

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

INT' L STANDARD CERTIFICATION TEAM SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA TEL : +82 31 639 8518 FAX : +82 31 639 8525

# CERTIFICATION

#### Manufacture; HYUNDAI IMAGEQUEST CO., LTD.

Date of Issue: AUGUST 16, 2001

Test Report No.: HCT-F01-0801

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

:

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

FCC ID

**MODEL / TYPE :** 

FCC Rule Part(s): Classification: Standard(s): Equipment(EUT) Type: Max Resolution: Port/ Connector(s)

# PJIC17F05071 F771

Part 15 & 2; ET Docket 95-19 FCC Class B Peripheral Device (JBP) FCC Class B: 1998 (CISPR 22) 17" CRT Monitor 1024 X 768 Non-interlaced (@68.7KHz/ 85Hz) 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** GTech. 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).

K SOO

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 F771 (referred to as the EUT in this report) is a 17" CRT Monitor with HOR. Freq. 70KHz (Max) and Resolution of 1024X768 (Non-Interlaced). 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 1.5A 60/50Hz
NUMBER OF LAYERS	MAIN BOARD 1 LAYER CRT BOARD 1 LAYER
MAX. RESOLUTION	1024 X 768 NON-INTERLACED(@68.7KHz/ 85 Hz)
H-SYNC FREQUENCY RANGE	30KHz 70KHz
V-SYNC FREQUENCY RANGE	50Hz 150Hz
CRT TYPE	17" ( CRT Type :M41QCJ761X173)

## **1.2** Related Submittal(s) / Grant(s)

**ORIGINAL SUBMITTAL ONLY** 

## **1.3 Tested System Details**

	(including inse	erted cards) are:			
	DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
ľ	MONITOR (EUT)	IMAGEQUEST CO., LTD.	F771	PJIC17F05071	HOST
ſ	PC(HOST)	H/P	DTPC-17	DoC	N/A
ſ	KEY BOARD	H/P	SK-2501-2D-K	GYUR385K	HOST
ľ	PRINTER	H/P	HP895C	DoC	HOST
ľ	MODEM	<b>3COM CORPORATION</b>	56K FAX MODEM	DoC	HOST
I	VIDEO CARD	DIAMOND	3D3000	DoC	HOST

**M-S34** 

DZL211029

HOST

The Model names for all equipment, plus descriptions used in the tested system (including inserted cards) are:

#### **1.4 Test Methodology**

H/P

MOUSE

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	3040100883
CRT BOARD	ImageQuest CO., Ltd.	3040100884

#### 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)	Ν	Y	1.8(P), 1.5(D)
PC(HOST)	Ν	N/A	1.8(P)
PRINTER	Ν	Y	2.0(P),1.8(D)
KEY BOARD	N/A	Y	2.0(D)
MODEM	Ν	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	PC END	Y	PC END
PRINTER	Y	PC END	Y	BOTH END
KEY BOARD	Y	PC END	Y	PC END
MODEM	Y	PC END	Y	BOTH END
MOUSE	Ν	N/A	Y	PC END

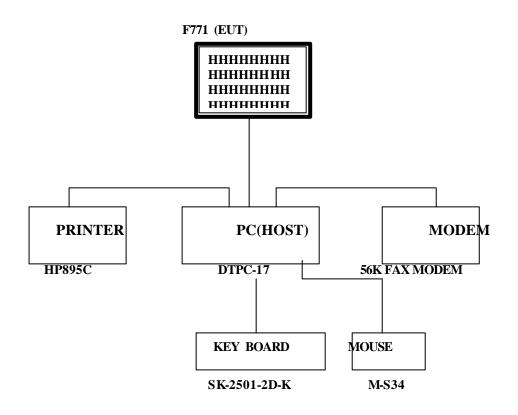
# **2.5 Equipment Modifications**

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<br/>procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating<br/>condition. Final Radiated Emission tests were conducted at 10 meter<br/>open area test site.

