



## EMC COMPLIANCE TEST REPORT

for

### WEB Terminal

**Trade Name** : ADVANTECH  
**Model Number** : TPC-642X-XXX (X=0~9, A~Z or Blank)  
**Serial Number** : N/A  
**Report Number** : 010252-E  
**Date** : June 29, 2001  
**Regulations** : 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 + 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:

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

Prepared by:

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C&C Laboratory Co., Ltd.**



## EC-Declaration of Conformity

For the following equipment:

WEB Terminal

( Product Name )

TPC-642X-XXX (X=0~9, A~Z or Blank) / ADVANTECH

( Model Designation / Trade name )

Advantech Co., Ltd.

( Manufacturer Name )

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

(Manufacturer Address)

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC, Amended by 92/31/EEC, 93/68/EEC & 98/13/EC), For the evaluation regarding the Electromagnetic Compatibility (89/336/EEC, Amended by 92/31/EEC, 93/68/EEC & 98/13/EC), the following standards are applied:



EN 55022: 1998



EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000



EN 61000-3-3: 1995



EN 55024: 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

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

( Company Name )

( Company Address )

Person responsible for making this declaration:

( Name, Surname )

( Position / Title )

( Place )

( Date )

( Legal Signature )

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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** WEB Terminal  
**Trade Name:** ADVANTECH  
**Model Number:** TPC-642X-XXX (X=0~9, A~Z or Blank)  
**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  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN 55024: 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:** 010252-E  
**Date of test:** June 18 ~ 22, 2001  
**Deviation:** N/A  
**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:** 010252-E

**Date of Test:** June 18 ~ 22, 2001

**Equipment Under Test:** WEB Terminal

**Model Number:** TPC-642X-XXX (X=0~9, A~Z or Blank)

**Serial Number:** N/A

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

**Technical Standards:** EN 55022: 1998  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN 55024: 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. An EMI test software was loaded and executed at DoS mode under Windows environment.
2. The EMI test program sequentially exercised all I/O's of EUT.
3. A communicated software was loaded and executed to communicate between EUT and remote side.
4. The EUT receives message from remote side, and filling the screen of monitor with upper case of "H" patterns.
5. Repeat step 2 to 4 throughout the test.

## PRODUCT INFORMATION

**Housing Type:** Plastic

**EUT Power Rating:** 24VDC from Power Adapter

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

**CPU Manufacture:** Intel      **Type:** StrongARM 1110 RISC

**OSC/Clock Frequencies:** 206MHz

**LCD Panel Manufacturer:** Kyocera      **Model:** KCS3224ASTT-X6

**Compact Flash Card Manufacturer:** ADVANTECH      **Install:** 16MB

### I/O Port of EUT

I/O PORT TYPES	Q'TY	TESTED WITH
1).Serial Port	2	2
2).LAN Port	1	1

### Note:

1. The means of "X-XXX" on model number is for marketing purpose only.
2. Client consigns only one model sample to test (Model Number: TPC-642S-CE). Therefore, the 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)	Serial Mouse	M-MM43	LZE94052771	DoC	Logitech	Shielded, 1.9m	N/A
2)	Power Adapter	SNP-PA59	N/A	N/A	Skynet	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.2m With a core
3)	Modem	231AA	A27631083840	BFJ9D9308US	Hayes	Shielded, 1.5m	Unshielded, 1.9m
4)	Server (Remote)	NetServer LH Pro	N/A	N/A	HP	LAN Cable: Unshielded, 10m	Unshielded, 1.8m
5)	RS485 to RS232 Adaptor	ADAM-4522	N/A	N/A	ADAM	Unshielded, 0.6m	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.

## TEST FACILITY (EN 55022)

- 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 is also approved by Ministry of Commerce of New Zealand
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission  
  
Also accredited by BCIQ for the product category of Information Technology Equipment.
- 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:** # 4

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	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	01/16/2001	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	11/24/2000	11/23/2001

**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	ESHS10	843743/015	12/15/2000	12/14/2001
LISN	R&S	ENV 4200	8303261016	11/18/2000	11/17/2001
LISN	EMCO	3825/2	9003/1382	02/08/2001	02/07/2002
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

### 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	Mar. 16, 2001	Mar. 15, 2002
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
HAEFELY TRENCH/ Clamp	093 506.1	080 421.13	N/A	N/A

### 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
C.D.N / CDN M2	CDN-M2	A3002010	Apr. 17, 2001	Apr. 16, 2002
M2S / Power Amplifier	A00181/1000	9801-112	N/A	N/A
MEB / Clamp	KEMZ-801	13 602	N/A	N/A

### 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
HAEFELY TRENCH/ CDN	IP6.2	148342	Mar. 22, 2001	Mar. 21, 2002
HAEFELY TRENCH/ CDN	DEC1A	148050	Apr. 06, 2001	Apr. 05, 2002

### 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	Feb. 08, 2001	Feb. 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 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. Down Load Data from Web**

- 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 (EN 55022)

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

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

## MEASUREMENT PROCEDURE (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.	= 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 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
B	150kHz-500kHz	84-74	74-64	40-30	30-20
	500kHz-30MHz	74	64	30	20

**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. Down Load Data from Web**

- 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 (dBu V/m/ Q.P.)
30-230	10	30
230-1000	10	37

