

MEASUREMENT/TECHNICAL REPORT

ETL EMC LAB.

MODEL : TH575

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

Equipment type : **15" COLOR 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.

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TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION.....	3
1.1 Product Description.....	3
1.2 Related submittal(s)/Grant(s).....	4
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.....	10
4.1 Conducted Emission Tests.....	10-12
4.2 Radiated Emission Tests.....	13
5. FIELD STRENGTH CALCULATION.....	14

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

CHASSIS TYPE	PLASTIC
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	MAX PIXEL CLOCK 60MHz X-TAL: 8MHz
CHIPSET BRAND AND PART NO.	6348 – SAMSUNG KA2142 – SAMSUNG KB2511B – SAMSUNG LM2439T – NATIONAL KA2500 – SAMSUNG KS2508 – SAMSUNG
POWER REQUIREMENT	100 – 240 VAC 2.0A~0.5A 60/50 Hz
NUMBER OF LAYERS	MAIN BOARD: 1 LAYER CRT B/D : 1 LAYER SUB B/D: 1 LAYER CONTROL B/D : 1 LAYER
MAX. RESOLUTION	1024 X 768 NON-INTERLACED (@ 48.4 KHz/60Hz)
H-SYNC FREQUENCY RANGE	30 KHz 54 KHz
V-SYNC FREQUENCY RANGE	50 Hz 120 Hz
CRT SIZE	15" IRICO 40SG202Y22-DC01
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
15" Color Monitor (EUT)	TONHI	TH575		HOST
PC(HOST)	COMPAQ	PRESARIO2230	DoC	N/A
KEYBOARD	COMPAQ	RT2156TWGR	AQ6-71Z15	HOST
MOUSE	COMPAQ	GNEZE4	FSUGMZE4	HOST
JOYSTICK	DAHOON	DHA-2000	N/A	HOST
SERIAL MOUSE	PETRA	MUS5S	JKGMUS5S01	
PRINTER	H/P	C6410	DoC	HOST
SPEAKER	PC BANK	N/A	N/A	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 584,SANGWHAL-RI,KANAM-MYUN, YOJU-KUN, KYOUNGKI-DO, 469-880,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 by Commission.

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
M/N	TONHI MONITOR	KA575SS-001
CRT	TONHI MONITOR	KA575SSVIDEO

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)
15" 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)
JOYSTICK	N	N	1.5(D)
SPEAKER	Y	N	1.5(P), 1.0(D)
SERIAL MOUSE	N	Y	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
15" COLOR MONITOR(EUT)	Y	PC END	Y	PC END
KEYBOARD	Y	N/A	Y	PC END
PARALLEL	N	N/A	Y	BOTH END
JOYSTICK	Y	PC END	N	N/A
SPEAKER	N	N/A	N	N/A
SERIAL	N	N/A	Y	N/A
MOUSE(PS/2)	N	N/A	Y	PC END

