

EMI TEST REPORT

SAMSUNG ELECTRONICS CO., LTD.

Product : **Notebook Computer**

Model No.: **SENS Pro 730**

FCC ID : **A3LS730**

DATE : **September 22, 1998**

SAMSUNG Reference NO. : 980947

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators. All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

1. Applicant Name : SAMSUNG ELECTRONICS CO., LTD.
(Company name & Address) 416 Maetan 3 Dong, Paldal-Ku,
Suwon City, Kyungki Do, Korea,
441-742

2. Identification of tested device

2.1 FCC ID : A3LS730
2.2 Device Name : Notebook Computer
2.3 Brand (Trade Name) : SAMSUNG
2.4 Model Number : SENS Pro 730

3. Test Procedure and Items

3.1 AC Powerline Conducted Emissions Measurement : ANSI C63.4-1992
3.2 Radiated Emissions Measurement : ANSI C63.4-1992

4. Issued Date : September 22, 1998

TESTED BY :

N. G. Park
No-Cheon, PARK / Test Engineer

APPROVED BY :

T. J. Shin
Taek-Jeong, SHIN / Manager of EMC Lab.

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1. General Information

1.1 Production Description

The Samsung Notebook Computer Model SENS Pro 730(FCC ID:A3LS730) is based on the powerful INTEL PENTIUM-II DIXON processor (CPU 300MHz) and has internal clock speeds of 14.318, 33, 48 and 66.6MHz.

It can be operated from rechargeable battery pack or by AC 100~240V FREE-VOLTAGE AC Adapter. See attached SENS Pro 730 User's Guide for more information.

1.2 Grants

N / A

1.3 Test System Details

The FCC IDs for all equipment plus descriptions of all cables used with the tested system (including inserted cards which have grant) are:

FCC ID	DESCRIPTION (Model Name)	CABLE DESCRIPTION
A3LS730	EUT (SENS Pro 730)	-
D2LCC	Serial Mouse (M-CG7)	Unshielded Cable
N/A	AC Adaper (AD-5019L)	Unshielded Power Cord (with Ferrite bead)
N/A	USB Termination Cable	Unshielded Cable
N/A	TelePhone (SSP-2501)	Unshielded Cable
N/A	Microphone (YMC-2511)	shielded Cable
GJJB50PA0	PS/2 Mouse (SMB-600)	Unshielded Cable
DSI16XU222	Inkjet Printer (2225C)	shielded Cable
N/A	PCMCIA(SLOTS-2EA) FLASH MEMORY	-
A3LCST768	External Monitor (CST7687L)	shielded Cable
N/A	Loud Speaker (BS-211)	Unshielded Cable

1.4 Test Methodology

Both radiated and conducted tests were performed according to the procedure in ANSI C63.4. Radiated testing was performed at an antenna-to-EUT distance of three meters.

1.5 Test Facility

All test described in this report were performed by :

SAMSUNG ELECTRONICS CO., LTD.
EMC TESTING LABORATORY
416 Maetan 3 Dong, Paldal-Ku,
Suwon City, Kyungki Do, Korea, 441-742
Open field test site (3 meter) and Shielded Room.

This test facility has been filed in FCC under the criteria in ANSI C63.4-1992.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in typical fashion (as a customer would use it). The EUT has internal clock speeds of 14.318, 33, 48 and 66.6MHz.

The EUT was investigated while operating at all speeds. The highest speed of 300MHz CPU was used for final testing as it was found to cause worst case emissions. And the EUT has LCD displays of 13.3" TFT.

The EUT's video circuitry is capable of operating at a maximum non-interlaced resolution of 1024x768 pixels. The EUT was observed while scrolling a continuous stream for capital "H's" in the 1024x768 mode(both LCD display and External Monitor).

Comparing the test results without port replicator and with port replicator. The test result without port replicator was found the worst case emissions. And so the final testing was performed without port replicator.

The EUT was tested with a Samsung AC Adapter Model number AD-5019L. Further details of cabling and configuration are shown in the test system configuration.

2.2 Video Mode Justification

The system was tested in 1024x768 resolution mode and in the highest resolution mode of 1024x768. Since the 1024x768 resolution mode(LCD & External Monitor both in use) was found to be worst case, this mode was used to collect the included data.

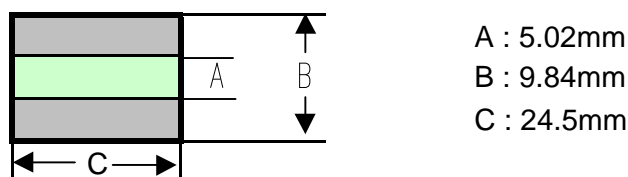
2.3 EUT Exercise Software

The EUT exercise program used during testing was designed to exercise the system in a manner similar to a typical use. This program was contained on the EUT's Hard Disk and Floppy Disk. Once loaded, the program sequentially exercise each system component in turn. The sequence used was : 1) serial "H"s scrolled to the LCD and Monitor; 2) copy series of "H"s characters to mass storage device.

