

FCC CLASS A COMPLIANCE REPORT

for

Electromagnetic Emissions

of

4 Channel Analog Output Module

Trade Name	:	Advantech
Model Number	:	ADAM-4024
Serial Number	:	N/A
Report Number	:	021276-F
Date	:	November 25, 2002

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)8642-1150

FAX: (02)8642-2256

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

TABLE OF CONTENTS

DESCRIPTION	PAGE
VERIFICATION OF COMPLIANCE	3
SYSTEM DESCRIPTION	4
PRODUCT INFORMATION	5
SUPPORT EQUIPMENT	6
MEASUREMENT PROCEDURE & LIMIT (LINE CONDUCTED EMISSION TEST)	7
MEASUREMENT PROCEDURE & LIMIT (RADIATED EMISSION TEST)	9
SUMMARY DATA	12
TEST FACILITY	15
TEST EQUIPMENT	24
BLOCK DIAGRAM OF TEST SETUP	25
APPENDIX 1 PHOTOGRAPHS (TEST SETUP OF LINE CONDUCTED EMISSION TEST)	26
APPENDIX 2 PHOTOGRAPHS (TEST SETUP OF RADIATED EMISSION TEST)	28
APPENDIX 3 PHOTOGRAPHS OF EUT	30
APPENDIX 4 LABELING REQUIREMENTS	34



VERIFICATION OF COMPLIANCE

Equipment Under Test: 4 Channel Analog Output Module
Trade Name: Advantech
Model Number: ADAM-4024
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: FCC Class A
Measurement Procedure: ANSI C63.4: 1992
File Number: 021276-F
Date of test: November 20 ~ 22, 2002

Deviation: According applicant declaration this EUT is a class A product, and to be marketed in industrial environment only.

Condition of Test Sample: Normal

Final Result: Pass

Worst data: See below

Test Item	Freq.(MHz)	Measured data	Margin (Mì C)	Remark
Radiated Emission	40.10	33.5 (dB/m)	-6.5dB (± 2.34 dB)	
Conducted Emission	18.026	39.3 (dB)	-33.7dB(± 1.66 dB)	
The negative sign in Margin cell means under the specific limit. This test result traceable to national or international standards				

The above equipment was tested by C&C Laboratory, Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedure according to ANSI C63.4. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Susan Su for

Lucky Chen / EMC Director

Responsible Party

Officer of the Responsible Party



SYSTEM DESCRIPTION

EUT Test Procedure:

1. EUT and Data Acquisition Modules (Customer consign) connected with PC Systems Via RS 232 Cable.
2. All D I/O port of EUT and Data Acquisition Modules be terminal by Terminal Board. (Customer consign)
3. The test program (Customer provided) was load and executed at Host PC in DOS mode to communicate with EUT via RS 232 Cable.
4. EMI test program sequentially exercised all related I/O' s and accessories of Host PC.
5. Repeat 3 to 4. Test program is self-repeating throughout the test.



PRODUCT INFORMATION

Housing Type: Plastic

EUT Power Rating: DCV from Power Adapter

AC power during Test: 120VAC/ 60Hz to Power Adapter

OSC/Clock Frequencies: 24MHz

I/O Port of EUT:

I/O PORT TYPES	Q' TY	TESTED WITH
1). D I/O Port	2	2

Note: According to customer requested, the EUT just connected with connector during all tested.



