SAMSUNG ELECTRONICS

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : Multi Function Printer
Model No. : SCX-4216F

FCC ID : A3LSCX4216F

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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 : February 24, 2003

Issued Date : February 26, 2003

Tested by:
Jin Hwan, Jung / Test Engineer

Reviewed by:
Yang Soo, KIM / Manager of EMC Lab.

Authorised by:
Kyu Baek, CHUNG / Chief of EMC Lab.

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NVLAP Code: 200447

Table of Contents

Distribution

This test report has been made available as follows:

CS Management Center, EMC Laboratory	1 original
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1. General Information

Applicant : **Samsung Electronics Co., Ltd.**

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

Kind of Product : **Multi Function Printer**

FCC ID : **A3LSCX4216F**

Project Name : **-**

Model & Variant Names : **SCX-4216F**
SCX-4116
SCX-4016

Test Report Produced by : **Jin Hwan, Jung / Test Engineer**

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.

In each test mode, Finally we found worst case emission that is above configuration with the Worst case components(in the above table). So, the DATA of the maximum EUT operation was reported.

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

2) Operating Frequency :

SCX-4216F is supporting the FAX(TX ,RX),SCAN and COPY(ADF,FLATEN), PRINTER Mode.
SCX-4116 is supporting the SCAN and COPY(ADF,FLATEN), PRINTER Mode.
SCX-4016 is supporting the SCAN and COPY(FLATEN), PRINTER Mode.

SCX-4x16 models have
System clock 10MHz, Modem clock 28.224MHz, CPU clock 66MHz,
RTC clock 32.768kHz, OPE-Micom clock 7.37MHz ,Video clock 14.7456 KHz
Video 1/4 clock 11.059 MHz ,USB clock 48MHz.

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
USB Printing	Continously H pattern printing by Computer
IEEE1284 Printing	Continously H pattern printing by Computer
Fax Tx, RX	Continously H pattern Receiving and Transmitting
Copying	Continously H pattern Copying

EUT was tested all operating mode as above. Finally EUT was tested USB Printing mode as maximum emission.

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors

5) Manufacturer : SAMSUNG Electronics Co., Ltd.

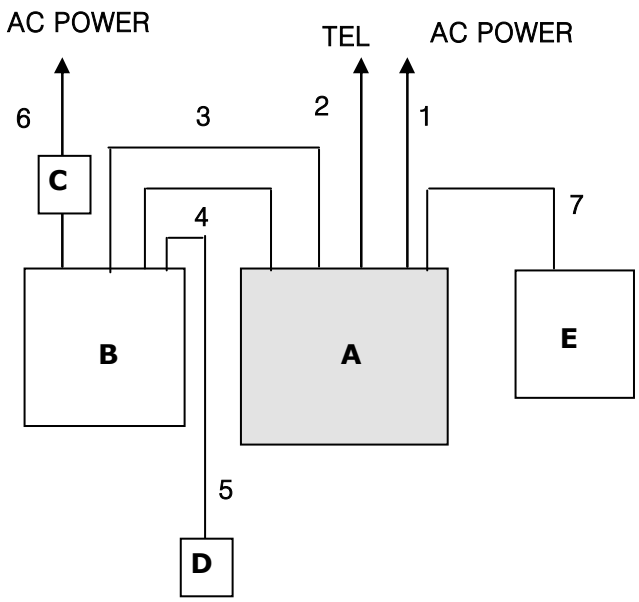
1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	Plain Paper Fax	SCX-4216F	-	Samsung	EUT
B	Note PC	PP01X	CN-03J010-12961-29N	DELL	-
C	AC Adapter	ADP-90FB	TH-06G356-17971-29C-27ET	DELL	-
D	Mouse	M-UR69	LNB23424350	Logitech	-
E	Analog Phone	SERVIFON T10	Sim S045	Samsung	-

1.3 Used Cable Description

No.	Item	Length[m]	Shielded (Y/N)	Remark
1	AC Power Cable	1.7	N	-
2	Tel line	2.0	N	-
3	USB Cable	1.5	Y	-
4	Parallel Cable	1.5	Y	-
5	Mouse Cable	1.5	Y	-
6	AC Power Cable	2.0	Y	-
7	Tel Line	2.0	N	-

1.4 System Block Diagram of Test Configuration



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, 442-742
Semi Anechoic Chamber #2(Registration Number:873282) and Shielded Room.

