



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E037R-005

Applicant : ATEC SYSTEM CO., LTD.

Address : #1451-78, Seocho-Dong, Seocho-Gu, Seoul, 137-866, Korea

Manufacturer : ATEC SYSTEM CO., LTD.

Address : #1451-78, Seocho-Dong, Seocho-Gu, Seoul, 137-866, Korea

Type of Equipment : 19" LCD MONITOR

FCC ID. : PDLAL190

Model Name : AL190

Serial number : N/A

Total page of Report : 13 pages (including this page)

Date of Incoming : May 27, 2003

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SUMMARY

The equipment complies with the regulation; *PART 15 SUBPART B, Class B Computing Device Peripherals.*

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:

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**1. VERIFICATION OF COMPLIANCE**

APPLICANT : ATEC SYSTEM CO., LTD.
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TELEPHONE NO. : +82-2-2190-5152
FCC ID : PDLAL190
MODEL NAME : AL190
SERIAL NUMBER : N/A
DATE : July 03, 2003

DEVICE TYPE	Peripheral Device for Class B Personal Computing Device -UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	19" LCD MONITOR
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART (S)	PART 15 SUBPART B, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	N/A
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. GENERAL INFORMATION

2.1 Product Description

The ATEC SYSTEM CO., LTD., Model AL190 (referred to as the EUT in this report) is a 19" LCD MONITOR that is connected a personal computer. The Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	14.3181 MHz, 12.000 MHz and 24.576 MHz on the main board
LCD PANEL SPEC.	LTM190E1-L01 / Samsung Electronics Co., Ltd.
INPUT VIDEO SIGNAL	VGA Compatible Analog RGB
DISPLAY MODE	Normally White
DISPLAY RESOLUTION	Maximum: 1280 X 1024, 75Hz
POWER REQUIREMENT	DC 12V, 5.0A, 60W(Max) from the AC/DC Adaptor
USED AC/DC ADAPTERS	LES9901B1260 manufactured by LI SHIN
NUMBER OF LAYERS	Main Board: 4 Layers OSD Board & Inverter Board: 2 Layers
EXTERNAL CONNECTORS	DVI, S-VHS, RCA, Audio In/Out, DC In

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only



2.4 Test System Details

The model numbers for all the equipments, which were used in the tested system, is:

Model	Manufacturer	Description	FCC ID	Connected to
AL190	ATEC SYSTEM CO., LTD.	19" LCD MONITOR(EUT)	PDLAL190	PC
LES9901B1260	LI SHIN	AC/DC ADAPTER	N/A	EUT
TC-PA1000	TAEIL	PC	DoC	-
KB-9963	Compaq	KEYBOARD	DoC	PC
M-SAS51	Logitech	MOUSE	JNZ211167	PC
2225C	HP	PRINTER	DSI6XU2225	PC
020-0470	Cardinal	MODEM	GDE0196	PC
SMS-015N	Sungil Precision Co., Ltd.	SPEAKER	N/A	PC
GHV-S9990	GoldStar	VCR	N/A	EUT

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992.

Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Gwangju-Si, Gyeonggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)



3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	NTI KOREA	MIB181 V3.0	N/A
Switch Board	EO SYSTEM	N/A	N/A
Inverter Board	DS-PLUS INC.	DS-1007WF	N/A
LCD Panel	SAMSUNG ELECTRONICS	LTM190E1-L01	N/A

3.2 EUT exercise Software

The windows program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. This program was included into HOST. Once loaded, this program sequentially exercises each system component in turn. The sequence used is: (1) series of “H” characters are printed on the monitor until the screen is completely full, (2) copy series of “H” characters to mass storage device (if one is used), (3) print series of “H” characters to printer. The complete cycle is repeated continuously.

The test was performed about each resolution from minimum resolution to maximum resolution for getting maximum noise level and the investigated maximum resolution mode of the EUT was 1280 X 1024, 75Hz.

**3.3 Cable Description**

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
19" LCD MONITOR (EUT)	N	Y	1.5(P), 1.5(D)
AC/DC ADAPTER	N	N/A	1.5(P)
PERSONAL COMPUTER	N	Y	1.8(P)
KEYBOARD	N/A	Y	1.5(D)
MOUSE	N/A	Y	1.5(D)
PRINTER	N	Y	1.8(P), 1.2(D)
SPEAKER	N/A	N	1.2(D)
MODEM	N	Y	1.8(P), 1.2(D)
VCR	N	Y	1.8(P), 1.2(D)

