

EMI TEST REPORT

FCC Part 15 Subpart B, Class B

Product : Inkjet MFP
Model No. : A3000

JOB NO. : KE-01-0410

1. This test reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.
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 : July 27, 2001

Issued Date : July 28, 2001

Prepared by: K. D. Kim
Kyeong Dong, Kim / Test Engineer

Reviewed by: Chun Kil, Kim
Chun Kil, Kim / Technical Manager

Authorised by: Yang Su, Kim
Yang Su, Kim / Quality Manager

This laboratory is registered by the NIST/NVLAP, U.S.A.
The test reported herein have been performed in accordance
with its terms of registration.

NVLAP[®]
LAB CODE : 200447-0

Table of Contents

1. General Information

- 1.1 Product Description
- 1.2 Tested System Details
- 1.3 Test Methodology
- 1.4 Test Facility

2. System Test Configuration

- 2.1 Operation Environment
- 2.2 Justification
- 2.3 EUT Exercise Software
- 2.4 Test Procedure
- 2.5 Test System configuration

3. Conducted and Radiated Measurement Photos

- 3.1 Conducted Measurement Photos
- 3.2 Radiated Measurement Photos

4. Measurement Uncertainty

- 4.1 Conducted Emission Test
- 4.2 Radiated Emission Test

5. Conducted Emission Test Data

6. Radiated Emission Test Data

7. Label and Label Location

8. Test Equipment Used

1. General Information

APPLICANT : SAMSUNG ELECTRONICS CO., LTD.

ADDRESS : 416, Maetan-3Dong, Paldal-Gu
Suwon-City, Kyungki-Do, Korea 442-742

CONTACT PERSON : Byeong Sun, Min
TEL. +82-31-200-4167

CONTACT ADDRESS : 416, Maetan-3Dong, Paldal-Gu
Suwon-City, Kyungki-Do, Korea 442-742

REGULATION(S) : FCC Part 15 Subpart B, Class B

MODEL NUMBER : A3000

SERIAL NUMBER : -

KIND OF PRODUCT : Inkjet MFP

TESTED DATE : July 27, 2001

TEST SITE : 3meter semi-anechoic chamber

TEST SITE ADDRESS : San 14, Nongseo-Ri, Kihung-Eup,
Yongin-City, Kyungki-Do, Korea, 449-900

1.1 Product Description

The Samsung A3000 print up to 2400x1200(VerticalxHorizontal)dots per inch class, monochrome 17 and color 7 pages-per-minute.

Standard 100 sheet automatic input tray support various sizes, types.

Main System Clock is 66MHz, Image Processor clock 75MHz and USB clock 48MHz.

Power rating is AC110~240V and less than 20W Power consumption during operation and less than 15 in sleep mode. See the attached A3000 User's Guide for more information.

1.2 Tested System Details

The FCC IDs for all equipment, plus descriptions of all products used in the tested system are:

Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
(1) Inkjet Printer (EUT)	Samsung	A3000	N/A	A3LA3000
(2) PC	Samsung	TD260-DT	C92DK409981	FCC DoC
(3) Monitor	Samsung	SyncMaster 17GLsi	H3MF400637	FCC DoC
(4) Keyboard	Samsung	5900	K09141644	FCC DoC
(5) Mouse	Logitech	M-SAS51	LZB00478743	JNZ211167
(6) External Modem	US Robotics	SPORTSTER	33083962	CJE-0149-217
(7) AC/DC Adaptor	US Robotics	AW-1220A	N/A	-

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4(1992).

Radiated testing was performed at a distance of 3 meters from the antenna to EUT.

1.4 Test Facility

All test described in this report were performed by :

Open area test site : 781-14, Chung-Ri, Dongtan-Myun, Hwasung-Kun, Kyungki-Do, Korea

Conducted measurement facility and 3meter Semi-anechoic chamber :

San 14, Nongseo-Ri, Kihung-Eup, Yongin-City, Kyungki-Do, Korea, 449-900

5W

2. System Test Configuration

2.1 Operation Environment

	Conduction	Radiation
Temperature [] :	24.5	24.5
Humidity [%] :	47	48
Power supply :	AC115V/60Hz	AC115V/60Hz

2.2 Justification

The system was configured in typical fashion(as a customer would normally use it) for testing.