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

2. System Test Configuration

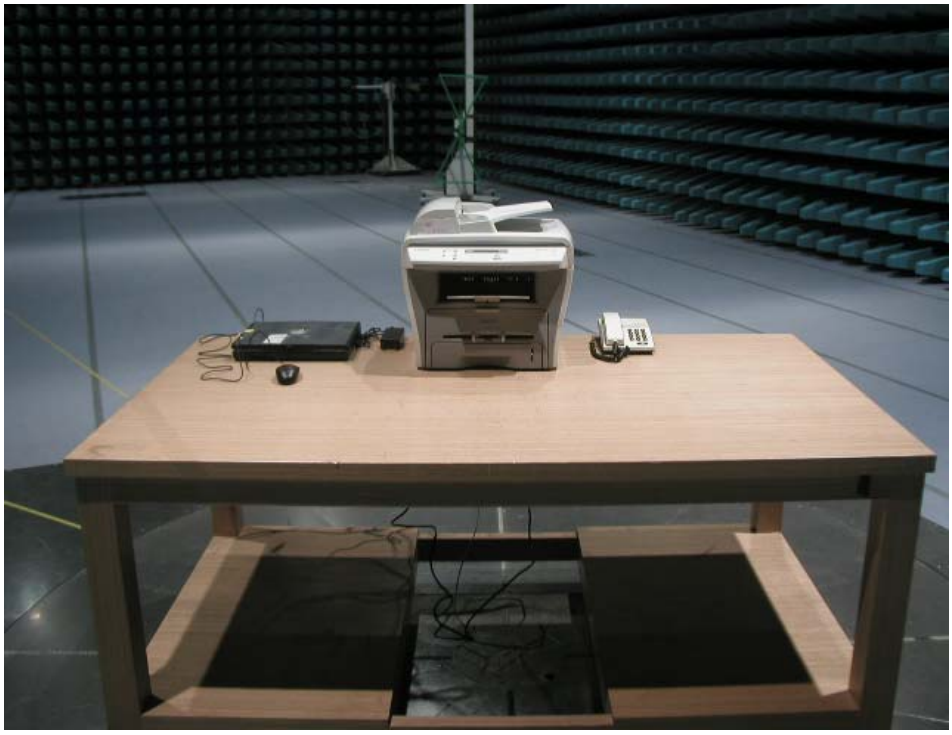
2.1 Configuration of Radiated and Conducted Interference Measurement

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

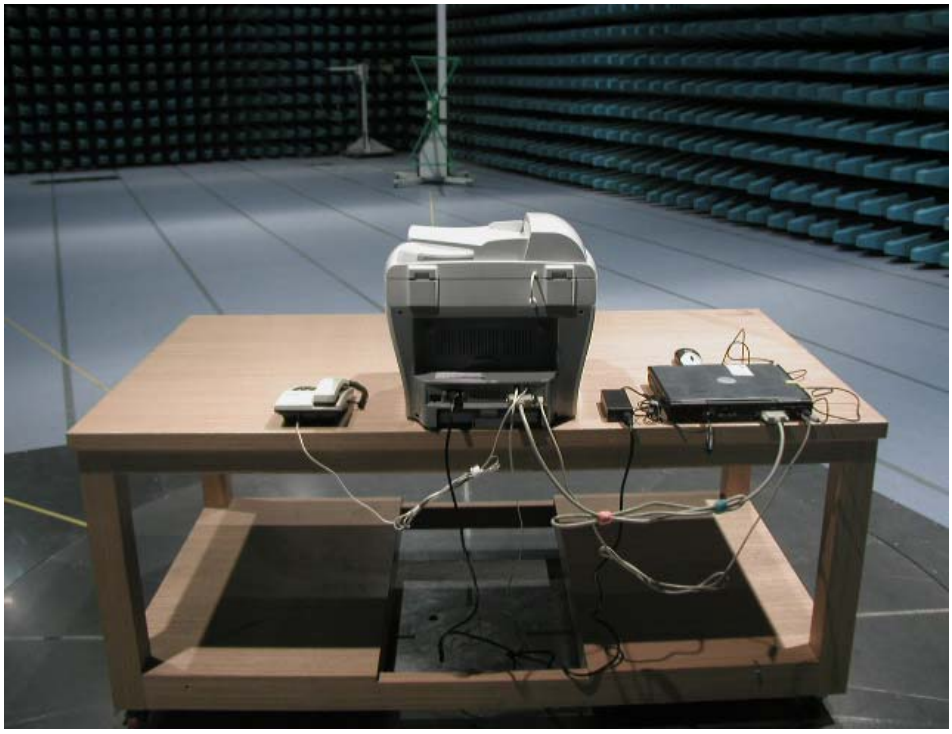
1)Conduction(Front View)

2)Conduction(Rear View)

3) Radiation(Front View)



4) Radiation(Rear View)



2.2 Operation Environment

	Conduction	Radiation
Temperature [C] :	25.1	23
Humidity [%]	40	43
Power supply :	AC110V/60Hz	AC110V/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.

