



## EMC COMPLIANCE TEST REPORT

for

### GX1 300 SYSTEM ON MODULE

**Trade Name** : Advantech  
**Model Number** : SOM-2353  
**Serial Number** : N/A  
**Report Number** : 010971-E-1  
**Date** : August 13, 2002  
**Regulations** : See below

Standards	Results (Pass/Fail)
EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 +A14: 2000	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998(following EN 61000-6-2:1999 test level)	PASS
- IEC 61000-4-2: 2001(EN 61000-4-2:2001)	PASS
- IEC 61000-4-3: 1995(EN 61000-4-3:1995)	PASS
- IEC 61000-4-4: 1995(EN 61000-4-4:1995)	PASS
- IEC 61000-4-5: 1995(EN 61000-4-5:1995)	PASS
- IEC 61000-4-6: 1996(EN 61000-4-6:1996)	PASS
- IEC 61000-4-8: 1993(EN 61000-4-8:1993)	PASS
- IEC 61000-4-11: 1994(EN 61000-4-11:1994)	PASS

Prepared for:

**Advantech Co., Ltd.**  
No. 1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, 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

FAX: (02)8642-2256



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C&C Laboratory Co., Ltd.**

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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** GX1 300 SYSTEM ON MODULE

**Trade Name:** Advantech

**Model Number:** SOM-2353

**Serial Number:** N/A

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

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

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

**Technical Standards:** EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998 (Following EN61000-6-2: 1999 test level)  
IEC 61000-4-2: 2001 (EN 61000-4-2:2001);  
IEC 61000-4-3: 1995 (EN 61000-4-3:1995);  
IEC 61000-4-4: 1995 (EN 61000-4-4:1995);  
IEC 61000-4-5: 1995 (EN 61000-4-5:1995);  
IEC 61000-4-6: 1996 (EN 61000-4-6:1996);  
IEC 61000-4-8: 1993 (EN 61000-4-8:1993);  
IEC 61000-4-11:1994 (EN 61000-4-11:1994)

**File Number:** 010971-E-1

**Date of test:** Oct. 24 ~ Oct. 27, 2001

**Deviation:**

1. According to applicant's declaration this EUT is Class A product, and to be market industrial environment only.
2. According to client declaration, the EUT is to be included component of original model: WebLink 2059 series. Therefore, all related measurement data and information was copied from test report WebLink 2059/BAR as per client requested.

**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: Susan Su for  
Lucky Chen/ EMC Director



*Report Number: 010971-E-1*  
*Refer Number: 020921-E*  
*August 13, 2002*



## 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:** 010971-E-1

**Date of Test:** Oct. 24 ~ Oct. 27, 2001

**Equipment Under Test:** GX1 300 SYSTEM ON MODULE

**Model Number:** SOM-2353

**Serial Number:** N/A

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

**Technical Standards:** EN 55022: 1994 + A1: 1995 + A2: 1997 (Class A)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000  
EN 61000-3-3: 1995  
EN55024: 1998 (Following EN61000-6-2: 1999 test level)  
IEC 61000-4-2: 2001 (EN 61000-4-2:2001);  
IEC 61000-4-3: 1995 (EN 61000-4-3:1995);  
IEC 61000-4-4: 1995 (EN 61000-4-4:1995);  
IEC 61000-4-5: 1995 (EN 61000-4-5:1995);  
IEC 61000-4-6: 1996 (EN 61000-4-6:1996);  
IEC 61000-4-8: 1993 (EN 61000-4-8:1993);  
IEC 61000-4-11:1994 (EN 61000-4-11:1994)

**Frequency Range  
(EN 55022):** 150kHz to 30MHz for Line Conducted Test  
30MHz to 1000MHz for Radiated Emission Test

**Test Site** C&C LABORATORY CO., LTD.  
No. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang  
Taoyuan, Taiwan, R.O.C.



## **SYSTEM DESCRIPTION**

### **EUT Test Program:**

1. Insert EUT to Web-enabled Device Connection.
2. An EMI test software was loaded and executed under Windows environment.
3. The EMI test program sequentially exercised all related I/O's of EUT.
4. A communicated software was loaded and executed to communicate between EUT and remote side.
5. The EUT receives message from remote side, and filling the screen of monitor with upper case of "H" patterns.
6. Repeat step 3 to 5 throughout the test.

## PRODUCT INFORMATION

**Housing Type:** N/A

**EUT Power Rating:** 24VDC from Power Adaptor

**AC Power during Test** 230VAC/50Hz

**Power Adaptor Manufacturer:** Reign Power

**Power Adaptor Model Number:** RP 1100-24F

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

**DC Power Cable Type:** Unshielded, 1.0m (Detachable)

**CPU Manufacture:** NS Geode      **Type:** GX1-300MHz

**OSC/Clock Frequencies:** 66MHz

**VGA Card Manufacturer:** On Board

**LAN Card Manufacturer:** On Board

### I/O Port of EUT

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

## SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1)	Web-enabled Device Connection	WebLink2059/BAR	N/A	FCC DoC	Advantech	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.0m
2)	Monitor	CPD-G200	2715884	FCC DoC	SONY	Shielded, 1.8m with a core	Unshielded, 1.8m
3)	Modem	2400	94-364-176272	DK467GSM24	Computer Peripherals	Shielded, 1.8m	Unshielded, 1.8m
4)	Modem	2400	94-364-176281	DK467GSM24	Computer Peripherals	Shielded, 1.8m	Unshielded, 1.8m
5)	Modem	231AA	A08631083930	BFJ9D93108US	Hayes	Shielded, 1.8m	Unshielded, 1.8m
6)	Modem	231AA	A25531083541	BFJ9D93108US	Hayes	Shielded, 1.8m	Unshielded, 1.8m
7)	PS/2 Keyboard	SK-2800C	B1C790BCPJCN09	GYUR79SK	Compaq	Shielded, 1.6m	N/A
8)	PS/2 Mouse	M-CAA43	LZA11750827	FCC DoC	Logitech	Shielded, 1.8m	N/A
9)	USB Mouse	M-BB48	LZE93050148	FCC DoC	Logitech	Shielded, 1.8m	N/A
10)	USB Mouse	M-BB48	LZE93050160	FCC DoC	Logitech	Shielded, 1.8m	N/A
11)	Server (Remote)	NetServer LH Pro	N/A	N/A	HP	LAN Cable: Unshielded, 20m	Unshielded, 1.8m

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

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

## TEST FACILITY

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

**Description:** There are four 3/10m open area test sites and three line conducted labs for final test.  
The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 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.



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

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



American Association for Laboratory Accreditation

### SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

C & C LABORATORY CO., LTD<sup>1</sup>  
No. 81-1, Lane 210, Pa-De 2<sup>nd</sup> 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)  
Radiated Immunity  
Electrical Fast Transient/Burst  
Surge Immunity  
Conducted Immunity  
Power Frequency Magnetic  
Field Immunity  
Voltage Dips, Short Interruptions, and  
Line 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 801-3  
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, Chung 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 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

### Product Immunity / Generic Immunity

ITE Product  
Home Appliance  
Residential; commercial and light  
Industry  
Industry

CISPR 24; EN 55024  
CISPR 14-2; EN 55014-2  
EN 50081-2/ EN 61000-6-1; 2001  
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



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

Page 2 of 2



FEDERAL COMMUNICATIONS COMMISSION  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD, 21046

March 06, 2002

C & C Laboratory Co., Ltd.  
No. 81-1, 210 Lane,  
Pa-de 2nd Road, Lu-Chu Hsiang  
Taoyuan  
Taiwan  
Attention: Kurt Chen

Registration Number: 93105

Re: Measurement facility located at Taoyuan  
Site No. 4 (3 & 10 meters)  
Date of Listing: March 06, 2002

Gentlemen:

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.

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.

Sincerely,

  
Thomas W Phillips  
Electronics Engineer

FEDERAL COMMUNICATIONS COMMISSION  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD, 21046

February 27, 2001

C & C Laboratory Co., Ltd.  
#B1, 1st Fl., No. 183, Sec. 1  
Tatung Rd., Hsi Chih  
Taipei  
Taiwan, R.O.C.  
Attention: Kurt Chen

Registration Number: 90471

Re: Measurement facility located at Taoyuan  
Sites No. 1 & 3 (3 & 10 meters)  
Date of Listing: February 27, 2001

Gentlemen:

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.

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Sincerely,

  
Thomas W Phillips  
Electronics Engineer

COMMERCE  
MINISTRY OF COMMERCE  
Te Manatu Taahukohoko

ENG 3/9  
AJD

22 January 1998

C & C Laboratory Co Ltd  
(# F)  
No. 344  
Fu Ching Street  
Taipei  
TAIWAN ROC

Attention: Mr Tony Houng

Dear Sir

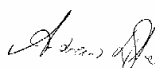
#### LABORATORY APPROVAL

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.

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 radiocommunications 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.

If you have any further questions on this matter please do not hesitate to contact me.

Yours faithfully



Andrew Dyke  
Senior Technical Officer(Regulatory)

COMMERCE  
MINISTRY OF COMMERCE  
Te Manatu Taahukohoko

ENG 3/9  
AJD

22 January 1998

C & C Laboratory Co Ltd  
(# F)  
No. 344  
Fu Ching Street  
Taipei  
TAIWAN ROC

Attention: Mr Tony Houng

Dear Sir

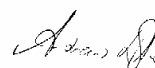
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If you have any further questions on this matter please do not hesitate to contact me.

Yours faithfully



Andrew Dyke  
Senior Technical Officer(Regulatory)





World-wide Testing and Certification

ELA 4RTTE

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 Twu Chi, Lu Chu Hsiang,  
Taoyuan 338, Taiwan R.O.C.

Scope of Authorisation: All CENELEC and ETSI standards [ENs and ETSs 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. 1999/5/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 fulfils 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 Directives specified above.

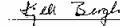
For Type Examination Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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, Nemko Group EMC Co-ordinator

Postal address:  
P.O.Box 73 Blindern  
N-0403 OSLO, NORWAY

Telephone: +47 22 96 00 30  
Fax: +47 22 96 00 50



World-wide Testing and Certification

ELA 4RTTE

EMC Laboratory Authorisation

Aut. No. : ELA 192

(Page 2 of 2)

SCOPE OF AUTHORISATION

Generic and product-family standards, R&TTE

ETS 300 328-1:1995 + A1:97 TIN 300 328-2:2000	ETS 300 342-1:1997 EN 301 489-07:2000	EN 301 489-08:2000
TIN 300 422-2:2000	ETS 300 445:1996 + A1:97 EN 301 489-09:2000	EN 301 489-10:2000
ETS 300 683:1997 EN 301 489-03:2000	ETS 300 826:1997 EN 301 489-17:2000	EN 301 357-2:2000
EN 301 419-1:1999	EN 301 419-2:1999	EN 301 419 3:1999
EN 301 489-01:2000		

Basic standards

EN 61000-4-2:1995 + A1:98 IEC 61000-4-2:1995 + A1:98 (IEC 60801-1:1993 IUC 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
TIN 61000-4-11:1994 IUC 61000-4-11:1994		

Oslo 26 April 2001

Kjell Bergh, Nemko Group EMC Co-ordinator

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World-wide Testing and Certification

ELA 4

EMC Laboratory  
Authorisation

Aut. No. : ELA 124

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

This Authorisation Document confirms that the above-mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfils 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 98/13/EC].

