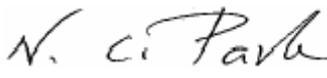
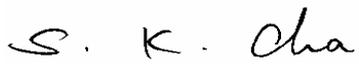


EMC Test Report

According to FCC Part 15 Subpart B

Project No.	LBE052466
Equipment under Test	
Applicant	Samsung Electronics Co., Ltd. 416 Maetan3- Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
FCC ID	A3LML-1610
Product Name	Laser Beam Printer
Model Name	Dell 1100
Manufacturer	Refer to page.3.
Date of Test	Sep 1, 2005
Issued Date	Sep 13, 2005

	Name/Position	Signature
Tested by	Kyeong Dong, Kim Test Engineer	
Reviewed by	No Cheon, Park Manager of EMC Lab.	
Authorized by	Seung Kyu, Cha Chief of EMC Lab.	

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

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 200623-0

3. FCC filing Registration Number : 873282

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- 1.1 Basic Information related Product
- 1.2 Detail Information related Product
- 1.3 Operating mode and condition
- 1.4 Test System Details
- 1.5 Equipment Modifications
- 1.6 Test Procedure
- 1.7 Test Configuration
- 1.8 Applied Standard
- 1.9 Test Facility

2. Summary of Test Results

3. Description of individual tests

- 3.1 Conducted Emission
- 3.2 Radiated Emission

4. Appendix

- 4.1 Test Photography
- 4.2 EUT Photography

1. General Information

1.1 Basic Information related Product

Applicant	Samsung Electronics Co., Ltd.
Model name	ML-1610
Applicant Address	416 Maetan3- Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Contact Person	Kyeong Dong, Kim
Kind of product	Laser Beam Printer
Variant list	Phaser 3117, Dell Laser Printer 1100, Dell Laser Printer 1110
Manufacturer	1) Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea. 2) Shandong Samsung Telecommunications Co., Ltd. 264209, Samsugn (Sanxing) Road, Weihai Hi-Tech. IDZ, Shandong Province, P.R.China 3) Weihai Shin Heung Digital Electronics Co., Ltd. 98, Samsung Road, Weihai Hi-Tech, IDZ Shandong Province, P.R.CHINA 4) Samsung Electronics Slovakia s.r.o.Hviezdoslavova 807, 924 27 Galanta, SLOVAKIA
New / Alternative / Permissive change Information	- Production process changed, SDRAM

1.2 Detail Information related Product

Specification

Item	Specification	Remark
Print Speed	Up to 16PPM in A4(17ppm in Letter)	-
Printing Resolution	600 x 600 dpi	-
Power consumption	300W average during operation /Less than 10W in sleep mode	-
Toner Cartridge Life	2000 pages (for starter, 1000 pages) @ IDC 5% coverage	-
Interface	USB1.1 1Port	-
Power Rating	AC 100~127V(USA, Canada), 50/60Hz, 4.0A	-
Weight	5.7 Kg	
External Dimensions	358mm X 275mm X 215mm (W X D X H)	-
Warmup Time	30 seconds	

Operating Frequency

System Clock : 75MHz

Main Clock : 12MHz

V / USB Clock : 48MHz

VDO Frequency : 80MHz

1.3 Operating Mode and Condition

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O port. Where applicable, peripherals were attached to the I/O cables.

This EUT is supporting only the USB printing.

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, USB printing(600X600) was reported.

1.4 Test System Details

Refer to 1.2

1.5 Equipment Modifications

No equipment modifications were required.

1.6 Test Procedure

1.6.1 Conducted Emission

The EUT was placed on a platform 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 bindle 30cm to 40cm long and were handed 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.

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
0.15 to 80	EMI Receiver	Quasi-Peak	9kHz	-
		Average	9kHz	-

1.6.2 Radiated Emission

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 and the run table azimuth was varied to obtain the maximum signal strength

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 biconi-Log antenna.

