

Certificate of Compliance

We, **ADVANCE DATA TECHNOLOGY CORP.**, hereby certify that:

The product : CPU BOARD

Trade Name : ADVANTECH

Model No. : PCM-5862E, PCM-5862EL

Applicant : ADVANTECH CO., LTD.

one sample of the designation has been tested in our facility from Nov. 30 to Dec. 16, 1998. The test record, data evaluation and Equipment Under Test (EUT) configuration represented in our report No. **CE87112502**, are in compliance with the following standards:

EN 55022: 1994+A1: 1995+A2: 1997, Class A EN 61000-4-2: 1995
EN 61000-4-3: 1996
EN 61000-4-4: 1995



Mike Su / Project Manager

Issue Date: Dec. 18, 1998



ADVANCE DATA TECHNOLOGY CORP.

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EMC

TEST REPORT

REPORT NO. : CE87112502
MODEL NO. : PCM-5862E, PCM-5862EL
DATE OF TEST : Nov. 30 to Dec. 16, 1998

PREPARED FOR : ADVANTECH CO., LTD.

ADDRESS : FL. 4, NO. 108-3, MING-CHUAN ROAD,
SHING-TIEN CITY TAIPEI HSIEN, TAIWAN

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION
11F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.



Accredited Laboratory

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1.

CERTIFICATION

Issue date: Dec. 18, 1998

Product : CPU BOARD
Trade Name : ADVANTECH
Model No. : PCM-5862E, PCM-5862EL
Applicant : ADVANTECH CO., LTD.
Standard : EN 55022:1994+A1: 1995+A2: 1997, EN 61000-4-2: 1995
Class A EN 61000-4-3: 1996
EN 61000-4-4: 1995

We hereby certify that one sample of the designation has been tested in our facility from Nov. 30 to Dec. 16, 1998. 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: J.W. Kuo , DATE: 12/18/98
(Emission) (J. W. Kuo)

TESTED BY: S.S. Wang , DATE: 12/18/98
(Immunity) (S. S. Wang)

CHECKED BY: Ariel Hsieh , DATE: 12/18/98
(Ariel Hsieh)

APPROVED BY: Mike Su , DATE: 12/18/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

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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	730020U00100292	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2.	PRINTER	HP	2225C+	3030S79138	Shielded Signal (1.5m) Nonshielded Power (2.2m)
3.	MODEM	ACEEX	1414	980020506	Shielded Signal (1.5m) Nonshielded Power (2.2m)
4.	MODEM	ACEEX	1414	980020569	Shielded Signal (1.5m) Nonshielded Power (2.2m)
5.	MODEM	ACEEX	1414	980020501	Shielded Signal (1.5m) Nonshielded Power (2.2m)
6.	MODEM	ACEEX	1414	980020539	Shielded Signal (1.5m) Nonshielded Power (2.2m)
7.	KEYBOARD	FORWARD	FDA-104G	FDKB8110115	Shielded Signal (1.4m)
8.	USB KEYBOARD	BTC	7932	D7A140012	Shielded Signal (1.8m)
9.	MOUSE	DEXIN	A2P800A	801100	Shielded Signal (1.5m)
10.	USB MOUSE	DEXIN	A3V800A	N/A	Shielded Signal (1.8m)
11.	WALKMAN	AIWA	HS-PS140	C101015	Nonshielded Signal (1.5m)
12.	SPEAKER	JAZZ HIPSTER	J-008	J791149	Nonshielded Signal (1.5m)
13.	MICROPHONE	CAROL	MUD-329	M501017	Nonshielded Signal (3.1m)
14.	EARPHONE	HP	LT-100	H201024	Nonshielded Signal (3.1m)
15.	PERSONAL COMPUTER	PACKARD BELL	PB400T	P201009	Nonshielded Power (1.8m)
16.	COLOR MONITOR	ADI	PD-959	730020U00100373	Shielded Signal (1.5m) Nonshielded Power (1.8m)
17.	KEYBOARD	BTC	5139	853300109	Nonshielded Signal (1.5m)
18.	MOUSE	LOGETECH	M-S34	LZA70703773	Nonshielded Signal (1.5m)
19.	LAN CARD	INTEL	S82555	00A0C9ACCB5252713	N/A

Note: 1. Support units 8 & 10 were connected to the USB ports of PC system.

