EMC

TEST REPORT

REPORT NO. : ADT-EC97058
MODEL NO. : SBC-455, PCM-3335,
SBC-400, SBC-410
DATE OF TEST : March 12 ~ March 20, 1997

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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TABLE OF CONTENTS

1. CERTIFICATION

Issue date: March 25, 1997

Product	:	CPU BOARD	
Trade Name	:	AAEON	
Model No.	:	SBC-455, PCM-3335, SBC-400, SBC-410	
Applicant	:	AAEON TECHNOLOGY INC.	
Standard	:	EN55 022:1994, Class A	**EN50 082-2:1995**
			EN61000-4-2:1995
			ENV50140:1993
			EN61000-4-4:1995
			ENV50141:1993
			EN61000-4-8:1993
			ENV50204:1995

We hereby certify that one sample of the designation has been tested in our facility from March 12 to March 20, 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: 3/25/97
(Sharon Hsiung)

CHECKED BY: Andy Cheng, DATE: 3/25/97
(Andy Cheng)

APPROVED BY: Charles Wang , DATE: 3/25/97
(Charles Wang)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	CPU BOARD
Model No.	:	SBC-455, PCM-3335, SBC-400, SBC-410
Power Supply Type	:	DC

Note: The EUT has four model names which use identical case and power supply:

* SBC-455 (CPU: IBM 5x86C-100 MHz)
* PCM-3335 (CPU: 386SX-40 MHz)
* SBC-400 (CPU: IBM 5x86C-100 MHz)
* SBC-410 (CPU: IBM 5x86C-100 MHz)

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: AAEON, model: DPC-421 (for model: SBC-400 and SBC-410)

For more detailed features, 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.

FOR EMISSION TEST

No.	Product	Brand	Model No.	Serial No.	I/O Cable
1	COLOR MONITOR	ACER	7134T	M5400233564	Nonshielded Power Shielded signal
2	KEYBOARD	FORWARD	FDA-102D	3005142	Shielded signal
3	PRINTER	HP	2225C+	3123S97230	Shielded signal Nonshielded Power
4	MODEM	DATATRONICS	1200CK	07-503003	Shielded signal Nonshielded Power
5	MODEM	HAYES	231AA	A00331003365	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	FORWARD	FDA-102D	3005142	Shielded Signal
3	PRINTER	HP	C2145A	SG5BN160GY	Shielded Signal Nonshielded Power
4	MODEM	GVC	F-1114V/R6	8503E100	Shielded signal Nonshielded Power
5	MODEM	HAYES	5300AP	A1425300K045	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.

2.3 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	8590L	3544A00941	Dec. 17, 1996
HP Pre-Amplifier	8447D	2944A08312	Sept. 9, 1996
R&S Receiver	ESVS10	844591010	Sept. 15, 1996
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 30, 1996
CHASE BiLOG Antenna	CBL6111A	1500	Sept. 21, 1996
EMCO Turn Table	1060-04	1196	N/A
EMCO Tower	1051	1264	N/A
Open Field Test Site	Site-1	ADT-R01	Sept. 11, 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.

4. TEST RESULTS (EMISSION)

4.1 Radio Disturbance

Product Family Standard	:	EN 55 022, Class A
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	:	20 ℃
Humidity	:	60 %
Atmospheric Pressure	:	1060 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: 28.0 dB at 12.990 MHz Minimum passing margin of radiated emission: 3.4 dB at 125.93 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. Confirm the CPU board installed in Industrial PC is model: SBC-455.
3. Industrial PC reads a test program to enable all functions.
5. The Industrial PC reads and writes messages from HDD.
6. The Industrial PC sends "H" messages to monitor and monitor display "H" patterns on screen.
7. The Industrial PC sends "H" messages to each modem.
8. The Industrial PC sends "H" messages to printer, and the printer prints them on paper.
9. Repeat steps 3-9.
10. Change the CPU board with model: PCM-3335 and repeat steps 3-9.
11. Change the CPU board with model: SBC-400 and repeat steps 3-9.
12. Change the CPU board with model: SBC-410 and repeat steps 3-9.

4.1.2 TEST DATA OF CONDUCTED EMISSION (A)

EUT: **CPU BOARD** MODEL: **SBC-455**

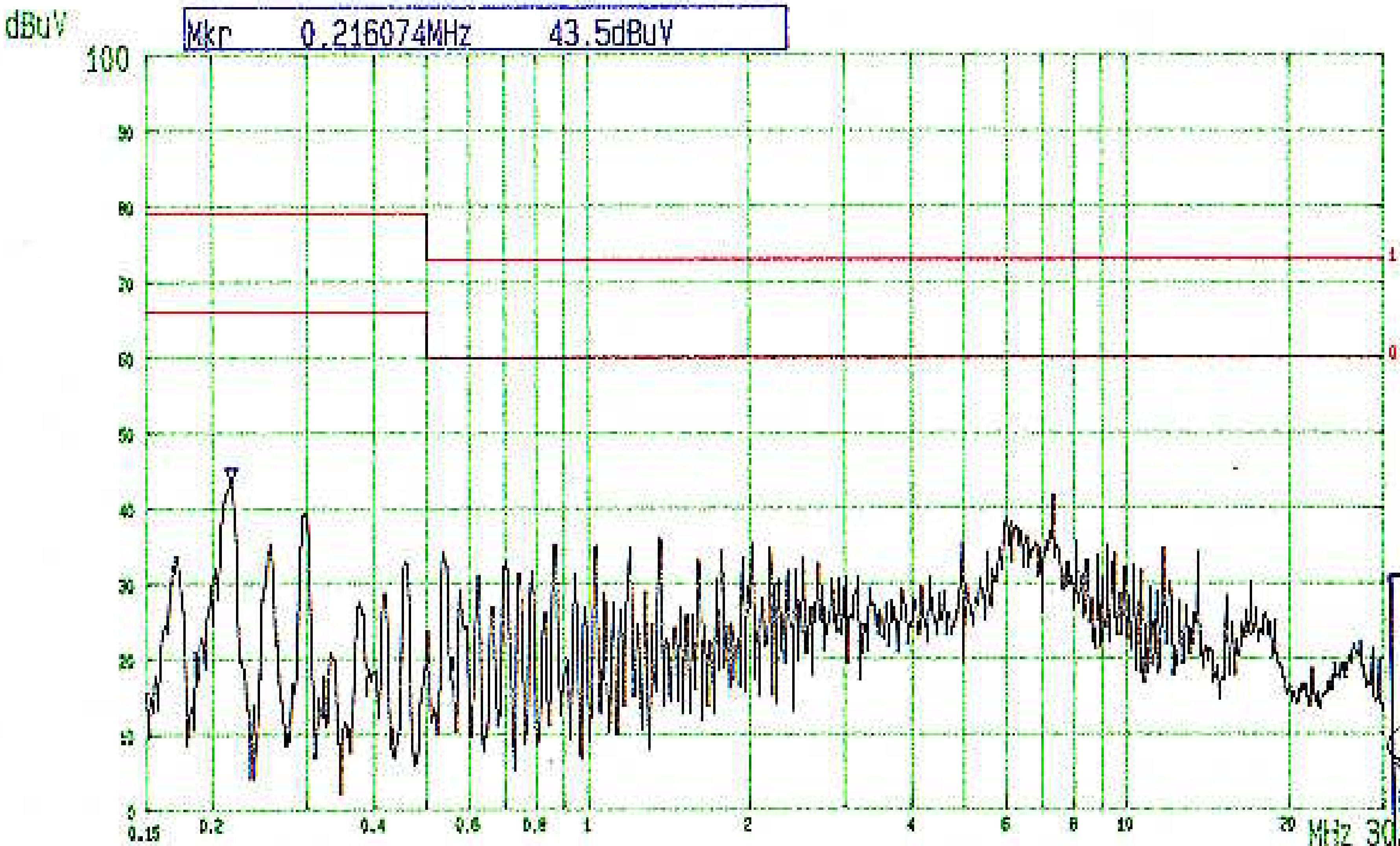
CPU: **5x86C-100 MHz**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Fred Chen

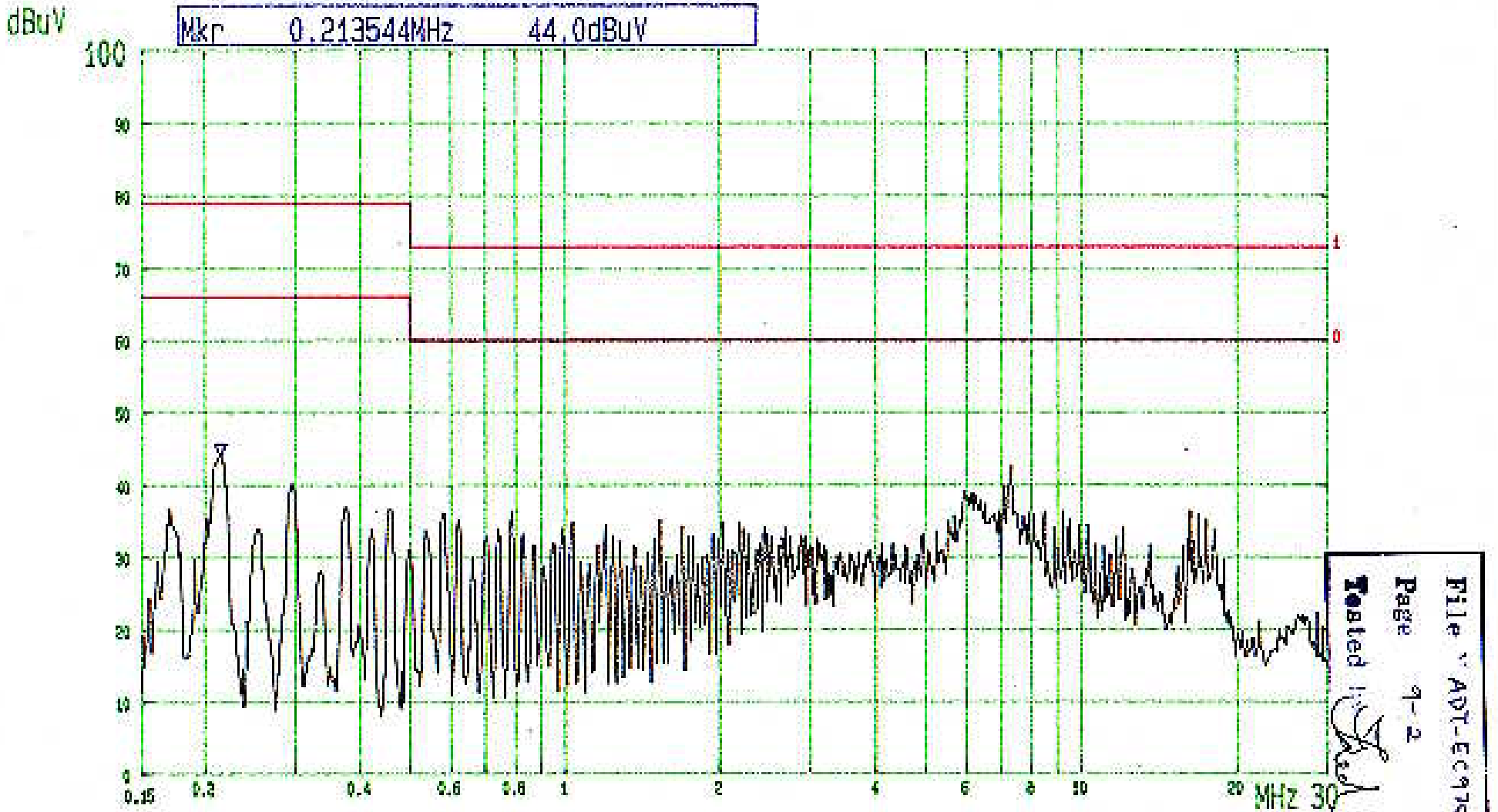
Freq.	L1 Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L1		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.203	44.30	-	45.10	-	79.00	66.00	34.7	-	33.9	-
0.285	42.10	-	41.10	-	79.00	66.00	36.9	-	37.9	-
0.367	35.10	-	37.00	-	79.00	66.00	43.9	-	42.0	-
5.947	33.40	-	33.20	-	73.00	60.00	39.6	-	39.8	-
7.300	33.50	-	33.80	-	73.00	60.00	39.5	-	39.2	-
16.270	28.20	-	28.70	-	73.00	60.00	44.8	-	44.3	-

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 12.MAR.'97 Time 18:54:20
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL : SBC-455 LISN : L1

File No. ADT-EC97058
Page 9-1
Tested by [signature]



