EMC

TEST REPORT

REPORT NO. : ADT-EC97056
MODEL NO. : SBC-590
DATE OF TEST : June 29 ~ July 10, 1997

PREPARED FOR: AAEON TECHNOLOGY INC.

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HSIN-TIEN CITY, TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

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12F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

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1. CERTIFICATION

Issue date: July 11, 1997

Product	:	CPU BOARD	
Trade Name	:	AAEON	
Model No.	:	SBC-590	
Applicant	:	AAEON TECHNOLOGY INC.	
Standard	:	EN55 022:1994, Class B	**EN50 082-2:1995**
			EN61000-4-2:1995
			EN61000-4-3: 1997
			EN61000-4-4:1995
			EN61000-4-6:1996
			EN61000-4-8:1993
			ENV50204:1995

We hereby certify that one sample of the designation has been tested in our facility from June 29 to July 10, 1997. 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.

PREPARED BY: Sharon Hsiung , DATE: 7/11/97
(Sharon Hsiung)

CHECKED BY: Andy Cheng , DATE: 7/11/97
(Andy Cheng)

APPROVED BY: _____ , DATE: 7/11/97
(Harris W. Lai)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-590
Power Supply	:	DC
Power Cord	:	N/A

Note: During the test, the EUT was installed in a metal enclosure with a slot board to form an industrial PC. The other parts of industrial PC includes the following:

* Case: AAEON, model: AIPC-110
* Switching power supply: SEASONIC, model: SSG-250G
* VGA Card: CARDEX, model: PCI-S3-765-B2

For more detailed features, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

According to the specifications of manufacturer, the EUT must compliance with the requirements of the following standards:

EN55 022:1994, Class B	**EN50 082-2:1995**
	EN61000-4-2:1995
	EN61000-4-3:1997
	EN61000-4-4:1995
	EN61000-4-6:1996
	EN61000-4-8:1993
	EN61000-4-8:1995

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	ACER	7134T	M500233452	Nonshielded Power Shielded signal
2	KEYBOARD	ZENITH	KB-5923	TBCM581B780	Shielded signal
3	PRINTER	HP	2225C+	2936S56294	Shielded signal Nonshielded Power
4	MODEM X 2	DATATRONICS	1200CK	07-503066 02-542194	Shielded signal Nonshielded Power

Note: There is no ferrite core on the interface cable of all support units.

FOR IMMUNITY TEST

No	Product	Manufacturer	Model No.	Serial No.	I/O Cable
1	MONITOR	ACTION	MV-0951	N/A	Shielded Signal Nonshielded Power
2	KEYBOARD	HP	C3753A	C3753-60223	Shielded Signal
3	PRINTER	HP	C2145A	SG59N16035	Shielded Signal Nonshielded Power
4	MODEM	HAYES	5300AP	A1425300K045	Shielded signal Nonshielded Power
5	MODEM	GVC	F-1114V/R6	853E100	Shielded signal Nonshielded Power

Note: There is a ferrite core on the interface cable of support unit 1.

There is no ferrite core on the interface cable of other support units.

2.2 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.	Date of Calibration
HP Spectrum Analyzer	8594A	3144A00308	Aug. 27, 1996
HP Preamplifier	8447D	2944A08119	Jan. 17, 1997
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 17, 1996
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 30, 1996
CHASE Bilog Antenna	CBL6112	2086	Dec. 28, 1996
EMCO Turn Table	1060	1195	N/A
EMCO Tower	1051	1263	N/A
Open Field Test Site	Site-2	ADT-R02	Oct. 1, 1996

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 17, 1996
ROHDE & SCHWARZ Spectrum	EZM	893787/013	July 17, 1996
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 25, 1996
EMCO-L.I.S.N.	3825/2	9204-1964	July 25, 1996
Shielding Room	Site 2	ADT-C02	N/A

Note: 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.	Date of Calibration
KeyTek, ESD Test System	2000	9105240/41	Aug. 5, 1996
KeyTek, ESD Simulator	MZ-15/EC	92022232	June 12,1997
KeyTek, EFT Generator	CE-40	9508257	Sept. 12, 1996
KeyTek, Capacitive Clamp	CE-40-CCL	9508259	Sept. 12, 1996
KeyTek, Control Center	E103	9508347	N/A
KeyTek, Surge Combination Wave	E501A	9508349	Sept. 20, 1996
KeyTek, Surge Coupler/Decoupler	E551	9508350	Sept. 20, 1996
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	Oct. 1, 1996
KALMUS Power Amplifier	LA1000V	091995-1	N/A
KALMUS Power Amplifier	757LC	091995-2	N/A
HOLADAY Field Probe	HI-4422	89915	Sept. 12, 1996
EMCO BiconiLog Antenna	3141	1001	N/A
FCC Coupling Decoupling Network	FCC-801-M3-25	48	N/A
FCC Coupling Decoupling Network	FCC-801-M2-25	20	N/A
FCC Coupling Decoupling Network	FCC-801-M1-25	17	N/A
BOONTON RF Voltage Meter	9200B	331801AE	Oct. 1, 1996
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 2, 1996
HAEFELY Mains Interference Simulator	PLINE 1610	083690-17	June 20, 1997
HAEFELY Magnetic Field Tester	MAG 100.1	083794-06	N/A
COMBINOVA Magnetic Field Meter	MFM10	224	June 6, 1997

