



EMC COMPLIANCE TEST REPORT

for

19" Rackmount 2U Height Industrial Chassis

Trade Name : ADVANTECH
Model Number : ACP-2000XX-YYY
(X=0 ~ 9 or A ~ Z; Y=0 ~ 9 or A ~ Z)
Serial Number : N/A
Report Number : 020205-E
Date : April 8, 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	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998(following EN 61000-6-2:1999 test level)	PASS
- IEC 61000-4-2: 1995(EN 61000-4-2:1995)	PASS
- IEC 61000-4-3: 1995(EN 61000-4-3:1996)	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, 1st 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.

TABLE OF CONTENTS

DESCRIPTION	PAGE
VERIFICATION OF COMPLIANCE	5
GENERAL INFORMATION	6
SYSTRM DESCRIPTION	7
PRODUCT INFORMATION	8
SUPPORT EQUIPMENT	9
TEST FACILITY	10
TEST EQUIPMENT	18
SECTION 1 EN 55022(LINE CONDUCTED & RADIATED EMISSION)	20
MEASUREMENT PROCEDURE & LIMIT (LINE CONDUCTED EMISSION TEST)	20
MEASUREMENT PROCEDURE & LIMIT (RADIATED EMISSION TEST)	23
BLOCK DIAGRAM OF TEST SETUP	26
SUMMARY DATA	28
SECTION 2 EN61000-3-2 & EN 61000-3-3 (POWER HARMONICS & VOLTAGE FLUCTUATION/FLICKER)	38
BLOCK DIAGRAM OF TEST SETUP	38
RESULT	38
SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)	53
BLOCK DIAGRAM OF TEST SETUP	53
TEST PROCEDURE	54
PERFORMANCE & RESULT	54
ESD TESTED POINT TO EUT	55
SECTION 4 IEC 61000-4-3 (RADIATED ELECTROM AGNETIC FIELD)	57
BLOCK DIAGRAM OF TEST SETUP	57
TEST PROCEDURE	58
PERFORMANCE & RESULT	58

DESCRIPTION	PAGE
SECTION 5 IEC 61000-4-4 (FAST TRANSIENTS/BURST)	59
BLOCK DIAGRAM OF TEST SETUP	59
TEST PROCEDURE	60
PERFORMANCE & RESULT	61
SECTION 6 IEC 61000-4-5 (SURGE IMMUNITY)	62
BLOCK DIAGRAM OF TEST SETUP	62
TEST PROCEDURE	63
PERFORMANCE & RESULT	63
SECTION 7 IEC 61000-4-6 (CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS)	64
BLOCK DIAGRAM OF TEST SETUP	64
TEST PROCEDURE	65
PERFORMANCE & RESULT	65
SECTION 8 IEC 61000-4-8 (POWER FREQUENCY MAGNETIC FIELD)	66
BLOCK DIAGRAM OF TEST SETUP	66
TEST PROCEDURE	67
PERFORMANCE & RESULT	67
SECTION 9 IEC 61000-4-11 (VOLTAGE DIP/INTERRUPTION)	68
BLOCK DIAGRAM OF TEST SETUP	68
TEST PROCEDURE	69
PERFORMANCE & RESULT	69
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP EN 55022 TEST EN 61000-3-2 TEST EN 61000-3-3 TEST IEC 61000-4-2 TEST IEC 61000-4-3 TEST IEC 61000-4-4 TEST IEC 61000-4-5 TEST IEC 61000-4-6 TEST IEC 61000-4-8 TEST IEC 61000-4-11 TEST	70
APPENDIX 2 PHOTOGRAPHS OF EUT	86

VERIFICATION OF COMPLIANCE

Equipment Under Test: 19" Rackmount 2U Height Industrial Chassis

Trade Name: ADVANTECH

Model Number: ACP-2000XX-YYY
(X=0 ~ 9 or A ~ Z; Y=0 ~ 9 or A ~ Z)

Serial Number: N/A

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

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

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

Technical Standards: EN 55022: 1998 (Class A) ; EN55011:1998(Group1, Class A)
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998
EN 61000-3-3: 1995
EN 55024: 1998 (following EN61000-6-2:1999 test level)
IEC 61000-4-2: 1995(EN 61000-4-2:1995);
IEC 61000-4-3: 1995(EN 61000-4-3:1996);
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: 020205-E

Date of test: Feb. 26 ~ March 28. 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: _____



Kurt Chen / Q.A. Manager

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: 020205-E

Date of Test: Feb. 26 ~ March 28, 2002

Equipment Under Test: 19" Rackmount 2U Height Industrial Chassis

Model Number: ACP-2000XX-YYY
(X=0 ~ 9 or A ~ Z; Y=0 ~ 9 or A ~ Z)

Serial Number: N/A

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

Technical Standards: EN 55022: 1998 (Class A) ; EN55011:1998(Group1, Class A)
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998
EN 61000-3-3: 1995
EN 55024: 1998 (following EN61000-6-2:1999 test level)
IEC 61000-4-2: 1995(EN 61000-4-2:1995);
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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 2nd Road, Lu-Chu Hsiang,
Taoyuan, Taiwan, R. O. C.



SYSTEM DESCRIPTION

EUT Test Program:

1. An EMI test software was loaded and executed Windows mode.
2. A communicated software was loaded and executed to communicate between EUT and remote side.
3. EUT (Industrial PC) sends and receives data from Notebook PC on remote side 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:	100-127/200-240VAC, 47-63Hz, 9/4.5A		
AC Power during Test	230VAC/50Hz		
Power Supply Manufacturer:	1.) Delta	Model:	DPS-300GB-1B
	2.) Zippy	Model:	MRT-6300P
	3.) WIN-TACT	Model:	WT-310D
Power Supply Power Rating:	1.) I/P: 100-127/ 200-240VAC, 47-63Hz, 9/4.5A O/P: +12VDC, 15A; +5VDC, 30A; -12VDC, 0.8A; -5VDC, 0.3A; +3.3VDC, 28A; +5Vsb, 2A		
	2.) I/P: 100-240VAC, 50-60Hz, 6-3A O/P: +12VDC, 16A; +5VDC, 25A; -12VDC, 0.5A; -5VDC, 0.5A; +3.3VDC, 18A; +5Vsb, 2A		
	3.) I/P: -48VDC, 10A O/P: +5VDC, 25A; -5VDC, 1A; +12VDC, 10A; -12VDC, 5A		
AC Power Cord Type:	Unshielded, 1.8m (Detachable)		
CPU Manufacture:	Intel	Type:	Pentium III 850MHz
OSC/Clock Frequencies:	100MHz		
Memory Capacity:		Install:	128MB
HDD Manufacturer:	IBM	Model:	DTLA-307030
FDD Manufacturer:	TEAC	Model:	FD-235HF
CD-ROM Manufacturer:	NEC	Model:	CDR-2800C
LAN Card Manufacturer:	On Board		
VGA Card Manufacturer:	On Board		
Backplate Manufacturer:	Advantech	Model:	ACP-6106P3V
CPU Board Manufacturer:	Advantech	Model:	PCA-6179
Chassis Manufacturer:	Advantech	Model:	ACP-2000

I/O Port of EUT

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

Note:

- The means of "XX" (X= 0 ~9 or A ~ Z) on the model number is different Backplate as per customer declaration.
 - The "P3" is for the Model Number PCA-6106P3V backplate.
- The means of "YYY" (Y= 0 ~ 9 or A ~ Z) on the model number is different Power Supply as per customer declaration.
 - The "30Z" is for Delta (Model Number: DPS-300GB-1B).
 - The "30R" is for ZIPPY (Model Number: MRT-6300P).
 - The "31D" is for WIC-TACT (Model Number: WT-310D).
- Client consigns only one Backplate with three Power Supply model samples to test. (Model Number is ACP-6106P3V) Therefore, testing Lab. just guarantees the units, which have been tested. (Please refer to page 20 and 23)

SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1)	Monitor	CPD-G200	2715884	FCC DoC	SONY	Shielded, 1.8m with one core	Unshielded, 1.8m
2)	Modem	231AA	A08431083982	BFJ9D93108US	Hayes	Shielded, 1.8m	Unshielded, 1.8m
3)	PS/2 Keyboard	SK-2800C	B1C790BCPJ73JQ	GYUR79SK	Compaq	Shielded, 1.8m	N/A
4)	PS/2 Keyboard	SK-2800C	B1C790BCPJCN09	GYUR79SK	Compaq	Shielded, 1.8m	N/A
5)	USB Mouse	M-BB48	LZE92250259	FCC DoC	Logitech	Shielded, 1.8m	N/A
6)	USB Mouse	M-BB48	LZE94150675	FCC DoC	Logitech	Shielded, 1.8m	N/A
7)	HUB (Remote)	UP 206	100825	N/A	PRO-COMM	LAN Cable: Unshielded, 20m	Unshielded, 1.8m
8)	Notebook PC (Remote)	Valiant 6380i9TD	N/A	FCC DoC	KDS	LAN Cable: Unshielded, 1.5m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m With one core

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

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



TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R. O. C.
- Description:** There are four 3/10m open area test sites and three line conducted labs for final test.
The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Registration also was made with Voluntary Control Council for Interference (VCCI).
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission

Also accredited by BSMI for the product category of Information Technology Equipment.
- Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.
- Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

Site # 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 30th day of January, 2002.



Pete Mhye
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., LTD¹
No. 81-1, Lane 210, Pa-De 2nd Rd.,
Lu Chu Hsiang, Taoyuan, TAIWAN, R.O.C.
Kurt Chen Phone: 002 886 3 324 0332
Fax: 002 886 3 324 5235

ELECTRICAL (EMC)

Valid to: January 31, 2004

Certificate Number: 0824-01

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

Test Technology

Test Method(s)

Emissions
Radiated & Conducted

CFR 47, FCC Part 15/18 using ANSI 63.4/1992&2000;
AS/NZS 3548; VCCI V3 (2001); CNS 13438;
CNS 13439; CNS 13783; CNS 13803; CNS 14115
CISPR 11; EN 55011; CISPR 14-1; EN 55014-1;
CISPR 15; EN 55015; CISPR 22; EN 55022;
EN 50081-1/ EN 61000-6-3; 2001;
EN 50082-1/ EN 61000-6-4; 2001

Immunity

Electrostatic Discharge (ESD)
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 801-4
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

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

(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

Pete Mhye

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

Page 2 of 2



FEDERAL COMMUNICATIONS COMMISSION
Equipment Authorization Division
7435 Oakland Mills Road
Columbia, MD. 21046

February 01, 1999

Registration Number: 93105

C & C Laboratory Co., Ltd.
1st Fl., No. 344, Fu Ching Street
Taipei
Taiwan, R.O.C.

Attention: Charles Wang

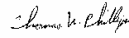
Re: Measurement facility located at Taoyuan, Site No. 4
3 & 10 meters
Date of Listing: February 01, 1999

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, Electronic 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

Registration Number: 90471

C & C Laboratory Co., Ltd.
781, 1st Fl., No. 183, Sec. 1
Tatung Rd., Hsi Chih
Taipei
Taiwan, R.O.C.

Attention: Kurt Chen

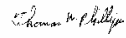
Re: Measurement facility located at Taoyuan
Sites No. 1 & 3 (3 & 10 meters)
Date of Listing: February 27, 2001

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



ENG 3/9
AJD

22 January 1998

C & C Laboratory Co Ltd
1st Fl
No. 344
Fu Ching Street
Taipei
TAIWAN ROC

Attention: Mr Tony Houng

Dear Sir

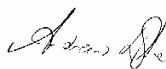
LABORATORY APPROVAL

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)



ENG 3/9
AJD

22 January 1998

C & C Laboratory Co Ltd
1st Fl
No. 344
Fu Ching Street
Taipei
TAIWAN ROC

Attention: Mr Tony Houng

Dear Sir

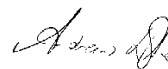
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If you have any further questions on this matter please do not hesitate to contact me.

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.