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Page 1-2

Tested by

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MODEL : SBC-455 LISN : N

4.1.2 TEST DATA OF CONDUCTED EMISSION (B)

EUT: **CPU BOARD** MODEL: **PCM-3335**

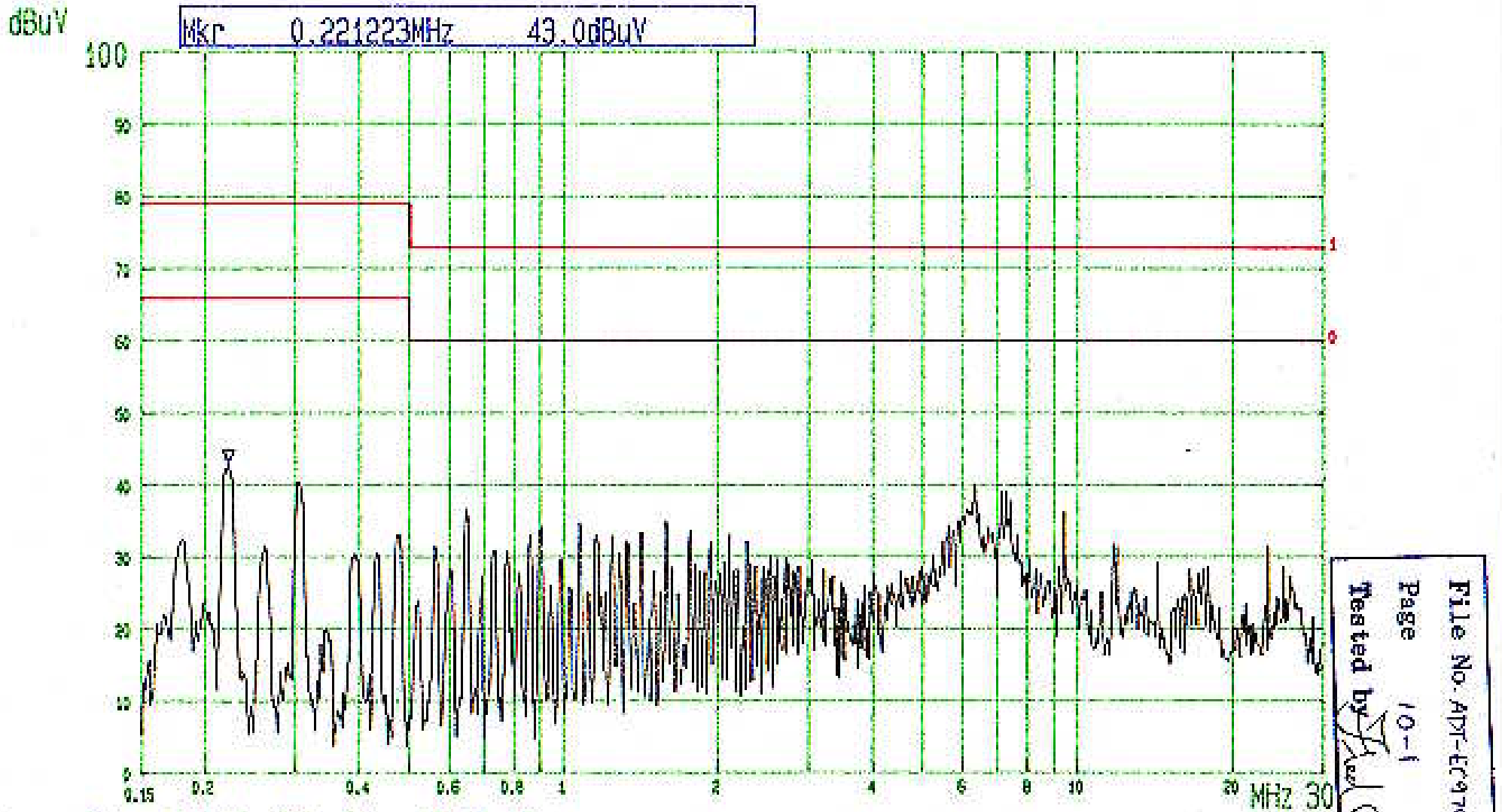
CPU: **386SX-40 MHz**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Fred Chen

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
0.212	43.60	-	42.60	-	79.00	66.00	35.4	-	36.4	-
0.297	41.20	-	40.90	-	79.00	66.00	37.8	-	38.1	-
0.468	34.00	-	36.70	-	79.00	66.00	45.0	-	42.3	-
6.300	42.00	-	41.30	-	73.00	60.00	31.0	-	31.7	-
7.326	35.90	-	37.30	-	73.00	60.00	37.1	-	35.7	-
17.500	26.10	-	26.70	-	73.00	60.00	46.9	-	46.3	-

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.



File No. ADT-EC9705P
Page 10-1
Tested by

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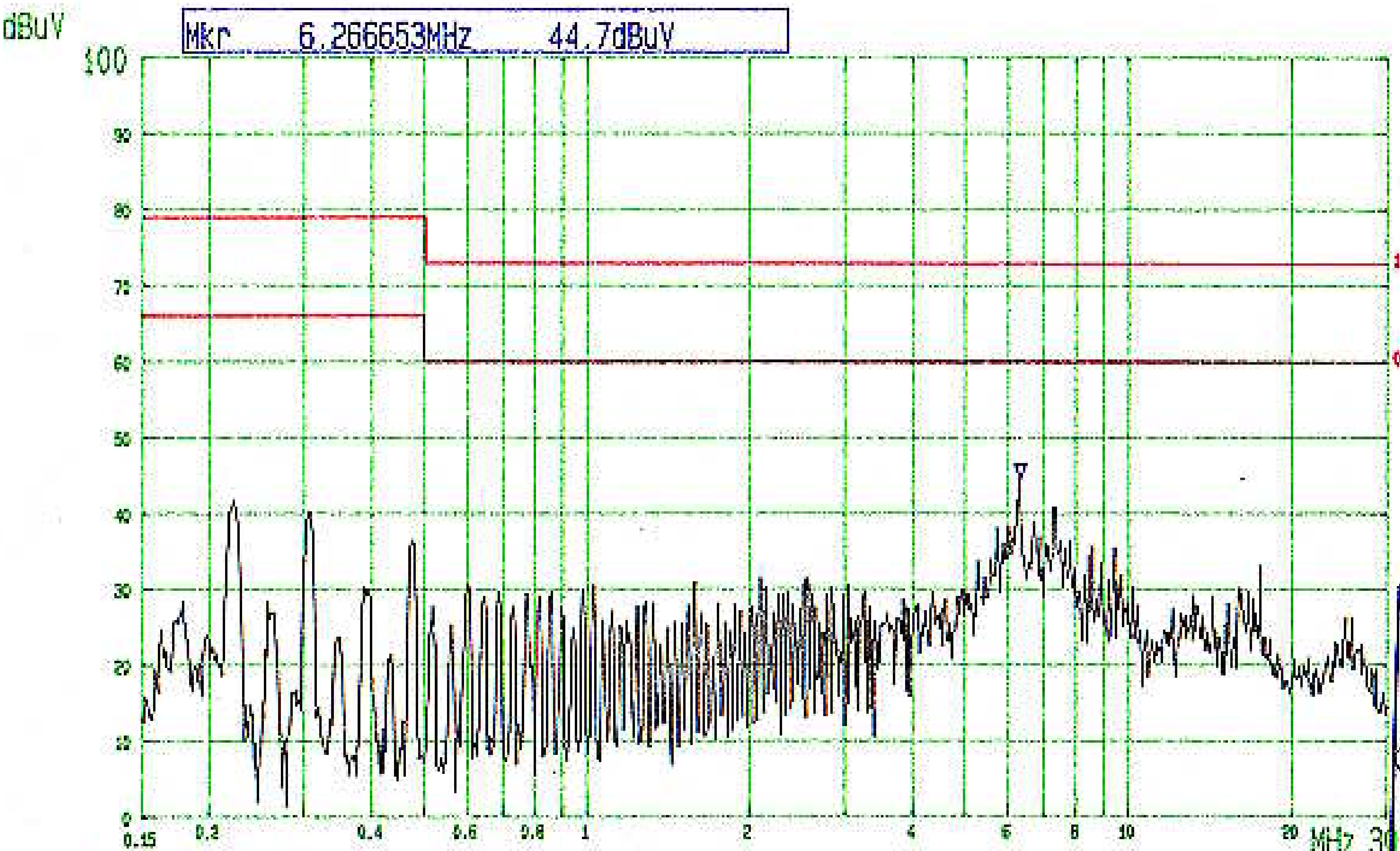
MODEL : PCM-3335 LISN : L1



|--- Date 12.MAR.'97 Time 18:03:06
EN55022 CLASS A CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL : PCM-3335 LISN : N