2.5 Equipment Modifications

N/A

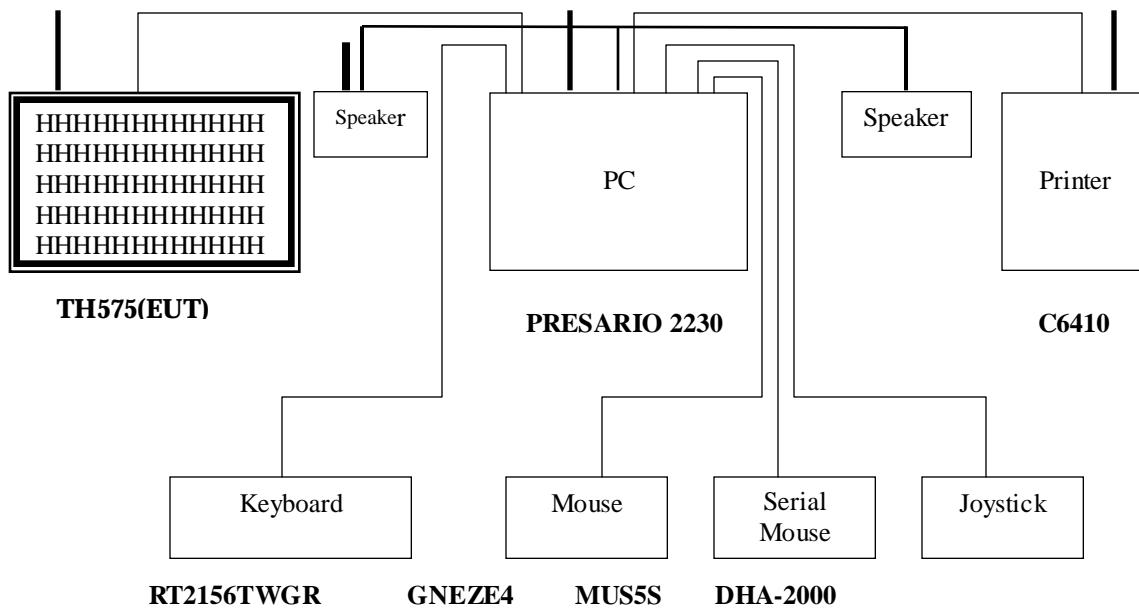
2.6 Configuration of Test system

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 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	1024 x 768 Non-Interlaced (48.4 kHz/60.0Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (54.0 KHz/85.0Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.2 KHz/85.0Hz)	

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	1024 x 768 Non-Interlaced (48.4 kHz/60.0Hz)	X
Pentium 75 MHz	800 x 600 Non-Interlaced (54.0 KHz/85.0Hz)	
Pentium 75 MHz	640 x 480 Non-Interlaced (43.2 KHz/85.0Hz)	

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 : 57% Temperature : 27
 Limit apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Tests : CLASS B
 Date : October 1, 2000
 Result : PASSED BY 4.15 dB

EUT : 15" COLOR MONITOR
 Operating Condition : 1024 X 768 Non-Interlaced (Hf : 48.4KHz, Vf : 60Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

Power Line Conducted Emissions			FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Polarization (Hot/Neutral)	Limit (dBuv)	Margin (dB)
0.512	43.10	HOT	48	-4.90
1.529	43.72	HOT	48	-4.28
2.334	40.92	HOT	48	-7.08
12.393	43.85	HOT	48	-4.15
13.043	43.70	HOT	48	-4.30
13.093	43.75	HOT	48	-4.25
13.236	43.54	HOT	48	-4.46

