EMC

TEST REPORT

REPORT NO. : F87111103
MODEL NO. : SBC-551
DATE OF TEST : Nov. 13, 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

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

TABLE OF CONTENTS

1. CERTIFICATION

Issue Date: Dec. 7, 1998

Product	:	CPU BOARD
Trade Name	:	AAEON
Model No.	:	SBC-551
Applicant	:	AAEON TECHNOLOGY INC.
Standard	:	FCC Part 15, Subpart B, Class A ANSI C63.4-1992 CISPR 22: 1993+A1: 1995+A2: 1996

We hereby certify that one sample of the designation has been tested in our facility on Nov. 13, 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.

TESTED BY: Jackey Chang (Jackey Chang), DATE: 12/7/98

CHECKED BY: Ariel Hsieh (Ariel Hsieh), DATE: 12/7/98

APPROVED BY: Mike Su (Mike Su), DATE: 12/7/98

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-551
Power Supply	:	DC (from PC)
Data Cable	:	N/A

Note: During the test, the EUT was installed in the industrial PC. The Industrial PC includes the following:

- CHASSIS : AAEON, model: AMPC-204P
- HDD : SEAGATE, model: ST51270A
- CPU : INTEL PENTIUM MMX 233 MHz
- BACK PLANE : AAEON, model: BP-204PSA
- SWITCHING POWER SUPPLY: ZIPPY, model: EP2-4150F

The EUT was tested under the CPU: INTEL PENTIUM MMX 233 MHz, frequency of clock generator is 66 MHz.

For more detailed features description, please refer to manufacturer's specification or 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	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2.	PRINTER	IIP	2225C+	DSI6XU2225	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3.	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.8m)
4.	KEYBOARD	AAEON	KB-130	Verification	Shielded Signal (1.0m)
5.	USB KEYBOARD	BTC	7932	E5XKBUCP10410	Shielded Signal (1.8m)
6.	MOUSE	LOGITECH	M-M30	DEL210569	Shielded Signal (1.9m)
7.	USB MOUSE	DEXIN	A3U800A	NIYS3U800A	Shielded Signal (1.5m)

Note: Support units 5 & 7 were connected to the USB ports of PC system.

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)

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 30	841977/002	Jan. 08, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE BILOG Antenna	CBL6112	2074	Dec. 25, 1998
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 3, 1999
CHANCE Turn Table & Tower Controller	ACS-1	N/A	N/A
Open Field Test Site	Site 6	ADT-R06	Dec. 23, 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	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	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 - 2000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	24 ℃
Humidity	:	67 %
Atmospheric Pressure	:	1015 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -3.5 dB at 0.156 MHz Minimum passing margin of radiated emission: -3.2 dB at 214.40 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 "H" messages to monitor and monitor displays "H" patterns on screen.
5. Industrial PC sends "H" messages to modem.
6. Industrial PC sends "H" messages to printer and printer prints them on paper.
7. Repeat steps 2-7.

4.3 TEST DATA OF CONDUCTED EMISSION

EUT: **CPU BOARD** MODEL: **SBC-551**

6 dB Bandwidth: 10 kHz

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
0.156	61.4	-	64.6	62.5	79.0	66.0	-24.0	-	-22.6	-3.5
0.201	55.0	-	56.4	-	79.0	66.0	-35.0	-	-30.8	-
0.558	31.0	-	35.2	-	66.0	60.0	-32.5	-	-31.1	-
7.922	33.5	-	34.9	-	66.0	60.0	-17.7	-	-17.1	-
11.999	48.3	-	48.9	-	66.0	60.0	-27.9	-	-29.1	-
25.057	38.1	-	36.9	-	66.0	60.0	-17.6	-	-14.4	-

