

FCC TEST REPORT

REPORT NO.: F930129A10

MODEL NO.: LXH-GJ7L3

RECEIVED: Jan. 29, 2004

TESTED: Jan. 29 ~ 30, 2004

APPLICANT: TOP VICTORY ELECTRONICS
(TAIWAN) CO., LTD.

ADDRESS: 18F, No. 738, Chung Cheng Road, Chung Ho,
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ILAC MRA



Lab Code: 200102-0



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1 CERTIFICATION

PRODUCT: 17" LCD MONITOR
BRAND NAME: Lenovo
MODEL NO.: LXH-GJ7L3
TEST ITEM: ENGINEERING SAMPLE
APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.
STANDARDS: FCC Part 15, Subpart B, Class B
CISPR22: 1997, Class B
ANSI C63.4-1992
ICES-003: 1997

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Jan. 29 ~ 30, 2004. 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: , **DATE:** Feb. 5, 2004
(Yemmy Soong)

APPROVED BY: , **DATE:** Feb. 5, 2004
(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 -15.66 dB at 0.175 MHz
CISPR22: 1997, Class B ICES-003: 1997	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -3.64 dB at 120.31 MHz

Note: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	17" LCD MONITOR
MODEL NO.	LXH-GJ7L3
POWER SUPPLY	Switching power adapter: Brand: TPV ELECTRONICS (FUJIAN) CO., LTD. Model: ADPC12416AW. I/P: 100-240Vac, 50/60Hz, 1.5A. O/P: 12Vdc, 4.16A. Non-shielded AC, 3-pin (1.8m). Non-shielded DC (1.5m) with one ferrite core.
DATA CABLE	VGA cable shielded (1.8m) with one ferrite core.

NOTE: The EUT is a 17" LCD MONITOR with resolution up to 1280x1024.

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:

- ◆ 1280x1024 mode (75Hz/80kHz)
- ◆ 1024x768 mode (75Hz/60kHz)
- ◆ 640x480 mode (60Hz/31.5kHz)

The worst emission level was found when the EUT was tested under **1280x1024 (75Hz/80kHz)** resolution. Therefore only the test data with this mode was 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	DELL COMPUTER	DELL	Dimension 4600	C48691S	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017089	FCC DoC Approved
3	MODEM	ACEEX	1414	980020501	IFAXDM1414
4	PS/2 KEYBOARD	BTC	5200T	F24800259	E5XKB5122WTH01 10
5	PS/2 MOUSE	BTC	M851	N/A	E5XMSM860
6	VGA DISPLAY CARD	MSI	TI4200-VTD8X128	3700282167	FCC DoC Approved

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

NOTE: 1.All power cords of the above support units are non-shielded (1.8m).
2. VGA card was installed in support unit 1.



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. 13, 2004
FCC ISN	FCC-TLISN-T4-02	20116	Oct. 13, 2004
FCC ISN	FCC-TLISN-T8-02	20096	Oct. 13, 2004
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	June 17, 2004
Software	Cond-V3	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.

