¡Û SAMSUNG Reference NO. : 980727

SAMSUNG ELECTRONICS

MEASUREMENT/TECHNICAL REPORT

SAMSUNG ELECTRONICS CO., LTD.

Notebook Computer (SENS Pro 620)

FCC ID : A3LS620

DATE : JULY 10, 1998

¡Û SAMSUNG Reference NO. : 980626

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

2. Identification of tested device

   2.1 FCC ID : A3LS620
   2.2 Device Name : Notebook Computer
   2.3 Brand (Trade Name) : SAMSUNG
   2.4 Model Number : SENS Pro 620

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 : July 06, 1998

5. Issued Date : July 10, 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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User's Manual ..... Attachment A

1. General Information

1.1 Production Description

The Samsung Electronics Co., Ltd. Notebook Computer Model SENS Pro 620(FCC ID :A3LS620)is based on the powerful pentium processor(CPU266MHz) and has internal clock speeds of 14.318, 33, 48, 56.448, and 66.6MHz. It can be operated from rechargeable battery pack or by 90-240V internal AC Adapter.
See attached SENS Pro 620 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
A3LS620	EUT (SENS Pro 620)	-
FCC DOC	Monitor (6547-3BN)	Shielded Interface Unshielded Power Cord
DSI16XU222	Inkjet Printer (2225C)	Shielded Interface
EW425-1040D	Serial Mouse (25-1040D)	Unshielded Interface
GJJSKR-1032B	Keyboard (SEM-K15Z)	Unshielded Interface
N/A	USB Termination Cable	Unshielded Interface
A3LSPR500E	Port Replicator (SPR-500E)	Unshielded Interface
N/A	TelePhone (SSP-2501)	Unshielded Interface
N/A	Speaker (BS-211)	Unshielded Interface
N/A	Mike (YMC-2511)	Unshielded 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 OATS.
An antenna-to-EUT distance is three meters.

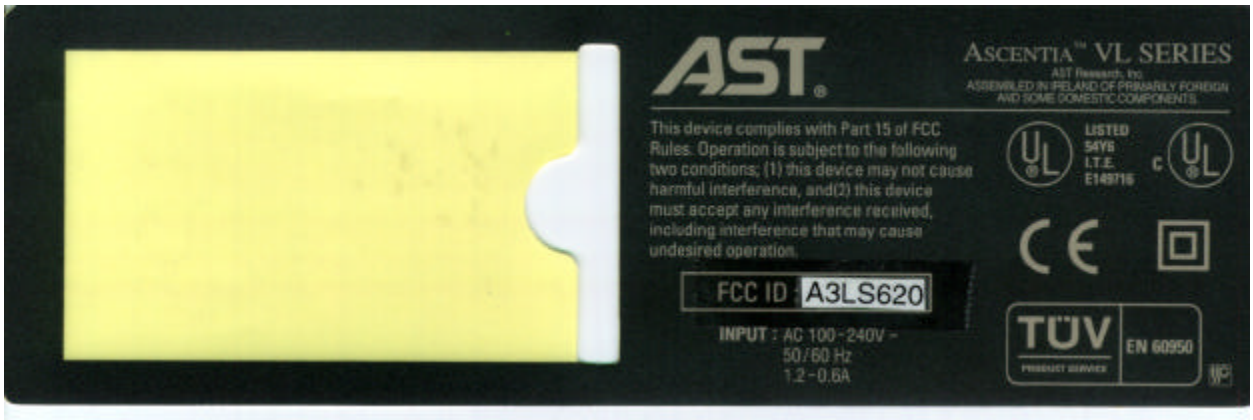
1.5 Test Facility

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 66.6MHz.

The EUT was investigated while operating at all speeds. The highest speed of 266MHz CPU was used for final testing as it was found to cause worst case emissions. And the EUT has LCD displays of 12.1" TFT.

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.

