



HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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CERTIFICATION

Manufacture;
GEMPACK CO., LTD.
324-18, Dangjung-Dong Kunpo-Si,
Kyungki-Do, 435-030, KOREA

Dates of Tests: JAN. 9, 2001
Test Report No.: HCT-F01-0101

Test Site: HYUNDAI CALIBRATION & CERTIFICATION
TECHNOLOGIES CO., LTD.

FCC ID :

PFMGPM-151

MODEL / TYPE :

GPM-151

FCC Rule Part(s):	Part 15 & 2; ET Docket 95-19
Classification:	FCC Class B Peripheral Device (JBP)
Standard(s):	FCC Class B: 1998 (CISPR 22)
Equipment(EUT) Type:	15" LCD Monitor
Max Resolution:	1024X768 Non-interlaced (@60KHz/ 75Hz)
Port/ Connector(s)	15-pin D-sub VGA connector

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-1992.(See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HYUNDAI certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse of 1988,21 U.S.C.853(a).

Report prepared by : Ki-Soo Kim
Manager of QA Office---



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1. GENERAL INFORMATION

1.1 Product Description

The GEMPACK Co., Ltd. Model GPM-151 (referred to as the EUT in this report) is a 15" LCD Monitor
HOR. Freq. 60KHz w/max. Resolution of 1024X768 Non-Interlaced. Product specification information
described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	PLASTIC
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	20MHz / 50MHZ
POWER REQUIREMENT	100 - 220 VAC 60/50Hz 1.5A
NUMBER OF LAYERS	MAIN BOARD 2 LAYER OSD BOARD 1 LAYER POWER BOARD 2 LAYER INVERTER BOARD 2 LAYER LCD MODULE BOARD 2 LAYER
MAX. RESOLUTION	1024X768 NON-INTERLACED(@60KHz/ 75 Hz)
H-SYNC FREQUENCY RANGE	24.6KHz 60KHz
V-SYNC FREQUENCY RANGE	56 Hz 75Hz
LCD SIZE	15" (LCD Type : LG.PHILIPS LCD LM151X2)

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
MONITOR (EUT)	HYUNDAI	GPM-151	PFMGPM-151	HOST
PC(HOST)	H/P	DTPC-17	DoC	N/A
KEY BOARD	H/P	SK-2501-2D-K	GYUR385K	HOST
PRINTER	H/P	HP895C	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
VIDEO CARD	DIAMOND	3D3000	DoC	HOST
MOUSE	H/P	M-S34	DZL211029	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 10 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO, 467-701,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 dated July 24,2000(Confirmation Number: EA90661)

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
MAIN BOARD	XELON	1510T1
POWER BOARD	ILAN ELEC. LTD.	-
OSD BOARD	XELON	-
INVERTOR BOARD	HANKOOK TECH CO.	HK1512LA
LCD BOARD	LG. PHILIPS	LM151X2

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.

2.3 Cable Description

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
PC(HOST)	N	N/A	1.8(P)
MONITOR(EUT)	N	Y	1.8(P), 1.5(D)
PRINTER	N	Y	2.0(P),1.5(D)
KEY BOARD	N/A	Y	2.0(D)
MODEM	N	Y	2.0(P),1.5(D)
MOUSE	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. (I/O CABLE)

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
MONITOR(EUT)	Y	BOTH END	Y	BOTH END
PRINTER	N	N/A	Y	BOTH END
KEY BOARD	Y	PC END	N	N/A
MODEM	N	N/A	Y	BOTH END
MOUSE	N	N/A	N	N/A