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

4. TEST RESULTS (EMISSION)

4.1 Radio Disturbance

Product Family Standard	:	EN 55 022, Class B
Frequency Range	:	0.15 - 30 MHz (Conducted Emission)
		30 - 1000 MHz (Radiated Emission)
Input Voltage	:	230 Vac, 50 Hz (to power of Industrial PC)
Temperature	:	28 ℃
Humidity	:	60 %
Atmospheric Pressure	:	1060 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: 11.0 dB at 0.250 MHz Minimum passing margin of radiated emission: 3.4 dB at 37.50 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. The Industrial PC reads and writes messages from HDD.
4. The Industrial PC sends "H" messages to monitor and monitor display "H" patterns on screen.
5. The Industrial PC sends "H" messages to each modem.
6. The Industrial PC sends "H" messages to printer, and the printer prints them on paper.
7. Repeat steps 2-7.

4.1.2 TEST DATA OF CONDUCTED EMISSION (A)

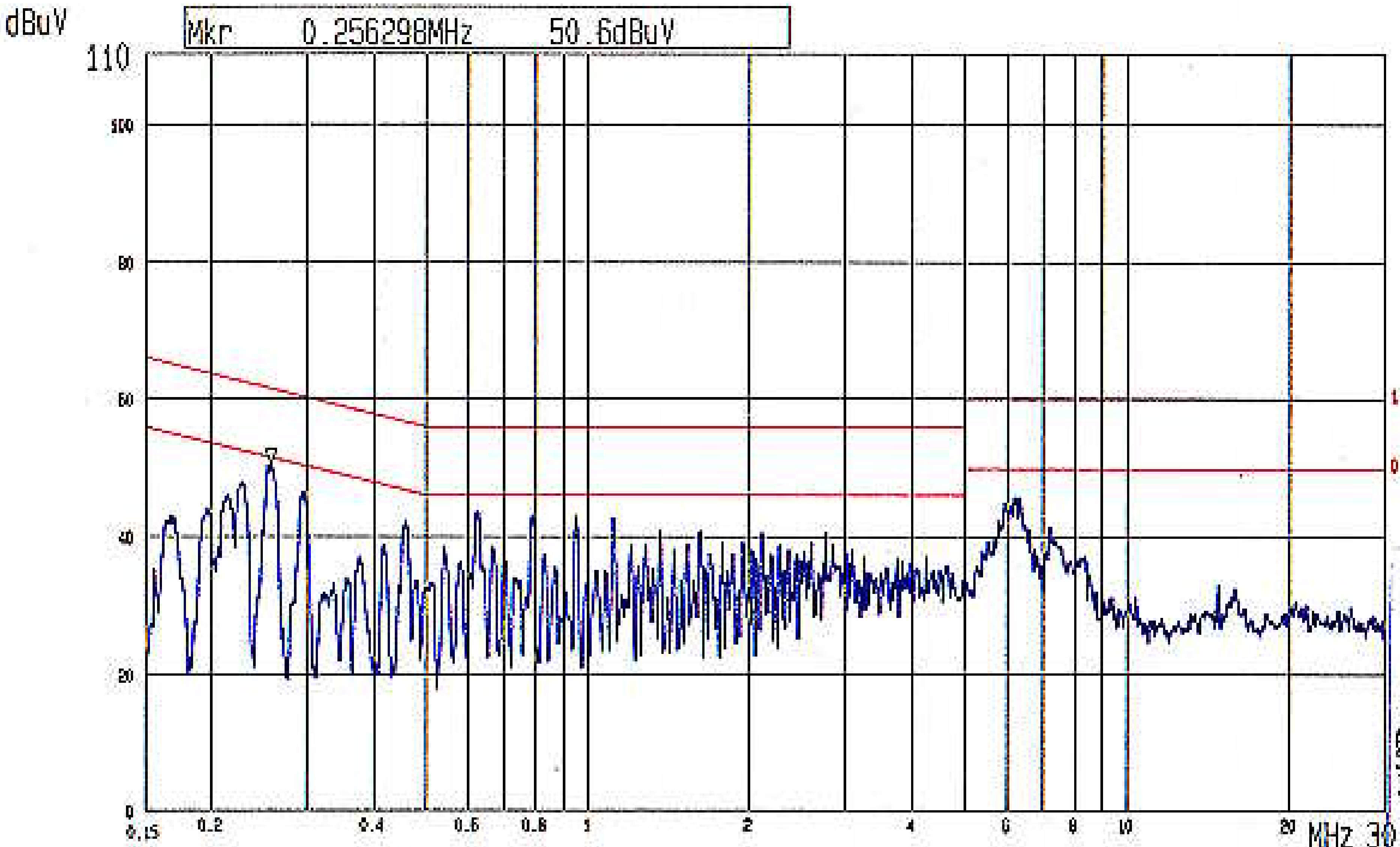
EUT: **CPU BOARD** MODEL: **SBC-590** CPU: **Pentium 166 MHz**