File No. ADT-EC91058
Page 10-2
Tested by

4.1.2 TEST DATA OF CONDUCTED EMISSION (C)

EUT: **CPU BOARD** MODEL: **SBC-400**

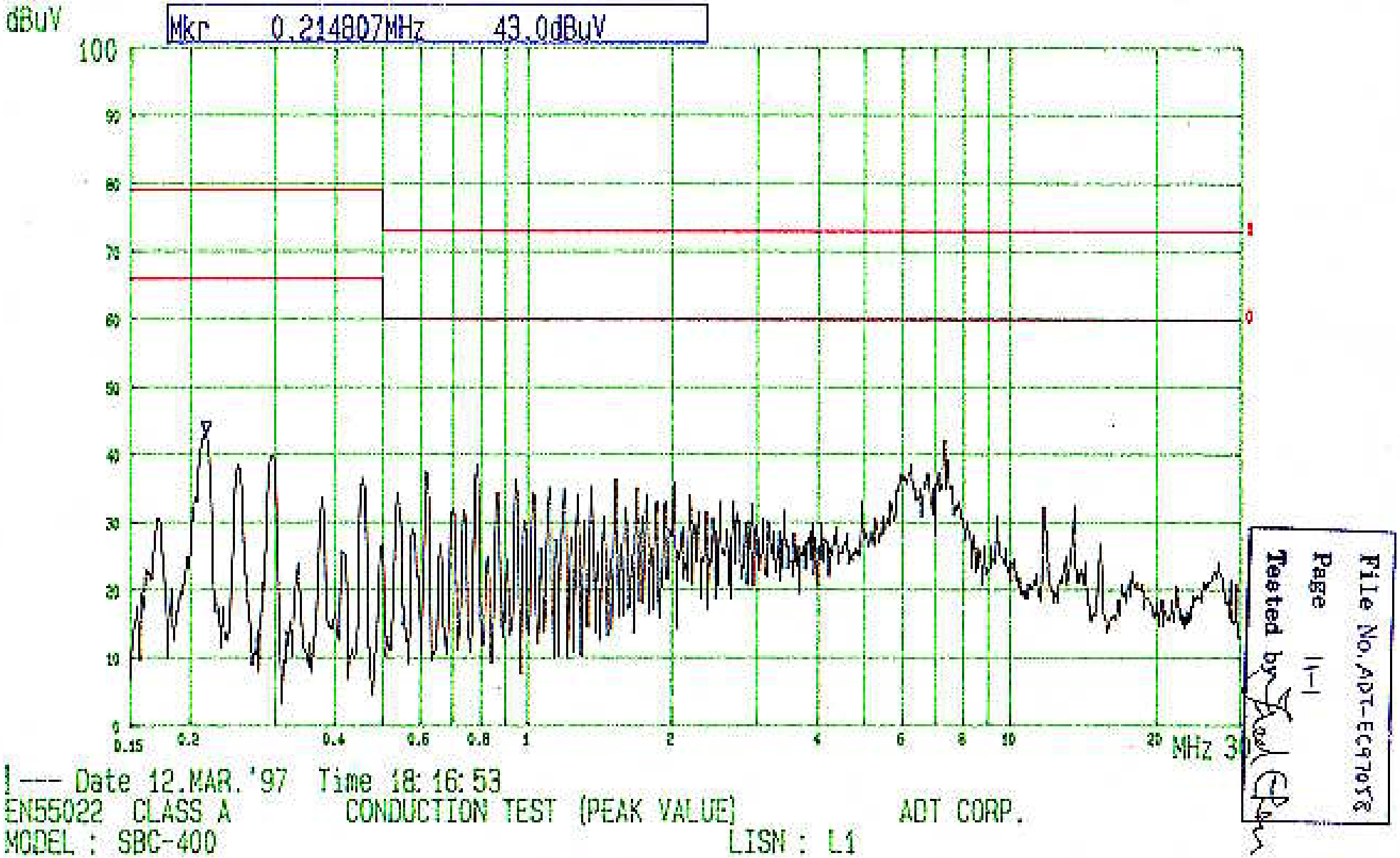
CPU: **5x86C-100 MHz**

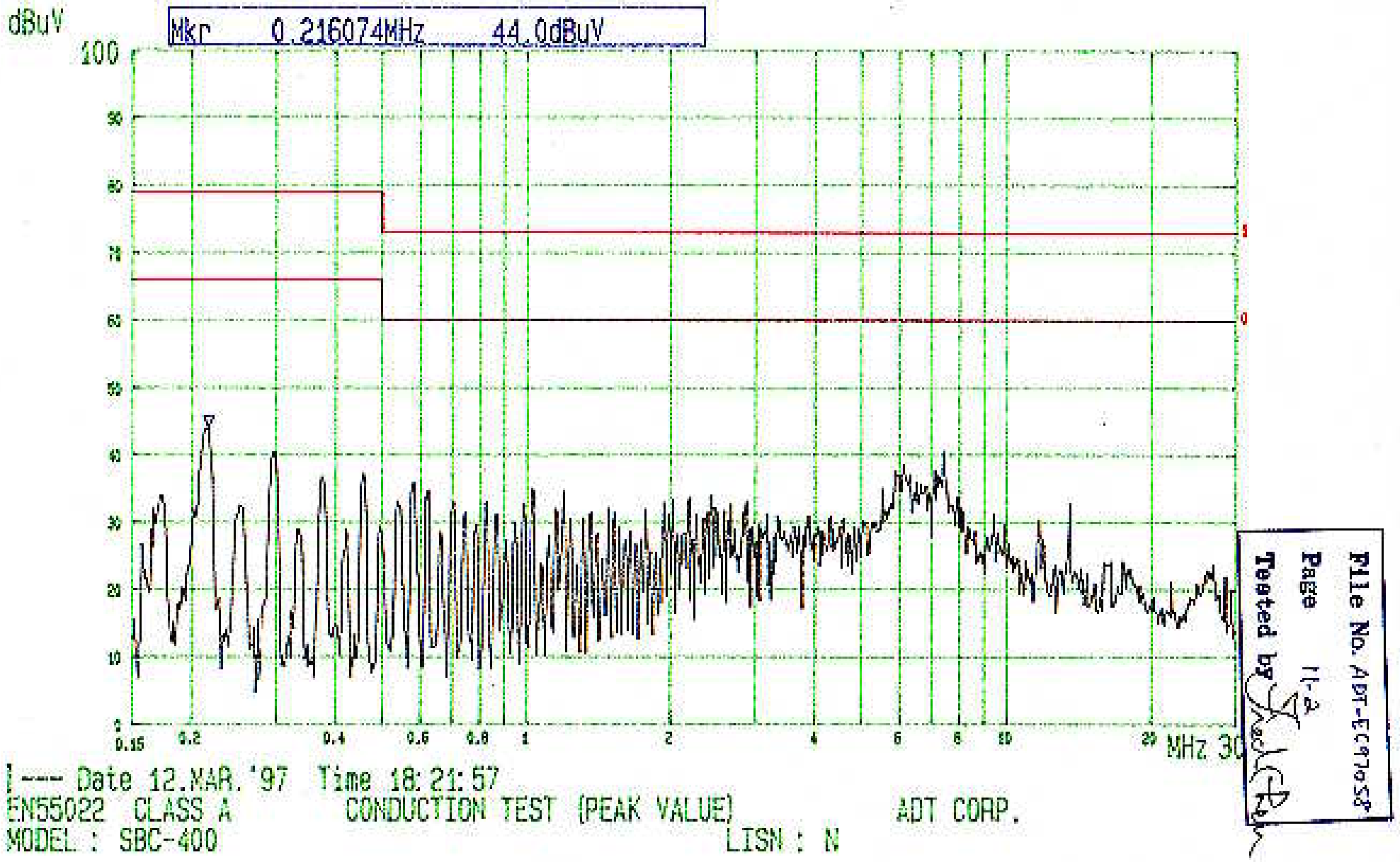
6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Fred Chen

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
0.205	43.70	-	45.00	-	79.00	66.00	35.3	-	34.0	-
0.284	41.20	-	40.40	-	79.00	66.00	37.8	-	38.6	-
0.616	37.40	-	34.00	-	73.00	60.00	35.6	-	39.0	-
0.778	36.40	-	35.20	-	73.00	60.00	36.6	-	37.8	-
7.365	33.90	-	33.90	-	73.00	60.00	39.1	-	39.1	-
13.567	24.90	-	25.10	-	73.00	60.00	48.1	-	47.9	-

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.


dBuV
Mkr 0.214807MHz 43.0dBuV
100
90
80
70
60
50
40
30
20
10
0
0.15
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
MHz 30
File No.ADT-EC97013
Page 1-1
Tested by
Date 12.MAR.'97 Time 18:16:53
EN55022 CLASS A
CONDUCTION TEST (PEAK VALUE)
ADT CORP.
MODEL : SBC-400
LISN : L1


dBuV
Mkr 0.216074MHz 44.0dBuV
100
90
80
70
60
50
40
30
20
10
0
0.15
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
MHz 30
File No. ADT-EC97058
Page 11-2
Tested by
Date 12.MAR.'97 Time 18:21:57
EN55022 CLASS A
CONDUCTION TEST (PEAK VALUE)
ADT CORP.
MODEL : SBC-400
LISN : N

4.1.2 TEST DATA OF CONDUCTED EMISSION (D)

EUT: **CPU BOARD** MODEL: **SBC-410**

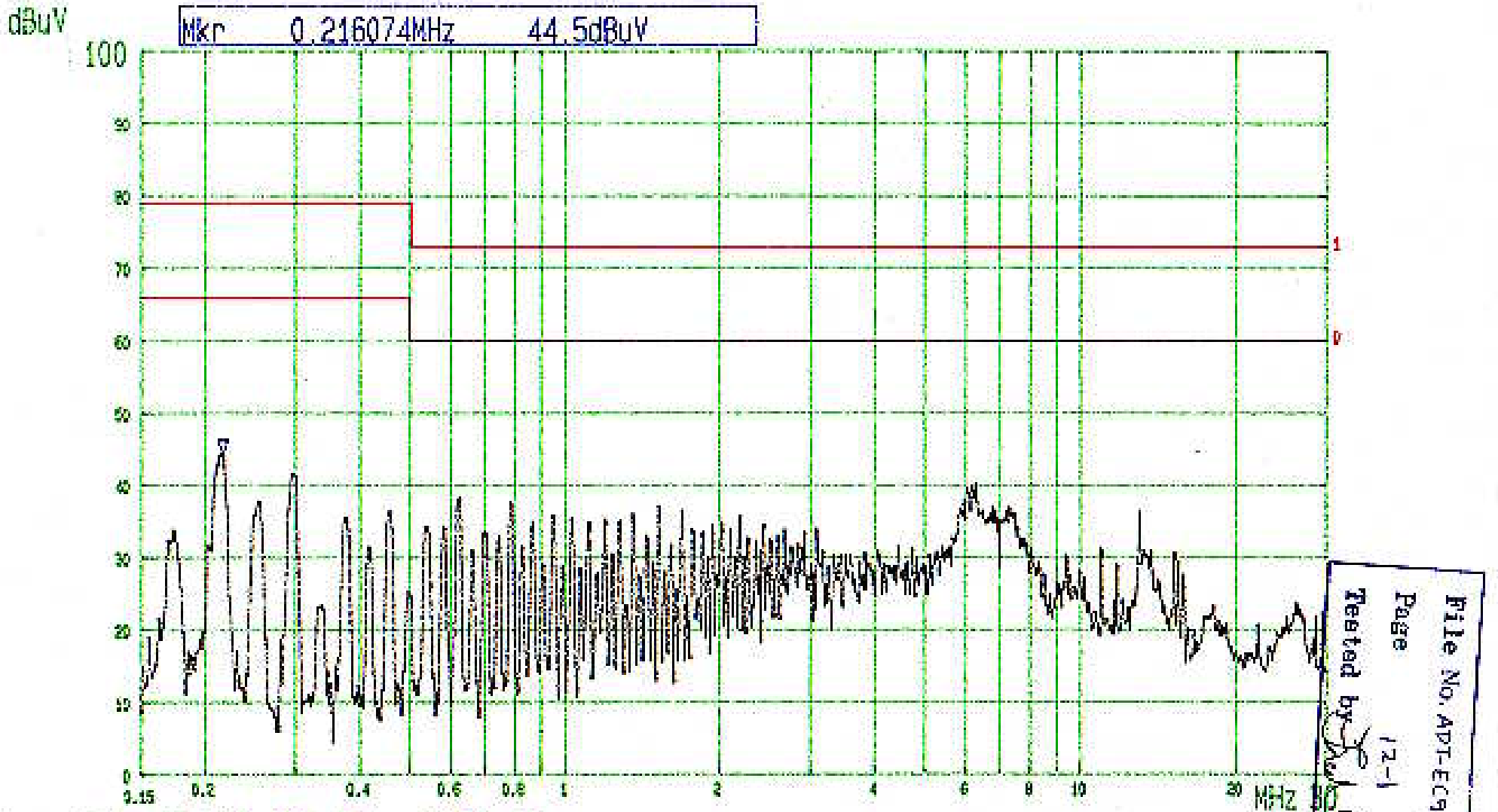
CPU: **5x86C-100 MHz**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Fred Chen

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
0.203	44.70	-	45.50	-	79.00	66.00	34.3	-	33.5	-
0.285	41.90	-	40.60	-	79.00	66.00	37.1	-	38.4	-
0.615	37.90	-	33.50	-	73.00	60.00	35.1	-	39.5	-
0.778	37.70	-	34.70	-	73.00	60.00	35.3	-	38.3	-
6.260	34.50	-	33.80	-	73.00	60.00	38.5	-	39.2	-
12.990	44.00	-	45.00	-	73.00	60.00	29.0	-	28.0	-

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.



File No. ADT-E97038
Page 12-1
Tested by

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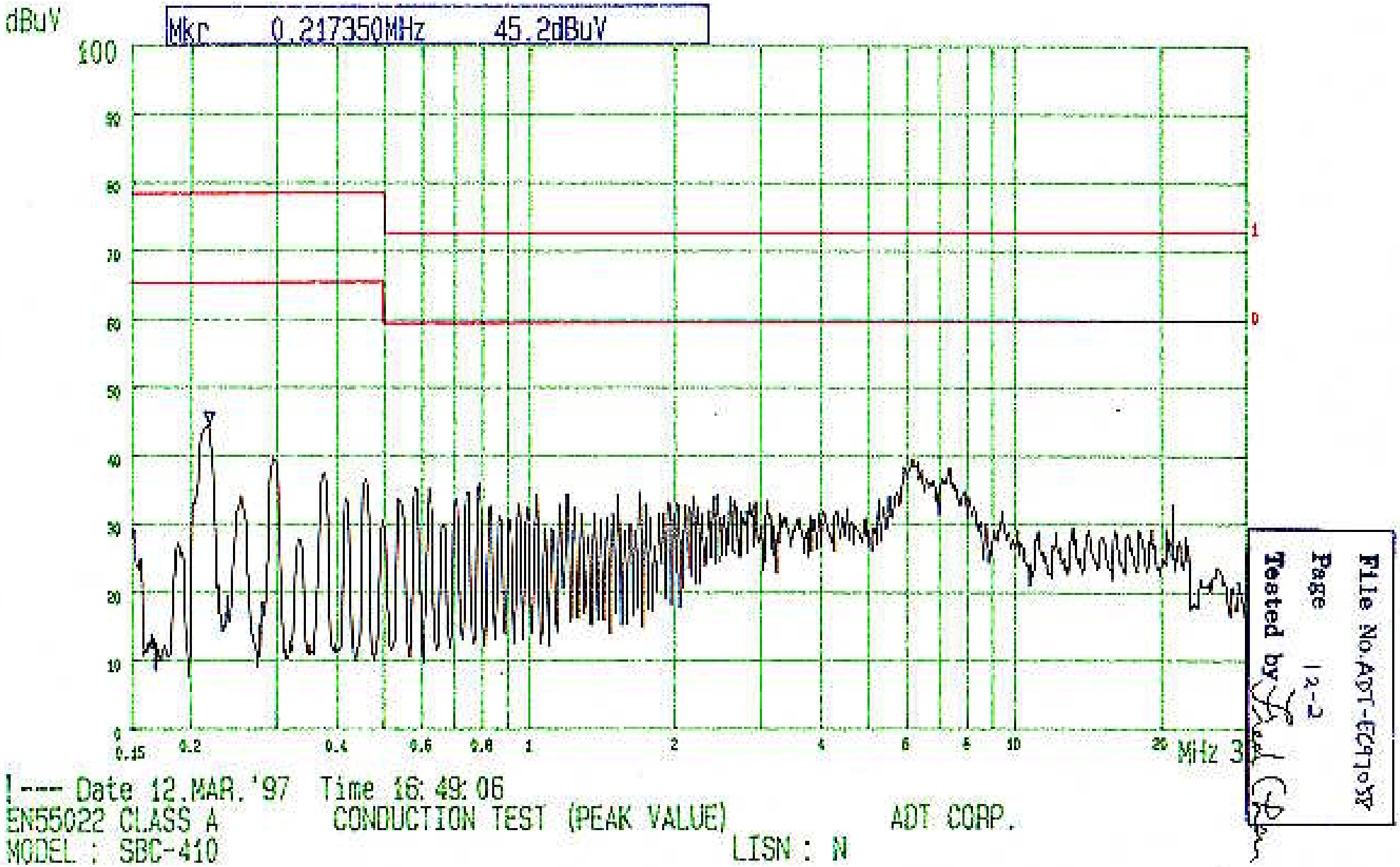
MODEL : SBC-410 LISN : L1


dBuV
Mkr 0.217350MHz 45.2dBuV
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90
80
70
60
50
40
30
20
10
0
0.15
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
MHz
1
0
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EN55022 CLASS A
CONDUCTION TEST (PEAK VALUE)
ADT CORP.
MODEL : SBC-410
LISN : N
File No.ADT-E2910XP
Page 12-2
Tested by

4.1.3 TEST DATA OF RADIATED EMISSION (A1)

EUT: **CPU BOARD** MODEL: **SBC-455** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: HORIZONTAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
69.26	8.2	14.1	22.3	40.0	-17.7
114.60	14.3	12.6	26.9	40.0	-13.1
185.71	12.3	11.6	23.9	40.0	-16.1
217.19	14.0	12.8	26.8	40.0	-13.2
232.91	15.5	17.9	33.4	47.0	-13.6
365.11	20.3	14.2	34.5	47.0	-12.5

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.

