EMC COMPLIANCE TEST REPORT

for

CPU Board

Trade Name : N/A
Model Number : MB-668(N)
Serial Number : N/A
Report Number : 010003-E
Date : January 18, 2001
Regulations : See below

Standards	Results (Pass/Fail)
EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998	PASS
EN 61000-3-3: 1995	PASS
EN 50082-2: 1995	PASS
- EN 61000-4-2: 1995	PASS
- ENV 50140: 1994	PASS
- ENV 50204: 1996	PASS
- EN 61000-4-4:1995	PASS
- ENV 50141: 1994	PASS
- EN 61000-4-8: 1993	N/A

Prepared for **:**

AAEON Technology Co., Ltd.
5F, No. 135, Lane 235, Pao Chiao Rd. Hsin-Tien City,
Taipei, Taiwan, R.O.C.

Prepared by **:**

C & C Laboratory Co., Ltd.
#B1, 1st Fl., Universal Center,
No. 183, Sec. 1, Tatung Rd., Hsi Chin,
Taipei Hsien, Taiwan, R.O.C.
TEL: (02)86422071
FAX: (02)86422256

ACCREDITED

This report shall not be reproduced, except in full, without the written approval of C&C Laboratory Co., Ltd.

EC-Declaration of Conformity

For the following equipment:

CPU Board
(Product Name)

MB-668(N)
(Model Designation / Trade name)

AAEON Technology Co., Ltd.
(Manufacturer Name)

5F, No.135, Lane 235, Pao Chiao Rd. Hsin-Tien City, Taiwan, R.O.C.
(Manufacturer Address)

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

☑ EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A)
☑ EN 61000-3-2: 1995+A1: 1998+A2: 1998 ; EN 61000-3-3: 1995
☑ EN 50082-2: 1995
EN 61000-4-2: 1995 ; ENV 50140: 1994 ; ENV 50204: 1996 ; EN 61000-4-4: 1995
ENV 50141: 1994

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

(Company Name)

(Company Address)

Person responsible for making this declaration:

(Name, Surname)

(Position / Title)

(Place) (Date) (Legal Signature)

TABLE OF CONTENTS

VERIFICATION OF COMPLIANCE

Equipment Under Test:	CPU Board
Trade Name:	N/A
Model Number:	MB-668(N)
Serial Number:	N/A
Applicant:	**AAEON Technology Co., Ltd.** 5F, No.135, Lane 235, Pao Chiao Rd. Hsin-Tien City, Taipei, Taiwan, R.O.C.
Manufacturer:	**AAEON Technology Co., Ltd.** 5F, No.135, Lane 235, Pao Chiao Rd. Hsin-Tien City, Taipei, Taiwan, R.O.C.
Type of Test:	EMC Directive 89/336/EEC for CE Marking
Technical Standards:	EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A) EN 61000-3-2: 1995+A1: 1998+A2: 1998 ; EN 61000-3-3: 1995 EN 50082-2: 1995 (EN 61000-4-2: 1995, ENV 50140: 1994, ENV 50141: 1994, EN 61000-4-4: 1995, ENV 50204: 1996)
File Number:	010003-E
Date of test:	January 7~11, 2001
Deviation:	According to applicant declaration this EUT is a class A product, and to market in 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: Nicki Cheng

Nicki Cheng / Authorized Signatory

GENERAL INFORMATION

Applicant:	**AAEON Technology Co., Ltd.** 5F, No.135, Lane 235, Pao Chiao Rd. Hsin-Tien City, Taipei, Taiwan, R.O.C.
Contact Person:	Millo Wang
Manufacturer:	**AAEON Technology Co., Ltd.** 5F, No.135, Lane 235, Pao Chiao Rd. Hsin-Tien City, Taipei, Taiwan, R.O.C.
File Number:	010003-E
Date of Test:	January 8~11, 2001
Equipment Under Test:	CPU Board
Model Number:	MB-668(N)
Serial Number:	N/A
Technical Standards:	EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A) EN 61000-3-2: 1995+A1: 1998+A2: 1998 ; EN 61000-3-3: 1995 EN 50082-2: 1995 (EN 61000-4-2: 1995, ENV 50140: 1994, ENV 50141: 1994, EN 61000-4-4: 1995, ENV 50204: 1996)
Frequency Range (EN 55011):	150Khz to 30MHz for Line Conducted Test 30MHz to 1000MHz for Radiated Emission Test
Test Site	**C & C LABORATORY CO., LTD.** No. 15, 14 Lin, Chi Twu Chi, 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. The EMI test program sequentially exercised all I/O's of EUT.
3. A communication software was loaded and executed on EUT to communicate with remote side equipment.
4. The EUT sends to and receives message from remote side, and filling the screen of monitor with upper case of "H" patterns.
5. Repeat step 2 to 4 throughout the test.

PRODUCT INFORMATION

Housing Type:	N/A		
EUT Power Rating:	DCV from Power Supply		
AC power during Test:	230VAC/50Hz to Power Supply		
Power Supply Manufacturer:	N/A		
Power Supply Model Number:	PPS100-31(71B)		
AC Power Cord Type:	Unshielded, 1.6m (Un-detachable) to Power Supply with a core		
DC Power Cable Type:	N/A		
CPU Manufacturer:	Intel	**Type:**	Celeron 466MHz(66 x 7)
OSC/Clock Frequencies：	133 MHz, 14.318 MHz		
Memory Capacity:		**Installed:**	32MB
HDD Manufacturer:	Fujitsu	**Model:**	M2714T
LCD Panel	TOSHIBA	**Model:**	15C151A
Case Manufacturer:	N/A	**Model:**	TOP-2000
VGA Card Type:	on Board		

I/O Port of EUT:

I/O PORT TYPES	Q'TY	TESTED WITH
1). Parallel Port	1	1
2). Serial Port	3	3
3). Video Port	1	1
4). PS/2 Keyboard Port	1	1
5). PS/2 Mouse	1	1
6). LAN Port	1	1
7). USB Port	2	2

SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	D2827A	KR92316215	C5F7NFCMC1518X	HP	Shielded, 1.5m	Unshielded, 1.8m with two core
2.	Modem	2400	94-364-176276	DK467GSM24	Computer Peripherals	Shielded, 1.6m	Unshielded, 1.6m
3.	Printer	2225C	2804S03094	DSI6XU2225	HP	Shielded, 1.6m	Unshielded, 1.6m
4.	PS/2 Keyboard	SK-2502C	M99043551	FCC DoC	HP	Shielded, 1.8m	N/A
5.	PS/2 Mouse	M-S34	LZC84445540	DZL211029	HP	Shielded, 1.8m	N/A
6.	USB Mouse	M-BB48	LZE93050088	FCC DoC	Logitech	Shielded, 1.8m	N/A
7.	USB Mouse	M-BB48	LZE93050148	FCC DoC	Logitech	Shielded, 1.8m	N/A
8.	Mouse	M-MM43	LZE93353024	DoC	Logitech	Shielded, 1.9m	N/A
9.	Mouse	M-MM43	LZE94052791	DoC	Logitech	Shielded, 1.9m	N/A
10.	Notebook PC (Remote)	365	EXTENSA367T	FCC DoC	Acer	Shielded, 10m	AC I/P: Unshielded, 1.6m DC O/P: Unshielded, 1.6m

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. 15, 14 Line, Chin Twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.
Description:	There are four 3/10m open area test sites and three line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.
Site Filing:	A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046. Registration also was made with Voluntary Control Council for Interference (VCCI).
Site 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 # 1 & # 3 Line Conducted Test Site:	Vertical ground plane (2.2m x 2.2m) Horizontal ground plane (2.5m x 2.5m)
Site # 4 Line Conducted Test Site:	At Shielding Room

TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 1.0 / 2.0 GHz.

Equipment used during the tests:

Open Area Test Site: ☐ # 1 ; ☐ # 2 ; ☐ # 3 ; ☑ # 4

Open Area Test Site # 1

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

Open Area Test Site # 2

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261A	N/A	03/08/2000	03/07/2001
Pre-Amplifier	HP	8447D	2944A08432	11/28/2000	11/27/2001
EMI Test Receiver	R&S	ESVS10	834468/006	03/24/2000	03/23/2001
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL 6112B	2635	12/01/2000	11/30/2001
Turn Table	Chance Most	CM-T003-1	T807-6	N.C.R	N.C.R
Antenna Tower	Chance Most	CM-A003-1	A807-6	N.C.R	N.C.R
Controller	Chance Most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M76890	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	11/11/2000	11/10/2001

Open Area Test Site # 3

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261A	21720279	08/15/2000	08/14/2001
Pre-Amplifier	HP	8447D	2944A09173	02/01/2000	01/31/2001
EMI Test Receiver	R&S	ESVS20	838804/004	12/28/2000	12/27/2001
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL6112A	2179	12/01/2000	11/30/2001
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

Open Area Test Site # 4

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3132	91700456	02/15/2000	02/14/2001
EMI Test Receiver	R&S	ESCS30	847793/012	11/10/2000	11/09/2001
Precision Dipole	R&S	HZ-12	846932/0004	07/14/2000	07/13/2001
Precision Dipole	R&S	HZ-13	846556/0008	07/14/2000	07/13/2001
Bilog Antenna	CHASE	CBL 6112B	2462	01/13/2000	01/12/2001
Turn Table	Chance most	N/A	N/A	N.C.R	N.C.R
Antenna Tower	Chance most	N/A	N/A	N.C.R	N.C.R
Controller	Chance most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M51067	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	11/24/2000	11/23/2001
Spectrum Analyzer	ADVANTEST	R3132	91700456	02/15/2000	02/14/2001

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	EMCO	3825/2	9106/1810	08/08/2000	08/07/2001
LISN	R&S	ENV 4200	8303261016	11/18/2000	11/17/2001

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

TEST EQUIPMENT LIST

For Power Harmonic & Voltage Fluctuation/Flicker Measurement:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH Harmonic & Flicker Tester	PHF 555	080 419-25	Oct. 16, 2000	Oct. 15, 2001

For ESD test:

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

For Radiated Electromagnetic Field immunity Measurement:

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

For Fast Transients/Burst test:

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

For CS test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi /Signal Generator	2022D	119246/003	Aug. 21, 2000	Aug. 20, 2001
MEB / CDN M3	M3	3683	Sep. 11, 2000	Sep. 10, 2001
C.D.N / CDN M2	CDN-M2	A3002010	Apr. 09, 2000	Apr. 08, 2001
M2S / Power Amplifier	A00181/1000	9801-112	N/A	N/A

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 230VAC/50Hz 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): (Customer defined)

   1. 1024 x 768 with Celeron 466MHz

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.

