EMC

TEST REPORT

REPORT NO. : CE88051302
MODEL NO. : SBC-770, SBC-675
DATE OF TEST : May 14 ~ May 27, 1999

PREPARED FOR: AAEON TECHNOLOGY INC.

ADDRESS : 1F, NO. 6, ALLEY 6, LANE 45, PAO-HSIN RD.,
HSIN-TIEN CITY, TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

11F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

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 6

3. TEST INSTRUMENTS 7

   3.1 TEST INSTRUMENTS (EMISSION) 7
   3.2 TEST INSTRUMENTS (IMMUNITY) 8
   3.3 LIMITS OF CONDUCTED AND RADIATED EMISSION 9

4. TEST RESULTS (EMISSION) 10

   4.1 RADIO DISTURBANCE 10
   4.2 EUT OPERATION CONDITION 10
   4.3 TEST DATA OF CONDUCTED EMISSION (A) 11
   4.4 TEST DATA OF CONDUCTED EMISSION (B) 13
   4.5 TEST DATA OF RADIATED EMISSION (A) 15
   4.6 TEST DATA OF RADIATED EMISSION (B) 17

5. TEST RESULTS (IMMUNITY) 19

   5.1 GENERAL DESCRIPTION 19
   5.2 PERFORMANCE CRITERIA DESCRIPTION 19
   5.3 EUT OPERATION CONDITION 19
   5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD) 20
   5.5 TEST RESULT OF RADIATED RADIO FREQUENCY 21
   5.6 TEST RESULT OF ELECTRICAL FAST TRANSIENT/BURST (EFT/BURST) 22
   5.7 TEST RESULT OF CONDUCTED RADIO FREQUENCY (CS) 23
   5.8 TEST RESULT OF POWER FREQUENCY MAGNETIC FIELD 24
   5.9 TEST RESULT OF RADIO-FREQUENCY ELECTROMAGNETIC 25

6. PHOTOGRAPHS OF THE TEST CONFIGURATION 26

7. APPENDIX - INFORMATION OF THE TESTING LABORATORY 34

1. **CERTIFICATION**

Issue date: May 31, 1999

Product	:	CPU BOARD	
Trade Name	:	AAEON	
Model No.	:	SBC-770, SBC-675	
Applicant	:	AAEON TECHNOLOGY INC.	
Standard	:	EN 55022: 1994+A1: 1995+A2: 1997, Class A	**EN 50082-2: 1995** EN 61000-4-2: 1995 EN 61000-4-3: 1996 EN 61000-4-4: 1995 EN 61000-4-6: 1996 EN 61000-4-8: 1994 ENV 50204: 1995

We hereby certify that one sample of the designation has been tested in our facility from May 14 to May 27,1999. 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 (Emission) : Jackey Chang (Jackey Chang), DATE: 5/31/99

TESTED BY (Immunity) : S.S. Wang (S. S. Wang), DATE: 5/31/99

CHECKED BY : Stacy Chang (Stacy Chang), DATE: 5/31/99

APPROVED BY : Mike Su (Mike Su), DATE: 5/31/99

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP Accredited Laboratory

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-770, SBC-675
Power Supply	:	Switching (from PC)

Note: During the test, the EUT was installed in a metal enclosure with a slot board to form an industrial PC.

The EUT has two model names which are identical to each other in all aspects except for their CPU and CPU socket. Both of the two models were tested separately and recorded in this report in two modes.

	MODE 1	MODE 2
MODEL	SBC-770	SBC-675
CPU	INTEL PENTIUM II 233 ~ 450 MHz (100 x 4.5)	INTEL CELERON™ 333~433MHz (66.6 x 6.5)
CPU SOCKET	INTEL SLOT 1	INTEL SOCKET 370
HDD	QUANTUM, 3.5series	
3 1/2 FDD	MITSUMI, D353M3	
5 1/2 FDD	PANASONIC, JU-475-5	
BOOKPLANE	AAEON, PCA-611494	
SPS	BPS, BPS-320A	

The EUT has a resolution up to 1024x768, 256 color.

For more detailed features description, please refer to Manufacturer's Specification or User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is a kind of Information Technology Equipment which could be used in industrial area and according to the manufacturer's specifications, it was tested according to the following standards:

EN 55022: 1994+A1: 1995+A2: 1997, Class A

EN 50082-2: 1995
EN 61000-4-2: 1995
EN 61000-4-3: 1996
EN 61000-4-4: 1995
EN 61000-4-6: 1996
EN 61000-4-8: 1994
ENV 50204: 1995

All tests are performed and recorded as per above standards.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-770, SBC-675
Power Supply	:	Switching (from PC)

Note: During the test, the EUT was installed in a metal enclosure with a slot board to form an industrial PC.

The EUT has two model names which are identical to each other in all aspects except for their CPU and CPU socket. Both of the two models were tested separately and recorded in this report in two modes.

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CPU SOCKET	INTEL SLOT 1	INTEL SOCKET 370
HDD	QUANTUM, 3.5series	
3 1/2 FDD	MITSUMI, D353M3	
5 1/2 FDD	PANASONIC, JU-475-5	
BOOKPLANE	AAEON, PCA-611494	
SPS	BPS, BPS-320A	

The EUT has a resolution up to 1024x768, 256 color.

For more detailed features description, please refer to Manufacturer's Specification or User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is a kind of Information Technology Equipment which could be used in industrial area and according to the manufacturer's specifications, it was tested according to the following standards:

EN 55022: 1994+A1: 1995+A2: 1997, Class A

EN 50082-2: 1995
EN 61000-4-2: 1995
EN 61000-4-3: 1996
EN 61000-4-4: 1995
EN 61000-4-6: 1996
EN 61000-4-8: 1994
ENV 50204: 1995

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	Nonshielded Signal (1.5m) Shielded Power (1.8m)
2	PRINTER	HP	2225C+	3030S79116	Nonshielded Signal (1.2m) Shielded Power (1.5m)
3	MODEM	ACEEX	1414	980020534	Shielded signal (1.2m) Nonshielded Power (1.5m)
4	MODEM	ACEEX	1414	980020540	Shielded signal (1.2m) Nonshielded Power (1.5m)
5	KEYBOARD	BTC	5140	765020075	Shielded Signal (1.5m)
6	MOUSE	DEXIN	A2P800A	80102130	Shielded signal (1.5m)
7	USB KEYBOARD	BTC	7932	178190030	Shielded Signal (1.8m)
8	USB MOUSE	DEXIN	A2U800A	71001831	Shielded Signal (1.5m)
9	PC	IBM	6560-T7T	9983708	Nonshielded power (1.8m) Shielded Signal (1.8m)
10	MONITOR	ADI	7133D	M133D022087	Shielded signal (1.5m) Nonshielded power (1.8m)
11	KEYBOARD	FORWARD	FDA-104GA	FDKB8110112	Nonshielded signal (1.5m)
12	MOUSE	DEXIN	A2P800A	80102114	Shielded signal (1.5m)
13	LAN CARD	INTEL	S82555	00A0C9A6CB525271	Shielded signal (10.0m)

Note: 1. Support unit 1~8 acted as SERVER PC and communicated with support unit 9-13 which acted as HOST PC and systems of communication partner via a UTP cable (10m).

2. Support unit 7 & 8 were connected to the USB ports of EUT.

FOR IMMUNITY TEST

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	COLOR MONITOR	ACER	7234e	9174302003	Nonshielded Signal (1.5m) Shielded Power (1.8m)
2	PRINTER	HP	C2145A	SG5BN160GY	Nonshielded Signal (1.5m) Shielded Power (1.8m)
3	MODEM	GVC	F-1128V1R6	96-191-113003	Shielded signal (1.25m) Nonshielded Power (1.5m)
4	MODEM	GVC	F-1128V1R6	96-191-113004	Shielded signal (1.25m) Nonshielded Power (1.5m)
5	KEYBOARD	BTC	5140	75B110606	Shielded Signal (1.5m)
6	MOUSE	COMPAQ	M-S28	LCA50224522	Shielded signal (1.8m)
7	CCD CAMERA	COMPAQ	YC72-CPQ	G06CC0A7AEB21Y	Shielded Signal (2.0m)
8	CCD CAMERA	COMPAQ	YC72-CPQ	G06CC0A7AEB22Y	Shielded Signal (2.0m)
9	LAN CARD	INTEL	S82555	00A0C9659E5C17713	Shielded signal (10.0m)
10	PC	IBM	6587-T8T	90A54WX	Nonshielded power (10.0m) Shielded Signal (1.8m)
11	MONITOR	ACTION	0951	NA	Shielded signal (1.5m) Nonshielded power (1.8m)
12	KEYBOARD	HP	C3758A	NA	Nonshielded signal (1.8m)
13	MOUSE	DEXIN	A2P800A	80102121	Shielded signal (1.5m)

Note: 1. Support unit 1~9 acted as SERVER PC and communicated with support unit 10-13 which acted as HOST PC and systems of communication partner via a UTP cable (10m).
2. Support unit 7 & 8 were connected to the USB ports of EUT.

2.4 TEST SETUP

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

3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 22, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 20, 1999
EMCO L.I.S.N.	3825/2	9504-2359	July 20, 1999
Shielded Room	Site 3	ADT-C03	NA

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.

