

# EMC UPDATE TEST REPORT

For

Panel PC

**Applicant** : Advantech Co., Ltd.  
**Trade Name** : Advantech  
**Model Number** : PPC-103T  
**Date** : August 27, 2002  
**Date of test** : July 10 ~ August 23, 2002  
**Revision** : 00  
**Regulation** : See below

Standards	Results (Pass/Fail)
EN 55022: 1998	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	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

## Description of Rev.00:

1. Applicant adds one Power Adapter to retest.  
(Please refer to have \*\* mark items on this report)
2. Other information please refer to report 000578 ( Rev. 00, Rev. 01 ) and this (Rev. 00) test report.

Approved by Authorized Signatory:

*Susan Su for*

Lucky Chen / EMC Director

## PRODUCT INFORMATION

**Housing Type:** Plastic

**EUT Power Rating:** 85-264VAC, 50/60Hz  
\*\*DCV from Power Adapter

**AC Power during Test:** 230VAC/50Hz to Power Supply  
\*\*230VAC/50Hz to Power Adapter

**Power Supply Manufacturer:** Skynet **Model:** SNP-9563-M

**Power Adapter Manufacturer:** \*\*EDAC **Model:** EA1050A-120

**AC Power Cord Type:** Unshielded, 1.8m (Detachable)  
\*\* Unshielded, 1.8m (Detachable) to Power Adapter

**\*\*DC Power Cable Type:** Unshielded, 1.3m (Noe-detachable) with a core at Power Adapter

**CPU Manufacturer:** Intel **Model:** Celeron 566MHz

**OSC/Clock Frequencies:** 66MHz

**Memory Capacity:** **Installed:** 64MB

**Hard Drive Manufacturer:** Fujitsu **Model:** MHH2032AT

**LCD Panel Manufacturer:** Toshiba **Model:** LTM10C273

Promate **Model:** PMB104S01HB

**Mother Board:** Advantech **Model:** PCM9573

**LAN Card Manufacturer:** On Board

**VGA Card Manufacturer:** On Board

### 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 Port	1	1
5). PS/2 Mouse Port	1	1
6). Microphone Port	1	1
7). Line -Out Port	1	1
8). LAN Port	1	1
9). USB Port	2	2

## SUPPORT EQUIPMENT

No.	Equipment	Model#	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	CPD-G200	2715863	FCC DoC	SONY	Shielded, 1.8m With one core	Unshielded, 1.8m
2.	Modem	231AA	A25531083541	BFJ9D93108US	Hayes	Shielded, 1.8m	Unshielded, 1.8m
3.	Printer	STYLUS C20SX	3050S82775	3902E004	EPSON	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	SK-2800C	B1C790BCPJ73JQ	GYUR79SK	Compaq	Shielded, 1.8m	N/A
5.	PS/2 Mouse	M-CAA43	PHB02400489	FCC DoC	Logitech	Shielded, 1.8m	N/A
6.	PS/2 Mouse	M-CAA43	LZA11752603	FCC DoC	Logitech	Shielded, 1.8m	N/A
7.	PS/2 Mouse	M-CAA43	LZA11750827	FCC DoC	Logitech	Shielded, 1.8m	N/A
8.	PS/2 Mouse	M-CAA43	LZA11751072	FCC DoC	Logitech	Shielded, 1.8m	N/A
9.	USB Mouse	M-BB48	LZE92250259	FCC DoC	Logitech	Shielded, 1.8m	N/A
10.	USB Mouse	M-BB48	LZE94150675	FCC DoC	Logitech	Shielded, 1.8m	N/A
11.	Earphone	GT-2004V	N/A	N/A	GITON	Unshielded, 1.25m	N/A
12.	Microphone	DM-510	I3-0	N/A	KOKA	Unshielded, 2.8m	N/A
13.	Notebook PC (Remote)	Valiant 6380i9TD	N/A	FCC DoC	KDS	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m With one core

**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

## BLOCK DIAGRAM OF TEST SETUP

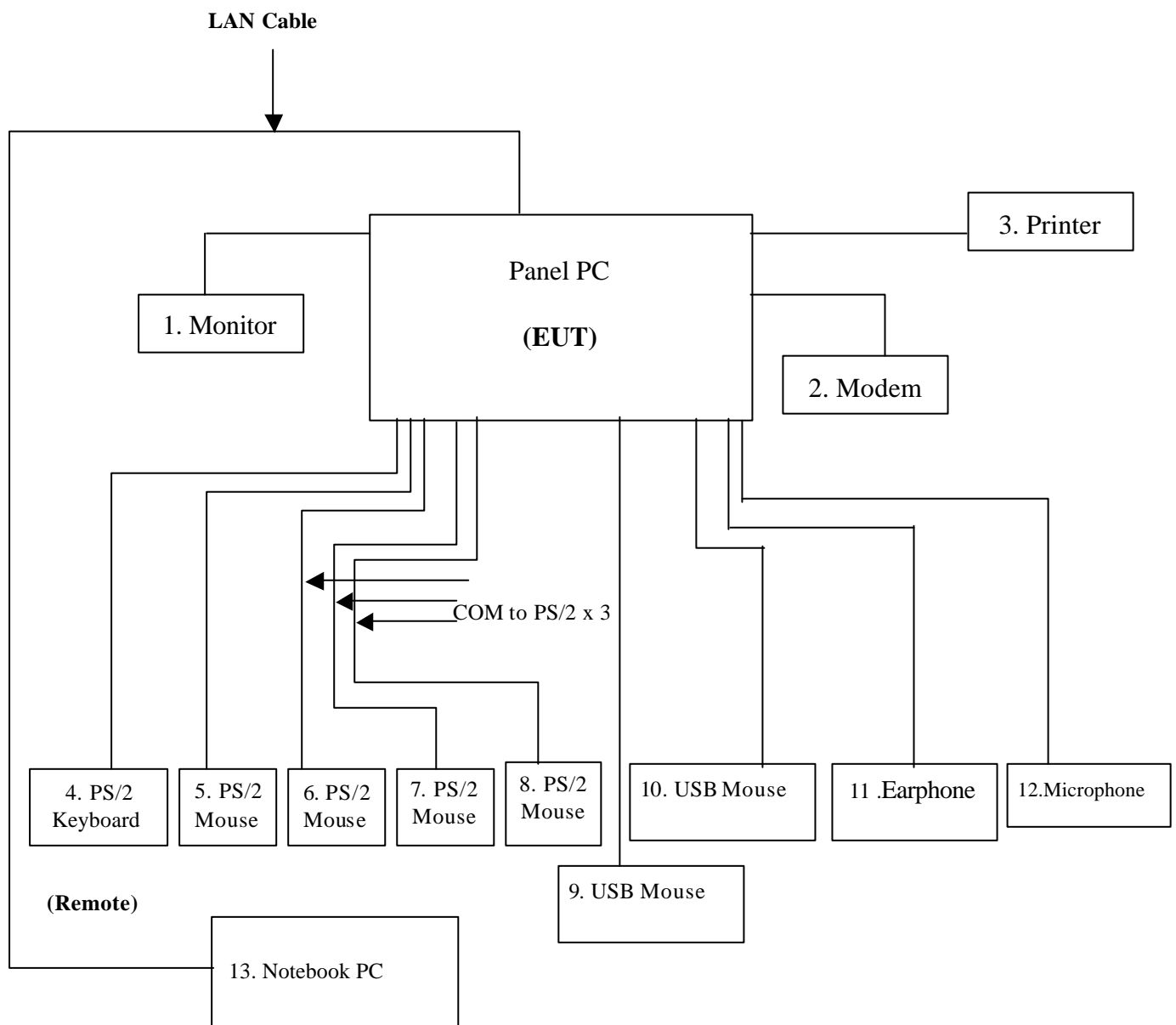
### System Diagram of Connections between EUT and Simulators

