EMC

TEST REPORT

REPORT NO. : F87100804
MODEL NO. : SBC-598, SBC-492
DATE OF TEST : Oct. 8, 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.

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1. CERTIFICATION

Issue Date: Oct. 21, 1998

Product	:	CPU BOARD
Trade Name	:	AAEON
Model No.	:	SBC-598, SBC-492
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 Oct. 14, 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 , DATE: 10/21/98
(Jackey Chang)

CHECKED BY: Ariel Hsieh , DATE: 10/21/98
(Ariel Hsieh)

APPROVED BY: Mike Su , DATE: 10/21/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-598, SBC-492
Power Supply	:	DC 5V (from PC)
Data Cable	:	N/A

Note: The EUT has two model names, which are identical to each other in all aspects except for the following:

- MODEL: **SBC-598**: 586 mainboard, Pentium 233 MHz, 1024x768 256 color, with USB port.
- MODEL: **SBC-492**: 486 mainboard, Pentium 133 MHz on board, 1024x768 256 color, without USB port.

Both the above models are selected as the representative during the test and their data are recorded individually as mode 1 & 2 in this report.

- MODE **1**: Model : SBC-598
- MODE **2**: Model : SBC-492

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.

For MODEL: SBC-598

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	COLOR MONITOR	HP	D2846	FCC DoC Approved	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (2.0m) Nonshielded Power (1.8m)
3	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.8m)
4	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
5	USB KEYBOARD	BTC	7932	E5XKBUCP10410	Shielded Signal (1.8m)
6	MOUSE	COMSYS	MOUSE 1300	HQXPC930101-12	Shielded Signal (1.5m)
7	USB MOUSE	DEXIN	A3U800A	NIYS3U800A	Shielded Signal (1.5m)

For MODEL: SBC-492

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	COLOR MONITOR	HP	D2846	FCC DoC Approved	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (2.0m) Nonshielded Power (1.8m)
3	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.8m)
4	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
5	MOUSE	LOGITECH	M-M30-9F	DZL210569	Shielded Signal (1.8m)

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	8590L	3544A01176	April 28, 1999
HP Preamplifier	8447D	2944A08485	Oct. 28, 1998
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 27, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BILOG Antenna	CBL6112A	2221	Aug. 10, 1999
EMCO Turn Table	1060	1115	N/A
SHOSHIN Tower	AP-4701	A6Y005	N/A
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 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	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	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	:	24 ℃
Humidity	:	51 %
Atmospheric Pressure	:	1000 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -30.0 dB at 25.143 MHz Minimum passing margin of radiated emission: -12.2 dB at 467.78 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 the printer prints them on paper.
7. Repeat steps 2-7.