SUPPORT EQUIPMENT

N o	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	PC	EVO D300	6K1BKF83F18F	FCC DoC	Compaq	Shielded, 1.8m	Unshielded, 1.8m
2.	Monitor	CPD-G200	2715863	FCC DoC	SONY	Shielded, 1.8m with a core	Unshielded, 1.8m
3.	Printer	EPSON STYLUS C20SX	DW4E130540	N/A	EPSON	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	SK-2800C	B1C790BCPJ73JM	GYUR79SK	Compaq	Shielded, 1.8m	N/A
5.	PS/2 Mouse	M-CAA43	LZE02801285	FCC DoC	Logitech	Shielded, 1.8m	N/A
6.	RS-232 to RS-422/485 ISOLATED Converter	ADAM-4520	N/A	N/A	Advantech	RS 232 Cable: Shielded, 2.6m	N/A
7.	8 Channel Relay Output Module	ADAM-4068	N/A	N/A	Advantech	N/A	N/A
8.	Connector x 5	N/A	N/A	N/A	N/A	Unshielded, 0.2m	N/A
	Power Adapter	SNP-PA59	N/A	N/A	Skynet	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m

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

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



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 ANSI C63.4 (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 ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 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.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode was scanned during the preliminary test:

Mode:

1. Data transmit

- 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 Average 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	---	L 1

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

Calculation example:

$$\text{Margin (dB)} = \text{RAW (dBuV)} - \text{Limit (dBuV)}$$

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 ANSI C63.4 (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 ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 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.
- 5) The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode was scanned during the preliminary test:

Mode:

1. Data transmit

- 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 reference of final testing.



MEASUREMENT PROCEDURE (FINAL RAIDATED EMISSION TEST)

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

Data Sample:

Freq. (MHz)	Raw Data (dBuV/m)	Corr. Factor (dB)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
xx.xx	14.0	11.2	26.2	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/m and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading

Calculation example:

$$\text{Margin (dB)} = \text{Emiss. Level (dBuV/m)} - \text{Limits (dBuV/m)}$$

$$\text{Emission Level (dBuV/m)} = \text{Raw Data (dBuV/m)} + \text{Corr Factor (dB)}$$



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.



SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: ADAM-4024

Location: Site # 3

Tested by: Lung Tsai

Test Mode: Mode 1

Test Results: Passed

Temperature: 24°C

Humidity: 63%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
15.974	38.40	---	73.00	60.00	-34.60	---	L1
17.033	39.00	---	73.00	60.00	-34.00	---	L1
18.026	39.30	---	73.00	60.00	-33.70	---	L1
19.581	38.90	---	73.00	60.00	-34.10	---	L1
20.837	38.50	---	73.00	60.00	-34.50	---	L1
24.841	37.60	---	73.00	60.00	-35.40	---	L1
16.968	38.70	---	79.00	66.00	-40.30	---	L2
17.981	39.00	---	73.00	60.00	-34.00	---	L2
19.833	38.90	---	73.00	60.00	-34.10	---	L2
20.794	37.80	---	73.00	60.00	-35.20	---	L2
25.063	38.20	---	73.00	60.00	-34.80	---	L2
25.404	38.60	---	73.00	60.00	-34.40	---	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: ADAM-4024

Location: Site # 4

Tested by: Stan Lin

Polar: Vertical--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 23°C

Humidity: 64%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)
40.10	20.1	13.4	33.5	40.0	-6.5
58.00	24.1	8.0	32.1	40.0	-7.9
116.70	15.7	14.4	30.1	40.0	-9.9
173.50	16.8	12.6	29.4	40.0	-10.6
183.70	17.6	12.2	29.8	40.0	-10.2
202.80	14.8	12.7	27.5	40.0	-12.5



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: ADAM-4024

Location: Site # 4

Tested by: Stan Lin

Polar: Horizontal--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 23°C

Humidity: 64%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)
123.70	14.2	14.5	28.7	40.0	-11.3
142.80	13.5	14.0	27.5	40.0	-12.5
167.00	14.2	13.0	27.2	40.0	-12.8
183.70	17.6	12.2	29.8	40.0	-10.2
191.20	17.4	12.5	29.9	40.0	-10.1
201.40	18.3	12.7	31.0	40.0	-9.0



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 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 - 1998 "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.



