

EXHIBIT 3
RFI/EMI TEST REPORT



EMC

TEST REPORT

REPORT NO. : F87080307A
MODEL NO. : DH-1764U
DATE OF TEST : March 16, 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



Accredited Laboratory

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TAIPEI, TAIWAN, R.O.C.

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**1. CERTIFICATION**

Issue Date: March 19, 1999

Product : COLOR MONITOR
Trade Name : TRL/RIC
Model No. : DH-1764U
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

We hereby certify that one sample of the designation has been tested in our facility on March 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 : John Liao , DATE: 03/19/99
(John Liao)

CHECKED BY : Yemmy Soong , DATE: 03/19/99
(Yemmy Soong)

APPROVED BY : Mike Su , DATE: 3/19/99
(Mike Su)

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	COLOR MONITOR
Model No.	:	DH-1764U
Power Supply Type	:	Switching
Power Cord	:	Non-shielded (1.8m)
Data Cable	:	Shielded (1.8m)

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

- 1) Addition of new CRT board.
- 2) The ground wires connected to the chassis are decreased from eleven to eight wires.
- 3) Added two capacitors on the solder side of CRT board for electrical improvement only and not for EMI. They will be built into component side after circuit relay-out.

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

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-233T	FCC Doc Approved	Nonshielded Power (1.8m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded signal (1.4m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.2m)
4	MODEM	DATATRONICS	1200C+	E2050V1200CK	Shielded signal (1.2m) Nonshielded Power (1.2m)
5	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded signal (1.5m)
6	VGA DISPLAY CARD	DIAMOND	STEALTH 64 VIDEO	FTUPCI968524	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 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	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	NA

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.

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01042	April 29, 1999
HP Preamplifier	8447D	2944A08313	March 21, 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 3, 1999
CHASE BILOG Antenna	CBL6111A	1647	July 3, 1999
EMCO Turn Table	1016	1722	NA
EMCO Tower	1051	1825	NA
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.



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 : 19 °C
Humidity : 78 %
Atmospheric Pressure : 991 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -10.1 dB at 0.165 MHz Minimum passing margin of radiated emission: -3.0 dB at 51.54 & 223.41 MHz

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

- * 1600 x 1200 mode (83 kHz),
- * 1280 x 1024 mode (80 kHz),
- * 640 x 480 mode (31.5 kHz)

The worst emission levels were found under 1600 x 1200 (83 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 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 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: DH-1764UMODE: 1600x1200 (83 kHz)6 dB Bandwidth: 10 kHzPHASE: LINE (L)

Freq.	Meter Reading [dB (uV)]					Limit		Margin	
[MHz]	Corr.	Reading Data		Total		[dB (uV)]		[dB (uV)]	
	Factor	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.2	54.9	-	55.1	-	65.2	55.2	-10.1	-
0.205	0.2	49.6	-	49.8	-	63.4	53.4	-13.6	-
0.247	0.2	47.1	-	47.3	-	61.9	51.9	-14.6	-
1.901	0.3	32.3	-	32.6	-	56.0	46.0	-23.4	-
13.213	1.0	43.3	-	44.3	-	60.0	50.0	-15.7	-
17.345	1.2	44.3	-	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 reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission level 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

