



## EMC COMPLIANCE TEST REPORT

for

### Mini-Workstation with 12.1" LCD and 4 Slot Backplane

**Trade Name** : ADVANTECH  
**Model Number** : AWS-8124TX-YZ (X=Blank, P or C; Y=Blank or T; Z=1, 2, 4 or Blank)  
**Serial Number** : N/A  
**Report Number** : 011018-E  
**Date** : November 19, 2001  
**Regulations** : See below

Standards	Results (Pass/Fail)
EN 55011: 1994 + A1: 1995 + A2: 1997 (Group 1, Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998 (following EN 61000-6-2:1999 test level)	PASS
- IEC 61000-4-2: 1995 + A2: 2000 (EN 61000-4-2:1995)	PASS
- IEC 61000-4-3: 1995 (EN 61000-4-3:1995)	PASS
- IEC 61000-4-4: 1995 (EN 61000-4-4:1995)	PASS
- IEC 61000-4-5: 1995 (EN 61000-4-5:1995)	PASS
- IEC 61000-4-6: 1996 (EN 61000-4-6:1996)	PASS
- IEC 61000-4-8: 1993 (EN 61000-4-8:1993)	PASS
- IEC 61000-4-11: 1994 (EN 61000-4-11:1994)	PASS

Prepared for:

**Advantech Co., Ltd.**  
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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** Mini-Workstation with 12.1" LCD and 4 Slot Backplane

**Trade Name:** ADVANTECH

**Model Number:** AWS-8124TX-YZ (X=Blank, P or C; Y=Blank or T; Z=1, 2, 4 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:** EN55022: 1994 + A1: 1995 + A2: 1997 (Class A)  
EN55011: 1994 + A1: 1995 + A2: 1997 (Group 1, Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998 (Following EN61000-6-2: 1999 test level)  
IEC 61000-4-2: 1995 + A2: 2000 (EN 61000-4-2:1995)  
IEC 61000-4-3: 1995 (EN 61000-4-3:1995)  
IEC 61000-4-4: 1995 (EN 61000-4-4:1995)  
IEC 61000-4-5: 1995 (EN 61000-4-5:1995)  
IEC 61000-4-6: 1996 (EN 61000-4-6:1996)  
IEC 61000-4-8: 1993 (EN 61000-4-8:1993)  
IEC 61000-4-11:1994 (EN 61000-4-11:1994)

**File Number:** 011018-E

**Date of test:** November 2 ~ 14, 2001

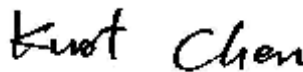
**Deviation:** According to applicant's declaration this EUT is Class A product, and to be market industrial environment only.

**Condition of Test Sample:** Normal

The above equipment was tested by C&C Laboratory Co., Ltd. for compliance with the requirements set forth in EMC Directive 89/336/EEC and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Approved by Authorized Signatory:



Kurt Chen / Q.A. Manager

## GENERAL INFORMATION

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

**Contact Person:** John Chou

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

**File Number:** 011018-E

**Date of Test:** November 2 ~ 14, 2001

**Equipment Under Test:** Mini-Workstation with 12.1" LCD and 4 Slot Backplane

**Model Number:** AWS-8124TX-YZ (X=Blank, P or C; Y=Blank or T; Z=1, 2, 4 or Blank)

**Serial Number:** N/A

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

**Technical Standards:** EN55022: 1994 + A1: 1995 + A2: 1997 (Class A)  
EN55011: 1994 + A1: 1995 + A2: 1997 (Group 1, Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998 (Following EN61000-6-2: 1999 test level)  
IEC 61000-4-2: 1995 + A2: 2000 (EN 61000-4-2:1995)  
IEC 61000-4-3: 1995 (EN 61000-4-3:1995)  
IEC 61000-4-4: 1995 (EN 61000-4-4:1995)  
IEC 61000-4-5: 1995 (EN 61000-4-5:1995)  
IEC 61000-4-6: 1996 (EN 61000-4-6:1996)  
IEC 61000-4-8: 1993 (EN 61000-4-8:1993)  
IEC 61000-4-11:1994 (EN 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 under Windows environment.
2. EUT sends and receives data from Mini-Workstation with 12.1" LCD and 4 Slot Backplane on remote side via LAN Cable.
3. Data was sent to monitor filling the screen with upper case of "H" patterns.
4. The EMI Test program sequentially exercised all related I/O's of EUT and sent "H" patterns to all applicable output ports of EUT.
5. Repeat step 2 to 4 Test program is self-repeating throughout the test.



## PRODUCT INFORMATION

<b>Housing Type:</b>	Metal case	
<b>EUT Power Rating:</b>	DCV from Power Supply	
<b>AC Power during Test</b>	230VAC/50Hz to Power Supply	
<b>AC Power Supply Manufacturer:</b>	Skynet	<b>Model:</b> SNP-8086
<b>AC Power Supply Power Rating:</b>	I/P: 100-240VAC, 50/60Hz, 1.7/0.9A O/P: $\pm 5/\pm 12$ VDC	
<b>AC Power Cord Type:</b>	Unshielded, 1.8m (Detachable)	
<b>DC Power Cable Type:</b>	Unshielded 0.5m (Non-detachable)	
<b>DC Power Supply Manufacturer:</b>	Skynet	<b>Model:</b> D12-8086
	Skynet	<b>Model:</b> D36-8086
<b>DC Power Supply Power Rating:</b>	I/P: 12VDC (D12-8086) /24-48VDC (D36-8086) O/P: $\pm 5/\pm 12$ VDC	
<b>CPU Manufacture:</b>	Intel	<b>Type:</b> Celeron 600MHz
		<b>Type:</b> Pentium II 266MMX
<b>OSC/Clock Frequencies:</b>	66MHz	
<b>Memory Capacity:</b>		<b>Install:</b> 64MB
<b>HDD Manufacturer:</b>	Quantum	<b>Model:</b> LCT 08 series
<b>FDD Manufacturer:</b>	TEAC	<b>Model:</b> FD-235HF
<b>Mother Board Manufacturer:</b>	ADVANTECH	<b>Model:</b> PCA-6751
	ADVANTECH	<b>Model:</b> PCA-6771
<b>Chassis Manufacturer:</b>	ADVANTECH	<b>Model:</b> AWS-8124T
<b>Backplane Manufacturer:</b>	ADVANTECH	<b>Model:</b> PCA-6104 (ISA bus slot x 4)
	ADVANTECH	<b>Model:</b> AWS-8100TP (PCI bus slot x 4)
<b>12.1" LCD Panel Manufacturer:</b>	SANYO	<b>Model:</b> MXS121022010
<b>Display Chip Manufacturer:</b>	Trident	<b>Model:</b> Trident9525DVD
	Chips	<b>Model:</b> Chips B69000
<b>LAN Manufacturer:</b>	On board	
<b>VGA Card Manufacturer:</b>	On board	
<b>TouchScreen Cable Type:</b>	Shielded, 0.1m (Detachable)	

## I/O Port of EUT:

I/O PORT TYPES	Q'TY	TESTED WITH
1). Serial Port	1	1
2). Video Port	1	1
3). PS/2 Keyboard	1	1
4). LAN Port	1	1
5). TouchScreen Port	1	1

### Note:

#### 1.) AWS-8124TX-YZ Series:

##### 1.1.) The means of suffix "X=Blank, P or C" on model number is:

- "Blank": ISA Bus Slot \* 4 BackPlane (ISA Bus)
- "P": PCI Bus Slot \* 4 Backplane (PCI Bus)
- "C": CPU Board (PCA-6751), ISA Bus Slot \* 4 BackPlane (ISA Bus) and Pentium II 266MMX CPU

##### 1.2.) The means of suffix "Y=Blank or T" on model number is:

- "Blank": without Touchscreen
- "T": with resistive Touchscreen

##### 1.3.) The means of suffix "Z=1, 2, 4 or Blank" on model number is:

- "Blank" type of input is 100-230VAC, 60Hz
- "1" type of input is 12VDC
- "2" type of input is 24VDC
- "4" type of input is 48VDC

- 2.) Client consigns two samples of different Model Number (AWS-8124T-T, AWS-8124TP-T2) are tested on this report. Therefore, test Lab. just guarantees the units, which have been tested.



