

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM
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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: SEPTEMBER 12, 2002 Test Report No.: HCT-F02-0907 Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
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CERTIFICATION Permissive change class II)

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	SAMSUNG ELECTRONICS CO.,LTD. (LTM150XH-L01)

FCC ID :

PJILT15U

MODEL / TYPE :

LT15u

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



TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION.....	3
1.1 Product Description.....	3
1.2 Related submittal(s)/Grant(s).....	3
1.3 Tested System Details.....	4
1.4 Test Methodology.....	4
1.5 Test Facility.....	4
2. SYSTEM TEST CONFIGURATION.....	5
2.1 Justification.....	5
2.2 EUT Exercise Software.....	5
2.3 Cable Description.....	5
2.4 Noise Suppression Parts on Cable.....	6
2.5 Equipment Modifications.....	6
2.6 Configuration of Tested System.....	7
3. PRELIMINARY TESTS.....	8
3.1 Power line Conducted Emissions Tests.....	9
3.2 Radiated Emissions Tests.....	9
4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY.....	9
4.1 Conducted Emission Tests.....	10
4.2 Radiated Emission Tests.....	11
5. FIELD STRENGTH CALCULATION.....	12
6. LIST OF TEST EQUIPMENT	13

ATTACHMENT A	ID Label / Location Info.
ATTACHMENT B.....	External Photos.
ATTACHMENT C	Block Diagram..
ATTACHMENT D	Test Setup Photos.
ATTACHMENT E	User's Manual.
ATTACHMENT F	Internal Photos.

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 : 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.	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	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)
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

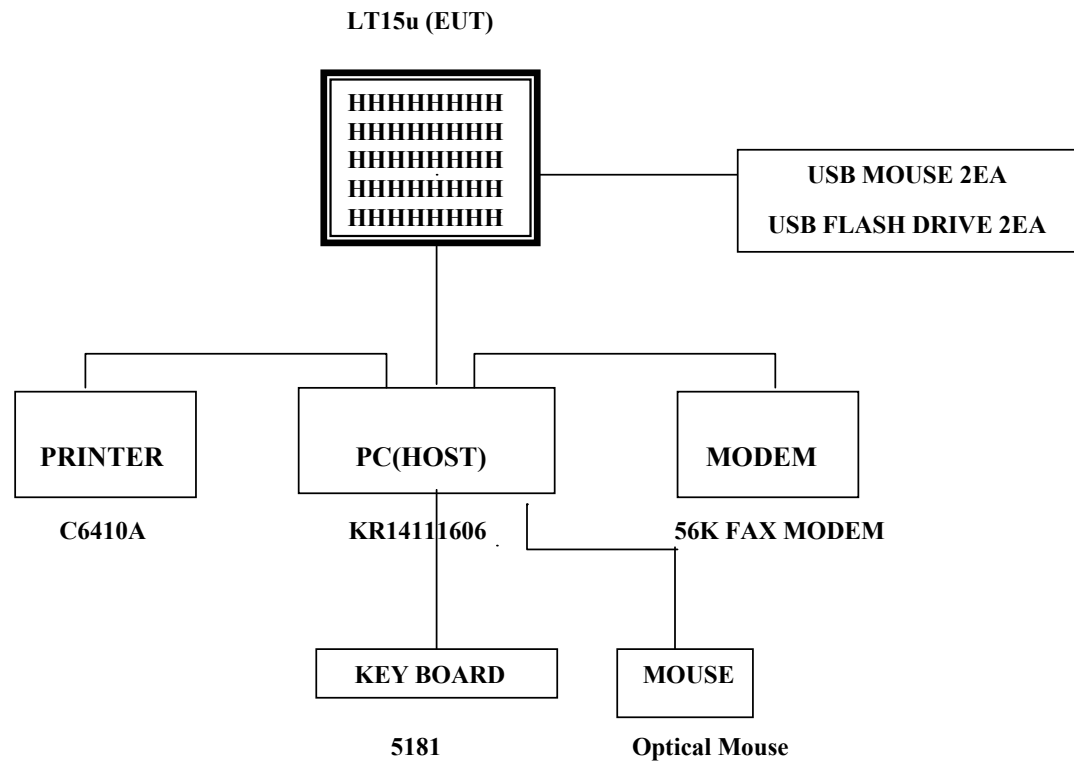
N/A

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 : SEPTEMBER 2, 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	: 32 %	Temperature	: 26 °C
Limit apply to	: CISPR 22		
Type of Tests	: CLASS B		
Date	: SEPTEMBER 5, 2002		
Result	: PASSED BY -11.5 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
0.250	40.3	HOT	52.0	-11.5	Average
0.165	42.7	HOT	55.0	-12.5	Average
0.330	35.1	HOT	50.0	-14.3	Average
0.335	35.1	HOT	49.0	-14.3	Average

