



EMC

TEST REPORT

REPORT NO. : F88110902

MODEL NO. : N9702

DATE OF TEST : Nov. 16, 1999

PREPARED FOR : NPG DISPLAY LTD., TAIWAN BRANCH

ADDRESS : 2FL-1, NO. 70, SEC. 2, TUN HWA S. RD.,
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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

This test report consists of 15 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
4.2 EUT OPERATION CONDITION	8
4.3 TEST DATA OF CONDUCTED EMISSION	9
4.4 TEST DATA OF RADIATED EMISSION	11
5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN	13
6. APPENDIX - INFORMATION OF THE TESTING LABORATORY	15



1. CERTIFICATION

Issue Date: Jan. 25, 2000

Product : COLOR MONITOR
Trade Name : NEC
Model No. : N9702
Applicant : NPG DISPLAY LTD. TAIWAN BRANCH
Standard : FCC Part 15, Subpart B, Class B
CISPR 22: 1993+A1: 1995+A2: 1996, Class B
ANSI C63.4-1992

We hereby certify that one sample of the designation has been tested in our facility on Nov. 16, 1999. 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 : Ken Lin , DATE: 1/25/2000
(Ken Liu)

CHECKED BY : Sharon Hsiung , DATE: 1/25/2000
(Sharon Hsiung)

APPROVED BY : Mike Su , DATE: 1/25/2000
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP[®]

Accredited Laboratory



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	COLOR MONITOR
Model No.	:	N9702
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.5m, 3-pin)
Data Cable	:	Shielded (1.5m)

Note: The EUT is a 17" color monitor with resolution up to 1600x1200.

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

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.	PERSONAL COMPUTER	NTI	PII-333T	FCC DoC Approved	Nonshielded Power (1.8m)
2.	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
3.	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded Signal (1.5m)
4.	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.2m)
5.	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.2m)
6.	VGA CARD	CARDEX	CD-GX2A44T	ICUVGA-GW710	NA

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)

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESHS30	828765/002	Aug. 2, 2000
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 21, 2000
EMCO-L.I.S.N.	3825/2	90031627	July 21, 2000
Shielded Room	Site 5	ADT-C05	NA

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS 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.

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01176	April 22, 2000
HP Preamplifier	8447D	2944A08485	May 1, 2000
HP Preamplifier	8347A	3307A01088	Aug. 30, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 30, 2000
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2000
EMCO Turn Table	1060	1115	NA
SHOSHIN Tower	AP-4701	A6Y005	NA
Open Field Test Site	Site 5	ADT-R05	July 30, 2000

Note: 1. The measurement uncertainty is less than +/- 3.0dB, which is calculated as per NAMAS 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) *	Class B (at 10m) *
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

* Detector Function: Quasi-Peak

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

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	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	:	21 Degree C
Humidity	:	61 %
Atmospheric Pressure	:	1002 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -18.8 dB at 8.527 MHz Minimum passing margin of radiated emission: -2.3 dB at 33.51 MHz

Note: The EUT was pre-tested under the following resolution & horizontal synchronization speed mode:

- ◆ 1600x1200 mode (75 kHz),
- ◆ 1280x1024 mode (80 kHz),
- ◆ 640x480 mode (31.5 kHz)

The worst emission levels were found under 1280x1024 mode (80 kHz) and therefore the test data of only this mode is recorded.

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
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. PC sends "H" messages to modem.
6. PC sends "H" messages to printer, and the printer prints them on paper.
7. Repeat steps 3-7.



4.3 TEST DATA OF CONDUCTED EMISSION

EUT: COLOR MONITORMODEL: N9702MODE: 1280x1024 (80 kHz)6 dB Band Width: 10 kHzPHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.1	45.8	-	45.9	-	66.0	56.0	-20.1	-
0.298	0.2	28.3	-	28.5	-	60.3	50.3	-31.8	-
0.747	0.2	26.4	-	26.6	-	56.0	46.0	-29.4	-
1.273	0.3	19.5	-	19.8	-	56.0	46.0	-36.2	-
8.527	0.7	30.5	-	31.2	-	60.0	50.0	-28.8	-
20.273	1.3	35.9	-	37.2	-	60.0	50.0	-22.8	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level 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
 6. Emission Level = Correction Factor + Reading Value.



