



EMC

TEST REPORT

REPORT NO. : F88061511
MODEL NO. : SBC-597
DATE OF TEST : June 15, 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



Accredited Laboratory

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

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1.

CERTIFICATION

Issue Date: June 22, 1999

Product : CPU BOARD
Trade Name : AAEON
Model No. : SBC-597
Applicant : AAEON TECHNOLOGY INC.
Standard : FCC Part 15, Subpart B, Class A
ANSI C63.4-1992
CISPR 22:1993+A1:1995+A2:1996, Class A

We hereby certify that one sample of the designation has been tested in our facility on June 15, 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.

The test results show that the EUT as described in this report is in compliance with the Class A limits of conducted and radiated emission of applicable standards.

TESTED BY : Kenny Meng , DATE: 6/22/99
(Kenny Meng)

CHECKED BY : Stacy Chang , DATE: 6/22/99
(Stacy Chang)

APPROVED BY : Mike Su , DATE: 6/22/99
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION**NVLAQ**

Accredited Laboratory



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product : CPU BOARD
Model No. : SBC-597
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 was tested under the following configurations:

CPU	AMD, K6III, 450MHz
HDD	MAXTOR, 72700AP
FDD	TEAC, FD-235HF
CHASSIS	AAEON, AIPC-110
SPS	SEASONIC, SSG-250G

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 DESCRIPTION OF SUPPORT UNITS

The EUT was installed into a system and tested together with necessary accessories or support units during the test. The following support units or accessories are used to form representative test configuration during the tests.

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	COLOR MONITOR	ADI	937G	BR8937G	Nonshielded Signal (1.5m) Shielded Power (1.8m)
2	PRINTER	HP	2225C+	DSI6XU2225	Nonshielded Signal (1.0m) Shielded Power (1.2m)
3	MODEM x2	ACEEX	1414	IFAXDM1414	Shielded signal (1.2m) Nonshielded Power (1.2m)
4	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
5	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded signal (1.5m)
6	USB KEYBOARD	BTC	7932	E5XKBUCP10410	Shielded Signal (1.5m)
7	USB MOUSE	DEXIN	A2U800A	NIYA2U800A	Shielded Signal (1.5m)
8	PC	IBM	6587-T8T	AN06587F	Nonshielded power (10.0m) Shielded Signal (1.8m)
9	MONITOR	ADI	PD-959	FCC DoC Approved	Nonshielded Signal (1.5m) Shielded Power (1.8m)
10	KEYBOARD	HP	C3757A	C1GE03614	Shielded Signal (1.4m)
11	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded signal (1.5m)

Note: 1. Support unit 1-7 acted as SERVER PC and communicated with support unit 8-11 which acted as HOST PC and systems of communication partner via a UTP cable (10m).

2. Support unit 6 & 7 were connected to the USB ports of EUT.

2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 1992. Radiated testing was performed at an antenna to EUT distance of 3/10 m on an open area test site.

Please refer to the photos of test configuration in Item 5.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

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	NA

- Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS 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	8590L	3544A01176	April 22, 2000
HP Preamplifier	8447D	2944A08485	April 21, 2000
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESM1	839013/007 839379/002	Aug. 27, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE BILOG Antenna	CBL6112A	2221	Aug. 10, 1999
EMCO Turn Table	1060	1115	NA
SHOSHIN Tower	AP-4701	A6Y005	NA
Open Field Test Site	Site 5	ADT-R05	Aug. 9, 1999

- Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMAS 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 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

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

* Detector Function: Quasi-Peak

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	54.0

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 CISPR 22

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

Frequency Range : 0.15 - 30 MHz (Conducted Emission)
30 - 2000 MHz (Radiated Emission)
Input Voltage : 120 Vac, 60 Hz
Temperature : 23 °C
Humidity : 63 %
Atmospheric Pressure : 1006 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -15.0 dB at 9.518 MHz Minimum passing margin of radiated emission: -3.7 dB at 181.94 MHz

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
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 "II" messages to printer, and the printer prints them on paper.
8. Repeat steps 2-8.