Also, the EMI RECEIVER was scanned from 1000 to 1800MHz using linearly polarization Double ridge horn antenna was used. The explanation of measuring instrument setup when Respective function is used in any frequency band is as following;

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1000	EMI Receiver	Quasi-Peak	120kHz	-
Above 1000	EMI Receiver	Peak	1MHz	1MHz

1.7 Test Configuration

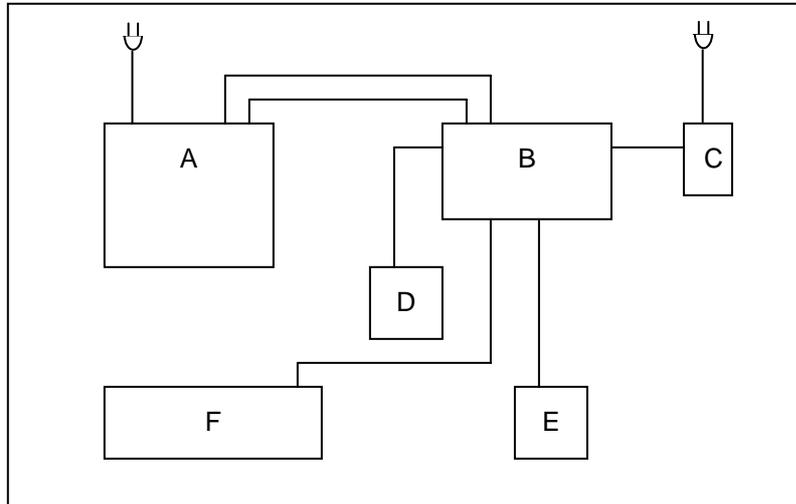
Used EUT and Peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	LBP	ML-1610	-	Samsung	EUT
B	Note PC	PP03S	KR-00P177-36521-2P-0013	DELL	-
C	AC Adapter	ADP-90FB	TH-06G356-17974-23M-6VX6	DELL	-
D	Ext. ODD Drive	SP-C21612	KR-00P177-36521-22P-0099	Samsung	
F	USB Mouse	M-UV69a	HCA50502097	Logitech	-
G	USB Key board	SDM800UH	-	Semco	-

Used Cable Description

	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.8	N	For EUT
2	Power	1.8	N	For Note PC
3	Parallel	1.7	Y	-
4	USB	1.8	Y	-
5	USB	0.7	Y	-
6	USB	1.0	Y	-
7	IEEE1394	0.2	Y	-

Block Diagram



1.8 Applied Standards

List

Product or Generic Standards	Basic Standards
FCC Part15 B	ANSI C63.4 : 2003

1.9 Test Facility

General Information

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 22, 16-1, 16-2.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement(MRA) for the above test item(s) and test method(s).

This Lab. is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:1998.

Accreditation and Listing



Uncertainty

(According to CISPR 16-4 and Lab. 34)

Samsung EMC Test Lab.

Conducted Emission : ±3.3dB

Radiated Emission Bi-Log Antenna : ±4.3dB

2. Summary of Test Results

Result : PASS

The equipment under test(EUT) has been found to comply with the applied standards.

Section of the Product Standard		Applied Standard	Result
Electromagnetic Emission Test			
3.1	Conducted Emission	ANSI C63.4 : 2003	Complied
3.2	Radiated Emission	ANSI C63.4 : 2003	Complied

3.1 Conducted Emission

Test Information	
Test Engineer	Kyeong Dong, Kim
Test Date	October 09, 2005
Climate Condition	Ambient Temperature : 27.3 Relative Humidity : 39%
	Atmospheric Pressure : 1020mbar
Test Place	Shield Room #1

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
EMI TEST RECEIVER	ESCI	R&S	100086	2006-08-23	12
LISN	NZV216	R&S	100117	2006-08-18	12
LISN	ESH3-Z5	R&S	847265/028	2006-09-08	12

Measurement Results	Passed
	The Measured emissions of the EUT have found to be below the specified limits.

Test Data & Graph

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

The find data represents worst-case emissions.

