



# EMC TEST REPORT

REPORT NO. : F88041404  
MODEL NO. : LA-1560A, LA-1560B  
DATE OF TEST : April 17, 1999

PREPARED FOR : ACTION ELECTRONICS CO., LTD.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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# 1. CERTIFICATION

Issue date: April 26, 1999

Product : LCD MONITOR  
 Trade Name : AXION  
 Model No. : LA-1560A, LA-1560B  
 Applicant : ACTION 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 April 17, 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 : Alan Chang , DATE: 4/26/99  
 ( Alan Chang )

CHECKED BY : Yemmy Soong , DATE: 4/26/99  
 ( Yemmy Soong )

APPROVED BY : Mike Su , DATE: 4/26/99  
 ( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION**

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## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product	:	LCD MONITOR
Model No.	:	LA-1560A, LA-1560B
Power Supply Type	:	Switching
Power Cord	:	Nonshielded AC (1.8m)
Data Cable	:	Shielded (1.8m)

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

The EUT has two models: **LA-1560A** & **LA-1560B**, which are identical to each other except for their LCD Panel.

The EUT is supplied with a power adapter and there are two brands of power adapters as the following:

- ◆ PHIHONG power adapter, model: PSS45U  
I/P: 100~240V, 1.2A, 50~60Hz and O/P: 12V, 3.5A
- ◆ ACBEL power adapter, model: API-208-98010  
I/P: 100~240V, 1.5A, 50~60Hz and O/P: 12V, 3.6A

There was a manufacture-implemented ferrite core on the DC output cable of both power adapters.

Both models were tested with the following test modes and the data of the tests are recorded separately in this report.

Model	LCD panel	Power Adapter
LA-1560A	HOSIDEN	PHIHONG, model: PSS45U
LA-1560B	LG	ACBEL, model: API-208-98010

There is a ferrite core on the video cable outside the LCD 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 (2.1m) Nonshielded Power (1.2m)
4.	MODEM	ACCEX	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	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)

##### CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 15, 1999
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 16, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 14, 1999
EMCO-L.I.S.N.	3825/2	9204-1964	July 14, 1999
Shielded Room	Site 2	ADT-C02	N/A

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	8594A	3144A00308	Sept. 3, 1999
HP Preamplifier	8447D	2944A08119	July 20, 1999
HP Preamplifier	8347A	3307A01088	Sept. 9, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 15, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE Bilog Antenna	CBL6112A	2329	Sept. 19, 1999
EMCO Double Ridged Guide Antenna	3115	9312-4192	April 5, 2000
EMCO Turn Table	1060	1195	NA
EMCO Tower	1051	1163	NA
Open Field Test Site	Site 2	ADT-R02	Sept. 18, 1999

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) *		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	:	25 °C
Humidity	:	60 %
Atmospheric Pressure	:	994 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: -18.7 dB at 0.177 & 0.413 MHz Minimum passing margin of radiated emission: -2.3 dB at 944.92 MHz

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

- \* 1024 x 768 mode (60 kHz),
- \* 800 x 600 mode (48 kHz),
- \* 640 x 480 mode (31.5 kHz)

The worst emission levels were found under 1024 x 768 (60 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 runs a test program to enable all functions.
3. PC reads and writes messages from FDD and HDD.
4. PC sends "H" messages & picture messages to LCD monitor (EUT) and the LCD monitor displays them on its 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.





