

MEASUREMENT/TECHNICAL REPORT

HYUNDAI ELECTRONICS INDUSTRIES CO.,LTD.

MODEL : S570

This report concerns(check one) : Original grant ☒ Class ☐ ±change ☐

Equipment type : MONITOR

Deferred grant requested per 47 CFR 0.457(d)(1)(☐ ☒? yes ☐ no ☒

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.

Transition Rules Request per 15.37? yes ☐ no ☒

If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-91 Edition] provision.

Report prepared by : BONG JAE, HUR - Manager of QA Office

Company : HYUNDAI ELECTRONICS INDUSTRIES CO., LTD.

Address : SAN 136-1, AMI-RI, BUBAL-EUB, ICHON-SI,
KYOUNGKI-DO, KOREA

Phone No : 82-336-630-3280

Fax No : 82-336-630-3265

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1. GENERAL INFORMATION

1.1 Product Description

The Hyundai Electronics Industries Co., Ltd. Model S570(referred to as the EUT in this report) is a 15"COLOR Monitor HOR. Freq. 68.7 kHz w/max. Resolution of 1024 \times 768 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. \times 1MHz)	8 MHz
CHIPSET BRAND AND PART NO.	WELTEND : WT6016 SAMSUNG : KA3842B SAMSUNG : KA7805 SAMSUNG : KA2500 SAMSUNG : KIA358 SGS-TOMSON : TDA9109S SGS-TOMSON : TDA9302 SGS-TOMSON : IRF630M MOTOROLA : 24LC08 NATIONAL : LM2409T TOSHIBA : YTA631 MYSON : MTV018
POWER REQUIREMENT	100 - 240 VAC 50/60Hz 1.3A
NUMBER OF LAYERS	MAIN BOARD 1 LAYER CRT SOCKET BOARD 1 LAYER
MAX. RESOLUTION	1024 X 768 NON-INTERLACED (@ 68.7 kHz/85 Hz)
H-SYNC FREQUENCY RANGE	30 kHz \times - 70kHz
V-SYNC FREQUENCY RANGE	50 Hz \times - 130 Hz
CRT SIZE	15" (SAMSUNG / Type : M36QAM351X111)
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	S570	CKLS570	HOST
PC(HOST)	H/P	HP BRIO 80XX	DoC	N/A
KEYBOARD	H/P	SK-2501-2D-K	DZL211029	HOST
PRINTER	H/P	C2168A	B94C2121X	HOST
MODEM	HYUNDAI	HMD-2404M	CKL8J7HMD-2404M	HOST
VIDEO CARD	DIAMOND	STELTH 3D 3000	FTUPCI130208	HOST
MOUSE	H/P	M-S34	GYUR38SK	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 3 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	E4208*****
CRT SOCKET BOARD	HYUNDAI	E4208*****

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	1.5(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(PS/2)	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
MOUSE(PS/2)	N	N/A	Y	PC END

2.5 Equipment Modifications

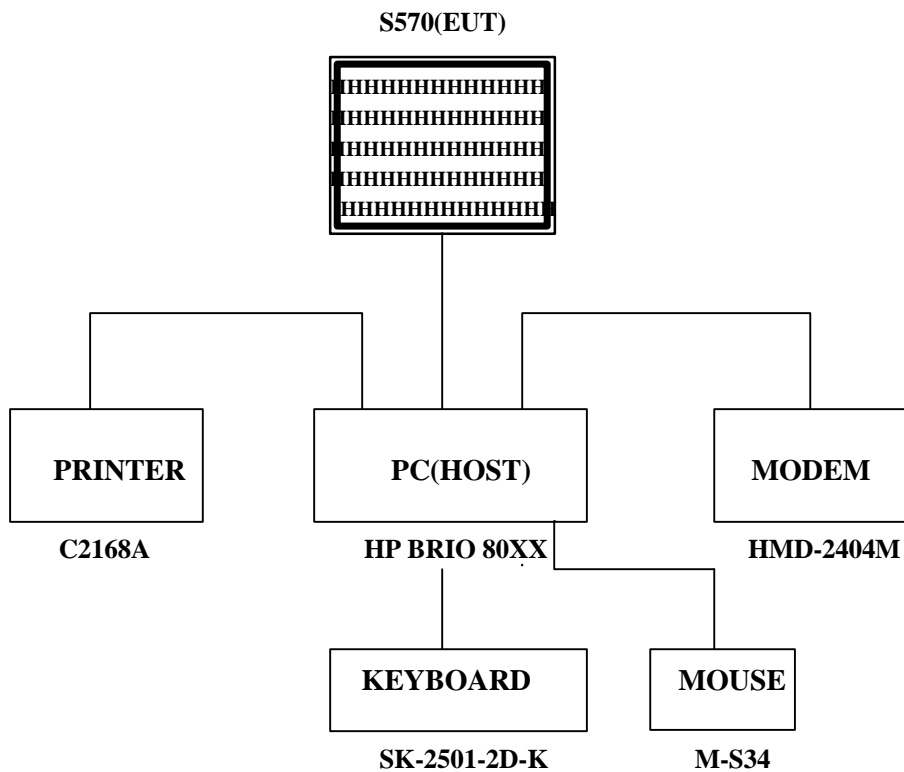
- 1. Add resister 3ea(510 Ohm) in solder side of CRT socket board.**