* QP : Quasi-peak, AV: Average

* Result = Meter Reading(QP or AV) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limit – Result

1. TEST DATA & GRAPH

1. TEST DATA & GRAPH

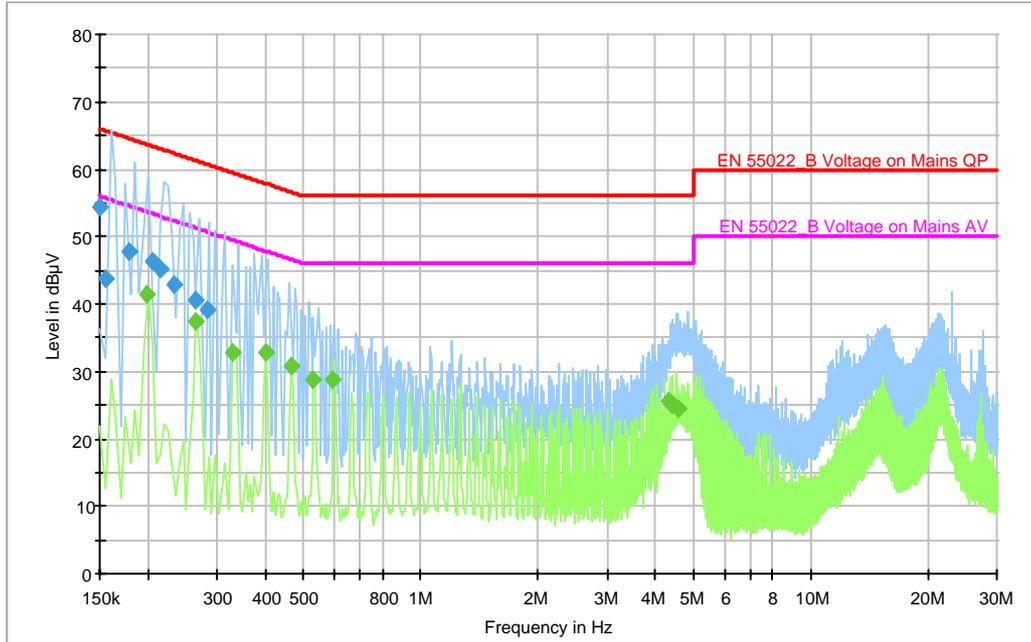
Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line
0.150000	54.3	66.0	11.7	N
0.155000	43.9	65.7	21.9	L1
0.179000	47.8	64.5	16.7	N
0.204000	46.4	63.4	17.1	L1
0.214000	45.3	63.0	17.8	N
0.233000	43.0	62.3	19.3	N
0.264000	40.5	61.3	20.8	L1
0.282000	39.2	60.8	21.5	L1
0.150000	54.3	66.0	11.7	N
0.155000	43.9	65.7	21.9	L1

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line
0.199000	41.5	53.7	12.1	L1
0.264000	37.4	51.3	13.9	L1
0.330000	32.9	49.5	16.6	L1
0.399000	32.7	47.9	15.2	L1
0.464000	30.7	46.6	15.9	L1
0.530000	28.6	46.0	17.4	N
0.595000	28.8	46.0	17.2	L1
4.339000	25.5	46.0	20.5	L1
4.408000	25.1	46.0	20.9	N
4.575000	24.6	46.0	21.4	L1

- Graph -



3.2 Radiated Emission

Test Information	
Test Engineer	Kyeong Dong, Kim
Test Date	October 09, 2005
Climate Condition	Ambient Temperature : 26.7.0 Relative Humidity : 35%
	Atmospheric Pressure : 1018mbar
Test Place	10m Semi Anechoic Chamber #1

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
EMI Test Receiver	ESI-26	R&S	100289	2006-04-11	12
EMI Test Receiver	ESI-26	R&S	100291	2006-04-12	12
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Ant. Mast	MA4000	inn-co	-	N/A	N/A
Mast Controller	CO2000	inn-co	-	N/A	N/A
Amplifier	310N	SONOMA	251674	2006-03-08	12
Amplifier	310N	SONOMA	251677	2006-03-08	12
Amplifier	NS4900	TOYO	-	N/A	N/A
Bi-log Antenna	CBL6141A	SCHAFFNER	4266	2006-05-24	12
Bi-log Antenna	CBL6141A	SCHAFFNER	4268	2006-05-24	12