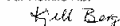
In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

In order to maintain this Authorization, 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 Authorization. The Authorization 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, Nemko Group EMC Co-ordinator

Postal address:  
P.O.Box 73 Blindern  
N-0403 OSLO, NORWAY

Telephone: +47 22 96 00 30  
Fax: +47 22 96 00 50



World-wide Testing and Certification

ELA 4

EMC Laboratory  
Authorisation

Aut. No. : ELA 160

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

Scope of Authorization: EN 60601-1-2 and IEC 60601-1-2, the Collateral Standards for electromedical 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 fulfils 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], 93/42/EEC, or the European Union Active Implantable Medical Device Directive [AIMD], 90/385/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

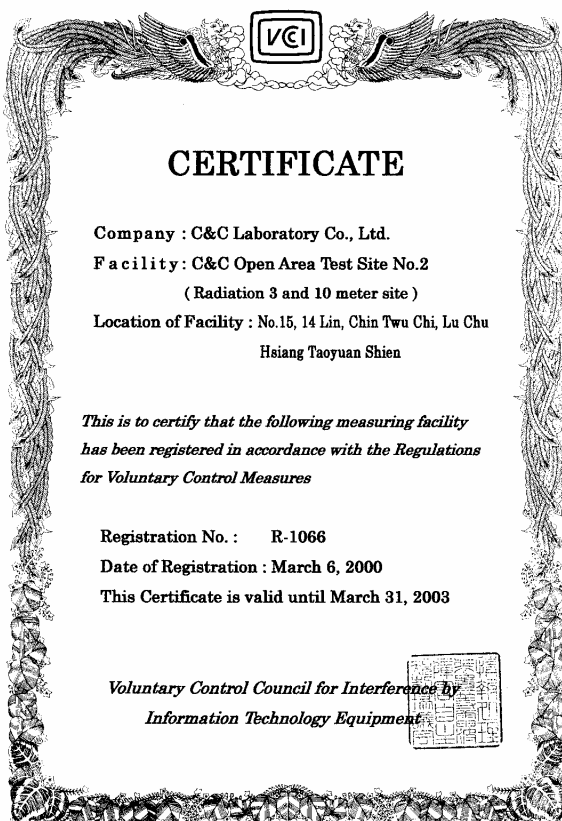
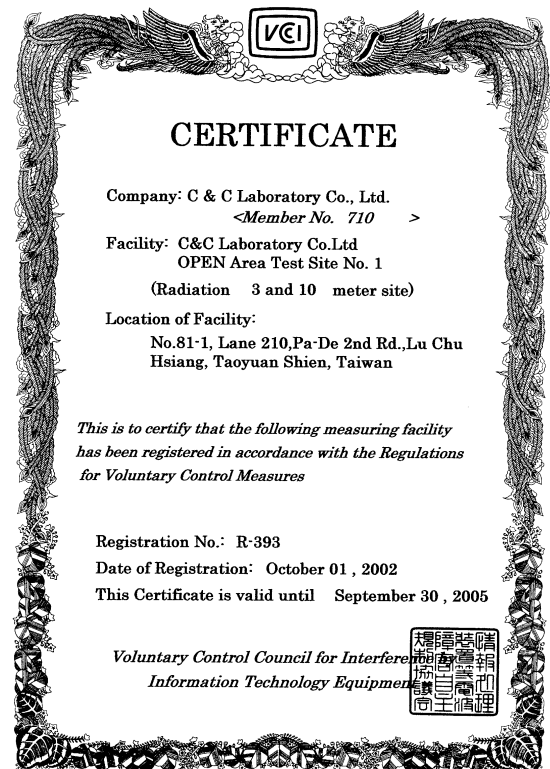
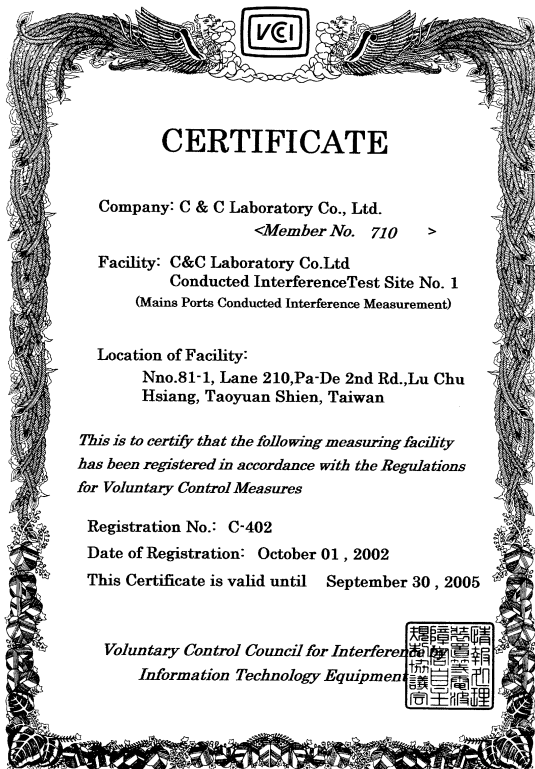
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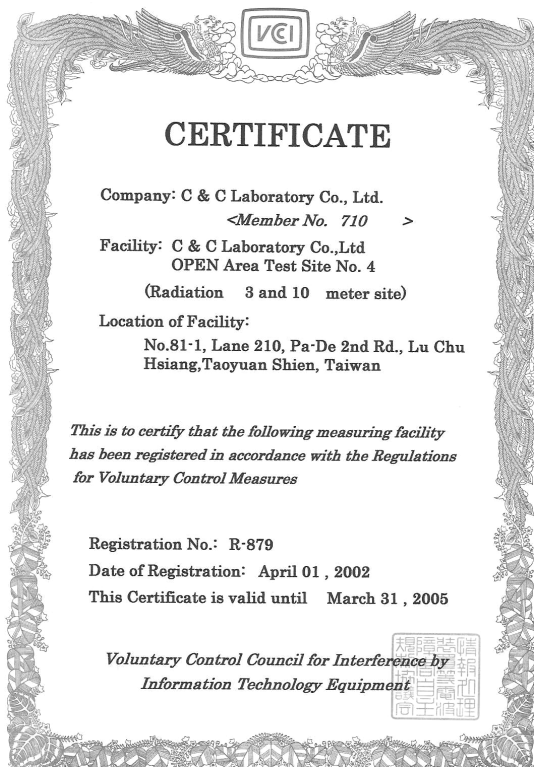
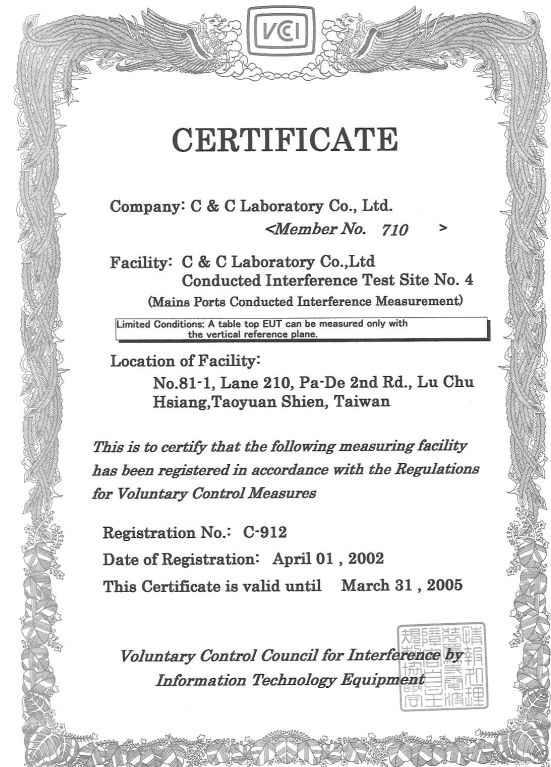
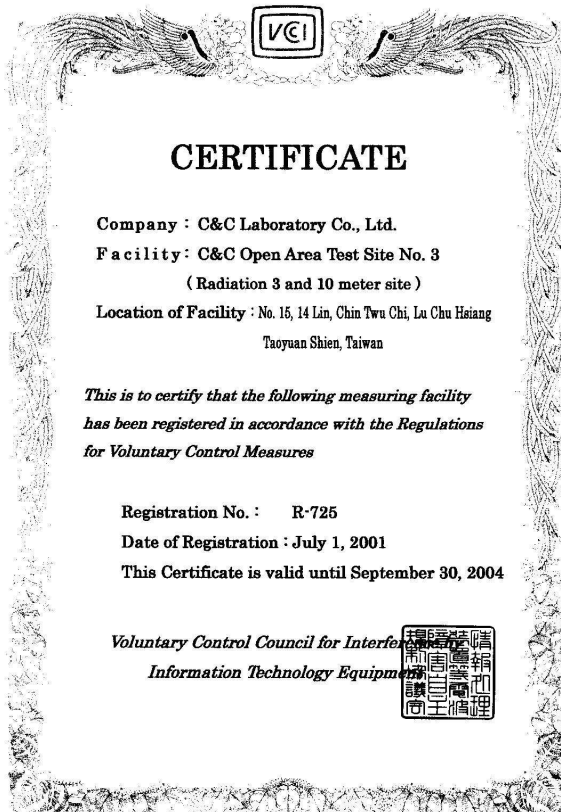