Peter Blay
President
For the Accreditation Council
Certificate Number 0824.01
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 17025:1998

C & C LABORATORY CO., LTD.
No. 81-1, Lane 210, Pa-De 2nd Rd.,
Lu Chu Hsiang, Tainan, TAIWAN, R.O.C.
Kuan Chen Phone: 002 886 7 324 0332
Fax: 002 886 7 324 5235

ELECTRICAL (EMC)

Valid to: January 31, 2004

Certificate Number: 0824-01

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

Test Technology

Emissions
Radiated & Conducted

Test Methods

CFR 47, FCC Part 15/18 using ANSI C63.4/1992&2000;
AS/NZS 3548; VCCI V3 (2001); CNS 13418;
CNS 13439; CNS 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 61010-6-4: 2001

Sensitivity

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/Pollution

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 61000-4-8
IEC/EN 61000-4-8
IEC/EN 61000-6-11
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 Yien City, Taipei, TAIWAN, R.O.C.

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

Page 1 of 2

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

Product Immunity / Generic Immunity
ITE Product
Home Appliances
Residential, commercial and light
Industry
Industry

CISPR 24; EN 55024
CISPR 14-2; EN 55014-2
EN 30081-2/ EN 61000-6-1: 2001
EN 55082-2/ EN 61000-6-2: 2001

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

01/25/02

Peter Blay

(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

Registration Number: 93105

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

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

Registration Number: 90471

C & C Laboratory Co., Ltd.
#81, 1st Fl, No. 183, Sec. 1
Tutung 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.

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

COMMERCE
MINISTRY OF COMMERCE
Te Manatu Taahokohoko

ENG 3/8
AJD

22 January 1998

C & C Laboratory Co Ltd
1# Fl
No. 344
Fu Ching Street
Taipei
TAIWAN ROC
Attention: Mr Tony Hough

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 telecommunications regulations. Test reports from your laboratory will be accepted under the new framework. Please find enclosed a copy of the Ministry's discussion paper, DP10, outlining the proposed compliance process from 1 January 1999.

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

Yours faithfully

Andrew Dyke
Senior Technical Officer(Regulatory)

Operations and Risk Management Branch, Ministry of Commerce Building, 35 Bowen Street, Wellington, New Zealand
P.O. Box 2847, Telephone: (04) 472 0030, Fax: (04) 473 7499

COMMERCE
MINISTRY OF COMMERCE
Te Manatu Taahokohoko

ENG 3/8
AJD

22 January 1998

C & C Laboratory Co Ltd
1# Fl
No. 344
Fu Ching Street
Taipei
TAIWAN ROC
Attention: Mr Tony Hough

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 telecommunications regulations. Test reports from your laboratory will be accepted under the new framework. Please find enclosed a copy of the Ministry's discussion paper, DP10, outlining the proposed compliance process from 1 January 1999.

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

Yours faithfully

Andrew Dyke
Senior Technical Officer(Regulatory)

Operations and Risk Management Branch, Ministry of Commerce Building, 35 Bowen Street, Wellington, New Zealand
P.O. Box 2847, Telephone: (04) 472 0030, Fax: (04) 473 7499



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 ETs 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.

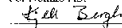
For Type Examination Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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-0413 Oslo, NORWAY

Telephone:
+47 22 96 90 30
Fax:
+47 22 96 90 30



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 EN 300 422-2:2000	ETS 300 342-1:1997 EN 301 489-07:2000 ETS 300 445:1996 + A1:97 EN 301 489-09:2000	EN 301 489-08:2000 EN 301 454-2:2000 EN 301 357-2:2000 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 60801-1:1993 IEC 801 2:1991 IEC 801 2:1984)	EN 61000-4-3:1996 + A1:98 IEC 61000-4-3:1995 + A1:98 (IEC 801 3:1984 ENV 50140:1993 + ENV 50204:1995)	EN 61000-4-4:1995 IEC 61000-4-4:1995 (IEC 801 4:1990)
EN 61000-4-5:1995 IEC 61000-4-5:1995 (ENV 50142:1994)	EN 61000-4-6:1996 IEC 61000-4-6:1996 (ENV 50141:1993)	EN 61000-4-8:1993 IEC 61000-4-8:1993
EN 61000-4-11:1994 IEC 61000-4-11:1994		

Oslo 26 April 2001

Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address:
P.O.Box 73 Blindern
N-0413 Oslo, NORWAY

Telephone:
+47 22 96 90 30
Fax:
+47 22 96 90 30



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].