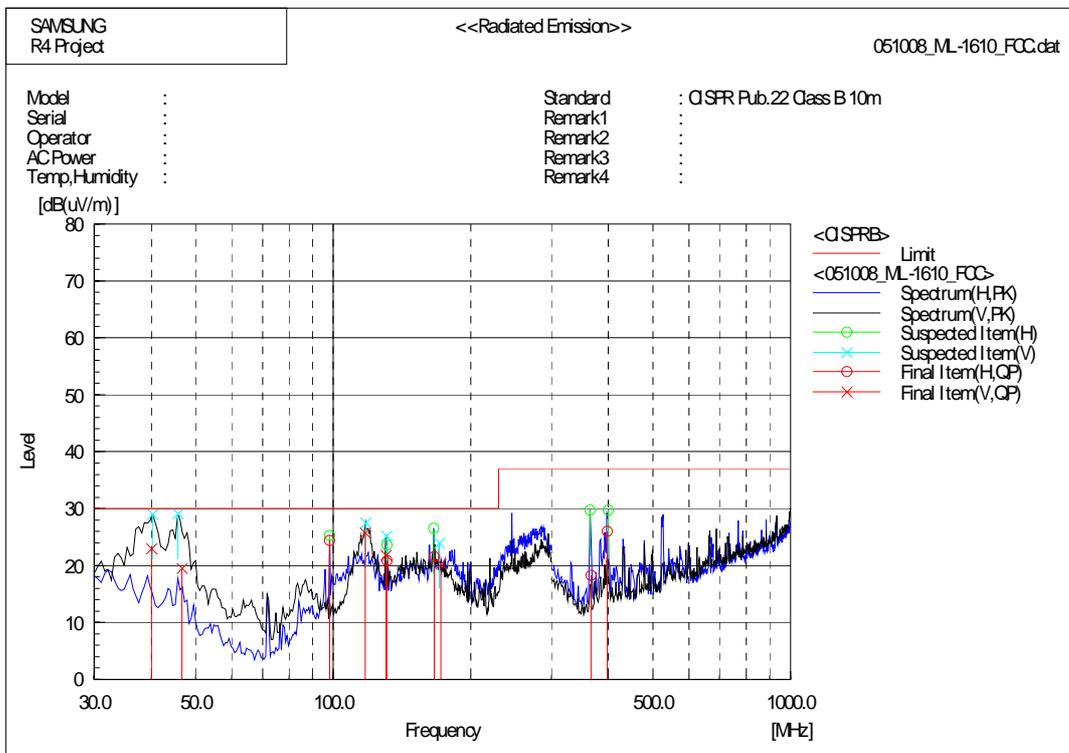
Measurement Results	Passed No Operation errors were detected during or after the applied test.
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Test Data & Graph

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

All other emission are non-significant.

- * Receiving Antenna Mode : Horizontal, Vertical
- * Test distance : 10m (Semi-Anechoic Chamber)
- * Result = Meter Reading + Total Loss(Antenna factor + Cable loss-Amp. Gain)
- * Margin = Limit – Result



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	System
1	40.040	V	34.8	-11.8	23.0	30.0	7.0	293.0	72.0	2
2	46.646	V	34.6	-15.0	19.6	30.0	10.4	180.0	167.4	2
3	98.293	H	44.6	-20.2	24.4	30.0	5.6	392.0	108.7	1
4	117.414	V	44.1	-18.3	25.8	30.0	4.2	100.0	133.0	2
5	130.314	V	39.3	-17.5	21.8	30.0	8.2	100.0	358.8	2
6	131.120	H	38.6	-17.7	20.9	30.0	9.1	330.0	359.6	1
7	166.209	H	40.1	-18.5	21.6	30.0	8.4	400.0	245.7	1
8	171.793	V	39.2	-18.9	20.3	30.0	9.7	100.0	48.1	2
9	366.037	H	31.9	-13.6	18.3	37.0	18.7	231.0	83.6	1
10	397.965	H	38.7	-12.7	26.0	37.0	11.0	207.0	72.4	1