#### [Configuration of Tested System]



# **3. PRELIMINARY TESTS3.1 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 75 MHz	1024 x 768 Non-Interlaced (68.67KHz/85Hz)	Х
Pentium 75 MHz	800 x 600 Non-Interlaced (63.70KHz/120Hz)	
Pentium 75 MHz	800 x 600 Non-Interlaced (63.92KHz/100Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.27KHz/85Hz)	

#### **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 75 MHz	1024 x 768 Non-Interlaced (68.67KHz/85Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (63.70KHz/120Hz)	
Pentium 75 MHz	800 x 600 Non-Interlaced (63.92KHz/100Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.27KHz/85Hz)	

Tested by Kyoung-Houn Seo/Engineer

Date : AUGUST 1, 2001

#### 4. FINAL CONDUCETD 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 : 25
Limit apply to	: CISPR 22	
Type of Tests	: CLASS B	
Date	: AUGUST 7, 2001	
Result	: PASSED BY -5.7 dB	
EUT	: 17" CRT MONITOR	

 Operating Condition
 : 1024 X 768 Non-Interlaced (Hf : 68.7 KHz, Vf : 85Hz)

 Detector
 : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

 CISPR Average(6 dB Bandwidth : 9 KHz)

#### Line Conducted Emission Tabulated Data

Power Li	ne Conducted Emi	ssions		CISPR 22	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)	Detector Mode
0.205	47.70	NEUTRAL	53.4	-5.7	Average
0.550	36.90	НОТ	46.0	-9.1	Average
1.095	35.70	NEUTRAL	46.0	-10.3	Average
1.645	35.90	NEUTRAL	46.0	-10.1	Average

NOET:

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1. 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 : AUGUST 7, 2001** 

HYUNDAI C-TECH. CO., LTD. EMC TEST LAB. F771 EUT: Manufacturer: Operating Condition: Shield Room Test Site: Operator: Test Specification: CISPR22 Class B Comment: N Start of Test: 8/7/01 / 3:24:14PM Scan TABLE: "EN 55022 Voltage" Short Description: EN 55022 Voltage Step Detector IF Transducer Meas. Start Stop Bandw. Time Frequency Frequency Width CABLE LOSS (NEW) 100.0 ms 9 kHz MaxPeak 150.0 kHz 2.0 MHz 5.0 kHz Average CABLE LOSS (NEW) 10.0 ms 9 kHz 2.0 MHz 30.0 MHz 5.0 kHz MaxPeak Average 66 dBuV 150 kHz Marker: Level [dBµV] 80 790 60 50 40 30 20 10 20M 3 CM 5M GM 8M 10M 150k 300k 400k 600k BOOk 1M 2M 3M 4M Frequency [Hz] E771\_fin QP E771\_fin AV E771\_pre PK E771\_pre AV MES 11 MES MRS MES

8/7/01 3:29PM Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.150000	37.10	0.5	66	28.9	1	
0.205000	54.40	0.5	63	9.0	1	
0.270000	41.80	0.5	61	19.3	1	
0.275000	45.40	0.5	61	15.6	1	
0.340000	40.70	0.5	59	18.5	1	
0.410000	34.20	0.5	58	23.4	1	
2.535000	41.50	0.6	56	14.5	1	
3.015000	41.20	0.6	56	14.8	1	
4,385000	41.00	0.8	56	15.0	1	-
4.455000	40.10	0.8	56	15.9	1	
4,795000	40.90	0.9	56	15.1	1	
4.865000	40.90	0.9	56	15.1	1	
6,715000	44.40	1.1	60	15.6	1	-
9.935000	42.60	1.3	60	17.4	1	

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MEASUREMENT (continued)	RESULT	: "F771	_fin (	2P"	-	
Frequency	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
11.440000	43.90	1.4	60	16.1	1	
11.920000	45.80	1.4	60	14.2	1	
12,470000	47.70	1.4	60	12.3	1	
18,840000	44.00	1.7	60	16.0	1	
MEASUREMENT 8/7/01 3:29PI		: "F771	_fin a	AV"		
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.205000	47.70	0.5	53	5.7	1	
0.270000	37.70	0.5	51	13.5		
0.275000	41.70	0.5	51	9.3	1	
0.340000	33.80	0.5	49	15.4	1	
0.410000	25.30	0.5	48	22.4	1	-
0.480000	26.90	0.5	46	19.4	1	
1.095000	35.70	0.5	46	10.3	1	
1,165000	35.40	0.5	46	10.6	1	
1.575000	35.40	0.5	46	10.6	1	
		6.0	30	10.1	1.1	-

