



ELECTRONICS

<p align="center"><b>MEASUREMENT/TECHNICAL REPORT</b>  <b>SAMSUNG ELECTRONICS CO., LTD.</b></p> <p align="center">Notebook Computer (SENS Pro 720)  FCC ID : <u>A3LS720</u></p> <p align="center">DATE : MAY. 28, 1998</p>
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○ SAMSUNG Reference NO. : 980562

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 : A3LS720  
2.2 Device Name : Notebook Computer  
2.3 Brand (Trade Name) : SAMSUNG  
2.4 Model Number : SENS Pro 720

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. Date of Measurement : MAY. 27, 1998

5. Issued Date : MAY. 27, 1998

Tested by : MIN-SOEK CHUNG *M. S. Chung*  
Test Engineer

Approved by : SANG-KYU, LEE *S. K. Lee*  
Manager of EMC Testing Laboratory

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## 1. General Information

### 1.1 Production Description

The Samsung Electronics Co., Ltd. Notebook Computer Model SENS Pro 720(FCC ID :A3LS720)is based on the powerful intel pentium processor and has internal clock speeds of 14.318, 33, 48, 56.448 and 66MHz.It can be operated from rechargeable battery pack or by 100–240V AC Adapter(with ferrite bead).

See attached SENS Pro 720 User's Guide for more information.

### 1.2 Grants

The EUT was tested with a External FDD. Samsung does not intend to market this as a separate unit; therefore, an application for certification is not being filed. This device will be supplied with this computer.

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
A3LS720	EUT (SENS Pro 720)	-
FCC DOC	Monitor (6547-3BN)	Shielded Interface Unshielded Power Cord
N/A	Earset	Unshielded Interface
EW425-1040D	Serial Mouse (25-1040D)	Unshielded Interface
GJJSKR-1032B	Keyboard (SEM-K15Z)	Unshielded Interface
N/A	AC Adaper (AD-5019)	Unshielded Power Cord (with Ferrite bead)
N/A	USB Termination Cable	Unshielded Interface
A3LSPR500E	Port Replicator (SPR-500E)	Unshielded Interface
N/A	TelePhone (SSP-2501)	Unshielded Interface
N/A	External FDD	Unshielded Interface (with Ferrite baed)
DSI16XU222	Inkjet Printer (2225C)	Shielded Interface
N/A	PCMCIA(SLOTS -2EA) FLASH MEMORY	-

#### 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.

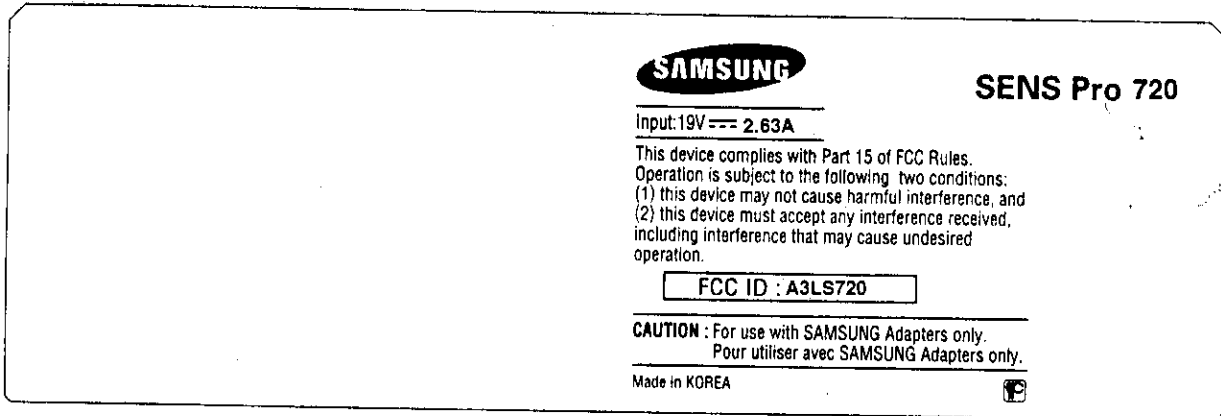
#### 1.5 Test Facility

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. PRODUCT LABELING



### 3. SYSTEM TEST CONFIGURATION

#### 3.1 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, 56.448 and 66MHz. And EUT have various CPUs (233, 266 and 300 MHz speed CPU) 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 various LCD displays of 12.1" TFT, 13.3" TFT.

The largest size of 13.3" TFT LCD display was used for final testing as it was found to cause worst case too.

The EUT's video circuitry is capable of operating at a maximum non-interlaced resolution of 1024\*768 pixels. The EUT was observed while scrolling a continuous stream for capital "H's" in the 1024\*768 mode(both LCD display and Ext. 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 External FDD that was tested with the computer is intended to be sold with the computer. It will not be marketed as a separate unit.

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

#### 3.2 Video Mode Justification

The system was tested in 1024\*768 resolution mode and in the highest resolution mode of 1024\*768. since the 1024\*768 resolution mode(LCD & Ext. monitor both in use) was found to be worst case, this mode was used to collect the included data.

### 3.3 EUT Exercise Software

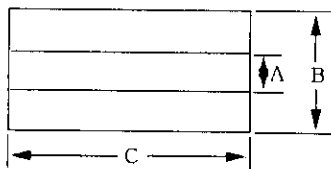
The EUT exercise program used during testing was designed to exercise the system in a manner similar to a typical use. The software was contained on the EUT's hard disk and floppy disk. Once loaded, the programs sequentially exercise each system component in turn and play the sound CD.

The sequence used was : 1) serial "H's" scrolled to the monitor(s); 2) played sound CD and; 3) mass storage device and floppy drive exercised. Since the keyboard and mouse are strictly input device, no data was transmitted to them during testing. They were, however, continuously scanned for data input activity.

### 3.4 Special Accessories

As shown in Figure 3.1, all interface cables used for compliance testing are unshielded. The Samsung AC adapter and Floppy disk drive connect cable has a ferrite bead on the line as supplied by the manufacturer. The ferrite specification that used on AC adapter and floppy disk drive connecting cable.

The following is ferrite specification.