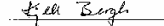
For Type Examination Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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-0214 OSLO, NORWAY

Telephone: +47 22 96 03 30
Fax: +47 22 96 08 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 300 328:1996 + A1:97 [EN 300 328-2:2000]	ETS 300 342-1:1997 EN 301 489-07:2000	EN 301 489-08:2000
ETN 300 422-2:2000	ETS 300 445:1996 + A1:97 EN 301 489-09:2000	EN 301 454-2:2000
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	EN 61000-4-3:1996 + A1:98 IEC 61000-4-3:1995 + A1:98	EN 61000-4-4:1995 IEC 61000-4-4:1995
(IEC 60801-1:1993 IEC 801-2:1991 IEC 801-2:1984)	(IEC 801-3:1984 ENV 50140:1993 + ENV 50204:1995)	(IEC 801-4:1990)
EN 61000-4-5:1995 IEC 61000-4-5:1995	EN 61000-4-6:1996 IEC 61000-4-6:1996	EN 61000-4-8:1993 IEC 61000-4-8:1993
(ENV 50142:1994)	(ENV 50141:1993)	
EN 61000-4-11:1994 IEC 61000-4-11:1994		

Oslo 26 April 2001

Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address: P.O.Box 73 Blindern
N-0214 OSLO, NORWAY

Telephone: +47 22 96 03 30
Fax: +47 22 96 08 50



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].

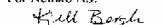
In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

In order to maintain this 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-0214 OSLO, NORWAY

Telephone: +47 22 96 03 30
Fax: +47 22 96 08 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).

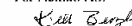
In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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

For Nemko AS:



Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address: P.O.Box 73 Blindern
N-0214 OSLO, NORWAY

Telephone: +47 22 96 03 30
Fax: +47 22 96 08 50

CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No.1
(Conducted Interference Measurement)
Address : No.15, 14 Lin, Chin Twu Chi,
Lu Chu Hsiang Taoyuan Shien, Taiwan

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

Registration No. : C-402
Date of Registration : July 1, 1999
This Certificate is valid until September 30, 2002

Voluntary Control Council for Interference by
Information Technology Equipment

CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No.1
(Radiation 3 and 10 meter site)
Address : No.15, 14 Lin, Chin Twu Chi,
Lu Chu Hsiang Taoyuan Shien, Taiwan

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

Registration No. : R-393
Date of Registration : July 1, 1999
This Certificate is valid until September 30, 2002

Voluntary Control Council for Interference by
Information Technology Equipment

CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No.2
(Radiation 3 and 10 meter site)
Location of Facility : No.15, 14 Lin, Chin Twu Chi, Lu Chu
Hsiang Taoyuan Shien

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

Registration No. : R-1066
Date of Registration : March 6, 2000
This Certificate is valid until March 31, 2003

Voluntary Control Council for Interference by
Information Technology Equipment

CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No. 3
(Conducted Interference Measurement)
Location of Facility : No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang
Taoyuan Shien, Taiwan

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

Registration No. : C-747
Date of Registration : July 1, 2001
This Certificate is valid until September 30, 2004

Voluntary Control Council for Interference by
Information Technology Equipment



CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No. 3
(Radiation 3 and 10 meter site)
Location of Facility : No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang
Taoyuan Shien, Taiwan

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

Registration No. : R-725
Date of Registration : July 1, 2001
This Certificate is valid until September 30, 2004

Voluntary Control Council for Interference by
Information Technology Equipment



CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility : C&C Conducted Interference Test Site No.4
(Conducted Interference Measurement)
Address : No.15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang Taoyuan Shien, Taiwan

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

Registration No. : C-912
Date of Registration : March 26, 1999
This Certificate is valid until March 31, 2002

Voluntary Control Council for Interference by
Information Technology Equipment



CERTIFICATE

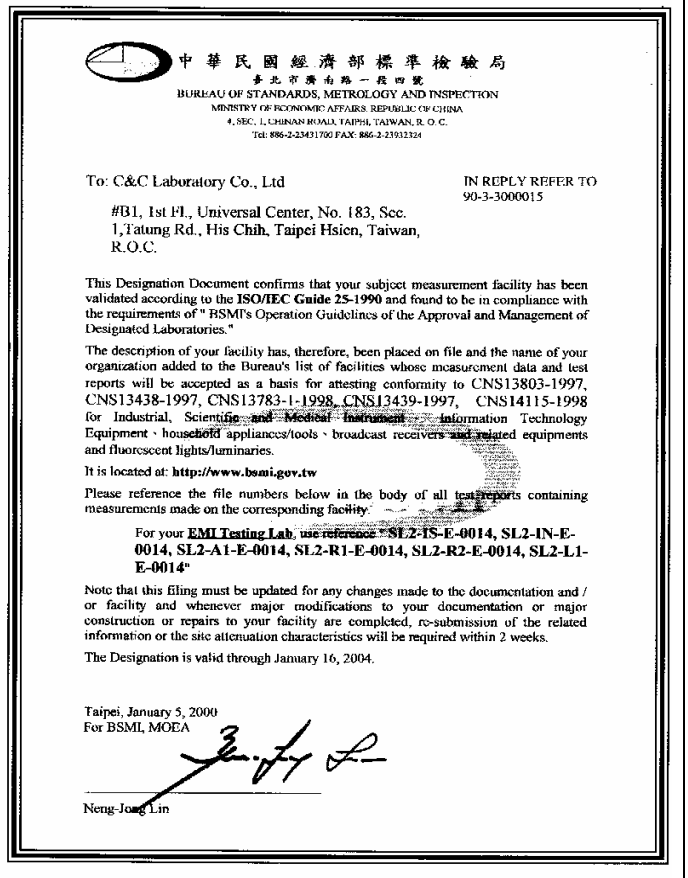
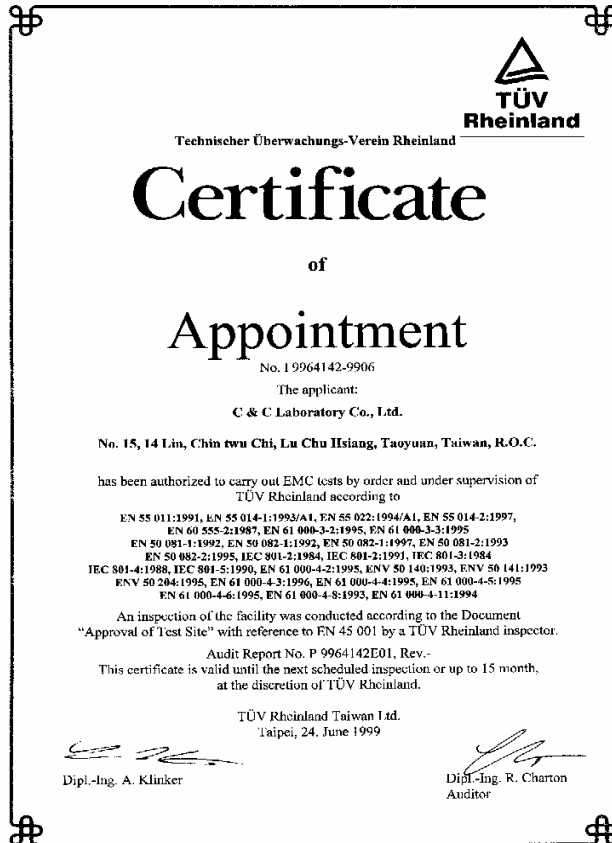
Company : C&C Laboratory Co., Ltd.
Facility : C&C Open Area Test Site No.4
(Radiation 3 and 10 meter site)
Address : No.15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang Taoyuan Shien, Taiwan

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

Registration No. : R-879
Date of Registration : March 26, 1999
This Certificate is valid until March 31, 2002

Voluntary Control Council for Interference by
Information Technology Equipment

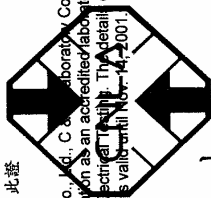




中華民國實驗室認證體系認可證書
Chinese National Laboratory Accreditation Certificate ROC

CNLA-ZL98078
Page 1 of 5

茲以 程智科技股份有限公司程智科技實驗室之電性測試領域經評鑑認可十三項發給本證書有效期限至九十年十一月十四日 此證



This is to certify that C & C Laboratory Co., Ltd. has been recognized by the Council of Chinese National Laboratory Accreditation as an accredited laboratory. The laboratory has been registered for thirteen specific tests within the field of Electrical Testing. The details of the scope of accreditation are described in the following pages and this certificate is valid until Nov. 14, 2001.

中華民國實驗室認證委員會
主席 林能中
Neng-Jong Lin
The Chairman of Chinese National Laboratory Accreditation Council

中華民國八十九年十一月十五日
(本證書共五頁, 另發使用簡章。This document is invalid unless accompanied by all 5 pages)

CNLA-ZL98078 Page 4 of 5

認可項目 Registration items	測試件 Test items	測試方法 Test Methods	範圍 Ranges	認可之最佳測試能力 Best Test capability recognized	備註 Remarks
EI0202 低電壓電壓測試 Low voltage test discharge test	資訊類及周邊產品 ITE and peripheral products	IEC 1000-4-2(1995) EN 1000-4-2(1995) CNS 13022-1(1992)	500V 脈衝電壓 1.2/50 μ s 1.5 kV (+/-) 接觸電阻 0.2 V 9.0 V (+/-)		
EI0203 輻射抗擾度測試 Radiated susceptibility tests	資訊類及周邊產品 ITE and peripheral products	IEC 80-3(1984) IEC 1000-4-3(1995) EN 1000-4-3(1995) BS 5284(1995)	電磁場 200kHz~1.0 GHz 電場 10 V/m, 1.0 V/m (A 類) 磁場 400 A/m (A 類)		
EI0204 電性快速瞬變測試 Electrical fast transient/burst tests	資訊類及周邊產品 ITE and peripheral products	IEC 801-4(1988) IEC 1000-4-4(1995) EN 1000-4-4(1995) CNS 13022-2(1992)	脈衝電壓 150~270 VAC (電壓) 脈衝電流 10~100 A 電壓上升時間 0.22~4.5 μ s		
EI0205 浪湧/雷擊測試 Surge/lightening tests	資訊類及周邊產品 ITE and peripheral products	IEC 1000-4-5(1995) BS 5042(1994) CNS 13022-3(1992)	脈衝電壓 100~270 VAC 單相/DC 100V 脈衝電流 16 A (AC/DC) 設備耐壓範圍 0~4.2 kV 測試時間：電壓線		
EI0206 電磁抗擾度測試 Electromagnetic susceptibility	資訊類及周邊產品 ITE and peripheral products	IEC 1000-4-6(1993) EN 1000-4-6(1996)	電磁場 150 dB~220 MHz (電場 10 V/m, 磁場)		

CNLA-ZL98078 Page 2 of 5

認可項目 Registration items	測試件 Test items	測試方法 Test Methods	範圍 Ranges	認可之最佳測試能力 Best Test capability recognized	備註 Remarks
EI0208 低功率電壓測試 Low power test equipment	低功率電壓測試 radiation receivers	IEC 1000-3-2(1995) EN 1000-3-2(1995)	9 kHz~1.75 GHz		
EI0209 資訊類及周邊產品 ITE and peripheral products	資訊類及周邊產品 Products	IEC 1000-3-2(1995) EN 1000-3-2(1995)	脈衝電壓 100~270 VAC (電壓) 脈衝電流 10~16 A 電壓上升時間 0.22~4.5 μ s		
EI0210 電壓波動及閃爍測試 Voltage fluctuations and flicker	電壓波動及閃爍測試 Products	IEC 1000-3-3(1994) EN 1000-3-3(1995)	脈衝電壓 100~270 VAC (電壓) 脈衝電流 10~16 A		

機構名稱：程泰科技股份有限公司
實驗室名稱：程泰科技電磁相容實驗室
認可編號：0363
實驗室負責人：王耀雄
測試領域：電磁測試
發證日期：1998.11.15
變更日期：2000.11.15
Organization : C & C Laboratory Co., Ltd.
Laboratory : C & C Laboratory Co., Ltd.
Registration : 0363
Laboratory Head : WANG, Charles
Testing Field : Electrical Testing
Date of Registration : 1998.11.15
Date of Revised : 2000.11.15

CNLA-ZL98078 Page 5 of 5

認可項目 Registration items	測試件 Test items	測試方法 Test Methods	範圍 Ranges	認可之最佳測試能力 Best Test capability recognized	備註 Remarks
EI0208 電磁抗擾度測試 Electromagnetic susceptibility tests	資訊類及周邊產品 ITE and peripheral products	IEC 1000-4-3(1995) EN 1000-4-3(1995)	電磁場 10 V/m~100 A/m		
EI0211 電壓波動及閃爍測試 Voltage fluctuations and flicker tests	電壓波動及閃爍測試 Products	IEC 1000-4-11(1994) EN 1000-4-11(1996)	脈衝電壓 150~270 VAC 脈衝電流 10~16 A 電壓上升時間 0.22~4.5 μ s		