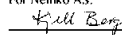
In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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-0413 Oslo, NORWAY

Telephone:
+47 22 96 90 30
Fax:
+47 22 96 90 30



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).

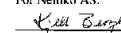
In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

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.

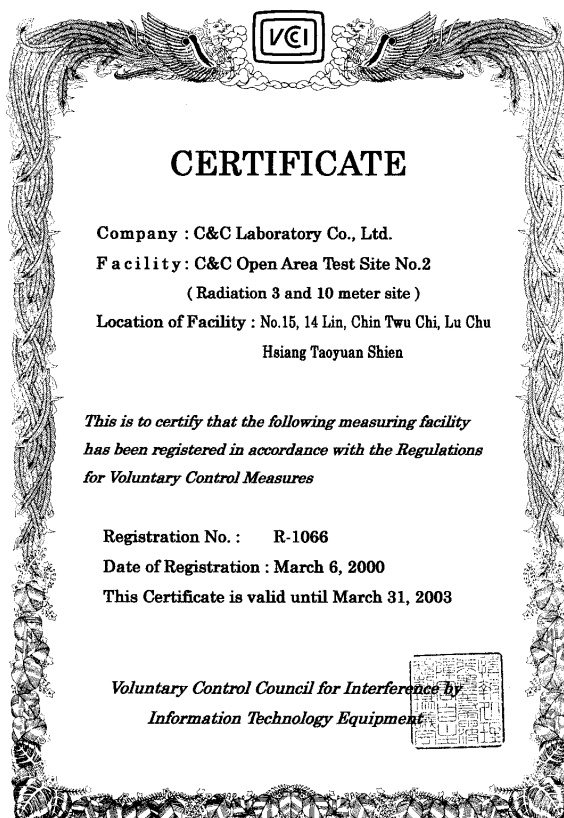
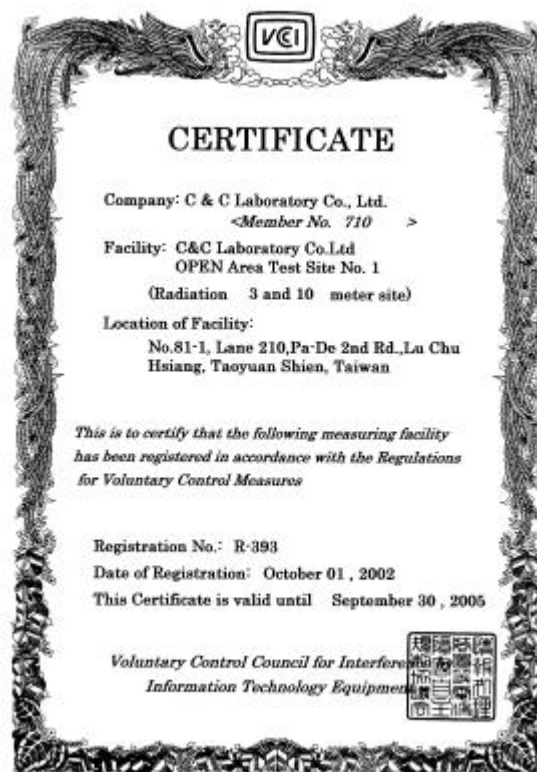
Oslo 26 April 2001