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 Soft ware

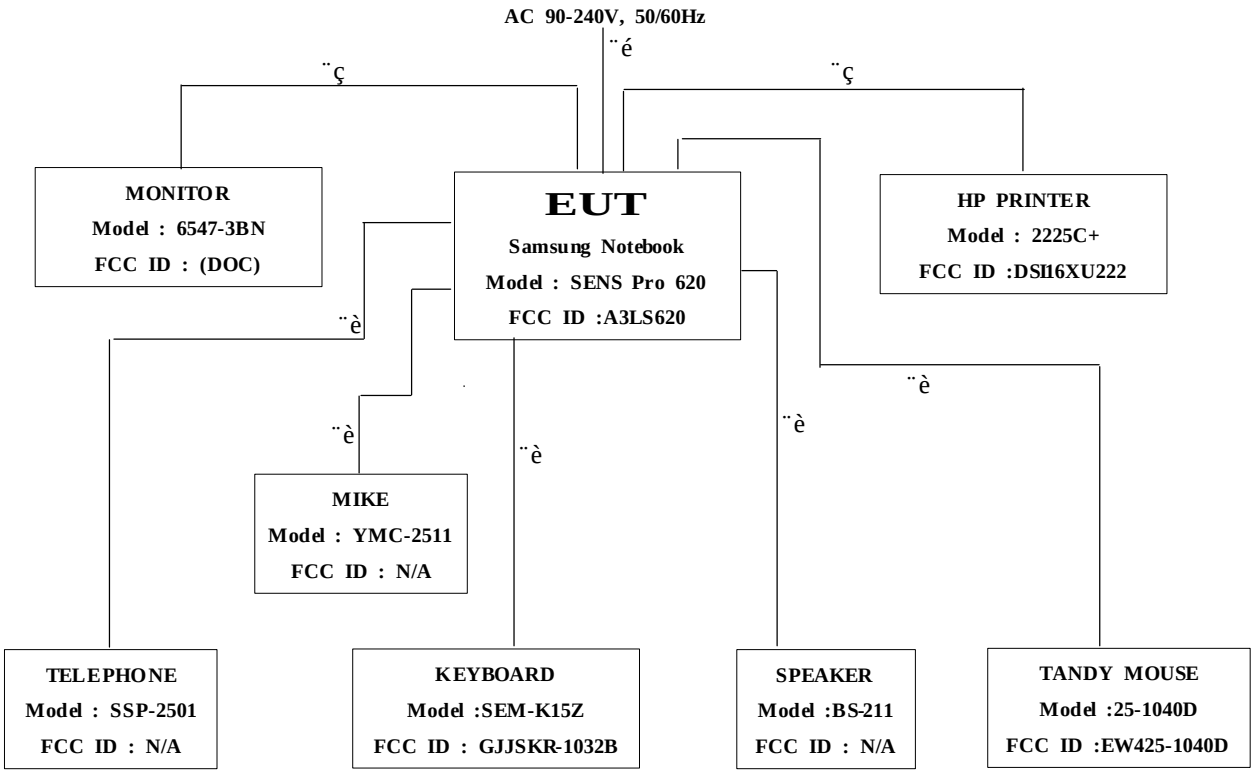
The EUT exercise program used during testing was designed to exercise the system in a manner similar to a typical use. The software was contained on the EUT's hard disk and floppy disk. Once loaded, the program sequentially exercise each system component in turn.

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.

3.4 Equipment Modifications

No equipment modifications were performed during testing.

