



# EMC

## TEST REPORT

REPORT NO. : F87070815  
MODEL NO. : TD-33T  
DATE OF TEST : July 12, 1998

PREPARED FOR : ADI CORP.

ADDRESS : 14TH FL. NO. 1, SEC. 4, NAN-KING E. RD.,  
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

12F, NO.1, SEC.4, NAN-KING EAST RD.,  
TAIPEI, TAIWAN, R.O.C.

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# 1. CERTIFICATION

Issue Date: Aug. 14, 1998

Product : LCD MONITOR  
 Trade Name : ADI  
 Model No. : TD-33T  
 Applicant : ADI CORP.  
 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 July 12, 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:

Jackey Chang  
 ( Jackey Chang )

DATE:

8/14/98

CHECKED BY :

Ariel Hsieh  
 ( Ariel Hsieh )

DATE:

8/14/98

APPROVED BY:

Mike Su  
 ( Mike Su )

DATE:

8/14/98

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAQ<sup>®</sup>

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## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product	:	LCD MONITOR
Model No.	:	TD-33T
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8 m)
Data Cable	:	Shielded (1.5m)

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

1. Originally, the brand of the logical board is NEC; now it's changed to SAGE.
2. Originally, the brand of LCD panel is NEC; now it's changed to SAMSUNG and HITACHI.
3. Originally, there is no back LCD panel metal cover but now the logical board is located on the back LCD panel metal cover, and another metal cover is added on the logical board.
4. Originally, the Microphone cable is connected to USB control board; now it can be connected to either USB control board or logical board.
5. The inverter board is changed.
6. Added a ferrite core on the wires connected between power switch and power board.
7. Added a metal cover on the I/O board.
8. Added a piece of EMI gasket on the metal plate of lower enclosure to enhance contact with the metal stand. A metal clamp will replace the EMI gasket in mass production.
9. Added a piece of copper foil on the back LCD panel metal cover. A metal clamp will replace the copper foil in mass production. (for HITACHI LCD panel only)
10. Added a ferrite core on the inverter cable.
11. Added a copper foil on the inverter cable. A metal clamp will replace the copper foil in mass production.
12. Added a ferrite core on the wire from control board.
13. Added a copper foil on the wire from control board. A metal clamp will replace the copper foil in mass production.
14. Added a metal foil on the LVDS cable. A metal clamp will replace the copper foil in mass production.
15. Added a ferrite core on the microphone cable.
16. Added a metal cover on the solder side of control board.
17. Added a metal cover on the solder side of inverter board. (for HITACHI LCD panel only)
18. Added two pieces of spring fingers on the HITACHI LCD panel to enhance contact with the back LCD panel metal cover. (for HITACHI LCD panel only)

The EUT is a 14"/14.1" TFT LCD Monitor with resolution up to 1024x768.

The EUT was tested under the following test modes:

- MODE 1: SAMSUNG LCD panel
- MODE 2: HITACHI LCD panel

Both data of the test modes are recorded in this report.

There are two ferrite cores 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	HP	D5220B	DoC Approved	Nonshielded Power (1.8 m) Shielded USB Cable (1.8m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Nonshielded signal ( 1.5 m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2 m) Nonshielded Power (1.8 m)
4	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded Signal ( 1.5 m)
5	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1. 2 m) Nonshielded Power (1.8 m)
6	CCD CAMERA	COMPAQ	YC72-CPQ	EDUYC72-CPQ	Shielded Signal (1.8m)
7	VGA CARD	GORDIA	DSV3365	LUT-DSV3365	N/A
8	SOUND CARD	AZTECH	5064-2620	I38-SN96116	N/A

Note: 1. Support unit 6 was connected to the USB port of EUT.

