MEASUREMENT/TECHNICAL REPORT

E-RAE TESTING LABORATORY

MODEL : HL-1510G

This report concerns(check one) : Original grant__X_ Class change

Equipment type : __15 LCD MONITOR

Deferred grant requested per 47 CFR 0.457(d)(1)( ) ? yes___no__X

If yes, defer until:

____ agrees to notify the Commission by

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? yes__ no_X

If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-91 Edition] provision.

Report prepared by : JOO MIN, KIM - Manager

Company : E-RAE TESTING LABORATORY
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1. GENERAL INFORMATION

1.1 Product Description

The monitor described in the followings is based on a multi-scanning, digital control display, 15.1" diagonally measured active display area with XGA resolution (768 vertical by 1024 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots that is arranged in vertical stripes.

Gray scale or the brightness of the sub-pixel color is determined with an 8-bit gray scale signal for each dot, thus, presenting a palette of more then 16M colors. The monitor is intended to be a finished product, basically a display device mounted inside a plastic enclosure that will provide the aesthetic, ergonomic and safety requirements.

The monitor is designed to supprot frame rate conversion of both graphics and digital video(Y,Cb,Cr) data, allowing a variety of input formats to be interfaced to a single format display device. It provides a digital RGB or an optional LVDS output suitable for driving a variety of LCD display panels, and producing images of the highest quality at 1x or larger magnifications.

CHASSIS TYPE	**Metal**
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	**67 MHz 26.8MHz 14.74MHz 50MHz Dot Clock : 80MHz Max.**
CHIPSET BRAND AND PART NO.	**MC140690B0 – MOTOROLA W78C32BP 16 – WINBONO GMZ2 – GENESIS KS01278 – SAMSUNG TDA8752H/8 – PHILIPS 1S8065IRA2 – INTEL B135 – GENESIS KS0127B – SAMSUNG THC631VDM63A – THINE**
POWER REQUIREMENT	**100 – 240 VAC 1.6A~0.8A 47/63 Hz**
NUMBER OF LAYERS	**MAIN BOARD 2 LAYER SAMPS 1 LAYER INVERTER 2 LAYER INTERFACE 2 LAYER**
MAX. RESOLUTION	**1024 * 768 NON-INTERLACED (@ 60 kHz/75Hz)**
H-SYNC FREQUENCY RANGE	**31.5 KHz 60Khz**
V-SYNC FREQUENCY RANGE	**56 Hz 75 Hz**
TFT LCD SIZE	**15.1" (LG PHILIPS LCD/TYPE LM151X1<C2MN)**
VIDEO CONNECTOR TYPE	**D-SUB 15-PIN**

1.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

1.3 Tested System Details

The Model names for all equipment, plus descriptions used in the tested system (including inserted cards) are:

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
15 LCD MONITOR(EUT)	Harsper Co.,Ltd.	HL-1510G	-	HOST
PC(HOST)	Compaq	PRESARIO 2230	DoC	N/A
KEYBOARD	Compaq	RT2156TWGR	AQ6-71Z15	HOST
MOUSE	Compaq	GNEZE4	FSUGMZE4	HOST
SERIAL MOUSE	PETRA	MUS5S	JKGMUS5S01	HOST
JOYSTICK	Dahoon	DHA-2000	N/A	HOST
PRINTER	H.P	C4562B	B94C2164X	HOST
VTR	PANASONIC	NY-HD9060PX	DoC	MONITOR
SPEAKER	PC BANK	N/A	N/A	HOST

1.4 Test Methodology

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 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 584,SANGWHAL-RI,KANAM-MYUN,YOJU-KUN,KYOUNGKI-DO, 469-880,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted by Commission.

2.SYSTEM TEST CONFIGURATION

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components and I/O cards inside the E.U.T were used.

