

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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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: OCTOBER 9, 2002

Test Report No.: HCT-F02-1003

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

CERTIFICATION (Permissive change class II)

FCC ID:

PJIL17C0D081

MODEL / TYPE :

Q17

FCC Rule Part(s):

Part 15 & 2

Classification:

FCC Class B Computing Device Peripheral (JBP)

Standard(s):

FCC Class B: 1998 (CISPR 22)

Equipment(EUT) Type:

17" LCD Monitor

Max Resolution:

1280 X 1024 (@80KHz/ 75Hz)

Port/ Connector(s):

**15-pin D-sub VGA connector, 20-pin DVI-D (Digital RGB),
USB 1 upstream port and 2 downstream ports, AUDIO IN/OUT.**

LCD PANEL:

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

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



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1. GENERAL INFORMATION

1.1 Product Description

The ImageQuest CO., LTD. Model Q17 (referred to as the EUT in this report) is a 17" LCD Monitor HOR. Freq. 80KHz w/max. Resolution of 1280 X 1024 . 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)	6MHz , 12MHz , 20MHz
POWER REQUIREMENT	100-240V AC
NUMBER OF LAYERS	MAIN BOARD 4 LAYER USB & AUDIO BOARD 1 LAYER POWER BOARD 1 LAYER INVERTER BOARD 1 LAYER
MAX. RESOLUTION	Analog RGB : 1280 X 1024 @ 75 Hz Digital TMDS : 1280 X 1024 @ 60 Hz
H-SYNC FREQUENCY RANGE	31.0KHz ~ 80.0KHz
V-SYNC FREQUENCY RANGE	56Hz ~ 75Hz
LCD TYPE	17" (LCD Type NO : LTM170EH-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.	Q17	PJIL17C0D081	HOST
PC(HOST)	H/P	KR20803647	DoC	N/A
VIDEO CARD	UNITECH	RADEON VE DUAL	DoC	HOST
KEY BOARD	H/P	BF12502086	DoC	HOST
MOUSE	M/S	Intellimouse optical USB and PS/2 compatible	DoC	HOST
PRINTER	H/P	C6410A	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
USB MOUSE	LOGITECH	M-BE55	DoC	EUT
USB FLASH DRIVE	Jung Myung Telecom Co.,Ltd	E-D900-00-4988	DoC	EUT
EAR PHONE	SAMBO COMPUTER	DW-400M	-	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.	3041001049
POWER BOARD	IPT CO.,LTD.	3610200107
USB & AUDIO BOARD	ImageQuest CO., Ltd.	3010700815
INVERTOR BOARD	ImageQuest CO., Ltd	3610400253
LCD BOARD	SAMSUNG ELECTRONICS CO.,LTD.	LTM170EH-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	Y	0.8(D)
USB FRESH DRIVE	N/A	N/A	N/A
AUDIO IN	N/A	N	1.5(D)
AUDIO OUT	N/A	N	2.9(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	N	N/A	Y	BOTH END
KEY BOARD	N	N/A	Y	PC END
MOUSE	Y	PC END	Y	PC END
MODEM	N	N/A	Y	BOTH END
UPLOAD	Y	BOTH END	Y	BOTH END
USB MOUSE	Y	PC END	Y	EUT END
USB FRESH DRIVE	N	N/A	Y	EUT END
AUDIO IN	Y	BOTH END	Y	BOTH END
AUDIO OUT	Y	PC END	Y	EUT END

