



EMC

TEST REPORT

REPORT NO. : F88072806AMODEL NO. : R-5, 10 15 50DATE OF TEST : Aug. 26, 1999PREPARED 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

Accredited Laboratory

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**1. CERTIFICATION**

Issue Date: Aug. 27, 1999

Reference No.: 88082402

Product : LCD MONITOR
Trade Name : RIC, Belinea
Model No. : R-5, 10 15 50
Applicant : ROYAL INFORMATION ELECTRONICS CO., LTD.
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 Aug. 26, 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 : Kenny Meng , DATE: 8/27/99
(Kenny Meng)

CHECKED BY : Ariel Hsieh , DATE: 8/27/99
(Ariel Hsieh)

APPROVED BY : Mike Su , DATE: 8/27/99.
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION**NVLAP[®]**

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	LCD MONITOR
Model No.	:	R-5, 10 15 50
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.8m)

Note: This report is prepared for Class II Permissive Change. The main change is as following:

1. Addition of HITACHI LCD PANEL
2. Addition of audio function

The EUT is a 15" LCD monitor with resolution up to 1024x768.

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

- ◆ Model: R-5, brand: RIC
- ◆ Model: 10 15 50, brand: Belinea

From the above model names, model: R-5 was selected as the representative for the test and its data is recorded in this report.

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	NTI	PII-233	FCC DoC Approved	Nonshielded Power (1.8m)
2.	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4 m)
3.	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.2m)
4.	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.2m)
5.	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded Signal (1.5m)
6.	VGA CARD	CARDEX	CD-GX2A44T	ICUVGA-GW710	NA
7.	EARPHONE	HP	LT-100	NA	Shielded Signal (3.0m)
8.	SOUND CARD	YA SHIN	AUDIO 1869	FCC DoC Approved	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 +/- 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 - 1000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	26 degree C
Humidity	:	63 %
Atmospheric Pressure	:	995 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -12.6 dB at 0.757 MHz Minimum passing margin of radiated emission: -3.2 dB at 208.65 MHz

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

- ♦ 1024x768 (69 kHz)
- ♦ 800x600 (54 kHz)
- ♦ 640x480 (31.5 kHz)

The worst emission levels were found under 1024x768 (69 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 LCD monitor (EUT) and LCD 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. PC sends audio messages to internal speaker of EUT and earphone.
8. Repeat steps 3-8.



4.3 TEST DATA OF CONDUCTED EMISSION

EUT: LCD MONITORMODEL: R-5MODE: 1024x768 (69 kHz)6 dB Bandwidth: 10 kHzPHASE: LINE (L)

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.164	0.2	49.1	-	49.3	-	65.4	55.4	-16.1	-
0.323	0.2	38.9	-	39.1	-	59.6	49.6	-20.5	-
0.757	0.2	42.5	-	42.7	-	56.0	46.0	-13.3	-
2.058	0.3	35.0	-	35.3	-	56.0	46.0	-20.7	-
13.003	0.8	34.3	-	35.1	-	60.0	50.0	-24.9	-
18.307	1.0	34.3	-	35.3	-	60.0	50.0	-24.7	-

- 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: LCD MONITORMODEL: R-5MODE: 1024x768 (69 kHz)6 dB Bandwidth: 10 kHzPHASE: NEUTRAL (N)

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.164	0.2	47.0	-	47.2	-	65.4	55.4	-18.2	-
0.323	0.2	36.9	-	37.1	-	59.6	49.6	-22.5	-
0.757	0.2	43.2	-	43.4	-	56.0	46.0	-12.6	-
2.058	0.3	37.9	-	38.2	-	56.0	46.0	-17.8	-
13.003	0.7	24.6	-	25.3	-	60.0	50.0	-34.7	-
18.307	0.9	34.3	-	35.2	-	60.0	50.0	-24.8	-

- 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.