TEST DATA OF CONDUCTED EMISSION

EUT: COLOR MONITORMODEL: N9702MODE: 1280x1024 (80 kHz)6 dB Bandwidth: 10 kHzPHASE: NEUTRAL (N)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.1	41.5	-	41.6	-	66.0	56.0	-24.4	-
0.298	0.2	36.7	-	36.9	-	60.3	50.3	-23.4	-
0.747	0.3	32.1	-	32.4	-	56.0	46.0	-23.6	-
1.273	0.3	31.3	-	31.6	-	56.0	46.0	-24.4	-
8.527	0.6	40.6	-	41.2	-	60.0	50.0	-18.8	-
20.273	1.1	39.3	-	40.4	-	60.0	50.0	-19.6	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level 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
 6. Emission Level = Correction Factor + Reading Value.



4.4 TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITORMODEL: N9702MODE: 1280x1024 (80 kHz)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 MHzMEASURED DISTANCE: 10 MFREQUENCY RANGE: 1000-2000 MHzMEASURED DISTANCE: 3 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
157.11	11.8	6.8	18.6	30.0	-11.4	400	83
168.30	11.3	8.8	20.1	30.0	-9.9	400	95
179.39	10.8	7.6	18.4	30.0	-11.6	400	106
190.84	10.4	10.5	20.9	30.0	-9.1	400	119
201.96	10.3	6.2	16.5	30.0	-13.5	400	308
448.51	18.6	6.3	24.9	37.0	-12.1	150	134
460.17	18.9	9.7	28.6	37.0	-8.4	214	114

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
 2. Correction Factor (dB) = Ant. Factor (dB)+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: N9702MODE: 1280x1024 (80 kHz)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 MHzMEASURED DISTANCE: 10 MFREQUENCY RANGE: 1000-2000 MHzMEASURED DISTANCE: 3 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
33.51	15.7	12.0	27.7	30.0	-2.3	180	158
67.30	6.6	19.4	26.0	30.0	-4.0	171	341
72.30	7.0	19.6	26.6	30.0	-3.4	208	284
126.41	12.8	11.9	24.7	30.0	-5.3	100	313
157.12	11.8	11.3	23.1	30.0	-6.9	100	196
168.28	11.3	13.7	25.0	30.0	-5.0	100	207
190.80	10.4	12.5	22.9	30.0	-7.1	100	213
202.01	10.3	13.0	23.3	30.0	-6.7	100	323
213.03	11.1	12.5	23.6	30.0	-6.4	100	13
448.50	18.6	10.1	28.7	37.0	-8.3	334	128
459.84	18.9	10.6	29.5	37.0	-7.5	374	85

REMARKS:

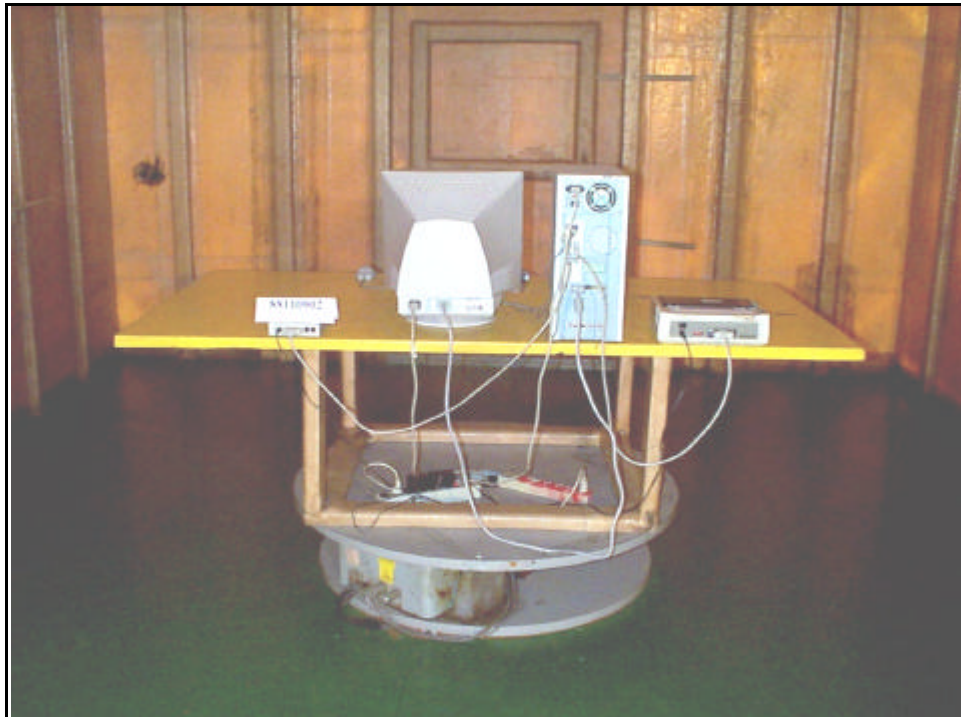
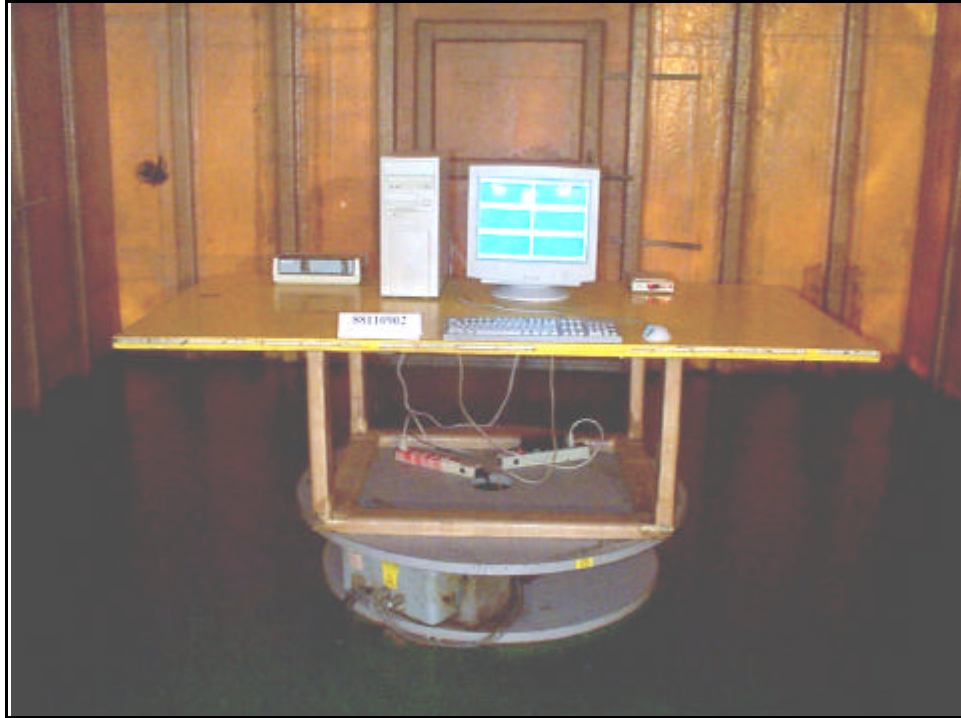
1. Emission level (dBuV/m) = Correction Factor (dB)
+ Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





6. APPENDIX - INFORMATION OF THE TESTING LABORATORY

Information of the testing laboratory

We, ADT Corp., is founded in 1988, to provide our best service in EMC and Safety consultation. Our laboratory is accredited by the following approval agencies according to ISO/IEC Guide 25 or EN 45001:

- | | |
|---------------|--------------------------------------|
| ● USA | FCC, UL, NVLAP |
| ● Germany | TUV Rheinland
TUV Product Service |
| ● Japan | VCCI |
| ● New Zealand | RFS |
| ● Norway | NEMKO, DNV |
| ● U.K. | INCHCAPE |
| ● R.O.C. | BSMI |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

Lin Kou EMC Lab.:
Tel: 886-2-26032180
Fax: 886-2-26022943

Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

Lin Kou Safety Lab.:
Tel: 886-2-26093195
Fax: 886-2-26093184

Design Center:
Tel: 886-2-26093195
Fax: 886-2-26093184

E-mail: service@mail.adt.com.tw
<http://www.adt.com.tw>