

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : Note Book Computer
Model No. : SENS Pro 760

FCC ID : A3LS760

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2. This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.
3. 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.

Date of test : March 13, 2001

Issued Date : March 20, 2001

Tested by:

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Chun Kyu, PARK / Test Engineer

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The test reported herein have been performed in accordance
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NVLAP Code: 200447

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Distribution

This test report has been made available as follows:

CS Management Center, EMC Laboratory	1 original
Computer Division	1 copy

1. General Information

Applicant : Samsung Electronics Co., Ltd.
CS Management Center EMC Test Laboratory
Tel.: +81-(0)31-200-2135 Fax.: +81-(0)31-200-2189

Full Address : 416 Maetan 3 Dong, Paldal-Ku,
Suwon City, Kyungki Do, Korea, 442-742

Kind of Product : **Note Book Computer**

Model & Variant Names : **SENS Pro 760** (Brand Name: SAMSUNG)
NV5000 Series (Brand Name: SAMSUNG)
SOLO 3450 (Brand Name: Gateway)

Customer Ref. : Computer Div.

Test Report Produced by : Chun Kyu, PARK / Test Eng.

1.1 Product Description

1) Justification

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use.

Comparing the test results with Docking Station(SSD-760E) and without Docking Station the test result with Docking Station was found the worst case emissions. And so the final testing was performed with Docking Station.

The EUT was tested with a Samsung AC Adapter Model number AD-6019 and inserted Mini PCI LAN/Modem Combo(Model Number:SEM-2100iL).

Further details of cabling and configuration are shown in the test system configuration.

2) Operating Frequency :

750MHz(CPU Speed), 100MHz(Host Clock), 100MHz(SDRAM Clock)
 33.3MHz(PCI Clock), 14.318MHz(Ref. OSC), 49.512MHz(Audio Clock)
 100MHz(Video Memory Clock), 12.288MHz(Audio Bit Clock), 24.576MHz(Audio Clock)
 16MHz(Micom Clock), 48MHz(USB Clock), 65MHz(LCD Clock)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
"H" Pattern display & Read / Write	LCD Screen
	CRT Monitor
	FDD, Hard disk drive & CD-ROM drive
	LPT1 to Printer
Network	Media Player Playing through Video CD in Network Server
Audio Output	Audio out to Speaker

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors
LCD(12.1")	1024 X 768	60Hz	32bits
Ext. Monitor	1024 X 768	85Hz	32bits

5) Assemble Parts

Item	Specification	Remark
CPU	Intel Mobile Pentium-III 750MHz w/SPEED STEP PACKAGE TYPE : BGA2TYPE	256KB L2 CACHE IN Pentium III
System Memory	64MB ON_BOARD 1 SODIMM SOCKET	MAX320MB(100MHz SDRAM ONLY)
Graphics	8MB SGRAM ON_CHIP, 2D/3D ACCELERATOR DuoVUE dual display support TV-OUT SUPPORT, CORE 1.9V	SAVAGEIX
LCD DISPLAY	12.1" XGA TFT LCD	SEC, LTN121XU-L01
AUDIO	ESS1988 ALLEGRO	
IEEE 1394	TSB43AB22	
HDD	9.5mmH 2.5", ultraDMA fixed design	
MINI-PCI	SEC, LAN/Modem COMBO, SEM-2100iL 10/100M LAN/56KBPS Modem	Samsung
AC Adapter	38-Watts, AC 100~240V FREE-VOLTAGE	SEM, AD-4212
MP3	MP3 BOARD 32M FLASH MEMORY	
Ports	1. Parallel & Serial 2. RJ-11 & RJ-45 3. CRT 4. USB, PS/2 5. MIC, Speaker 6. TV-Out, DC-In 7. IEEE 1394	
Battery	Standard: 24Watt, 4Cell Long life: 53Watt, 8Cell	Li-Ion & Smart
Docking Station	SEC, SSD-760E,K	
WEIGHT	1.35Kg W/ Standard battery	