4.3 TEST DATA OF CONDUCTED EMISSION (A)

EUT: **CPU BOARD** MODEL: **SBC-598**

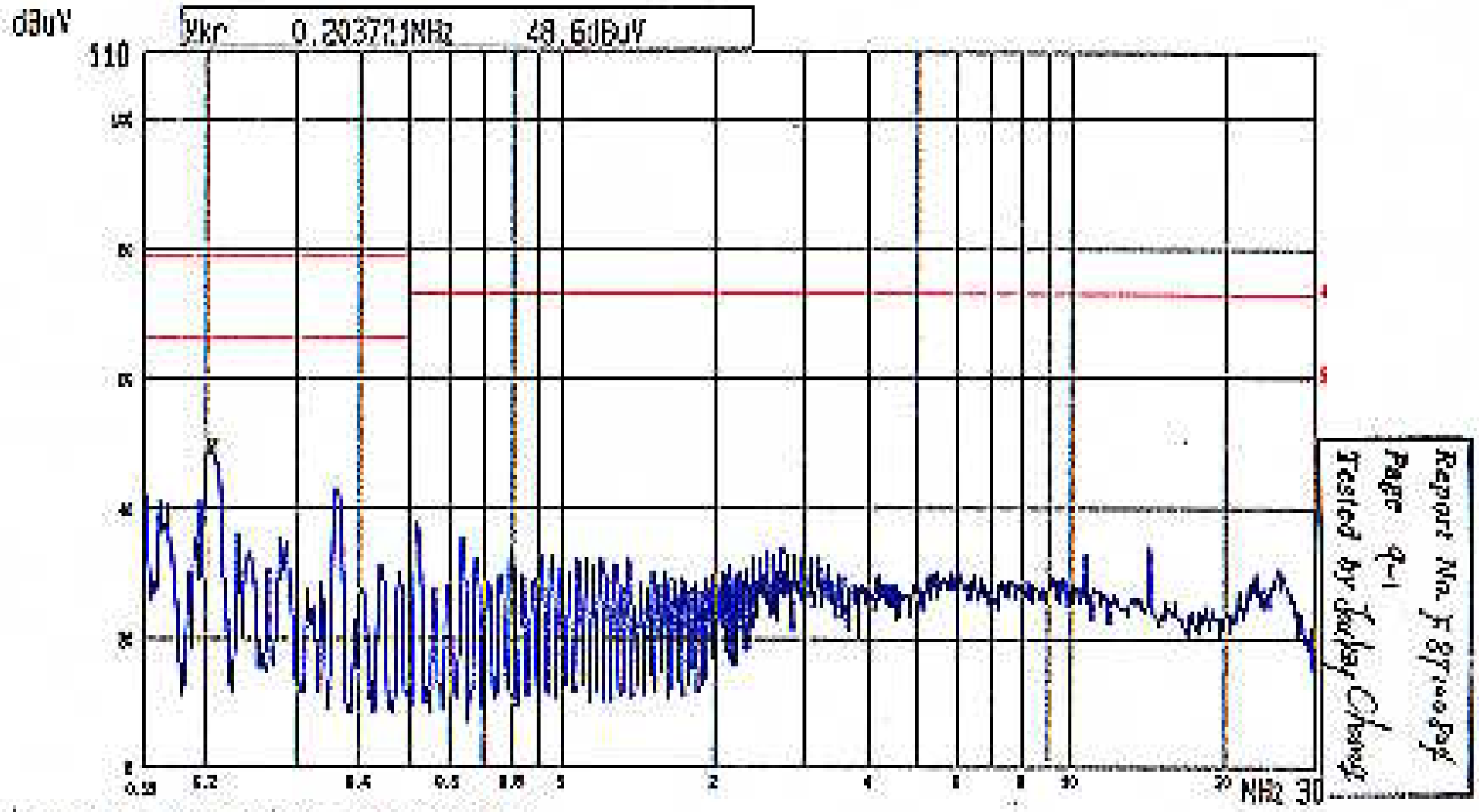
MODE: **1**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Jackey Chang

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
0.203	47.20	-	49.00	-	79.00	66.00	-36.1	-	-38.1	-
0.358	42.90	-	40.90	-	79.00	66.00	-35.4	-	-38.4	-
0.519	37.60	-	34.60	-	73.00	60.00	-40.9	-	-40.6	-
1.078	32.10	-	32.40	-	73.00	60.00	-42.6	-	-43.6	-
6.121	30.40	-	29.40	-	73.00	60.00	-42.5	-	-40.3	-
25.143	30.50	-	32.70	-	73.00	60.00	-31.8	-	-30.0	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading valuc 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



