FCC ID: HSUTRLX-970

EMC

TEST REPORT

REPORT NO. : F88072702
MODEL NO. : X-970
DATE OF TEST : July 29, 1999

PREPARED FOR: ROYAL INFORMATION ELECTRONICS CO., LTD.

ADDRESS : NO. 3, LANE 11, TZU-CHANG ST., TU-CHENG IND.
DISTRICT TAIPEI HSIEN, TAIWAN,R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

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Accredited Laboratory

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

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1. CERTIFICATION

Issue Date: Aug. 2, 1999

Product	:	COLOR MONITOR
Trade Name	:	RIC
Model No.	:	X-970
Applicant	:	ROYAL INFORMATION ELECTRONICS CO., LTD.
Standard	:	FCC Part 15, Subpart B, Class B ANSI C63.4-1992 CISPR 22: 1993+A1: 1995+A2: 1996, Class B

We hereby certify that one sample of the designation has been tested in our facility on July 29, 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 : Bruce Lu , DATE: 8/2/99
(Bruce Lu)

CHECKED BY : Yemmy Soong , DATE: 8/2/99
(Yemmy Soong)

APPROVED BY : Mike Su , DATE: 8/2/99
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	COLOR MONITOR
Model No.	:	X-970
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.8m)

Note: The EUT is a 19" color monitor with resolution up to 1280 x 1024.

There are two ferrite cores 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	HP	VL Series 4 5/00	B94VECTRA500T	Nonshielded Power (1.8m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded signal (1.4m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (2.2m) Nonshielded Power (1.5m)
4	MODEM	ACEEX	1414	IFAXDM1414	Shielded signal (1.5m) Nonshielded Power (1.2m)
5	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded signal (1.5m)
6	VGA CARD	GORDIA	DSV3365	LUT-DSV3365	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 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	ESH3	893495/006	July 7, 2000
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 8, 2000
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 7, 2000
EMCO-L.I.S.N.	3825/2	9204-1964	July 7, 2000
Shielded Room	Site 2	ADT-C02	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	3544A01042	April 15, 2000
HP Preamplifier	8447D	2944A08313	Sept. 24, 1999
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 1, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 5, 2000
CHASE BILOG Antenna	CBL6111A	1647	July 3, 2000
EMCO Turn Table	1016	1722	NA
EMCO Tower	1051	1825	NA
Open Field Test Site	Site 4	ADT-R04	June 11, 2000

Note: 1. The measurement uncertainty is less than +/- 3dB, 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) * dBuV/m	Class B (at 10m) * 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 - 1000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	26 ℃
Humidity	:	69 %
Atmospheric Pressure	:	989 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -13.1 dB at 18.161MHz Minimum passing margin of radiated emission: -3.7 dB at 212.00 MHz

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

- 1280 x 1024 (64 kHz)
- 1024 x 768 (69 kHz)
- 640 x 480 (31.5 kHz)

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

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. PC reads 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 display "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

