



EMC COMPLIANCE TEST REPORT

for

Panel PC

Trade Name : Advantech
Model Number : PPC-S154
Serial Number : N/A
Report Number : 030350-E
Date : May 23, 2003
Regulations : See below

Standards	Results (Pass/Fail)
EN 55022: 1998	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998	PASS
- IEC 61000-4-2: 2001	PASS
- IEC 61000-4-3: 1995	PASS
- IEC 61000-4-4: 1995	PASS
- IEC 61000-4-5: 1995	PASS
- IEC 61000-4-6: 1996	PASS
- IEC 61000-4-8: 1993	PASS
- IEC 61000-4-11: 1994	PASS

Prepared for:

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No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, R.O.C.

Prepared by:



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1 VERIFICATION OF COMPLIANCE

Equipment Under Test: Panel PC
Trade Name: Advantech
Model Number: PPC-S154
Serial Number: N/A
Applicant: **Advantech Co., Ltd.**
No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, R.O.C.

Manufacturer: **Advantech Co., Ltd.**
No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, 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
EN 61000-3-3: 1995
EN 55024: 1998
(IEC 61000-4-2: 2001, 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: 030350-E
Date of Test: May 19 ~ 21, 2003
Deviation: None
Condition of Test Sample: Normal
Final Result: Pass
Worst Data: See below

Test Item	Freq. (MHz)	Measured Data	Margin (M _μ C)	Remark
Radiated Emission	720.2/ 432.1	34.9 (dB/m)	-2.1 dB (± 1.6672/ 1.5758 dB)	
Conducted Emission	0.158	51.9 (dB)	-13.6 dB (± 2.8104 dB)	

- The negative sign in Margin cell means under the specific limit.
- This test result traceable to national or international standards.

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:



Jonson Lee / EMC Director

Reviewed by:



Susan Su / Section Manager

2 GENERAL INFORMATION

Applicant: **Advantech Co., Ltd.**
No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, R.O.C.

Contact Person: John Chou

Manufacturer: **Advantech Co., Ltd.**
No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, R.O.C.

File Number: 030350-E

Date of Test: May 19 ~ 21, 2003

Equipment Under Test: Panel PC

Model Number: PPC-S154

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
EN 61000-3-3: 1995
EN 55024: 1998
(IEC 61000-4-2: 2001, 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 2nd Road, Lu-Chu Hsiang,
Taoyuan, Taiwan, R.O.C.

3 SYSTEM DESCRIPTION

EUT Test Program:

1. EMI test program was loaded and executed in “Windows 2000” mode.
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. Test EUT receives message from remote side, and filling the screen of monitor with upper case of “H” patterns.
5. Repeat 2 to 4. Test program is self-repeating throughout the test.

4 PRODUCT INFORMATION

Housing Type:	Plastic		
EUT Power Rating:	DCV from Power Adapter		
AC power during Test:	230VAC/50Hz to Power Adapter		
Power Adapter Manufacturer:	LIEN	Model:	LE-9702B-06
Power Adapter Power Rating:	I/P: 100-240VAC, 50/60Hz, 1.8A O/P: 19VDC, 3.79A		
AC Power Cord Type:	Unshielded, 1.8m (Detachable) to Power Adapter		
DC Power Cable Type:	Unshielded, 1.5m (Non-detachable) at Power Adapter with a core		
CPU Manufacture:	Intel	Type:	P4-M 1.7 GHz
OSC/Clock Frequencies:	100MHz		
Memory Capacity:		Installed:	128MB
15” TFT LCD Panel Manufacturer:	CHUNGHWA	Model:	CLAA150XG01
HDD Manufacturer:	Fujitsu	Model:	MHK2120AT (20GB)
FDD Manufacturer:	NEC	Model:	FD1238T
ODD Manufacturer:	ASUS	Model:	SCD-2400
Mother Board Manufacturer:	Advantech	Model:	PCM-9681
LAN Card Manufacturer:	On Board		

I/O Port of EUT:

I/O Port Type	Q'TY	Tested with
1.) Serial Port	2	2
2.) PS/2 Keyboard Port	1	1
3.) Video Port (VGA)	1	1
4.) Audio In Port	1	1
5.) Audio Out Port	1	1
6.) Microphone Port	1	1
7.) LAN Port	1	1
8.) USB Port	4	4

5 SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	CPD-G200	2715862	FCC DoC	SONY	Shielded, 1.8m with a core	Unshielded, 1.8m
2.	Modem	DM-1414	0304012267	IFAXDM1414	ACEEX	Unshielded, 1.8m	Unshielded, 1.8m
3.	PS/2 Keyboard	SK-2800C	B1C790BCPJ73JM	GYUR79SK	Compaq	Shielded, 1.8m	N/A
4.	PS/2 Mouse	M-CAA43	LZE02801285	FCC DoC	Logitech	Shielded, 1.8m	N/A
5.	Mouse	M-BB48	LZE01450904	FCC DoC	Logitech	Shielded, 1.8m	N/A
6.	USB Mouse	MO19UCA	020440990	FCC DoC	HP	Shielded, 1.8m	N/A
7.	Multimedia Headset	DM-510	I1-0	N/A	KOKA	Unshielded, 1.8m	N/A
8.	Walkman	RQ-L10	HB004471	FCC DoC	Panasonic	Unshielded, 1.8m	N/A
9.	USB 2.0 HDD	F12-U	A0100214-31d0028	FCC DoC	TeraSyS	Unshielded, 1.8m	Unshielded, 1.8m with a core
10.	USB 2.0 HDD	F12-U	A0100214-31d0014	FCC DoC	TeraSyS	Unshielded, 1.8m	Unshielded, 1.8m with a core
11.	USB 2.0 HDD	F12-U	A0100214-2Bq0039	FCC DoC	TeraSyS	Unshielded, 1.8m	Unshielded, 1.8m with a core
12.	Notebook PC (Remote)	M285	NU2503589	FCC DoC	LEO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

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

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

6 TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2nd 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 16 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
- Accredited by NVLAP (Certificate #: 200600-0)
- 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

7 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	N/A	N/A
EMI Test Receiver	R&S	ESCS30	845552/030	02/18/2003	02/17/2004
Bilog Antenna	CHASE	CBL 6112B	2462	01/11/2003	01/10/2004
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	08/17/2002	08/16/2003

Conducted Emission Test Site: # 3

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	R&S	ESCS30	847793/012	12/21/2002	12/20/2003
LISN	R&S	ESH2-Z5	843285/010	12/16/2002	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
2X2 WIRE ISN	R&S	ENY22	100020	06/20/2002	06/19/2003
FOUR WIRE ISN	R&S	ENY41	100006	06/20/2002	06/19/2003

