

**HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.**

INT'L STANDARD CERTIFICATION TEAM  
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA  
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**CERTIFICATION (Permissive change class )**

**Manufacture;**

**IMAGEQUEST CO., LTD.**  
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI,  
KYOUNKI-DO, 467-701, KOREA

**Date of Issue: NOVEMBER 26, 2001**

**Test Report No.: HCT-F01-1004**

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

**FCC ID :**

**PJIL50C  
L50C**

**MODEL / TYPE :**

<b>FCC Rule Part(s):</b>	<b>Part 15 &amp; 2; ET Docket 95-19</b>
<b>Classification:</b>	<b>FCC Class B Peripheral Device (JBP)</b>
<b>Standard(s):</b>	<b>FCC Class B: 1998 (CISPR 22)</b>
<b>Equipment(EUT) Type:</b>	<b>15" LCD Monitor</b>
<b>Max Resolution:</b>	<b>1024X768 (@60KHz/ 75Hz)</b>
<b>Port/ Connector(s):</b>	<b>15-pin D-sub VGA connector</b>
<b>LCD PANEL:</b>	<b>SAMSUNG ELECTRONICS CO.,LTD. (LTM150XH-L01)</b>

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 C-Tech. 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 EMC Tech. Part



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# 1. GENERAL INFORMATION

## 1.1 Product Description

The ImageQuest CO., LTD. Model L50C (referred to as the EUT in this report) is a 15" LCD Monitor HOR. Freq. 60KHz w/max. Resolution of 1024X768 . 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)	12MHz, 20MHz
POWER REQUIREMENT	DC 12V/5V --- 2.0A/2.0A
NUMBER OF LAYERS	MAIN BOARD 4 LAYER OSD BOARD 1 LAYER POWER BOARD 1 LAYER INVERTER BOARD 4 LAYER
MAX. RESOLUTION	1024X768 (@60KHz/ 75 Hz)
H-SYNC FREQUENCY RANGE	31KHz 60KHz
V-SYNC FREQUENCY RANGE	56Hz 75Hz
LCD TYPE	15" ( LCD Type : LTM150XH-L01 )

## 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)	IMAGEQUEST CO., LTD.	L50C	PJIL50C	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	INTELLIMOUSE	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	ImageQuest CO., Ltd.	3041001039
POWER BOARD	C&C TECH CO.,LTD.	3610200087
OSD BOARD	ImageQuest CO., Ltd.	3010700781
INVERTOR BOARD	ImageQuest CO., Ltd.	3610400244
LCD BOARD	SAMSUNG ELECTRONICS CO., LTD.	LTM150XH-L01

### 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

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

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
<b>MONITOR(EUT)</b>	N	Y	<b>1.8(P), 1.5(D)</b>
<b>PC(HOST)</b>	N	N/A	<b>1.8(P)</b>
<b>PRINTER</b>	N	Y	<b>2.0(P),1.8(D)</b>
<b>KEY BOARD</b>	N/A	Y	<b>2.0(D)</b>
<b>MODEM</b>	N	Y	<b>2.0(P),0.8(D)</b>
<b>MOUSE</b>	N/A	Y	<b>1.8(D)</b>