0.5

0.6

0.6

1.2

1.3

1.3

1.4

46

46

46

50

50

50

50

50

50

1

1

1

1

1

1

1

1

10.1

10.8

11.0

19.9

19.1

22.5

21.1

19.7

11.5

35.90

35.20

35.00

30.10 30.90 27.50 28.90

30.30

38.50

1.645000

2.055000

2.535000

9.385000

9.935000

10.965000

11.440000

11.920000

18.840000

F771 8/7/01 3:29PM Page 2/2

HYUNDAI C-TECH. CO., LTD. EMC TEST LAB. F771 EUT: Manufacturer: Operating Condition: Test Site: Shield Room Operator: Test Specification: CISPR22 Class B H Comment: 8/7/01 / 3:30:12PM Start of Test: SCAN TABLE: "EN 55022 Voltage" Short Description: EN 55022 Voltage Step Detector Meas. IF Transducer Start Stop Bandw. Frequency Frequency 150.0 kHz 2.0 MHz Time Width 100.0 ms 9 kHz CABLE LOSS (NEW) MaxPeak 5.0 kHz Average 10.0 ms 9 kHz CABLE LOSS (NEW) 30.0 MHz 5.0 kHz MaxPeak 2.0 MHz Average 66 dBµV 150 kHz Markert Level [dBµV] 80 700 60 50 40 30 20 10 5M 6M BM 10M 20M 30M 4M 3M 150k 300k 400k 600k 800k 1M 2M Frequency [Hz] F771\_fin QP F771\_fin AV F771\_pre PK F771\_pre AV MES MES MES MES MEASUREMENT RESULT: "F771 fin QP"

Level	Transd	Limit	Margin	Line	PE
ODH A	GD	Carola 4			
36,80	0.5	66	29.2	1	
51.10	0.5	63	12.3	1	
39.60	0.5	61	21.5	1	
43.10	0.5	61	17.9	1	
38.80	0.5	59	20.4	1	
33.90	0.5	56	22.4	1	
40.80	0.5	56	15.2	1	-
39.20	0.5	56	16.8	1	
40.10	0.6	56	15.9	1	
39.20	0.6	56	16.8	1.	
40.10	0.6	56	15.9	1	
38.90	0.7	56	17.1	1	
41.10	1.0	60	18.9	1	
41.20	1.4	60	18.8	1	
	dBµV 36.80 51.10 39.60 43.10 38.80 33.90 40.80 39.20 40.10 39.20 40.10 38.90 41.10	dBµV         dB           36.80         0.5           51.10         0.5           39.60         0.5           43.10         0.5           38.80         0.5           33.90         0.5           40.80         0.5           39.20         0.5           40.10         0.6           39.20         0.5           40.10         0.6           38.90         0.7           41.10         1.0	dBµV         dB         dBµV           36.80         0.5         66           51.10         0.5         63           39.60         0.5         61           43.10         0.5         61           38.80         0.5         59           33.90         0.5         56           40.80         0.5         56           40.10         0.6         56           39.20         0.5         56           40.10         0.6         56           39.20         0.5         56           40.10         0.6         56           39.20         0.5         56           40.10         0.6         56           39.20         0.6         56           40.10         0.6         56           41.10         1.0         60	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
42.10	1.4	60	17.9	1	
43.90	1.4	60	16.1	1	
43.80	1.4	60	16.2	1	
42.30	1.4	60	17.7	1	
	42.10 43.90 43.80	42.10 1.4 43.90 1.4 43.80 1.4	42.10 1.4 60 43.90 1.4 60 43.80 1.4 60	42.10         1.4         60         17.9           43.90         1.4         60         16.1           43.80         1.4         60         16.2	42.10         1.4         60         17.9         1           43.90         1.4         60         16.1         1           43.80         1.4         60         16.2         1