2.5 Equipment Modifications

N/A

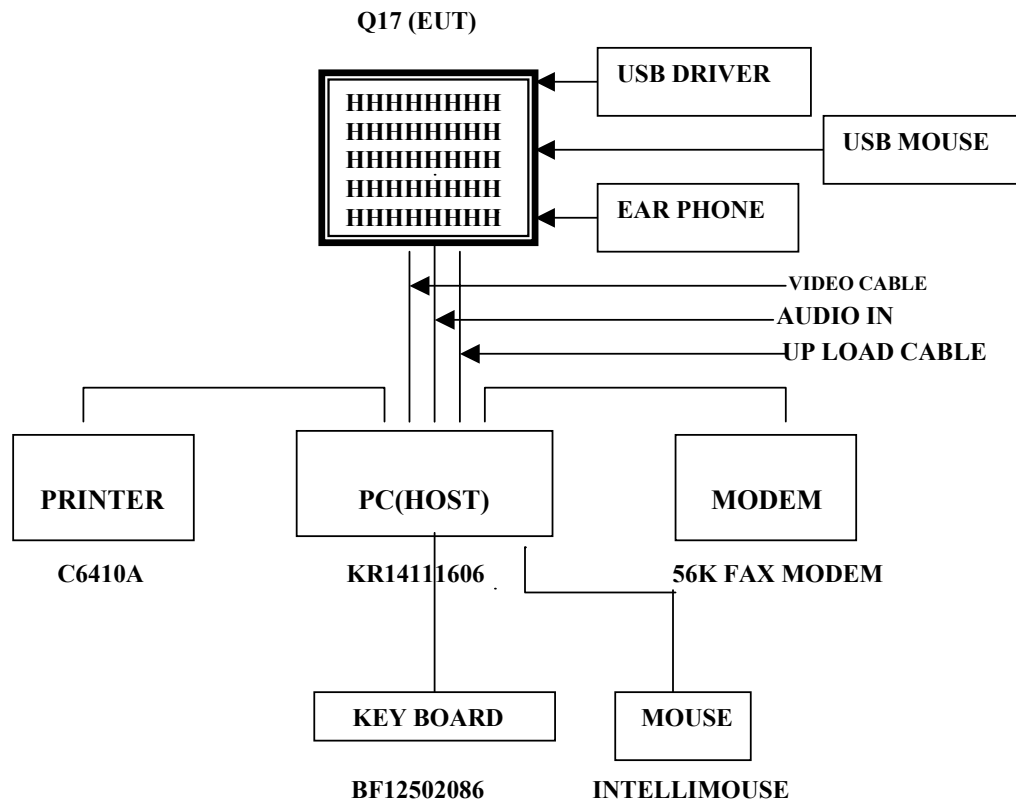
2.6 Configuration of Test system

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

NOTE:

The monitor(EUT) has video interface ports(15-pin D-sub VGA connector and 20-pin DVI-D (Digital RGB), to support graphics.

So the test were performed with each video interface port. The final measurement was performed with VGA 15 pin D-sub video interface port that produce the worst case emission.

Tested by Kyoung-Houn SEO / Engineer

Date : NOVEMBER 24, 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	: 35 %	Temperature : 20 °C
Limit apply to	: CISPR 22	
Type of Tests	: CLASS B	
Date	: NOVEMBER 26, 2002	
Result	: PASSED BY 3.1 dB	
EUT	: 17" LCD MONITOR	

Operating Condition : 1280 X 1024 (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
4.425	42.9	HOT	46.0	3.1	Average
4.425	41.4	NEUTRAL	46.0	4.6	Average
4.090	40.3	NEUTRAL	46.0	5.7	Average
4.090	40.3	HOT	46.0	5.7	Average

Measured by : Kyoung-Houn SEO / Engineer

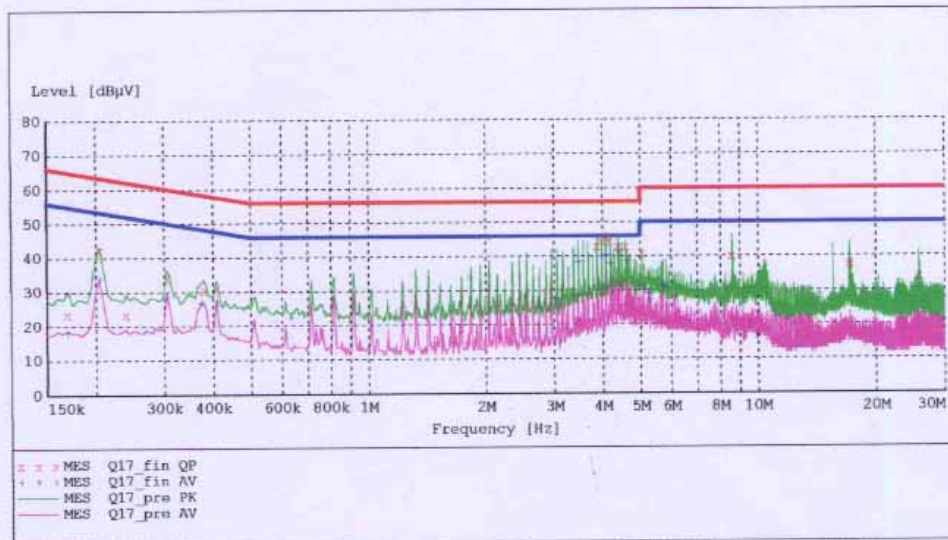
Date : NOVEMBER 26, 2002

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EMC Testing Laboratory

EUT: Q17
 Manufacturer: IMGAEQUEST
 Operating Condition: 1280 X 1024 75Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 Test Specification: EN55022 CLASS B
 Comment: N
 Start of Test: 11/26/02 / 9:08:05AM