## SUPPORT EQUIPMENT

### For AWS-8124T-T:

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1)	Monitor	CPD-G200	2716046	DoC	SONY	Shielded, 1.8m With one Core	Unshielded, 1.8m
2)	PS/2 Keyboard	SK-2800C	B1C790BCPJCN09	GYUR79SK	Compaq	Shielded, 1.8m	N/A
3)	Industrial Workstation (Remote)	AWS-8124TP-T2	N/A	DoC	ADVANTECH	LAN Cable Unshielded, 20m	AC I/P: Unshielded, 1.8m DC I/P: Unshielded, 1.2m With a core
4)	PS/2 Keyboard (Remote)	6511-TA	N/A	N/A	Acer	Shielded, 1.8m	N/A

### For AWS-8124TP-T2:

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1)	Monitor	CPD-G200	2716046	DoC	SONY	Shielded, 1.8m With one Core	Unshielded, 1.8m
2)	PS/2 Keyboard	SK-2800C	B1C790BCPJCN09	GYUR79SK	Compaq	Shielded, 1.8m	N/A
3)	Industrial Workstation (Remote)	AWS-8124T-T	N/A	DoC	ADVANTECH	LAN Cable Unshielded, 20m	Unshielded, 1.8m
4)	PS/2 Keyboard (Remote)	6511-TA	N/A	N/A	Acer	Shielded, 1.8m	N/A
5)	Power Adapter (For EUT)	SNP-PA59 (For D36-8086)	N/A	N/A	Skynet	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.2m
	Power Adapter (For EUT)	CH-1204 (For D12-8086)	N/A	N/A	Chi	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.2m

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

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

## TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R. O. C.
- Description:** There are four 3/10m open area test sites and three line conducted labs for final test.  
The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.  
  
Registration also was made with Voluntary Control Council for Interference (VCCI).
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission  
  
Also accredited by BSMI for the product category of Information Technology Equipment.
- Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.
- Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

**Site # 3 & # 4 Line Conducted Test Site:** At Shielding Room



## TEST EQUIPMENT LIST (EMISSION)

**Instrumentation:** The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 9kHz to 1.0 / 2.0 GHz.

**Equipment used during the tests:**

**Open Area Test Site:** # 3

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	ADVANTEST	R3261A	N/A	03/16/2001	03/15/2002
EMI Test Receiver	R&S	ESVS20	838804/004	12/28/2000	12/27/2001
Pre-Amplifier	HP	8447D	2944A09173	02/19/2001	02/18/2002
Precision Dipole	SCHWAZBECK	VHAP	998/999	05/17/2001	05/16/2002
Precision Dipole	SCHWAZBECK	UHAP	981/982	05/17/2001	05/16/2002
Bilog Antenna	CHASE	CBL6112B	SITE2	07/28/2001	07/27/2002
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	11/23/2000	11/22/2001

**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

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

## TEST EQUIPMENT LIST

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

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

Radiated Electromagnetic Field immunity Measurement (61000-4-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Signal Generator	Maconi	2022D	119246/003	08/20/2001	08/19/2002
Power Amplifier	M2S	A00181/ 1000	9801-112	N/A	N/A
Power Amplifier	M2S	AC8113/ 800-250A	9801-179	N/A	N/A
EM-Radiation Meter	Wandel & Goltormann	EMR-30	L-0013	03/16/2001	03/15/2002
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
EM PROBE	GW	EMR-30	L-0013	03/13/2001	03/12/2002

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



Surge Immunity test (61000-4-5)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	09/01/2001	08/31/2002
CDN	HAEFELY TRENCH	IP6.2	148342	03/22/2001	03/21/2002
CDN	HAEFELY TRENCH	DEC1A	148050	04/06/2001	04/05/2002

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

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

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

## SECTION 1 EN 55022 (LINE CONDUCTED & RADIATED EMISSION)

### MEASUREMENT PROCEDURE

#### (PRELIMINARY LINE CONDUCTED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55022 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per EN 55022.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source of and was grounded to the ground plane.
- 5) All support equipment-received power from a second LISN supplying power of 110VAC/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

#### Mode(s):

##### AWS-8124T-T:

1. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base)
2. LCD Panel + Monitor (800 x 600) with TouchScreen (10Base)
3. LCD Panel (800 x 600) with TouchScreen (100Base)
4. Monitor (800 x 600) (100Base)

##### AWS-8124TP-T2:

5. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
6. LCD Panel + Monitor (800 x 600) with TouchScreen (10Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
7. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base) + D12-8086 12VDC Power Supply + CH-1204 AC Power Adapter
8. LCD Panel (800 x 600) with TouchScreen (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
9. Monitor (800 x 600) (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter

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

#### Mode(s): 1. 5.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

## MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Q.P. mode, then the emission signal was re-checked using an A.V. detector.
- 3) The test data of the worst-case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. MHz	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.xx	43.95	---	56	46	-12.05	---	L1

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer / Receiver reading
Limit dBuV	= Limit stated in standard
Margin dB	= Reading in reference to limit
Note	= Current carrying line of reading
“---“	= The emission level complied with the Average limits, with at least 2dB margin limits, so no further recheck.

## LINE CONDUCTED EMISSION LIMIT

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

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

## MEASUREMENT PROCEDURE (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):

#### AWS-8124T-T:

1. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base)
2. LCD Panel + Monitor (800 x 600) with TouchScreen (10Base)
3. LCD Panel (800 x 600) with TouchScreen (100Base)
4. Monitor (800 x 600) (100Base)

#### AWS-8124TP-T2:

5. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
6. LCD Panel + Monitor (800 x 600) with TouchScreen (10Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
7. LCD Panel + Monitor (800 x 600) with TouchScreen (100Base) + D12-8086 12VDC Power Supply + CH-1204 AC Power Adapter
8. LCD Panel (800 x 600) with TouchScreen (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter
9. Monitor (800 x 600) (100Base) + D36-8086 24VDC Power Supply + SNP-PA59 AC Power Adapter

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

### Mode(s): 1. 5.

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for final testing.



## MEASUREMENT PROCEDURE (FINAL RADIATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- 4) The test data of the worst-case condition(s) was reported on the Summary Data page.