**EUT:** Panel PC

**Trade Name:** Advantech

**Model Number:** PPC-103T

**AC Power Cord:** Unshielded, 1.8m to Power Adapter



## 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:** # 2

Open Area Test Site # 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	ADVANTEST	R3261A	21720279	08/23/2002	08/22/2003
EMI Test Receiver	R&S	ESVS10	834468/006	04/25/2002	04/24/2003
Pre-Amplifier	ADVANTEST	R14601	73120050	03/15/2002	03/14/2003
Bilog Antenna	CHASE	CBL 6112B	2635	06/22/2002	06/21/2003
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	11/10/2001	11/09/2002

**Conducted Emission Test Site:** # 4

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	847793/012	12/19/2001	12/18/2002
LISN	R&S	ENV 4200	830326/016	02/08/2002	02/07/2003
LISN	EMCO	3825/2	9003/1382	02/18/2002	02/17/2003

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	NoiseKen	ESS-2001	ESS0210582	06/18/2002	06/17/2003
Radiated Electromagnetic Field immunity Measurement (61000-4-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	150W1000	300300	N/A	N/A
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
EM PROBE	GW	EMR-30	L-0013	05/23/2002	05/22/2003
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	08/22/2002	08/21/2003
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
CS test (61000-4-6)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	500A100A	300299	N/A	N/A
CDN	Lüthi	801-M3	1879	03/05/2002	03/04/2003
CDN	MEB	M2	A3002010	04/24/2002	04/23/2003
CDN	SCHAFFNER	T200	16892	10/12/2001	10/11/2002
CDN	SCHAFFNER	T400	16906	10/12/2001	10/11/2002
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	04/08/2002	04/07/2003

## **EUT Configuration during measurement:**

1) Final test mode is list as below:

### **Model:**

- 1. 800 x 600 Resolution with touch screen**

## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** PPC-103T

**Location:** Site # 4

**Tested by:** Sam Chang

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 28 °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
0.172	50.10	---	65.00	55.00	-14.90	---	L1
2.068	50.30	42.90	56.00	46.00	-5.70	-3.10	L1
2.531	54.00	43.50	56.00	46.00	-2.00	-2.50	L1
12.936	46.60	---	60.00	50.00	-13.40	---	L1
14.033	48.70	46.80	60.00	50.00	-11.30	-3.20	L1
14.672	46.20	---	60.00	50.00	-13.80	---	L1
2.303	52.60	43.70	56.00	46.00	-3.40	-2.30	L2
2.529	53.90	43.50	56.00	46.00	-2.10	-2.50	L2
11.438	43.50	---	60.00	50.00	-16.50	---	L2
12.992	47.80	---	60.00	50.00	-12.20	---	L2
13.967	50.10	47.60	60.00	50.00	-9.90	-2.40	L2
14.661	44.30	---	60.00	50.00	-15.70	---	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:** PPC-103T

**Location:** Site # 4

**Tested by:** Sam Chang

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 28°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
0.600	61.40	---	84.00	74.00	-22.60	---	10Base
1.339	54.10	---	84.00	74.00	-29.90	---	10Base
5.002	58.60	---	84.00	74.00	-25.40	---	10Base
10.000	79.50	55.30	84.00	74.00	-4.50	-18.70	10Base
10.172	57.30	---	84.00	74.00	-26.70	---	10Base
15.001	56.90	---	84.00	74.00	-27.10	---	10Base
16.230	69.30	---	84.00	74.00	-14.70	---	100Base
18.241	68.70	---	84.00	74.00	-15.30	---	100Base
23.130	71.70	---	84.00	74.00	-12.30	---	100Base
24.350	68.40	---	84.00	74.00	-15.60	---	100Base
26.609	68.80	---	84.00	74.00	-15.20	---	100Base
27.160	67.20	---	84.00	74.00	-16.80	---	100Base

**\*\*NOTE: 1.** “---” denotes the emission level was less –2 dB to the Average limit, so no re-check anymore.

**2.** According to Note 3 on table 4 of EN 55022: 1998 Standard, the limits allowed to relaxation of 10dB over at frequency range 6MHz to 30MHz.

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PPC-103T

**Location:** Site # 2

**Tested by:** Sam Chang

**Polar:** Vertical-10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25°C

**Humidity:** 55%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)
43.17	10.3	15.8	26.1	30.0	-3.9
56.31	16.7	10.1	26.8	30.0	-3.2
65.06	17.3	8.6	25.9	30.0	-4.1
72.37	18.8	8.4	27.2	30.0	-2.8
116.39	8.7	14.8	23.5	30.0	-6.5
126.30	12.2	14.6	26.8	30.0	-3.2
129.39	8.6	14.3	22.9	30.0	-7.1
166.44	13.0	11.4	24.4	30.0	-5.6



186.23	13.0	11.9	24.9	30.0	-5.1
193.70	11.7	11.9	23.6	30.0	-6.4
216.09	12.2	12.6	24.8	30.0	-5.2
234.94	12.8	14.4	27.2	37.0	-9.8
235.09	8.1	14.4	22.5	37.0	-14.5
329.00	13.3	17.2	30.5	37.0	-6.5
383.00	8.3	19.5	27.8	37.0	-9.2
457.00	8.5	21.4	29.9	37.0	-7.1
528.00	8.5	23.3	31.8	37.0	-5.2
583.00	9.0	23.8	32.8	37.0	-4.2
615.00	6.4	24.0	30.4	37.0	-6.6
778.00	7.3	26.5	33.8	37.0	-3.2
854.00	8.5	26.4	34.9	37.0	-2.1

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PPC-103T

**Location:** Site # 2

**Tested by:** Sam Chang

**Polar:** Horizontal-10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25 °C

**Humidity:** 55%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)
48.37	9.7	13.0	22.7	30.0	-7.3
129.01	8.7	14.4	23.1	30.0	-6.9
144.04	8.2	12.9	21.1	30.0	-8.9
157.60	8.4	11.4	19.8	30.0	-10.2
167.10	12.5	11.4	23.9	30.0	-6.1
186.26	9.1	11.9	21.0	30.0	-9.0
216.09	11.2	12.6	23.8	30.0	-6.2
223.51	9.3	13.0	22.3	30.0	-7.7
235.04	10.7	14.4	25.1	37.0	-11.9



257.86	8.7	16.6	25.3	37.0	-11.7
260.73	9.7	16.6	26.3	37.0	-10.7
335.00	8.8	17.3	26.1	37.0	-10.9
382.00	8.8	19.5	28.3	37.0	-8.7
522.00	10.7	23.1	33.8	37.0	-3.2
547.00	8.7	24.0	32.7	37.0	-4.3
564.00	6.6	24.0	30.6	37.0	-6.4
631.00	9.9	24.3	34.2	37.0	-2.8
656.00	9.5	24.7	34.2	37.0	-2.8
685.00	8.5	25.2	33.7	37.0	-3.3
785.00	6.3	26.9	33.2	37.0	-3.8
812.00	7.0	27.4	34.4	37.0	-2.6
841.00	6.0	26.6	32.6	37.0	-4.4
903.00	5.5	27.5	33.0	37.0	-4.0