2. Three USB cables (1.8m) are connected to the three USB ports of EUT to form three USB open loop cables.

3. Two audio cables (1.8m) are connected between PC and EUT.

## 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	8590L	3544A01042	April 29, 1999
HP Preamplifier	8447D	2944A08313	Sept. 18, 1998
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 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	828765/002	July 31, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 28, 1998
EMCO-L.I.S.N.	3825/2	90031627	July 28, 1998
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	:	25 °C
Humidity	:	61 %
Atmospheric Pressure	:	998 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: - 5.5 dB at 4.134 MHz Minimum passing margin of radiated emission: -3.0 dB at 75.00, 37.13 & 119.99 MHz

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

- \* 1024x768 mode (56 kHz),
- \* 800x600 mode (54 kHz),
- \* 640x480 mode (31.5 kHz)

The worst emission levels were found under 1024x768 (56 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 LCD monitor (EUT) and then LCD monitor displays "H" patterns on screen.
5. CCD camera captures an image and sends image messages to EUT, and EUT displays them on its screen.
6. PC sends "H" messages to modem.
7. PC sends "H" messages to printer, and then printer prints them on paper.
8. PC sends audio messages to internal speaker.
9. Repeat steps 3-9.



**4.3 TEST DATA OF CONDUCTED EMISSION (A)**

EUT: LCD MONITOR

MODEL: TD-33T

MODE 1: SAMSUNG LCD PANEL

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

*Jackey Chong*

Freq. [MHz]	L Level		N Level		Limit		Margin [dB (μV)]			
	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.177	50.10	-	48.30	-	64.60	54.60	-14.5	-	-16.3	-
0.474	41.10	-	41.00	-	56.44	46.44	-15.3	-	-15.4	-
1.359	42.30	-	42.20	-	56.00	46.00	-13.7	-	-13.8	-
4.134	44.90	40.30	45.40	40.50	56.00	46.00	-11.1	-5.7	-10.6	-5.5
6.620	43.50	-	42.80	-	60.00	50.00	-16.5	-	-17.2	-
14.636	39.80	-	38.50	-	60.00	50.00	-20.2	-	-21.5	-

- 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 levels 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

12. Jul 98 17:52

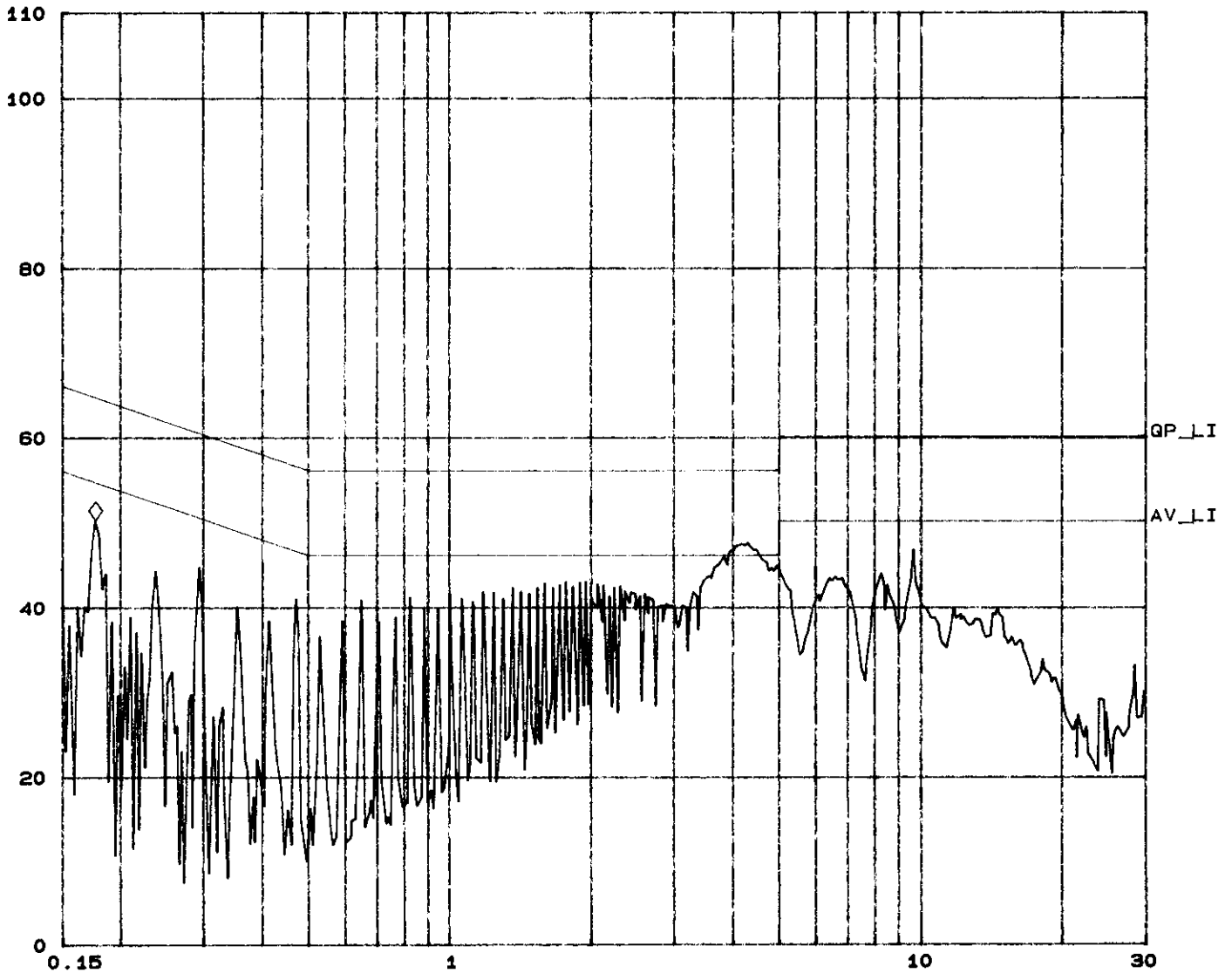
EUT: TD-33T  
 Operator: JACKY\_CHANG  
 Test Spec: LISN : L  
 Comment: 1024X768 70Hz 56kHz  
 SAMSUNG LCD PANEL