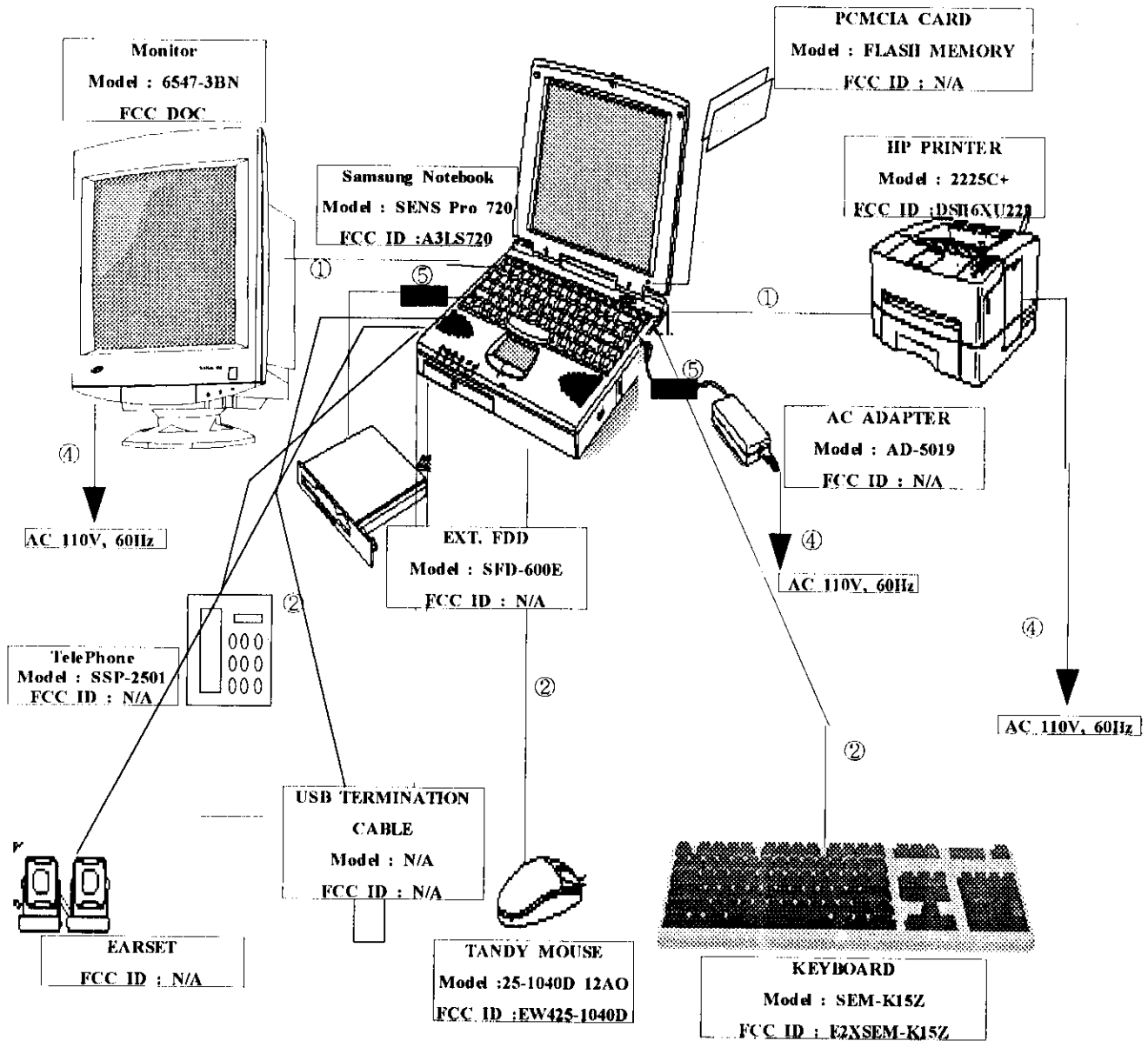


	EXT. FDD	AC-ADAPTER
A :	7mm	4.7mm
B :	18mm	9.8mm
C :	32mm	24.5mm

### 3.5 Equipment Modifications

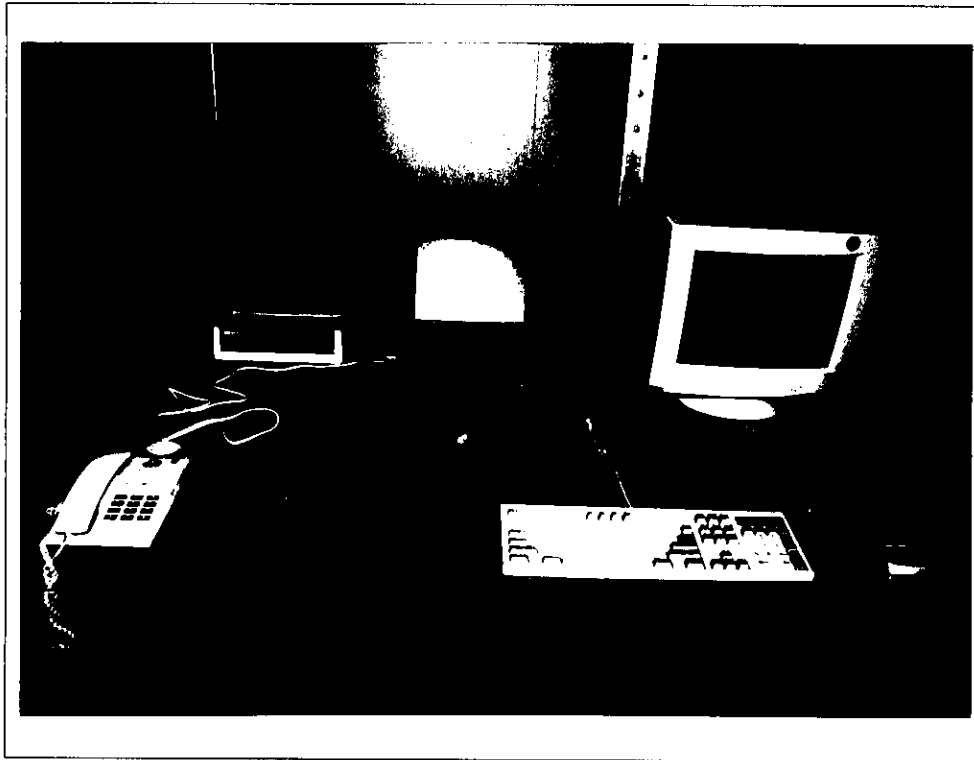
No equipment modifications were performed during testing.