3.5 Test System configuration
Samsung Notebook
Model : SENS Pro 620



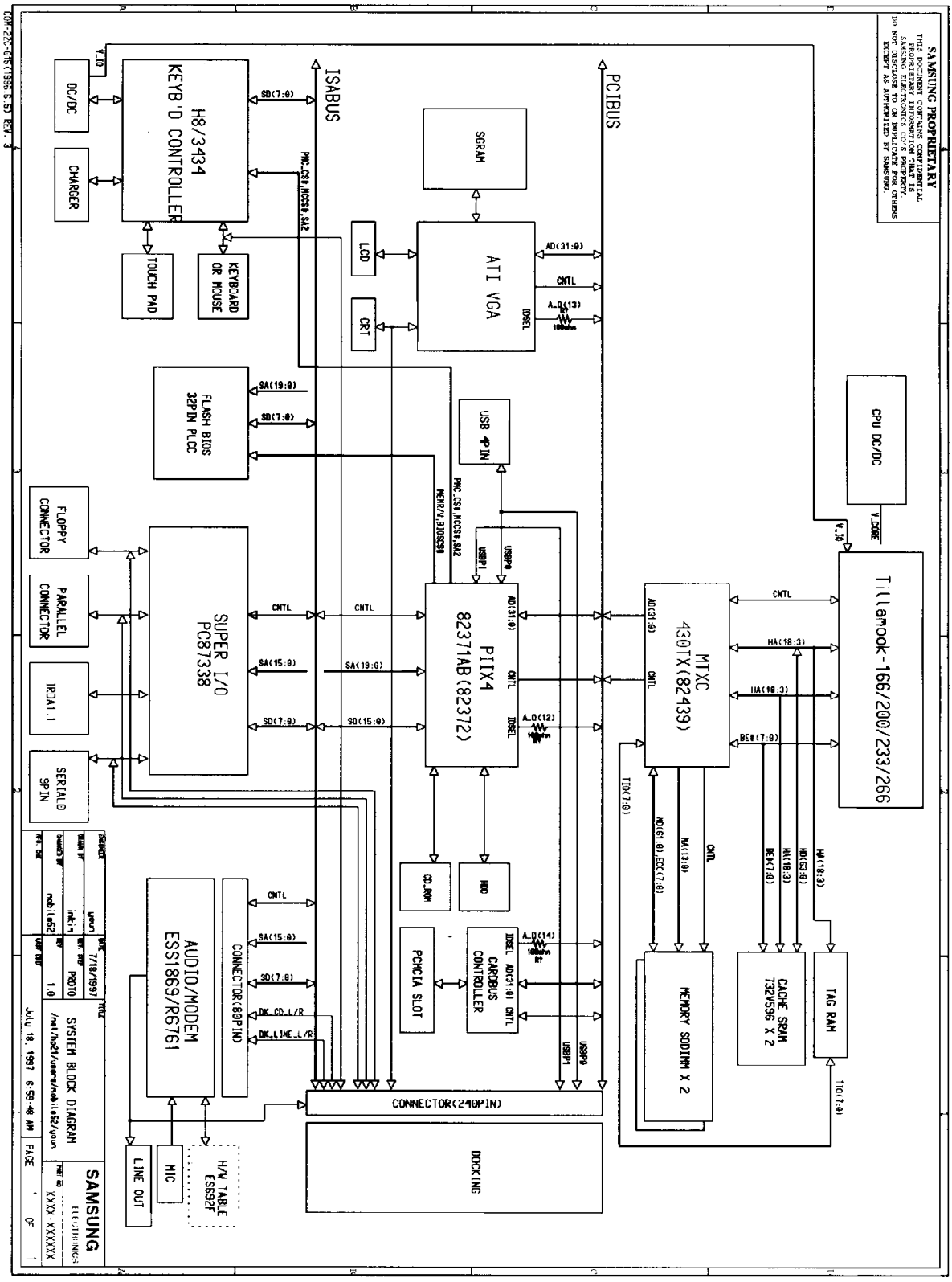
¨ç Shielded Cable
¨è Unshielded Cable
¨é Unshield Power Cord
¨ê Ferrite Bead