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 10	846285/012	Dec. 14, 1999
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 5, 2000
CHANCE Turn Table & Tower Controller	ACS-I	NA	NA
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	92022232	April 14, 2000
KeyTek, EFT Generator	CE-40	9508257	Sept. 8, 1999
KeyTek, Capacitive Clamp	CE-40-CCL	9508259	Sept. 9, 1999
KeyTek, Control Center	E103	9508347	NA
KeyTek, Surge Combination Wave	E501A	9508349	Sept. 3, 1999
KeyTek, Surge Coupler/Decoupler	E551	9508350	Sept. 3, 1999
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	Sept. 30, 1999
KALMUS Power Amplifier	LA1000V	091995-1	NA
KALMUS Power Amplifier	757LC	091995-2	NA
HOLADAY Field Probe	HI-4422	89915	Oct. 27, 1999
EMCO BiconiLog Antenna	3141	1001	NA
FCC Coupling Decoupling Network	FCC-801-M3-25	48	NA
FCC Coupling Decoupling Network	FCC-801-M2-25	20	NA
FCC Coupling Decoupling Network	FCC-801-M1-25	17	NA
BOONTON RF Voltage Meter	9200B	331801AE	Dec. 17, 1999
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 4, 1999
HAEFELY Mains Interference Simulator	PLINE 1610	083690-17	July 6, 1999
HAEFELY Magnetic Field Tester	MAG 100.1	083794-06	NA
COMBINOVA Magnetic Field Meter	MFM10	224	Aug. 26, 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) dBuV/m	Class B (at 10m) 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: 1994+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	:	23 ℃
Humidity	:	78 %
Atmospheric Pressure	:	1002 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -14.8 dB at 0.629 MHz Minimum passing margin of radiated emission: -3.4 dB at 167.02 MHz

4.2 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 to and from HOST PC via a UTP cable.
5. Industrial PC sends "H" messages to monitor and monitor display "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. Repeat steps 2-8.

4.3 TEST DATA OF CONDUCTED EMISSION (A)

EUT: **CPU BOARD** MODEL: **SBC-770**

6 dB Bandwidth: 10 kHz MODE: **1**

PHASE: **LINE (L)**

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.209	0.2	54.1	-	54.3	-	79.0	66.0	-24.7	-
0.294	0.2	56.2	-	56.4	-	79.0	66.0	-22.6	-
0.634	0.2	55.8	-	56.0	-	73.0	60.0	-17.0	-
0.798	0.2	47.6	-	47.8	-	73.0	60.0	-25.2	-
5.688	0.5	51.4	-	51.9	-	73.0	60.0	-21.1	-
24.665	1.4	51.7	-	53.1	-	73.0	60.0	-19.9	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average ndividually.
3. "-": The Emission Level 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
6. Emission Level = Correction Factor + Reading Value.

ADT CO. Shielded Room 3
EN55022 CLASS A

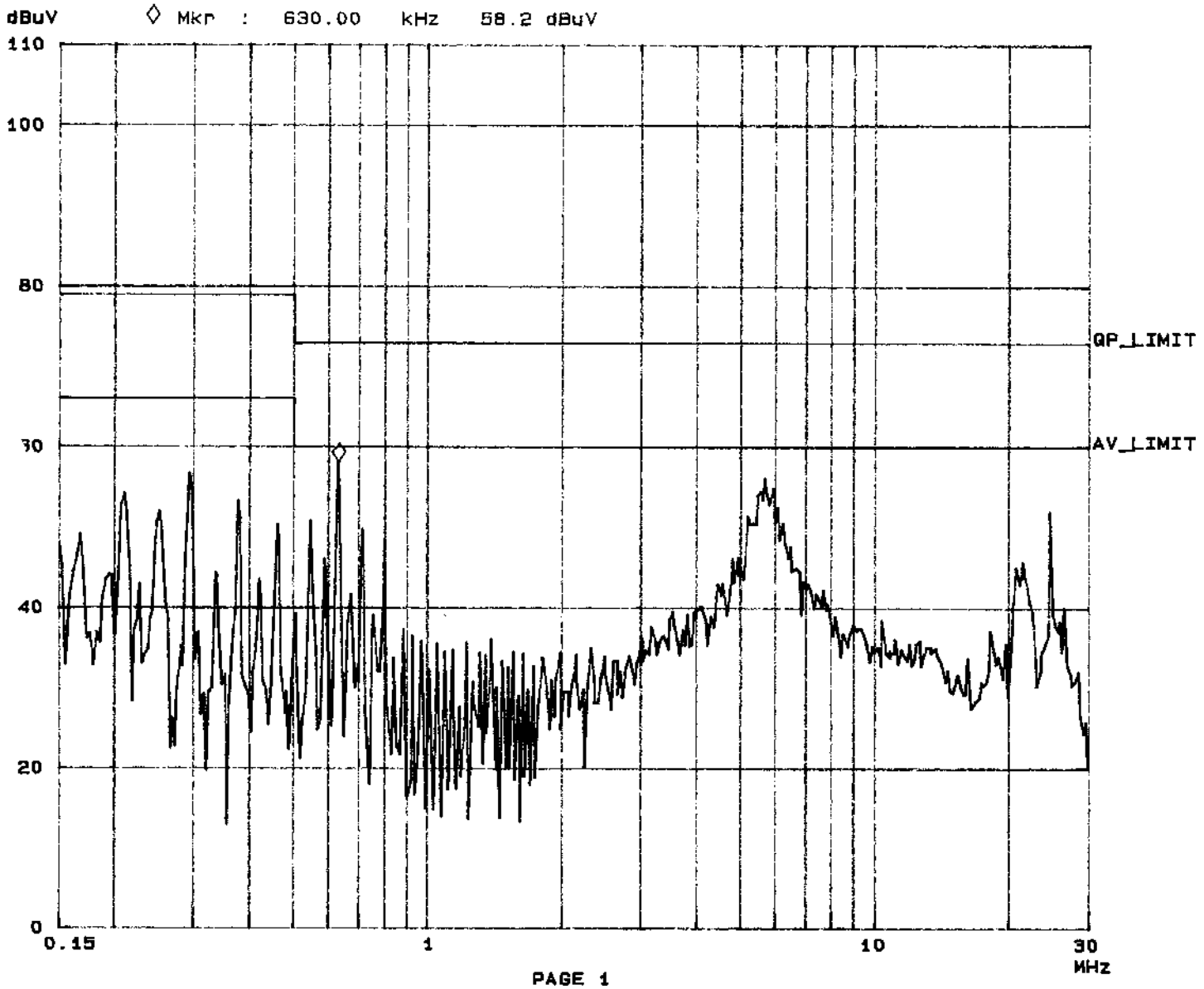
14. May 99 09:50

Report No.CE880512-02
Page 1-1
Tested by Jackey Chang

EUT: SBC-770
Op Cond: 1024X768 256 COLOR
Operator: JACKEY
Test Spec: LISN : L
Comment: 230V AC/50Hz
MODE 1: PII 450MHz (100MHz)

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB



TEST DATA OF CONDUCTED EMISSION

EUT: **CPU BOARD** MODEL: **SBC-770**

6 dB Bandwidth: 10 kHz MODE: **1**

PHASE: **NEUTRAL (N)**

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.209	0.2	58.8	-	59.0	-	79.0	66.0	-20.0	-
0.294	0.2	60.4	-	60.6	-	79.0	66.0	-18.4	-
0.634	0.2	55.6	-	55.8	-	73.0	60.0	-17.2	-
0.798	0.2	47.9	-	48.1	-	73.0	60.0	-24.9	-
5.688	0.4	51.6	-	52.0	-	73.0	60.0	-21.0	-
24.665	1.0	52.3	-	53.3	-	73.0	60.0	-19.7	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Emission Level 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
6. Emission Level = Correction Factor + Reading Value.