DEVICE TYPE	MANUFACTURE	MODEL/PART NUMBER
LCD INTERFACE	DICON	1024BDP
INVERTER	DICON	-
TUNER&AMP	DICON	REV. B
MAIN BOARD	DICON	LCD 1024TD
SMPS	AULT KOREA	-

2.2 EUT exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing, and VTR play mode.

2.3 Cable Description

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
PC(HOST)	N	N/A	1.5(P)
15 LCD MONITOR(EUT)	N	Y	1.5(P), 1.5(D)
PARALLEL	N	Y	1.5(P), 1.5(D)
KEYBOARD	N/A	Y	1.0(D)
JOYSTICK	N	N	1.5(D)
SPEAKER	Y	N	1.0(D)
VTR	N	N	1.5(P), 1.0(D)
SERIAL MOUSE	N	Y	1.5(P), 1.5(D)
MOUSE(PS/2)	N/A	Y	1.8(D)

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

2.4 Noise Suppression Parts on Cable.

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PC(HOST)	N	N/A	N	N/A
15 LCD MONITOR(EUT)	Y	PC END	Y	BOTH END
JOYSTICK	Y	PC END	N	N/A
SPEAKER	N	N/A	N	N/A
KEYBOARD	Y	N/A	Y	PC END
PARALLEL	N	N/A	Y	BOTH END
SERIAL	N	N/A	Y	N/A
VIDEO & AUDIO	N	N/A	Y	BOTH END
MOUSE(PS/2)	N	N/A	Y	PC END

2.5 Equipment Modifications

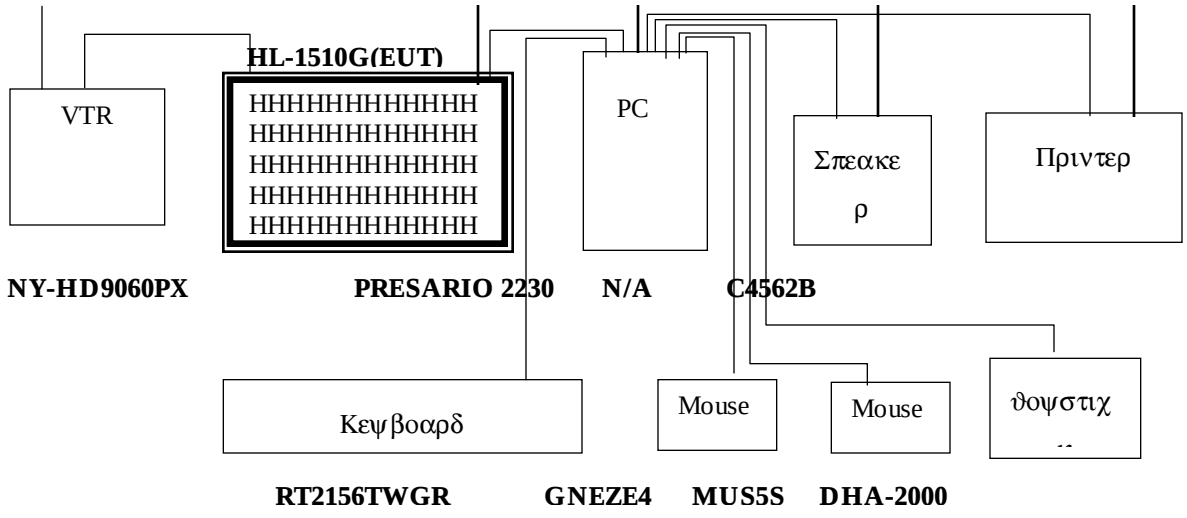
N/A

2.6 Configuration of Test system

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN.
Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary Radiated Emissions tests were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating condition. Final Radiated Emission tests were conducted at 3 meter open area test site.

