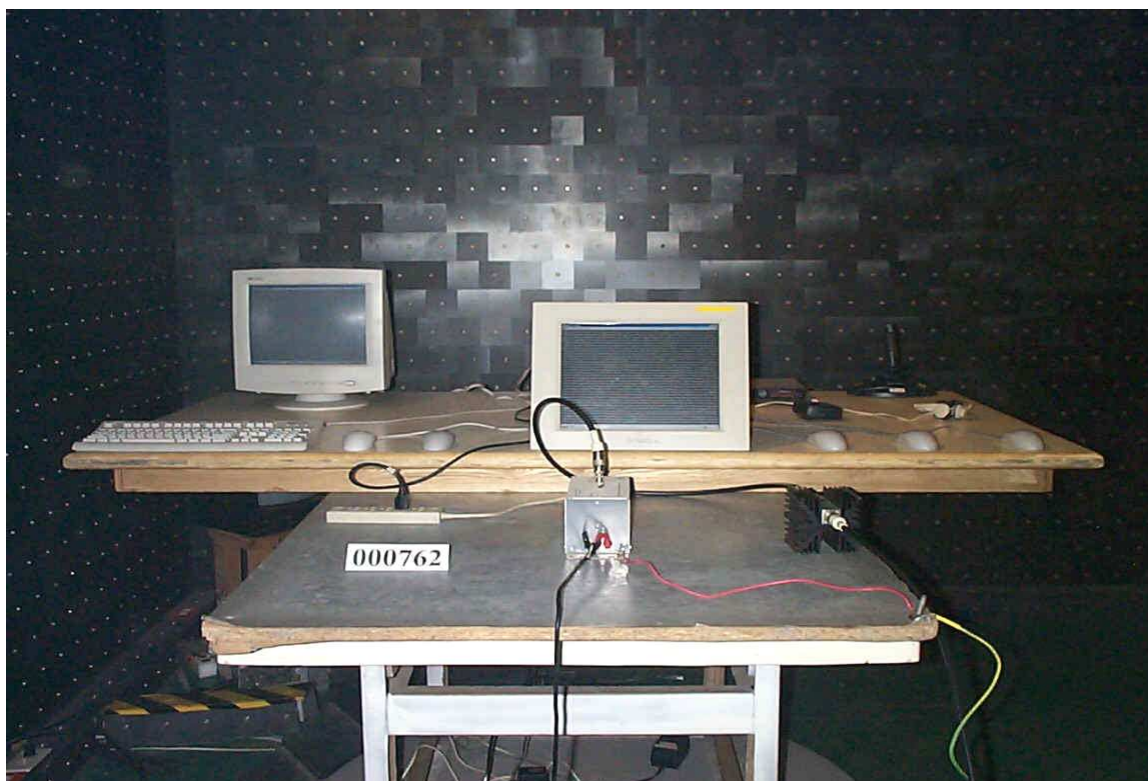
## FAST TRANSIENTS/BURST TEST (EN 61000-4-4)



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



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





## VOLTAGE DIP/INTERRUPTION TEST (EN 61000-4-11)



## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

**Front View of EUT**



**Back View of EUT**



**Left View of EUT**



**Right View of EUT**





### Back View of PORT