4.3 TEST DATA OF CONDUCTED EMISSION

EUT: CPU BOARD

MODEL: SBC-597

6 dB Bandwidth: 10 kHz

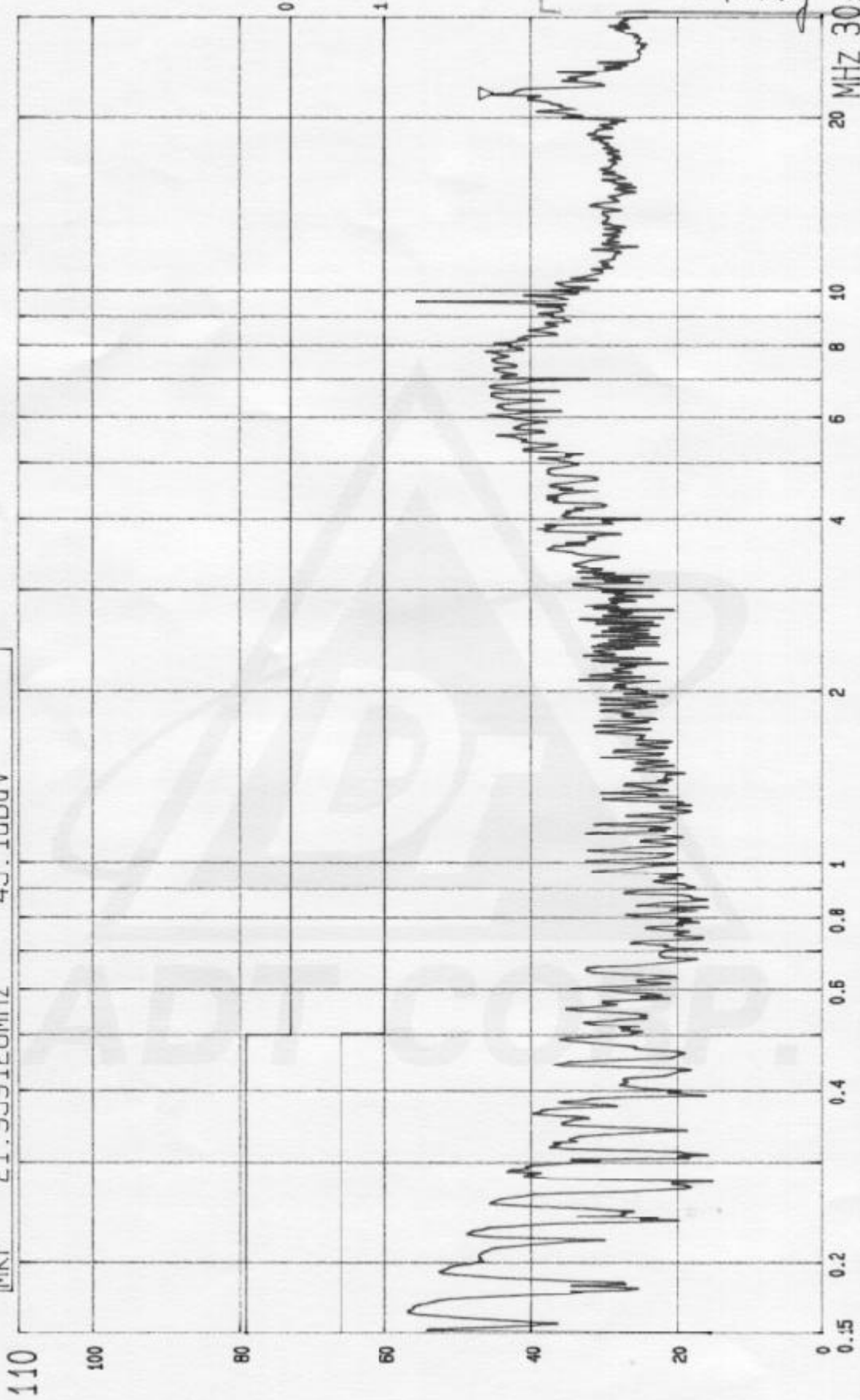
PHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.162	0.2	56.9	-	57.1	-	79.0	66.0	-21.9	-
0.192	0.2	51.4	-	51.6	-	79.0	66.0	-27.4	-
3.561	0.3	38.7	-	39.0	-	73.0	60.0	-34.0	-
6.607	0.5	45.3	-	45.8	-	73.0	60.0	-27.2	-
9.518	0.7	54.3	-	55.0	-	73.0	60.0	-18.0	-
22.089	1.7	45.1	-	46.8	-	73.0	60.0	-26.2	-