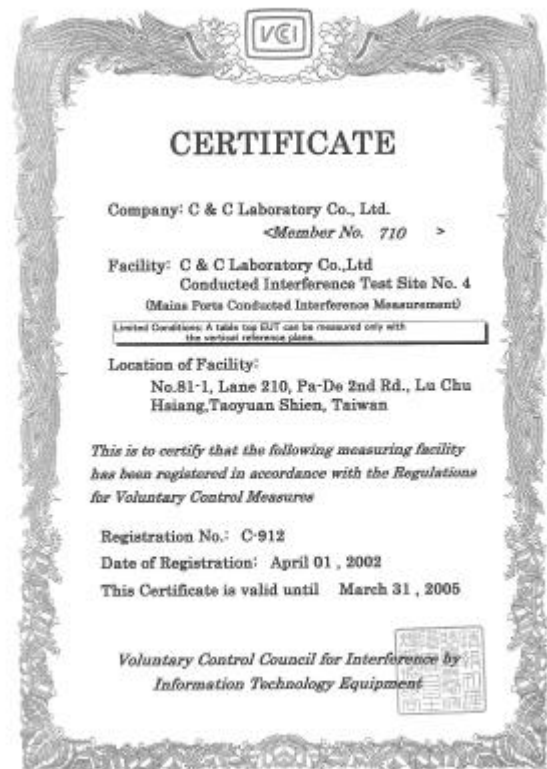
For Nemko AS:


Kjell Bergh, Nemko Group EMC Co-ordinator

Postal address:
P.O.Box 73 Blindern
N-0413 Oslo, NORWAY

Telephone:
+47 22 96 90 30
Fax:
+47 22 96 90 30







Certificate

of

Appointment

No. 19964142-9906

The applicant:

C & C Laboratory Co., Ltd.

No. 15, 14 Lin, Chin twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.

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

EN 55 011:1991, EN 55 014-1:1993/A1, EN 55 022:1994/A1, EN 55 014-2:1997,
EN 60 555-2:1987, EN 61 000-3-2:1995, EN 61 000-3-3:1995
EN 50 081-1:1992, EN 50 082-1:1992, EN 50 082-1:1997, EN 50 081-2:1993
EN 50 082-2:1995, IEC 801-2:1984, IEC 801-2:1991, IEC 801-3:1984
IEC 801-4:1988, IEC 801-5:1990, EN 61 000-4-2:1995, EN 50 140:1993, EN 50 141:1993
EN 50 204:1995, EN 61 000-4-3:1996, EN 61 000-4-4:1995, EN 61 000-4-5:1995
EN 61 000-4-6:1995, EN 61 000-4-8:1993, EN 61 000-4-11:1994

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

Audit Report No. P 9964142E01, Rev.-

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

TUV Rheinland Taiwan Ltd.
Taipei, 24. June 1999

Dipl.-Ing. A. Klinker

Dipl.-Ing. R. Charton
Auditor



中華民國經濟部標準檢驗局
BUREAU OF STANDARDS, METROLOGY AND INSPECTION
MINISTRY OF ECONOMIC AFFAIRS, REPUBLIC OF CHINA
4, SEC. 1, CHINAN ROAD, TAIPEI, TAIWAN, R. O. C.
Tel: 886-2-2301700 FAX: 886-2-2303334

To: C&C Laboratory Co., Ltd

IN REPLY REFER TO
90-3-3000015

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

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

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

It is located at: <http://www.bsmi.gov.tw>

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

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

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

The Designation is valid through January 16, 2004.