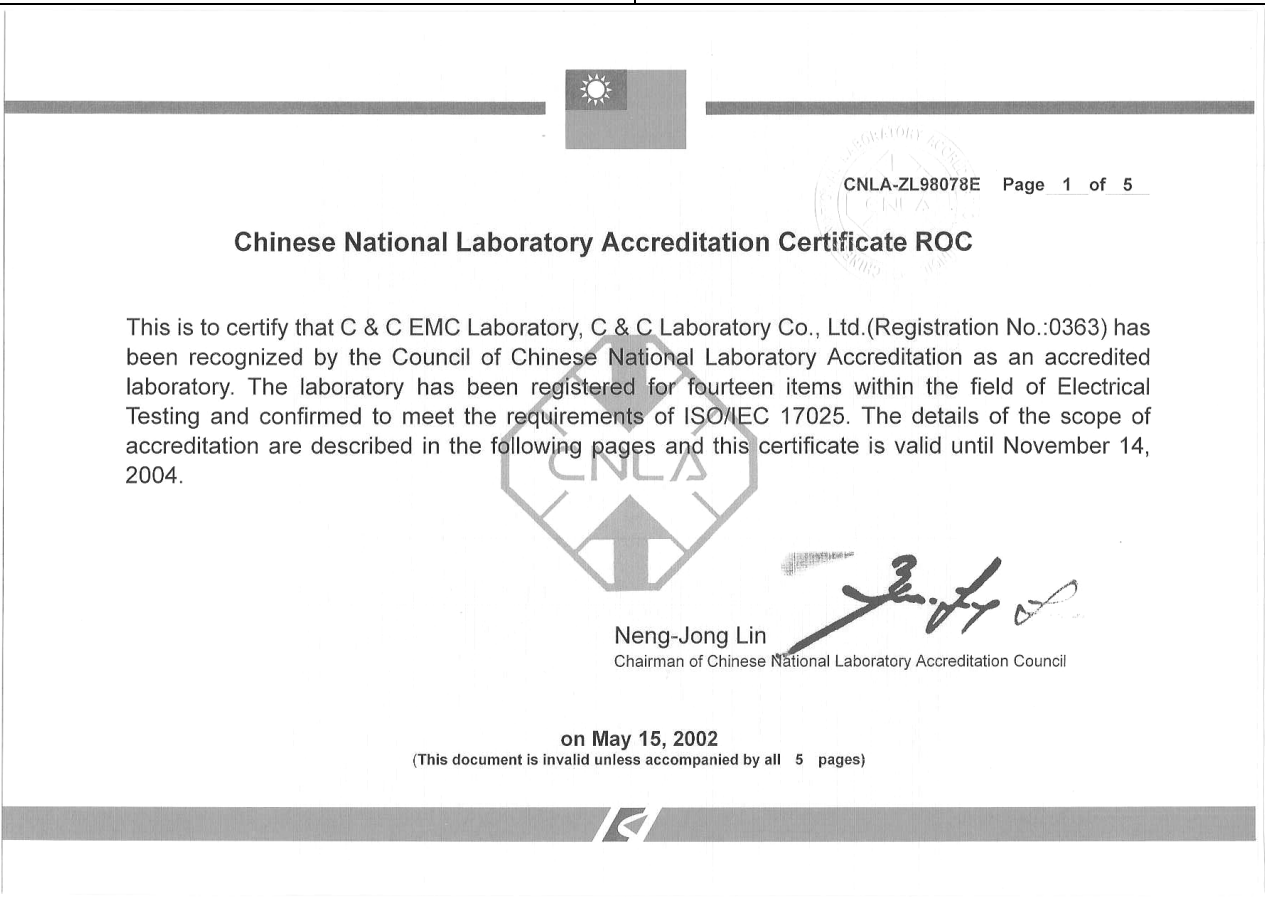
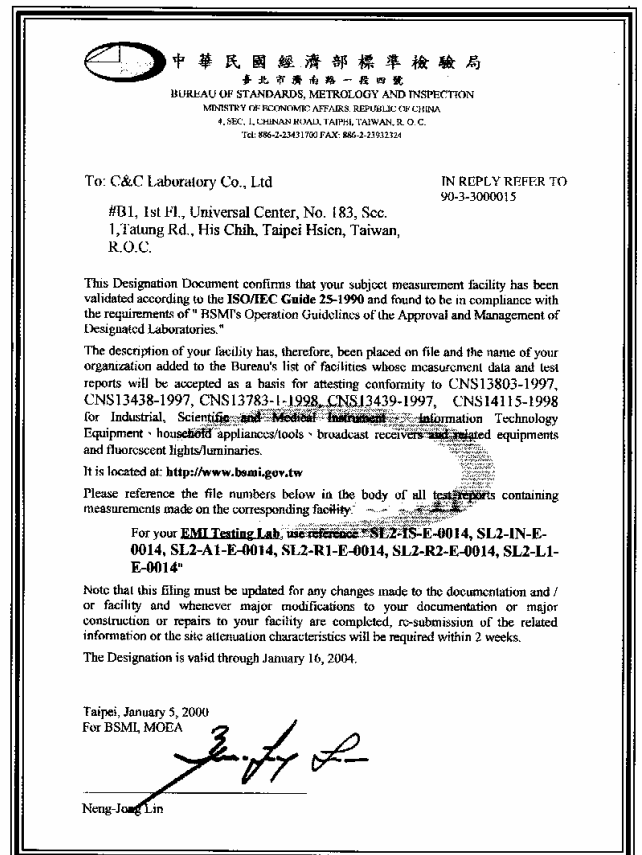
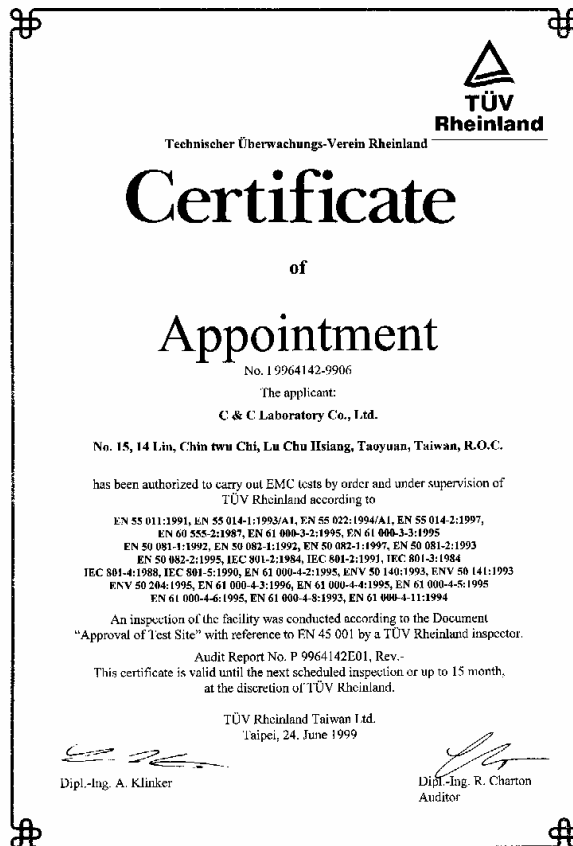
Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address:  
P.O.Box 73 Blindern  
N-0403 OSLO, NORWAY

Telephone: +47 22 96 00 30  
Fax: +47 22 96 00 50









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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
EE0280 Low power R.F. equipment	Low power radiators/receivers  Low power R. F. Equipment	DGT Low Power RF Devices Technical Specification (2000.10)  ETSI EN 300 328-1 V1.3.1 (2001-08) ETSI EN 300 328-2 V1.2.1 (2001-08) ETSI EN 300 220-1 V1.3.1 (2000-09) ETSI EN 300 220-2 V1.3.1 (2000-09) TEST EN 300 220-3 V1.1.1 (2000-09) 47 CFR Part 15 Subpart C (2000-10)	9 kHz-30 GHz		
EJ0102 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)	EUT Voltage: 0-270VAC (Single Phase)50/60 Hz EUT current: 0-16 A Harmonic number: 1-40 order		
EJ0103 Voltage fluctuations and flicker	ITE and peripheral Products	IEC 1000-3-3 (1994) EN 61000-3-3 (1995)	EUT Voltage: 0-270 VAC (Single Phase)50/60 Hz EUT Current: 0-16 A Standard impedance: Ra = 0.4 Ω		



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Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EJ0113 Audio and television broadcast receivers and associated equipment	Broadcast receivers and associated equipment	EN 55013:1990+A12:1994+A13: 1996 CISPR 13:1975+A1:1983 CNS 13439 (1997.5)	EUT Voltage: 100-270 VAC (Single Phase)50/60 Hz EUT Current: 0-30 A 9 kHz-1.75 GHz Conduction Emission: 9 kHz-30 MHz Antenna Terminal: 30 MHz-1.75 GHz Radiation Emission: 30 MHz-1000 GHz Disturbance Power: 30-300 MHz		
EJ0114 Electrical appliances and systems	Household appliances/Electric tools and similar apparatus	EN 55014-1: 1993+A1: 1997+A2: 1999 CISPR 14: 1993+A1: 1996+A2: 1998 CNS 13783-1 (1998.6)	EUT Voltage: 0-270 VAC (Single/3 Phase)50/60 Hz EUT Current: 0-200 A Conduction Emission: 9 kHz-30 MHz Disturbance Power: 30-300 MHz		
EJ0115 Fluorescent lamps and luminosities	Fluorescent Lamps and Luminosities	CISPR 15 (1992) EN 55015 (1999) CNS 14115 (1998)	EUT Voltage: 0-270 VAC (Single/3 Phase) Conduction emission frequency range: 9 kHz-30 MHz Magnetic interference frequency range: 9 kHz-30 MHz (Magnetic loop antenna) Insertion loss frequency range: 150-1605 kHz 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 22 (1997) EN 55022 (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) EN 50204 (1995)	EUT Voltage:0-270 VAC (Single Phase)50/60 Hz EUT Current:0-30 A Frequency range: 26MHz-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 Equipment 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 (1993) EN 61000-4-6 (1996) EN 50141 (1993)	EUT Voltage:0-270 VAC (Single 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 (1993) EN 61000-4-8 (1993)	EUT Voltage:0-270 VAC (Single/3 Phase)50/60 Hz EUT Current:0-16 A Continuous magnetic field: 1-100 A/m		
EJ0211 Voltage dips,short interruptions and voltage variations immunity tests  ( Null Below )	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		



## TEST EQUIPMENT LIST (EMISSION)

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

**Equipment used during the tests:**

**Open Area Test Site:** # 4

Open Area Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3132	91700456	02/21/2001	02/20/2002
EMI Test Receiver	R&S	ESVS10	846285/016	04/16/2001	04/15/2002
Precision Dipole	SCHWAZBECK	VHAP	998/999	05/17/2001	05/16/2002
Precision Dipole	SCHWAZBECK	UHAP	981/982	05/17/2001	05/16/2002
Bilog Antenna	CHASE	CBL 6112B	2462	01/16/2001	01/15/2002
Turn Table	Chance most	N/A	N/A	N.C.R	N.C.R
Antenna Tower	Chance most	N/A	N/A	N.C.R	N.C.R
Controller	Chance most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M51067	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	11/24/2000	11/23/2001

**Conducted Emission Test Site:** # 4

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	R&S	ESHS10	843743/015	12/15/2000	12/14/2001
LISN	R&S	ENV 4200	8303261016	11/18/2000	11/17/2001
LISN	EMCO	3825/2	9003/1382	02/08/2001	02/07/2002

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

**For Power Harmonic & Voltage Fluctuation/Flicker Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH Harmonic & Flicker Tester	PHF 555	080 419-25	Oct. 12, 2001	Oct. 11, 2002

**For ESD test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY/TRENCH / ESD Generator	PESD 1600	H710203	Sep. 01, 2001	Aug. 31, 2002

**For Radiated Electromagnetic Field immunity Measurement:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi / Signal Generator	2022D	119246/003	Aug. 20, 2001	Aug. 19, 2002
M2S / Power Amplifier	A00181/ 1000	9801-112	N/A	N/A
M2S / Power Amplifier	AC8113/ 800-250A	9801-179	N/A	N/A
Wandel & Goltormann / EM-Radiation Meter	EMR-30	L-0013	Mar. 13, 2001	Mar. 15, 2002
EMCO Power Antenna	93141	9712-1083	N/A	N/A

**For Fast Transients/Burst test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH / Fast Transients / Burst Generator	PEFT-JUNIOR	583 333-117	Aug. 21, 2001	Aug. 20, 2002
HAEFELY TRENCH/ Clamp	093 506.1	080 421.13	N/A	N/A

**For CS test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
Maconi /Signal Generator	2022D	119246/003	Aug. 20, 2001	Aug. 19, 2002
MEB / CDN	M3	3683	Sep. 14, 2001	Sep. 13, 2002
Lüthi / CDN	801-M3	1879	Mar. 05, 2001	Mar. 04, 2002
MEB / CDN	M2	A3002010	Apr. 17, 2001	Apr. 16, 2002
M2S / Power Amplifier	A00181/ 1000	9801-112	N/A	N/A
MEB / Clamp	KEMZ-801	13 602	N/A	N/A

**For Surge Immunity test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH / Surge Tester	PSURGE 4010	583 334-71	Sep. 01, 2001	Aug. 31, 2002
HAEFELY TRENCH / CDN	IP6.2	148342	Mar. 22, 2001	Mar. 21, 2002
HAEFELY TRENCH / CDN	DEC1A	148050	Apr. 06, 2001	Apr. 05, 2002

**For Power Frequency Magnetic Field Immunity test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
F.W.BELL / TRIAX ELF Magnetic Field Meter	4090	9711	Oct, 20,2001	Oct.19, 2002
HAEFELY TRENCH/ Magnetic Field Tester	MAG 100.1	080 938-01	N/A	N/A

