

EMC Test Report

According to FCC Part 15 Subpart B

Project No.	LBE050067
Equipment under Test	
Applicant	Samsung Electronics Co., Ltd 416 Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea, 443-742
FCC ID	A3LML-1610
Product Name	LBP
Model Name	ML-1610
Variant Model	Phaser 3117, Dell Laser Printer 1100
Manufacturer	1) Samsung Electronics Co., Ltd 259, Gongdan-Dong, Gumi-City, Kyung-Buk, 730-030, Korea 2) Shandong Samsung Telecommunications Co., Ltd Sanxing Road, Weihai Hi-Tech, IDZ shandong Province, 264209, China 3) Samsung Electronics Slovakia s.r.o. Hviezdoslavova 807, 924 27 Galanta, Slovakia
Date of Test	January 13, 2005~ January 14, 2005
Issued Date	January 25, 2005

	Name/Position	Signature
Tested by	Min Gon, 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

Table of Contents

1. General Information

- 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, Yeoung tong-gu, Suwon-si, Gyeonggi-do, 443-742, Korea
Contact Person	Min Gon, Kim
Kind of product	LBP
Variant list	Phaser 3117 Dell Laser Printer 1100
Manufacturer	1) Samsung Electronics Co., Ltd 259, Gongdan-Dong, Gumi-City, Kyung-Buk, 730-030, Korea 2) Shandong Samsung Telecommunications Co., Ltd Sanxing Road, Weihai Hi-Tech, IDZ shandong Province, 264209, China 3) Samsung Electronics Slovakia s.r.o. Hviezdoslavova 807, 924 27 Galanta, Slovakia
New / Alternative / Permissive change Information	New

1.2 Detail Information related Product

Specification

Item	Specification	Remark
Print Speed	Up to 16 ppm in A4 (17 ppm in Letter).	–
Resolution	600 x 600 dpi	–
Power Rating	AC 110 ~ 127, 50 / 60 Hz	–
Power Consumption	300 W average during operation / Less than 10 W in sleep mode	–
First Printing Time	10 seconds	–
Warmup Time	30 seconds	–
External Dimensions	358mm X 275mm X 215mm (W x D x H)	–
Interface	USB 1.1 (Compatible with USB 2.0)	–
Weight	5.7 Kg (including Toner Cartridge)	

Operating Frequency

- System clock (75MHz)
- Oscillator clock (12MHz)
- USB clock (48MHz)

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 through USB port.

The EUT was tested USB Printing mode as maximum emission.

1.4 Test System Details

N/A

1.5 Equipment Modifications

No equipment modifications were required.

1.6 Test Procedure

1.6.1 Conducted Emission

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 30	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 biconiLog antenna.

Also, the EMI RECEIVER was scanned from 1000 to 1800MHz using linearly polarization Double ridge horn antennas were 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

