EMC

TEST REPORT

REPORT NO. : F86123011
MODEL NO. : MB-562C
DATE OF TEST : Mar. 16, 1998

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

12F, 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 DESCRIPTION OF SUPPORT UNITS 5
2.3 TEST METHODOLOGY AND CONFIGURATION 5

3. TEST INSTRUMENTS 6

3.1 TEST INSTRUMENTS (EMISSION) 6
3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION 7

4. TEST RESULTS (EMISSION) 8

4.1 RADIO DISTURBANCE 8
4.1.1 EUT OPERATION CONDITION 8
4.1.2 TEST DATA OF CONDUCTED EMISSION 9
4.1.3 TEST DATA OF RADIATED EMISSION 10

5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN 12

6. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT 14

1. CERTIFICATION

Issue Date: Mar. 24, 1998

Product	:	CPU BOARD
Trade Name	:	AAEON
Model No.	:	MB-562C
Applicant	:	AAEON TECHNOLOGY INC.
Standard	:	FCC Part 15, Subpart B, Class A ANSI C63.4-1992 CISPR 22:1993+A1+A2

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

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.

PREPARED BY: Sharon Hsiung, DATE: 3/24/98
(Sharon Hsiung)

TESTED BY: Leo Hong , DATE: 3/24/98
(Leo Hong)

APPROVED BY: , DATE: 3/24/98
(Harris W. Lai)

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	MB-562C
Power Supply	:	Switching
Data Cable	:	N/A

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

* Chassis: AAEON, model: AIPX-250
* Switching power supply: SEASONIC, model: SSG-250G
* FDD: TEAC, modle: FD-235HF
* HDD: Seagate, ST3630A
* CPU: INTEL Pentium MMX 200MHZ
* VGA Card: On-board

The EUT was tested under the CPU: MMX 200 MHz, frequency of clock generator is 66.6 MHz.

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

2.2 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.

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	COLOR MONITOR	ADI	PD-959	FCC DoC Approved	Nonshielded Signal (1.5m) Shielded Power (1.2m)
2	PRINTER	HP	2225C+	DSI6XU2225	Nonshielded Signal (1.9m) Shielded Power (2.1m)
3	MODEM	DATATRONICS	1200C+	E2O5OV1200CK	Shielded signal (1.2m) Nonshielded Power (1.9m)
4	MODEM	HAYES	231AA	BFJ9D9231AA	Shielded signal (1.2m) Nonshielded Power (1.9m)
5	MODEM	DATATRONICS	1200CK	E2O5OV1200CK	Shielded signal (1.2m) Nonshielded Power (1.9m)
6	KEYBOARD	TATUNG	FDA-102A	F4Z4K3FDA-102A	Shielded Signal (1.2m)
7	MOUSE	HP	M-S34	DZL211029	Shielded signal (1.8m)
8	SPEAKER	J-S	J-003	N/A	Nonshielded signal (1.1m)
9	JOYSTICK	LOGITECH	#3001	LTD52000385	Nonshielded signal (2.2m)
10	MICROPHONE	CAROL	MUD-329	N/A	Nonshielded signal (3.0m)
11	RECORDER	PANASONIC	RQ-L309GT	N/A	Nonshielded signal (1.5m)
12	DIGITAL VIDEO CAMERA	EASTMAN KODAK	DVC300	E4BT1	Shidelded signal (2.8m)
13	PC	ACER	PT75WB	GQ8V20-ID3P	Nonshielded power (1.8m)
14	MONITOR	OPTIQUEST	4500DC	KZQ4500DC	Shielded signal (1.5m) Nonshielded power (1.8m)
15	KEYBOARD	BTC	5139	E5XKBM10410	Nonshielded signal (1.2m)
16	MOUSE	COMPAQ	M-S28-6MD	DZL210472	Shielded signal (1.8m)
17	HUB	ACCTON	EN2040	N/A	Nonshielded signal-- 10m to EUT; 2.0m to PC Shielded power (1.8m)

Note: A USB cable (2 m) was connected between Industrial PC and support unit 1.
Support unit 1~12 acted as SERVER PC and communicated with support unit 13~16 (which acted as HOST PC and systems of communication partner) via support unit 17. .