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

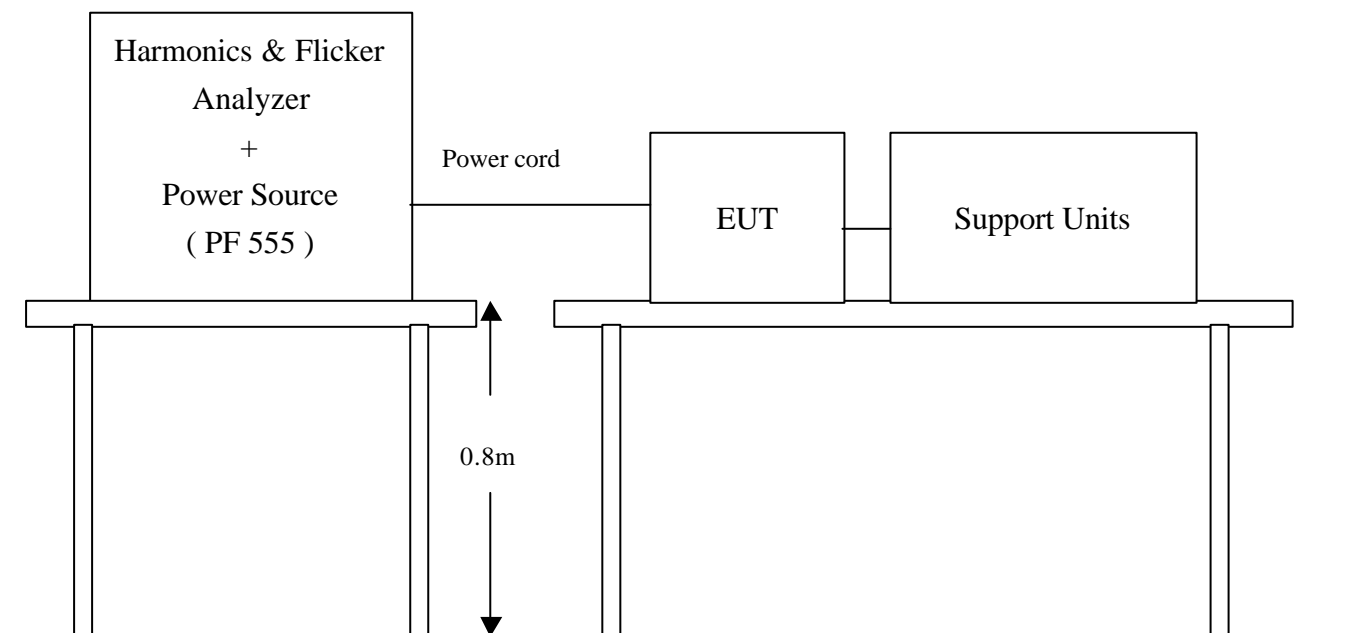
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 + A14: 2000)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Tester** : Sam Chang  
**Temperature** : 25 °C  
**Humidity** : 55%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : § 5 of EN 61000-3-3  
**Tester** : Sam Chang  
**Temperature** : 25 °C  
**Humidity** : 55%

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.



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EN 61000-3-2 TEST REPORT 2002/8/6 07:37 PM  
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Unit: PANEL PC

Model No.: PPC-103T

Remarks: Temp: 25 °C Humid: 55%

Operator: Sam Chang

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TEST SETUP

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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
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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: 57.0W



# TEST DATA

Result: PASS

## Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.257	NaN	NaN	PASS
2	0.001	1.080	1.080	PASS
3	0.231	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.213	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.194	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.170	0.400	0.400	PASS
10	0.001	0.184	0.184	PASS
11	0.143	0.330	0.330	PASS
12	0.001	0.153	0.153	PASS
13	0.115	0.210	0.210	PASS
14	0.001	0.131	0.131	PASS
15	0.088	0.150	0.150	PASS
16	0.001	0.115	0.115	PASS
17	0.063	0.132	0.132	PASS
18	0.001	0.102	0.102	PASS
19	0.043	0.118	0.118	PASS
20	0.001	0.092	0.092	PASS
21	0.028	0.107	0.107	PASS
22	0.001	0.084	0.084	PASS
23	0.022	0.098	0.098	PASS





24	0.001	0.077	0.077	PASS
25	0.023	0.090	0.090	PASS
26	0.001	0.071	0.071	PASS
27	0.024	0.083	0.083	PASS
28	0.001	0.066	0.066	PASS
29	0.024	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.022	0.073	0.073	PASS
32	0.001	0.058	0.058	PASS
33	0.018	0.068	0.068	PASS
34	0.001	0.054	0.054	PASS
35	0.014	0.064	0.064	PASS
36	0.001	0.051	0.051	PASS
37	0.010	0.061	0.061	PASS
38	0.001	0.048	0.048	PASS
39	0.008	0.058	0.058	PASS
40	0.001	0.046	0.046	PASS

END OF REPORT



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EN 61000-3-3 TEST REPORT 2002/8/6 07:53 PM  
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Unit: PANEL PC

Model No.: PPC-103T (Contiune)

Remarks: Temp: 25 °C Humid: 55%

Operator: Sam Chang

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TEST SETUP

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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

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EN 61000-3-3 TEST REPORT 2002/8/6 08:08 PM  
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Unit: PANEL PC

Model No.: PPC-103T (Manual Switch)

Remarks: Temp: 25 °C Humid: 55%

Operator: Sam Chang

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TEST SETUP

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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