4. Appendix

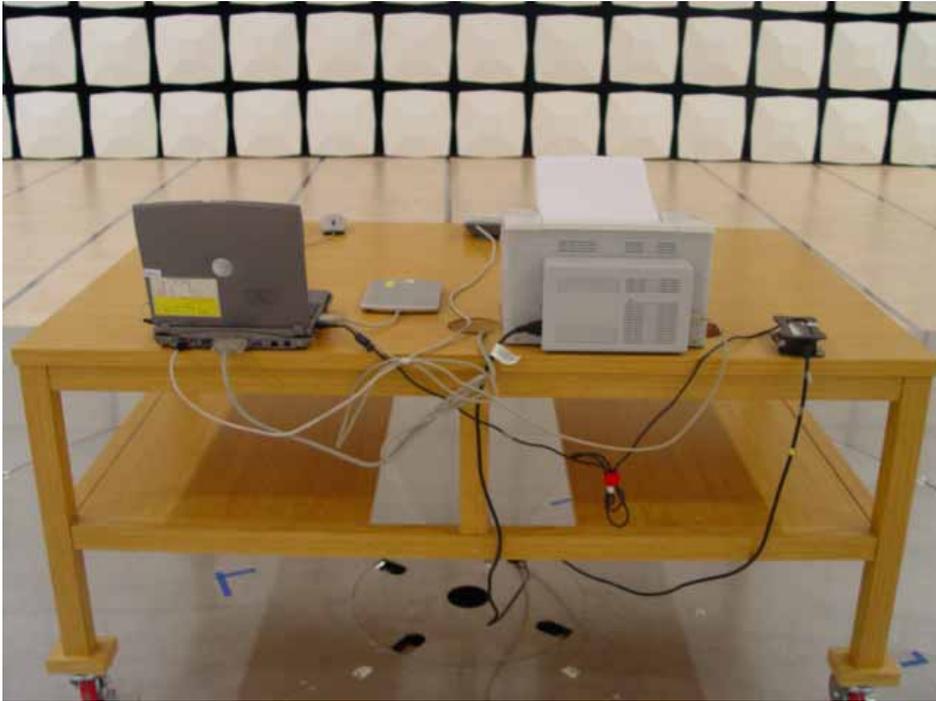
4.1 Test Photography



Picture 1. Conducted Emission (Front)



Picture 2. Radiated Emission (Front)



Picture 3. Radiated Emission (Rear)

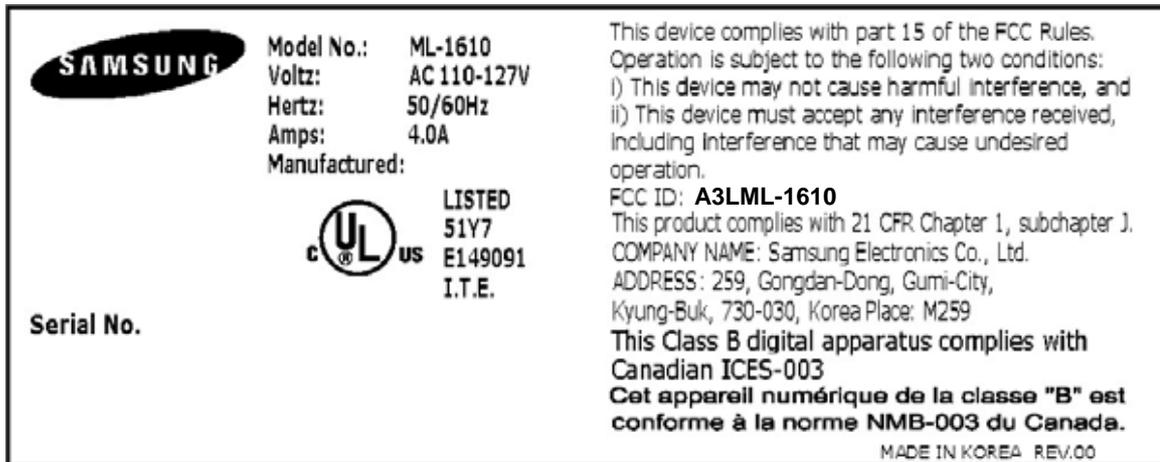
4.2 EUT Photography



Picture 5. EUT (Front)