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	39.2	---	79	66	-39.8	-26.8	L 1

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

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 230VAC/50Hz 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 some given distance 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 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): (Customer defined)

1. **1024 x 768 with Celeron 466MHz**

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, were recorded into a computer (The antenna position, polarization and turntable position were kept in raw data file) in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

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	40	-13.8

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/m 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

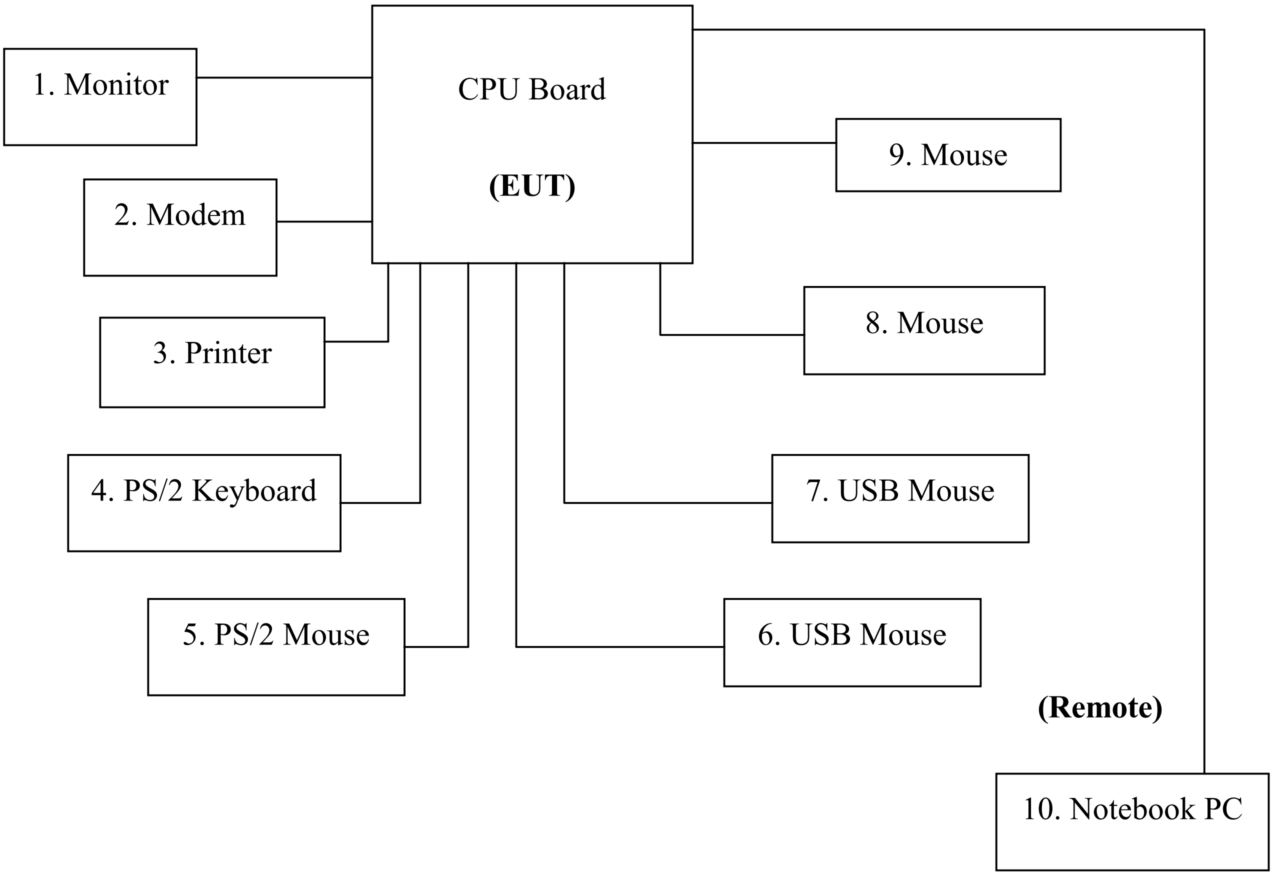
SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

EUT: CPU Board

Trade Name: N/A

Model Number: MB-668(N)

Power Cord: Unshielded, 1.6m



SUMMARY DATA

(LINE CONDUCTED TEST)

Model Number: MB-668(N) **Location:** Site # 4

Tested by: Jacky Wang

Test Mode: Mode 1

Test Results: Passed

Temperature: 21℃ **Humidity:** 71%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
0.200	41.9	---	79.00	66.00	-37.1	---	L1
0.940	40.1	---	73.00	60.00	-32.9	---	L1
2.550	31.7	---	73.00	60.00	-41.3	---	L1
4.090	33.5	---	73.00	60.00	-39.5	---	L1
6.020	25.6	---	73.00	60.00	-47.4	---	L1
24.070	38.1	---	73.00	60.00	-34.9	---	L1
0.200	43.4	---	79.00	66.00	-35.6	---	L2
0.935	39.7	---	73.00	60.00	-33.3	---	L2
3.680	29.8	---	73.00	60.00	-43.2	---	L2
3.950	30.2	---	73.00	60.00	-42.8	---	L2
6.020	29.4	---	73.00	60.00	-43.6	---	L2
24.070	38.6	---	73.00	60.00	-34.4	---	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: MB-668(N) **Location:** Site # 4

Tested by: Jacky Wang

Test Mode: Mode 1 **Polar:** Vertical -- 10m

Detector Function: Quasi-Peak **Test Results:** Passed

Temperature: 20℃ **Humidity:** 70%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 (dBuV/m)	Margin (dB)
48.34	23.0	11.8	34.8	40.0	-5.2
64.81	27.0	5.5	32.5	40.0	-7.5
97.48	22.3	12.0	34.3	40.0	-5.7
178.48	21.9	11.4	33.3	40.0	-6.7
200.35	24.7	11.6	36.3	40.0	-3.7
434.38	22.1	19.4	41.5	47.0	-5.5

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: MB-668(N) **Location:** Site # 4

Tested by: Jacky Wang

Test Mode: Mode 1 **Polar:** Horizontal -- 10m

Detector Function: Quasi-Peak **Test Results:** Passed

Temperature: 20℃ **Humidity:** 70%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)
66.70	30.2	5.8	36.0	40.0	-4.0
123.13	19.8	14.5	34.3	40.0	-5.7
194.95	24.2	11.6	35.8	40.0	-4.2
207.91	23.7	11.3	35.0	40.0	-5.0
467.28	22.0	19.5	41.5	47.0	-5.5
601.28	20.9	21.4	42.3	47.0	-4.7