## ***SECTION 1 - IMMUNITY TESTS (EN 55024: 1998)***

**Electrostatic discharge (ESD) immunity test (IEC 61000-4-2)**

**Radiated electromagnetic field (RS) immunity test  
(IEC 61000-4-3)**

**Fast transient / Burst (EFT) immunity test (IEC 61000-4-4)**

**Surge immunity test (IEC 61000-4-5)**

**Conducted disturbances inducted by radio-frequency fields, (CS)  
immunity test (IEC 61000-4-6)**

**Power-frequency magnetic field immunity test (IEC 61000-4-8)**

**Voltage dips, short interruption and voltage variation  
immunity test (IEC 61000-4-11)**

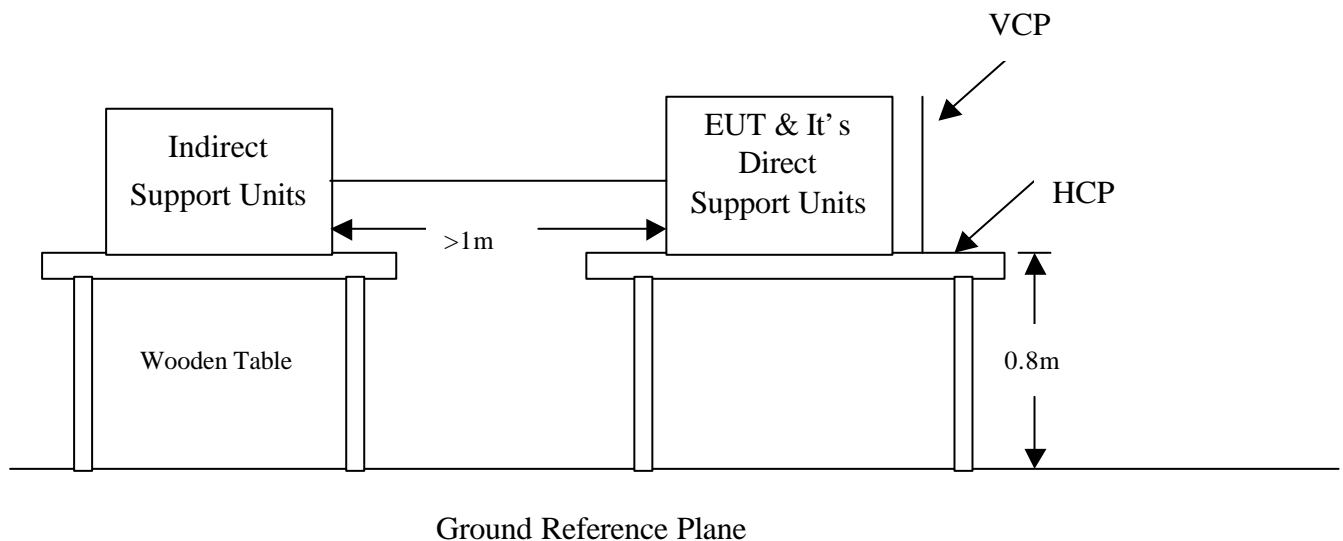
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### 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** : Sam Chang  
**Temperature/Humidity**: 25 °C / 60%

#### **Block Diagram of Test Setup:**

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



## Test Procedure:

1. The EUT was located 0.1 m minimum from all side of the HCP.
2. The indirect support units were located 1m minimum away from the EUT, but direct support unit was/ were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
3. A scroll 'H' test program was loaded and executed in Windows mode.
4. The EUT sent above message to EUT Panel and monitor and related peripherals through the test.
5. Active the communication function if the EUT with such port(s).
6. As per the requirement of EN 55024; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.
7. Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.
8. The application of ESD to the contact of open connectors is not required.
9. The EUT direct connection units also need to be applied ESD at the port of EUT cable connected
10. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

**Note:** As per IEC 61000-4-2:2001, with two 470k bleed resistors cable is connected between the EUT and HCP during the test applicable for power ungrounded or battery operating unit only.

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
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
Mini 10 /Point	±8kV	Air Discharge	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 3 )*



*( Photo 2 of 3 )*



( Photo 3 of 3 )

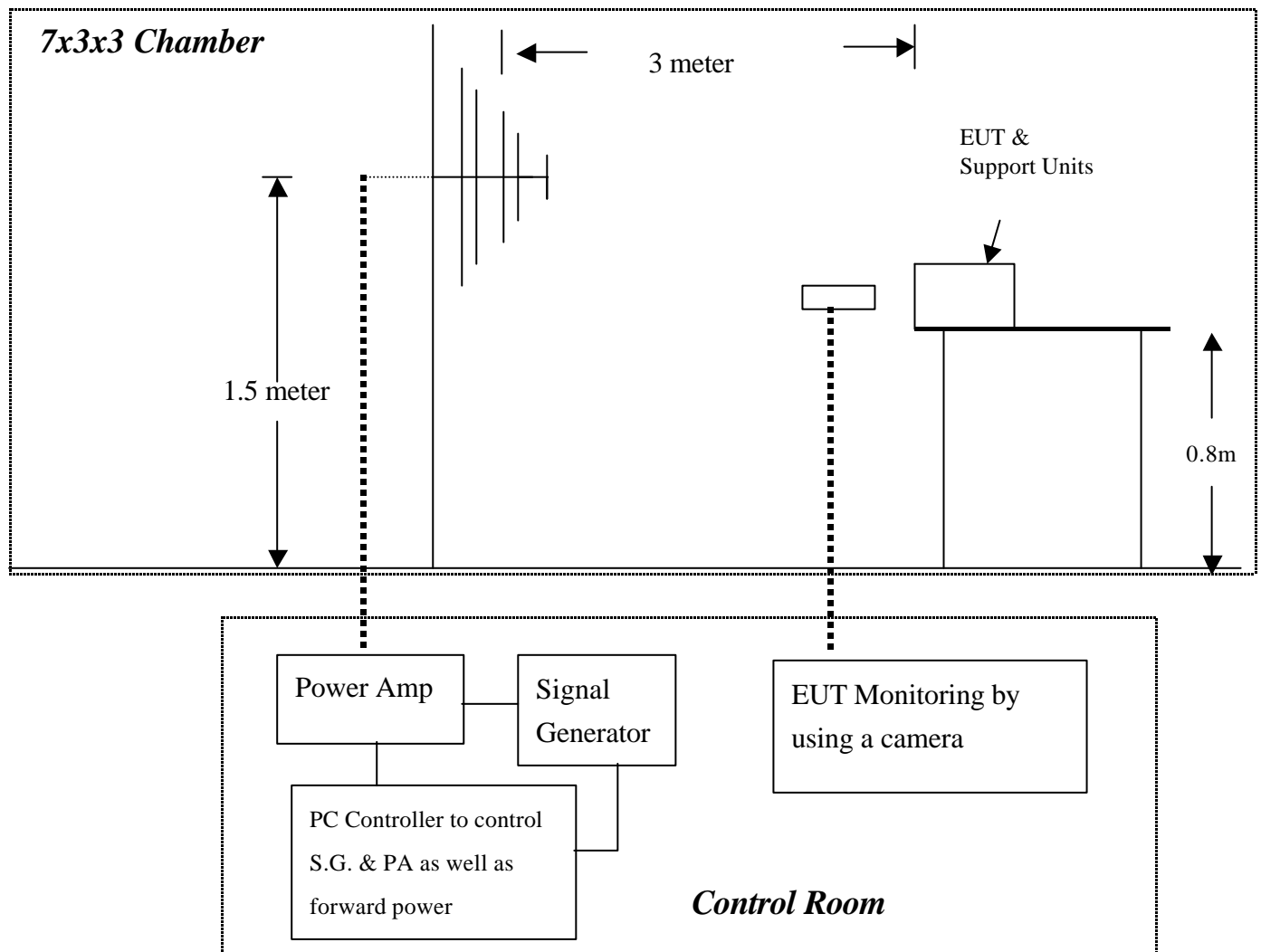


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD )

### 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** : Sam Chang  
**Temperature** : 25 °C  
**Humidity** : 60%

#### Block Diagram of Test Setup:



## **Test Procedure:**

1. The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per IEC 61000-4-3.
2. A scroll 'H' messages were displayed on part of screen of EUT and an enlarged 'H' characters were displayed on the other part of screen of EUT.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of RS test software per IEC 61000-4-3.
5. Performing the pre-test at each side of with double specified level (6V/m) at 4% steps.
6. From the result of pre-test in step 5, choice the worst side of EUT for final test from 80 MHz to 1000 MHz at 1% steps.
7. Recording the test result in following table.
8. It is not necessary to perform test as per annex A of EN 55024 if the EUT doesn't belong to ITE 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**

