



EMC

TEST REPORT

REPORT NO. : CE88020906

MODEL NO. : PPC-100S

DATE OF TEST : Feb. 10 ~ March 08, 1999

PREPARED FOR : ADVANTECH CO., LTD.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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TABLE OF CONTENTS

1. CERTIFICATION	3
2. GENERAL INFORMATION	4
2.1 GENERAL DESCRIPTION OF EUT	4
2.2 GENERAL DESCRIPTION OF APPLIED STANDARD	4
2.3 DESCRIPTION OF SUPPORT UNITS	5
2.4 TEST SETUP	5
3. TEST INSTRUMENTS	6
3.1 TEST INSTRUMENTS (EMISSION)	6
3.2 TEST INSTRUMENTS (IMMUNITY)	6
3.3 LIMITS OF RADIATED EMISSION	7
4. TEST RESULTS (EMISSION)	8
4.1 RADIO DISTURBANCE	8
4.2 EUT OPERATION CONDITION	8
4.3 TEST DATA OF RADIATED EMISSION	9
5. TEST RESULTS (IMMUNITY)	11
5.1 GENERAL DESCRIPTION	11
5.2 PERFORMANCE CRITERIA DESCRIPTION	11
5.3 EUT OPERATION CONDITION	11
5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD)	12
5.5 TEST RESULT OF RADIATED ELECTROMAGNETIC FIELDS (RS)	13
6. PHOTOGRAPHS OF THE TEST CONFIGURATION	14
7. APPENDIX - INFORMATION OF THE TESTING LABORATORY	17



1. CERTIFICATION

Issue date: March 11, 1999

Product : INDUSTRIAL PANEL COMPUTER
Trade Name : ADVANTECH
Model No. : PPC-100S
Applicant : ADVANTECH CO., LTD.
Standard : EN 55022: 1994+A1: 1995+A2: 1997, EN 61000-4-2: 1995
Class A (radiation only) EN 61000-4-3: 1996

We hereby certify that one sample of the designation has been tested in our facility from Feb. 10 to Mar. 8, 1999. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY : _____ , DATE: _____
(Emission) (Ken Liu)

TESTED BY : _____ , DATE: _____
(Immunity) (S. S. Wang)

CHECKED BY : _____ , DATE: _____
(Yemmy Soong)

APPROVED BY : _____ , DATE: _____
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	INDUSTRIAL PANEL COMPUTER
Model No.	:	PPC-100S
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8m)

Note: The EUT was tested with the following configuration:

- CPU: AMD 5X86
- CPU BOARD: ADVANTECH, model: PCM-4865
- HDD: IBM, model: DKLA-23240
- POWER SUPPLY: SKYNET, model: SNP-9551
- T/S SENSOR: EL TOUCH, model: 002741HL-683
- LCD DISPLAY: KYOCERA, model: KCB6448BSTT-X6

For more detailed features description, please refer to manufacturer' s specification or User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

According to the specifications of manufacturer, the EUT was tested under the following standards:

EN 55022: 1994+A1: 1995+A2:1997, Class A
(Radiation only)

EN 61000-4-2: 1995
EN 61000-4-3: 1996

All tests are performed and recorded as per above standards.



2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

FOR EMISSION TEST

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	COLOR MONITOR	ADI	PD-959	730020U00100274	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2	PRINTER	HP	2225C+	3030S79116	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3	MODEM X 4	ACEEX.	1414	980020507 980020540 980020532 980020534	Shielded Signal (1.2m) Nonshielded Power (1.2m)
4	KEYBOARD	FORWARD	FDA-104GA	FDKB8110112	Shielded Signal (1.4m)
5	MOUSE	DEXIN	A2P800A	80110011	Shielded Signal (1.5m)
6	MONITOR	ACER	7134T	M500233564	Shielded Signal (1.5m) Nonshielded Power (1.8m)
7	PERSONAL COMPUTER	IBM	6560-T7T	9983708	Nonshielded Power (1.8m)
8	KEYBOARD	FORWARD	FDA-104GA	FDKB8110129	Shielded Signal (1.4m)
9	MOUSE	DEXIN	A2P800A	80110023	Shielded Signal (1.5m)
10	LAN CARD	INTEL	S82555	00A0C98B9F7635713	N/A

Note: The EUT acted as SERVER PC and communicated with support units 6-10 which acted as WORKSTATION and partners of communication system via a UTP cable (10m).