## 2.4 Noise Suppression Parts on Cable. (I/O CABLE)

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

## 2.5 Equipment Modifications

N/A

## 2.6 Configuration of Test system

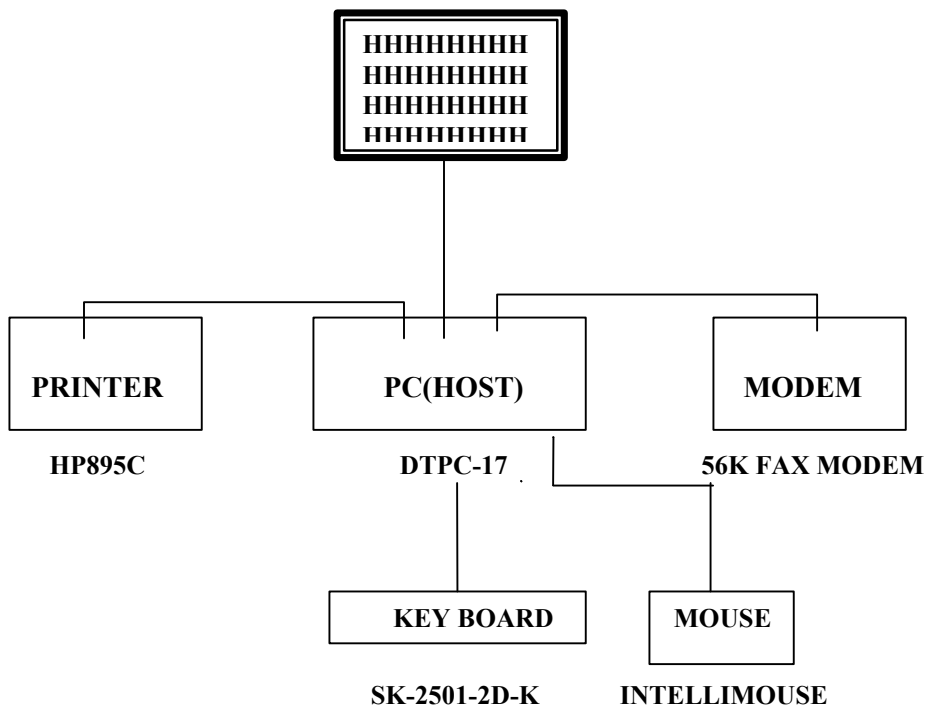
**Line Conducted Test** : EUT was connected to LISN, all other supporting equipment were connected to another LISN.

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]

L50C (EUT)





### 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	1024X768 (60KHz/75Hz)	X
	1024X768 (48.4KHz/60Hz)	
	1024X768 (56.5KHz/70Hz)	
	720X400 (31.5KHz/70Hz)	
	800 x 600 (46.7 KHz/75Hz)	
	640 x 480 (31.5KHz/60Hz)	

#### 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 350 MHz	1024X768 (60KHz/75Hz)	X
	1024X768 (48.4KHz/60Hz)	
	1024X768 (56.5KHz/70Hz)	
	720X400 (31.5KHz/70Hz)	
	800 x 600 (46.7 KHz/75Hz)	
	640 x 480 (31.5KHz/60Hz)	

Tested by Kyoung-Houn SEO / Engineer

Date : NOVEMBER 19, 2001

## 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 : 41 %                      Temperature : 22  
 Limit apply to : CISPR 22  
 Type of Tests : CLASS B  
 Date : NOVEMBER 23, 2001  
 Result : PASSED BY 4.1 dB  
 EUT : 15" LCD MONITOR

Operating Condition : 1024X768 (Hf : 60KHz, 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
0.17	50.70	NEUTRAL	55.0	4.1	Average
0.17	60.10	NEUTRAL	65.0	4.6	Quasi-Peak
0.17	58.80	HOT	65.0	5.9	Quasi-Peak
0.17	47.30	HOT	55.0	7.5	Average

NOET:

- 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 : Kyoung-Houn SEO / Engineer

