

MEASUREMENT/TECHNICAL REPORT

HYUNDAI ELECTRONICS INDUSTRIES CO., LTD

MODEL : V770

This report concerns(check one) : Original grant X Class change

Equipment type : MONITOR

Deferred grant requested per 47 CFR 0.457(d)(1)()? yes___no X

If yes, defer until:

___ agrees to notify the Commission by

of the intended date of announcement of the product so that the grant can be issued on that date.

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1. GENERAL INFORMATION

1.1 Product Description

The Hyundai Electronics Industries Co., Ltd. Model V770(referred to as the EUT in this Report) is a 17"COLOR Monitor HOR. Freq. 64KHz w/max. Resolution of 1280 X 1024Non-Interlaced

Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	PLASTIC(OUT SIDE), METAL(INSIDE)
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	12 MHz
CHIPSET BRAND AND PART NO.	STMICROELECTRO: UUC3842N SAMSUNG ELEC.: ULM7805CT PHILIPS H.K: TDA4857 NATIONAL SEMICO: LM458 WELTREND: WT62PI-N40 SAMSUNG ELEC.: KS24C081C PHILIPS H.K: TDA4866 SAMSUNG ELEC.:KA2500 MYSON TECH: MTV021 9LANGUAGE NATIONAL SEMICO: LM2437T NATIONAL SEMICO: LM2439T
POWER REQUIREMENT	100 – 240 VAC 50/60Hz(Universal Power) 1.3A , 75W
NUMBER OF LAYER	MAIN BOARD 1 LAYER CRT SOCKET BOARD 1 LAYER
MAX. RESOLUTION	1280 X 1024 NON-INTERLACED (@ 64KHz/60Hz)
H-SYNC FREQUENCY RANGE	30KHz ~ 70KHz
V- SYNC FREQUENCY RANGE	50Hz ~ 150Hz
CRT SIZE	17" (SAMSUNG CRT / Type : M41QAR361X114)
VIDEO CONNECTOR TYPE	D-SUB 15-PIN

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
COLOR MONITOR (EUT)	HYUNDAI	V770	CKLV770	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	MATROX	MIL2P/4G	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 on May 22, 1997 and accepted dated July 25,1997(1300F2)

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	HYUNDAI	E4208516901
CRT SOCKET BOARD	HYUNDAI	E4208616902

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)
PC(Host)	N	N/A	1.8(P)
COLOR MONITOR(EUT)	N	Y	1.5(P) , 1.5(D)
PARALLEL	N	Y	1.5(P) , 1.5(D)
KEYBOARD	N/A	Y	1.0(D)
SERIAL	N	Y	1.5(P) , 1.5(D)
MOUSE(PS2)	N/A	Y	1.8(D)

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

2.4 Noise Suppression Parts on Cable.

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PC(HOST)	N	N/A	N	N/A
COLOR MONITOR(EUT)	Y	PC END	Y	PC END
KEYBOARD	Y	PC END	Y	PC END
PARALLEL	N	N/A	Y	BOTH END
SERIAL	N	N/A	Y	BOTH END
MOUAE(PS/2)	N	N/A	Y	PC END