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 3 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 (64 kHz/60Hz)	
Pentium 75 MHz	1024 x 768 Non-Interlaced (68.7 kHz/85Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (53.6 KHz/85Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.2 KHz/85Hz)	

4.2 Radiated Emission Tests

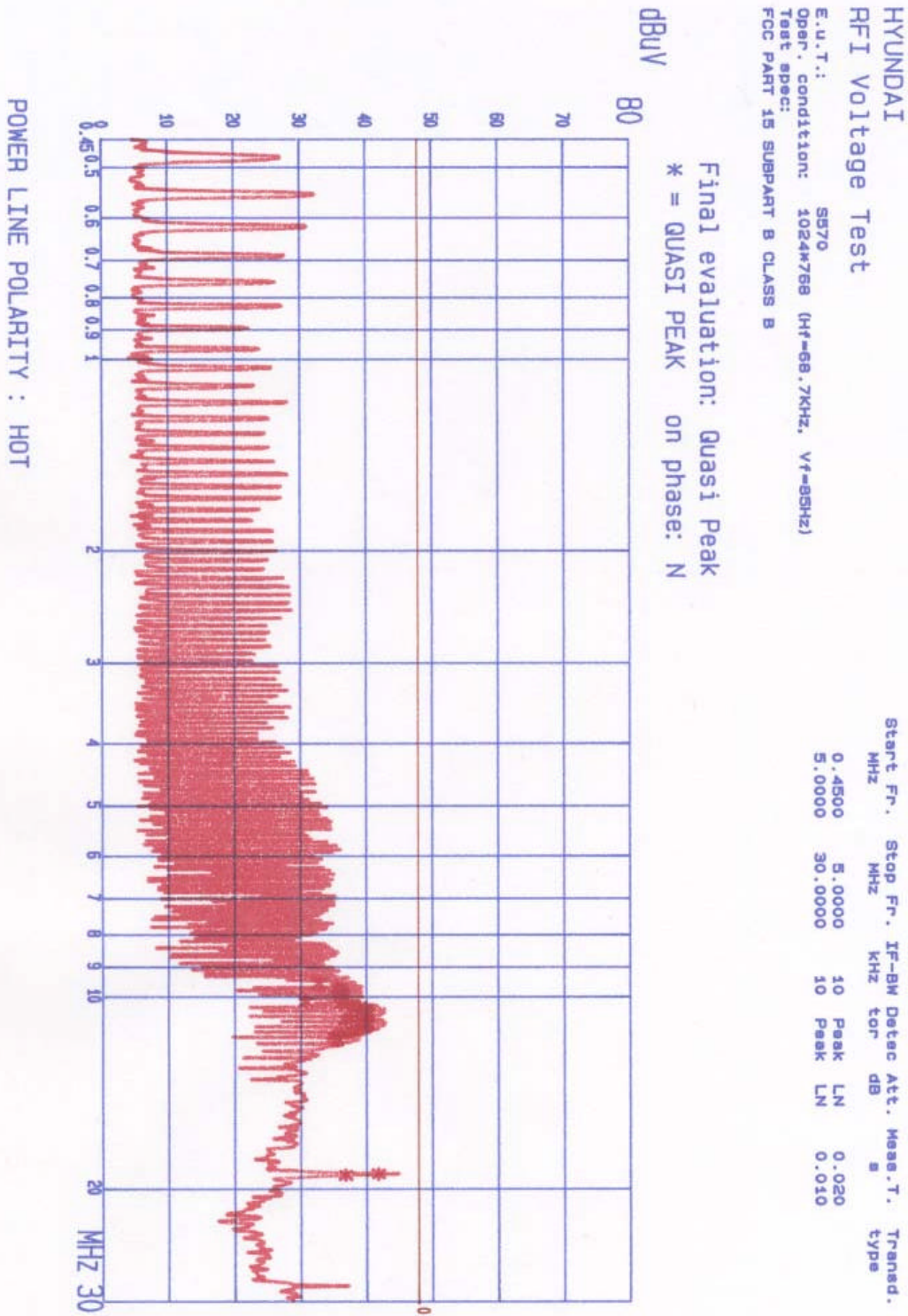
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Pentium 75 MHz	1024 x 768 Non-Interlaced (68.7 kHz/85Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (53.6KHz/85Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.2KHz/85Hz)	