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

ADT CO. Shielded Room 3

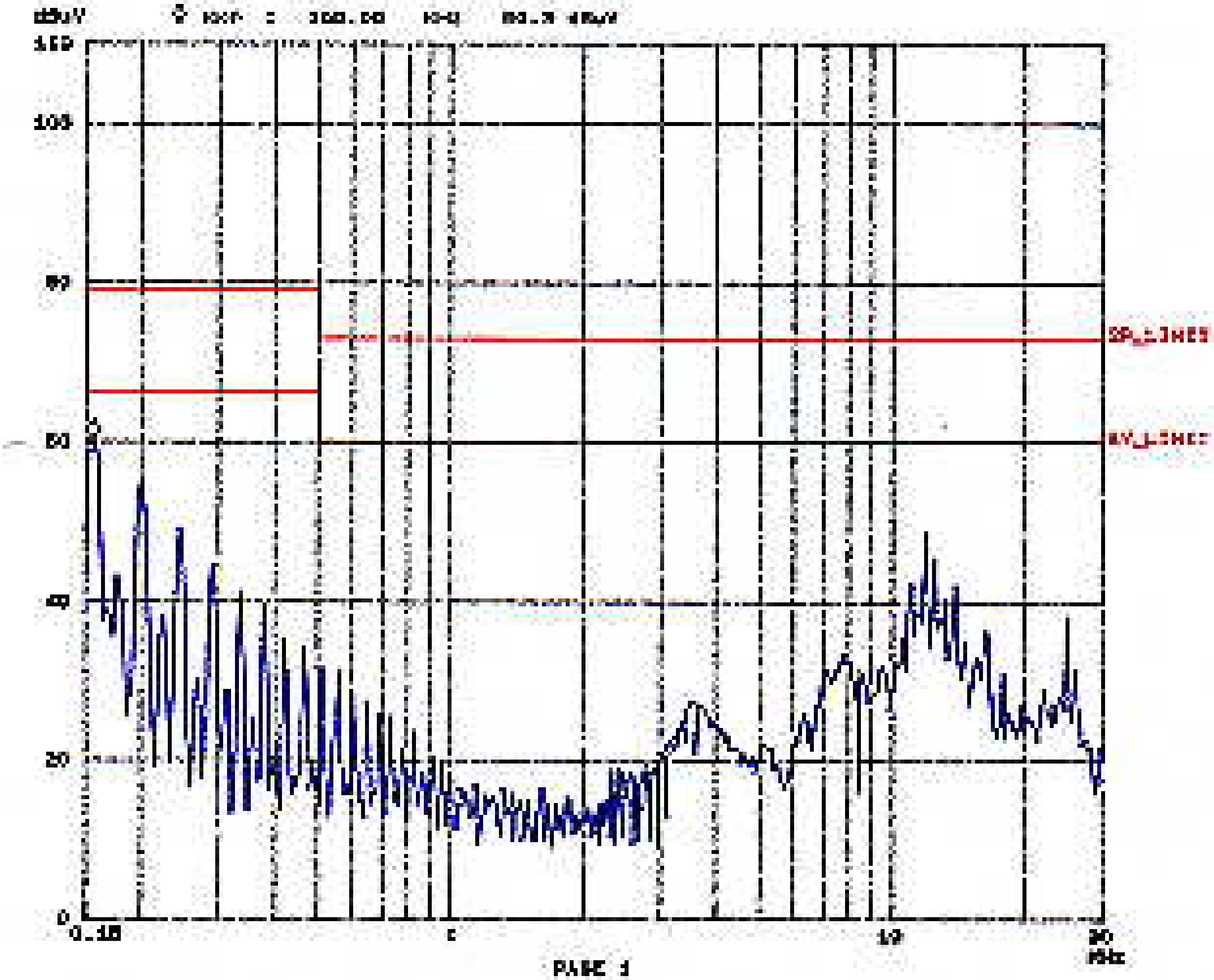
CISPR 22 CLASS A

Report No. F 84/11/03
Page 9-1
Tested by Jacky Chang

EUT: 880-851
Operator: JACKEY_CHANG
Test Spec: LINE : L
Comment: 1024X768 COLOR
FULL SYSTEM

Fast Scan Settings (3 Ranges)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	5k	10k	PK	0.02ms	10dBLN	OFF	60dB
450k	5M	5k	10k	PK	0.02ms	10dBLN	OFF	60dB
5M	30M	5k	10k	PK	0.02ms	10dBLN	OFF	60dB