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 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)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01042	May 5, 1998
HP Preamplifier	8447D	2944A08313	Sept. 18, 1998
HP Preamplifier	8347A	3307A01088	Sept. 4, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 5, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BiLOG Antenna	CBL6111A	1647	Aug. 2, 1998
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 21, 1998
EMCO Turn Table	1016	1722	N/A
EMCO Tower	1051	1263	N/A
Open Field Test Site	Site 4	ADT-R04	Aug. 1, 1998

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	ESHS30	828765/002	July 31, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 28, 1998
EMCO-L.I.S.N.	3825/2	90031627	July 28, 1998
Shielded Room	Site 5	ADT-C05	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 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

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

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

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	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 - 1000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	16 ℃
Humidity	:	84 %
Atmospheric Pressure	:	1060 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -22.20 dB at 5.858 MHz Minimum passing margin of radiated emission: -7.0 dB at 598.0 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 "H" messages to monitor and monitor display "H" patterns on screen.
5. Industrial PC sends "H" messages to modem.
6. Industrial PC sends "H" messages to printer, and the printer prints them on paper.
7. Industrial PC sends audio messages to speaker.
8. Repeat steps 2-8.

4.1.2 TEST DATA OF CONDUCTED EMISSION

EUT: **CPU BOARD** MODEL: **MB-562C**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Leo Hong

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.211	49.50	-	49.80	-	79.00	66.00	-29.5	-	-29.2	-
0.549	45.00	-	46.80	-	73.00	60.00	-28.0	-	-26.2	-
0.685	45.80	-	47.80	-	73.00	60.00	-27.2	-	-25.2	-
5.048	42.80	-	40.90	-	73.00	60.00	-30.2	-	-32.1	-
5.858	48.90	-	50.80	-	73.00	60.00	-24.1	-	-22.2	-
13.251	37.80	-	33.40	-	73.00	60.00	-35.2	-	-39.6	-

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.
5. Margin value = Emission level - Limit value