Graph of Test Result

Model:SBC-455
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

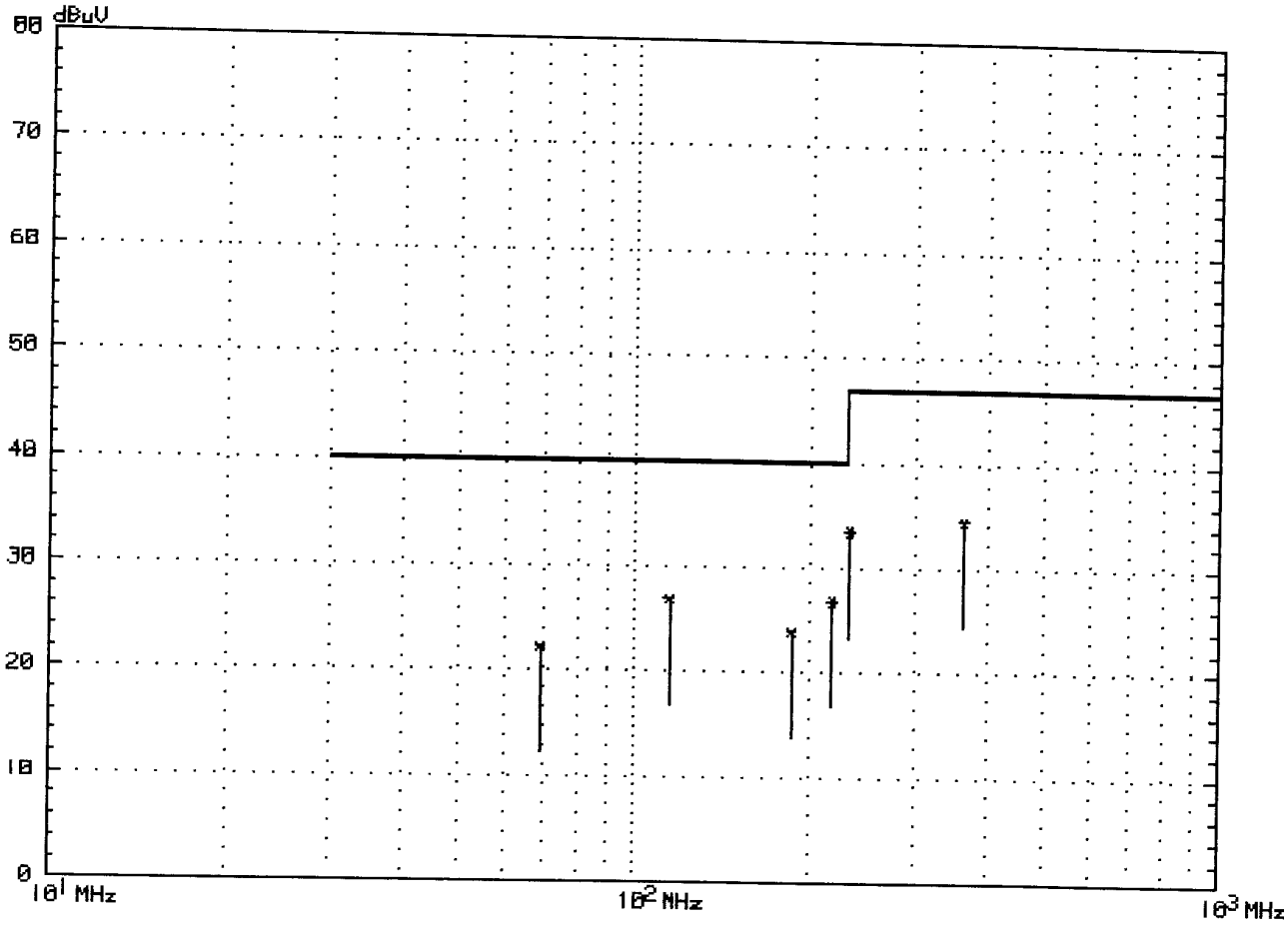
Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Horizontal

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)
1	69.3	22.3
3	185.7	23.9
5	232.9	33.4

No.	Freq.(MHz)	Emission(dBuV)
2	114.6	26.9
4	217.2	26.8
6	365.1	34.5



TEST DATA OF RADIATED EMISSION (A2)

EUT: **CPU BOARD** MODEL: **SBC-455** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: VERTICAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
31.49	18.2	10.7	28.9	40.0	-11.1
56.68	8.2	22.4	30.6	40.0	-9.4
59.81	7.6	22.1	29.7	40.0	-10.3
185.71	12.5	15.5	28.0	40.0	-12.0
217.18	14.1	14.8	28.9	40.0	-11.1
364.33	20.6	12.1	32.7	47.0	-14.3

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.

Graph of Test Result

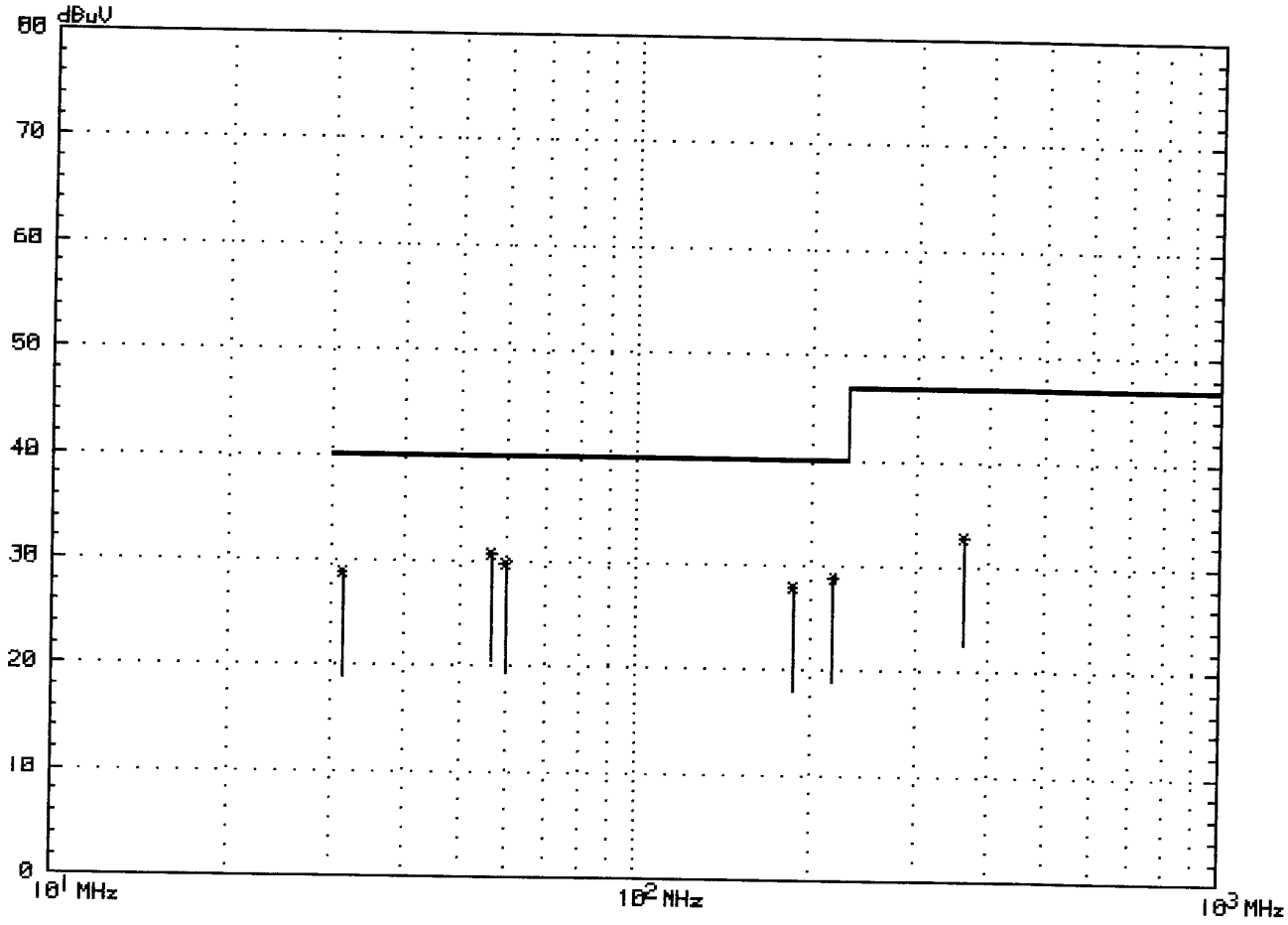
Model:SBC-455
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Vertical

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)	No.	Freq.(MHz)	Emission(dBuV)
1	31.5	28.9	2	56.7	30.6
3	59.8	29.7	4	185.7	28.0
5	217.2	28.9	6	364.3	32.7



4.1.3 TEST DATA OF RADIATED EMISSION (B1)

EUT: **CPU BOARD** MODEL: **PCM-3335** CPU: **386SX-40 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: HORIZONTAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
75.52	9.3	25.5	34.8	40.0	-5.2
80.21	10.1	19.2	29.3	40.0	-10.7
176.23	12.5	15.7	28.2	40.0	-11.8
226.57	14.9	13.7	28.6	40.0	-11.4
320.76	19.1	15.5	34.6	47.0	-12.4
503.51	25.0	14.5	39.5	47.0	-7.5

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.

Graph of Test Result

Model:PCM-3335
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

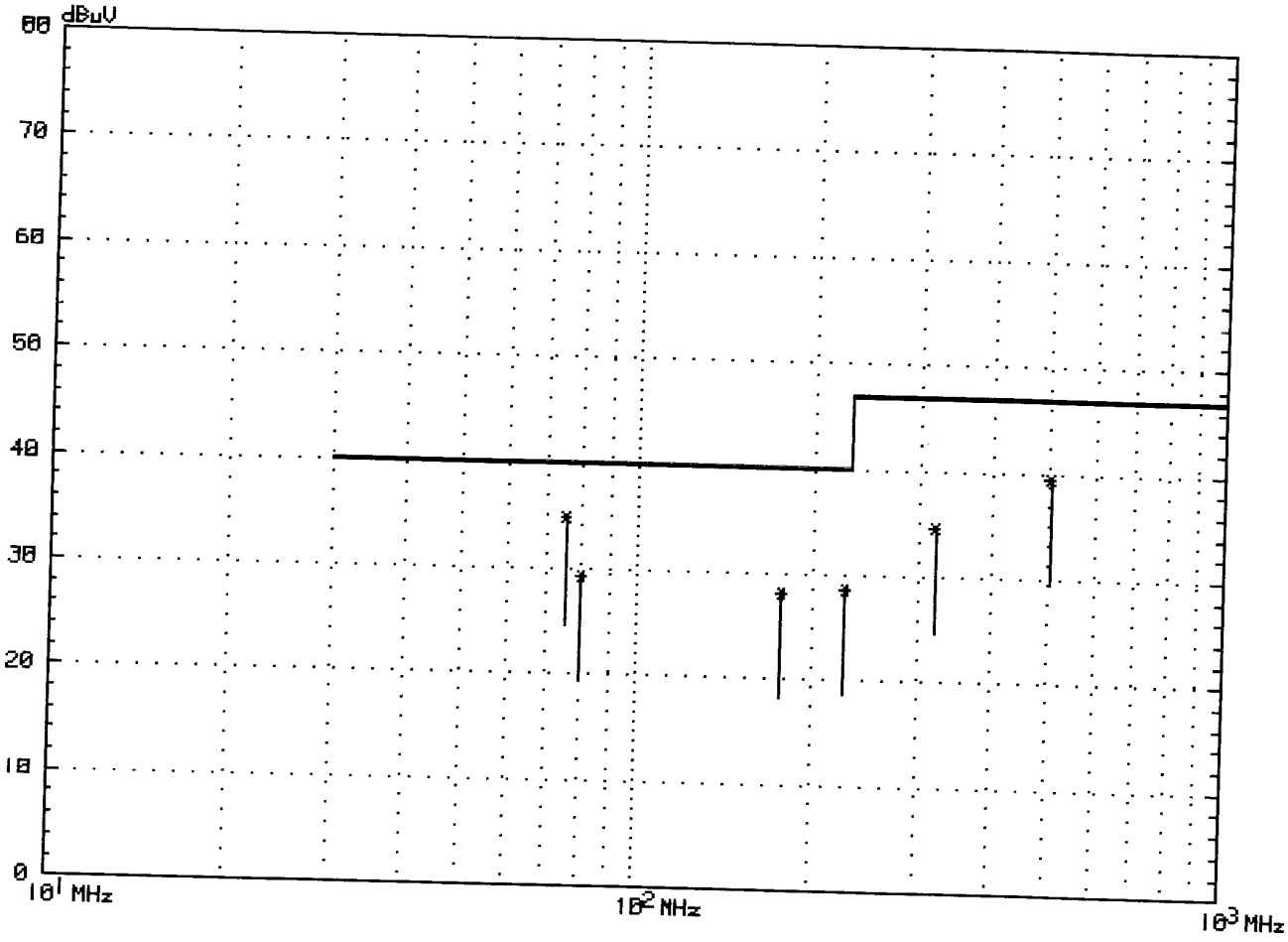
Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Horizontal

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)
1	75.5	34.8
3	176.2	28.2
5	320.8	34.6

No.	Freq.(MHz)	Emission(dBuV)
2	80.2	29.3
4	226.6	28.6
6	503.5	39.5



TEST DATA OF RADIATED EMISSION (B2)

EUT: **CPU BOARD** MODEL: **PCM-3335** CPU: **386SX-40 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: VERTICAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
31.49	18.2	10.7	28.9	40.0	-11.1
56.68	8.2	22.4	30.6	40.0	-9.4
59.81	7.6	22.1	29.7	40.0	-10.3
185.71	12.5	15.5	28.0	40.0	-12.0
217.18	14.1	14.8	28.9	40.0	-11.1
364.33	20.6	12.1	32.7	47.0	-14.3

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.