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

## BLOCK DIAGRAM OF TEST SETUP

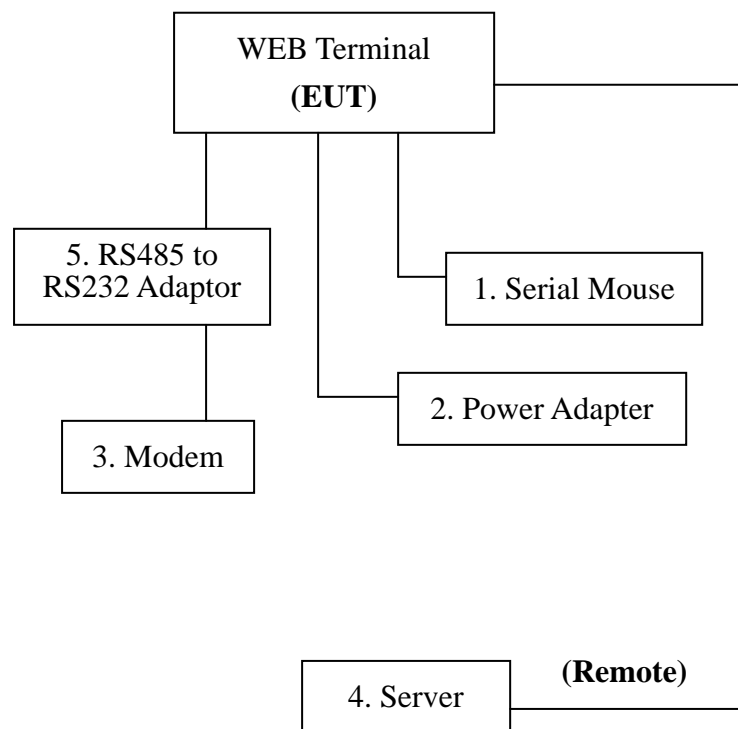
### System Diagram of Connections between EUT and Simulators

**EUT:** WEB Terminal

**Trade Name:** ADVANTECH

**Model Number:** TPC-642X-CE

**Power Cord:** Unshielded, 1.8m



## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** TPC-642X-CE

**Tested by:** Summer Lee

**Location:** Site # 4

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 26°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
0.150	40.3	---	66.00	56.00	-25.7	---	L1
1.403	28.9	---	56.00	46.00	-27.1	---	L1
2.387	27.4	---	56.00	46.00	-28.6	---	L1
6.405	30.1	---	60.00	50.00	-29.9	---	L1
7.034	31.0	---	60.00	50.00	-29.0	---	L1
8.675	29.2	---	60.00	50.00	-30.8	---	L1
0.150	39.3	---	66.00	56.00	-26.7	---	L2
2.276	29.6	---	56.00	46.00	-26.4	---	L2
3.009	31.2	---	56.00	46.00	-24.8	---	L2
3.907	32.3	---	56.00	46.00	-23.7	---	L2
5.756	32.8	---	60.00	50.00	-27.2	---	L2
7.017	30.9	---	60.00	50.00	-29.1	---	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:** TPC-642X-CE

**Tested by:** Summer Lee

**Location:** Site # 4

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 28°C

**Humidity:** 72%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
0.825	57.2	---	74.0	64.0	-16.8	---	10 Base
1.858	56.3	---	74.0	64.0	-17.7	---	10 Base
2.689	58.2	---	74.0	64.0	-15.8	---	10 Base
3.927	52.1	---	74.0	64.0	-21.9	---	10 Base
7.690	49.3	---	74.0	64.0	-24.7	---	10 Base
11.238	57.3	---	74.0	64.0	-16.7	---	10 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:** TPC-642X-CE

**Location:** Site # 4

**Tested by:** Summer Lee

**Polar:** Vertical--10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 32°C

**Humidity:** 60%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)
70.60	19.6	6.4	26.0	30.0	-4.0
80.68	18.6	8.2	26.8	30.0	-3.2
108.65	12.5	12.5	25.0	30.0	-5.0
121.22	14.4	12.9	27.3	30.0	-2.7
130.42	13.9	12.4	26.3	30.0	-3.7
206.80	16.7	10.8	27.5	30.0	-2.5



## SUMMARY DATA (RADIATED EMISSION TEST)

**Model Number:** TPC-642X-CE

**Location:** Site # 4

**Tested by:** Summer Lee

**Polar:** Horizontal--10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 32°C

**Humidity:** 60% 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)
110.59	12.4	12.6	25.0	30.0	-5.0
130.44	11.9	12.4	24.3	30.0	-5.7
146.36	12.0	11.5	23.5	30.0	-6.5
151.89	13.2	11.3	24.5	30.0	-5.5
180.65	12.7	10.6	23.3	30.0	-6.7
206.56	14.0	10.8	24.8	30.0	-5.2