1.2 Tested System Details

	Model	Description	Cable description	FCC ID
(1)	SAMSUNG M/N : SENS Pro 760	NOTEBOOK PC S/N : -	-	A3LS760
(2)	SAMSUNG M/N : AD-4212	AC-adapter S/N : -	Unshielded AC Power Cable Unshielded DC Power Cable	-
(3)	Cannon M/N : K10158	InkjetPrinter S/N : CLG000800377	Unshielded Printer Cable	DOC
(4)	Dell M/N : D828L(T)	External monitor S/N :R0688EN47020CIAKE	Shielded Monitor Cable	DOC
(5)	Microsoft M/N : 83351-576	Serial Mouse S/N :7561995	Unshielded Cable	DOC
(6)	SAMSUNG M/N : SEM-A17K	PS/2 Keyboard S/N : KBAR04MT14247	Unshielded Cable	DOC
(7)	LOGITECH M/N :M-U48a	USB Mouse S/N : LZE01375334	Unshielded Cable	JNZ211360
(8)	LOGITECH M/N :M-U48a	USB Mouse S/N : LZE94654021	Unshielded Cable	JNZ211360
(9)	LOGITECH M/N :M-U48a	USB Mouse S/N : LZE01604734	Unshielded Cable	JNZ211360
(10)	SAMSUNG M/N : -	Earphone S/N : -	Unshielded Cable	N/A
(11)	SAMSUNG M/N : SSD-760K	Docking S/N : -	Unshielded Cable	N/A
(12)	Maxtor M/N : FWRA080LE001	Exteral Storage S/N : V80A9PHC	Shielded Storage Cable	DOC
(13)	SAMSUNG M/N : YMC-2511	Microphone S/N : -	Shielded Mic Cable	N/A
(14)	SAMSUNG M/N : SSP-2300	Telephone S/N :902164618	Unshielded Cable	N/A
(15)	Rexon M/N : AC-005	Switching Adapter S/N :-	Unshielded AC Power Cable Unshielded DC Power Cable	
(16)	SAMSUNG M/N : K30088	Printer Adapter S/N :CLG00100275	Unshielded AC Power Cable Unshielded DC Power Cable	