Graph of Test Result

Model:PCM-3335
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

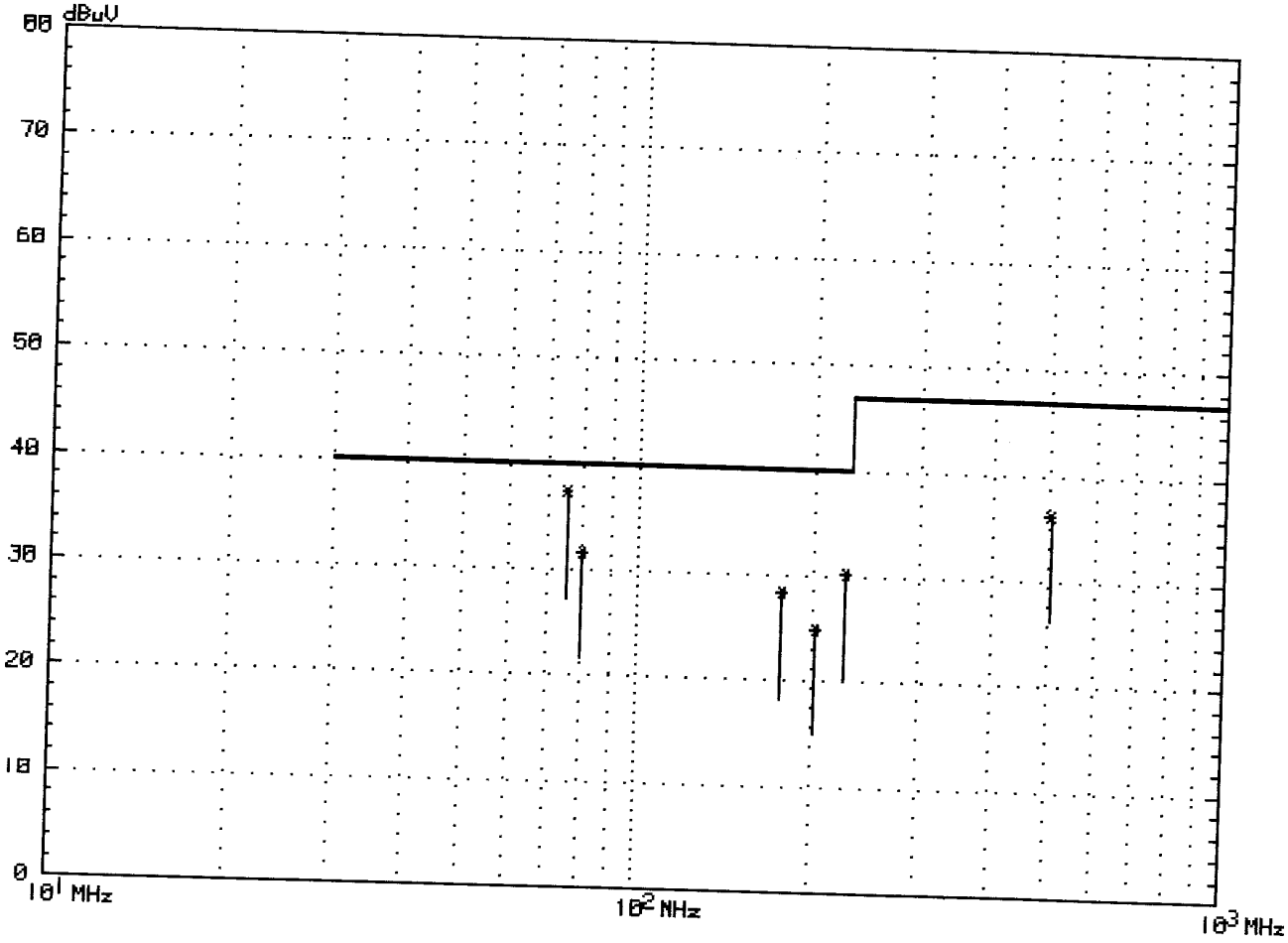
Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Vertical

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)
1	75.5	37.3
3	176.2	28.3
5	226.6	30.3

No.	Freq.(MHz)	Emission(dBuV)
2	80.2	31.6
4	201.4	25.0
6	503.5	36.3



4.1.3 TEST DATA OF RADIATED EMISSION (C1)

EUT: **CPU BOARD** MODEL: **SBC-400** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: HORIZONTAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
114.59	14.3	12.7	27.0	40.0	-13.0
135.39	14.7	11.2	25.9	40.0	-14.1
171.87	12.8	11.2	24.0	40.0	-16.0
210.94	13.4	7.1	20.5	40.0	-19.5
232.53	15.5	18.8	34.3	47.0	-12.7
432.06	22.7	11.8	34.5	47.0	-12.5

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.

Graph of Test Result

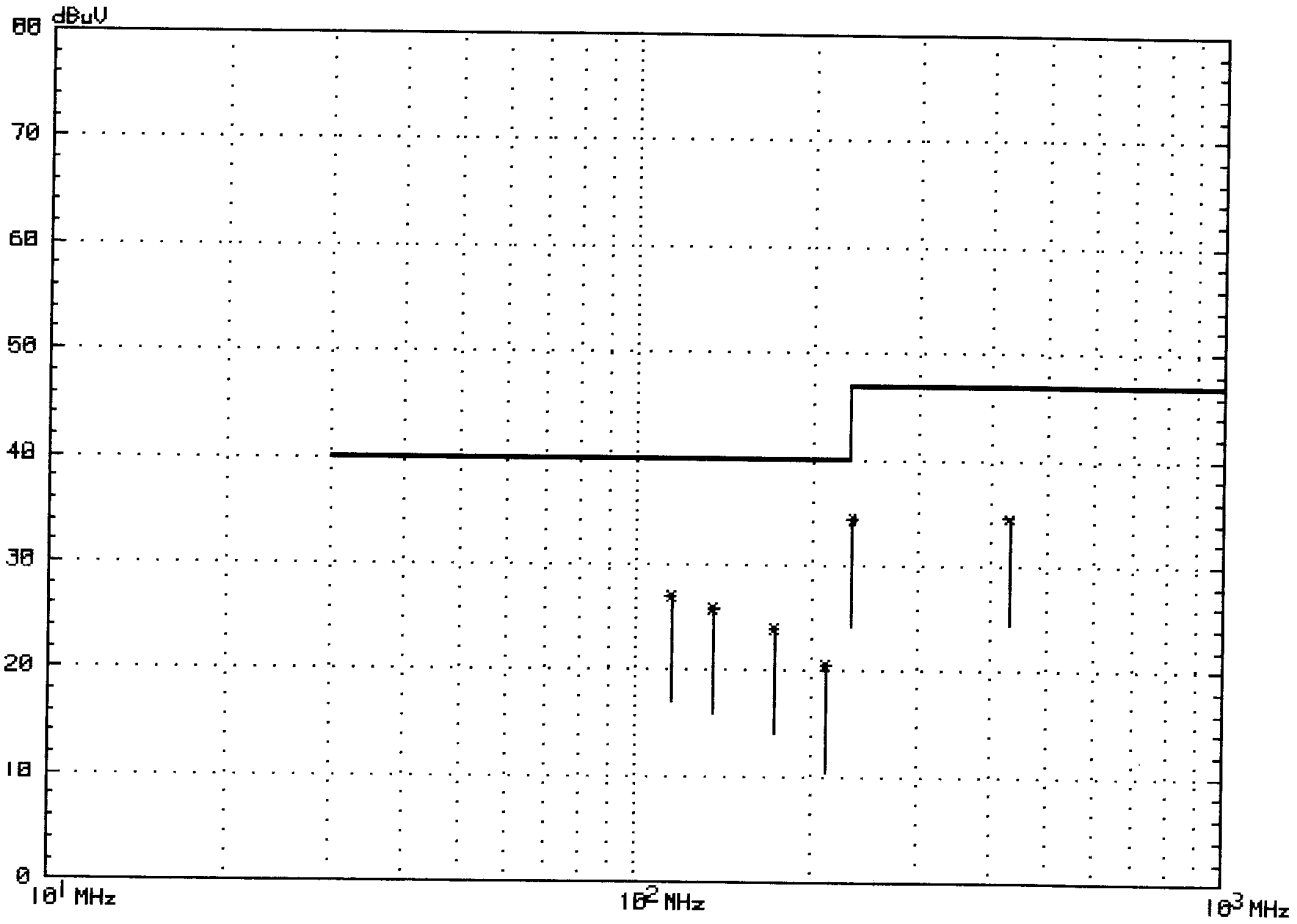
Model:SBC-400
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

Tested By : Fred Chan

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Horizontal

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)	No.	Freq.(MHz)	Emission(dBuV)
1	114.6	27.0	2	135.4	25.9
3	171.9	24.0	4	210.9	20.5
5	232.5	34.3	6	432.1	34.5



TEST DATA OF RADIATED EMISSION (C2)

EUT: **CPU BOARD** MODEL: **SBC-400** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: VERTICAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
37.93	15.8	5.0	20.8	40.0	-19.2
114.59	14.2	17.4	31.6	40.0	-8.4
135.36	15.4	15.9	31.3	40.0	-8.7
171.88	13.3	14.1	27.4	40.0	-12.6
210.91	13.7	11.0	24.7	40.0	-15.3
431.55	23.2	16.5	39.7	47.0	-7.3

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.

Graph of Test Result

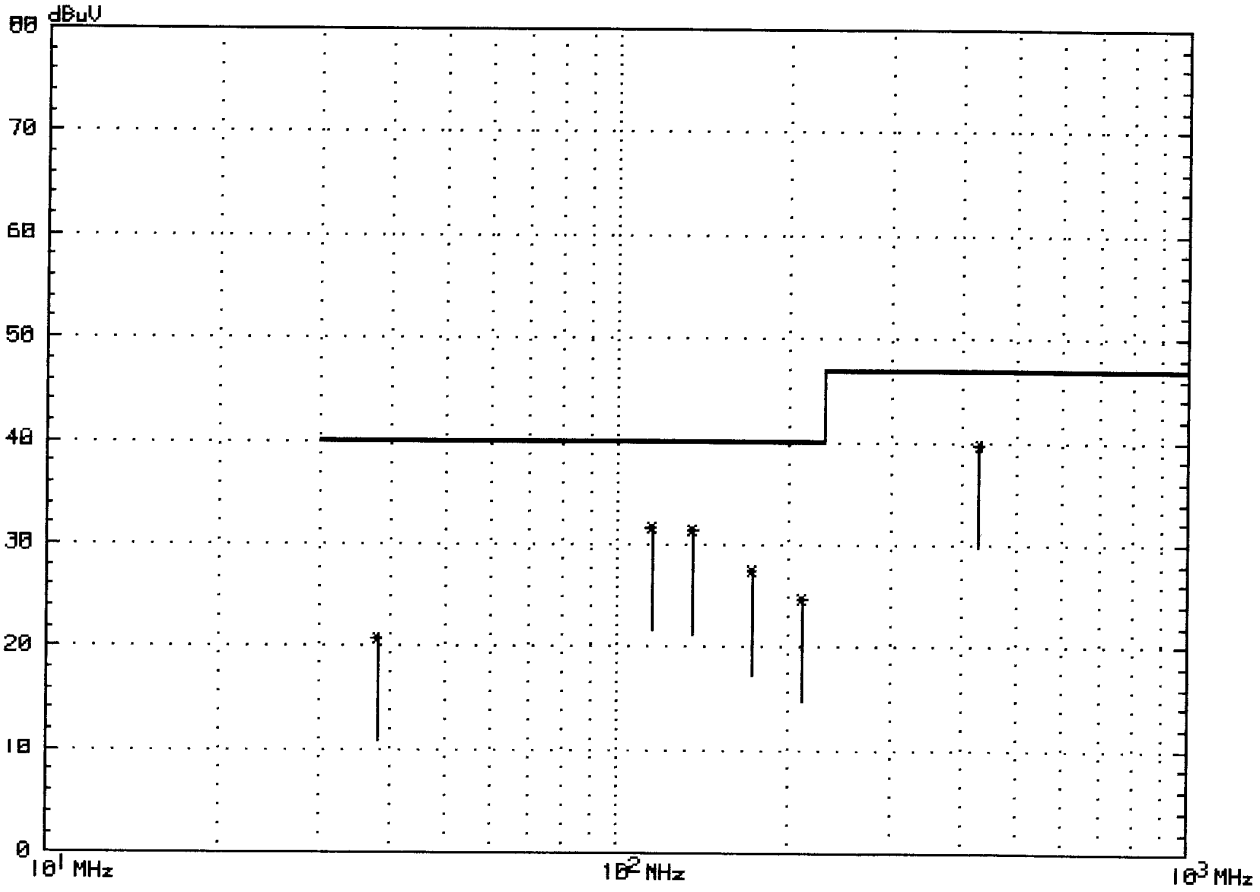
Model:SBC-400
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Vertical

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)	No.	Freq.(MHz)	Emission(dBuV)
1	37.9	20.8	2	114.6	31.6
3	135.4	31.3	4	171.9	27.4
5	210.9	24.7	6	431.6	39.7



4.1.3 TEST DATA OF RADIATED EMISSION (D1)

EUT: **CPU BOARD** MODEL: **SBC-410** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: HORIZONTAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
116.48	14.5	17.8	32.3	40.0	-7.7
120.01	14.9	20.2	35.1	40.0	-4.9
124.88	14.9	18.5	33.4	40.0	-6.6
151.11	14.0	11.5	25.5	40.0	-14.5
226.66	14.9	16.9	31.8	40.0	-8.2
402.95	21.8	16.6	38.4	47.0	-8.6

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.