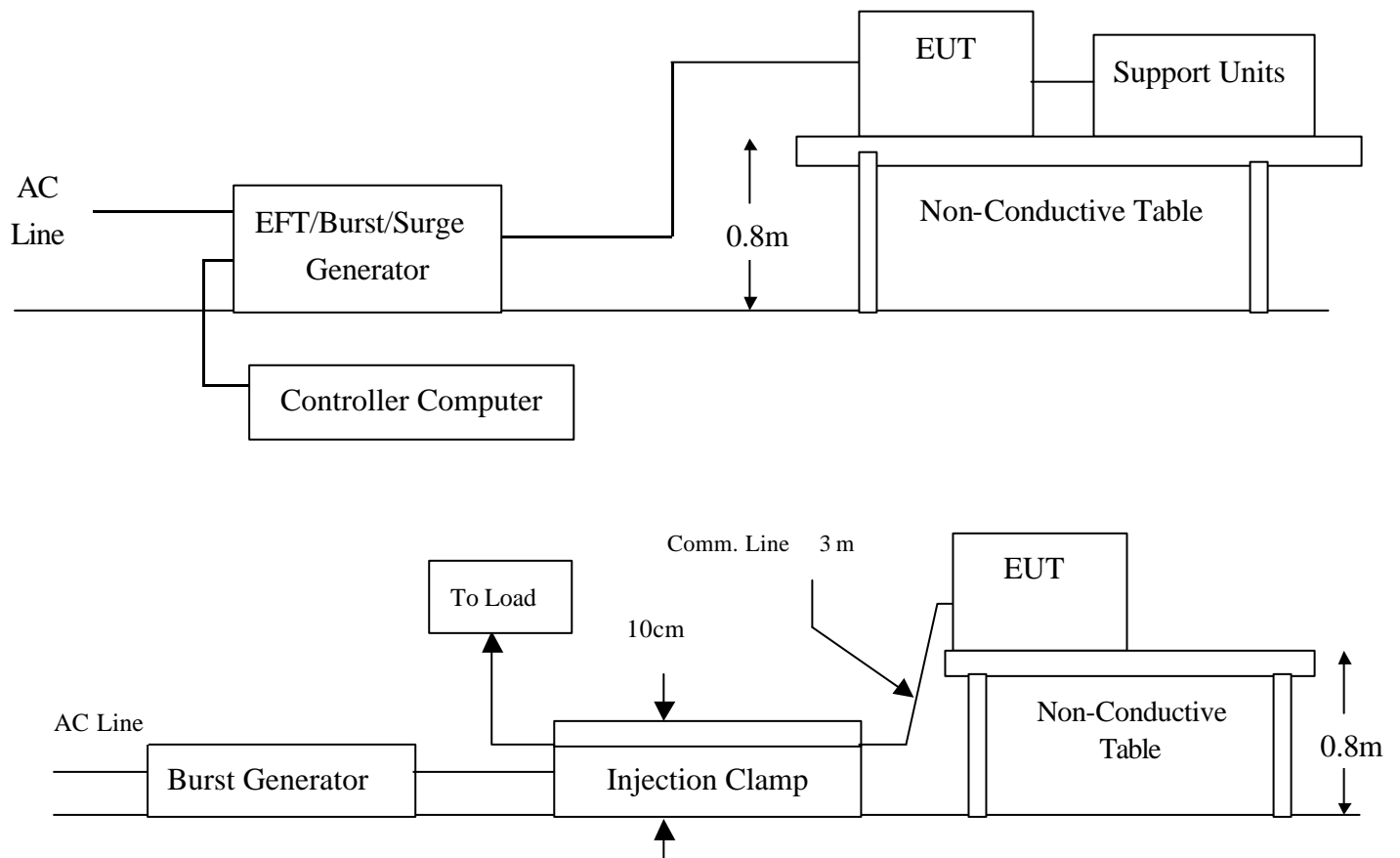
**Observation: No any function degraded during the tests.**

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

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Lines and Data Lines
<b>Basic Standard</b>	: IEC 61000-4-4
<b>Requirements</b>	: +/- 1kV for Power Supply Lines +/- 0.5kV for Data Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 25 °C
<b>Humidity</b>	: 60%

#### 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 1.0 meter long power cord was attached to EUT during the test.
3. The length of communication cable between communication port and clamp was keeping within 1 meter.
4. A test program was loaded and executed in Windows mode.
5. The data was sent to EUT filling the screens with upper case of "H" patterns.
6. The test program exercised related support units sequentially.
7. Repeating step 3 to 4 through the test and increase test voltage to the EUT ports from minimum to standard request or client request.
8. 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**

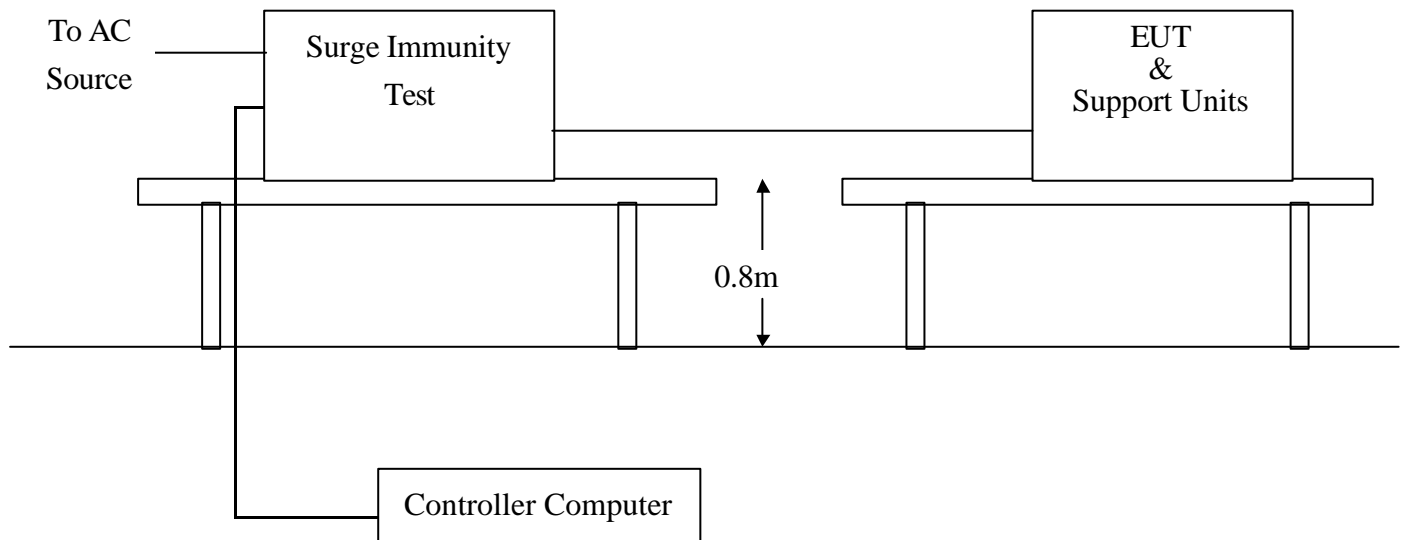
**Observation: No any function degraded during the tests.**

## 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** : Lung Tsai  
**Temperature** : 25 °C  
**Humidity** : 60%

#### 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 EUT 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 and increase test voltage to the EUT ports from minimum to standard request or client request.
6. Recording the test result as shown in following table.