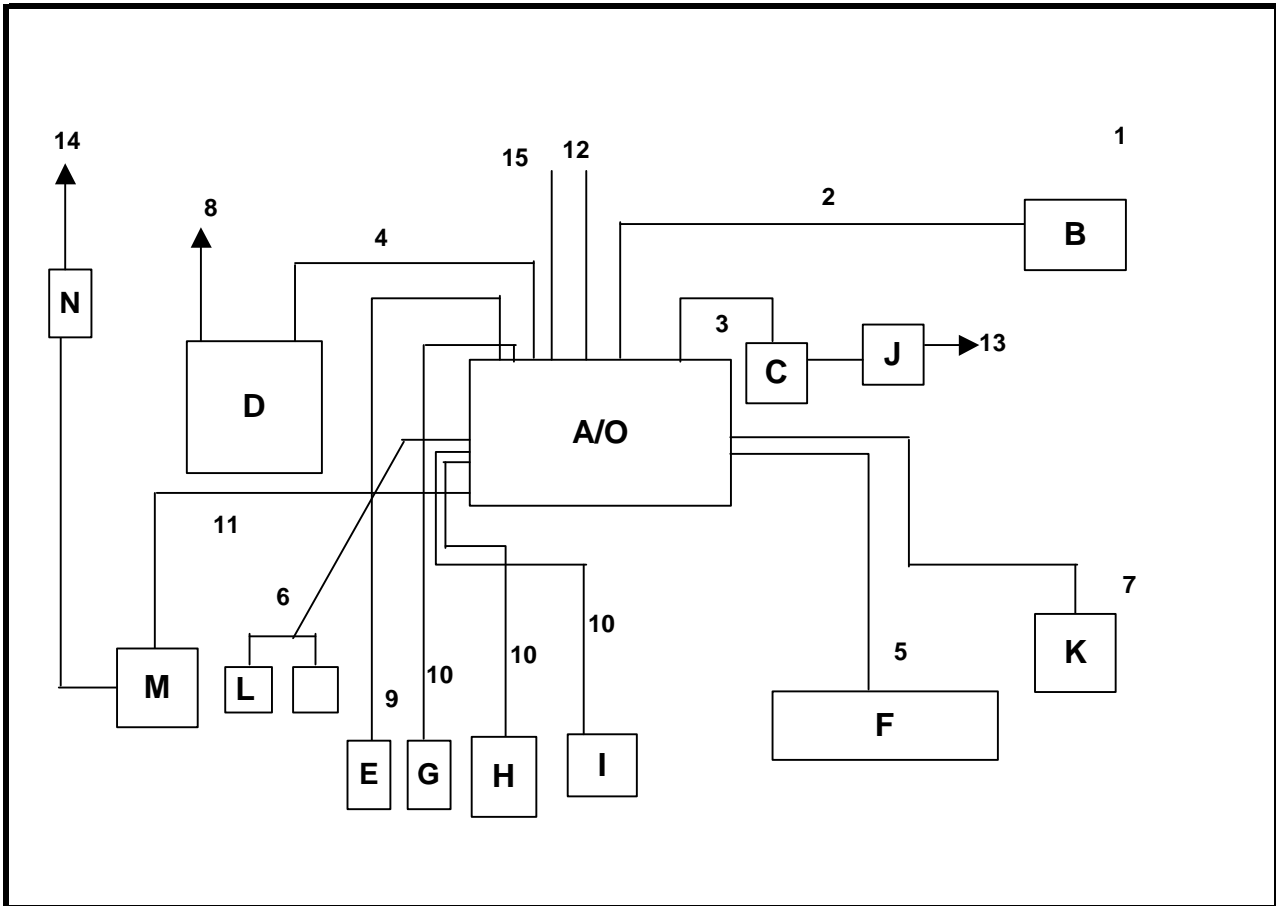
1.3 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	Note PC	SENS Pro 760	None	SAMSUNG	EUT
B	AC-adapter	AD-4212	None	SAMSUNG	
C	Printer	K10158	None	Cannon	
D	External monitor	D828L(T)	R0688EN47020CIAKE	DELL	
E	Serial mouse	83351-576	7561995	Microsoft	
F	PS/2 Keyboard	SEM-A17K	KBAR04MT14247	SAMSUNG	
G	USB mouse	M-U48a	LZE94654021	LOGITECH	
H	USB mouse	M-U48a	LZE01375334	LOGITECH	
I	USB mouse	M-U48a	LZE01604734	LOGITECH	
J	Printer Adapter	K30088	CLG001000275	TABUCHI	
K	MIKE	YMC-2511	None	SAMSUNG	
L	Earphone	None	None	SAMSUNG	
M	External Storage	FWRA080LE001	V80A9PHC	Maxtor	94 port
N	Switching Adapter	AC-005	None	REXON	
O	Docking	SSD-760K	None	SAMSUNG	
P	Telephone	SSP-2300	902164618	SAMSUNG	

1.4 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power cable	1.5	N	Power Supply For Computer
2	AC adapter Cable	1.8	N	
3	Printer Cable	1.5	Y	
4	Monitor Cable	1.5	Y	
5	PS/2 Keyboard Cable	1.3	N	
6	EarPhone Cable	1.8	N	
7	MIKE Cable	3.5	Y	
8	AC Power cable	1.6	N	Power Supply For Monitor
9	Serial Mouse Cable	1.6	N	
10	USB Mouse Cable	1.5	N	
11	Telephone Cable	3	N	
12	LAN Cable	2	N	
13	AC power cabel	3.6	N	Power Supply For Printer
14	AC power cabel	1.7	N	Power Supply For Storage
15	TV Connect Cable	1	N	

1.5 System Block Diagram of Test Configuration



1.6 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, 442-742
Semi Anechoic Chamber #1(Registration Number:98856) 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 Configuration of Radiated and Conducted Interference Measurement

* Cabling was taken into consideration and test data was taken under worse case conditions.