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 Tested by Jackey Chang

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpAge
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 : 177.00    kHz    50.1 dBuV







#### 4.4 TEST DATA OF CONDUCTED EMISSION (B)

EUT: LCD MONITOR

MODEL: TD-33T

MODE 2: HITACHI LCD PANEL

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

*Jackey Chang*

Freq. [MHz]	L Level		N Level		Limit		Margin [dB (μV)]			
	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.184	49.30	-	48.30	-	64.28	54.28	-15.0	-	-16.0	-
0.306	40.70	-	33.60	-	60.08	50.08	-19.4	-	-26.5	-
0.672	29.80	-	29.00	-	56.00	46.00	-26.2	-	-27.0	-
4.878	32.00	-	32.80	-	56.00	46.00	-24.0	-	-23.2	-
7.991	34.40	-	34.80	-	60.00	50.00	-25.6	-	-25.2	-
15.710	38.10	-	36.20	-	60.00	50.00	-21.9	-	-23.8	-

- 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

ADT CO. Shielded Room 5  
 CISPR 22 CLASS B

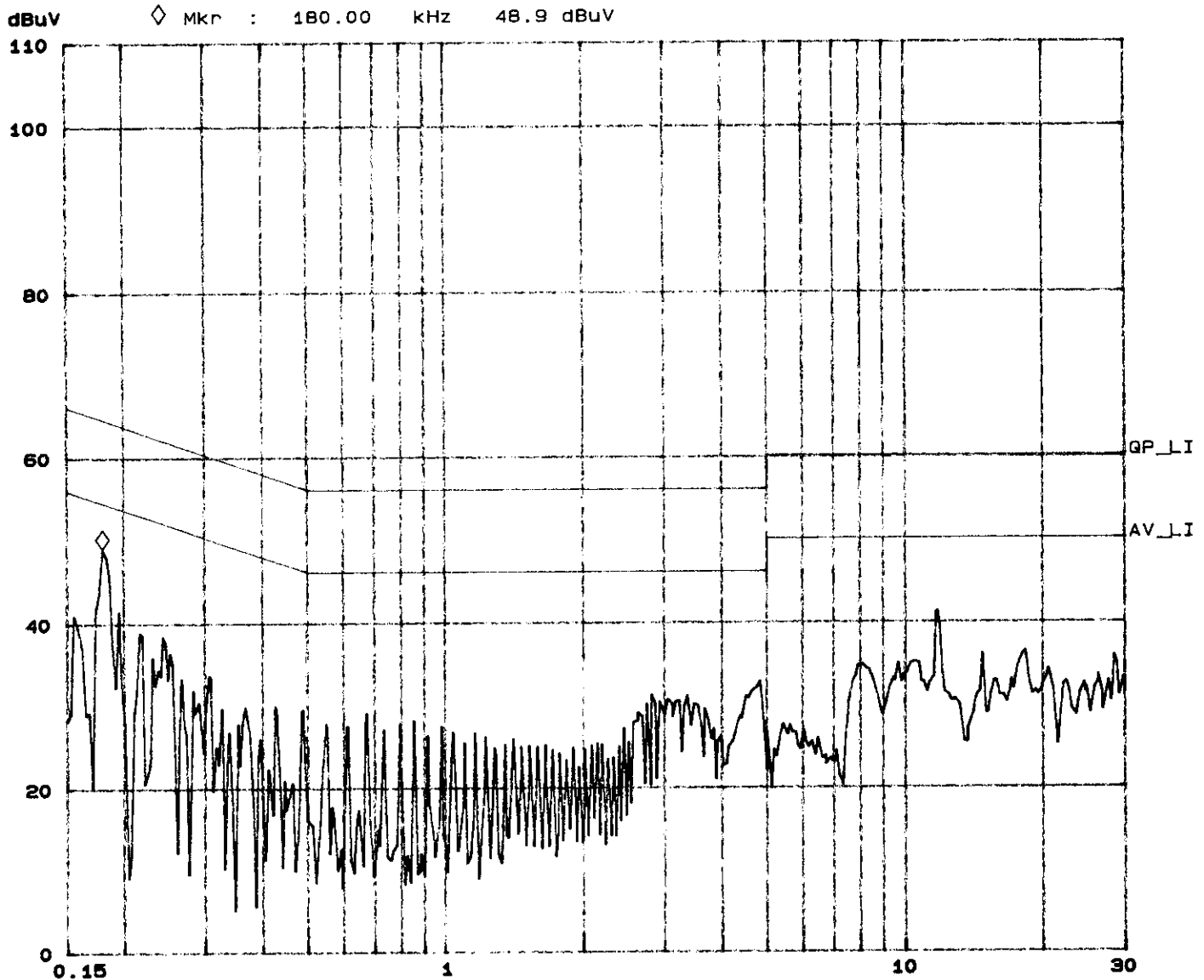
12. Jul 98 18:36

EUT: TD-33T  
 Operator: JACKEY\_CHANG  
 Test Spec: LISN : L  
 Comment: 1024X768 70Hz 56kHz  
 HITACHI LCD PANEL

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 Tested by Jackey Chang

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	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