4. BLOCK DIAGRAM(S)

FIGURE 4.1 Block Diagram

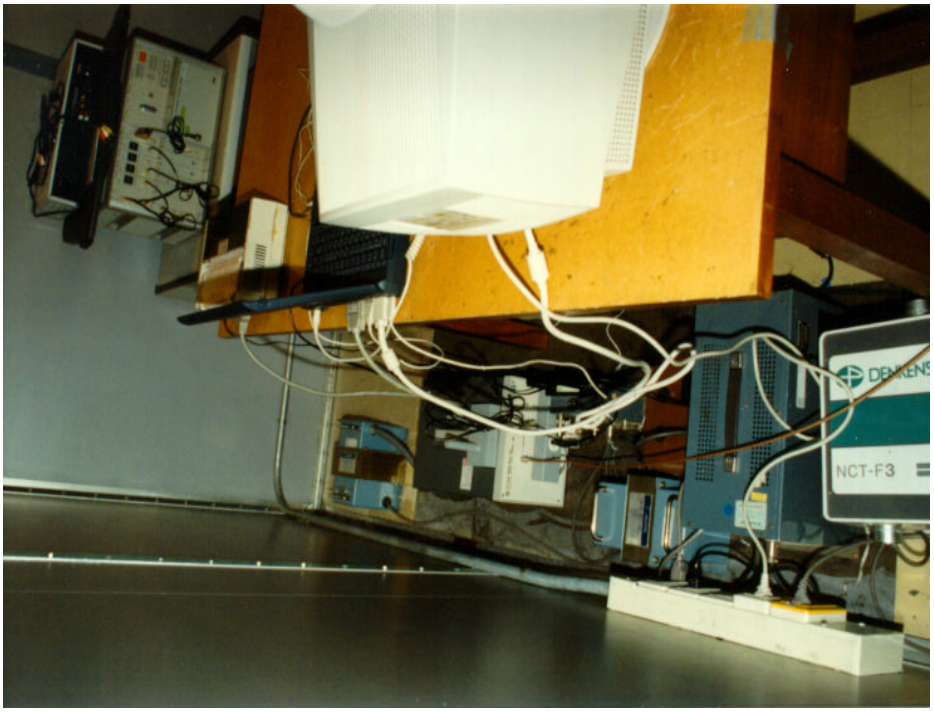
Please see block diagram on the next page.

Figure 4.1 Block Diagram



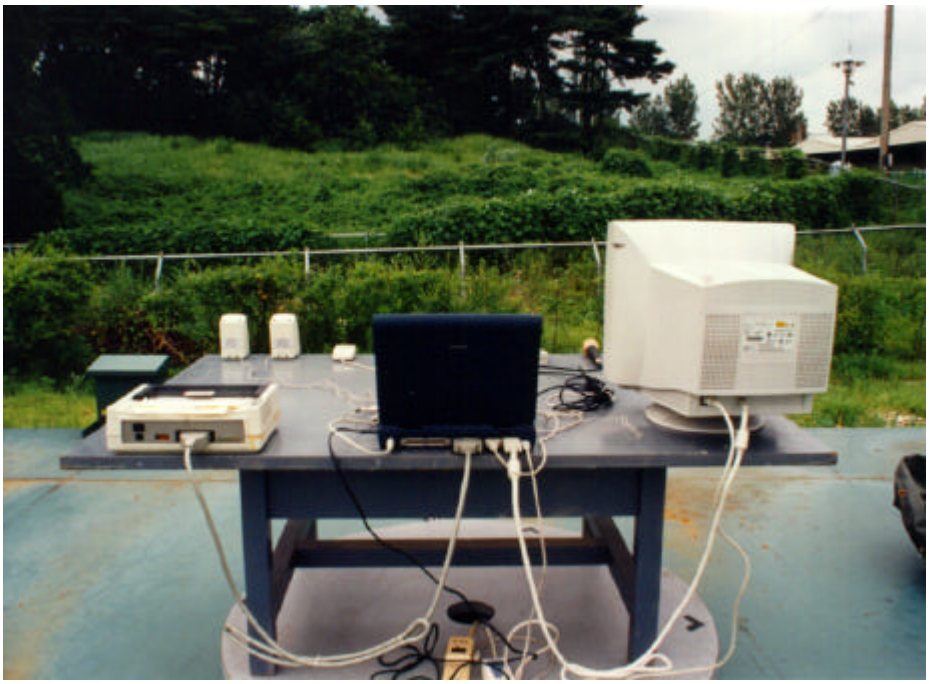
5. CONDUCTED AND RADIATED MEASUREMENT PHOTOS

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 anlyzer.