#### MEASUREMENT RESULT: "F771\_fin AV" 8/7/01 3:36PM

07	1/UL 3:30PM						
	Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
	0.205000	42.40	0.5	53	11.0	1	
	0.270000	31.70	0.5	51	19.4	1	
	0.275000	35.60	0.5	51	15.3	1	
	0.340000	30.30	0.5	49	18.9	1	-
	0.410000	25.00	0.5	48	22.6	1	
	0.480000	29.60	0.5	4.6	16.7	1	
	0.550000	36.90	0.5	46	9.1	1	
	0.755000	34.50	0.5	46	11.5	1	
	1.095000	34.30	0.5	46	11.7	1	
	1,165000	34.50	0.5	46	11.5	1	
	2.055000	34.10	0.6	46	11.9	1	
	2.535000	35.50	0.6	46	10.5	1	
	5.890000	31.90	1.0	50	18.1	1	
	6.305000	33.70	1.0	50	16.3	1	-
	6.715000	33.60	1.1	50	16.4	1	
	12.265000	28.80	1.4	50	21.2	1	
	12.740000	26.50	1.4	50	23.5	1	
	12.815000	27.80	1.4	50	22.2	1	

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Hz)

#### **4.2 Radiated Emissions Tests**

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

Humidity Level	: 30 %	Temperature : 24
Limit apply to	: CISPR 22	
Type of Tests	: CLASS B	
Date	: AUGUST 6,2001	
Result	: PASSED BY -4.0 dB	

EUT	: 17" CRT MONITOR
<b>Operating Condition</b>	: 1024 X 768 Non-Interlaced (Hf :68.7 kHz, Vf : 85
Detector	: CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Frequency	Reading	Ant. Factor	Cable Loss	ANT POL	Total	Limit	Margin
MHz	dBuV	dB	dB	(H/V)	dBuV/m	dB	dB
43.0	10.14	13.96	1.30	V	25.4	30.0	- 4.6
51.6	9.53	10.47	1.50	н	21.5	30.0	- 8.5
64.4	17.71	6.59	1.70	V	26.0	30.0	- 4.0
75.9	13.14	5.96	1.80	н	20.9	30.0	-9.1
107.6	8.94	11.46	2.20	н	22.6	30.0	-7.4
151.5	5.74	14.76	2.60	н	23.1	30.0	-6.9
287.9	3.37	18.03	3.80	н	25.2	37.0	-11.8
403.3	5.05	16.55	4.20	н	25.8	37.0	-11.2
445.3	5.89	17.21	4.60	н	27.7	37.0	-9.3
501.3	5.02	18.58	4.90	V	28.5	37.0	- 8.5
545.0	6.25	19.15	5.30	н	30.7	37.0	-6.3
613.3	2.19	21.01	5.90	V	29.1	37.0	-7.9

#### 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 : AUGUST 6, 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 dBuV/m

Level in uV/m = Common Antilogarithm [(30 dBuV/m)/20] = 31.6 uV/m

# 6. LIST OF TEST EQUIPMENT

ТҮРЕ	MANUFACTURE	MODEL	CAL. DATE
EMI Test Receiver	Rohde & Schwarz	ESH3	2001.6.26
<b>EMI Test Receiver</b>	Rohde & Schwarz	ESVP	2001.2.14
<b>EMI Test Receiver</b>	Rohde & Schwarz	ESI40	2001.1.18
<b>EMI Test Receiver</b>	Rohde & Schwarz	ESVS30	2001.6.26
Spectrum Monitor	Rohde & Schwarz	EZM	N.A
<b>Graphic Plotter</b>	Rohde & Schwarz	DOP2	N.A
Printer	Rohde & Schwarz	PDN	N.A
Spectrum Analyzer	H.P	8591EM	2001.7.11
LISN	ЕМСО	3825/2	2001.7.13
LISN	Rohde & Schwarz	ESH2-Z5	2001.7.19
Amplifier	Hewlett-Packard	8447E	2001.3.2
Dipole Antennas	Rohde & Schwarz	VHAP	2001.6.28
<b>Dipole Antennas</b>	Rohde & Schwarz	UHAP	2001.6.28
<b>Biconical Antenna</b>	Rohde & Schwarz	<b>BBA-9106</b>	2001.6.28
Log-Periodic Antenna	Rohde & Schwarz	<b>UHALP-9107</b>	2001.6.26
Antenna Position Tower	EMCO	1051-12	N.A
Turn Table	ЕМСО	1060-06	N.A
Line Filter	KEENE	ULW 2X30-60	N.A
Power Analyzer	Voltech	PM 3300	2001.2.20
<b>Reference Network Imped</b>	anceVoltech	IEC 555	N.A
<b>AC Power Source</b>	PACIFIC	<b>Magnetic Module</b>	N.A
<b>AC Power Source</b>	PACIFIC	360AMX	Ν.Α