FOR IMMUNITY TEST

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	COLOR MONITOR	ACER	7254e	9171602003	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2	PRINTER	HP	C2145A	SG5BN160GY	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3	MODEM x4	ACEEX	1414	980020528	Shielded Signal (1.25m) Nonshielded Power (1.5m)
		GVE	F-1128V1R6 F-1128V1R6 F-1114V/R6	96-191-113004 96-191-113003 853E100	
4	KEYBOARD	HP	C3758A	K101088	Shielded Signal (1.5m)
5	MOUSE	COMPAQ	13H6690	23-D365100	Shielded Signal (1.8m)
6	PERSONAL COMPUTER	NTI	PII-233	P201097	Nonshielded Power (1.8m)
7	MONITOR	ADI	PV-448	604012V00100231A	Shielded Signal (1.5m) Nonshielded Power (1.8m)
8	KEYBOARD	ACER	6311	K6355122516	Shielded Signal (1.5m)
9	MOUSE	HP	M-S34	LZA72556243	Shielded Signal (1.8m)
10	LAN CARD	3 COM	3C905B-TX	6NKDOBEFCB	N/A

Note: The EUT acted as SERVER PC and communicated with support units 6-10 which acted as WORKSTATION and partners of communication system via a UTP cable (10m).

2.4 TEST SETUP

Please refer to the photos of test configuration in Item 6.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8594E	3412A01132	Sept. 24, 1999
CHASE Preamplifier	CPA9231A/4	3215	Nov. 1, 1999
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/002	Jan. 11, 2000
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE BILOG Antenna	CBL6112	2074	Dec. 25, 1999
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 3, 1999
CHANCE Turn Table & Tower Controller	ACS-I	N/A	N/A
Open Field Test Site	Site 6	ADT-R06	Dec. 24, 1999

- Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

3.2 TEST INSTRUMENTS (IMMUNITY)

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
KeyTek, ESD Test System	2000	9105240/41	Aug. 9, 1999
KeyTek, ESD Simulator	MZ-15/EC	9507277	April 15, 1999
KeyTek, EFT Generator	CE-40	9508d257	Sept. 8, 1999
KeyTek, Capacitive Clamp	CE-40-CCL	9508259	Sept. 8, 1999
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	Sept. 30, 1999
KALMUS Power Amplifier	LA1000V	091995-1	N/A
KALMUS Power Amplifier	757LC	091995-2	N/A
HOLADAY Field Probe	HI-4422	89915	Oct. 27, 1999
EMCO BiconiLog Antenna	3141	1001	N/A
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 4, 1999

- Note: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.



3.3 LIMITS OF RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF EN 55022

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

- Note: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

Product Family Standard : EN 55022:1994+A1: 1995+A2: 1997, Class A
Frequency Range : 30 - 1000 MHz (Radiated Emission)
Input Voltage : 230 Vac, 50 Hz
Temperature : 28 degree C
Humidity : 50 %
Atmospheric Pressure : 1004 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of radiated emission: -3.3 dB at 210.98 MHz

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. INDUSTRIAL PANEL COMPUTER (EUT) and communication PC run a test program to enable all functions.
3. EUT transmitted messages to and received messages from the communication PC via LAN cable connected between EUT and communication PC.
4. EUT sent "H" messages to monitor and monitor displayed "H" patterns on screen.
5. EUT sent "H" messages to printer, then printer printed them on paper.
6. EUT sent "H" messages to modem.
7. Repeat steps 3-7.



4.3 TEST DATA OF RADIATED EMISSION

EUT: **INDUSTRIAL PANEL COMPUTER**

MODEL: **PPC-100S**

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
50.10	11.8	20.5	32.3	40.0	-7.7
71.10	7.5	26.6	34.1	40.0	-5.9
130.18	14.2	20.0	34.2	40.0	-5.8
151.00	12.2	19.2	31.4	40.0	-8.6
166.75	10.8	22.4	33.2	40.0	-6.8
174.28	10.8	25.1	35.9	40.0	-4.1
192.03	11.0	22.7	33.7	40.0	-6.3
201.40	11.2	22.9	34.1	40.0	-5.9
216.28	12.6	23.5	36.1	40.0	-3.9
239.53	14.9	24.9	39.8	47.0	-7.2

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



TEST DATA OF RADIATED EMISSION

EUT: **INDUSTRIAL PANEL COMPUTER**

MODEL: **PPC-100S**

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
45.33	11.5	22.5	34.0	40.0	-6.0
70.28	7.6	28.0	35.6	40.0	-4.4
79.85	8.6	27.2	35.8	40.0	-4.2
135.26	13.3	19.0	32.3	40.0	-7.7
140.19	13.7	17.0	30.7	40.0	-9.3
175.31	11.4	21.8	33.2	40.0	-6.8
195.88	11.9	23.2	35.1	40.0	-4.9
201.43	12.2	24.2	36.4	40.0	-3.6
210.98	12.5	24.2	36.7	40.0	-3.3
226.54	13.0	23.6	36.6	40.0	-3.4

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
 2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



5. TEST RESULTS (IMMUNITY)

5.1 GENERAL DESCRIPTION

Basic Standard and Performance Criteria	:	EN 61000-4-2 (Electrostatic Discharge, ESD, 8kV air discharge, 4kV Contact discharge, Performance Criterion B)
		EN 61000-4-3 (Radio-Frequency Electromagnetic Field Susceptibility Test, RS, 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criterion A)
Input Voltage	:	230 Vac, 50 Hz
Temperature	:	25 degree C
Humidity	:	57 %
Atmospheric Pressure	:	1008 mbar

5.2 PERFORMANCE CRITERIA DESCRIPTION

- Criterion A - The apparatus shall continue 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.
- Criterion B - The apparatus shall continue 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.
- Criterion C - Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

5.3 EUT OPERATION CONDITION

Same as item 4.2.



