



FCC TEST REPORT

REPORT NO.: F920716A06

MODEL NO.: LXB-L15C

RECEIVED: July 16, 2003

TESTED: July 18, 2003

APPLICANT: Top Victory Electronics (Taiwan) Co., Ltd.

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ISSUED BY: Advance Data Technology Corporation

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0528
ILAC MRA



Lab Code: 200102-0



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1 CERTIFICATION

PRODUCT: 15" LCD MONITOR
BRAND NAME: Lenovo
MODEL NO.: LXB-L15C
TEST ITEM: ENGINEERING SAMPLE
APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.
STANDARDS: FCC Part 15, Subpart B, Class B
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on July 18, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY: Eric Chang , **DATE:** July 22, 2003
(Eric Chang)

APPROVED BY: Mike Su , **DATE:** July 22, 2003
(Mike Su, Manager)



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B, Class B	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is -4.25 dB at 0.582 MHz
ANSI C63.4-1992	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -5.10 dB at 120.90 MHz



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	15" LCD MONITOR
MODEL NO.	LXB-L15C
POWER SUPPLY	Switching Input rating: 100-240Vac, 50/60Hz Power Cord: Non-shielded AC, 3 pin (1.8m)
DATA CABLE	VGA Shielded (1.8m) with one ferrite core

NOTE: The EUT is a 15" LCD MONITOR with resolution up to 1024x768.

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

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

- ◆ 1024x768 mode (75Hz/60kHz),
- ◆ 800x600 mode (75Hz/47kHz),
- ◆ 640x480 mode (60Hz/31.5kHz)

The worst emission levels were found when the EUT was tested under **1024x768 mode (75Hz/60kHz)** resolution. Therefore, only the test data of EUT tested under this mode is recorded in this report.



3.3 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 were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	HP	Brio BA410	SG12106012	FCC DoC Approved
2	PS/2 MOUSE	BTC	M851	N/A	E5XMSM860
3	PS/2 KEYBOARD	BTC	5200T	F24800258	E5XKB5122WTH01 10
4	PRINTER	EPSON	LQ-300+	DCGY017076	FCC DoC Approved
5	MODEM	ACEEX	1414	980020526	IFAXDM1414
6	VGA DISPLAY CARD	ELSA	ERAZOR III LT	0105017189	DOC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	1.5 m Non-shielded wire, terminated with PS/2 connector via drain wire, w/o core.
3	1.6 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
4	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
5	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
6	N/A

NOTE: All power cords of the above support units are non-shielded (1.8m).



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTES:**
- (1) The lower limit shall apply at the transition frequencies.
 - (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 - (3) All emanations 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	June 24, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	June 17, 2004
FCC ISN	FCC-TLISN-T2-02	20117	Oct. 18, 2003
FCC ISN	FCC-TLISN-T4-02	20116	Oct. 18, 2003
FCC ISN	FCC-TLISN-T8-02	20096	Oct. 18, 2003
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	June 17, 2004
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C02.01	May 23, 2004
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 23, 2004
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 23, 2004

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. “*”: These equipment are used for conducted telecom port test only (if tested).
 3. The test was performed in ADT Shielded Room No. 2.
 4. The VCCI Site Registration No. is C-240.

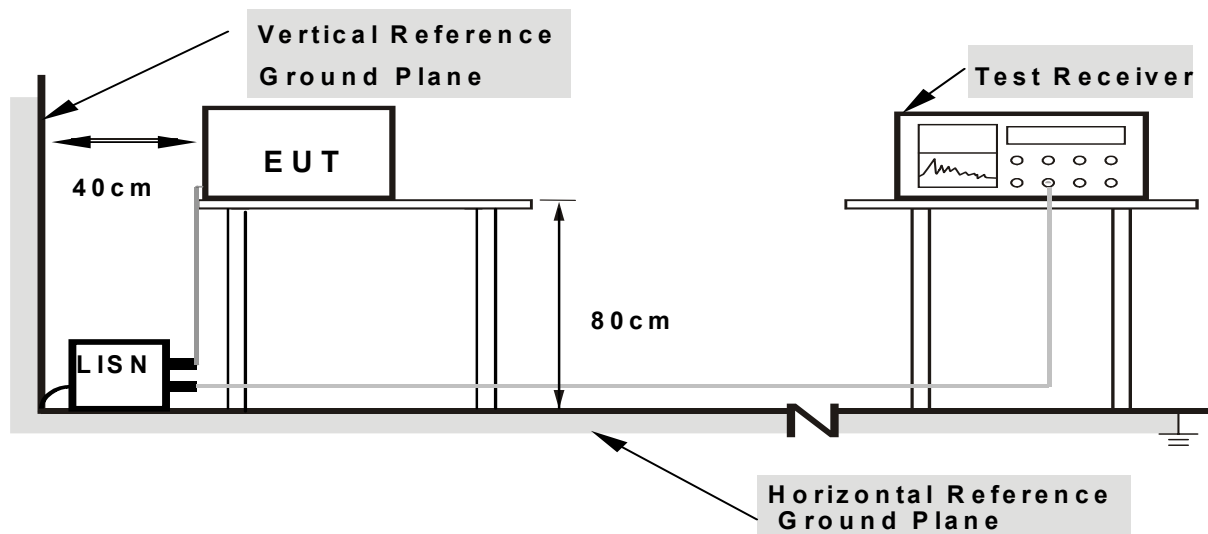
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.