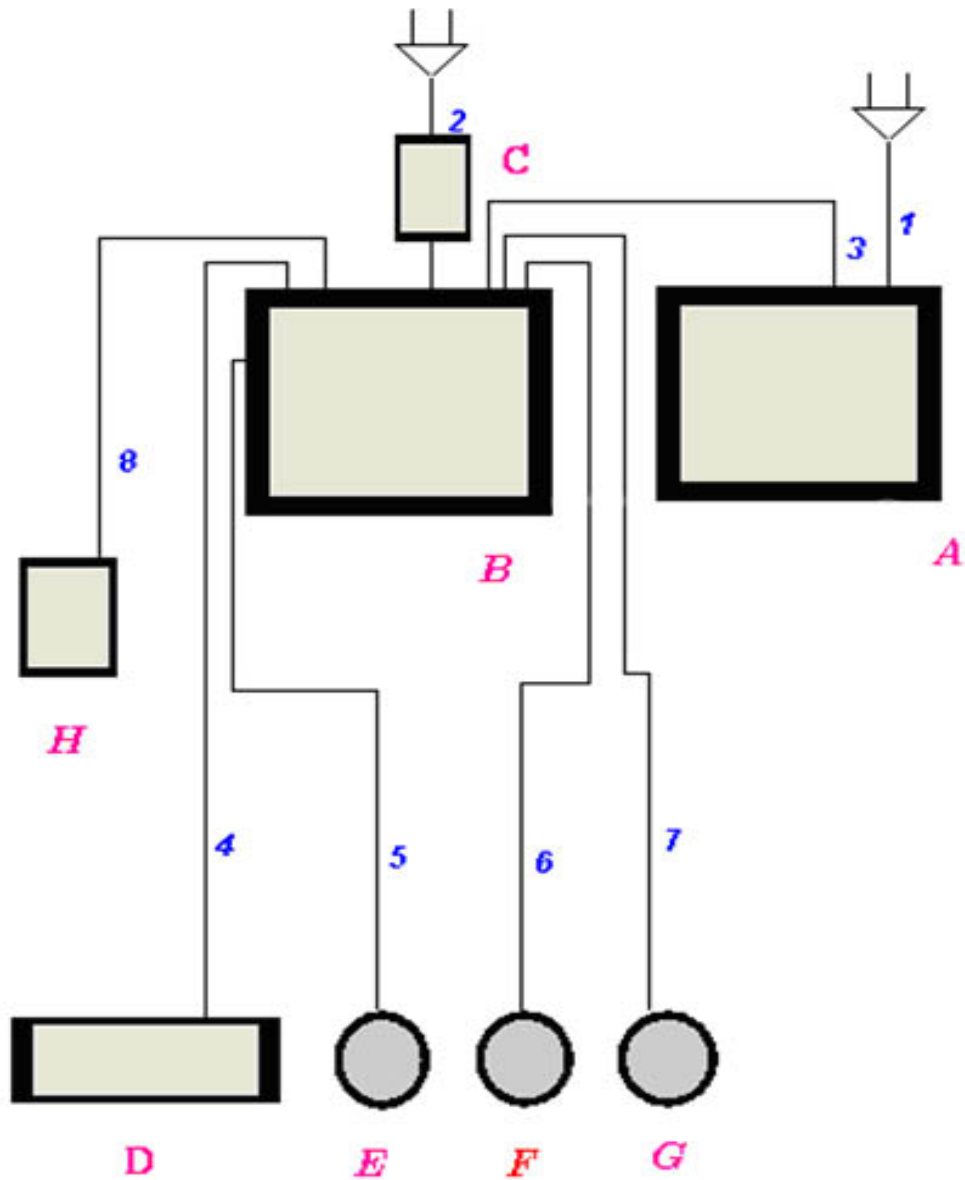
Used EUT and Peripherals

Seq	Device	Model Name	Serial #	Maker	Note	FCC ID
A	LBP	ML-1610	-	Samsung	EUT	A3LML-1610
B	Note PC	PP03L	TW-04P102- 7016-23K-J0V7	DELL	-	DoC
C	Adaptor	ADP-90FB Rev.B	TH-06G356- 17971-23M-6VX6	DELL	For Note PC	-
D	Keyboard	SEM-DT35	3V004765	Samsung	PS/2	DoC
E	Mouse	Serial Mouse	1020764	Microsoft	Serial	C3KMS1
F	Joystick	X04-97602	9760200730535	Microsoft	USB	DoC
G	Mouse	Scroll Mouse P801	01047838	Kye Systems	PS/2	FSUGMZFT
H	FDD Reader	MSFD-20U	20001405	Sanyo Motor	USB	-

Used Cable Description

	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.7	No	EUT
2	Power	1.7	No	-
3	USB	1.8	Yes	-
4	PS/2	1.8	Yes	-
5	Serial	1.7	No	-
6	USB	1.8	Yes	-
7	PS/2	1.8	Yes	-
8	USB	0.5	Yes	-

Block Diagram



1.8 Applied Standards

List

Product or Generic Standards	Basic Standards
FCC Part15	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 Agreement (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 NAMAS Pub.NIS81)

Samsung IT EMC Test Lab.