PAGE 1

ADT CO. Shielded Room 3   15. Nov 95 13:33

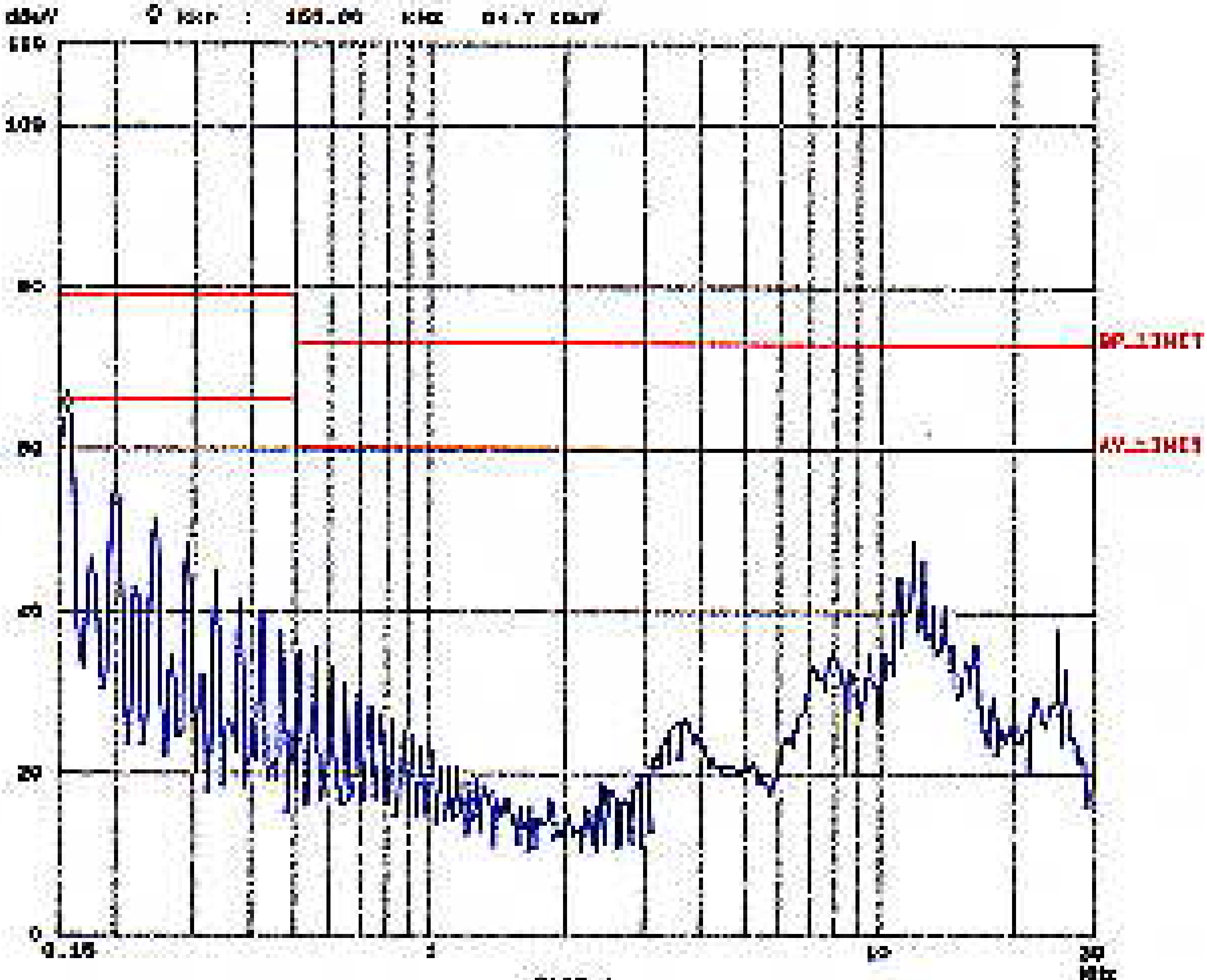
CISPR 22 CLASS A

Report No. F27114-2
Page 4-2
Tested by Jacky Chang

EUT: BSC-851
Operator: JACKEY_CHANG
Test Spec: LISN 1 N
Comment: 1024X768 COLOR
FULL SYSTEM

Fast Scan Settings (3 Ranges)