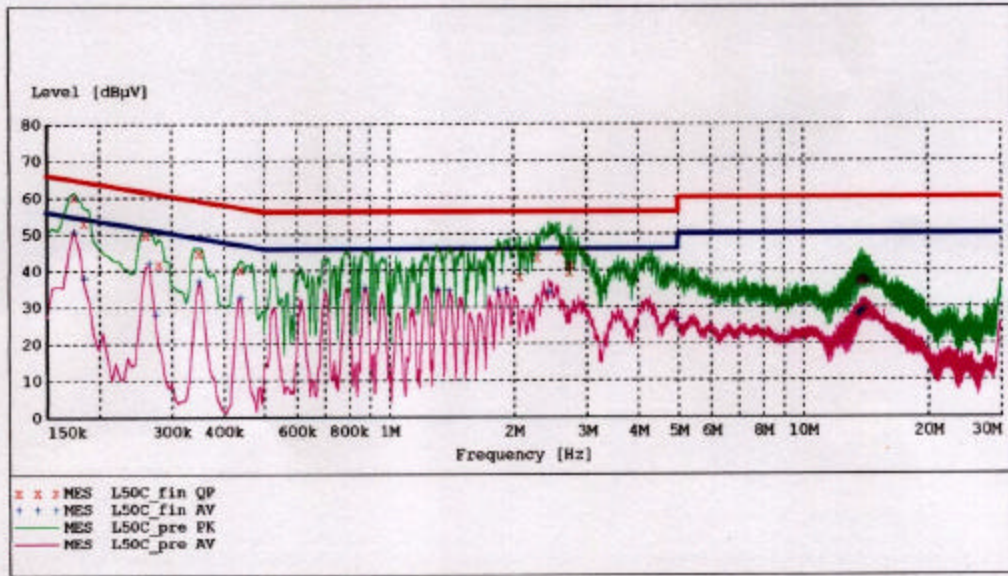
Date : NOVEMBER 23, 2001

**HYUNDAI C-TECH. CO., LTD.**  
**EMC TEST LAB.**

EUT: L50C  
 Manufacturer: IMAGEQUEST  
 Operating Condition: 1024 X 768 60KHz 75Hz  
 Test Site: Shield Room  
 Operator:  
 Test Specification:  
 Comment: N  
 Start of Test: 11/23/01 / 2:14:07PM

**SCAN TABLE:**

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	100.0 ms	9 kHz	CABLE LOSS (NEW)
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	CABLE LOSS (NEW)
			Average			



**MEASUREMENT RESULT: "L50C\_fin QP"**

11/23/01 2:18PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.175000	60.10	0.5	65	4.6	1	---
0.185000	53.00	0.5	64	11.3	1	---
0.260000	49.80	0.5	61	11.6	1	---
0.280000	41.70	0.5	61	19.1	1	---
0.350000	44.80	0.5	59	14.2	1	---
0.440000	40.40	0.5	57	16.6	1	---
2.070000	38.20	0.6	56	17.8	1	---
2.290000	43.60	0.6	56	12.4	1	---
2.595000	45.50	0.6	56	10.5	1	---
2.720000	41.60	0.6	56	14.4	1	---
2.740000	39.60	0.6	56	16.4	1	---
2.760000	41.30	0.6	56	14.7	1	---
13.660000	36.60	1.4	60	23.4	1	---
13.795000	37.90	1.5	60	22.1	1	---

**MEASUREMENT RESULT: "L50C\_fin QP"**

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
13.930000	37.50	1.5	60	22.5	1	---
14.110000	37.40	1.5	60	22.6	1	---
14.120000	37.40	1.5	60	22.6	1	---
14.365000	37.00	1.5	60	23.0	1	---