Conducted Emission : $\pm 1.9\text{dB}$

Radiated Emission Bi-Log Antenna : $\pm 5.1\text{dB}$

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	Fcc Part 15 Sub. B	Complied
3.2	Radiated Emission	Fcc Part 15 Sub. B	Complied

3.1 Conducted Emission

Test Information	
Test Engineer	Min Gon, Kim
Test Date	January 14, 2005
Climate Condition	Ambient Temperature : 25 °C Relative Humidity : 41%
	Atmospheric Pressure 1015mbar
Test Place	Shield Room

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
EMI TEST RECEIVER	ESCS30	R&S	830986/004	2005-02-12	12
LISN	ESH3-Z5	R&S	100263	2005-05-25	12
LISN	3810/2NM	EMCO	2251	2005-02-12	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

1.1 Quasi Peak Table

MEASUREMENT RESULT: "ML-1610_LV_1_fin QP"

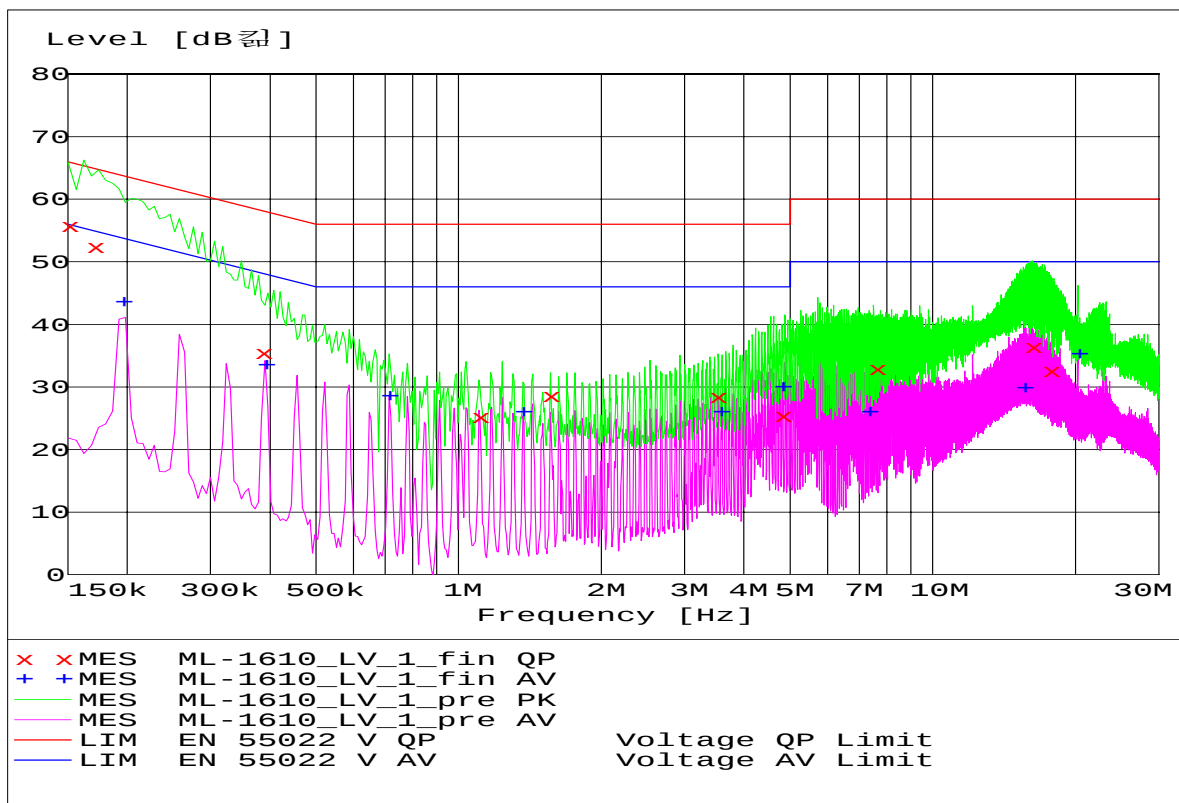
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.150000	55.70	0.6	66	10.3	N	GND
0.170000	52.30	0.6	65	12.7	N	GND
0.385000	35.50	0.5	58	22.7	L1	GND
1.105000	25.20	0.6	56	30.8	L1	GND
1.555000	28.60	0.6	56	27.4	L1	GND
3.500000	28.40	0.7	56	27.6	N	GND
4.800000	25.30	0.8	56	30.7	N	GND
7.580000	32.80	1.0	60	27.2	L1	GND
16.195000	36.40	1.6	60	23.6	N	GND
17.685000	32.60	1.7	60	27.4	N	GND