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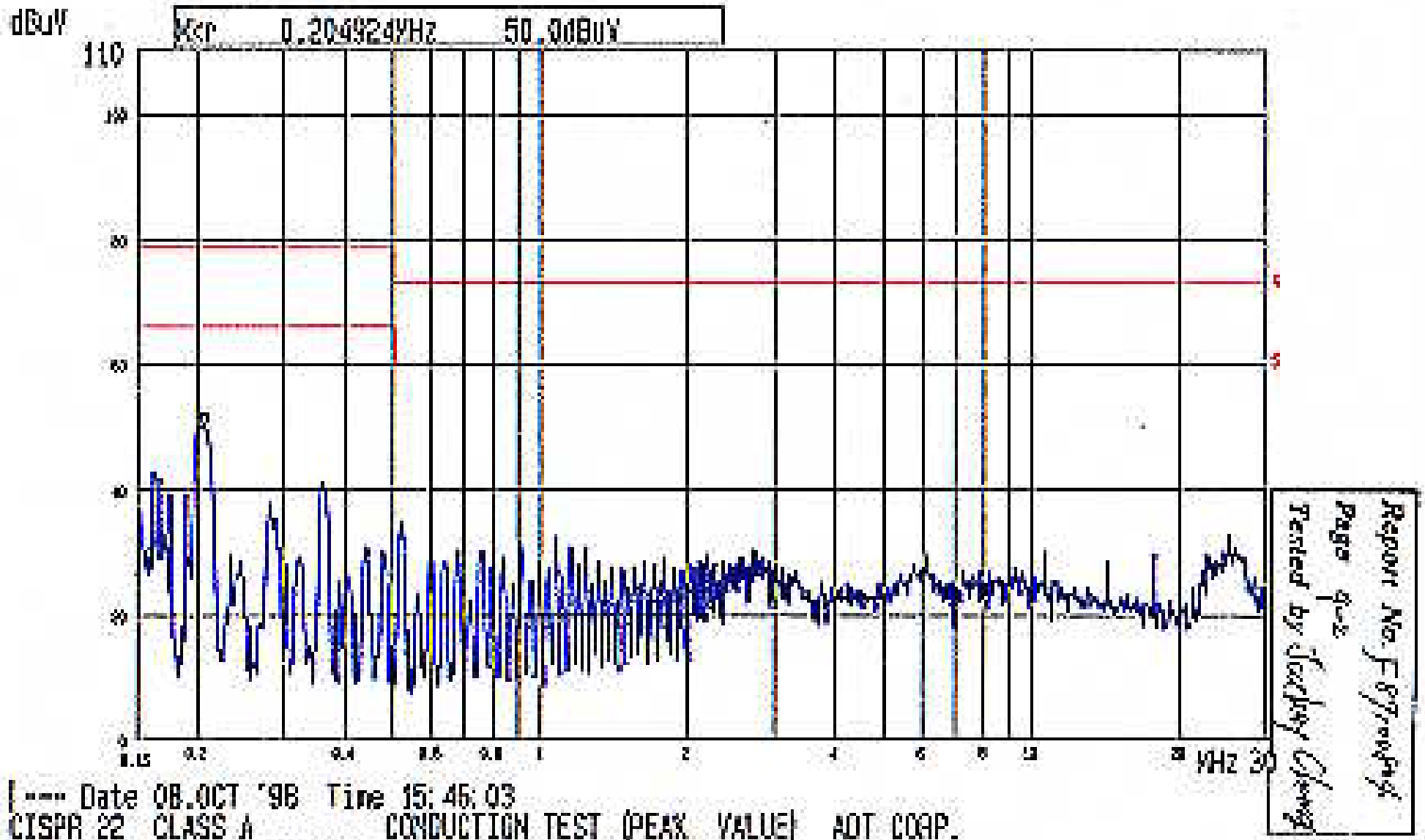
MODEL: SBC-598 PENTIUM 233MHz 1024X768 256 COLOR LISN : L



Date 08.OCT '98 Time 15:46:03
CISPR 22 CLASS A CONDUCTION TEST (PEAK VALUE) ADT COAP.
MODEL: S3C-598 PENTIUM 233MHz 1024X768 256 COLOR LISN : N