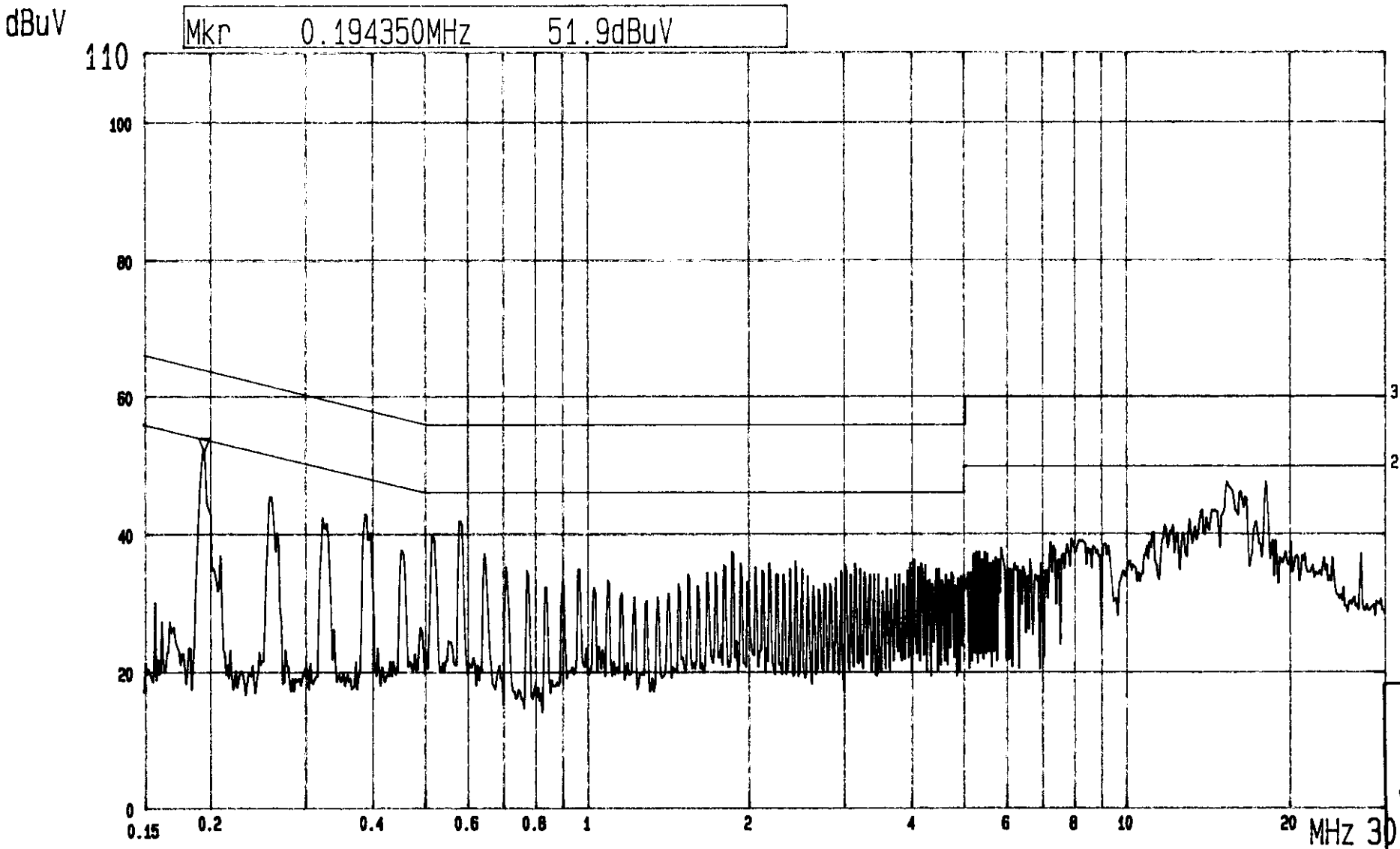
EUT: **COLOR MONITOR** MODEL: **X-970**

MODE: **1280x1024 (64 kHz)** 6 dB Bandwidth: 10 kHz

PHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.190	0.2	46.9	-	47.1	-	64.0	54.0	-16.9	-
0.448	0.2	37.5	-	37.7	-	56.9	46.9	-19.2	-
0.576	0.2	39.5	-	39.7	-	56.0	46.0	-16.3	-
1.925	0.2	34.6	-	34.8	-	56.0	46.0	-21.2	-
15.722	1.0	45.3	-	46.3	-	60.0	50.0	-13.7	-
18.161	1.0	45.9	-	46.9	-	60.0	50.0	-13.1	-

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.



|--- Date 29.JUL.'99 Time 18:41:38
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL: X-970 1280X1024 60Hz/64k FULL SYSTEM LISN: L

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TEST DATA OF CONDUCTED EMISSION

