

**EXHIBIT 4**  
**RFI/EMI TEST REPORT**



# EMC

## TEST REPORT

REPORT NO. : F87082802  
MODEL NO. : CL-1999, CH-1999, XT-9882  
DATE OF TEST : Sept. 8, 1998

PREPARED FOR : ACTION ELECTRONICS CO., LTD.

ADDRESS : 198, CHUNG YUAN RD., CHUNG LI IND. ZONE,  
CHUNG LI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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1.

**CERTIFICATION**

Issue Date: Sept. 10, 1998

Product : COLOR MONITOR  
 Trade Name : AXION, HENNESSY, MAXTECH, ICON  
 Model No. : CL-1999, CH-1999, XT-9882  
 Applicant : ACTION ELECTRONICS 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 Sept. 8, 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: Alan Chang, DATE: 9/10/98  
 ( Alan Chang )

CHECKED BY: Yenny, DATE: 9/10/98  
 ( Yenny Soong )

APPROVED BY: Mike Su, DATE: 9/10/98  
 ( Mike Su )

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## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product	:	COLOR MONITOR
Model No.	:	CL-1999, CH-1999, XT-9882
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.5m)

Note: The EUT is a 19" color monitor with resolution up to 1600 x 1200.

The EUT has three model names which are identical to each other in all aspects except for their model names and brand names:

- Model: CL-1999, brand name: AXION, HENNESSY
- Model: CH-1999, brand name: AXION
- Model: XT-9882, brand name: MAXTECH, ICON

From the above models, model: CL-1999 was chosen as representative model for the test.

There is one 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	NTI	PII-233T	FCC Doc Approved	Nonshielded Power (1.8m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Nonshielded Signal (1.4m)
3	MOUSE	DEXIN	A2P800A	NIYA2P800A	Nonshielded Signal (1.5m)
4	PRINTER	HP	2225C+	DSI6XU2225	Nonshielded Signal (1.4m) Nonshielded Power (1.8m)
5	MODEM	ACEEX	1414	IFAXDM1414	Nonshielded signal (1.2m) Nonshielded Power (1.8m)
6	VGA CARD	CARDEX	CD-GX2A44T	ICUVGA-GW710	N/A

## 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 / 3 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	3544A01042	April 29, 1999
HP Preamplifier	8447D	2944A08313	Sept. 18, 1998
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 5, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BiLOG Antenna	CBL6111A	1647	July 3, 1999
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 3, 1999
EMCO Turn Table	1016	1722	N/A
EMCO Tower	1051	1825	N/A
Open Field Test Site	Site 4	ADT-R04	June 19, 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	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)	Class B (at 10m)
	dBuV/m	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	:	28 °C
Humidity	:	55 %
Atmospheric Pressure	:	998 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: -6.2 dB at 2.415 MHz Minimum passing margin of radiated emission: -2.7 dB at 384.68 MHz

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

- \* 1600 x 1200 mode (93.7 kHz),
- \* 1280 x 1024 mode (91 kHz),
- \* 640 x 480 mode (31.5 kHz)

The worst emission levels were found under 1600 x 1200 (93.7 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. 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: CH-1999MODE: 1600 x 1200 (93.7 kHz)6 dB Bandwidth: 10 kHzTEST PERSONNEL: Alan Chang

Freq. [MHz]	L Level [dB (μV)]		N Level [dB (μV)]		Limit [dB (μV)]		Margin [dB (μV)]			
	QP	AV	QP	AV	QP	AV	L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.281	41.90	-	43.90	-	60.78	50.78	-18.9	-	-16.9	-
0.748	37.20	-	41.20	-	56.00	46.00	-18.8	-	-14.8	-
1.401	31.30	-	42.50	-	56.00	46.00	-24.7	-	-13.5	-
2.415	32.10	-	46.90	39.80	56.00	46.00	-23.9	-	-9.1	-6.2
6.272	35.80	-	41.80	-	60.00	50.00	-24.2	-	-18.2	-
12.003	41.50	-	43.10	-	60.00	50.00	-18.5	-	-16.9	-