**Figure 3.1**  
**Test System configuration**  
**Samsung Notebook**  
**Model ; SENS Pro 720**

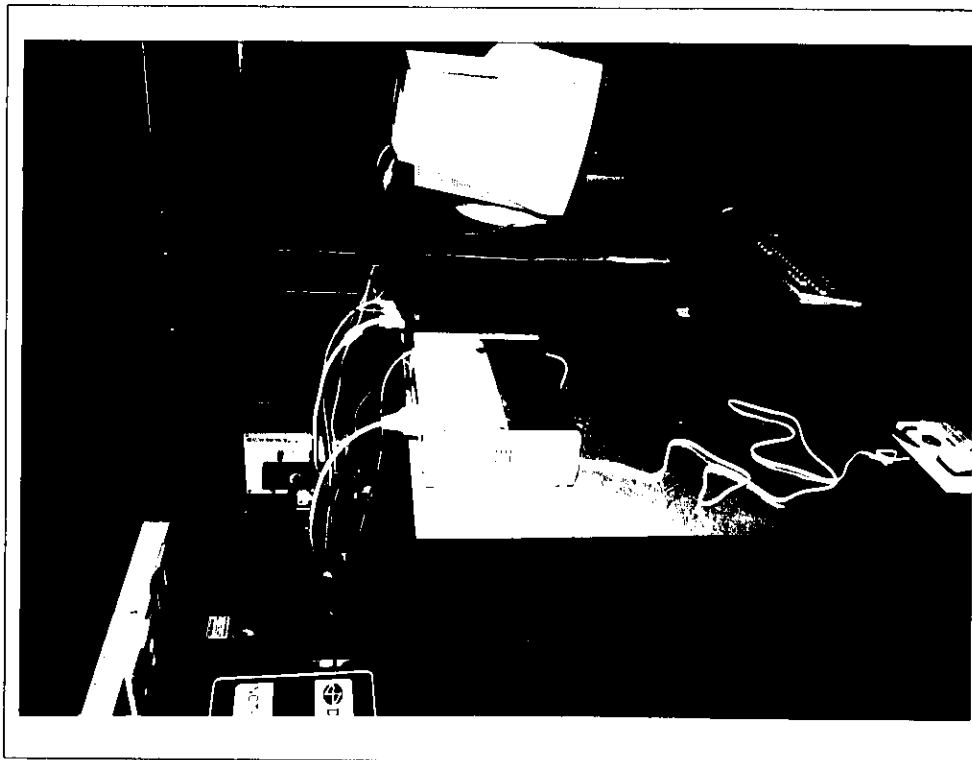


- ①Shielded Cable
- ②Unshielded Cable
- ③Shielded Power Cord
- ④Unshield Power Cord
- ⑤Ferrite Bead