### Data Sample:

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

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



## RADIATED EMISSION LIMIT

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

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

## BLOCK DIAGRAM OF TEST SETUP

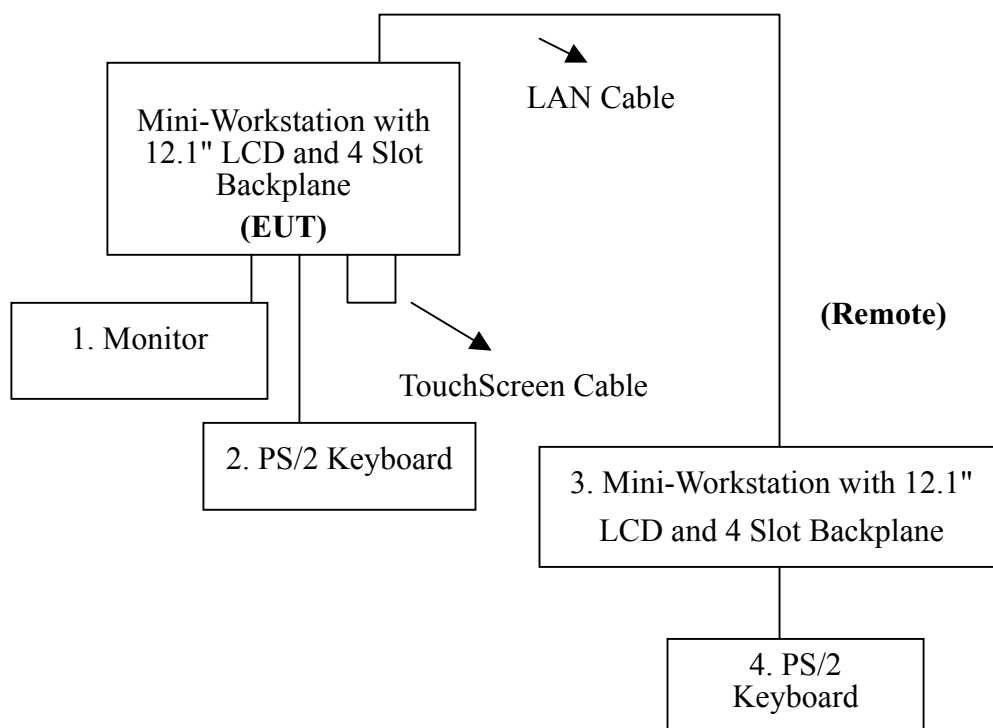
### System Diagram of Connections between EUT and Simulators

**EUT:** Mini-Workstation with 12.1" LCD and 4 Slot Backplane

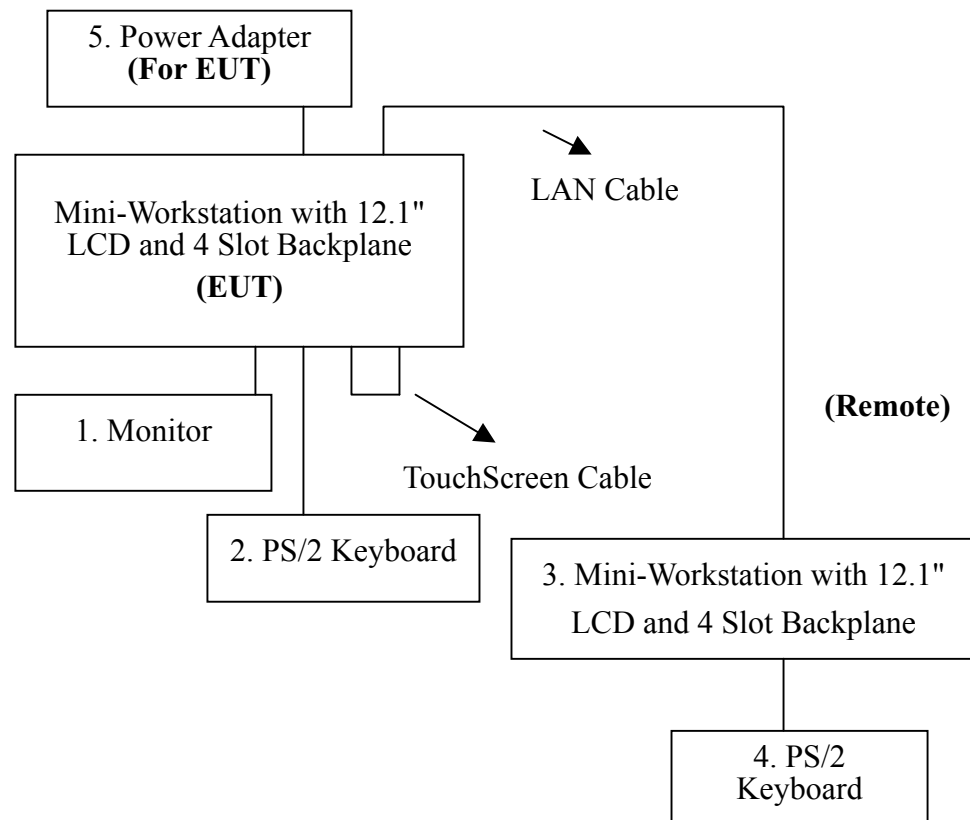
**Trade Name:** ADVANTECH

**Model Number:** AWS-8124T-T; AWS-8124TP-T2

### AWS-8124T-T



## AWS-8124TP-T2



## SUMMARY DATA (LINE CONDUCTED TEST)

**Model Number:** AWS-8124T-T

**Location:** Site # 4

**Tested by:** Michael Chen

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 26°C

**Humidity:** 66%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	56.5	---	79.0	66.0	-22.5	---	L1
8.000	58.1	---	73.0	60.0	-14.9	---	L1
12.020	52.6	---	73.0	60.0	-20.4	---	L1
16.010	40.0	---	73.0	60.0	-33.0	---	L1
20.070	44.2	---	73.0	60.0	-28.8	---	L1
28.010	45.9	---	73.0	60.0	-27.1	---	L1
0.150	56.3	---	79.0	66.0	-22.7	---	L2
8.000	59.6	---	73.0	60.0	-13.4	---	L2
12.020	53.2	---	73.0	60.0	-19.8	---	L2
16.010	40.5	---	73.0	60.0	-32.5	---	L2
20.070	44.2	---	73.0	60.0	-28.8	---	L2
28.010	47.0	---	73.0	60.0	-26.0	---	L2

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

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

## SUMMARY DATA (LINE CONDUCTED TEST)

**Model Number:** AWS-8124TP-T2

**Location:** Site # 4

**Tested by:** Michael Chen

**Test Mode:** Mode 5

**Test Results:** Passed

**Temperature:** 26°C

**Humidity:** 66%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	61.6	---	79.0	66.0	-17.4	---	L1
0.920	51.3	---	73.0	60.0	-21.7	---	L1
2.760	49.9	---	73.0	60.0	-23.1	---	L1
4.970	41.6	---	73.0	60.0	-31.4	---	L1
5.520	39.5	---	73.0	60.0	-33.5	---	L1
8.010	40.3	---	73.0	60.0	-32.7	---	L1
0.150	61.5	---	79.0	66.0	-17.5	---	L2
0.920	51.8	---	73.0	60.0	-21.2	---	L2
2.760	51.8	---	73.0	60.0	-21.2	---	L2
4.050	39.3	---	73.0	60.0	-33.7	---	L2
7.480	36.2	---	73.0	60.0	-36.8	---	L2
20.100	37.6	---	73.0	60.0	-35.4	---	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:** AWS-8124T-T

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Vertical--10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25°C

