



MEASUREMENT/TECHNICAL REPORT
SAMSUNG ELECTRONICS CO., LTD.

Notebook Computer (SENS Pro 750)
FCC ID : A3LS750

DATE : AUG. 03, 1998

* SAMSUNG Reference NO. : 980801

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

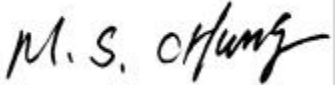
2.1 FCC ID : A3LS750
 2.2 Device Name : Notebook Computer
 2.3 Brand (Trade Name) : SAMSUNG
 2.4 Model Number : SENS Pro 750

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 : AUG. 03, 1998

5. Issued Date : AUG. 03, 1998

Tested by : **MIN-SOEK CHUNG** 
 (Test Engineer)


Approved by : **SANG-KYU, 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 750(FCC ID : A3LS750) is based on the powerful pentium II processor(CPU300MHz) 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 100-240V AC Adapter.

See attached SENS Pro 750 User's Guide for more information.

1.2 Grants

The EUT was tested with External FDD and with CD-ROM driver. 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
A3LS750	EUT (SENS Pro 750)	-
FCC DOC	Monitor (6547-3BN)	Shielded Interface Unshielded Power Cord
DSI16XU222	Inkjet Printer (2225C)	Shielded Interface
EW425-1040D	Serial Mouse (25-1040D)	Unshielded Interface
DZL210472	PS/2 Mouse (M-S34)	Unshielded Interface
E2XSEM-K15Z	Keyboard (SEM-K15Z)	Unshielded Interface
N/A	USB Termination Cable	Unshielded Interface
N/A	Port Replicator (SPR-750E)	Unshielded Interface
N/A	Television (CT-141F)	Unshielded Interface
N/A	Earset (-)	Unshielded Interface
N/A	Joystick (GRAVIS)	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. 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, 56.448, 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 12.1" TFT.

The EUT's video circuitry is capable of operating at a maximum non-interlaced resolution of 800*600 pixels. The EUT was observed while scrolling a continuous stream for capital "H's" in the 800*600 mode(both LCD display and Ext. Monitor).

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

Comparing the test results with Ext. CD-ROM Driver and with Ext. FDD, The test result with Ext. CD-ROM Driver was found the worst case emissions. And so the final testing was performed with Ext. CD-ROM Driver.

The External FDD and CD-ROM Driver 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.

2.2 Video Mode Justification

The system was tested in 800*600 resolution mode and in the highest resolution mode of 800*600. since the 800*600 resolution mode(LCD & Ext. monitor both in use) was found to be worst case, this mode was used to collect the included data.

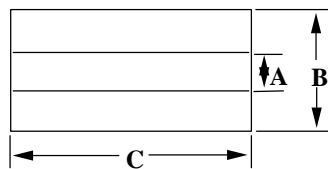
2.3 EUT Exercise Soft ware

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.

2.4 Special Accessories

As shown in next page 2.6, all interface cables used for compliance testing are unshielded. The Samsung AC adapter cable has a ferrite bead on the line as supplied by the manufacturer. The ferrite specification that used on AC adapter cable.

The following is ferrite specification.