4.4 TEST DATA OF CONDUCTED EMISSION (B)

EUT: **CPU BOARD** MODEL: **SBC-492**

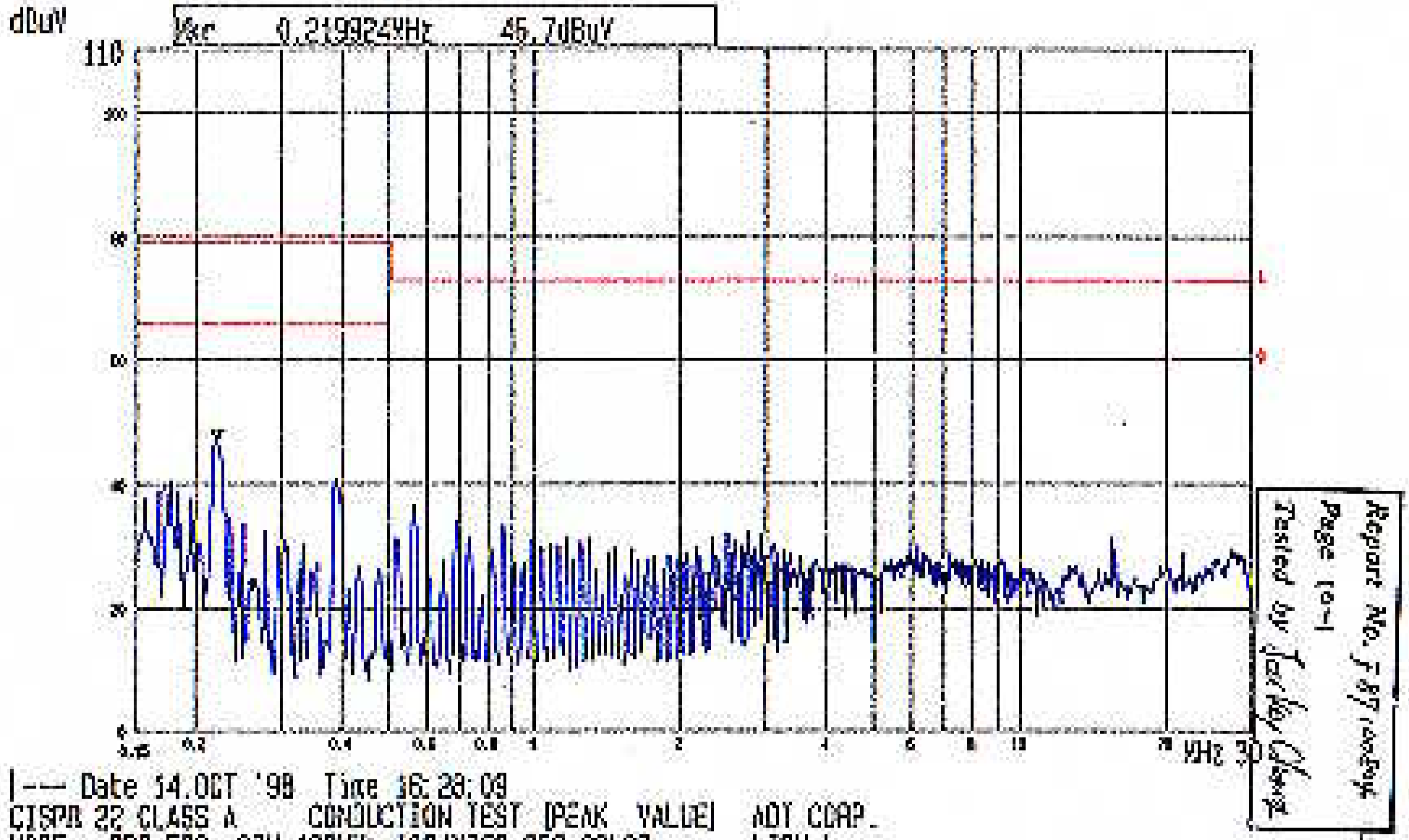
MODE: **2**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Jackey Chang

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MIIz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.220	46.50	-	48.50	-	79.00	66.00	-32.5	-	-30.5	-
0.387	40.70	-	40.10	-	79.00	66.00	-38.3	-	-38.9	-
0.560	36.50	-	34.10	-	73.00	60.00	-36.5	-	-38.9	-
2.732	32.10	-	28.80	-	73.00	60.00	-40.9	-	-44.2	-
12.776	26.60	-	28.80	-	73.00	60.00	-46.4	-	-44.2	-
21.702	28.60	-	32.10	-	73.00	60.00	-44.4	-	-40.9	-

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 levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value