CNLA-ZL98078 Page 3 of 5

認可項目 Registration items	測試件 Test items	測試方法 Test Methods	範圍 Ranges	認可之最佳測試能力 Best Test capability recognized	備註 Remarks
EI0213 廣播接收機測試 Broadcast receivers and associated equipment	廣播接收機測試 Broadcast receivers and associated equipment	EN 5013 : 1994/12 : 1994/13 : 1996 CISPR 13 : 1975/41 : 1985 CNS 13439 (86.5)	9 kHz~1.75 GHz		
EI0214 電氣產品及系統 Electrical appliances and systems	電氣產品及系統 Household appliances/Electric tools and similar apparatus	EN 55014-1 : 1994/1 : 1994/2 : 1996 CISPR 14 : 1995/41 : 1995/41 : 1996 CNS 13783-1 (87.5)	9 kHz~1 GHz		
EI0222 電磁抗擾度測試 Electromagnetic susceptibility tests	電磁抗擾度測試 ITE and peripheral products	CISPR 22(1996) EN 55022(1995) CNS 13438(1997) AS/NZS 3548(1995) VCCI(1997) FCC Part 15(1996)	電磁場 150 dB~220 MHz 電磁場 30 dB~1.0 GHz 電磁場 30 dB~2.0 GHz		



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	02/22/2002	02/21/2003
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	01/12/2002	01/11/2003
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	11/24/2001	11/23/2002

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	ESCS30	845552/030	12/12/2001	12/11/2002
LISN	R&S	ENV 4200	8303261016	02/08/2002	02/07/2003
LISN	EMCO	3825/2	9003/1382	02/18/2002	02/17/2003

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	EMV	SESD 2000	812006	02/08/2002	02/07/2003
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	08/03/2001	08/02/2002
Power Amplifier	ar	150W1000	300300	N/A	N/A
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
EM PROBE	narda	EMR-20	AF-0024	06/28/2001	06/27/2002
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	08/03/2001	08/02/2002
Power Amplifier	ar	500A100A	300299	N/A	N/A
CDN	MEB	M3	3683	09/14/2001	09/13/2002
CDN	Lüthi	801-M3	1879	03/05/2002	03/04/2003
CDN	MEB	M2	A3002010	04/17/2001	04/16/2002
CDN	SCHAFFNER	T200	16892	10/12/2001	10/11/2002
CDN	SCHAFFNER	T400	16906	10/12/2001	10/11/2002
Power Frequency Magnetic Field Immunity test (61000-4-8)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
TRIAX ELF Magnetic Field Meter	F.W.BELL	4090	9711	10/30/2001	10/29/2002
Magnetic Field Tester	HAEFELY TRENCH	MAG 100.1	080 938-01	N/A	N/A
Voltage Dips/Short Interruption and Voltage Variation Immunity test (61000-4-11)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Dips/Interruption and Variations Simulator	HAEFELY TRENCH	PLINE 1610	080 344-05	02/18/2002	02/17/2003

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(s) were scanned during the preliminary test:

Mode(s):

1. 800 x 600 Resolution 100Mbps (ACP-2000P3-30Z)
 2. 1280 x 1024 Resolution 100Mbps (ACP-2000P3-30Z)
 3. 1600 x 1200 Resolution 10Mbps (ACP-2000P3-30Z)
 4. 1600 x 1200 Resolution 100Mbps (ACP-2000P3-30Z)
 5. 1600 x 1200 Resolution 100Mbps (ACP-2000P3-30R)
- 10) After the preliminary scan, we found the following test mode producing the highest emission level.

Mode: 4, 5.

Then, the EUT configuration and cable configuration of the above highest emission levels 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) : (Customer defined)

1. LAN (ACP-2000P3-30Z) 2.LAN (ACP-2000P3-30R)

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

Mode(s): 1, 2.

Data Sample:

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

Freq.	= 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(s) were scanned during the preliminary test:

Mode(s):

1. **800 x 600 Resolution 100Mbps (ACP-2000P3-30Z)**
2. **1280 x 1024 Resolution 100Mbps (ACP-2000P3-30Z)**
3. **1600 x 1200 Resolution 10Mbps (ACP-2000P3-30Z)**
4. **1600 x 1200 Resolution 100Mbps (ACP-2000P3-30Z)**
5. **1600 x 1200 Resolution 100Mbps (ACP-2000P3-30R)**
6. **1600 x 1200 Resolution 100Mbps (ACP-2000P3-31D)**

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

Mode(s): 4, 5, 6.

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

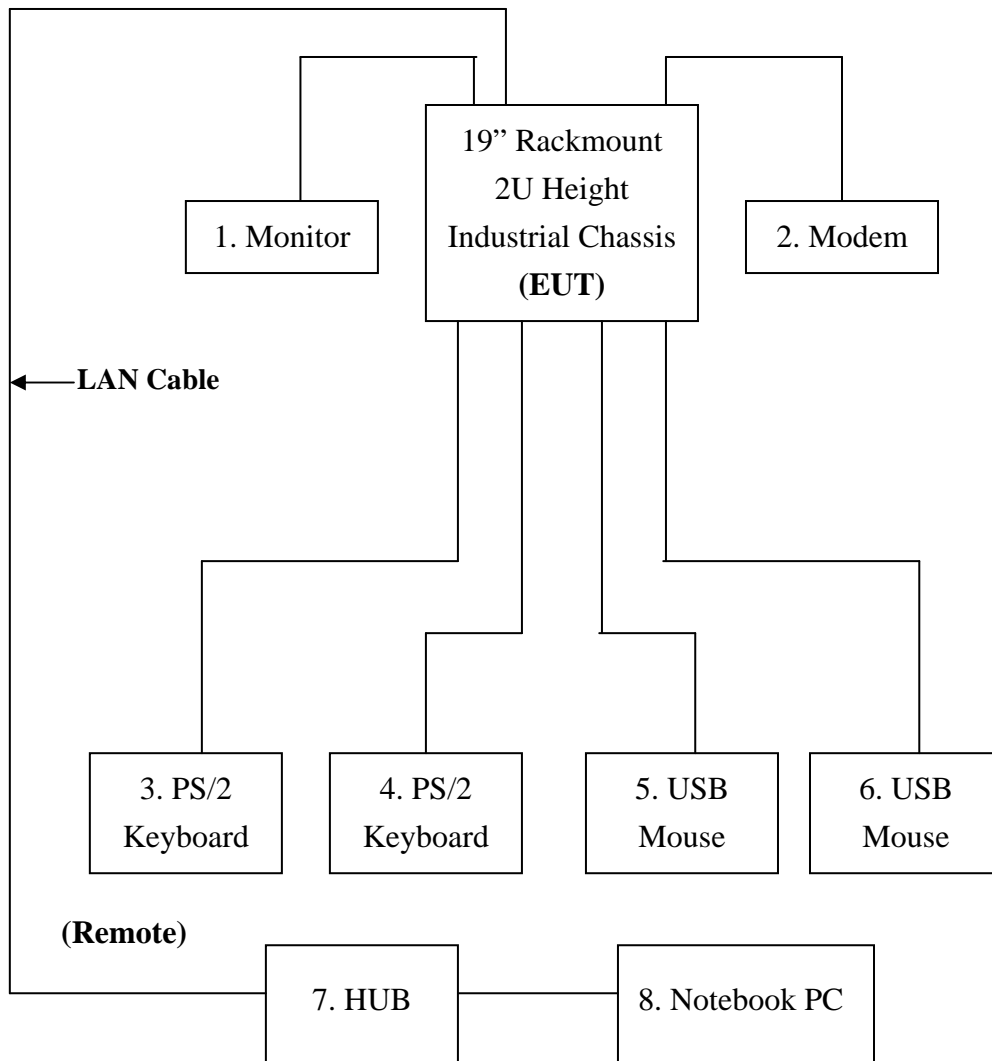
EUT: 19" Rackmount 2U Height Industrial Chassis

Trade Name: ADVANTECH

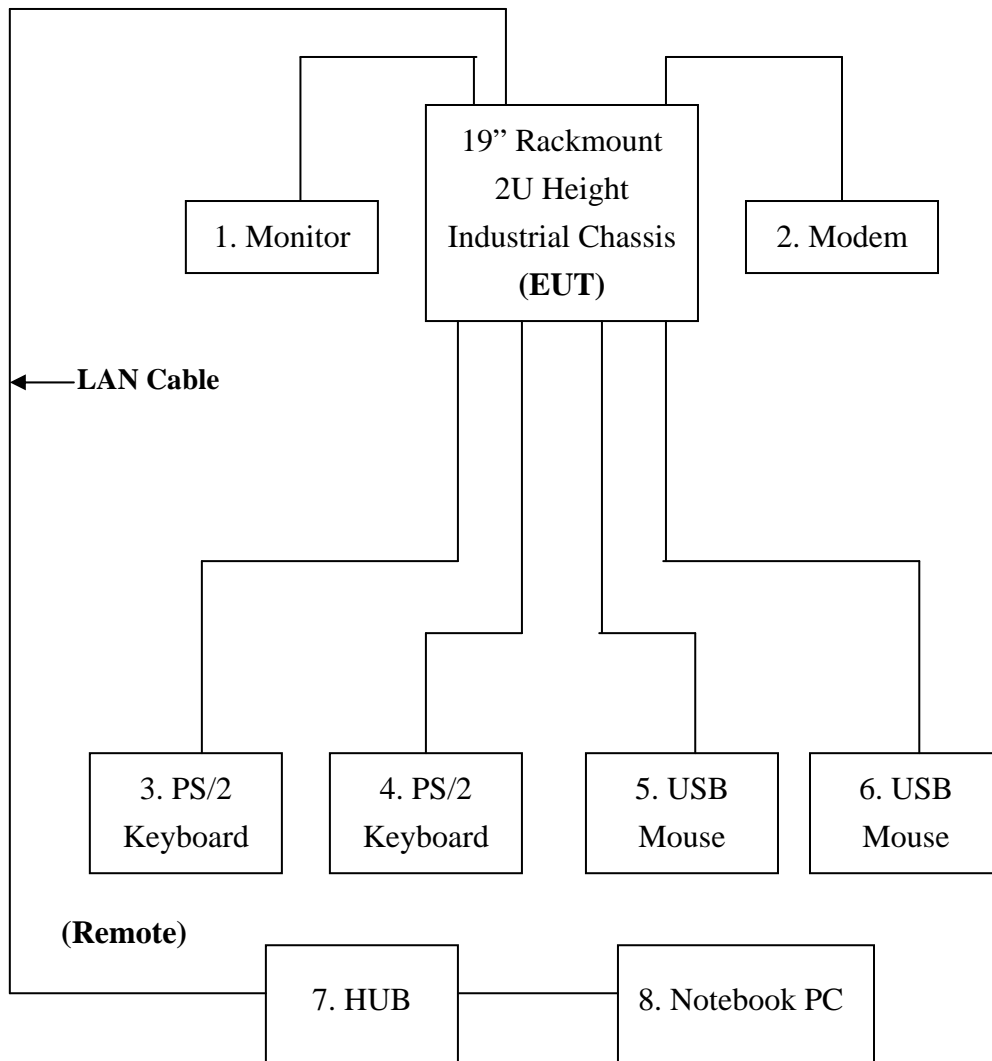
Model Number: ACP-2000P3-30Z; ACP-2000P3-30R

AC Power Cord: Unshielded, 1.8m (Detachable)

EUT With AC Power Supply



EUT (ACP-2000P3-31D) With DC Power Supply





SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: ACP-2000P3-30Z

Location: Site # 3

Tested by: Michael Chen

Test Mode: Mode 4

Test Results: Passed

Temperature: 24°C

Humidity: 68%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
0.150	52.20	---	79.00	66.00	-26.80	---	L1
1.800	36.10	---	73.00	60.00	-36.90	---	L1
4.960	42.00	---	73.00	60.00	-31.00	---	L1
6.640	37.80	---	73.00	60.00	-35.20	---	L1
8.580	32.50	---	73.00	60.00	-40.50	---	L1
29.900	33.40	---	73.00	60.00	-39.60	---	L1
0.150	52.70	---	79.00	66.00	-26.30	---	L2
1.800	36.80	---	73.00	60.00	-36.20	---	L2
2.400	30.90	---	73.00	60.00	-42.10	---	L2
4.630	35.10	---	73.00	60.00	-37.90	---	L2
6.420	38.00	---	73.00	60.00	-35.00	---	L2
10.000	42.40	---	73.00	60.00	-30.60	---	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 (LINE CONDUCTED TEST)