* The marked "(D)" means the I/O Cable and "(P)" means the Power Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
19" LCD MONITOR (EUT)	Y	BOTH END	Y	BOTH END
AC/DC ADAPTER	Y	EUT END	Y	EUT END
PERSONAL COMPUTER	-	-	-	-
KEYBOARD	N	N/A	Y	PC END
MOUSE	N	N/A	Y	PC END
PRINTER	N	N/A	Y	BOTH END
SPEAKER	N	N/A	Y	BOTH END
MODEM	N	N/A	Y	BOTH END
VCR	N	N/A	Y	BOTH END

3.5 Equipment Modifications

- The rating of bead for L15 was changed from 120 Ohm to 300 Ohm.
- The rating of C238 was changed from 47pF to 68pF.
- The resistors(BA1~12) were changed to bead(150 Ohm) and added the capacitor(47pF).
- The resistors(R74, R104, R106, R114~120, R123~129, R136~138) were changed to bead(120 Ohm) and added the capacitor(47pF).
- The bead(30 Ohm) was added to the pins(1, 2, 9, 10, 17, 18, 23, 24) of connector(DVI29P).
- The rating of bead for L4~6 was changed from 80 Ohm to 120 Ohm.
- The ferrite core was added to the video signal cable that is connected from main board to LCD panel.
- The EMI gasket was added to the J1, J3, J4 and J10.

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3.6 Configuration of Test System

Line Conducted Test: The power of the EUT was supplied by AC/DC adapter and the adapter was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Resolution: 640 X 480	-
Resolution: 800 X 600	-
Resolution: 1024 X 768	-
Resolution: 1280 X 1024	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Resolution: 640 X 480	-
Resolution: 800 X 600	-
Resolution: 1024 X 768	-
Resolution: 1280 X 1024	X

**5. FINAL RESULT OF MEASUREMENT**

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 32% Temperature : 20°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)
 Type of Test : CLASS B
 Result : PASSED BY -9.25 dB at 4.11 MHz when used a Peak detector mode

EUT : 19" LCD MONITOR Date : March 31, 2003
 Operating Condition : Continuously displayed "H" characters on the screen of EUT
 Detector : CISPR Quasi-Peak and Average(6 dB Bandwidth: 9 kHz)
 Resolution : 1280 X 1024, 75Hz

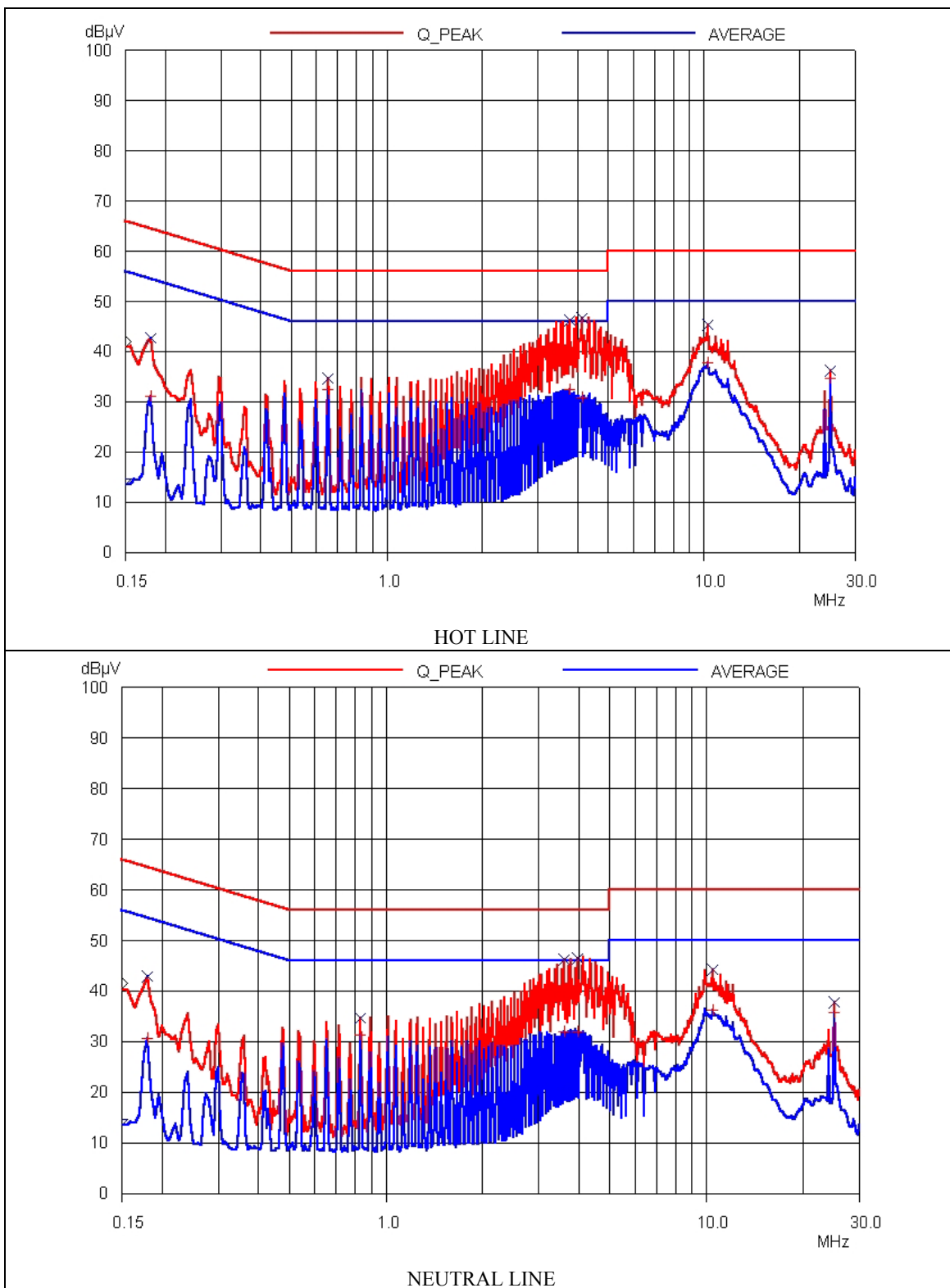
Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.65	H	34.75	56.00	-21.25
3.58	N	46.15	56.00	-9.85
3.76	H	46.24	56.00	-9.76
3.94	N	46.36	56.00	-9.64
4.11	H	46.75	56.00	-9.25
10.26	H	45.41	60.00	-14.59
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.65	H	32.40	46.00	-13.60
3.76	H	32.41	46.00	-13.59
3.94	N	31.99	46.00	-14.01
10.26	H	37.77	50.00	-12.23