ADT CO. Shielded Room 3
EN55022 CLASS A

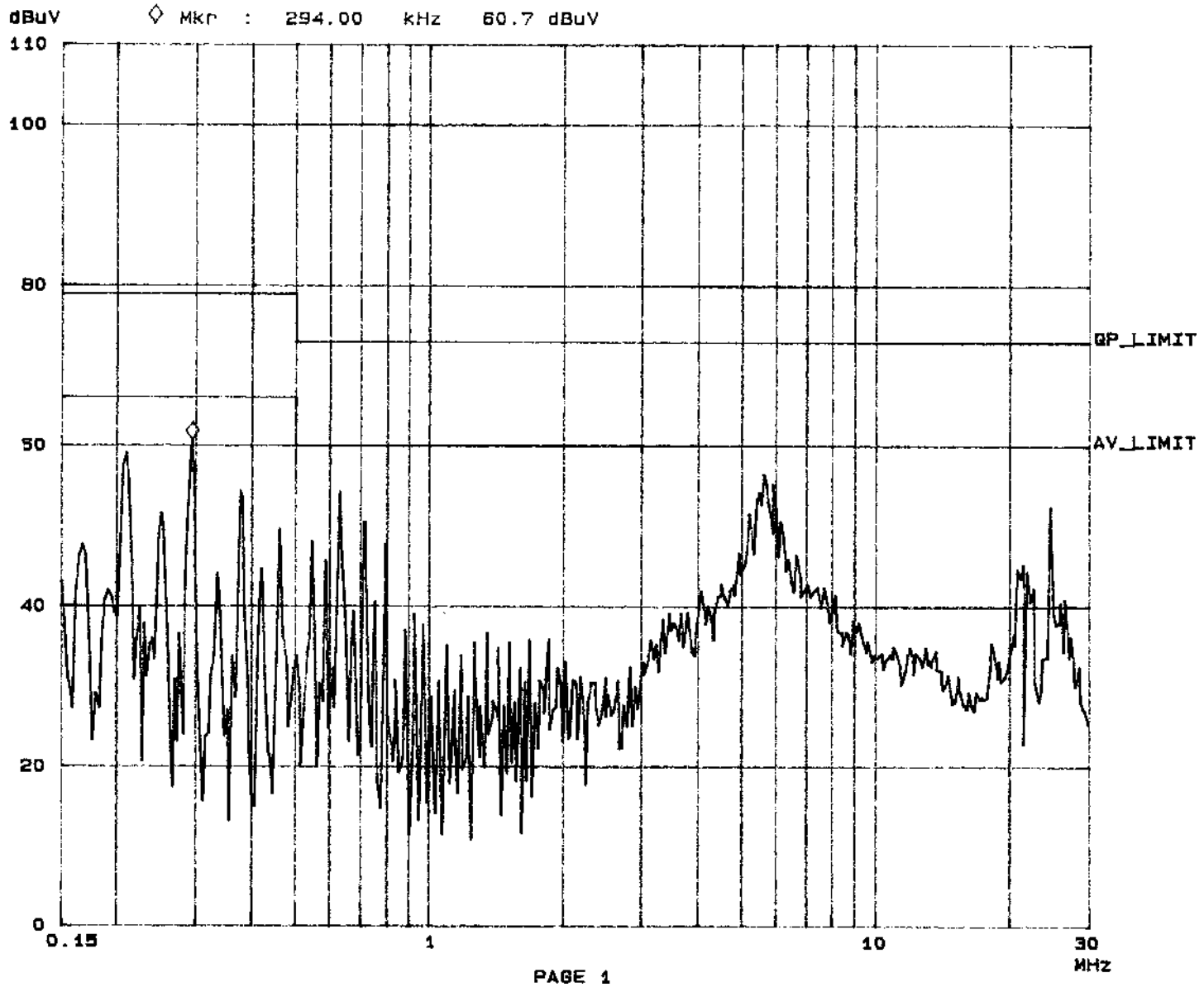
14. May 99 09:58

Report No. CE 8805(3)02
Page 1 > -1
Tested by Jackey Chang

EUT: SBC-770
Op Cond: 1024X768 256 COLOR
Operator: JACKEY
Test Spec: LISN : N
Comment: 230V AC/50Hz
MODE 1: PII 450MHz (100MHz)

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
0.15 MHz	30 MHz	9 kHz	9 kHz	QP	1 s	10 dB	On



4.4 TEST DATA OF CONDUCTED EMISSION (B)

EUT: **CPU BOARD** MODEL: **SBC-675**

6 dB Bandwidth: 10 kHz MODE: **2**

PHASE: **LINE (L)**

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.210	0.2	53.5	-	53.7	-	79.0	66.0	-25.3	-
0.294	0.2	55.3	-	55.5	-	79.0	66.0	-23.5	-
0.629	0.2	58.0	-	58.2	-	73.0	60.0	-14.8	-
3.672	0.3	46.8	-	47.1	-	73.0	60.0	-25.9	-
7.731	0.5	44.4	-	44.9	-	73.0	60.0	-28.1	-
24.638	1.4	55.3	-	56.7	-	73.0	60.0	-16.3	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Emission Level 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
6. Emission Level = Correction Factor + Reading Value.

ADT CO. Shielded Room 3

13. May 99 17:00

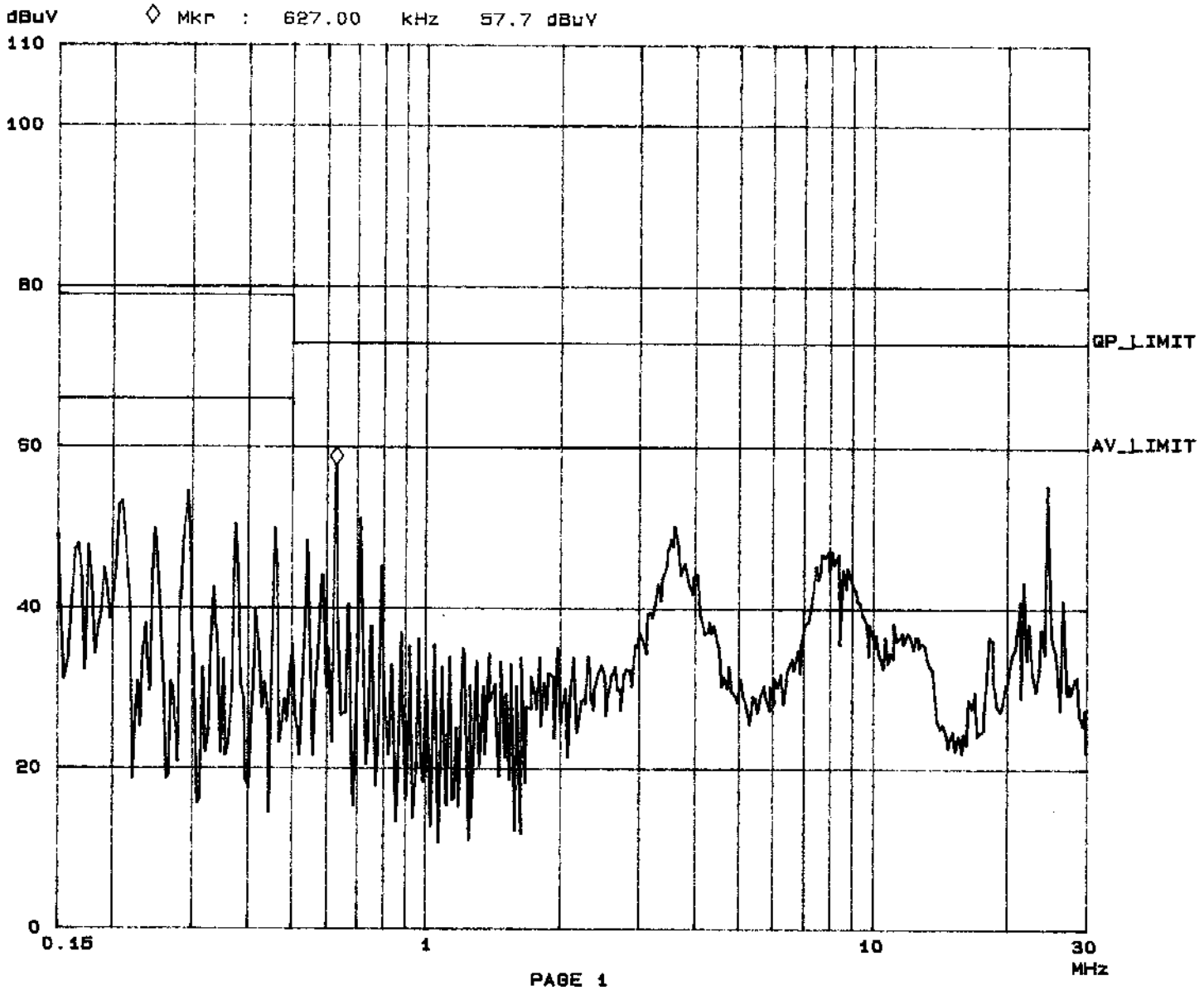
EN55022 CLASS A

Report No. CE88051702
Page 13-1
Tested by Jackey Chang

EUT: SBC-675
Op Cond: 1024X768 256 COLOR
Operator: JACKEY
Test Spec: LISN : L
Comment: 230V AC/50Hz
MODE 2: CELERON 433MHz (66.6MHz)

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB



TEST DATA OF CONDUCTED EMISSION

EUT: **CPU BOARD** MODEL: **SBC-675**

6 dB Bandwidth: 10 kHz MODE: **2**

PHASE: **NEUTRAL (N)**

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.210	0.2	57.9	-	58.1	-	79.0	66.0	-20.9	-
0.294	0.2	59.9	-	60.1	-	79.0	66.0	-18.9	-
0.629	0.2	55.0	-	55.2	-	73.0	60.0	-17.8	-
3.672	0.3	49.9	-	50.2	-	73.0	60.0	-22.8	-
7.731	0.4	45.0	-	45.4	-	73.0	60.0	-27.6	-
24.638	1.0	55.5	-	56.5	-	73.0	60.0	-16.5	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Emission Level 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
6. Emission Level = Correction Factor + Reading Value.