Power Harmonic & Voltage Fluctuation/Flicker Measurement:

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	10/14/2002	10/13/2003

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

8 TEST EQUIPMENT LIST (IMMUNITY)

ESD test (61000-4-2)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
ESD Generator	EM TEST	P30C	0603-01	02/27/2003	02/26/2004
Radiated Electromagnetic Field immunity Measurement (61000-4-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	150W1000	300300	N/A	N/A
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
Fast Transients/Burst test (61000-4-4)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT- JUNIOR	583 333-117	08/22/2002	08/21/2003
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N/A	N/A
Surge Immunity test (61000-4-5)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	09/03/2002	09/02/2003
CS test (61000-4-6)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	500A100A	300299	N/A	N/A
CDN	Lüthi	801-M3	1879	02/26/2003	02/25/2004
CDN	MEB	M2	A3002010	04/28/2003	04/27/2004
CDN	SCHAFFNER	T400	16906	10/17/2002	10/16/2003
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	10/21/2002	10/20/2003
Clamp Meter	National	300K	11-5980 K	11/19/2002	11/18/2003
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	03/28/2003	03/27/2004

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

9.1 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. **1024 × 768 Resolution / 100Mbps**
2. **1024 × 768 Resolution / 10Mbps**
3. **800 × 600 Resolution / 100Mbps**
4. **640 × 480 Resolution / 100Mbps**

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

Mode: 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 + Insertion loss of LISN, if it > 0.5 dB
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.

Calculation example:

$$\text{Margin (dB)} = \text{RAW (dBuV)} - \text{Limit (dBuV)}$$

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.

9.2 MEASUREMENT PROCEDURE (COMMON MODE CONDUCTED EMISSION MEASUREMENT)

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

Data Sample:

Freq. MHz	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.xx	43.95	---	74	64	-30.05	---	

Freq.

Raw dBuV

Limit dBuV

Margin dB

Note

“---“

= Emission frequency in MHz

= Uncorrected Analyzer / Receiver reading

= Limit stated in standard

= Reading in reference to limit

= Current carrying line of reading

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

COMMON MODE CONDUCTED EMISSION LIMIT AT TELECOMMUNICATION PORTS

<input checked="" type="checkbox"/> CE-Mark (EN 55022:1998)					
CLASS	Measuring Band	Voltage limit dB(uV)		Current limit dB(uA)	
		Q.P.	AV	Q.P.	AV
B	150kHz-500kHz	84-74	84-64	40-30	30-20
	500kHz-30MHz	74	64	30	20

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

9.3 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. **1024 × 768 Resolution / 100Mbps**
2. **1024 × 768 Resolution / 10Mbps**
3. **800 × 600 Resolution / 100Mbps**
4. **640 × 480 Resolution / 100Mbps**

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

Mode: 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)	Corr. Factor (dB/m)	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)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB/m)	= Antenna factor + Cable loss – Amplifier gain
Emiss. Level (dBuV/m)	= Raw reading converted to dBuV/m and CF added
Limit (dBuV/m)	= Limit stated in standard
Margin (dB)	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading

Calculation example:

$$\text{Margin (dB)} = \text{Emiss. Level (dBuV/m)} - \text{Limits (dBuV/m)}$$

$$\text{Emission Level (dBuV/m)} = \text{Raw Data (dBuV)} + \text{Corr Factor (dB/m)}$$

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.

10 BLOCK DIAGRAM OF TEST SETUP

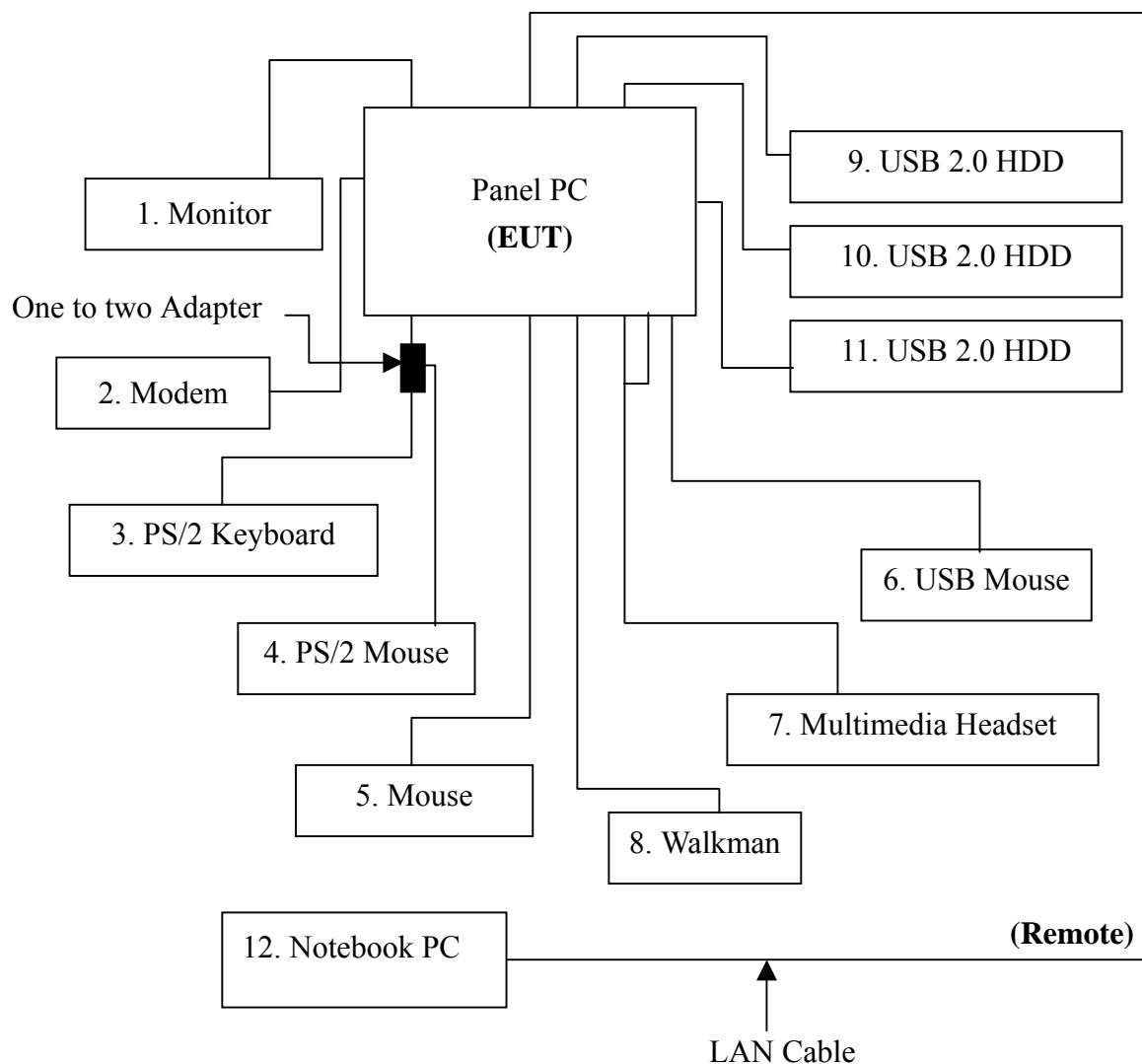
System Diagram of Connections between EUT and Simulators