Tested by Sang Jun, Lee

Date : APR. 8, 1999

EUT : 15" COLOR MONITOR
Operating Condition : 1024 X 768 Non-Interlaced (Hf : 68.7 KHz, Vf : 85Hz)
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)



HYUNDAI
RFI Voltage Test

E.U.T.: S570
Oper. condition: 1024M768 (Hf=68.7KHz, Vf=65Hz)
Test spec:
FCC PART 15 SUBPART B CLASS B

Exceeding values on phase: N			
Frequency MHz	Peak dBuV	Q-Peak dBuV	Q-Peak dB
9.5100	38.4	32.9	-15.0
9.6500	39.5	35.7	-12.2
9.7200	39.3	35.9	-12.0
9.7899	39.4	35.5	-11.4
9.8600	39.0	35.5	-11.4
9.9300	39.3	36.2	-11.7
10.0000	39.7	36.2	-11.7
10.1300	38.6	30.6	-17.1
10.2000	39.1	36.2	-11.7
10.2700	41.0	38.1	-9.8
10.3400	41.8	39.1	-8.8
10.4100	42.8	39.7	-8.2
10.4800	42.9	40.0	-7.9
10.5500	42.4	40.1	-7.8
10.6198	42.0	39.4	-8.5
10.6900	41.2	37.6	-10.3
10.7600	40.6	36.8	-11.1
10.8200	42.7	39.4	-8.5
10.8900	43.0	40.1	-7.8
10.9600	42.9	39.9	-8.0
11.0300	42.0	39.6	-8.3
11.1000	41.7	38.8	-8.1
11.2400	40.8	37.8	-10.1
11.3100	39.4	35.3	-11.6
11.3800	39.3	35.1	-12.6
11.5100	39.0	35.6	-12.9
11.6500	45.0	41.9	-6.0
18.9600	40.3	35.8	-11.1
19.0300			