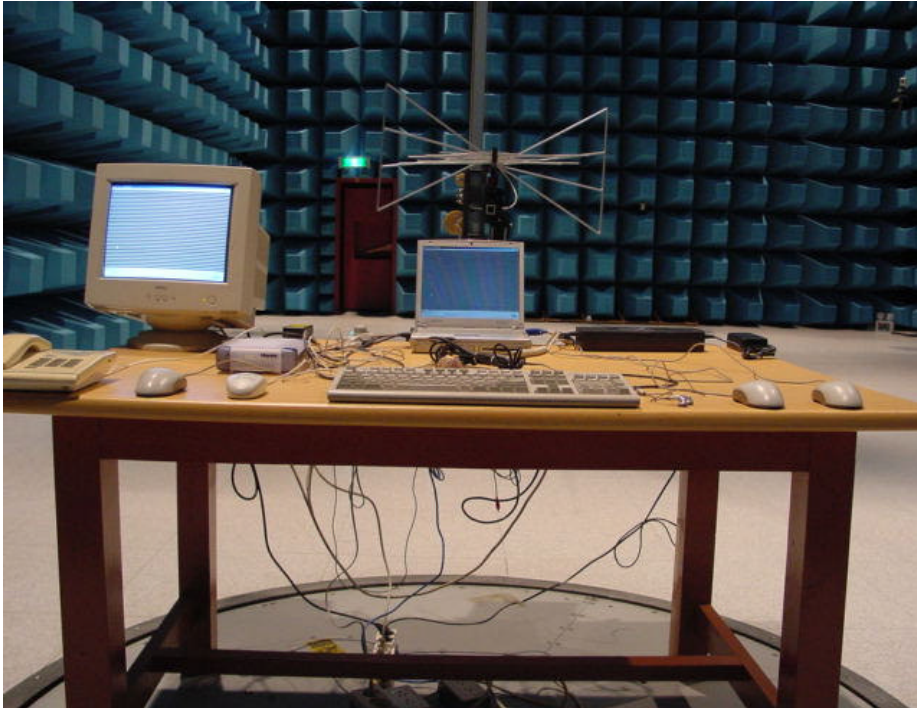
1)Conduction(Front View)



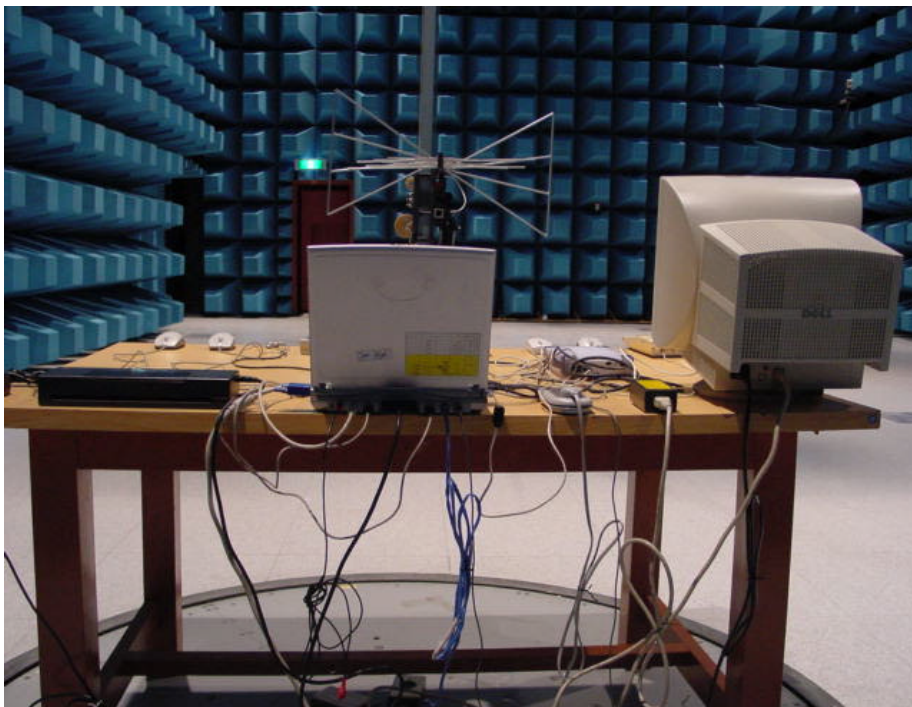
2)Conduction(Rear View)