Measured by : Kyoung-Houn SEO / Engineer

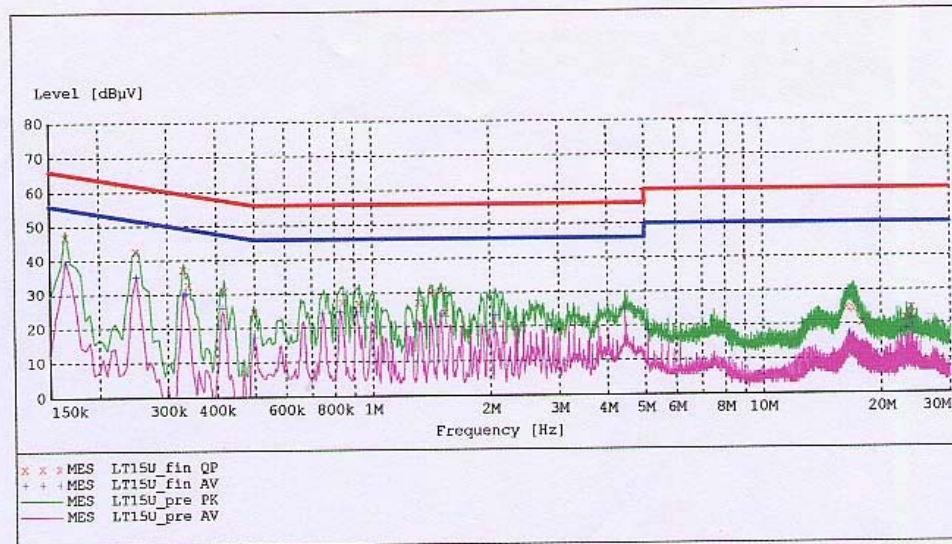
Date : SEPTEMBER 5, 2002

HYUNDAI C TECH
EMC Testing Laboratory

EUT: LT15U
 Manufacturer: IMAGEQUEST
 Operating Condition: 1024 X 768 75Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 Test Specification: CISPR22 CLASS B
 Comment: N
 Start of Test: 9/5/02 / 1:17:52PM

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: "LT15U_fin QP"

9/5/02 1:22PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.165000	47.10	0.1	65	18.1	1	---
0.250000	42.80	0.2	62	19.0	1	---
0.330000	37.50	0.2	60	22.0	1	---
0.340000	32.80	0.2	59	26.4	1	---
0.420000	31.20	0.2	57	26.2	1	---
0.500000	25.00	0.2	56	31.0	1	---
0.845000	27.50	0.2	56	28.5	1	---
0.930000	27.20	0.2	56	28.8	1	---
1.320000	27.40	0.3	56	28.6	1	---
1.415000	30.10	0.3	56	25.9	1	---
1.505000	30.90	0.3	56	25.1	1	---
1.545000	24.30	0.3	56	31.7	1	---
16.450000	25.20	0.9	60	34.8	1	---
17.130000	24.50	1.0	60	35.5	1	---

MEASUREMENT RESULT: "LT15U_fin QP"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
17.955000	20.70	1.0	60	39.3	1	---
23.315000	22.00	1.2	60	38.0	1	---
23.950000	22.60	1.2	60	37.4	1	---
24.000000	25.00	1.2	60	35.0	1	---

MEASUREMENT RESULT: "LT15U_fin AV"

9/5/02 1:22PM

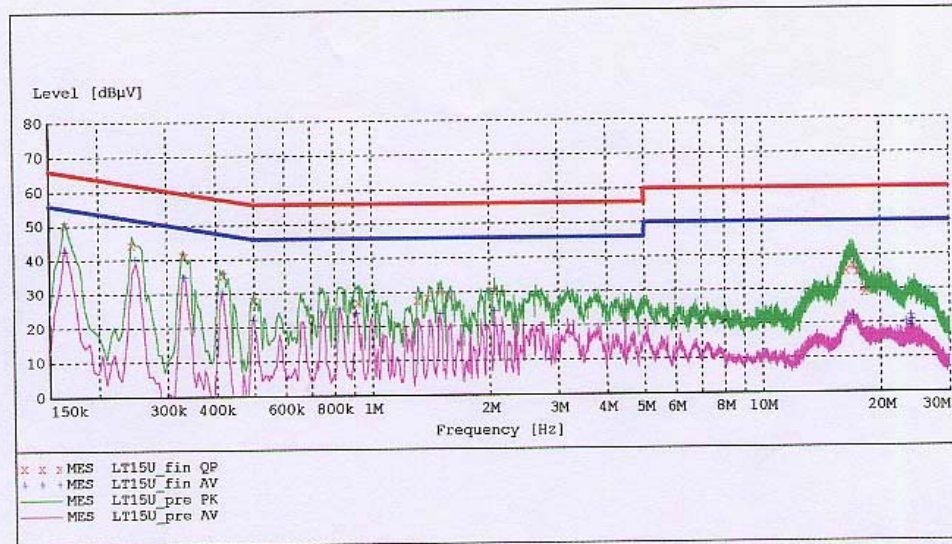
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.165000	39.10	0.1	55	16.2	1	---
0.250000	35.30	0.2	52	16.4	1	---
0.330000	29.90	0.2	50	19.6	1	---
0.335000	30.50	0.2	49	18.8	1	---
0.415000	26.00	0.2	48	21.5	1	---
0.500000	17.20	0.2	46	28.8	1	---
0.750000	24.50	0.2	46	21.5	1	---
0.830000	24.70	0.2	46	21.3	1	---
0.915000	24.80	0.2	46	21.2	1	---
1.505000	23.90	0.3	46	22.1	1	---
2.070000	23.50	0.3	46	22.5	1	---
4.450000	25.00	0.4	46	21.0	1	---
5.085000	18.70	0.5	50	31.3	1	---
16.640000	17.50	1.0	50	32.5	1	---
22.460000	17.60	1.1	50	32.4	1	---
23.305000	18.80	1.2	50	31.2	1	---
24.000000	21.70	1.2	50	28.3	1	---
24.130000	19.80	1.2	50	30.2	1	---

