FCC PART 15
TEST REPORT

Applicant : Advantech Co., Ltd.
Equipment : 250 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card
Model : PCI-1716/1716L

Contain

Exhibit A **Label**

Exhibit B **Test Report**

Exhibit C **User Manual**

Exhibit D **Block Diagram**

Exhibit E **Circuit Diagram**

Exhibit F **Photograph of EUT**

Exhibit A
LABEL

Size of Label

Long x Wide = 4.5cm x 2.0cm

This device complies with Part 15 of 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.

Model No.: PCI-1716

Position of Label

Exhibit B
Test Report

Test Report Certification

Best Laboratory

No. 336, Ba Lian Rd., Sec. 1, Hsi Chih City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2646-2899 Fax: 886-2-2646-2870

Applicant	: Advantech Co., Ltd.
Address	: Fl.4, No. 108-3, Ming-Chuan Road, Shing-Tien City, Taipei, Taiwan, R.O.C.
Equipment	: 250 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card
Model	: PCI-1716/1716L
Device's Class	: Class A Device
Measurement Standard	: FCC Part 15.109(g)
Measurement Procedure	: CISPR 22: 1997
Operating Voltage	: 230VAC, 50Hz
Test Result	: **Compliance** (Detail showed in the test report)
Sample Received	: May 28, 2001
Test Date	: June 04, 2001
Report Number	: RE-A01-FC-298
Test Firm	: No. 336, Ba Lian Rd., Sec. 1, Hsi Chih City, Taipei Hsien, Taiwan, R.O.C.

Remark:

(1) The test report is only relating to the sample tested
(2) The test report shall not be reproduced except in full, without the written approval of Best Laboratory

Prepared : Jacky Wu
JACKY WU

Approved : _____ (Title: Quality Department Manager)
JEFF CHIU

Date Issued : June 05. 2001

Contain

1. General Information

1.1 EUT Description

Applicant : Advantech Co., Ltd.

Address : Fl.4, No. 108-3, Ming-Chuan Road,
Shing-Tien City, Taipei, Taiwan, R.O.C.

Equipment : 250 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card

Model No. : PCI-1716/1716L

Device's Class : Class A Device

Operation Voltage : 230VAC, 50Hz

Output Ports :

D-Sub 68 pin Connector : connect with the " Industrial Wiring Terminal Board ", Model No.: PCLD-8710, via one data cable, model No.: PCL-10168, which is 2 meters long, shielded, no ferrite bead.

Feature:

1. 16-BIT HIGH RESOLUTION
2. 250kS/s sampling rate
3. Auto Calibration Function
4. PCI-Bus mastering for data transfer
5. 16 analog input channels with 1K FIFO
6. 16 S.E. or 8 Diff. Al, or combination
7. Unipolar/Bipolar input range
8. 2 analog output channels (PCI-1716 only)
9. 16 digital input channels
10. 16 digital output channels
11. One 10MHz 16-bit resolution counter
12. Board ID
13. Windows 95/98/NT/2000 DLL drivers

1.2 Test System Detail

PC **: HP (Brio)**
Model No. : 71xx
Serial No. : TW84400040
FCC ID : DoC Approval
BSMI : 3872H009
Power Type : 100-127/200-240VAC, 50/60Hz, 6A/3A, Switching
Power Cord : 180cm long, non-shielded, no ferrite bead.

Monitor **: Viewsonic**
Model No. : VCDT321496-1D
Serial No. : HR94500066
FCC ID : DoC Approval
BSMI : 3882A702
Power Type : 100-240VAC, 50/60Hz, 1.5A, Switching
Power Cord : 180cm long, non-shielded, no ferrite bead.
Data Cable : 120cm long, shielded, with ferrite bead
Backshell : Metal
Connected Port : VGA Port

Keyboard **: HP (Pavilion)**
Model No. : SK-2506
Serial No. : C0006002889
FCC ID : DoC Approval
BSMI : 3882A375
Power Type : By PC
Data Cable : 180cm long, shielded, no ferrite bead
Backshell : Metal
Connected Port : PS/2 Keyboard Port

Mouse **: Logitech**
Model No : M-S48a
Serial No. : N/A
FCC ID : JNZ201213
BSMI : 4882A001
Power Type : By PC
Data Cable : 120cm long, non-shielded, no ferrite bead
Backshell : Metal
Connected Port : PS/2 Mouse Port