4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. PC ran a test program to enable all functions.
- c. PC read and wrote messages from FDD and HDD.
- d. PC sent "H" messages to monitor (EUT) and monitor displayed "H" patterns on screen.
- e. PC sent "H" messages to modem.
- f. PC sent "H" messages to printer, and the printer printed them out.
- g. Steps c-g were repeated.

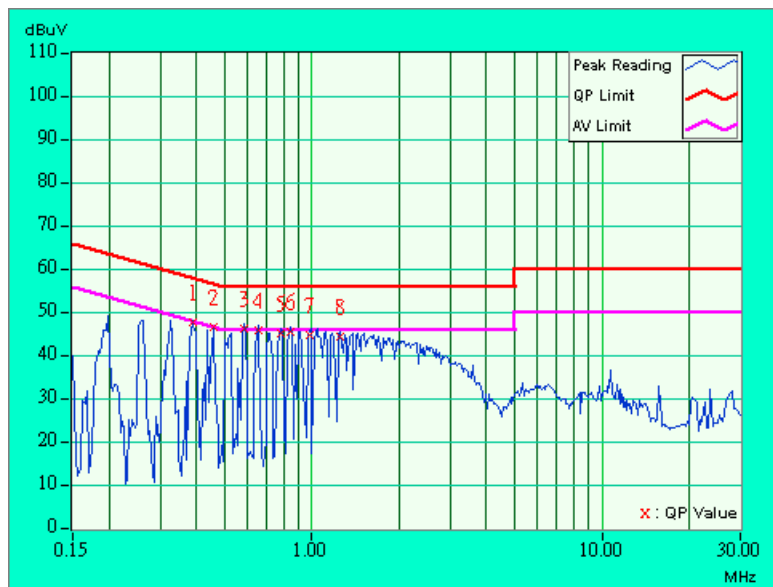


4.1.7 TEST RESULTS

EUT	15" LCD MONITOR	MODEL NO.	LXB-L15C
MODE	1024x768 (75Hz/60kHz)	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	24 deg. C, 60 % RH, 1005 hPa	TESTED BY: Kevin Chen	

No	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.
1	0.387	0.10	47.41	-	47.51	-	58.13	48.13	-10.62	-
2	0.456	0.11	46.35	-	46.46	-	56.77	46.77	-10.31	-
3	0.582	0.13	46.20	41.62	46.33	41.75	56.00	46.00	-9.67	-4.25
4	0.654	0.14	45.89	41.24	46.03	41.38	56.00	46.00	-9.97	-4.62
5	0.783	0.16	45.15	-	45.31	-	56.00	46.00	-10.69	-
6	0.849	0.17	45.47	-	45.64	-	56.00	46.00	-10.36	-
7	0.981	0.20	44.76	-	44.96	-	56.00	46.00	-11.04	-
8	1.245	0.20	44.26	-	44.46	-	56.00	46.00	-11.54	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

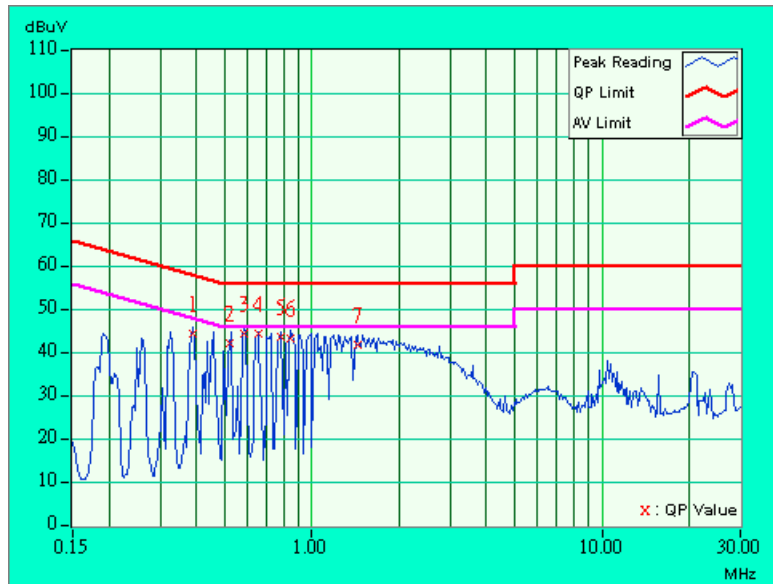




EUT	15" LCD MONITOR	MODEL NO.	LXB-L15C
MODE	1024x768 (75Hz/60kHz)	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	24 deg. C, 60 % RH, 1005 hPa	TESTED BY: Kevin Chen	