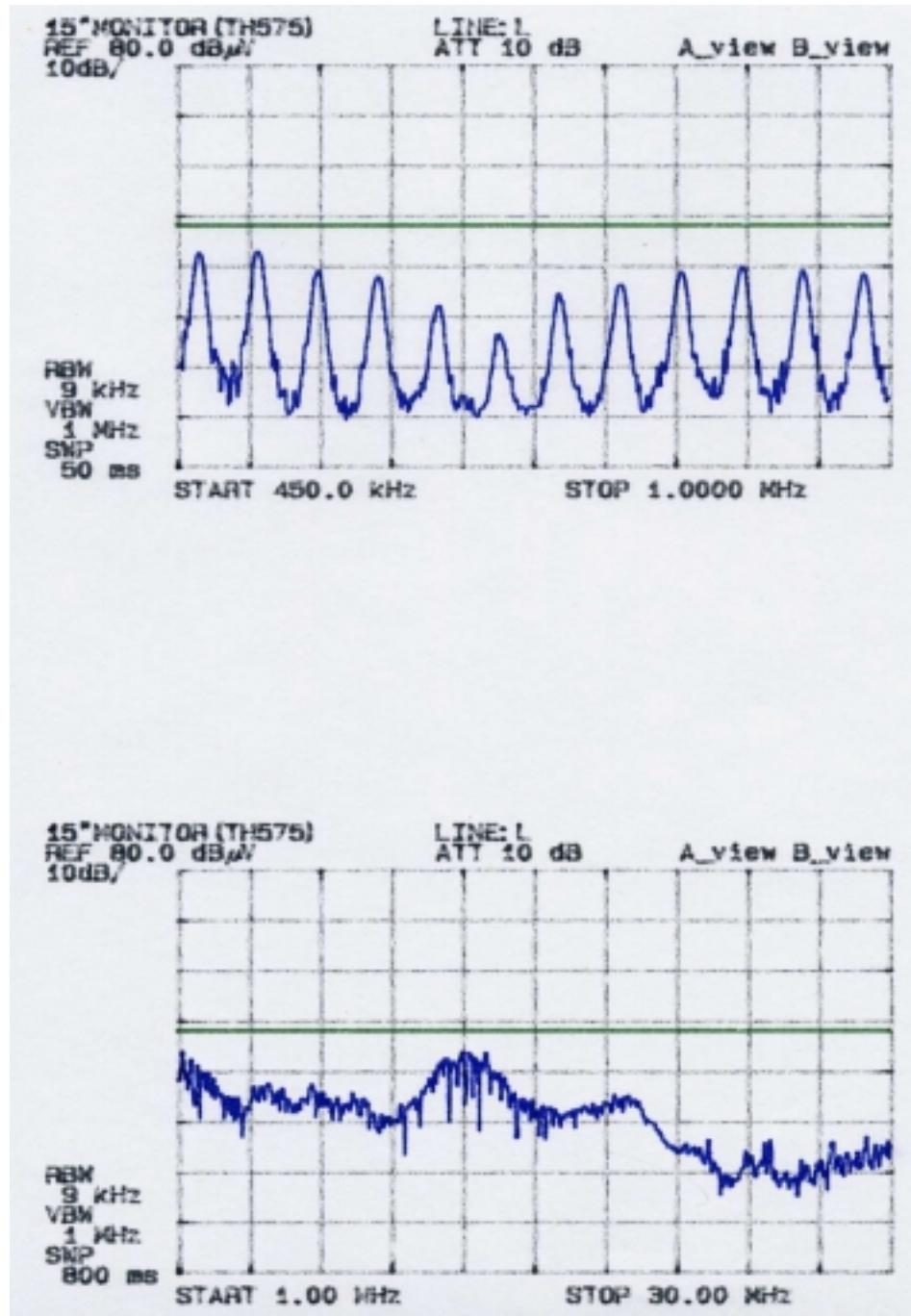
Line Conducted Emissions Tabulated Data

NOET:

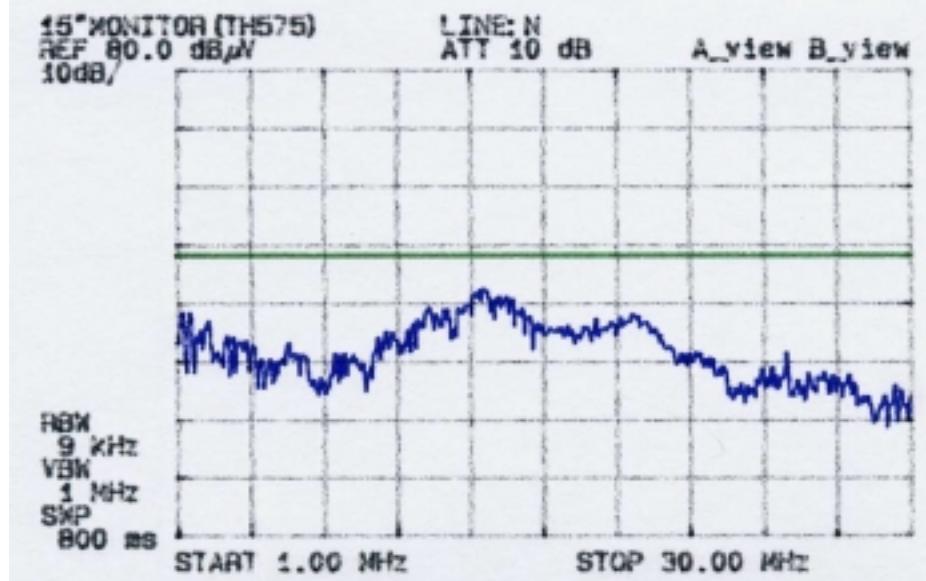
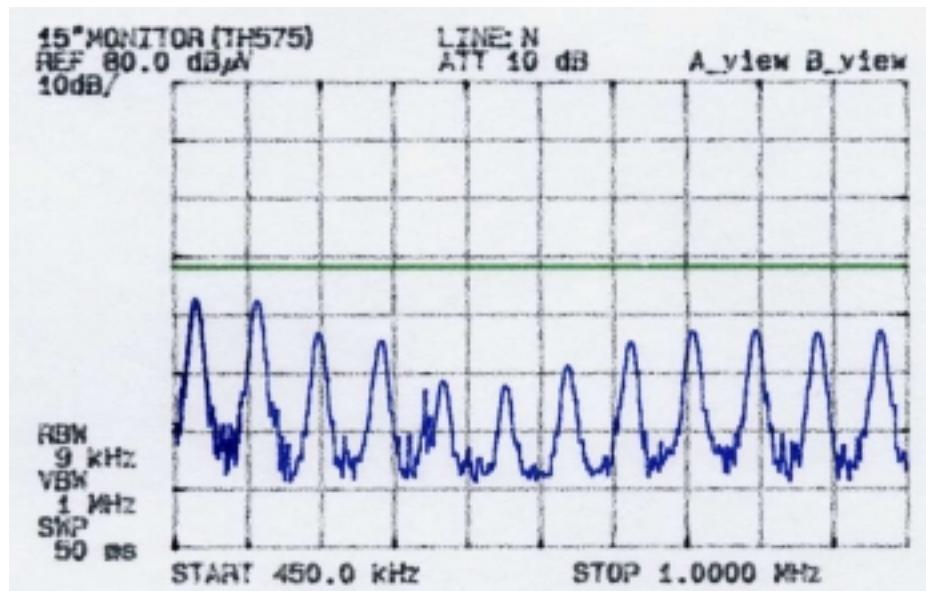
1. All video modes and resolutions were investigated and the worst-case emissions are reported
Other video modes & resolution were tested and found to be in compliance.
2. The limit for Class B device is 250 uV from 450 kHz to 30 MHz.

Measured by : Yo Han, Park / Engineer

LINE POLARIZATION : HOT



LINE POLARIZATION : 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 : 50 % Temperature : 26
 Limit apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Tests : CLASS B
 Date : October 2, 2000
 Result : PASSED BY 6.33 dB

EUT : 15" COLOR MONITOR
 Operating Condition : 1024 X 768 Non-Interlaced (Hf : 48.4 KHz, Vf : 60 Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Radiated Emissions		Ant.	Correction Factors	Total	FCC Class B	
Freq. (MHz)	Ampl. (dBuV)				Ampl. (dBuV/m)	Limit (dBuV/m)
45.61	14.88	V	14.89	29.97	40.0	-10.03
52.12	14.70	V	14.44	29.14	40.0	-10.86
130.30	20.71	V	15.03	35.74	43.5	-7.76
136.82	21.58	V	15.41	36.99	43.5	-6.51
208.42	14.59	V	13.39	27.98	43.5	-15.52
280.16	16.68	H	17.06	33.74	46.0	-12.26
306.15	19.40	H	17.84	37.24	46.0	-8.76
310.30	20.70	H	17.89	38.59	46.0	-7.41
312.90	18.76	H	17.89	36.65	46.0	-9.35
372.60	19.62	H	20.05	39.67	46.0	-6.33
434.60	17.42	H	21.56	38.98	46.0	-7.02

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 : Yo Han, 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 17.42 dBuV is obtained. The Antenna Factor of 15.48 and a Cable Factor of 6.08 is added. The 36.71 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 17.42 + 15.48 + 6.08 = 38.98 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(38.98 \text{ dBuV/m})/20] = 88.93 \text{ uV/m}$$