**For Voltage Dips/Short Interruption and Voltage Variation Immunity test:**

Manufacturer/Type	Model No.	Serial No.	Last Cal.	Cal. Due
HAEFELY TRENCH / Dips / Interruption and Variations Simulator	PLINE 1610	080 344-05	Feb. 08, 2001	Feb. 07, 2002



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

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

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

#### **Mode:**

#### **1. Download Data**

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

#### **Mode: 1.**

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



## MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

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

### Data Sample:

Freq. MHz	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.xx	39.2	---	79	66	-39.8	-26.8	L 1

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

## LINE CONDUCTED EMISSION LIMIT

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

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

## **MEASUREMENT PROCEDURE**

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

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

**Mode:**

**1. Download Data**

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

**Mode: 1.**

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



## MEASUREMENT PROCEDURE (FINAL RADIATED EMISSION TEST)

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

### Data Sample:

Freq. (MHz)	Raw Data ( dBuV/m )	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)
xx.xx	14.0	11.2	26.2	40	-13.8

Freq.	= Emission frequency in MHz
Raw Data (dBuV/m)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB)	= Correction factors of antenna factor and cable Loss
Emiss. Level	= Raw reading converted to dBuV 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

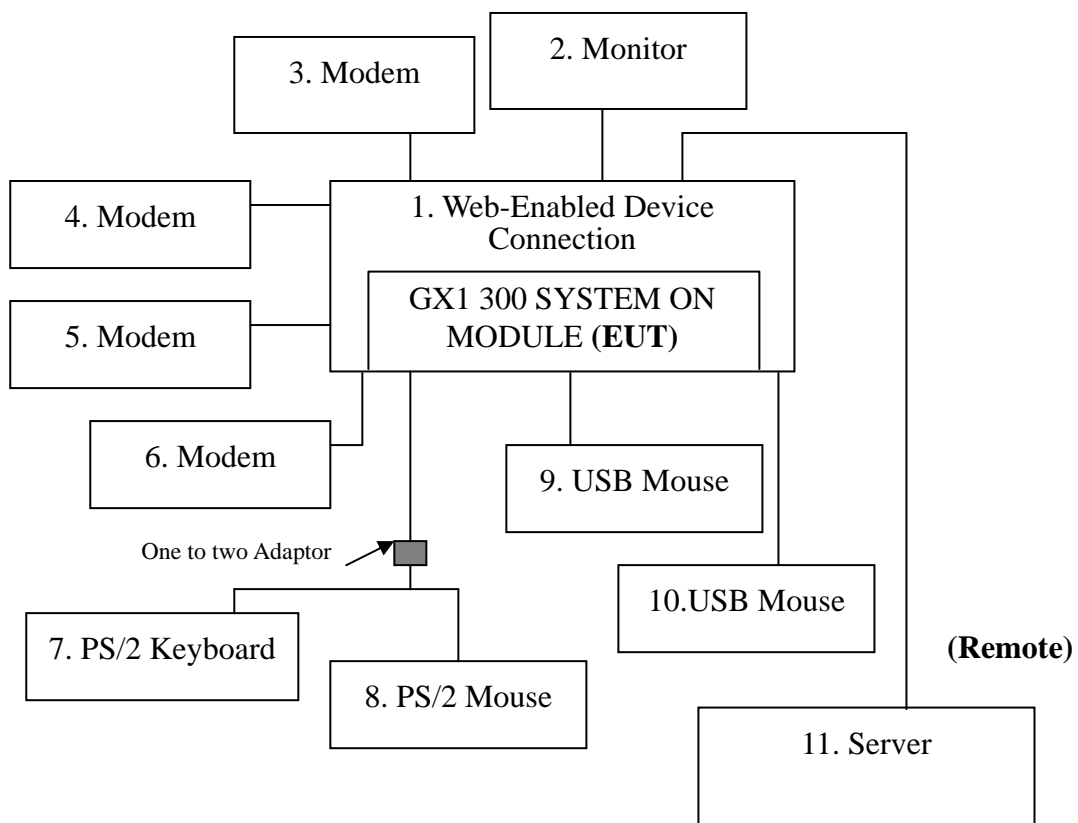
### System Diagram of Connections between EUT and Simulators

**EUT:** Web-enabled Device Connection With PC Card

**Trade Name:** Advantech

**Model Number:** WebLink 2059/BAR

**AC Power Cord:** Unshielded, 1.8m to Power Adaptor





## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** WebLink 2059/BAR

**Location:** Site # 4

**Tested by:** Lung Tsai

**Test Mode:** Mode 1

**Test Results:** Passed

**Temperature:** 24°C

**Humidity:** 69% 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
0.483	43.70	---	79.00	66.00	-35.30	---	L1
1.562	51.20	---	73.00	60.00	-21.80	---	L1
2.371	45.40	---	73.00	60.00	-27.60	---	L1
4.798	46.10	---	73.00	60.00	-26.90	---	L1
5.713	46.70	---	73.00	60.00	-26.30	---	L1
12.033	42.90	---	73.00	60.00	-30.10	---	L1
0.537	64.10	---	79.00	66.00	-14.90	---	L2
1.621	51.20	---	73.00	60.00	-21.80	---	L2
2.433	44.70	---	73.00	60.00	-28.30	---	L2
4.621	45.80	---	73.00	60.00	-27.20	---	L2
5.655	46.10	---	73.00	60.00	-26.90	---	L2
12.068	37.40	---	73.00	60.00	-35.60	---	L2

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

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



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** WebLink 2059/BAR

**Location:** Site # 4

**Tested by:** Michael Chen

**Polar:** Vertical -- 10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 26°C

**Humidity:** 68%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)
160.01	26.4	11.0	37.4	40.0	-2.6
179.98	25.6	10.6	36.2	40.0	-3.8
200.18	26.5	10.6	37.1	40.0	-2.9
240.09	29.3	13.0	42.3	47.0	-4.7
400.40	24.3	18.8	43.1	47.0	-3.9
630.51	20.3	22.0	42.3	47.0	-4.7





## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** WebLink 2059/BAR

**Location:** Site # 4

**Tested by:** Michael Chen

**Polar:** Horizontal -- 10m

**Test Mode:** Mode 1

**Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 26°C

**Humidity:** 68%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)
160.01	25.5	11.0	36.5	40.0	-3.5
200.21	26.6	10.6	37.2	40.0	-2.8
240.01	29.1	13.0	42.1	47.0	-4.9
280.28	27.3	14.9	42.2	47.0	-4.8
400.28	25.1	18.8	43.9	47.0	-3.1
560.21	21.6	21.6	43.2	47.0	-3.8

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

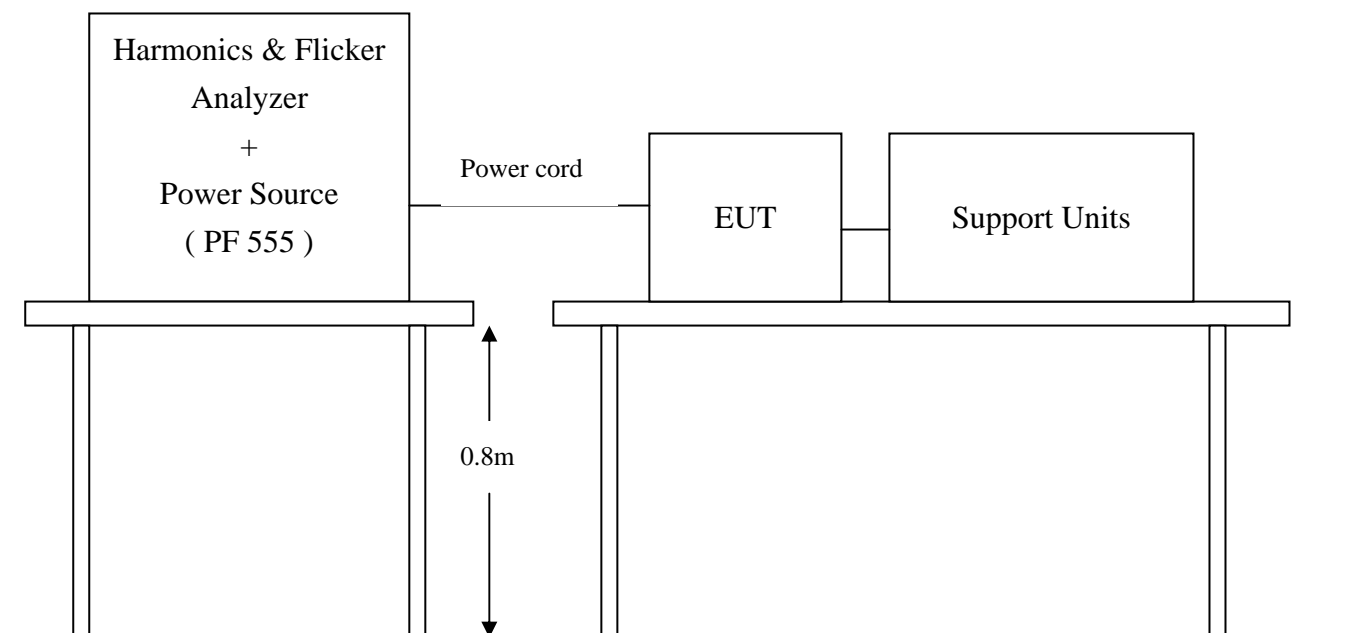
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 + A14: 2000)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Tester** : Lung Tsai  
**Temperature** : 26°C  
**Humidity** : 49%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : §5 of EN 61000-3-3  
**Tester** : Lung Tsai  
**Temperature** : 26°C  
**Humidity** : 49%

#### Block Diagram of Test Setup:



#### Result:

Please see the attached test data.