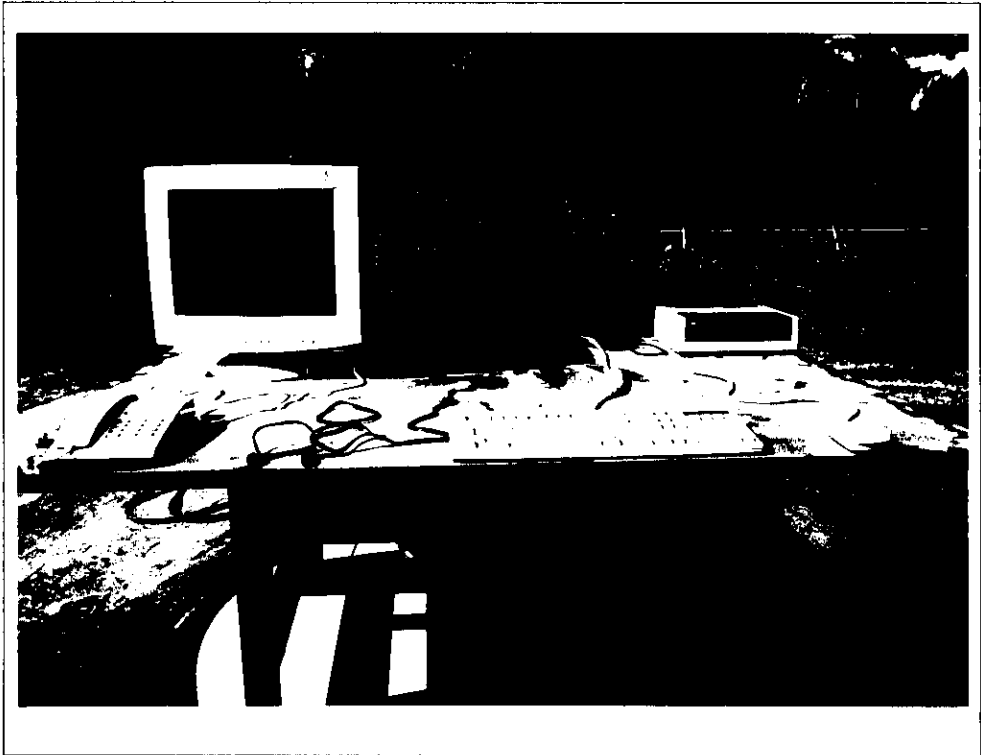
### 5. CONDUCTED AND RADIATED MEASUREMENT PHOTOS



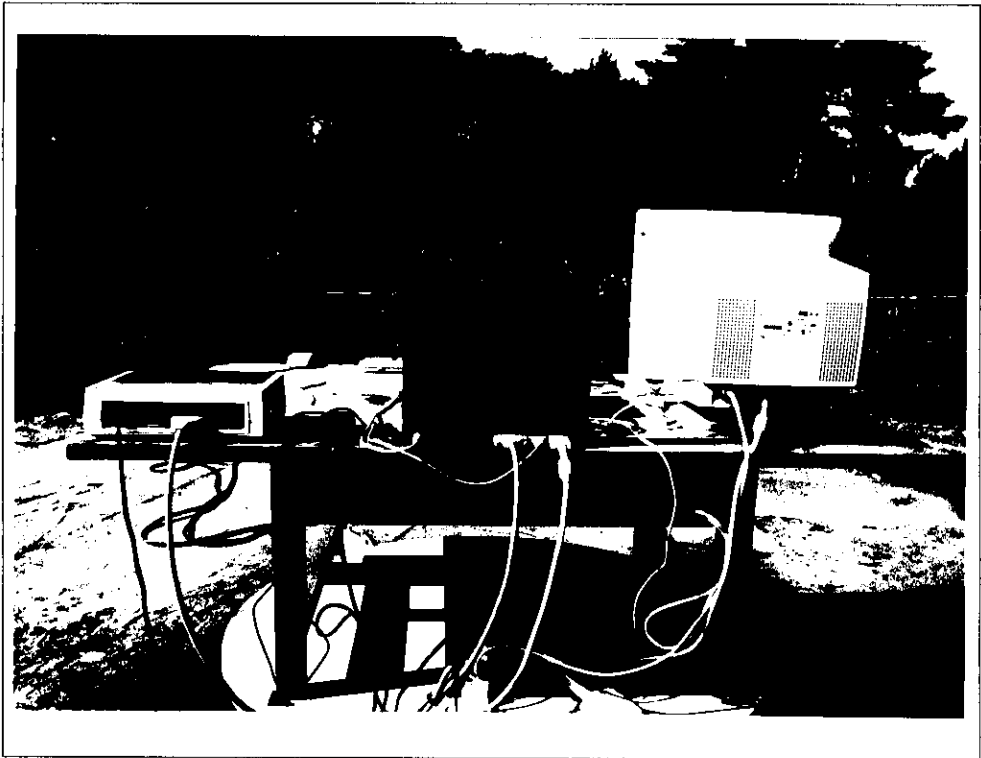
Conducted Emission Test Front



Conducted Emission Test Rear



Radiated Emission Test Front



Radiated Emission Test Rear

### 6. 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 : 0.657[MHz]  
 Meter Reading : 43.2 [dBuV] <--- Maximum Meter Reading  
 Factor of LISN : 0.1 [dB]

Then, Result is calculated as follows.

$$43.2 + 0.1 = 43.3 \text{ [dBuV]}$$

- Summary of Test Result

Below data shows that the test device complies with FCC rules.

Minimum margin was 4.7dB at 0.657MHz.

- Test Data Sheet

Tested Frequency [MHz]	LISN	Meter Reading [A] [dBuV/m]	CABLE Loss [B] [dB]	Results [A+B] [dBuV/m]	Limits [dBuV/m]
0.477	L	41.4	0.1	41.5	
0.657	L	43.2	0.1	43.3	
0.837	L	43.0	0.1	43.1	48.0
1.015	N	42.7	0.3	43.0	
1.376	L	42.0	0.1	42.1	
1.731	L	41.0	0.1	41.1	
16.771	L	32.0	0.2	32.2	

- Data graph N : Neutral L: Live

See the next pages.

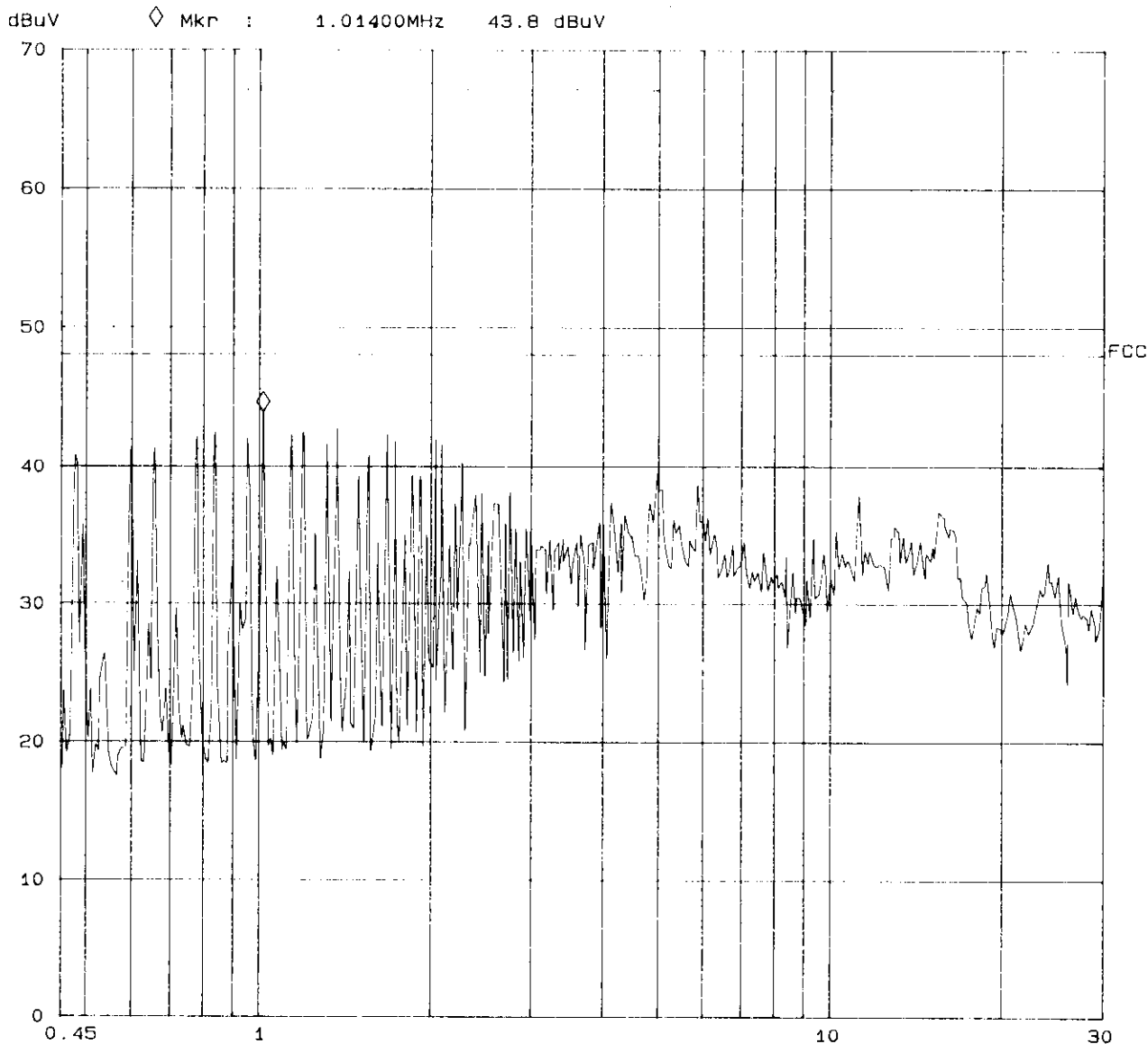
# Conducted Emission Peak

27. May 98 10:39

EUT: SENS Pro 720  
Manuf: SAMSUNG  
Op Cond: 1024 X 768  
Operator: M.S.CHUNG  
Test Spec: FCC Part 15  
Comment: NEUTRAL

