



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 (Permissive change class)

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: MAY 23, 2002

Test Report No.: HCT-F02-0505

**Test Site: HYUNDAI CALIBRATION & CERTIFICATION
TECHNOLOGIES CO., LTD.
HCT FRN : 0005-8664-21**

FCC ID :

PJIL17C0D080

MODEL / TYPE :

L70A/L17C0D080

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:

17" LCD Monitor

Max Resolution:

1280X1024 (@80KHz/ 75Hz)

Port/ Connector(s)

**15-pin D-sub VGA connector; USB 1 upstream port and 2 downstream ports
AU Optronics Corporation. (M170EN04)**

LCD PANEL

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



HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD. EMC LAB.

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1. GENERAL INFORMATION

1.1 Product Description

The ImageQuest CO., LTD. Model L70A (referred to as the EUT in this report) is a 17" LCD Monitor HOR. Freq. 80KHz w/max. Resolution of 1280X1024 . 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 , 16MHz , 20MHz
POWER REQUIREMENT	DC 12V ---- 3.75A
NUMBER OF LAYERS	MAIN BOARD 4 LAYER OSD BOARD 2 LAYER POWER BOARD 2 LAYER INVERTER BOARD 2 LAYER
MAX. RESOLUTION	1280X1024 (@80KHz/ 75 Hz)
H-SYNC FREQUENCY RANGE	31.0KHz 80.0KHz
V-SYNC FREQUENCY RANGE	56Hz 75Hz
LCD TYPE	17" (LCD Type NO : M170EN04)

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.	L70A	PJIL17C0D080	HOST
PC(HOST)	H/P	KR14111606	DoC	N/A
KEY BOARD	H/P	BF12502086	DoC	HOST
PRINTER	H/P	HP895C	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
VIDEO CARD	NVIDIA	NVIDIA GeForce MX 200	DoC	HOST
MOUSE	H/P	M-S48a	DoC	HOST
USB MOUSE	LOGITECH	M-BE55	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.	3041001038
POWER BOARD	ImageQuest CO., Ltd	3610200099
OSD BOARD	ImageQuest CO., Ltd.	3100700778
INVERTOR BOARD	ImageQuest CO., Ltd	3610400248
LCD BOARD	AU Optronics Corporation	M170EN04

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

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

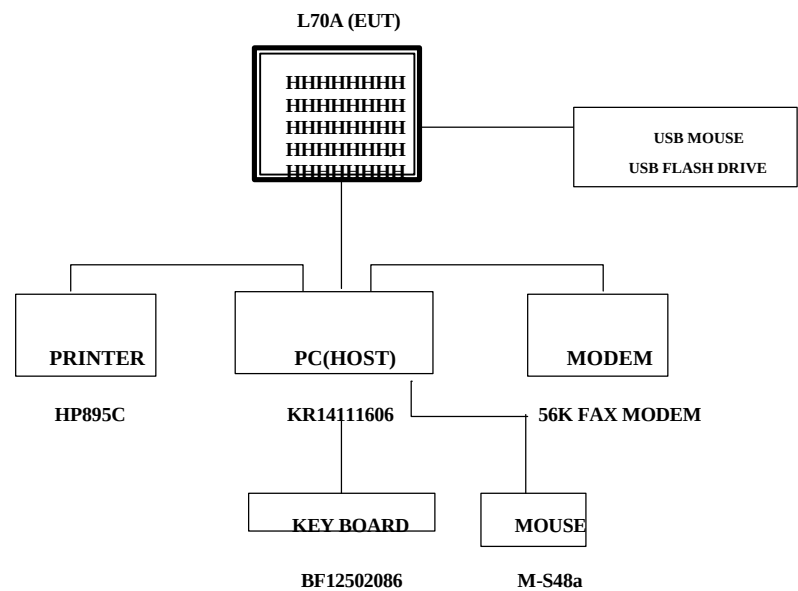
2.5 Equipment Modifications

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	1280X1024 (80KHz/75Hz)	X
	1024X768 (60KHz/75Hz)	
	1024X768 (56.5KHz/70Hz)	
	800X600 (37.9KHz/60Hz)	
	800X600 (35.2 KHz/56Hz)	
	640X480 (31.5KHz/70Hz)	

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	1280X1024 (80KHz/75Hz)	X
	1024X768 (60KHz/75Hz)	
	1024X768 (56.5KHz/70Hz)	
	800X600 (37.9KHz/60Hz)	
	800X600 (35.2 KHz/56Hz)	
	640X480 (31.5KHz/70Hz)	

Tested by Kyoung-Houn SEO / Engineer

Date : MAY 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	: 34%	Temperature	: 27
Limit apply to	: CISPR 22		
Type of Tests	: CLASS B		
Date	: MAY 8, 2001		
Result	: PASSED BY -7.9 dB		
EUT	: 17" LCD MONITOR		