No	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.
1	0.391	0.10	44.24	-	44.34	-	58.04	48.04	-13.70	-
2	0.522	0.12	42.13	-	42.25	-	56.00	46.00	-13.75	-
3	0.585	0.13	44.19	-	44.32	-	56.00	46.00	-11.68	-
4	0.654	0.14	44.10	-	44.24	-	56.00	46.00	-11.76	-
5	0.786	0.16	43.62	-	43.78	-	56.00	46.00	-12.22	-
6	0.846	0.17	43.06	-	43.23	-	56.00	46.00	-12.77	-
7	1.437	0.20	41.75	-	41.95	-	56.00	46.00	-14.05	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FOR FREQUENCY BELOW 1000 MHz

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 (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.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8594E	3911A07465	July 7, 2004
HP Preamplifier	8447D	2944A10386	Aug. 15, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 1, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 7, 2003
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
SCHAFFNER TEST RECEIVER	SCR 3501	409	Jan. 26, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	July 15, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	June 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23, 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V 5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 30, 2003
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 30, 2003

- NOTE:**
1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. "*" = These equipment are used for the final measurement.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The test was performed in ADT Open Site No. 10.
 5. The VCCI Site Registration No. is R-1625.

4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to



make the measurement.

- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

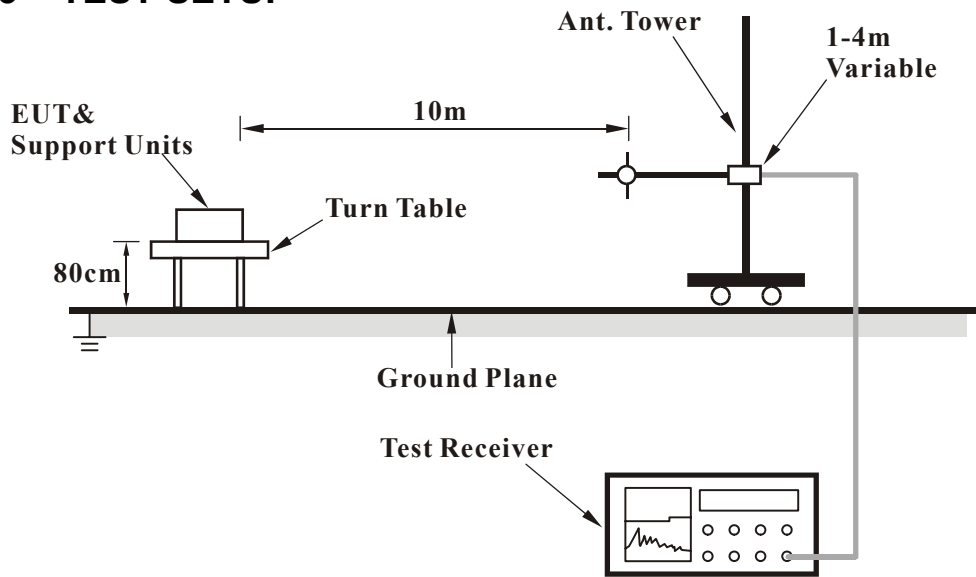
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference antenna.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