[Configuration of Tested System]



3. PRELIMINARY TESTS

3.1 AC Power line Conducted Emission Tests

During Preliminary Tests, the following operating mode were investigated

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 75 MHz	1024 x 768 Non-Interlaced (60.0 kHz/75Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (48.0 KHz/72.1Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (37.8 KHz/72.8Hz)	

Mode	Condition	
Display	Video display of VTR	

4.2 Radiated Emission Tests

During Preliminary Tests, the following operating mode were investigated

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 75 MHz	1024 x 768 Non-Interlaced (60.0 kHz/75Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (48.0 KHz/72.1Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (37.8 KHz/72.8Hz)	

Mode	Condition	
Display	Video display of VTR	

Tested by Yo Han, Park **Date :** JUNE 13. 2000

4. FINAL CONDUCETD AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emissions Tests

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level : 57% Temperature : 25
Limit apply to : FCC CFR 47, PART 15, SUBPART B
Type of Tests : CLASS B
Date : JUNE 12, 2000
Result : PASSED BY 8.93 dB

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EUT : 15" LCD MONITOR
Operating Condition : 1024 X 768 Non-Interlaced (Hf : 60KHz, Vf : 75Hz)
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

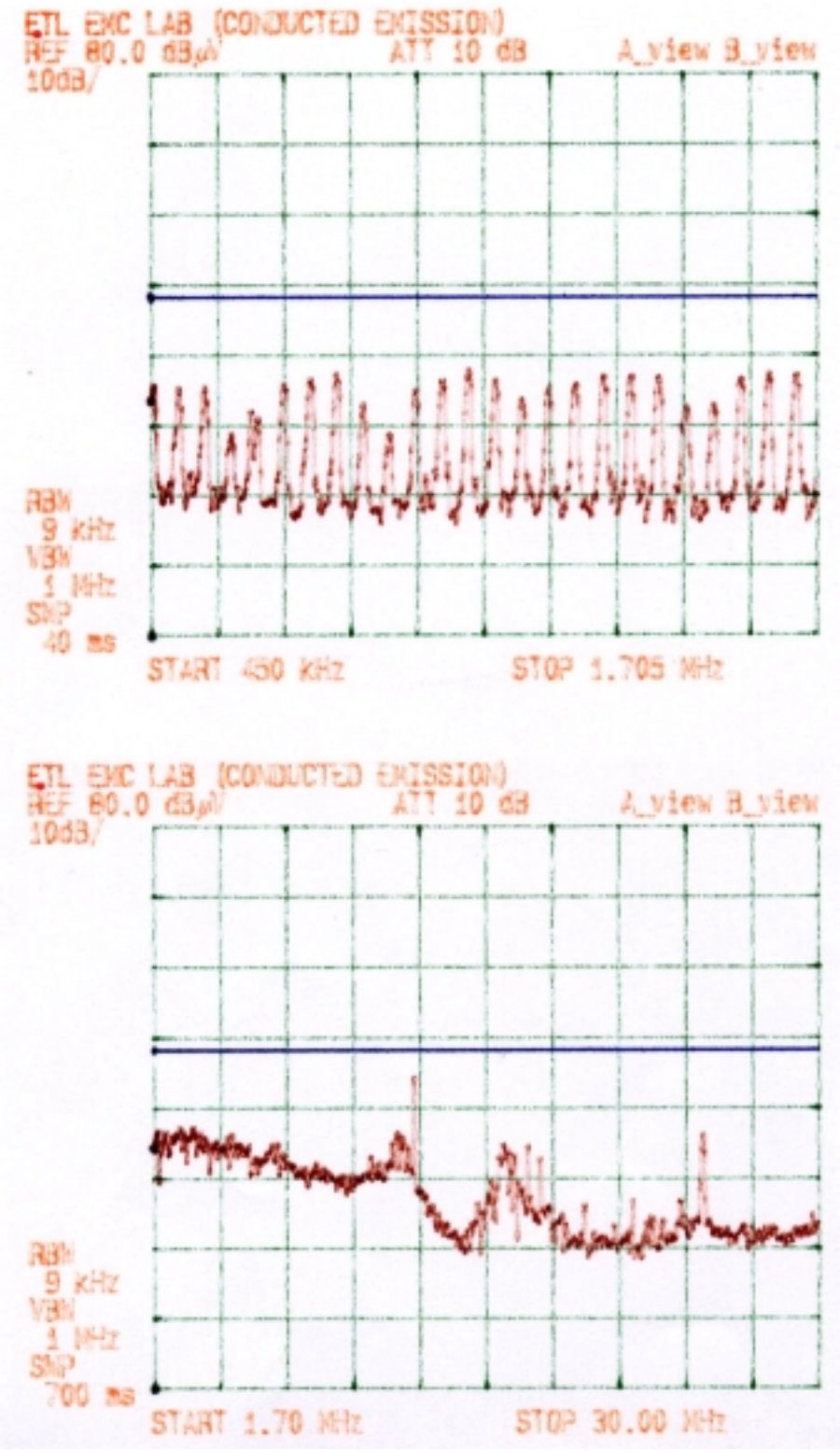
Power Line Conducted Emissions			FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Polarization (Hot/Neutral)	Limit (dBuv)	Margin (dB)
0.454	37.62	HOT	48	-10.38
0.749	37.12	HOT	48	-10.88
1.00	37.32	NEUTRAL	48	-10.68
5.22	36.25	HOT	48	-11.75
14.32	39.07	HOT	48	-8.93
21.96	26.22	NEUTRAL	48	-21.78
23.73	29.62	HOT	48	-18.38