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

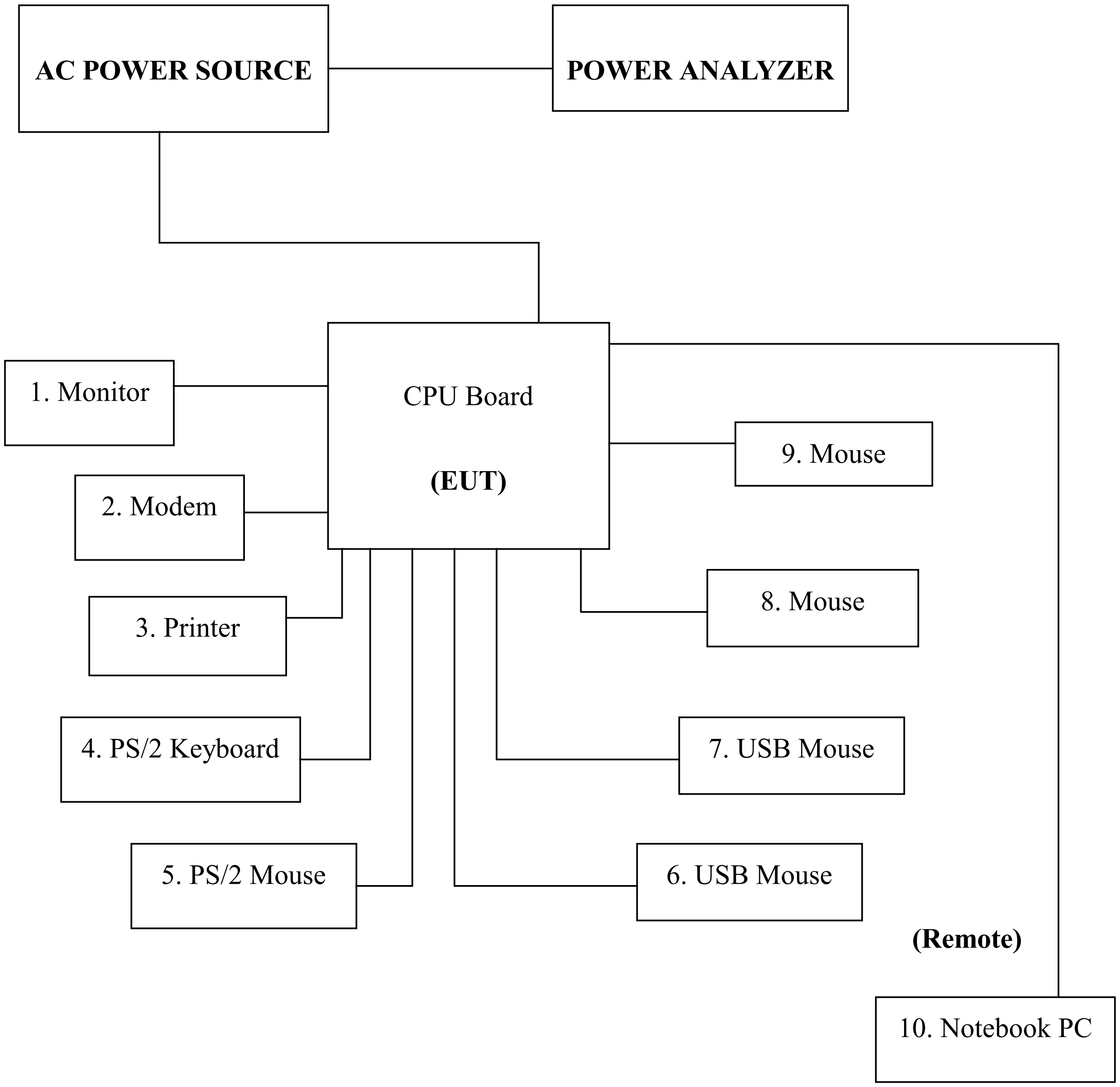
POWER HARMONICS MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-2: 1995+A1: 1998+A2: 1998
Limits : ☑ Class A, ☐ Class D
Tested by : Jacky Wang
Temperature : 30℃
Humidity : 45%

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-3: 1995
Limits : §5 of EN 61000-3-3
Tested by : Jacky Wang
Temperature : 30℃
Humidity : 45%

Block Diagram of Test Setup:



Result:

Please see the attached test data.

```
--------------------------------------------------------------------

EN 61000-3-2 TEST REPORT  2001/01/07  02:11 PM
--------------------------------------------------------------------

Unit:          CPU BOARD

Serial No.:    MB-668(N)

Remarks:       Temp: 30℃          Humidity: 45%

Operator:      JACKY WANG

====================================================================


                              TEST SETUP
                              ----------

Test Freq.:          50.00 Hz.     Test Voltage:          230.0 vac
Waveform :           SINE          Test Time:               2.5 min.
Classification :     CLASS A       Test Type:          STEADY-STATE

Prog. Zo Enabled:    YES           Prog. Zo:                0.000

Motor Driven with Phase Angle Control:   NO
Impedance selected:           IEC-725 STD. REF.

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

Max Watts:   62.7W
```

```
                TEST DATA
                ---------


             Result:     PASS


          Harmonic Current Results
   -----------------------------------------

   Hn     AMPS  LO Limit  HI Limit   Result

    0    0.000    0.000    0.000      PASS
    1    0.215      NaN      NaN      PASS
    2    0.002    1.080    1.080      PASS
    3    0.188    2.300    2.300      PASS
    4    0.002    0.430    0.430      PASS
    5    0.173    1.140    1.140      PASS
    6    0.002    0.300    0.300      PASS
    7    0.155    0.770    0.770      PASS
    8    0.002    0.230    0.230      PASS
    9    0.134    0.400    0.400      PASS
   10    0.001    0.184    0.184      PASS
   11    0.110    0.330    0.330      PASS
   12    0.001    0.153    0.153      PASS
   13    0.085    0.210    0.210      PASS
   14    0.001    0.131    0.131      PASS
   15    0.062    0.150    0.150      PASS
   16    0.001    0.115    0.115      PASS
   17    0.041    0.132    0.132      PASS
   18    0.001    0.102    0.102      PASS
   19    0.027    0.118    0.118      PASS
   20    0.001    0.092    0.092      PASS
   21    0.015    0.107    0.107      PASS
   22    0.001    0.084    0.084      PASS
   23    0.005    0.098    0.098      PASS
```

24	0.001	0.077	0.077	PASS
25	0.010	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.013	0.083	0.083	PASS
28	0.000	0.066	0.066	PASS
29	0.013	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.011	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.009	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.007	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.004	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.003	0.058	0.058	PASS
40	0.000	0.046	0.046	PASS

END OF REPORT

```
----------------------------------------------------------------------

EN 61000-3-3 TEST REPORT  2001/01/07  02:31 PM
----------------------------------------------------------------------

Unit:          CPU BOARD

Serial No.:    MB-668(N) (Manual Switch)

Remarks:       Temp: 30℃         Humidity: 45%

Operator:      JACKY WANG

======================================================================


                              TEST SETUP
                              ----------

Test Freq.:          50.00 Hz.     Test Voltage:          230.0 vac
Waveform :            SINE
Test Time:           10.0 min.        Tshort:               10.0 min.

Prog. Zo Enabled:    YES            Prog. Zo:                 0.000

Voltage Change less than once per Hour:     NO
Impedance selected:          IEC-725 STD. REF.

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

TEST DATA

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.029	1.00	PASS	true
Plt max	0.029	0.65	PASS	true
dc %	0.00	3.00	PASS	true
dmax %	0.00	4.00	PASS	true
d(t) sec.	0.00	0.20	PASS	true
	Power Source Data			
Source Pst max	0.020	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT

```
-----------------------------------------------------------------

EN 61000-3-3 TEST REPORT  2001/01/07  02:43 PM
-----------------------------------------------------------------

Unit:          CPU BOARD

Serial No.:    MB-668(N) (Continuous Switch)

Remarks:       Temp: 30℃         Humidity: 45%

Operator:      JACKY WANG

=================================================================


                             TEST SETUP
                             ----------

Test Freq.:          50.00 Hz.     Test Voltage:          230.0 vac
Waveform :            SINE
Test Time:           10.0 min.        Tshort:              10.0 min.

Prog. Zo Enabled:    YES             Prog. Zo:                0.000

Voltage Change less than once per Hour:     NO
Impedance selected:           IEC-725 STD. REF.

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

TEST DATA

Result: PASS

	EUT Data	Limit	Result	Test Enabled
Pst max	0.016	1.00	PASS	true
Plt max	0.016	0.65	PASS	true
dc %	0.00	3.00	PASS	true
dmax %	0.00	4.00	PASS	true
d(t) sec.	0.00	0.20	PASS	true
	Power Source Data			
Source Pst max	0.020	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT

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

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port **:** Enclosure

Basic Standard **:** EN 61000-4-2

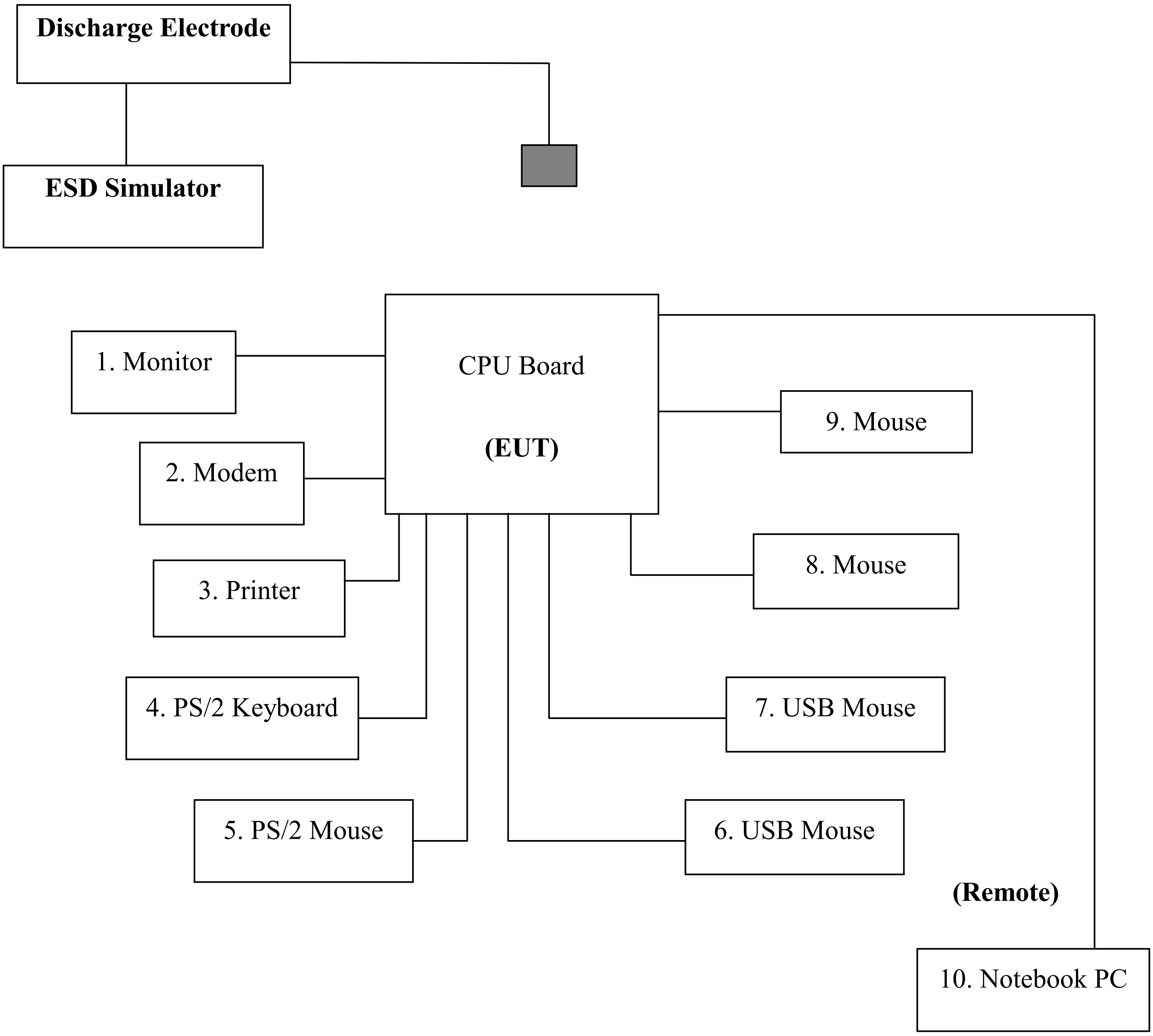
Requirements **:** ± 8kV (Air Discharge)
± 4kV (Contact Discharge)
± 4kV (Indirect Discharge)