## 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** : Summer Lee

**Temperature** : 30°C

**Humidity** : 50%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains

**Basic Standard** : EN 61000-3-3 (1995)

**Limits** : §5 of EN 61000-3-3

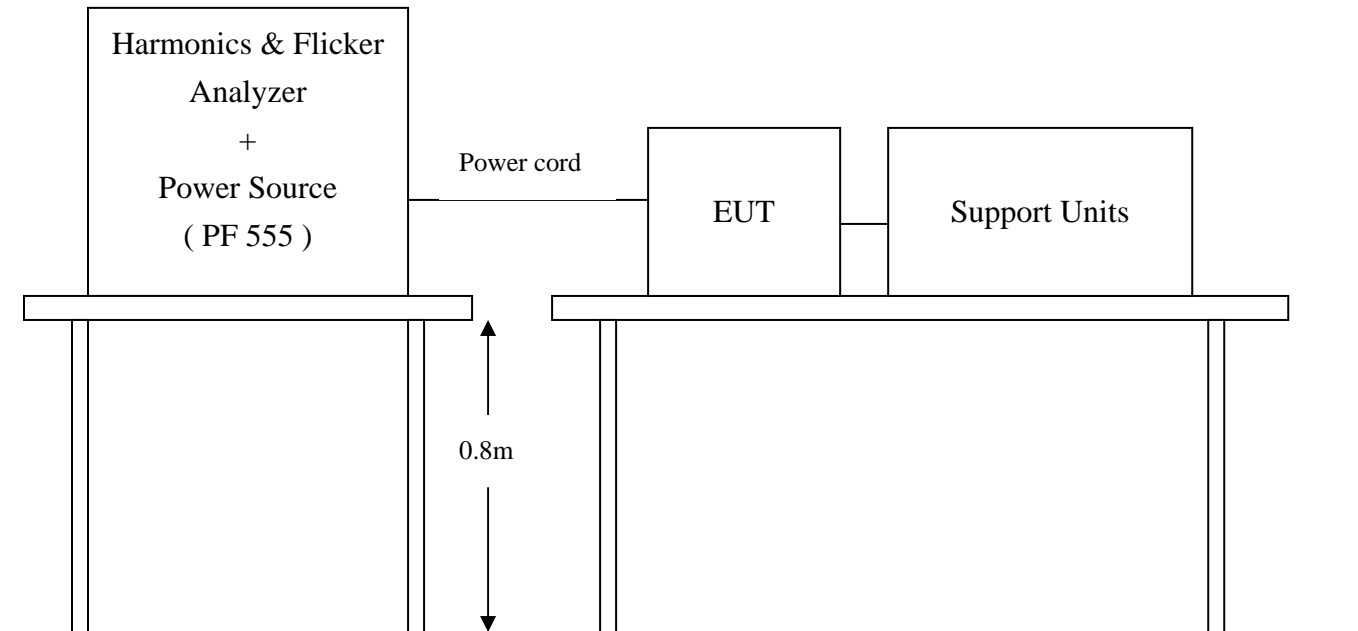
**Tester** : Summer Lee

**Temperature** : 30°C

**Humidity** : 50%



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



### **Result:**

Please see the attached test data.



-----  
EN 61000-3-2 TEST REPORT 2001/6/19 10:03 AM  
-----

Unit: WEB Terminal

Model No.: TPC-642S-CE

Remarks: TEMP:30°C HUM:50%

Operator: SUMMER

=====

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:14.1W

TEST DATA

-----

Result: PASS

Harmonic Current Results

-----

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.087	NaN	NaN	PASS
2	0.001	1.080	1.080	PASS
3	0.041	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.037	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.035	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.032	0.400	0.400	PASS
10	0.000	0.184	0.184	PASS
11	0.029	0.330	0.330	PASS
12	0.000	0.153	0.153	PASS
13	0.026	0.210	0.210	PASS
14	0.000	0.131	0.131	PASS
15	0.023	0.150	0.150	PASS
16	0.000	0.115	0.115	PASS
17	0.020	0.132	0.132	PASS
18	0.000	0.102	0.102	PASS
19	0.017	0.118	0.118	PASS

20	0.000	0.092	0.092	PASS
21	0.014	0.107	0.107	PASS
22	0.000	0.084	0.084	PASS
23	0.011	0.098	0.098	PASS
24	0.000	0.077	0.077	PASS
25	0.008	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.006	0.083	0.083	PASS
28	0.000	0.066	0.066	PASS
29	0.003	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.002	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.001	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.001	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.001	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.002	0.058	0.058	PASS
40	0.000	0.046	0.046	PASS

END OF REPORT

-----  
EN 61000-3-3 TEST REPORT 2001/6/19 10:27 AM  
-----

Unit: WEB Terminal

Model No.: TPC-642S-CE (Continue)

Remarks: TEMP:30°C HUM:50%

Operator: SUMMER

=====

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	0.008	1.00	PASS	true
Plt max	0.008	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	0.025	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT 2001/6/19 10:39 AM  
-----

Unit: WEB Terminal

Model No.: TPC-642S-CE (Manual Switch)

Remarks: TEMP:30°C HUM:50%

Operator: SUMMER

=====

TEST SETUP

-----

Test Freq.: 50.00 Hz. Test Voltage: 230.0 vac  
Waveform : SINE  
Test Time: 3.0 min. Tshort: 3.0 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	0.008	1.00	PASS	true
Plt max	0.008	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	0.025	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT



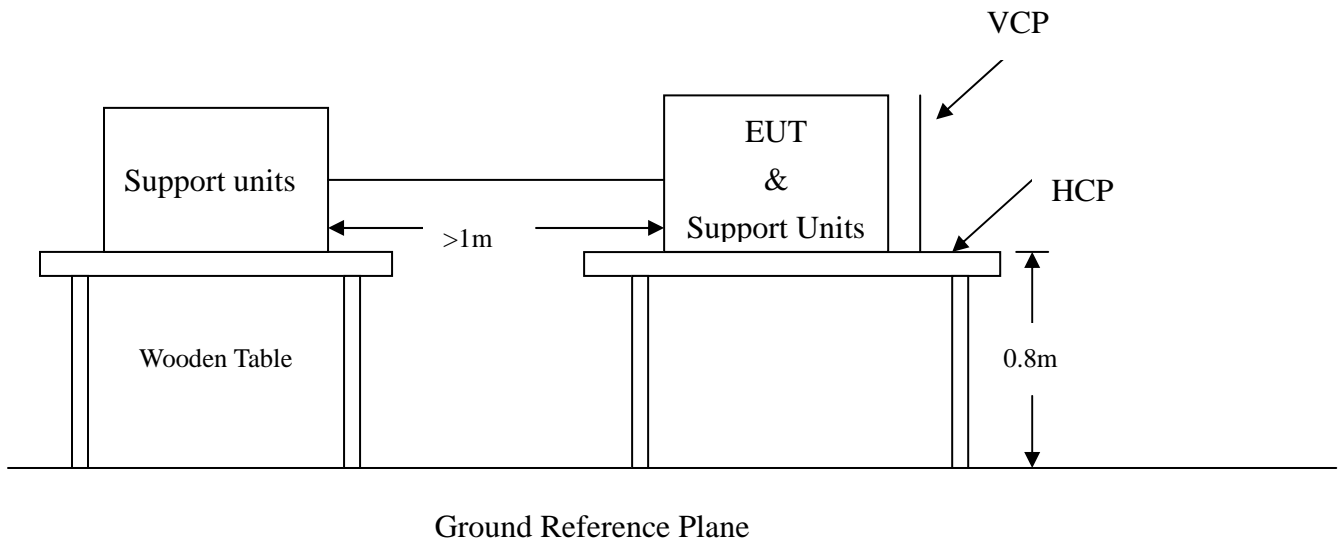
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

<b>Port</b>	: Enclosure
<b>Basic Standard</b>	: IEC 61000-4-2
<b>Test Level</b>	: $\pm 8$ kV (Air Discharge) $\pm 4$ kV (Contact Discharge) $\pm 4$ kV (Indirect Discharge)
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Summer Lee
<b>Temperature/Humidity</b>	: 30°C/50%

#### 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 Monitor 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.