**Humidity:** 67%RH

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

Freq.	Raw	Corr.	Emiss.	Limits	Margin
(MHz)	Data	Factor	Level		
	( dBuV/m )	(dB)	( dBuV/m )		(dB)



## SUMMARY DATA (RADIATED EMISSION TEST)

**Model Number:** AWS-8124T-T

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Horizontal --10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25°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)
----------------	---------------------------	-------------------------	-------------------------------	--------	----------------



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** AWS-8124TP-T2

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Vertical--10m

**Test Mode:** Mode 5

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25°C

**Humidity:** 67%RH

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

Freq.	Raw	Corr.	Emiss.	Limits	Margin
(MHz)	Data	Factor	Level		
	( dBuV/m )	(dB)	( dBuV/m )		(dB)



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** AWS-8124TP-T2

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Horizontal --10m

**Test Mode:** Mode 5

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 25°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)
----------------	---------------------------	-------------------------	-------------------------------	--------	----------------

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

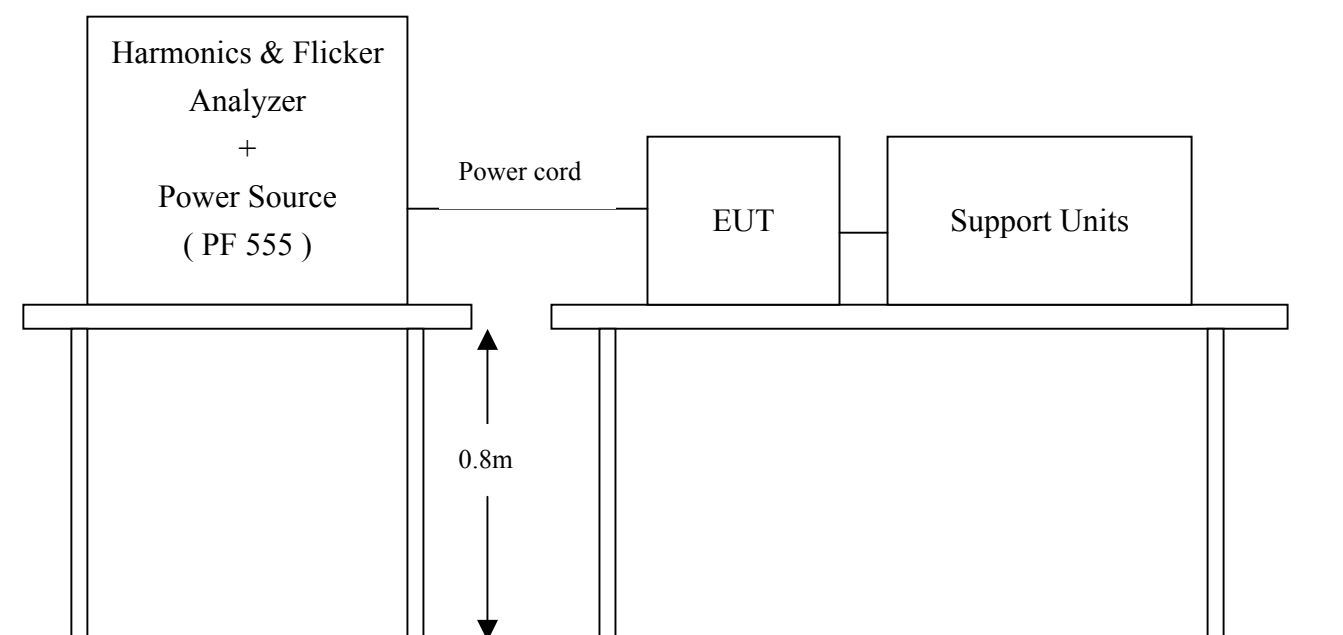
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 +A14: 2000)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Tester** : Michael Chen  
**Temperature** : 24°C  
**Humidity** : 56%  
**Test Mode** : Mode 1, 5

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : 5 of EN 61000-3-3  
**Tester** : Michael Chen  
**Temperature** : 24°C  
**Humidity** : 56%  
**Test Mode** : Mode 1, 5

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.

























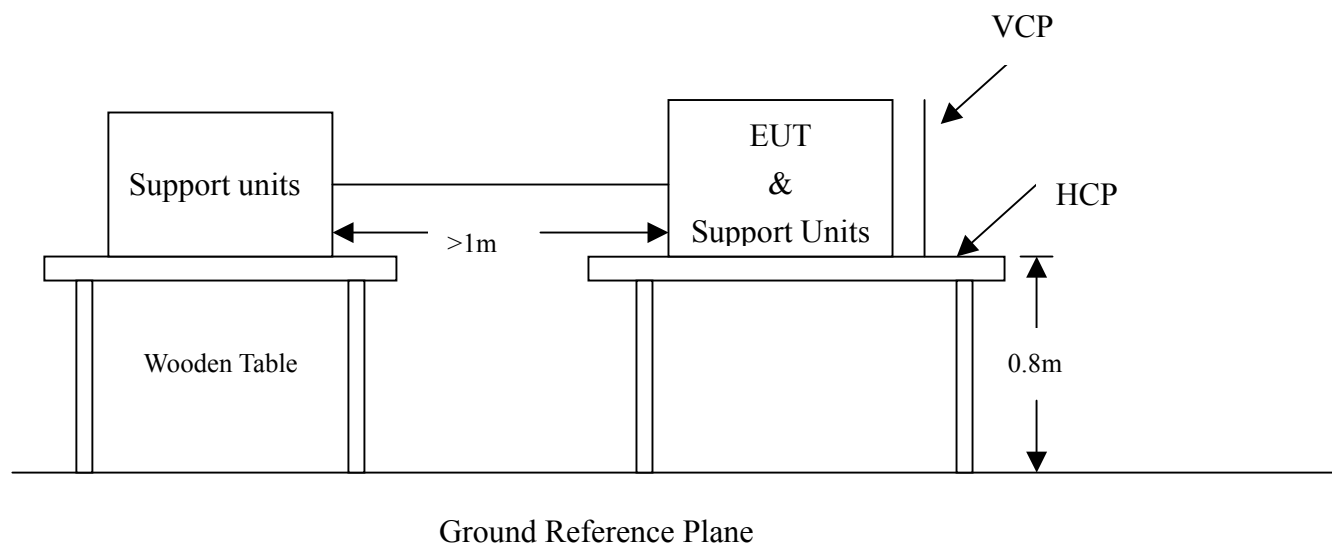
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### 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** : Michael Chen  
**Temperature/Humidity**: 24°C/58%  
**Test Mode** : Mode 1, 5

#### Block Diagram of Test Setup:

( The 470 k resistors





## **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 Windows mode.
4. The EUT sent above message to EUT 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. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

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

The electrostatic discharges were applied as follows:

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

\*\*\* 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:***

***AWS-8124T-T  
(Photo 1 of 4)***



***(Photo 2 of 4)***



*(Photo 3 of 4)*



*(Photo 4 of 4)*



***AWS-8124TP-T2  
(Photo 1 of 4)***



***(Photo 2 of 4)***



*(Photo 3 of 4)*



*(Photo 4 of 4)*

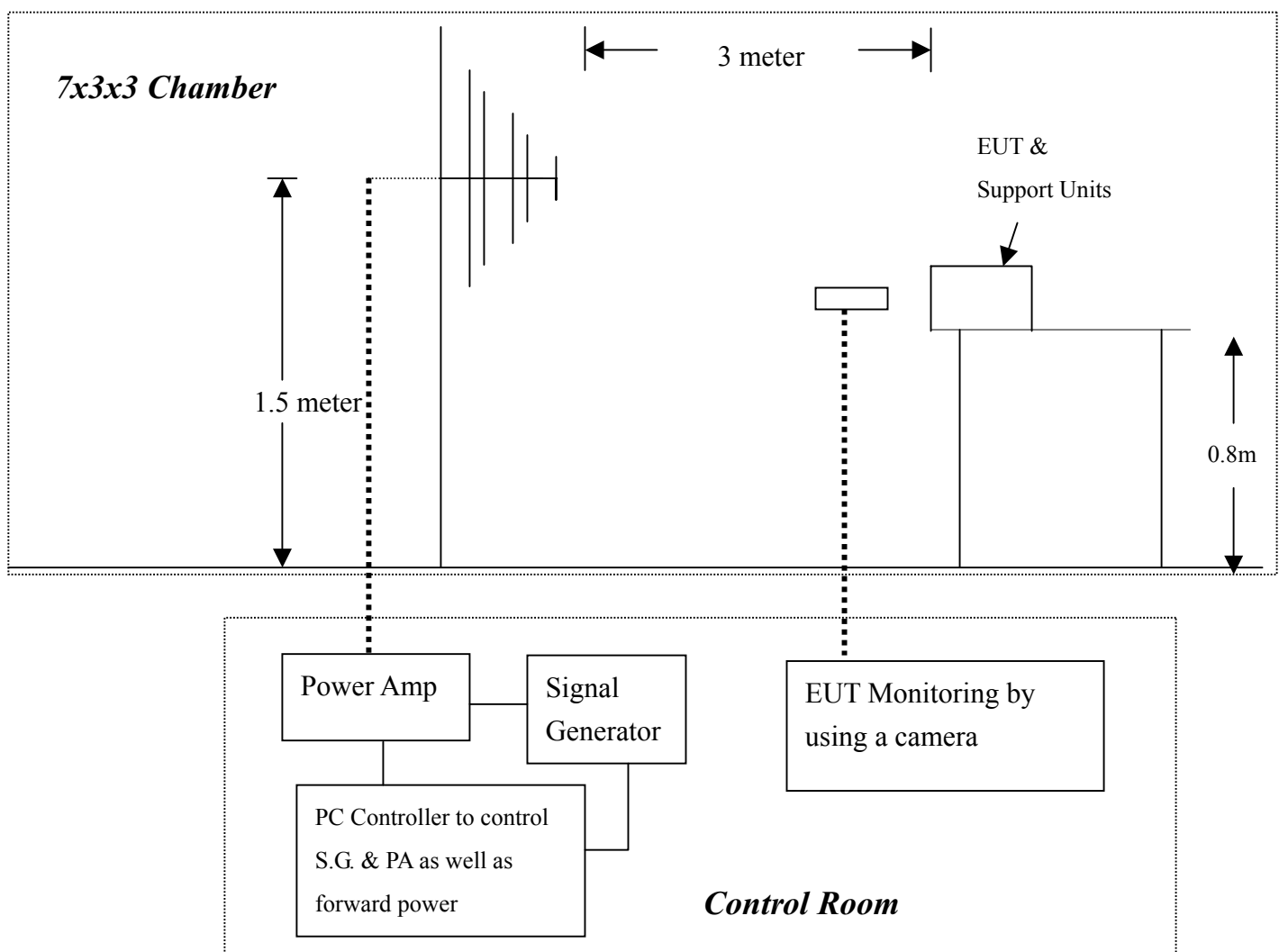


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-3  
**Requirements** : 10 V/m / with 80% AM. 1kHz Modulation.  
**Performance Criteria** : A ( Standard require )  
**Tester** : Michael Chen  
**Temperature** : 23°C  
**Humidity** : 59%  
**Test Mode** : Mode 1, 5

#### 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 test at each side of with specified level from 80MHz to 1000MHz at 1% steps.
6. Recording the test result in following table.
7. It is not necessary to perform test as per annex A of EN 55024 if the EUT doesn't belong to TTE product.

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

Test level : 10V/m

Steps : 1 % of fundamental

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	10V	Yes	H	Front	Pass
80-1000	10V	Yes	V	Front	Pass
80-1000	10V	Yes	H	Right	Pass
80-1000	10V	Yes	V	Right	Pass
80-1000	10V	Yes	H	Back	Pass
80-1000	10V	Yes	V	Back	Pass
80-1000	10V	Yes	H	Left	Pass
80-1000	10V	Yes	V	Left	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**

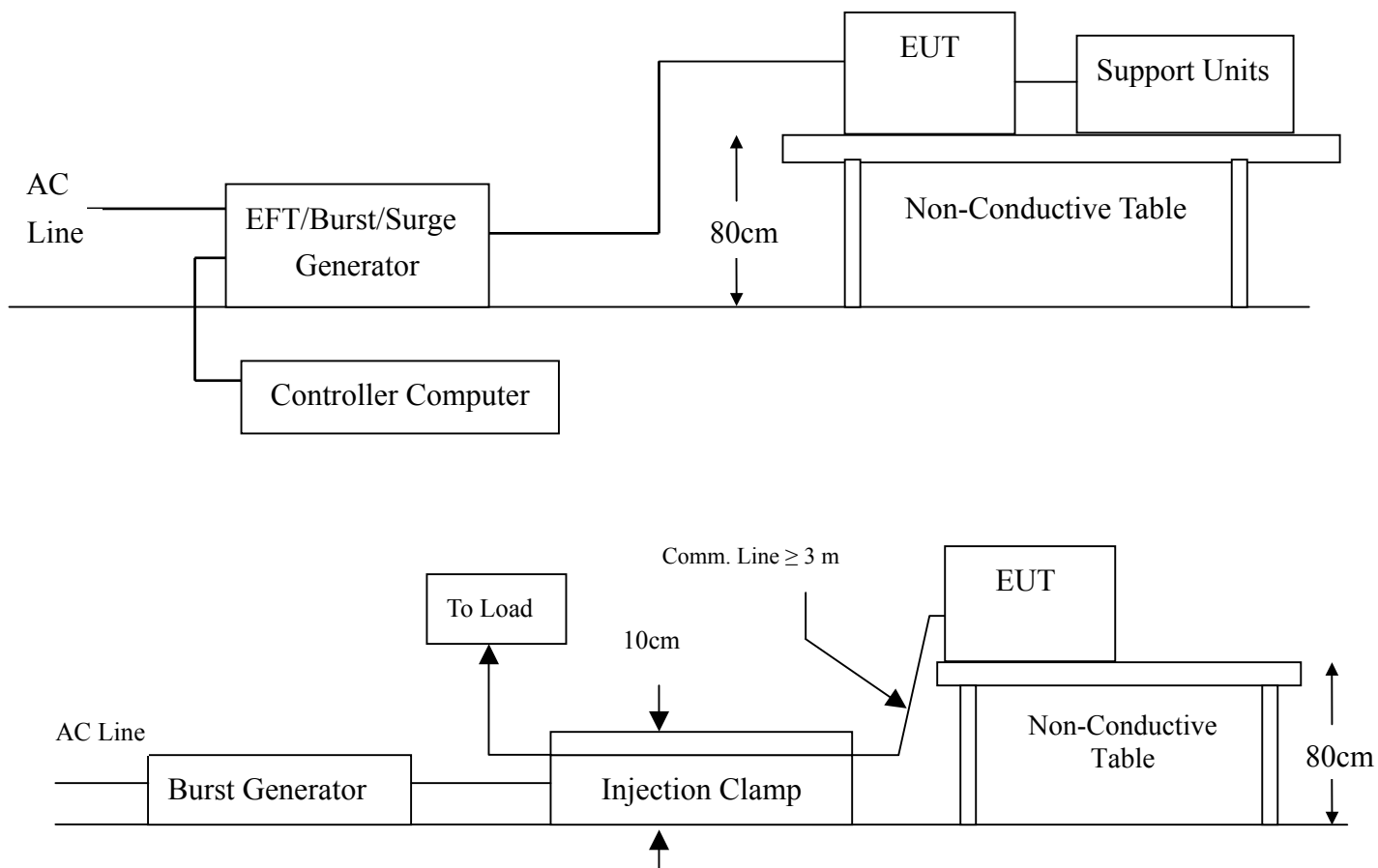
**Observation: No any function degraded during the tests.**