### Fast Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	3k	10k	PK	0.05ms	20dB	BLN OFF	60dB



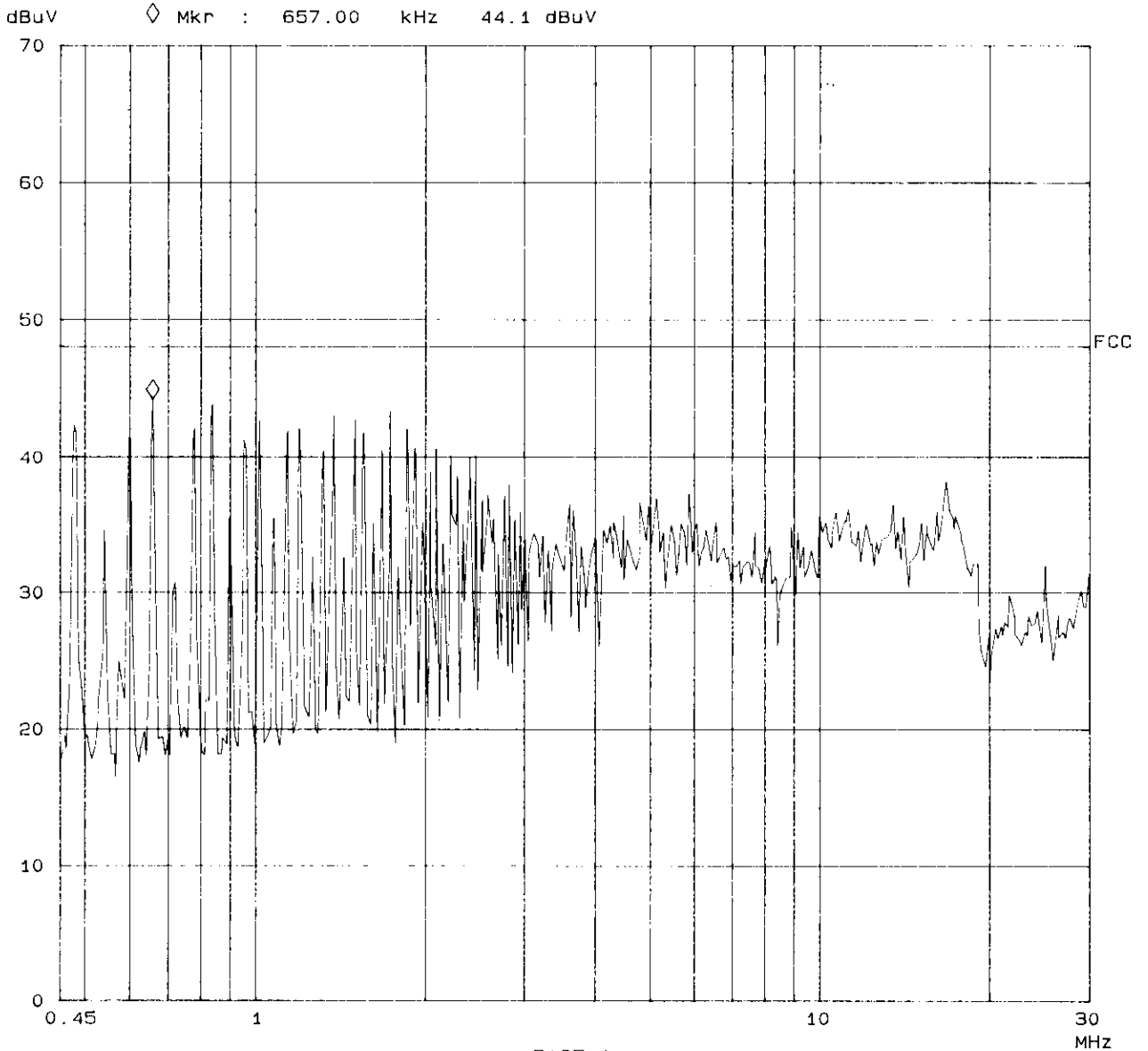
# Conducted Emission Peak

07/98 10:22

EUT: SENS Pro 720  
Manuf: SAMSUNG  
Op Cond: 1024 X 768  
Operator: M.S.CHUNG  
Test Spec: FCC Part 15  
Comment: LIVE

### Fast Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	3k	10k	PK	0.05ms	20dB	BLN OFF	60dB



### 7. RADIATED EMISSION DATA

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Limits [dBuV/m]
30 - 88	41.9	H	14.6	13.1	27.7	40.0
	52.1	H	14.3	10.8	25.1	
	65.9	H	17.9	10.2	28.1	
	68.1	H	15.8	10.3	26.1	
	69.8	H	22.5	10.3	32.8	
	73.8	V	21.5	10.4	31.9	
88 - 216	92.9	V	25.3	11.6	36.9	43.5
	146.1	H	17.0	15.6	32.6	
	148.1	H	19.1	15.6	34.7	
	162.3	H	14.5	16.0	30.5	
	194.8	H	16.0	17.9	33.9	
	200	H	16.8	18.3	35.1	
216 - 960	216.5	H	14.2	19.5	33.7	46.0
	227.4	H	13.7	19.9	33.6	
	500.6	V	19.8	22.6	42.4	
	598.6	V	18.6	23.4	42.0	
	677.4	H	17.5	24.3	41.8	
	698.3	V	18.5	25.2	43.7	
960 -	1098	H	10.1	29.1	39.2	54.0
	1188	H	9.2	31.7	40.9	
	1441	H	10.6	33.0	43.6	

NOTES:

- 1.All modes of operation were investigated and the worst-case emission are reported.
- 2.All other emission are non-significant.
- 3.Measurements using CISPR quasi-peak mode.
- 4.H = Horizontal V = Vertical Polarization.

## 8. PHOTOS OF TESTED EUT

SEE FOLLOWING PAGES.

NOTEBOOK PC(FRONT)

FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.

NOTEBOOK PC(REAR)

FCC ID : A3L5720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.

