



EMC

TEST REPORT

REPORT NO. : F87080307

MODEL NO. : DH-1764U

DATE OF TEST : Aug. 20, 1998

PREPARED FOR: ROYAL INFORMATION ELECTRONICS CO., LTD.

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DISTRICT TAIPEI HSIEN, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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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
4.1.1 EUT OPERATION CONDITION	8
4.1.2 TEST DATA OF CONDUCTED EMISSION	9
4.1.3 TEST DATA OF RADIATED EMISSION	10
5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN	12
6. ATTACHMENT I -TECHNICAL DESCRIPTION OF EUT	14

**1. CERTIFICATION**

Issue Date: Aug. 25, 1998

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+A2

We hereby certify that one sample of the designation has been tested in our facility on Aug. 20, 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: J. W. KUO , DATE: 8/25/98
(J. W. Kuo)

CHECKED BY: Sharon Hsiung , DATE: 8/25/98
(Sharon Hsiung)

APPROVED BY: Mike Su , DATE: 8/25/98
(Mike Su)

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

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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	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.5m)

Note: This report is prepared for Class II Permissive Change.
The main change is upgrade of resolution to 1600x1200.

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
ATTACHMENT I - 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	HP	D4579A	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 (2.1m) Nonshielded Power (1.8m)
4	MODEM	ACEEX	1414	IFAXDM1414	Shielded signal (1.2m) Nonshielded Power (1.8m)
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 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)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	E4411A	US37360834	Sept. 28, 1998
CHASE Preamplifier	CPA9231A/4	3215	Oct. 31, 1998
HP Preamplifier	8347A	3307A01088	Sept. 4, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/002	Jan. 08, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BILOG Antenna	CBL6112	2074	Dec. 25, 1998
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 3, 1999
CHANCE Turn Table & Tower Controller	ACS-I	N/A	N/A
Open Field Test Site	Site 6	ADT-R06	Dec. 23, 1998

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	828765/002	July 29, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 27, 1999
EMCO-L.I.S.N.	3825/2	90031627	July 27, 1999
Shielded Room	Site 5	ADT-C05	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 - 1000 MHz (Radiated Emission)
Input Voltage : 120 Vac, 60 Hz
Temperature : 24 °C
Humidity : 46 %
Atmospheric Pressure : 998 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -15.0 dB at 13.546 MHz Minimum passing margin of radiated emission: -2.8 dB at 120.29 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC reads a test program to enable all functions.
4. PC reads and writes messages from FDD and HDD.
5. PC sends "H" messages to monitor (EUT) and monitor display "H" patterns on screen.
6. PC sends "H" messages to modem.
7. PC sends "H" messages to printer, and the printer prints them on paper.
8. Repeat steps 3-8.



4.1.2 TEST DATA OF CONDUCTED EMISSION

EUT: **COLOR MONITOR**MODEL: **DH-1764U**MODE: **1600x1200 (83 kHz)**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: *J. W. Kuo*

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.164	48.90	-	48.60	-	65.26	55.26	-16.4	-	-16.7	-
0.248	41.40	-	43.20	-	61.26	51.26	-19.9	-	-18.1	-
0.578	35.40	-	33.40	-	56.00	46.00	-20.6	-	-22.6	-
1.899	26.20	-	28.00	-	56.00	46.00	-29.8	-	-28.0	-
5.533	32.30	-	34.30	-	60.00	50.00	-27.7	-	-25.7	-
13.546	45.00	-	45.00	-	60.00	50.00	-15.0	-	-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