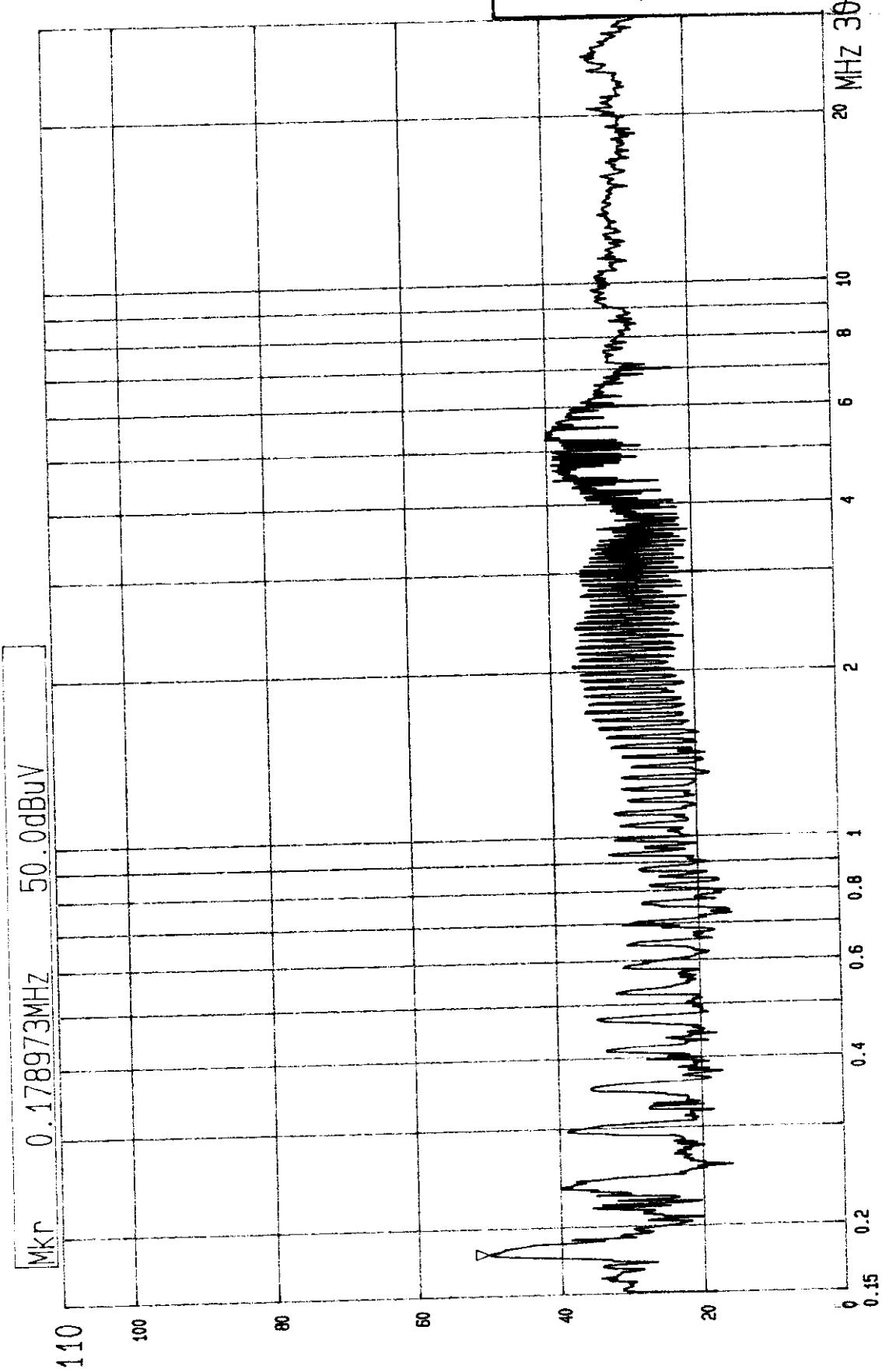
### 4.3 TEST DATA OF CONDUCTED EMISSION (A)

EUT: LCD MONITORMODEL: LA-1560AMODE: 1024x768 (60 kHz)6 dB Bandwidth: 10 kHzPHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.177	0.1	42.6	-	42.7	-	64.6	54.6	-21.9	-
0.286	0.2	33.2	-	33.4	-	60.4	50.4	-27.0	-
0.477	0.2	29.5	-	29.7	-	56.4	46.4	-26.7	-
2.027	0.2	32.1	-	32.3	-	56.0	46.0	-23.7	-
5.255	0.5	37.5	-	38.0	-	60.0	50.0	-22.0	-
25.591	1.8	30.8	-	32.6	-	60.0	50.0	-27.4	-

- 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
  6. Emission Level = Correction Factor + Reading Value.