ADT CO. Shielded Room 3

EN55022 CLASS A

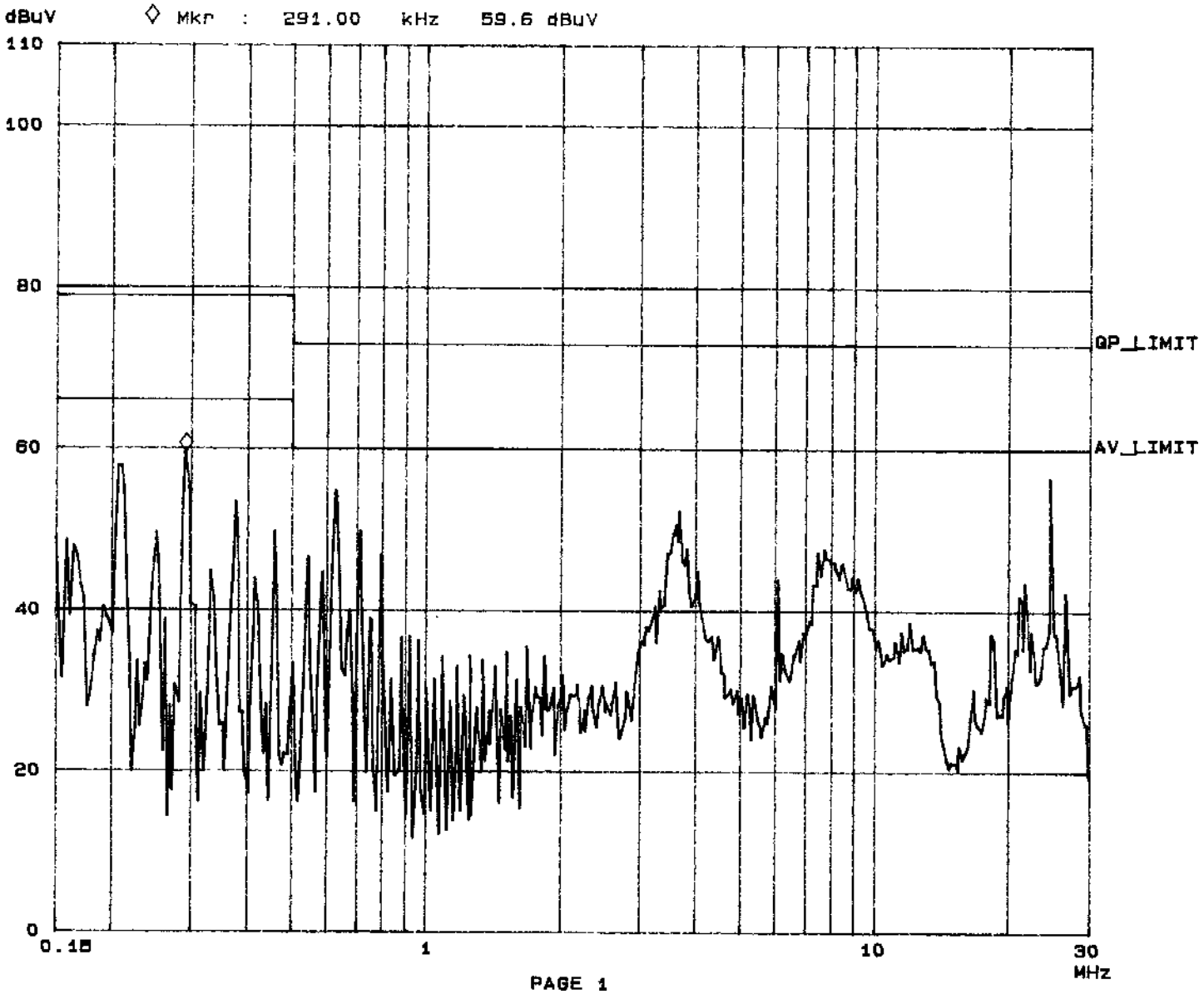
13. May 99 16:49

Report No.CE8805102
Page 10-1
Tested by Jackey Chang

EUT: SBC-675
Op Cond: 1024X768 256 COLOR
Operator: JACKEY
Test Spec: LISN : N
Comment: 230V AC/50Hz
MODE 2: CELERON 433MHz (66.6MHz)

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	0.05ms	10dBLN	OFF	60dB



4.5 TEST DATA OF RADIATED EMISSION (A)

EUT: **CPU BOARD** MODEL: **SBC-770**

ANT. POLARITY: Horizontal MODE: **1**

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
75.17	8.3	20.8	29.1	40.0	-10.9	378	12
124.99	14.4	17.3	31.7	40.0	-8.3	399	0
133.63	14.1	16.2	30.3	40.0	-9.7	399	12
144.01	13.3	15.1	28.4	40.0	-11.6	399	301
167.02	10.8	25.8	36.6	40.0	-3.4	399	353
181.93	10.9	13.1	24.0	40.0	-16.0	399	77
200.46	11.1	20.3	31.4	40.0	-8.6	400	231
225.50	13.5	16.8	30.3	40.0	-9.7	400	155
233.87	14.3	20.8	35.1	47.0	-11.9	400	322
249.98	15.9	16.6	32.5	47.0	-14.5	400	0
267.25	17.0	15.6	32.6	47.0	-14.4	400	345
272.92	16.6	16.6	33.2	47.0	-13.8	400	71
300.68	16.2	26.5	42.7	47.0	-4.3	400	321
350.02	18.8	15.7	34.5	47.0	-12.5	400	25
367.52	19.9	17.8	37.7	47.0	-9.3	400	359
400.91	21.8	18.6	40.4	47.0	-6.6	253	0
451.03	22.4	10.7	33.1	47.0	-13.9	336	12
902.05	30.0	10.4	40.4	47.0	-6.6	158	0

REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+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: **SBC-770**

ANT. POLARITY: Vertical MODE: **1**

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
75.17	8.1	20.4	28.5	40.0	-11.5	113	12
125.00	12.7	21.8	34.5	40.0	-5.5	113	0
133.64	13.2	19.7	32.9	40.0	-7.1	113	12
150.02	13.5	14.7	28.2	40.0	-11.8	113	0
167.05	12.4	24.0	36.4	40.0	-3.6	113	12
200.01	12.2	20.9	33.1	40.0	-6.9	100	0
214.45	12.6	19.2	31.8	40.0	-8.2	100	12
233.89	13.3	18.0	31.3	47.0	-15.7	100	0
250.01	13.8	16.9	30.7	47.0	-16.3	113	12
267.28	15.0	12.0	27.0	47.0	-20.0	100	0
300.68	16.6	19.8	36.4	47.0	-10.6	100	12
334.10	18.3	13.4	31.7	47.0	-15.3	100	0
349.98	19.2	10.9	30.1	47.0	-16.9	100	12
367.49	20.0	16.9	36.9	47.0	-10.1	100	0
400.90	21.7	14.1	35.8	47.0	-11.2	100	12
451.04	22.6	8.8	31.4	47.0	-15.6	100	147
467.86	22.8	3.4	26.2	47.0	-20.8	100	12
902.03	31.5	11.6	43.1	47.0	-3.9	174	334

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

4.6 TEST DATA OF RADIATED EMISSION (B)

EUT: **CPU BOARD** MODEL: **SBC-675**

ANT. POLARITY: Horizontal MODE: **2**

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
75.16	8.3	21.2	29.5	40.0	-10.5	399	0
108.60	13.7	11.6	25.3	40.0	-14.7	399	12
125.07	14.4	10.5	24.9	40.0	-15.1	399	205
200.46	11.1	16.3	27.4	40.0	-12.6	399	30
250.00	15.9	20.8	36.7	47.0	-10.3	381	206
267.29	17.0	17.5	34.5	47.0	-12.5	381	271
300.69	16.2	17.9	34.1	47.0	-12.9	399	63
350.00	18.8	14.0	32.8	47.0	-14.2	399	44
367.49	19.9	16.7	36.6	47.0	-10.4	399	77
400.89	21.8	20.8	42.6	47.0	-4.4	245	147
434.34	22.2	17.0	39.2	47.0	-7.8	242	141
467.72	22.7	19.3	42.0	47.0	-5.0	274	174
801.83	29.0	3.7	32.7	47.0	-14.3	247	180

REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+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: **SBC-675**

ANT. POLARITY: Vertical MODE: **2**

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
75.24	8.1	17.3	25.4	40.0	-14.6	100	12
108.56	12.9	17.4	30.3	40.0	-9.7	100	0
124.99	12.7	17.6	30.3	40.0	-9.7	100	321
133.62	13.2	11.6	24.8	40.0	-15.2	100	0
150.00	13.5	19.7	33.2	40.0	-6.8	100	12
200.46	12.2	16.3	28.5	40.0	-11.5	100	12
233.86	13.2	13.0	26.2	47.0	-20.8	100	0
249.99	13.8	22.0	35.8	47.0	-11.2	100	12
300.68	16.6	17.2	33.8	47.0	-13.2	100	0
334.10	18.3	16.8	35.1	47.0	-11.9	100	149
400.90	21.7	21.4	43.1	47.0	-3.9	142	0
467.70	22.8	14.9	37.7	47.0	-9.3	100	203
801.83	29.0	10.5	39.5	47.0	-7.5	236	12

REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+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

Generic Standard	:	**EN 50082-2: 1995**	
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)
		EN 61000-4-4	(Electrical Fast Transient/Burst, EFT, Power line: 2kV, Signal line: 1kV, Performance Criterion B)
		EN 61000-4-6	(Conducted Radio Frequency Disturbances Test, CS, 0.15-80 MHz, 10V/m, 80% AM, 1kHz, Performance Criterion A)
		EN 61000-4-8	(Power Frequency Magnetic Field Test, 50 Hz, 30A/m, Performance Criterion A)
		ENV 50204	(Radio-Frequency Electromagnetic Field, Pulse modulated, 900+/-5 MHz, 10V/m, 50 % duty cycle, Rep. Frequency 200 Hz, Performance Criterion A)
Input Voltage	:	230 Vac, 50 Hz (to power of Industrial PC)	
Temperature	:	25 ℃	
Humidity	:	55 %	
Atmospheric Pressure	:	999 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 show the result on monitor screen.

5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD)

Basic Standard	:	EN 61000-4-2
Generic Standard	:	EN 50082-2
Discharge Impedance	:	330 ohm / 150 pF
Discharge Voltage	:	Air Discharge - 8 kV (Direct) Contact Discharge - 4 kV (Direct/ 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 B	**PASS**	MODE 1
Criterion B	**PASS**	MODE 2

OBSERVATION DESCRIPTION

Direct Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
8	+/-	1 ~ 2	NA	Note 1
8	+/-	2 ~ 9	NA	Note 2
4	+/-	1 ~ 9	Note 1	NA

Description of test point: (Please refer to ESD photo)

1. Floppy
2. Switch
3. Metal case
4. USB ports
5. Serial ports
6. Parallel port
7. PS2 port
8. RJ 45 port
9. VGA port

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. Right side
3. Left side
4. Rear side

Description of test result:

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

Note 2: The transmission was stopped during the test, but recoverable after the test.