Line Conducted Emissions Tabulated Data

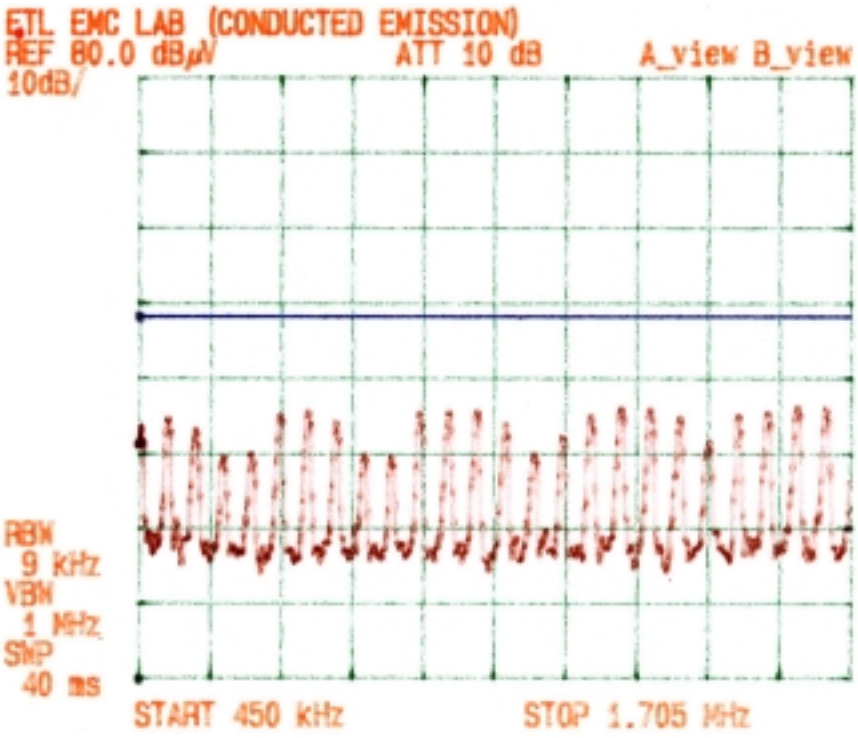
NOET:
1. All video modes and resolutions were investigated and the worst-case emissions are reported
Other video modes & resolution were tested and found to be in compliance.
2. The limit for Class B device is 250 uV from 450 kHz to 30 MHz.