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Page 97  
Tested by Alan Chang



--- Date 17.APR.'99 Time 16:17:42  
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE)  
MODEL: LA-1560A 1024X768 75Hz/60kHz ADAPEOR: PSS45U-120

ADT CORP.  
LISN: L

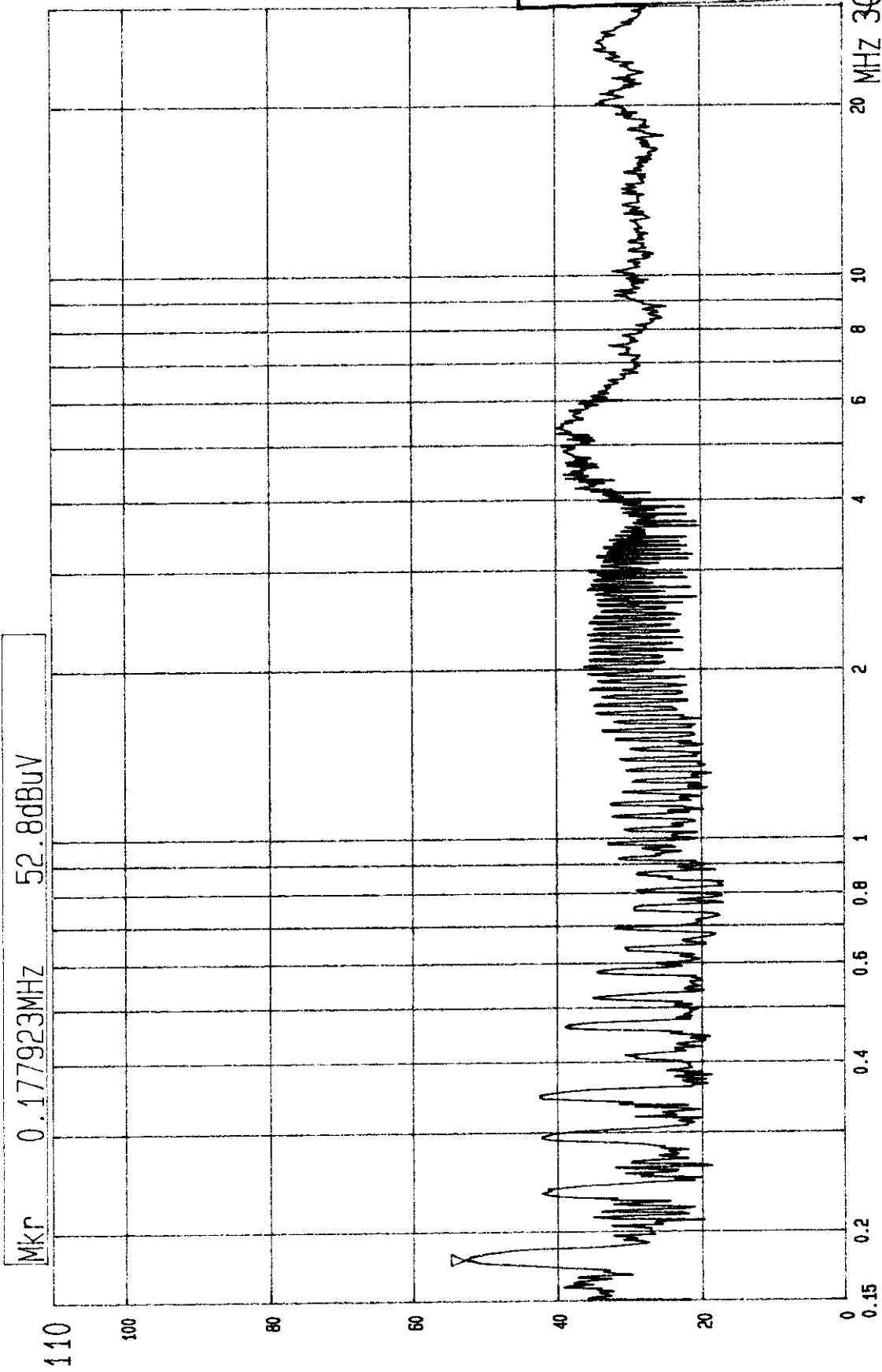


## TEST DATA OF CONDUCTED EMISSION (A)

EUT: LCD MONITORMODEL: LA-1560AMODE: 1024x768 (60 kHz)6 dB Bandwidth: 10 kHzPHASE: NEUTRAL (N)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.177	0.1	45.8	-	45.9	-	64.6	54.6	-18.7	
0.286	0.2	40.1	-	40.3	-	60.4	50.4	-20.1	-
0.477	0.2	35.7	-	35.9	-	56.4	46.4	-20.5	-
2.027	0.2	31.2	-	31.4	-	56.0	46.0	-24.6	-
5.255	0.5	37.4	-	37.9	-	60.0	50.0	-22.1	-
25.591	1.8	29.7	-	31.5	-	60.0	50.0	-28.5	-

- 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
  6. Emission Level = Correction Factor + Reading Value.



--- Date 17.APR.'99 Time 16:14:31  
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE)  
MODEL: LA-1560A 1024X768 75HZ/60KHZ ADAPEOR: PSS45U-120  
ADT CORP.  
LISN: N