- 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



#### 4.4 TEST DATA OF RADIATED EMISSION

EUT: **COLOR MONITOR**MODEL: **CH-1999**MODE: **1600 x 1200 (93.7 kHz)**POLARITY: **Horizontal**ANTENNA: **CHASE BILOG CBL 6111A/EMCO Horn 3115**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: **Cha**

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
40.54	15.9	9.1	25.0	30.0	-5.0
60.78	7.8	12.9	20.7	30.0	-9.3
101.30	11.8	12.7	24.5	30.0	-5.5
121.57	14.2	10.6	24.8	30.0	-5.2
141.86	14.2	10.1	24.3	30.0	-5.7
162.19	12.0	12.5	24.5	30.0	-5.5
182.49	11.6	13.7	25.3	30.0	-4.7
202.72	11.7	11.7	23.4	30.0	-6.6
222.75	13.1	13.1	26.2	30.0	-3.8

- 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 MONITOR**MODEL: **CH-1999**MODE: **1600 x 1200 (93.7 kHz)**POLARITY: **Vertical**ANTENNA: **CHASE BILOG CBL 6111A/EMCO Horn 3115**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:

*Alan Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
42.71	13.4	11.1	24.5	30.0	-5.5
60.80	7.7	18.6	26.3	30.0	-3.7
81.07	7.3	15.4	22.7	30.0	-7.3
101.34	10.2	15.0	25.2	30.0	-4.8
121.56	13.5	12.1	25.6	30.0	-4.4
161.92	12.6	12.0	24.6	30.0	-5.4
182.52	11.5	11.6	23.1	30.0	-6.9
202.48	12.2	10.9	23.1	30.0	-6.9
384.68	20.2	14.1	34.3	37.0	-2.7
404.83	20.0	12.0	32.0	37.0	-5.0

- 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



## 6. ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT

### Specifications:

- \* **Picture tube** 19 inches, 90 degrees deflection, 0.26mm dot pitch  
Dot-type: black matrix
- \* **Input Signal** Video: Analog 0.7 Vpp/75 ohm positive  
Sync.: Separate sync. TTL level
- \* **Display color** Analog input, Unlimited colors
- \* **Synchronization** Horizontal: 30 to 99 kHz (automatically)  
Vertical: 50 to 150 Hz (automatically)
- \* **Video Bandwidth** 165 MHz
- \* **Display size** Horizontal: 340mm  
Vertical: 255mm
- \* **Power Supply** VAC 100-240, 60/50 Hz
- \* **Current Rating** 2.0A Typical
- \* **Dimensions** (W)455mm x (H) 465mm x (D) 465mm
- \* **Weight** 44.0 Lbs (20.0kgs.)
- \* **Environmental Considerations** Operating temperature: 0°C to 35°C  
humidity: 30% to 80%  
Storage temperature: -20°C to 60°C  
humidity: 10% to 90%

ADT CO. Shielded Room 5

CISPR 22 CLASS B

EUT:

CL-1998

Test Spec:

LISN : L

Comment:

1800X1200 83.7KHz/75Hz

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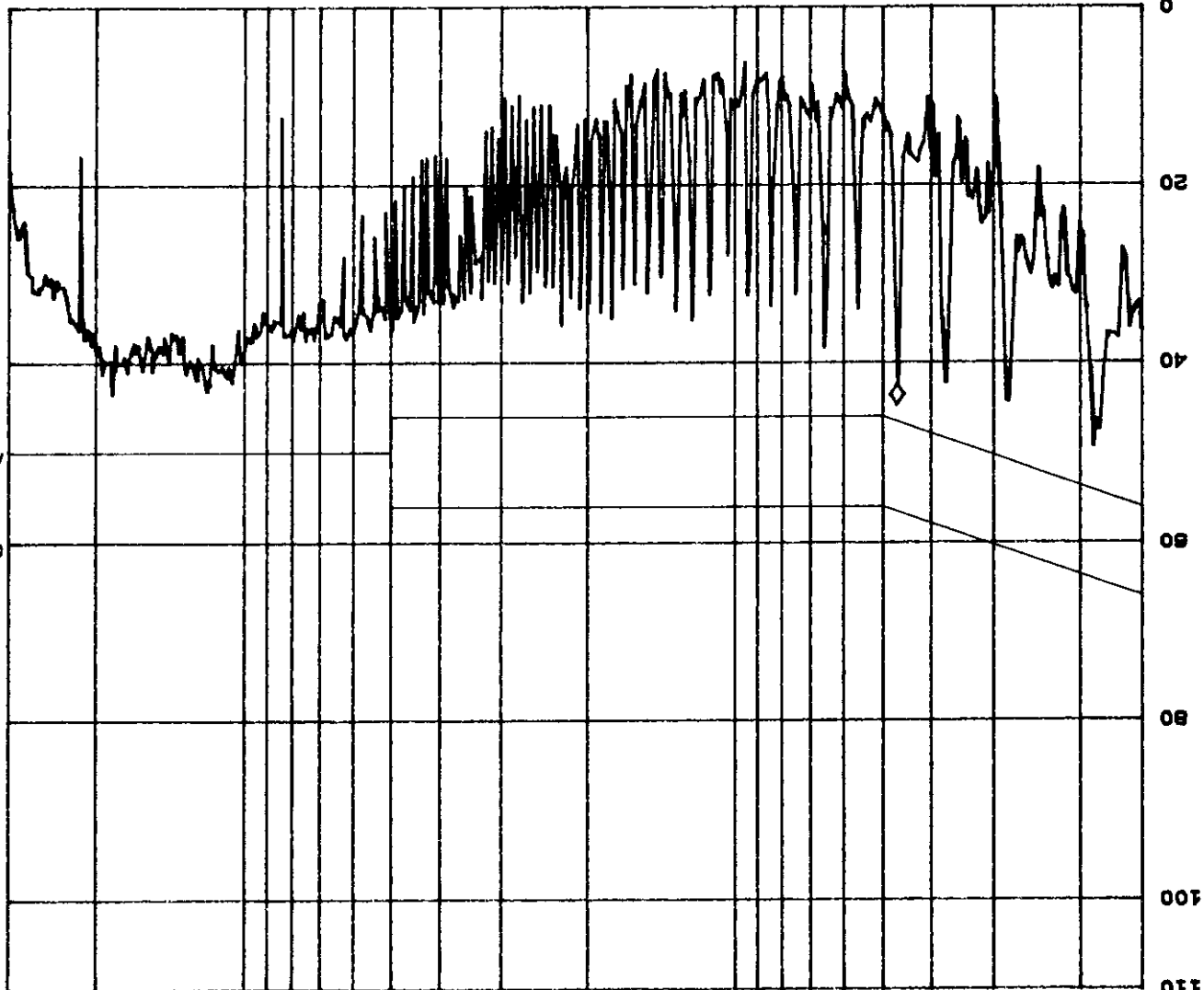
Alan Chang

Fast Scan Settings (3 Ranges)

Frequencies

Start	Stop	IF BW	Detector	M-Time	Atten	Preamp	OpRng
150K	450K	3K	PK	1ms	10dB	LN	OFF
450K	8M	3K	PK	1ms	10dB	LN	OFF
8M	30M	3K	PK	1ms	10dB	LN	OFF

dBV : 468.00 KHz 42.4 dBV



ADT CO. Shielded Room 5

CISPR 22 CLASS B

EUT: CL-1888  
Test Spec: LISN : N  
Comment: 1800X1200 93.7KHz/7MHz

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Tested by Alam Chang

Fast Scan Settings (3 Ranges)  
Start 150K 450K 30M  
Stop 3K 3K 3K  
IF BW Detector M-Time Atten Preamp OpRgs  
PK 10K 10K 10K  
1ms 10dB LN OFF 60dB  
1ms 10dB LN OFF 60dB  
1ms 10dB LN OFF 60dB  
Receiver Settings

DBUV 110 80 60 40 20 0  
MKR : 2.43800MHz 47.8 DBUV

