

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

Manufacture;

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

Date of Issue: SEPTEMBER 17, 2001

Test Report No.: HCT-F01-0902

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

FCC ID :

PJIL15A0C062

MODEL / TYPE :

L550S

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 (@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 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



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.....	6
2.4 Noise Suppression Parts on Cable.....	6
2.5 Equipment Modifications.....	7
2.6 Configuration of Tested System.....	8
3. PRELIMINARY TESTS.....	9
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 L550S (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
POWER REQUIREMENT	100-240 VAC 50/60 Hz, 1.0A
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	44Hz 75Hz
LCD TYPE	15" (LCD Type : HSD150SX73)

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.	L550S	PJIL15A0C062	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	Hannstar Display Corp	HSD150SX73
POWER BOARD	C&C TECH.	301 0700 780
OSD BOARD	ImageQuest CO., Ltd.	301 0700 779
INVERTOR BOARD	Hannstar Display Corp	HSD150SX73
LCD BOARD	Hannstar Display Corp	HSD150SX73

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)
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)

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

2.5 Equipment Modifications

N/A

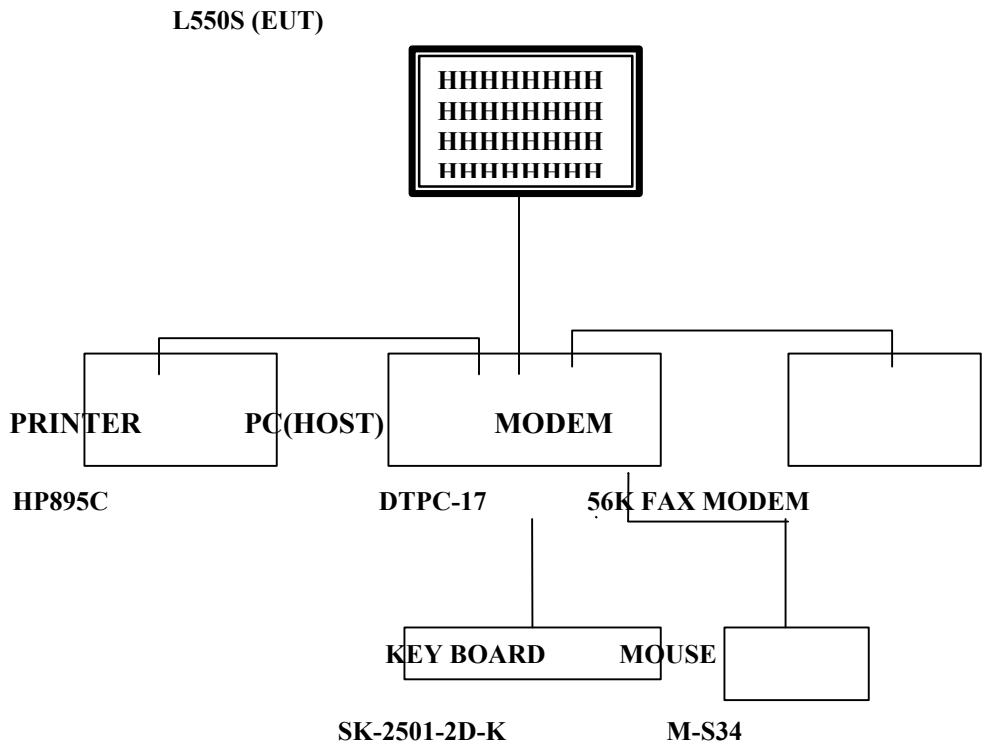
2.6 Configuration of Test system

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	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 : SEPTEMBER 3 , 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 : 33% Temperature : 27
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : SEPTEMBER 7, 2001
 Result : PASSED BY 3.6 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
0.395	44.40	NEUTRAL	48.0	3.6	Average
0.395	43.70	HOT	48.0	4.3	Average
0.595	40.70	NEUTRAL	46.0	5.3	Average
0.595	40.30	HOT	46.0	5.7	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

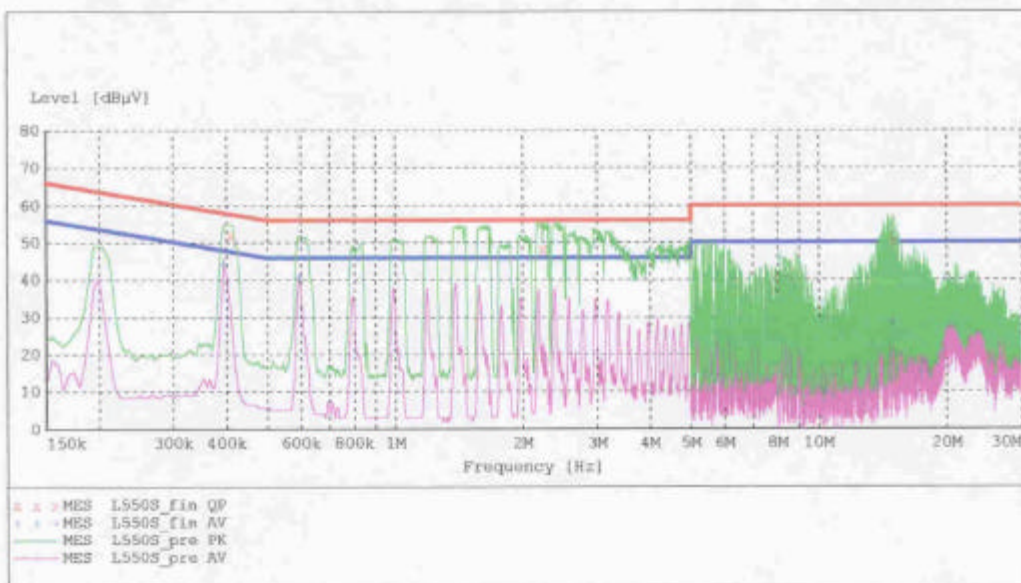
Date : SEPTEMBER 7 , 2001

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

EUT: L550S
 Manufacturer: IQT
 Operating Condition:
 Test Site: Shield Room
 Operator:
 Test Specification: CISPR22 Class B
 Comment: N
 Start of Test: 9/7/01 / 11:06:10AM