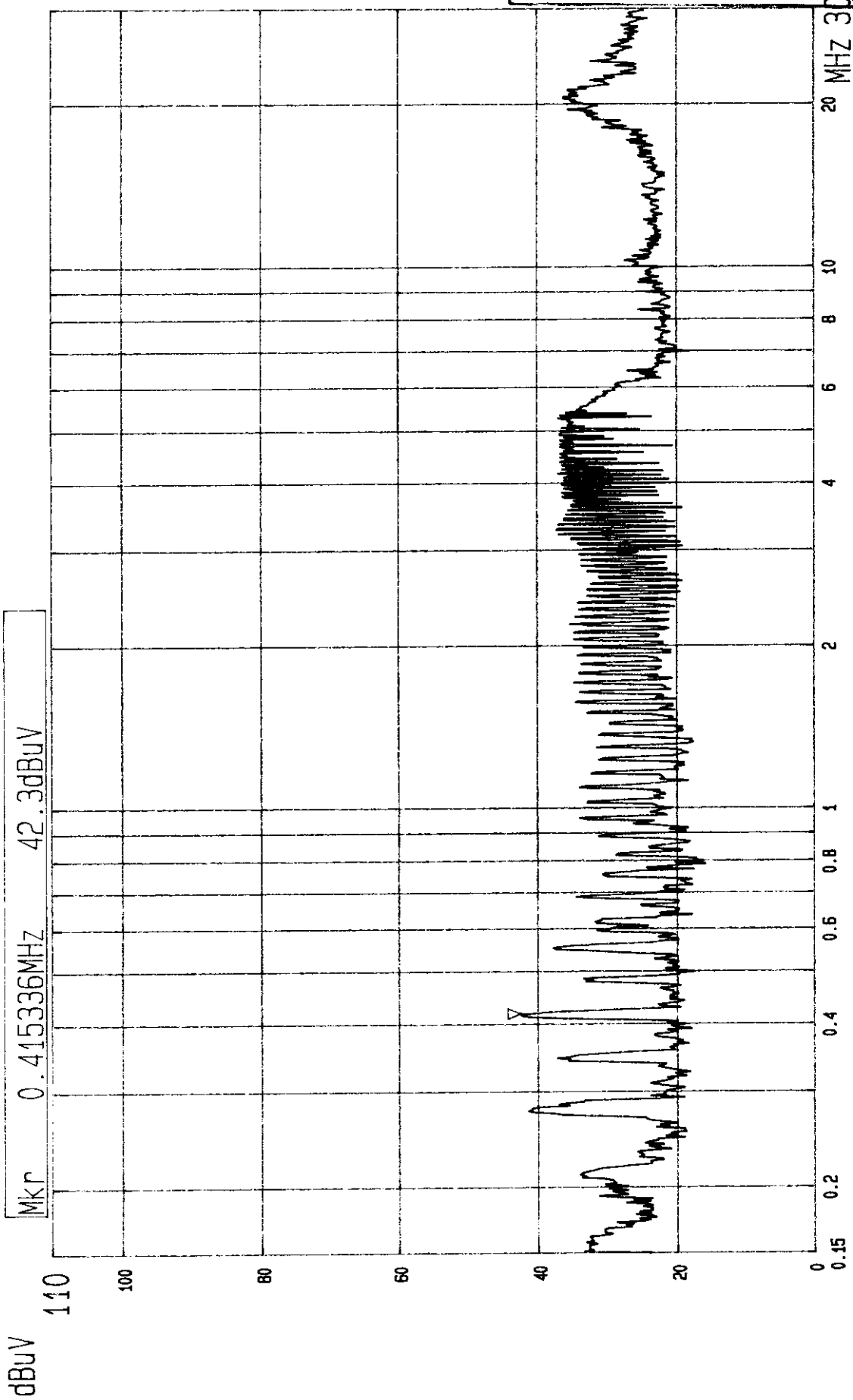


#### 4.4 TEST DATA OF CONDUCTED EMISSION (B)

EUT: LCD MONITORMODEL: LA-1560BMODE: 1024x768 (60 kHz)6 dB Bandwidth: 10 kHzPHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.271	0.2	39.1	-	39.3	-	61.1	51.1	-21.8	
0.413	0.2	38.7	-	38.9	-	57.6	47.6	-18.7	-
0.948	0.2	31.2	-	31.4	-	56.0	46.0	-24.6	-
2.175	0.2	28.5	-	28.7	-	56.0	46.0	-27.3	-
4.652	0.5	35.1	-	35.6	-	56.0	46.0	-20.4	-
20.461	1.2	26.4	-	27.6	-	60.0	50.0	-32.4	-

- 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
  6. Emission Level = Correction Factor + Reading Value.



--- Date 17.APR. '99 Time 15:58:39  
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE)  
MODEL: LA-1560B 1024X768 75Hz/60kHz ADAPEOR: API-208-98010  
ADT CORP.  
LISN: L