SCAN TABLE: "EN 55022 Voltage"

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5
500.0 kHz	5.0 MHz	5.0 kHz	Average	10.0 ms	9 kHz	ESH3-Z5
			MaxPeak			
			Average			


MEASUREMENT RESULT: "Q17_fin QP"

11/26/02 9:12AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.170000	23.50	10.1	65	41.5	1	---
0.205000	42.30	10.1	63	21.1	1	---
0.240000	23.40	10.1	62	38.7	1	---
0.305000	34.10	10.1	60	26.0	1	---
0.380000	30.40	10.1	58	27.9	1	---
0.410000	31.20	10.1	58	26.4	1	---
3.885000	43.00	10.3	56	13.0	1	---
3.985000	44.50	10.3	56	11.5	1	---
4.090000	45.50	10.3	56	10.5	1	---
4.190000	44.30	10.3	56	11.7	1	---
4.395000	43.00	10.3	56	13.0	1	---
4.600000	42.90	10.3	56	13.1	1	---
5.055000	40.80	10.3	60	19.2	1	---
8.615000	40.00	10.4	60	20.0	1	---

MEASUREMENT RESULT: "Q17_fin QP"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
15.605000	17.90	10.5	60	42.1	1	---
17.210000	37.90	10.5	60	22.1	1	---
17.230000	37.00	10.5	60	23.0	1	---
25.835000	34.20	10.6	60	25.8	1	---

MEASUREMENT RESULT: "Q17_fin AV"

11/26/02 9:12AM

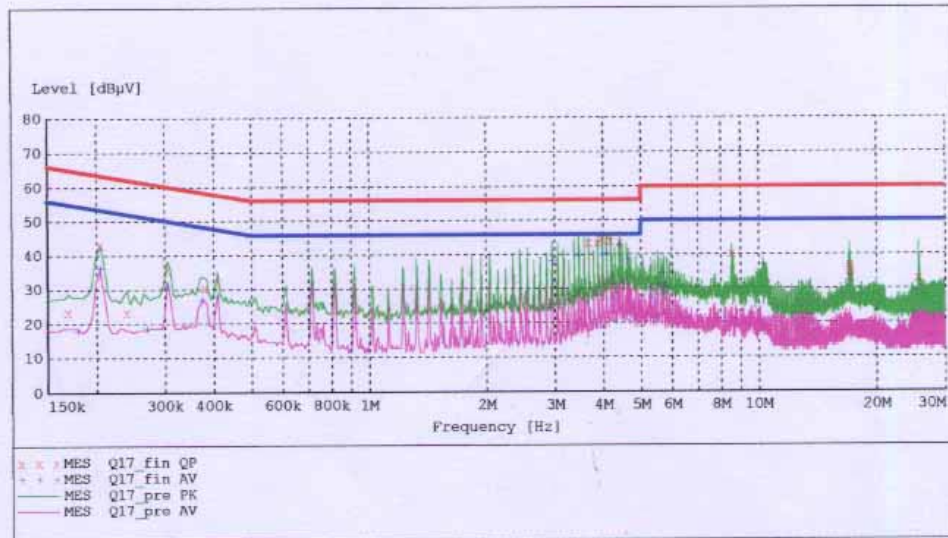
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.170000	18.30	10.1	55	36.7	1	---
0.205000	33.90	10.1	53	19.5	1	---
0.270000	18.60	10.1	51	32.5	1	---
0.305000	28.80	10.1	50	21.3	1	---
0.375000	27.00	10.1	48	21.3	1	---
0.410000	27.40	10.1	48	20.3	1	---
3.475000	38.40	10.2	46	7.6	1	---
3.985000	40.10	10.3	46	5.9	1	---
4.090000	40.30	10.3	46	5.7	1	---
4.190000	37.90	10.3	46	8.1	1	---
4.425000	41.40	10.3	46	4.6	1	---
4.635000	38.80	10.3	46	7.2	1	---
5.010000	31.50	10.3	50	18.5	1	---
5.110000	30.70	10.3	50	19.3	1	---
5.265000	29.30	10.3	50	20.7	1	---
5.325000	27.50	10.3	50	22.5	1	---
5.685000	32.00	10.3	50	18.0	1	---
5.725000	31.00	10.3	50	19.0	1	---