## 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>	: +/- 2kV for Power Supply Lines +/- 1kV for Data Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Michael Chen
<b>Temperature</b>	: 25°C
<b>Humidity</b>	: 57%
<b>Test Mode</b>	: Mode 1, 5

#### 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 6 through the test.
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

Test Mode	Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
1, 5	L1	+/- 2	Direct	Pass
1, 5	N	+/- 2	Direct	Pass
1	PE	+/- 2	Direct	Pass
1, 5	L1+N	+/- 2	Direct	Pass
1	L1+PE	+/- 2	Direct	Pass
1	N+PE	+/- 2	Direct	Pass
1	L1 + N + PE	+/- 2	Direct	Pass
1, 5	LAN Cable	+/- 1	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**



0363

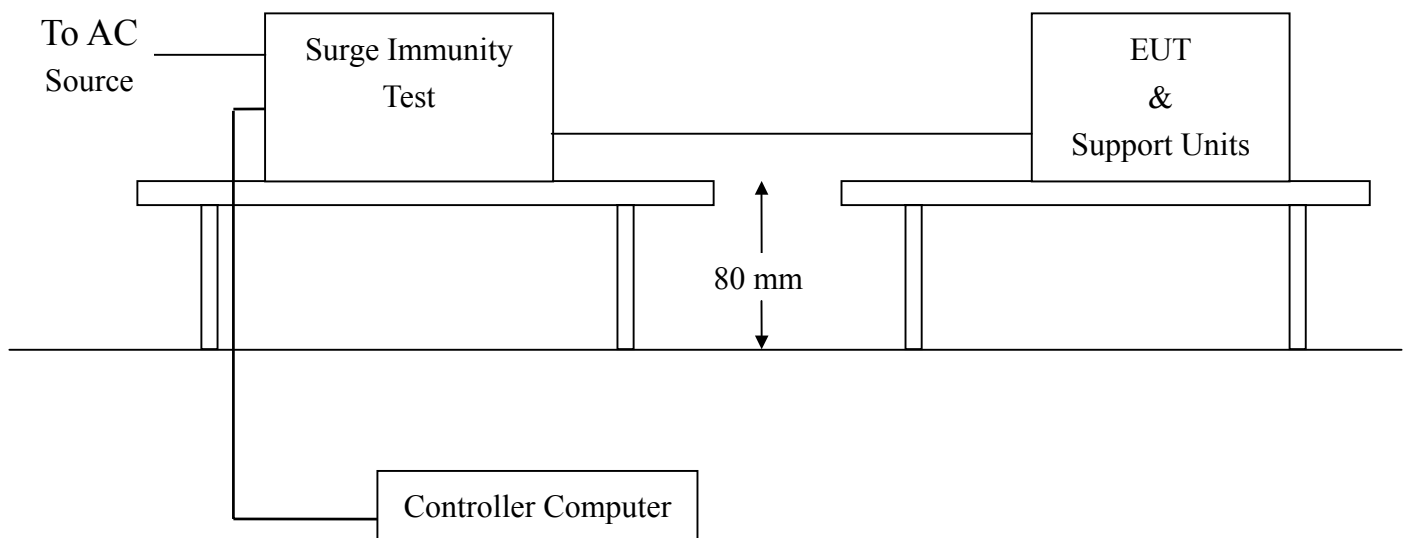
**Observation: No any function degraded during the tests.**

## 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** : Michael Chen  
**Temperature** : 25°C  
**Humidity** : 58%  
**Test Mode** : Mode 1, 5

### 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.
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

Test Mode	Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
1, 5	L1-L2	1	Positive	Capacitive	Pass
1, 5	L1-PE	2	Positive	Capacitive	Pass
1	L2-PE	2	Positive	Capacitive	Pass
1, 5	L1-L2	1	Negative	Capacitive	Pass
1	L1-PE	2	Negative	Capacitive	Pass
1	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**