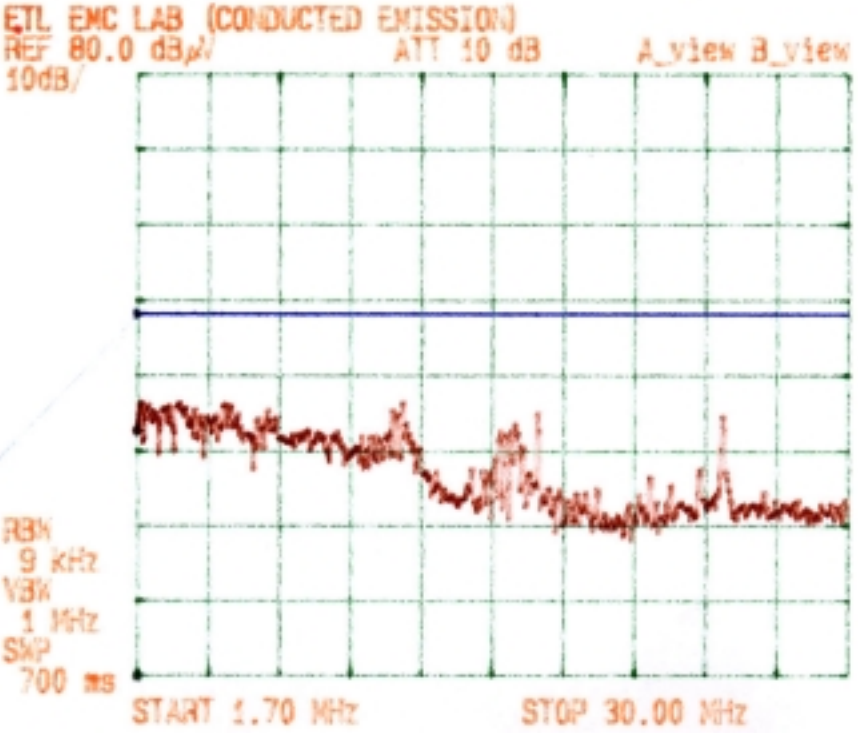
Measured by : Yo Han, Park / Engineer

LINE POLARIZATION : HOT



LINE POLARIZATION : NEUTRAL





4.2 Radiated Emissions Tests

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 56 % Temperature : 26
Limit apply to : FCC CFR 47, PART 15, SUBPART B
Type of Tests : CLASS B
Date : JUNE 13, 2000
Result : PASSED BY 4.5 dB

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EUT : 15" LCD MONITOR
Operating Condition : 1024 X 768 Non-Interlaced (Hf : 60 KHz, Vf : 75 Hz)
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Radiated Emissions		Ant.	Correction Factors	Total	FCC Class B	
Freq. (MHz)	Ampl. (dBuV)	Pol.	Antenna & Cable Loss (dB/m)	Ampl. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
60.26	21.47	H	9.58	31.1	40.0	-9.0
215.11	17.07	H	12.59	29.7	43.5	-13.8
241.00	23.05	H	13.68	36.7	46.0	-9.3
288.07	17.20	H	15.76	33.0	46.0	-13.0
306.31	25.00	H	16.50	41.5	46.0	-4.5
312.66	15.67	H	16.50	32.2	46.0	-13.8
402.00	19.30	H	18.72	38.0	46.0	-8.0
469.00	16.07	H	20.36	36.4	46.0	-9.6
509.20	6.52	H	21.72	28.2	46.0	-17.8
535.97	13.55	H	22.07	35.6	46.0	-10.4

NOTE:
1.All video modes and resolutions were investigated and the worst-case emissions are reported.
2.Other video modes & resolution were tested and found to be in compliance.

Measured by : Yo Han, Park / Engineer

5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.
The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 25.00 dBuV is obtained. The Antenna Factor of 13.12 and a Cable Factor of 3.38 is added. The 41.50 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 25.00 + 13.12 + 3.38 = 41.50 dBuV/m

Level in uV/m = Common Antilogarithm [(41.50 dBuV/m)/20] = 118.85 uV/m