Modem **: ACEEX**
Model No. : XDM-9624
Serial No. : 0017884
FCC ID : IFAXDM-9624
Power Type : 230VAC, 50Hz / 9VAC, 1A
Power Core : 1.9meters long, non-shielded, no ferrite bead
Data Cable : RS232, shielded, 1.2meters long, no ferrite bead
RJ11C x 2, 7' long, non-shielded, no ferrite bead
Backshell : Metal
Connected Port : Serial #1 Port

Printer **: Epson**
Model No. : P950
Serial No. : BW9Y113923
FCC ID : DoC Approval
BSMI : 3872P001
Power Type : 230VAC, 50Hz, 0.4A
Power Core : 165cm long, non-shielded, no ferrite bead
Data Cable : 120cm long, shielded, no ferrite bead
Backshell : Metal
Connected Port : Parallel Port

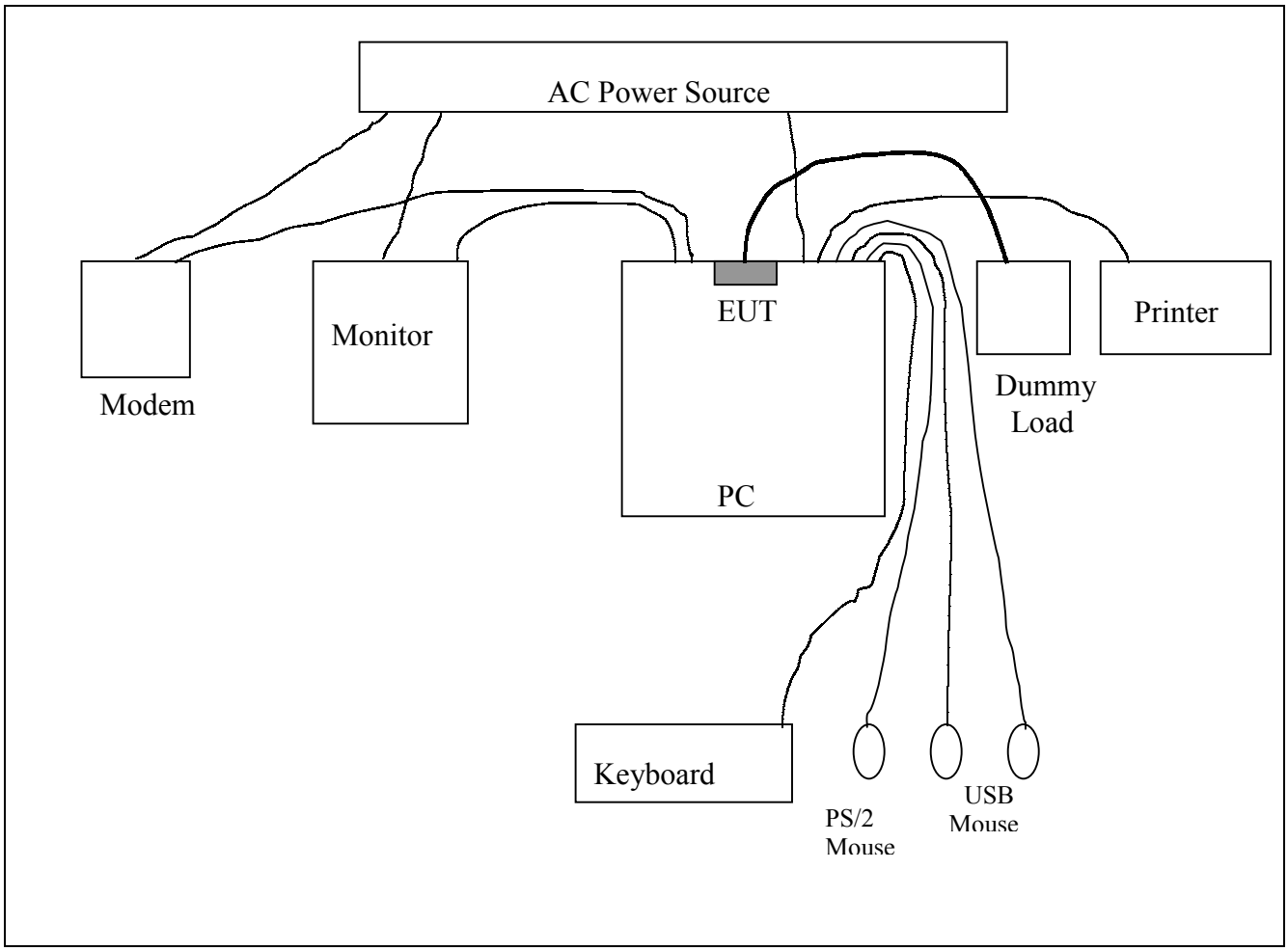
USB Mouse **: Logitech**
Model No. : M-BB48
Serial No. : LZE92250126
FCC ID : DoC Approval
BSMI : 4872A221
Power Type : By PC
Data Cable : 120cm long, shielded, no ferrite bead
Backshell : Metal
Connected Port : USB Port

1.3 EUT Configuration

(1) Plug the EUT into the PCI bus of PC and screw it up.
(2) The D-Sub 68 pin connector of EUT is connected the "Industrial Wiring Terminal Board; PCLD-8710 " via the data cable (Model No. PCL- PCL-10168).