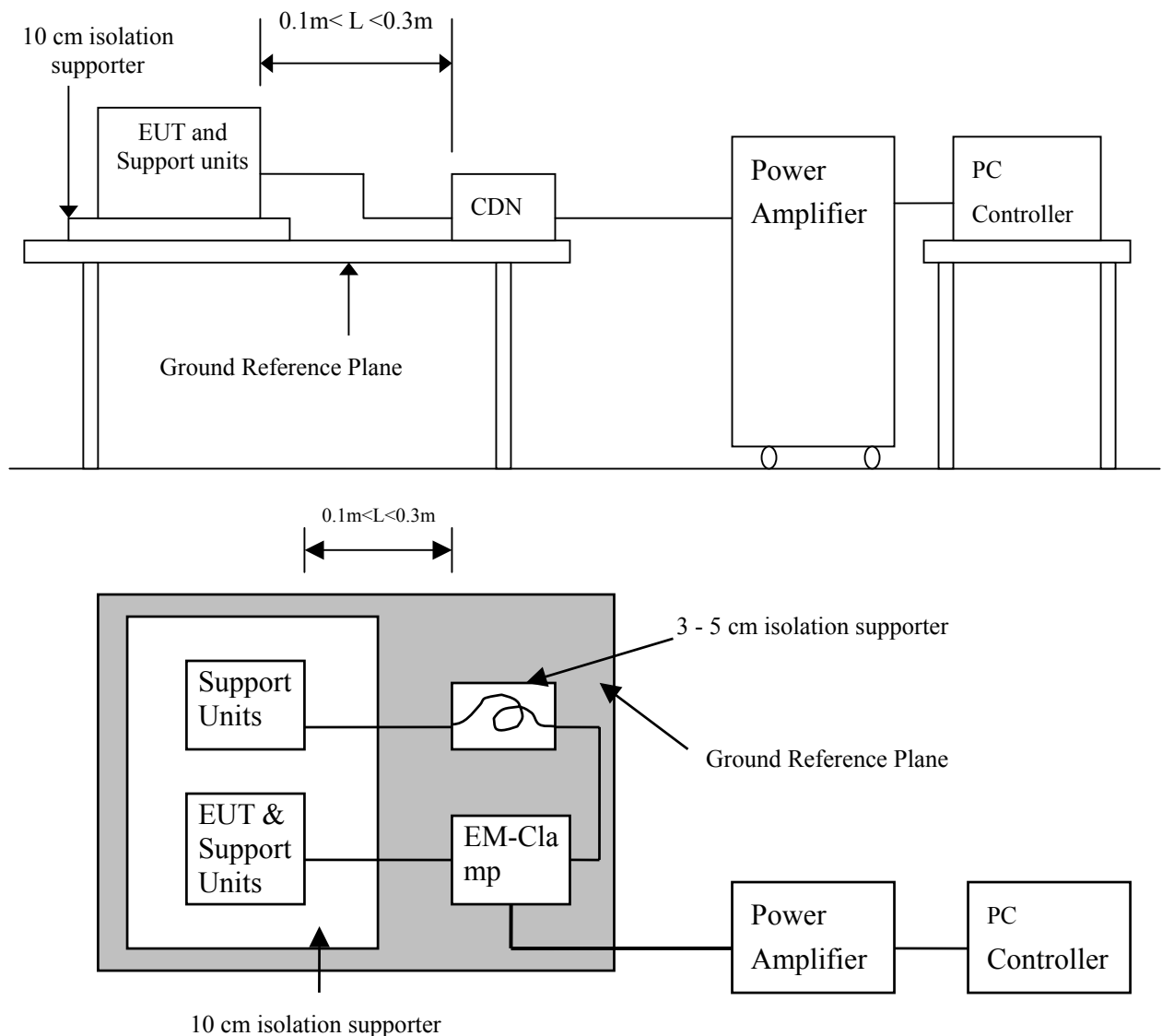
☐ **FAILED**

**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** : 10V with modulated  
**Injection Method** : CDN-M3 for Power Cord  
 EM-Clamp for LAN Cable  
**Performance Criteria** : A (Standard require)  
**Tester** : Michael Chen  
**Temperature** : 23°C  
**Humidity** : 60%  
**Test Mode** : Mode 1, 5

### 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 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	10V	Yes	Pass

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self-recoverable or can be restored by the operation of controls.

☒ **PASS**

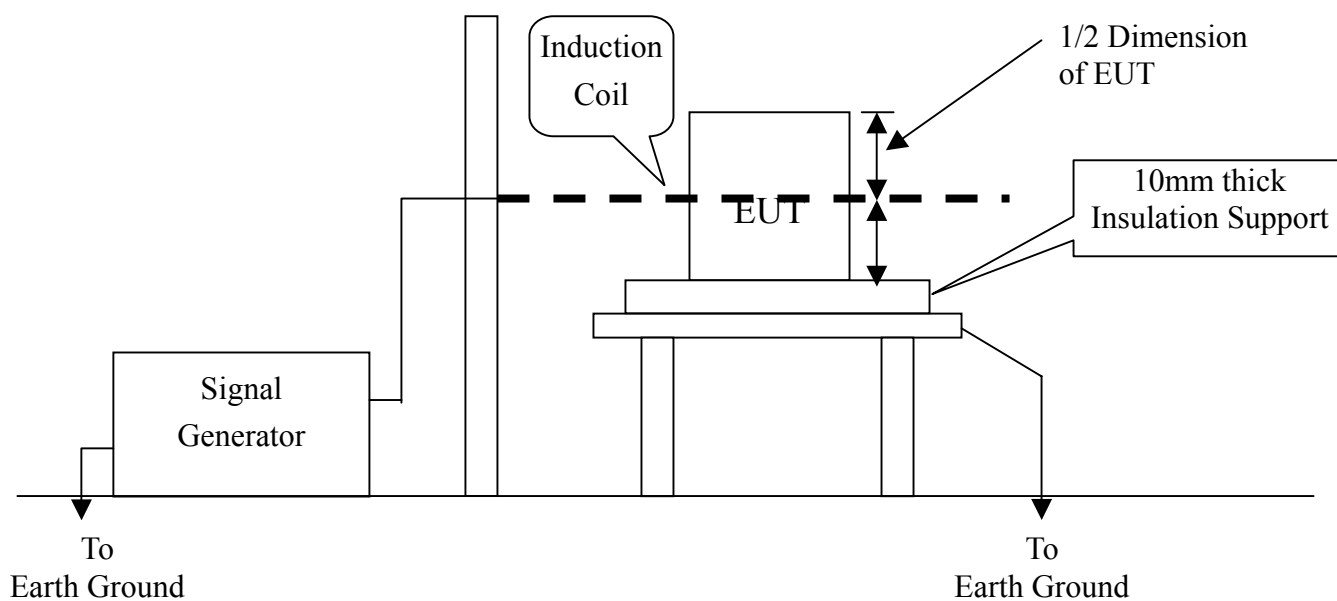
☐ **FAILED**

**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** : 30 A/m  
**Performance Criteria** : A (Standard Required)  
**Tester** : Michael Chen  
**Temperature / Humidity** : 24°C / 58%  
**Test Mode** : Mode 1, 5

### 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: 30A/m  
Power Freq.: 50Hz  
Orientation: X, Y, Z

Orientation	Field	Result (Pass/Fail)	Remark
X	30A	Pass	
Y	30A	Pass	
Z	30A	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 (EN55024)	Test Level % U <sub>T</sub>	Reduction (%)	Duration	Performance Criteria
	<5	>95	0.5 (periods)	B
	70	30	25 (periods)	C

Voltage Dips (EN61000-6-2 )	Test Level % U <sub>T</sub>	Reduction (%)	Duration	Performance Criteria
	70	30	0.5 periods (10ms)	B
	40	60	5 and 50 periods (100 and 1000ms)	C

Voltage Interruptions (EN55024 ) (EN61000-6-2)	Test Level % U <sub>T</sub>	Reduction (%)	Duration	Performance Criteria
	<5	>95	250 (periods) 5000ms	C