Performance Criteria **:** B (Standard Required)

Tested by **:** Jacky Wang

Temperature/Humidity: 21℃ / 48%

Block Diagram of Test Setup:



Test Procedure:

The electrostatic discharges were applied as follows:

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

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

Performance & Result:

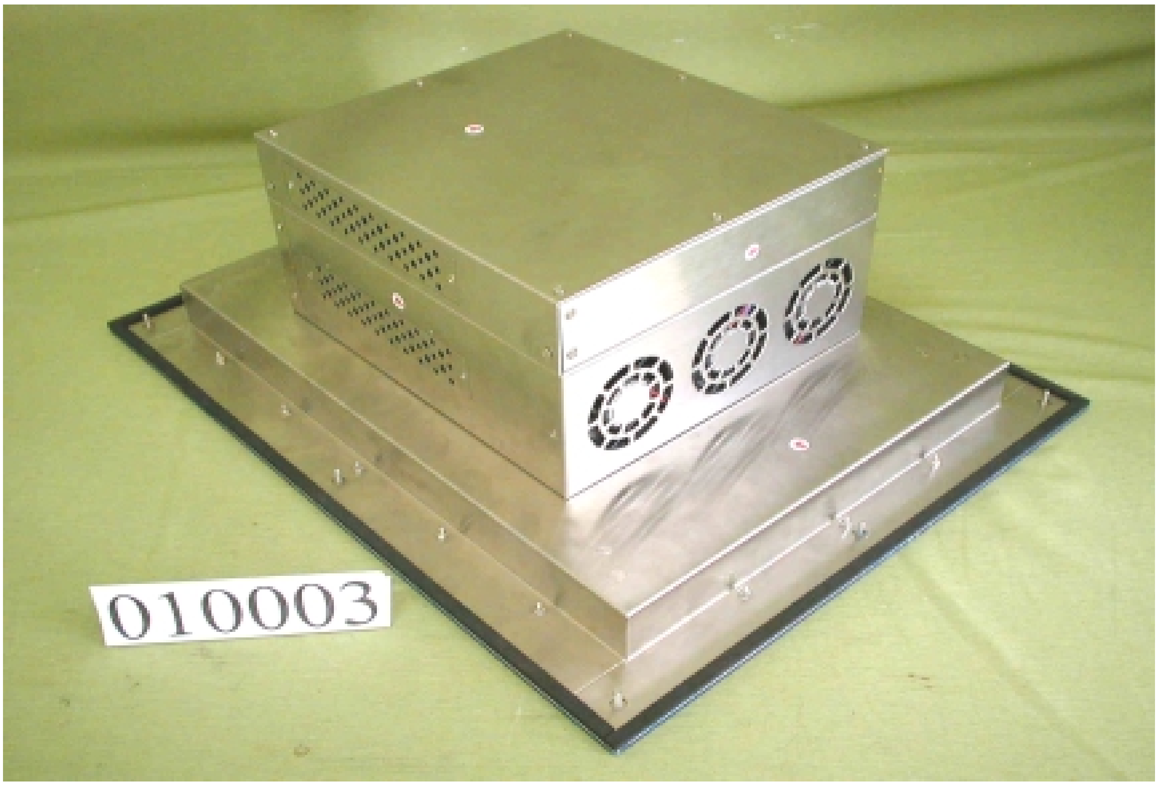
☑ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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

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

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

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

The Tested Points of EUT




010003

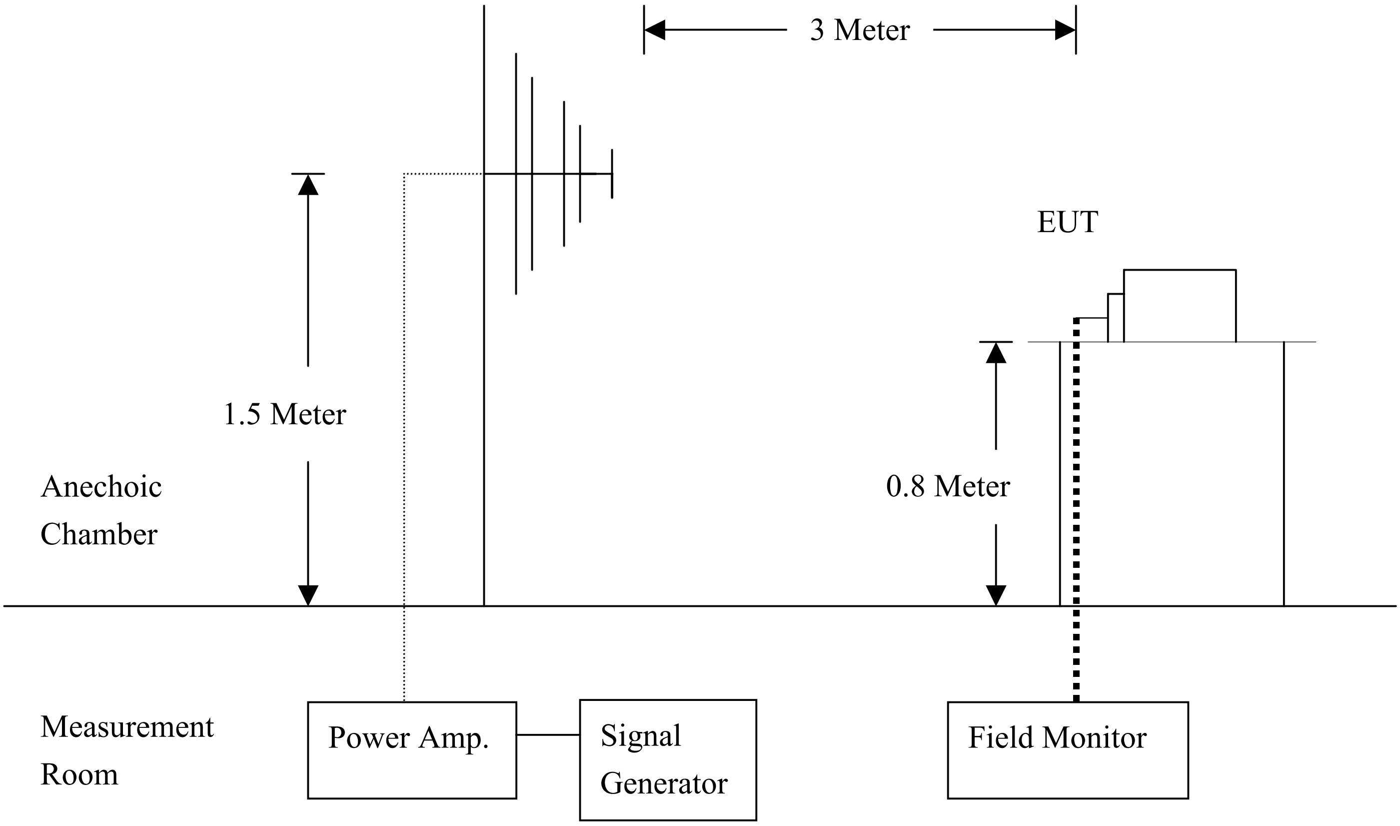
SECTION 4 ENV 50140 (RADIATED ELECTROMAGNETIC FIELD)

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: ENV 50140
Requirements	: 10 V/m / Modulated
Performance Criteria	: A (Standard Required)
Tested by	: Jacky Wang
Temperature	: 21℃
Humidity	: 68%

Block Diagram of Test Setup:

Same as Section 3 EN 61000-4-2 Test Setup:



Test Procedure:

Frequency Range : 80MHz-1000MHz
Frequency Step : 1% of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	10V	Yes	H	0	Pass
80-1000	10V	Yes	V	0	Pass
80-1000	10V	Yes	H	90	Pass
80-1000	10V	Yes	V	90	Pass
80-1000	10V	Yes	H	180	Pass
80-1000	10V	Yes	V	180	Pass
80-1000	10V	Yes	H	270	Pass
80-1000	10V	Yes	V	270	Pass

