



## EMC COMPLIANCE TEST REPORT

for

IPC

**Trade Name** : Advantech  
**Model Number** : SG-3103  
**Serial Number** : N/A  
**Report Number** : 020867-E  
**Date** : August 15, 2002  
**Regulations** : See below

Standards	Results (Pass/Fail)
EN 55022: 1998 (Class A)	PASS
EN 55011:1998 (Group 1, Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998	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:

**Advantech Co., Ltd.**

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

Prepared by:

**C&C LABORATORY, CO., LTD.**

**#B1, 1<sup>st</sup> Fl., Universal Center,**

**No. 183, Sec. 1, Tatung Rd., Hsi Chih,**

**Taipei Hsien, Taiwan, R.O.C.**

TEL: (02)8642-2071~3

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C&C Laboratory Co., Ltd.**

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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** IPC

**Trade Name:** Advantech

**Model Number:** SG-3103

**Serial Number:** N/A

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

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

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

**Technical Standards:** EN 55022: 1998 (Class A)  
EN 55011:1998 (Group 1, Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
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:** 020867-E

**Date of test:** August 13 ~ 15, 2002


**Deviation:** According to applicant's declaration this EUT is a class A product, and to be 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: \_\_\_\_\_



**Lucky Chen/ EMC Director**



## 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:** 020867-E

**Date of Test:** August 13 ~ 15, 2002

**Equipment Under Test:** IPC

**Model Number:** SG-3103

**Serial Number:** N/A

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

**Technical Standards:** EN 55022: 1998 (Class A)  
EN 55011:1998 (Group 1, Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
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 2<sup>nd</sup> Road, Lu-Chu Hsiang,  
Taoyuan, Taiwan, R. O. C.



## **SYSTEM DESCRIPTION**

### **EUT Test Procedure:**

1. An EMI test software was loaded and executed Windows mode.
2. A communicated software was loaded and executed to communicate between EUT and equipment.
3. EUT (Industrial PC) sends and receives data from PC and Hub via LAN cable.
4. Data was sent to monitor filling the screen with upper case of “H” patterns.
5. Test program sequentially exercised all related I/O’ s of EUT and sent “H” patterns to all applicable output ports of EUT.
6. Repeat 3 to 5. Test program is self-repeating throughout the test.



## PRODUCT INFORMATION

**Housing Type:** Metal Case

**EUT Power Rating:** 100-240 VAC, 60-50Hz, 5-2.5A

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

**Power Supply Manufacturer:** Enhance      **Model:** ENP-1815

**AC Power Cord Type:** Unshielded, 1.8m (Detachable)

**CPU Board Manufacture:** Intel      **Model:** PIII 850MHz

**OSC/Clock Frequencies:** 100 MHz

**Memory Capacity:**      **Install:** 128MB

**HDD Manufacturer:** Seagate      **Model:** ST320011A

**Main Board Manufacture:** Advantech      **Model:** PCM-9576

**Chassis Manufacture:** Advantech      **Model:** SG-3103

**LAN Card:** On Board

### I/O Port of EUT:

I/O PORT TYPES	Q' TY	TESTED WITH
1). LAN Port	3	3
2). RS 232 Port	1	1



## SUPPORT EQUIPMENT

No	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	PC	EVO D300	6K1BKF83F102	FCC DoC	Compaq	RS232 Cable: Shielded, 1.2m	Unshielded, 1.8m
2.	Monitor	CPD-G200	2715863	FCC DoC	SONY	Shielded, 1.8m with a core	Unshielded, 1.8m
3.	Printer	2225C	2648S40021	DK467GSM24	HP	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	SK-2800C	B1C790BCPJ73JM	GYUR79SK	Compaq	Shielded, 1.6m	N/A
5.	PS/2 Mouse	M-CAA43	LZE02801285	FCC DoC	Logitech	Shielded, 1.8m	N/A
6.	HUB	TL-5008DS	XT942040616	N/A	Link Pro	Lan Cable x 4: Unshielded, 1m	Unshielded, 1.8m

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

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





## TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang, 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  
  
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



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 30<sup>th</sup> day of January, 2002.



*Peter R. Hays*  
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.  
No. 81-1, Lane 210, Pa-Die 2<sup>nd</sup> Rd.,  
Lu Chu Hsiang, Teyuan, TAIWAN, R.O.C.  
Kuan Chin Phone: 002 886 7 324 0332  
Fax: 002 886 7 324 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:

Electromagnetic  
Radiated & Conducted

#### Test Methods:

CFR 47, FCC Part 15/18 using ANSI C63.4/1992&2000;  
AS/NZS 3548, VCCI V3 (2001), CNS 13418;  
CNS 13439, CNS 13793, 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)  
Radiated Immunity  
Electrical Fast Transient/Burst  
Surge Immunity  
Conducted Immunity  
Power Frequency Magnetic  
Field Immunity  
Voltage Dips, Short Interruptions, and  
Low Voltage Variations  
Harmonics Flicker

IEC/EN 61000-4-2; IEC 801-2  
IEC/EN 61000-4-3; IEC 801-3  
IEC/EN 61000-4-4; IEC 801-4  
IEC/EN 61000-4-5  
IEC/EN 61000-4-6  
IEC/EN 61000-4-8  
IEC/EN 61000-4-11  
IEC/EN 61000-3-2, IEC/EN 61000-3-3

<sup>1</sup> Note: This accreditation covers testing performed at the main laboratory listed above, and the satellite laboratory located at No. 199, Chang Sheng Road, Hsin Tien City, Taipei, TAIWAN, R.O.C.

(A2LA Cert. No. 0824.01) 01/30/02

Page 1 of 2

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8375 • Phone: 301-644-3248 • Fax: 301-662-2974

#### Product Immunity / Generic Immunity

IIE Product	CISPR 24; EN 55014
Home Appliances	CISPR 14-2; EN 55014-2
Residential commercial and light	EN 55081-2/ EN 61000-6-1; 2001
Industry	EN 55082-2/ EN 61000-6-2; 2001

Quota following products/equipment:  
Computer Components and Peripherals, Networking Components, Wireless Communications  
Components, Electronic Components, Televisions, Home Appliances

01/25/02

*Peter R. Hays*

(A2LA Cert. No. 0824.01) 01/30/02

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<p style="text-align: center;"><b>FEDERAL COMMUNICATIONS COMMISSION</b> Laboratory Division 7435 Oakland Mills Road Columbia, MD, 21046</p> <p style="text-align: center;">March 06, 2002</p> <p style="text-align: right;">Registration Number: 93105</p> <p>C &amp; C Laboratory Co., Ltd. No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang Taoyuan Taiwan Attention: Kurt Chen</p> <p>Re: Measurement facility located at Taoyuan Site No. 4 (3 &amp; 10 meters) Date of Listing: March 06, 2002</p> <p>Gentlemen:</p> <p>Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.</p> <p>If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.</p> <p style="text-align: right;">Sincerely,  Thomas W Phillips Electronic Engineer</p>	<p style="text-align: center;"><b>FEDERAL COMMUNICATIONS COMMISSION</b> Laboratory Division 7435 Oakland Mills Road Columbia, MD, 21046</p> <p style="text-align: center;">February 27, 2001</p> <p style="text-align: right;">Registration Number: 96471</p> <p>C &amp; C Laboratory Co., Ltd. No. 81-1, No. 183, Sec. 1 Tungsh Rd, Hsiao Chai Taoyuan, R.O.C. Attention: Kurt Chen</p> <p>Re: Measurement facility located at Taoyuan Site No. 1 &amp; 3 (3 &amp; 10 meters) Date of Listing: February 27, 2001</p> <p>Gentlemen:</p> <p>Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.</p> <p>If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.</p> <p style="text-align: right;">Sincerely,  Thomas W Phillips Electronic Engineer</p>
<p style="text-align: center;"><b>COMMERCE</b> MINISTRY OF COMMERCE To Minister Tsai Ing-tsun</p> <p style="text-align: right;">ENG 319 AJD</p> <p>22 January 1998</p> <p>C &amp; C Laboratory Co Ltd 1st Fl No. 344 Fu Ching Street Taipei TAIWAN ROC</p> <p>Attention: Mr Tony Hsiung</p> <p>Dear Sir</p> <p><b>LABORATORY APPROVAL</b></p> <p>Thank you for your submission of 21 January regarding the approval of your testing laboratory to the Ministry of Commerce's laboratory approval criteria. Thank you for your interest in this matter.</p> <p>I am pleased to advise that your submission has been successful and your laboratory has been added to the list of Ministry-approved laboratories. Your approved status is valid until 31 December 1998. At this time, the Approved Laboratory scheme will cease operation with the implementation of the new telecommunications regulations. Test reports from your laboratory will be accepted under the new framework. Please find enclosed a copy of the Ministry's discussion paper, DP10, outlining the proposed compliance process from 1 January 1999.</p> <p>If you have any further questions on this matter please do not hesitate to contact me.</p> <p>Yours faithfully</p> <p> Andrew Dyko Senior Technical Officer(Regulatory)</p> <p style="font-size: small;">Operations and Risk Management Branch, Ministry of Commerce Building, 25 Avenue Road, Wellington, New Zealand. P.O. Box 2407, 2407, Wellington. (06) 472 0936, Fax (06) 472 0946</p>	<p style="text-align: center;"><b>COMMERCE</b> MINISTRY OF COMMERCE To Minister Tsai Ing-tsun</p> <p style="text-align: right;">ENG 319 AJD</p> <p>22 January 1998</p> <p>C &amp; C Laboratory Co Ltd 1st Fl No. 344 Fu Ching Street Taipei TAIWAN ROC</p> <p>Attention: Mr Tony Hsiung</p> <p>Dear Sir</p> <p><b>LABORATORY APPROVAL</b></p> <p>Thank you for your submission of 21 January regarding the approval of your testing laboratory to the Ministry of Commerce's laboratory approval criteria. Thank you for your interest in this matter.</p> <p>I am pleased to advise that your submission has been successful and your laboratory has been added to the list of Ministry-approved laboratories. Your approved status is valid until 31 December 1998. At this time, the Approved Laboratory scheme will cease operation with the implementation of the new telecommunications regulations. Test reports from your laboratory will be accepted under the new framework. Please find enclosed a copy of the Ministry's discussion paper, DP10, outlining the proposed compliance process from 1 January 1999.</p> <p>If you have any further questions on this matter please do not hesitate to contact me.</p> <p>Yours faithfully</p> <p> Andrew Dyko Senior Technical Officer(Regulatory)</p> <p style="font-size: small;">Operations and Risk Management Branch, Ministry of Commerce Building, 25 Avenue Road, Wellington, New Zealand. P.O. Box 2407, 2407, Wellington. (06) 472 0936, Fax (06) 472 0946</p>



### EMC Laboratory Authorisation

Aut. No. : ELA 192

#### Testing of

#### Radio & Telecommunications Terminal Equipment

EMC Laboratory: C & C Laboratory Co., Ltd.  
No. 15, 14 Lin, Chin Tzu Chi, Lu Chu Hsiang,  
Taoyuan 338, Taiwan R.O.C.

Scope of Authorisation: All CENELEC and ETSI standards (ENs and ETNs that are listed on the accompanying page, and, all of the corresponding CISPR, IEC, and ISO EMC standards). This authorisation covers all of the EMC-related testing and documentation within the scope of the Radio and Telecommunications Terminal Equipment (R&TTE) Directive (i.e. 1990/269/EC).

NOTE: This authorisation also covers EMC-related testing and documentation that is within the scope of Article 10.5 of the EMC Directive (i.e. 89/336/EEC as amended by 92/31/EEC).

This Authorisation Document confirms that the above mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfills the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory, an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under the European Union's Directive specified above.

For Type Examination Certification(s) to be issued by Nemko, your EMC Laboratory's test reports will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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

The Authorisation is valid through 31. December 2003.