3) print series of H characters to printer. Since the mouse and speaker are strictly input device, no data was transmitted to them during testing. They are, however, continuously scanned for data input activity.

2.4 Special Accessories

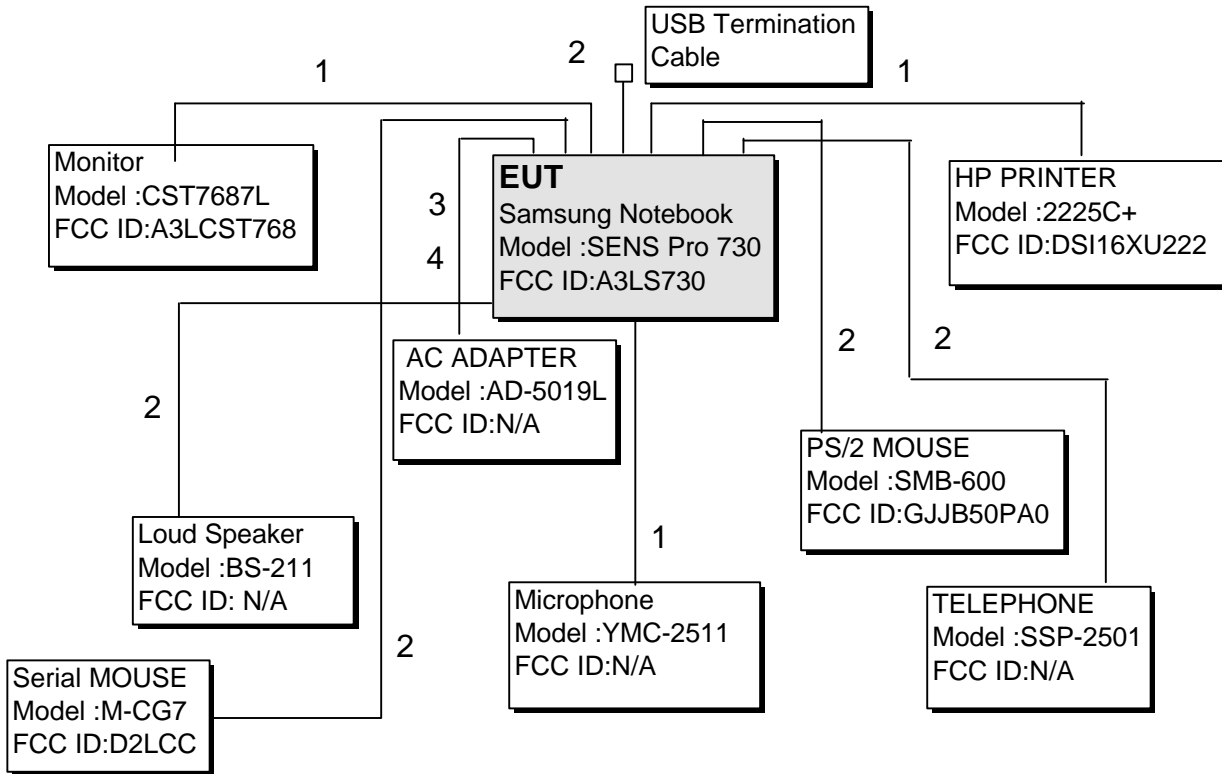
The Samsung AC adapter cable has a ferrite bead on the line. The following is ferrite Core specification.



2.5 Equipment Modifications

No equipment modifications were performed during testing.

2.6 Test System configuration



- 1) Shielded Cable
- 2) Unshielded Cable
- 3) Unshield Power Cord
- 4) Ferrite Bead

2.7 Photographs

Radiation(Front View)



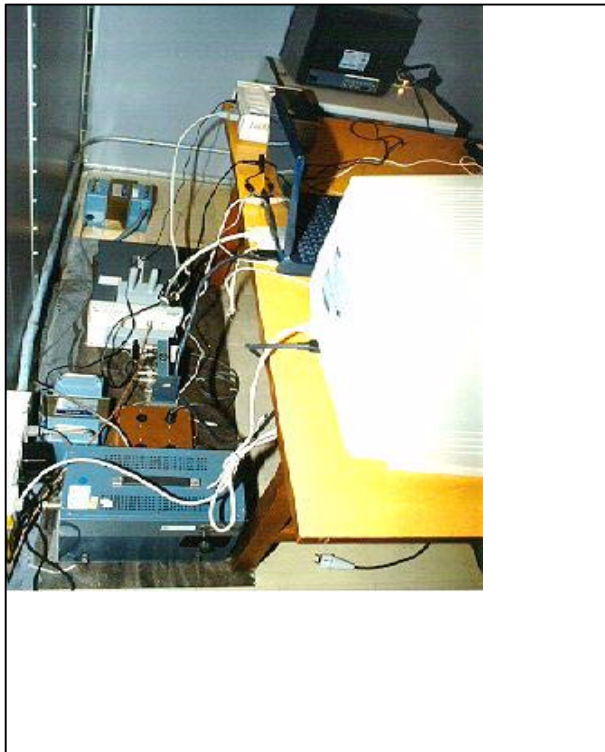
Radiation(Rear View)