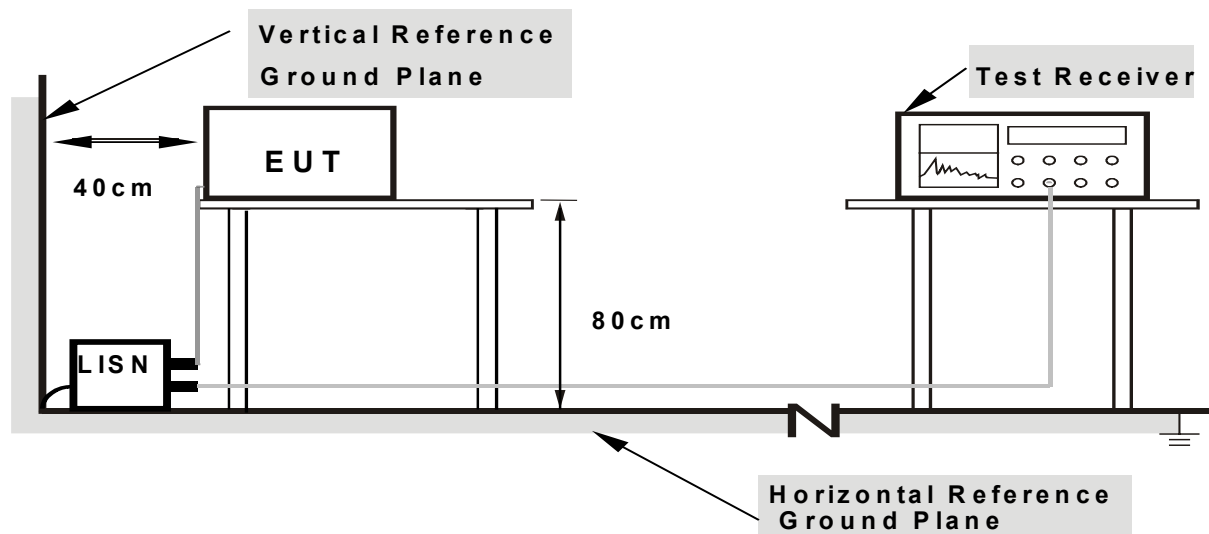
4.1.3 TEST PROCEDURE

- 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 under (Limit - 20dB) was not recorded.

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

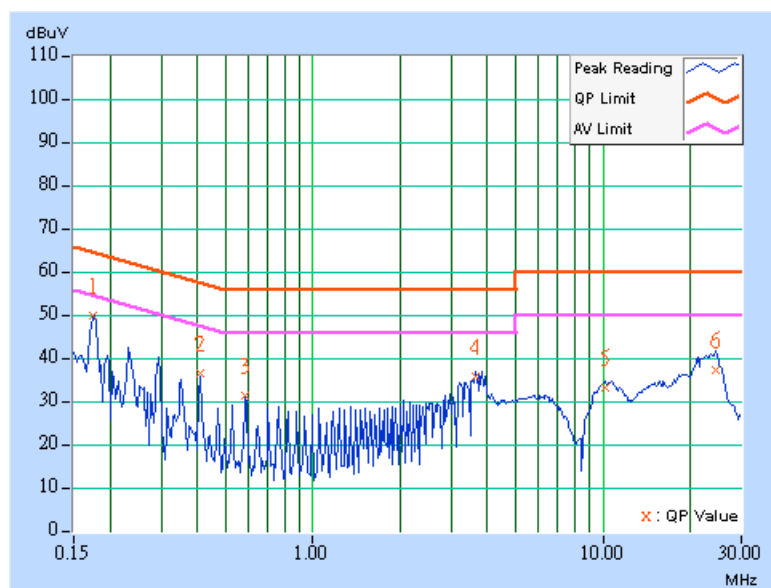
- a. Turn on the power of all equipment.
- b. PC ran a test program to enable all functions.
- c. PC read and wrote messages from FDD and HDD.
- d. PC sent "H" messages to LCD monitor (EUT) and it displayed "H" patterns on screen.
- e. PC sent "H" messages to modem.
- f. PC sent "H" messages to printer,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

4.1.7 TEST RESULTS

EUT	17" LCD MONITOR	MODEL NO.	LXH-GJ7L3
MODE	1280x1024(75Hz/80kHz)	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 85 % RH, 1005 hPa	TESTED BY: JN 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	0.175	0.10	48.97	-	49.07	-	64.73	54.73	-15.66	-
2	0.409	0.10	35.35	-	35.45	-	57.67	47.67	-22.22	-
3	0.584	0.13	30.34	-	30.47	-	56.00	46.00	-25.53	-
4	3.632	0.36	34.81	-	35.17	-	56.00	46.00	-20.83	-
5	10.193	0.61	32.22	-	32.83	-	60.00	50.00	-27.17	-
6	24.380	1.18	36.13	-	37.31	-	60.00	50.00	-22.69	-