**Note:** As per the A2 to IEC 61000-4-2, 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 25 / Point	+/- 4kV	Contact Discharge	Pass
Mini 10 / Point	+/- 8kV	Air Discharge	Pass
Mini 25 / Point	+/- 4kV	Indirect Discharge HCP (Front)	Pass
Mini 25 / Point	+/- 4kV	Indirect Discharge VCP (Back)	N/A
Mini 25 / Point	+/- 4kV	Indirect Discharge VCP (Right)	Pass
Mini 25 / Point	+/- 4kV	Indirect Discharge VCP (Left)	Pass

**\*\* The tested points to EUT, please refer to attached pages.**

**(Blue arrow mark for Contact discharge, red arrow mark for Air discharge)**

## Performance & Result:

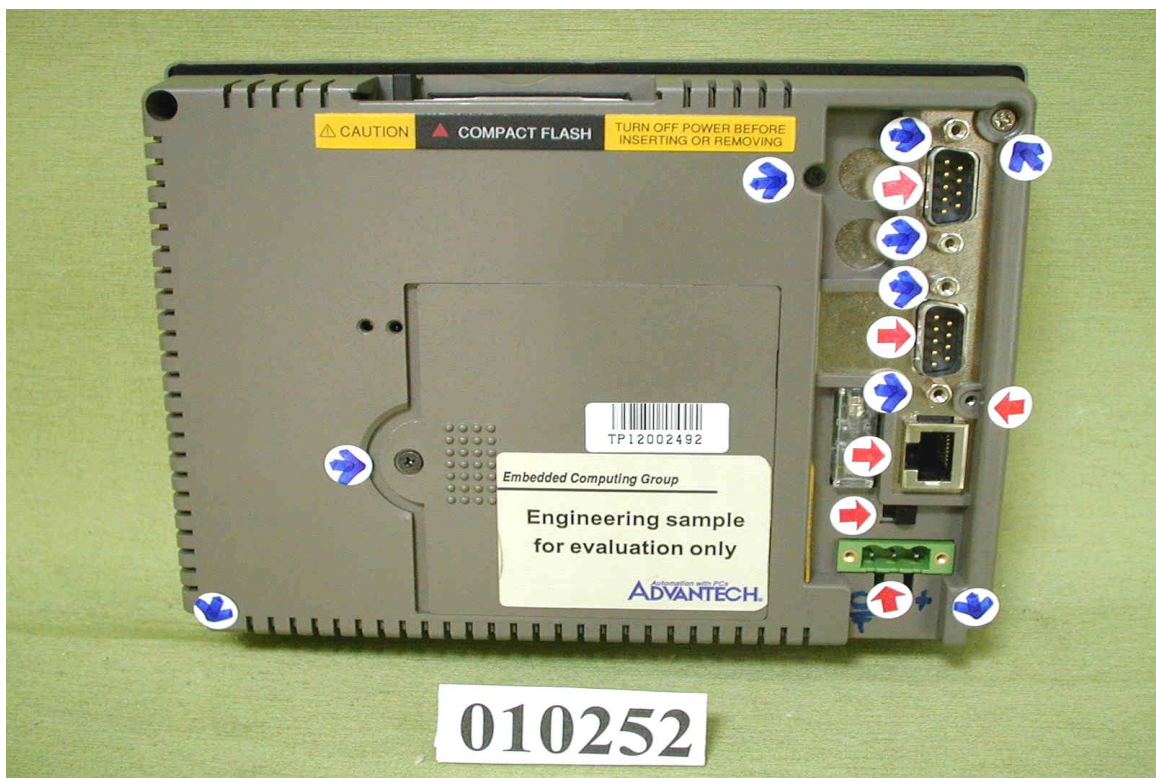
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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