**ASPIRE™ M SERIES**

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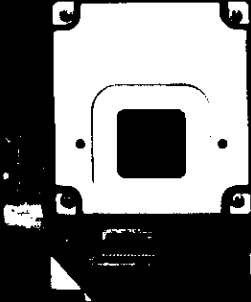
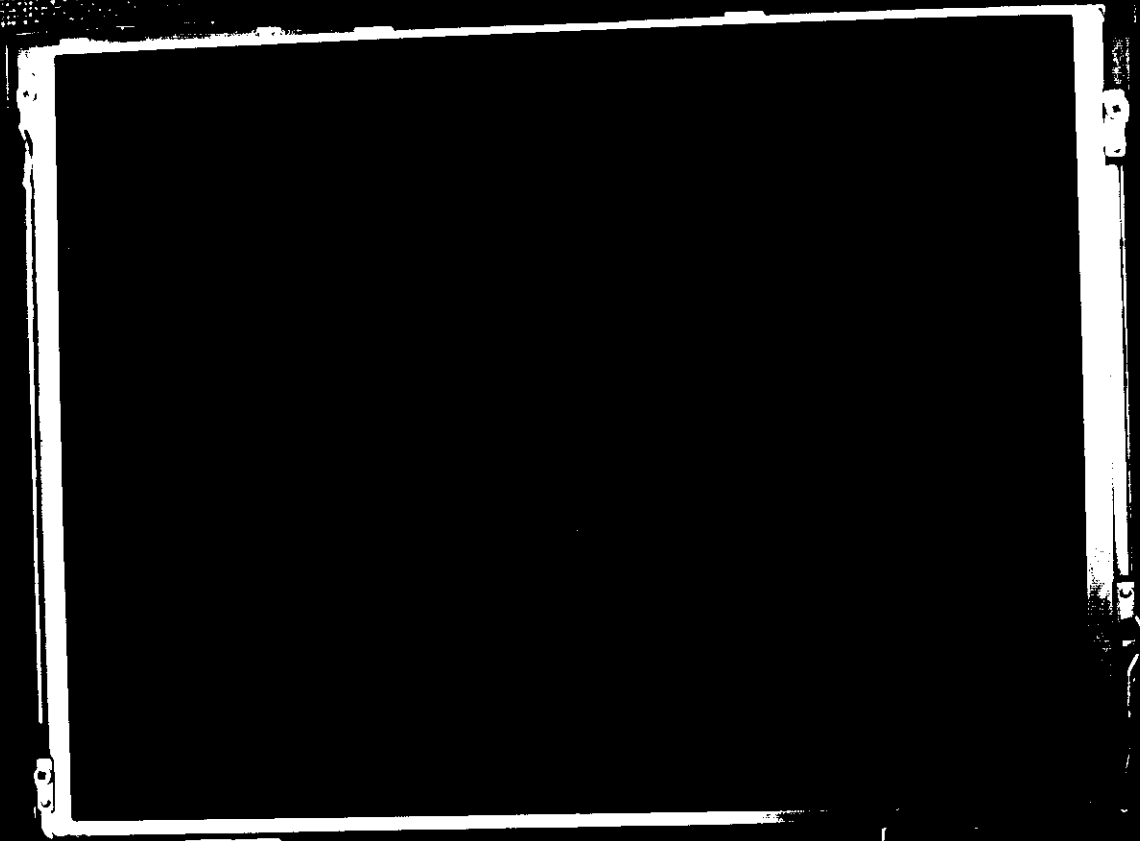
ASPIRE™ M SERIES  
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NOTEBOOK PC(BOTTOM)  
FCC ID : A3LS720  
MODEL : SENS Pro 720  
SAMSUNG ELECTRONICS CO., LTD.



NOTEBOOK PC (INSIDE)

FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.



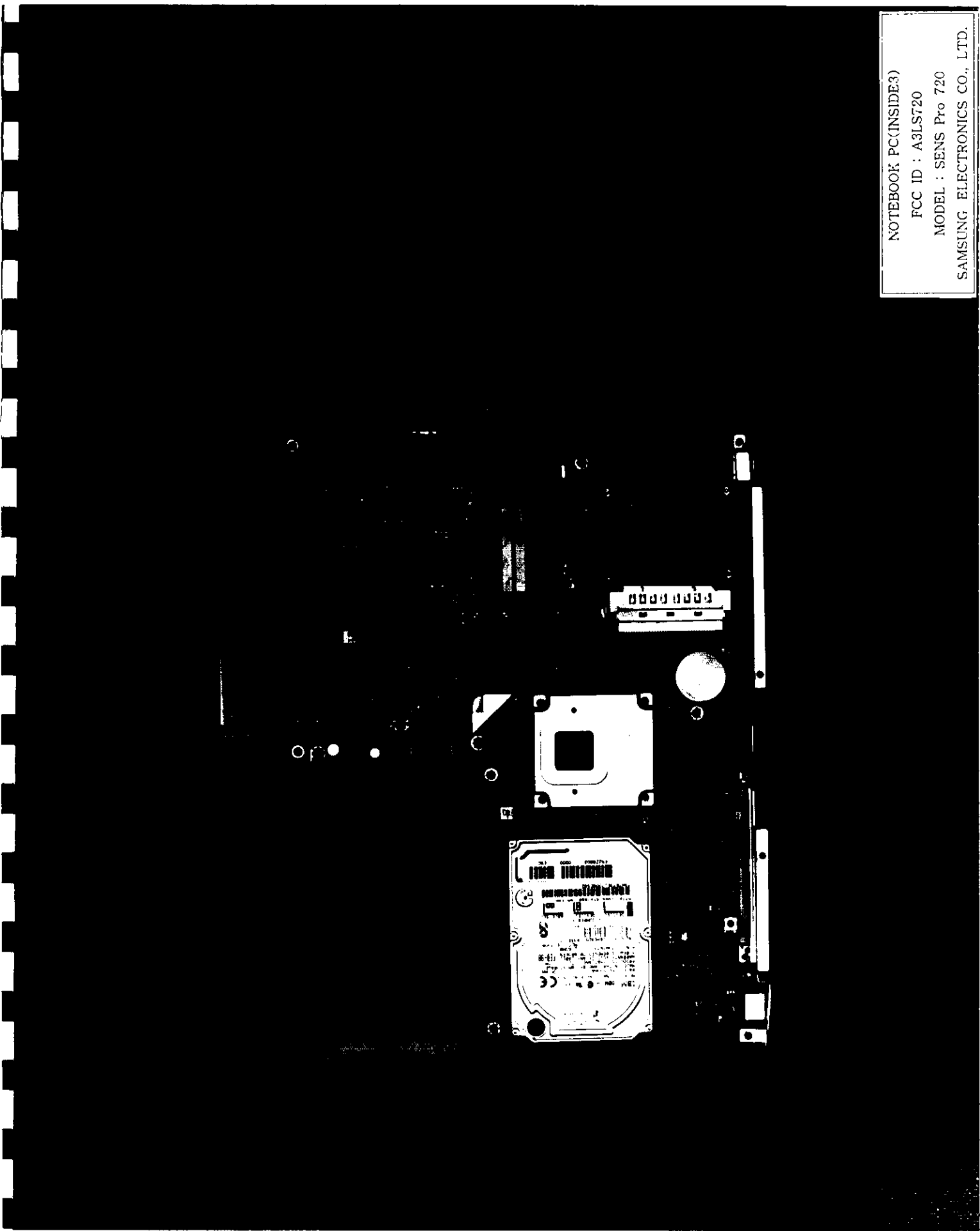
NOTEBOOK PC (INSIDE2)  
FCC ID : A3LS720  
MODEL : SENS Pro 720  
SAMSUNG ELECTRONICS CO., LTD.