Oslo 26 April 2001

For Nemko AS:

*Kjell Bergh*

Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address:  
Nemko AS  
P.O. Box 100, 2007  
N-2007, Norway

Telephone:  
+47 22 90 90 00  
Fax:  
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### EMC Laboratory Authorisation

Aut. No. : ELA 192

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#### SCOPE OF AUTHORISATION

##### Generic and product-family standards, R&TTE

ETS 300 328-01/06 + A1/07	ETS 300 344-1-1/97	EN 50 489-30 (2000)
EN 50 528-2 (2000)	EN 50 489-31 (2000)	
EN 50 422-2 (2000)	EN 50 489-32 (1996 + A1/97)	EN 50 489-32 (2000)
	EN 50 489-33 (2000)	
ETS 300 328-01/07	ETS 300 328-1/97	EN 50 527-2 (2000)
EN 50 489-30 (2000)	EN 50 489-31 (2000)	
EN 50 422-2 (2000)	EN 50 489-32 (1996 + A1/97)	EN 50 489-32 (2000)
EN 50 489-33 (2000)		

##### Basic standards

EN 50064-4-2 (1995 + A1/96)	EN 50064-4-3 (1995 + A1/96)	EN 50064-4-4 (1995)
EN 50064-4-5 (1995 + A1/96)	EN 50064-4-6 (1995 + A1/96)	EN 50064-4-7 (1995)
EN 50064-4-8 (1995)	EN 50064-4-9 (1995)	EN 50064-4-10 (1995)
EN 50064-4-11 (1995)	EN 50064-4-12 (1995)	EN 50064-4-13 (1995)
EN 50064-4-14 (1995)	EN 50064-4-15 (1995)	EN 50064-4-16 (1995)
EN 50064-4-17 (1995)	EN 50064-4-18 (1995)	EN 50064-4-19 (1995)
EN 50064-4-20 (1995)	EN 50064-4-21 (1995)	EN 50064-4-22 (1995)
EN 50064-4-23 (1995)	EN 50064-4-24 (1995)	EN 50064-4-25 (1995)
EN 50064-4-26 (1995)	EN 50064-4-27 (1995)	EN 50064-4-28 (1995)
EN 50064-4-29 (1995)	EN 50064-4-30 (1995)	EN 50064-4-31 (1995)
EN 50064-4-32 (1995)	EN 50064-4-33 (1995)	EN 50064-4-34 (1995)
EN 50064-4-35 (1995)	EN 50064-4-36 (1995)	EN 50064-4-37 (1995)
EN 50064-4-38 (1995)	EN 50064-4-39 (1995)	EN 50064-4-40 (1995)
EN 50064-4-41 (1995)	EN 50064-4-42 (1995)	EN 50064-4-43 (1995)
EN 50064-4-44 (1995)	EN 50064-4-45 (1995)	EN 50064-4-46 (1995)
EN 50064-4-47 (1995)	EN 50064-4-48 (1995)	EN 50064-4-49 (1995)
EN 50064-4-50 (1995)	EN 50064-4-51 (1995)	EN 50064-4-52 (1995)
EN 50064-4-53 (1995)	EN 50064-4-54 (1995)	EN 50064-4-55 (1995)
EN 50064-4-56 (1995)	EN 50064-4-57 (1995)	EN 50064-4-58 (1995)
EN 50064-4-59 (1995)	EN 50064-4-60 (1995)	EN 50064-4-61 (1995)
EN 50064-4-62 (1995)	EN 50064-4-63 (1995)	EN 50064-4-64 (1995)
EN 50064-4-65 (1995)	EN 50064-4-66 (1995)	EN 50064-4-67 (1995)
EN 50064-4-68 (1995)	EN 50064-4-69 (1995)	EN 50064-4-70 (1995)
EN 50064-4-71 (1995)	EN 50064-4-72 (1995)	EN 50064-4-73 (1995)
EN 50064-4-74 (1995)	EN 50064-4-75 (1995)	EN 50064-4-76 (1995)
EN 50064-4-77 (1995)	EN 50064-4-78 (1995)	EN 50064-4-79 (1995)
EN 50064-4-80 (1995)	EN 50064-4-81 (1995)	EN 50064-4-82 (1995)
EN 50064-4-83 (1995)	EN 50064-4-84 (1995)	EN 50064-4-85 (1995)
EN 50064-4-86 (1995)	EN 50064-4-87 (1995)	EN 50064-4-88 (1995)
EN 50064-4-89 (1995)	EN 50064-4-90 (1995)	EN 50064-4-91 (1995)
EN 50064-4-92 (1995)	EN 50064-4-93 (1995)	EN 50064-4-94 (1995)
EN 50064-4-95 (1995)	EN 50064-4-96 (1995)	EN 50064-4-97 (1995)
EN 50064-4-98 (1995)	EN 50064-4-99 (1995)	EN 50064-4-100 (1995)

Oslo 26 April 2001

Kjell Bergh, Nemko Group EMC Co-ordinator

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### EMC Laboratory Authorisation

Aut. No. : ELA 124

EMC Laboratory: C & C Laboratory Co., Ltd.  
No. 15, 14 Lin, Chin Tzu Chi, Lu Chu Hsiang,  
Taoyuan 338, Taiwan R.O.C.

Scope of Authorisation: 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.

This Authorisation Document confirms that the above mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfills the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under the European Union EMC Directive [89/336/EEC as amended by 92/31/EEC and 93/1/EEC].

In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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

The Authorisation is valid through 31 December 2003.

Oslo 26 April 2001

For Nemko AS:

*Kjell Bergh*

Kjell Bergh, Nemko Group EMC Co-ordinator

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### EMC Laboratory Authorisation

Aut. No. : ELA 160

EMC Laboratory: C & C Laboratory Co., Ltd.  
No. 15, 14 Lin, Chin Tzu Chi, Lu Chu Hsiang,  
Taoyuan 338, Taiwan R.O.C.

Scope of Authorisation: EN 60601-1-2 and IEC 60601-1-2, the Colateral Standards for electro-medical products, with particular application to EMC requirements only.

This Authorisation Document confirms that the above mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfills the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation listed above. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under either the European Union Medical Device Directive [MDD], 90/269/EEC, or the European Union Active Implantable Medical Device Directive [AIMD], 90/269/EEC, (as applicable).

In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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

The Authorisation is valid through 31. December 2003.

Oslo 26 April 2001

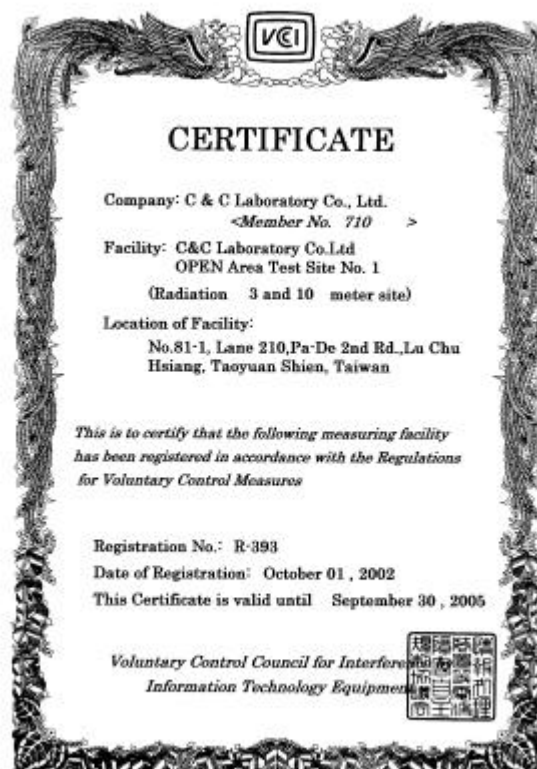
For Nemko AS:

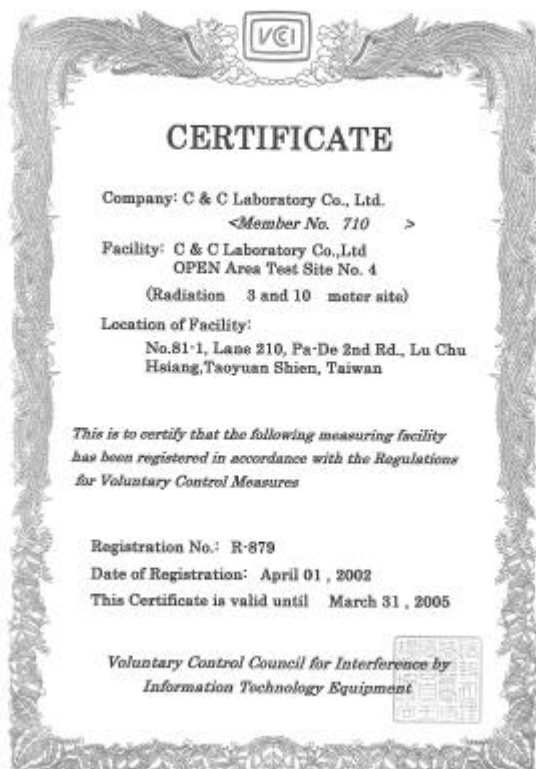
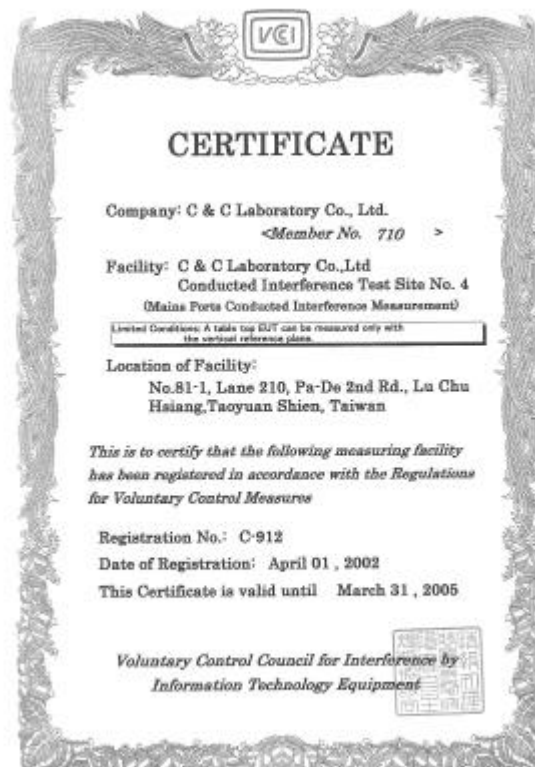
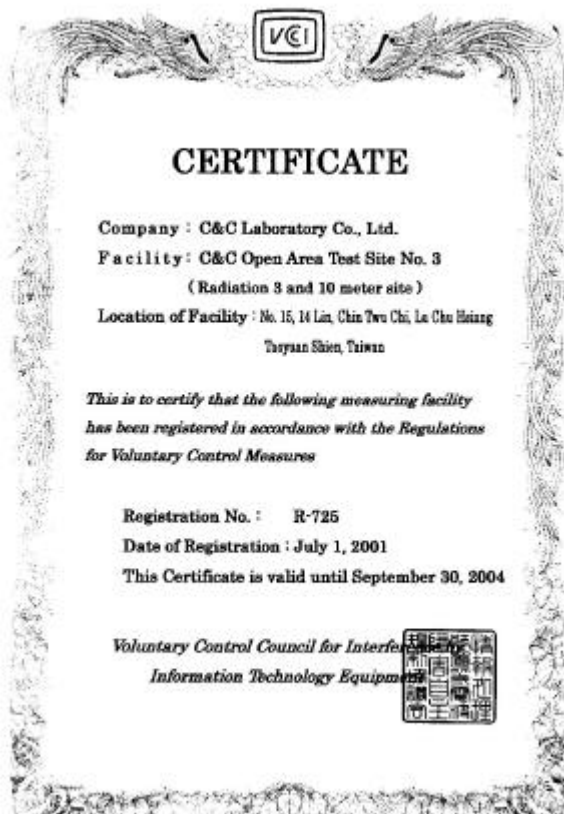
*Kjell Bergh*

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Technischer Überwachungs-Verein Rheinland

# Certificate

of

## Appointment

No. 19964142-9906

The applicant:

C. &amp; C. Laboratory Co., Ltd.

No. 15, 14 Lin, Chien-yueh Chi, La Chu Island, Tainan, Taiwan, R.O.C.

has been authorized to carry out EMC tests by order and under supervision of  
TÜV Rheinland according to

EN 55 011-1:1991, EN 55 014-1:1993/AT, EN 60 625:1994/AT, EN 55 014-2:1997,  
EN 61 555-2:1987, EN 61 400-3-2:1995, EN 61 400-3-3:1995  
EN 50 181-1:1992, EN 50 181-2:1993, EN 60 083-1:1995, EN 62 002-2:1995  
EN 50 080-2:1995, IEC 600-2:1984, IEC 600-2:1991, IEC 600-3:1984  
IEC 580-2:1985, IEC 600-3:1990, IEC 600-3:1996, IEC 50 140:1993, EN 50 140:1993  
EN 50 204:1995, EN 61 009-4-2:1996, IEC 61 000-4-2:1995, EN 61 000-4-3:1995  
EN 61 000-4-4:1995, IEC 61 000-4-5:1993, EN 61 000-4-6:1994

An inspection of the facility was conducted according to the Document "Approval of Test Site" with reference to EN 45 001 by a TÜV Rheinland inspector

Audit Report No. P 9961142E01 Rev

This certificate is valid until the next scheduled inspection or up to 15 months, at the discretion of TÜV Rheinland.