Model Number: ACP-2000P3-30R

Location: Site # 3

Tested by: Michael Chen

Test Mode: Mode 5

Test Results: Passed

Temperature: 25°C

Humidity: 62%RH

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

FREQ MHz	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.150	47.60	---	79.00	66.00	-31.40	---	L1
1.320	18.10	---	73.00	60.00	-54.90	---	L1
2.580	18.90	---	73.00	60.00	-54.10	---	L1
5.370	15.70	---	73.00	60.00	-57.30	---	L1
6.780	15.80	---	73.00	60.00	-57.20	---	L1
7.570	17.10	---	73.00	60.00	-55.90	---	L1
0.155	49.50	---	79.00	66.00	-29.50	---	L2
0.945	27.70	---	73.00	60.00	-45.30	---	L2
3.700	23.90	---	73.00	60.00	-49.10	---	L2
7.490	21.20	---	73.00	60.00	-51.80	---	L2
8.550	19.80	---	73.00	60.00	-53.20	---	L2
11.930	16.10	---	73.00	60.00	-56.90	---	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: ACP-2000P3-30Z

Location: Site # 3

Tested by: Michael Chen

Test Mode: Mode 1

Test Results: Passed

Temperature: 24°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
5.000	66.40	---	87.00	74.00	-20.60	---	10 Base
6.870	60.90	---	87.00	74.00	-26.10	---	10 Base
7.500	65.80	---	87.00	74.00	-21.20	---	10 Base
10.000	69.90	---	87.00	74.00	-17.10	---	10 Base
12.720	55.40	---	87.00	74.00	-31.60	---	10 Base
15.000	59.10	---	87.00	74.00	-27.90	---	10 Base
0.150	55.30	---	97.00	84.00	-41.70	---	100 Base
13.420	64.50	---	87.00	74.00	-22.50	---	100 Base
16.230	65.60	---	87.00	74.00	-21.40	---	100 Base
19.710	66.80	---	87.00	74.00	-20.20	---	100 Base
20.810	63.20	---	87.00	74.00	-23.80	---	100 Base
26.610	66.50	---	87.00	74.00	-20.50	---	100 Base

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

SUMMARY DATA

(COMMON MODE CONDUCTED EMISSION MEASUREMENT)

(LAN Port)

Model Number: ACP-2000P3-30R

Location: Site # 3

Tested by: Michael Chen

Test Mode: Mode 2

Test Results: Passed

Temperature: 22°C

Humidity: 68%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
0.870	60.30	---	87.00	74.00	-26.70	---	10 Base
1.130	61.10	---	87.00	74.00	-25.90	---	10 Base
2.380	66.40	---	87.00	74.00	-20.60	---	10 Base
5.000	65.60	---	87.00	74.00	-21.40	---	10 Base
10.000	71.30	---	87.00	74.00	-15.70	---	10 Base
14.930	69.70	---	87.00	74.00	-17.30	---	10 Base
0.855	60.40	---	87.00	74.00	-26.60	---	100 Base
1.050	61.50	---	87.00	74.00	-25.50	---	100 Base
2.440	64.50	---	87.00	74.00	-22.50	---	100 Base
10.060	65.20	---	87.00	74.00	-21.80	---	100 Base
16.230	67.10	---	87.00	74.00	-19.90	---	100 Base
19.710	66.40	---	87.00	74.00	-20.60	---	100 Base

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



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-30Z

Location: Site # 3

Tested by: Michael Chen

Polar: Vertical--10m

Test Mode: Mode 4

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 22°C

Humidity: 67%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)
125.01	19.9	14.4	34.3	40.0	-5.7
140.03	22.3	14.1	36.4	40.0	-3.6
175.94	20.1	12.4	32.5	40.0	-7.5
200.03	23.2	12.7	35.9	40.0	-4.1
569.98	17.6	24.8	42.4	47.0	-4.6
759.78	15.4	25.6	41.0	47.0	-6.0



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-30Z

Location: Site # 3

Tested by: Michael Chen

Polar: Horizontal--10m

Test Mode: Mode 4

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 22°C

Humidity: 67%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)
124.96	15.5	14.4	29.9	40.0	-10.1
140.57	21.3	14.1	35.4	40.0	-4.6
199.96	20.4	12.7	33.1	40.0	-6.9
229.05	16.2	13.4	29.6	40.0	-10.4
569.97	16.4	24.8	41.2	47.0	-5.8
759.98	12.0	25.6	37.6	47.0	-9.4



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-30R

Location: Site # 3

Tested by: Michael Chen

Polar: Vertical--10m

Test Mode: Mode 5

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 21°C

Humidity: 65%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)
124.94	17.3	14.4	31.7	40.0	-8.3
140.45	22.0	14.1	36.1	40.0	-3.9
203.96	22.3	12.7	35.0	40.0	-5.0
229.02	17.0	13.4	30.4	40.0	-9.6
730.91	11.8	25.5	37.3	47.0	-9.7
772.91	15.3	25.4	40.7	47.0	-6.3



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-30R

Location: Site # 3

Tested by: Michael Chen

Polar: Horizontal--10m

Test Mode: Mode 5

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 21°C

Humidity: 65%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)
125.11	16.1	14.4	30.5	40.0	-9.5
140.09	19.8	14.1	33.9	40.0	-6.1
203.64	15.4	12.7	28.1	40.0	-11.9
229.09	15.2	13.4	28.6	40.0	-11.4
501.02	16.6	23.1	39.7	47.0	-7.3
772.92	11.6	25.4	37.0	47.0	-10.0



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-31D

Location: Site # 3

Tested by: Michael Chen

Polar: Vertical--10m

Test Mode: Mode 6

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 22°C

Humidity: 67%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)
140.05	22.7	14.1	36.8	40.0	-3.2
160.06	20.3	13.5	33.8	40.0	-6.2
199.94	23.0	12.7	35.7	40.0	-4.3
213.95	24.1	12.8	36.9	40.0	-3.1
569.94	16.7	24.8	41.5	47.0	-5.5
759.64	14.9	25.6	40.5	47.0	-6.5



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ACP-2000P3-31D

Location: Site # 3

Tested by: Michael Chen

Polar: Horizontal--10m

Test Mode: Mode 6

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 22°C

Humidity: 67%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)
125.00	15.1	14.4	29.5	40.0	-10.5
140.57	22.5	14.1	36.6	40.0	-3.4
200.09	20.1	12.7	32.8	40.0	-7.2
229.09	16.9	13.4	30.3	40.0	-9.7
569.93	15.7	24.8	40.5	47.0	-6.5
759.93	12.2	25.6	37.8	47.0	-9.2

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

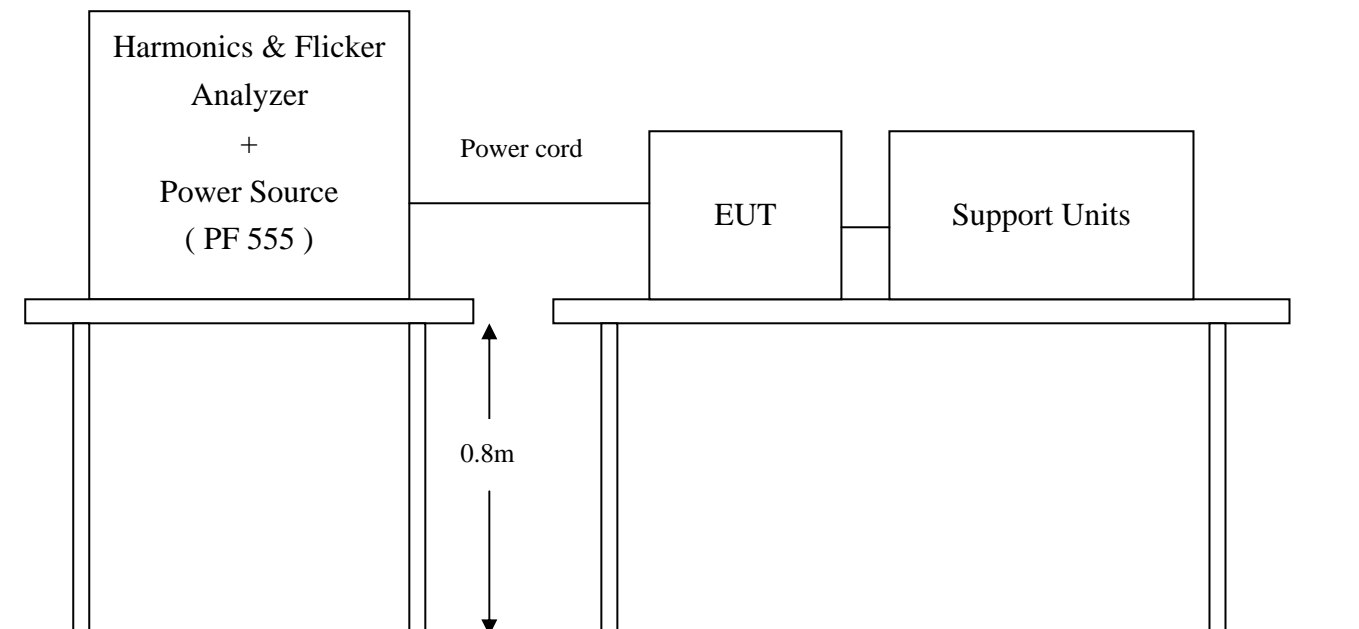
POWER HARMONICS MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998)
Limits : ☐ CLASS A ; ☒ CLASS D
Tester : George Liao; Michael Chen
Temperature : 22°C; 22°C
Humidity : 64%; 54%
Test Mode : Mode 4; Mode 5

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-3 (1995)
Limits : §5 of EN 61000-3-3
Tester : George Liao; Michael Chen
Temperature : 22°C; 22°C
Humidity : 64%; 54%
Test Mode : Mode 4; Mode 5

Block Diagram of Test Setup:



Result:

Please see the attached test data.



Test Mode: Mode 4. (With Delta Power Supply)

EN 61000-3-2 TEST REPORT 2002/2/27 01:19 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30Z

Remarks: (Temp:22°C hum:64%)

Operator: George Liao

TEST SETUP

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

Prog. Zo Enabled:	YES	Prog. Zo:	0.000
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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: 129.8W



TEST DATA

Result: PASS

Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.598	NaN	NaN	PASS
2	0.003	NaN	NaN	PASS
3	0.081	0.443	0.443	PASS
4	0.001	NaN	NaN	PASS
5	0.034	0.205	0.205	PASS
6	0.001	NaN	NaN	PASS
7	0.010	0.111	0.111	PASS
8	0.001	NaN	NaN	PASS
9	0.012	0.065	0.065	PASS
10	0.001	NaN	NaN	PASS
11	0.007	0.046	0.046	PASS
12	0.000	NaN	NaN	PASS
13	0.010	0.039	0.039	PASS
14	0.001	NaN	NaN	PASS
15	0.016	0.029	0.029	PASS
16	0.001	NaN	NaN	PASS
17	0.007	0.025	0.025	PASS
18	0.001	NaN	NaN	PASS
19	0.009	0.026	0.026	PASS
20	0.001	NaN	NaN	PASS



21	0.010	0.024	0.024	PASS
22	0.000	NaN	NaN	PASS
23	0.008	0.022	0.022	PASS
24	0.001	NaN	NaN	PASS
25	0.011	0.017	0.017	PASS
26	0.001	NaN	NaN	PASS
27	0.008	0.019	0.019	PASS
28	0.001	NaN	NaN	PASS
29	0.006	0.014	0.014	PASS
30	0.001	NaN	NaN	PASS
31	0.003	0.013	0.013	PASS
32	0.001	NaN	NaN	PASS
33	0.001	0.015	0.015	PASS
34	0.001	NaN	NaN	PASS
35	0.005	0.014	0.014	PASS
36	0.001	NaN	NaN	PASS
37	0.006	0.014	0.014	PASS
38	0.001	NaN	NaN	PASS
39	0.006	0.013	0.013	PASS
40	0.000	NaN	NaN	PASS

END OF REPORT



EN 61000-3-3 TEST REPORT 2002/2/27 03:56 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30Z (Continue)

Remarks: (Temp:22°C hum:64%)

Operator: George Liao

=====

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	0.010	1.00	PASS	true
Plt max	0.010	0.65	PASS	true
dc %	0.003	3.00	PASS	true
dmax %	0.002	4.00	PASS	true
d(t) sec.	0.003	0.20	PASS	true
Power Source Data				
Source Pst max	0.021	0.400	PASS	true
% THD	0.030	3.000	PASS	true