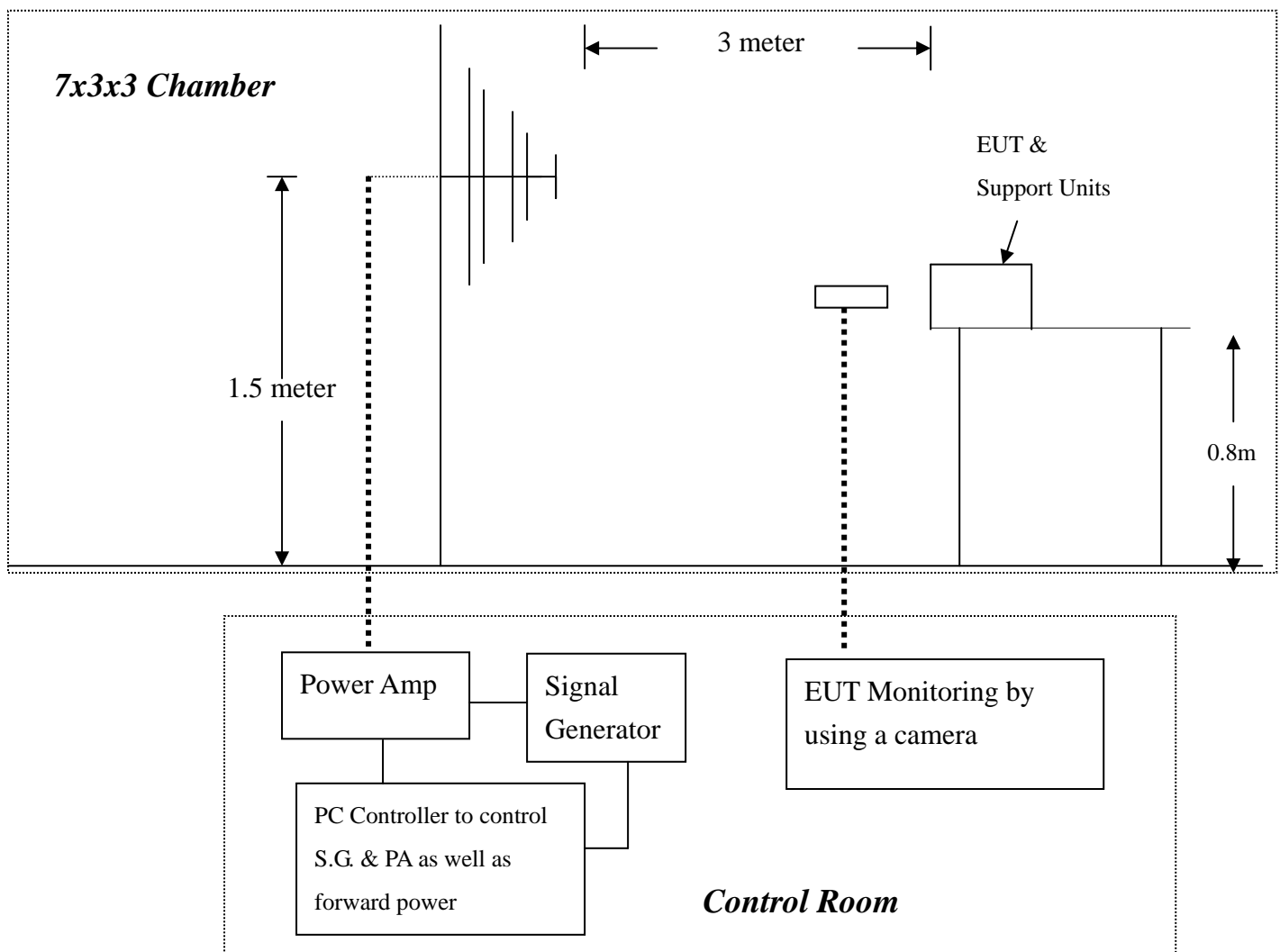


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD )

### 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** : Summer Lee  
**Temperature** : 30°C  
**Humidity** : 50%

#### 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 in 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. 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 EUT to the other side and repeat step 3 to 7, until 4 sides of EUT were verified.

### **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	Front	Pass
80-1000	3V	Yes	V	Front	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.**