2.3 EUT Exercise Soft ware

The EUT exercise program used during radiated and conducted testing is word editor(Hun2000) and Twain scanner driver.
And the emission was tested in the status of printing of 'H' pattern, scanning and copying.

2.4 Test Procedure

2.4.1 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.

2.4.2 Radiated Emissions

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

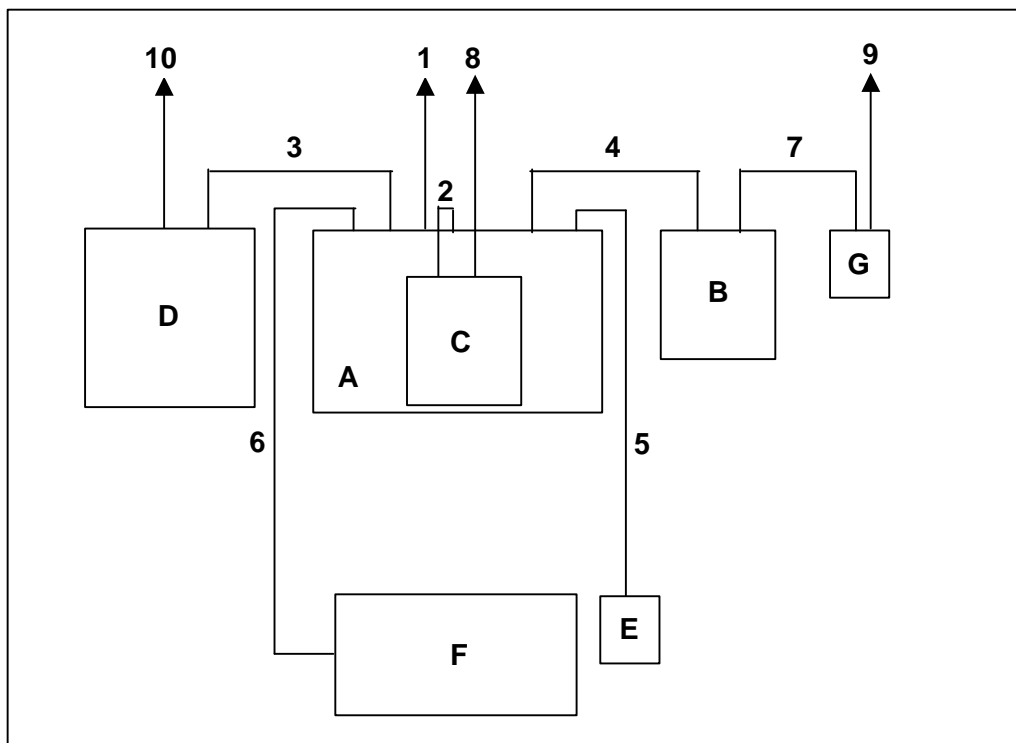
The rear of EUT, including peripherals was aligned and flush with rear of tabletop. I/O cables that were connected to the peripherals were bundle in center.

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.

2.5 Test System configuration

2.5.1 System Block Diagram of Test Configuration



2.5.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	Desktop computer	TD260-DT	C92DK409981	Samsung	
B	External Modem	SPORTSTER	33083962	US ROBOTICS	
C	Monitor	SyncMaster 17GLsi	H3MF400637	Samsung	
D	Inkjet MFP	A3000	-	Samsung	EUT
E	PS/2 Mouse	M-SAS51	LZB00478743	Logitech	
F	Keyboard	5900	K09141644	Samsung	
G	AC/DC Adaptor	AW-1220A	-	US ROBOTICS	

2.5.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power cable	1.7	N	
2	Video cable	1.8	Y	
3	USB cable	1.8	Y	
4	Serial cable	3.0	Y	
5	Mouse cable	2.0	Y	
6	Keyboard Cable	1.7	Y	
7	DC Power cable	1.7	N	
8	AC Power cable	1.7	N	
9	AC Power cable	1.5	N	
10	AC Power cable	1.7	N	

3. Conducted and Radiated Measurement Photos

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

3.1 Conducted Measurement Photos

o Conduction(Front View)



o Conduction(Rear View)