END OF REPORT



EN 61000-3-3 TEST REPORT 2002/27 03:34 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30Z (Manual Switch)

Remarks: (Temp:22°C hum:64%)

Operator: George Liao

=====

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	0.018	1.00	PASS	true
Plt max	0.018	0.65	PASS	true
dc %	0.009	3.00	PASS	true
dmax %	0.008	4.00	PASS	true
d(t) sec.	0.009	0.20	PASS	true

Power Source Data

Source Pst max	0.021	0.400	PASS	true
% THD	0.032	3.000	PASS	true

END OF REPORT



Test Mode: Mode 5. (With Zippy Power Supply)

EN 61000-3-2 TEST REPORT 2002/3/26 10:09 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30R

Remarks: Temp: 22°C Humid: 54%

Operator: Michael Chen

=====

TEST SETUP

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

Prog. Zo Enabled:	YES	Prog. Zo:	0.000
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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: 130.9W



TEST DATA

Result: PASS

Harmonic Current Results

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.598	NaN	NaN	PASS
2	0.003	NaN	NaN	PASS
3	0.081	0.443	0.443	PASS
4	0.002	NaN	NaN	PASS
5	0.033	0.205	0.205	PASS
6	0.001	NaN	NaN	PASS
7	0.010	0.111	0.111	PASS
8	0.001	NaN	NaN	PASS
9	0.011	0.065	0.065	PASS
10	0.001	NaN	NaN	PASS
11	0.007	0.046	0.046	PASS
12	0.000	NaN	NaN	PASS
13	0.010	0.039	0.039	PASS
14	0.001	NaN	NaN	PASS
15	0.016	0.029	0.029	PASS
16	0.001	NaN	NaN	PASS
17	0.006	0.025	0.025	PASS
18	0.001	NaN	NaN	PASS
19	0.008	0.026	0.026	PASS
20	0.001	NaN	NaN	PASS
21	0.010	0.024	0.024	PASS



22	0.000	NaN	NaN	PASS
23	0.008	0.022	0.022	PASS
24	0.001	NaN	NaN	PASS
25	0.011	0.017	0.017	PASS
26	0.001	NaN	NaN	PASS
27	0.008	0.019	0.019	PASS
28	0.001	NaN	NaN	PASS
29	0.006	0.014	0.014	PASS
30	0.001	NaN	NaN	PASS
31	0.002	0.013	0.013	PASS
32	0.001	NaN	NaN	PASS
33	0.001	0.015	0.015	PASS
34	0.001	NaN	NaN	PASS
35	0.004	0.014	0.014	PASS
36	0.001	NaN	NaN	PASS
37	0.006	0.014	0.014	PASS
38	0.001	NaN	NaN	PASS
39	0.005	0.013	0.013	PASS
40	0.000	NaN	NaN	PASS

END OF REPORT



EN 61000-3-3 TEST REPORT 2002/3/26 10:23 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30R (Continue)

Remarks: Temp: 22°C Humid: 54%

Operator: Michael Chen

=====

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 %	0.002	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



EN 61000-3-3 TEST REPORT 2002/3/26 10:38 PM

Unit: 19" Rackmount 2U Height Industrial Chassis

Model No.: ACP-2000P3-30R (Manual Switch)

Remarks: Temp: 22°C Humid: 54%

Operator: Michael Chen

=====

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	0.012	1.00	PASS	true
Plt max	0.011	0.65	PASS	true
dc %	0.008	3.00	PASS	true
dmax %	0.009	4.00	PASS	true
d(t) sec.	0.008	0.20	PASS	true

Power Source Data

Source Pst max	0.024	0.400	PASS	true
% THD	0.033	3.000	PASS	true

END OF REPORT

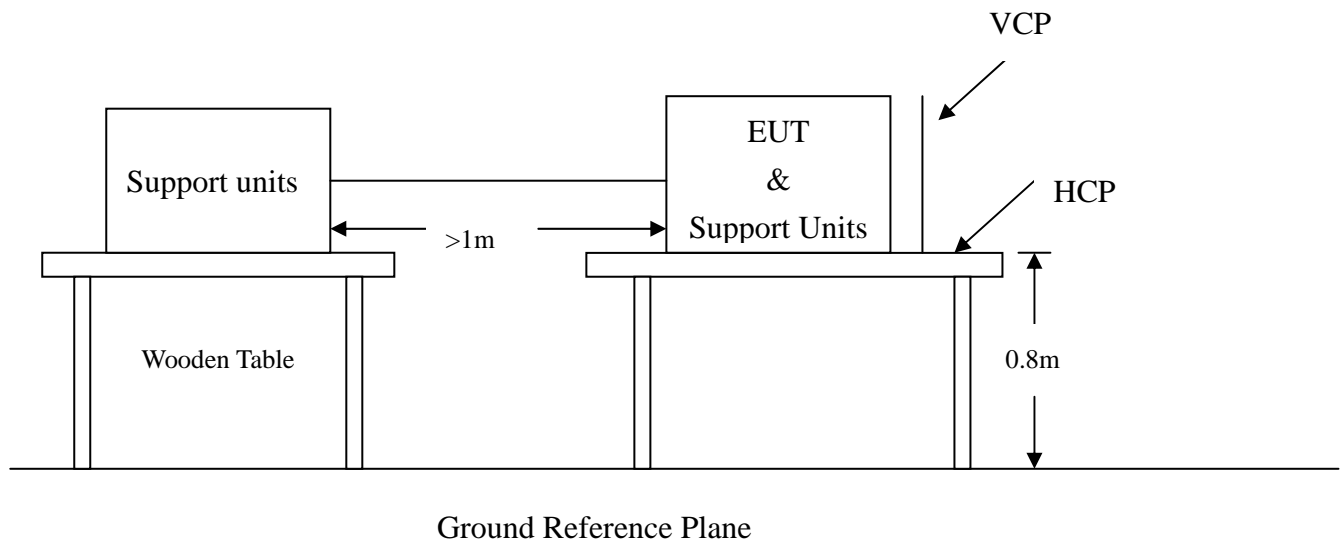
SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port : Enclosure
Basic Standard : IEC 61000-4-2
Test Level : ± 8 kV (Air Discharge)
 ± 4 kV (Contact Discharge)
 ± 4 kV (Indirect Discharge)
Performance Criteria : B (Standard require)
Tester : Michael Chen
Temperature/Humidity: 21°C/ 54%, 22°C/ 55%
Test Mode : Mode 4, 5, 6.

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 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 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 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)	N/A
Mini 25 /Point	±4kV	Indirect Discharge VCP (Back)	N/A
Mini 25 /Point	±4kV	Indirect Discharge VCP (Right)	N/A

*** 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 4



Photo 2 of 4



Photo 3 of 4



Photo 4 of 4

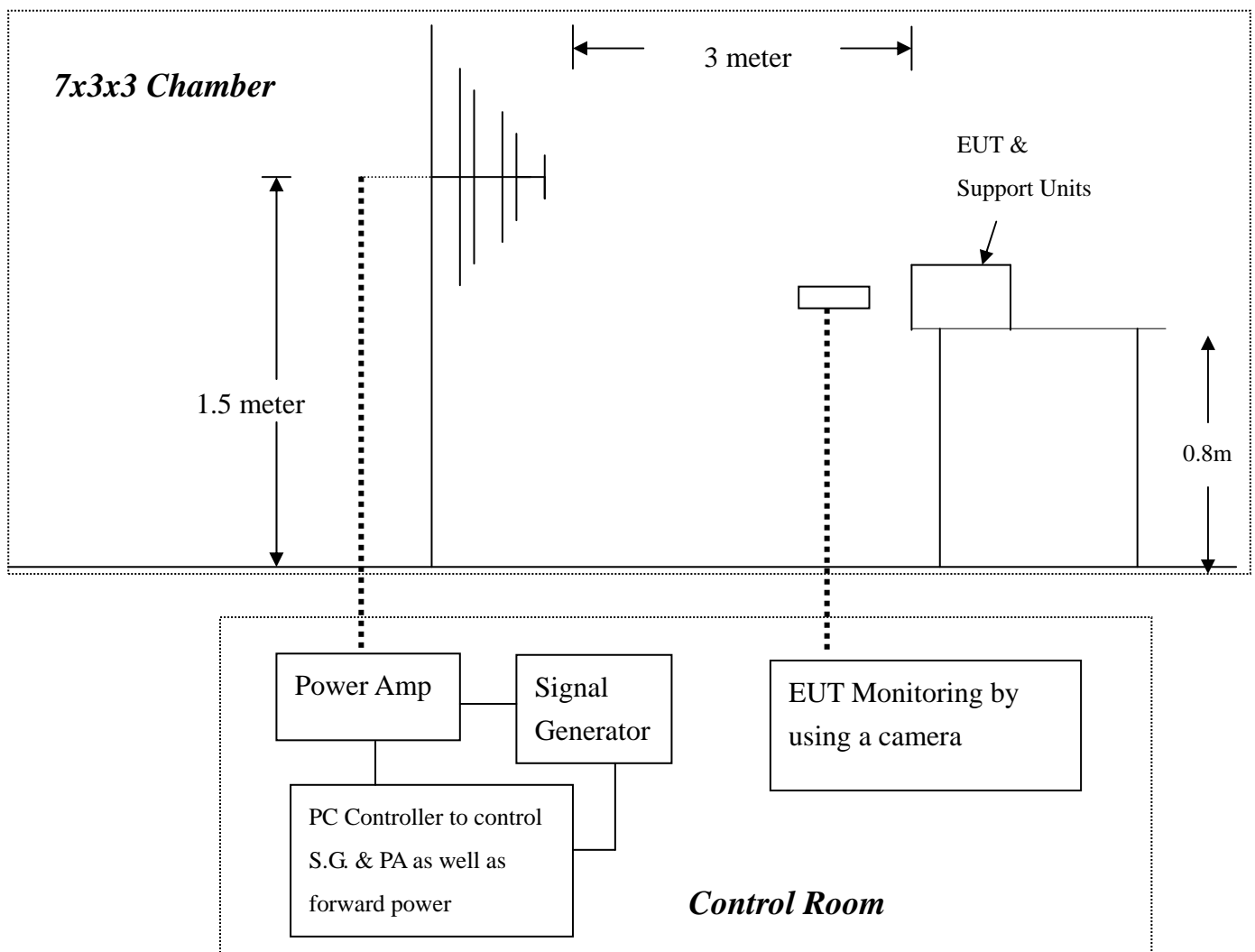


SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port : Enclosure
Basic Standard : IEC 61000-4-3
Requirements : 10 V/m / with 80% AM. 1kHz Modulation.
Performance Criteria : A (Standard require)
Tester : Michael Chen
Temperature : 23°C, 24 °C
Humidity : 55%, 61%
Test Mode : Mode 4, 5, 6.