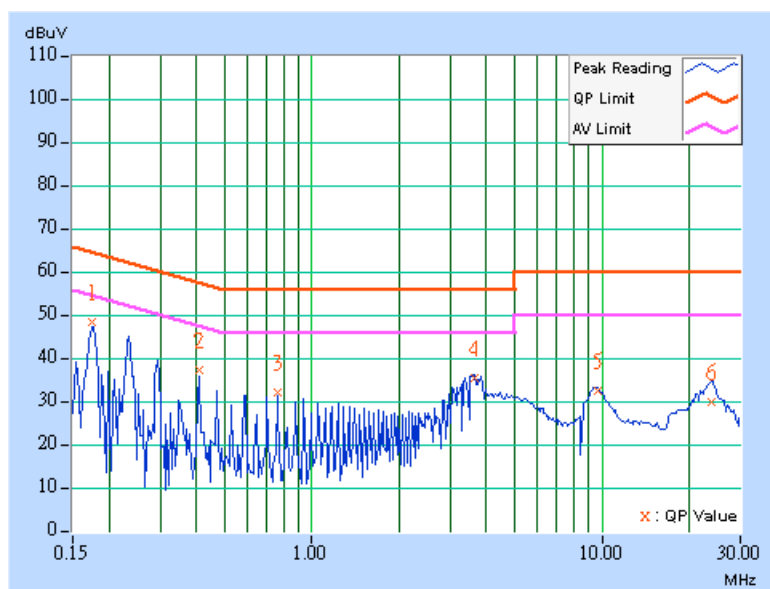
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	17" LCD MONITOR	MODEL NO.	LXH-GJ7L3
MODE	1280x1024(75Hz/80kHz)	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 85 % RH, 1005 hPa	TESTED BY: JN 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	0.175	0.10	47.42	-	47.52	-	64.71	54.71	-17.19	-
2	0.409	0.10	36.19	-	36.29	-	57.67	47.67	-21.38	-
3	0.761	0.16	31.13	-	31.29	-	56.00	46.00	-24.71	-
4	3.627	0.36	34.51	-	34.87	-	56.00	46.00	-21.13	-
5	9.661	0.49	31.39	-	31.88	-	60.00	50.00	-28.12	-
6	23.717	1.05	28.85	-	29.90	-	60.00	50.00	-30.10	-

- 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.

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8594A	3144A00308	Aug. 18, 2004
HP Preamplifier	8447D	2944A08119	July 01, 2004
* HP Preamplifier	8449B	3008A01924	Oct. 12, 2004
* HP Preamplifier	8449B	3008A01638	Oct. 17, 2004
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Oct. 22, 2004
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	Nov. 15, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
* CHASE Bilog Antenna	CBL6112B	2433	July 26, 2004
* EMCO Horn Antenna	3115	6714	Nov 26, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23, 2004
* ADT. Turn Table	TT100	0302	NA
* ADT. Tower	AT100	0302	NA
* Software	ADT_Radiate d_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Oct. 09, 2004
* TIMES RF cable	8D	CABLE-ST2-01	Oct. 09, 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 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. 2.
5. The VCCI Site Registration No. is R-237.



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.

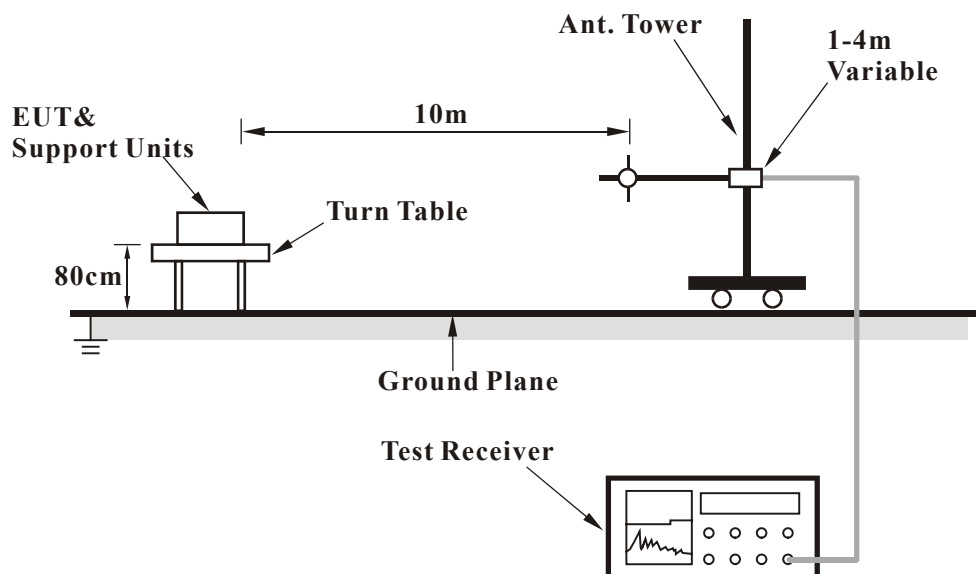
NOTE:

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 and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.
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 item 4.1.6.

