



EMC

TEST REPORT

REPORT NO. : F87070609

MODEL NO. : PL7U+, MS700U

DATE OF TEST : July 11, 1998

PREPARED FOR : CHUNTEX ELECTRONIC CO., LTD.

ADDRESS : 6F, NO. 2, ALLEY 6, LANE 235 PAO CHIAO RD.,

HSIN TIEN, TAIPEI HSIEN, TAIWAN, R.O.C.

ADVANCE DATA TECHNOLOGY CORPORATION

12F, NO.1, SEC.4, NAN-KING EAST RD.,

TAIPEI, TAIWAN, R.O.C.

Accredited Laboratory



PREPARED BY :

This test report consists of 14 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of our laboratory. It should not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. government. The test result in the report only applies to the tested sample.



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
4.2 TEST DATA OF CONDUCTED EMISSION	9
4.3 TEST DATA OF RADIATED EMISSION	10
5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN	12
6. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT	14



CERTIFICATION

Issue Date: July 14, 1998

Product	:	COLOR MONITOR
Trade Name	:	CTX
Model No.	:	PL7U+, MS700U
Applicant	:	CHUNTEX ELECTRONIC CO., LTD.
Standard	:	FCC Part 15, Subpart B, Class B
		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 July 11, 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 B limits of conducted and radiated emission of applicable standards.

TESTED BY:	<u>John Liao</u>	(John Liao)
CHECKED BY:	<u>David Hsieh</u>	(Ariel Hsieh)
APPROVED BY:	<u>Mike Su</u>	(Mike Su)

NVLAP

Accredited Laboratory

ADVANCE DATA TECHNOLOGY CORPORATION



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	COLOR MONITOR
Model No.	:	PL7U+, MS700U
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.8m)

Note: The EUT is a 17" color monitor with resolution up to 1280 x 1024 (64 KHz).

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

- MODEL: PL7U+
- MODEL: MS700U

From the above models, model: PL7U+ was selected as the representative during the test and therefore only its data is recorded in this report.

The EUT was tested with a USB box, which acted as a base for the EUT.

There is a ferrite core on the video cable outside the monitor.

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	PERSONAL COMPUTER	HP	D4579A	DoC Approved	Nonshielded Power (1.8m) Shielded USB Cable (1.8m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104A	Shielded Signal (1.4m)
3	MOUSE	COMPAQ	M-S28	DZL210472	Shielded Signal (1.8m)
4	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.9m)
5	MODEM	ACBEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.9m)
6	VGA CARD	GORDIA	DSV3365	LUT-DSV3365	N/A
7	CCD CAMERA	COMPAQ	YC72-CPQ	EDUYC72-CPQ	Shielded USB Cable (1.8m)
8	MICROPHONE	L	UDM-535	N/A	Nonshielded Signal (2.8m)
9	HEADPHONE	GAMMA	LH115	N/A	Nonshielded Signal (1.4m)

Note: 1. Three USB cables (1.8m) were connected to the three USB ports of EUT to form three open loop cables.

2. An audio cable (1.5m) was connected between EUT and PC.
3. A microphone output cable (1.8m) was connected between EUT and PC.

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.



3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m)	
	Class A (at 10m)	Class B (at 10m)
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 A (at 10m)	Class B (at 3m)
Above 1000	300 uV/m	500 uV/m
	49.5 dBuV/m	54.0 dBuV/m

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)	
	Average	Quasi-peak
0.15 - 0.5	66	66
0.50 - 5.0	60	60
5.0 - 30.0	60	60

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.



4.2 TEST DATA OF CONDUCTED EMISSION

EUT: COLOR MONITORMODEL: PL7U+MODE: 1280x1024 (64 kHz)6 dB Bandwidth: 10 kHzTEST PERSONNEL: John Liao

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
0.192	51.50	-	52.40	-	63.95	53.95	-12.5	-	-11.6	-
0.256	48.90	-	49.50	-	61.54	51.54	-12.6	-	-12.0	-
0.771	30.40	-	31.10	-	56.00	46.00	-25.6	-	-24.9	-
10.459	36.70	-	36.90	-	60.00	50.00	-23.3	-	-23.1	-
15.271	46.40	-	46.10	-	60.00	50.00	-13.6	-	-13.9	-
24.007	49.60	-	49.80	-	60.00	50.00	-10.4	-	-10.2	-

- 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 B

11. Jul 98 16:43

EUT: MODEL: PL7U+
Op Cond: 1280x1024 64kHz
Test Spec: LISN : L
Comment: FULL SYSTEM