EUT: Panel PC

Trade Name: Advantech

Model Number: PPC-S153T

Power Cord: Unshielded, 1.8m to Power Adapter



11 SUMMARY DATA

(LINE CONDUCTED TEST)

Model Number: PPC-S154

Location: Site # 3

Tested by: Bill Cheng

Test Mode: Mode 1

Test Results: Passed

Temperature: 28°C

Humidity: 63%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
0.157	46.50	---	65.60	55.60	-19.10	---	L1
2.202	37.10	---	56.00	46.00	-18.90	---	L1
2.490	36.90	---	56.00	46.00	-19.10	---	L1
4.977	39.00	---	56.00	46.00	-17.00	---	L1
6.829	39.90	---	60.00	50.00	-20.10	---	L1
10.810	41.00	---	60.00	50.00	-19.00	---	L1
0.158	51.90	---	65.50	55.50	-13.60	---	L2
1.851	38.50	---	56.00	46.00	-17.50	---	L2
2.373	38.00	---	56.00	46.00	-18.00	---	L2
4.513	40.90	---	56.00	46.00	-15.10	---	L2
6.878	42.50	---	60.00	50.00	-17.50	---	L2
7.107	41.60	---	60.00	50.00	-18.40	---	L2

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

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

SUMMARY DATA

(COMMON MODE CONDUCTED EMISSION MEASUREMENT)

(LAN Port)

Model Number: PPC-S154

Location: Site # 3

Tested by: Bill Cheng

Test Mode: Mode 1

Test Results: Passed

Temperature: 30°C

Humidity: 62%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
0.757	59.10	---	74.00	64.00	-14.90	---	10Base
1.218	62.90	61.30	74.00	64.00	-11.10	-2.70	10Base
7.252	56.30	---	74.00	64.00	-17.70	---	10Base
10.033	48.30	---	74.00	64.00	-25.70	---	10Base
10.067	57.50	---	74.00	64.00	-16.50	---	10Base
15.002	55.60	---	74.00	64.00	-18.40	---	10Base
19.708	67.70	---	84.00	74.00	-16.30	---	100Base
21.662	68.80	---	84.00	74.00	-15.20	---	100Base
23.128	71.10	---	84.00	74.00	-12.90	---	100Base
24.349	66.80	---	84.00	74.00	-17.20	---	100Base
26.609	68.30	---	84.00	74.00	-15.70	---	100Base
27.158	68.00	---	84.00	74.00	-16.00	---	100Base

NOTE:

- 1) “---” denotes the emission level was less -2 dB to the Average limit, so no re-check anymore.
- 2) According to Note 3 on table 4 of EN 55022: 1998 standard, the Limits allowed to relaxation of 10dB over at frequency range 6 MHz to 30MHz.

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: PPC-S154

Location: Site # 4

Tested by: George Liao

Polar: Vertical--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 27°C

Humidity: 55%RH

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
109.60	9.1	14.0	23.1	30.0	-6.9
133.35	4.4	14.2	18.6	30.0	-11.4
150.41	9.9	13.8	23.7	30.0	-6.3
165.66	12.5	13.1	25.6	30.0	-4.4
180.01	14.7	12.1	26.8	30.0	-3.2
188.14	11.2	12.4	23.6	30.0	-6.4
322.50	10.4	18.0	28.4	37.0	-8.6
432.08	12.4	21.2	33.6	37.0	-3.4
720.20	9.5	25.4	34.9	37.0	-2.1

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: PPC-S154

Location: Site # 4

Tested by: George Liao

Polar: Vertical--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 27°C

Humidity: 55%RH

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
150.08	8.5	13.8	22.3	30.0	-7.7
186.32	7.1	12.3	19.4	30.0	-10.6
299.98	6.5	18.0	24.5	37.0	-12.5
300.01	7.4	18.0	25.4	37.0	-11.6
400.02	6.0	20.8	26.8	37.0	-10.2
432.10	13.7	21.2	34.9	37.0	-2.1
721.20	9.1	25.4	34.5	37.0	-2.5

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

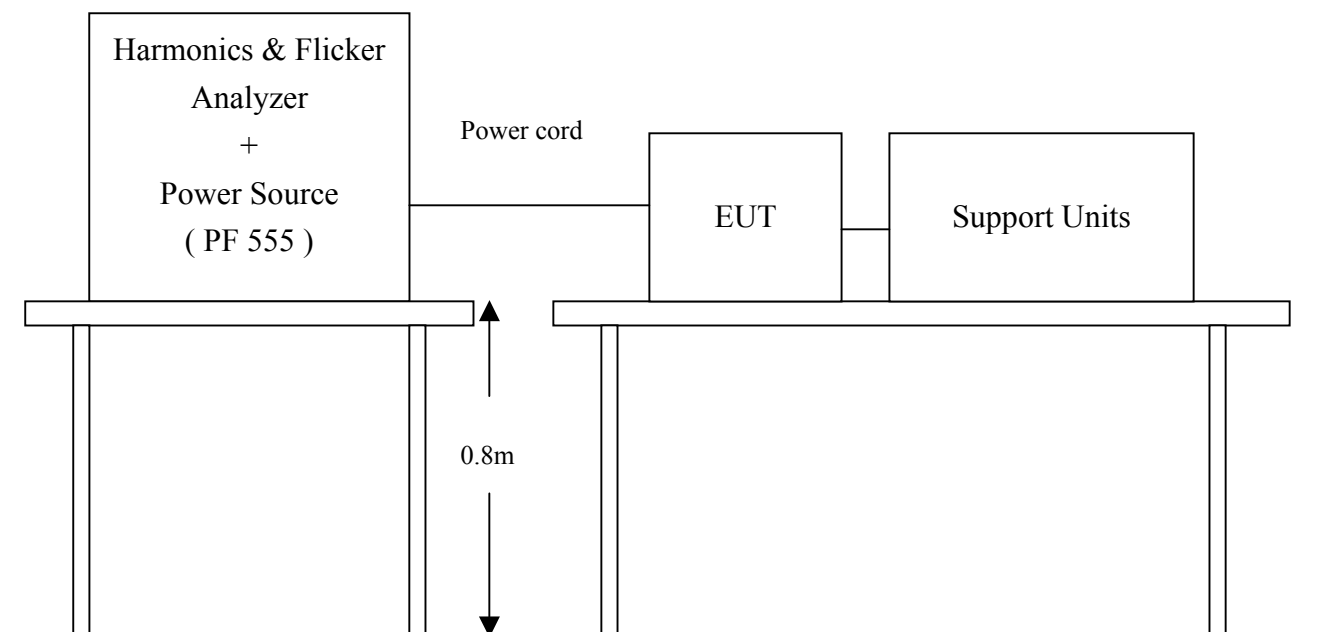
POWER HARMONICS MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998)
Limits : ☒ CLASS A ; ☐ CLASS D
Tester : Hank Huang
Temperature : 20°C
Humidity : 55%