## TEST DATA OF CONDUCTED EMISSION (B)

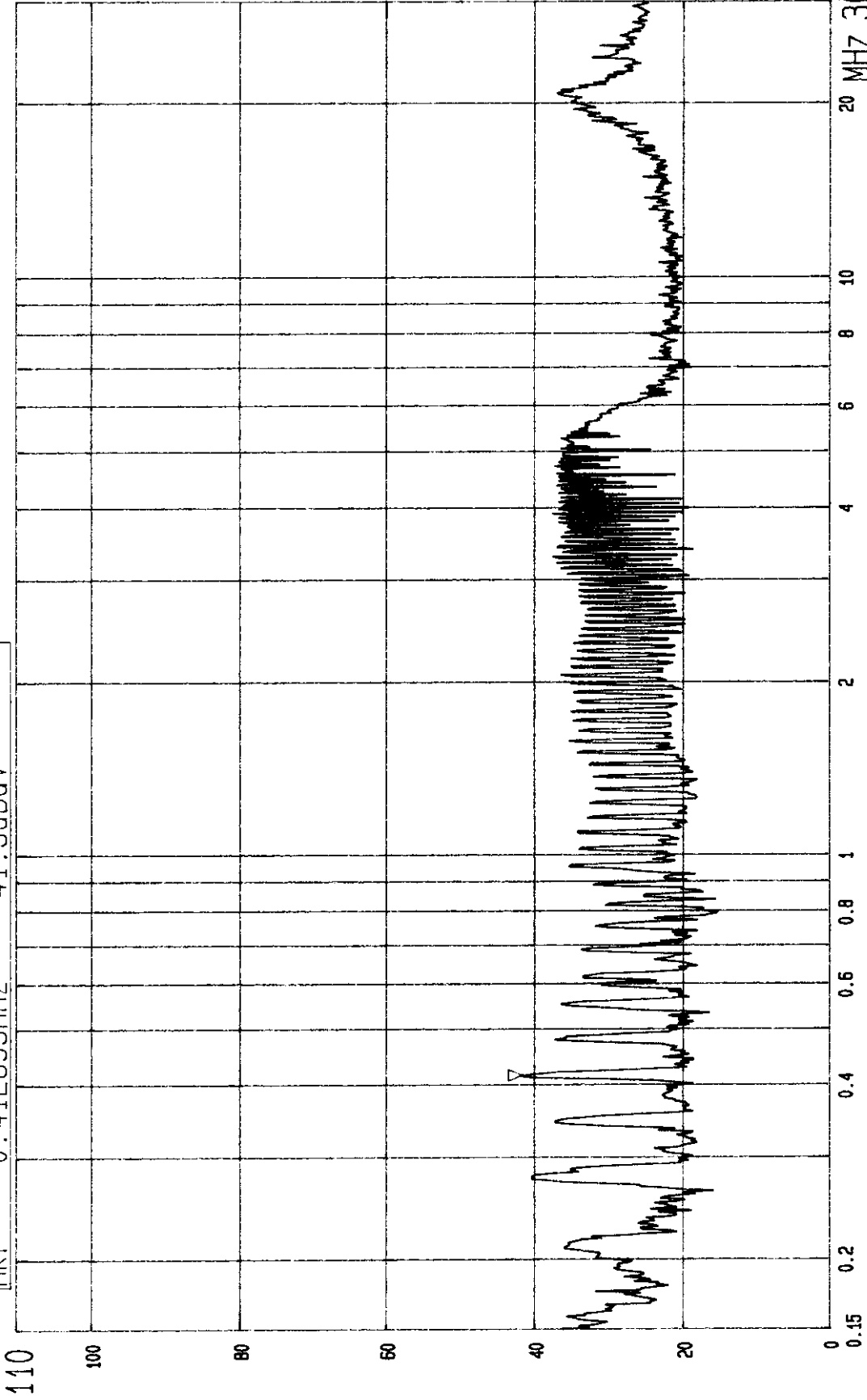
EUT: LCD MONITORMODEL: LA-1560BMODE: 1024x768 (60 kHz)6 dB Bandwidth: 10 kHzPHASE: NEUTRAL (N)

Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.271	0.2	38.1	-	38.3	-	61.1	51.1	-22.8	
0.413	0.2	38.5	-	38.7	-	57.6	47.6	-18.9	-
0.948	0.2	30.7	-	30.9	-	56.0	46.0	-25.1	-
2.175	0.2	29.6	-	29.8	-	56.0	46.0	-26.2	-
4.652	0.4	35.7	-	36.1	-	56.0	46.0	-19.9	-
20.461	1.1	25.9	-	27.0	-	60.0	50.0	-33.0	-

- 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 levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

dBuV

MKP 0.412893MHZ 41.5dBuV



No. P 88041404  
12-1  
Alan Chang

---- Date 17.APR.'99 Time 15:56:49  
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE)  
MODEL: LA-1560B 1024X768 75HZ/60KHZ ADAPEOR: API-208-98010  
ADT CORP.  
LISN: N