NOTEBOOK PC(INSIDE3)

FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.

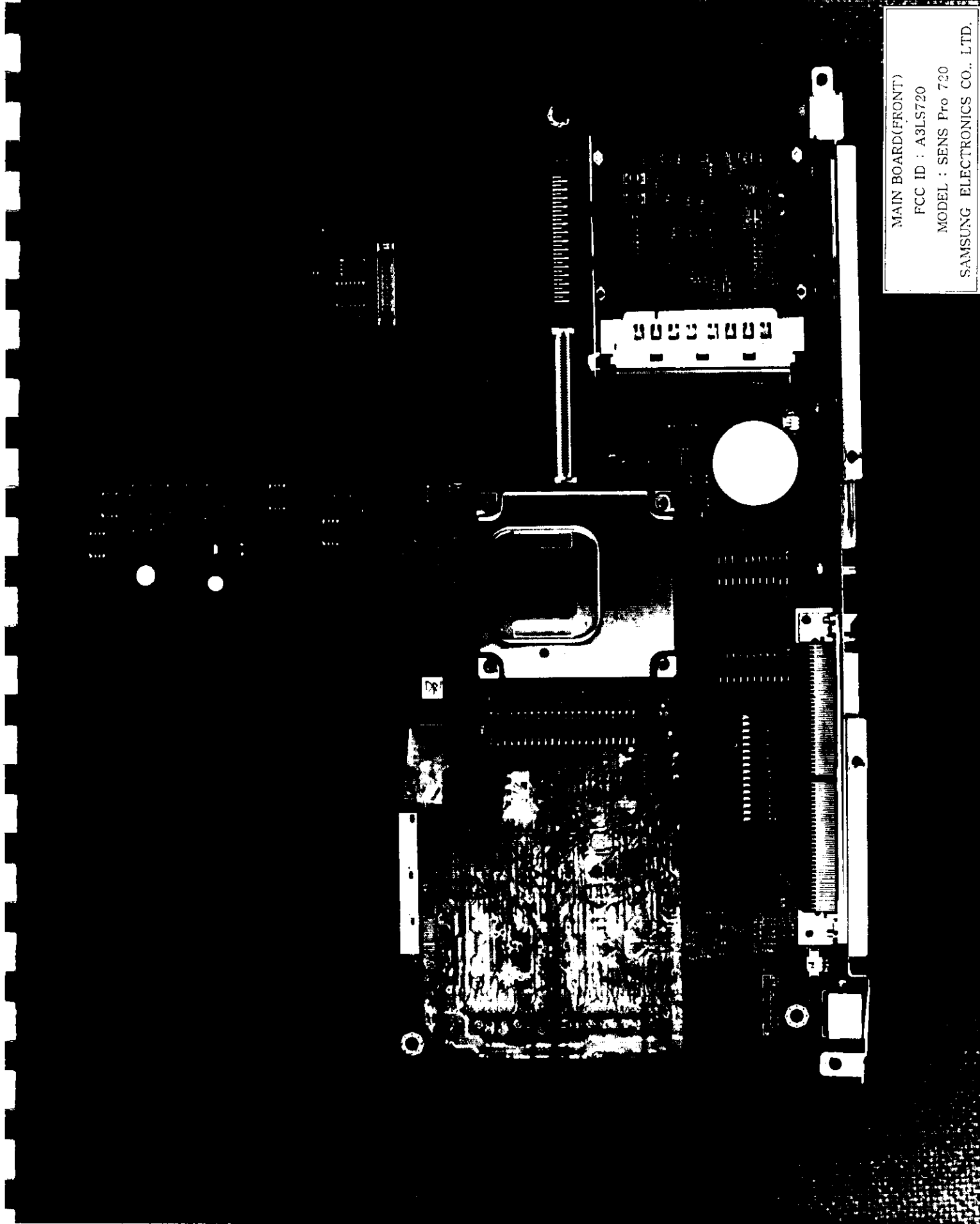


MAIN BOARD(FRONT)

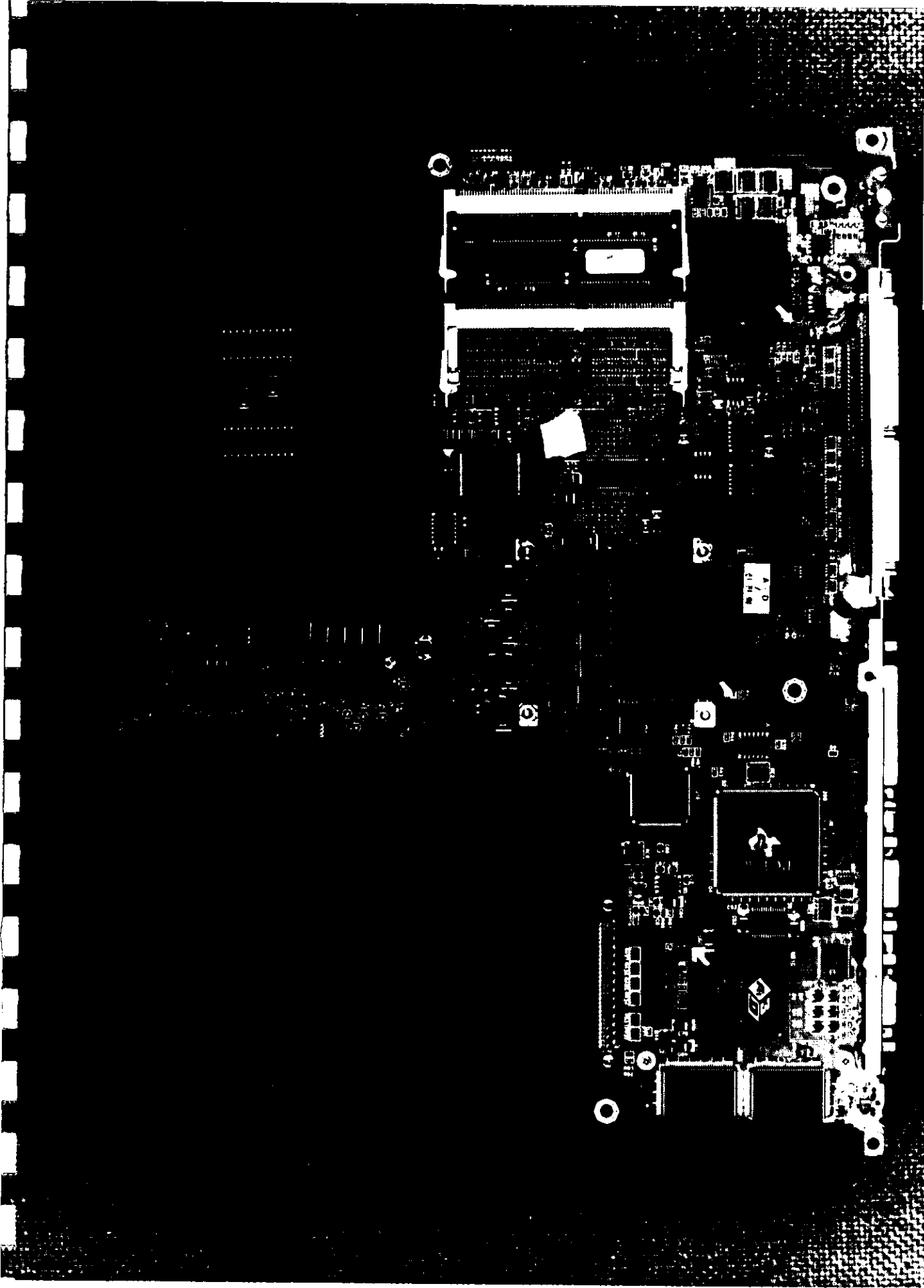
FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.