2. Support units 1-14 were set up as the SERVER PC system and communicated with support units 15-19 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	ADI	SM-5514A	521S030297A	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2.	PRINTER	HP	C2145A	SG5N1601K	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3.	MODEM	GVC	F-1128V1R6	96-191-113004	Shielded Signal (1.25m) Nonshielded Power (1.5m)
4.	MODEM	GVC	F-1128V1R6	853E100	Shielded Signal (1.25m) Nonshielded Power (1.5m)
5.	MODEM	GVC	F-1128V1R6	96-191-113003	Shielded Signal (1.25m) Nonshielded Power (1.5m)
6.	MODEM	HAYES	5300AP	A1425300K045	Shielded Signal (1.25m) Nonshielded Power (1.5m)
7.	KEYBOARD	ACER	6311	K6357050927	Shielded Signal (1.8m)
8.	USB KEYBOARD	BTC	7932	174250046	Shielded Signal (1.8m)
9.	MOUSE	HP	M-S34	LZA72556243	Shielded Signal (1.8m)
10.	USB MOUSE	AGILER	N/A	N/A	Shielded Signal (1.5m)
11.	WALKMAN	PANASONIC	RQ-LS307	C101007	Nonshielded Signal (2.0m)
12.	SPEAKER	J-S	J-009	S501016	Nonshielded Signal (1.1m)
13.	MICROPHONE	MICRO	AKG-220	M501003	Nonshielded Signal (2.1m)
14.	EARPHONE	J-S	H-201	H201002	Nonshielded Signal (1.1m)
15.	PERSONAL COMPUTER	PACKARD BELL	PB400T	P201009	Nonshielded Power (1.8m)
16.	COLOR MONITOR	ADI	SM-5514A	521S030301A	Shielded Signal (1.5m) Nonshielded Power (1.8m)
17.	KEYBOARD	HP	C3758A	C3758-60223	Nonshielded Signal (1.8m)
18.	MOUSE	HP	M-S34	LZA72701223	Nonshielded Signal (1.8m)
19.	LAN CARD	INTEL	S82555	00A0C9ACCB5252713	N/A

Note: 1. Support units 8 & 10 were connected to the USB ports of PC system.

2. Support units 1-14 were set up as the SERVER PC system and communicated with support units 15-19 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	8594A	3144A00308	Sept. 3, 1999
HP Preamplifier	8447D	2944A08119	Jan. 20, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 15, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE Bilog Antenna	CBL6112A	2329	Sept. 19, 1999
EMCO Turn Table	1060	1195	N/A
EMCO Tower	1051	1163	N/A
Open Field Test Site	Site 2	ADT-R02	Sept. 18, 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.

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 15, 1999
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 16, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 14, 1999
EMCO-L.I.S.N.	3825/2	9204-1964	July 14, 1999
Shielded Room	Site 2	ADT-C02	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, 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 CONDUCTED AND 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.

LIMIT OF CONDUCTED EMISSION OF EN 55022

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(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+A1: 1995+A2: 1997, Class A
Frequency Range : 0.15 - 30 MHz (Conducted Emission)
30 - 1000 MHz (Radiated Emission)
Input Voltage : 230 Vac, 50 Hz (to PC)
Temperature : 26 °C
Humidity : 65 %
Atmospheric Pressure : 1017 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -19.5 dB at 0.486 MHz Minimum passing margin of radiated emission: -2.6 dB at 133.43 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. Industrial PC reads a test program to enable all functions.
3. Industrial PC reads and writes messages from HDD.
4. Industrial PC sends and receives messages from WORKSTATION via a LAN cable.
5. Industrial PC sends "H" messages to monitor and monitor displays "H" patterns on screen.
6. Industrial PC sends "H" messages to modem.
7. Industrial PC sends "H" messages to printer and the printer prints them on paper.
8. Industrial PC sends audio messages to speaker and earphone.
9. Repeat steps 2-9.