-----  
EN 61000-3-2 TEST REPORT 2001/10/25 10:23 PM  
-----

Unit: Web-enabled Device Connection With PC Card

Model No.: WebLink 2059/BAR

Remarks: Temp:26 °C Humidity:49%

Operator: LUNG TSAI

=====

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: 21.5W



## TEST DATA

Result: PASS

### Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.099	NaN	NaN	PASS
2	0.001	1.080	1.080	PASS
3	0.073	2.300	2.300	PASS
4	0.001	0.430	0.430	PASS
5	0.067	1.140	1.140	PASS
6	0.001	0.300	0.300	PASS
7	0.064	0.770	0.770	PASS
8	0.001	0.230	0.230	PASS
9	0.059	0.400	0.400	PASS
10	0.001	0.184	0.184	PASS
11	0.054	0.330	0.330	PASS
12	0.001	0.153	0.153	PASS
13	0.048	0.210	0.210	PASS
14	0.000	0.131	0.131	PASS
15	0.042	0.150	0.150	PASS
16	0.000	0.115	0.115	PASS
17	0.036	0.132	0.132	PASS
18	0.000	0.102	0.102	PASS
19	0.030	0.118	0.118	PASS
20	0.000	0.092	0.092	PASS
21	0.024	0.107	0.107	PASS
22	0.000	0.084	0.084	PASS
23	0.018	0.098	0.098	PASS



24	0.000	0.077	0.077	PASS
25	0.013	0.090	0.090	PASS
26	0.000	0.071	0.071	PASS
27	0.008	0.083	0.083	PASS
28	0.000	0.066	0.066	PASS
29	0.005	0.078	0.078	PASS
30	0.000	0.061	0.061	PASS
31	0.002	0.073	0.073	PASS
32	0.000	0.058	0.058	PASS
33	0.002	0.068	0.068	PASS
34	0.000	0.054	0.054	PASS
35	0.003	0.064	0.064	PASS
36	0.000	0.051	0.051	PASS
37	0.004	0.061	0.061	PASS
38	0.000	0.048	0.048	PASS
39	0.004	0.058	0.058	PASS
40	0.000	0.046	0.046	PASS

END OF REPORT



-----  
EN 61000-3-3 TEST REPORT    2001/10/25    10:38 PM  
-----

Unit:                    Web-enabled Device Connection With PC Card

Model No.:            WebLink 2059/BAR

Remarks:            Temp:26 °C            Humidity:49%

Operator:            LUNG TSAI

=====

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 %	0.004	3.00	PASS	true
dmax %	0.003	4.00	PASS	true
d(t) sec.	0.002	0.20	PASS	true

Power Source Data

Source Pst max	0.020	0.400	PASS	true
% THD	0.030	3.000	PASS	true

END OF REPORT

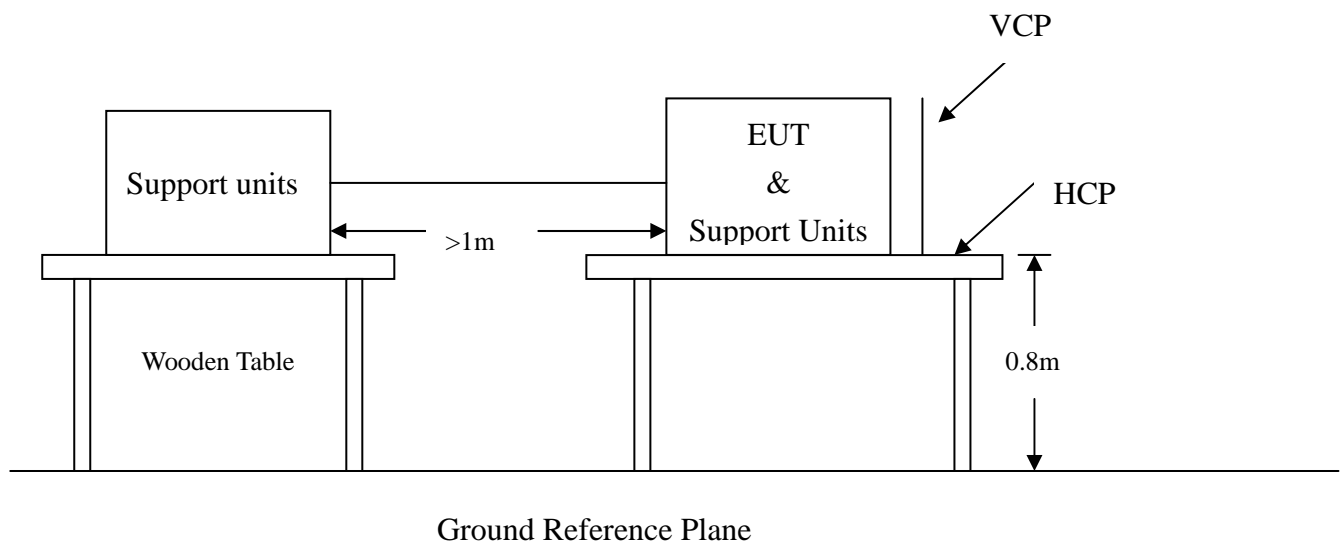
## SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

### 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** : Lung Tsai  
**Temperature/Humidity**: 26°C/49%

#### Block Diagram of Test Setup:

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





## **Test Procedure:**

1. The Web-enabled Device connection (included EUT) was located 0.1 m minimum from all side of the HCP.
2. The support units were located 1 m minimum away from the EUT.
3. A scroll 'H' test program was loaded and executed in Windows mode.
4. The Web-enabled Device connection (included EUT) sent above message to EUT and related peripherals through the test.
5. Active the communication function if the EUT with such port(s).
6. As per the requirement of EN 55024:1998; 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 Web-enabled Device connection (included EUT) where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.
8. The application of ESD to the contact of open connectors is not required.
9. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

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

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
Mini 10 /Point	±8kV	Air Discharge	Pass
Mini 25 /Point	±4kV	Contact Discharge	Pass
Mini 25 /Point	±4kV	Indirect Discharge HCP (Front)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Left)	Pass
Mini 25 /Point	±4kV	Indirect Discharge VCP (Back)	N/A
Mini 25 /Point	±4kV	Indirect Discharge VCP (Right)	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 2)*



*(Photo 2 of 2)*

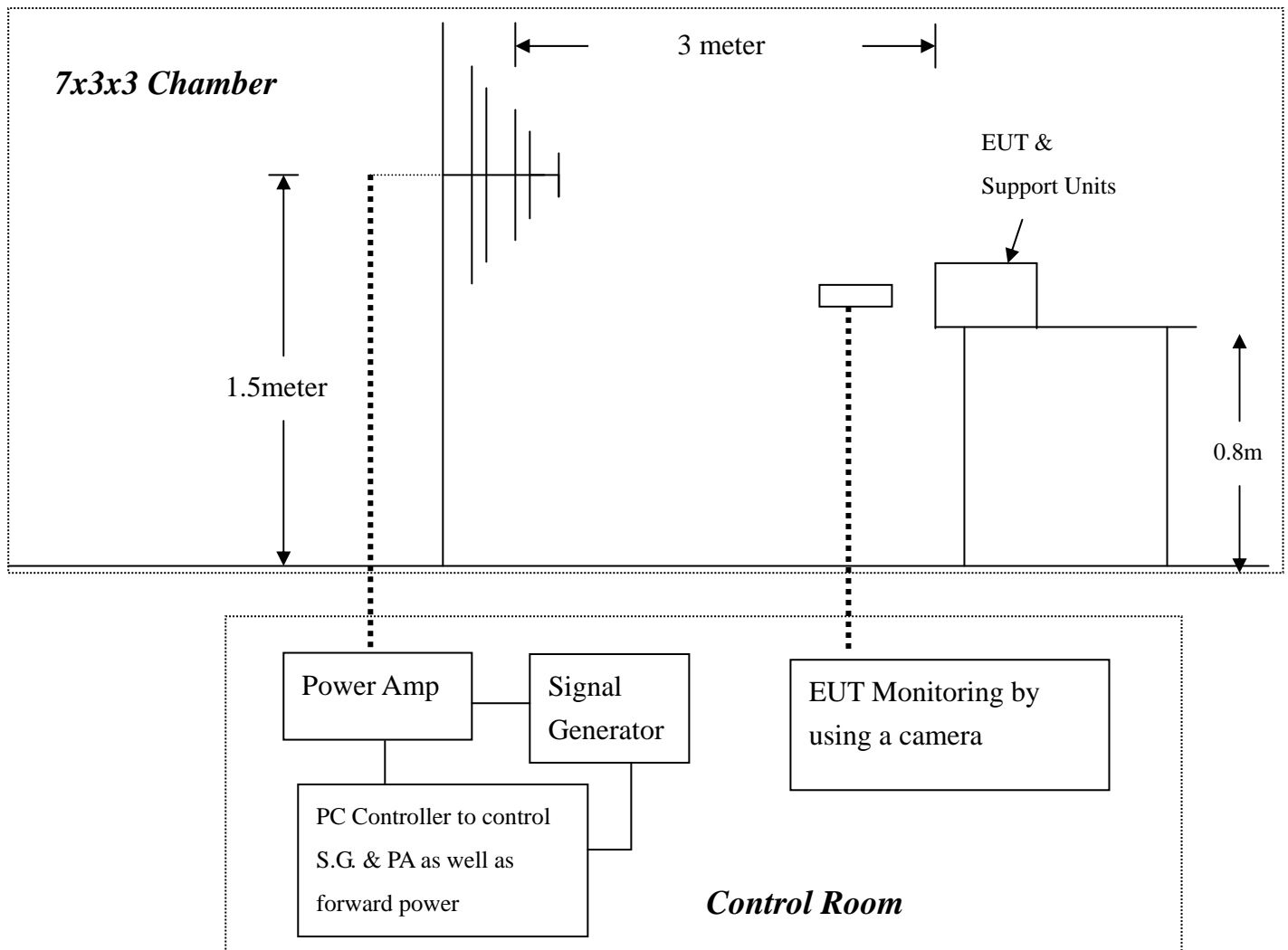


## SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD )

### 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.
<b>Performance Criteria</b>	: A ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 29°C
<b>Humidity</b>	: 46%

#### Block Diagram of Test Setup:



## **Test Procedure:**

1. The Web-enabled Device connection (included EUT) was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per IEC 61000-4-3.
2. A scroll 'H' messages were displayed on part of screen of EUT and an enlarged 'H' characters were displayed on the other part of screen of EUT.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of RS test software per IEC 61000-4-3.
5. Performing the test at each side of with specified level from 80MHz to 1000MHz at 1% steps.
6. Recording the test result in following table.
7. It is not necessary to perform test as per annex A of EN 55024:1998 if the EUT doesn't belong to TTE product.

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

Test level : 10V/m

Steps : 1 % of fundamental;

Dwell Time : 3 sec

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



### **Performance & Result:**

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

☒ **PASS**

☐ **FAILED**

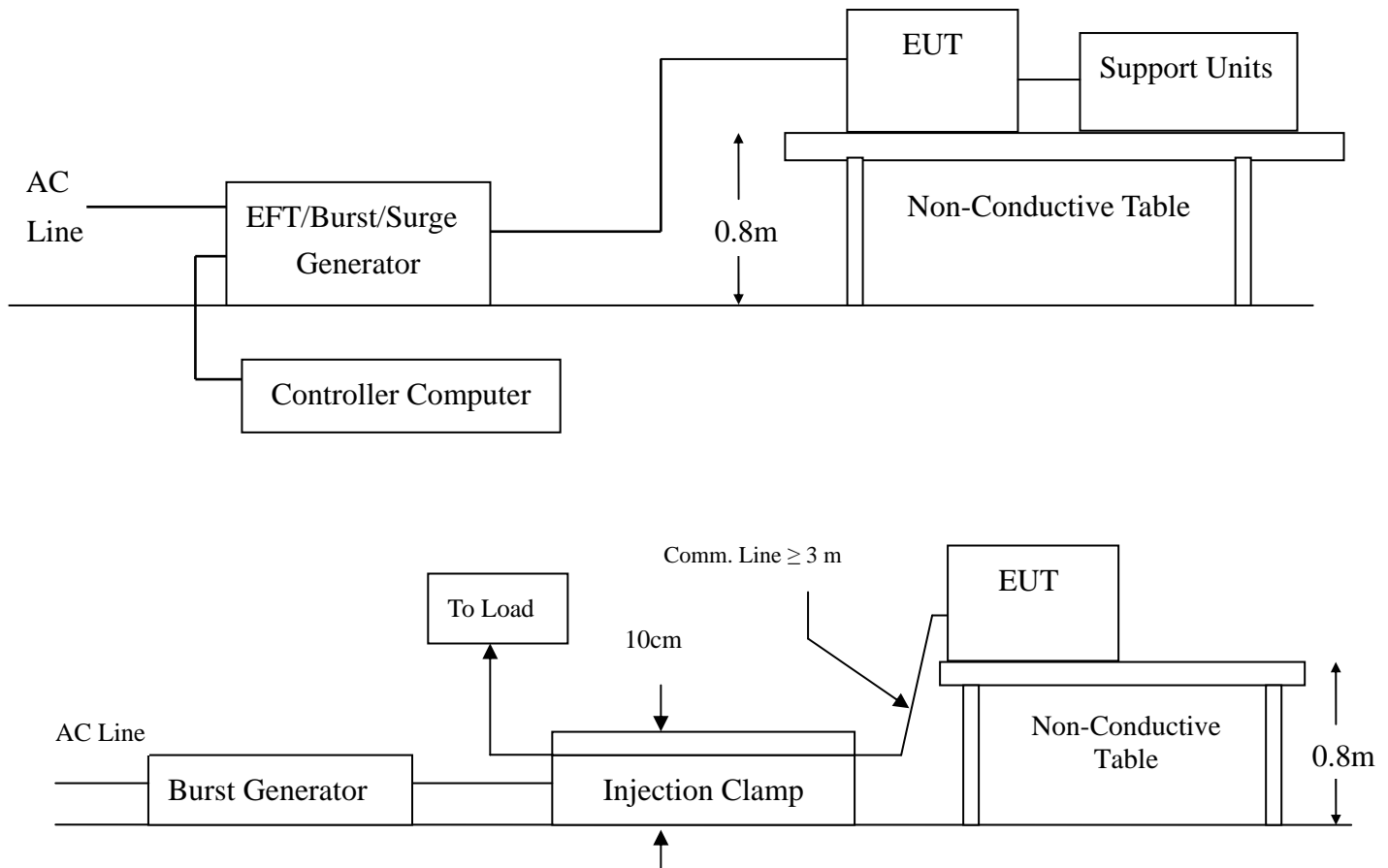
**Observation: No any function degraded during the tests.**