Report No. F87070609

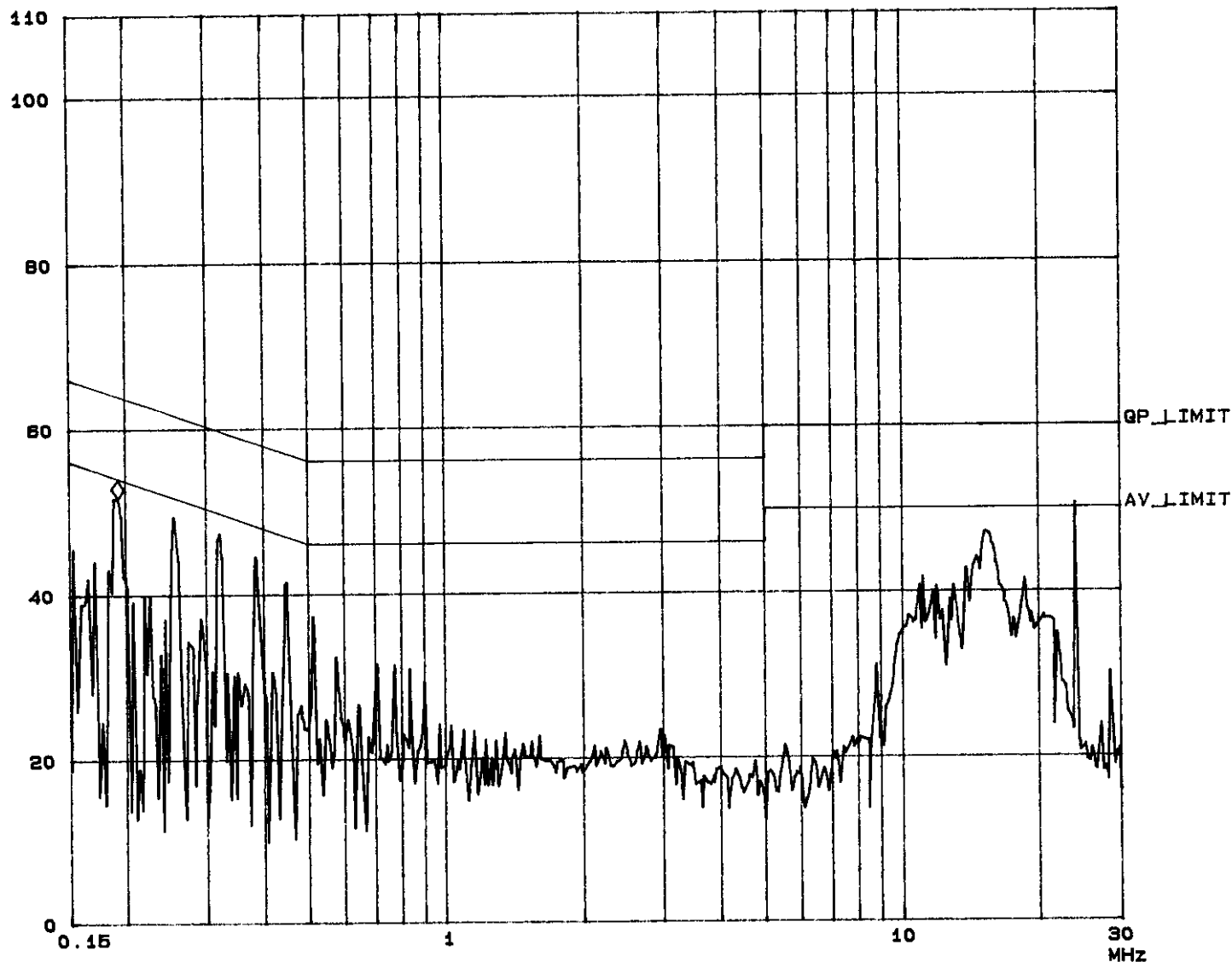
Page 9-1

Tested by John Liao

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dB	LN OFF	60dB
450k	5M	3k	10k	PK	1ms	10dB	LN OFF	60dB
5M	30M	3k	10K	PK	1ms	10dB	LN OFF	60dB

dBuV ◇ Mkr : 192.00 kHz 51.6 dBuV



ADT CO. Shielded Room 3
CISPR 22 CLASS B

11. Jul 98 16:54

EUT: MODEL: PL7U+
Op Cond: 1280x1024 64kHz
Test Spec: LISN : N
Comment: FULL SYSTEM