2.5 Equipment Modifications

N/A

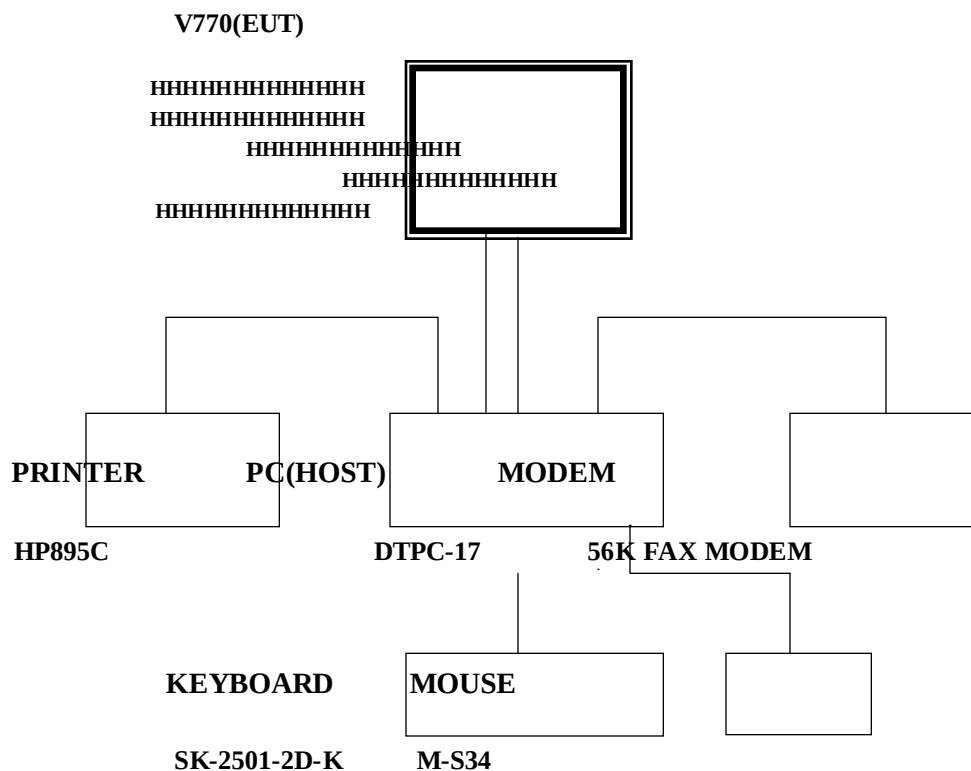
2.6 Configuration of Test system

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 75 MHz	1280 x 1024 Non-Interlaced (63.99KHz/60Hz)	
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)	

3.2 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	1280 x 1024 Non-Interlaced (63.99KHz/60Hz)	
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 KEUN HO, PARK

Date : FEB. 18, 2000

4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emissions Tests

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level : 22% Temperature : 21
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : FEB. 22, 2000
 Result : PASSED BY -5.8 dB(Average)

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EUT : 17" COLOR MONITOR
 Operating Condition : 1024 X 768 Non-Interlaced (Hf : 68.7KHz, Vf : 85Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