Block Diagram of Test Setup:



Test Procedure:

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

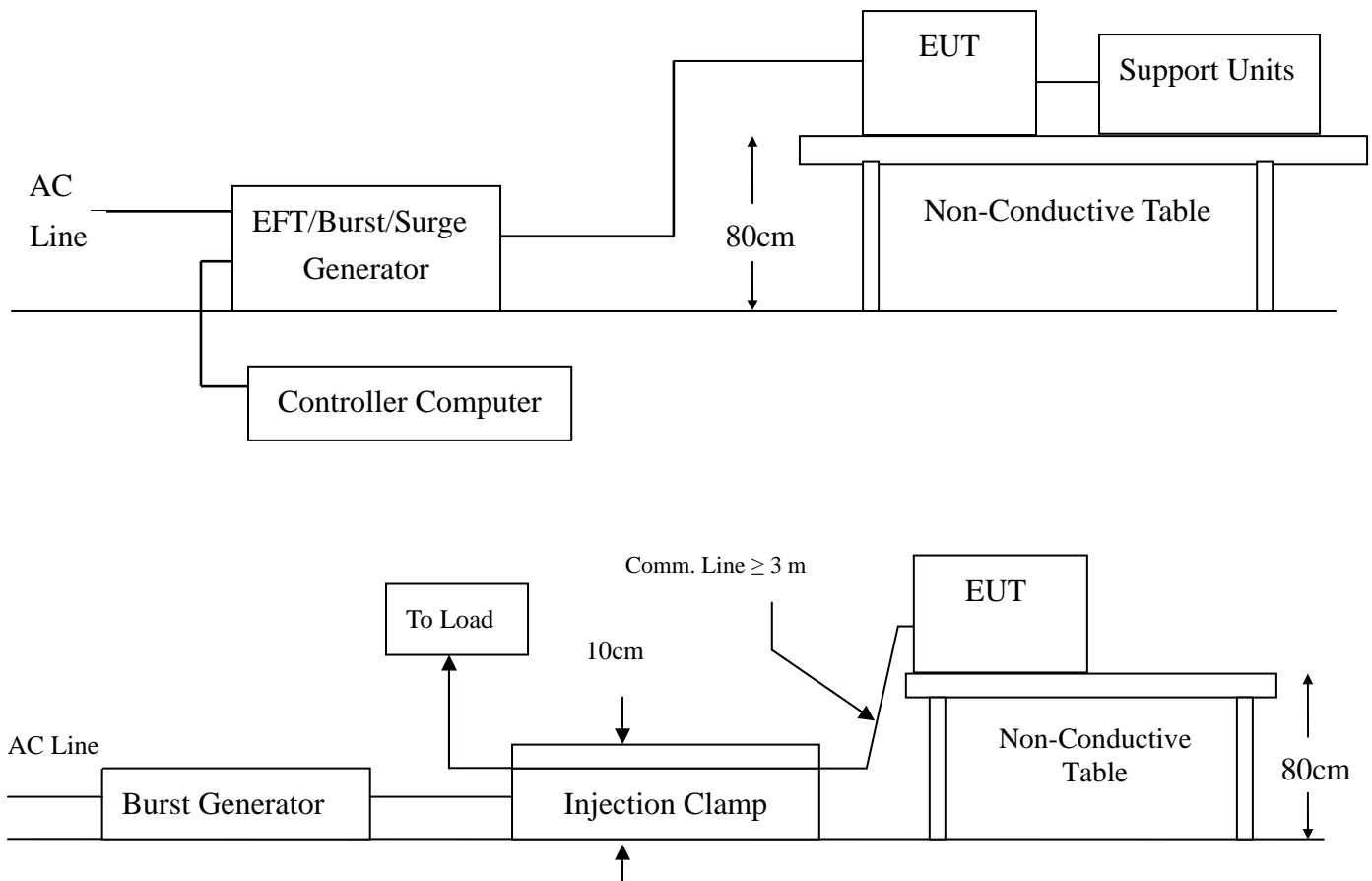
Observation: No any function degraded during the tests.

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

FAST TRANSIENTS/BURST IMMUNITY TEST

Port	: On Power Supply Lines and Data Cable
Basic Standard	: IEC 61000-4-4
Requirements	: +/- 2kV for Power Supply Lines +/- 1kV for Data Cable
Requirements For Mode 6.	+/- 1kV for Power Supply Lines +/- 0.5kV for Data Cable
Performance Criteria	: B (Standard require)
Tester	: Michael Chen
Temperature	: 20°C, 23 °C
Humidity	: 55%, 56%
Test Mode	: Mode 4, 5, 6.

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 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 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

Test Mode: Mode 4, 5.

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

Test Mode: Mode 6.

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**

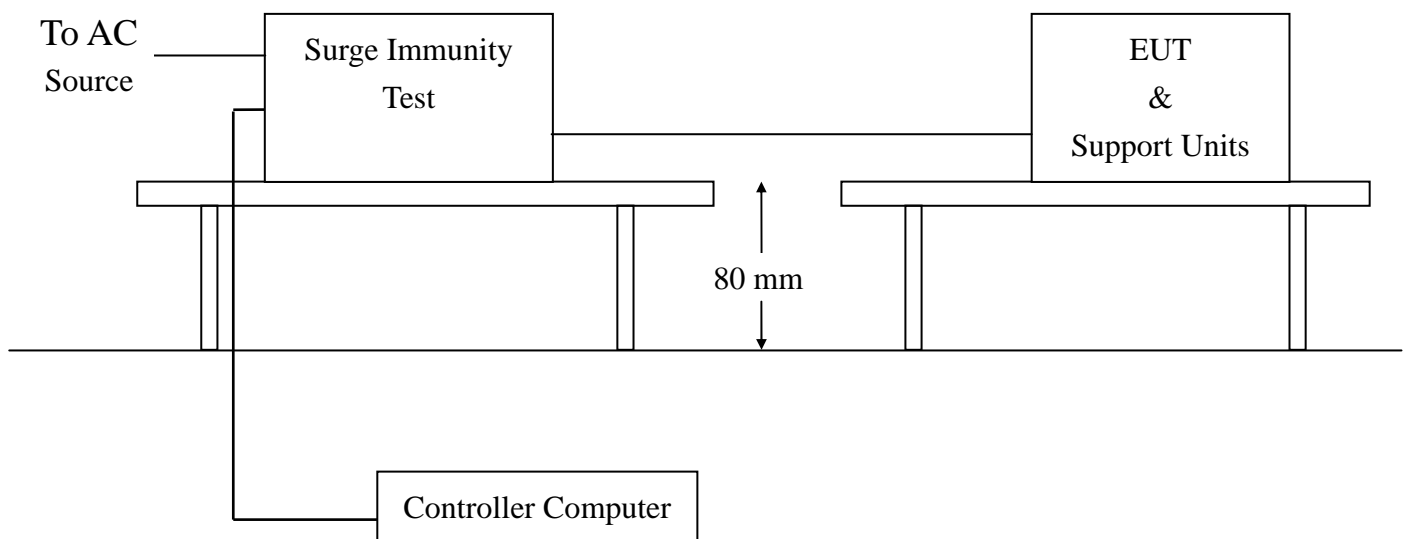
Observation: No any function degraded during the tests.

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

SURGE IMMUNITY TEST

Port : Power Cord
Basic Standard : IEC 61000-4-5
Requirements : +/- 1kV (Line to Line)
: +/- 2kV (Line to Ground)
Performance Criteria : B (Standard require)
Tester : Michael Chen
Temperature : 20°C, 24°C
Humidity : 54%, 55%
Test Mode : Mode 4, 5.

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

Test conditions:

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

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

Performance & Result:

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

☒ **PASS**

☐ **FAILED**

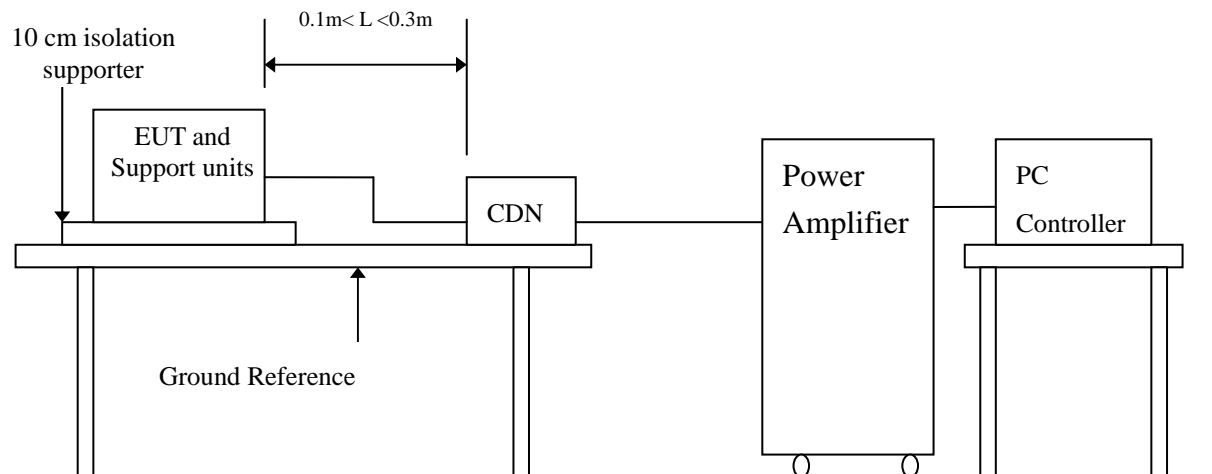
Observation: No any function degraded during the tests.

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

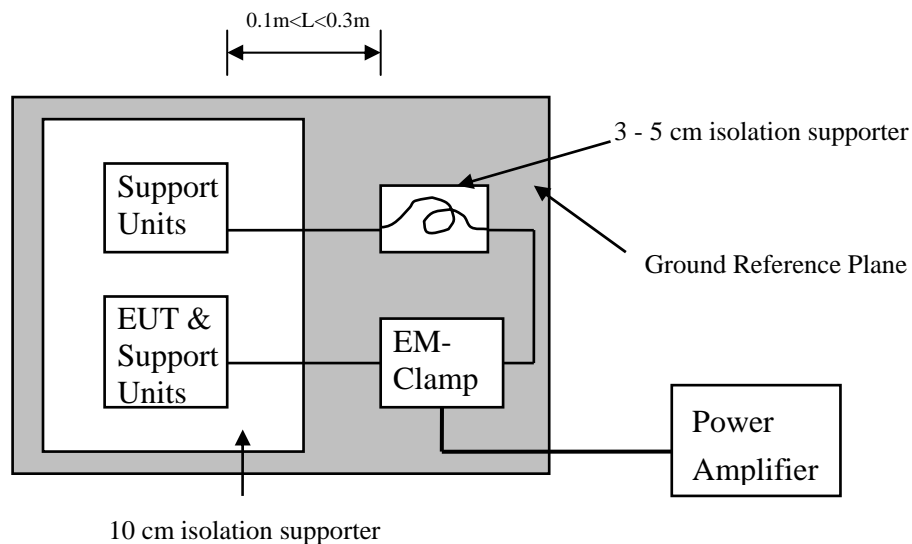
Port : AC Port and LAN Cable
Basic Standard : IEC 61000-4-6
Requirements : 10V with modulated
Injection Method : CDN-M3 for Power Cord
EM-Clamp for LAN Cable
Performance Criteria : A (Standard require)
Tester : Michael Chen
Temperature : 22°C, 24°C
Humidity : 56%, 61%
Test Mode : Mode 4, 5, 6.

Block Diagram of Test Setup:

Side View:



Top View:



Test Procedure:

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

Test conditions:

Frequency Range : 0.15MHz-80MHz
Frequency Step : 1% of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	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**

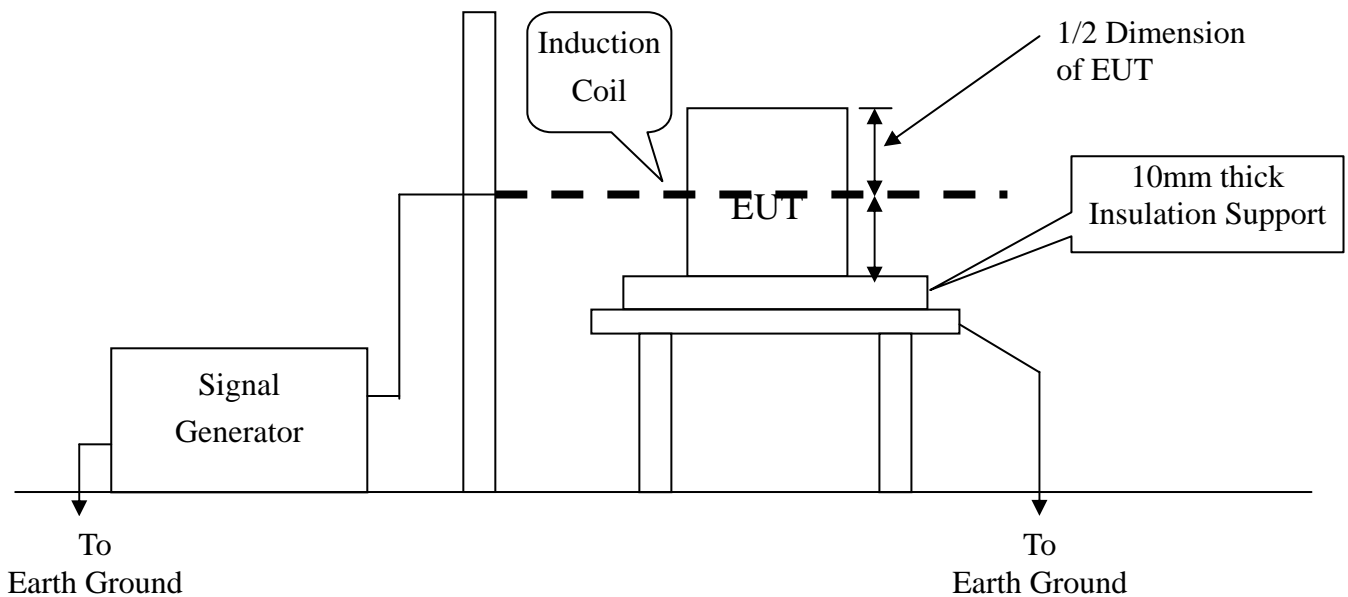
☐ **FAILED**

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 : Michael Chen
Temperature / Humidity : 21°C, 22 °C / 55%, 57%
Test Mode : Mode 4, 5, 6.