dBuV
Mkr 0.219924MHz 45.7dBuV
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100
90
80
70
60
50
40
0.15
0.2
0.4
0.5
0.8
1
2
4
6
8
10
20
MHz
30
L
N
Average
Peak
Transd Qp / Trans Peak
Page 1(+1)
Report No. J 97 / 1xxxPM
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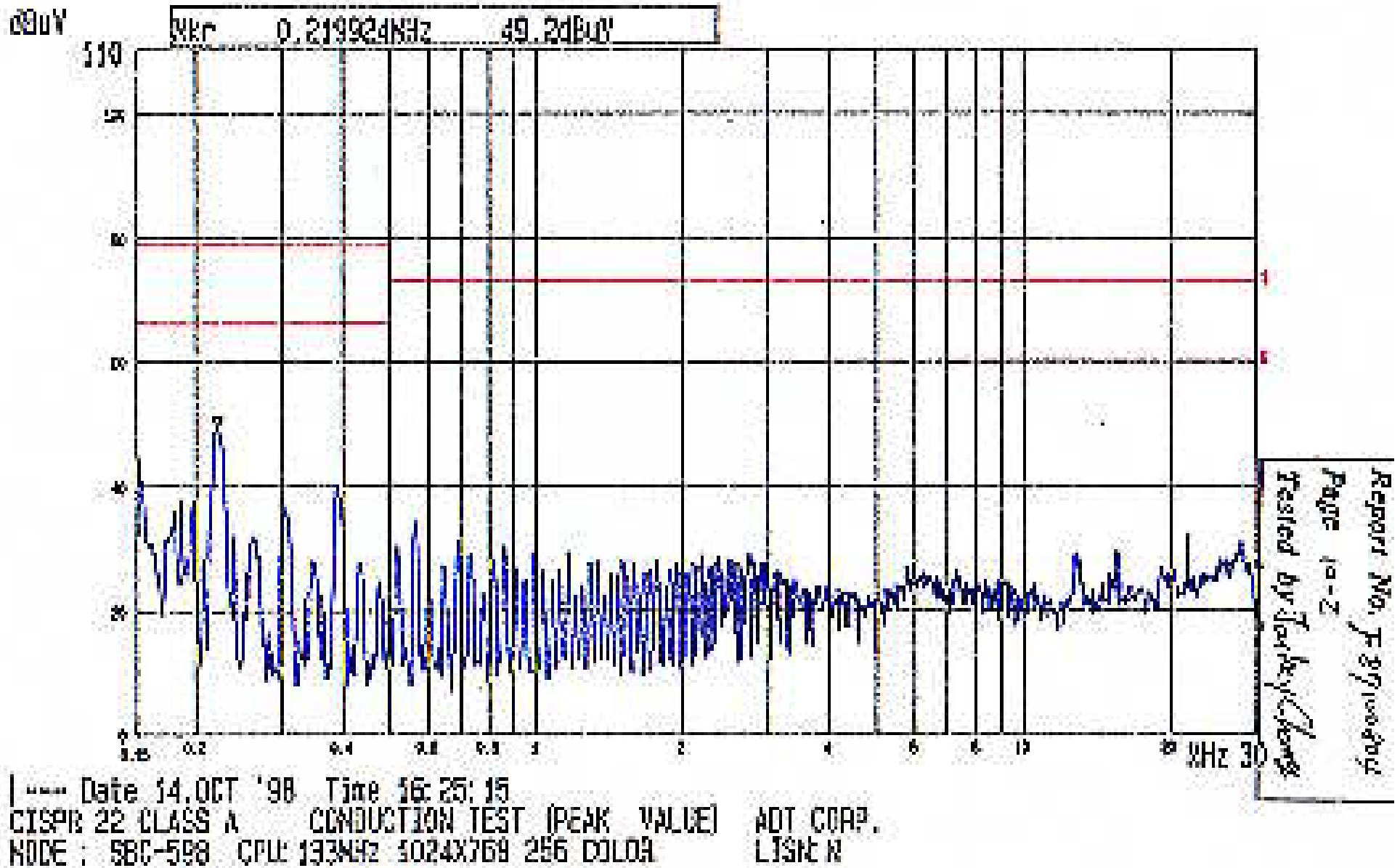
MODE : SBC-588 CPU: 133MHz 1024X768 256 COLOR LISN L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Mkr 0.219924MHz 49.20dBuV
110
MHz 30
Report No. F690[illegible]
Page 1-2
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CISPR 22 CLASS A CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODE : SBC-598 CPU 133MHz 1024X768 256 COLOR LISNE N

4.5 TEST DATA OF RADIATED EMISSION (A)

EUT: **CPU BOARD** MODEL: **SBC-598**

MODE: 1 POLARITY: Horizontal

ANTENNA: CHASE BILOG CBL 6112A

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: Jackey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
113.81	14.1	9.1	23.2	40.0	-16.8
160.26	12.0	15.7	27.7	40.0	-12.3
169.69	11.9	13.4	25.3	40.0	-14.7
179.11	11.7	12.5	24.2	40.0	-15.8
188.56	12.0	13.9	25.9	40.0	-14.1
216.85	13.3	14.3	27.6	40.0	-12.4
235.68	14.3	19.3	33.6	47.0	-13.4
467.73	21.8	11.9	33.7	47.0	-13.3

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 (A)

EUT: **CPU BOARD** MODEL: **SBC-598**

MODE: **1** POLARITY: Vertical

ANTENNA: CHASE BILOG CBL 6112A

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: Jackey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
75.42	8.2	17.1	25.3	40.0	-14.7
122.55	15.1	8.1	23.2	40.0	-16.8
131.59	15.0	11.9	26.9	40.0	-13.1
138.70	15.0	9.3	24.3	40.0	-15.7
169.67	12.0	14.8	26.8	40.0	-13.2
179.10	12.0	13.4	25.4	40.0	-14.6
188.54	12.4	12.3	24.7	40.0	-15.3
216.82	13.6	12.3	25.9	40.0	-14.1
226.22	13.9	9.3	23.2	40.0	-16.8
235.68	14.3	19.8	34.1	47.0	-12.9
377.50	19.2	13.2	32.4	47.0	-14.6
467.78	22.1	12.7	34.8	47.0	-12.2