2.5 Equipment Modifications

N/A

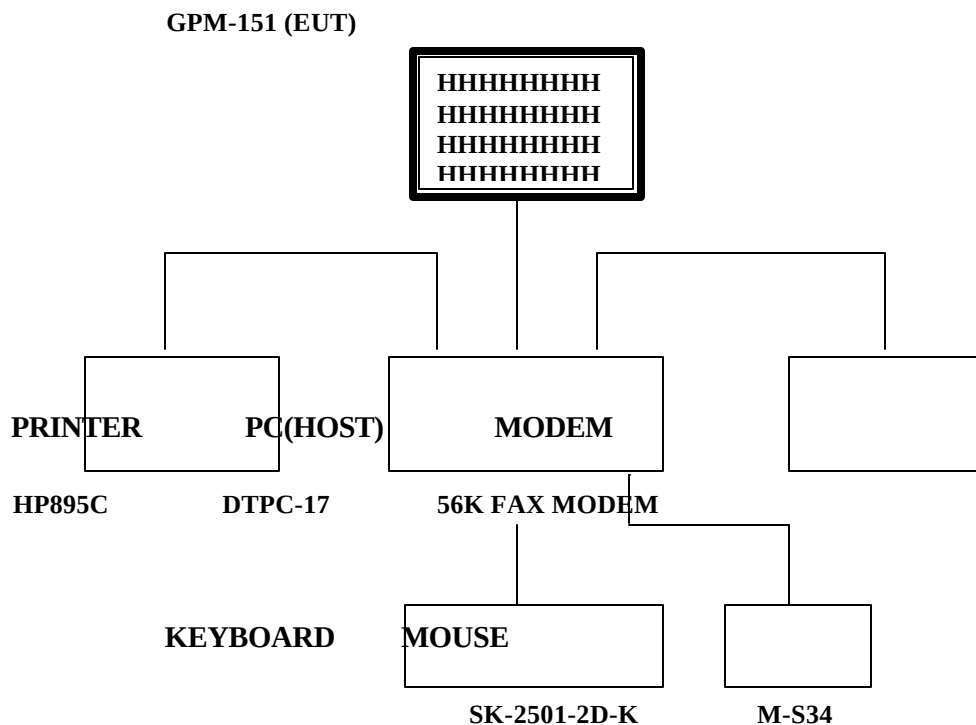
2.6 Configuration of Test system

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 10 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 350 MHz	1024 x 768 Non-Interlaced (60KHz/75Hz)	X
Pentium 350 MHz	1280X1024 Non-Interlaced (64KHz/60Hz)	
Pentium 350 MHz	800 x 600 Non-Interlaced (53.7 KHz/85Hz)	
Pentium 350 MHz	640 x 480 Non-Interlaced (50.6 KHz/100Hz)	

4.2 Radiated Emission Tests

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1024 x 768 Non-Interlaced (60 KHz/75 Hz)	X
Pentium 350 MHz	1280X1024 Non-Interlaced (64KHz/60Hz)	
Pentium 350 MHz	800 x 600 Non-Interlaced (53.7 KHz/85Hz)	
Pentium 350 MHz	640 x 480 Non-Interlaced (50.6 KHz/100Hz)	

NOTE:

The monitor(EUT) has video interface port(VGA 15 pin D-sub) to support various kinds of graphics adapters. So the test were performed with each video interface port. The final measurement was performed with VGA 15 pin D-sub video interface port that produce the worst case emission.

Tested by KEUN- HO PARK / Engineer

Date : DEC. 20, 2000

4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emission Test

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

Humidity Level : 36% Temperature : 12
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : DEC. 23, 2000
 Result : PASSED BY -11.0 dB
 EUT : 15" LCD MONITOR

Operating Condition : 1024X768 Non-Interlaced (Hf : 60 KHz, Vf : 75Hz)

Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)
 CISPR Average(6 dB Bandwidth : 9 KHz)

Line Conducted Emission Tabulated Data

Power Line Conducted Emissions			CISPR 22		
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)	Detector Mode
4.485	43.5	N	56.0	-12.5	Quasi- Peak
4.540	43.4	N	56.0	-12.6	Quasi- Peak
4.375	34.5	N	46.0	-11.5	Average
4.760	35.0	N	46.0	-11.0	Average

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.