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 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

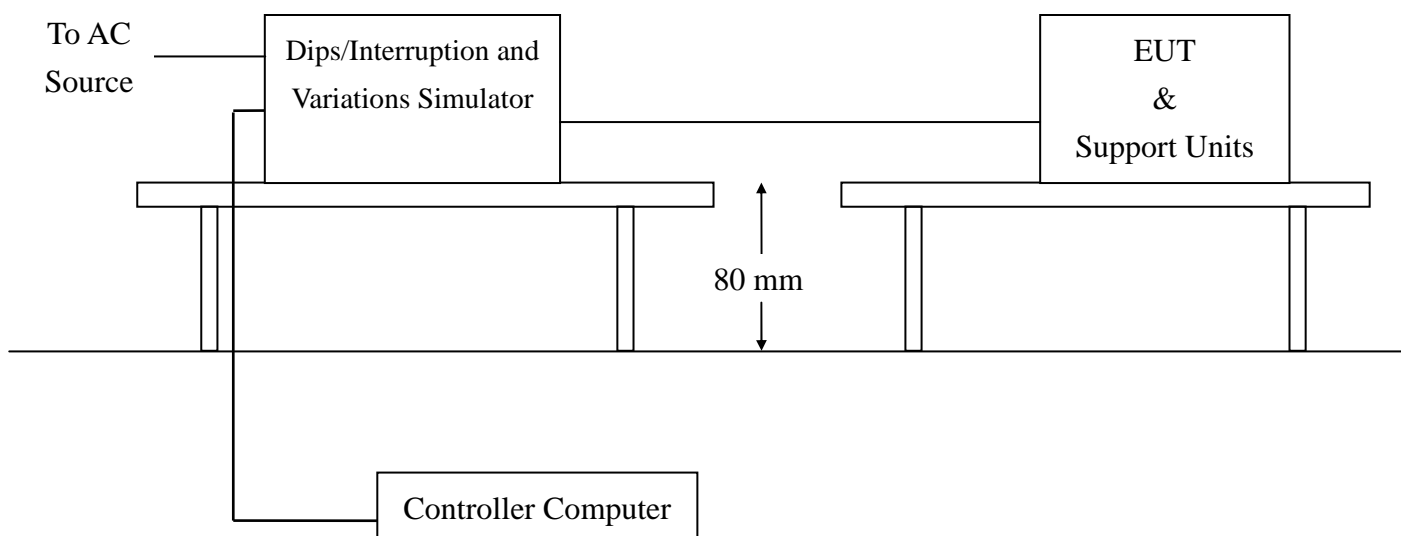
Voltage Dips (EN55024)	Test Level % U _T	Reduction (%)	Duration (Periods)	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Dips (EN61000-6-2)	Test Level % U _T	Reduction (%)	Duration (Periods)	Performance Criteria
	70	30	0.5 (10ms)	B
	40	60	5 (100ms) and 50 (1000ms)	C

Voltage Interceptions (EN55024) (EN61000-6-2)	Test Level % U _T	Reduction (%)	Duration (Periods)	Performance Criteria
	<5	>95	250 (5000ms)	C

Test Interval : Min. 10 sec.
Tester : Michael Chen
Temperature : 24°C, 22°C
Humidity : 56%, 57%
Test Mode : Mode 4, 5.

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 EUT filling the screens with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Setting the parameter of tests and then Perform the test software of test simulator.
6. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
7. Repeating step 3 to 4 through the test.
8. Recording the test result in test record form.

Test conditions:

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

Voltage Dips:

Test Level % U _T	Reduction (%)	Duration (Periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A
70	30	0.5 (10ms)	Normal	A
40	60	5 (100ms)	Normal	A
40	60	50 (1000ms)	Normal	A

Voltage Interruptions:

Test Level % U _T	Reduction (%)	Duration (Periods)	Observation	Meet Performance Criteria
0	100	250 (5000ms)	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 (EN 55022)

Front View (With AC Power Supply)



Back View (With AC Power Supply)



COMMON MODE CONDUCTED EMISSION TEST

(With AC Power Supply)



(With DC Power Supply)

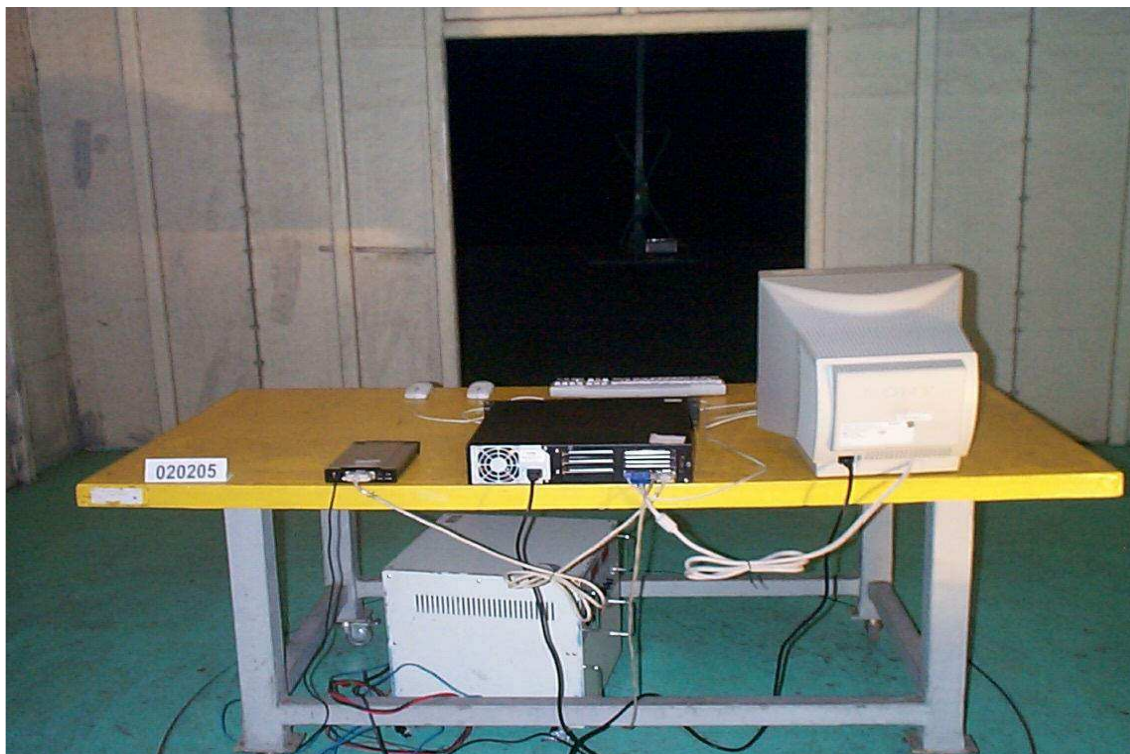


RADIATED EMISSION TEST (EN 55022)

Front View(With AC Power Supply)



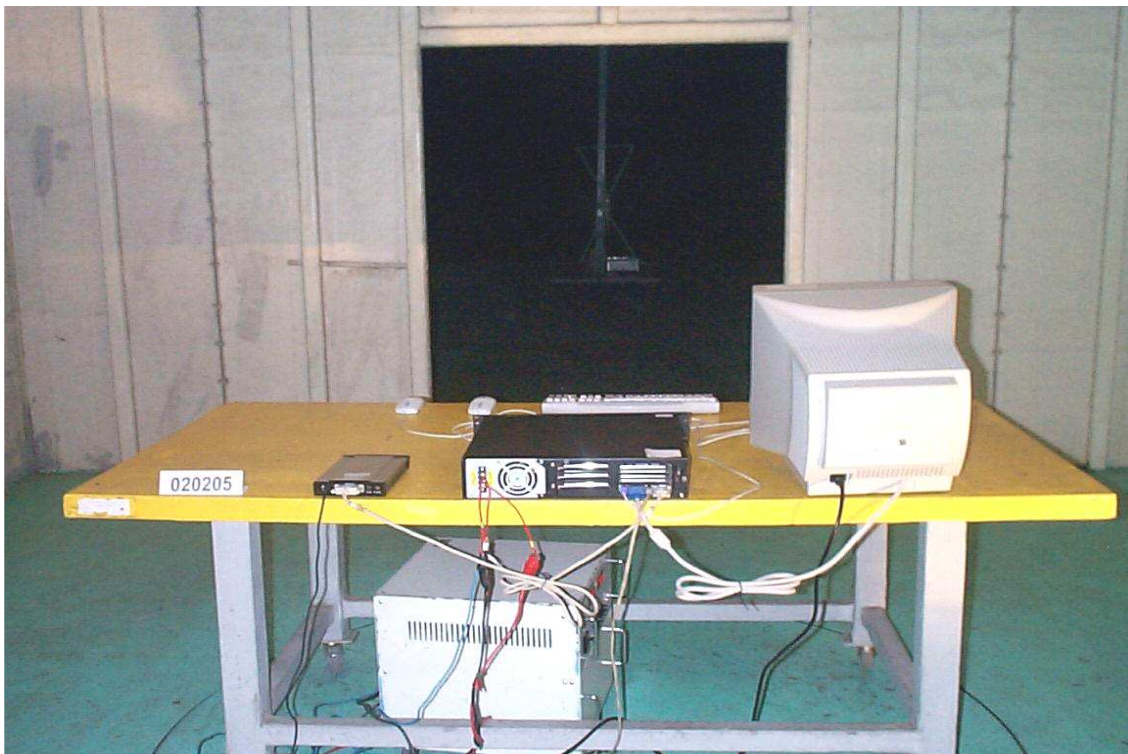
Back View(With AC Power Supply)



Front View (With DC Power Supply)



Back View (With DC Power Supply)



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

(With AC Power Supply)



ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2) (With AC Power Supply)



(With DC Power Supply)

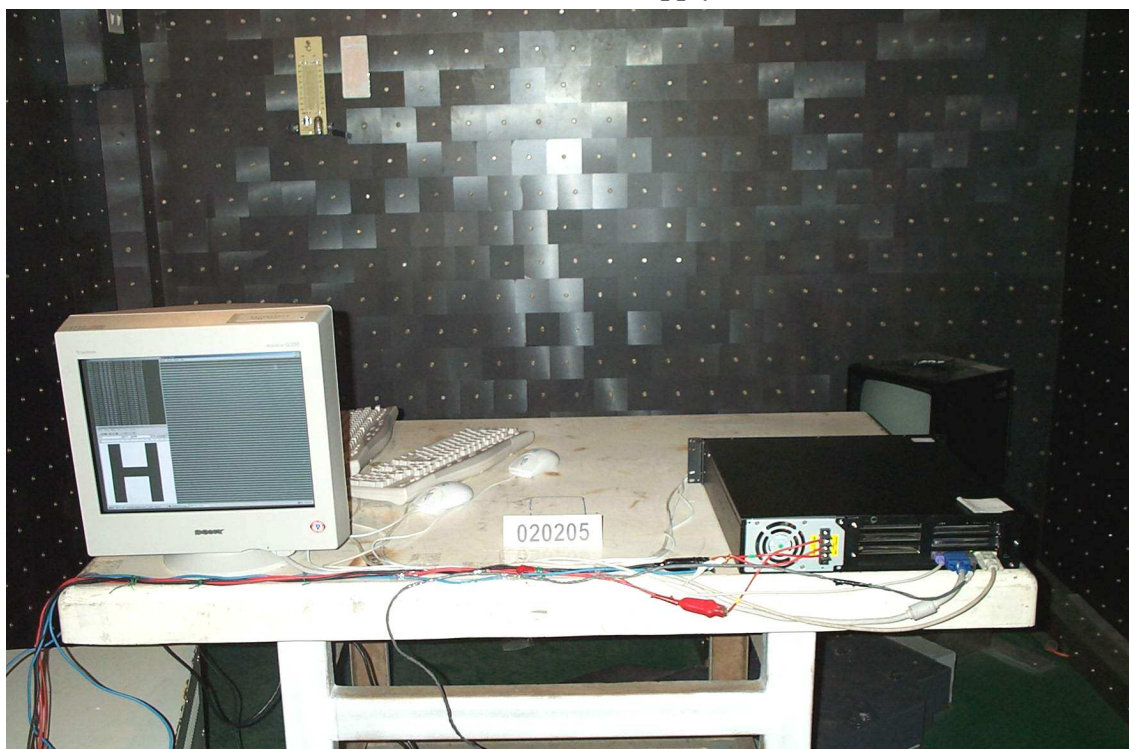


RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3)