The EUT was switched on and allowed to warm up to its normal operating condition.
A quick scan, from 150kHz to 30MHz, was made on the L1 & L2 line by LISN.
High peaks, relative to the limit line, over the frequency range were then selected.
The EMI TEST RECEIVER was then tuned to the selected frequencies.
CISPR quasi-peak measurements with a receiver bandwidth setting of 10kHz, were taken.

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.

The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 1000 MHz using biconiLog antenna.

Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment; powering the monitor from the floor mounted outlet box and the computer aux AC outlet if applicable, and changing the polarity of the antenna; whichever determined the worst-case emission.

3. Conducted Emission Test Data

O Test Mode :

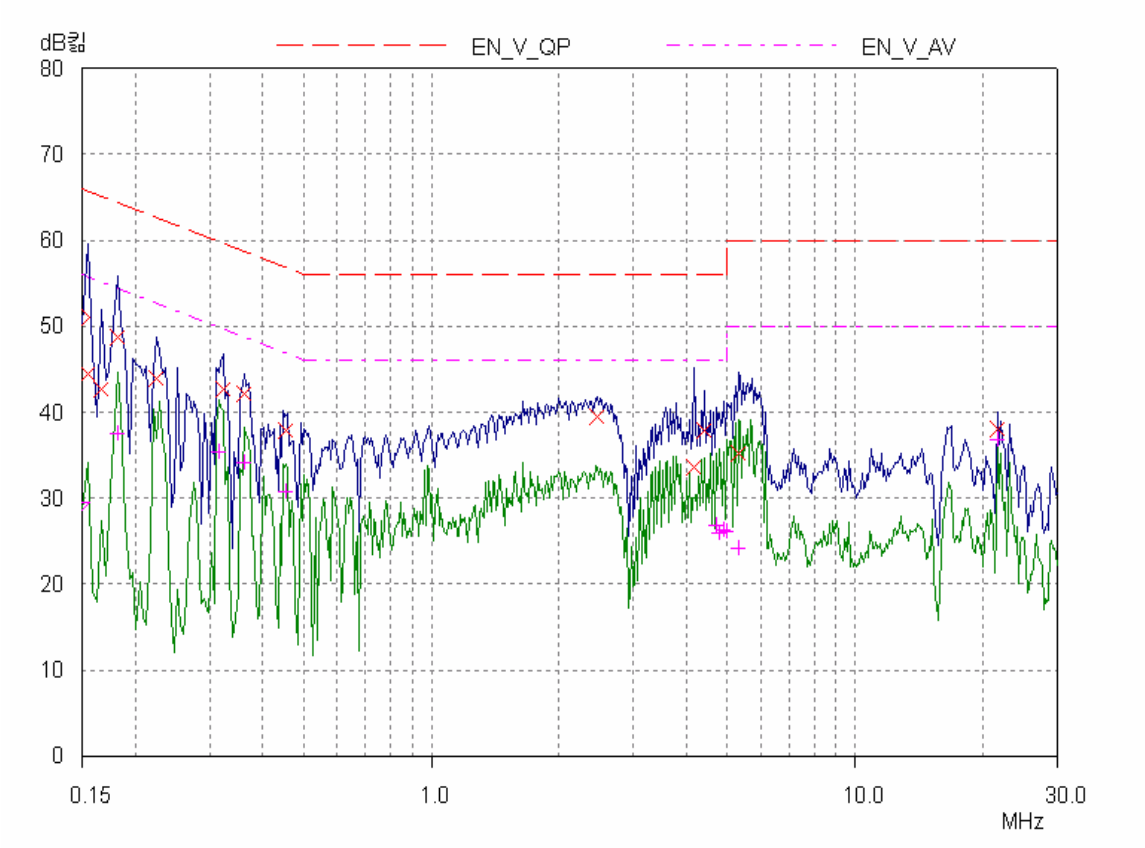
Frequency [MHz]	Meter reading (a) QP [dBuV]	Meter reading (a) AV [dBuV]	Phase	Total Loss (b) [dB]	Limits QP [dBuV]	Limits AV [dBuV]	Result QP [dBuV]	Result AV [dBuV]
0.154	44.39		L1	0.61	65.79	55.8	**45.0**	
0.166	42.74		N	0.61	65.18	55.2	**43.4**	
0.181	48.66		N	0.61	64.43	54.4	**49.3**	
0.224	43.85		N	0.61	62.66	52.7	**44.5**	
0.322	42.66		L1	0.51	59.66	49.7	**43.2**	
0.361	42.21		N	0.52	58.71	48.7	**42.7**	
0.455	37.94		L1	0.63	56.79	46.8	**38.6**	
2.435	39.4		L1	0.58	56.00	46.0	**40.0**	
4.146	33.55		N	0.83	56.00	46.0	**34.4**	
4.392	37.81		L1	0.83	56.00	46.0	**38.6**	
5.271	35.15		L1	0.85	60.00	50.0	**36.0**	
21.662	38.04		L1	1.71	60.00	50.0	**39.8**	