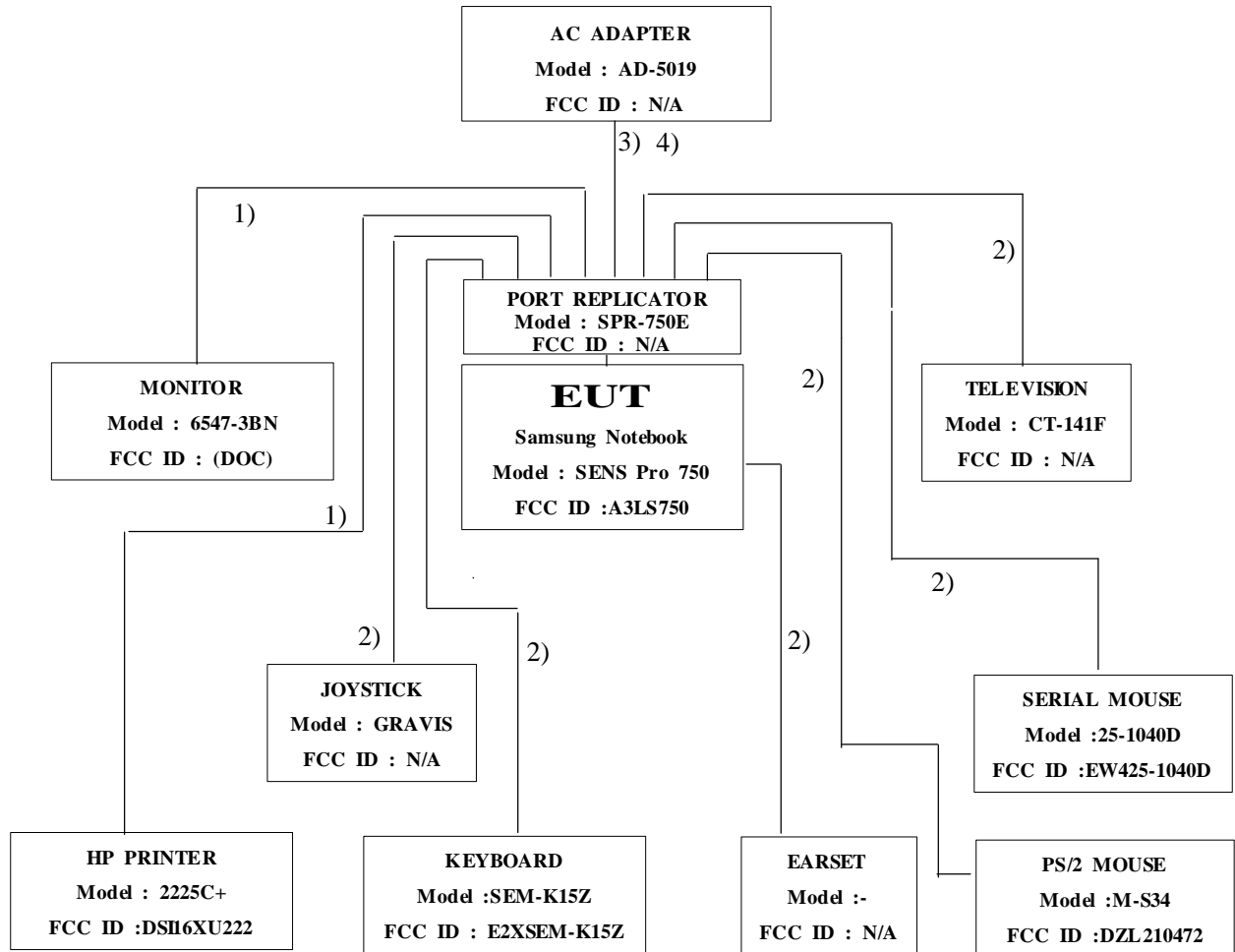


AC-ADAPTER	
A :	4.7mm
B :	9.8mm
C :	24.5mm

2.5 Equipment Modifications

No equipment modifications were performed during testing.

2.6 Test System configuration
Samsung Notebook
Model : SENS Pro 750



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

3. 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 : 0.742 [MHz]
 Meter Reading : 41.3 [dBuV] <--- Maximum Meter Reading
 Factor of LISN : 0.1 [dB]

Then, Result is calculated as follows.

$$41.3 + 0.1 = 41.4 \text{ [dBuV]}$$

- Summary of Test Result

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

Minimum margin was 6.4dB at 0.742MHz.

- Test Data Sheet

Tested frequency [MHz]	LISN	Meter Reading [A] [dBuV]	CABLE Loss [B] [dB]	Results [A+B] [dBuV]	Limits [dBuV]
0.154	L	40.9	0.1	41	48
0.740	L	41.3	0.1	41.4	
0.940	L	39.1	0.1	39.2	
1.35	N	39.7	0.1	39.8	
6.00	L	35.1	0.2	35.3	
11.600	L	34.4	0.3	34.7	

N : Neutral L ■ :
 Live

- Data graph

See the next pages.