- 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.

dBuV

Mkr 21.959128MHz 45.1dBuV



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Tested by Kenny-meng

---- Date 15.JUN.'99 Time 20:40:41
CISPR 22 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: SBC-597 K6/3 450 1024X768 256 COLOR

ADT CORP.
LISN: L



TEST DATA OF CONDUCTED EMISSION

EUT: CPU BOARD

MODEL: SBC-597

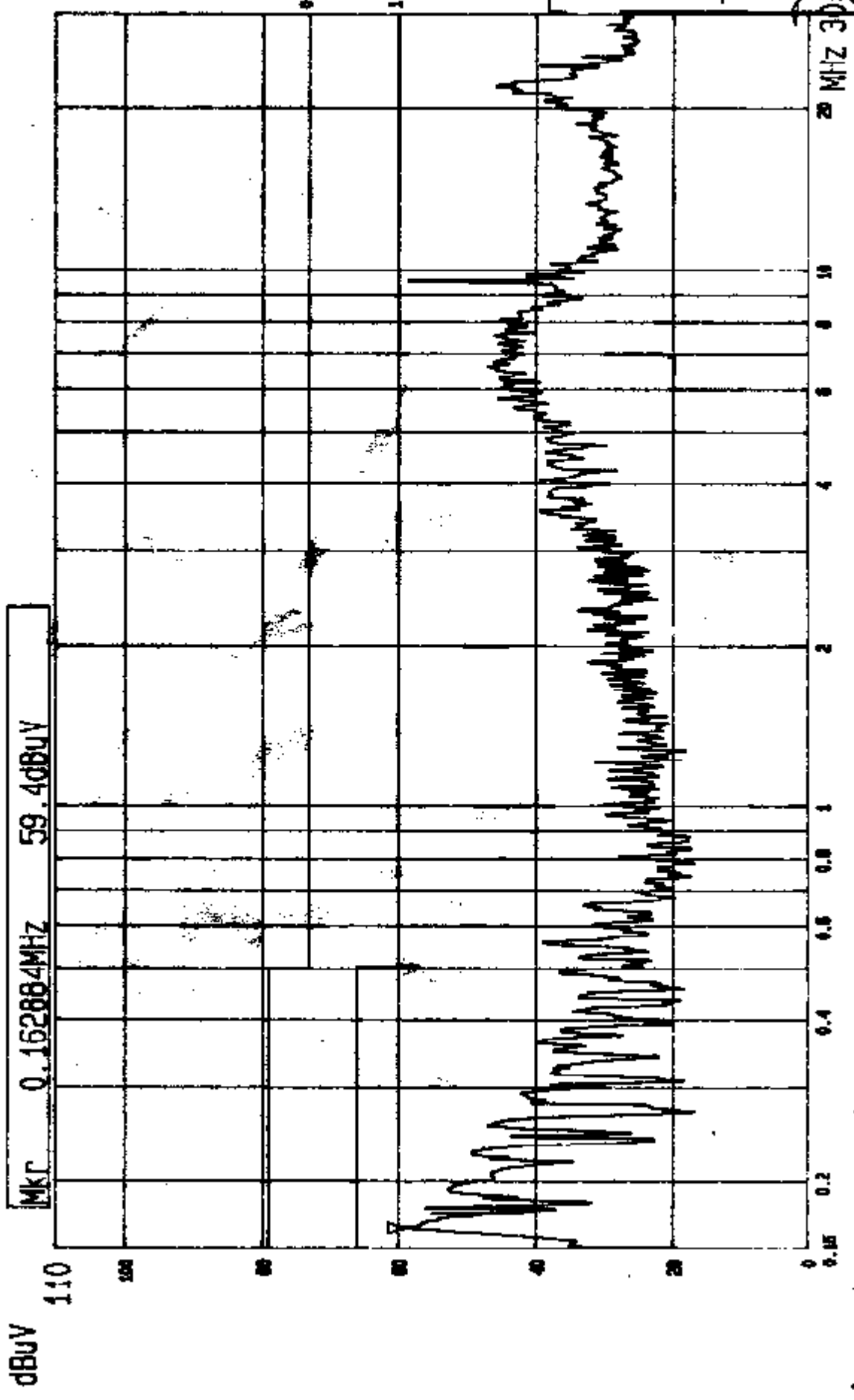
6 dB Bandwidth: 10 kHz

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.
0.162	0.2	58.3	-	58.5	-	79.0	66.0	-20.5	-
0.192	0.2	51.8	-	52.0	-	79.0	66.0	-27.0	-
3.561	0.2	39.3	-	39.5	-	73.0	60.0	-33.5	-
6.607	0.5	45.8	-	46.3	-	73.0	60.0	-26.7	-
9.518	0.7	57.3	-	58.0	-	73.0	60.0	-15.0	-
22.089	1.2	45.3	-	46.5	-	73.0	60.0	-26.5	-

- 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.

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Tested by Kenny-Mong



--- Date 15. JUN. '99 Time 20: 35: 23
CISPR 22 CLASS A CONDUCTION TEST (PEAK VALUE)