TÜV Rheinland Taiwan Ltd.  
Taipei, 24 June 1999

Dipl.-Ing. A. Klinkert

Didl.-Ing. R. Charton  
Aachen



中華民國經濟部標準檢驗局

北京京華書局發行

BUREAU OF STANDARDS, METROLOGY AND INSPECTION

MINISTRY OF ECONOMIC AFFAIRS, REPUBLIC OF CHINA

4. MSc. I. UNGURU HADU, TAPIL, TAINAN, R. O. C.

To: C&C Laboratory Co., Ltd

IN REPLY REFER TO  
90-1-3000015

#B1, 1st Fl., Universal Center, No. 183, Sec. 1, Tatung Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

This Designation Document confirms that your subject measurement facility has been validated according to the ISO/IEC Guide 25:1990 and found to be in compliance with the requirements of \* BSM's Operation Guidelines of the Approval and Management of Designated Laboratories.\*

The description of your facility has, therefore, been placed on file and the name of your organization added to the Bureau's list of facilities whose measurement data and test reports will be accepted as a basis for attesting conformity to CNS13803-1997, CNS13438-1997, CNS13783-1-1998, CNS13439-1997, CNS14115-1998 For Industrial, Scientific and Medical Instrumentation, Information Technology Equipment, household appliances/tools, broadcast receivers and related equipments and fluorescent luminaires.

It is located at: <http://www.bumil-gow.tw>

Please reference the file numbers below in the body of all test reports containing measurements made on the corresponding facility.

For your EMI Testing Lab, use reference: SL2-TS-E-0014, SL2-IN-E-0014, SL2-A1-E-0014, SL2-R1-E-0014, SL2-R2-E-0014, SL2-L1-E-0014.

Note that this filing must be updated for any changes made to the documentation and / or facility and whenever major modifications to your documentation or major construction or repairs to your facility are completed, re-submission of the related information or the site allocation characteristics will be required within 2 weeks.

The Designation is valid through January 16, 2004.

Trained January 9, 2010

For BSMIL MODEL:

Notre-Dame, la



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## Chinese National Laboratory Accreditation Certificate ROC

This is to certify that C & C EMC Laboratory, C & C Laboratory Co., Ltd.(Registration No.:0363) has been recognized by the Council of Chinese National Laboratory Accreditation as an accredited laboratory. The laboratory has been registered for fourteen items within the field of Electrical Testing and confirmed to meet the requirements of ISO/IEC 17025. The details of the scope of accreditation are described in the following pages and this certificate is valid until November 14, 2004.

Neng-Jong Lin

Chairman of Chinese National Laboratory Accreditation Council

on May 15, 2002

(This document is invalid unless accompanied by all 5 pages)



CNLA-ZL98078E Page 2 of 5

Organization : C & C Laboratory Co., Ltd.  
Laboratory : C & C EMC Laboratory  
Registration No. : 0363  
Laboratory Head : WANG, Charles  
Testing Field : Electrical Testing  
Date of Registration : 1998.11.15  
Date of Extension : 2001.11.15

Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EH128 Low power R.F. equipment	Low power radiations/receivers  Low power R. F. Equipment	DOT Low Power R.F. Devices Technical Specification 1000.101  ETSI EN 300 128-1 V1.3.1 (2001-08) ETSI EN 300 128-2 V1.3.1 (2001-08) ETSI EN 300 128-1 V1.3.1 (2001-09) ETSI EN 300 128-2 V1.3.1 (2001-09) ETSI EN 300 220-3 V1.1.1 (2000-00) 47 CFR Part 15 Subpart C (2000-10)	9 kHz-30 GHz		
ED102 Harmonic current emissions	ITE and peripheral products	IEC 61000-3-2 (1995) A1 (2001) EN 61000-3-2 (1995) A1 (1998), A2 (1998), A14 (2000)	ELV Voltage: 0-270VAC (Single Phase) 50/60 Hz ELV current: 0-16 A Harmonic number: 1-90 order		
ED105 Voltage fluctuations and flicker	ITE and peripheral Products	IEC 1000-3-3 (1994) EN 61000-3-3 (1995)	ELV Voltage: 0-270 VAC (Single Phase) 50/60 Hz ELV Current: 0-16 A Standard impedance: $R_s = 0.4 \Omega$		



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Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
ED113 Audio and television broadcast receivers and associated equipment	Broadcast receivers and associated equipment	EN 55013:1996+A12:1994+A13:1996 CISPR 13:1975+A1:1983 CNS 13439 (1997.3)	ELV Voltage: 100-270 VAC (Single Phase) 50/60 Hz ELV Current: 0-30 A 9 kHz-1.75 GHz Conduction Emission: 0.15-30 MHz Antenna Terminal: 30 MHz-1.75 GHz Radiation Emission: 30 MHz-1000 GHz Disturbance Power: 30-300 MHz		
ED114 Electrical appliances and systems	Household appliances/Electric tools and similar apparatus	EN 55014-1:1998+A1:1997+A2:1999 CISPR 14:1993+A1:1996+A2:1998 CNS 13783-1 (1998.6)	ELV Voltage: 0-270 VAC (Single Phase) 50/60 Hz ELV Current: 0-200 A Conduction Emission: 9 kHz-30 MHz Disturbance Power: 30-300 MHz		
ED115 Fluorescent lamps and luminaires	Fluorescent Lamps and luminaires	CISPR 15 (1992) EN 55015 (1999) CNS 14115 (1998)	ELV Voltage: 0-270 VAC (Single Phase) Conduction emission frequency range: 9 kHz-30 MHz Magnetic interference frequency range: 9 kHz-30 MHz (Magnetic loop antenna) Insertion loss frequency range: 150-600 MHz Lamp EM interference frequency		







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Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EJ0122 Systems and apparatus of the telecommunication and information technology	ITE and peripheral products	CISPR 12 (1997) EN 55012 (1998) CNS 13438 (1997) AS/NZS 3548 (1998) VCCI (2001) 47 CFR Part 15 Subpart B (2000/10)	range: 30 MHz-26.5 GHz EUT Voltage: 0-270 VAC (Single/3 Phase) 50/60 Hz EUT Current: 0-200 A Conduction interference: 150 kHz-30 MHz Radiation interference: 30 MHz-26.5 GHz		
EJ0202 Electrostatic discharge tests	ITE and peripheral products	IEC 61000-4-2 (2001) EN 61000-4-2 (1995) CNS 13022-1 (1992)	EUT Voltage: 100-270 VAC (Single Phase) 50/60 Hz EUT Current: 0-16 A Air discharge: 0.2-25 kV(+/-) Contact discharge: 0.2-15 kV(+/-)		
EJ0203 Radiated susceptibility tests	ITE and peripheral products	IEC 801-3 (1984) IEC 1000-4-3 (1995) EN 61000-4-3 (1996) BS 50204 (1993)	EUT Voltage: 0-270 VAC (Single Phase) 50/60 Hz EUT Current: 0-30 A Frequency range: 25MHz-1.0 GHz (Field intensity) 10 V/m, AM Modulation)		
EJ0204 Electrical Fast transient/burst tests	ITE and peripheral products	IEC 801-4 (1988) IEC 1000-4-4 (1995) EN 61000-4-4 (1995) CNS 13022-2 (1992)	EUT Voltage: 0-270 VAC (Single/3 phase) 50/60 Hz EUT Current: 0-200 A Burst range: 0.2-4.5 kV		



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Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EJ0205 Surge/lightening tests	ITE and peripheral products	IEC 1000-4-5 (1995) EN 50142 (1994) CNS 13022-3 (1992) EN 61000-4-5 (1995)	EUT Volt.: 0-270 VAC (Single phase) 50/60 Hz DC 100V EUT Current: 0-16 A (AC/DC) Equipment range: 0.2-4.2 kV Test Ports: Power line, Signal line		
EJ0206 Conducted susceptibility tests	ITE and peripheral products	IEC 1000-4-6 (1995) EN 61000-4-6 (1996) EN 50141 (1993)	EUT Voltage: 0-270 VAC (Single/3 Phase) 50/60 Hz EUT Current: 0-16 A Frequency range: 150 kHz-230 MHz (Amplitude: 10 V, AM Modulation)		
EJ0208 Power frequency magnetic field immunity test	ITE and peripheral products	IEC 1000-4-8 (1995) EN 61000-4-8 (1995)	EUT Voltage: 0-270 VAC (Single/3 Phase) 50/60 Hz EUT Current: 0-16 A Continuous magnetic field: 0-100 A/m		
EJ0211 Voltage dips, short interruptions and voltage variations immunity tests	ITE and peripheral products	IEC 1000-4-11 (1994) EN 61000-4-11 (1994)	EUT Voltage: 100-270 VAC (Single Phase) 50/60 Hz EUT Current: 0-16 A Voltage interruption: 100 % Voltage Dips: 0-100 % Voltage variation: Standard variation wave shape		
( Null Below )					



## 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:** # 1

Open Area Test Site # 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Q.P Adaptor	HP	85650A	2043A00373	06/12/2002	06/11/2003
RF Pre-selector	HP	85685A	3010A01113	06/12/2002	06/11/2003
Spectrum Analyzer	HP	8568B	2415A00314	06/12/2002	06/11/2003
S.P.A Display	HP	85662A	2403A06937	06/12/2002	06/11/2003
Bilog Antenna	CHASE	CBL6112A	2309	02/09/2002	02/08/2003
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
Site NSA	C&C	N/A	N/A	11/03/2001	11/02/2002
Spectrum Analyzer	Anritsu	MS2601A	MT09950	N/A	N/A
Pre-Amplifier	HP	8447D	2944A08432	12/08/2001	12/07/2002

**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	12/19/2001	12/18/2002
LISN	R&S	ESH2-Z5	843285/010	12/10/2001	12/09/2002
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
Spectrum Analyzer	ADVANTEST	R3261AN	31720234	08/06/2002	08/05/2003
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

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



## TEST EQUIPMENT LIST

Power Harmonic & Voltage Fluctuation/Flicker Measurement (61000-3-2&-3-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Harmonic & Flicker Tester	HAEFELY TRENCH	PHF555	080 419-25	10/12/2001	10/11/2002
ESD test (61000-4-2)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
ESD Generator	NoiseKen	ESS-2001	ESS0210582	06/18/2002	06/17/2003
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
EM PROBE	GW	EMR-30	L-0013	05/23/2002	05/22/2003
Fast Transients/Burst test (61000-4-4)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT-JUNIOR	583 333-117	08/21/2001	08/20/2002
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N/A	N/A
Surge Immunity test (61000-4-5)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	09/01/2001	08/31/2002
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	03/05/2002	03/04/2003
CDN	MEB	M2	A3002010	04/24/2002	04/23/2003
CDN	SCHAFFNER	T400	16906	10/12/2001	10/11/2002
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	04/08/2002	04/07/2003



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

### **MEASUREMENT PROCEDURE (PRELIMINARY LINE CONDUCTED EMISSION TEST)**

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

#### **Mode:**

##### **1. Data transmission**

- 10) After the preliminary scan, we found the following test mode(s) 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
Limit dBuV	= Limit stated in standard
Margin dB	= Reading in reference to limit
Note	= Current carrying line of reading
“---“	= The emission level complied with the Average limits, with at least 2dB margin limits, so no further recheck.