5.5 TEST RESULT OF RADIATED RADIO FREQUENCY DISTURBANCES (RS)

Basic Standard	:	EN 61000-4-3
Generic Standard	:	EN 50082-2
Frequency range	:	80 MHz - 1000 MHz
Field strength	:	10 V/m
Modulation	:	1kHz Sine Wave, 80%, AM Modulation
Dwell Time	:	3 seconds
Frequency step	:	1 % of fundamental
Polarity of Antenna	:	Horizontal and Vertical
Test distance	:	3 m

Test Result		Remarks
Criterion A	**PASS**	MODE 1
Criterion A	**PASS**	MODE 2

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/BURST (EFT/BURST)

Basic Standard	:	EN 61000-4-4
Generic Standard	:	EN 50082-2
Test Voltage	:	Power Line - 2 kV (to power of Industrial PC) Signal/Control Line - 1kV
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 B	**PASS**	MODE 1
Criterion B	**PASS**	MODE 2

OBSERVATION DESCRIPTION

Test Point	Polarity	Test Level (kV)	Result
L1	+/−	2	Note 1
L2	+/−	2	Note 1
GND	+/−	2	Note 1
Signal / Control Line	+/−	1	Note 1

Description of test result:
Note 1: The transmission was stopped during the test, but recoverable after the test.

5.7 TEST RESULT OF CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

Basic Standard	:	EN 61000-4-6
Generic Standard	:	EN 50082-2
Frequency range	:	0.15 MHz - 80 MHz
Field strength	:	10 V/m
Modulation	:	1kHz Sine Wave, 80%, AM Modulation
Frequency step	:	1 % of fundamental
Coupled cable	:	Power Mains, Unshielded
Coupling device	:	CDN-M3 (3 wires), Clamp

Test Result		Remarks
Criterion A	**PASS**	MODE 1
Criterion A	**PASS**	MODE 2

OBSERVATION DESCRIPTION

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

5.8 TEST RESULT OF POWER FREQUENCY MAGNETIC FIELD

Basic Standard	:	EN 61000-4-8
Generic Standard	:	EN 50082-2
Frequency range	:	50 Hz
Field strength	:	30 A/m
Observation Time	:	1 minute
Inductance coil	:	Rectangular type, 1mx1m

Test Result		Remarks
Criterion A	**PASS**	MODE 1
Criterion A	**PASS**	MODE 2

OBSERVATION DESCRIPTION

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

5.9 TEST RESULT OF RADIO-FREQUENCY ELECTROMAGNETIC FIELD, PULSE MODULATED

Basic Standard	:	ENV 50204
Generic Standard	:	EN 50082-2
Frequency range	:	900 +/- 5 MHz
Field strength	:	10 V/m
Modulation	:	200Hz, Square Wave, 50% Duty Cycle
Dwell Time	:	30 second
Polarity of Antenna	:	Horizontal and Vertical
Test distance	:	3 m

Test Result		Remarks
Criterion A	**PASS**	MODE 1
Criterion A	**PASS**	MODE 2

Note: Four sides of EUT are verified separately.

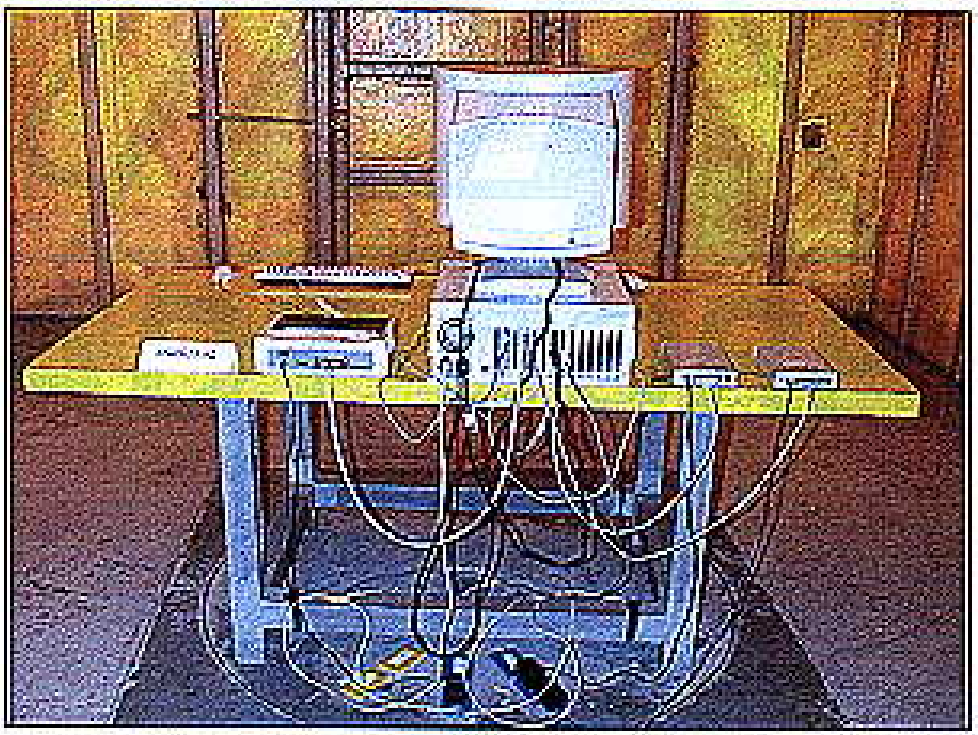
OBSERVATION DESCRIPTION

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

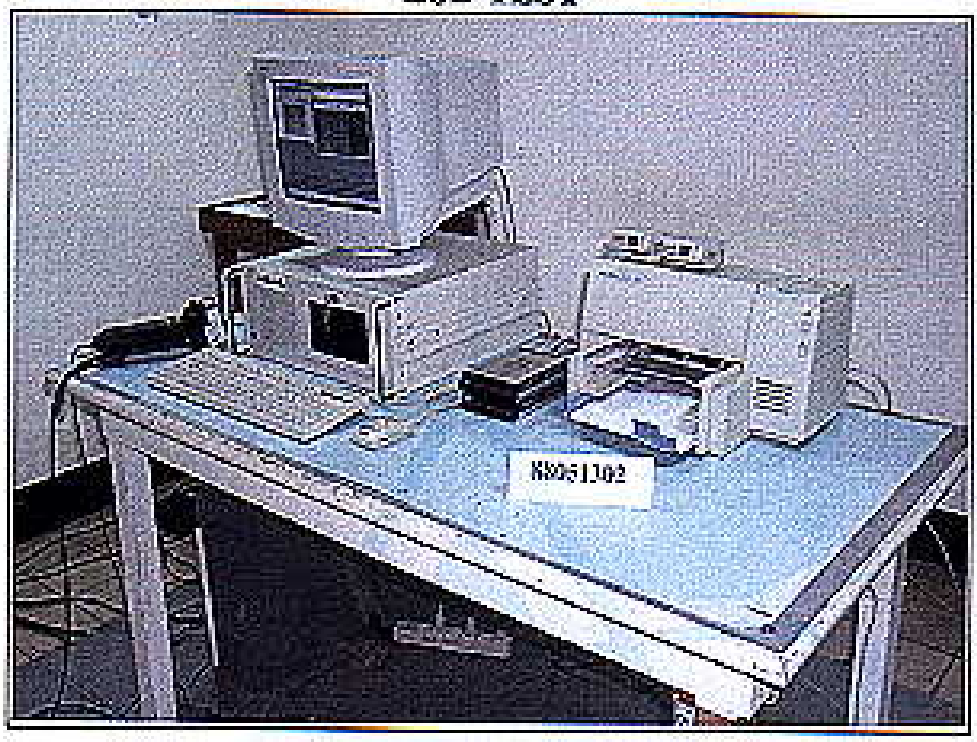
6. PHOTOGRAPHS OF THE TEST CONFIGURATION