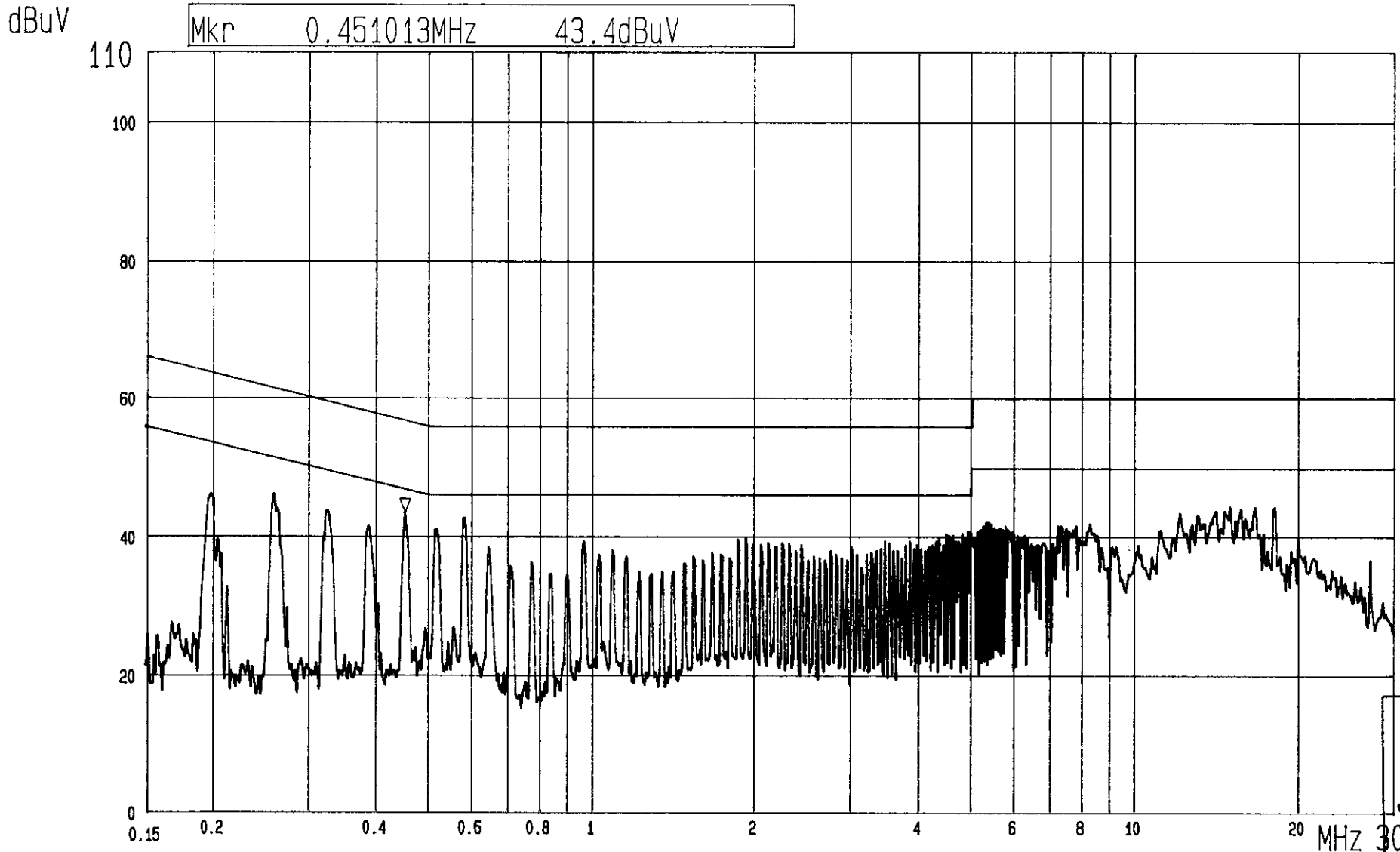
EUT: **COLOR MONITOR** MODEL: **X-970**

MODE: **1280x1024 (64 kHz)** 6 dB Bandwidth: 10 kHz

PHASE: NEUTRAL (N)

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.190	0.2	45.6	-	45.8	-	64.0	54.0	-18.2	-
0.448	0.2	40.5	-	40.7	-	56.9	46.9	-16.2	-
0.576	0.2	39.4	-	39.6	-	56.0	46.0	-16.4	-
1.925	0.2	36.7	-	36.9	-	56.0	46.0	-19.1	-
15.722	0.8	44.1	-	44.9	-	60.0	50.0	-15.1	-
18.161	0.9	44.6	-	45.5	-	60.0	50.0	-14.5	-

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.



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|--- Date 29.JUL.'99 Time 18:48:53
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEL: X-970 1280X1024 60Hz/64k FULL SYSTEM LISN: N

4.4 TEST DATA OF RADIATED EMISSION

EUT: **COLOR MONITOR** MODEL: **X-970**

MODE: **1280x1024 (64 kHz)** ANT. POLARITY: Horizontal

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

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

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
63.46	6.5	11.7	18.2	30.0	-11.8	400	260
72.56	7.3	8.8	16.1	30.0	-13.9	400	250
112.00	12.0	9.5	21.5	30.0	-8.5	400	100
120.01	12.5	8.6	21.1	30.0	-8.9	400	290
172.30	11.4	13.2	24.6	30.0	-5.4	400	266
172.31	11.4	12.6	24.0	30.0	-6.0	347	268
181.43	11.1	10.6	21.7	30.0	-8.3	348	259
199.97	10.3	11.3	21.6	30.0	-8.4	400	252
212.00	11.2	11.6	22.8	30.0	-7.2	400	276
224.00	12.1	10.9	23.0	30.0	-7.0	400	269
229.21	12.5	6.8	19.3	30.0	-10.7	378	274
265.26	14.7	11.8	26.5	37.0	-10.5	287	59
331.56	16.2	6.4	22.6	37.0	-14.4	243	162

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 MONITOR** MODEL: **X-970**

MODE: **1280x1024 (64 kHz)** ANT. POLARITY: Vertical

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

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

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
35.92	17.2	8.0	25.2	30.0	-4.8	181	358
72.64	7.3	11.5	18.8	30.0	-11.2	181	206
112.01	12.0	12.1	24.1	30.0	-5.9	100	120
120.00	12.5	12.4	24.9	30.0	-5.1	100	214
137.81	13.2	11.1	24.3	30.0	-5.7	100	358
200.00	10.3	13.3	23.6	30.0	-6.4	100	281
212.00	11.2	15.1	26.3	30.0	-3.7	100	301
224.00	12.1	13.7	25.8	30.0	-4.2	100	285
265.26	14.7	10.7	25.4	37.0	-11.6	100	7
331.58	16.2	4.2	20.4	37.0	-16.6	100	176

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

6. APPENDIX - INFORMATION OF THE TESTING LABORATORY

Information of the testing laboratory

We, ADT Corp., are 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:

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