## LINE CONDUCTED EMISSION LIMIT

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

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



## MEASUREMENT PROCEDURE (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 following test mode(s) were scanned during the preliminary test:

**Mode(s):**

1.) LAN 1                      2.) LAN1 + 2                      3.) LAN1 + 2 + 3

- 7) After the preliminary scan, we found the following test mode(s) producing the highest emission level and test date of the worst case was reported on the summary data page.

**Mode: 3 (10 / 100Mbps)**

### 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	---	87	74	-43.05	---	

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

## COMMON MODE CONDUCTED EMISSION LIMIT AT TELECOMMUNICATION PORTS

<input checked="" type="checkbox"/> CE-Mark ( EN 55022:1998 )					
CLASS	Measuring Band	Voltage limit dB(uV)		Current limit dB(uA)	
		Q.P.	AV	Q.P.	AV
A	150kHz-500kHz	97-87	84-74	53-43	40-30
	500kHz-30MHz	87	74	43	30

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



## **MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)**

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55022 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per EN 55022.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 4) The EUT received AC power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable, if any.
- 5) The antenna was placed at 10 meter away from the EUT as stated in EN 55022. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode was scanned during the preliminary test:

**Mode :**

### **1. Data transmission**

- 8) After the preliminary scan, we found the following test mode(s) 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/m )	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)
xx.xx	14.0	11.2	26.2	30	-3.8

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

## RADIATED EMISSION LIMIT

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

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



## BLOCK DIAGRAM OF TEST SETUP

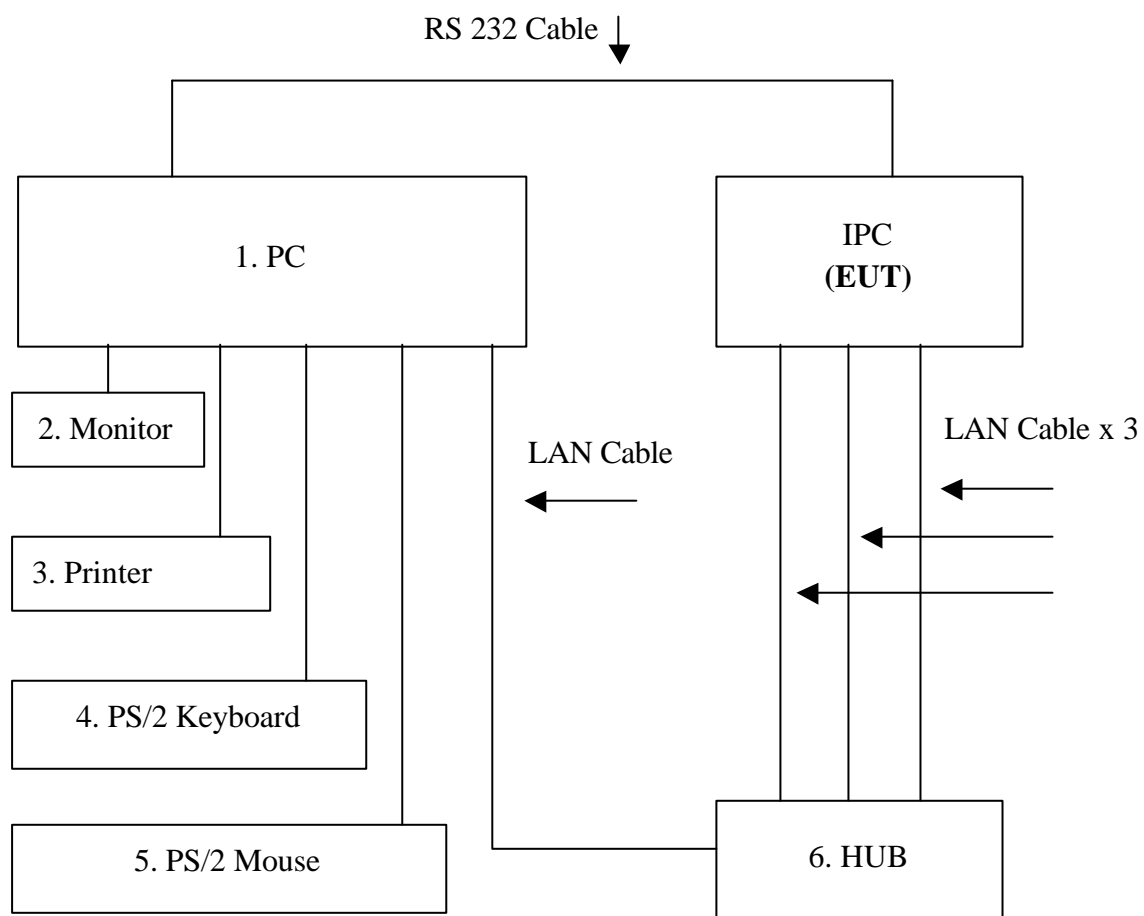
### System Diagram of Connections between EUT and Simulators

**EUT:** IPC

**Trade Name:** Advantech

**Model Number:** SG-3103

**Power Cord:** Unshielded, 1.8m





## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** SG-3103

**Location:** Site # 3

**Tested by:** Stan Lin

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 28°C

**Humidity:** 64%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
0.668	50.10	---	79.00	66.00	-28.90	---	L1
4.506	40.70	---	73.00	60.00	-32.30	---	L1
6.096	39.40	---	73.00	60.00	-33.60	---	L1
10.787	40.10	---	73.00	60.00	-32.90	---	L1
12.748	41.20	---	73.00	60.00	-31.80	---	L1
13.417	41.60	---	73.00	60.00	-31.40	---	L1
0.167	51.80	---	79.00	66.00	-27.20	---	L2
3.716	40.10	---	73.00	60.00	-32.90	---	L2
4.507	40.80	---	73.00	60.00	-32.20	---	L2
12.807	41.20	---	73.00	60.00	-31.80	---	L2
13.418	42.80	---	73.00	60.00	-30.20	---	L2
16.226	38.90	---	73.00	60.00	-34.10	---	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:** SG-3103

**Location:** Site # 3

**Tested by:** Stan Lin

**Test Mode:** Mode 3

**Test Results:** Passed

**Temperature:** 28°C

**Humidity:** 64%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
10.001	77.40	46.40	87.00	74.00	-9.60	-27.60	10Base
10.168	66.10	---	87.00	74.00	-20.90	---	10Base
12.556	58.60	---	87.00	74.00	-28.40	---	10Base
15.007	60.10	---	87.00	74.00	-26.90	---	10Base
20.002	64.20	---	87.00	74.00	-22.80	---	10Base
29.987	60.10	---	87.00	74.00	-26.90	---	10Base
13.417	66.80	---	87.00	74.00	-20.20	---	100Base
16.226	71.40	---	87.00	74.00	-15.60	---	100Base
18.236	70.10	---	87.00	74.00	-16.90	---	100Base
19.708	71.50	---	87.00	74.00	-15.50	---	100Base
21.657	68.60	---	87.00	74.00	-18.40	---	100Base
23.126	70.10	---	87.00	74.00	-16.90	---	100Base

**\*\*NOTE: 1. “---” denotes the emission level was less –2 dB to the Average limit, so no re-check anymore.**



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** SG-3103

**Location:** Site # 1

**Tested by:** Lung Tsai

**Polar:** Vertical-10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 28°C

**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)
42.13	20.3	14.3	34.6	40.0	-5.4
143.40	23.9	11.9	35.8	40.0	-4.2
155.56	23.6	10.4	34.0	40.0	-6.0
165.35	19.4	10.3	29.7	40.0	-10.3
183.52	20.1	11.4	31.5	40.0	-8.5
375.23	18.3	18.9	37.2	47.0	-9.8



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** SG-3103

**Location:** Site # 1

**Tested by:** Lung Tsai

**Polar:** Horizontal--10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 28°C

**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)
74.85	19.6	6.2	25.8	40.0	-14.2
137.85	13.9	12.2	26.1	40.0	-13.9
150.23	20.4	11.0	31.4	40.0	-8.6
165.78	16.7	10.4	27.1	40.0	-12.9
299.87	24.6	15.6	40.2	47.0	-6.8
373.98	22.3	18.8	41.1	47.0	-5.9
452.36	17.1	19.1	36.2	47.0	-10.8

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

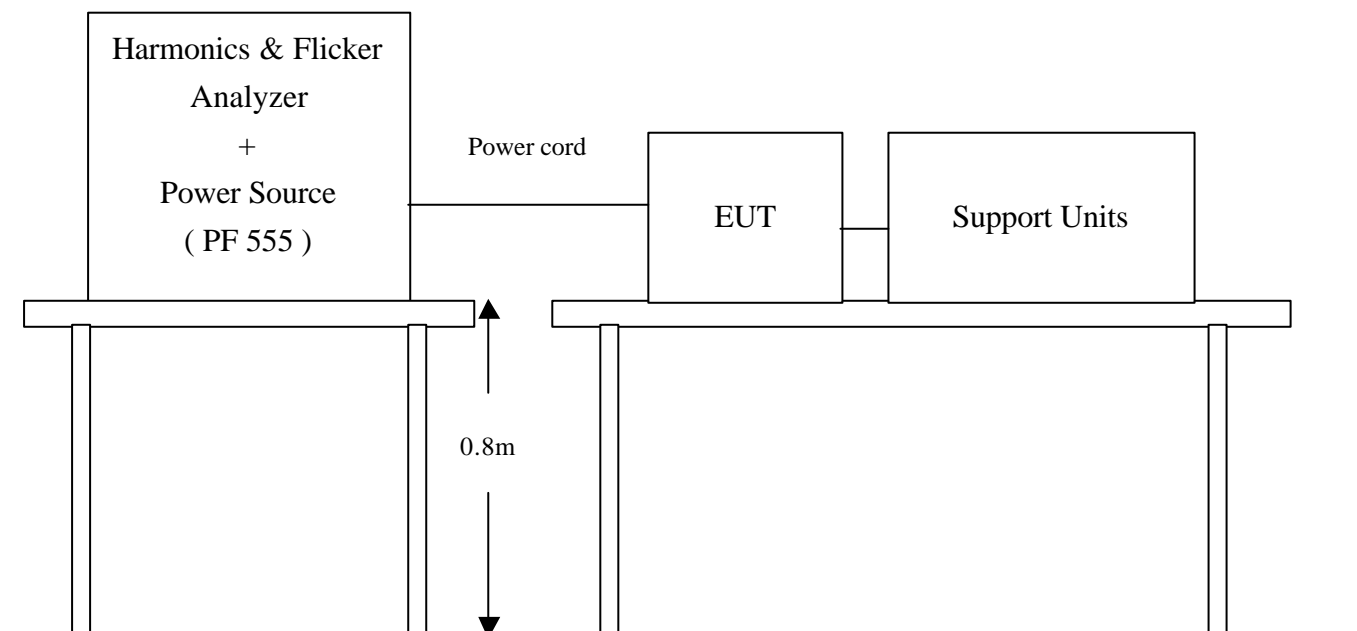
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 + A14: 2000)  
**Limits** : ☒ V CLASS A ; ☐ CLASS D  
**Tester** : Stan Lin  
**Temperature** : 28°C  
**Humidity** : 62%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : § 5 of EN 61000-3-3  
**Tester** : Stan Lin  
**Temperature** : 28°C  
**Humidity** : 62%

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.