**MEASUREMENT RESULT: "L50C\_fin AV"**

11/23/01 2:18PM

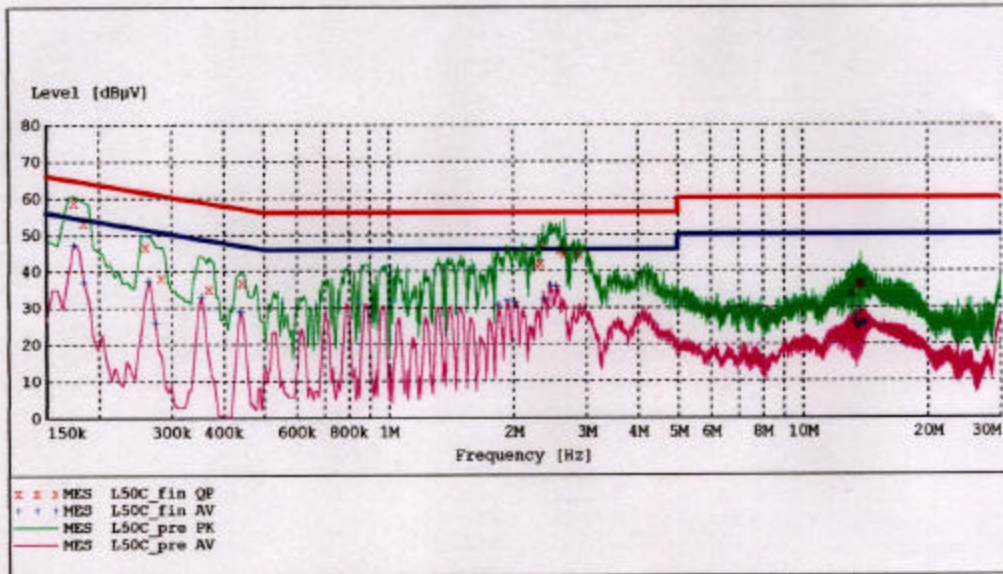
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.175000	50.70	0.5	55	4.1	1	---
0.185000	38.10	0.5	54	16.2	1	---
0.265000	42.20	0.5	51	9.1	1	---
0.275000	28.10	0.5	51	22.8	1	---
0.350000	37.00	0.5	49	12.0	1	---
0.440000	32.80	0.5	47	14.3	1	---
0.880000	35.20	0.5	46	10.8	1	---
1.315000	34.90	0.5	46	11.1	1	---
1.400000	34.50	0.5	46	11.5	1	---
1.840000	34.70	0.6	46	11.3	1	---
1.925000	35.00	0.6	46	11.0	1	---
2.440000	34.20	0.6	46	11.8	1	---
5.000000	26.60	0.9	46	19.4	1	---
13.620000	27.70	1.4	50	22.3	1	---
13.765000	28.20	1.5	50	21.8	1	---
13.775000	28.40	1.5	50	21.6	1	---
13.900000	28.80	1.5	50	21.2	1	---
14.170000	29.20	1.5	50	20.8	1	---

**HYUNDAI C-TECH. CO., LTD.**  
**EMC TEST LAB.**

EUT: L50C  
 Manufacturer: IMAGEQUEST  
 Operating Condition: 1024 X 768 60KHz 75Hz  
 Test Site: Shield Room  
 Operator:  
 Test Specification:  
 Comment: H  
 Start of Test: 11/23/01 / 2:19:22PM

**SCAN TABLE:**

Short Description:		Step		EN 55022 Voltage	Detector	Meas. Time	IF Bandw.	Transducer
Start Frequency	Stop Frequency	Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	5.0 kHz	MaxPeak	100.0 ms	9 kHz		CABLE LOSS (NEW)
500.0 kHz	5.0 MHz	5.0 kHz	5.0 kHz	Average	10.0 ms	9 kHz		CABLE LOSS (NEW)
				MaxPeak				
				Average				



**MEASUREMENT RESULT: "L50C\_fin QP"**

11/23/01 2:23PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.175000	58.80	0.5	65	5.9	1	---
0.185000	53.20	0.5	64	11.0	1	---
0.260000	46.80	0.5	61	14.6	1	---
0.285000	38.30	0.5	61	22.4	1	---
0.370000	35.30	0.5	59	23.2	1	---
0.445000	36.90	0.5	57	20.0	1	---
2.300000	41.50	0.6	56	14.5	1	---
2.335000	42.20	0.6	56	13.8	1	---
2.365000	47.10	0.6	56	8.9	1	---
2.605000	46.00	0.6	56	10.0	1	---
2.665000	44.90	0.6	56	11.1	1	---
2.890000	44.40	0.6	56	11.6	1	---
13.190000	34.20	1.4	60	25.8	1	---
13.685000	36.40	1.4	60	23.6	1	---