HYUNDAI C TECH
EMC Testing Laboratory

EUT: LT15U
 Manufacturer: IMAGEQUEST
 Operating Condition: 1024 X 768 75Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 Test Specification: CISPR22 CLASS B
 Comment: H
 Start of Test: 9/5/02 / 1:25:08PM

SCAN TABLE: "EN 55022 Voltage"

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 150.0 kHz	Frequency 500.0 kHz	Width 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: "LT15U_fin QP"

9/5/02 1:29PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.165000	50.50	0.1	65	14.8	1	---
0.245000	44.50	0.2	62	17.4	1	---
0.330000	41.50	0.2	60	17.9	1	---
0.335000	41.10	0.2	59	18.2	1	---
0.420000	35.40	0.2	57	22.1	1	---
0.500000	28.00	0.2	56	28.0	1	---
0.930000	27.20	0.2	56	28.8	1	---
1.315000	27.80	0.3	56	28.2	1	---
1.400000	28.60	0.3	56	27.4	1	---
1.505000	30.50	0.3	56	25.5	1	---
1.595000	28.60	0.3	56	27.4	1	---
2.070000	30.50	0.3	56	25.5	1	---
16.460000	35.40	0.9	60	24.6	1	---
17.025000	37.40	1.0	60	22.6	1	---

MEASUREMENT RESULT: "LT15U_fin QP"
(continued)

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
17.195000	36.80	1.0	60	23.2	1	---
17.540000	35.10	1.0	60	24.9	1	---
18.190000	30.60	1.0	60	29.4	1	---
18.335000	29.10	1.0	60	30.9	1	---

MEASUREMENT RESULT: "LT15U_fin AV"
9/5/02 1:29PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.165000	42.70	0.1	55	12.5	1	---
0.250000	40.30	0.2	52	11.5	1	---
0.330000	35.10	0.2	50	14.3	1	---
0.335000	35.10	0.2	49	14.3	1	---
0.415000	30.80	0.2	48	16.8	1	---
0.500000	22.50	0.2	46	23.5	1	---
0.745000	24.50	0.2	46	21.5	1	---
0.830000	25.20	0.2	46	20.8	1	---
0.915000	24.20	0.2	46	21.8	1	---
1.505000	23.90	0.3	46	22.1	1	---
2.070000	24.60	0.3	46	21.4	1	---
4.450000	24.60	0.4	46	21.4	1	---
16.505000	20.40	0.9	50	29.6	1	---
17.105000	22.20	1.0	50	27.8	1	---
23.310000	20.60	1.2	50	29.4	1	---
23.940000	19.30	1.2	50	30.7	1	---
24.000000	22.30	1.2	50	27.7	1	---
24.130000	21.00	1.2	50	29.0	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 : 39 % Temperature : 26 °C
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : SEPTEMBER 12, 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
44.9	10.69	13.61	1.30	V	25.6	30.0	-4.4
59.7	16.14	8.46	1.60	V	26.2	30.0	-3.8
71.9	15.49	5.71	1.80	V	23.0	30.0	-7.0
120.5	9.69	13.41	2.40	V	25.5	30.0	-4.5
198.6	8.39	15.61	3.00	H	27.0	30.0	-3.0
217.0	1.76	16.64	3.30	V	21.7	30.0	-8.3
331.5	13.42	16.08	3.90	V	33.4	37.0	-3.6
399.8	11.48	16.52	4.20	H	32.2	37.0	-4.8
466.3	8.07	17.93	4.80	V	30.8	37.0	-6.2
482.0	10.69	18.11	4.80	V	33.6	37.0	-3.4
531.0	6.48	19.02	5.20	V	30.7	37.0	-6.3
541.5	8.58	19.12	5.30	V	33.0	37.0	-4.0

NOTE:

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

Measured by Kyoung-Houn SEO / Engineer

Date : SEPTEMBER 12, 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	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESVP	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESI40	2001.11.5
EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.7.16
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	2002.9.1
LISN	EMCO	3825/2	2002.2.7
LISN	Rohde & Schwarz	ESH2-Z5	2002.8.12
Amplifier	Hewlett-Packard	8447E	2002.9.1
Dipole Antennas	Rohde & Schwarz	VHAP	2002.7.16
Dipole Antennas	Rohde & Schwarz	UHAP	2002.7.16
Biconical Antenna	Rohde & Schwarz	BBA-9106	2002.7.12
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2002.7.12
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