6 dB Band Width: 10 kHz

TEST PERSONNEL: John Liao

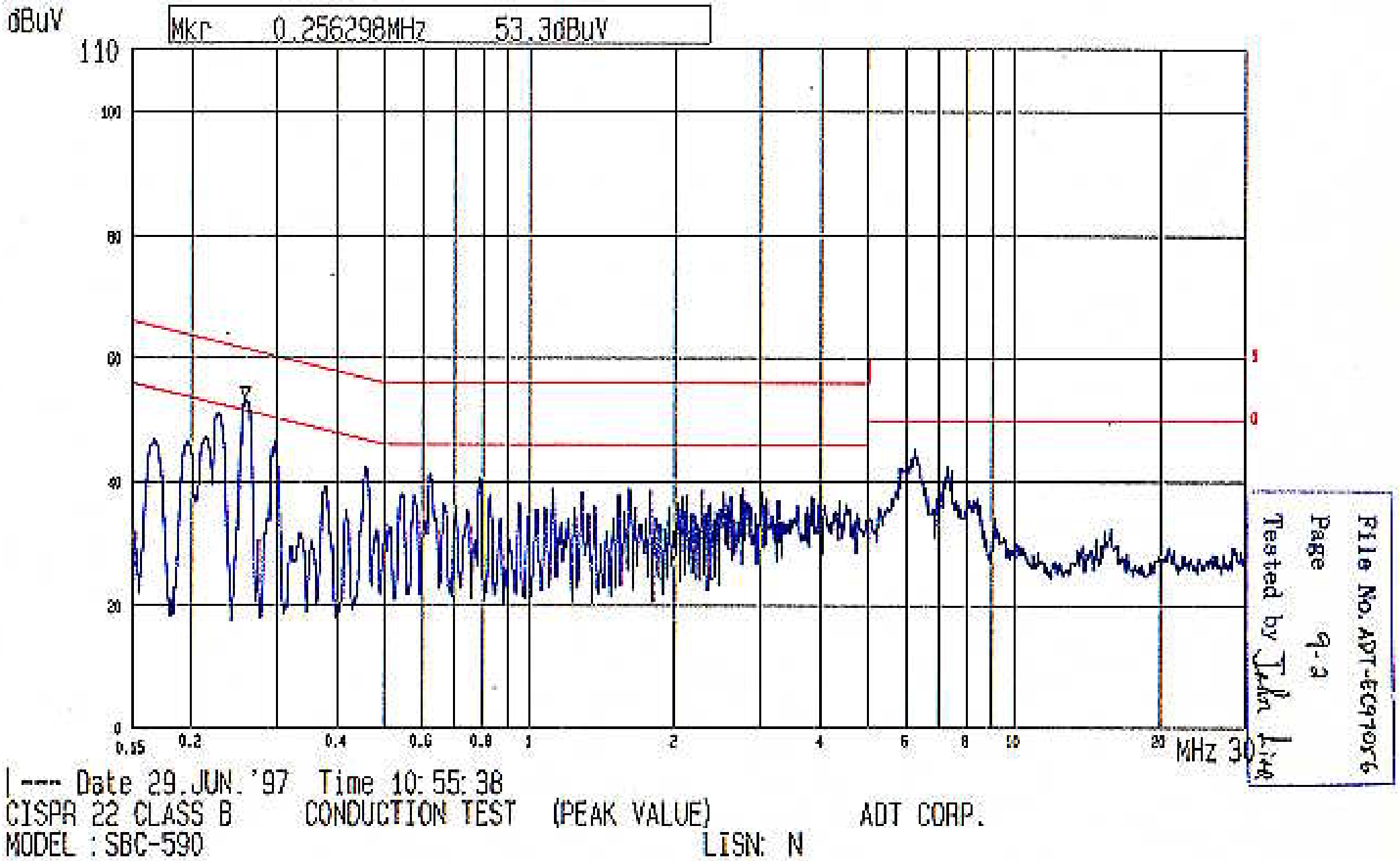
Freq.	L1 Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L1		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.250	49.30	-	50.70	-	61.75	51.75	12.5	-	11.0	-
0.616	41.20	-	38.80	-	56.00	46.00	14.8	-	17.2	-
1.109	38.50	-	38.10	-	56.00	46.00	17.5	-	17.9	-
1.603	37.20	-	36.60	-	56.00	46.00	18.8	-	19.4	-
5.969	38.50	-	37.80	-	60.00	50.00	21.5	-	22.2	-
6.313	39.80	-	39.10	-	60.00	50.00	20.2	-	20.9	-