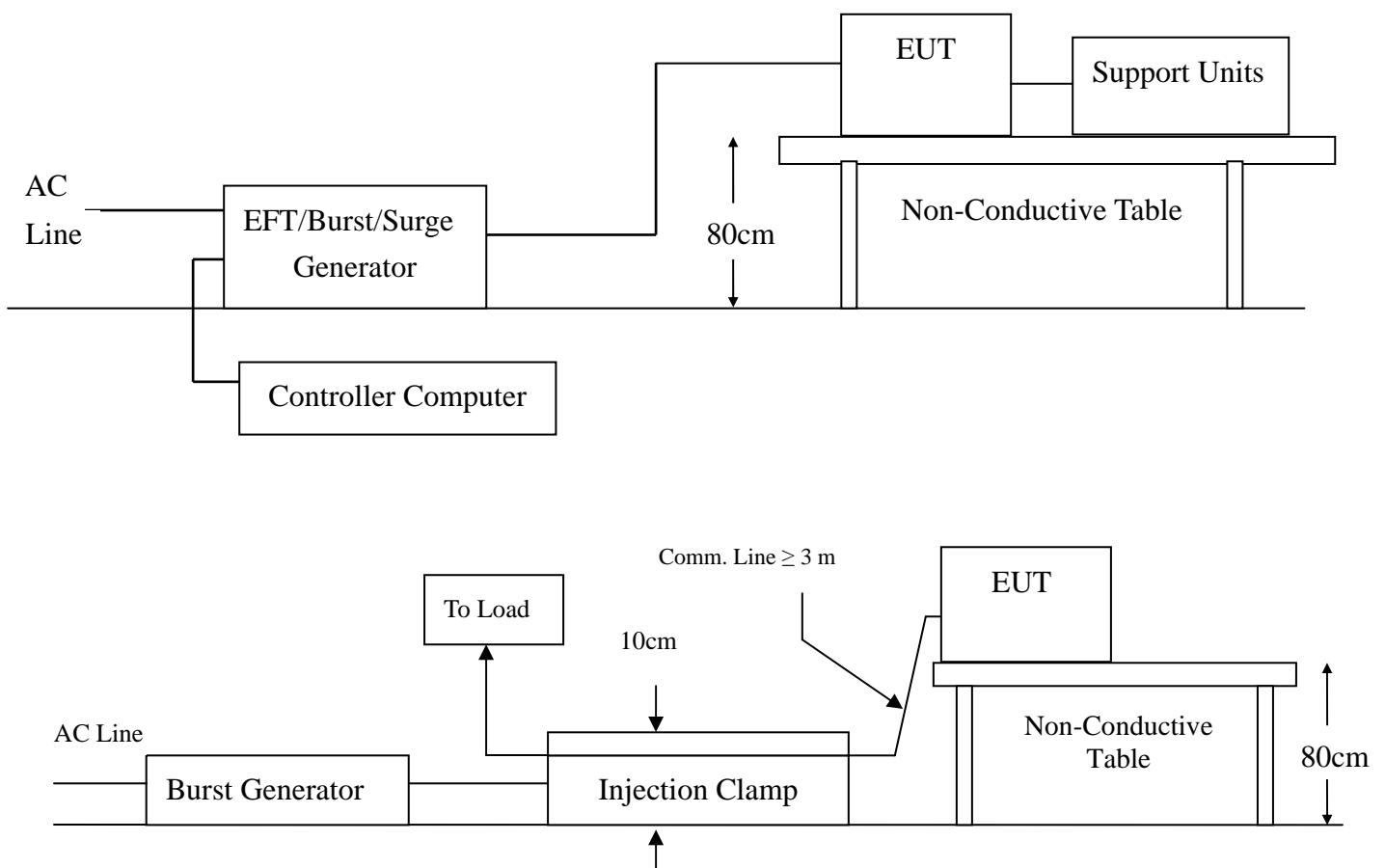


## SECTION 5 IEC 61000-4-4 (FAST TRANSIENTS/BURST)

### FAST TRANSIENTS/BURST IMMUNITY TEST

**Port** : On Power Supply Lines and LAN Cable  
**Basic Standard** : IEC 61000-4-4  
**Requirements** : +/- 1kV for Power Supply Lines  
                      +/- 0.5kV for LAN Cable  
**Performance Criteria** : B ( Standard require )  
**Tester** : Summer Lee  
**Temperature** : 30°C  
**Humidity** : 50%

#### Block Diagram of Test Setup:



### **Test Procedure:**

1. The 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 EUT.
3. A scroll H test program was loaded and executed in DoS mode at Windows environment.
4. The EUT sent above message to Monitor and related peripherals through the test.
5. The following test condition was followed during the tests.

### **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	+/- 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**

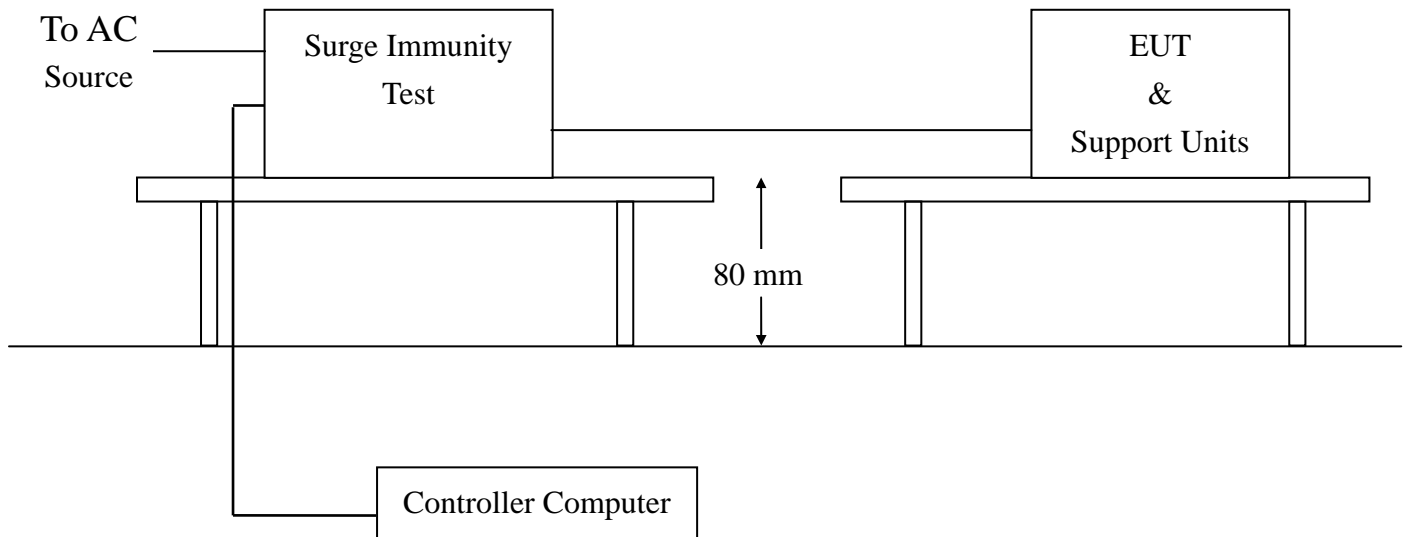
**Observation: No any function degraded during the tests.**

## 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** : Summer Lee  
**Temperature** : 30°C  
**Humidity** : 50%

#### Block Diagram of Test Setup:



## **Test Procedure:**

1. The 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 EUT.
3. A scroll H test program was loaded and executed in DoS mode at Windows environment.
4. The EUT sent above message to Monitor and related peripherals through the test.
5. The following test condition was followed during the tests.