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-3 (1995)
Limits : § 5 of EN 61000-3-3
Tester : Hank Huang
Temperature : 20°C
Humidity : 55%

Block Diagram of Test Setup:



Result:

Please see the attached test data.

EN 61000-3-2 TEST REPORT 2003/5/19 09:40 PM

Unit: Panel PC

Model No.: PPC-S154

Remarks: TEMP: 20°C Humidity: 55%

Operator: Hank Huang

=====

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: 56W



TEST DATA

Result: PASS

Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.177	NaN	NaN	PASS
2	0.003	1.080	1.080	PASS
3	0.155	2.300	2.300	PASS
4	0.003	0.430	0.430	PASS
5	0.148	1.140	1.140	PASS
6	0.002	0.300	0.300	PASS
7	0.137	0.770	0.770	PASS
8	0.002	0.230	0.230	PASS
9	0.125	0.400	0.400	PASS
10	0.002	0.184	0.184	PASS
11	0.111	0.330	0.330	PASS
12	0.002	0.153	0.153	PASS
13	0.096	0.210	0.210	PASS
14	0.002	0.131	0.131	PASS
15	0.080	0.150	0.150	PASS
16	0.002	0.115	0.115	PASS
17	0.064	0.132	0.132	PASS
18	0.001	0.102	0.102	PASS
19	0.050	0.118	0.118	PASS
20	0.001	0.092	0.092	PASS

21	0.037	0.107	0.107	PASS
22	0.001	0.084	0.084	PASS
23	0.026	0.098	0.098	PASS
24	0.001	0.077	0.077	PASS
25	0.018	0.090	0.090	PASS
26	0.001	0.071	0.071	PASS
27	0.013	0.083	0.083	PASS
28	0.001	0.066	0.066	PASS
29	0.012	0.078	0.078	PASS
30	0.001	0.061	0.061	PASS
31	0.012	0.073	0.073	PASS
32	0.001	0.058	0.058	PASS
33	0.013	0.068	0.068	PASS
34	0.001	0.054	0.054	PASS
35	0.012	0.064	0.064	PASS
36	0.001	0.051	0.051	PASS
37	0.011	0.061	0.061	PASS
38	0.001	0.048	0.048	PASS
39	0.009	0.058	0.058	PASS
40	0.001	0.046	0.046	PASS

END OF REPORT

EN 61000-3-3 TEST REPORT 2003/5/19 10:02 PM

Unit: Panel PC

Model No.: PPC-S154 (Continue)

Remarks: TEMP: 20°C Humidity: 55%

Operator: Hank Huang

=====

TEST SETUP

Test Freq.: 50.00 Hz. Test Voltage: 230.0 vac

Waveform : SINE

Test Time: 10.0 min. Tshort: 10.0 min.

Prog. Zo Enabled: YES Prog. Zo: 0.000

Voltage Change less than once per Hour: NO

Impedance selected: DIRECT

Synthetic R+L Enabled: NO

Resistance: 0.380 Ohms Inductance: 460.000 uH



TEST DATA

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.001	1.00	PASS	true
Plt max	0.001	0.65	PASS	true
dc %	0.00	3.00	PASS	true
dmax %	0.00	4.00	PASS	true
d(t) sec.	0.00	0.20	PASS	true
Power Source Data				
Source Pst max	0.021	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT

EN 61000-3-3 TEST REPORT 2003/5/19 10:17 PM

Unit: Panel PC

Model No.: PPC-S154 (Manual Switch)

Remarks: TEMP: 20°C Humidity: 55%

Operator: Hank Huang

=====

TEST SETUP

Test Freq.: 50.00 Hz. Test Voltage: 230.0 vac

Waveform : SINE

Test Time: 10.0 min. Tshort: 10.0 min.