4.1.2 TEST DATA OF CONDUCTED EMISSION

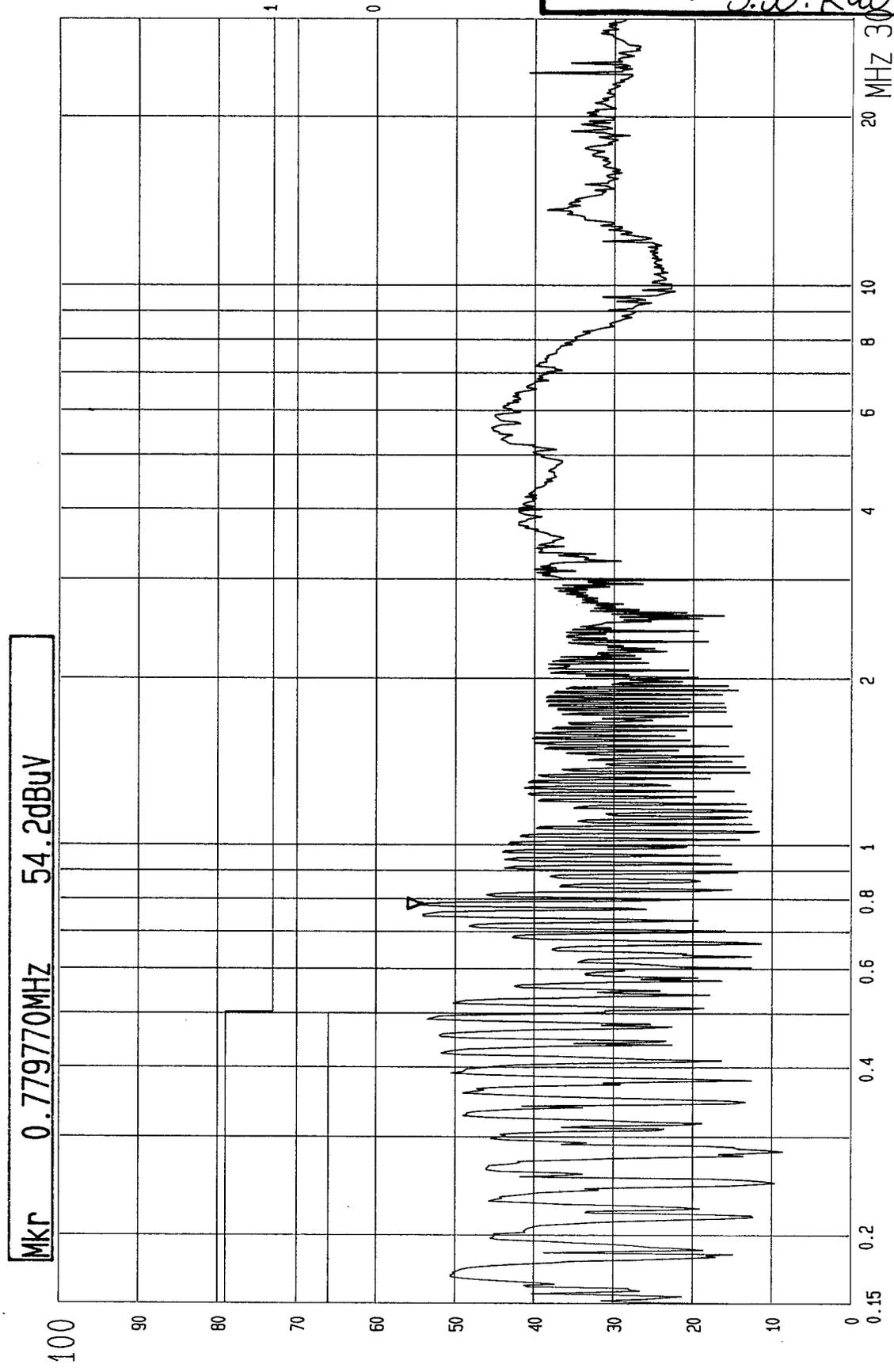
EUT: CPU BOARD

MODEL: PCM-5862E

6 dB Bandwidth: 10 kHz

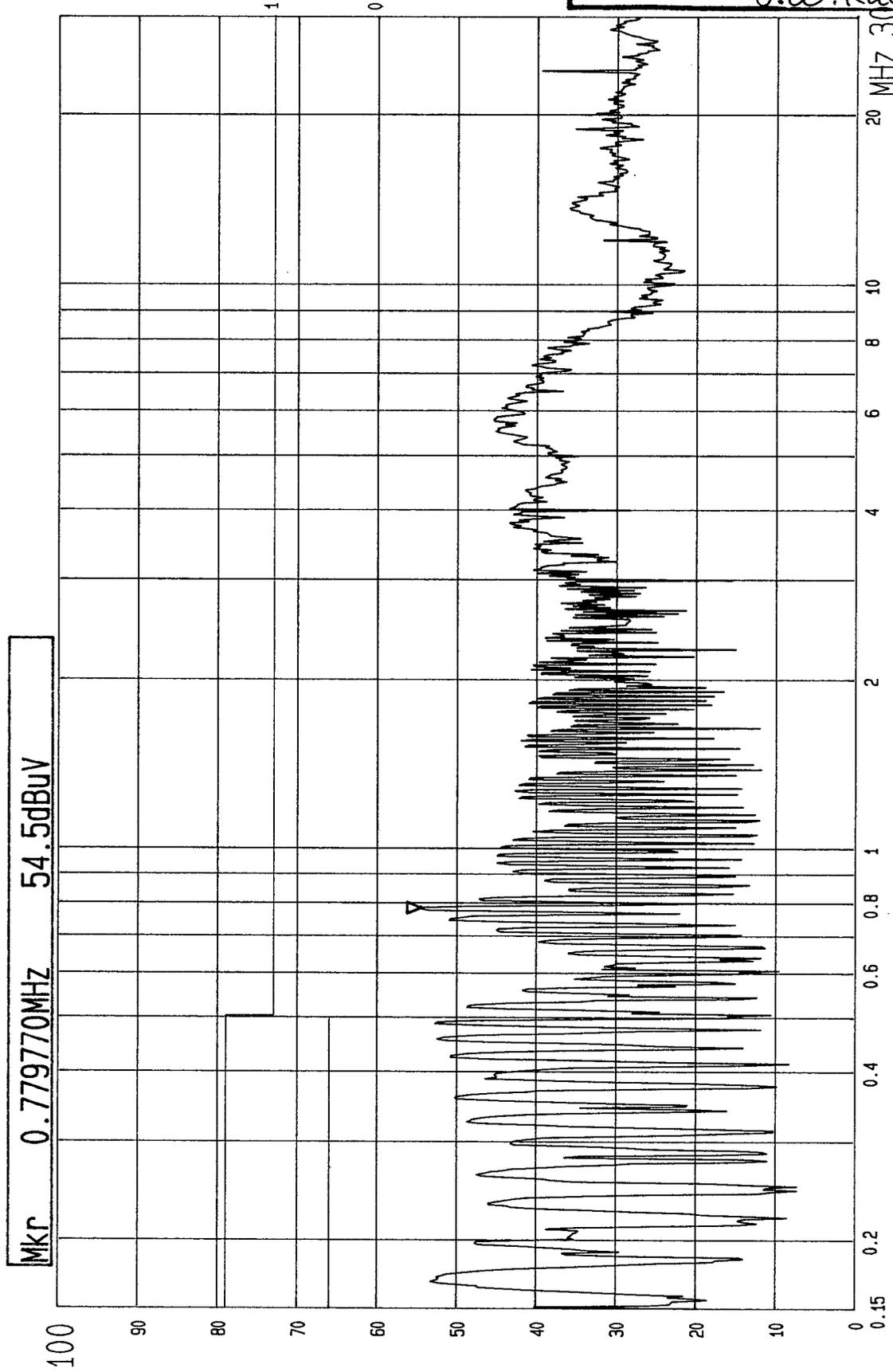
Freq. [MHz]	L Level [dB (μV)]		N Level [dB (μV)]		Limit [dB (μV)]		Margin [dB (μV)]			
	QP	AV	QP	AV	QP	AV	L		N	
0.168	50.0	-	52.2	-	79.0	66.0	-26.5	-	-27.3	-
0.486	52.5	-	51.7	-	79.0	66.0	-19.8	-	-19.5	-
0.779	53.2	-	53.5	-	73.0	60.0	-28.5	-	-28.0	-
5.570	44.5	-	45.0	-	73.0	60.0	-35.5	-	-37.0	-
13.630	37.5	-	36.0	-	73.0	60.0	-33.3	-	-34.5	-
23.986	39.7	-	38.5	-	73.0	60.0	-29.0	-	-26.8	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value



--- Date 30.NOV.'98 Time 19:11:05
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE)
MODE: PCM-5862E

ADT CORP.
LISN: L



--- Date 30.NOV.'98 Time 19:12:47
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODE: PCM-5862E LISN: N



4.1.3 TEST DATA OF RADIATED EMISSION

EUT: CPU BOARD

MODEL: PCM-5862E

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)
67.97	7.5	17.0	24.5	40.0	-15.5
80.55	8.6	17.9	26.5	40.0	-13.5
95.68	11.0	14.3	25.3	40.0	-14.7
113.29	13.5	15.0	28.5	40.0	-11.5
133.41	13.9	17.1	31.0	40.0	-9.0
133.65	13.9	20.6	34.5	40.0	-5.5
138.49	13.7	22.2	35.9	40.0	-4.1
144.21	13.1	10.7	23.8	40.0	-16.2
156.09	11.8	16.2	28.0	40.0	-12.0
201.42	12.0	15.9	27.9	40.0	-12.1
267.29	16.6	17.2	33.8	47.0	-13.2
276.93	16.4	16.2	32.6	47.0	-14.4
334.12	17.5	13.4	30.9	47.0	-16.1