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 level of other frequencies were very low against the limit.



|--- Date 29.JUN.'97 Time 10:53:44
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL : SBC-590 LISN: L

File No. ADT-EC97056
Page 9-1
Tested by John Liao


dBuV
Mkr 0.256298MHz 53.36BuV
110
100
80
60
40
20
0
0.15
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
MHz 30
Date 29.JUN.'97 Time 10:55:38
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL : SBC-590
LISN: N
File No. ADT-EC97056
Page 9-3
Tested by

4.1.3 TEST DATA OF RADIATED EMISSION (A1)

EUT: **CPU BOARD** MODEL: **SBC-590** CPU: **Pentium 166 MHz**

ANTENNA: CHASE BILOG CBL6112 POLARITY: Horizontal

DETECTOR FUNCTION: CISPR, Quasi-peak 6 dB BAND WIDTH: 120 kHz

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

TEST PERSONNEL: John Liao

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
75.06	7.9	11.0	18.9	30.0	-11.1
108.41	13.6	5.1	18.7	30.0	-11.3
125.09	13.4	8.0	21.4	30.0	-8.6
133.43	13.4	5.7	19.1	30.0	-10.9
171.84	11.0	4.5	15.5	30.0	-14.5
190.85	10.9	11.3	22.2	30.0	-7.8
200.13	10.9	10.9	21.8	30.0	-8.2
205.23	11.3	8.6	19.9	30.0	-10.1

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.

TEST DATA OF RADIATED EMISSION (A2)

EUT: **CPU BOARD** MODEL: **SBC-590** CPU: **Pentium 166 MHz**

ANTENNA: CHASE BILOG CBL6112 POLARITY: VERTICAL

DETECTOR FUNCTION: CISPR, Quasi-peak 6 dB BAND WIDTH: 120 kHz

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

TEST PERSONNEL: John Liao

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
37.50	14.6	12.0	26.6	30.0	-3.4
51.57	9.0	9.2	18.2	30.0	-11.8
80.94	8.9	14.0	22.9	30.0	-7.1
108.42	12.2	10.0	22.2	30.0	-7.8
125.10	13.3	11.6	24.9	30.0	-5.1
133.42	13.4	9.5	22.9	30.0	-7.1
200.16	12.2	13.3	25.5	30.0	-4.5
205.27	12.3	4.0	16.3	30.0	-13.7
433.65	19.2	1.6	20.8	37.0	-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.

5. TEST RESULTS (IMMUNITY)

5.1 GENERAL DESCRIPTION

Basic Standard	:	EN61000-4-2	(Electrostatic Discharge Test, ESD)
		EN61000-4-3	(Radiated Radio-Frequency Disturbance Test, RS)
		EN61000-4-4	(Electrical Fast Transient/Burst Test, EFT)
		EN61000-4-6	(Conducted Radio Frequency Disturbances Test, CS)
		EN61000-4-8	(Power Frequency Magnetic Field Test)
		ENV50204	(Radio-Frequency Electromagnetic Field, Pulse modulated)
Generic Standard	:	EN 50 082-2	
Input Voltage	:	230 Vac, 50 Hz (to power of Industrial PC)	
Temperature	:	22 ℃	
Humidity	:	58 %	
Atmospheric Pressure	:	1060 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	:	EN61000-4-2
Generic Standard	:	EN 50 082-2
Discharge Impedance	:	330 ohm / 150.pF
Discharge Voltage (Direct/Indirect)	:	Air Discharge - 8 kV (Direct/Indirect) Contact Discharge - 4 kV
Polarity	:	Positive/Negative
Number of Discharge	:	Minimum 10 times at each test point
Discharge Mode	:	Single Discharge
Discharge Period	:	1 second minimum
Test Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

OBSERVATION DESCRIPTION

Direct Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
4	+	1-4	Note 1	N/A
8	+	5	N/A	Note 1

Description of test point:

1. COM ports
2. FDD
3. Power Switch
4. Metal case
5. LPT ports

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.