Measured by : Keun-Ho Park / Engineer

Date : DEC. 23, 2000

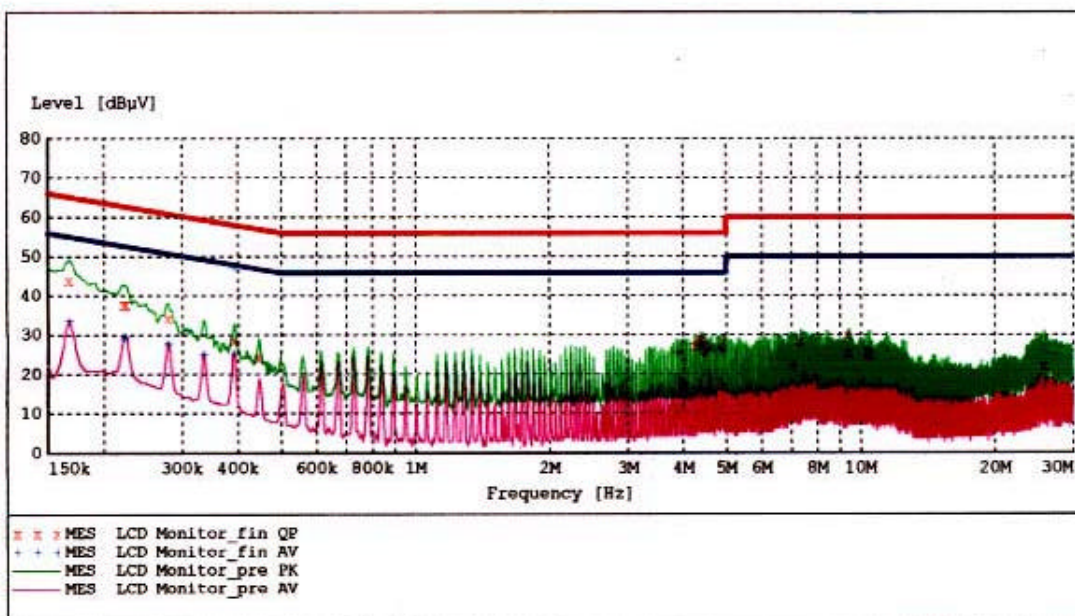
HYUNDAI C-TECH. CO.,LTD. EMC LAB
San 136-1,Ami-Ri-Bubal-Eub,Ichon-Si,Kyongki-Do

EUT: GPM-151
 Manufacturer: GEMPACK CO.,LTD.
 Operating Condition: 1024X768 Hf:60KHz Vf:75Hz
 Test Site: Shield Room
 Operator: Keun-Ho Park

Comment: HOT
 Start of Test: 12/23/00 / 10:46:58AM

SCAN TABLE: "MIC CLASS B"

Short Description:				KN22 CLASS B Voltage			Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
Frequency	Frequency	Width					
150.0 kHz	500.0 kHz	3.0 kHz	MaxPeak	100.0 ms	9 kHz	C/E FACTOR	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	C/E FACTOR	
			Average				



MEASUREMENT RESULT: "LCD Monitor_fin QP"

12/23/00 10:51AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.168000	43.90	0.5	65	21.1	1	---
0.222000	37.70	0.5	63	25.0	1	---
0.225000	37.70	0.5	63	24.9	1	---
0.279000	34.30	0.5	61	26.5	1	---
0.393000	28.60	0.5	58	29.4	1	---
0.447000	24.30	0.5	57	32.6	1	---
4.255000	27.30	0.8	56	28.7	1	---
4.370000	29.20	0.8	56	26.8	1	---
4.425000	29.00	0.8	56	27.0	1	---
4.480000	27.60	0.8	56	28.4	1	---
4.650000	27.00	0.8	56	29.0	1	---
4.930000	28.40	0.9	56	27.6	1	---
7.345000	28.40	1.1	60	31.6	1	---
9.365000	30.10	1.2	60	29.9	1	---

MEASUREMENT RESULT: "LCD Monitor_fin QP"
(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
9.475000	25.50	1.2	60	34.5	1	---
10.425000	25.80	1.2	60	34.2	1	---
10.535000	25.10	1.3	60	34.9	1	---
25.850000	22.20	2.1	60	37.8	1	---

MEASUREMENT RESULT: "LCD Monitor_fin AV"
12/23/00 10:52AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.168000	33.80	0.5	55	21.3	1	---
0.222000	29.30	0.5	53	23.4	1	---
0.225000	29.60	0.5	53	23.1	1	---
0.279000	27.80	0.5	51	23.0	1	---
0.336000	25.20	0.5	49	24.1	1	---
0.393000	25.40	0.5	48	22.6	1	---
3.920000	25.50	0.7	46	20.5	1	---
4.370000	27.20	0.8	46	18.8	1	---
4.425000	27.00	0.8	46	19.0	1	---
4.480000	25.20	0.8	46	20.8	1	---
4.875000	26.70	0.9	46	19.3	1	---
4.930000	26.20	0.9	46	19.8	1	---
7.120000	22.40	1.1	50	27.6	1	---
7.455000	19.70	1.1	50	30.3	1	---
7.510000	17.70	1.1	50	32.3	1	---
7.960000	19.20	1.1	50	30.8	1	---
8.015000	17.10	1.1	50	32.9	1	---
8.520000	17.30	1.1	50	32.7	1	---