Taipei, January 5, 2000
For BSMI, MOEA

Neng-Jong Lin

CNLA-ZL98078E Page 1 of 5

Chinese National Laboratory Accreditation Certificate ROC

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

Neng-Jong Lin
Chairman of Chinese National Laboratory Accreditation Council

on May 15, 2002

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



CNLA-ZL98078E Page 2 of 5

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

Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EH0180 Low power R.F. equipment	Low power radiators/receivers Low power R. F. Equipment	DUT Low Power R/F devices/Technical Specification (2000.10) BEST EN 300 328-1 V1.3.1 (2001-08) BEST EN 300 328-2 V1.3.1 (2001-08) BEST EN 300 220-1 V1.3.1 (2000-09) BEST EN 300 220-2 V1.3.1 (2000-09) BEST EN 300 220-3 V1.3.1 (2000-09) 47 CFR Part 15 Subpart C (2000-10)	9 kHz-50 GHz		
EH0102 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)	DUT Voltage: 0-270VAC (Single Phase)50/60 Hz DUT current:0-16 A Harmonic number: 1-40 order		
EH0103 Voltage fluctuations and flicker	ITE and peripheral Products	IEC 1000-3-3 (1994) EN 61000-3-3 (1995)	DUT Voltage:0-270 VAC (Single Phase)50/60 Hz DUT Current:0-16 A Standard impedance:Ra = 0.4 Ω		



CNLA-ZL98078E Page 3 of 5

Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EH0113 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 CIS 13439 (1997.5)	DUT Voltage:100-270 VAC (Single Phase)50/60 Hz DUT 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		
EH0114 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 CIS 13783-1 (1998.6)	DUT Voltage:0-270 VAC (Single Phase)50/60 Hz DUT Current:0-200 A Conduction Emission: 9 kHz-30 MHz Disturbance Power: 30-300 MHz		
EH0115 Fluorescent lamps and luminaires	Fluorescent lamps and luminaires	CISPR 15 (1992) EN 55015 (1998) CIS 14115 (1998)	DUT Voltage:0-270 VAC (Single Phase) Conduction emission frequency range:9 kHz-30 MHz Magnetic interference frequency range:9 kHz-30 MHz (Magnetic loop antenna) Injection low frequency range:150-800 kHz Lamp EM interference frequency		



CNLA-ZL98078E Page 4 of 5

Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EJ0122 Systems and apparatus of the telecommunication and information technology	ITE and peripheral products	CISPR 12 (1997) EN 55012 (1998) CNS 13438 (1997) AS623 3548 (1998) PCCI (2001) 47 CFR Part 15 Subpart E (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: 0.1-25 kV(+/-) Contact discharge: 0.1-15 kV(+/-)		
EJ0203 Radiated susceptibility tests	ITE and peripheral products	IEC 801-3 (1984) IEC 1000-4-3 (1995) EN 61000-4-3 (1996) BSI 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 Burst range:0.2-4.5 kV		



CNLA-ZL98078E Page 5 of 5

Registration items	Test items	Test Methods	Ranges	Best Test capability recognized	Remarks
EJ0305 Surge/lightning 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 EC 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 (1995) 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:10V, 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	ITE and peripheral products	IEC 1000-4-11 (1994) EN 61000-4-11 (1994)	EUT Voltage:100-270 VAC (Single Phase)50/60 Hz EUT Current:0-16 A Voltage interruption: 100 % Voltage Dips:0-100 % Voltage variation: Standard variation wave shape		
(Null Below)					



TEST EQUIPMENT LIST

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

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	04/18/2002	04/17/2003
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	08/17/2002	08/16/2003
Spectrum Analyzer	ADVANTEST	R3132	91700456	02/22/2002	02/21/2003
EMI Test Receiver	R&S	ESVS10	846285/016	04/18/2002	04/17/2003

Conducted Emission Test Site: # 3

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESHS30	828144/003	08/08/2002	08/07/2003
LISN	R&S	ESH2-Z5	843285/010	12/10/2001	12/09/2002
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003

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.