(With AC Power Supply)



(With DC Power Supply)



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

(With AC Power Supply)



(With DC Power Supply)



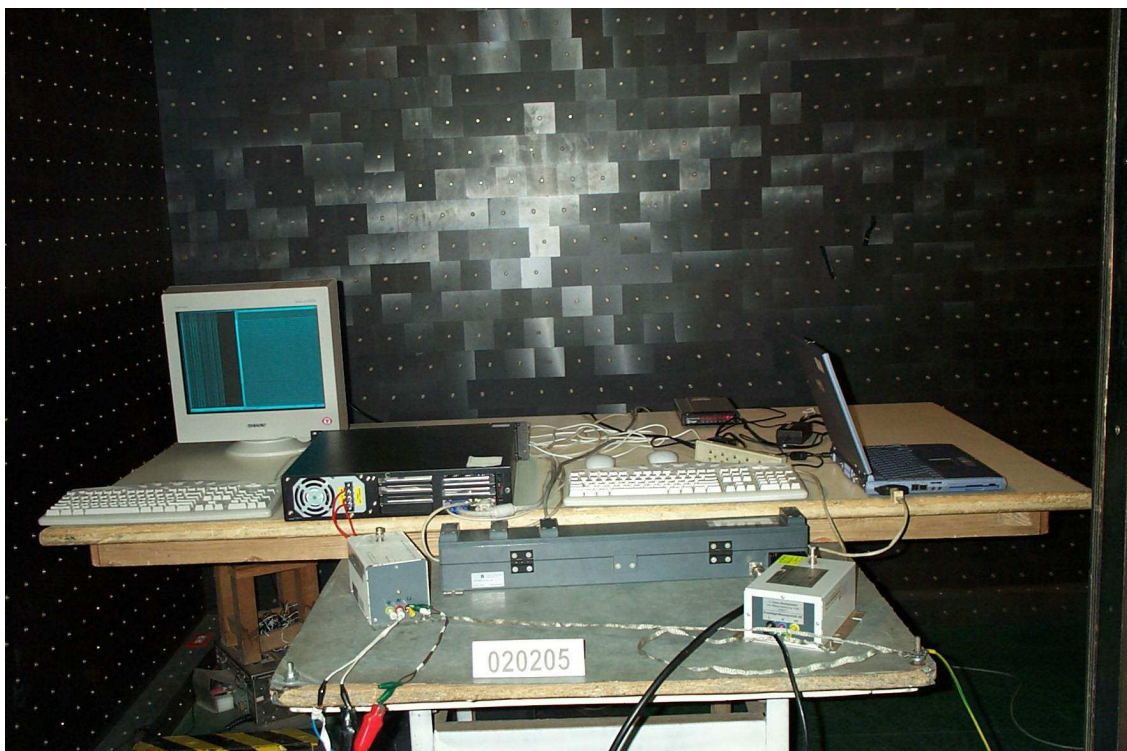
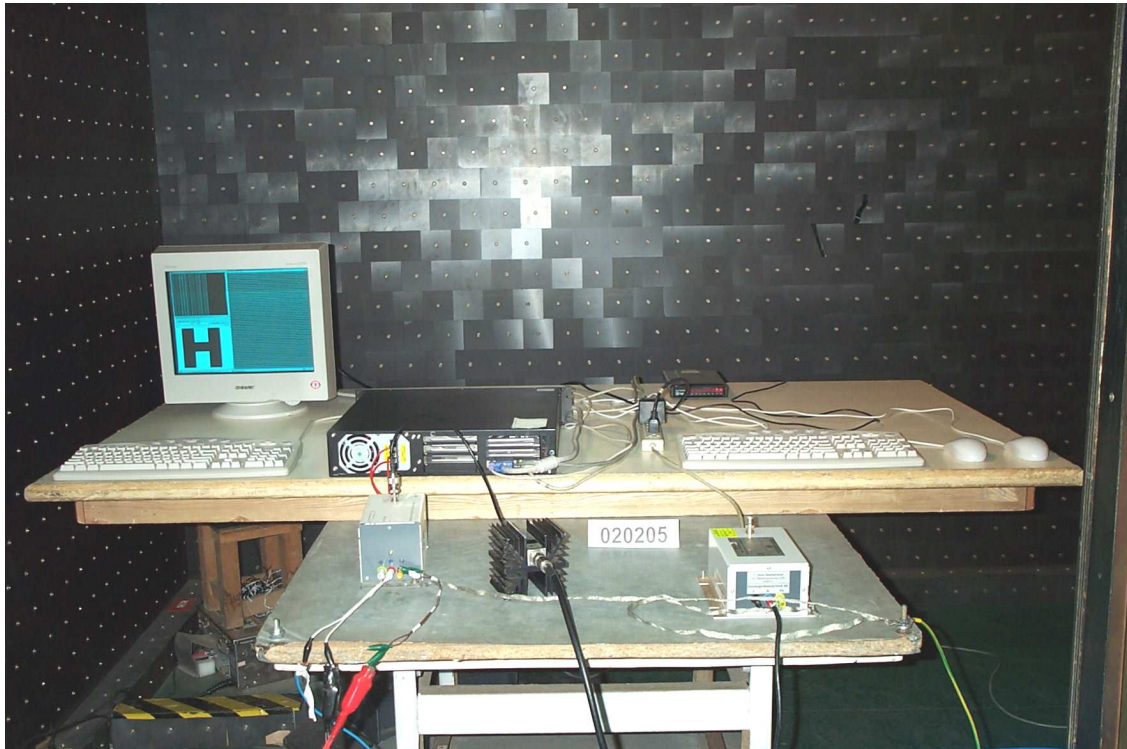
SURGE IMMUNITY TEST (IEC 61000-4-5) *(With AC Power Supply)*



CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (IEC 61000-4-6) (With AC Power Supply)



(With DC Power Supply)



POWER FREQUENCY MAGNETIC FIELD IMMUNITY
TEST (IEC 61000-4-8)
(With AC Power Supply)



(With DC Power Supply)



VOLTAGE DIPS / INTERRUPTION TEST (IEC 61000-4-11) (With AC Power Supply)





APPENDIX 2

PHOTOGRAPHS OF EUT

Front view of EUT (IPC)



Back view of EUT (IPC)



Right view of EUT



Left view of EUT



Open view of EUT (IPC)



Front view of Power Supply (Delta: DPS-300GB-1B)



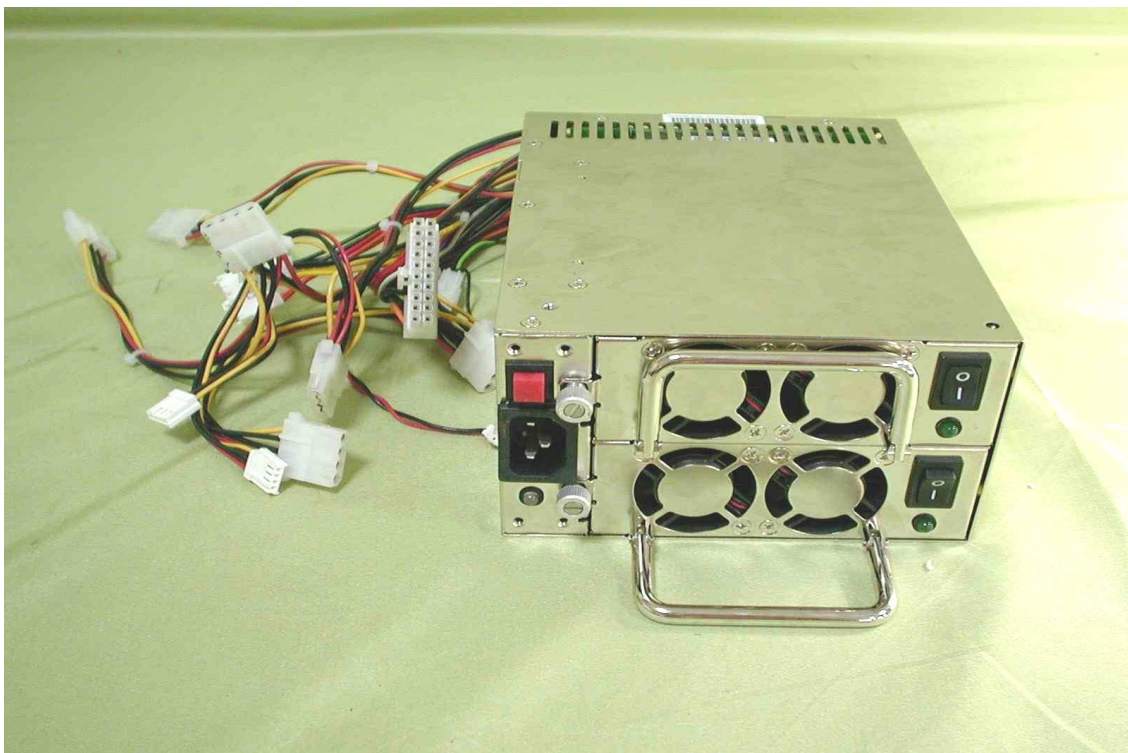
Back View of Power Supply (Delta: DPS-300GB-1B)



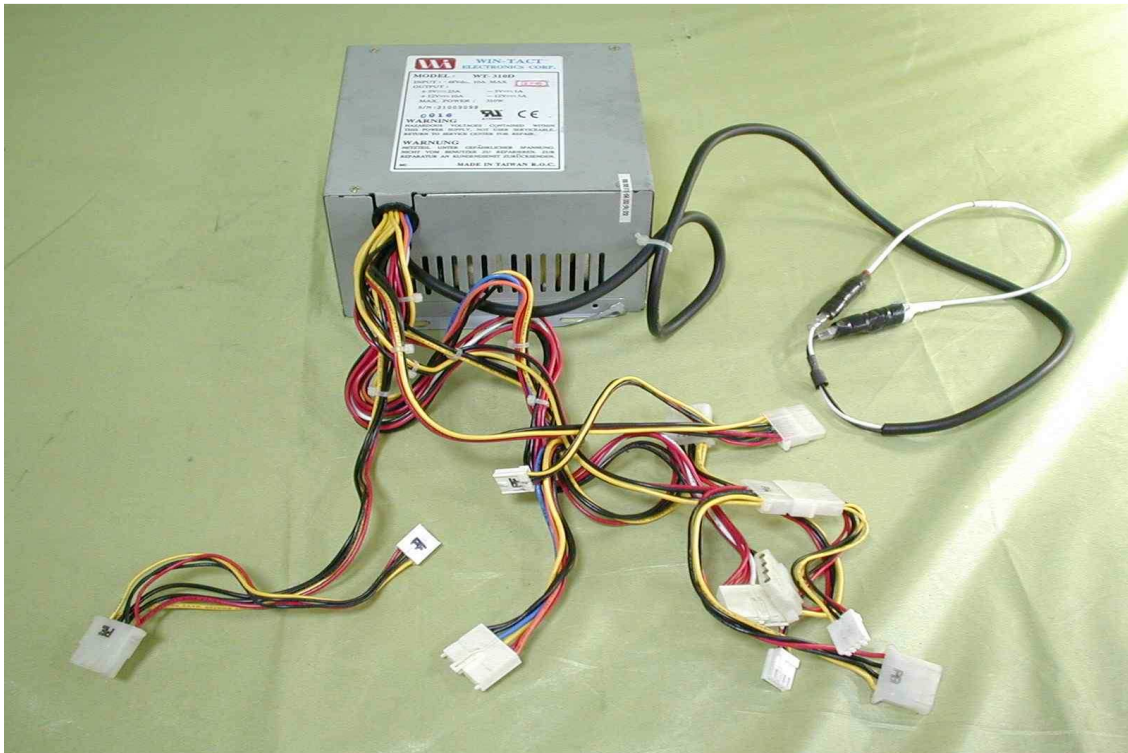
Front view of Power Supply (ZIPPY: MRT-6300P)



Back View of Power Supply (ZIPPY: MRT-6300P)



Front view of Power Supply (WIN-TACT: WT-310D)



Back View of Power Supply (WIN-TACT: WT-310D)