- Sample Calculation

Frequency : 15.123 [MHz]
Meter Reading : 41.9 [dBuV] < - - - Maximum Meter Reading
Factor of LISN : 0.2 [dB]

Then, Result is calculated as follows.

41.9 + 0.2 = 42.1 [dBuV]

- Summary of Test Result

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

Minimum margin was 5.9dB at 15.123MHz.

- Test Data Sheet

Tested frequency [MHz]	LISN	Meter Reading [A] [dBuV]	CABLE Loss [B] [dB]	Results [A+B] [dBuV]	Limits [dBuV]
1.230	L	38.0	0.1	38.1	48
1.374	L	38.5	0.1	38.6	
1.518	L	38.2	0.1	38.3	
2.169	L	36.3	0.1	36.4	
15.123	N	41.9	0.2	42.1	
28.065	L	38.5	0.4	38.9	

N : Neutral L:Live

- Data graph

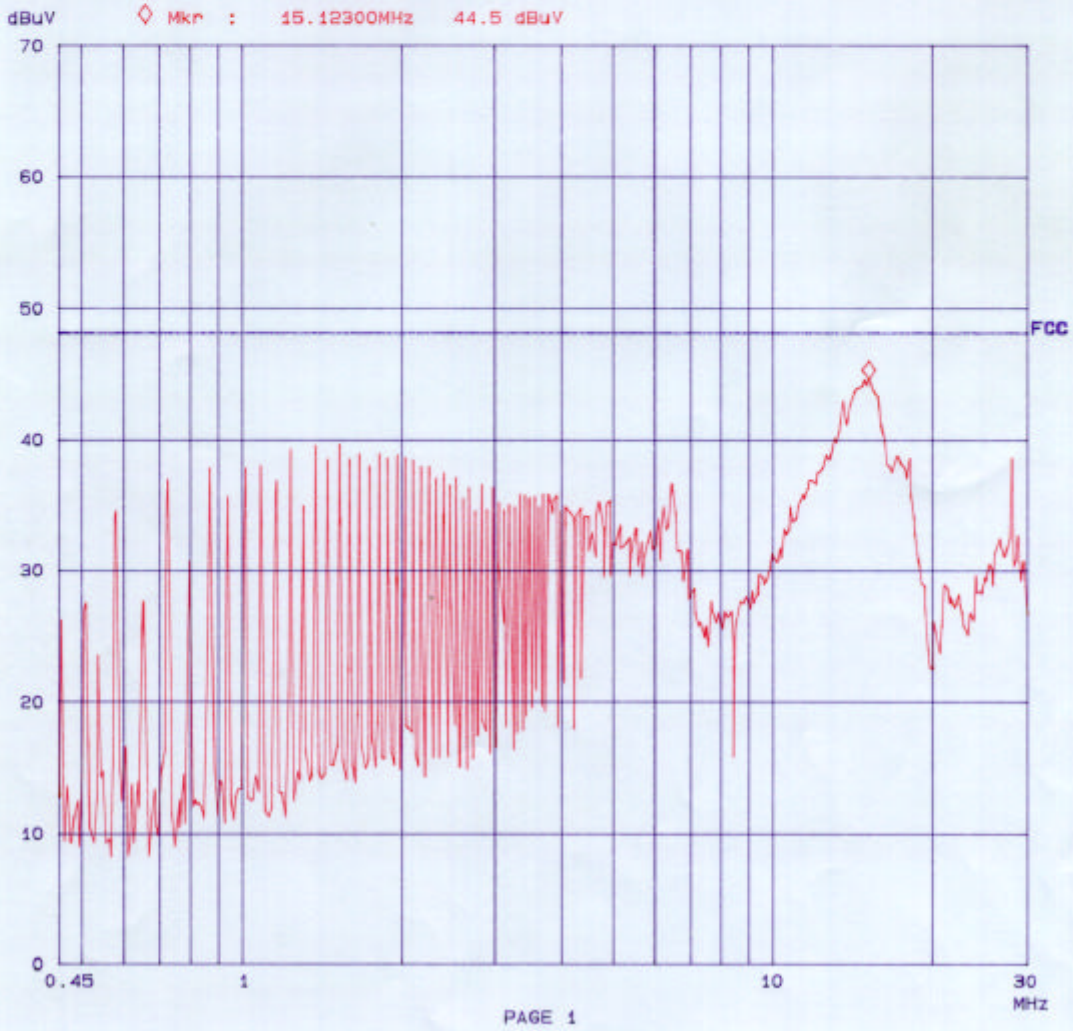
See the next pages.