ADT CO. Shielded Room 5  
 CISPR 22 CLASS B

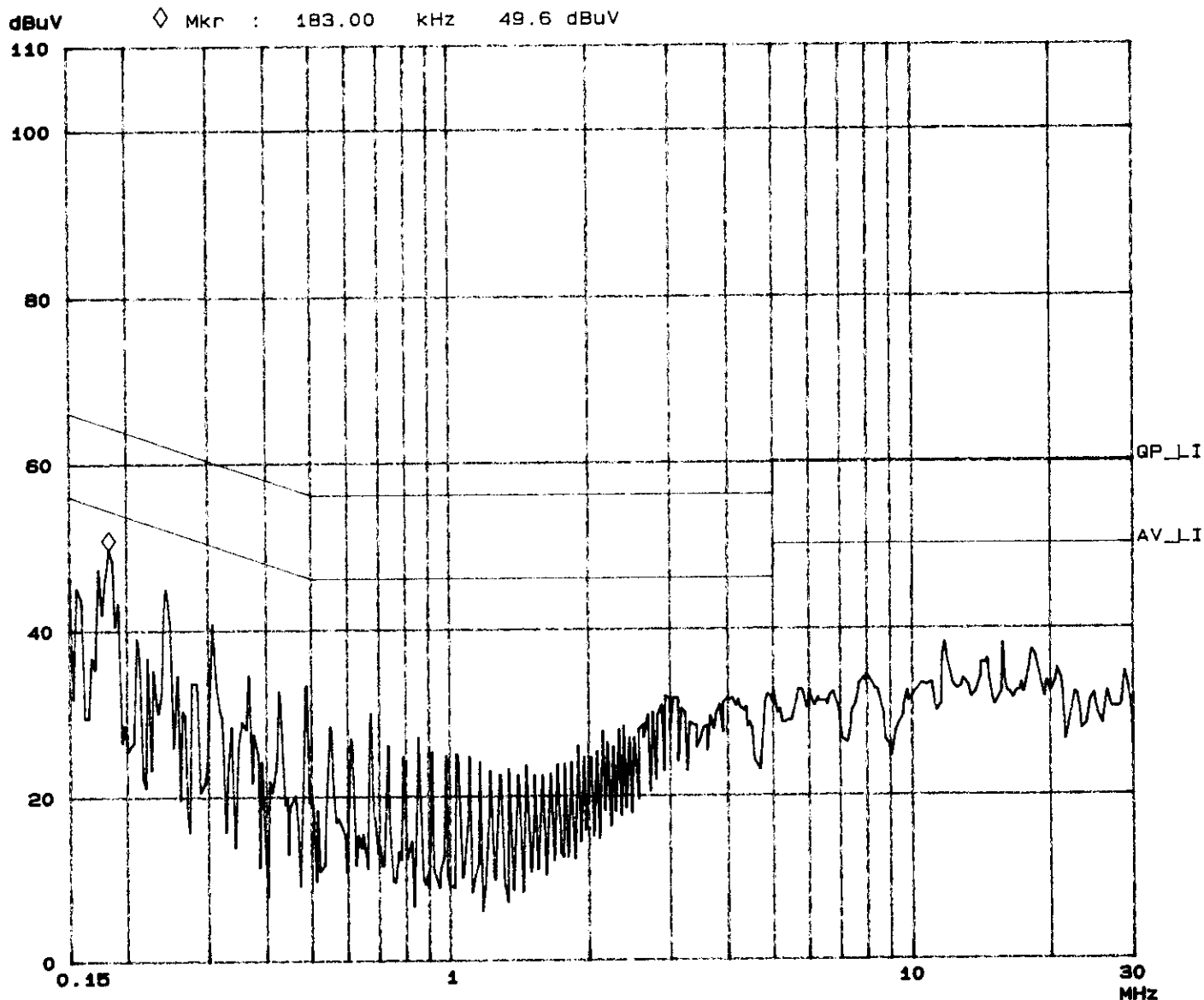
12. Jul 98 18:26

EUT: TD-33T  
 Operator: JACKEY\_CHANG  
 Test Spec: LISN : N  
 Comment: 1024X768 70Hz 56kHz  
 HITACHI LCD PANEL

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 Page 10-2  
 Tested by Jackey Chang

Fast Scan Settings (9 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
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





#### 4.5 TEST DATA OF RADIATED EMISSION (A)

EUT: LCD MONITOR

MODEL: TD-33T

MODE 1: SAMSUNG LCD PANEL

ANTENNA: CHASE BILOG CBL 6111A

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

*Jackey Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
75.01	9.0	12.0	21.0	30.0	-9.0
112.49	13.2	12.9	26.1	30.0	-3.9
120.00	14.2	11.3	25.5	30.0	-4.5
144.00	13.9	10.0	23.9	30.0	-6.1
150.00	13.2	11.9	25.1	30.0	-4.9
156.01	12.5	13.9	26.4	30.0	-3.6
204.03	11.8	14.5	26.3	30.0	-3.7
215.99	12.6	12.7	25.3	30.0	-4.7
225.00	13.2	10.9	24.1	30.0	-5.9
299.30	16.4	15.5	31.9	37.0	-5.1
336.00	17.7	12.4	30.1	37.0	-6.9
597.00	23.9	7.4	31.3	37.0	-5.7

- 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 (A)

EUT: **LCD MONITOR**MODEL: **TD-33T**MODE 1: **SAMSUNG LCD PANEL**

ANTENNA: CHASE BILOG CBL 6111A

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

*Jackey Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
37.13	16.3	10.7	27.0	30.0	-3.0
75.02	7.5	18.6	26.1	30.0	-3.9
119.99	13.3	13.7	27.0	30.0	-3.0
144.03	14.9	10.9	25.8	30.0	-4.2
167.99	12.3	13.4	25.7	30.0	-4.3
180.02	11.5	14.5	26.0	30.0	-4.0
216.02	12.7	13.9	26.6	30.0	-3.4
224.97	13.1	13.0	26.1	30.0	-3.9
239.98	13.7	15.4	29.1	37.0	-7.9
299.65	15.7	15.1	30.8	37.0	-6.2
336.80	19.2	11.1	30.3	37.0	-6.7