Report No. F87070609

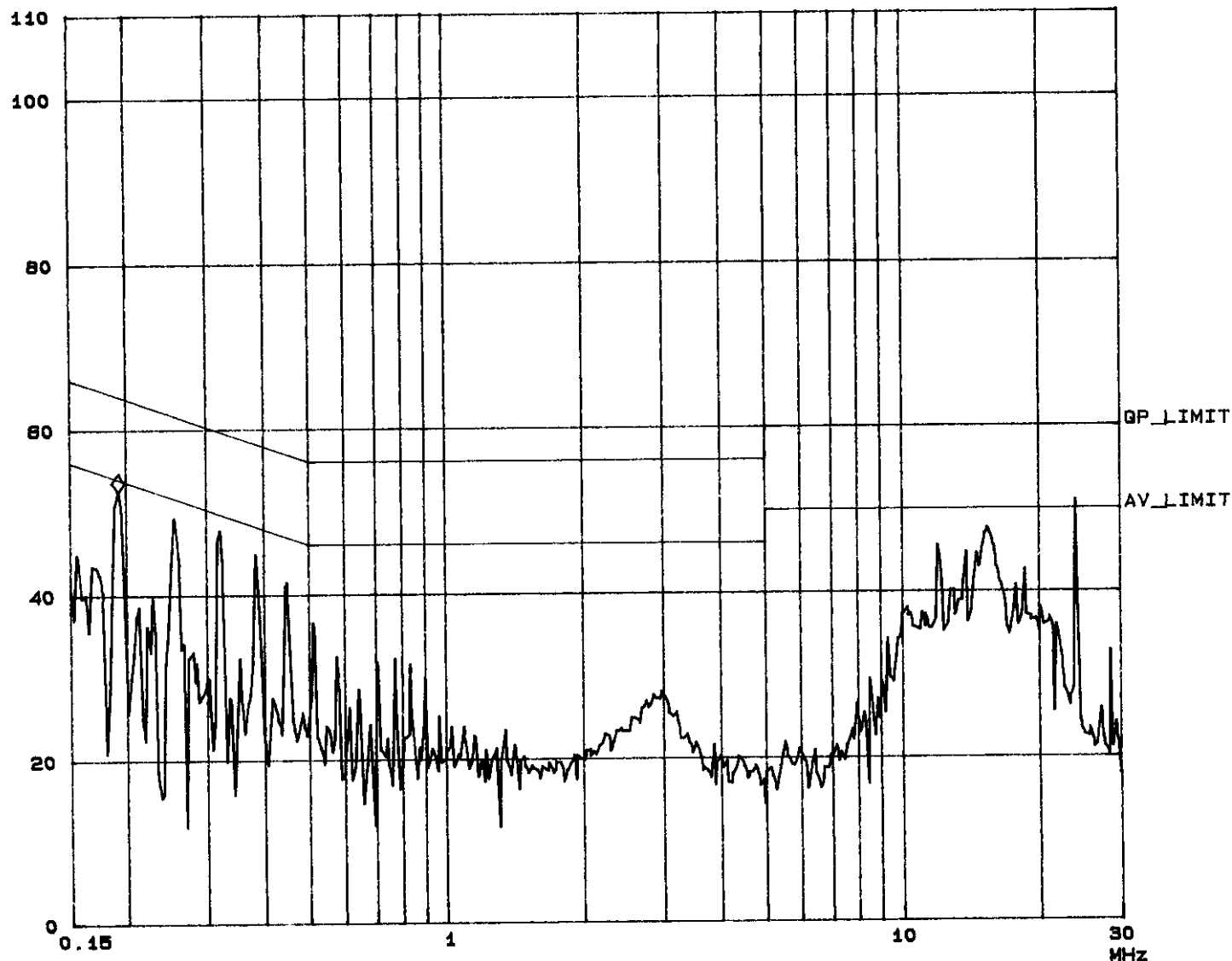
Page 9-2

Tested by John Liao

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	1ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	1ms	10dBLN	OFF	60dB

dBuV ◇ Mkr : 192.00 kHz 52.5 dBuV





4.3 TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITORMODEL: PL7U+MODE: 1280x1024 (64 kHz)ANTENNA: CHASE BILOG CBL6111APOLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 MTEST PERSONNEL: John Liao