### **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**

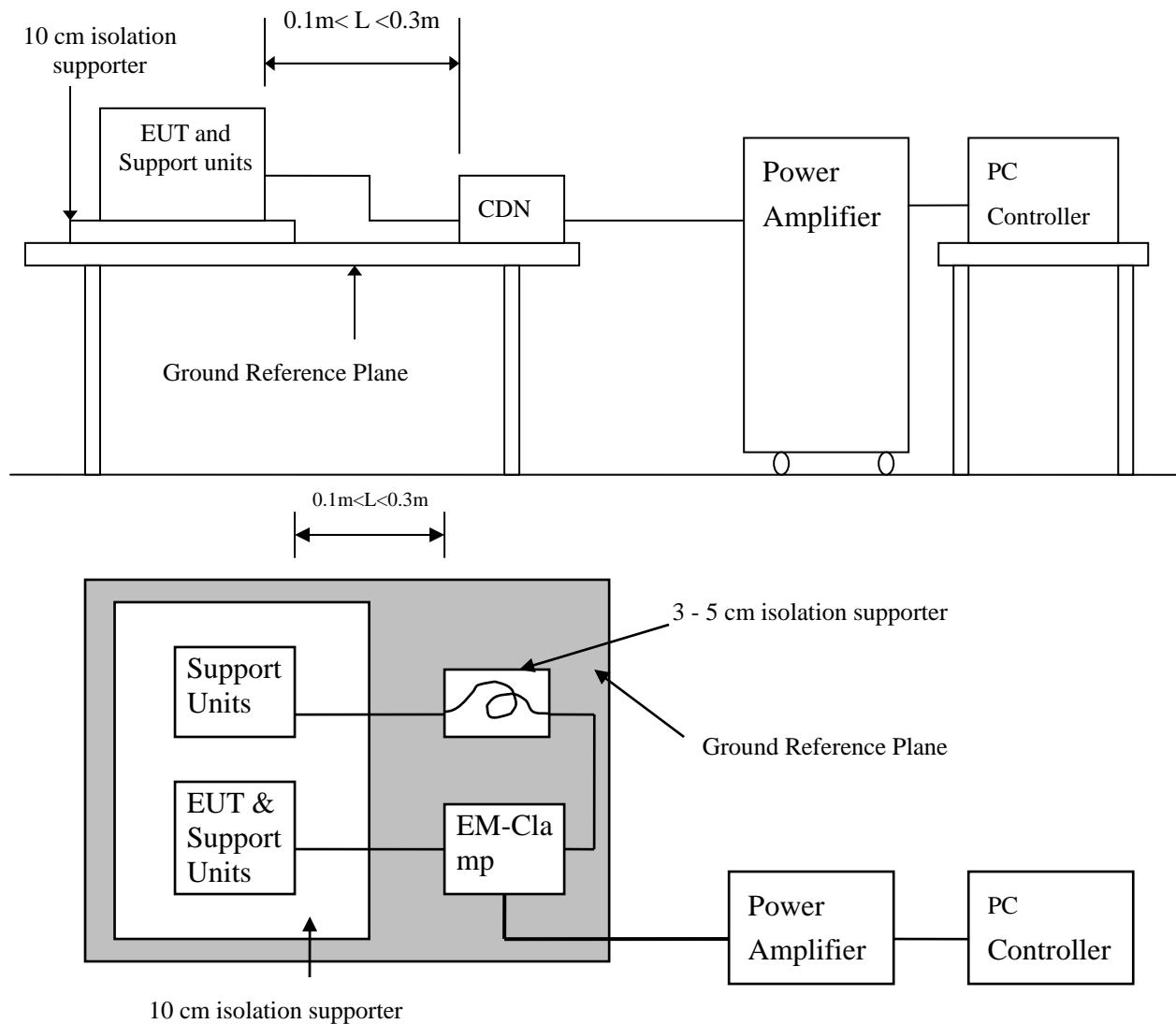
☐ **FAILED**

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

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

<b>Port</b>	: Power cord and LAN Cable
<b>Basic Standard</b>	: IEC 61000-4-6
<b>Requirements</b>	: 3V with modulated
<b>Injection Method</b>	: CDN-M3 for Power Cord EM-Clamp for LAN Cable
<b>Performance Criteria</b>	: A (Standard require)
<b>Tester</b>	: Summer Lee
<b>Temperature</b>	: 30°C
<b>Humidity</b>	: 50%

### 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 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.

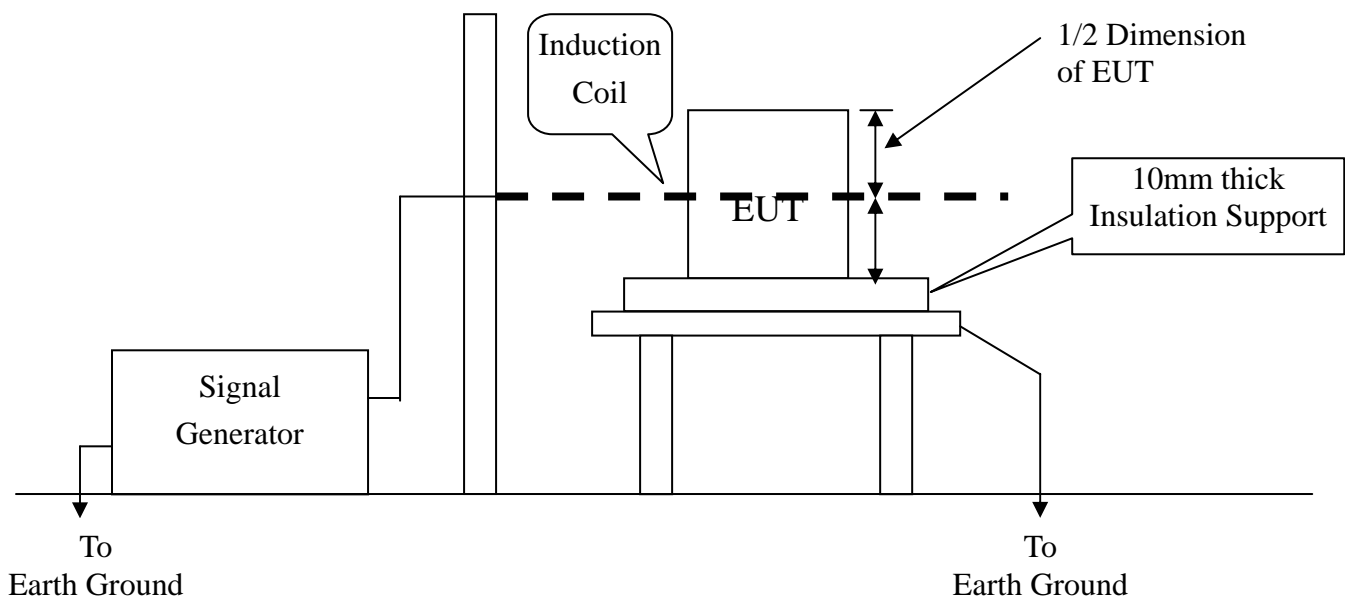
☒ **PASS**      ☐ **FAILED**

**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	: Summer Lee
Temperature	: 30 °C
Humidity	: 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 Monitor 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  $90^0$  ( Y direction ) then repeat step 3 to 7.
9. Rotating the induction coil by  $90^0$  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 test.**