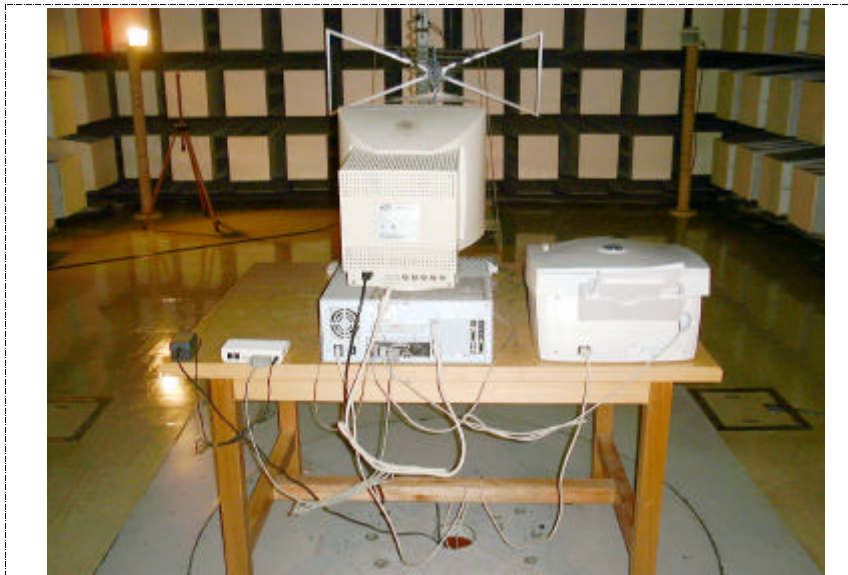
* Cabling was taken into consideration and test data was taken under worse case conditions.

3.2 Radiated Measurement Photos

o Radiation(Front View)



o Radiation(Rear View)



4. Measurement Uncertainty

All data in report are to be traceability to the national or international standards.

4.1 Conducted Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was $\pm 2.08\text{dB}$.

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

The data listed in this test report has enough margin, more than 2.08dB.

4.2 Radiated Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was as follow
30MHz~200MHz : ± 4.50 200MHz~1000MHz : ± 5.23

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

The data listed in this test report has enough margin, more than 3.4dB.

5. Conducted Emission Test Data

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

All modes of operation(printing in USB connection, scanning using the twain driver and copying) were investigated and the worst case(USB printing) emissions were reported. All other emission are non-significant.

The minimum margin to the limit is as follows :

Frequency : 0.618 [MHz]
 Meter Reading : 38.4 [dBuV]
 LISN Loss : 0.13 [dB]
 Cable loss : 0.5 [dB]
 Corrected Readings : 39.03 [dBuV/m]
 Margin : -8.93 [dB]

Test Data Sheet

Tested Frequency [MHz]	Meter Reading [A] [dBuV]	LISN Pol. [L1/L2]	Factor[B]		Corrected Reading [A+B] [dBuV/m]	Limits [dBuV/m]	Margin [dB]
			LISN Loss [dB]	Cable Loss [dB]			
0.450	36.06	L2	0.11	0.40	36.57	47.96	-11.39
0.461	33.60	L1	0.12	0.50	34.22	47.96	-13.74
0.473	35.96	L1	0.12	0.50	36.58	47.96	-11.38
0.544	32.74	L1	0.12	0.50	33.36	47.96	-14.60
0.610	37.18	L1	0.13	0.50	37.81	47.96	-10.15
0.618	38.40	L2	0.13	0.50	39.03	47.96	-8.93
0.626	34.74	L1	0.13	0.50	35.37	47.96	-12.59
1.188	32.81	L2	0.15	0.49	33.45	47.96	-14.51

- * All readings are quasi-peak mode.
- * Set resolution bandwidth to 9kHz minimum.
- * Results = Meter Reading + LISN Insertion loss + Cable loss
- * Margin = Corrected Reading - Limits
- * L1 = Hot, L2 = Neutral

6. Radiated Emission Test Data

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

All modes of operation(printing in USB connection, scanning using the twain driver and copying) were investigated and the worst case(USB printing) emissions were reported.

All other emission are non-significant.