Prog. Zo Enabled: YES Prog. Zo: 0.000

Voltage Change less than once per Hour: NO

Impedance selected: DIRECT

Synthetic R+L Enabled: NO

Resistance: 0.380 Ohms Inductance: 460.000 uH

TEST DATA

Result: PASS

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

Power Source Data

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

END OF REPORT

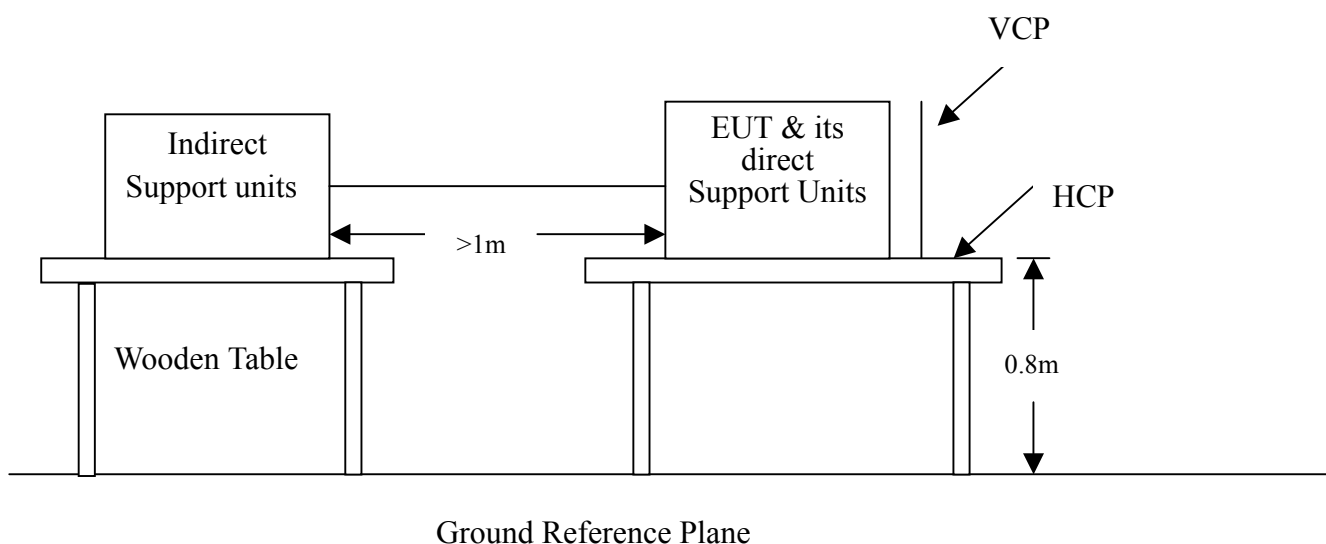
13 SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port : Enclosure
Basic Standard : IEC 61000-4-2
Test Level : ± 8 kV (Air Discharge)
 ± 4 kV (Contact Discharge)
 ± 4 kV (Indirect Discharge)
Performance Criteria : B (Standard require)
Tester : Hank Huang
Temperature : 20°C
Humidity : 55%
Pressure : 1019mbar

Block Diagram of Test Setup:

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



Test Procedure:

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

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

The electrostatic discharges were applied as follows:

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

****The tested points to EUT, please refer to attached page.**

(Blue arrow mark for Contact Discharge and red arrow mark for Air Discharge)

Performance & Result:

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

☒ **PASS**

☐ **FAILED**

Observation: No any function degraded during the tests.

The Tested Points of EUT

(Photo 1 of 4)



(Photo 2 of 4)



(Photo 3 of 4)



(Photo 4 of 4)

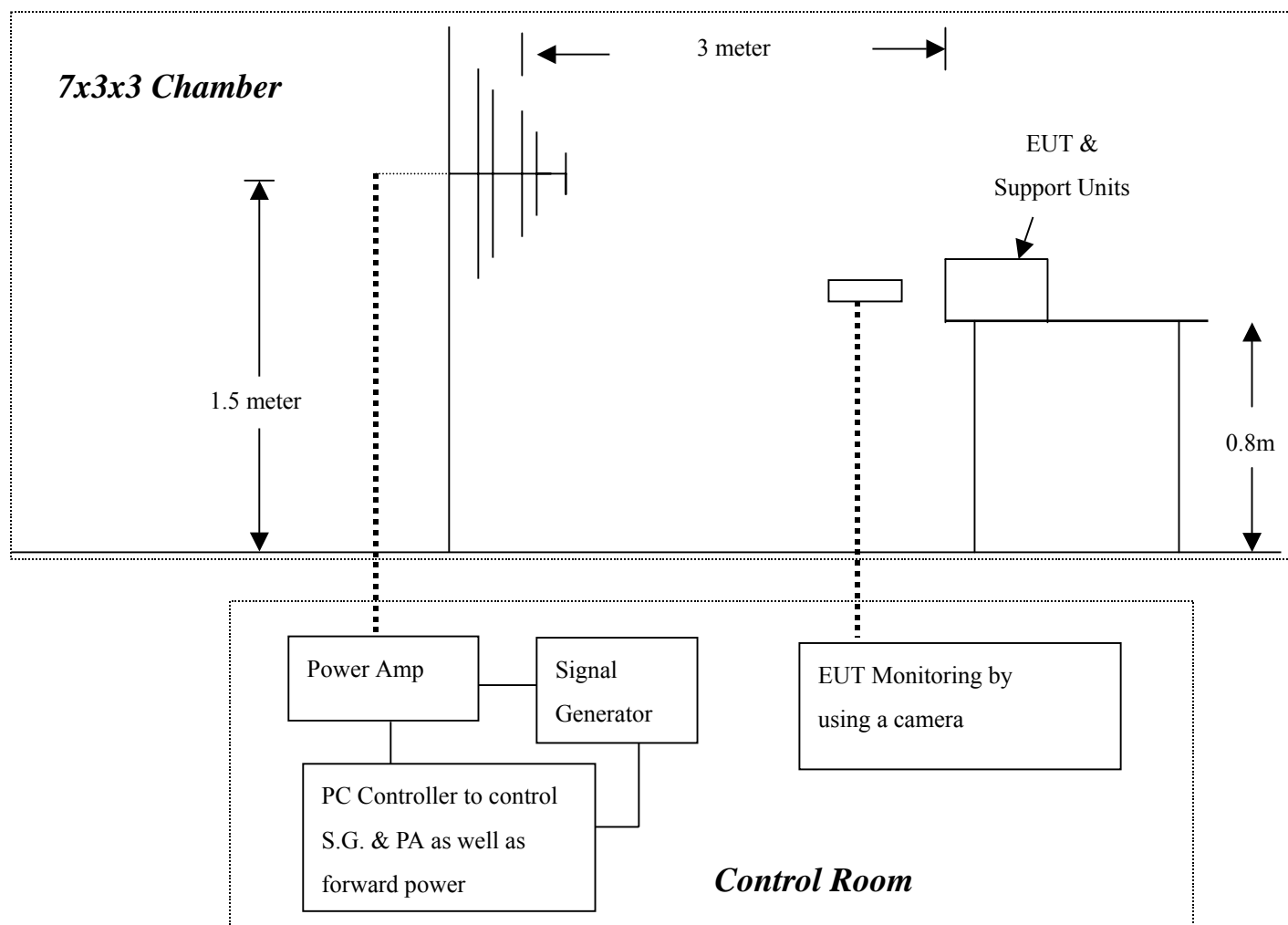


14 SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

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	: Hank Huang
Temperature	: 20°C
Humidity	: 55%
Pressure	: 1019mbar

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 55024:1998 if the EUT doesn't belong to ITE product.