Graph of Test Result

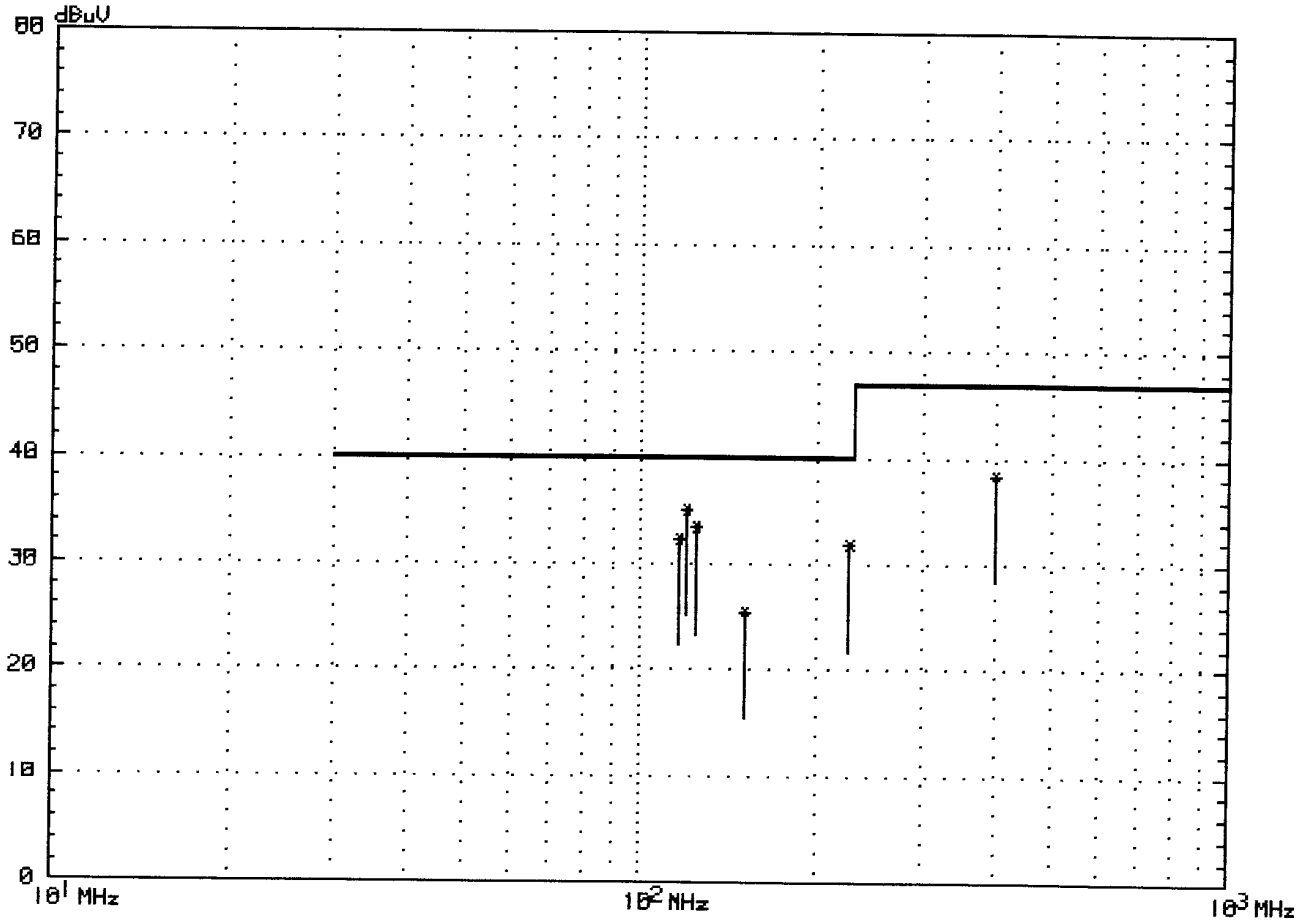
Model:SBC-410
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Horizontal

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)	No.	Freq.(MHz)	Emission(dBuV)
1	116.5	32.3	2	120.0	35.1
3	124.9	33.4	4	151.1	25.5
5	226.7	31.8	6	403.0	38.4



TEST DATA OF RADIATED EMISSION (D2)

EUT: **CPU BOARD** MODEL: **SBC-410** CPU: **5x86C-100 MHz**

ANTENNA: CHASE BILOG CBL6111A POLARITY: VERTICAL

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

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

TEST PERSONNEL: Fred Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
114.58	14.2	20.2	34.4	40.0	-5.6
120.01	14.7	19.6	34.3	40.0	-5.7
125.93	15.0	21.6	36.6	40.0	-3.4
129.06	15.1	20.5	35.6	40.0	-4.4
151.09	15.1	17.6	32.7	40.0	-7.3
210.93	13.7	16.8	30.5	40.0	-9.5
226.68	14.8	17.7	32.5	40.0	-7.5
277.04	16.8	12.0	28.8	47.0	-18.2
402.95	22.7	15.5	38.2	47.0	-8.8
430.78	23.2	10.7	33.9	47.0	-13.1

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.

Graph of Test Result

Model:SBC-410
Mode:
EMI Type:EN55022 Class A
Freq. Range:30-1000 MHz
Antenna:CHASE Bi_Log

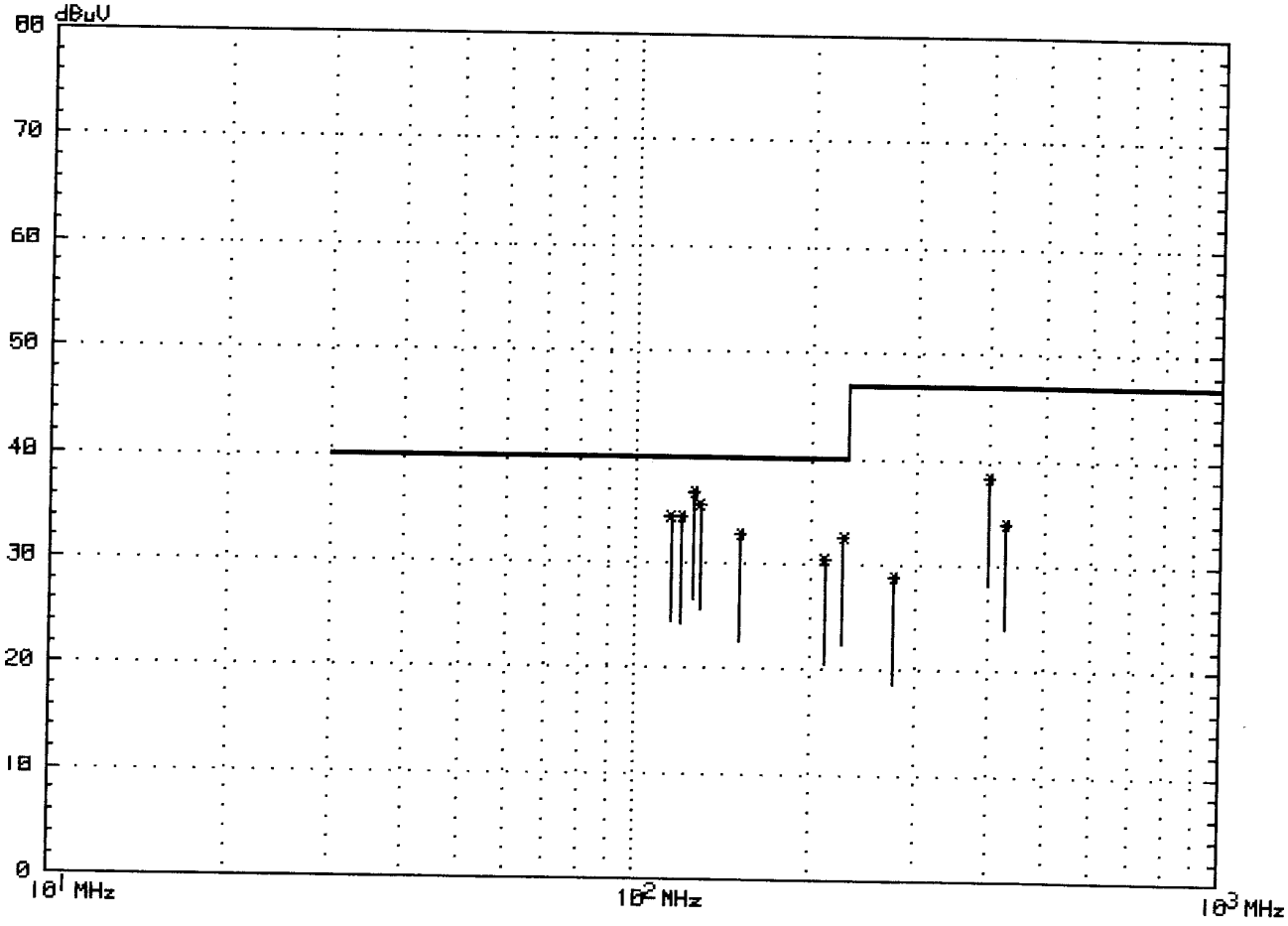
Tested By : Fred Chen

Test Date: 12 Mar 1997
Remark:FULL SYSTEM
Distance:10 M
Detector:CISPR,QUASI_Peak
Ant. Polarization:Vertical

Report No. : EC97058

No.	Freq.(MHz)	Emission(dBuV)
1	114.6	34.4
3	125.9	36.6
5	151.1	32.7
7	226.7	32.5
9	402.9	38.2

No.	Freq.(MHz)	Emission(dBuV)
2	120.0	34.3
4	129.1	35.6
6	210.9	30.5
8	277.0	28.8
10	430.8	33.9



5. TEST RESULTS (IMMUNITY)

5.1 GENERAL DESCRIPTION

Basic Standard	:	EN61000-4-2	(Electrostatic Discharge Test, ESD)
		ENV50140	(Radiated Radio-Frequency Disturbance Test, RS)
		EN61000-4-4	(Electrical Fast Transient/Burst Test, EFT)
		ENV50141	(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	:	18 ℃	
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	:	TM Yeung

Test Result		Remarks
Criterion A	PASS	Model: SBC-455, PCM-3335, SBC-400, SBC-410

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. Power Switch
2. Metal Case
3. Bracket of CPU board
4. Bracket of I/O port
5. FDD

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	:	ENV50140
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	:	

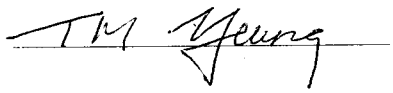
Test Result		Remarks
Criterion A	**PASS**	Model: SBC-455, PCM-3335, SBC-400, SBC-410

Note: Four sides of Industrial PC 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-455, PCM-3335, SBC-400, SBC-410

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)

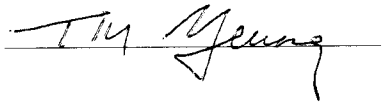
Basic Standard	:	ENV50141
Generic Standard	:	EN 50 082-2
Frequency range	:	0.15 MHz - 80 MHz
Field strength	:	10 V/m
Modulation	:	1kHz Sine Wave, 80%, AM Modulation
Frequency step	:	1 % of fundamental
Coupled cable	:	Power Mains, Unshielded
Coupling device	:	CDN-M3 (3 wires)
Test Personnel	:	Tim Yeung

Test Result		Remarks
Criterion A	PASS	Model: SBC-455, PCM-3335, SBC-400, SBC-410

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-455, PCM-3335, SBC-400, SBC-410

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-455, PCM-3335, SBC-400, SBC-410

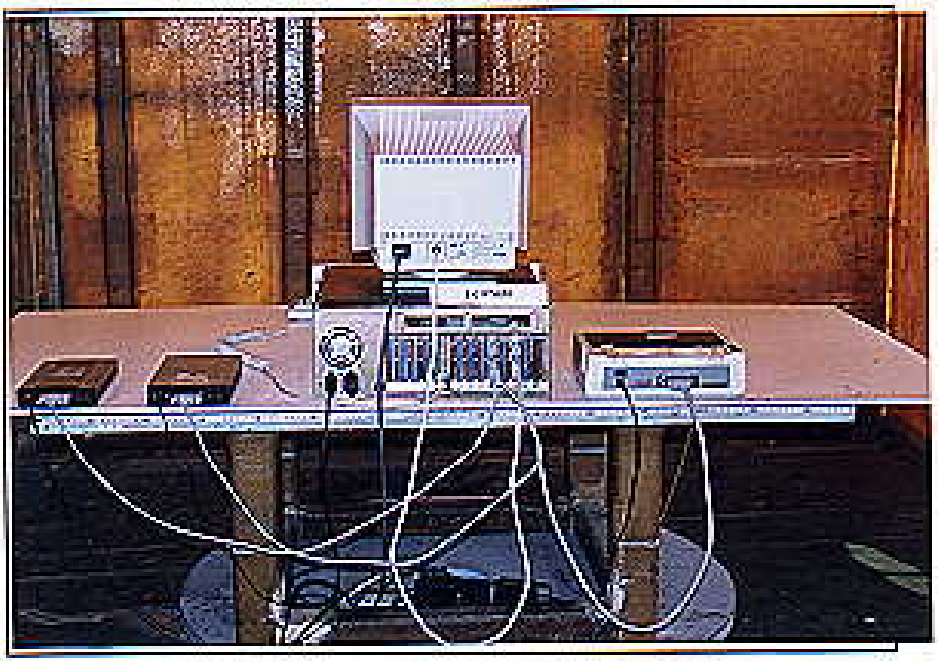
Note: Four sides of Industrial PC are verified separately.