16. Mar 99 13:35

EUT: MODEL: DH-1764U
Op Cond: 1600x1200 83kHz
Test Spec: LISN : L
FULL SYSTEM

Report No. F 97080307A

Page

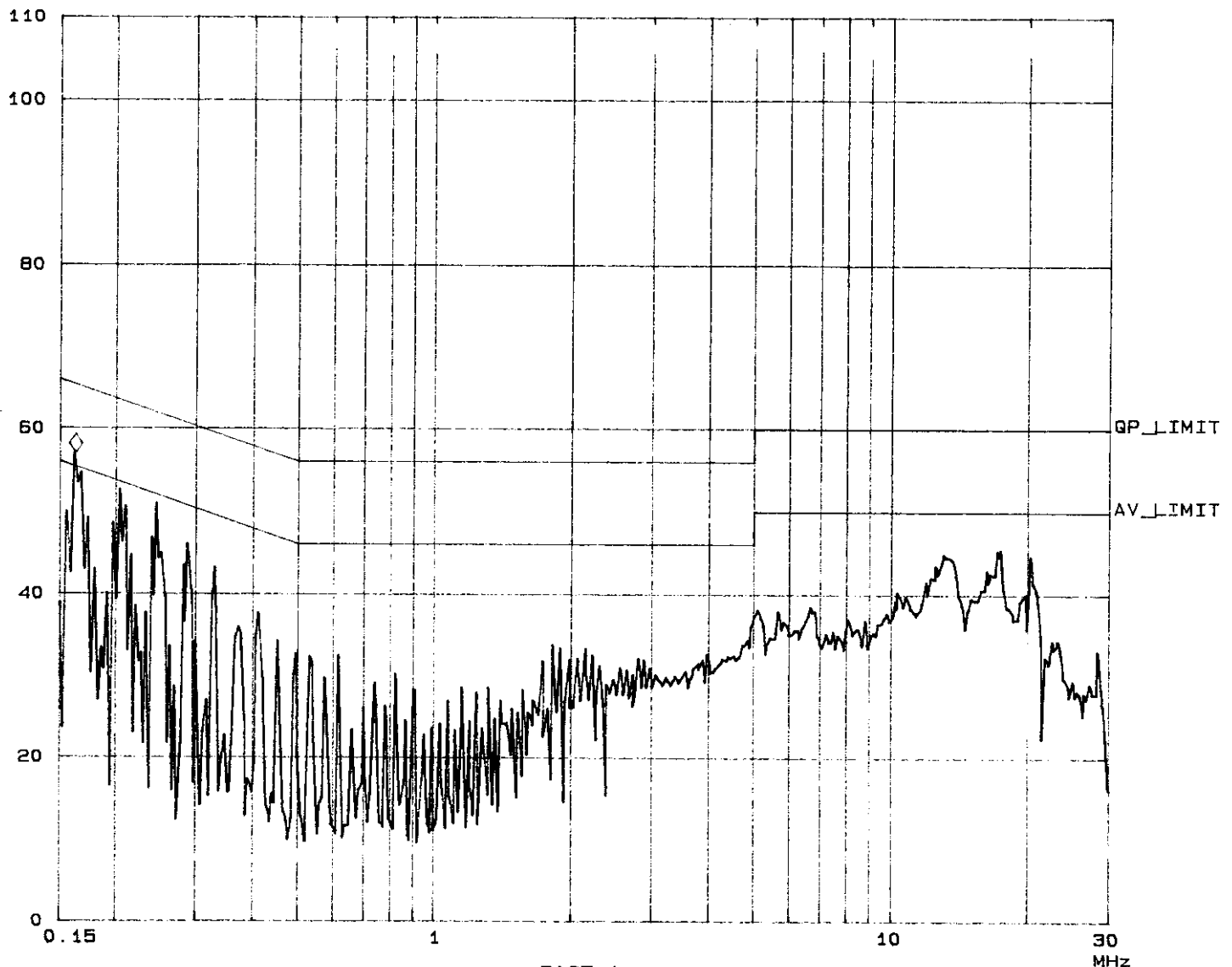
9-1

Tested by John Liag

Fast Scan Settings (3 Ranges)

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

dBuV Mkr : 162.00 kHz 57.0 dBuV





TEST DATA OF CONDUCTED EMISSION

EUT: COLOR MONITORMODEL: DH-1764UMODE: 1600x1200 (83 kHz)6 dB Bandwidth: 10 kHzPHASE: NEUTRAL (N)

Freq.	Meter Reading [dB (uV)]					Limit		Margin	
[MHz]	Corr.	Reading Data		Total		[dB (uV)]		[dB (uV)]	
	Factor	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.2	54.9	-	55.1	-	65.2	55.2	-10.1	-
0.205	0.2	49.7	-	49.9	-	63.4	53.4	-13.5	-
0.247	0.2	46.3	-	46.5	-	61.9	51.9	-15.4	-
1.901	0.3	31.9	-	32.2	-	56.0	46.0	-23.8	-
13.213	0.7	44.1	-	44.8	-	60.0	50.0	-15.2	-
17.345	0.8	44.2	-	45.0	-	60.0	50.0	-15.0	-

- 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 level 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