Operating Condition : 1280X1024 (Hf : 80KHz, 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
3.644	38.1	HOT	46.0	-7.9	Average
2.981	38.0	HOT	46.0	-8.0	Average
3.641	37.9	NEUTRAL	46.0	-8.1	Average
3.050	37.7	HOT	46.0	-8.3	Average

Measured by : Kyoung-Houn SEO / Engineer

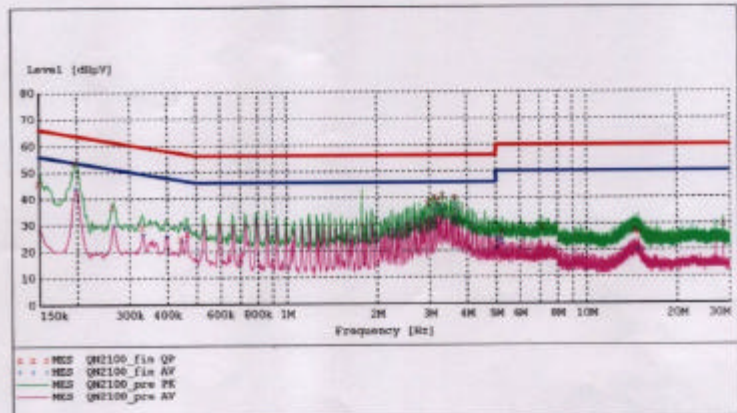
Date : MAY 8, 2002

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

EUT: L70A ACER
Manufacturer: IMAGEQUEST
Operating Condition: 1280 X 1024 80K 75Hz
Test Site: SHIELD ROOM
Operator: KH-SEO
Test Specification: CISPR 22
Comment: N
Start of Test: 5/8/02 / 1:35:12PM

SCAN TABLE: "EN 55022 Voltage"

Start	Stop	Step	EN 55022 Voltage	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width					
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak		10.0 ms	9 kHz	old-C/E FACTOR
			Average				

**MEASUREMENT RESULT: "QN2100_fin QP"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	45.80	1.0	66	20.2	1	---
0.198000	53.80	1.0	64	9.9	1	---
0.264000	36.90	1.0	61	24.4	1	---
0.330000	29.10	1.0	60	30.3	1	---
0.444000	24.80	1.0	57	32.2	1	---
0.468000	26.70	1.0	57	29.9	1	---
1.787000	29.70	1.2	56	26.3	1	---
2.984000	37.90	1.4	56	18.1	1	---
3.107000	40.30	1.4	56	15.7	1	---
3.212000	39.10	1.4	56	16.9	1	---
3.317000	40.70	1.4	56	15.3	1	---
3.641000	40.20	1.5	56	15.8	1	---
5.246000	27.10	1.6	60	32.9	1	---
7.094000	28.80	1.6	60	31.2	1	---

MEASUREMENT RESULT: "QN2100_fin QP"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	FE
14.453000	27.90	1.7	60	32.2	1	----
14.519000	27.60	1.7	60	32.4	1	----
14.855000	26.90	1.7	60	33.1	1	----
28.637000	30.10	1.7	60	29.9	1	----

MEASUREMENT RESULT: "QN2100_fin AV"

5/8/02 1:39PM

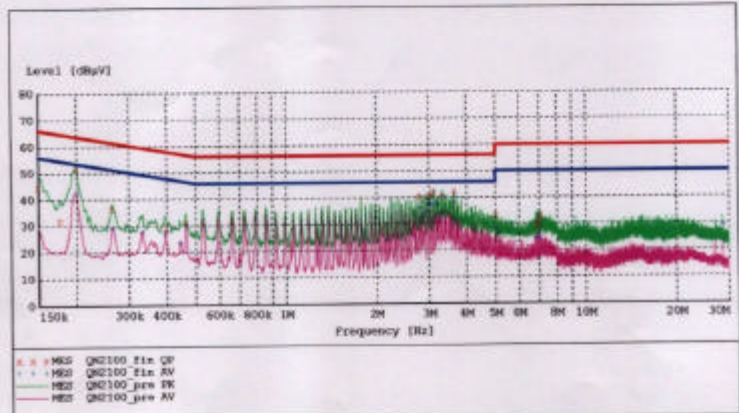
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	FE
0.198000	43.90	1.0	54	9.8	1	----
0.267000	29.80	1.0	51	21.4	1	----
0.333000	26.60	1.0	49	22.8	1	----
0.399000	25.80	1.0	48	22.1	1	----
0.447000	24.00	1.0	47	22.9	1	----
0.465000	28.80	1.0	47	17.8	1	----
3.107000	35.80	1.4	46	10.2	1	----
3.212000	37.20	1.4	46	8.8	1	----
3.317000	35.90	1.4	46	10.1	1	----
3.641000	37.90	1.5	46	8.1	1	----
3.716000	32.60	1.5	46	13.4	1	----
3.749000	35.90	1.5	46	10.1	1	----
5.033000	25.00	1.6	50	25.0	1	----
5.051000	21.30	1.6	50	28.7	1	----
5.141000	24.20	1.6	50	25.8	1	----
5.246000	23.10	1.6	50	26.9	1	----
14.855000	20.30	1.7	50	29.7	1	----
28.637000	29.10	1.7	50	20.9	1	----