* Limit exceeded

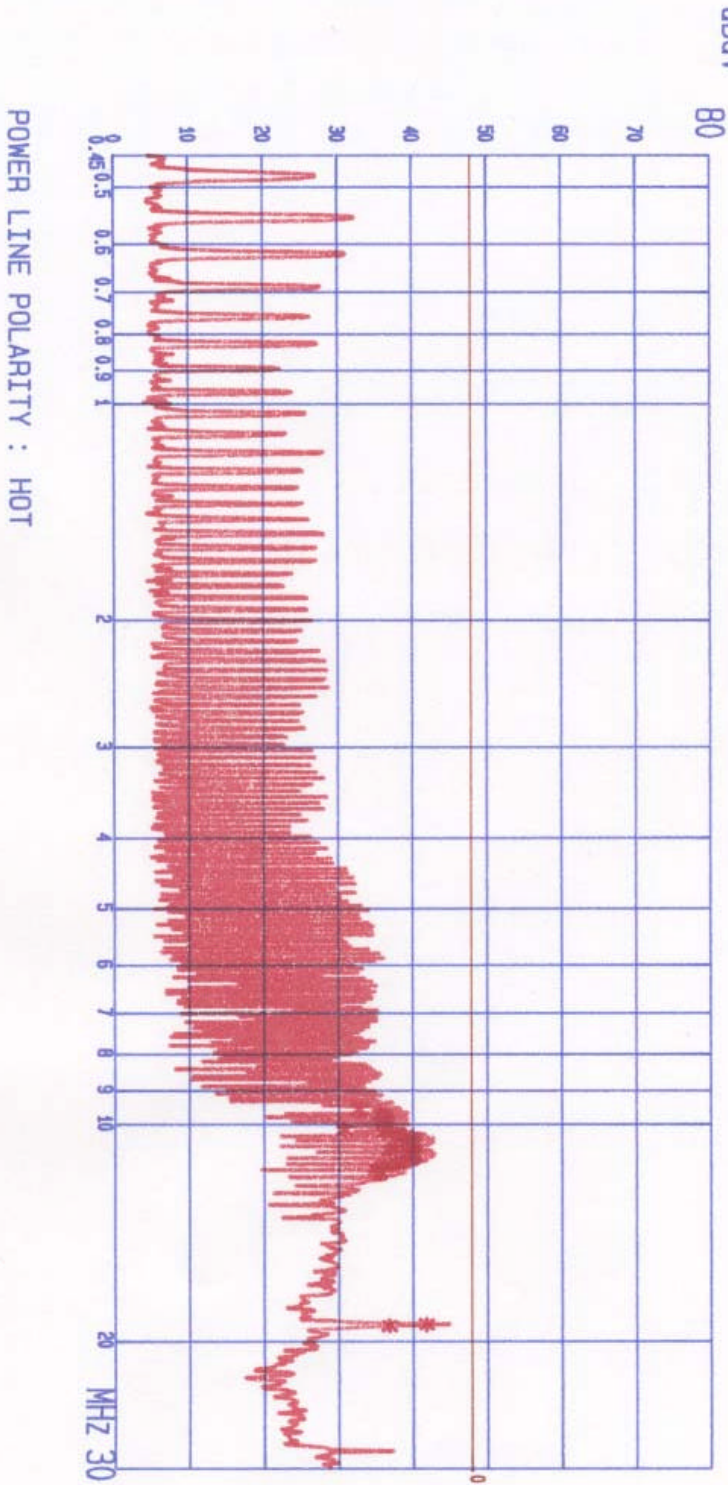
POWER LINE POLARITY : HOT

HYUNDAI
RFI Voltage Test

E.U.T.: S570
Oper. condition: 1024K768 (Hf=68.7KHz, Vf=85Hz)
Test spec:
FCC PART 15 SUBPART B CLASS B

Start Ff.	Stop Ff.	IF-BW	Detec	Att.	Meas.T.	Transd.
MHz	MHz	KHz	tor	dB	s	type
0.4500	5.0000	10	Peak	LN	0.020	
5.0000	30.0000	10	Peak	LN	0.010	

Final evaluation: Quasi Peak
* = QUASI PEAK on phase: N



HYUNDAI
RFI Voltage Test

E.U.T.: S570
Oper. condition: 1024M768 (HF: 68.7KHz, VF: 85Hz)
Test spec:
FCC PART 15 SUBPART B CLASS B

Exceeding values on phase: N			
Frequency MHz	Peak dBuV	Q-Peak dBuV	Q-P-Margin dB
9.2400	38.1	34.9	-13.0
9.4500	38.2	34.1	-13.8
9.5100	41.1	35.9	-12.0
9.5800	38.2	34.8	-13.1
9.6500	38.6	36.0	-11.9
9.7200	39.6	36.8	-11.1
9.7899	40.9	37.6	-10.3
9.8600	40.4	37.6	-10.3
9.9300	40.4	37.4	-10.5
10.0000	40.5	37.3	-10.6
10.0700	40.3	36.9	-11.0
10.2000	40.9	37.7	-10.2
10.2700	41.9	38.9	-9.0
10.3400	41.3	39.1	-8.8
10.4100	42.8	39.7	-8.2
10.4800	41.9	39.9	-8.0
10.5500	42.3	39.8	-8.1
10.6199	41.9	39.5	-8.4
10.6900	42.3	38.8	-9.1
10.7600	40.1	36.7	-11.2
10.8200	40.0	35.2	-12.7
10.8300	37.9	29.4	-18.5
10.8900	42.0	38.1	-9.8
10.9600	41.0	38.7	-9.2
11.0300	41.4	38.8	-9.1
11.1000	40.8	38.1	-9.8
11.1700	40.1	37.5	-10.4
11.2400	39.1	36.4	-11.5
11.3100	38.4	35.6	-12.3
11.6500	38.0	34.1	-13.8
18.9600	48.6	43.6	-4.9
19.0300	42.8	39.0	-8.9
28.4100	37.9	33.5	-14.4
28.4700	42.8	37.8	-10.1
28.4800	40.8	34.9	-13.0
* Limit exceeded			

POWER LINE POLARITY : NEUTRAL

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.

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

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