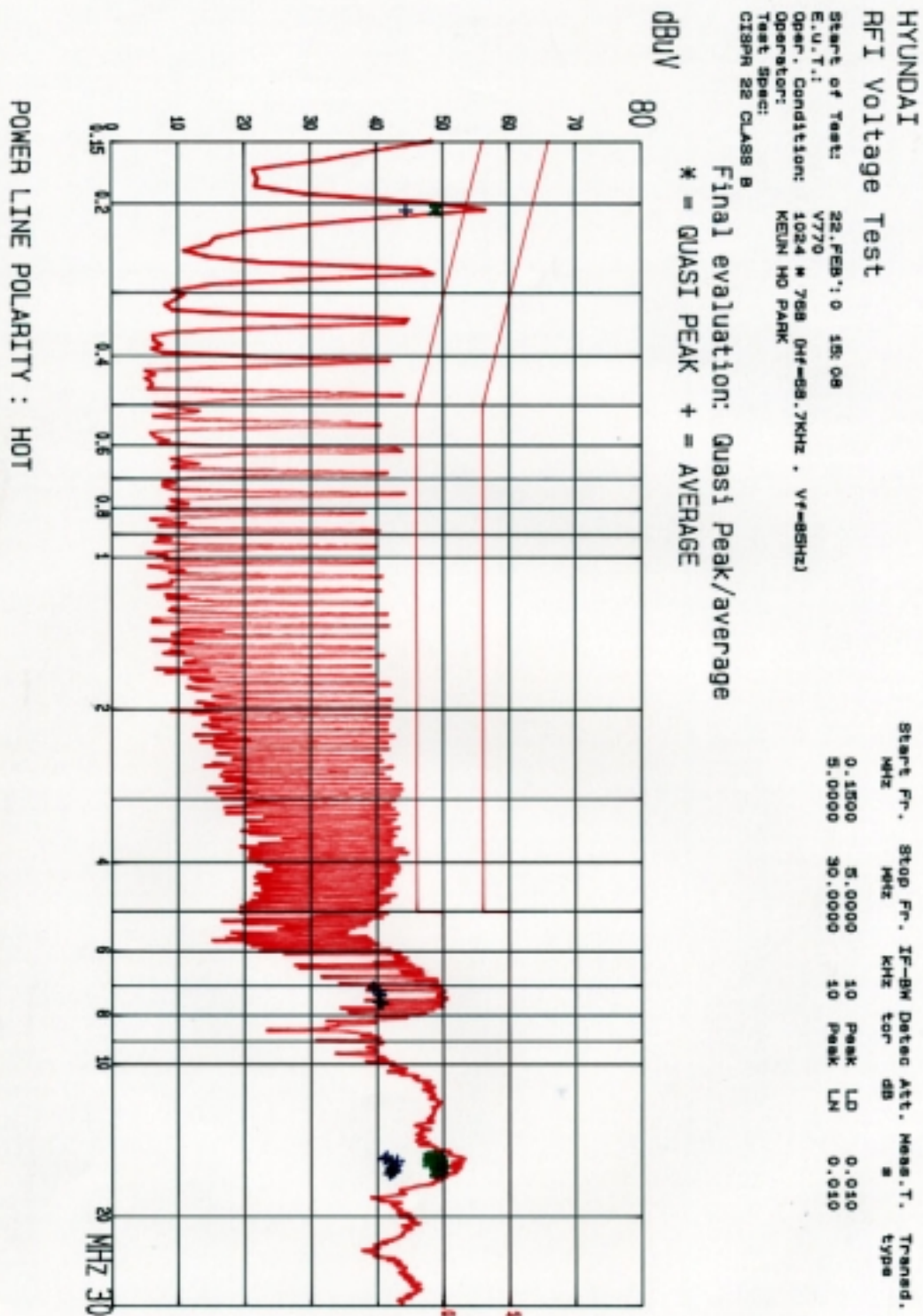
Frequency (MHz)	Quasi Peak(dBuV)			Average(dBuV)			Power Line (H/N)
	LEVEL	LIMIT	Magin	LEVEL	LIMIT	Magin	
16.15	49.6	60.0	-1.04	42.2	50.0	-7.8	H
15.87	49.4	60.0	-10.6	42.8	50.0	-7.2	H
6.91	50.4	60.0	-9.4	44.2	50.0	-5.8	N
7.18	49.9	60.0	-10.1	44.0	50.0	-6.0	N
7.52	48.9	60.0	-11.1	43.9	50.0	-6.1	N
11.29	49.1	60.0	-10.9	43.8	50.0	-6.2	N

Line Conducted Emissions Tabulated Data

NOTE:

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 : KUN HO, PARK / Engineer



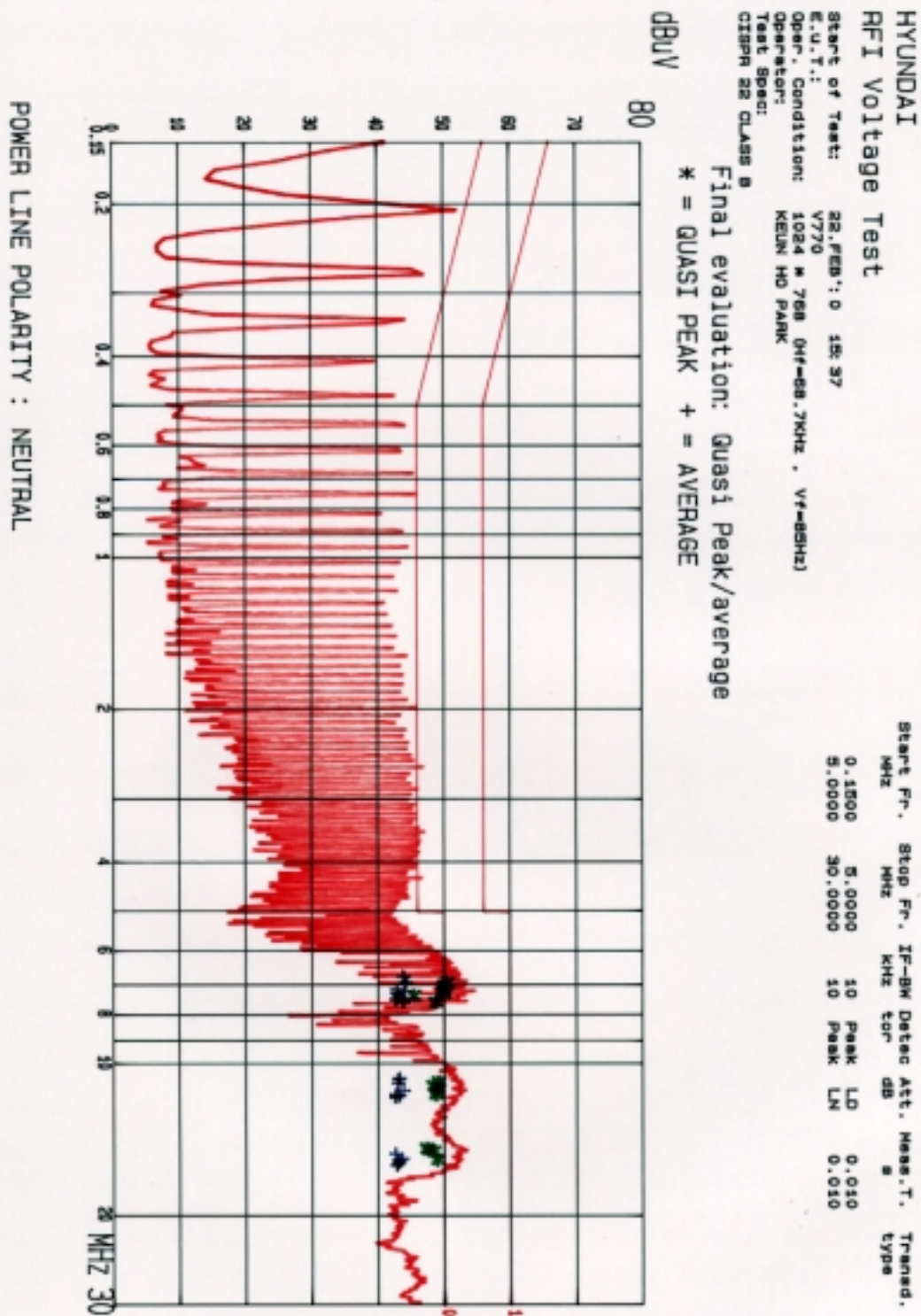
HYUNDAI RFI Voltage Test

Start of Test: 22.FEB'00 15:08
 E.U.T.: V770
 Oper. Condition: 1024 M 768 (H=68.7MHz, V=65Hz)
 Operator: KEUN HO PARK
 Test Spec: CISPR 22 CLASS B

Quest Peak values		Q-Peak GP-Margin	
Frequency MHz	Peak dBuV	dBuV	dB
0.2060	58.5	49.1	-14.5
15.2620	51.7	48.8	-11.5
15.3320	51.8	48.7	-11.5
15.3950	52.8	48.1	-11.8
15.4550	53.2	48.0	-11.0
15.5350	51.8	48.5	-10.5
15.6050	52.5	48.2	-10.8
15.6680	52.2	48.0	-12.0
15.8080	51.8	48.7	-10.5
15.8780	52.8	48.4	-10.8
15.9480	52.0	48.3	-10.7
16.0810	52.3	48.5	-10.7
16.1510	52.6	48.6	-10.4
16.2210	51.8	48.3	-10.7
16.4240	52.1	49.1	-10.8
Average values		Average-Margin	
Frequency MHz	Peak dBuV	Average dBuV	Average-Margin dB
0.2060	58.5	44.4	-9.2
7.0510	49.3	39.5	-10.5
7.1840	50.2	40.2	-9.8
7.3240	49.7	40.4	-9.6
7.5270	50.0	40.2	-9.8
7.5970	49.4	40.6	-8.4
15.3320	51.8	41.5	-8.5
15.3950	52.8	41.5	-8.5
15.4550	53.2	41.0	-9.0
15.5350	51.8	43.0	-7.0
15.6050	52.5	42.1	-7.8
15.6680	52.2	42.1	-7.8
15.8080	51.8	42.8	-7.2
15.8480	52.0	42.5	-7.5
15.0810	52.3	42.5	-7.5
16.1510	52.6	42.2	-7.8
16.2210	51.8	42.1	-7.9
16.3040	51.5	42.6	-7.4
16.4240	52.1	42.3	-7.7
16.4940	51.5	41.8	-8.2