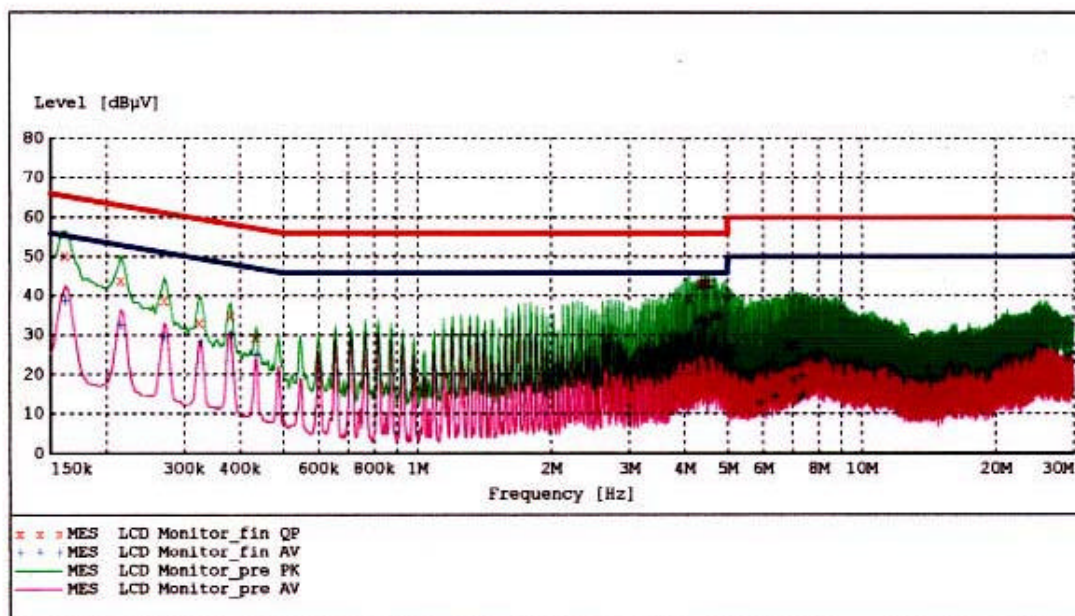
HYUNDAI C-TECH. CO.,LTD. EMC LAB
San 136-1,Ami-Ri-Bubal-Eub,Ichon-Si,Kyongki-Do

EUT: GPM-151
 Manufacturer: GEMPACK CO.,LTD.
 Operating Condition: 1024X768 Hf:60KHz Vf:75Hz
 Test Site: Shield Room
 Operator: Keun-Ho Park

Comment: NEUTRAL
 Start of Test: 12/23/00 / 10:13:53AM

SCAN TABLE: "MIC CLASS B"

Short Description:			KN22 CLASS B Voltage				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
Frequency 150.0 kHz	500.0 kHz	3.0 kHz	MaxPeak	100.0 ms	9 kHz	C/E FACTOR	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	C/E FACTOR	
			Average				



MEASUREMENT RESULT: "LCD Monitor_fin QP"

12/23/00 10:24AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162000	50.30	0.5	65	15.0	1	---
0.216000	44.00	0.5	63	19.0	1	---
0.270000	39.00	0.5	61	22.1	1	---
0.324000	33.20	0.5	60	26.4	1	---
0.381000	35.10	0.5	58	23.1	1	---
0.435000	29.50	0.5	57	27.6	1	---
4.100000	39.40	0.7	56	16.6	1	---
4.375000	43.10	0.8	56	12.9	1	---
4.430000	43.40	0.8	56	12.6	1	---
4.485000	43.50	0.8	56	12.5	1	---
4.540000	43.40	0.8	56	12.6	1	---
4.645000	35.30	0.8	56	20.7	1	---
5.040000	25.50	0.9	60	34.5	1	---
5.095000	27.00	0.9	60	33.0	1	---

MEASUREMENT RESULT: "LCD Monitor_fin QP"
(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
6.905000	27.40	1.1	60	32.6	1	---
7.120000	27.90	1.1	60	32.1	1	---
7.340000	24.10	1.1	60	35.9	1	---
7.560000	21.40	1.1	60	38.6	1	---

