ESD TEST REPORT

for

IPC

Trade Name : AAEON
Model Number : SBC-456E Rev:B1.0
Serial Number : N/A
Report Number: 03E0967-E
Date : April 21, 2003
Regulations : See below

Standards
EN 55024: 1998 - IEC 61000-4-2: 1995 +A2: 2001

Prepared for :

AAEON TECHNOLOGY INC.
5F, NO.135, LANE 235, PAO CHIAO RD., HSIN TIEN CITY, TAIPEI, TAIWAN, R.O.C.

Prepared by :

C&C LABORATORY CO., LTD.
No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan, R. O. C.
TEL: (02)2217-0894
FAX: (02)2217-1254

Lab. Code: 200617-0

ACCREDITED

VERIFICATION OF COMPLIANCE

Equipment Under Test:	IPC
Trade Name:	AAEON
Model Number:	SBC-456E Rev:B1.0
Serial Number:	N/A
Applicant:	**AAEON TECHNOLOGY INC.** 5F, NO.135, LANE 235, PAO CHIAO RD., HSIN TIEN CITY, TAIPEI, TAIWAN, R.O.C.
Manufacturer:	**AAEON TECHNOLOGY INC.** 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 55024: 1998 IEC 61000-4-2: 1995 +A2: 2001
File Number:	03E0967-E
Date of test:	April 17, 2003
Deviation:	None
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: Vince Chiang

Vince Chiang / Supervisor

GENERAL INFORMATION

Applicant:	**AAEON TECHNOLOGY INC.** 5F, NO.135, LANE 235, PAO CHIAO RD., HSIN TIEN CITY, TAIPEI, TAIWAN, R.O.C.
Contact Person:	MILO WANG/Q.E.DEPT.ENGINEER
Manufacturer:	**AAEON TECHNOLOGY INC.** 5F, NO.135, LANE 235, PAO CHIAO RD., HSIN TIEN CITY, TAIPEI, TAIWAN, R.O.C.
File Number:	03E0967-E
Date of Test:	April 17, 2003
Equipment Under Test:	IPC
Model Number:	SBC-456E Rev:B1.0
Serial Number:	N/A
Type of Test:	EMC Directive 89/336/EEC for CE Marking
Technical Standards:	EN 55024: 1998 IEC 61000-4-2: 1995 +A2: 2001
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. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan, R. O. C.

TEST FACILITY

Location: No. 199, Chung Sheng Road, Hsin Tien City,
Taipei, Taiwan, R. O. C.

Description: There are two 3/10m open area test sites and one line conducted lab 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). Registration No. R-1434 / C-1511.

Site Accreditation: Accredited by NEMKO (Authorization #: ELA 103) for EMC & A2LA (Certificate #: 824.01) for EMC.

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.

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

C&C LABORATORY CO., LTD (SHINTIEN LAB)
TAIPEI HSEIN, 231
TAIWAN

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2003
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200617-0

NVLAP-01C (06-01)

National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200617-0

C&C LABORATORY CO., LTD (SHINTIEN LAB)
No. 199, Chunghsen Rd., Hsintien City
Taipei Hsein, 231
TAIWAN
Mr. Kurt Chen
Phone: 886-2-2240222 Fax: 886-2-2245225
E-Mail: kurt_chen@cclab.com.tw
URL: http://www.cclab.com.tw

NVLAP Code	***Designation / Description***
Emissions Test Methods:	
12/CIS11	IEC/CISPR 11 (1990) and EN 55011 (1998): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment
12/CIS14a	EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999)
12/CIS14b	AS/NZS 1044 (1995)
12/CIS14c	CNS 13783-1
12/CIS22	IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1:1995, and Amendment 2:1996.

