

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA
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CERTIFICATION

Manufacture; IMAGEQUEST CO., LTD. SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA IMAGEQUEST FRN : 0005-8664-39	Date of Issue: JULY 15, 2002 Test Report No.: HCT-F02-0702 Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
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FCC ID :

PJILT15U

MODEL / TYPE :

LT15u

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:

1024 X 768 (@60KHz/ 75Hz)

Port/ Connector(s)

15-pin D-sub VGA connector, USB 1 upstream port and 4 downstream ports

LCD PANEL

HYUNDAI DISPLAY TECHNOLOGY.INC. (HT15X13-100)

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).

Ki Soo Kim

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 LT15u (referred to as the EUT in this report) is a 15" LCD Monitor HOR. Freq. 60KHz w/max. Resolution of 1024 X 768 . 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 , 30MHz
POWER REQUIREMENT	100-240V AC 1.2A 60 / 50 Hz
NUMBER OF LAYERS	MAIN BOARD 4 LAYER OSD BOARD 1 LAYER POWER BOARD 2 LAYER INVERTER BOARD 2 LAYER
MAX. RESOLUTION	1024 X 768 (@60KHz/ 75 Hz)
H-SYNC FREQUENCY RANGE	31.0KHz ~ 60.0KHz
V-SYNC FREQUENCY RANGE	56Hz ~ 75Hz
LCD TYPE	15" (LCD Type NO : HT15X13-100)

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.	LT15u	PJILT15U	HOST
PC(HOST)	H/P	KR14111606	DoC	N/A
VIDEO CARD	NVIDIA	NVIDIA GeForce MX 200	DoC	HOST
KEY BOARD	H/P	5181	DoC	HOST
MOUSE	MicroSoft	IntelliMouse	DoC	HOST
PRINTER	H/P	C6410A	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
USB MOUSE	LOGITECH	M-BE55	DoC	EUT
USB MOUSE	MicroSoft	IntelliMouse	DoC	EUT
USB FLASH DRIVE	Jung Myung Telecom Co.,Ltd	E-D900-00-4988	DoC	EUT
USB FLASH DRIVE	Jung Myung Telecom Co.,Ltd	E-D900-00-4988	DoC	EUT

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.	3041001045
POWER BOARD	C&C TECH CO.,LTD.	3610200105
OSD BOARD	ImageQuest CO., Ltd.	3010700807
INVERTOR BOARD	ImageQuest CO., Ltd	3610400251
LCD BOARD	Hyundai Display Technology Inc.	HT15X13-100

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)
MONITOR(EUT)	N	Y	1.8(P), 1.5(D), 1.5(D)
PC(HOST)	N	N/A	1.8(P)
KEY BOARD	N/A	Y	2.0(D)
MOUSE	N/A	Y	1.8(D)
PRINTER	N	Y	2.0(P),1.8(D)
MODEM	N	Y	2.0(P),0.8(D)
UPLOAD	N/A	Y	1.8(D)
USB MOUSE	N/A	N/A	0.8(D)
USB MOUSE	N/A	Y	1.8(D)
USB FRESH DRIVE	N/A	N/A	N/A
USB FRESH DRIVE	N/A	N/A	N/A

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	Y	PC END	Y	BOTH END
KEY BOARD	Y	PC END	Y	PC END
MOUSE	N	N/A	Y	PC END
MODEM	Y	PC END	Y	BOTH END
UPLOAD	Y	BOTH END	Y	BOTH END
USB MOUSE	N	N/A	Y	EUT END
USB MOUSE	N	N/A	Y	EUT END
USB FRESH DRIVE	N	N/A	Y	EUT END
USB FRESH DRIVE	N	N/A	Y	EUT END