Performance & Result:

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

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

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

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

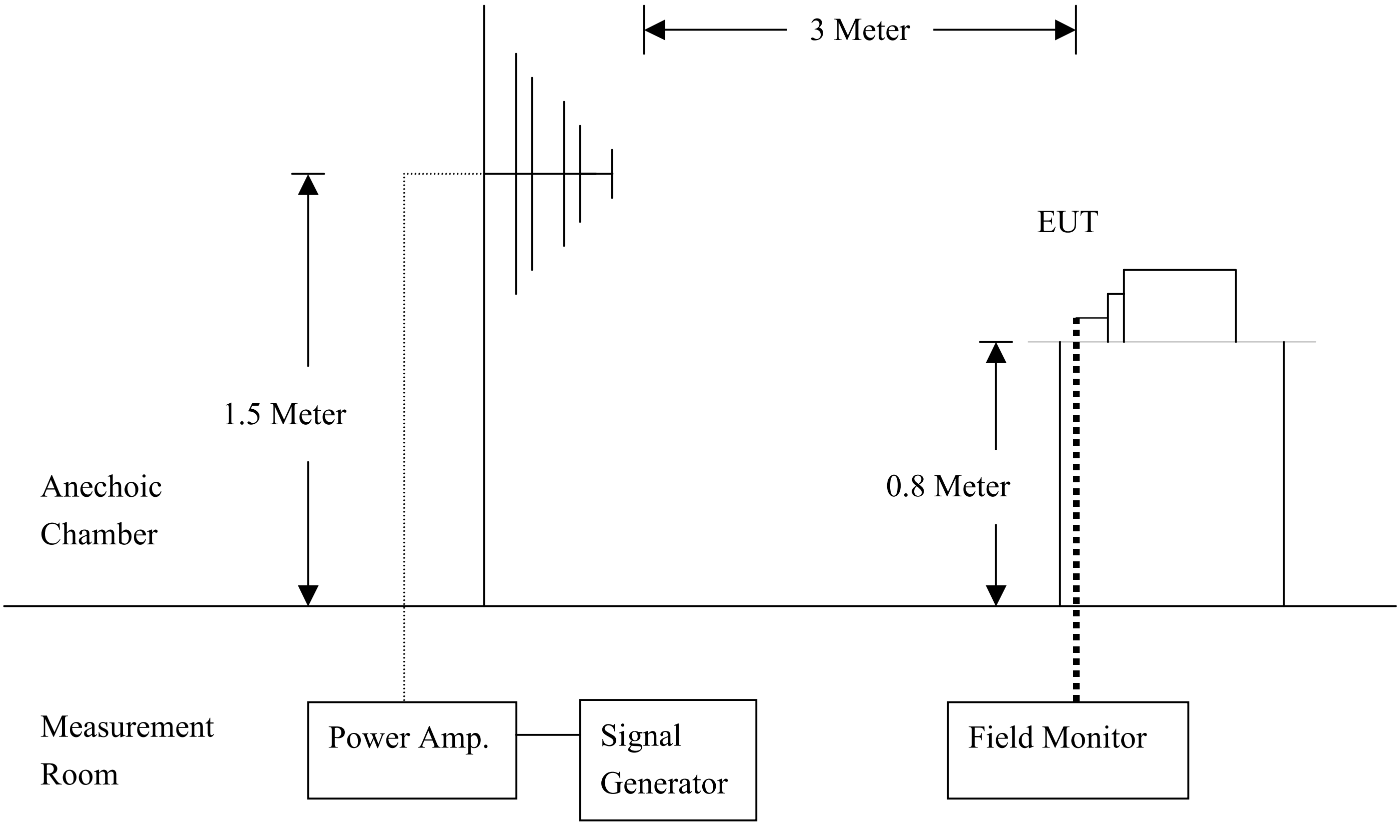
SECTION 5 ENV 50204 (RADIATED ELECTROMAGNETIC FIELD FROM DIGITAL TELEPHONES)

Radiated Electromagnetic Field From Digital Telephones Immunity Test

Port	: Enclosure
Basic Standard	: ENV 50204
Requirements	: 10 V/m, with modulated
Performance Criteria	: A (Standard Required)
Tested by	: Jacky Wang
Temperature	: 21℃
Humidity	: 68%

Block Diagram of Test Setup:

Same as Section 3 EN 61000-4-2 Test Setup:



Test Procedure:

Spot Frequency : 900 MHz ± 5MHz
Modulated Frequency : 200 Hz
Duty cycle : 50%

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
900	10V	Yes	H	0	Pass
900	10V	Yes	V	0	Pass
900	10V	Yes	H	90	Pass
900	10V	Yes	V	90	Pass
900	10V	Yes	H	180	Pass
900	10V	Yes	V	180	Pass
900	10V	Yes	H	270	Pass
900	10V	Yes	V	270	Pass

Performance & Result:

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

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

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

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

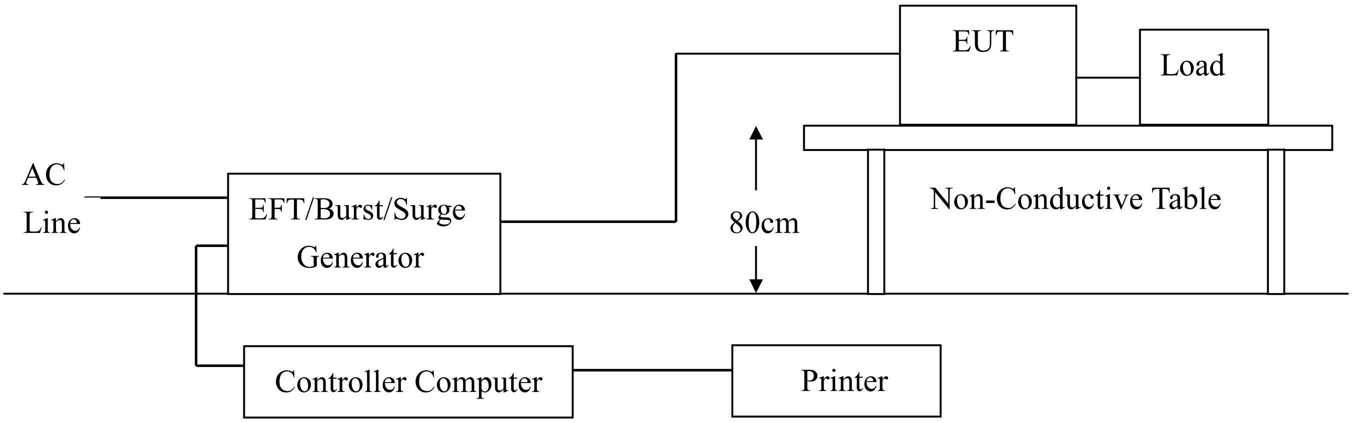
SECTION 6 EN 61000-4-4 (FAST TRANSIENTS/BURST)

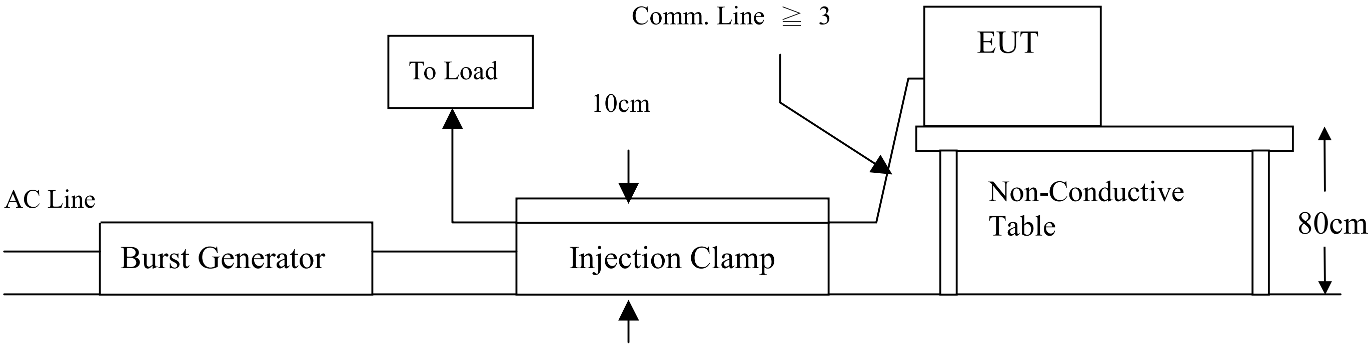
FAST TRANSIENTS/BURST IMMUNITY TEST

Port : On Power Port
Basic Standard : EN 61000-4-4
Requirements : ± 2kV for Power Supply Lines
± 1kV for Data Cable
Performance Criteria : B (Standard require)
Tested by : Jacky Wang
Temperature : 21℃
Humidity : 48%

Block Diagram of Test Setup:

Same as Section 3 EN 61000-4-2 Test Setup:





Test Procedure:

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 3Hz

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L1	± 2	Direct	Pass
N	± 2	Direct	Pass
PE	± 2	Direct	Pass
L1 + N	± 2	Direct	Pass
L1 + PE	± 2	Direct	Pass
N + PE	± 2	Direct	Pass
L1 + N + PE	± 2	Direct	Pass
LAN	±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.