ADT CO. SITE 5

CISPR 22 CLASS A

18. Mar 98 21:15

EUT: HB-5820

Test Spec: LISN : L

Comment: 120V AC/60Hz

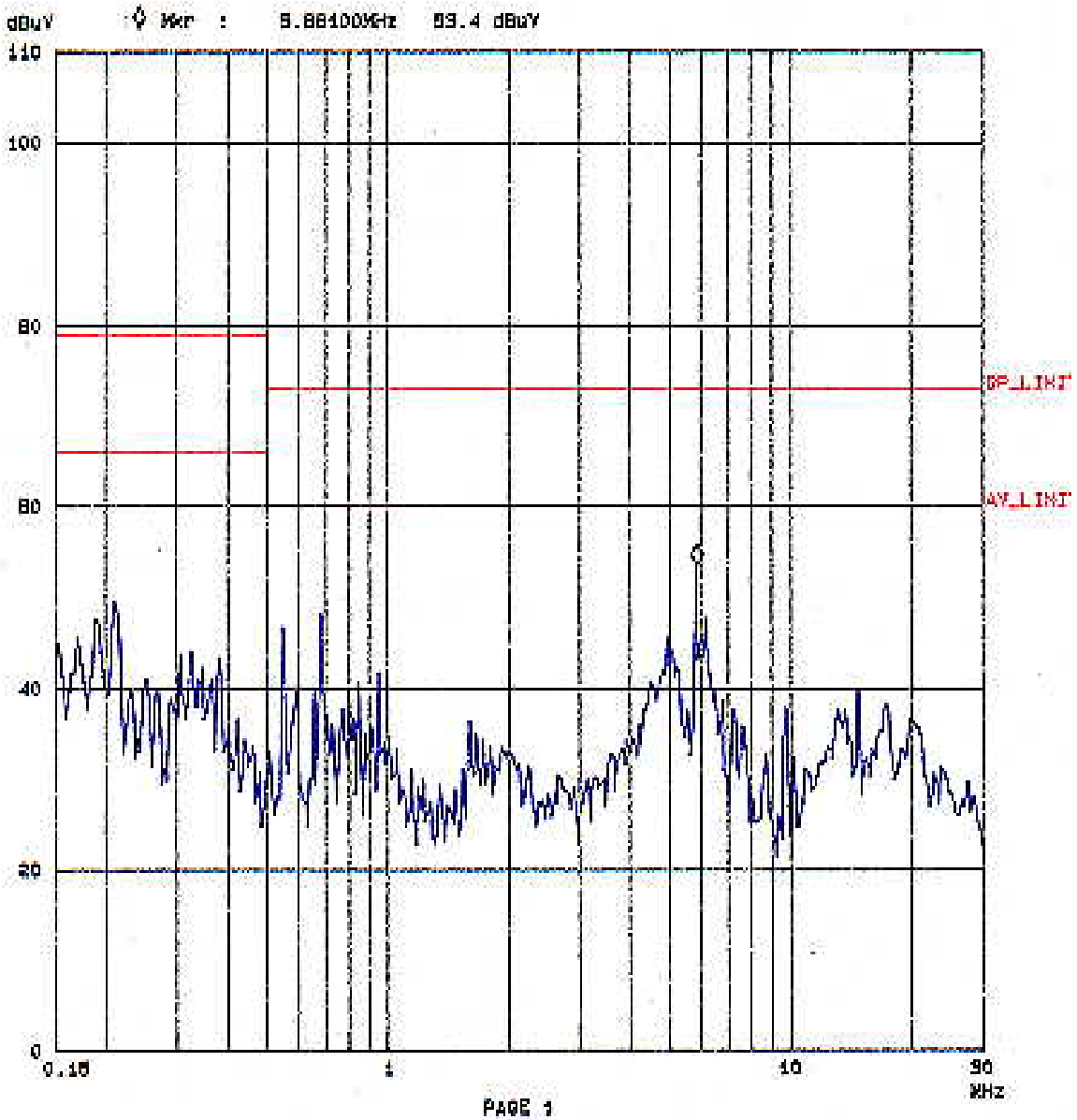
Report No. F8612301

Page 9-1

Tested by Lee Hong

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	80dB
450k	5M	3k	10k	PK	0.05ms	10dBLN	OFF	80dB
5M	30M	3k	10k	PK	0.05ms	10dBLN	OFF	80dB