Conduction(Front View)



Conduction(Side View)



4. CONDUCTED EMISSION DATA

The initial step in collecting conducted data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer.

- Sample Calculation

Frequency : 0.511 [MHz]
 Meter Reading : 35.2 [dBuV] <--- Maximum Meter Reading
 Factor of LISN : 0.1 [dB]

Then, Result is calculated as follows.

$$35.2 + 0.1 = 35.3 \text{ [dBuV]}$$

- Test Data Sheet

Tested Frequency [MHz]	Meter Reading (Quasi-Peak) [A]	LISN Pol. [L1,L2]	Total Loss	Results	Limits [dBuV]	FCC Margin [dB]
	[dBuV]		[B]	[A+B]		
	[dB]		[dBuV]			
0.511	35.2	L1	0.1	35.3	48	12.7
0.582	39.2	L1	0.1	39.3	48	8.7
1.023	33.1	L1	0.1	33.2	48	14.8
2.328	33.3	L1	0.1	33.4	48	14.6
3.495	33.2	L2	0.1	33.3	48	14.7
27.003	34.6	L1	0.3	34.9	48	13.1

5. RADIATED EMISSION DATA

The initial step in collecting radiated data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer. All modes of operation were investigated and the worst-case emission are reported. All other emission are non-significant.

- Sample Calculation

Frequency : 47.981 [MHz]
 Meter Reading : 12.4 [dBuV] <--- Maximum Meter Reading
 Total of Loss : 10.85 [dB]

Then, Result is calculated as follows.

$$12.4 + 10.85 = 23.25 \text{ [dBuV]}$$

- Test Data Sheet

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	FCC Margin [dB]	Limits [3m] [dBuV/m]
30 - 88	47.981	V	12.4	10.85	23.25	16.75	40.0
	58.941	H	18.6	10.2	28.8	11.2	
	64.321	H	24.1	10.23	34.33	5.67	
	66.741	H	25.3	10.23	35.53	4.47	
	74.021	H	19.2	10.39	29.59	10.41	
	86.241	H	21.2	11.08	32.28	7.72	
88 - 216	115.324	H	22.5	14.19	36.69	6.81	43.5
	134.287	H	23.1	15.38	38.48	5.02	
	144.512	H	23.4	15.56	38.96	4.54	
	145.947	H	24.3	15.56	39.86	3.64	
	162.848	H	24.6	15.67	40.27	3.23	
216 - 960	195.081	H	22.6	17.94	40.54	2.96	46.0
	260.674	H	21.3	21.31	42.61	3.39	
	324.542	H	18.6	18.68	37.28	8.72	
	332.872	H	18.7	19.17	37.87	8.13	
	364.578	H	19.3	19.74	39.04	6.96	
	498.25	V	17.9	22.61	40.51	5.49	
960 -	797.078	H	14.3	28.55	42.85	3.15	54.0
	961.2	H	<6	31.4	-	-	
	1242.2	H	<6	31.5	-	-	
	1778.4	H	-	36.4	-	-	

[NOTE] "<" Means equal or less than

Receiving Antenna polarization : **Horizontal, Vertical**

6. LIST OF TEST INSTRUMENT.

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Spectrum analyzer	8566B	3340A21744	H.P	97/ 9/25, 12Months
Quasi-peak adapter	85650A	3303A01784	H.P	97/ 9/25, 12Months
RF Preselector	85685A	3506A01500	H.P	97/ 9/25, 12Months
Field strength meter	ESS	844861/005	R & S	98/ 3/16, 12Months
	ESVP	860688/015	R & S	97/ 9/24, 12Months
Pre-amplifier	8447D	2443A04331	H.P	97/12/22, 12Months
L.I.S.N	3825-2	9208-1981	EMCO	98/ 9/ 5, 12Months
Double Ridged WaveGuide	3115	4028	EMCO	97/10/ 5, 12Months
Bi-conical Antenna	3110B	2012	EMCO	97/12/ 1, 12Months
Log-periodic Antenna	3146A	1320	EMCO	97/12/ 1, 12Months