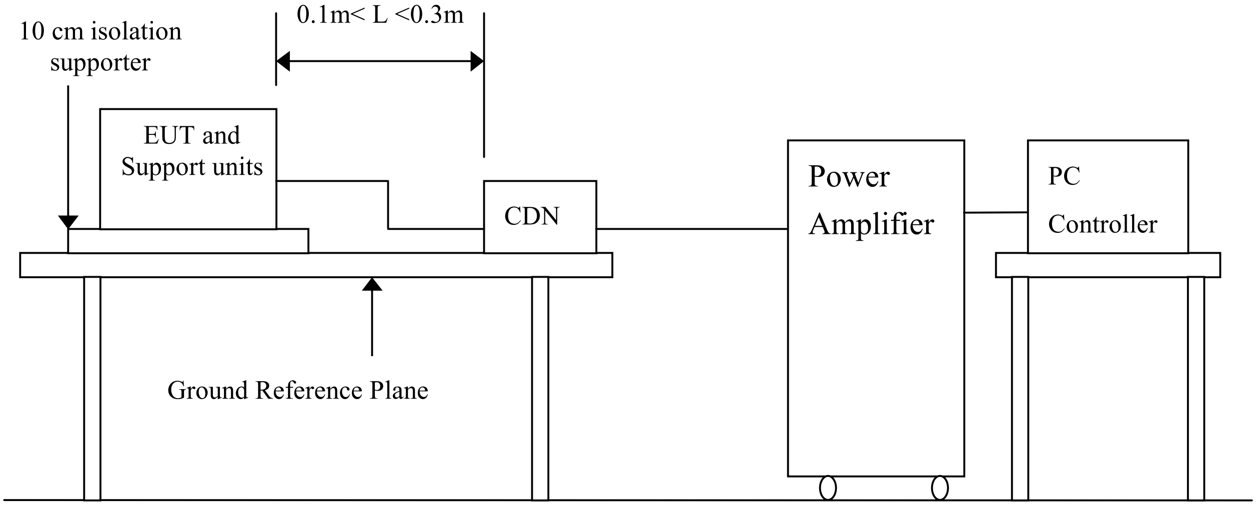
****Observation:** No any function degraded during the tests.

SECTION 7 ENV 50141 (CONDUCTED DISTURBANCE/INDUCED BY RADIO-FREQUENCY FIELD)

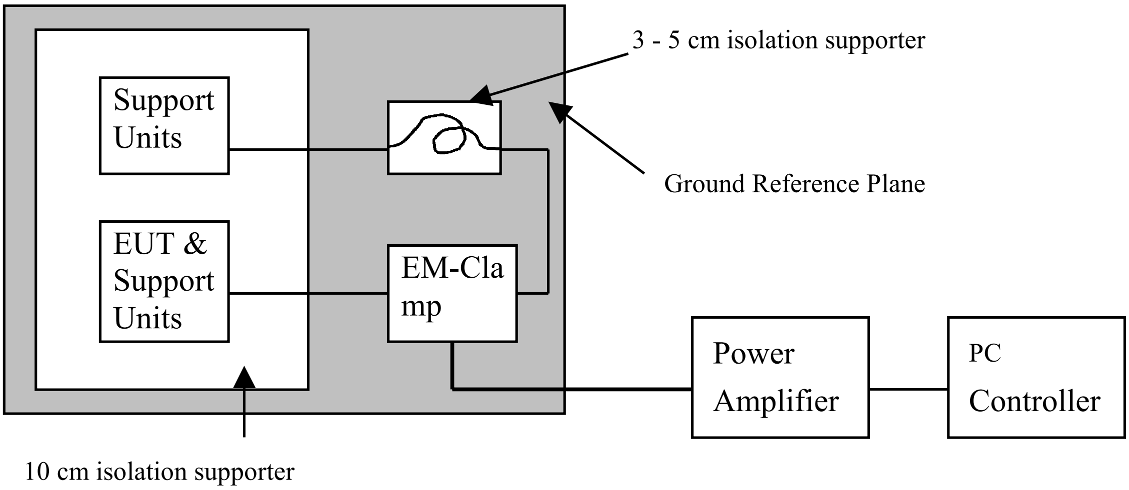
Port : Power cord and Data Cable
Basic Standard : ENV 50141
Requirements : 10 V with Modulated
Injection Method : CDN-M3 for Poser Cord
EC-Clamp for Data Cable
Performance Criteria : A
Tested by : Jacky Wang
Temperature : 21℃
Humidity : 68%

Block Diagram of Test Setup:

Same as Section 3 EN 61000-4-2 Test Setup:



Top View



Test Procedure:

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.

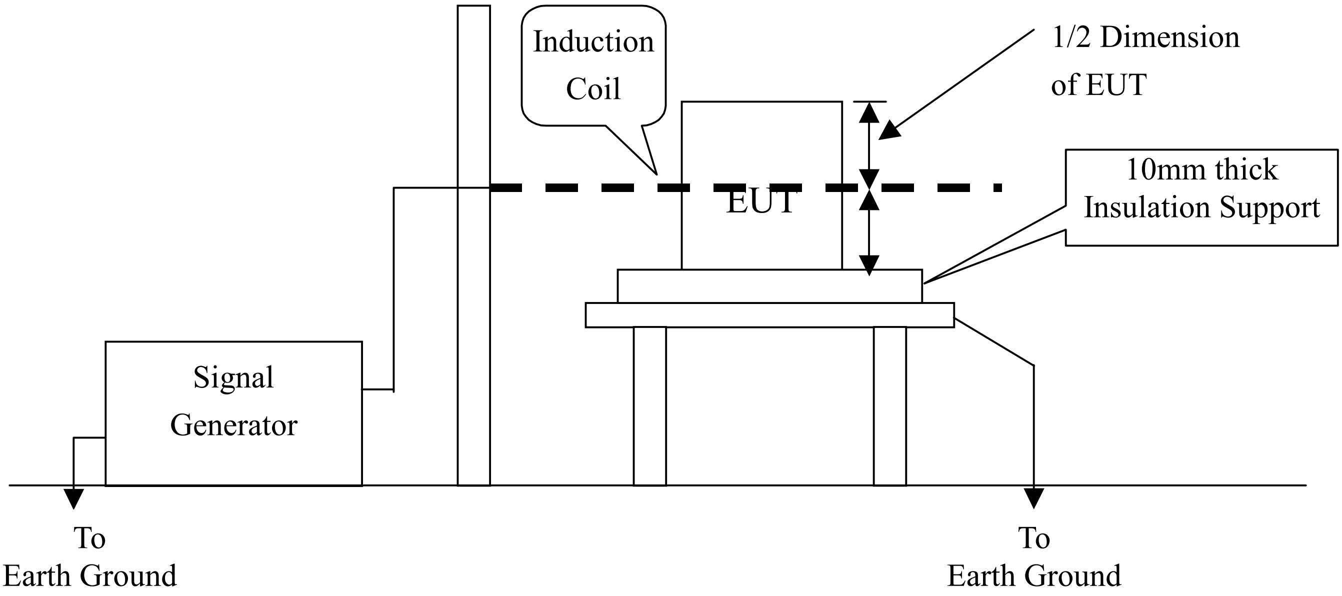
☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

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

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

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

Block Diagram of Test Setup:



Test Procedure:

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

Orientation	Field	Result (Pass/Fail)	Remark

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

Performance & Result:

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

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

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

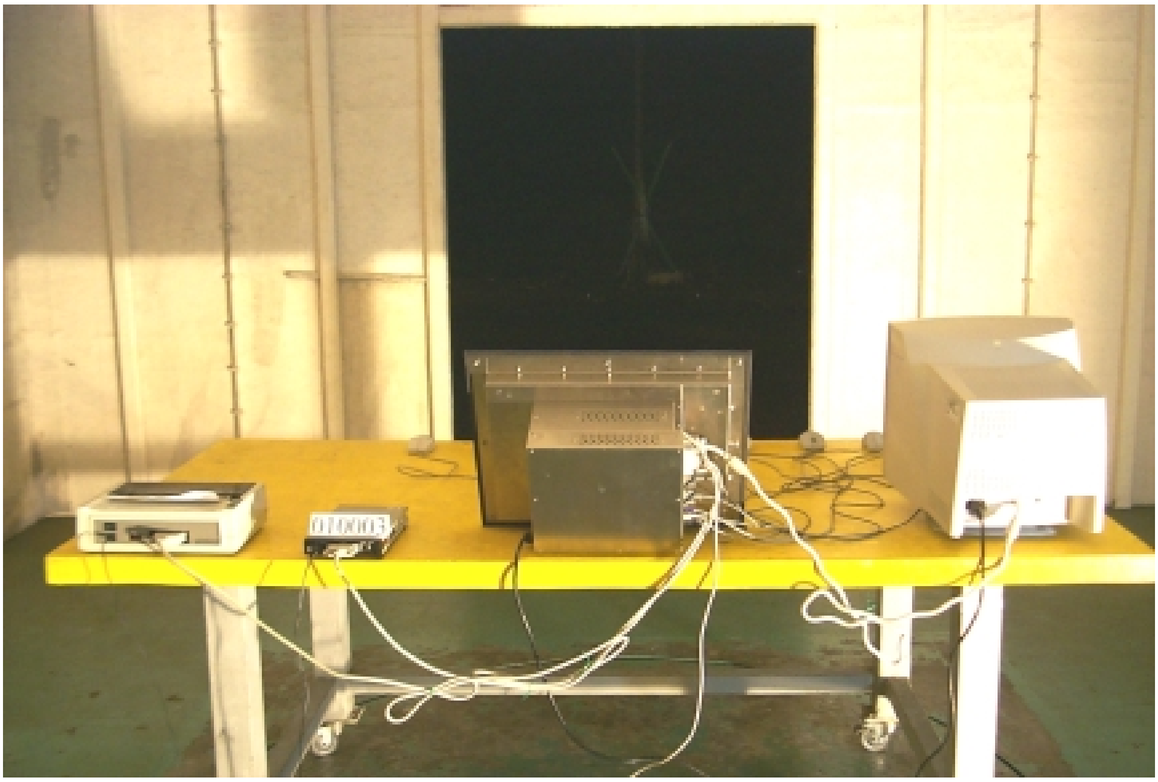
****Observation:** N/A

APPENDIX 1

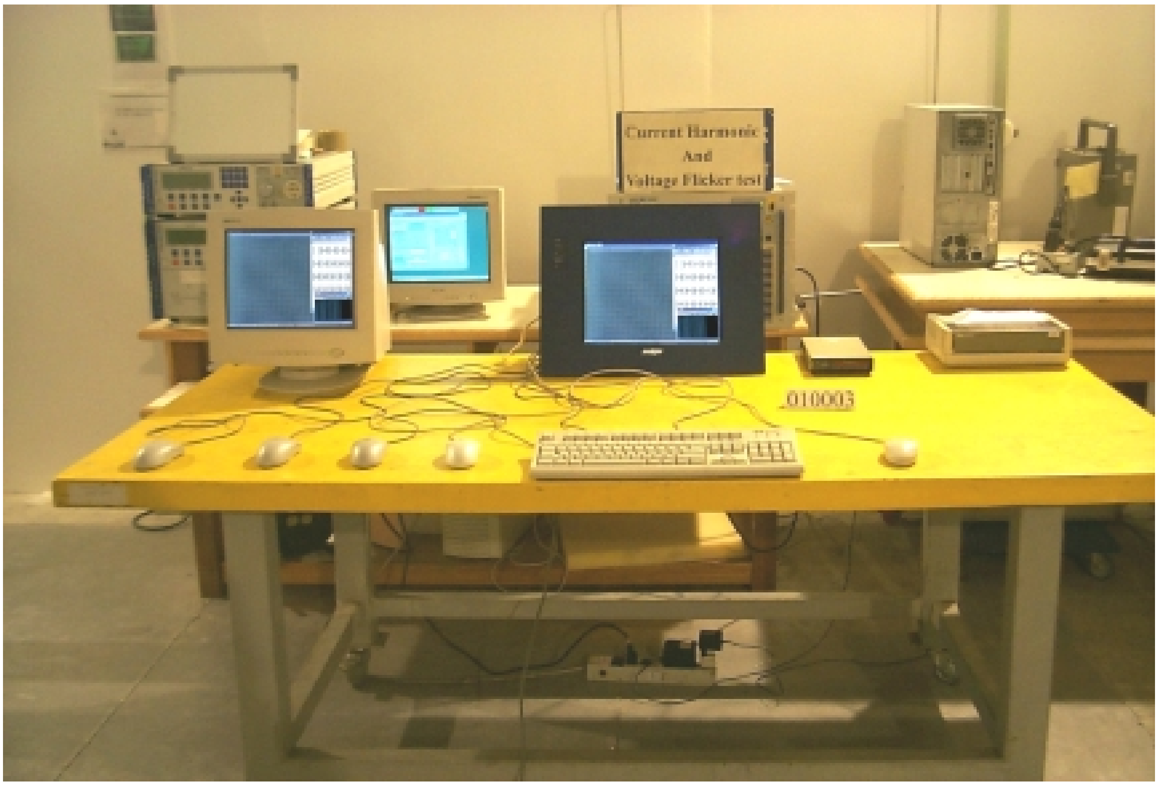
PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST

RADIATED EMISSION TEST

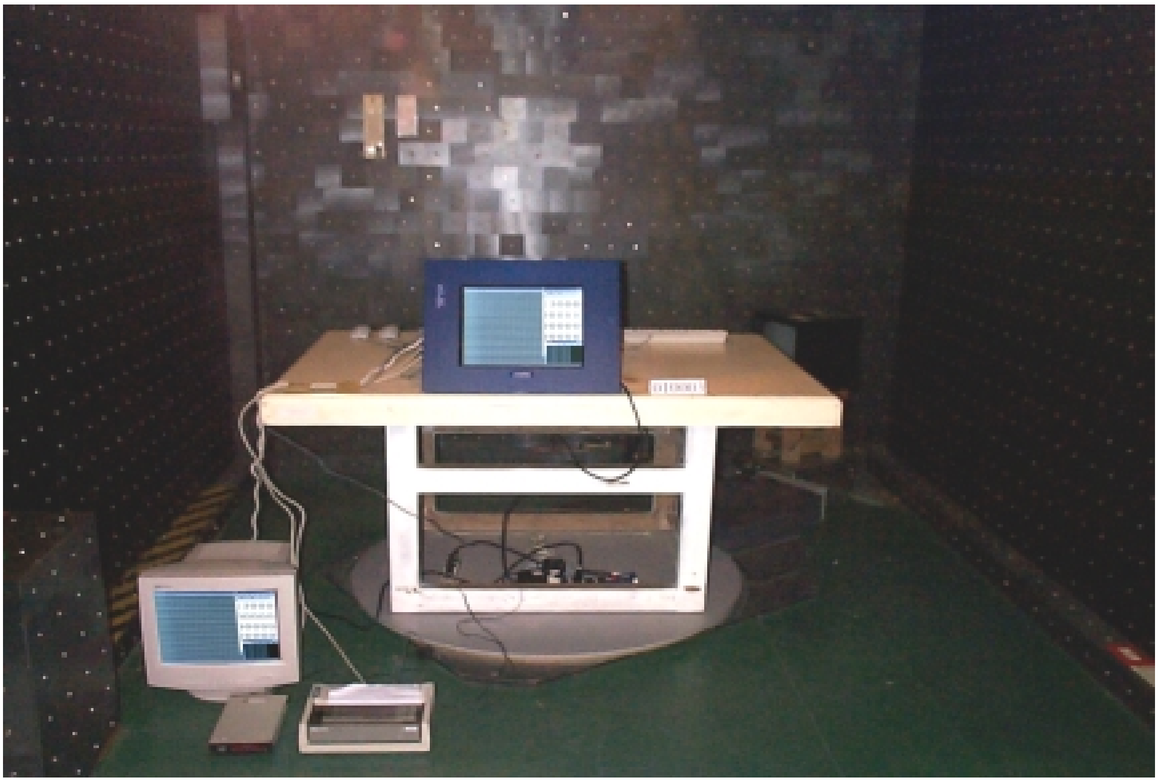


POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST

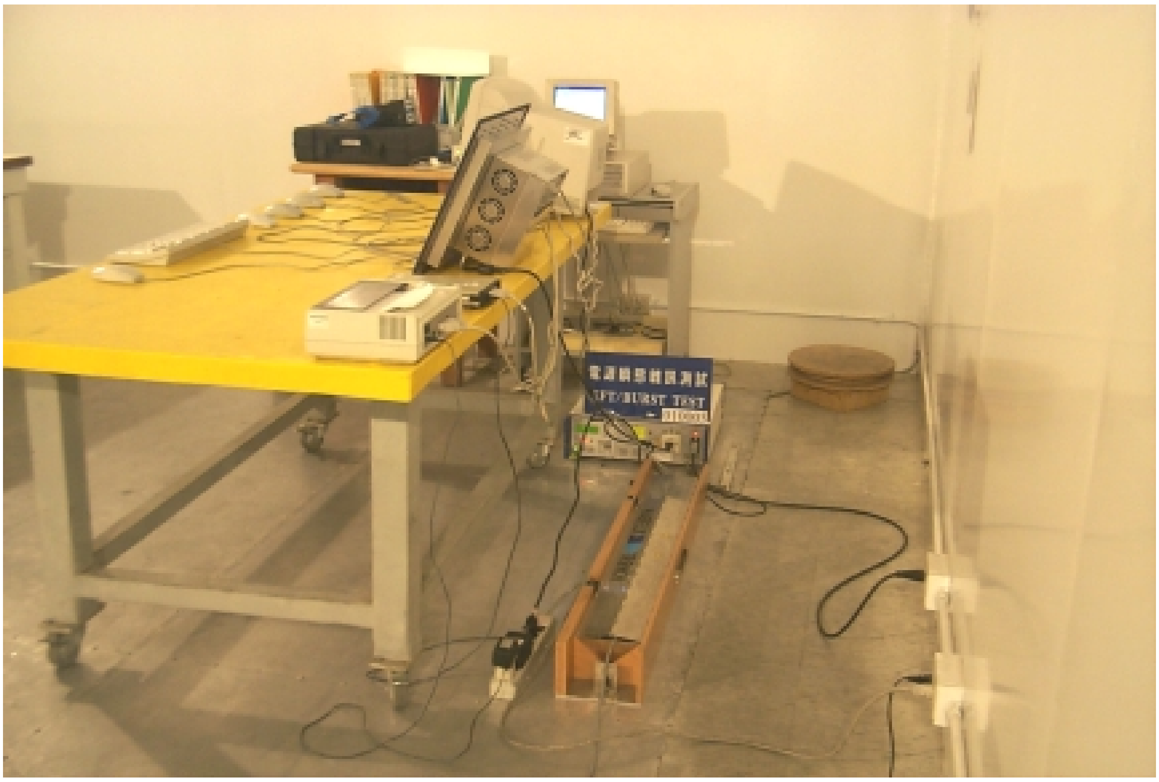


ELECTROSTATIC DISCHARGE TEST

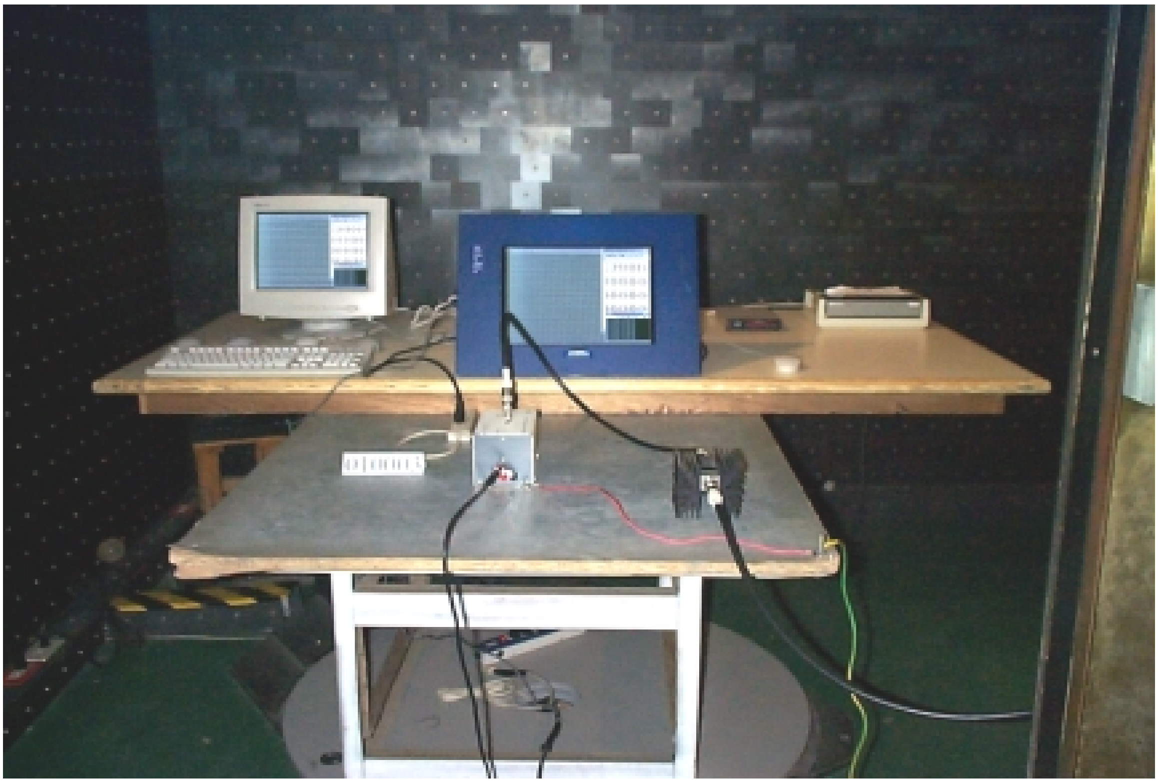
RADIATED ELECTROMAGNETIC FIELD

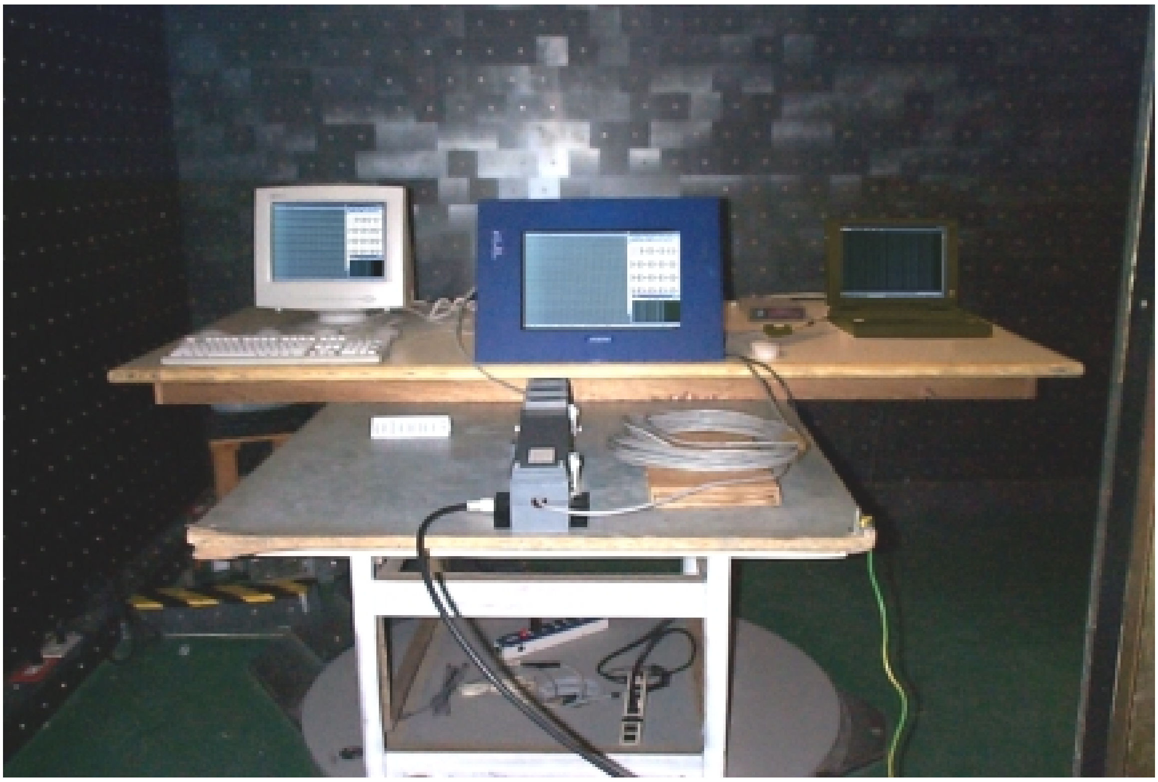


FAST TRANSIENTS/BURST TEST



CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST



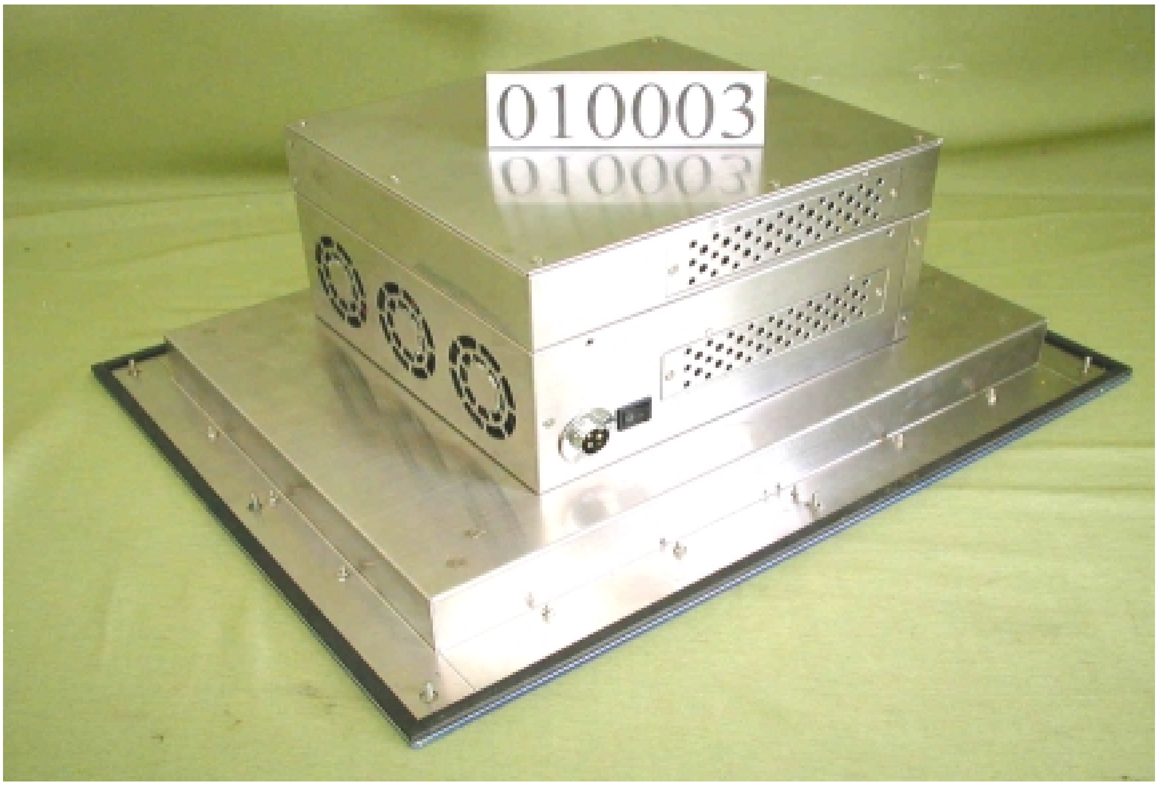


APPENDIX 2

PHOTOGRAPHS OF EUT

Front View of Panel PC

Left View of Panel PC



Right View of PC

Front View of EUT

Rear View of EUT

I/O Port of EUT


010003