-----  
EN 61000-3-2 TEST REPORT 2002/8/13 10:21 PM  
-----

Unit: IPC

Model No. : SG-3103

Remarks: Temp:28°C Hum:62%

Operator: Stan Lin

=====

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: 40.2W



## TEST DATA

-----

Result: PASS

## Harmonic Current Results

-----

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.179	NaN	NaN	PASS
2	0.002	1.080	1.080	PASS
3	0.158	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.145	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.133	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.119	0.400	0.400	PASS
10	0.001	0.184	0.184	PASS
11	0.102	0.330	0.330	PASS
12	0.001	0.153	0.153	PASS
13	0.084	0.210	0.210	PASS
14	0.001	0.131	0.131	PASS
15	0.066	0.150	0.150	PASS
16	0.001	0.115	0.115	PASS
17	0.049	0.132	0.132	PASS
18	0.001	0.102	0.102	PASS
19	0.034	0.118	0.118	PASS
20	0.000	0.092	0.092	PASS
21	0.021	0.107	0.107	PASS
22	0.000	0.084	0.084	PASS
23	0.012	0.098	0.098	PASS





24	0.000	0.077	0.077	PASS
25	0.008	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.011	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	0.013	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.012	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.010	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.008	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.005	0.058	0.058	PASS
40	0.001	0.046	0.046	PASS

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT 2002/8/13 10:43 PM  
-----

Unit: IPC

Model No. : SG-3103 (Continue)

Remarks: Temp:28°C Hum:62%

Operator: Stan Lin

=====

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 2002/8/13 10:58 PM  
-----

Unit: IPC

Model No. : SG-3103 (Manual Switch)

Remarks: Temp:28°C Hum:62%

Operator: Stan Lin

=====

#### 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

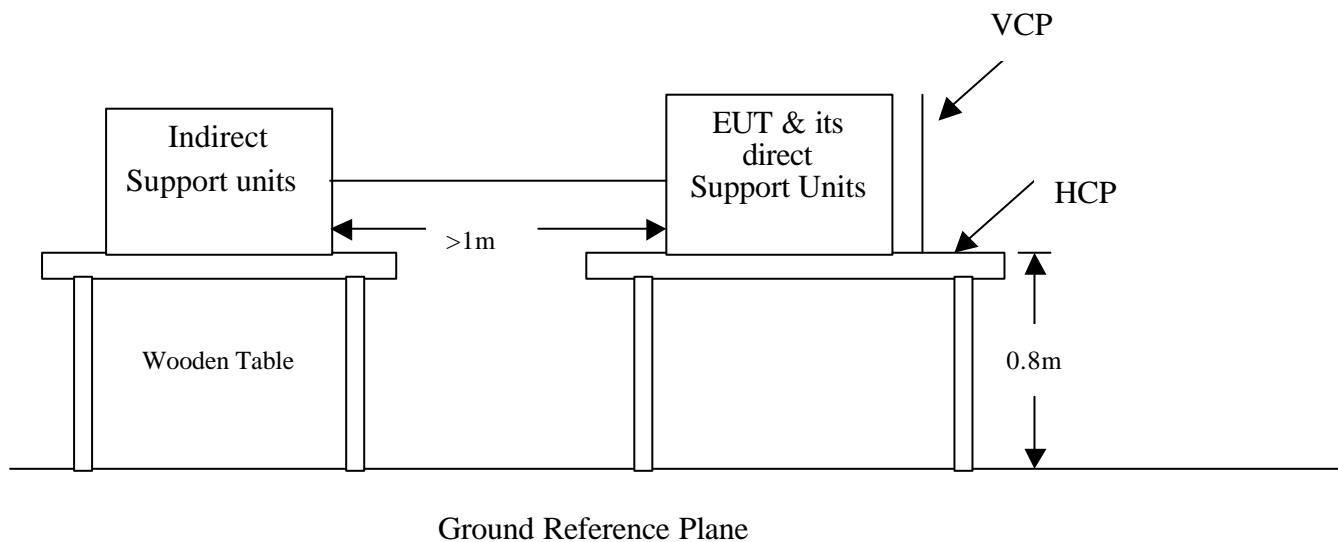
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-2  
**Test Level** :  $\pm 8$  kV (Air Discharge)  
                   $\pm 4$  kV (Contact Discharge)  
                   $\pm 4$  kV (Indirect Discharge)  
**Performance Criteria** : B ( Standard require )  
**Tester** : Stan Lin  
**Temperature/Humidity**: 27°C / 62%

#### 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 1m 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 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 25 /Point	±4kV	Contact Discharge	Pass
Mini 25 /Point	±4kV	Indirect Discharge HCP (Front)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Left)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Back)	N/A
Mini 25 /Point	±4kV	Indirect Discharge VCP (Right)	Pass
Mini 10 /Point	±8kV	Air Discharge	Pass

\*\*\* The tested points to EUT please refer to attach pages.

(Blue arrow mark for contact discharge, red arrow mark for air discharge.)

## **Performance & Result:**

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

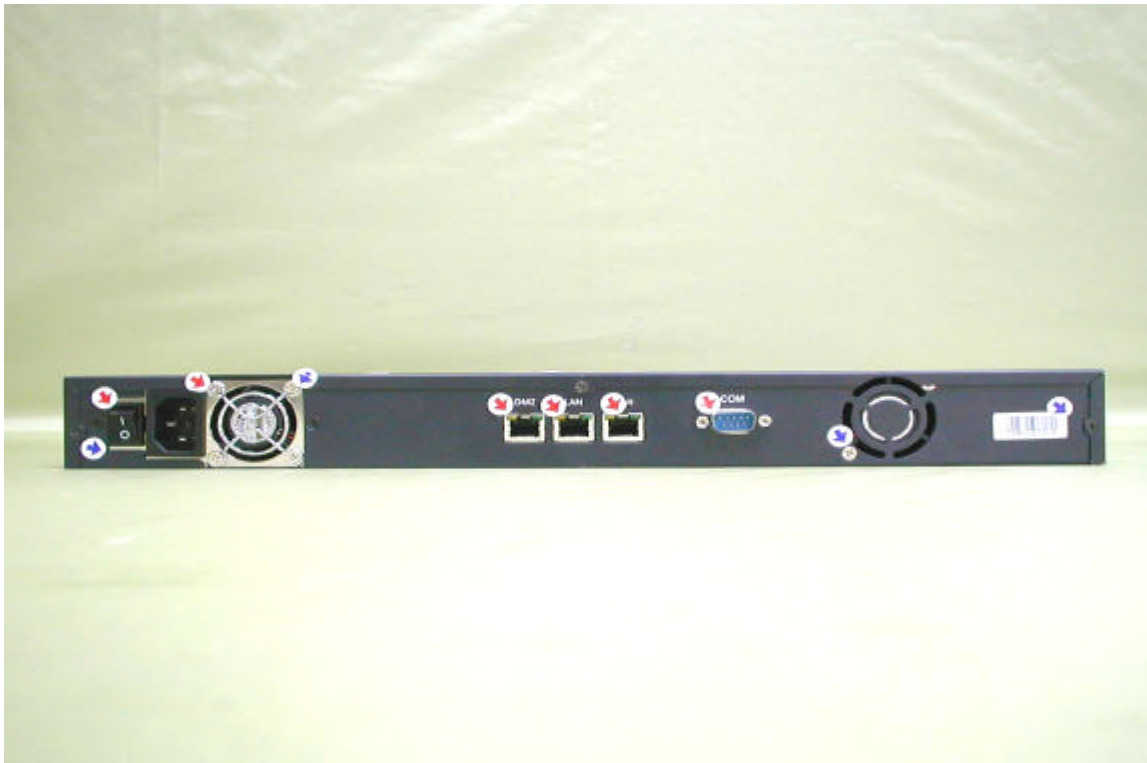
☒ **PASS**

☐ **FAILED**

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

*The Tested Points of EUT*

( Photo 1 of 1 )



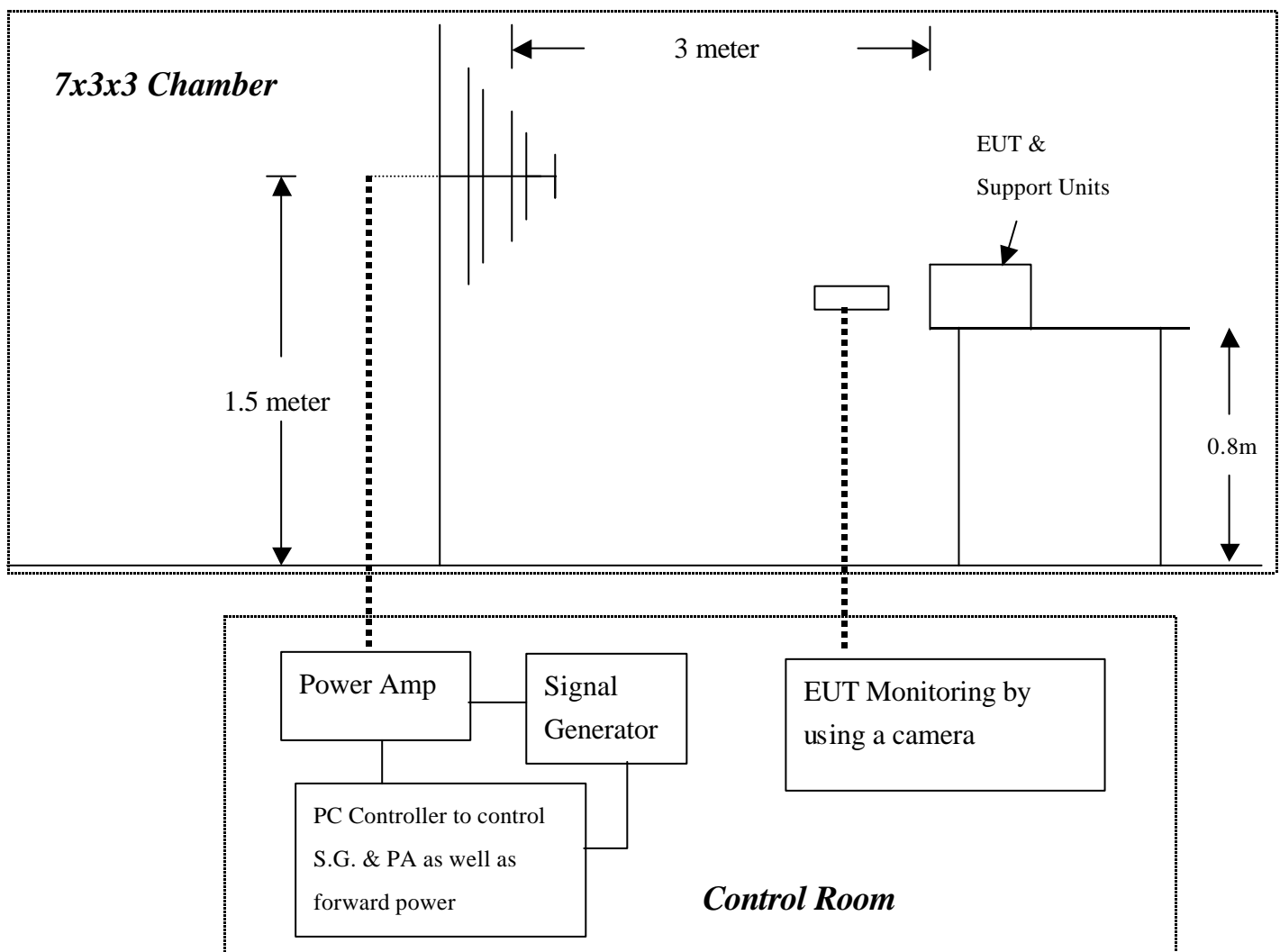


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

<b>Port</b>	: Enclosure
<b>Basic Standard</b>	: IEC 61000-4-3
<b>Requirements</b>	: 10 V/m / with 80% AM. 1kHz Modulation. (Customer requested)
<b>Performance Criteria</b>	: A ( Standard require )
<b>Tester</b>	: Stan Lin
<b>Temperature</b>	: 29°C
<b>Humidity</b>	: 64%

#### 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. The LAN communication software was loaded and executed on PC system.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of RS test software per IEC 61000-4-3.
5. Performing the test at each side of with specified level from 80MHz to 1000MHz at 1% steps.
6. Recording the test result in following table.
7. It is not necessary to perform test as per annex A of EN 55024 if the EUT doesn't belong to ITE product.