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

EUT: L70A ACER
Manufacturer: IMAGEQUEST
Operating Condition: 1280 X 1024 80K 75Hz
Test Site: SHIELD ROOM
Operator: KH-SEO
Test Specification: CISPR 22
Comment: N
Start of Test: 5/8/02 / 1:40:41PM

SCAN TABLE: "EN 55022 Voltage"

Short Description:	EN 55022 Voltage	Detector	Meas. Time	IF Bandw.	Transducer
Start Stop Step					
Frequency Frequency Width					
150.0 kHz 30.0 MHz 5.0 kHz		MaxPeak	10.0 ms	9 kHz	old-C/E FACTOR
		Average			

**MEASUREMENT RESULT: "QN2100 fin QP"**

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	FE
0.150000	44.50	1.0	66	21.5	1	---
0.177000	32.00	1.0	65	32.6	1	---
0.201000	52.00	1.0	64	11.6	1	---
0.264000	36.50	1.0	61	24.8	1	---
0.399000	29.30	1.0	58	28.5	1	---
0.465000	31.10	1.0	57	25.5	1	---
2.786000	40.50	1.4	56	15.5	1	---
2.981000	40.50	1.4	56	15.5	1	---
3.047000	40.90	1.4	56	15.1	1	---
3.113000	41.80	1.4	56	14.2	1	---
3.320000	40.50	1.4	56	15.5	1	---
3.644000	42.40	1.5	56	13.6	1	---
5.036000	33.40	1.6	60	26.6	1	---
6.893000	29.00	1.6	60	31.0	1	---

MEASUREMENT RESULT: "QN2100_fin QP"

(continued)

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PK
6.959000	30.20	1.6	60	29.8	1	----
7.019000	32.60	1.6	60	27.4	1	----
7.025000	30.30	1.6	60	29.7	1	----
7.085000	33.00	1.6	60	27.0	1	----

MEASUREMENT RESULT: "QN2100_fin AV"

5/8/02 1:44PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PK
0.201000	42.70	1.0	54	10.8	1	----
0.264000	29.30	1.0	51	22.0	1	----
0.333000	27.90	1.0	49	21.5	1	----
0.396000	27.10	1.0	48	20.9	1	----
0.444000	23.70	1.0	47	23.3	1	----
0.465000	30.40	1.0	47	16.2	1	----
2.786000	36.20	1.4	46	9.8	1	----
2.981000	38.00	1.4	46	8.0	1	----
3.050000	37.70	1.4	46	8.3	1	----
3.116000	37.50	1.4	46	8.5	1	----
3.215000	37.30	1.4	46	8.7	1	----
3.644000	38.10	1.5	46	7.9	1	----
5.036000	28.30	1.6	50	21.7	1	----
5.141000	26.30	1.6	50	23.7	1	----
6.881000	24.60	1.6	50	25.4	1	----
6.959000	24.30	1.6	50	25.7	1	----
7.019000	26.00	1.6	50	24.0	1	----
28.637000	28.90	1.7	50	21.1	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 : 42 % Temperature : 24
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : MAY 7, 2002
 Result : PASSED BY -3.0dB

EUT : 17" LCD MONITOR
 Operating Condition : 1280X1024 (Hf :80 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/m	Margin dB
32.7	5.57	18.83	0.90	V	25.3	30.0	-4.7
52.3	15.30	10.10	1.50	V	26.9	30.0	-3.1
128.6	10.76	13.84	2.40	H	27.0	30.0	-3.0
192.7	5.07	15.43	3.00	V	23.5	30.0	-6.5
256.8	11.77	17.73	3.60	V	33.1	37.0	-3.9
282.5	10.30	17.90	3.80	V	32.0	37.0	-5.0
289.2	11.64	18.06	3.80	V	33.5	37.0	-3.5
482.0	7.79	18.11	4.80	V	30.7	37.0	-6.3
576.5	5.79	20.01	5.40	H	31.2	37.0	-5.8
748.0	0.16	22.54	6.40	V	29.1	37.0	-7.9
847.8	3.79	23.11	6.90	H	33.8	37.0	-3.2
895.0	2.06	24.34	7.00	V	33.4	37.0	-3.6

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 : MAY 7, 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

TYPE	MANUFACTURE	MODEL	CAL. DATE
EMI Test Receiver	Rohde & Schwarz	ESH3	2001.6.29
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	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	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