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

EUT: LCD MONITORMODEL: LA-1560AMODE: 1024x768 (60 kHz)ANT. POLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
80.65	8.6	14.0	22.6	30.0	-7.4	400	254
120.99	14.3	7.2	21.5	30.0	-8.5	400	78
147.86	12.7	7.9	20.6	30.0	-9.4	400	207
168.03	11.4	14.3	25.7	30.0	-4.3	400	7
194.89	11.8	10.3	22.1	30.0	-7.9	400	221
201.59	12.0	12.9	24.9	30.0	-5.1	400	359
208.29	12.5	13.6	26.1	30.0	-3.9	400	357
282.27	16.3	12.7	29.0	37.0	-8.0	400	291
629.93	24.2	9.2	33.4	37.0	-3.6	176	314
944.92	28.1	6.6	34.7	37.0	-2.3	100	141

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Meter Reading (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 (A)

EUT: LCD MONITORMODEL: LA-1560AMODE: 1024x768 (60 kHz)ANT. POLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
80.65	7.7	17.9	25.6	30.0	-4.4	190	69
114.27	13.3	10.7	24.0	30.0	-6.0	100	6
120.99	14.4	11.0	25.4	30.0	-4.6	100	153
127.71	14.3	10.1	24.4	30.0	-5.6	100	339
147.84	13.1	9.6	22.7	30.0	-7.3	100	46
161.31	11.6	13.3	24.9	30.0	-5.1	100	195
168.04	11.5	15.3	26.8	30.0	-3.2	100	6
188.18	11.9	9.1	21.0	30.0	-9.0	100	192
194.92	12.3	13.2	25.5	30.0	-4.5	100	6
201.68	12.7	12.1	24.8	30.0	-5.2	100	7
208.36	13.0	11.6	24.6	30.0	-5.4	100	14
216.01	13.4	10.8	24.2	30.0	-5.8	100	19

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Meter Reading (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



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

EUT: LCD MONITORMODEL: LA-1560BMODE: 1024x768 (60 kHz)ANT. POLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
138.01	13.7	10.0	23.7	30.0	-6.3	400	269
167.98	11.4	8.2	19.6	30.0	-10.4	400	300
207.03	12.4	12.0	24.4	30.0	-5.6	400	326
215.98	13.0	8.6	21.6	30.0	-8.4	400	86
229.88	14.0	6.0	20.0	30.0	-10.0	400	5
232.98	14.3	13.6	27.9	37.0	-9.1	400	358
776.00	26.0	3.2	29.2	37.0	-7.8	187	137
853.65	28.1	5.0	33.1	37.0	-3.9	139	157
892.47	28.4	4.8	33.2	37.0	-3.8	128	164
931.30	28.2	5.9	34.1	37.0	-2.9	100	135

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Meter Reading (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 (B)

EUT: LCD MONITORMODEL: LA-1560BMODE: 1024x768 (60 kHz)ANT. POLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
47.41	8.4	14.4	22.8	30.0	-7.2	100	357
119.98	14.4	9.2	23.6	30.0	-6.4	100	43
172.54	11.5	8.8	20.3	30.0	-9.7	100	316
195.34	12.3	8.5	20.8	30.0	-9.2	100	38
207.08	13.0	13.8	26.8	30.0	-3.2	100	7
216.00	13.4	11.5	24.9	30.0	-5.1	100	36
224.55	13.8	6.9	20.7	30.0	-9.3	100	228
240.33	14.5	15.5	30.0	37.0	-7.0	100	85
517.63	22.1	7.9	30.0	37.0	-7.0	318	358
853.62	28.5	2.2	30.7	37.0	-6.3	193	189
931.25	28.2	6.4	34.6	37.0	-2.4	207	5

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Meter Reading (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