### **Test conditions:**

Voltage Waveform : 1.2/50 *us*  
Current Waveform : 8/20 *us*  
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**

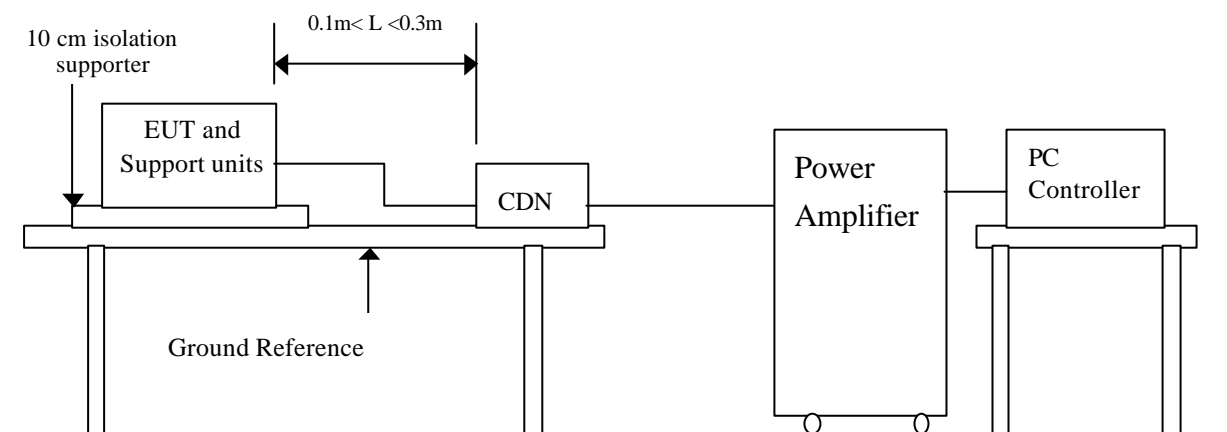
**Observation: No any function degraded during the tests.**

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

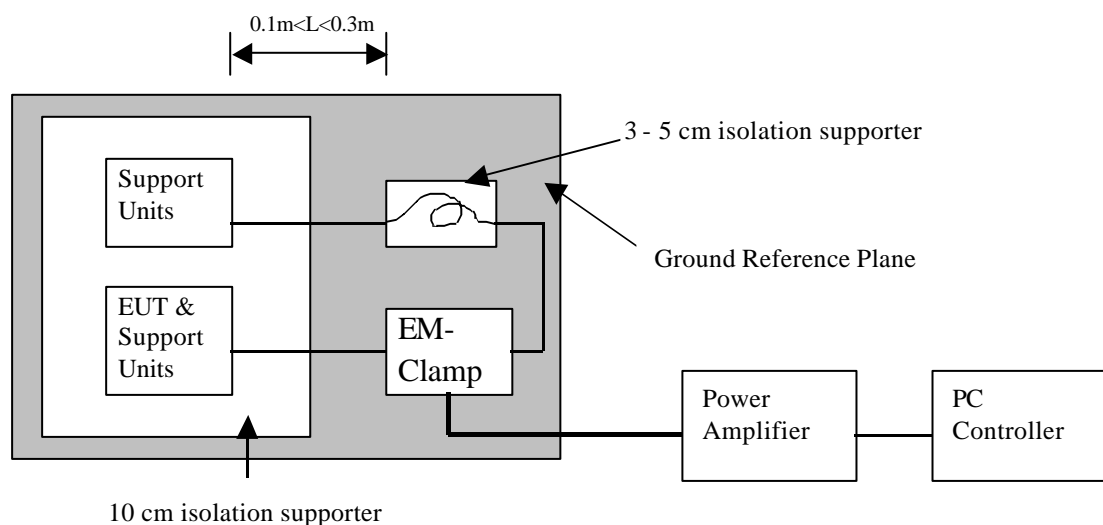
**Port** : AC Port and LAN Cable  
**Basic Standard** : IEC 61000-4-6  
**Requirements** : 3V with modulated  
**Injection Method** : CDN-M3 for Power Cord  
EM-Clamp for LAN Cable  
**Performance Criteria** : A (Standard require)  
**Tester** : Sam Chang  
**Temperature** : 25 °C  
**Humidity** : 60%

### Block Diagram of Test Setup:

Side View



Top View:



## **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 EUT.
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**

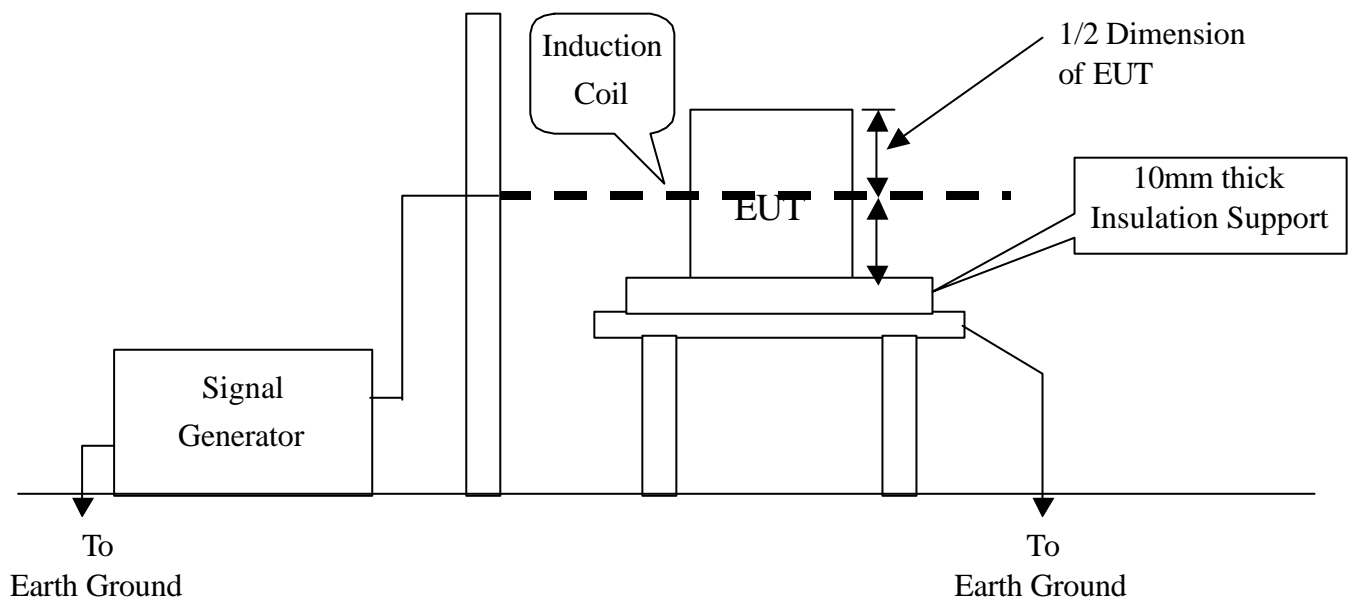
☐ **FAILED**

**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	: 1A/m
Performance Criteria	: A (Standard Required)
Tester	: Sam Chang
Temperature	: 25 °C
Temperature / Humidity	: 60%

### 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: 1A/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	Reduction	Duration	Performance
	% $U_T$	(%)		Criteria
	<5	>95	0.5	B
	70	30	25	C