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

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Lines and Data Cable
<b>Basic Standard</b>	: IEC 61000-4-4
<b>Requirements</b>	: +/- 2kV for Power Supply Lines +/- 1kV for Data Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 26°C
<b>Humidity</b>	: 49%

#### Block Diagram of Test Setup:



### **Test Procedure:**

1. The Web-enabled Device connection (included EUT) and support units were located on a wooden table 0.8 m away from ground reference plane.
2. A 1.0 meter long power cord was attached to EUT during the test.
3. The length of communication cable between communication port and clamp was keeping within 1 meter.
4. A test program was loaded and executed in Windows mode.
5. The data was sent to EUT filling the screens with upper case of "H" patterns.
6. The test program exercised related support units sequentially.
7. Repeating step 3 to 6 through the test.
8. Recording the test result as shown in following table.

### **Test conditions:**

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 3Hz

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L1	+/- 2	Direct	Pass
N	+/- 2	Direct	Pass
PE	+/- 2	Direct	Pass
L1+N	+/- 2	Direct	Pass
L1+PE	+/- 2	Direct	Pass
N+PE	+/- 2	Direct	Pass
L1 + N + PE	+/- 2	Direct	Pass
LAN Cable	+/- 1	Clamp	Pass

### **Performance & Result:**

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

☒ **PASS**

☐ **FAILED**

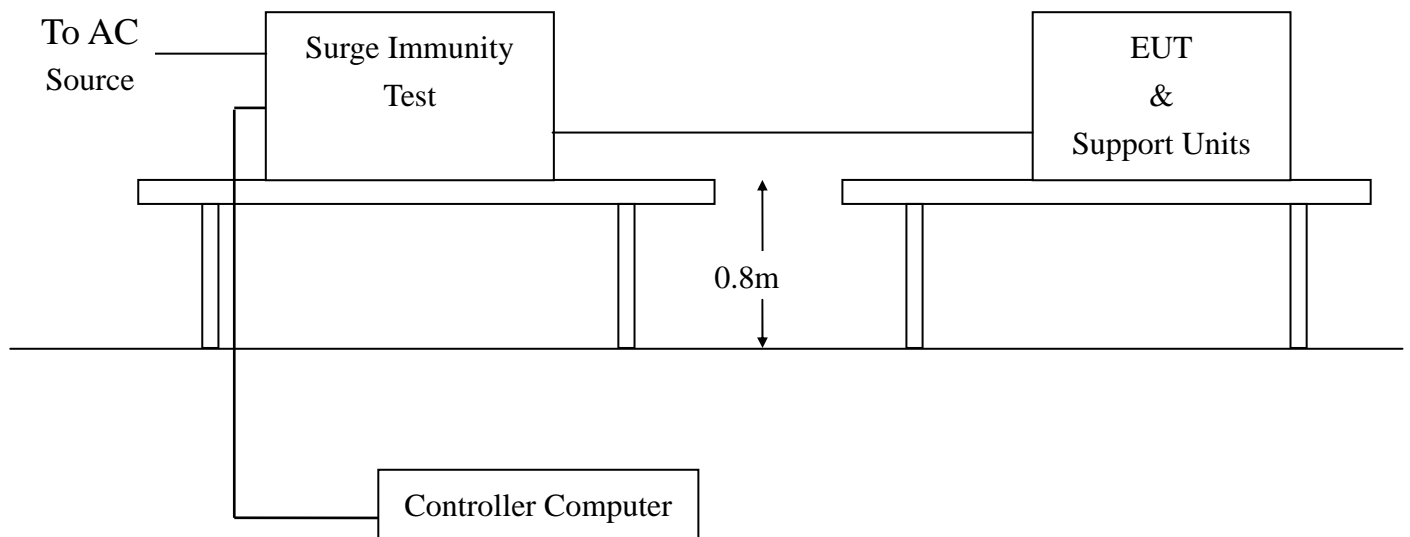
**Observation: No any function degraded during the tests.**

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

### SURGE IMMUNITY TEST

**Port** : Power Cord  
**Basic Standard** : IEC 61000-4-5  
**Requirements** : +/- 1kV (Line to Line)  
: +/- 2kV (Line to Ground)  
**Performance Criteria** : B ( Standard require )  
**Tester** : Lung Tsai  
**Temperature** : 26°C  
**Humidity** : 49%

#### Block Diagram of Test Setup:





### **Test Procedure:**

1. The Web-enabled Device connection (included EUT) and support units were located on a wooden table 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to EUT filling the screens with upper case of “H” patterns.
4. The test program exercised related support units sequentially.
5. Repeating step 3 to 4 through the test.
6. Recording the test result as shown in following table.

### **Test conditions:**

Voltage Waveform : 1.2/50 *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**

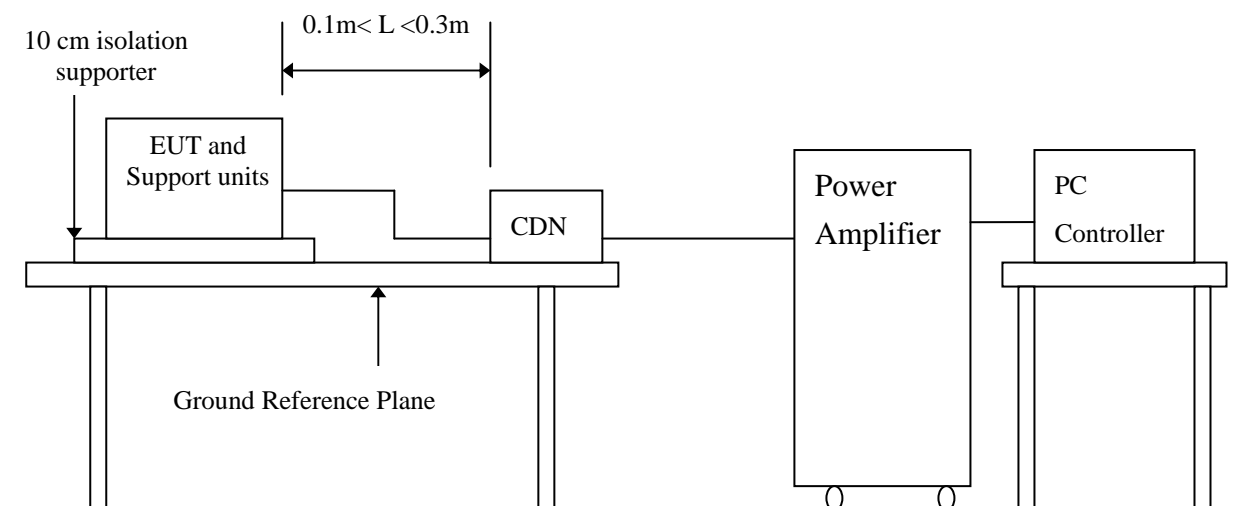
☐ **FAILED**



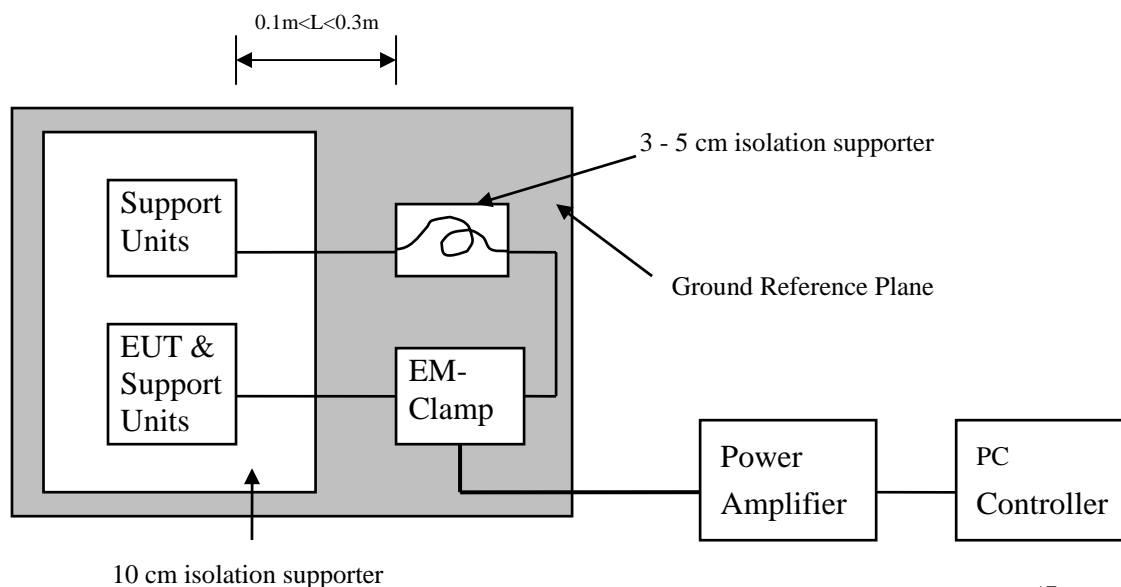
**Observation: No any function degraded during the tests.**

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

**Port** : AC Port and LAN Cable  
**Basic Standard** : IEC 61000-4-6  
**Requirements** : 10V with modulated  
**Injection Method** : CDN-M3 for Power Cord  
EM-Clamp for LAN Cable  
**Performance Criteria** : A (Standard require)  
**Tester** : Lung Tsai  
**Temperature** : 26°C  
**Humidity** : 49%