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

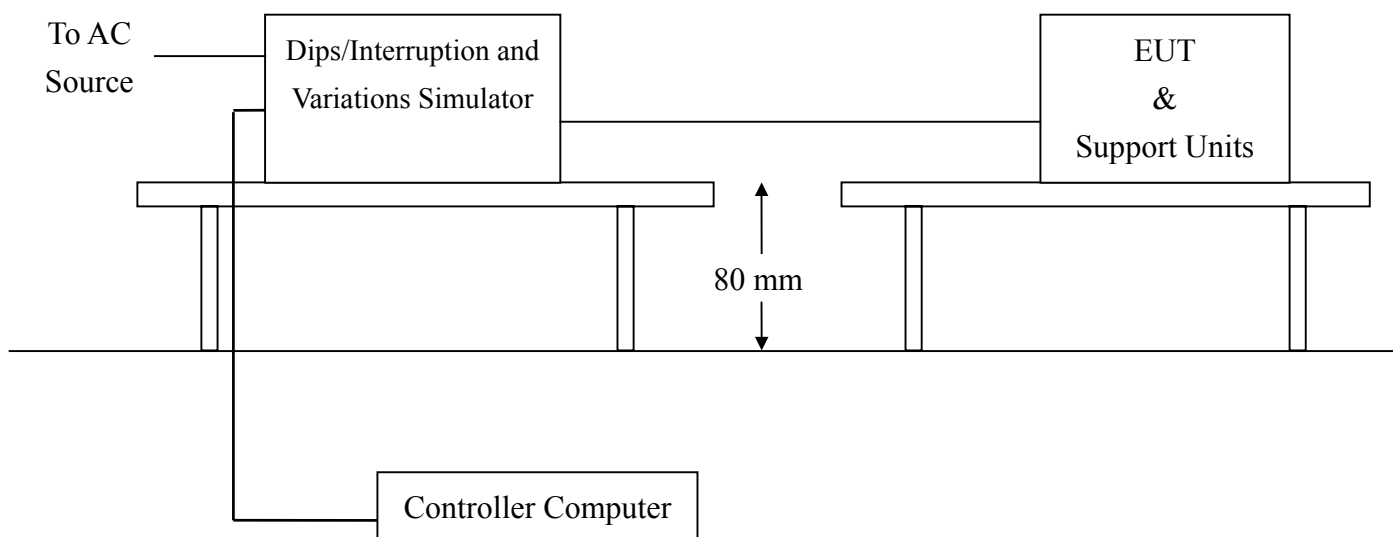
**Tester** : Michael Chen

**Temperature** : 25°C

**Humidity** : 58%

**Test Mode** : Mode 1, 5

### 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. Setting the parameter of tests and then Perform the test software of test simulator.
6. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
7. Repeating step 3 to 4 through the test.
8. 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
70	30	0.5 (10ms)	Normal	A
40	60	5 (100ms)	Normal	A
40	60	50 (1000ms)	Normal	A

### **Voltage Interruptions:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	250 (5000ms)	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 (EN55022)

*AWS-8124T-T*

*Front View*



*Back View*



***AWS-8124TP-T2***  
***Front View***



***Back View***



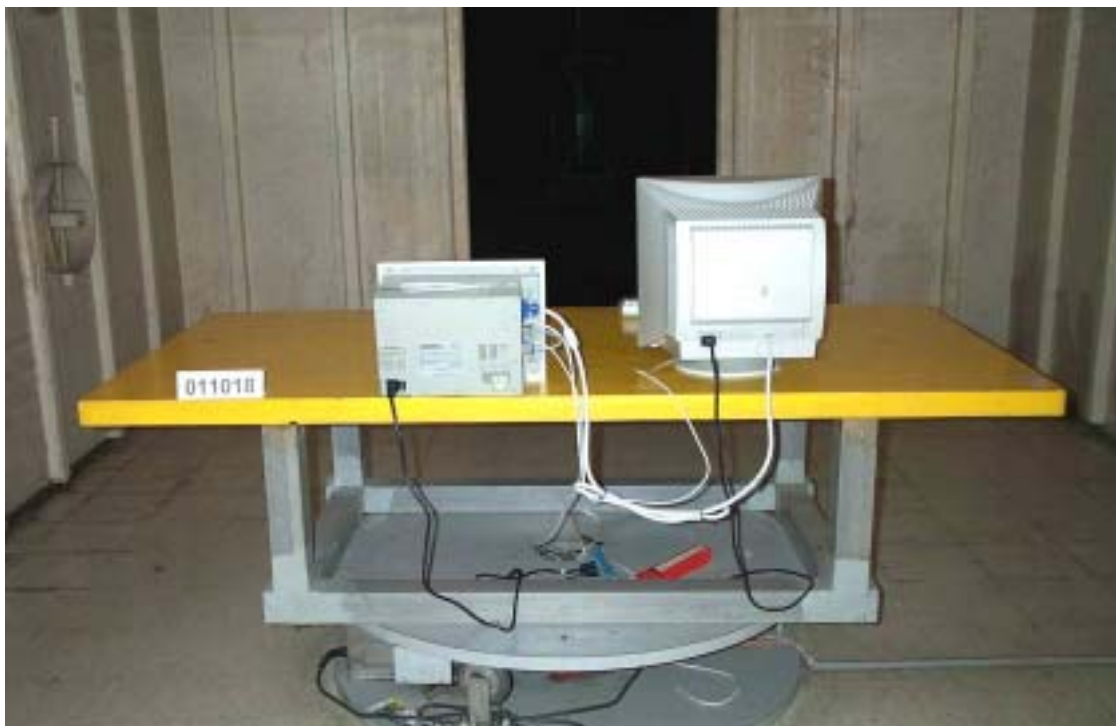
## **RADIATED EMISSION TEST (EN55022)**

***AWS-8124T-T***

***Front View***



***Back View***



## ***AWS-8124TP-T2***

### ***Front View***



### ***Back View***



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

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*

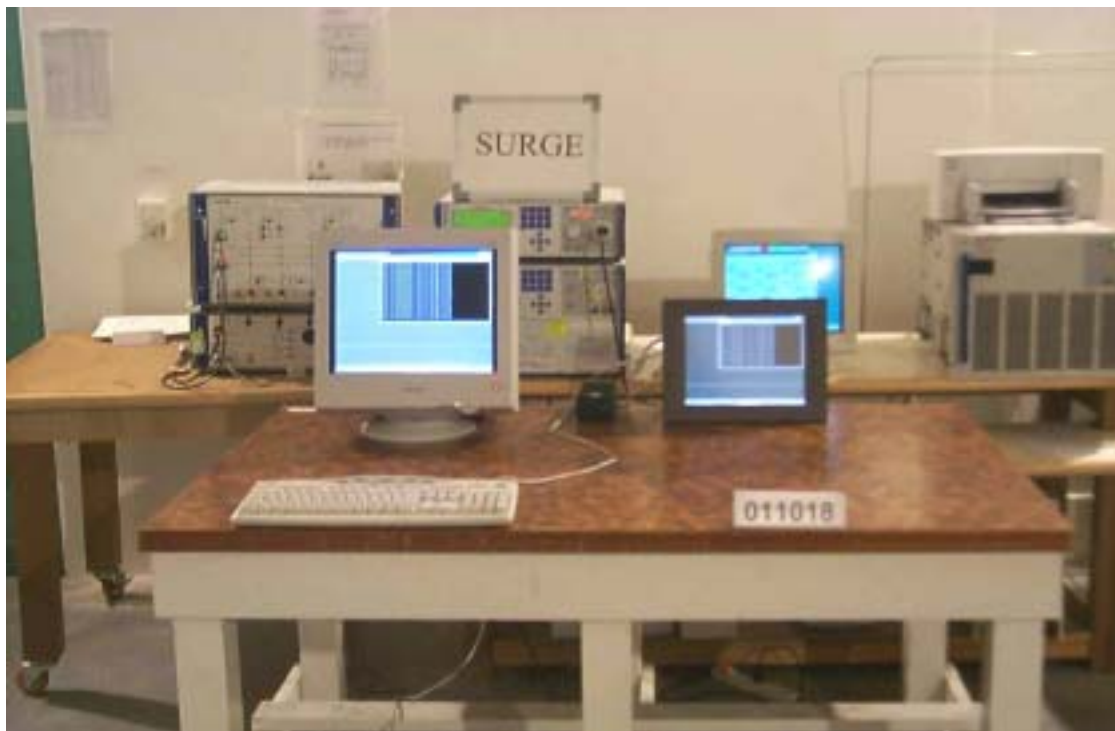


## SURGE IMMUNITY TEST (IEC 61000-4-5)

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*



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

*AWS-8124T-T*



*AWS-8124TP-T2*





## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

### Front View of EUT



### Back View of EUT (AC Input)



### Back View of EUT (DC Input)



**Left View of EUT (with CPU Board)**



**Left View of EUT -- open (with CPU Board)**



### Right View of EUT