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EMC Testing Laboratory

EUT: Q17
 Manufacturer: IMGAEQUEST
 Operating Condition: 1280 X 1024 75Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 Test Specification: EN55022 CLASS B
 Comment: H
 Start of Test: 11/26/02 / 9:13:20AM

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	ESH3-Z5
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5
			Average			


MEASUREMENT RESULT: "Q17_fin QP"

11/26/02 9:17AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.170000	23.50	10.1	65	41.5	1	---
0.205000	43.20	10.1	63	20.2	1	---
0.240000	23.40	10.1	62	38.7	1	---
0.305000	36.00	10.1	60	24.2	1	---
0.380000	30.40	10.1	58	27.9	1	---
0.410000	32.50	10.1	58	25.1	1	---
3.680000	43.50	10.3	56	12.5	1	---
3.885000	43.50	10.3	56	12.5	1	---
3.985000	44.60	10.3	56	11.4	1	---
4.090000	45.60	10.3	56	10.4	1	---
4.190000	44.00	10.3	56	12.0	1	---
4.425000	43.80	10.3	56	12.2	1	---
8.555000	40.40	10.4	60	19.6	1	---
17.115000	36.20	10.5	60	23.8	1	---

MEASUREMENT RESULT: "Q17_fin QP"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
17.145000	35.30	10.5	60	24.7	1	---
17.165000	37.00	10.5	60	23.0	1	---
17.175000	33.20	10.5	60	26.8	1	---
25.710000	32.90	10.6	60	27.1	1	---

MEASUREMENT RESULT: "Q17_fin AV"

11/26/02 9:17AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.180000	18.00	10.1	55	36.5	1	---
0.205000	36.40	10.1	53	17.0	1	---
0.270000	18.60	10.1	51	32.5	1	---
0.305000	31.40	10.1	50	18.7	1	---
0.375000	27.20	10.1	48	21.2	1	---
0.410000	28.20	10.1	48	19.4	1	---
2.965000	38.20	10.2	46	7.8	1	---
3.475000	39.80	10.2	46	6.2	1	---
3.985000	40.00	10.3	46	6.0	1	---
4.090000	40.30	10.3	46	5.7	1	---
4.425000	42.90	10.3	46	3.1	1	---
4.635000	38.80	10.3	46	7.2	1	---
5.270000	30.10	10.3	50	19.9	1	---
5.325000	27.40	10.3	50	22.6	1	---
5.520000	31.00	10.3	50	19.0	1	---
5.690000	34.50	10.3	50	15.5	1	---
5.725000	31.40	10.3	50	18.6	1	---
5.825000	30.40	10.3	50	19.6	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 : 19 °C
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : DECEMBER 2, 2002
 Result : PASSED BY 3.0dB

EUT : 17" LCD MONITOR
 Operating Condition : 1280 X 1024 (Hf : 80 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 dBuV/m	Margin dB
71.9	15.59	5.71	1.80	V	23.1	30.0	-6.9
96.2	13.25	9.55	2.00	V	24.8	30.0	-5.2
108.3	12.67	11.53	2.20	V	26.4	30.0	-3.6
120.5	10.39	13.41	2.40	V	26.2	30.0	-3.8
153.2	9.63	14.77	2.60	V	27.0	30.0	-3.0
163.0	8.16	14.84	2.70	H	25.7	30.0	-4.3
326.3	13.68	16.02	3.90	V	33.6	37.0	-3.4
352.5	9.90	16.60	4.00	H	30.5	37.0	-6.5
434.8	10.12	17.08	4.50	V	31.7	37.0	-5.3
452.3	11.08	17.72	4.70	V	33.5	37.0	-3.5
541.5	6.28	19.12	5.30	H	30.7	37.0	-6.3
569.5	6.19	19.91	5.30	V	31.4	37.0	-5.6

NOTE:

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

Measured by Kyoung-Houn SEO / Engineer

Date : DECEMBER 2, 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