PAGE 1

ADT CO. SITE 5

CISPR 22 CLASS A

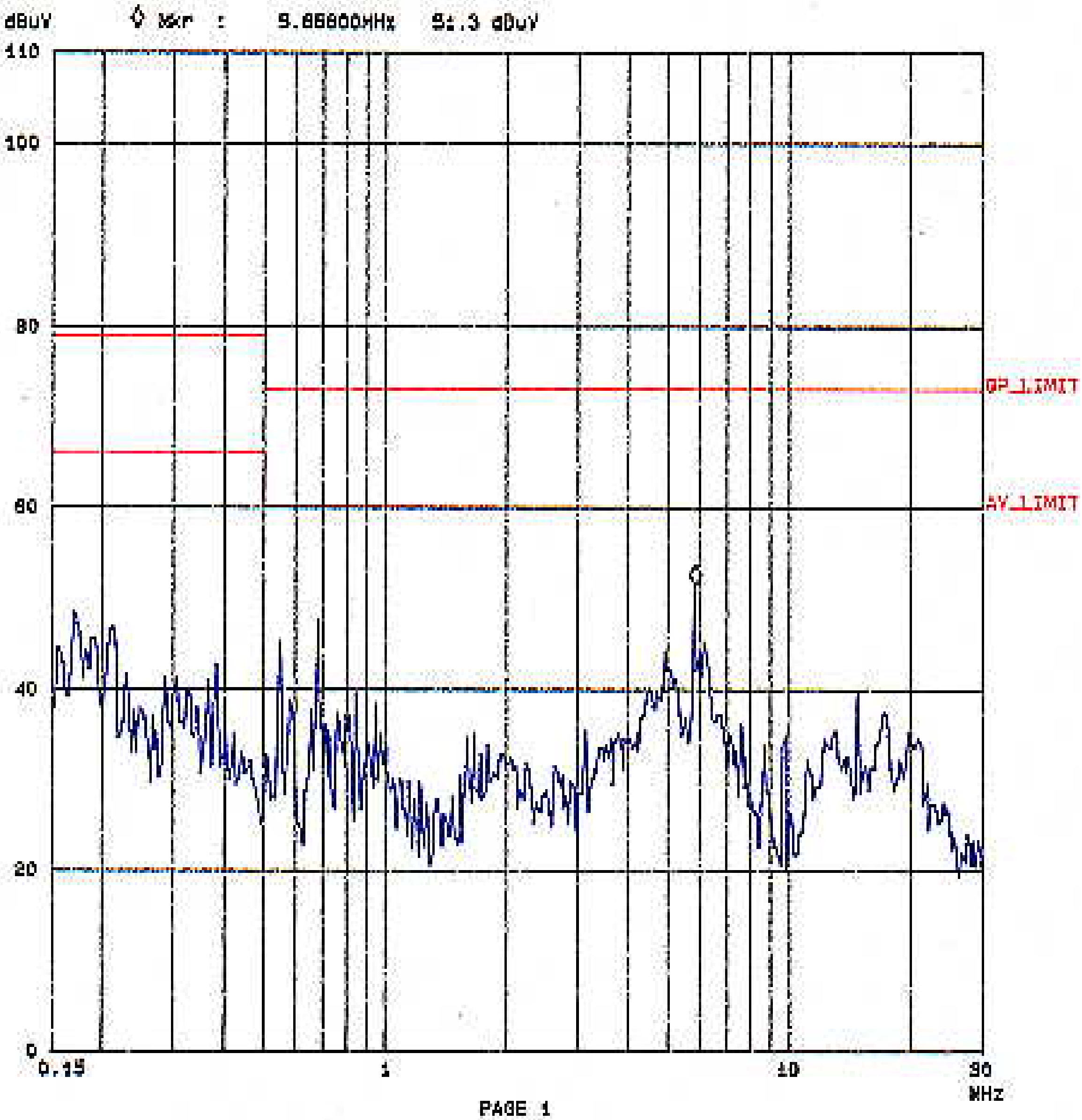
10. Mar 98 21:22

Report No. F86023011
Page 9-2
Tested by Leo Hong

EUT: MB-8820
Test Spec: LISN : N
Comment: 120V AC/60Hz

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



PAGE 1

4.1.3 TEST DATA OF RADIATED EMISSION

EUT: **CPU BOARD** MODEL: **MB-562C**

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

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

TEST PERSONNEL: Leo Hong

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
111.98	14.3	11.3	25.6	40.0	-14.4
119.98	15.1	9.8	24.9	40.0	-15.1
298.97	17.6	12.3	29.9	47.0	-17.1
332.26	18.6	14.5	33.1	47.0	-13.9
372.46	20.3	13.6	33.9	47.0	-13.1
465.18	22.6	16.7	39.3	47.0	-7.7
531.60	25.0	10.3	35.3	47.0	-11.7
561.40	26.0	7.2	33.2	47.0	-13.8
598.00	26.1	13.7	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: **CPU BOARD** MODEL: **MB-562C**