OBSERVATION DESCRIPTION

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

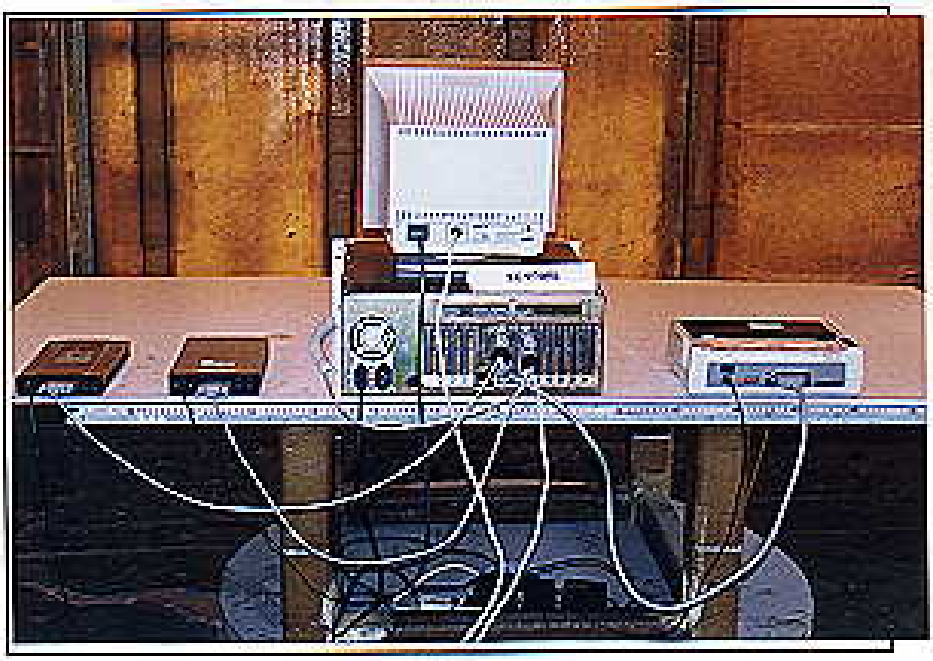
6. PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST (MODEL: SBC-455)



CONDUCTED EMISSION TEST (MODEL: SBC-455)

RADIATED EMISSION TEST (MODEL: PCM-3335)



CONDUCTED EMISSION TEST (MODEL: PCM-3335)

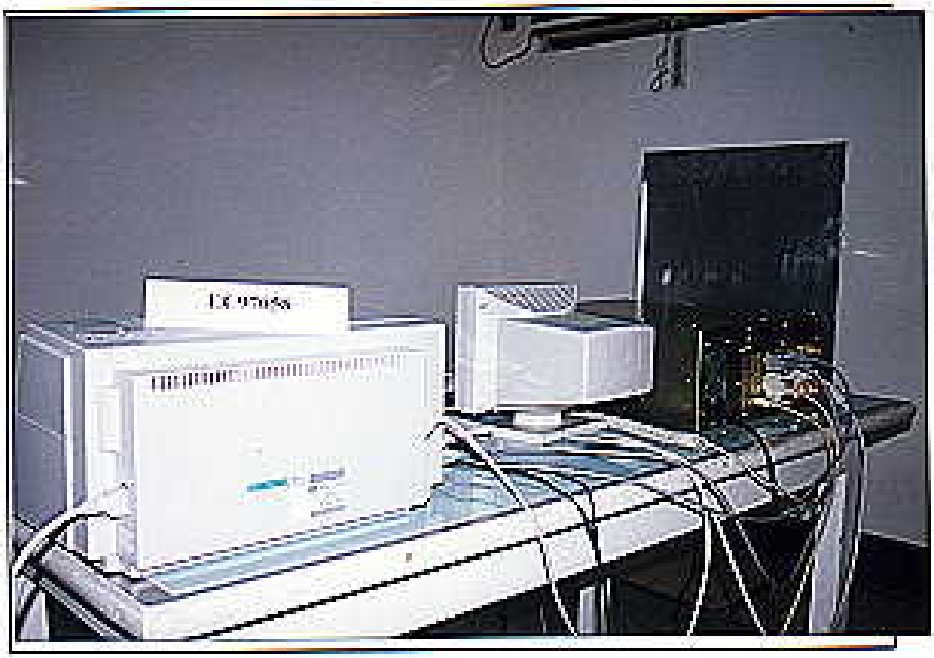
RADIATED EMISSION TEST (MODEL: SBC-400)

CONDUCTED EMISSION TEST (MODEL: SBC-400)

RADIATED EMISSION TEST (MODEL: SBC-410)

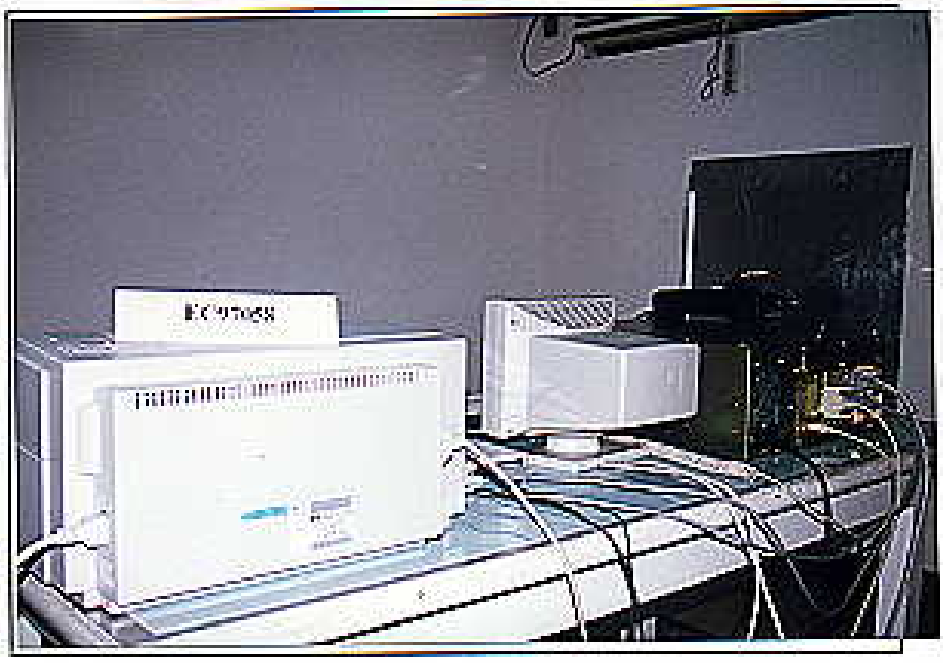
CONDUCTED EMISSION TEST (MODEL: SBC-410)

ESD TEST (MODEL: SBC-455)



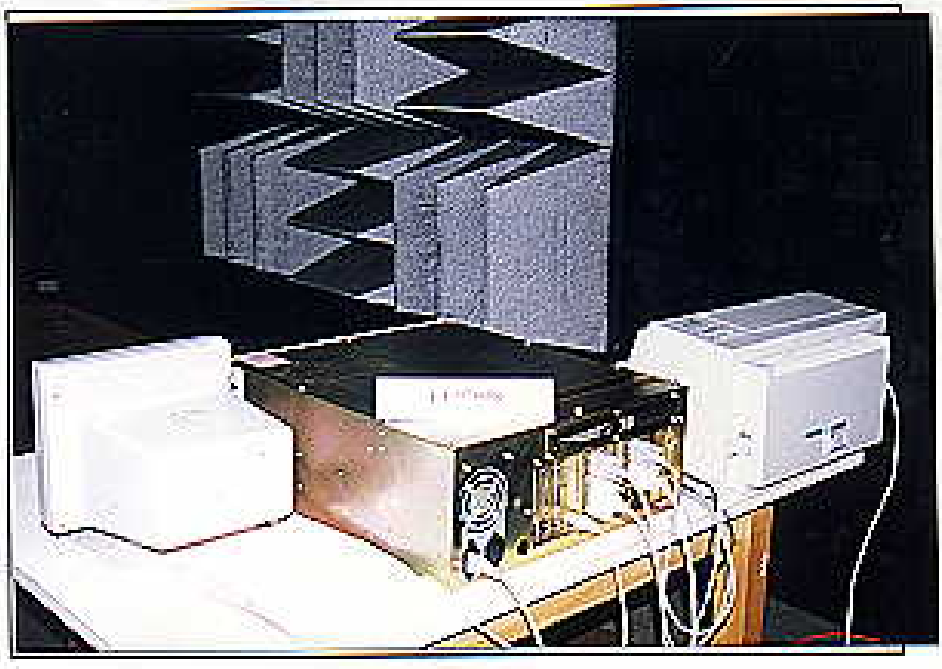
ESD TEST (MODEL: PCM-3335)

ESD TEST (MODEL: SBC-400)

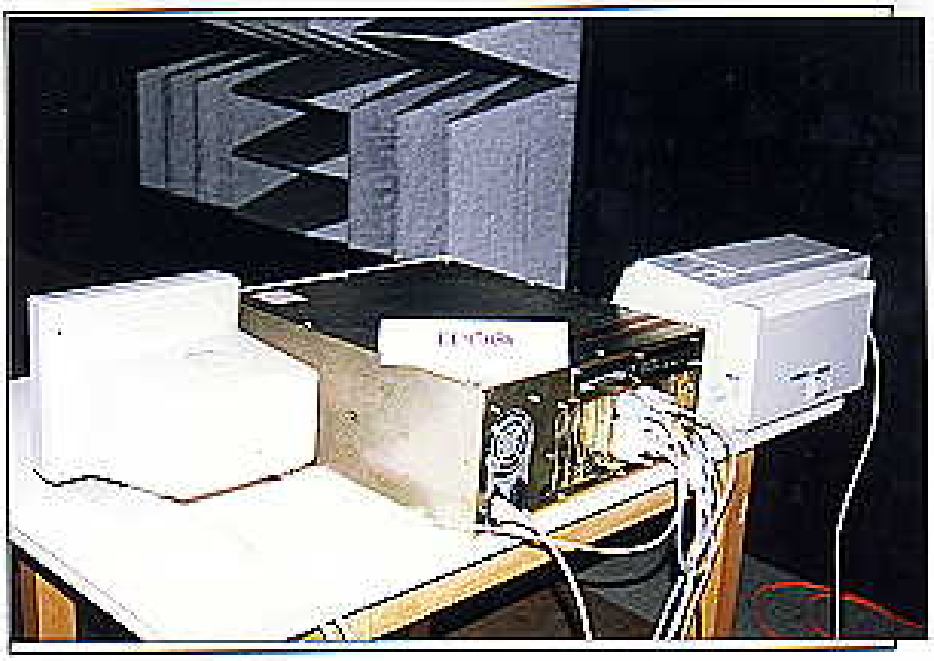


ESD TEST (MODEL: SBC-410)

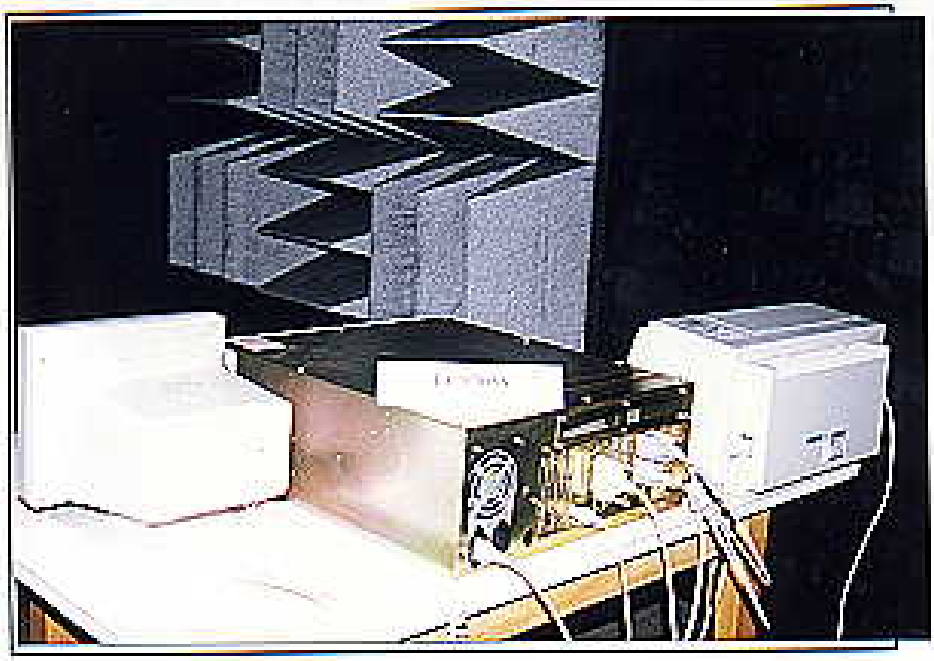
RS TEST (AM MODULATION AND PULSE MODULATION)
(MODEL: SBC-455)