5.5 TEST RESULT OF RADIATED RADIO FREQUENCY DISTURBANCES (RS)

Basic Standard	:	EN61000-4-3
Generic Standard	:	EN 50 082-2
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 Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

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	:	EN61000-4-4
Generic Standard	:	EN 50 082-2
Test Voltage	:	Power Line - 2 kV (to power of Industrial PC) Signal/Control Line - N/A
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 Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

OBSERVATION DESCRIPTION

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

Description of test result:

Note1: There is no change compared with initial operation during the test.

5.7 TEST RESULT OF CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

Basic Standard	:	EN61000-4-6
Generic Standard	:	EN 50 082-2
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)
Test Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

OBSERVATION DESCRIPTION

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

5.8 TEST RESULT OF POWER FREQUENCY MAGNETIC FIELD

Basic Standard	:	EN61000-4-8
Generic Standard	:	EN 50 082-2
Frequency range	:	50Hz
Field strength	:	30 A/m
Observation Time	:	1 minute
Inductance coil	:	Rectangular type, 1mx1m
Test Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

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	:	ENV50204
Generic Standard	:	EN 50 082-2
Frequency range	:	900 +/- 5 MHz
Field strength	:	10 V/m
Modulation	:	200Hz, Square Wave, 50% Duty Cycle
Dewell Time	:	30 second
Polarity of Antenna	:	Horizontal and Vertical
Test distance	:	3 m
Test Personnel	:	

Test Result		Remarks
Criterion A	PASS	Model: SBC-590

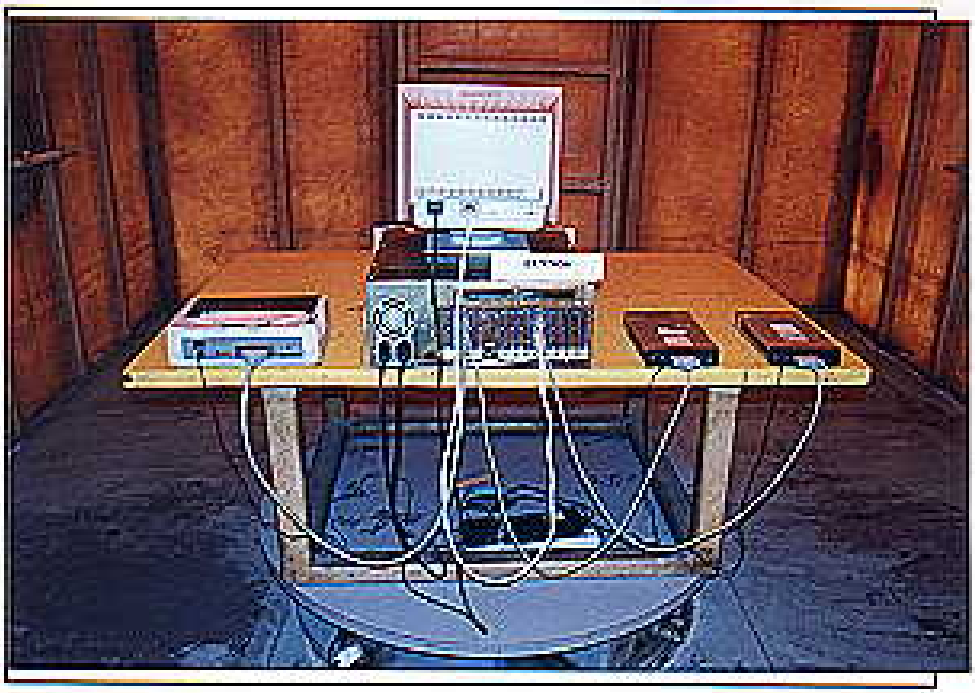
Note: Four sides of EUT are verified separately.

OBSERVATION DESCRIPTION

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

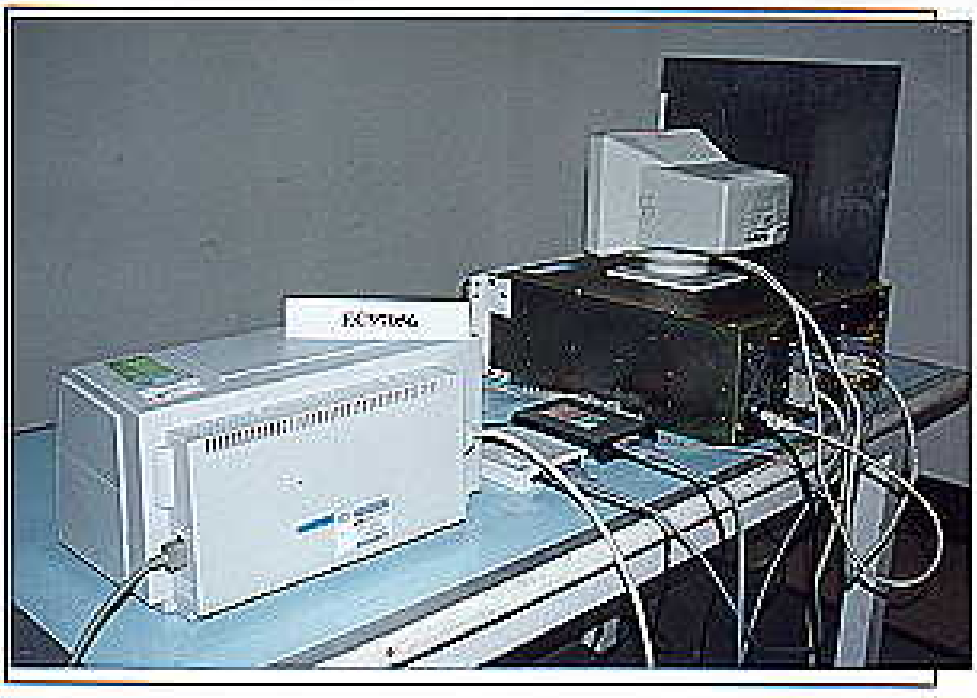
6. PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST