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

Test level : 10V/m  
Steps : 1 % of fundamental  
Dwell Time : 3 sec

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

## **Performance & Result:**

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

☒ **PASS**

☐ **FAILED**

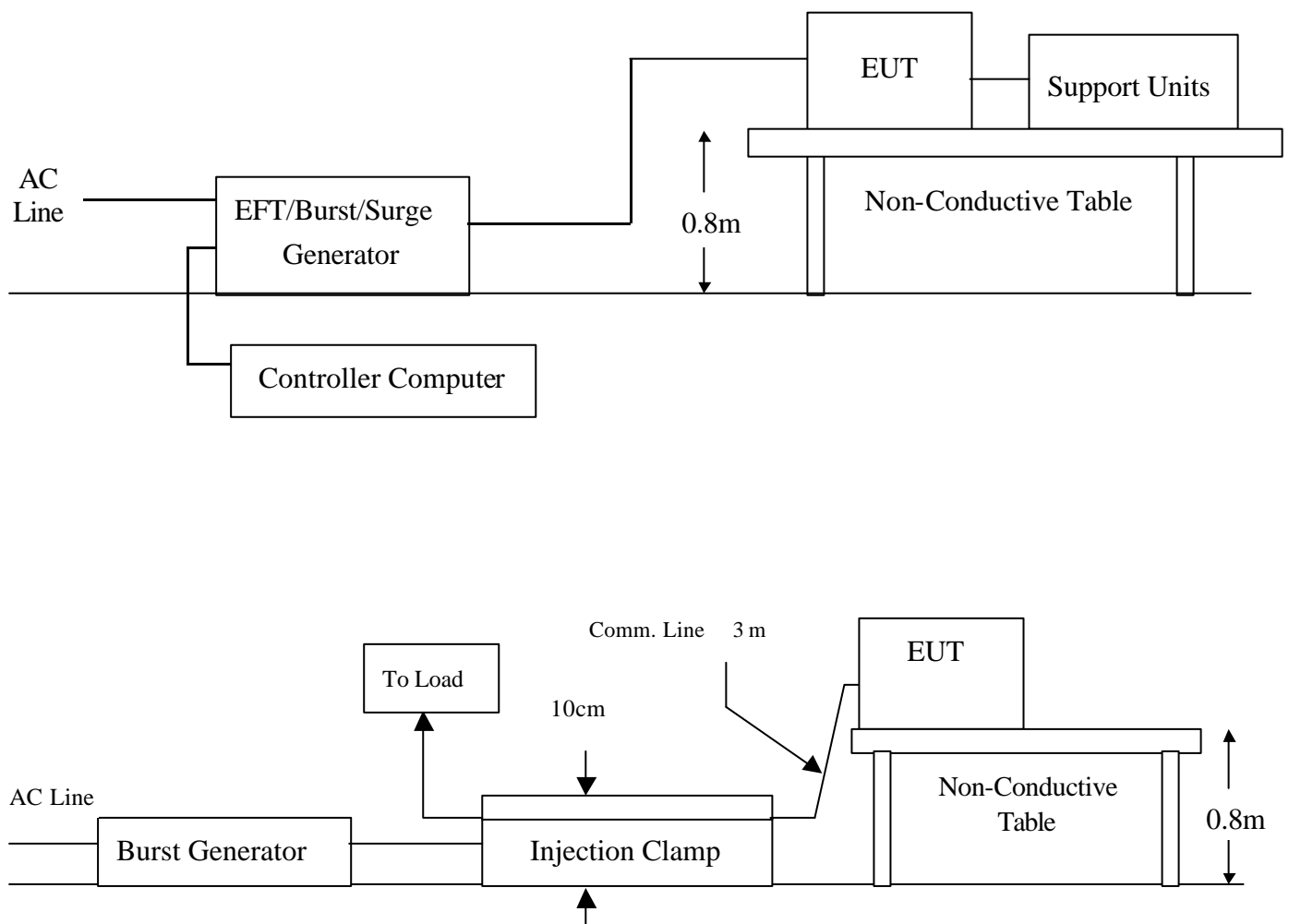
**Observation: No any function degraded during the tests.**

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

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Lines and Data Cable
<b>Basic Standard</b>	: IEC 61000-4-4
<b>Requirements</b>	: +/- 1kV for Power Supply Lines +/- 0.5kV for LAN Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Stan Lin
<b>Temperature</b>	: 27°C
<b>Humidity</b>	: 62%

#### Block Diagram of Test Setup:





### **Test Procedure:**

1. The EUT and support units were located on a wooden table 0.8 m away from ground reference plane.
2. A 1.0 meter long power cord was attached to EUT during the test.
3. The length of communication cable between communication port and clamp was keeping within 1 meter.
4. A test program was loaded and executed in Windows mode.
5. The data was sent to the screen of monitor and filling the screens with upper case of "H" patterns.
6. The test program exercised related support units sequentially.
7. Repeating step 3 to 6 through the test 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)
L1	+/- 1	Direct	Pass
N	+/- 1	Direct	Pass
PE	+/- 1	Direct	Pass
L1 + N	+/- 1	Direct	Pass
L1 + PE	+/- 1	Direct	Pass
N + PE	+/- 1	Direct	Pass
L1 + N + PE	+/- 1	Direct	Pass
LAN 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.

☒ **PASS**

☐ **FAILED**

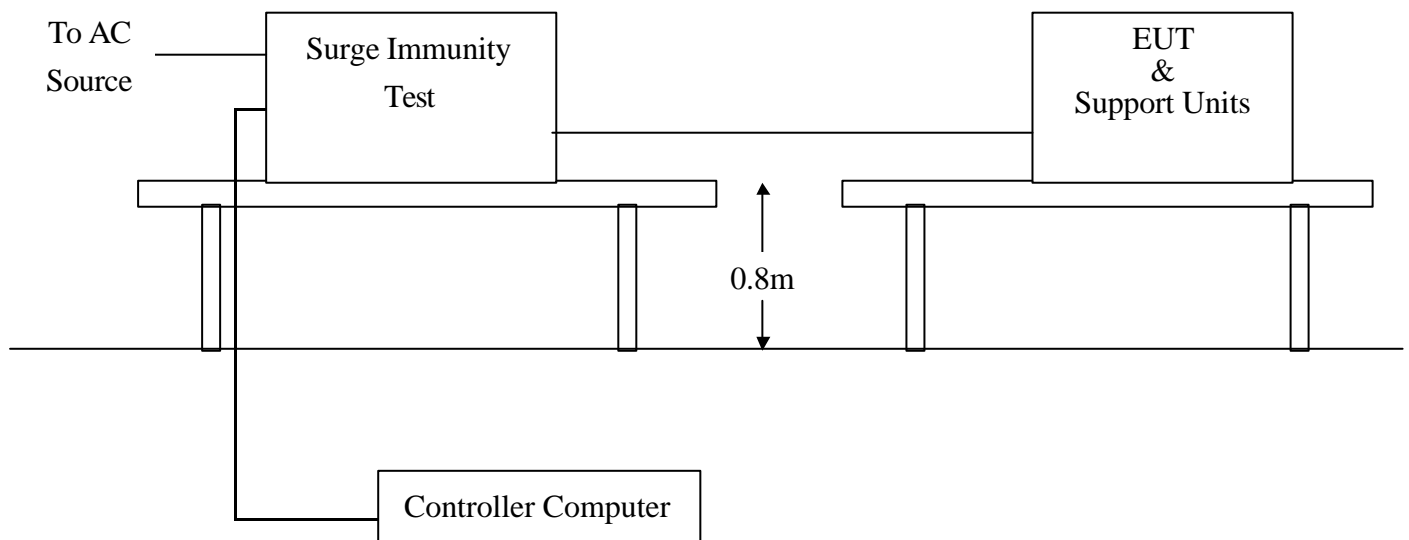
**Observation: No any function degraded during the tests.**

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

### SURGE IMMUNITY TEST

<b>Port</b>	: Power Cord
<b>Basic Standard</b>	: IEC 61000-4-5
<b>Requirements</b>	: +/- 1kV (Line to Line) +/- 2kV (Line to Ground)
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Stan Lin
<b>Temperature</b>	: 27°C
<b>Humidity</b>	: 62%

#### Block Diagram of Test Setup:



### **Test Procedure:**

1. The EUT and support units were located on a wooden table 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to the screen of monitor and 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 *us*  
Current Waveform : 8/20 *us*  
Polarity : Positive / Negative  
Phase angle : 0°, 90°, 270°  
Number of Test : 5

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

### **Performance & Result:**

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

☒ **PASS**      ☐ **FAILED**

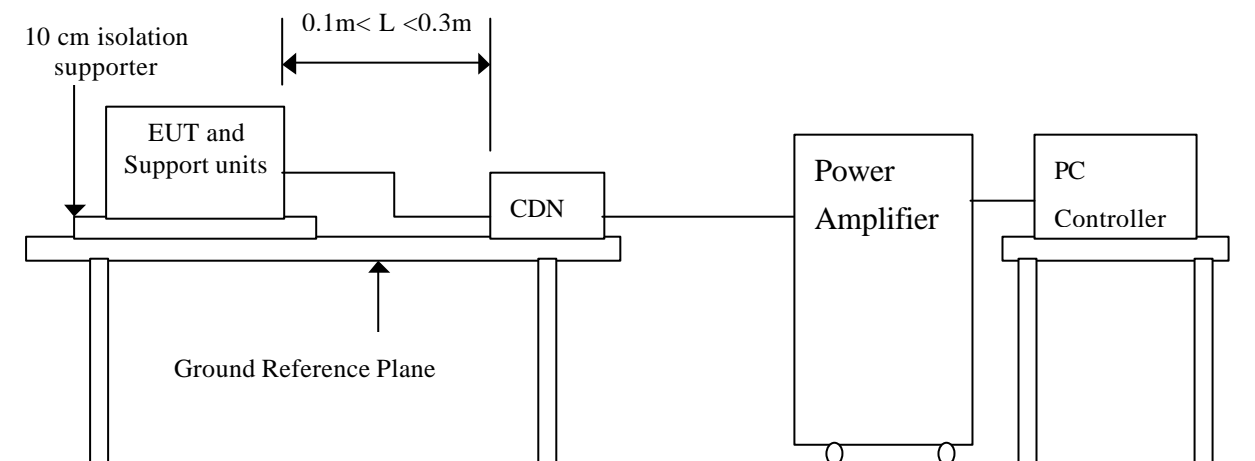
**Observation: No any function degraded during the tests.**