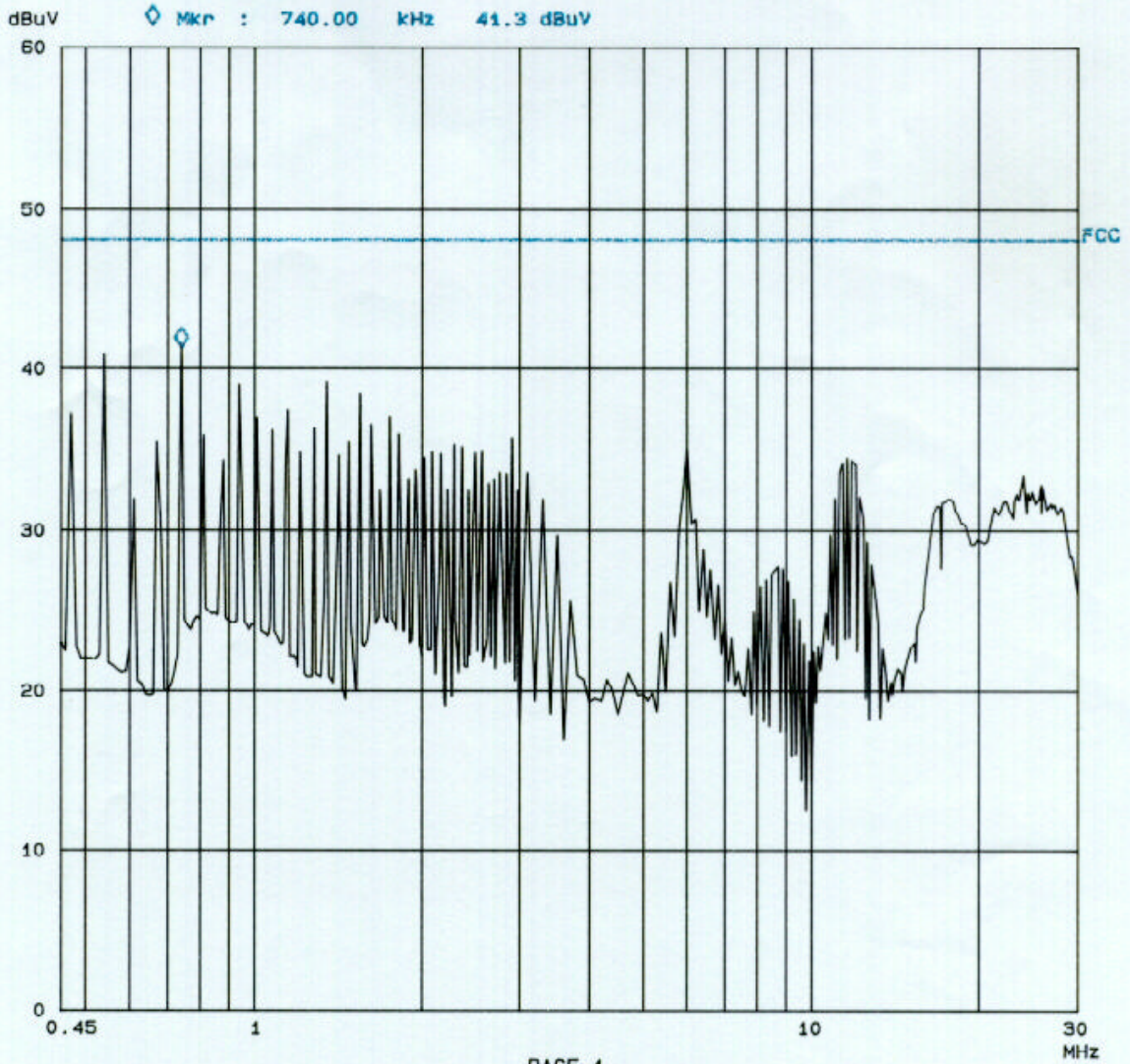
Conducted Emission

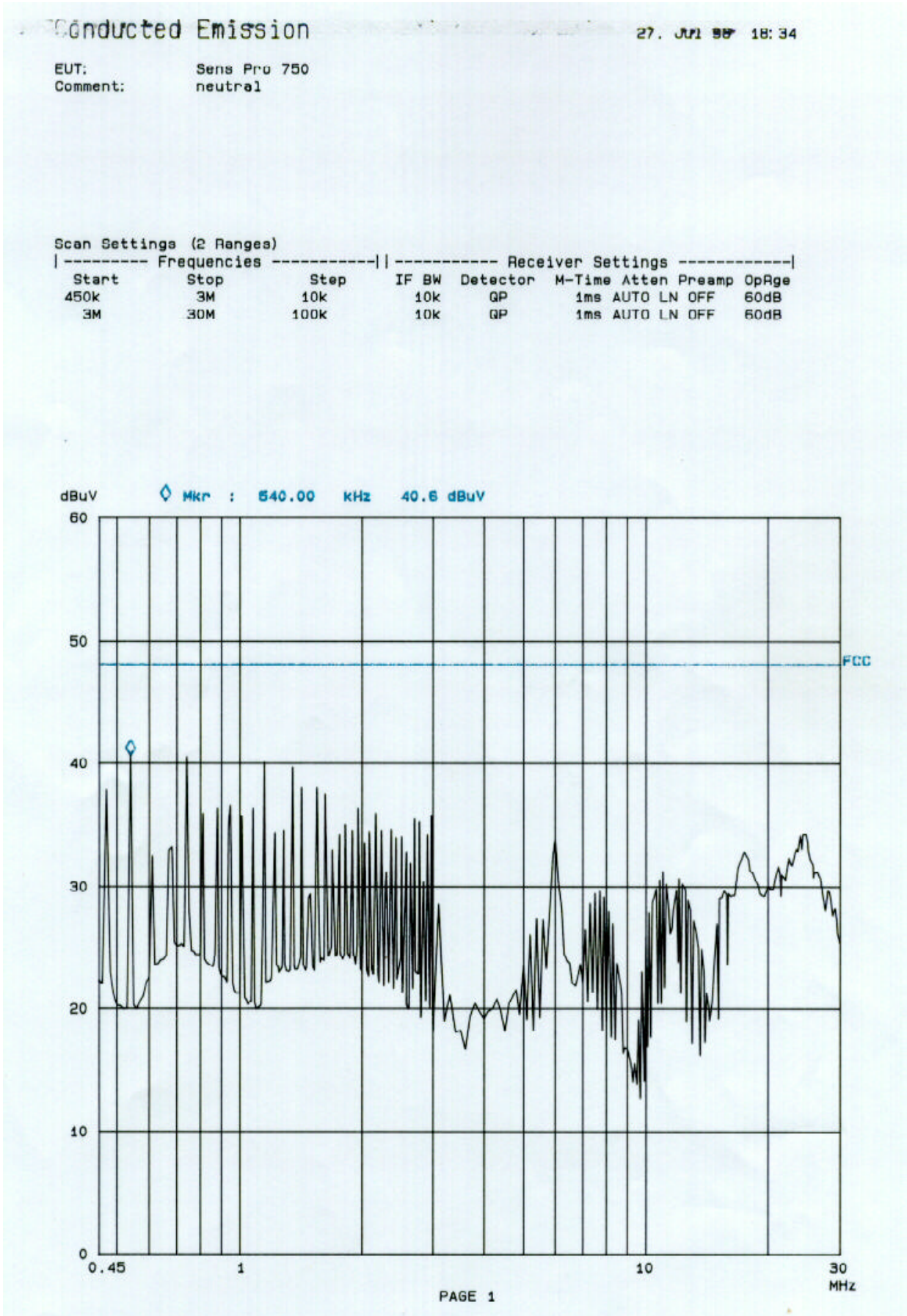
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EUT: Sens Pro 750
Comment: live

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450K	3M	10K	10K	GP	1ms	AUTO	LN OFF	60dB
3M	30M	100K	10K	GP	1ms	AUTO	LN OFF	60dB





4. 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]
	45.90	V	17.4	11.97	29.4	
	52.10	V	18.2	10.85	29.1	
30 - 88	64.00	H	21.3	10.23	31.5	40.0
	65.10	V	19.6	10.23	29.8	
	71.82	H	24.0	10.26	34.3	
	86.20	H	16.8	11.08	27.9	
	92.10	V	18.2	11.63	29.8	
	96.40	H	17.4	12.23	29.6	
88 - 216	112.40	H	15.2	13.88	29.1	43.5
	118.00	H	15.9	14.50	30.4	
	160.00	H	13.7	15.67	29.4	
	196.60	H	12.1	17.94	30.0	
	240.10	H	12.3	20.37	32.7	
	407.80	V	19.2	20.31	39.5	
216 - 960	478.50	V	19.0	22.04	41.0	46.0
	558.30	V	16.4	23.43	39.8	
	837.60	V	13.0	29.23	42.2	
	939.10	V	11.0	31.40	42.4	
	968.5	V	12.0	31.81	43.8	
	1.482	H	9.7	33.20	42.9	
960 -	1.578	H	9.9	35.20	45.1	54.0
	1.724	H	10.8	36.00	46.8	
	1.939	H	11.3	36.60	47.9	

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.

5. LIST OF TEST INSTRUMENT.

Equipment	Model No.	Serial No.	Maker	Calibration Last Calibration and Interval
Spectrum Analyzer	8566B	2607A02581	H.P	97/10/17, 12 Months
Quasi-Peak Adapter	85650A	2521A00687	H.P	98/07/07, 12 Months
RF PreSelector	85685A	2602A00224	H.P	98/02/16, 12 Months
Spectrum Monitor	EZM	8611921012	R & S	98/04/15, 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	9208-1981	EMCO	97/09/23, 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	97/10/08, 12 Months