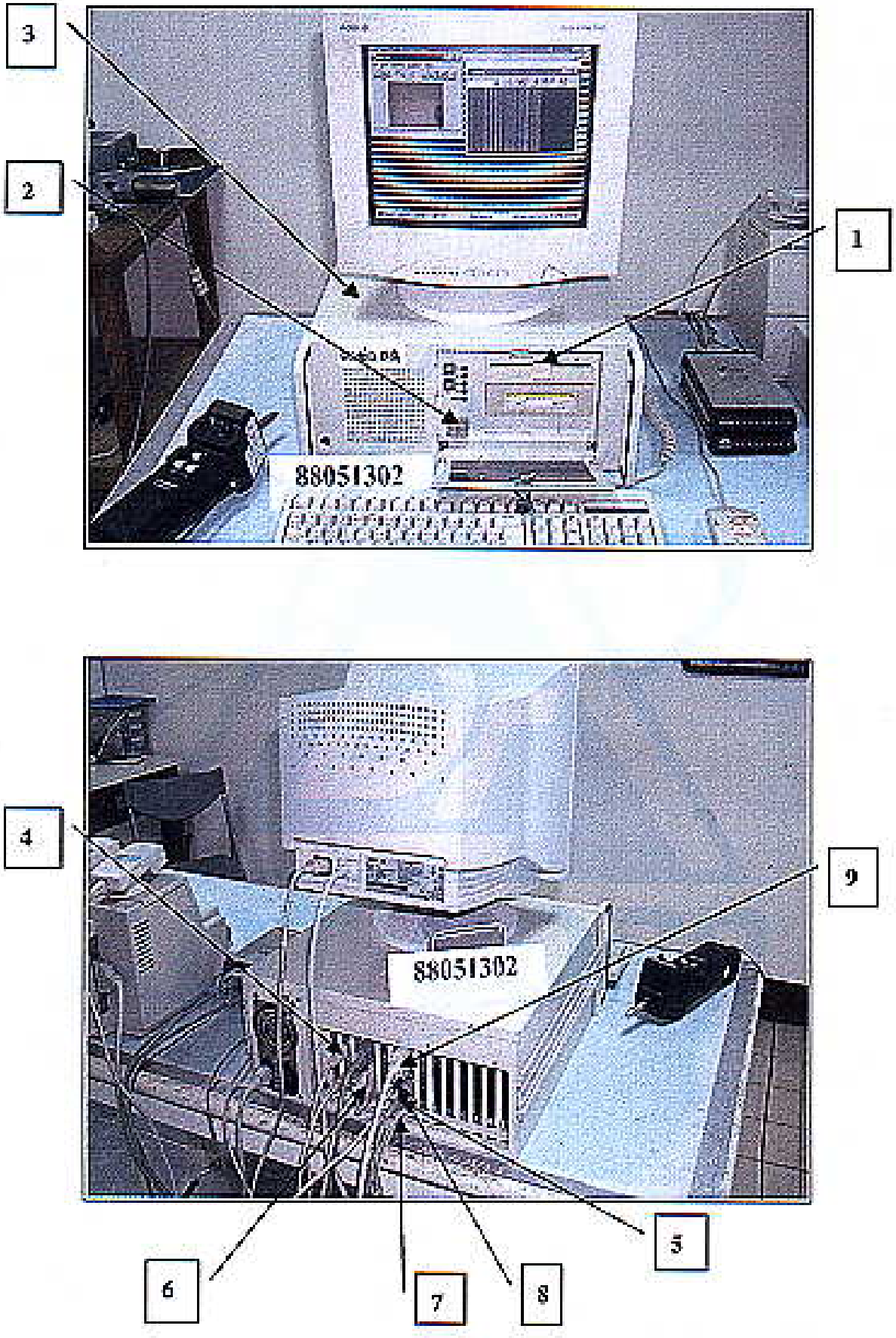
CONDUCTED EMISSION TEST

RADIATED EMISSION TEST



ESD TEST

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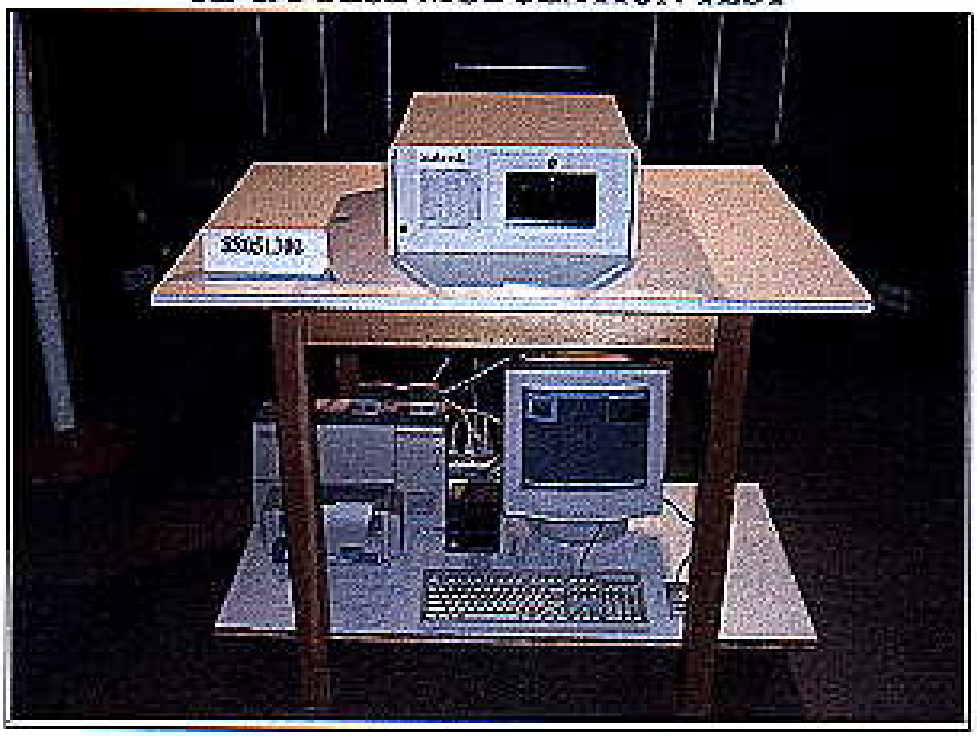
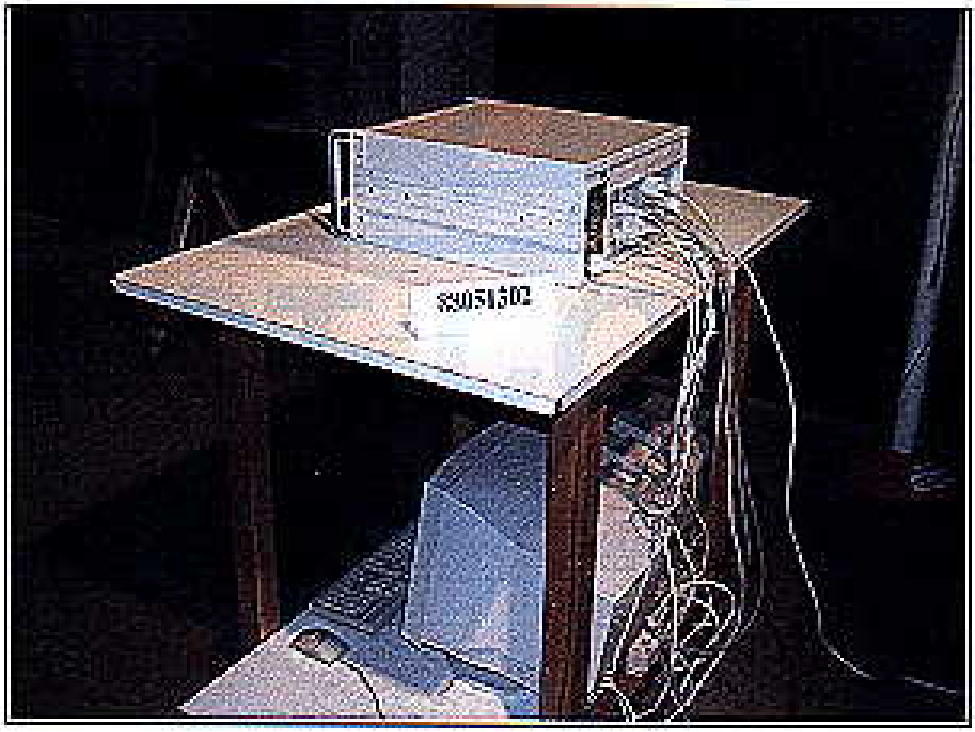
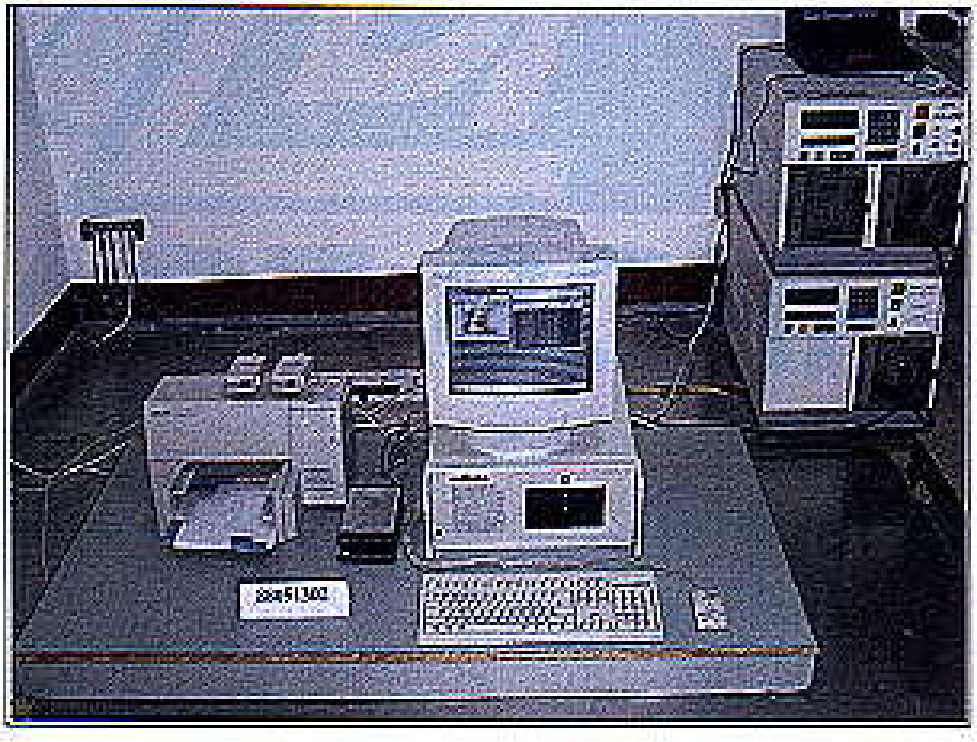
RS & PULSE MODULATION TEST