The minimum margin to the limit is as follows :

Frequency : **264.4** [MHz]
 Meter Reading : **28.8** [dBuV]
 Antenna Factor : **9.9** [dB]
 Cable loss : **1.5** [dB]
 Corrected Reading : **40.2** [dBuV/m]
 Margin : **-5.8** [dB]

Test Data Sheet

Frequency Range [MHz]	Tested Frequency [MHz]	Ant. Pol.	Meter Reading [A] [dBuV]	Factor[B]		Antenna Height [Cm]	Turn table Degree [Deg]	Corrected Reading [A+B] [dBuV/m]	Margin [dB]	Limits [3m] [dBuV/m]
				Ant. Factor	Cable Loss					
				[dB]						
30 - 88	77.4	V	19.20	7.70	0.35	135	170	27.25	-12.75	40
88 - 216	95.5	V	20.10	8.90	0.50	140	162	29.50	-14.00	43.5
	149.5	H	23.40	7.50	1.00	110	0	31.90	-11.60	
	162.4	H	22.90	7.30	0.90	125	97	31.10	-12.40	
216 - 960	248.1	V	23.20	9.40	1.50	150	180	34.10	-11.90	46
	264.4	V	28.80	9.90	1.50	130	100	40.20	-5.80	
	288.3	V	24.50	10.60	1.56	130	100	36.66	-9.34	
	442.1	V	23.00	14.30	2.20	150	160	39.50	-6.50	
	449.0	V	21.20	14.50	2.20	125	90	37.90	-8.10	
	450.6	H	23.40	14.50	2.20	100	80	40.10	-5.90	
960 -	589.6	H	17.40	16.90	2.76	100	75	37.06	-8.94	54

* "<" Means equal or less than * All readings are quasi-peak mode.

* The selected bandwidth in emission testing is 100kHz.

* Corrected Reading = Meter Reading + Antenna Factor + Cable loss

* Margin = Corrected Reading - Limits

* H = Horizontal Polarization/Antenna, V = Vertical Polarization/Antenna

7. Label and Label Location

7.1 Label



7.2 Label location



8. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Spectrum analyzer	8568B	2841A04394	H.P	00/11/02, 12Months
		Firmware versions : REV 7.4.87		
Quasi-peak adapter	85650A	2811A01182	H.P	00/11/16, 12Months
RF Preselector	85685A	2837A00835	H.P	00/11/16, 12Months
EMI Test Receiver	ESCS30	830986/004	R & S	01/01/06, 12Months
		F/W ver. : N/A		
L.I.S.N	ESH2-Z5	831886/006	R & S	00/11/30, 12Months
	3825/2	1408	EMCO	00/11/11, 12Months
Biconilog Antenna	HL 562	361324/003	R & S	01/01/22, 12Months
EMI Measurement Software	HP	Firmware versions : Rev. A.00.00		