BLOCK DIAGRAM OF TEST SETUP

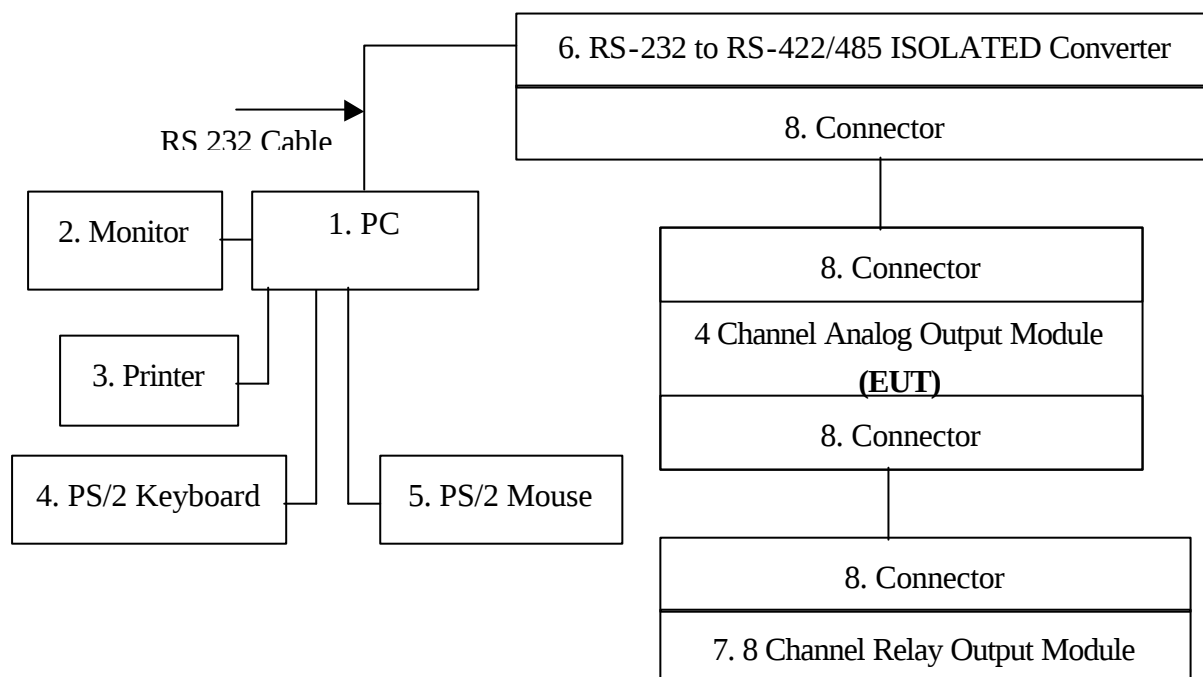
System Diagram of Connections between EUT and Simulators

EUT: 4 Channel Analog Output Module

Trade Name: Advantech

Model Number: ADAM-4024

Power Cord: Unshielded, 1.8m to Power Adapter





APPENDIX 1

PHOTOGRAPHS **(TEST SETUP OF LINE CONDUCTED EMISSION TEST)**

LINE CONDUCTED EMISSION TEST

Front View



Back View





APPDENDIX 2

PHOTOGRAPHS

(TEST SETUP OF RADIATED EMISSION TEST)