## SECTION 9 IEC 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

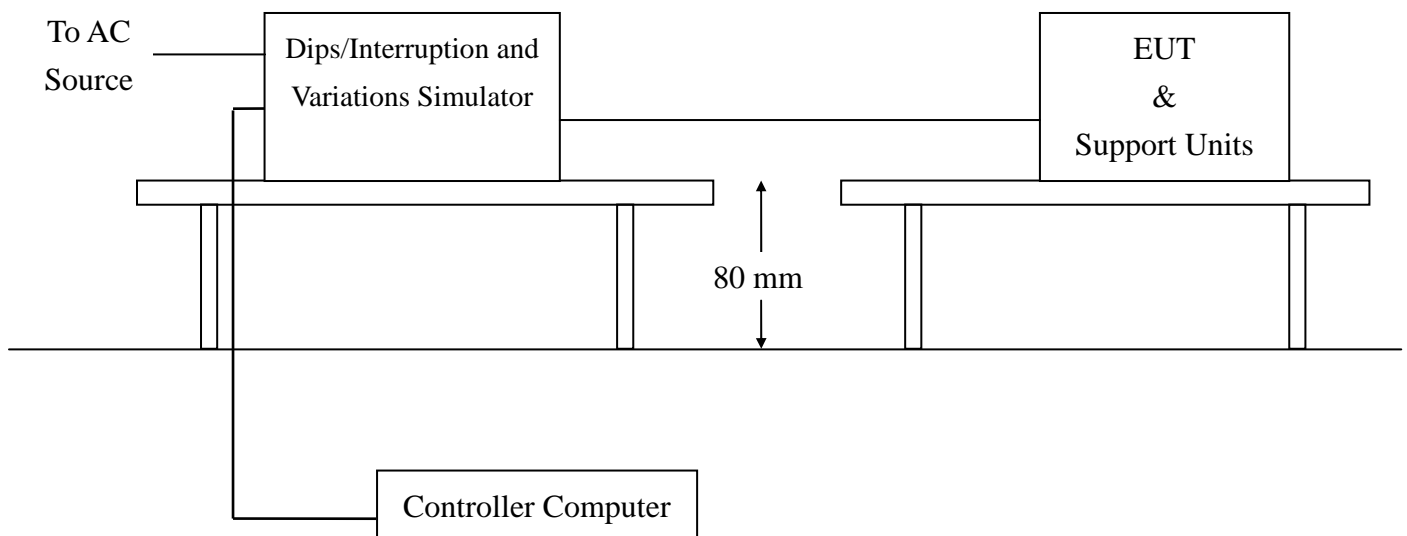
Voltage Dips	Test Level % $U_T$	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

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

**Test Interval** : Min. 10 sec.  
**Tester** : Summer Lee  
**Temperature** : 30°C  
**Humidity** : 50%

### 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 % $U_T$	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 recovered by manual as the evens 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)



## RADIATED EMISSION TEST (EN 55022)





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

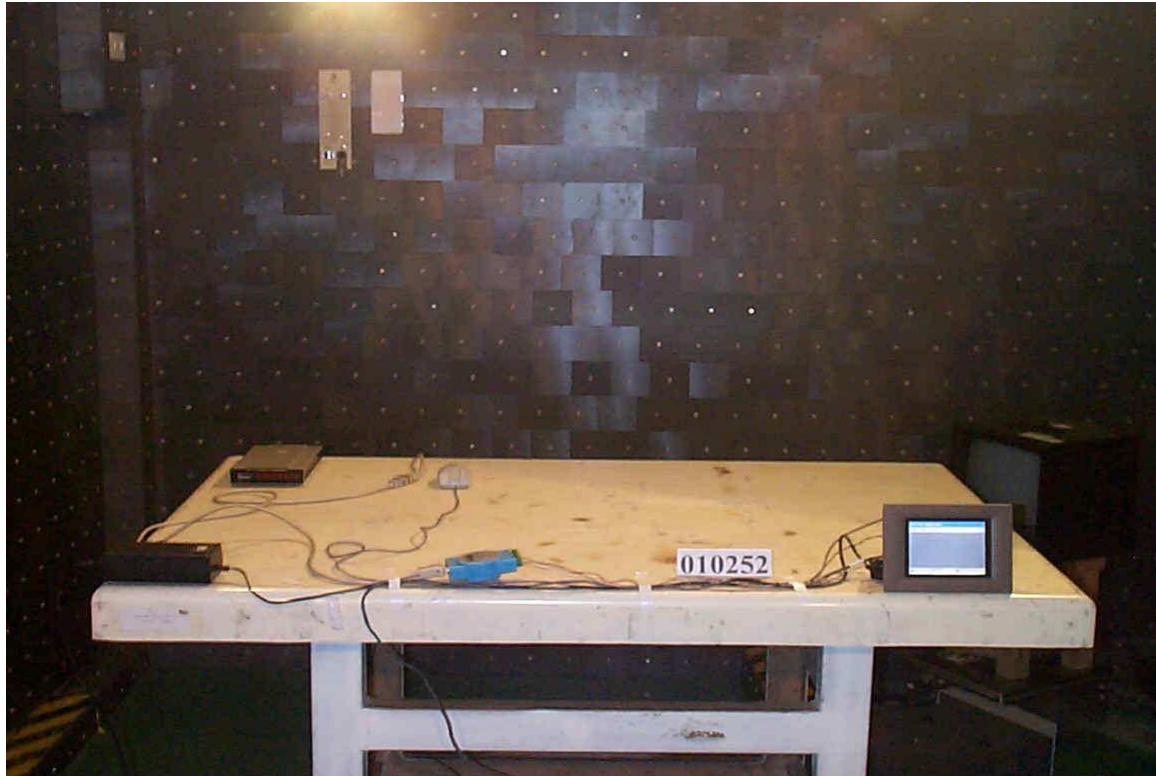


## ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2)





## 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**





**Right view of EUT**



**Left view of EUT**



**Top view of EUT**



**Bottom view of EUT**