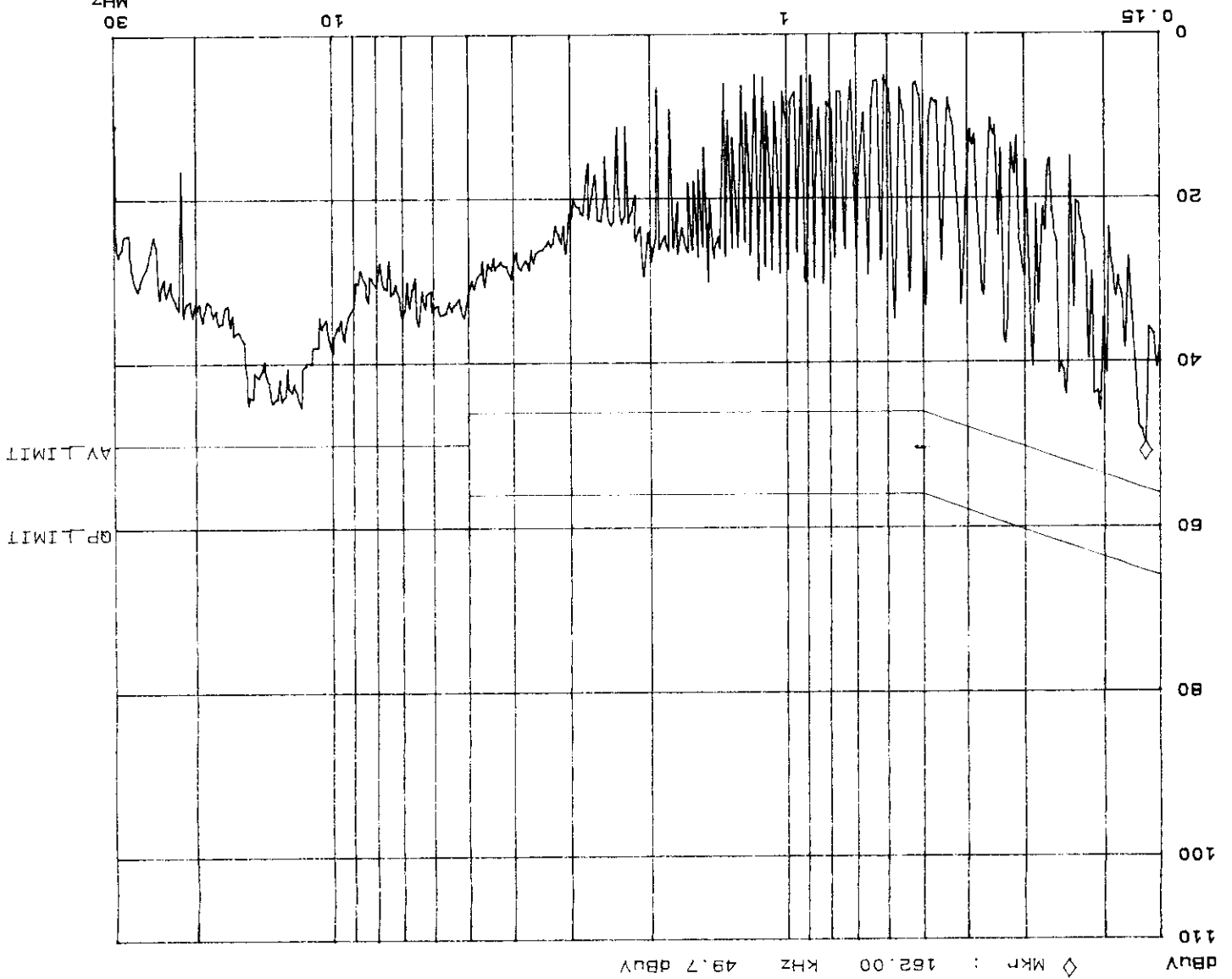
ADT CO. Shielded Room 5
CISPR 22 CLASS B

EUT: DH-1764U
Test Spec: LISN : L

Report No. F87080307
Page 9-1
Tested by J.W. Kuo

Fast Scan Settings (3 Ranges)
----- Frequencies -----

Start	Stop	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150K	450K	3K	PK	10K	10dB	LN	OFF
450K	5M	3K	PK	10K	10dB	LN	OFF
5M	30M	3K	PK	10K	10dB	LN	OFF