* Limit exceeded

POWER LINE POLARITY : HOT



HYUNDAI RFI Voltage Test

Start of Test: 22.FEB'00 15:37
 E.U.T.: V770
 Oper. Condition: 1024 M 768 (HF=88.7KHz, VF=85Hz)
 Operator: KEUN HO PARK
 Test Spect: CISPM 22 CLASS B

Frequency MHz	Peak dBuV	G-Peak dBuV	GP-Margin dB
6.9110	53.4	50.5	-9.4
6.9810	53.2	50.1	-9.8
7.0510	53.1	50.1	-9.8
7.1840	54.6	49.9	-10.0
7.2540	53.2	50.0	-9.9
7.3170	53.3	49.4	-14.5
7.5270	53.4	48.9	-11.0
10.8800	52.6	48.3	-10.6
11.0830	52.8	48.5	-11.4
11.1530	52.6	48.0	-10.9
11.2829	53.3	49.1	-10.8
11.4960	52.7	48.6	-11.1
14.7790	52.6	47.5	-12.4
14.8490	52.7	47.7	-12.2
14.9190	53.4	48.5	-11.4
15.0050	52.6	48.0	-10.9
Average values			
Frequency MHz	Peak dBuV	Average dBuV	Average-Margin dB
6.7080	52.4	43.8	-6.2
6.9110	53.4	44.2	-5.8
7.1140	51.6	42.8	-7.2
7.1840	54.6	44.0	-6.0
7.2540	53.2	42.9	-7.1
7.3240	52.4	43.3	-6.7
7.4570	52.3	42.7	-7.3
7.5270	53.4	43.8	-6.1
10.6770	51.6	43.2	-6.8
10.7470	51.8	43.0	-7.0
10.9500	51.8	43.0	-7.0
11.2829	53.3	43.8	-6.2
11.4960	52.7	42.7	-7.3
11.5660	52.2	43.2	-6.8
11.6359	51.6	42.7	-7.3
15.1220	52.0	42.6	-7.4
15.4050	51.9	43.6	-6.4
15.6050	52.6	43.1	-6.9
15.7380	52.2	43.3	-6.7
15.9480	51.7	42.9	-7.1

M Limit exceeded

POWER LINE POLARITY : NEUTRAL

4.2 Radiated Emissions Tests

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

Humidity Level : 20 % Temperature : 15
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : FEB. 24, 2000
 Result : PASSED BY -4.0 dB

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EUT : 17" COLOR MONITOR

Operating Condition : 1024 X768 Non-Interlaced (Hf : 68.7KHz, Vf : 85Hz)

Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Radiated Emissions		Ant.	Correction Factors	Total	FCC Class B	
Freq. (MHz)	Ampl. (dBuV)	Pol.	Antenna & Cable Loss (dB/m)	Ampl. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
32.5	8.0	V	17.5	25.5	30.0	-4.5
46.7	12.2	V	13.1	25.3	30.0	-4.7
90.9	9.9	V	10.1	20.0	30.0	-10.0
115.4	12.3	V	13.7	26.0	30.0	-4.0
115.7	9.3	H	13.8	23.1	30.0	-6.9
144.1	9.8	V	16.5	26.3	30.0	-3.7
145.2	3.9	H	16.6	20.5	30.0	-9.5
188.3	5.3	V	19.4	24.7	30.0	-5.3
198.4	4.7	V	20.1	24.8	30.0	-5.2
198.4	1.6	H	20.1	21.7	30.0	-8.3
267.8	4.5	H	21.3	25.8	37.0	-11.2
268.4	4.3	H	21.3	25.6	37.0	-11.4
273.1	4.7	H	21.6	26.3	37.0	-10.7
333.3	3.3	H	19.5	22.8	37.0	-14.2
378.8	5.3	H	20.6	25.9	37.0	-11.1
473.3	2.0	H	22.5	24.5	37.0	-12.5

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 : KEUN HO, PARK / Engineer

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.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(30 \text{ dBuV/m})/20] = 31.6 \text{ uV/m}$$