5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD)

Basic Standard	:	EN 61000-4-2
Discharge Impedance	:	330 ohm / 150 pF
Discharge Voltage	:	Air Discharge – 8 kV (Direct) Contact Discharge - 4 kV (Indirect)
Polarity	:	Positive/Negative
Number of Discharge	:	Minimum 10 times at each test point
Discharge Mode	:	Single Discharge
Discharge Period	:	1-second minimum

Test Result		Remarks
Criterion A	PASS	Model: PPC-100S

OBSERVATION DESCRIPTION

Direct Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
8	+/-	1 ~ 4	N/A	Note 1

Description of test point:

- | | |
|------------------------------------|------------------|
| 1. Junction between panel and case | 2. All I/O ports |
| 3. All opening | 4. Switch |

Indirect Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
4	+/-	1 ~ 4	Note 1	Note 1

Description of test point:

- | | |
|---------------|--------------|
| 1. Front side | 2. Rear side |
| 3. Right side | 4. Left side |

Description of test result:

Note 1: There was no change compared with initial operation during the test.



5.5 TEST RESULT OF RADIATED ELECTROMAGNETIC FIELDS (RS)

Basic Standard : EN 61000-4-3
Frequency range : 80 MHz - 1000 MHz
Field strength : 10 V/m
Modulation : 1kHz Sine Wave, 80%, AM Modulation
Frequency step : 1 % of fundamental
Polarity of Antenna : Horizontal and Vertical
Test distance : 3 m

Test Result		Remarks
Criterion A	PASS	Model: PPC-100S

Note: Four sides of EUT are verified separately.

Description of test result:

There was no change compared with initial operation during the test.

6. PHOTOGRAPHS OF THE TEST CONFIGURATION

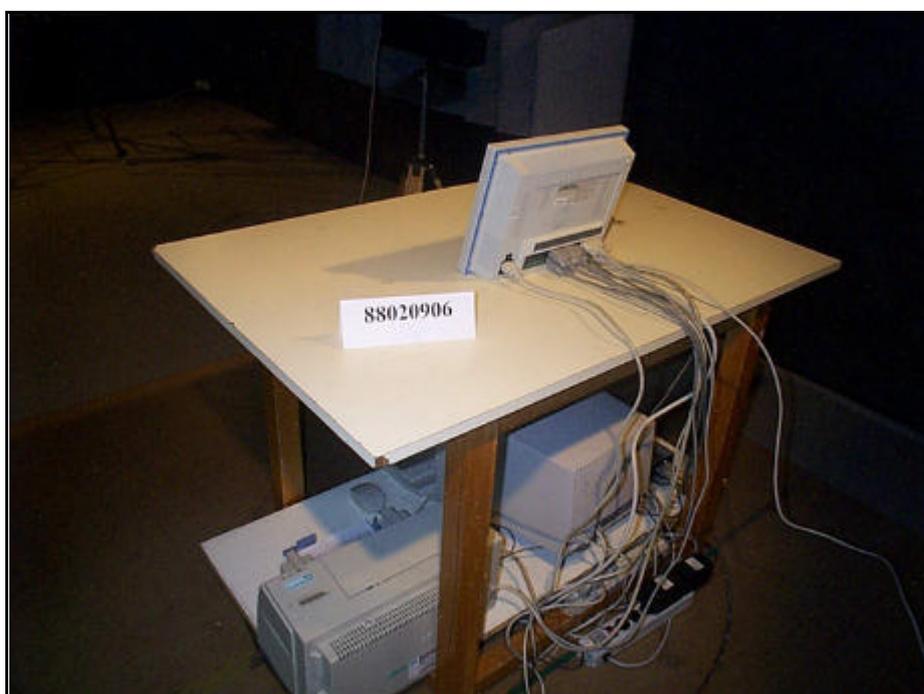
RADIATED EMISSION TEST



ESD TEST



RS TEST





7. APPENDIX - INFORMATION OF THE TESTING LABORATORY

Information of the testing laboratory

We, ADT Corp., are founded in 1988, to provide our best service in EMC and Safety consultation. Our laboratory is accredited by the following approval agencies according to ISO/IEC Guide 25 or EN 45001:

- | | |
|---------------|--------------------------------------|
| ● USA | FCC, UL, NVLAP |
| ● Germany | TUV Rheinland
TUV Product Service |
| ● Japan | VCCI |
| ● New Zealand | RFS |
| ● Norway | NEMKO, DNV |
| ● U.K. | INCHCAPE, SGS |
| ● R.O.C. | BSMI |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

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