December 31, 2003

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National Institute of Standards and Technology

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National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200617-0

C&C LABORATORY CO., LTD (SHINTIEN LAB)

NVLAP Code	*Designation / Description*
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/EM02a	IEC 61000-3-2, Edition 2.1 (2001-10) and EN 61000-3-2 (2000) : Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)
12/EM03	EN 61000-3-3 (1995) and IEC 61000-3-3 (1995): Electromagnetic compatibility (EMC) - Part 3: Limits - Section 3. Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <= 16 A
12/F01	ANSI C63.4 (2001) - cited in FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a	Conducted Emissions, Power Lines, 150 KHz to 30 MHz
12/F01b	Radiated Emissions
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/T51	AS/NZS CISPR (2002) and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

December 31, 2003

Effective through

For the National Institute of Standards and Technology

National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200617-0

C&C LABORATORY CO., LTD (SHINTIEN LAB)

NVLAP Code	*Designation / Description*
Immunity Test Methods:	
12/I01	IEC 61000-4-2 (1995) and Amendment 1 (1998): Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3 (1995) and Amendment 1 (1998): Radiated, Radio-Frequency Electromagnetic Field Immunity Test
12/I03	IEC 61000-4-4 (1995): Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5 (1995): Surge Immunity Test
12/I05	IEC 61000-4-6 (1996): Immunity to Conducted Disturbances, Induced Radio-Frequency Fields
12/I06	IEC 61000-4-8 (1993): Power Frequency Magnetic Field Immunity Test
12/I07	IEC 61000-4-11 (1994): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

December 31, 2003

Effective through

For the National Institute of Standards and Technology

EMC Laboratory
Preliminary Authorisation
Aut. No.: ELA 103

EMC Laboratory: **C & C Laboratory Co, Ltd**
(Hsintien Lab.)
No. 199, Chunghsen Rd., Hsintien City,
Taipei Hsien (231)
Taiwan, R.O.C.

Scope of Authorization: **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and, all of the corresponding CISPR, IEC, and ISO EMC standards that are listed on the accompanying page.**

Nemko has assessed the testing facilities, qualifications and testing practices and the relevant part of the organization. The above-mentioned EMC Laboratory has been validated against EN 45001 and ISO 17025 and found to be compliant. The laboratory also fulfils the conditions described in Nemko Document ELA-INFO-10. During Nemko's visit it was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page(s).

Accordingly, Nemko will accept test reports from the laboratory as a basis for attesting conformity to these EMC Standards under either the European Union EMC Directive (89/336/EEC) or, when applicable, the national standards of countries Nemko has been authorised to attest conformity with.

In order to maintain the Authorisation, the information given in the pertinent ELA-INFO-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the EMC Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through 31 December 2003.

Oslo, 17. December 2002

For Nemko AS:

Kjell Bergh

Kjell Bergh, Nemko Group EMC Co-ordinator

Nemko AS Gaustadalléen 30 P.O.Box 73 Blindern N-0314 Oslo Norway T +47 22 96 03 30 F +47 22 96 05 50 Enterprise number NO974404532

EMC Laboratory
Preliminary Authorisation
Aut. No.: ELA 103

SCOPE OF AUTHORIZATION

GENERIC & PRODUCT-FAMILY STANDARDS

EN 50091-2:1995 (doc=exp)	EN 50130-4:1995 + A1:98 (doc=exp)	EN 55011:1998 + A1 :99 (doc=exp) CISPR 11:97 + A1 :99
EN 55013:1990 + A12:1994 + A13:1996 + A14 :1999 (doc=exp) CISPR 13:1975 + A1:1983 mod. EN 55013 :2001 (doc=1.9.04) CISPR 13 :2001 (mod)	EN 55014-1:1993 + A1:1997 + A2 :1999 (doc=exp) CISPR 14:1993 + A1:1996 + A2 :1998 EN 55014-1 :2000 (doc=1.8.03) + A1 :2001 (doc=1.10.04) CISPR 14-1 :2000 + A1 :2001	EN 55014-2:1997 (doc=exp) + A1:2001 (doc=1.12.04) CISPR 14-2:1997 + A1 :2001
EN 55015:1996 + A1:97 + A2 :99 (doc=exp) CISPR 15:96 + A1:97 + A2 :98 EN 55015 :2000 (doc=1.8.03) + A1 :2001 (doc=1.12.04) CISPR 15 :2000 + A1 :2000	EN 55022:1994 + A1:1995 + A2:1997 (doc=exp) CISPR 22:1993 + A1:1995 + A2:1996 EN 55022:1998 + A1 :2000 (doc=1.8.03) + A2 :2002 (doc=not harmonised yet) CISPR 22:1997 + A1 :2000 + A2 :2002	EN 55024:1998 (doc=exp) + A1 :2001 (doc=1.10.04) + A2 :2002 (doc=not harmonised yet) CISPR 24:1997 + A1 :2001 + A2 :2002
EN 61000-3-2:1995 + A1:1998 + A2:1998 (doc=exp) + A14 :2000 (doc=1.1.04) IEC 61000-3-2:1995 + A1:1997 + A2:1998 EN 61000-3-2 :2000 (doc=1.1.04) IEC 61000-3-2 :2000 (mod) + A1 :2001	EN 61000-3-3 :1995 (doc=exp) + A1 :2001 (doc=1.5.04) IEC 61000-3-3 :1994 + A1 :2001 EN 61000-3-11 :00 (doc=1.11.03) IEC 61000-3-11 :00	EN 61000-6-1:2001 (doc=1.7.04) IEC 61000-6-1:1997 (mod) EN 50082-1 :1997 (doc=exp)
EN 61000-6-2:1999 (doc=exp) IEC 61000-6-2:1999 EN 61000-6-2:2001 (doc=1.7.04) IEC 61000-6-2:1999 (mod)	EN 61000-6-3 :2001 (doc=1.7.04) IEC 61000-6-3 :1996 (mod) EN 50081-1:1992 (doc=exp)	EN 61000-6-4 :2001 (doc=1.7.04) IEC 61000-6-4:1997 (mod) EN 50081-2:1993 (doc=exp)
EN 61326 :1997 + A1 :98 (doc=exp) + A2 :01 (doc=1.4.04) IEC 61326 :1997 + A1 :98 + A2 :00		