※Quasi-peak value is less 10dB than Average limits.

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

* Margin = Limits - Result

3-1. Conducted Emission Test Graph



4. Radiated Emission Test Data

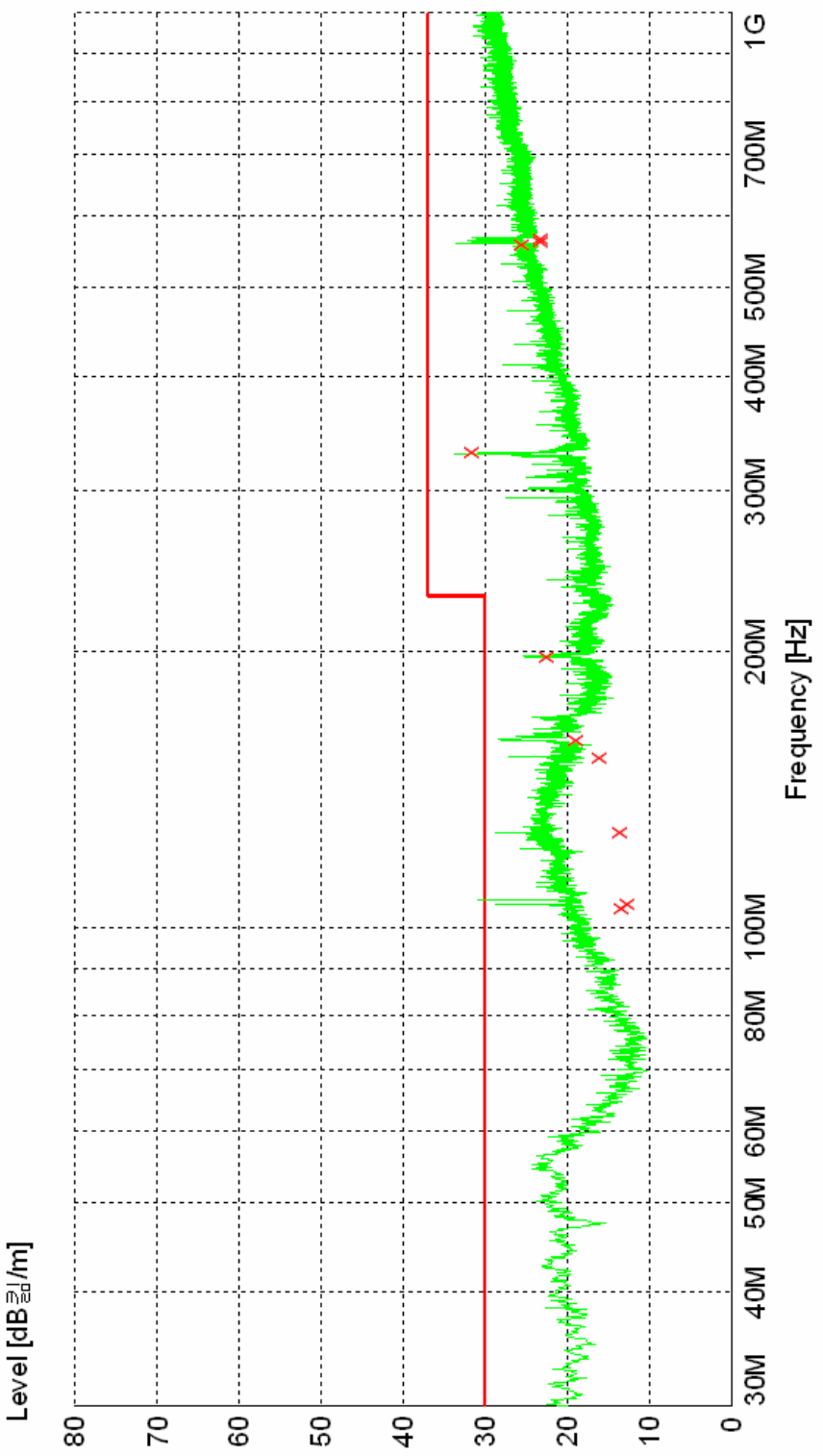
Frequency Range	Tested Frequency	ANT Pol.	Meter Reading [A]	Total Loss [B]	Antenna Height	Turn table Degree	Results [A+B]	Limits at 3m	Margin (Limit-Result)
[MHz]	[MHz]		[dBuV/m]	[dB]	[Cm]	[Deg]	[dBuV/m]	[dBuV/m]	[dB]
30 - 230	105.400	H	1.0	12.8	326	59	13.8	**30.0**	16.2
	106.400	V	0.2	12.9	319	0	13.1	**30.0**	16.9
	127.100	H	0.7	13.4	384	58	14.1	**30.0**	15.9
	153.700	H	4.5	12.0	400	120	16.5	**30.0**	13.5
	160.700	V	7.8	11.6	119	53	19.4	**30.0**	10.6
	198.100	V	12.0	10.9	154	117	22.9	**30.0**	7.1
230 - 1000	330.200	V	15.5	16.6	100	42	32.1	**37.0**	4.9
	560.200	H	3.4	22.6	400	300	26.0	**37.0**	11.0
	563.200	H	1.2	22.5	400	281	23.7	**37.0**	13.3
	566.400	H	1.1	22.5	400	273	23.6	**37.0**	13.4