**MEASUREMENT RESULT: "L50C\_fin QP"**

(continued)

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
13.720000	36.40	1.5	60	23.6	1	---
13.790000	36.40	1.5	60	23.6	1	---
13.820000	36.60	1.5	60	23.4	1	---
13.905000	36.50	1.5	60	23.5	1	---

**MEASUREMENT RESULT: "L50C\_fin AV"**

11/23/01 2:23PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.175000	47.30	0.5	55	7.5	1	---
0.185000	37.20	0.5	54	17.0	1	---
0.265000	37.30	0.5	51	13.9	1	---
0.275000	25.80	0.5	51	25.2	1	---
0.355000	33.20	0.5	49	15.6	1	---
0.440000	29.00	0.5	47	18.1	1	---
1.845000	30.70	0.6	46	15.3	1	---
1.935000	32.10	0.6	46	13.9	1	---
2.025000	31.60	0.6	46	14.4	1	---
2.365000	32.40	0.6	46	13.6	1	---
2.460000	36.20	0.6	46	9.8	1	---
2.545000	35.80	0.6	46	10.2	1	---
13.655000	24.90	1.4	50	25.1	1	---
13.800000	25.40	1.5	50	24.6	1	---
13.925000	25.70	1.5	50	24.3	1	---
13.935000	25.70	1.5	50	24.3	1	---
14.070000	25.80	1.5	50	24.2	1	---
14.205000	26.10	1.5	50	23.9	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 : 38 %                      Temperature : 23  
 Limit apply to : CISPR 22  
 Type of Tests : CLASS B  
 Date : NOVEMBER 22, 2001  
 Result : PASSED BY 3.1dB

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

Frequency MHz	Reading dBuV/m	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV	Margin dBuV/m
34.7	5.12	18.08	0.90	V	24.1	30.0	-5.9
57.0	15.70	8.80	1.60	H	26.1	30.0	-3.9
81.3	14.38	6.62	1.90	V	22.9	30.0	-7.1
120.5	10.19	13.41	2.40	H	26.0	30.0	-4.0
140.7	9.73	14.57	2.50	H	26.8	30.0	-3.2
281.1	10.14	17.86	3.80	H	31.8	37.0	-5.2
301.8	13.87	15.63	3.80	H	33.3	37.0	-3.7
420.8	12.71	16.89	4.30	H	33.9	37.0	-3.1
490.8	9.33	18.17	4.90	H	32.4	37.0	-4.6
560.8	7.75	19.75	5.30	V	32.8	37.0	-4.2
581.8	2.92	20.08	5.60	H	28.6	37.0	-8.4
616.8	3.72	21.08	5.90	V	30.7	37.0	-6.3

**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 Kyoung-Houn SEO / Engineer

Date : NOVEMBER 22, 2001

## 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

<u>TYPE</u>	<u>MANUFACTURE</u>	<u>MODEL</u>	<u>CAL. DATE</u>
EMI Test Receiver	Rohde & Schwarz	ESH3	2001.6.29
EMI Test Receiver	Rohde & Schwarz	ESVP	2001.2.14
EMI Test Receiver	Rohde & Schwarz	ESI40	2001.1.18
EMI Test Receiver	Rohde & Schwarz	ESVS30	2001.6.26
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	2001.7.11
LISN	EMCO	3825/2	2001.7.13
LISN	Rohde & Schwarz	ESH2-Z5	2001.7.14
Amplifier	Hewlett-Packard	8447E	2001.3.2
Dipole Antennas	Rohde & Schwarz	VHAP	2001.6.28
Dipole Antennas	Rohde & Schwarz	UHAP	2001.6.28
Biconical Antenna	Rohde & Schwarz	BBA-9106	2001.6.28
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2001.6.26
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	2001.2.20
Reference Network Impedance	Voltech	IEC 555	N.A
AC Power Source	PACIFIC	Magnetic Module	N.A
AC Power Source	PACIFIC	360AMX	N.A