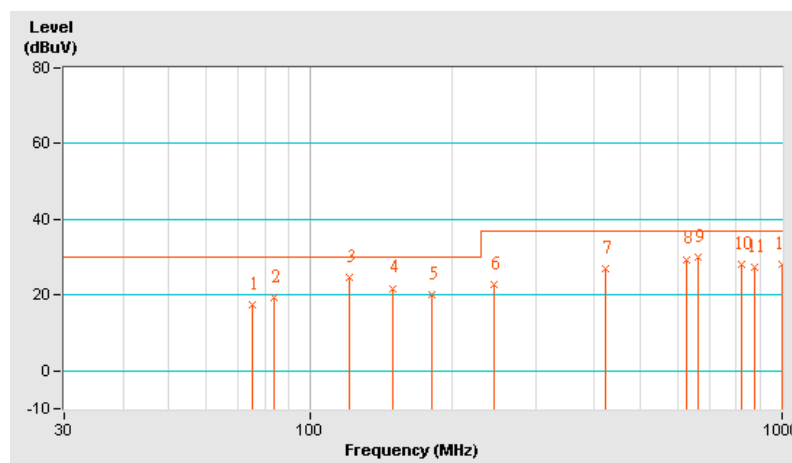
4.2.7 TEST RESULTS

EUT	17" LCD MONITOR	MODEL NO.	LXH-GJ7L3
MODE	1280x1024(75Hz/80kHz)	INPUT POWER	120Vac, 60 Hz
FREQUENCY RANGE	30 ~ 1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	21 deg. C, 70 % RH, 1005 hPa	TESTED BY: JN 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	75.30	17.35 QP	30.00	-12.65	4.00 H	146	9.77	7.58
2	83.80	19.24 QP	30.00	-10.76	4.00 H	255	10.22	9.02
3	120.48	24.55 QP	30.00	-5.45	4.00 H	41	11.06	13.49
4	148.88	21.81 QP	30.00	-8.19	4.00 H	302	9.89	11.92
5	180.44	20.21 QP	30.00	-9.79	4.00 H	152	9.51	10.70
6	244.35	22.87 QP	37.00	-14.13	4.00 H	49	8.96	13.91
7	422.50	27.09 QP	37.00	-9.91	3.21 H	72	7.38	19.71
8	625.00	29.43 QP	37.00	-7.57	2.77 H	145	5.58	23.85
9	662.50	29.89 QP	37.00	-7.11	3.46 H	300	5.88	24.01
10	818.70	28.22 QP	37.00	-8.78	2.06 H	73	2.87	25.35
11	873.70	27.27 QP	37.00	-9.73	2.64 H	75	1.43	25.84
12	1000.00	28.07 QP	37.00	-8.93	2.84 H	20	0.93	27.14

- 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.



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	33.65	23.19 QP	30.00	-6.81	1.00 V	22	6.92	16.27
2	76.31	25.26 QP	30.00	-4.74	1.97 V	57	17.50	7.76
3	84.75	21.53 QP	30.00	-8.47	1.70 V	329	12.35	9.18
4	114.76	24.76 QP	30.00	-5.24	1.00 V	224	11.63	13.13
5	118.41	24.51 QP	30.00	-5.49	1.00 V	95	11.12	13.39
6	120.31	26.36 QP	30.00	-3.64	1.00 V	262	12.86	13.50
7	176.56	19.85 QP	30.00	-10.15	1.00 V	37	9.11	10.74
8	182.38	22.99 QP	30.00	-7.01	1.00 V	212	12.25	10.74
9	213.20	18.62 QP	30.00	-11.38	1.00 V	292	6.69	11.93
10	225.20	17.63 QP	30.00	-12.37	1.00 V	348	4.94	12.69
11	244.18	23.94 QP	37.00	-13.06	1.00 V	340	10.04	13.90
12	302.00	25.83 QP	37.00	-11.17	1.00 V	43	9.41	16.42
13	426.50	23.83 QP	37.00	-13.17	1.00 V	119	4.05	19.78
14	625.00	29.12 QP	37.00	-7.88	3.84 V	98	5.27	23.85
15	873.70	29.77 QP	37.00	-7.23	3.34 V	147	3.93	25.84
16	999.01	29.77 QP	37.00	-7.23	1.48 V	39	2.64	27.13

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:

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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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Web Site: www.adt.com.tw

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