**Block Diagram of Test Setup:**



### **Test Procedure:**

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

### **Test conditions:**

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Dwell Time : 3 sec

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

### **Performance & Result:**

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

☒ **PASS**

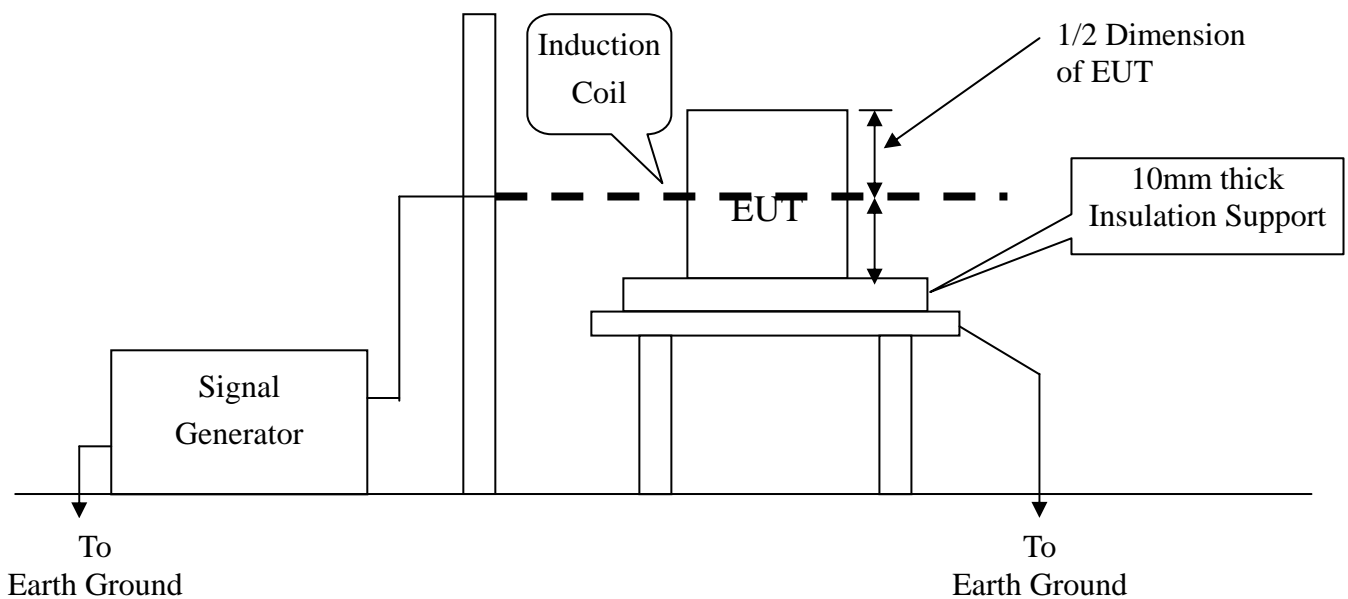
☐ **FAILED**

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

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

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-8  
**Requirements** : 30 A/m  
**Performance Criteria** : A (Standard Required)  
**Tester** : Lung Tsai  
**Temperature / Humidity** : 26°C / 49%

### Block Diagram of Test Setup:



## **Test Procedure:**

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

\*. Test conditions:

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

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



### **Performance & Result:**

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

☒ **PASS**

☐ **FAILED**

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

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

### VOLTAGE DIPS / SHORT INTERRUPTIONS

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

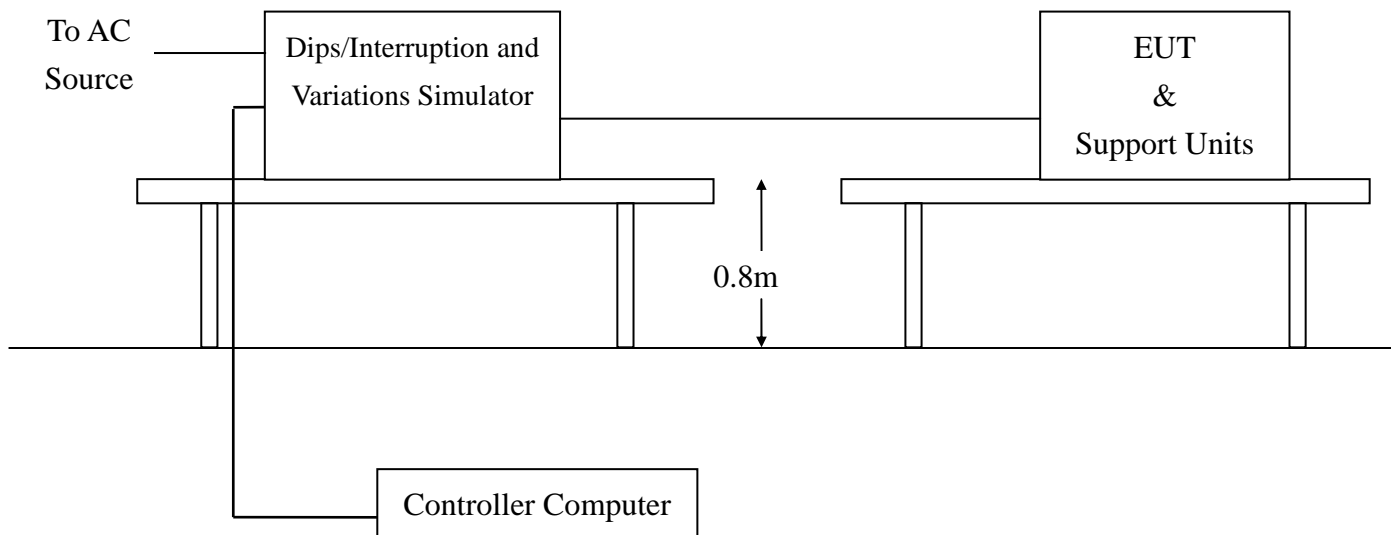
Voltage Dips (EN55024)	Test Level % U <sub>T</sub>	Reduction (%)	Duration	Performance Criteria
	<5	>95	0.5( periods )	B
	70	30	25( periods )	C

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

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

**Test Interval** : Min. 10 sec.  
**Tester** : Lung Tsai  
**Temperature** : 26°C  
**Humidity** : 49%

### Block Diagram of Test Setup:





### **Test Procedure:**

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

### **Test conditions:**

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

### **Voltage Dips:**

Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A
70	30	0.5(10ms)	Normal	A
40	60	5(100ms)	Normal	A
40	60	50(1000ms)	Normal	A

### **Voltage Interruptions:**

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

**Normal:** No any functions degrade during and after the test.

### **Performance & Result:**

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



**PASS**



**FAILED**



## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

## LINE CONDUCTED EMISSION TEST (EN55022)

*Front View*



*Rear View*

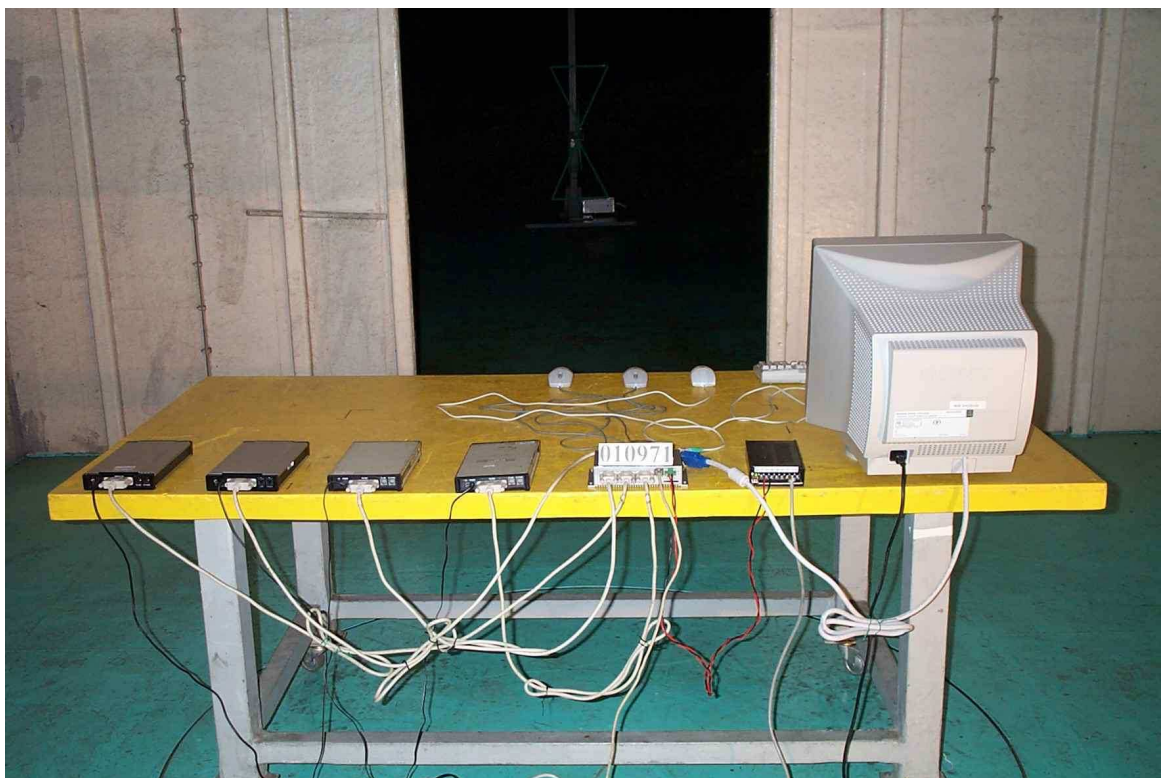


## RADIATED EMISSION TEST (EN55022)

### *Front View*



### *Rear View*

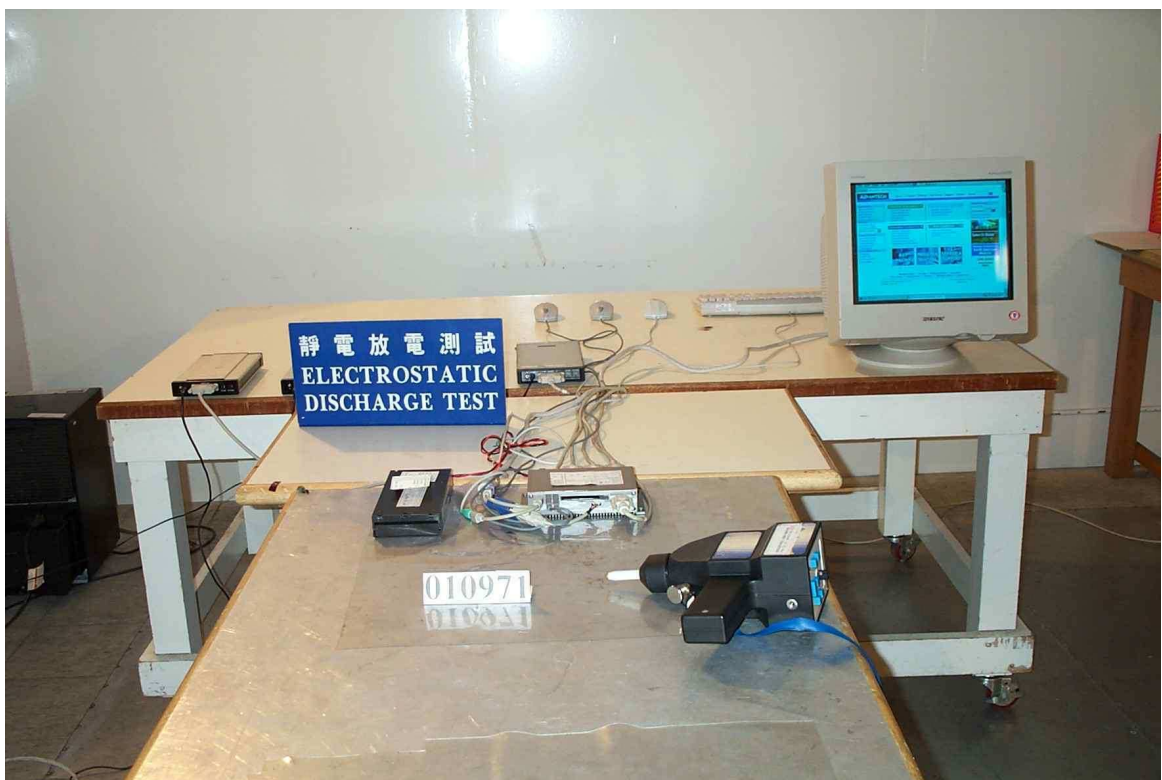




## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2; EN 61000-3-3)