- 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: CPU BOARD

MODEL: PCM-5862E

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)
51.99	6.8	14.5	21.3	40.0	-18.7
67.97	6.5	23.6	30.1	40.0	-9.9
80.50	7.7	21.8	29.5	40.0	-10.5
95.68	10.1	24.4	34.5	40.0	-5.5
113.31	13.1	20.0	33.1	40.0	-6.9
133.43	14.2	23.2	37.4	40.0	-2.6
133.61	14.2	22.4	36.6	40.0	-3.4
138.49	14.1	20.2	34.3	40.0	-5.7
143.96	13.6	11.5	25.1	40.0	-14.9
151.00	12.7	18.9	31.6	40.0	-8.4
156.08	12.1	17.1	29.2	40.0	-10.8
201.42	12.7	20.8	33.5	40.0	-6.5
267.28	15.9	17.6	33.5	47.0	-13.5
276.92	15.8	20.9	36.7	47.0	-10.3
334.11	17.5	13.3	30.8	47.0	-16.2

- 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



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 Criteria B)
		EN 61000-4-3	(Radio-Frequency Electromagnetic Field Susceptibility Test, RS, 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criteria A)
		EN 61000-4-4	(Electrical Fast Transient/Burst, EFT, Power line: 2kV, Signal line: 1kV, Performance Criteria B)
Input Voltage	:	230 Vac, 50 Hz (to PC)	
Temperature	:	26 °C	
Humidity	:	59 %	
Atmospheric Pressure	:	1001 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

Industrial PC runs a test program to access FDD/HDD/MODEM/PRINTER sequentially and shows the result on monitor screen.



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: PCM-5862E

Note: Four sides of EUT are verified separately.

OBSERVATION DESCRIPTION

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



5.6 TEST RESULT OF ELECTRICAL FAST TRANSIENT (EFT)

Basic Standard : EN 61000-4-4
Test Voltage : Power Line - 2 kV (to PC)
Signal/Control Line -1 kV
Polarity : Positive/Negative
Impulse Frequency : 5 kHz
Tr / Tn : 5/50 ns
Burst Duration : 15 ms
Burst Period : 300 ms
Test Duration : Not less than 1 min.

Test Result		Remarks
Criterion A	PASS	Model: PCM-5862E

OBSERVATION DESCRIPTION

Test Point	Polarity	Test Level (kV)	Result
DC input	+/-	2	Note 1
Signal / Control Line	+/-	1	Note 1

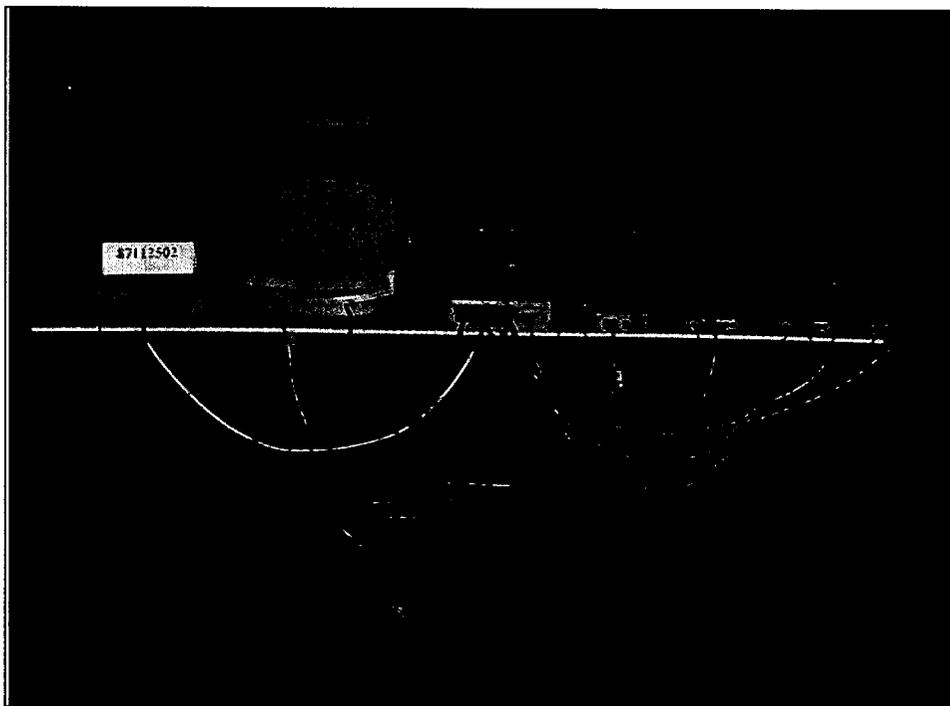
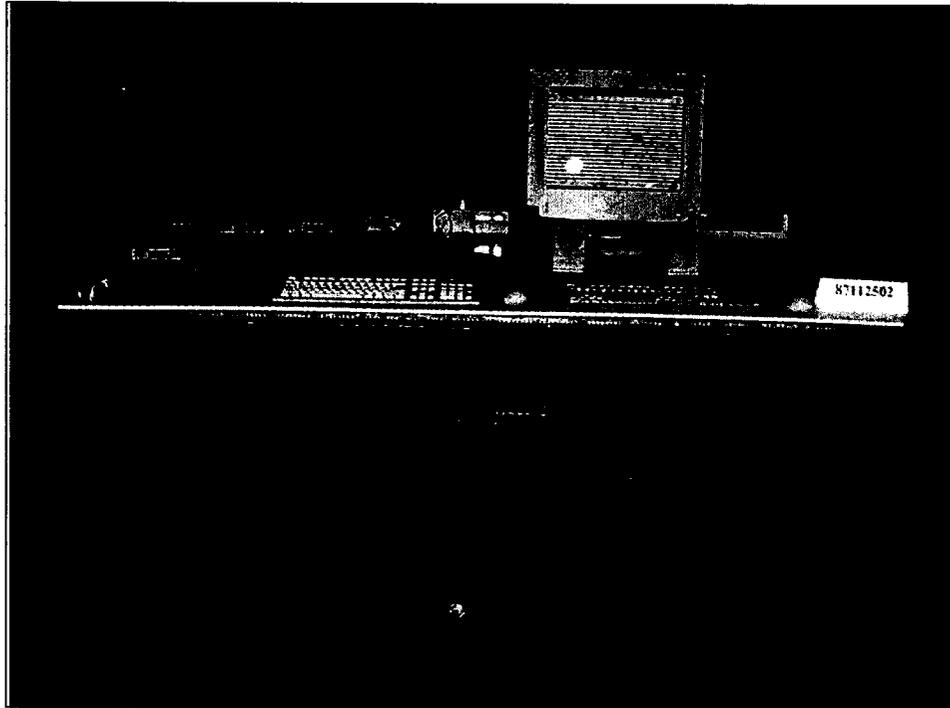
Description of test result:

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



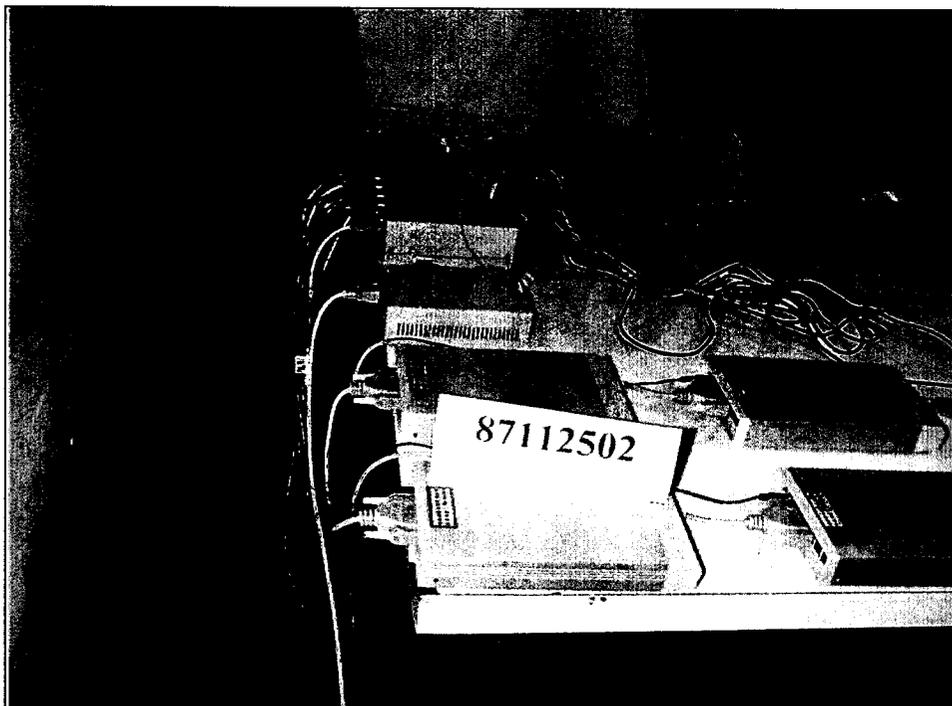
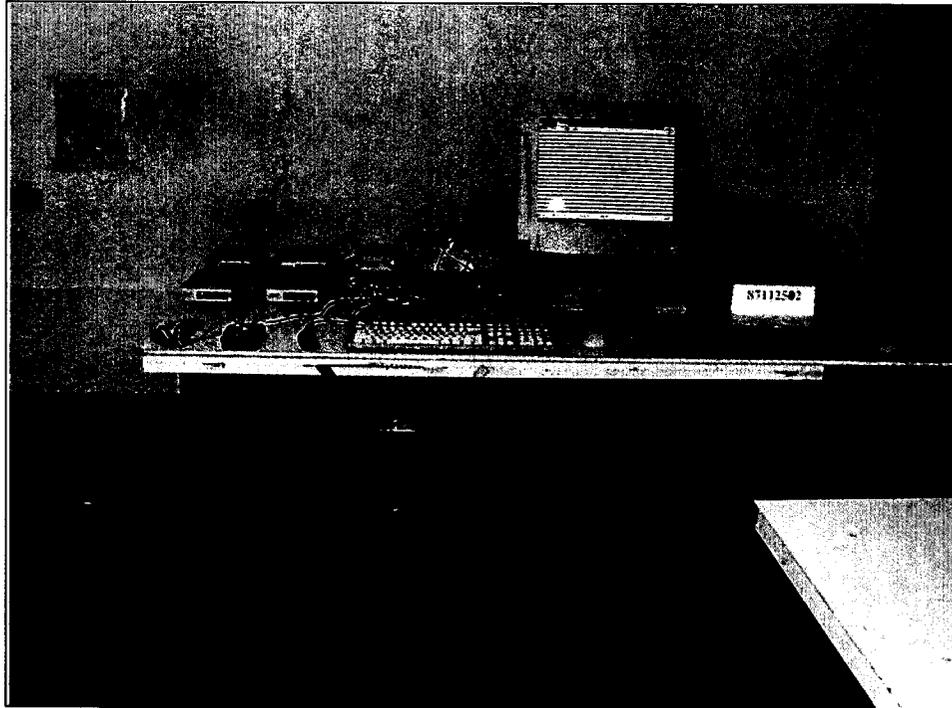
6. PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST



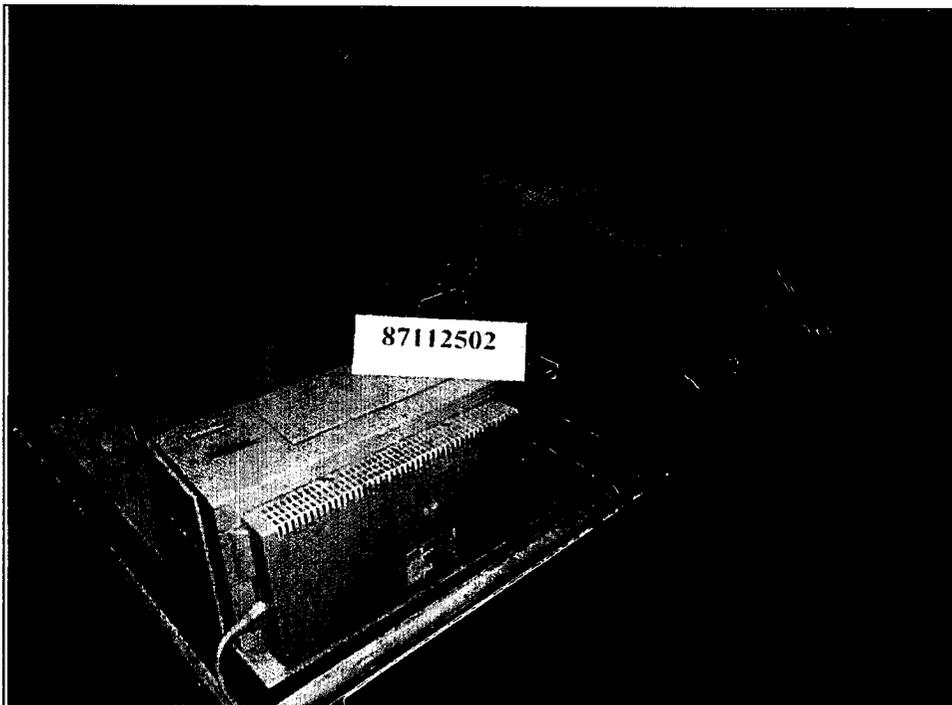


CONDUCTED EMISSION TEST



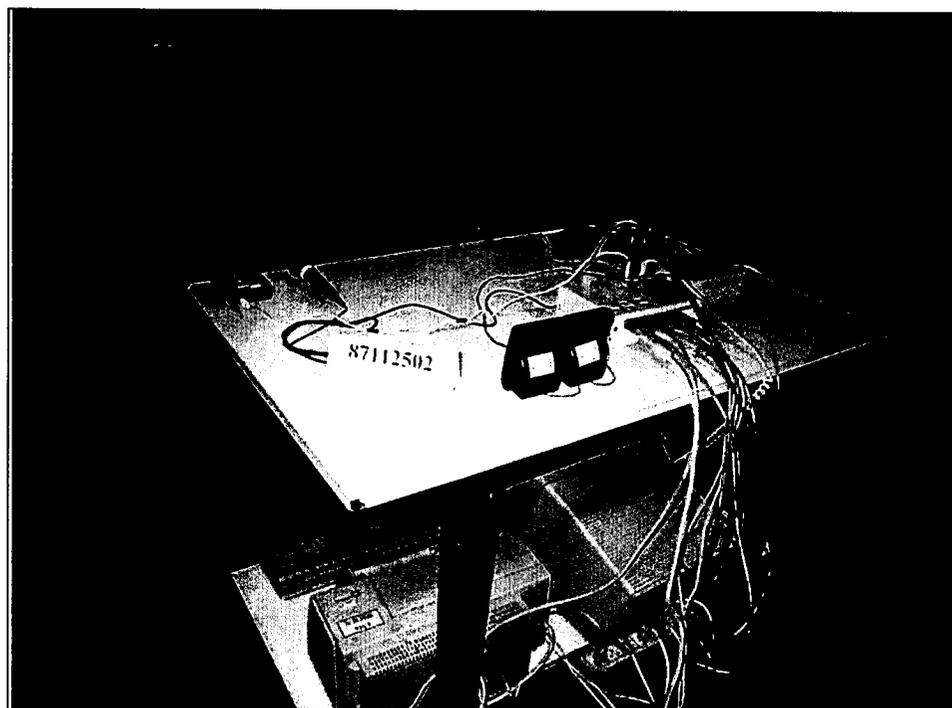
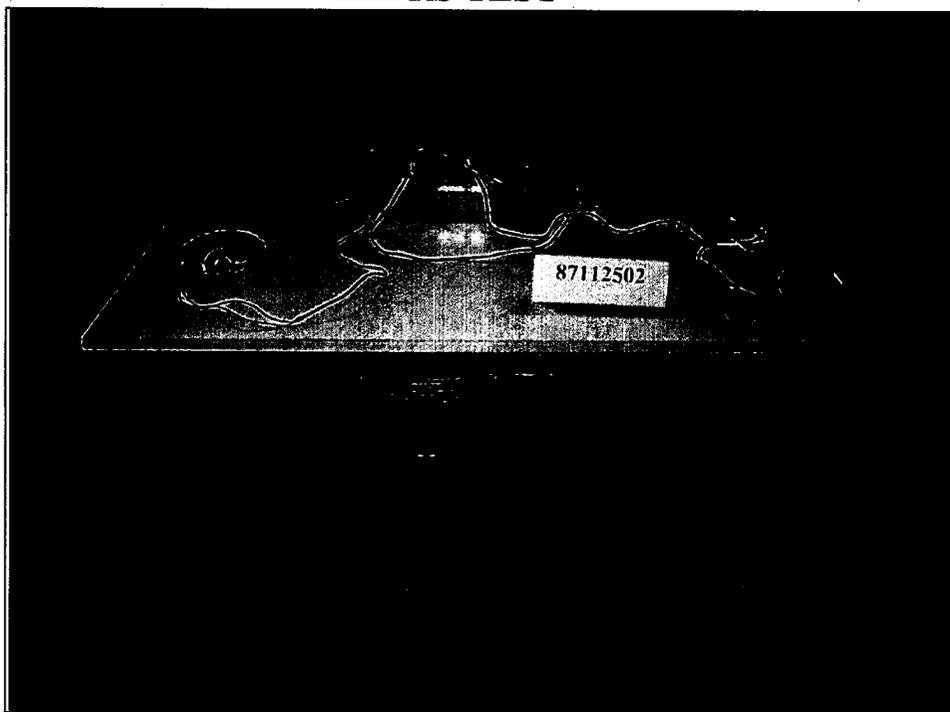


ESD TEST





RS TEST





EFT CLAMP TEST



EFT CLAMP TEST





7. APPENDIX - INFORMATION OF THE TESTING LABORATORY

Information of the testing laboratory

We, ADT Corp., is 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 |
| ● U.K. | INCHCAPE, SGS |
| ● R.O.C. | BCIQ |

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:

Lin Kou EMC Lab.:

Tel: 886-2-26032180

Fax: 886-2-26022943

Lin Kou Safety Lab.:

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