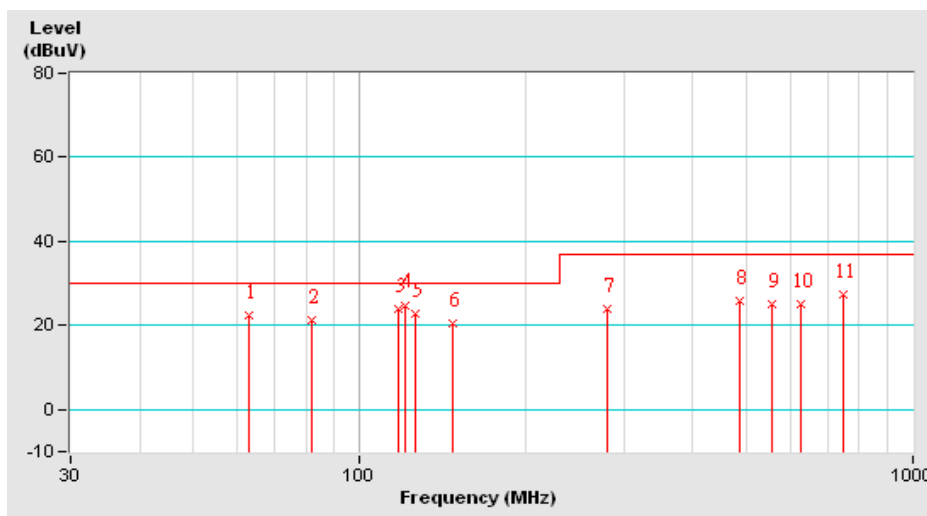


4.2.7 TEST RESULTS

EUT	15" LCD MONITOR	MODEL NO.	LXB-L15C
MODE	1024x7684 (75Hz/60kHz)	FREQUENCY RANGE	30-2000 MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	34 deg. C, 56 % RH, 1005 hPa	TESTED BY: Kevin Chen	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	63.03	22.5 QP	30.00	-7.50	4.00 H	20	16.90	5.60
2	82.11	21.2 QP	30.00	-8.80	4.00 H	141	13.60	7.60
3	117.69	24.1 QP	30.00	-5.90	4.00 H	350	12.50	11.60
4	120.90	24.9 QP	30.00	-5.10	4.00 H	20	13.10	11.80
5	126.23	22.7 QP	30.00	-7.30	4.00 H	159	10.90	11.80
6	147.30	20.4 QP	30.00	-9.60	4.00 H	0	9.30	11.00
7	280.50	23.9 QP	37.00	-13.10	4.00 H	237	9.80	14.10
8	487.40	25.7 QP	37.00	-11.30	3.89 H	22	6.50	19.20
9	556.70	25.0 QP	37.00	-12.00	3.87 H	339	4.20	20.80
10	625.50	25.1 QP	37.00	-11.90	2.71 H	20	3.00	22.10
11	751.00	27.2 QP	37.00	-9.80	1.75 H	129	3.10	24.10

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

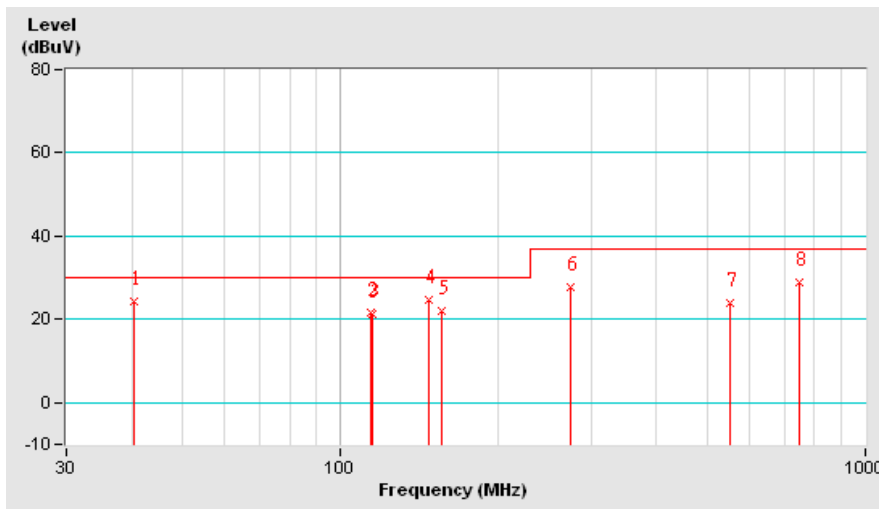




EUT	15" LCD MONITOR	MODEL NO.	LXB-L15C
MODE	1024x768 (75Hz/60kHz)	FREQUENCY RANGE	30-2000 MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	34 deg. C, 56 % RH, 1005 hPa	TESTED BY: Kevin Chen	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.23	24.2 QP	30.00	-5.80	1.00 V	244	11.10	13.10
2	114.05	21.8 QP	30.00	-8.20	1.00 V	35	10.50	11.30
3	115.25	21.2 QP	30.00	-8.80	1.00 V	0	9.80	11.40
4	147.41	24.6 QP	30.00	-5.40	1.00 V	299	13.60	11.00
5	155.60	22.1 QP	30.00	-7.90	1.00 V	0	11.80	10.30
6	274.65	27.7 QP	37.00	-9.30	1.00 V	20	13.80	13.90
7	553.50	24.0 QP	37.00	-13.00	3.49 V	267	3.20	20.80
8	750.50	28.8 QP	37.00	-8.20	4.00 V	0	4.70	24.10

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (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 CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	CNLA, BSMI

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Lin Kou EMC Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC Lab:

Tel: 886-35-935343

Fax: 886-35-935342

Lin Kou Safety Lab:

Tel: 886-2-26093195

Fax: 886-2-26093184

Lin Kou RF & Telecom Lab.

Tel: 886-3-3270910

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The address and road map of all our labs can be found in our web site also.