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

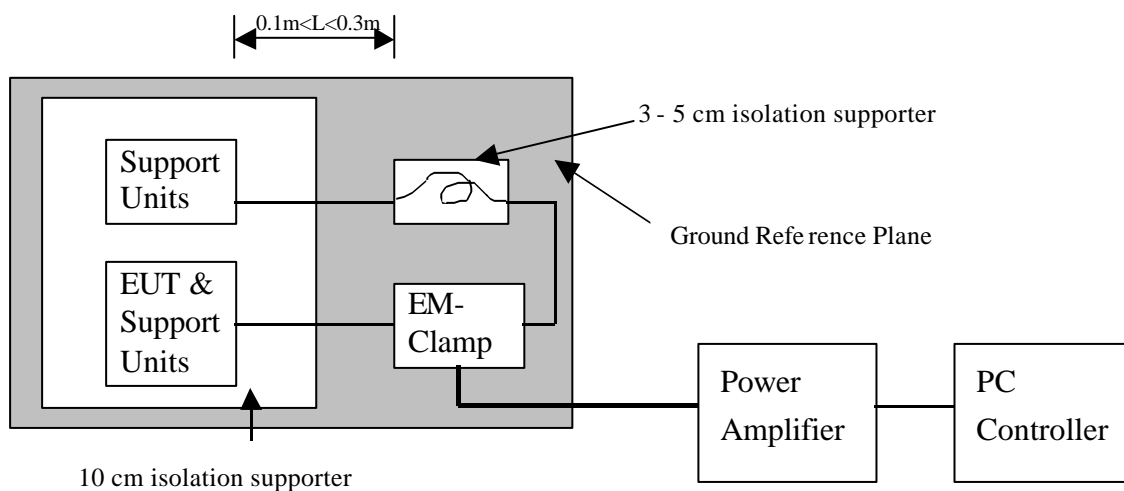
<b>Port</b>	: AC Port and LAN Cable
<b>Basic Standard</b>	: IEC 61000-4-6
<b>Requirements</b>	: 10V with modulated (Customer requested)
<b>Injection Method</b>	: CDN-M3 for Power Cord EM-Clamp for LAN Cable
<b>Performance Criteria</b>	: A (Standard require)
<b>Tester</b>	: Stan Lin
<b>Temperature</b>	: 29°C
<b>Humidity</b>	: 64%

### 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 monitor via EUT.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of CS test software per IEC 61000-4-6.
5. Recording the test result in following table.

### **Test conditions:**

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	10V	Yes	Pass

### **Performance & Result:**

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

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

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

☒ **PASS**

☐ **FAILED**

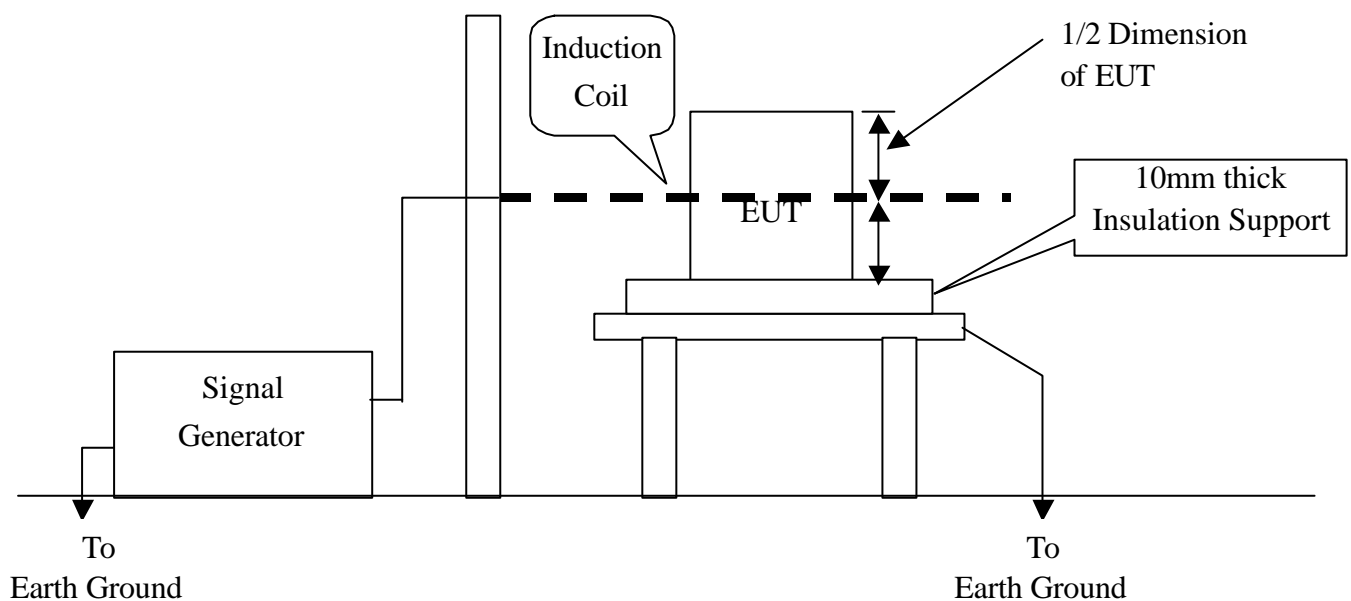
**Observation: No any function degraded during the tests.**



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

Port	: Enclosure
Basic Standard	: IEC 61000-4-8
Requirements	: 30 A/m (Customer requested)
Performance Criteria	: A (Standard Required)
Tester	: Stan Lin
Temperature	: 27 °C
Humidity	: 62%

### Block Diagram of Test Setup:





### **Test Procedure:**

1. The EUT and support units were located on Ground Reference Plane with the interposition of a 0.1 m thickness insulation support.
2. Putting the induction coil on horizontal direction.( X direction )
3. A test program was loaded and executed in Windows mode.
4. The data was sent to the screen of monitor and filling the screen with upper case of "H" patterns.
5. The test program exercised related support units sequentially.
6. Repeating step 3 to 5 through the test.
7. Recording the test result as shown in following table.
8. Rotating the induction coil by 90° ( Y direction ) then repeat step 3 to 7.
9. Rotating the induction coil by 90° again ( Z direction ) then repeat step 3 to 7.

\*. Test conditions:

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

Orientation	Field	Result (Pass/Fail)	Remark
X	30A	Pass	
Y	30A	Pass	
Z	30A	Pass	

### **Performance & Result:**

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

☒ **PASS**

☐ **FAILED**

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

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

### VOLTAGE DIPS / SHORT INTERRUPTIONS

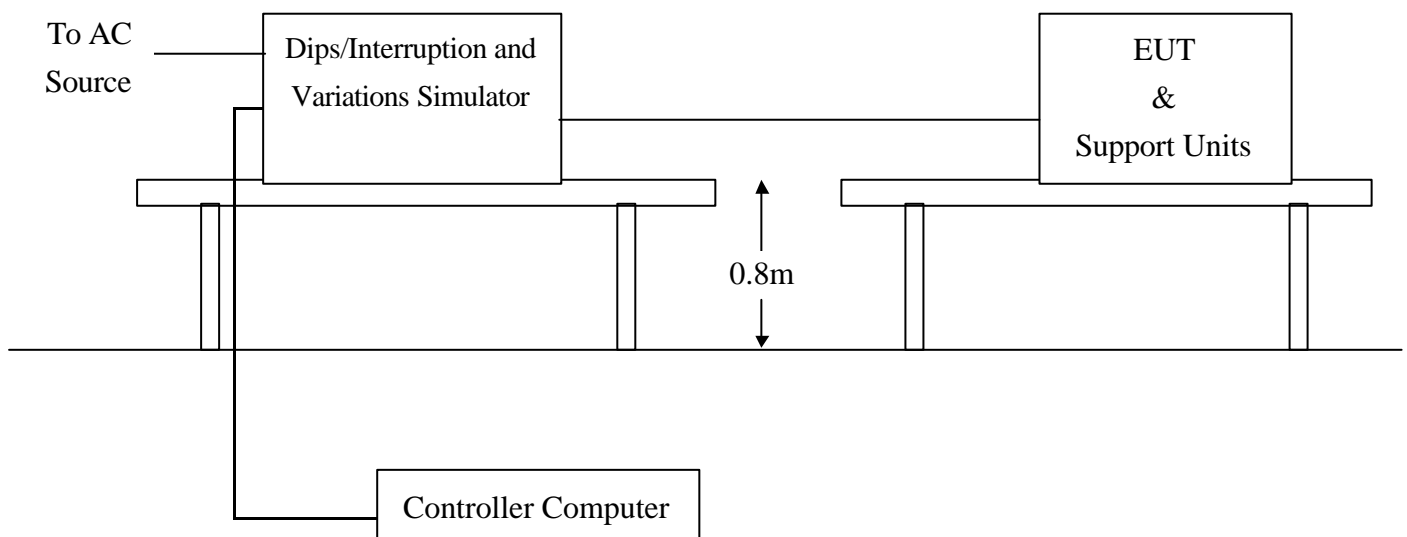
Port : AC mains  
Basic Standard : IEC 61000-4-11 (1994)  
Requirement : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

Voltage Dips ( EN 55024 )	Test Level	Reduction	Duration	Performance
	% $U_T$	(%)	( periods )	Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Interceptions (EN 55024)	Test Level	Reduction	Duration	Performance
	% $U_T$	(%)	( periods )	Criteria
	<5	>95	250	C

Test Interval : Min. 10 sec.  
Tester : Stan Lin  
Temperature : 27°C  
Humidity : 62%

### Block Diagram of Test Setup:





### **Test Procedure:**

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to the screen of monitor and filling the screens with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Setting the parameter of tests and then Perform the test software of test simulator.
6. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
7. Repeating step 3 to 4 through the test.
8. Recording the test result in test record form.

### **Test conditions:**

The duration with a sequence of three dips/interruptions with interval of 10 s minimum  
( Between each test event )

### **Voltage Dips:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A

### **Voltage Interruptions:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	250	EUT shut down but can be recovered by manual, as the events disappear.	C

### **Performance & Result:**

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

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

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

☒ **PASS**

☐ **FAILED**



## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

## LINE CONDUCTED EMISSION TEST

*Front View*



*Back view*



## COMMON MODE CONDUCTED EMISSION TEST





## RADIATED EMISSION TEST

*Front View*



*Back View*





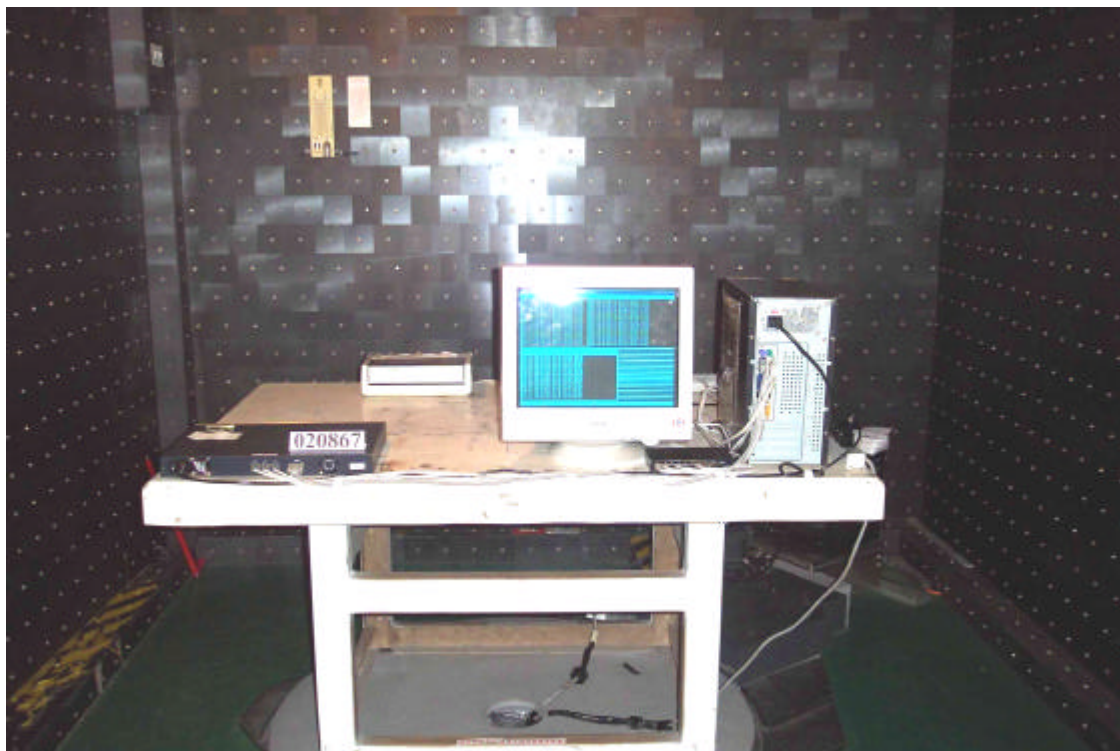
## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2, EN 61000-3-3)