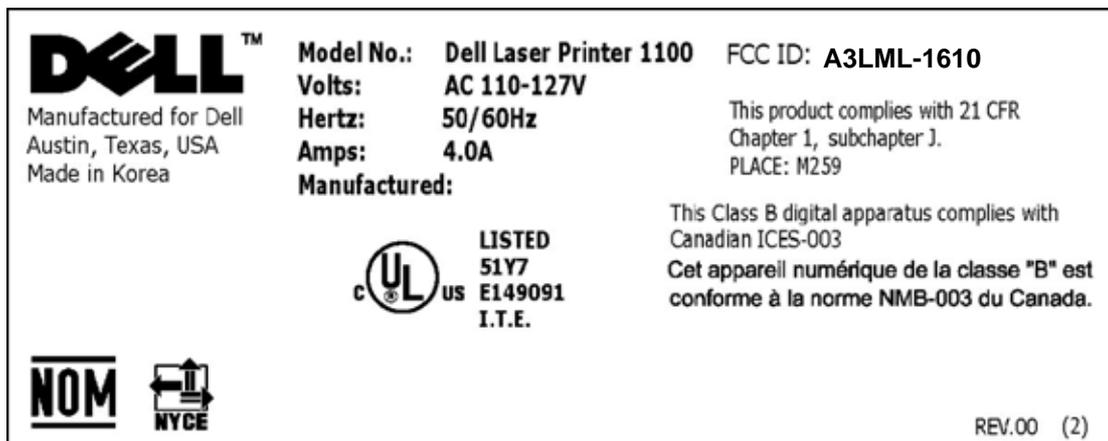
Picture 6. EUT (Rear) & Label Location



#1. Model Name : ML-1610 (Brand : Samsung)

- Factory #1 : Samsung Electronics Co., Ltd (Korea)
- Factory #2 : Shandong Samsung Telecommunications Co., Ltd (China)
- Factory #3 : Weihai Shin Heung Digital Electronics Co., Ltd. (China)
- Factory #4 : Samsung Electronics Slovakia s.r.o (Slovakia)

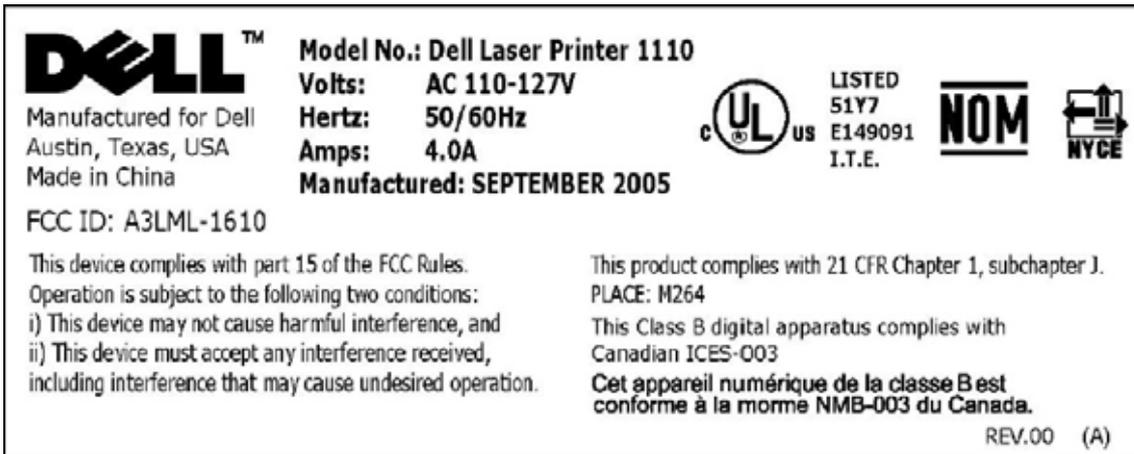
Picture 7. Label of Samsung ML-1610 (Korea/China/Slovakia)



#2. Model Name : Dell Laser Printer 1100 (Brand : DELL)

- Factory #1 : Shandong Samsung Telecommunications Co., Ltd (China)
- Factory #2 : Weihai Shin Heung Digital Electronics Co., Ltd. (China)