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



PAGE 1

4.4 TEST DATA OF RADIATED EMISSION

EUT: **CPU BOARD** MODEL: **SBC-551**

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/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
86.71	11.2	16.9	28.1	40.0	-11.9
133.66	13.9	18.7	32.6	40.0	-7.4
142.00	12.9	17.8	30.7	40.0	-9.3
167.06	10.9	20.2	31.1	40.0	-8.9
172.62	10.9	19.8	30.7	40.0	-9.3
178.19	10.8	22.5	33.3	40.0	-6.7
180.98	10.7	20.8	31.5	40.0	-8.5
186.56	10.6	21.5	32.1	40.0	-7.9
200.48	10.5	20.2	30.7	40.0	-9.3
217.18	12.1	22.1	34.2	40.0	-5.8
245.05	14.7	11.5	26.2	47.0	-20.8
300.69	16.2	14.2	30.4	47.0	-16.6
334.13	17.0	19.7	36.7	47.0	-10.3
467.77	19.8	11.2	31.0	47.0	-16.0
567.99	22.3	11.1	33.4	47.0	-13.6

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: **SBC-551**

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

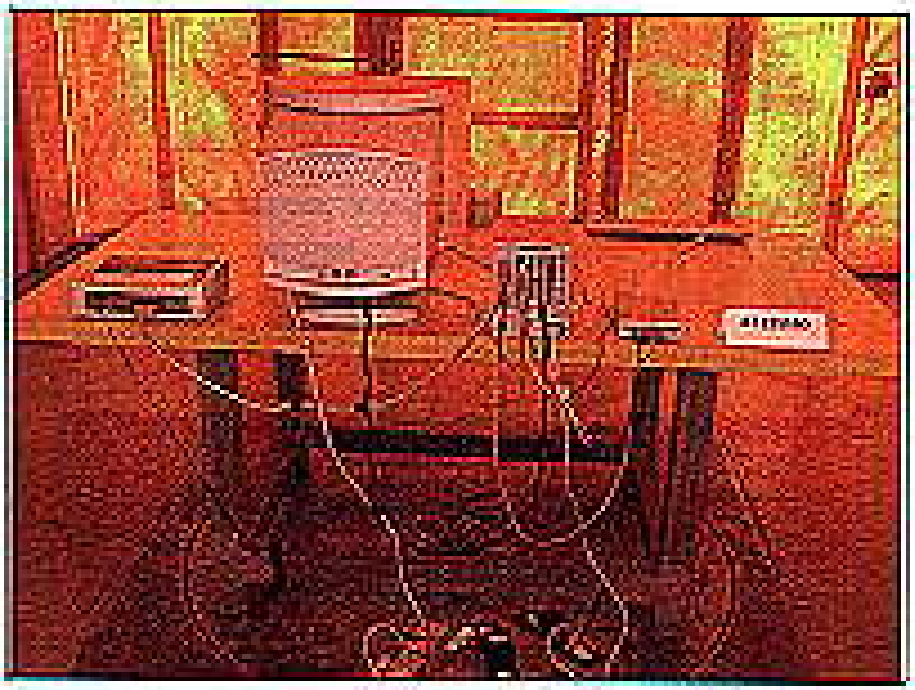
FREQUENCY RANGE: 1000-2000 MHz MEASURED DISTANCE: 3 M

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
75.75	7.5	19.4	26.9	40.0	-13.1
124.34	14.1	13.3	27.4	40.0	-12.6
172.62	10.6	23.4	34.0	40.0	-6.0
175.48	10.2	24.1	34.3	40.0	-5.7
178.21	9.9	26.4	36.3	40.0	-3.7
186.55	10.4	26.1	36.5	40.0	-3.5
189.33	10.7	24.4	35.1	40.0	-4.9
192.12	11.0	24.1	35.1	40.0	-4.9
194.91	11.3	23.0	34.3	40.0	-5.7
200.49	11.9	24.4	36.3	40.0	-3.7
206.04	12.1	24.3	36.4	40.0	-3.6
208.87	12.2	24.3	36.5	40.0	-3.5
214.40	12.5	24.3	36.8	40.0	-3.2
217.20	12.6	23.2	35.8	40.0	-4.2
225.53	13.0	20.0	33.0	40.0	-7.0
231.16	13.2	11.7	24.9	47.0	-22.1
334.12	17.0	16.1	33.1	47.0	-13.9

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

3. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

RADIATED EMISSION TEST



CONDUCTED EMISSION TEST