MODEL: SBC-597 K6/3 450 1024X768 256 COLOR
ADT CORP.
LISN: N



4.4 TEST DATA OF RADIATED EMISSION

EUT: CPU BOARD

MODEL: SBC-597

ANT. POLARITY: Horizontal

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz

MEASURED DISTANCE: 3 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
77.97	8.3	21.9	30.2	40.0	-9.8	400	272
116.96	14.5	17.3	31.8	40.0	-8.2	400	346
181.94	11.8	24.5	36.3	40.0	-3.7	400	327
200.43	12.4	20.3	32.7	40.0	-7.3	400	138
208.82	12.9	19.1	32.0	40.0	-8.0	400	244
214.75	13.2	16.9	30.1	40.0	-9.9	400	93
225.50	13.7	16.3	30.0	40.0	-10.0	400	113
300.68	16.3	21.5	37.8	47.0	-9.2	400	87
400.98	20.4	17.2	37.6	47.0	-9.4	209	131
451.00	21.7	17.8	39.5	47.0	-7.5	264	201
501.14	22.1	17.0	39.1	47.0	-7.9	242	34
701.70	25.1	9.0	34.1	47.0	-12.9	215	324

- 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-597

ANT. POLARITY: Vertical

DETECTOR FUNCTION AND BANDWIDTH: Quasi peak, 120 kHz (30-1000 MHz)
Peak, 1 MHz (1000 MHz-2000 MHz)