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

4.6 TEST DATA OF RADIATED EMISSION (B)

EUT: **CPU BOARD** MODEL: **SBC-492**

MODE: **2** POLARITY: Horizontal

ANTENNA: CHASE BILOG CBL 6112A

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: Jackey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
157.52	12.3	10.6	22.9	40.0	-17.1
181.16	11.7	9.6	21.3	40.0	-18.7
196.92	12.3	8.6	20.9	40.0	-19.1
220.52	13.5	11.3	24.8	40.0	-15.2
236.26	14.3	13.0	27.3	47.0	-19.7
252.03	15.3	17.3	32.6	47.0	-14.4
259.90	16.7	17.7	34.4	47.0	-12.6
275.65	16.5	18.2	34.7	47.0	-12.3
315.06	17.0	12.1	29.1	47.0	-17.9
448.95	21.7	9.9	31.6	47.0	-15.4

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 (B)

EUT: **CPU BOARD** MODEL: **SBC-492**

MODE: **2** POLARITY: Vertical

ANTENNA: CHASE BILOG CBL 6112A

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

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

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

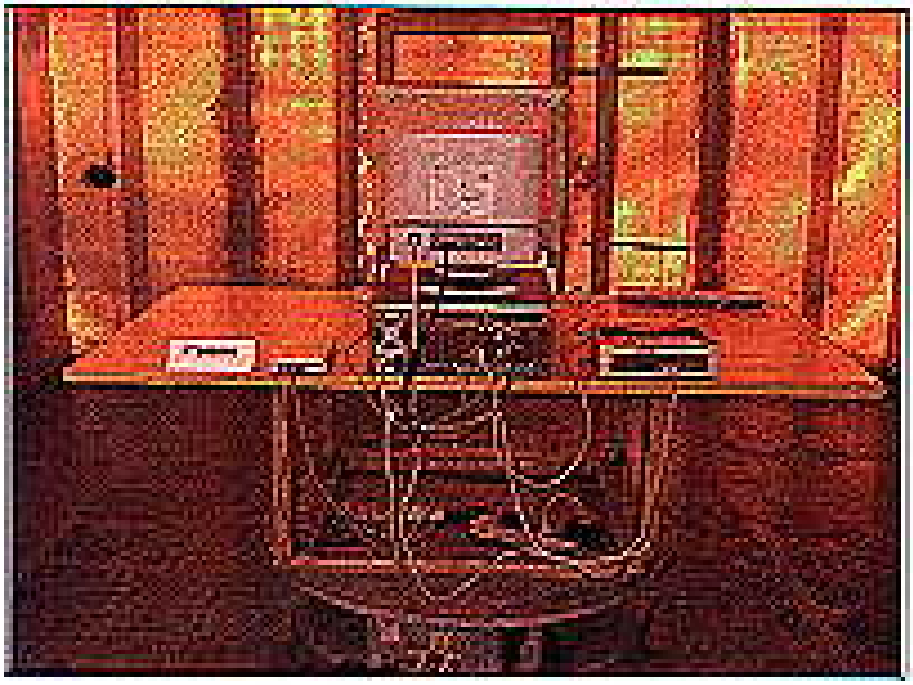
TEST PERSONNEL: Jackey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
157.52	12.3	10.6	22.9	40.0	-17.1
181.16	11.7	9.6	21.3	40.0	-18.7
196.92	12.3	8.6	20.9	40.0	-19.1
220.52	13.5	11.3	24.8	40.0	-15.2
236.26	14.3	13.0	27.3	47.0	-19.7
252.03	15.3	17.3	32.6	47.0	-14.4
259.90	16.7	17.7	34.4	47.0	-12.6
275.65	16.5	18.2	34.7	47.0	-12.3
315.06	17.0	12.1	29.1	47.0	-17.9
448.95	21.7	9.9	31.6	47.0	-15.4