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
45.40	13.7	12.4	26.1	30.0	-3.9
84.01	9.6	12.5	22.1	30.0	-7.9
120.02	14.9	11.4	26.3	30.0	-3.7
132.04	14.7	6.6	21.3	30.0	-8.7
144.04	14.2	12.4	26.6	30.0	-3.4
156.02	12.8	12.4	25.2	30.0	-4.8
168.06	12.2	10.6	22.8	30.0	-7.2
172.31	12.2	9.9	22.1	30.0	-7.9
180.03	12.1	9.9	22.0	30.0	-8.0
190.48	12.4	11.9	24.3	30.0	-5.7
192.06	12.4	12.7	25.1	30.0	-4.9
204.01	13.0	12.6	25.6	30.0	-4.4
216.01	14.2	11.8	26.0	30.0	-4.0

- 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



TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITORMODEL: PL7U+MODE: 1280x1024 (64 kHz)ANTENNA: CHASE BILOG CBL6111APOLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 MTEST PERSONNEL: John Liad

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
45.42	13.1	14.0	27.1	30.0	-2.9
84.00	8.5	18.5	27.0	30.0	-3.0
120.01	15.4	11.2	26.6	30.0	-3.4
132.07	16.5	9.5	26.0	30.0	-4.0
144.02	16.5	10.5	27.0	30.0	-3.0
156.02	14.2	13.2	27.4	30.0	-2.6
168.06	13.1	11.4	24.5	30.0	-5.5
192.04	13.3	13.0	26.3	30.0	-3.7
204.09	14.0	12.7	26.7	30.0	-3.3
208.00	14.2	10.8	25.0	30.0	-5.0
216.08	14.6	12.6	27.2	30.0	-2.8
223.02	15.0	9.1	24.1	30.0	-5.9
228.03	15.3	10.3	25.6	30.0	-4.4

- 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



6. ATTACHMENT I - TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

Picture Tube:	43.1cm/17 inches (viewable 40cm/15.7"), 0.28mm Dot Pitch, (Low radiation / Anti-Static/ Anti-Magnetic)		
Scan Frequency	Horizontal	30 to 70 kHz	
	Vertical	50 to 160 Hz	
Max. Resolution	1280x1024 (60Hz), maximum		
Plug & Play	DDC 1/DDC 2B		
Power Supply	AC 100-120V/200-240V, 50/60 Hz (Automatic)		
Power Consumption	120W (<6W in power-saving mode)		
Dimensions	443 (W) x 438.5 (H) x 434 (D) mm		
	17.4 (W) x 17.3 (H) x 17.1 (D) inches		
Weight	19.6Kgs/43.18lbs		
Environmental Consideration	Operating	Temperature	0°C to 40°C
		Humidity	20% to 80% (Non condensing)
	Storage	Temperature	-20°C to 60°C
		Humidity	10% to 90% (Non condensing)



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	:	30 °C
Humidity	:	56 %
Atmospheric Pressure	:	998 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -10.2 dB at 24.007 MHz Minimum passing margin of radiated emission: -2.6 dB at 156.02 MHz

Note: The EUT was pretested under the following resolution & horizontal synchronization speed mode:

- 1280 x 1024 mode (64 KHz),
- 1024 x 768 mode (69 KHz)
- 640 x 480 mode (31.5 KHz)

The worst emission levels were found under 1280 x 1024 mode (64 KHz) and therefore the test data of only this mode is recorded.

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC runs a test program to enable all functions.
3. PC reads and writes messages from FDD and HDD.
4. PC sends "H" messages to monitor (EUT) and monitor displays "H" patterns on screen.
5. CCD camera captures an image and sends image messages to EUT and then EUT displays them on its screen.
6. PC sends "H" messages to modem.
7. PC sends "H" messages to printer, and printer prints them on paper.
8. PC sends audio messages to headphone and internal speaker.
9. Repeat steps 3-9.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated until
HP Spectrum Analyzer	8590L	3544A00941	Dec. 14, 1998
HP Pre-Amplifier	8447D	2944A08312	Sept. 10, 1998
R&S Receiver	ESVS10	844591/010	Sept. 23, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BILOG Antenna	CBL6111A	1500	Sept. 12, 1998
EMCO Turn Table	1060-04	1196	N/A
EMCO Tower	1051	1264	N/A
Open Field Test Site	Site 1	ADT-R01	Sept. 5, 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	Aug. 4, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 22, 1998
EMCO L.I.S.N.	3825/2	9504-2359	Aug. 1, 1998
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.