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

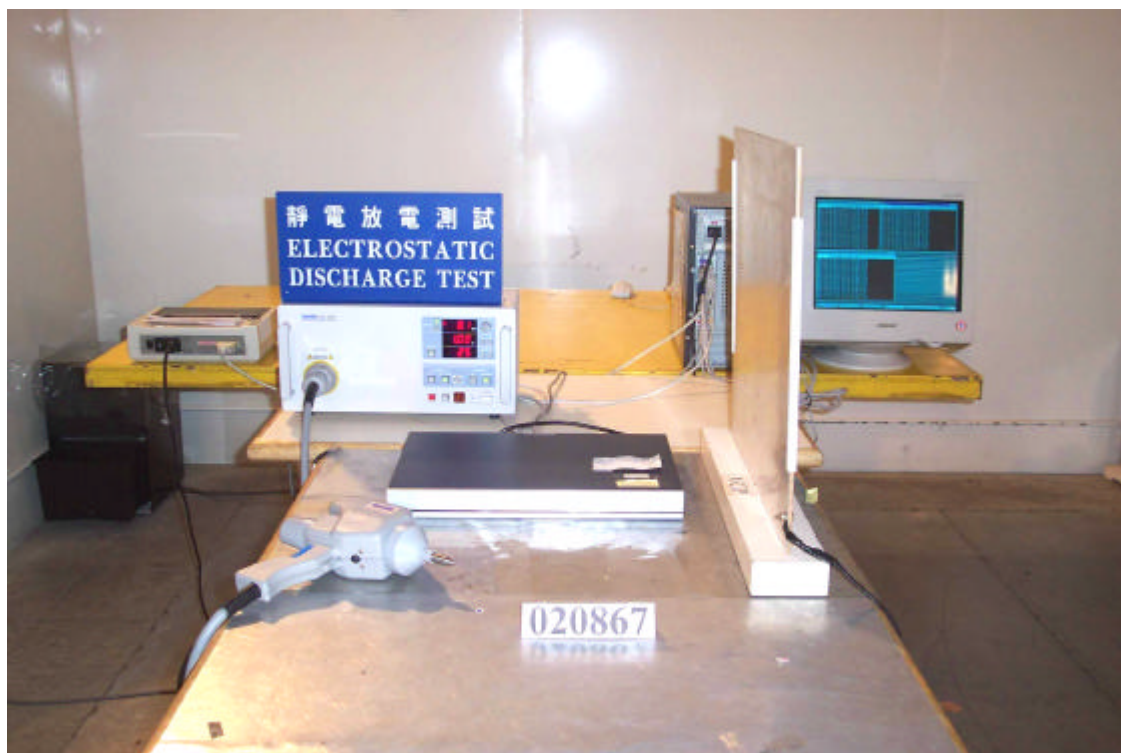


## RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3)





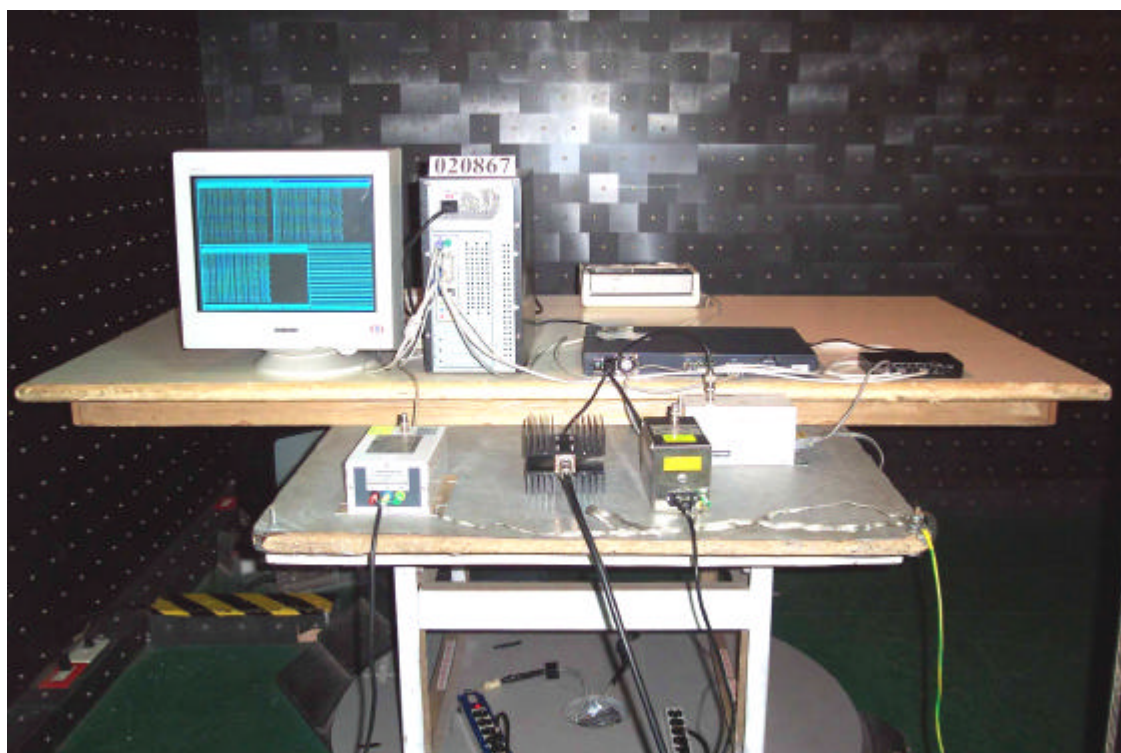
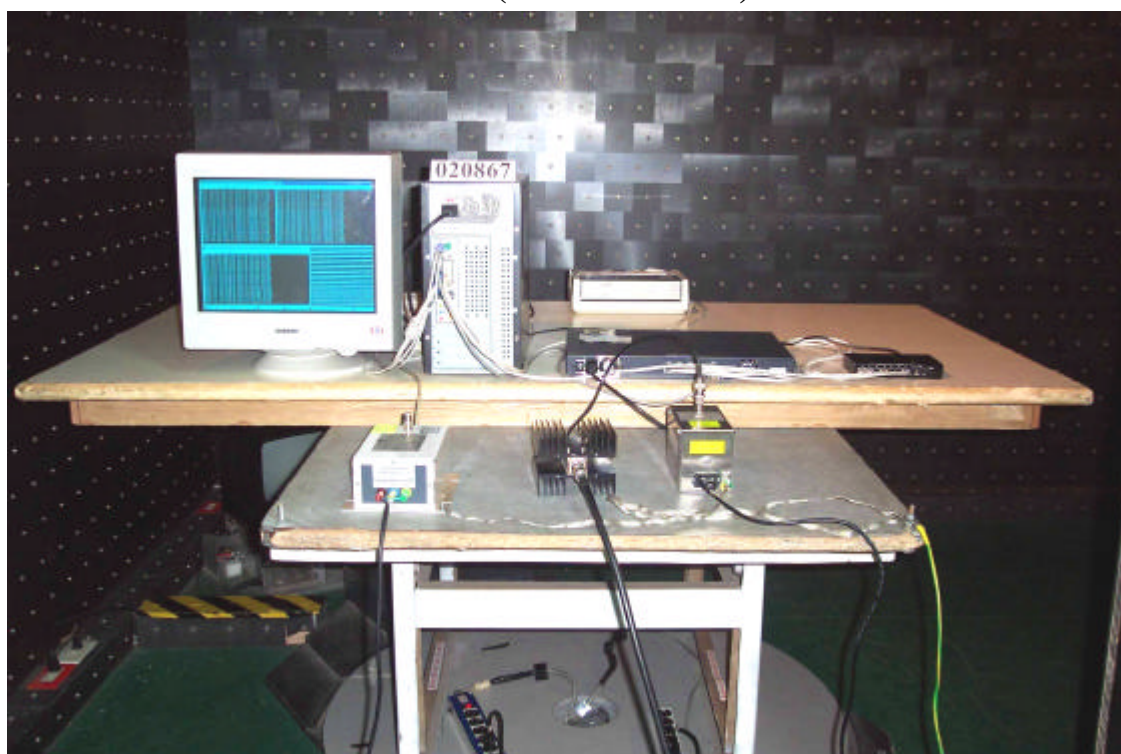
## FAST TRANSIENTS/BURST TEST (IEC 61000-4-4)



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

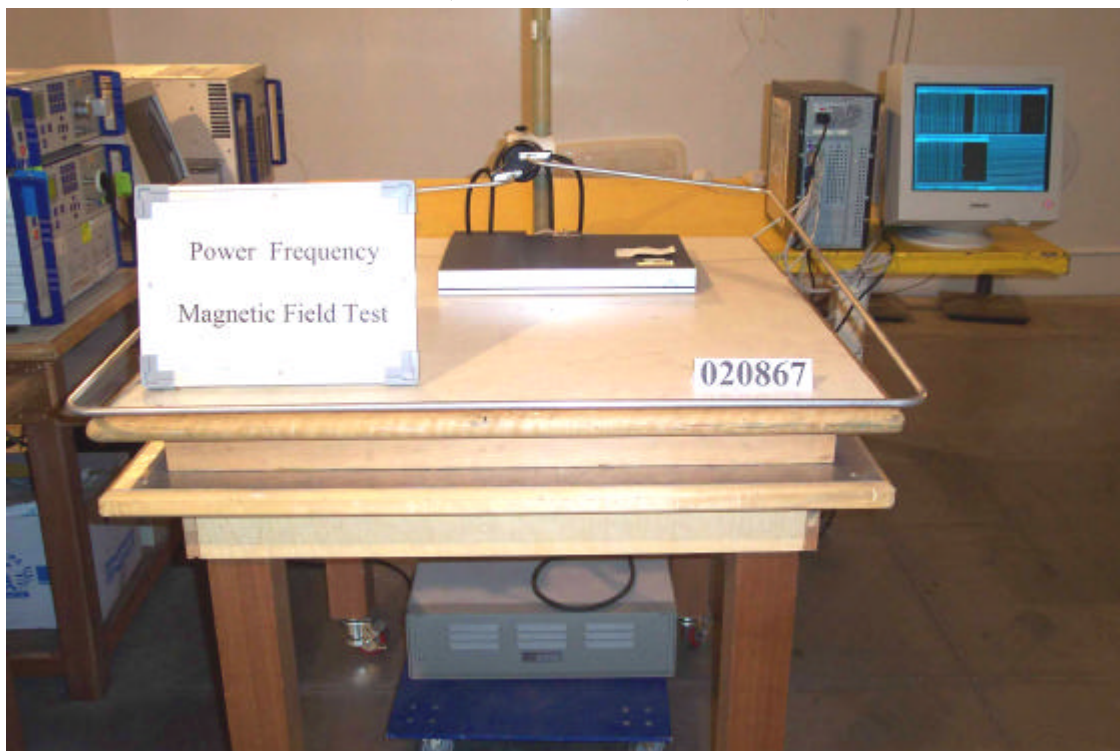


## CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (IEC 61000-4-6)





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



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







## **APPENDIX 2**

## **PHOTOGRAPHS OF EUT**

*Front View of EUT*



*Back View of EUT*



*Right View of EUT*



*Left View of EUT*



***Bottom View of EUT***