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

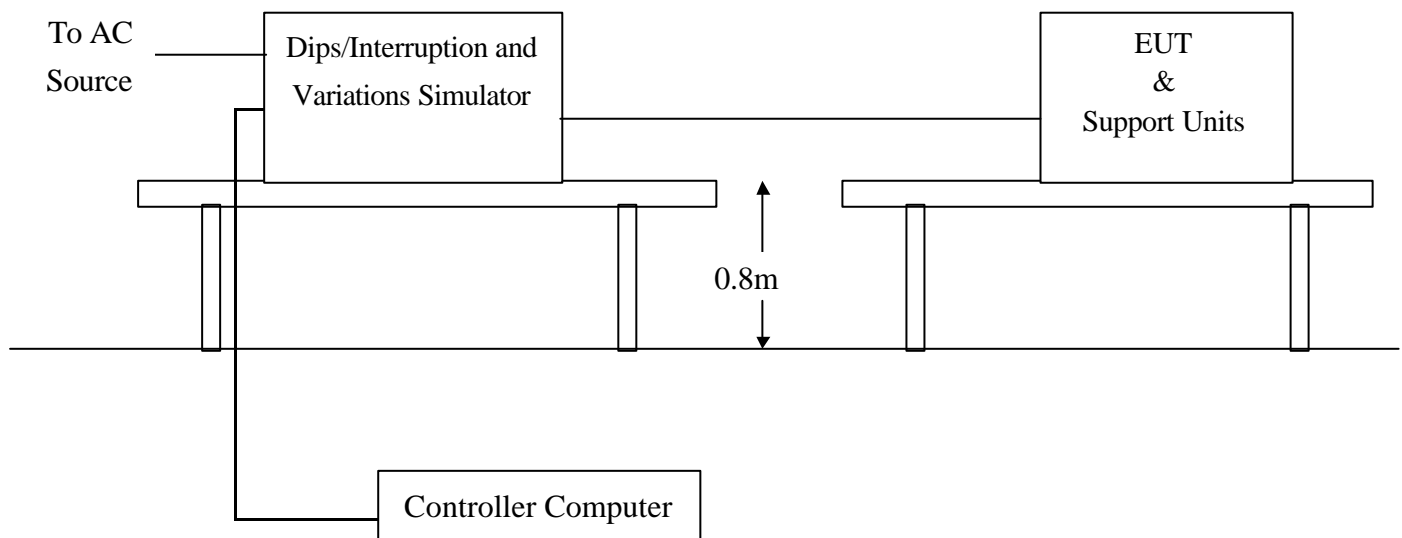
**Test Interval** : Min. 10 sec.

**Tester** : Michael Chen

**Temperature** : 25°C

**Humidity** : 60%

### 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 test program exercised related support units sequentially.
4. Setting the parameter of tests and then executed the test software of test simulator.
5. Repeating step 3 to 4 through the test.
6. 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 <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A

### **Voltage Interruptions:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	250	EUT shut down, but can be recovered by manual, as the events disappear.	C