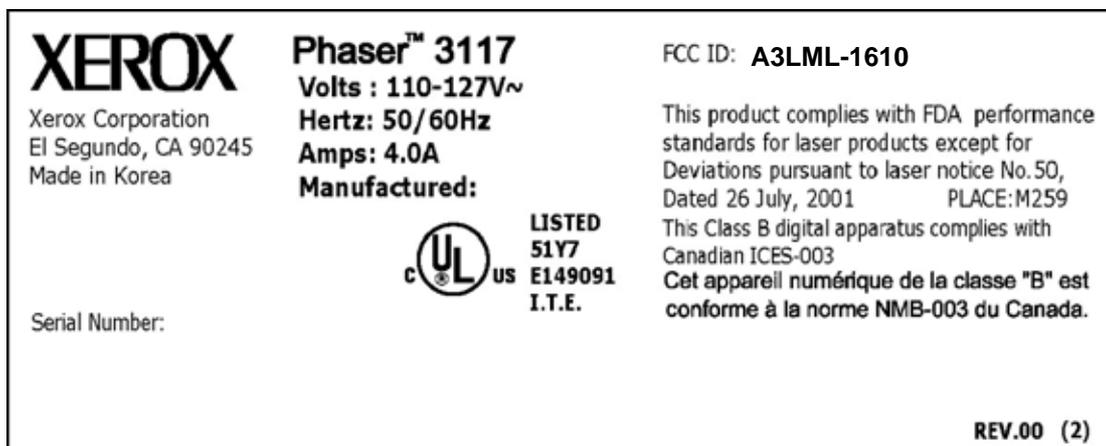
Picture 8. Label of Dell Laser Printer 1100 (China)



#3. Model Name : Dell Laser Printer 1110 (Brand : DELL)

- Factory #1 : Shandong Samsung Telecommunications Co., Ltd (China)
- Factory #2 : Weihai Shin Heung Digital Electronics Co., Ltd. (China)

Picture 9. Label of Dell Laser Printer 1110 (China)



#4. Model Name : Phaser 3117 (Brand : XEROX)

- Factory #1 : Shandong Samsung Telecommunications Co., Ltd (China)
- Factory #2 : Weihai Shin Heung Digital Electronics Co., Ltd. (China)

Picture 10. Label of Xerox Phaser 3117 (China)

Annex A. Changing information of EUT

Die Changing vendor are ICSI and ESMT.

Cause :

For the reason to maintain the competitiveness for customers, a newly released die shrink version of **1Mx16 SDRAM** chips with technology transition from 0.165um to 0.15um will be in full production starting December 2003.

The new device remains the same part number . Also the new device has been fully qualified to fulfill consistent performance and the functional specification is identical to the current version. Meanwhile, we will ramp up the delivery on the new version of this product.

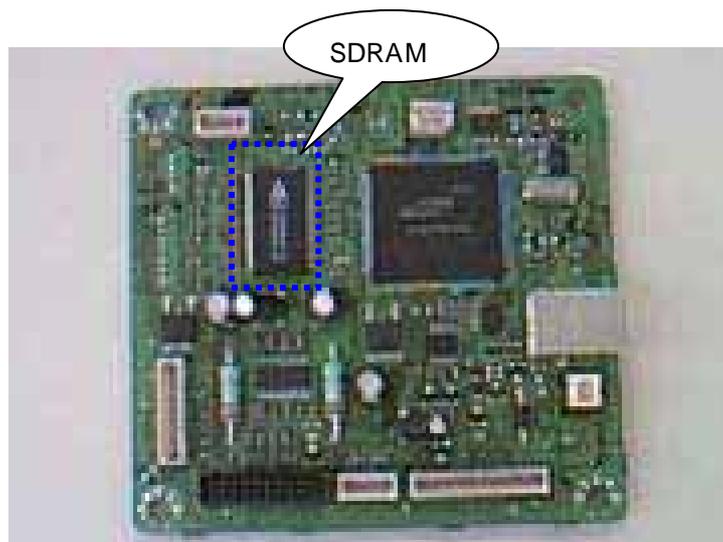


Fig.1 Changing point on the board