IEC 61000-4-3 Preliminary test conditions:

Test level : 6V/m
Steps : 4 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	6V/m	Yes	H	Front	Pass
80-1000	6V/m	Yes	V	Front	Pass
80-1000	6V/m	Yes	H	Right	Pass
80-1000	6V/m	Yes	V	Right	Pass
80-1000	6V/m	Yes	H	Back	Pass
80-1000	6V/m	Yes	V	Back	Pass
80-1000	6V/m	Yes	H	Left	Pass
80-1000	6V/m	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/m	Yes	H	Front	Pass
80-1000	3V/m	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**

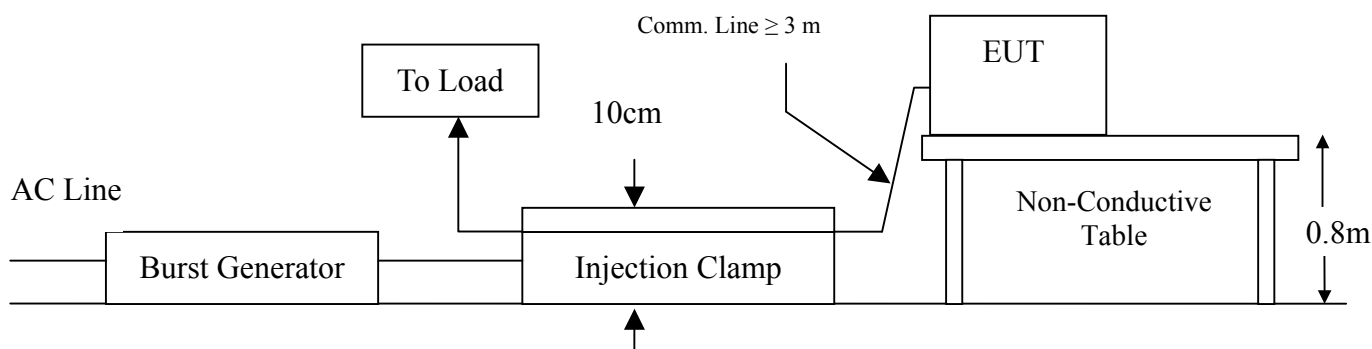
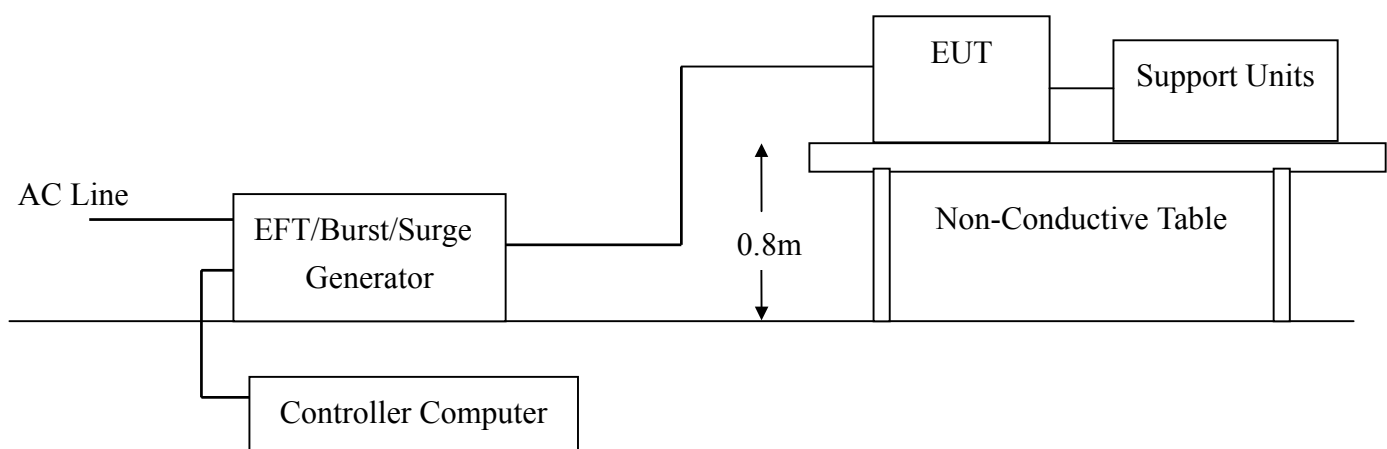
Observation: No any function degraded during the tests.

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

FAST TRANSIENTS/BURST IMMUNITY TEST

Port	: On Power Supply Lines and Data Lines
Basic Standard	: IEC 61000-4-4
Requirements	: ± 1 kV for Power Supply Line ± 0.5 kV to LAN Cable
Performance Criteria	: B (Standard require)
Tester	: Hank Huang
Temperature	: 20°C
Humidity	: 55%
Pressure	: 1019mbar

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 2000" mode.
5. The data was sent to EUT filling the screens with upper case of "H" patterns.
6. The test program exercised related support units sequentially.
7. Repeating step 3 to 4 through the test and increase test voltage to the EUT ports from minimum to standard request or client request.
8. Recording the test result as shown in following table.

Test conditions:

Impulse Frequency : 5kHz

Tr/Th : 5/50ns

Burst Duration : 15ms

Burst Period : 3Hz

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L	± 1	Direct	Pass
N	± 1	Direct	Pass
PE	± 1	Direct	Pass
L + N	± 1	Direct	Pass
L + PE	± 1	Direct	Pass
N + PE	± 1	Direct	Pass
L + N + PE	± 1	Direct	Pass
LAN Cable	± 0.5	Clamp	Pass

Performance & Result:

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

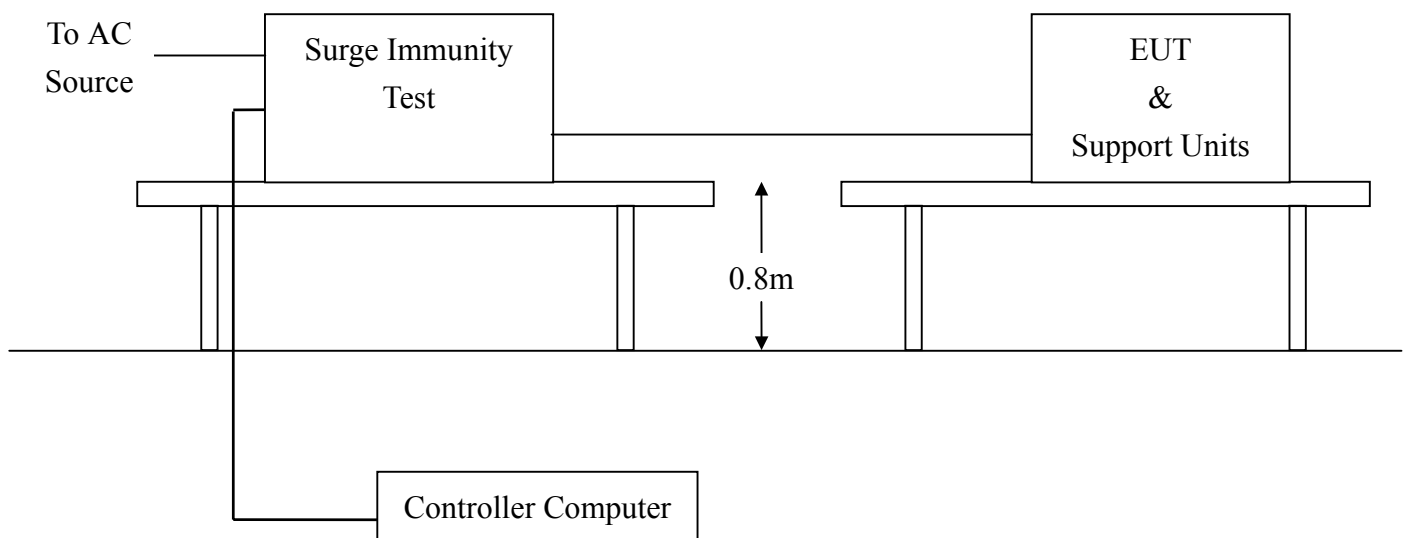
<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAILED
Observation: No any function degraded during the tests.	