ANTENNA: CHASE BILOG CBL 6111A/EMCO Horn 3115

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

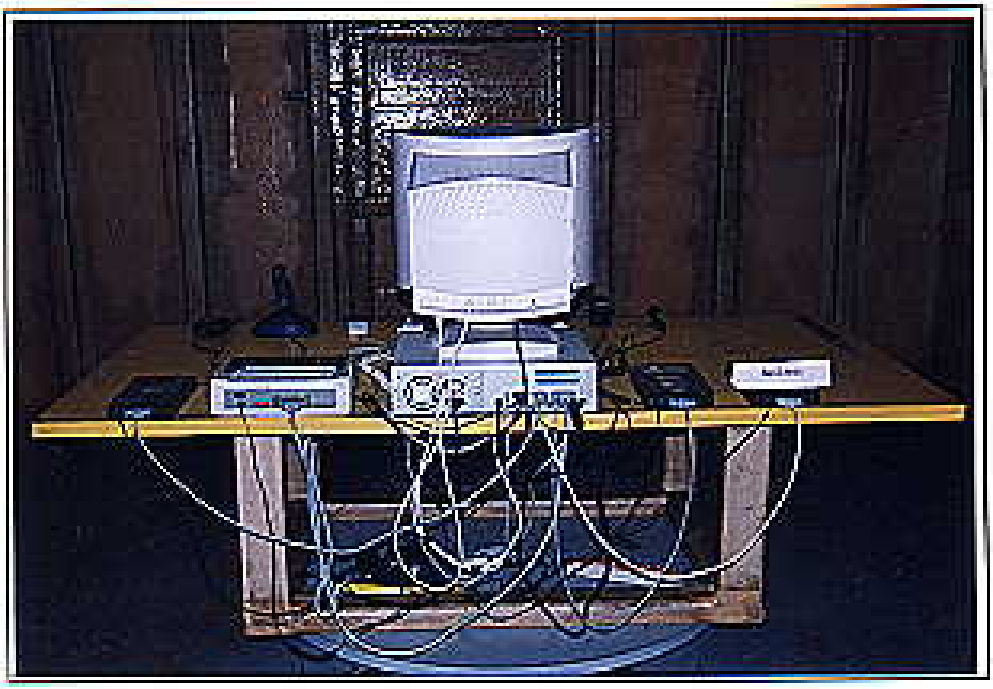
TEST PERSONNEL: Leo Hong

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
63.99	7.6	17.5	25.1	40.0	-14.9
112.00	13.7	10.6	24.3	40.0	-15.7
120.00	15.5	8.0	23.5	40.0	-16.5
205.33	13.8	14.9	28.7	40.0	-11.3
236.93	15.1	16.3	31.4	47.0	-15.6
298.99	17.4	12.3	29.7	47.0	-17.3
332.28	17.9	15.6	33.5	47.0	-13.5
373.03	19.7	11.8	31.5	47.0	-15.5
465.18	22.0	16.6	38.6	47.0	-8.4
531.60	24.5	9.1	33.6	47.0	-13.4
561.40	25.5	12.3	37.8	47.0	-9.2
598.10	24.9	15.1	40.0	47.0	-7.0

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. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

RADIATED EMISSION TEST



CONDUCTED EMISSION TEST

6. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

* CPU	Intel Pentium MMX 200 MHz
* BIOS	Award 128KB FLASH BIOS
* Chipset	SiS 5582
* Super I/O Chipset	SMC37C669 and UM8669F
* Cache Memory	On board 512KB pipeline burst RAM 2nd level cache
* RAM memory	8MB to 128MB, Two 72-pin SIMM socket on board one 168-pin SDRAM socket
* IDE hard disk drive interface:	Supports both PIO bus master and Ultra DMA/33 mode up to four IDE (AT) drives. BIOS auto-detect
* Floppy disk drive interface:	Supports up to two floppy disk drives, 5.25" (360KB and 1.2MB) and / or 3.5" (720KB, 1.44MB and 2.88MB)
* Multi-mode parallel port:	Configured to LPT1, LPT2, LPT3 or disabled. Supports SPP, ECP and EPP
* Serial ports	Three RS-232 and one RS-232/422/485 serial ports. Ports can be configured as COM1, COM2, COM3, COM4 or disabled individually. Two 16C550 serial UART's.
* Keyboard/mouse connector:	6 pin mini DIN connector supports standard PC/AT keyboard and PS/2 mouse
* USB ports	Dual USB port on board
* Real Time Clock/Calendar:	Dallas DS-12887 or equivalent with quartz oscillator, powered by lithium battery for data retention of up to 10 years.