(***PS: Please refers to the Photograph***)

Drawing of Configuration



1.4 EUT Exercise Software

The testing software is provided by the applicant.

It is designed to exercise the EUT in a manner similar to a typical use. The software will be continuous sending out the data to the "Industrial Wiring Terminal Board; PCLD-8710" from EUT; The "Industrial Wiring Terminal Board; PCLD-8710" will be continuous to feed back the data to EUT. The software will enable all functions of EUT.

1.5 Test Performed

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver which bandwidth is set at 9KHz.

Radiated emissions were invested over the frequency range from 30MHz to 1000MHz using a receiver which bandwidth is set at 120KHz. Radiated measurement was performed at distance that from an antenna to EUT is 10meters.

The testing result of pretest was shown out that the " Testing " mode is worse than the " Standby " mode. So, the final measurement was made on the " Testing " mode.

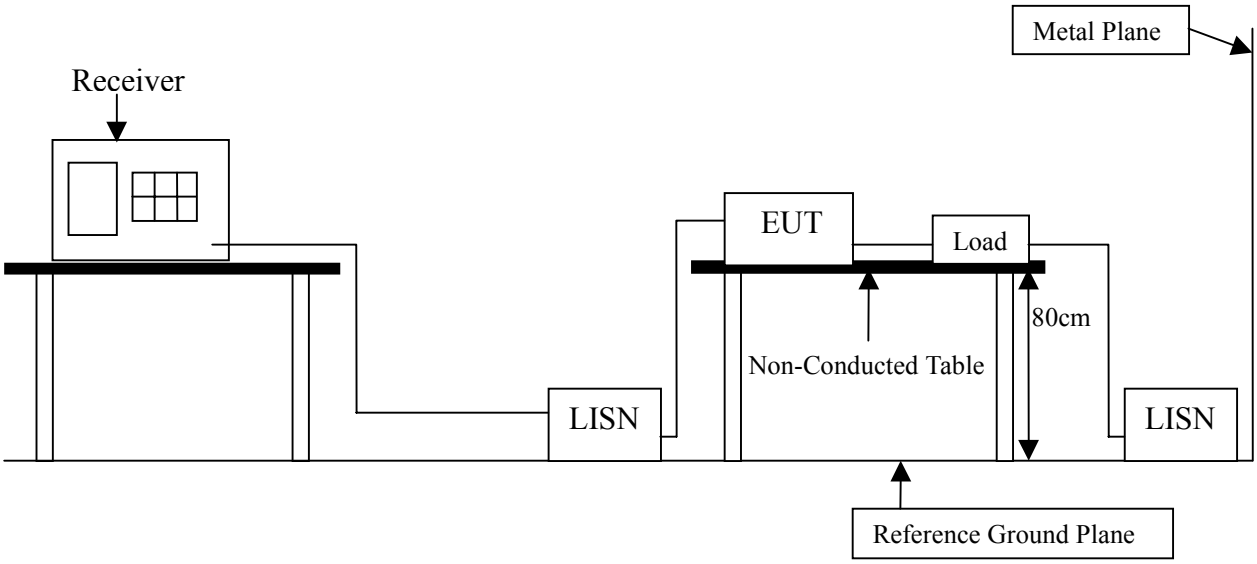
2 Conducted Emission Measurement

2.1 Test Equipment

No.	Instrument	Manufacture	Model	Serial No.	Last Calibrate
1.	LISN (EUT)	Rolf Heine	NNB-2/16Z	99084	Dec 14, 1999
2.	LISN (AXE)	Rolf Heine	NNB-2/16Z	99086	Dec 14, 1999
3.	EMI Receiver	Rohde & Schwarz	ESI 7	830154/001	Nov 22, 1999
4.	50Ω Terminator	Amphenol	46650-51	N/A	Mar 10, 2000
5.	RF Cable	Belden	M17/158	MIL-C-17	Jan 20, 2000

Remark: All equipment upon which need to calibrated are with calibration period of one year.