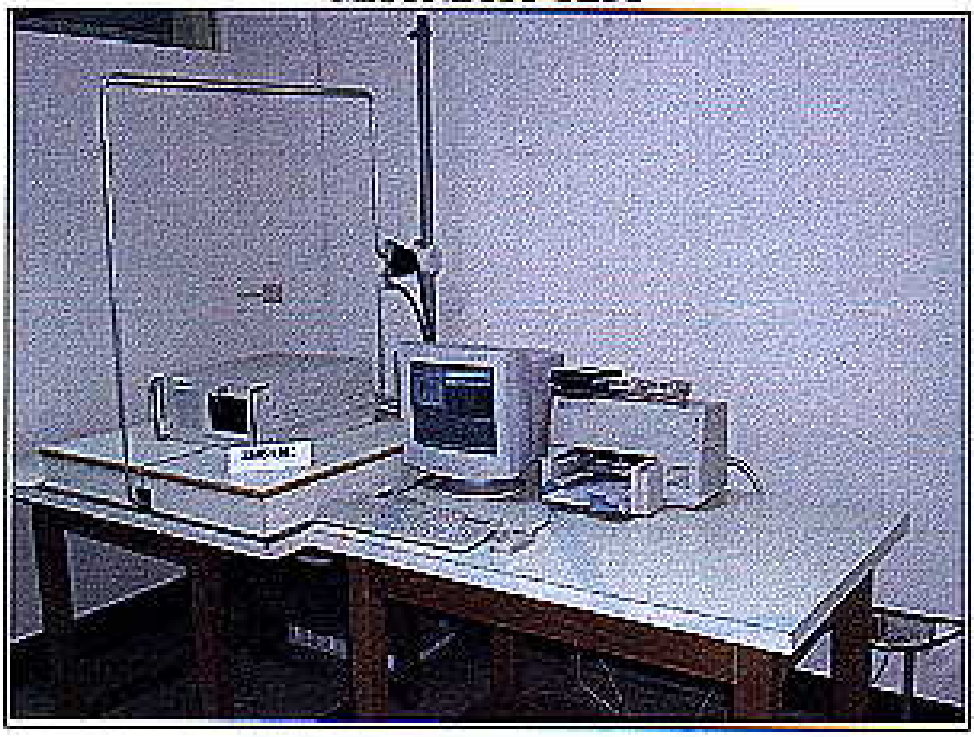
EFT TEST



CONDUCTED SUSCEPTIBILITY TEST

CONDUCTED SUSCEPTIBILITY CLAMP TEST

MAGNETIC 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, 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:

Lin Kou EMC Lab.:
Tel: 886-2-26032180
Fax: 886-2-26022943

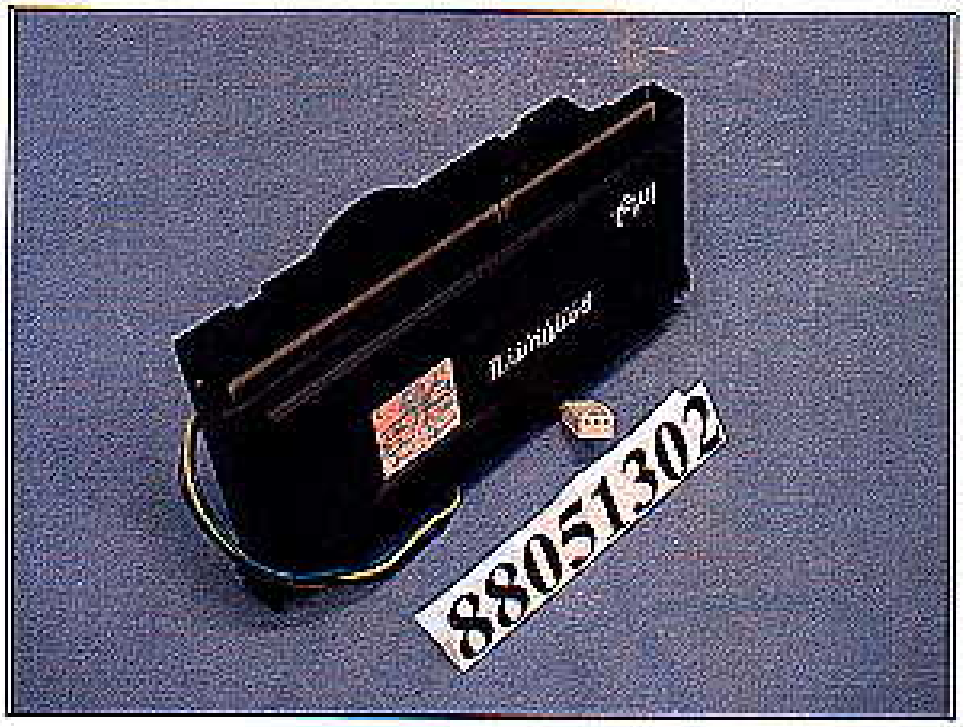
Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

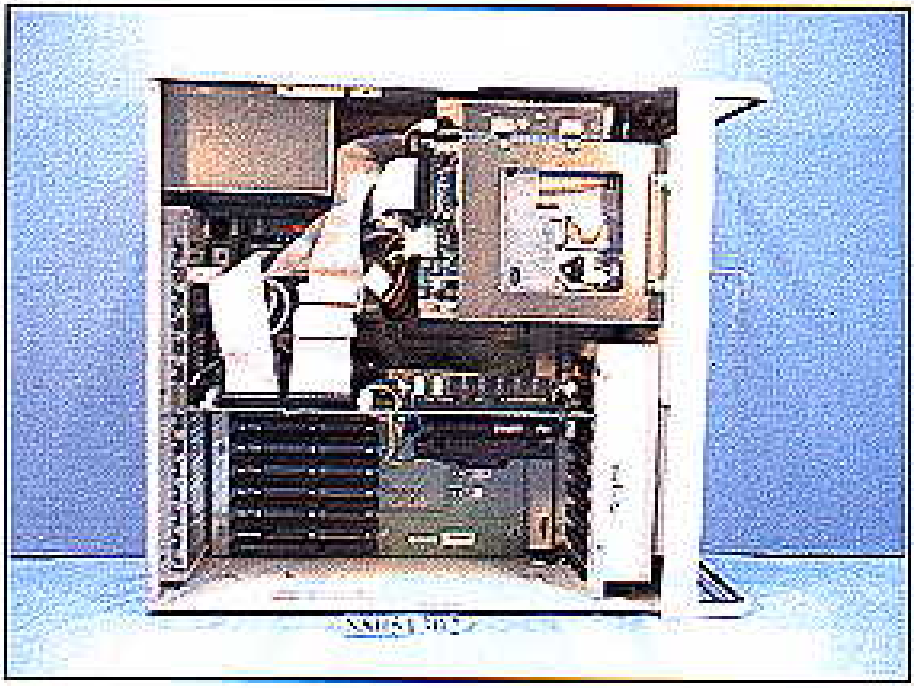
Lin Kou Safety Lab.:
Tel: 886-2-26093195
Fax: 886-2-26093184

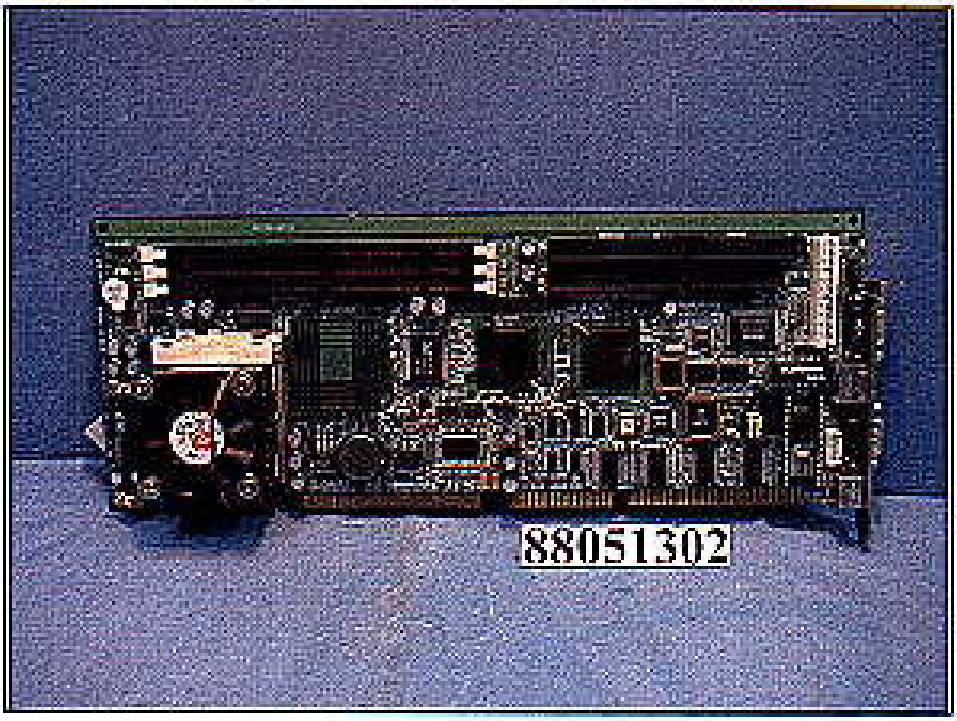
Design Center:
Tel: 886-2-26093195
Fax: 886-2-26093184