MEASUREMENT RESULT: "LCD Monitor_fin AV"
12/23/00 10:24AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162000	38.80	0.5	55	16.5	1	---
0.216000	32.60	0.5	53	20.3	1	---
0.270000	29.70	0.5	51	21.4	1	---
0.327000	28.30	0.5	50	21.2	1	---
0.381000	30.50	0.5	48	17.7	1	---
0.435000	25.10	0.5	47	22.1	1	---
4.265000	33.40	0.8	46	12.6	1	---
4.320000	34.20	0.8	46	11.8	1	---
4.375000	34.50	0.8	46	11.5	1	---
4.430000	34.00	0.8	46	12.0	1	---
4.485000	33.00	0.8	46	13.0	1	---
4.760000	35.00	0.8	46	11.0	1	---
5.915000	12.90	1.0	50	37.1	1	---
6.410000	14.50	1.0	50	35.5	1	---
7.010000	18.90	1.1	50	31.1	1	---
7.285000	14.20	1.1	50	35.8	1	---
7.340000	19.90	1.1	50	30.1	1	---
7.395000	15.00	1.1	50	35.0	1	---

4.2 Radiated Emissions Tests

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

Humidity Level : 35 % Temperature : 8
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : DEC. 27, 2000
 Result : PASSED BY -3.1 dB

=====

EUT : 15" LCD MONITOR
 Operating Condition : 1024X768 Non-Interlaced (Hf :60 kHz, Vf : 75 Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dB	Margin dB
137.8	6.93	14.37	2.50	V	23.8	30.0	-6.2
152.9	7.14	14.76	2.60	V	24.5	30.0	-5.5
172.3	7.39	15.01	2.70	V	25.1	30.0	-4.9
172.3	6.89	15.01	2.70	H	24.6	30.0	-5.4
186.1	6.85	15.25	2.80	V	24.9	30.0	-5.1
206.7	4.91	15.99	3.00	V	23.9	30.0	-6.1
206.7	6.51	15.99	3.00	H	25.5	30.0	-4.5
237.9	6.98	17.42	3.40	H	27.8	37.0	-9.2
393.5	9.47	16.53	4.20	V	30.2	37.0	-6.8
447.9	12.08	17.22	4.60	V	33.9	37.0	-3.1
462.0	9.63	17.87	4.80	V	32.3	37.0	-4.7
482.4	9.49	18.11	4.80	V	32.4	37.0	-4.6
551.3	5.64	19.56	5.30	V	30.5	37.0	-6.5

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.
3. The EUT was test up to 2GHz and no significant emission was found.

Measured by : Keun-Ho Park / Engineer

Date : DEC. 27, 2000

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 21.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The 30 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm } [(30 \text{ dBuV/m})/20] = 31.6 \text{ uV/m}$$

6. LIST OF TEST EQUIPMENT

TYPE	MANUFACTURE	MODEL	CAL. DATE	
EMI Test Receiver	Rohde & Schwarz	ESH3	2000.6.29	
EMI Test Receiver	Rohde & Schwarz	ESVP	2000.2.14	
EMI Test Receiver	Rohde & Schwarz	ESI40	2000.1.18	
EMI Test Receiver	Rohde & Schwarz	ESVS30	2000.6.29	Spectrum
Monitor	Rohde & Schwarz	EZM	N.A	
Graphic Plotter	Rohde & Schwarz	DOP2	N.A	
Printer	Rohde & Schwarz	PDN	N.A	
Spectrum Analyzer	H.P	8591EM	2000.7.11	
LISN	EMCO	3825/2	2000.10.13	
LISN	Rohde & Schwarz	ESH2-Z5	2000.7.14	
Amplifier	Hewlett-Packard	8447E	2001.3.6	
Dipole Antennas	Rohde & Schwarz	VHAP	2000.6.29	
Dipole Antennas	Rohde & Schwarz	UHAP	2000.6.29	
Biconical Antenna	Rohde & Schwarz	BBA-9106	2000.6.29	
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2000.6.29	
Antenna Position Tower	EMCO	1051-12	N.A	
Turn Table	EMCO	1060-06	N.A	
Line Filter	KEENE	ULW 2X30-60	N.A	
Power Analyzer	Voltech	PM 3300	2000.12.20	
Reference Network Impedance	Voltech	IEC 555	N.A	
AC Power Source	PACIFIC	Magnetic Module	N.A	
AC Power Source	PACIFIC	360AMX	N.A	