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

FREQUENCY RANGE: 1000-2000 MHz

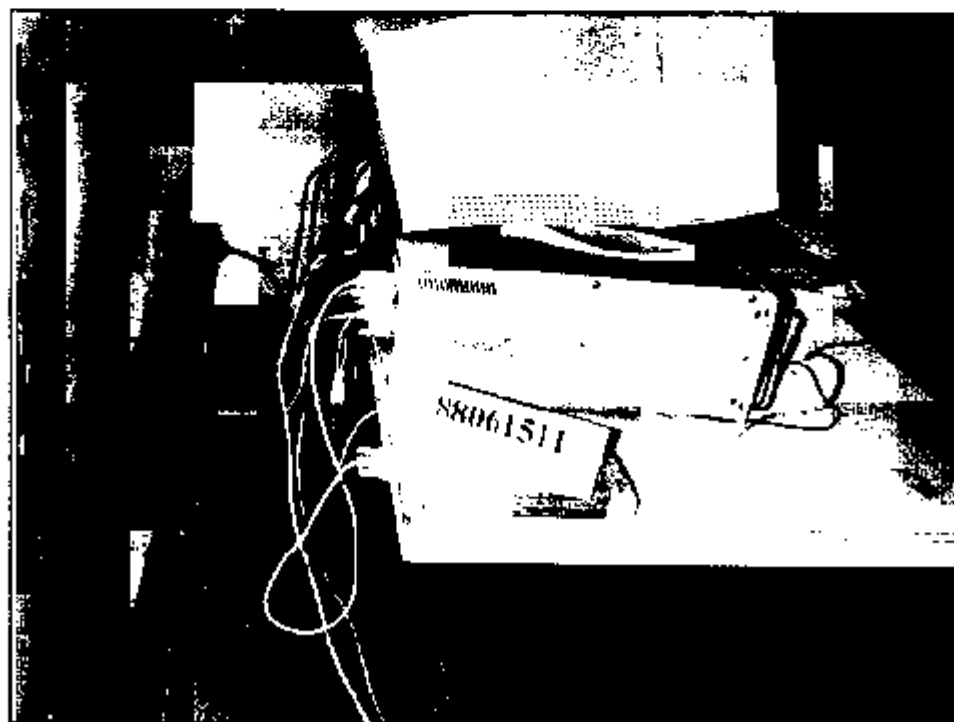
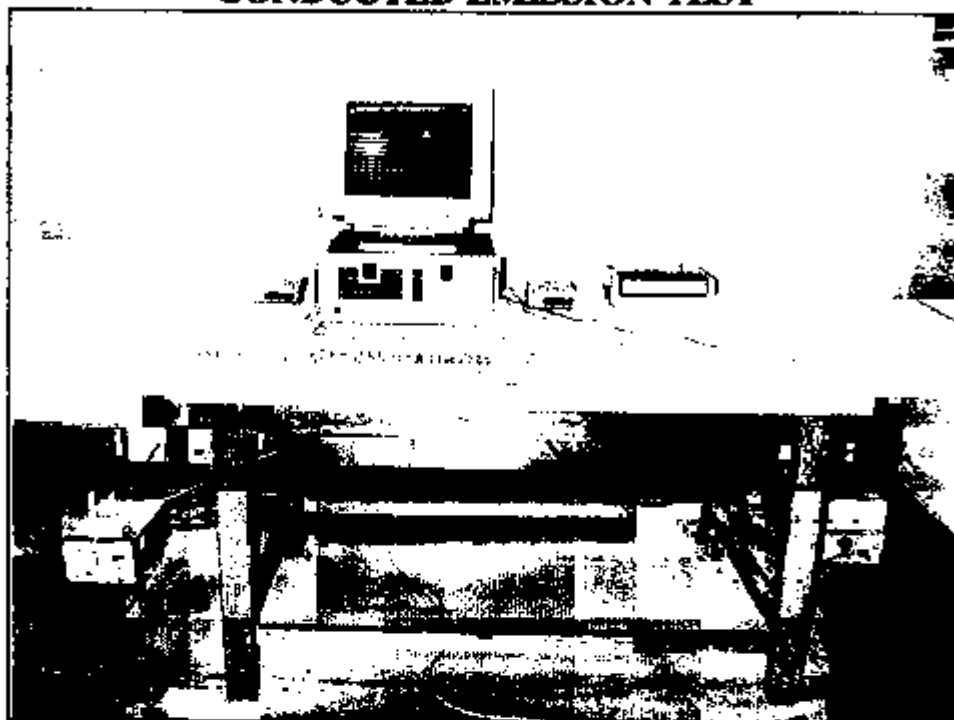
MEASURED DISTANCE: 3 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
78.02	8.3	25.1	33.4	40.0	-6.6	155	320
178.84	12.0	18.5	30.5	40.0	-9.5	100	289
181.93	12.1	19.5	31.6	40.0	-8.4	100	290
200.47	13.0	19.8	32.8	40.0	-7.2	100	63
208.84	13.3	15.3	28.6	40.0	-11.4	100	221
214.70	13.5	17.7	31.2	40.0	-8.8	100	186
225.51	13.9	16.4	30.3	40.0	-9.7	100	133
233.80	14.2	18.9	33.1	47.0	-13.9	100	288
300.67	16.3	23.2	39.5	47.0	-7.5	100	300
400.91	20.0	18.7	38.7	47.0	-8.3	400	176
451.09	22.1	21.1	43.2	47.0	-3.8	333	184
701.70	26.0	17.0	43.0	47.0	-4.0	218	209
901.97	28.1	7.7	35.8	47.0	-11.2	200	51