E-mail: service@mail.adt.com.tw
http://www.adt.com.tw

CONSTRUCTION PHOTOS OF EUT



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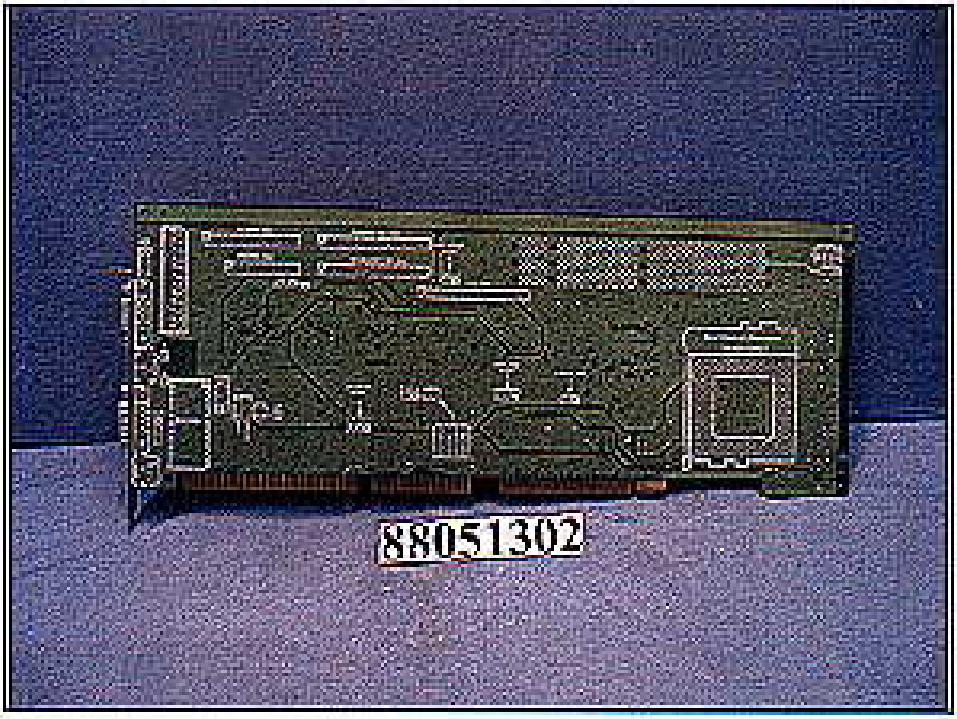
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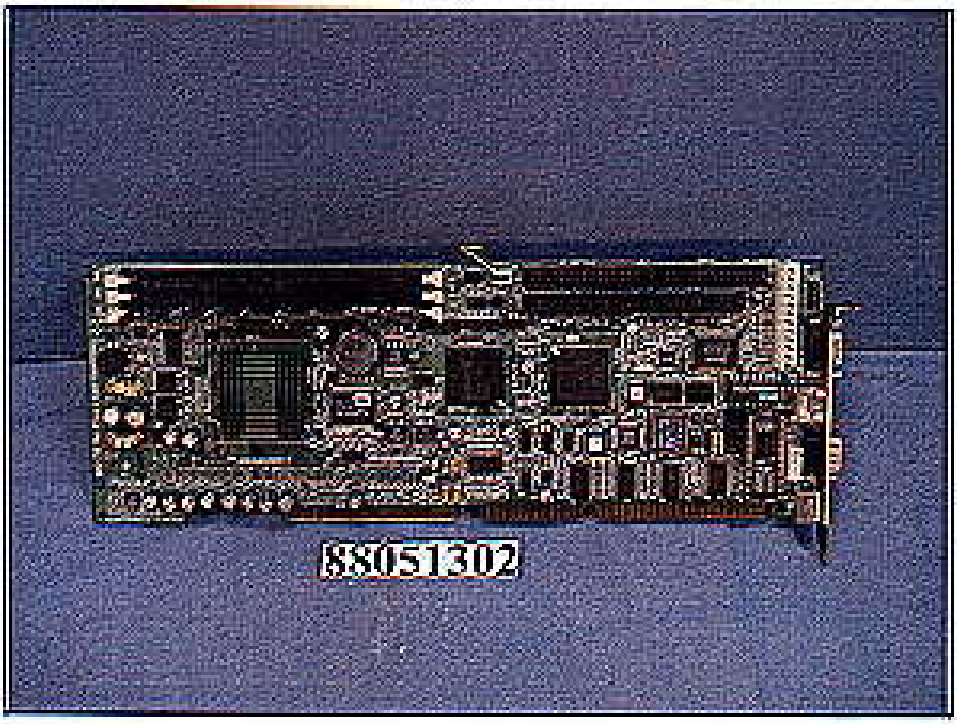
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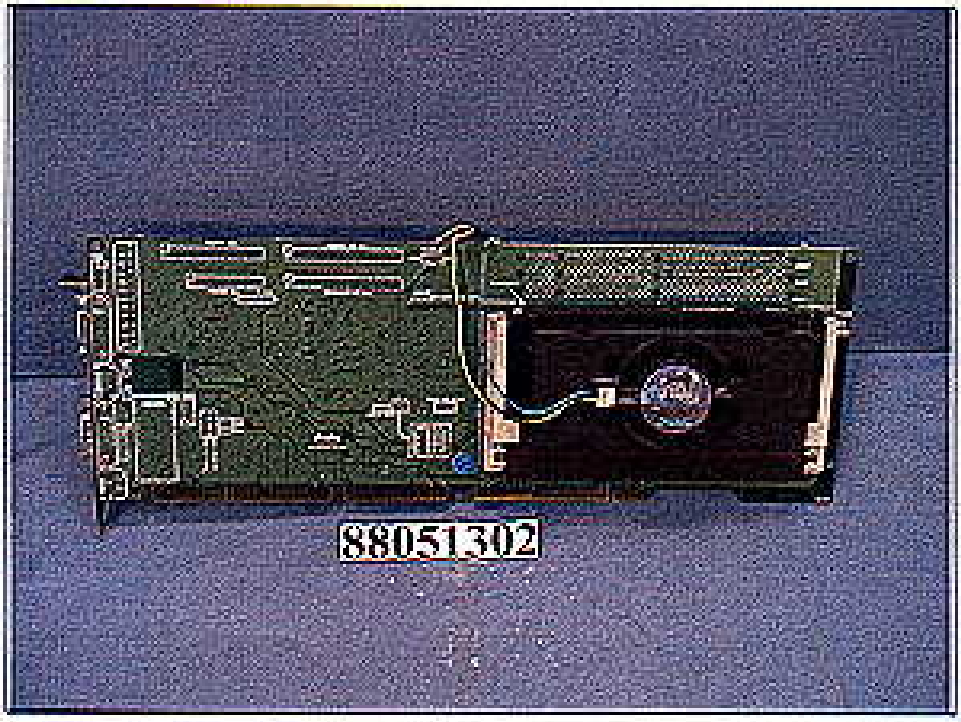
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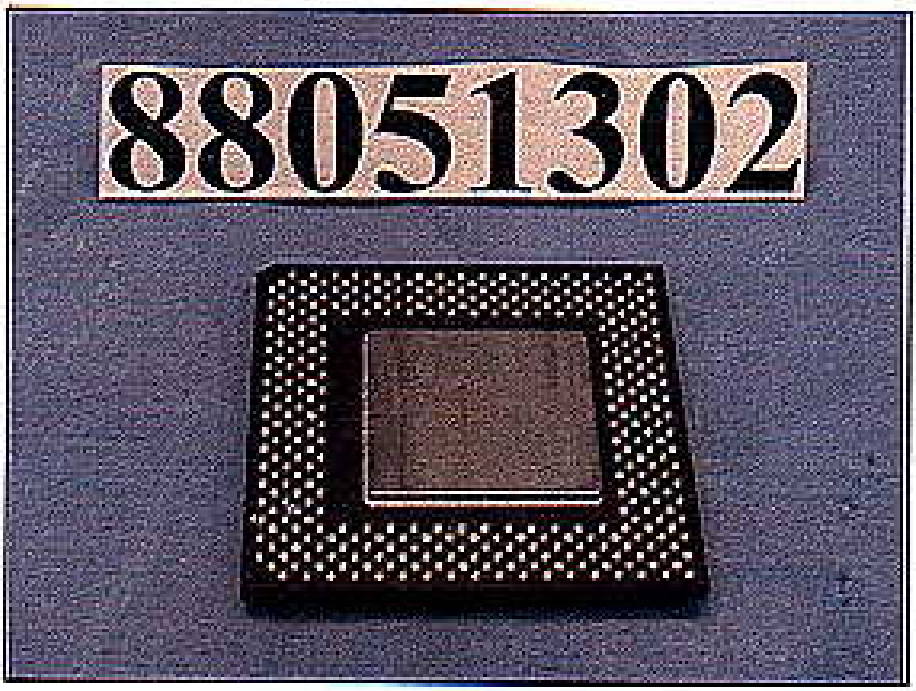
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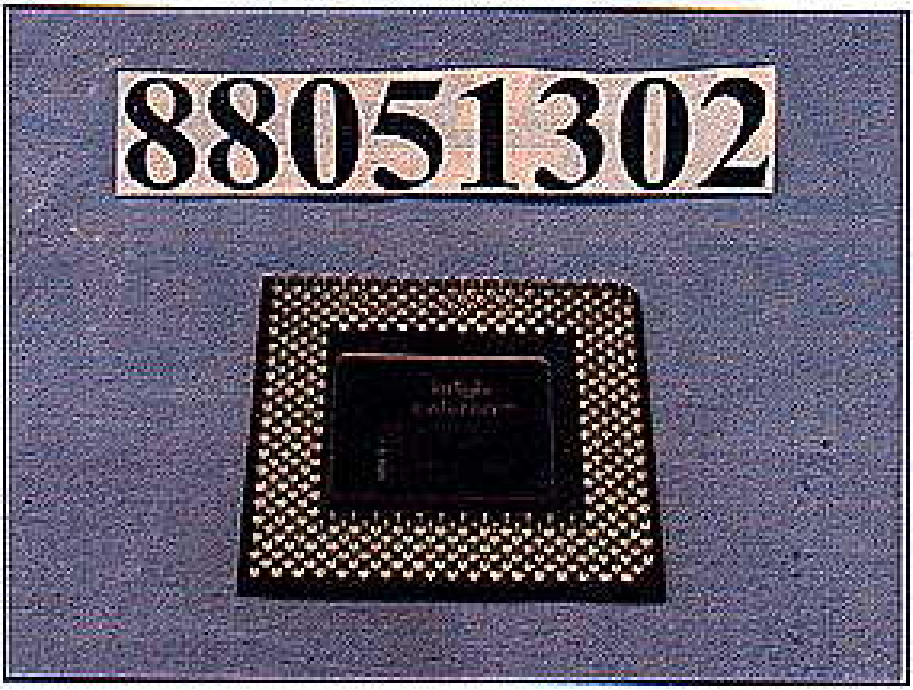
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