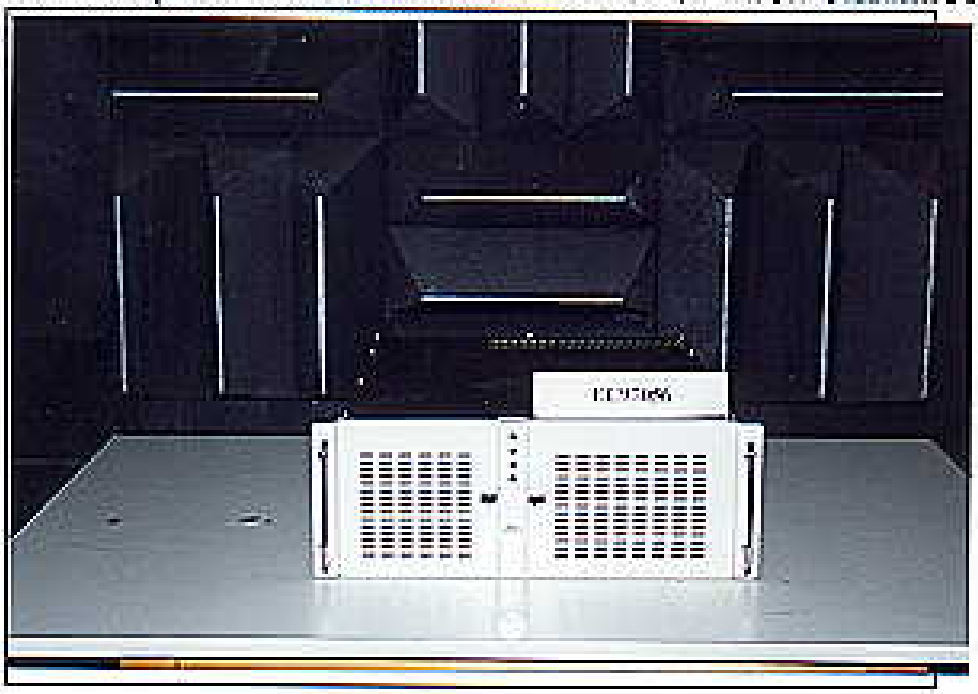


CONDUCTED EMISSION TEST

ESD TEST



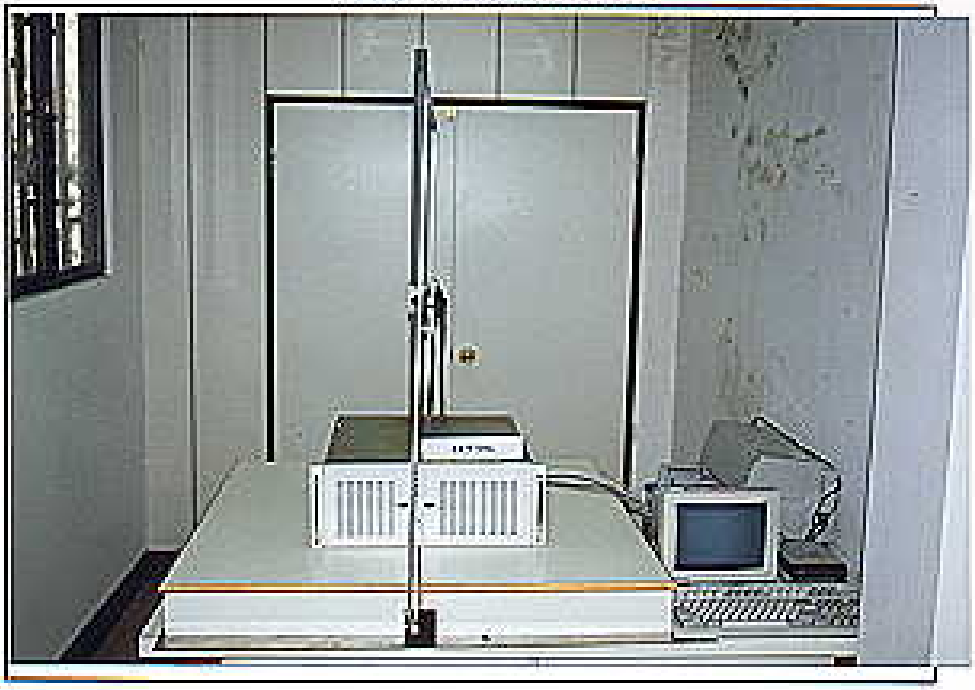
RS TEST (AM MODULATION AND PULSE MODULATION)