ADT CO. Shielded Room 5
CISPR 22 CLASS B

20. Aug 98 19:44

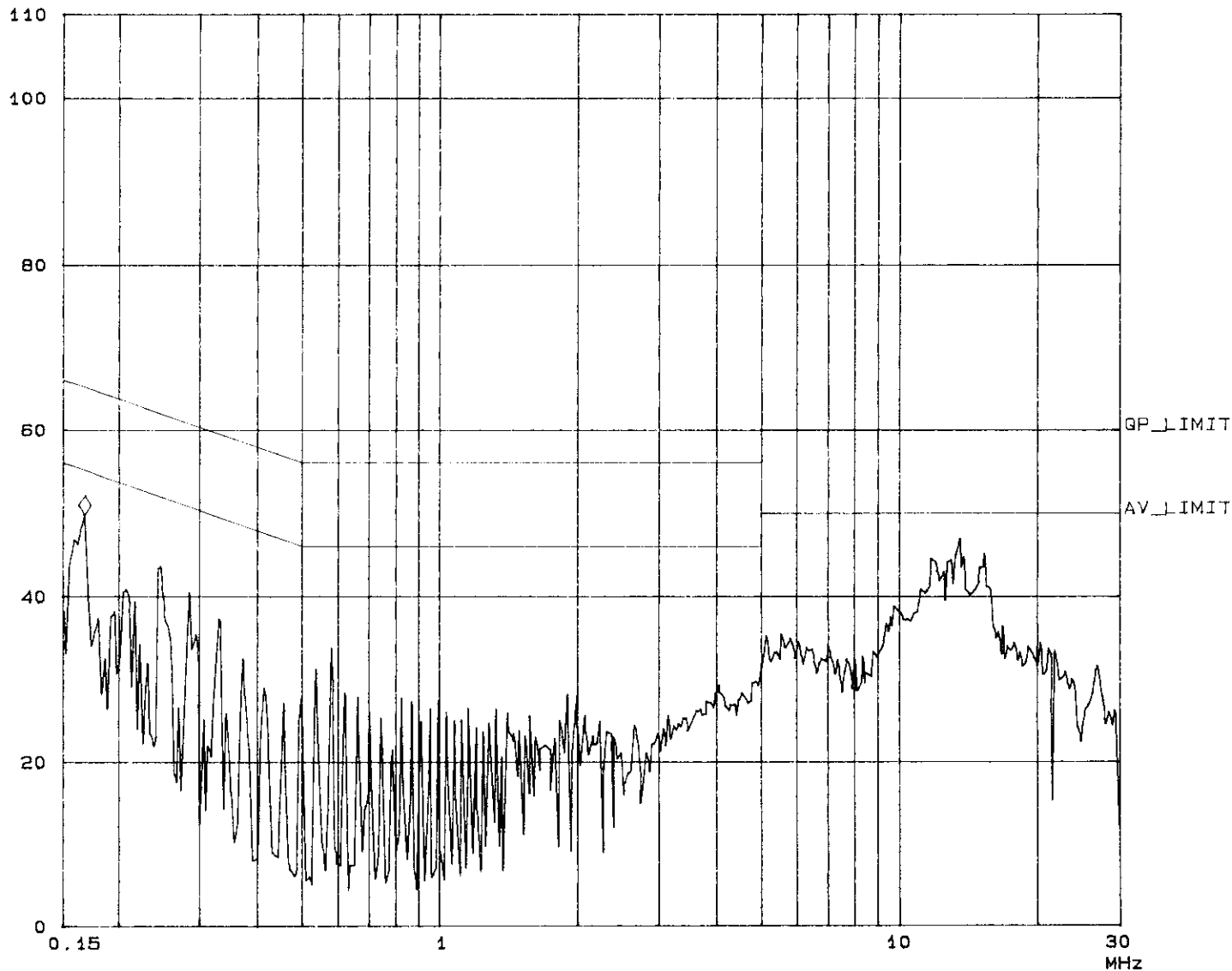
EUT: DH-1764U
Test Spec: LISN : N

Report No.	F87080307
Page	9-2
Tester	J. W. Kuo

Fast Scan Settings (3 Ranges)

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

dBuV ◇ Mkr : 158.00 kHz 49.8 dBuV





4.1.3 TEST DATA OF RADIATED EMISSION

EUT: **COLOR MONITOR**MODEL: **DH-1764U**MODE: **1600x1200 (83 kHz)**

ANTENNA: CHASE BILOG CBL6112

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 MTEST PERSONNEL: *J. w. Kuo*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.41	18.5	8.1	26.6	30.0	-3.4
51.59	11.6	6.3	17.9	30.0	-12.1
120.29	15.6	11.6	27.2	30.0	-2.8
137.47	13.4	8.5	21.9	30.0	-8.1
188.99	10.6	14.7	25.3	30.0	-4.7
206.20	11.0	10.8	21.8	30.0	-8.2
343.63	17.3	7.1	24.4	37.0	-12.6

- 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)**

ANTENNA: CHASE BILOG CBL6112

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

TEST PERSONNEL: *J. W. 1240*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.37	17.6	7.7	25.3	30.0	-4.7
51.56	9.4	16.9	26.3	30.0	-3.7
120.26	14.2	12.0	26.2	30.0	-3.8
189.01	10.6	16.5	27.1	30.0	-2.9
206.17	12.1	9.8	21.9	30.0	-8.1
343.64	17.5	8.5	26.0	37.0	-11.0

- 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 I-TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

CRT:

- | | |
|-----------------|-----------------------------------|
| 1. Visible Size | 40 cm (15.8")max. screen Diagonal |
| 2. Deflection | 90-degree deflection |
| 3. Dot pitch | 0.26mm |
| 4. Phosphor | P22 |
| 5. Surface | Non glare |
| 6. Transmission | 46% |

Video and Synchronization Signals:

- | | |
|-----------------------|--------------------------|
| 1. Signal cable | 15- pin D-type connector |
| 2. Video | Analog level |
| 3. Horizontal Sync | TTL Positive / Negative |
| 4. Vertical Sync | TTL Positive / Negative |
| 5. Bandwidth | 135 MHz (-3dB) |
| 6. Display area | 300 x 225 mm +/- 5mm |
| 7. Display Colors | limited by VGA card |
| 8. Video signal input | 0.7 Vpp |

Scanning Frequency

- | | |
|---------------|------------------|
| 1. Horizontal | 30 kHz to 86 kHz |
| 2. Vertical | 47 Hz to 150Hz |

Power supply

- | | |
|------------------|----------------------|
| 1. Input voltage | 100 - 240Vac 60/50Hz |
| 2. Consumption | 120 Watts maximum |

Environment

- | | |
|------------------|---------------|
| 1. Operating | |
| Temperature | 0°C to 40°C |
| Humidity | 20% to 80% |
| 2. Non operating | |
| Temperature | -20°C to 60°C |
| Humidity | 10% to 90% |

Dimension

445 mm (W) x 447 mm (H) X 434 mm (D)

Weight

Approx. 17kgs (NET)