4.4 TEST DATA OF RADIATED EMISSION

EUT: **LCD MONITOR**MODEL: **R-5**MODE: **1024x768 (69 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)
118.25	12.4	11.0	23.4	30.0	-6.6	400	265
125.12	12.7	8.7	21.4	30.0	-8.6	400	271
139.11	13.2	8.2	21.4	30.0	-8.6	400	144
146.14	12.8	8.7	21.5	30.0	-8.5	400	250
153.04	12.4	11.7	24.1	30.0	-5.9	400	187
160.02	11.9	10.6	22.5	30.0	-7.5	400	188
173.89	11.4	9.2	20.6	30.0	-9.4	361	306
187.74	10.8	8.8	19.6	30.0	-10.4	400	309
208.66	11.0	10.8	21.8	30.0	-8.2	360	12
347.76	16.6	12.1	28.7	37.0	-8.3	295	80
486.85	20.5	12.8	33.3	37.0	-3.7	153	293

- 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: **LCD MONITOR**MODEL: **R-5**MODE: **1024x768 (69 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)
35.42	17.6	7.2	24.8	30.0	-5.2	100	291
63.60	6.5	17.2	23.7	30.0	-6.3	185	338
118.17	12.4	12.1	24.5	30.0	-5.5	100	92
139.12	13.2	12.8	26.0	30.0	-4.0	100	262
160.04	11.9	12.8	24.7	30.0	-5.3	100	285
187.73	10.8	11.3	22.1	30.0	-7.9	100	28
208.65	11.0	15.8	26.8	30.0	-3.2	100	8
216.07	11.5	12.3	23.8	30.0	-6.2	100	359
283.75	15.0	15.7	30.7	37.0	-6.3	100	129
417.33	18.8	13.5	32.3	37.0	-4.7	100	63
556.40	23.3	8.5	31.8	37.0	-5.2	275	200

- 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



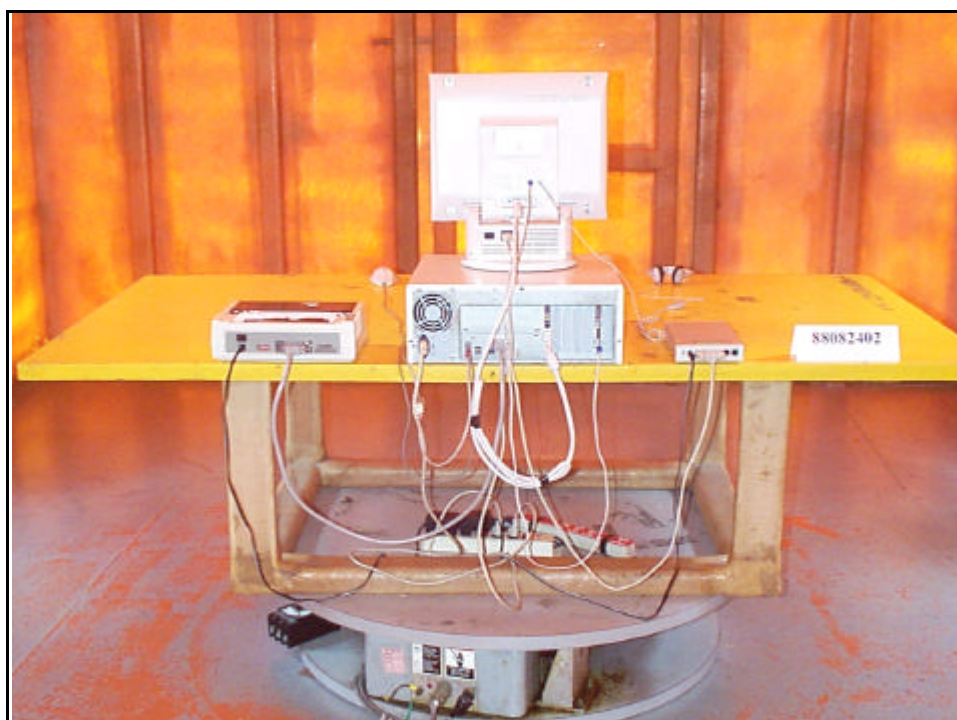
5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

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:

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