BASIC STANDARDS

EN 61000-4-2:1995 + A1:98 IEC 61000-4-2:1995 + A1:98 (EN 60801-1:1993 IEC 801.2:1991 IEC 801.2:1984)	EN 61000-4-3:1996 + A1:98 IEC 61000-4-3:1995 + A1:98 (IEC 801.3:1984 ENV 50140:1993 + ENV 50204:1995)	EN 61000-4-4:1995 IEC 61000-4-4:1995 (IEC 801.4:1990)
EN 61000-4-5:1995 IEC 61000-4-5:1995 (ENV 50142:1994)	EN 61000-4-6:1996 IEC 61000-4-6:1996 (ENV 50141:1993)	EN 61000-4-8:1993 IEC 61000-4-8:1993
EN 61000-4-11:1994 IEC 61000-4-11:1994	CISPR 16-1 :1999 + A1 :2002 CISPR 16-2 :1996 + A1 :1999 + A2 :2002 CISPR 16-3 :2000 + A1 :2002 CISPR 16-4 :2002	

Oslo, 17. December 2002

Kjell Bergh, Nemko Group EMC Co-ordinator

Nemko AS Gaustadalléen 30 P.O.Box 73 Blindern N-0314 Oslo Norway T +47 22 96 03 30 F +47 22 96 05 50 Enterprise number NO974404532

THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

C & C LABORATORY CO., LTD
Hsi Chin, Taipei Hsien, Taiwan, R.O.C

for technical competence in the field of

Electrical Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 30th day of January, 2002.

President
For the Accreditation Council
Certificate Number 824.01
Valid to January 31, 2004

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation

American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

C & C LABORATORY CO., LTD[1]
No. 81-1, Lane 210, Pa-De 2nd Rd.,
Lu Chu Hsiang, Taoyuan, TAIWAN, R.O.C.
Kurt Chen Phone: 002 886 3 324 0332
Fax: 002 886 3 324 5235

ELECTRICAL (EMC)

Valid to: January 31, 2004 Certificate Number: 0824-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Test Technology	Test Method(s)
Emissions	
Radiated & Conducted	CFR 47, FCC Part 15/18 using ANSI 63.4/1992&2000; AS/NZS 3548; VCCI V3 (2001); CNS 13438; CNS 13439; CNS 13783; CNS 13803; CNS 14115 CISPR 11; EN 55011; CISPR 14-1; EN 55014-1; CISPR 15; EN 55015; CISPR 22; EN 55022; EN 50081-1/ EN 61000-6-3: 2001; EN 50082-1/ EN 61000-6-4: 2001
Immunity	
Electrostatic Discharge (ESD)	IEC/EN 61000-4-2; IEC 801-2
Radiated Immunity	IEC/EN 61000-4-3; IEC 801-3
Electrical Fast Transient/Burst	IEC/EN 61000-4-4; IEC 801-4
Surge Immunity	IEC/EN 61000-4-5
Conducted Immunity	IEC/EN 61000-4-6
Power Frequency Magnetic Field Immunity	IEC/EN 61000-4-8
Voltage Dips, Short Interruptions, and Line Voltage Variations	IEC/EN 61000-4-11
Harmonics/Flicker	IEC/EN 61000-3-2; IEC/EN 61000-3-3

[1] Note: This accreditation covers testing performed at the main laboratory listed above, and the satellite laboratory located at No.199, Chung Sheng Road, Hsin Tien City, Taipei, TAIWAN, R.O.C.