- 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

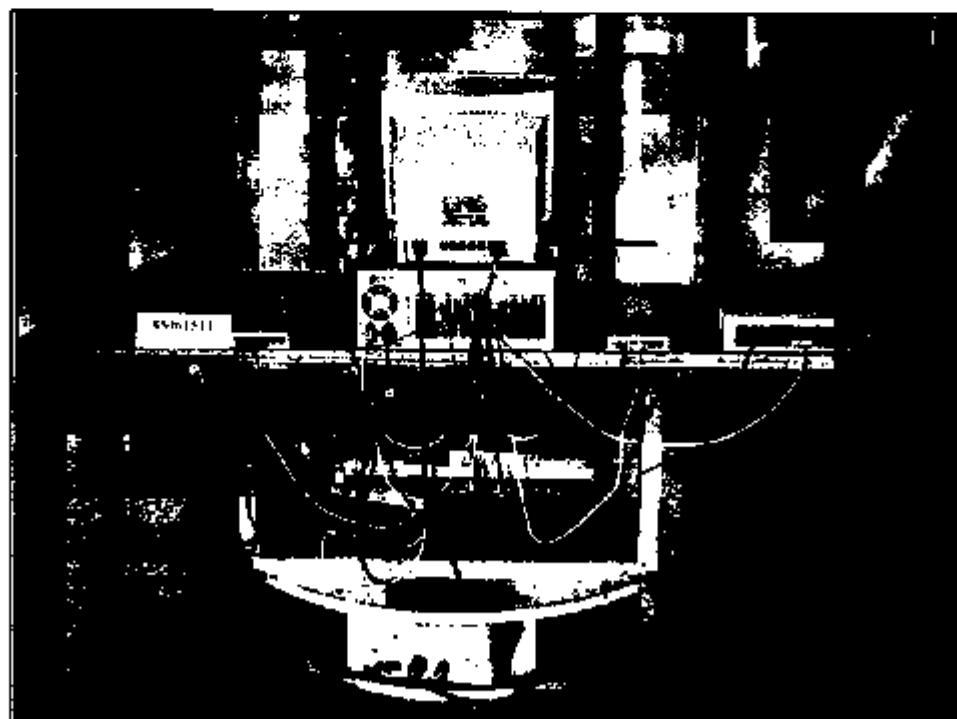


**5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH
MINIMUM MARGIN
CONDUCTED EMISSION TEST**





RADIATED EMISSION TEST





6. 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:

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

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

Liu 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