3) Radiation(Front View)



4) Radiation(Rear View)



2.2 Operation Enviroment

	Conduction	Radiation
Temperature [C] :	25C	24C
Humidity [%] :	34C	34C
Power supply	: AC120V/60Hz	AC120V/60Hz

2.3 Test Procedure

2.3.1 Conducted Emissions

Eut was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting ground plane.

The rear of EUT, including peripherals was aligned and flush with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Each EUT current-carrying power lead, except the ground(safety) lead, were individually connected through a LISN to the input power source.

All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

2.3.2 Radiated Emissions

Eut was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The rear of EUT, including peripherals was aligned and flush with rear of tabletop. I/O cables that were connected to the peripherals were bundle in center.

They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

3. Conducted Emission Test Data

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

The final data represents worst-case emissions.

+ Test Data Sheet

Frequency	Meter Reading [a]	LISN Pol.	Total Loss [b]	Results [a+b]	Limits	Margin (Limit - Result)
[MHz]	[dBuV]	[L,N]	[dB]	[dBuV]	[dBuV]	[dB]
0.50	23.40	L1	0.18	23.58	48.00	24.42
0.63	30.80	L2	0.25	31.05		16.95
0.88	30.80	L1	0.12	30.92		17.08
1.13	31.80	L1	0.11	31.91		16.09
1.57	35.20	L1	0.29	35.49		12.51
3.96	41.40	L2	0.12	41.52		6.48
5.28	45.30	L1	0.11	45.41		2.59
7.67	35.40	L2	0.25	35.65		12.35
8.36	37.30	L1	0.24	37.54		10.46
11.57	35.10	L2	0.55	35.65		12.35
18.04	35.00	L1	1.13	36.13		11.87
21.38	38.70	L2	1.41	40.11		7.89
25.53	28.70	L1	1.69	30.39		17.61

* QP : Quasi-peak

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

4. Radiated Emission Test Data

The initial step in collecting radiated data was to perform a quasi-peak scan over the measurement range using a receiver.
All modes of operation were investigated and the worst-case emission are reported.
All other emission are non-significant.
The minimum margin to the limit is as follows :

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Antenna Height [Cm]	Turn table Degree [Deg]	Results [A+B] [dBuV/m]	Limits at 3m [dBuV/m]	Margin (Limit-Result) [dB]
30 - 88	42.4	V	18.8	14.5	115	240	33.3	40.0	6.7
	45.5	V	19.3	13.2	128	280	32.5	40.0	7.5
	52.1	V	21.0	11.7	105	266	32.7	40.0	7.3
	72.1	H	24.1	8.9	211	146	33.0	40.0	7.0
	84.5	H	23.8	9.1	107	194	32.9	40.0	7.1
30 - 216	97.2	H	19.7	9.3	134	95	29.0	43.5	14.5
	130.1	H	22.2	9.5	219	108	31.7	43.5	11.8
	138.1	H	25.3	9.7	264	250	35.0	43.5	8.5
	184.1	H	23.9	11.5	135	287	35.4	43.5	8.1
	200.6	H	20.5	12.1	145	176	32.6	43.5	10.9
	215.2	H	20.6	12.2	227	85	32.8	43.5	10.7
216 - 960	233.0	H	19.1	13.4	262	247	32.5	46.0	13.5
	259.8	H	20.4	14.4	261	281	34.8	46.0	11.2
	276.3	H	18.4	14.9	240	232	33.3	46.0	12.7
	300.1	H	19.4	16.5	199	260	35.9	46.0	10.1
	368.4	H	16.6	18.1	168	87	34.7	46.0	11.3
	520.0	V	17.6	21.4	201	80	39.0	46.0	7.0
960 - 5000	1099.0	V	8.9	29.4	165	240	38.3	54.0	15.7