onducted Emission 24. Jun 98 13:46

EUT: SENS Pro 620
Manuf: SAMSUNG
Operator: M.S.CHUNG
Comment: L1

Fast Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	3k	10k	PK	0.10ms	10dBLN	OFF	60dB



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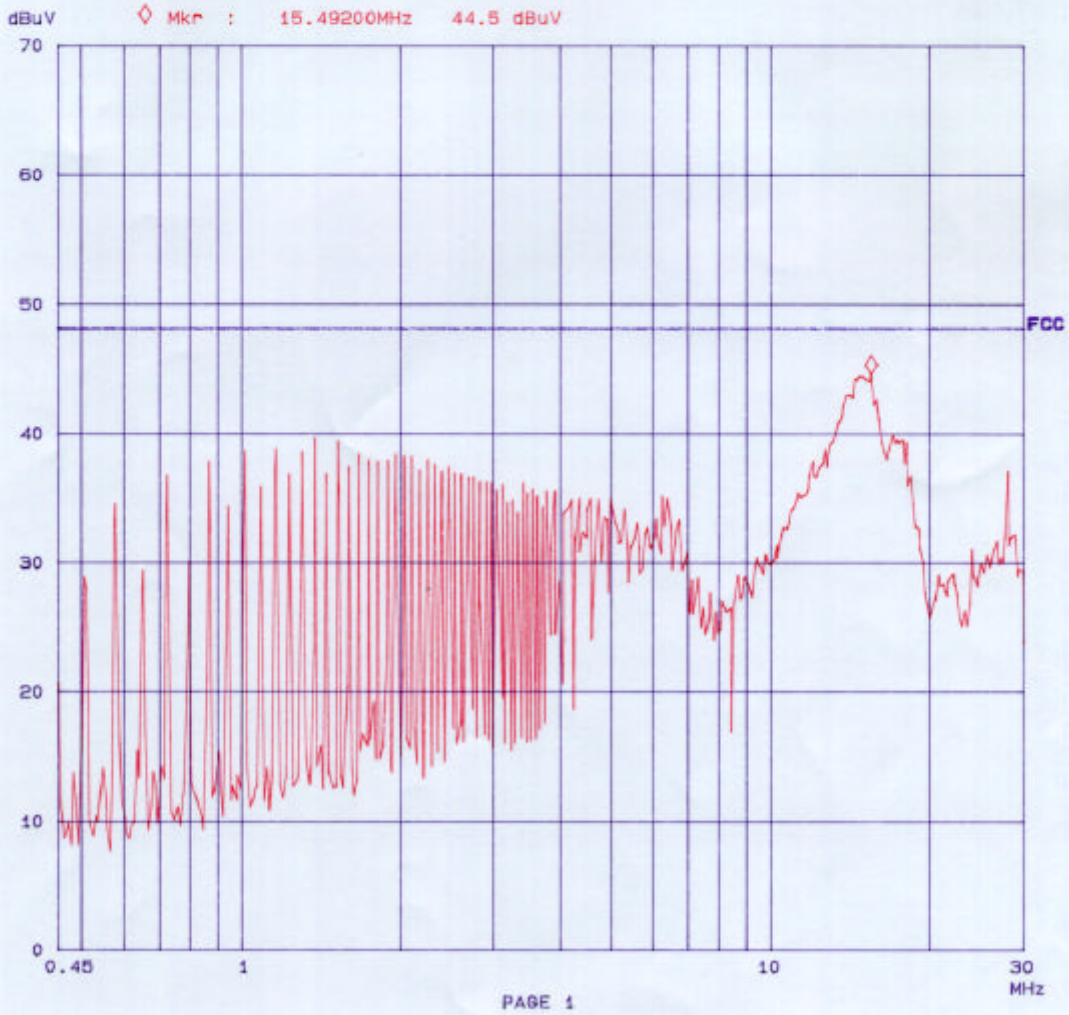
onducted Emission 24. Jun 98 14:00