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



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





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

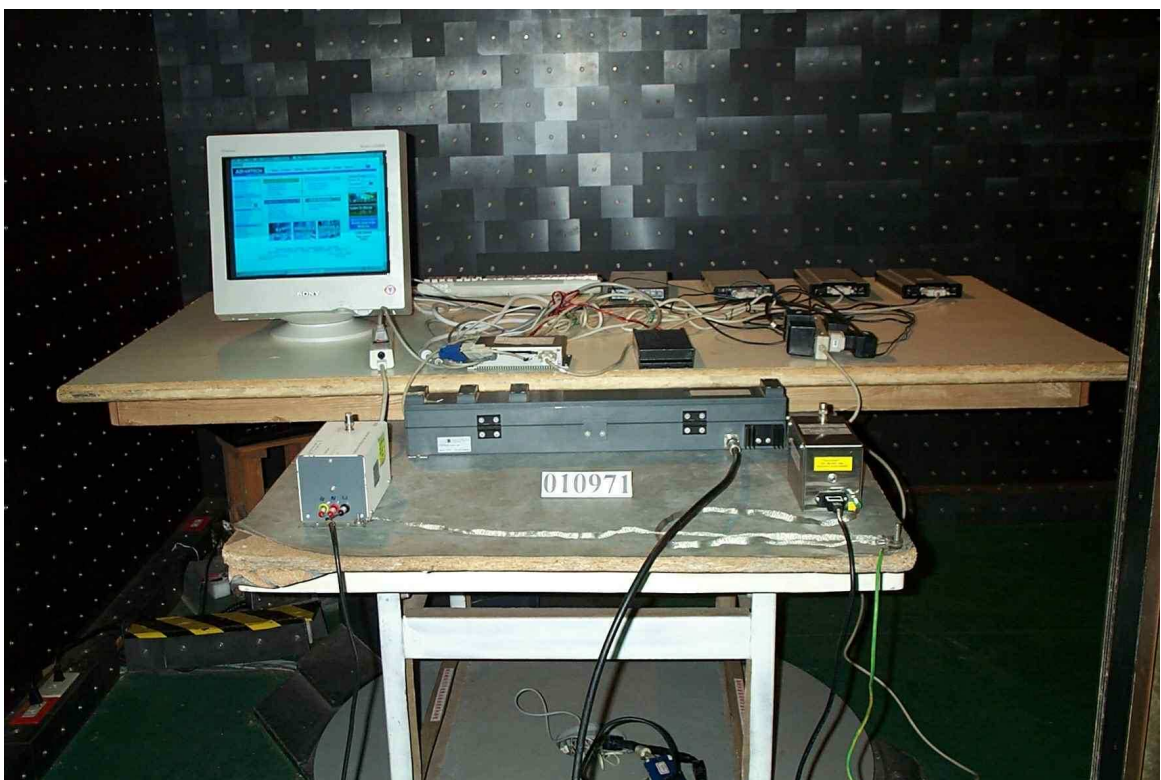
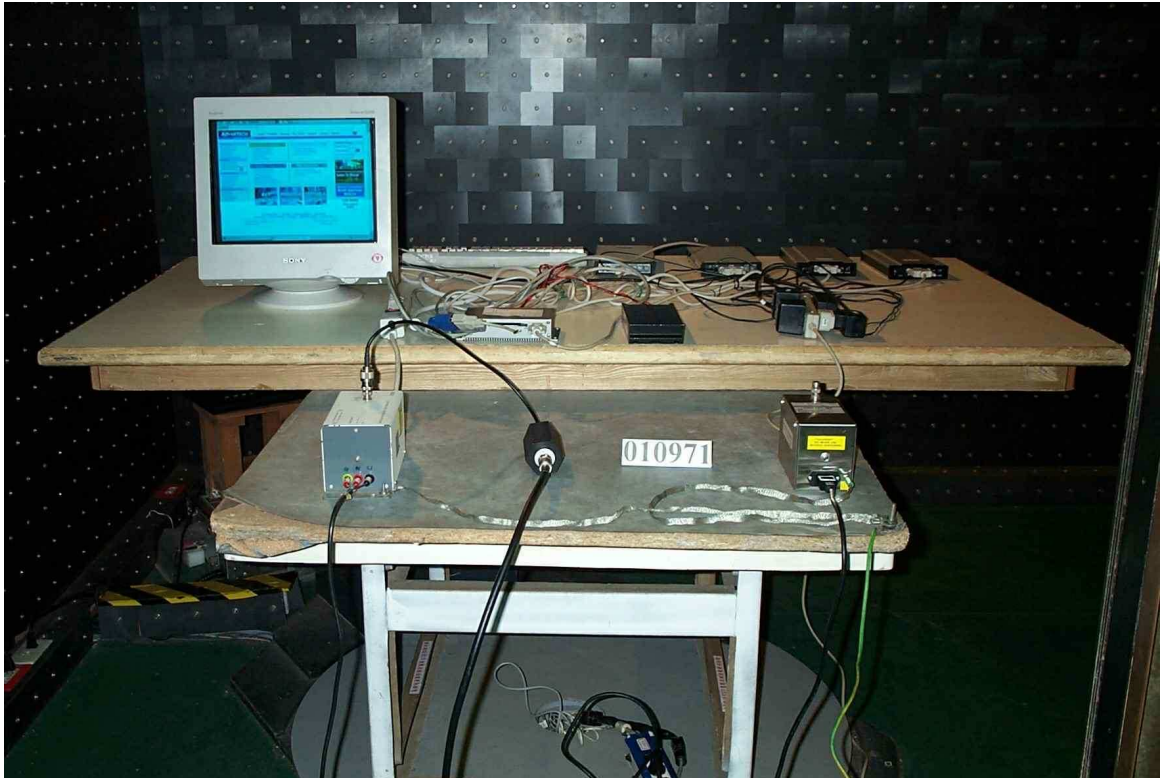




## SURGE IMMUNITY TEST (IEC 61000-4-5)



## 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)

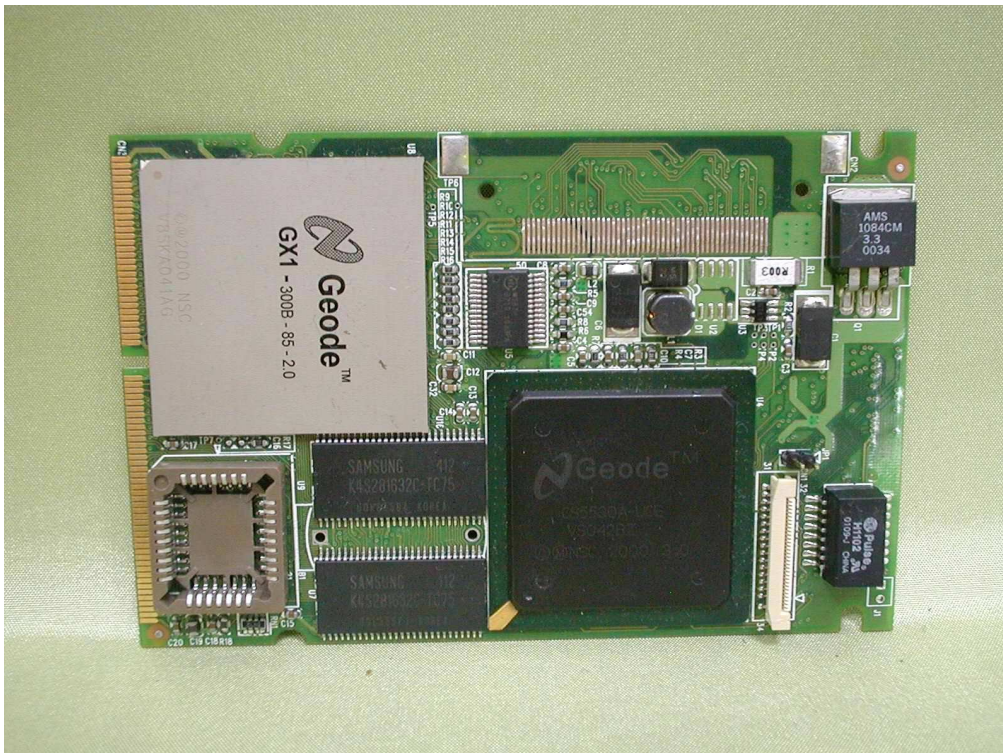




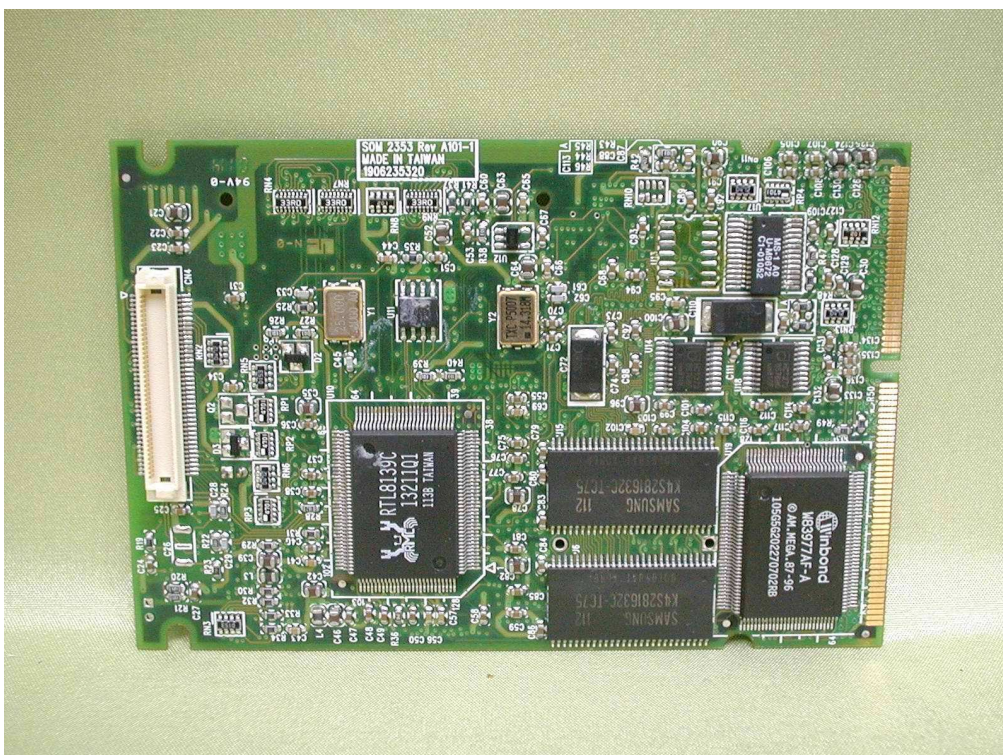
## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

### Front View of EUT



### Rear View of EUT





### Front View of Web-enabled Device Connection



### Back View of Web-enabled Device Connection