2.5 Equipment Modifications

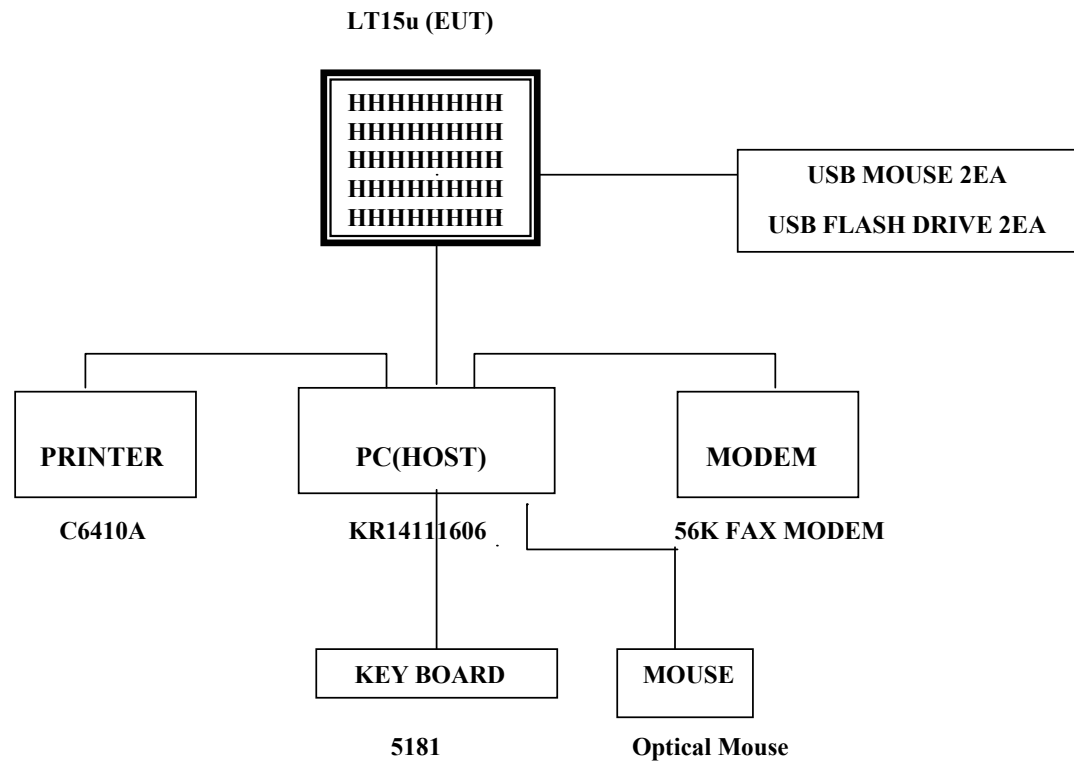
N/A

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 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 1GHz	1024X768 (60KHz/75Hz)	X
	1024X768 (56.5KHz/70Hz)	
	800X600 (37.9KHz/60Hz)	
	800X600 (46.9 KHz/75Hz)	
	640X480 (31.5KHz/59Hz)	

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 1GHz	1024X768 (60KHz/75Hz)	X
	1024X768 (56.5KHz/70Hz)	
	800X600 (37.9KHz/60Hz)	
	800X600 (46.9 KHz/75Hz)	
	640X480 (31.5KHz/59Hz)	

Tested by Kyoung-Houn SEO / Engineer

Date : JULY 1, 2002

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	: 34 %	Temperature	: 21 °C
Limit apply to	: CISPR 22		
Type of Tests	: CLASS B		
Date	: JULY 4, 2002		
Result	: PASSED BY -7.8 dB		
EUT	: 15" LCD MONITOR		

Operating Condition : 1024 X 768 (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
1.115	38.2	NEUTRAL	46.0	-7.8	Average
1.125	37.6	HOT	46.0	-8.4	Average
1.240	36.2	HOT	46.0	-9.8	Average
1.480	36.1	HOT	46.0	-9.9	Average

Measured by : Kyoung-Houn SEO / Engineer

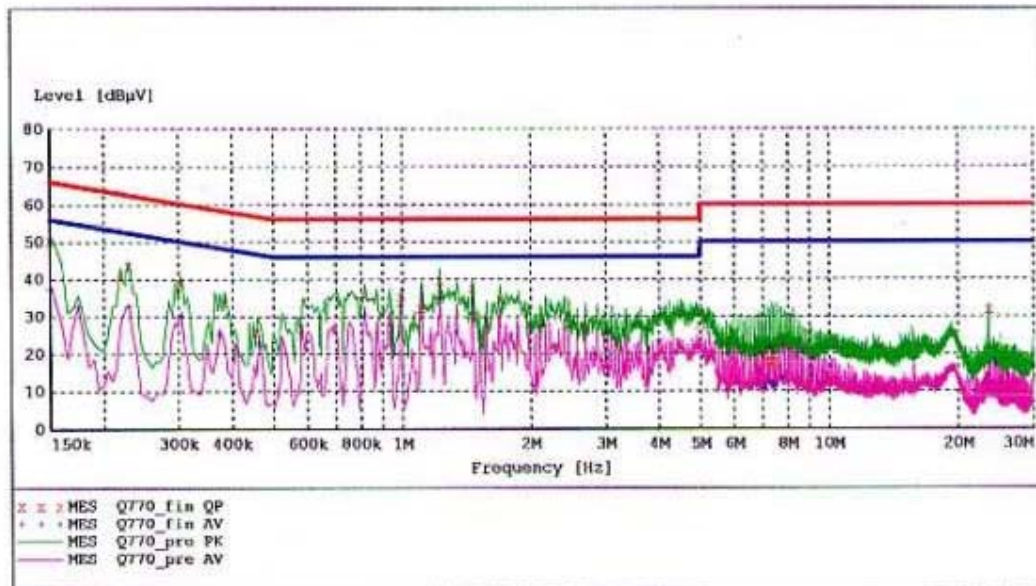
Date : JULY 4, 2002

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

EUT: LT15u
 Manufacturer: IMAGEQUEST
 Operating Condition: 1024 X 768 75Hz
 Test Site: Shield Room
 Operator: KH-SEO
 Test Specification: CISPR 22 CLASS B
 Comment: N