EUT: SENS Pro 620
Manuf: SAMSUNG
Operator: M.S.CHUNG
Comment: N

Fast Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	30M	3k	10k	PK	0.10ms	10dBLN	OFF	60dB



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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]
	40.80	V	15.0	13.08	28.1	
	59.22	H	17.1	10.20	27.3	
30 - 88	65.10	H	13.5	10.23	23.7	**40.0**
	72.10	H	13.8	10.26	24.1	
	77.30	H	13.6	10.39	24.0	
	86.20	H	11.8	11.08	22.9	
	113.20	V	19.3	14.19	33.5	
	119.75	V	23.3	14.50	37.8	
88 - 216	160.10	H	15.6	15.67	31.3	**43.5**
	166.67	H	19.0	15.81	34.8	
	177.70	H	16.7	16.28	33.0	
	200.00	H	20.0	18.29	38.3	
	330.80	H	17.8	18.68	36.5	
	358.80	V	21.1	19.17	40.3	
216 - 960	466.67	V	17.5	22.04	39.5	**46.0**
	489.00	H	20.1	22.61	42.7	
	600.00	H	18.5	24.28	42.8	
	733.34	H	15.2	27.64	42.8	
	1177	H	9.1	31.70	40.8	
	1616	H	9.9	34.80	44.7	
960 -	1692	H	10.4	35.20	45.6	**54.0**
	1824	H	10.3	36.40	46.7	

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. LIST OF TEST INSTRUMENT.

Equipment	Model No.	Serial No.	Maker	Calibration Last Calibration and Interval
Spectrum Analyzer	8566B	2607A2581	H.P	97/09/12, 12 Months
Quasi-Peak Adapter	85650A	2521A00687	H.P	97/08/01, 12 Months
RF PreSelector	85685A	2602A00224	H.P	97/09/17, 12 Months
Spectrum Monitor	EZM	374.4019.03	R & S	97/12/12, 12 Months
Field Strength Meter	ESVP	882401/009	R & S	98/06/10, 12 Months
	ESH3	860905/010	R & S	98/03/26, 12 Months
Pre-Amplifier	8447D	2443A04331	H.P	97/12/08, 12 Months
L.I.S.N	3825/2R	1151	EMCO	97/07/23, 12 Months
	KNW-404	8-507-5	Kyoritsu	97/07/23, 12 Months
Bi-Conical Antenna	3110B	2706	EMCO	97/09/12, 12 Months
Log-Periodic Antenna	3146A	1353	EMCO	97/09/12, 12 Months
Double Ridged WaveGuide	3115	4028	EMCO	97/10/05, 12 Months