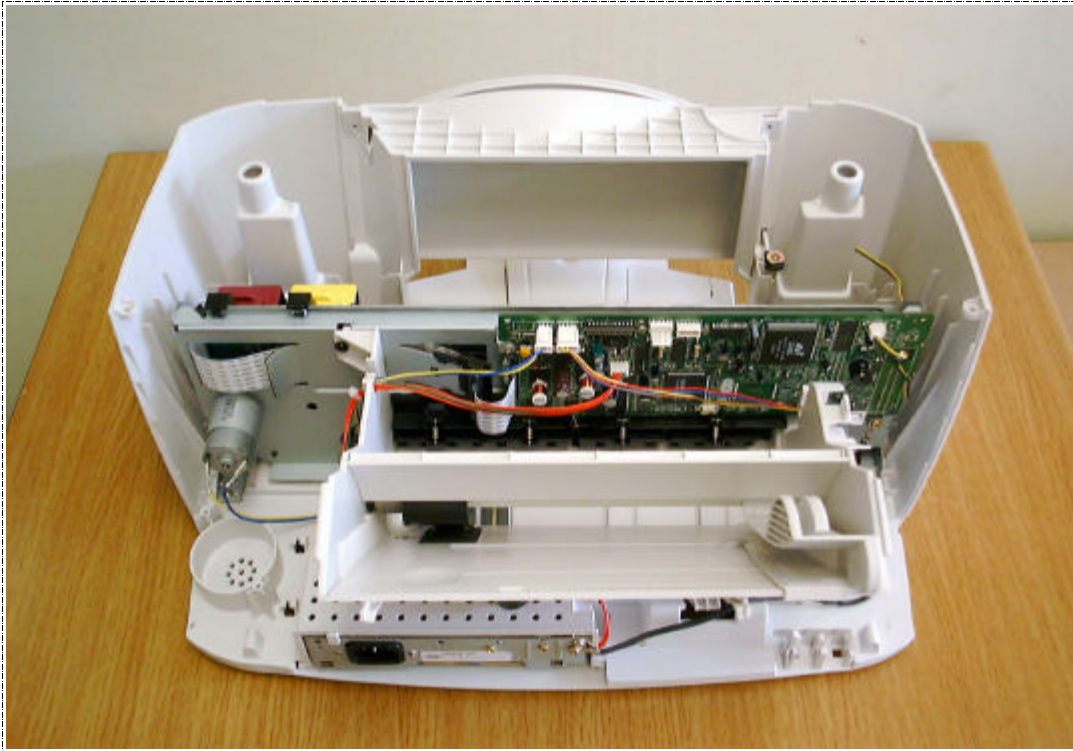
Front view of EUT



Rear view of EUT



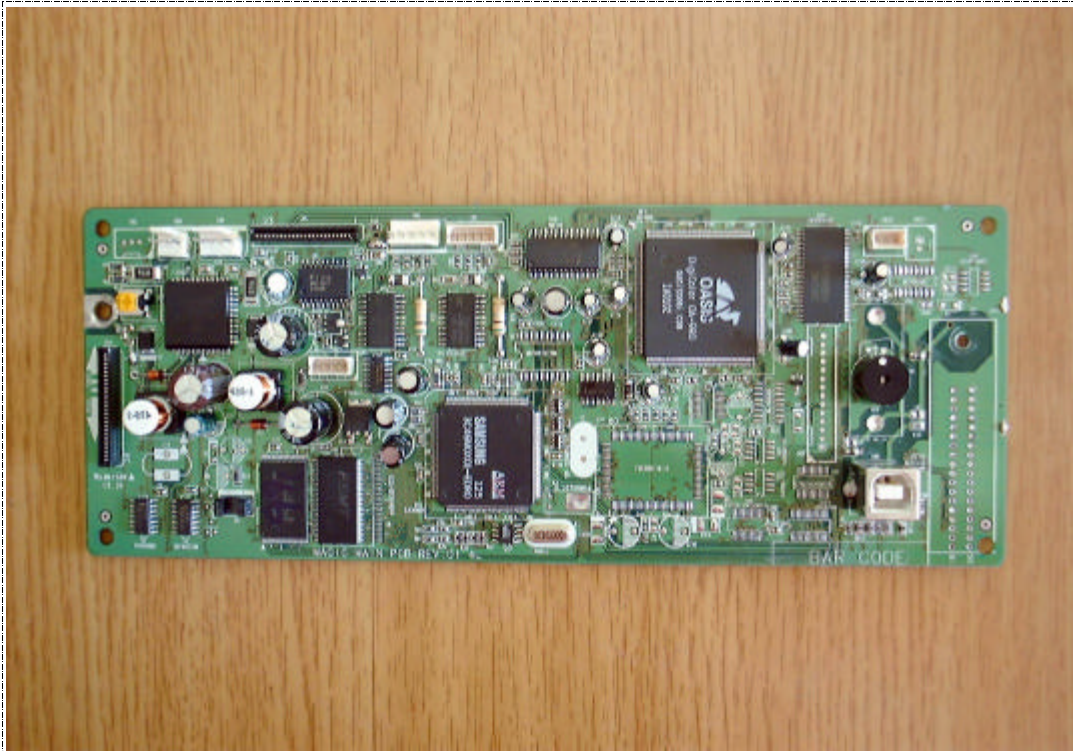
Internal view of EUT



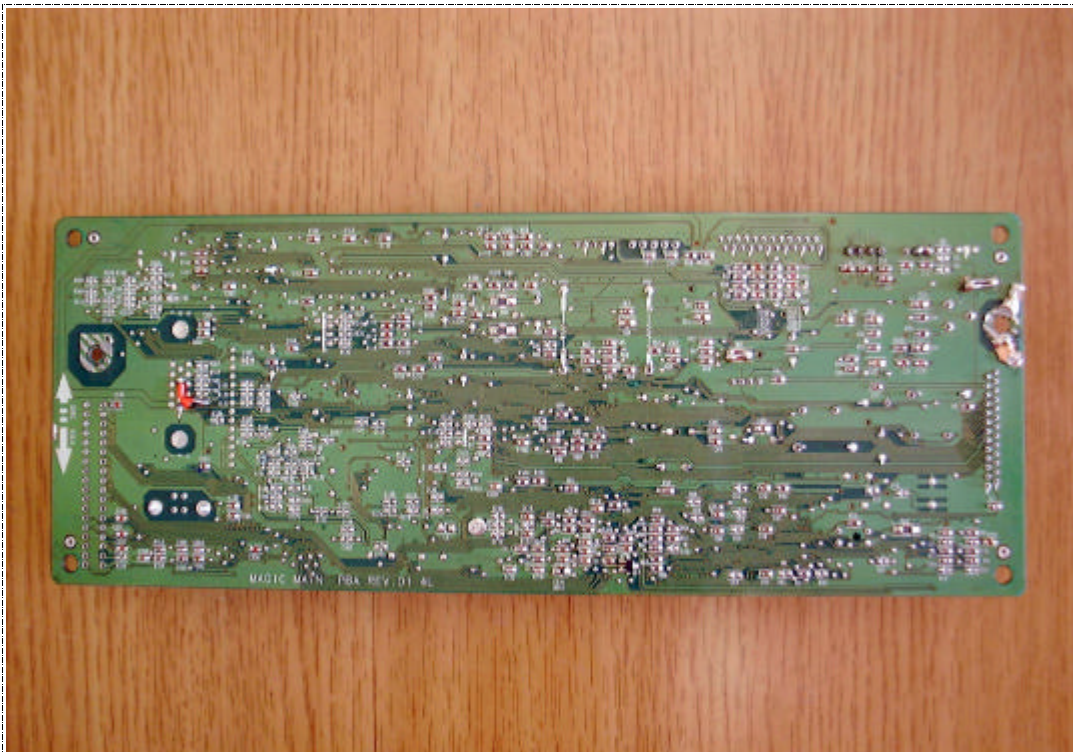