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

** Test distance : 10m*

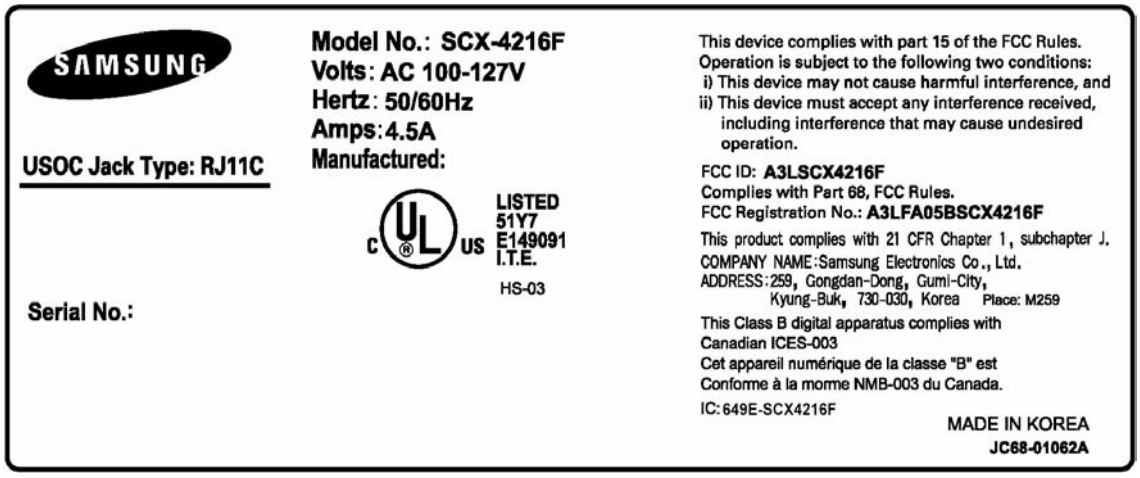
** Results = Meter Reading + Total Loss(Antenna factor + Cable loss)*

4-2. Radiated Emission Test Graph



5. FCC Label Configuration and Location

5.1 Label Configulation



5.2 Location of Label

6. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Calibration Last calibration and Interval
Field strength meter	ESCS30	100104	R & S	03/ 01/17, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESI	100010	R & S	02/ 05/04, 12Months
L.I.S.N	3810/2NM	EMCO	2251	02/05/07, 12Months
L.I.S.N	ESH3-Z5	831887/0004	R & S	02/ 08/06, 12Months
Bi-Log Antenna	CBL6112B	2804	Schaffner	02/04/23, 12Months