SCAN TABLE: "CISPR22 Class B"

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



MEASUREMENT RESULT: "L550S_fin QP"

9/7/01 11:09AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.410000	51.80	0.5	58	5.8	1	---
2.240000	48.10	0.6	56	7.9	1	---
14.985000	50.40	1.5	60	9.6	1	---

MEASUREMENT RESULT: "L550S_fin AV"

9/7/01 11:09AM

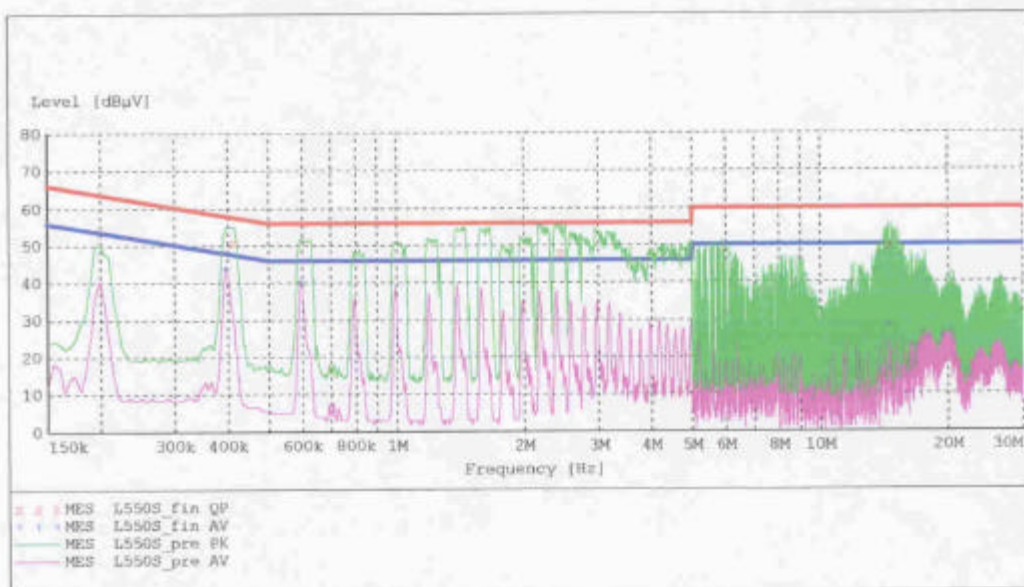
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.395000	44.40	0.5	48	3.6	1	---
0.595000	40.70	0.5	46	5.3	1	---
14.985000	28.80	1.5	50	21.2	1	---

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

EUT: L550S
 Manufacturer: IQT
 Operating Condition:
 Test Site: Shield Room
 Operator:
 Test Specification: CISPR22 Class B
 Comment: H
 Start of Test: 9/7/01 / 11:13:25AM

SCAN TABLE: "CISPR22 Class B"

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	100.0 ms	9 kHz	CABLE LOSS (NEW)
			Average			



MEASUREMENT RESULT: "L550S_fin QP"

9/7/01 11:17AM

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBuV	dB	dBuV	dB		
0.415000	50.80	0.5	58	6.8	1	---
2.445000	47.90	0.6	56	8.1	1	---
14.585000	49.60	1.5	60	10.4	1	---

MEASUREMENT RESULT: "L550S_fin AV"

9/7/01 11:17AM

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBuV	dB	dBuV	dB		
0.395000	43.70	0.5	48	4.2	1	---
0.595000	40.30	0.5	46	5.7	1	---
14.510000	28.70	1.5	50	21.3	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 : 25
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : SEPTEMBER 12, 2001
 Result : PASSED BY 3.0dB

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	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dB	Margin dB
42.8	10.66	14.34	1.30	V	26.3	30.0	-3.7
62.4	17.15	6.85	1.70	V	25.7	30.0	-4.3
112.4	7.11	12.39	2.30	H	21.8	30.0	-8.2
119.1	7.14	12.96	2.30	V	22.4	30.0	-7.6
125.9	10.88	13.72	2.40	H	27.0	30.0	-3.0
131.9	3.44	14.16	2.50	V	20.1	30.0	-9.9
165.7	7.94	14.86	2.70	H	25.5	30.0	-4.5
218.3	6.82	16.68	3.30	H	26.8	30.0	-3.2
229.8	2.81	17.19	3.30	V	23.3	30.0	-6.7
462.8	9.23	17.87	4.80	H	31.9	37.0	-5.1
594.0	4.28	20.22	5.70	V	30.2	37.0	-6.8
748.0	2.26	22.54	6.40	H	31.2	37.0	-5.8

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 : SEPTEMBER 12 , 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.</u>	<u>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