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

Product Immunity / Generic Immunity

ITE Product	CISPR 24; EN 55024
Home Appliance	CISPR 14-2; EN 55014-2
Residential; commercial and light Industry	EN 50081-2/ EN 61000-6-1: 2001
Industry	EN 50082-2/ EN 61000-6-2: 2001

On the following products/equipment:
Computer Components and Peripherals; Networking Components; Wireless Communications Components; Electronic Components; Televisions; Home Appliances

01/23/02

CERTIFICATE

Company: C & C Laboratory Co., Ltd.

<Member No. 710 >

Facility: C&C Open Area Test Site No.D

(Radiation 3 and 10 meter site)

Location of Facility:

No.199, Chung Sheng Road, Hsin Tien City
Taipei Shien, Taiwan

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures

Registration No.: R-1434

Date of Registration: February 25 , 2002

This Certificate is valid until March 31 , 2005

Voluntary Control Council for Interference by Information Technology Equipment

CERTIFICATE

Company: C & C Laboratory Co., Ltd.
<Member No. 710 >

Facility: C&C Conducted Test Room No.D
(Main Ports Conducted Interference Measurement)

Location of Facility:
No.199, Chung Sheng Road, Hsin Tien City
Taipei Shien, Taiwan

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures

Registration No.: C-1511

Date of Registration: February 25 , 2002

This Certificate is valid until March 31 , 2005

Voluntary Control Council for Interference by Information Technology Equipment

TEST EQUIPMENT LIST

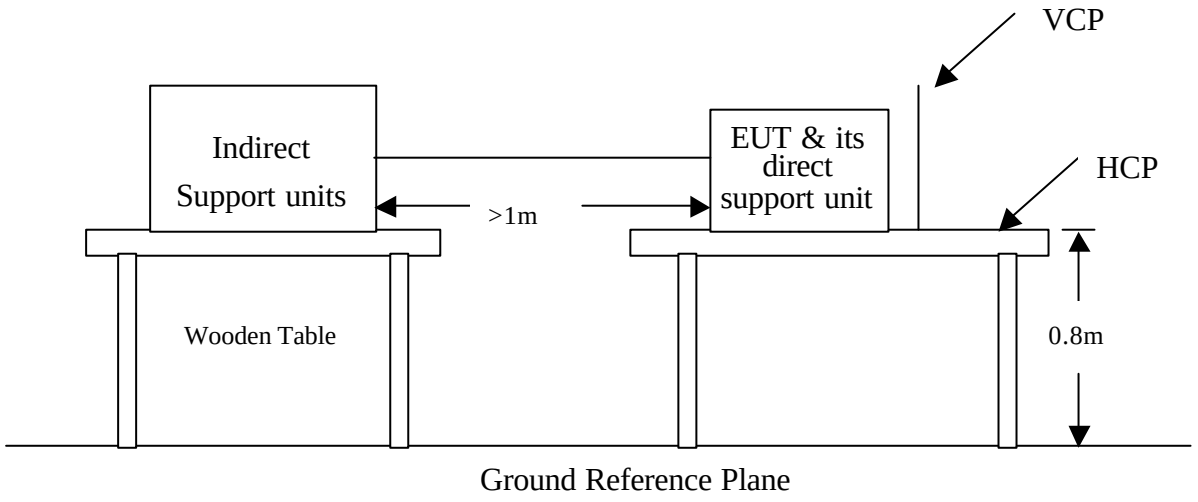
For ESD test:

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
NoiseKen/ ESD Simulator	TC-815P	ESS0210601	06/18/2002	06/17/2003

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port **:** Enclosure
Basic Standard **:** IEC 61000-4-2
Requirements **:** ±8kV (Air Discharge)
±6kV (Contact Discharge)
±6kV (Indirect Discharge)
Performance Criteria **:** B (Standard require)
Temperature/Humidity **:** 20^0C / 60%
Pressure **:** 1018 mbar
Test By **:** Jason Lee

Block Diagram of Test Setup:



Ground Reference Plane

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 communication test program was loaded and executed in Windows mode.
4. PC sent transmit data to remote side via EUT.
5. 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.
6. 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.
7. The application of ESD to the contact of open connectors is not required.
8. 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.