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.

Tested by: Sue-Yong, Lee / Test Engineer



**5.2 Radiated Emission Test for Digital mode**

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 34 % Temperature : 21°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109(a)
 Type of Test : CLASS B
 Result : PASSED BY -3.34 dB at 946.69 MHz

EUT : 19" LCD MONITOR Date : April 11, 2003
 Operating Condition : Continuously displayed "H" characters on the screen of EUT
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter
 Resolution : 1280 X 1024, 75Hz

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
106.55	22.14	V	12.66	1.18	35.98	43.50	-7.52
116.24	20.46	V	13.24	1.22	34.92	43.50	-8.58
134.65	20.71	V	12.78	1.29	34.78	43.50	-8.72
160.82	18.42	V	15.66	1.38	35.46	43.50	-8.04
175.35	18.45	V	15.85	1.44	35.74	43.50	-7.76
186.98	16.85	V	16.40	1.49	34.74	43.50	-8.76
292.61	24.58	H	14.46	1.97	41.01	46.00	-4.99
315.86	23.54	H	14.51	2.10	40.15	46.00	-5.85
327.49	24.69	H	14.19	2.16	41.04	46.00	-4.96
374.01	24.74	H	14.59	2.39	41.72	46.00	-4.28
384.63	23.84	H	14.84	2.41	41.09	46.00	-4.91
676.34	17.96	H	20.75	3.19	41.90	46.00	-4.10
946.69	15.44	H	23.13	4.09	42.66	46.00	-3.34

Radiated Emission Tabulated Data

Tested by: Sue-Yong, Lee / Test Engineer



6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	NOV/02	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APR/03	12MONTH	
3.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12MONTH	■
			8566B	3407A08547	AUG/02		
4.	RF preselector	HP	85685A	3107A01264	MAY/03	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	APR/03	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12MONTH	■
				9109-4444	MAY/03		
		Schwarzbeck	VHA9103	91031852	JUL/02		
8.	Log Periodic antenna	EMCO	3146	9109-3214	JUL/02	12MONTH	■
				9109-3217	MAY/03		
		Schwarzbeck	9108-A(494)	62281001	AUG/02		
9.	Horn antenna	Schwarzbeck	BBHA9120D	BBHA9120D294	JUN/03	12MONTH	
10.	Trilog Broadband antenna	Schwarzbeck	VULB9163	VULB9163-166	FEB/03	12MONTH	
11.	LISN	EMCO	3825/2	9109-1867	AUG/02	12MONTH	■
				9109-1869	OCT/02		
12.	RF Amplifier	HP	8447F	3113A04554	N/A	N/A	
13.	Portable Spectrum Analyzer	HP	8591A	3131A02312	N/A	N/A	
14.	Computer System Hard disk drive	HP	98581C	98543A	N/A	N/A	
			9153C	CMC762Z9153	N/A	N/A	
15.	Plotter	HP	7475A	30052 22986	N/A	N/A	
16.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
17.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
18.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

* Mark "■" means used equipment.



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Testing & Evaluation Lab.

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