MAIN BOARD(REAR)  
FCC ID : A3LS720  
MODEL : SENS Pro 720  
SAMSUNG ELECTRONICS CO., LTD.



AUDIO & MODEM BOARD(FRONT)

FCC ID : A31LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.

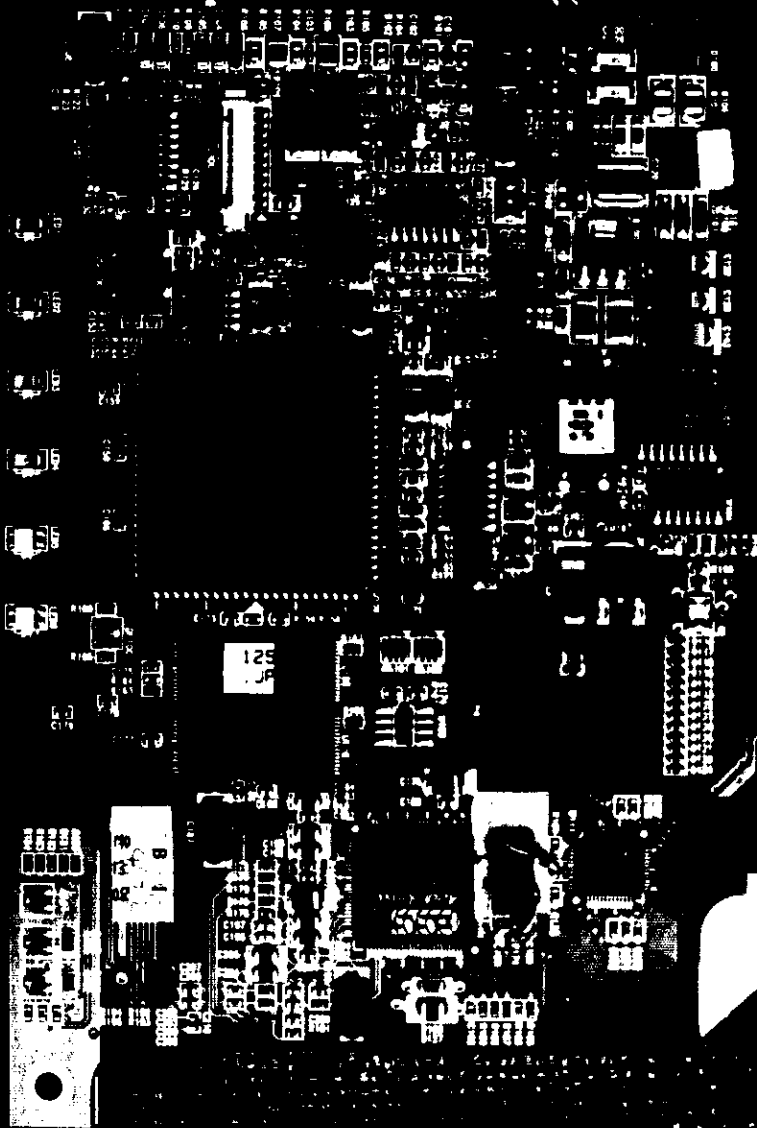
INDY 56K AUDIO/MODEM

MODEL SAV-1000R36  
REV D1  
P/B BNA1-10023A

PBA

S/N

SAMSUNG ELECTRONICS CO., LTD.  
MADE IN KOREA



AUDIO & MODEM BOARD(REAR)

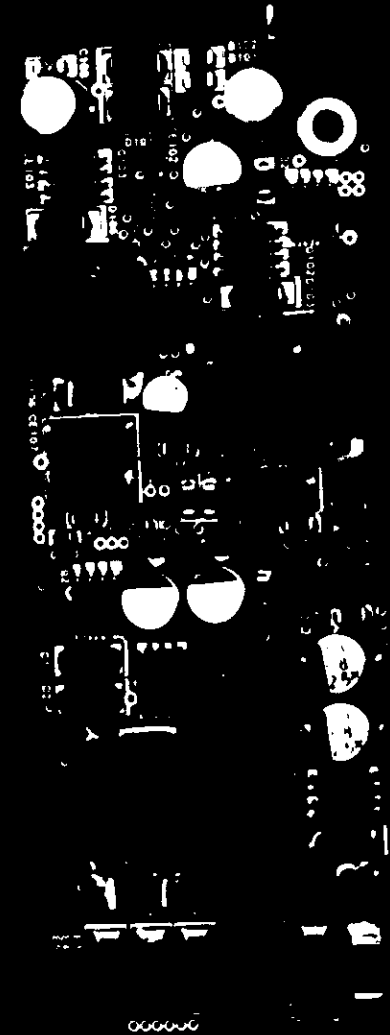
FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.



DC/DC BOARD(FRONT)  
FCC ID : A3LS720  
MODEL : SENS Pro 720  
SAMSUNG ELECTRONICS CO., LTD.



DC/DC BOARD(REAR)

FCC ID : A3LS720

MODEL : SENS Pro 720

SAMSUNG ELECTRONICS CO., LTD.