RADIATED EMISSION TEST

Front View



Back View

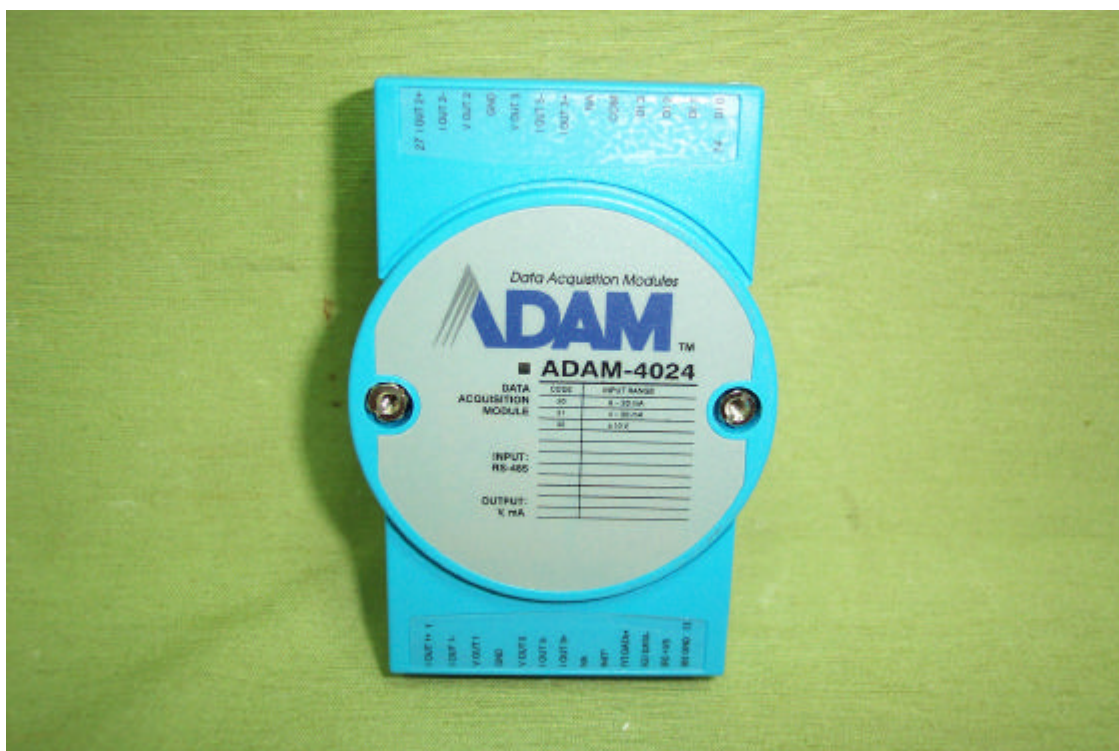




APPENDIX 3

PHOTOGRAPHS OF EUT

Front View of EUT



Left View of EUT



Right View of EUT



Top View of EUT



Bottom View of EUT





APPENDIX 4

LABELING REQUIREMENTS



§ 15.19 Labeling requirements.

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification, or verification shall be labeled as follows:

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with the part 15 of the FCC Rules for use with cable television service.

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

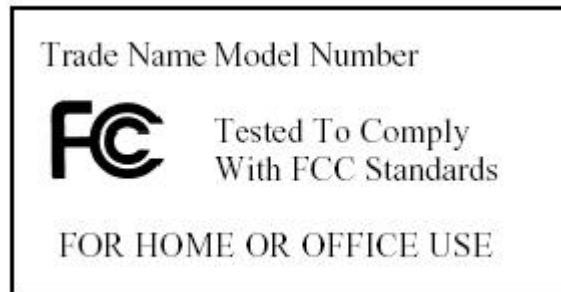
- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

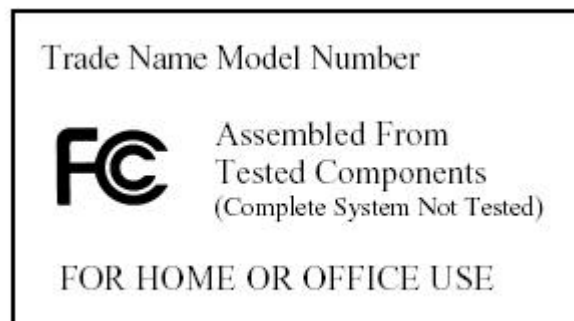
(b) Products subject to authorization under a Declaration of Conformity shall be labeled as follows:

- (1) The label shall be located in a conspicuous location on the device and shall contain the unique identification described in § 2.1074 of this chapter and the following logo:

- (i) If the product is authorized based on testing of the product or system; or



- (ii) If a personal computer is authorized based on assembly using separately authorized components, in accordance with § 15.101(c) (2) or (c)(3), and the resulting product is not separately tested:



- (2) Label text information should be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and the label. However, the type size for the text is not required to be larger than eight points.
- (3) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (b)(1) of this section on it, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instruction manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.
- (4) The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as, described in § 2.925(d) of this chapter. "Permanently affixed" means that the label is etched, engraved, stamped, silk screen, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.