2.2 Test Set-Up



2.3 Limit

Frequency	Limit (dBμV)			
	Class A		Class B	
MHz	Quasi Peak	Average	Quasi Peak	Average
0.15 ~ 0.50	79	66	66 ~ 56	56 ~ 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30.0	73	60	60	50

Remark: In the above table, the tighter limit applies at the band edges.

2.4 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μH coupling impedance with 50 ohm termination. (Please refers to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to CISPR 22/1997 regulation: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter (Rohde & Schwarz) is set at 9KHz.

2.5 Test Specification

According to the CISPR 22/1997

2.6 Test Result

The emissions that come from the EUT were below the specified limits. The worst case of conducted emissions measurement are shown in the appendix A. The acceptance criterion was met and the EUT has pass the measurement.

2.7 Deviation from the Test Method

No Deviation.

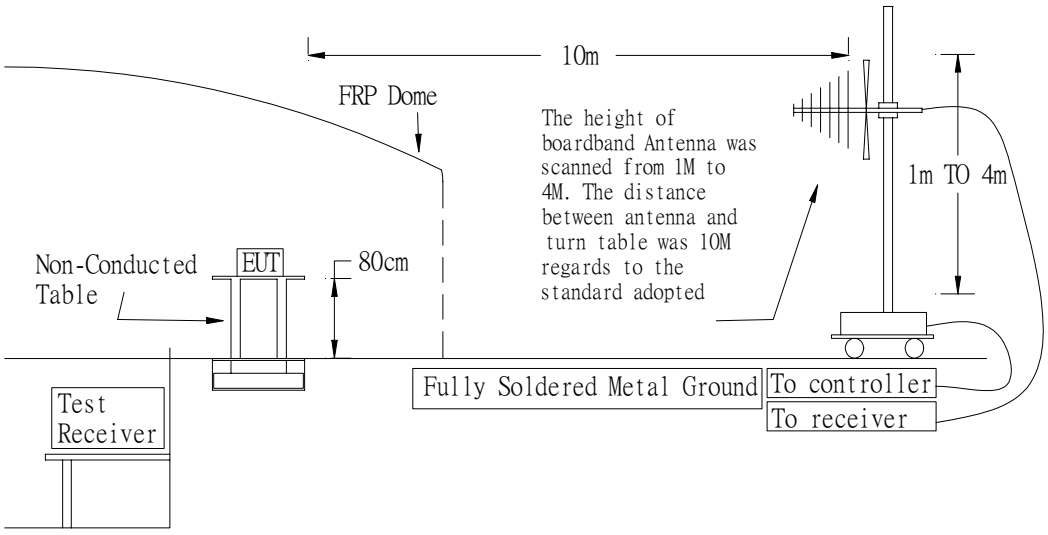
3. Radiated Emission Measurement

3.1 Test Equipment List

No.	Instrument	Manufacture	Model	Serial No.	Last Calibrate
1.	Antenna	Mess-Elektronik	VULB 9160	9160-3078	Jan 19, 2000
2.	EMI Receiver	Rohde & Schwarz	ESI 7	830154/001	Nov 22, 1999
3.	RF Cable	Adventest	AD-N-CA-01	2000-0220	Apr 01, 2000
4.	OATS	Bestlab	N/A	OATS#1	Mar 30, 2000

Remark: All equipment upon which need to calibrated are with calibration period of one year.

3.2 Test Setup



3.3 Limit

Frequency	Class A		Class B	
MHz	Distance (Meter)	Limit (dBμV)	Distance (Meter)	Limit (dBμV)
30 ~ 230	10	40	10	30
230 ~ 1000	10	47	10	37

Remark: In the above table, the tighter limit applies at the band edges

3.4 Test Procedure

The EUT and its simulators are placed on turn table, non-ducted and wooden, which is 0.8 meter above ground. The turn table rotates 360 degree to determine the position of the maximum emission level. The EUT was positioned such that distance from antenna to the EUT is 10 meters.
The antenna is moved up and down between 1 meter to 4 meter to receive the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interference cables must be manipulated according to CISPR 22/1997 regulation: the test procedure of the radiated emission measurement.

The bandwidth set on the field strength is 120KHz when the frequency range is below 1GHz

3.5 Test Specification

According to CISPR 22/1997

3.6 Test Result

The emissions that come from the EUT was below the specified limits. The worst case of conducted emissions measurement are shown in the appendix A. The acceptance criterion was met and the EUT has pass the measurement.

3.7 Deviation from the Test Method

No Deviation.