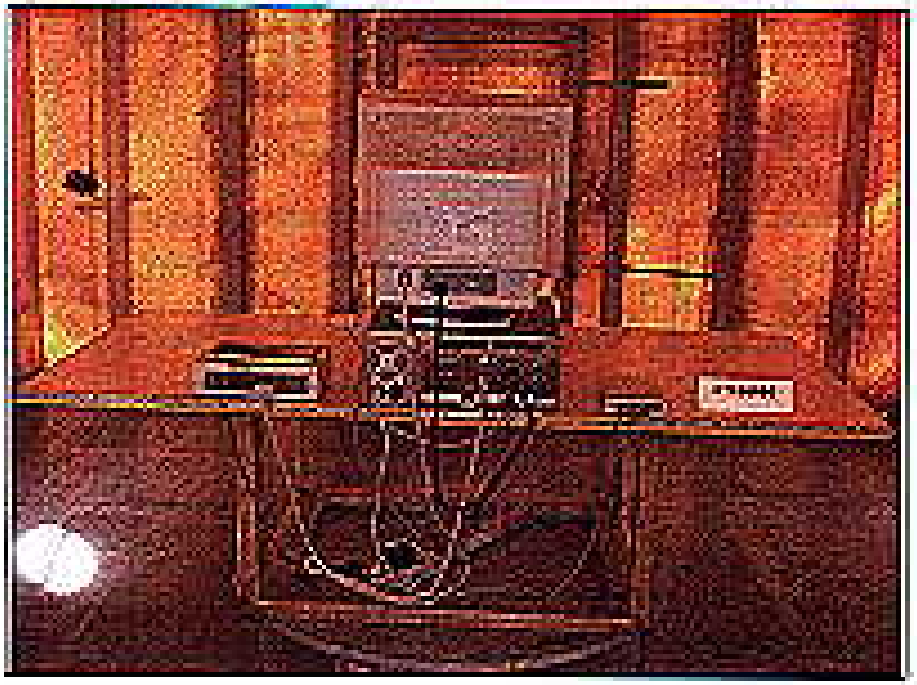
REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB/m) +Meter Reading (dBuV).
2. Correction Factor (dB/m) = Ant. Factor (dB/m) + Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

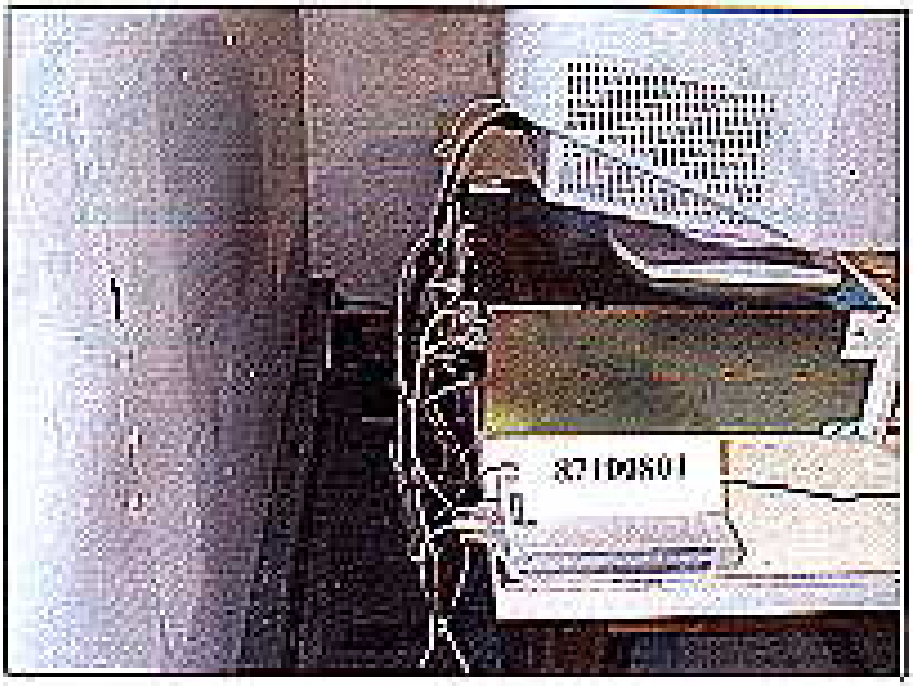
RADIATED EMISSION TEST (MODEL: SEC-506)



RADIATED EMISSION TEST (MODEL: SBC-492)



CONDUCTED EMISSION TEST (MODEL: SBC-598)



CONDUCTED EMISSION TEST (MODEL: SDC-492)