SCAN TABLE: "EN 55022 Voltage"

Short Description:		EN 55022 Voltage				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	old-C/E FACTOR
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	old-C/E FACTOR
			Average			


MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	50.40	0.1	66	15.6	---	---
0.220000	40.80	0.2	63	22.0	---	---
0.230000	43.50	0.2	62	19.0	---	---
0.305000	39.20	0.2	60	20.9	---	---
0.385000	33.70	0.2	58	24.5	---	---
0.460000	26.00	0.2	57	30.7	---	---
0.820000	35.40	0.2	56	20.6	---	---
0.995000	35.20	0.3	56	20.8	---	---
1.110000	32.30	0.3	56	23.7	---	---
1.230000	39.60	0.3	56	16.4	---	---
1.465000	37.40	0.3	56	18.6	---	---
1.700000	34.70	0.3	56	21.3	---	---
5.000000	27.70	0.5	56	28.3	---	---
7.170000	17.80	0.5	60	42.2	---	---

MEASUREMENT RESULT:
(continued)

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
7.290000	18.40	0.5	60	41.6	---	---
7.405000	18.20	0.5	60	41.8	---	---
7.525000	17.40	0.5	60	42.6	---	---
23.655000	31.80	1.2	60	28.2	---	---

MEASUREMENT RESULT:

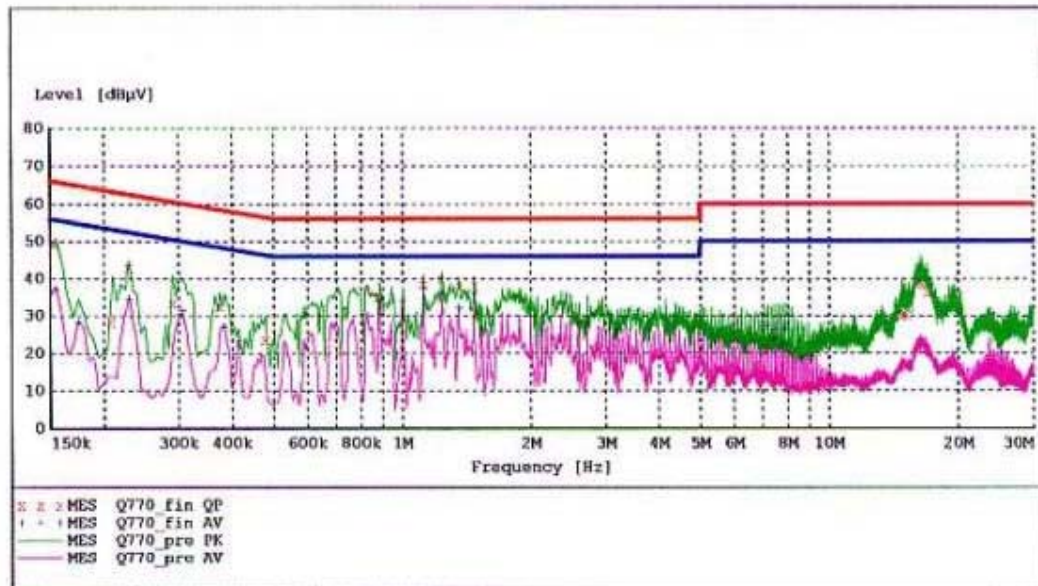
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150000	37.40	0.1	56	18.6	---	---
0.175000	32.80	0.1	55	21.9	---	---
0.230000	32.90	0.2	52	19.6	---	---
0.305000	30.20	0.2	50	19.9	---	---
0.375000	25.20	0.2	48	23.2	---	---
0.465000	23.10	0.2	47	23.6	---	---
0.820000	30.60	0.2	46	15.4	---	---
0.995000	32.80	0.3	46	13.2	---	---
1.115000	38.20	0.3	46	7.8	---	---
1.230000	35.30	0.3	46	10.7	---	---
1.345000	26.00	0.3	46	20.0	---	---
1.465000	33.90	0.3	46	12.1	---	---
7.055000	10.80	0.5	50	39.2	---	---
7.170000	11.80	0.5	50	38.2	---	---
7.290000	12.70	0.5	50	37.3	---	---
7.405000	11.80	0.5	50	38.2	---	---
7.525000	11.40	0.5	50	38.6	---	---
7.760000	13.50	0.5	50	36.5	---	---