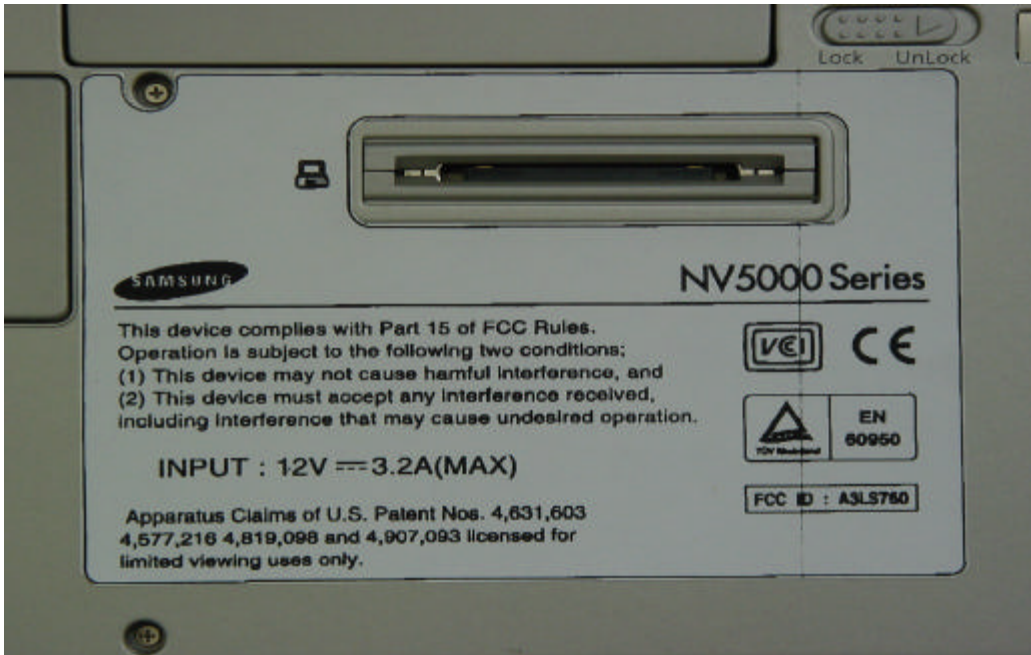
* "<" Means equal or less then 5dB

* Receiving Antenna Mode : **Horizontal, Vertical**

* Results = Meter Reading + Total Loss(Antenna factor + Cable loss)

5. FCC Label Configuration and Location

5.1 Label Configuration



5.2 Location of Label



6. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Spectrum analyzer	8566B	2611A02672	H.P	00/06/23, 12Months
	Firmware versions : Rev.29.9.86			
Field strength meter	ESS	844861/005	R & S	00/ 6/23, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESVP	882402/009	R & S	00/ 6/23, 12Months
Quasi-peak adapter	85650A	2521A00687	H.P	00/10/10, 12Months
RF Preselector	85685A	2602A00224	H.P	00/10/10, 12Months
L.I.S.N	3825-2	9208-1981	EMCO	00/ 3/23, 12Months
Biconilog Antenna	3142	1237	EMCO	01/1/2, 12Months
Double ridged horn ant.	3115	9505-4441	EMCO	00/05/23, 12Months