Side view of EUT



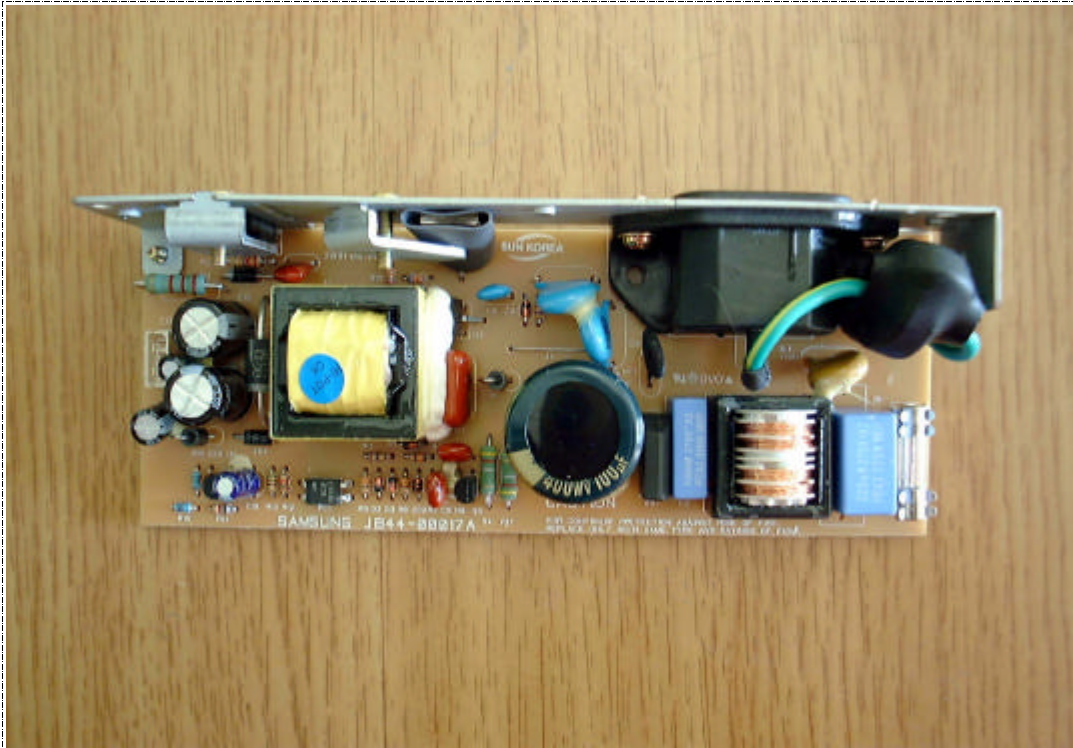
PCBs view of MAIN b'd



Solder view of MAIN b'd



PCBs view of SMPS



Solder view of SMPS