16. Mar 99 13:23

EUT: MODEL: DH-1764U
Op Cond: 1600x1200 83kHz
Test Spec: LISN: N
FULL SYSTEM

Report No. F87080307A

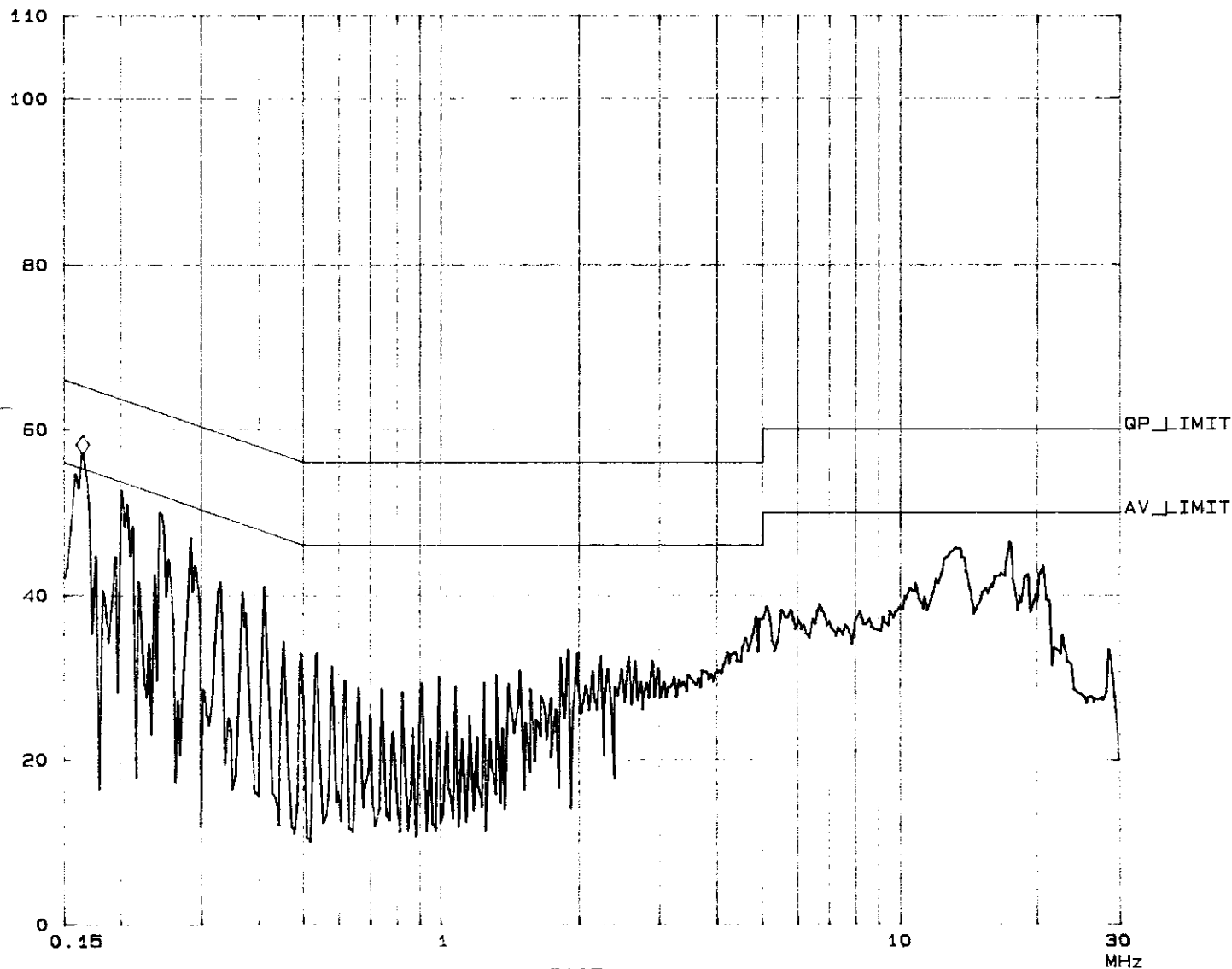
10-1

Tested by John Liao

Fast Scan Settings (2 Ranges)

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

dBuV Mkr : 165.00 kHz 57.1 dBuV





4.4 TEST DATA OF RADIATED EMISSION

EUT: COLOR MONITORMODEL: DH-1764UMODE: 1600x1200 (83 kHz)ANT. POLARITY: HorizontalDETECTOR 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/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
51.54	10.5	12.4	22.9	30.0	-7.1
68.73	8.2	7.2	15.4	30.0	-14.6
171.83	11.8	7.2	19.0	30.0	-11.0
206.18	12.0	12.0	24.0	30.0	-6.0
223.41	13.1	13.9	27.0	30.0	-3.0
240.54	14.3	16.8	31.1	37.0	-5.9
257.73	15.9	14.1	30.0	37.0	-7.0
274.91	15.5	12.2	27.7	37.0	-9.3
292.11	16.2	7.1	23.3	37.0	-13.7

- 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: **DH-1764U**MODE: **1600x1200 (83 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 MHz**MEASURED DISTANCE: **10 M**FREQUENCY RANGE: **1000-2000 MHz**MEASURED DISTANCE: **3 M**

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.37	17.8	9.1	26.9	30.0	-3.1
51.54	9.0	18.0	27.0	30.0	-3.0
68.74	8.0	15.0	23.0	30.0	-7.0
120.27	13.3	6.1	19.4	30.0	-10.6
171.82	12.0	13.2	25.2	30.0	-4.8
223.36	13.0	11.7	24.7	30.0	-5.3
236.27	13.5	2.2	15.7	37.0	-21.3
240.55	13.7	4.7	18.4	37.0	-18.6
360.82	20.4	7.3	27.7	37.0	-9.3
395.17	20.1	4.6	24.7	37.0	-12.3
429.54	19.9	7.1	27.0	37.0	-10.0
446.76	19.8	6.3	26.1	37.0	-10.9

- 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. 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, SGS |
| ● 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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