12 Modification List for EMC Complying Test

The modification is solely made by the applicant.

6 Appendix

Appendix A: Summary of Test Result

Appendix B: The test photograph of EUT

Appendix C: The Detail Photograph of EUT

Appendix A: Summary of Test Result

The test result in the emission and immunity were performed according to the requirement of measurement standard and procedures. Best Laboratory is assumed full responsibility for the accuracy and completeness of these measurements. The Test data of the emissions and immunity are listed as the appendix data.

All these tests are were carried out with the EUT in normal operation, which was defined as:

******* EMC Test Result: The EUT has been passed the all measurements. *******

The uncertainty is calculated in accordance with NAMAS NIS 81, the total uncertainty for this test is as follows:

⇒ Emission Test

- Uncertainty in the Conducted Emission Test: <±2.0dB
- Uncertainty in the Field Strength measurement: <±4.0dB

Conducted Emission Test

Date Measurement Performed: May 29, 2001
EUT : 250 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card
Temperature : 26°C
Humidity :75%RH

Line 1:

Frequency	Corrected Amplitude (dBμV)			Limit (dBμV)		Margin
(KHz)	Peak	QP	Avg.	QP	Avg.	dB
199.3000	47.79	*.**	*.**	79.00	60.00	-18.21
218.8500	44.35	*.**	*.**	79.00	60.00	-21.65
2105.0000	37.93	*.**	*.**	73.00	60.00	-22.07
5470.0000	38.95	*.**	*.**	73.00	60.00	-21.05
12536.0000	39.33	*.**	*.**	73.00	60.00	-20.67
***						

Line 2:

Frequency	Corrected Amplitude (dBμV)			Limit (dBμV)		Margin
(KHz)	Peak	QP	Avg.	QP	Avg.	dB
200.1500	49.42	*.**	*.**	79.00	66.00	-16.58
217.1500	43.45	*.**	*.**	79.00	66.00	-22.55
298.7500	35.06	*.**	*.**	79.00	66.00	-30.94
1290.0000	31.77	*.**	*.**	73.00	60.00	-28.23
2075.0000	37.34	*.**	*.**	73.00	60.00	-22.66
5375.0000	38.12	*.**	*.**	73.00	60.00	-21.88
12760.0000	41.09	*.**	*.**	73.00	60.00	-18.91
***						

*** Remark: The above corrected amplitudes are all under the average limit. ***

Field Strength Test

Date Measurement Performed: May 30, 2001
EUT : 250 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card
Polarity : Vertical
Temperature : 25°C
Humidity : 52%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
32.170	15.99	220	1.00	11.25	27.25	40.00	-12.75
48.506	19.89	191	4.00	11.99	31.88	40.00	-8.12
75.016	20.48	219	3.00	9.87	30.35	40.00	-9.65
171.094	15.17	256	1.00	12.62	27.79	40.00	-12.21
220.020	24.78	314	4.00	10.60	35.38	40.00	-4.62
415.693	15.96	328	4.00	16.74	32.70	47.00	-14.30
***							

Remark:
1. The " Correction Factor " contains antenna factor, cable loss.
2. The formula of " Corrected Amplitude " is as follow"
   Reading Amplitude + Correction Factor = Corrected Amplitude.

Field Strength Measurement

Date Measurement Performed: May 30, 2001
EUT : 250 kS/s, 16bit, 16-ch High-Resolution Multifunction Card
Polarity : Horizontal
Temperature : 25°C
Humidity : 51%RH

Frequency (MHz)	Reading Amplitude (dBμV/m)	Table Degree (°)	Antenna Height (Meter)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.360	17.90	79	4.00	11.29	29.19	40.00	-10.81
62.676	10.23	358	3.00	10.59	20.82	40.00	-19.18
63.486	14.65	221	3.00	10.48	25.13	40.00	-14.87
581.385	9.01	22	4.00	20.19	29.20	47.00	-17.80
747.997	1.44	336	1.00	22.98	24.42	47.00	-22.58
***							

Remark:
1. The “ Correction Factor “ contains antenna factor, cable loss.
2. The formula of “ Corrected Amplitude “ is as follow”
   Reading Amplitude + Correction Factor = Corrected Amplitude.

Appendix B: The Test Photograph of EUT

The Photograph of Conducted Emission Test

The Photograph of Radiated Emission Test

Exhibit C
User Manual

Exhibit D
Block Diagram

Exhibit E
Circuit Diagram

Exhibit F
Photograph of EUT


PCI-1716
AGND
MINMAX
MIW 3027
PCI-9054
Lattice