9. The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
Mini 25 /Point	±6kV	Contact Discharge	Pass
Mini 25 /Point	±6kV	Indirect Discharge HCP (Front)	Pass
Mini 25 /Point	±6kV	Indirect Discharge VCP (Back)	Pass
Mini 25 /Point	±6kV	Indirect Discharge VCP (Left)	Pass
Mini 25 /Point	±6kV	Indirect Discharge VCP (Right)	Pass
Mini 10 /Point	±8kV	Air Discharge	Pass

**** The tested points to EUT, please refer to attached page.**
(Blue arrow mark for contact discharge, red arrow mark for air discharge.)

Performance & Result:

[V] **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.

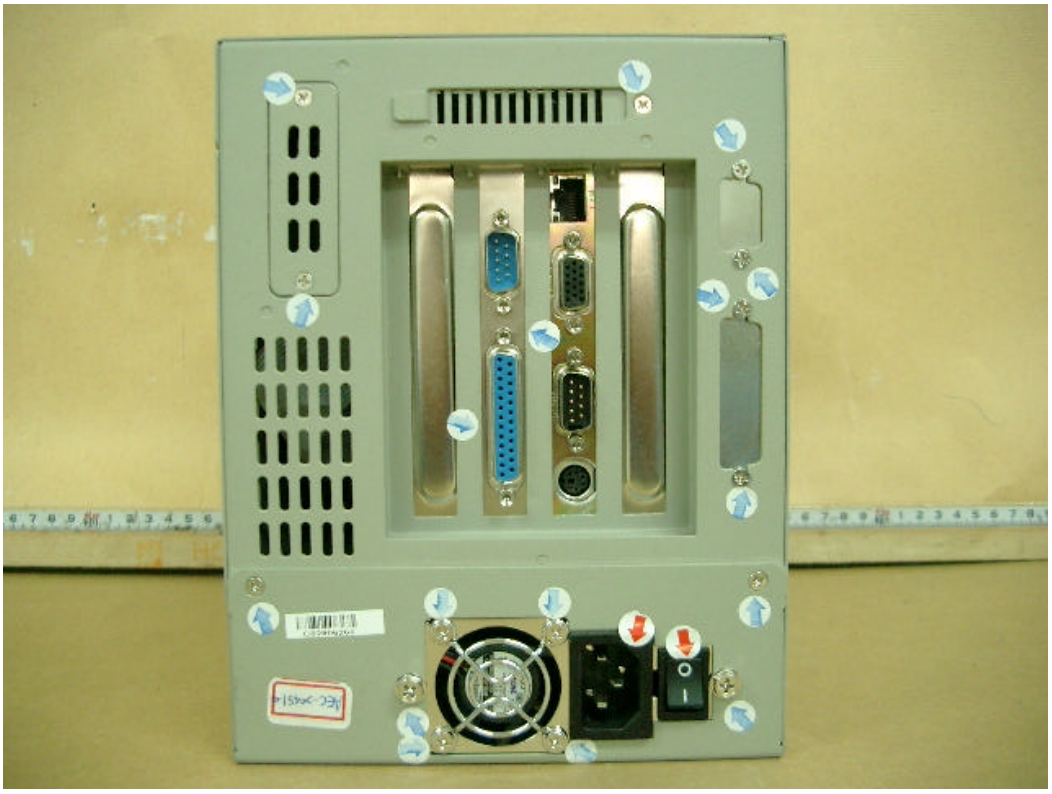
[V] ***PASS***	[ ] ***FAILED***

Observation: No any function degraded during the tests.

The Tested Points of EUT

(Photo 1 of 5)

(Photo 2 of 5)



(Photo 3 of 5)

(Photo 4 of 5)

(Photo 5 of 5)

PHOTOGRAPHS OF TEST SETUP

PHOTOGRAPHS OF EUT