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

EUT: LT15u
 Manufacturer: IMAGEQUEST
 Operating Condition: 1024 X 768 75Hz
 Test Site: Shield Room
 Operator: KH-SEO
 Test Specification: CISPR 22 CLASS B
 Comment: H

SCAN TABLE: "EN 55022 Voltage"

Short Description:		EN 55022 Voltage				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	old-C/E FACTOR
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	old-C/E FACTOR
			Average			



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.155000	49.00	0.1	66	16.7	---	---
0.210000	28.20	0.2	63	35.0	---	---
0.230000	43.00	0.2	62	19.4	---	---
0.290000	33.30	0.2	61	27.3	---	---
0.375000	32.50	0.2	58	25.8	---	---
0.480000	23.60	0.2	56	32.7	---	---
0.830000	36.90	0.2	56	19.1	---	---
0.885000	35.10	0.2	56	20.9	---	---
1.125000	38.60	0.3	56	17.4	---	---
1.240000	39.90	0.3	56	16.1	---	---
1.360000	38.00	0.3	56	18.0	---	---
1.480000	38.20	0.3	56	17.8	---	---
14.830000	30.30	0.9	60	29.7	---	---
15.060000	30.60	0.9	60	29.4	---	---

MEASUREMENT RESULT:
(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
15.325000	30.20	0.9	60	29.8	---	---
16.365000	38.90	0.9	60	21.1	---	---
16.560000	38.50	0.9	60	21.5	---	---
17.035000	36.20	1.0	60	23.8	---	---

MEASUREMENT RESULT:

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.155000	37.20	0.1	56	18.5	---	---
0.175000	28.40	0.1	55	26.3	---	---
0.230000	34.50	0.2	52	18.0	---	---
0.305000	31.60	0.2	50	18.5	---	---
0.385000	27.30	0.2	48	20.9	---	---
0.415000	23.50	0.2	48	24.0	---	---
0.885000	34.30	0.2	46	11.7	---	---
1.005000	33.90	0.3	46	12.1	---	---
1.125000	37.60	0.3	46	8.4	---	---
1.240000	36.20	0.3	46	9.8	---	---
1.360000	32.30	0.3	46	13.7	---	---
1.480000	36.10	0.3	46	9.9	---	---
7.220000	27.50	0.5	50	22.5	---	---
7.455000	23.80	0.5	50	26.2	---	---
7.575000	26.40	0.5	50	23.6	---	---
7.695000	29.90	0.5	50	20.1	---	---
7.810000	22.00	0.5	50	28.0	---	---
7.930000	26.60	0.5	50	23.4	---	---

4.2 Radiated Emissions Tests

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

Humidity Level : 42 % Temperature : 28 °C
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : JULY 8, 2002
 Result : PASSED BY -3.0dB

EUT : 15" LCD MONITOR
 Operating Condition : 1024 X 768 (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
42.2	10.86	14.34	1.30	V	26.5	30.0	-3.5
102.9	11.27	10.93	2.10	V	24.3	30.0	-5.7
118.8	11.79	12.91	2.30	H	27.0	30.0	-3.0
154.9	7.63	14.77	2.60	V	25.0	30.0	-5.0
190.0	8.36	15.34	3.00	V	26.7	30.0	-3.3
210.9	3.70	16.20	3.20	V	23.1	30.0	-6.9
350.8	11.70	16.60	4.00	V	32.3	37.0	-4.7
371.8	12.34	16.56	4.10	V	33.0	37.0	-4.0
479.9	10.82	18.08	4.80	V	33.7	37.0	-3.3
525.8	7.85	18.95	5.10	V	31.9	37.0	-5.1
560.8	6.95	19.75	5.30	V	32.0	37.0	-5.0
839.0	3.39	23.11	6.90	V	33.4	37.0	-3.6

NOTE:

1.All video modes and resolutions were investigated and the worst-case emissions are reported.

Measured by Kyoung-Houn SEO / Engineer

Date : JULY 8, 2002

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	2002.6.29
EMI Test Receiver	Rohde & Schwarz	ESVP	2002.2.14
EMI Test Receiver	Rohde & Schwarz	ESI40	2001.11.5
EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.3.6
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	2002.2.7
LISN	Rohde & Schwarz	ESH2-Z5	2001.8.12
Amplifier	Hewlett-Packard	8447E	2002.3.2
Dipole Antennas	Rohde & Schwarz	VHAP	2002.6.28
Dipole Antennas	Rohde & Schwarz	UHAP	2002.6.28
Biconical Antenna	Rohde & Schwarz	BBA-9106	2002.6.28
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2002.6.26
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	2002.2.20
Reference Network Impedance	Voltech	IEC 555	N.A
AC Power Source	PACIFIC	Magnetic Module	N.A
AC Power Source	PACIFIC	360AMX	N.A