**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**

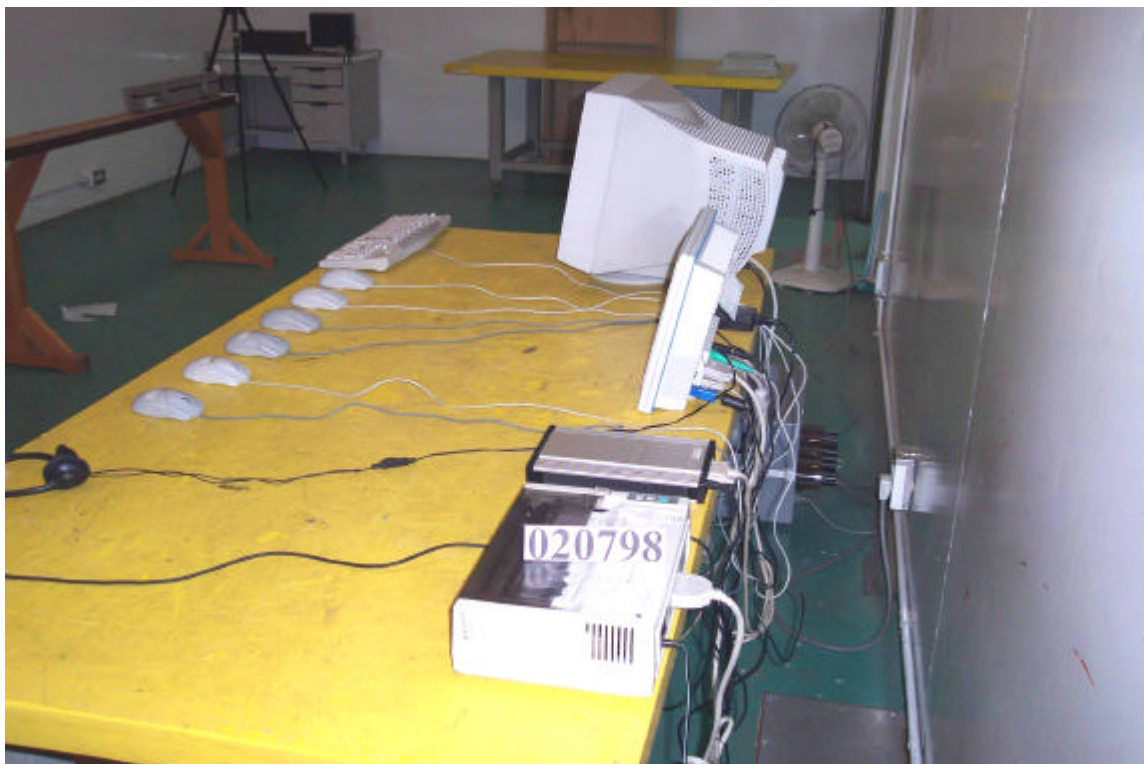


## LINE CONDUCTED EMISSION TEST (EN 55022)

### *Front View*



### *Back View*



## COMMON MODE CONDUCTED EMISSION TEST

*Front View*



## RADIATED EMISSION TEST (EN 55022)

### *Front View*



### *Back View*

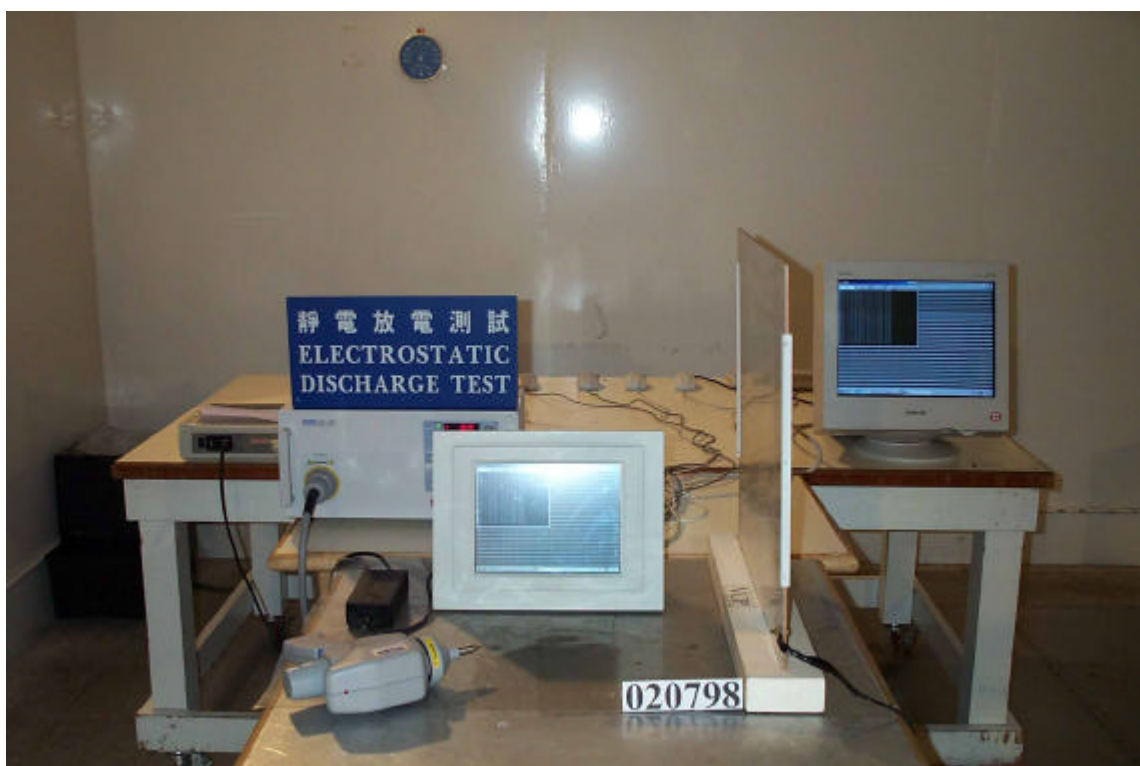




## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2; EN 61000-3-3)



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



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





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

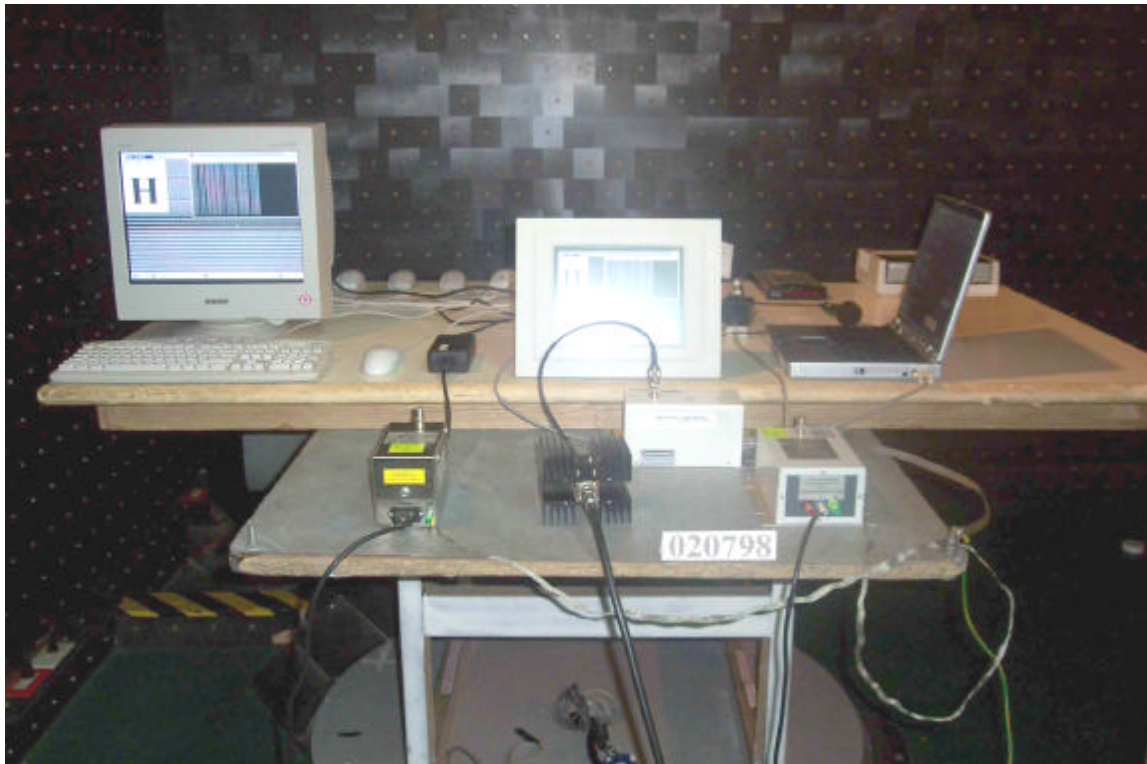
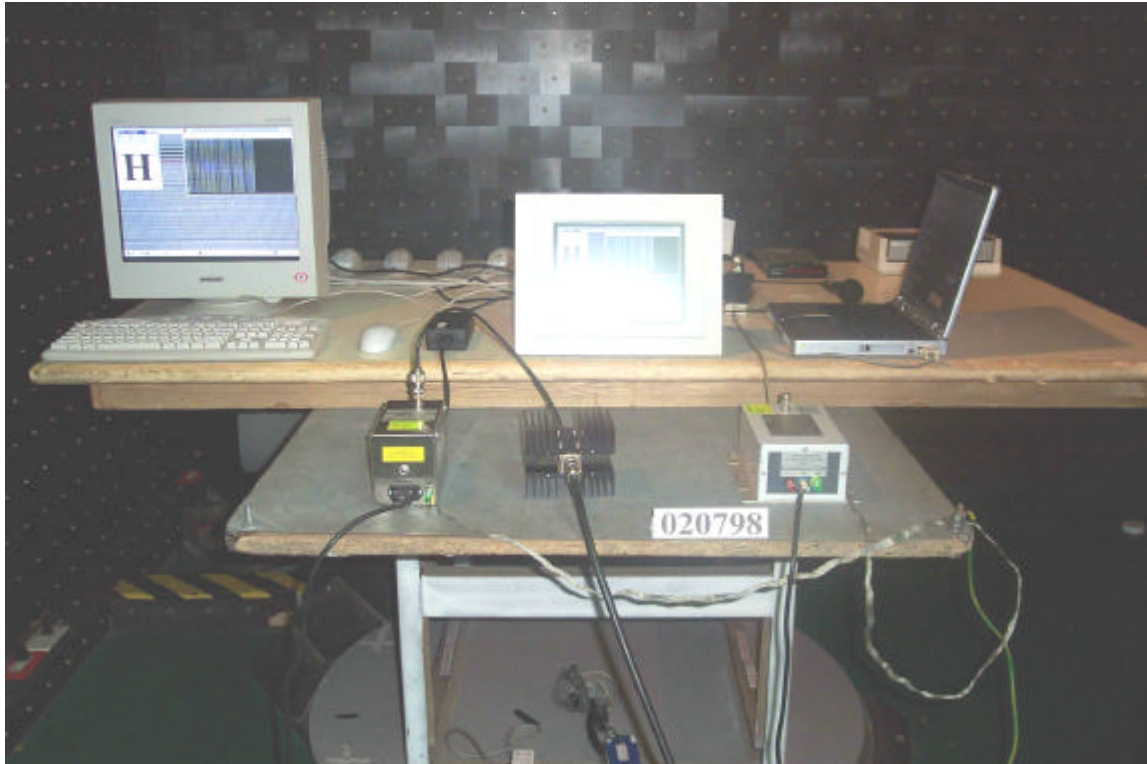


## SURGE IMMUNITY TEST (IEC 61000-4-5)





## 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 EUT**



**Back View of EUT**



*Left View of EUT*



**Right View of EUT**



## Label





*Front View of Power Adapter*



*Back View of Power Adapter*