- 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



**4.6 TEST DATA OF RADIATED EMISSION (B)**

EUT: LCD MONITOR

MODEL: TD-33T

MODE 2: HITACHI LCD PANEL

ANTENNA: CHASE BILOG CBL 6111A

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

*Jackey Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.10	12.2	8.5	20.7	30.0	-9.3
52.51	10.2	16.5	26.7	30.0	-3.3
75.17	9.1	12.5	21.6	30.0	-8.4
112.52	13.2	12.3	25.5	30.0	-4.5
120.01	14.2	12.1	26.3	30.0	-3.7
150.01	13.2	11.0	24.2	30.0	-5.8
167.99	11.9	13.3	25.2	30.0	-4.8
180.00	11.6	14.5	26.1	30.0	-3.9
195.01	11.6	10.6	22.2	30.0	-7.8
225.55	13.3	13.4	26.7	30.0	-3.3
239.98	14.2	13.4	27.6	37.0	-9.4
299.65	16.5	14.1	30.6	37.0	-6.4
337.50	17.8	12.3	30.1	37.0	-6.9

- 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





## TEST DATA OF RADIATED EMISSION (B)

EUT: LCD MONITOR

MODEL: TD-33T

MODE 2: HITACHI LCD PANEL

ANTENNA: CHASE BILOG CBL 6111A

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

*Sackey Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.88	16.4	8.0	24.4	30.0	-5.6
48.07	10.5	14.9	25.4	30.0	-4.6
72.02	7.8	18.4	26.2	30.0	-3.8
75.00	7.5	19.5	27.0	30.0	-3.0
82.51	7.8	16.3	24.1	30.0	-5.9
112.51	12.0	13.5	25.5	30.0	-4.5
132.01	14.6	11.9	26.5	30.0	-3.5
150.01	14.1	10.5	24.6	30.0	-5.4
156.01	13.3	13.5	26.8	30.0	-3.2
172.51	12.0	11.5	23.5	30.0	-6.5
180.02	11.5	15.0	26.5	30.0	-3.5
195.00	11.9	13.9	25.8	30.0	-4.2
216.05	12.7	11.8	24.5	30.0	-5.5
225.02	13.1	10.9	24.0	30.0	-6.0
228.02	13.2	13.2	26.4	30.0	-3.6
299.65	15.7	15.9	31.6	37.0	-5.4
336.80	19.2	14.3	33.5	37.0	-3.5
375.80	20.3	12.4	32.7	37.0	-4.3

- 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:

* Picture panel	13.5-inch diagonal viewable screen. TFT (thin film transistor) active matrix, color liquid crystal display, RGB interface
* Resolution	XGA 1024x768
* Display area (H x V)	285 mm x 214 mm
* View angle	110° (V)          120° (H)
* Input signals	Horizontal: 31.5 to 56.6 kHz Vertical:    56 to 85 Hz
* Max. video input bandwidth	75 MHz
* Display color	262 K (16M types of colors)
* Signal system	Analog RGB signals
* Luminance	200 cd/m <sup>2</sup> (typ.)
* Contrast ratio	150: 1 (typ.)
* Response time	40 ms (typ.)
* Front panel controls	Menu, -(decrease/down), +(increase/up)
* OSD menu controls	Brightness, Contrast, H-Position, V-Position, H-Size, Phase, Center/Expand, Factory Defaults, 5 Language, OSM Position, OSM Turn Off Time, Exit
* Input connectors	15-pin D-sub Type Speaker/ Microphone jack, AC IN, USB hub
* Multimedia speaker set	Audio output: 1.5W x 2
* Power source	90-240 VAC
* Power consumption	40 watts
* Power saving	VESA DPMS standard EPA/Energy Star compliant
* PnP compatibility	VESA DDC 2B standards compliant
* USB hub	Built-in at the rear panel Locally powered hub with 4 downstream ports and 1 upstream port
* Dimension (H x V x D)	347.5 x 251 x 20 mm
* Net Weight	5.6 kg