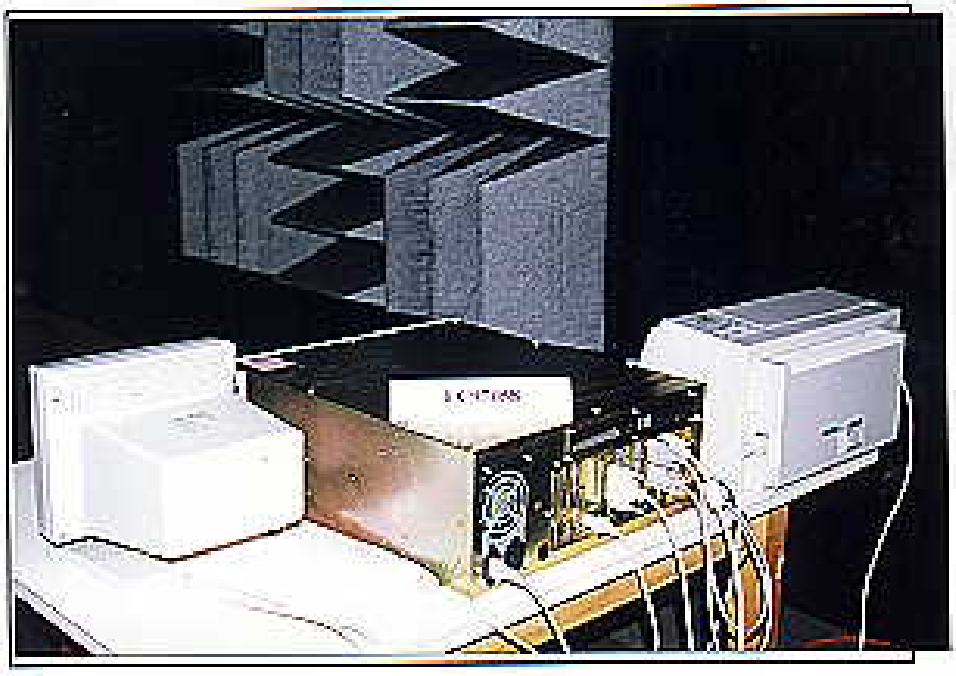
RS TEST (AM MODULATION AND PULSE MODULATION)
(MODEL: PCM-3335)



RS TEST (AM MODULATION AND PULSE MODULATION)
(MODEL: SBC-400)



RS TEST (AM MODULATION AND PULSE MODULATION)
(MODEL: SBC-410)

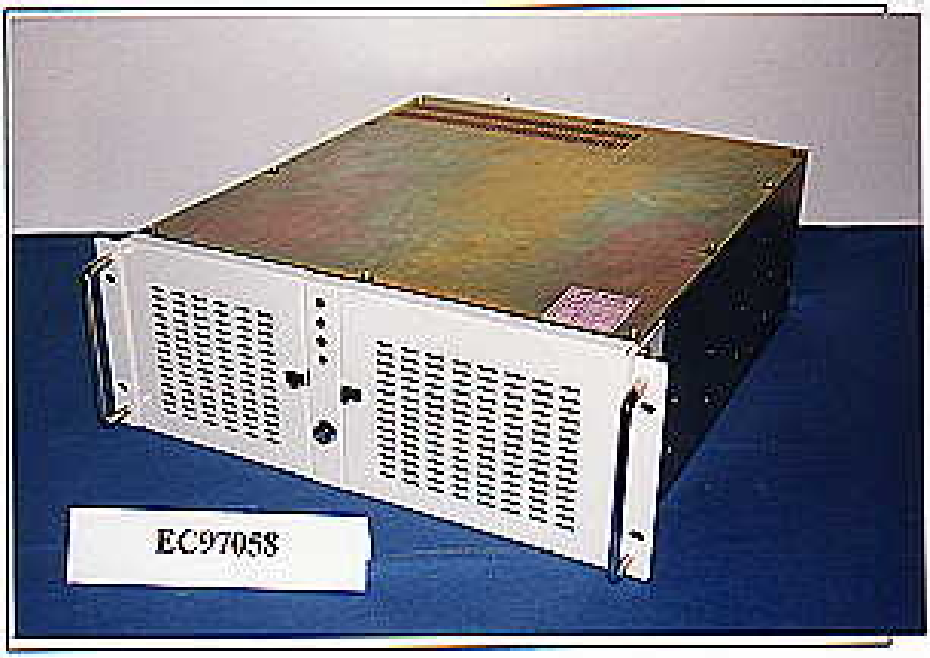


EFT TEST
(MODEL: SBC-455, PCM-3335, SBC-400, SBC-410)

CONDUCTED SUSCEPTIBILITY TEST
(MODEL: SBC-455, PCM-3335, SBC-400, SBC-410)

MAGNETIC TEST
(MODEL: SBC-455, PCM-3335, SBC-400, SBC-410)

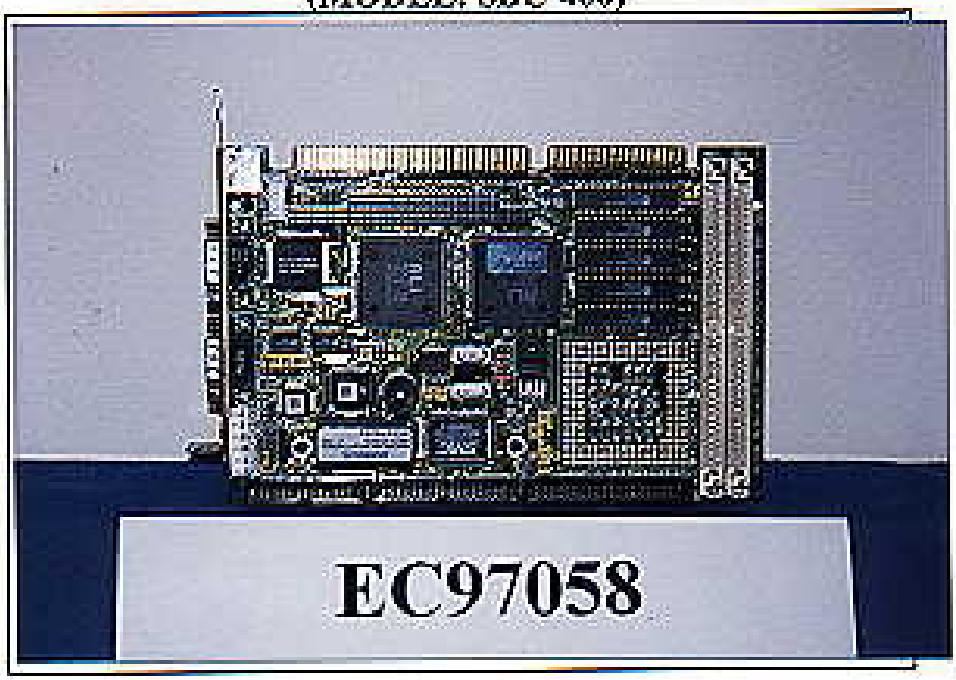
7. CONSTRUCTION PHOTOS OF EUT

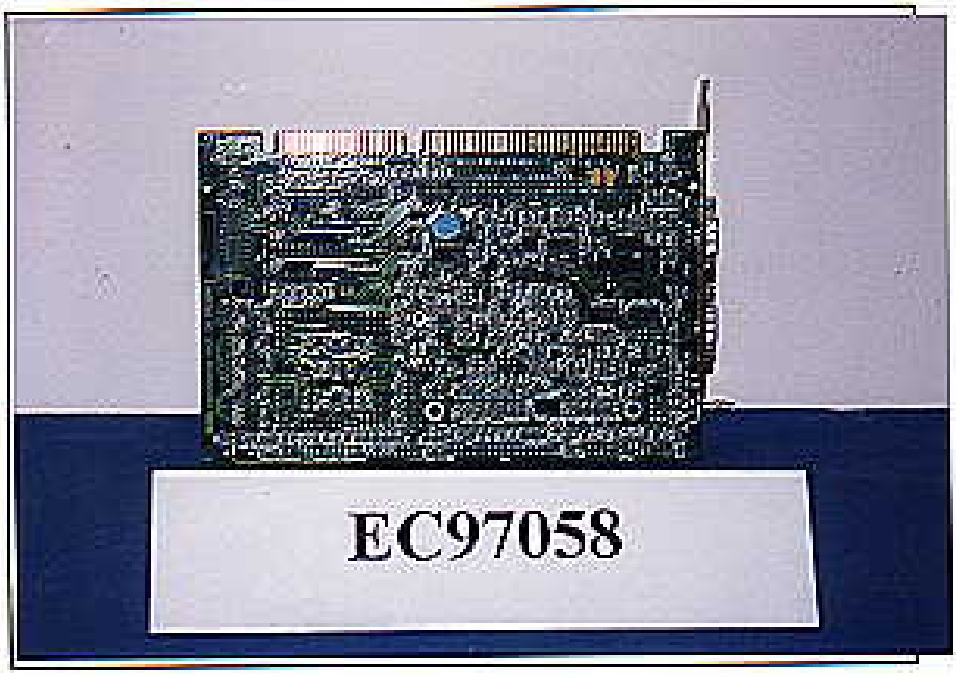


(MODEL: SBC-455)

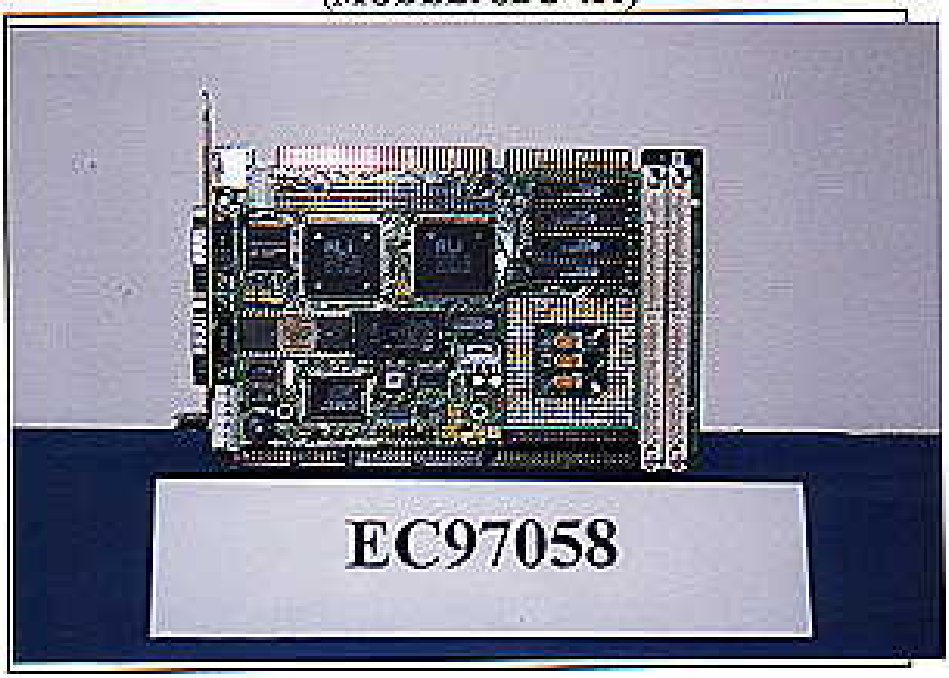
(MODEL: PCM-3335)

(MODEL: SBC-400)





(MODEL: SBC-410)



8. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

* CPU	IBM 5x86C 100 MHz (Model: SBC-455, SBC-400, SBC-410) 386SX-40 MHz (Model: PCM-3335)
* BIOS	AMI Flash Win
* 2nd Level Cache	128K-512K (Model: SBC-455, SBC-400, SBC-410) N/A (Model: PCM-3335)
* DRAM	4 MB
* SCSI Interface	N/A
* IDE	Enhanced x 2 (Model: SBC-400) Enhanced x 2 (Model: SBC-410) Enhanced (Model: SBC-455, PCM-3335)
* FDD Interface	Yes
* Parallel Port	SPP/EPP/ECP
* RS-232 Port	2 (Model: SBC-455, PCM-3335) 1 (Model: SBC-400, SBC-410)
* Watch Dog Timer	2-32 sec. (Model: SBC-455, SBC-410, SBC-400) N/A (Model: PCM-3335)
* Video Memory Size	512K/1M (Model: SBC-455) 512K (Model: PCM-3335) N/A (Model: SBC-400, SBC-410)
* PCI Bus	N/A
* ISA Bus	Yes (SBC-455, SBC-400, SBC-410) No (PCM-3335)
* PC-104 Connector	Yes
* Power Saving	Yes
* Size (LxW Inches)	7.3x4.8 (Model: SBC-455) 7.3x4.8 (Model: SBC-410, SBC-400) 3.55x3.77 (Model: PCM-3335)