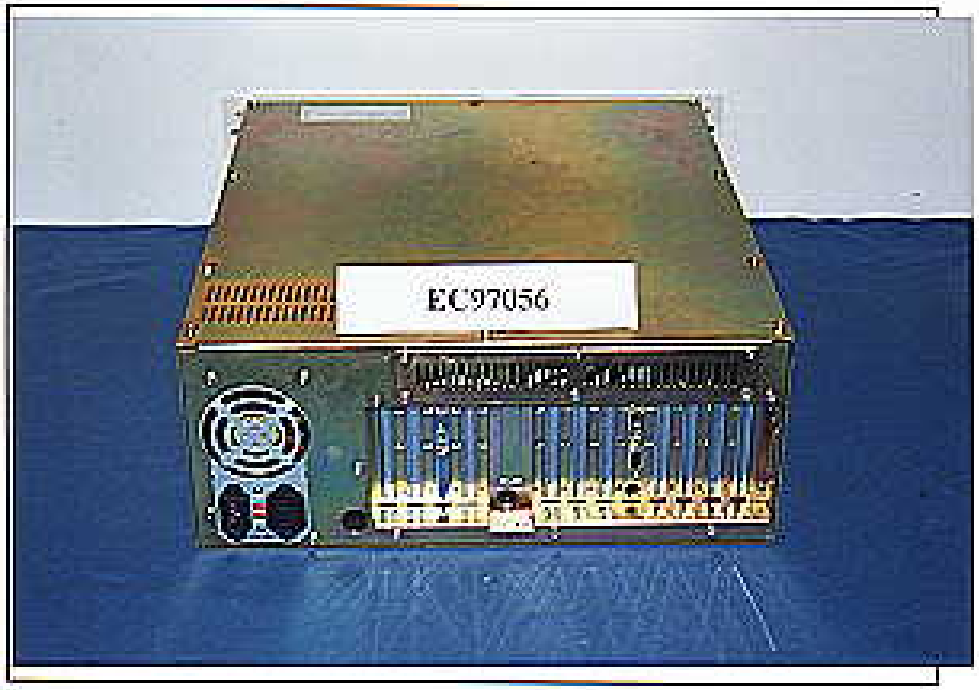
EFT TEST

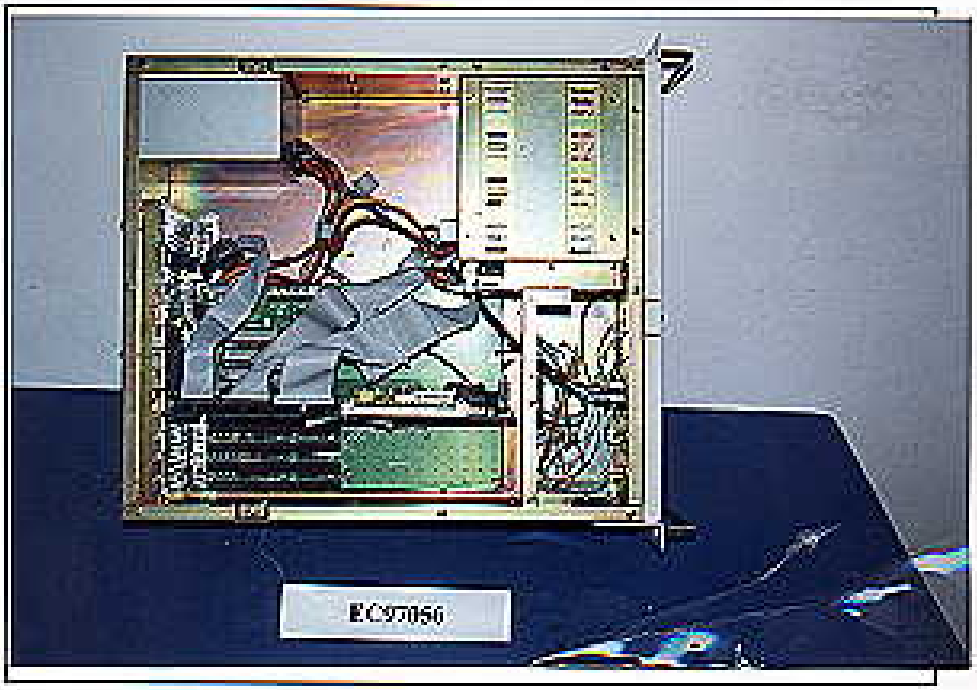
CONDUCTED SUSCEPTIBILITY TEST

MAGNETIC TEST



7. CONSTRUCTION PHOTOS OF EUT

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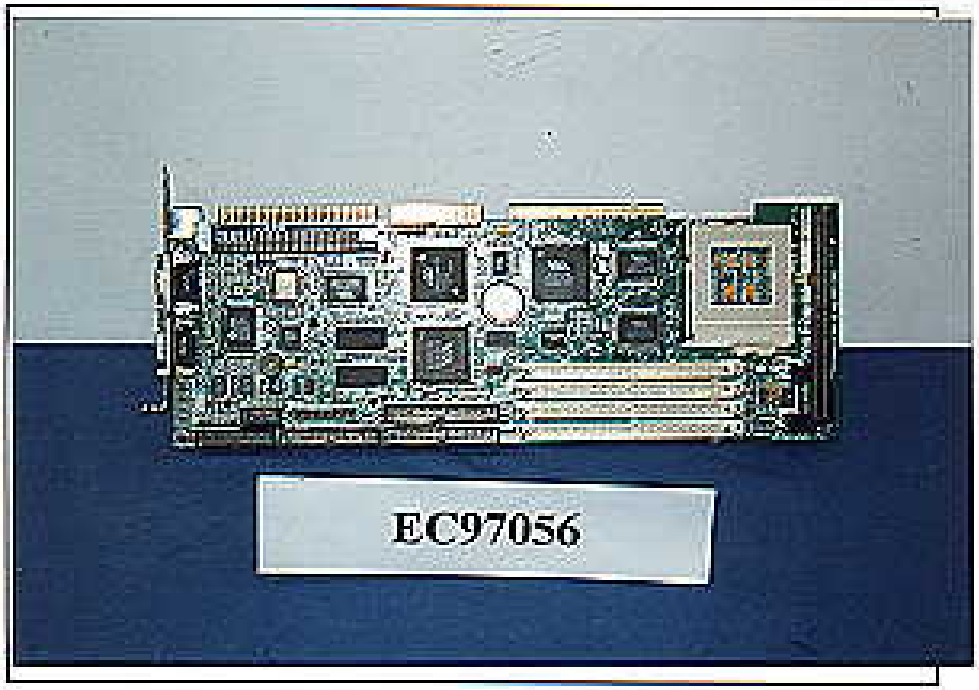
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8. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

* CPU	Pentium 166 MHz
* Bus interface	ISA and PCI (PC/AT) bus
* Data bus	64 bit
* Processing ability	64 bit
* Chipset	VT 82C575/82C576/82C577
* RAM memory	1 MB to 128 MB. Uses four 72-pin SIMM sockets supporting EDO RAM
* L2 Cache memory size	256KB/512KB 2nd level cache memory (Support pipeline burst SRAM module)
* Shadow RAM memory	Supports system and video BIOS shadow memory
* Feature connector	26-pin header for external VGA display
* Enhanced IDE hard disk	Faast PCI bus, supports up to four enhanced IDE (ATA-2)
* Driver interface	Large hard disk drives or other enhanced IDE devices. Supports mode 3 and mode 4 hard disks.
* Floppy disk drive interface	Supports up to two floppy disk drives, 5.25" and/or 3.5"
* Bidirectional parallel port	Configurable to LPT1, LPT2, LPT3 or disabled. Supports SPP/EPP/ECP standards
* Serial ports	Two serial RS-232 ports; use 16C550 UARTs with 16-byte FIFO buffer. Supports speeds up to 115 Kbps. Ports can be individually configured from COM1 to COM4 or disabled
* BIOS	Award BIOS
* Watchdog timer	Can generate a system reset or IRQ15. The time interval is software slectable from 1 to 64 seconds
* PC/104	104-pin connector for a 16-bit bus
* DMA channels	7
* Interrupt levels	15
* Keyboard or PS/2 mouse	A 6-pin mini DIN keyboard connector is located on the mounting bracket for easy access to the keyboard and PS/2 mouse
* Bus speed	8 MHz for ISA bus

* Max. power requirements	+5V@5A
* Power supply voltage	+5V (4.75V to 5.25V)
* Operating temperature	0 to 60 ℃
* Board size	13.3"(L) x 4.8"(W)
* Board weight	0.5 kg.