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

SURGE IMMUNITY TEST

Port	: Power Cord
Basic Standard	: IEC 61000-4-5
Requirements	: ± 1 kV (Line to Line) ± 2 kV (Line to Ground)
Performance Criteria	: B (Standard require)
Tester	: Hank Huang
Temperature	: 20°C
Humidity	: 55%
Pressure	: 1019mbar

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 2000" mode.
3. The data was sent to EUT filling the screens with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Repeating step 3 to 4 through the test and increase test voltage to the EUT ports from minimum to standard request or client request.
6. Recording the test result as shown in following table.

Test conditions:

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

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

Performance & Result:

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

☒ **PASS**

☐ **FAILED**

Observation: No any function degraded during the tests.

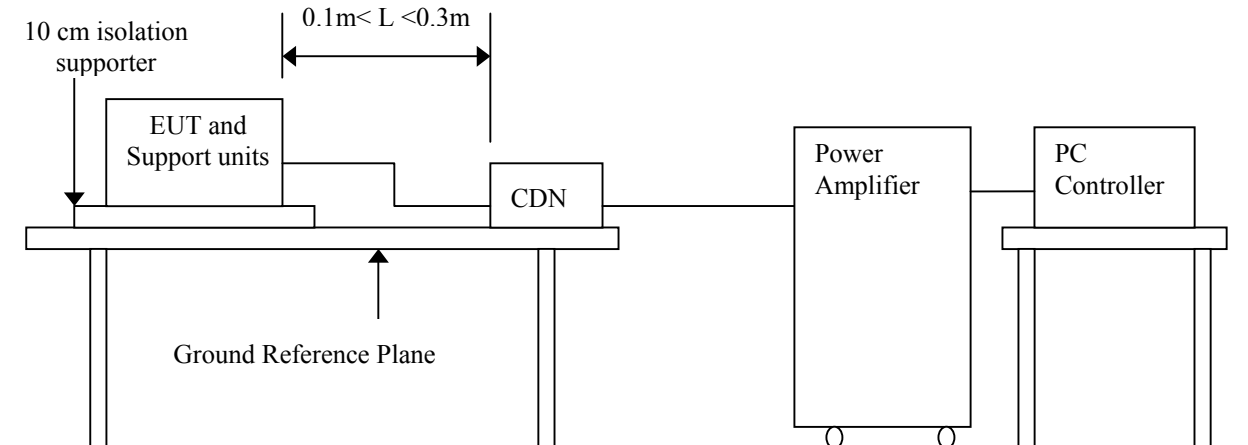
17 SECTION 7 IEC 61000-4-6 (CONDUCTED DISTRBANCE/INDUCED RADIO-FREQUENCY FIELD)

CONDUCTED DISTRBANCE/INDUCED RADIO-FREQUENCY FIELD IMMUNITY TEST

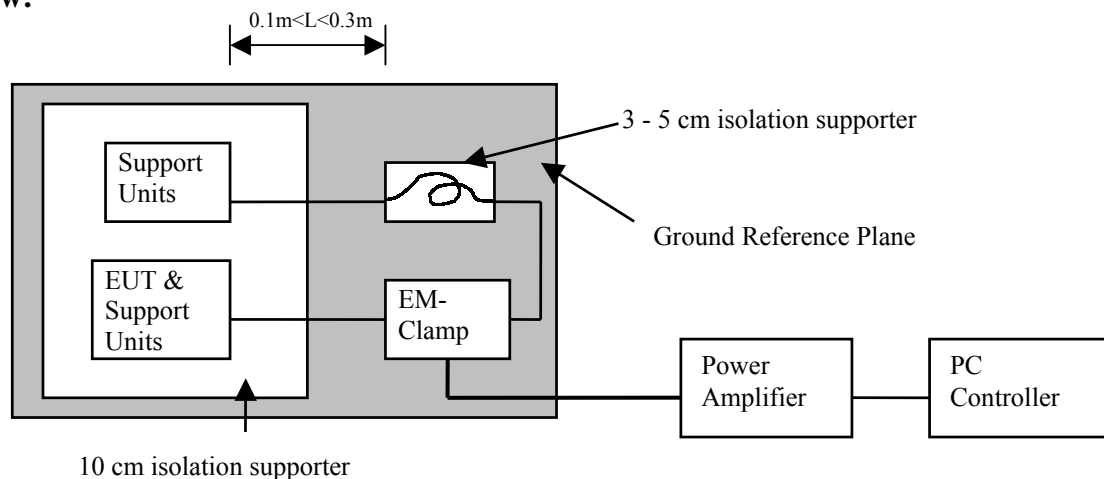
Port	: AC Port and LAN Cable
Basic Standard	: IEC 61000-4-6
Requirements	: 3V with 80% AM. 1kHz Modulated
Injection Method	: CDN-M3 for Power Cord EM-Clamp for LAN Cable
Performance Criteria	: A (Standard require)
Tester	: Hank Huang
Temperature	: 20°C
Humidity	: 55%
Pressure	: 1019mbar

Block Diagram of Test Setup:

Side View:



Top view:



Test Procedure:

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

Test conditions:

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Dwell Time : 3 sec

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

Performance & Result:

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

☒ **PASS**

☐ **FAILED**

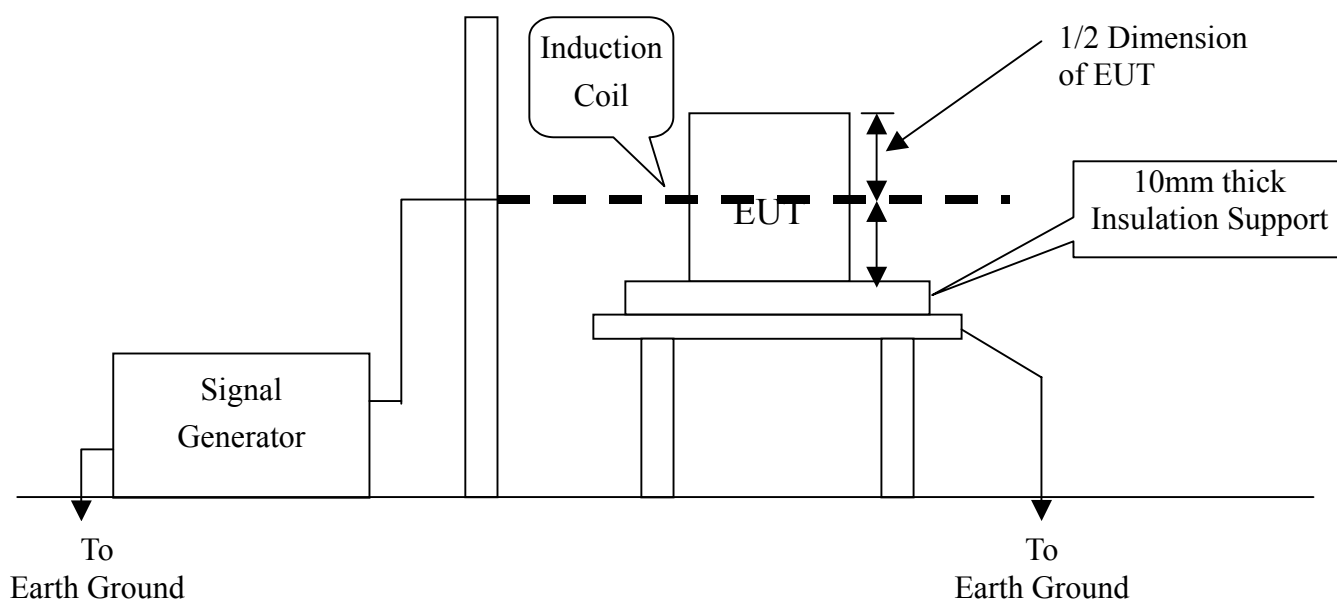
Observation: No any function degraded during the tests.

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

POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC 61000-4-8
Requirements	: 1 A/m
Performance Criteria	: A (Standard Required)
Tester	: Hank Huang
Temperature	: 20 °C
Humidity	: 55%
Pressure	: 1019mbar

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 2000” mode.
4. The data was sent to the screen of EUT and filling the screen with upper case of “H” patterns.
5. The test program exercised related support units sequentially.
6. Repeating step 3 to 5 through the test.
7. Recording the test result as shown in following table.
8. Rotating the induction coil by 90° (Y direction) then repeat step 3 to 7.
9. Rotating the induction coil by 90° again (Z direction) then repeat step 3 to 7.

*. Test conditions:

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

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

<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAILED
Observation: No any function degraded during the tests.

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

VOLTAGE DIPS / SHORT INTERRUPTIONS

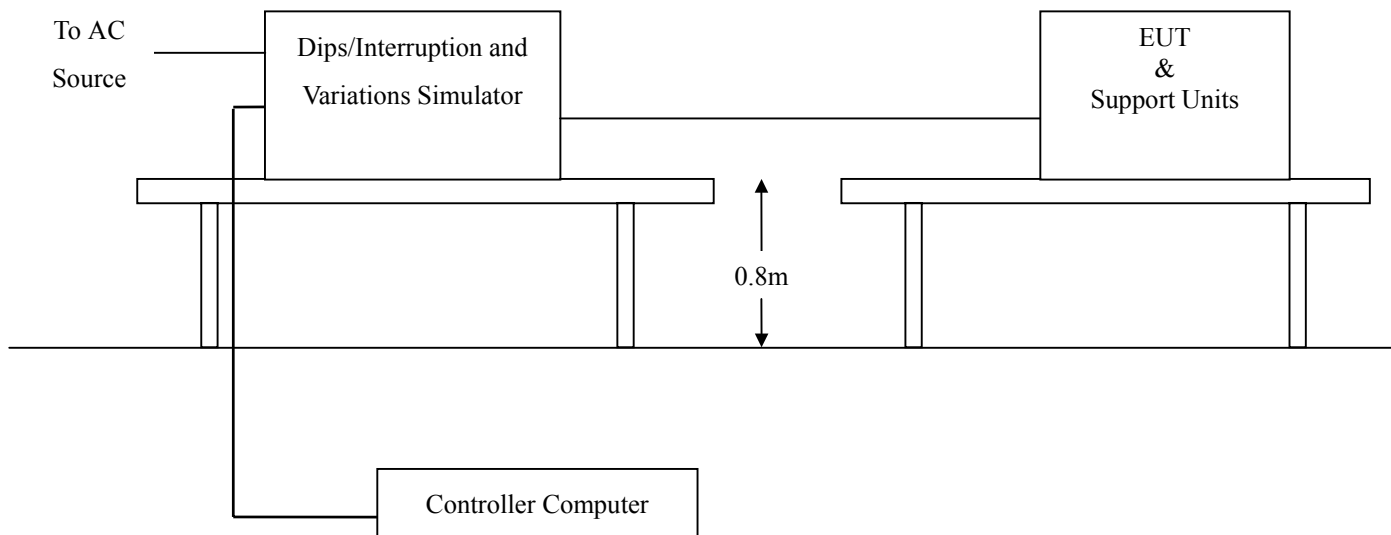
Port : AC mains
Basic Standard : IEC 61000-4-11 (1994)
Requirement : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

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

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

Test Interval : Min. 10 sec.
Tester : Hank Huang
Temperature : 20°C
Humidity : 55%
Pressure : 1019mbar

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 2000" 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 _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	Normal	A

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.

<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAILED
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20 APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

20.1 LINE CONDUCTED EMISSION TEST (EN 55022)

Front View



Back View



20.2 COMMON MODE CONDUCTED EMISSION TEST



20.3 RADIATED EMISSION TEST (EN 55022)

Front View



Back View



20.4 POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST

(EN 61000-3-2, EN 61000-3-3)



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



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



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



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



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



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



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





21 APPENDIX 2 PHOTOGRAPHS OF EUT

Front View of EUT



Back View of EUT



Left View of EUT



Right View of EUT



I/O Port View of EUT



Front View of Power Adapter



Back View of Power Adapter