1.2 Average Table

MEASUREMENT RESULT: "ML-1610_LV_1_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dB μ V	dB	dB μ V	dB		
0.195000	43.50	0.6	54	10.3	L1	GND
0.390000	33.50	0.5	48	14.5	L1	GND
0.710000	28.60	0.5	46	17.4	L1	GND
1.360000	26.00	0.6	46	20.0	L1	GND
3.560000	26.00	0.7	46	20.0	N	GND
4.790000	29.90	0.8	46	16.1	L1	GND
7.315000	26.00	0.9	50	24.0	N	GND
15.535000	29.80	1.6	50	20.2	N	GND
20.240000	35.20	1.8	50	14.8	N	GND

1.3 Graph



3.2 Radiated Emission

Test Information	
Test Engineer	Min Gon, Kim
Test Date	January 13, 2005
Climate Condition	Ambient Temperature : 25℃ Relative Humidity : 39%
	Atmospheric Pressure 1018mbar
Test Place	10m Semi Anechoic Chamber

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Test Receiver	ESI26	R&S	100010	2005-03-16	12
Turn Table	DT430	HD	430/691/01	N/A	N/A
Antenna Mast	MA240	HD	240/678 BJ:01	N/A	N/A
Controller	HD100	HD	100/723	N/A	N/A
Preamplifier	CPA9232	Schaffner	1054	2005-02-12	12
BILOG Antenna	CBL6112B	Schaffner	2805	2005-02-23	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 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.

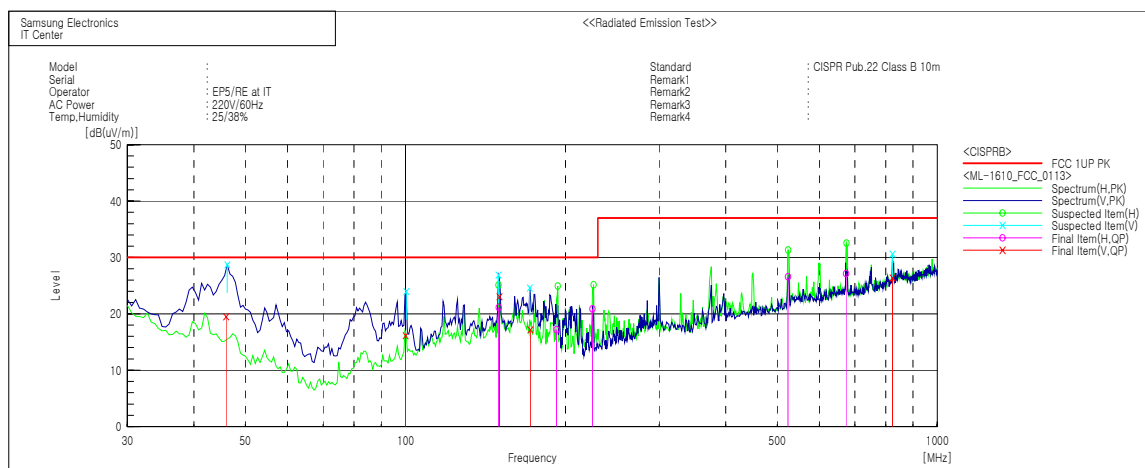
* Receiving Antenna Mode : Horizontal, Vertical

* Test distance : 10m (Semi-Anechoic Chamber)

* Result = Meter Reading + Total Loss(Antenna factor + Cable loss - Amp. Gain)

* Margin = Limit – Result

Samsung Electronics Co., Ltd
IT Center



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]	Remark
1	46.013	V	29.7	-10.2	19.5	30.0	10.5	276.0	145.0	
2	100.002	V	25.4	-9.3	16.1	30.0	13.9	105.0	278.0	
3	149.750	H	29.6	-8.5	21.1	30.0	8.9	393.0	185.0	
4	150.285	V	31.5	-8.5	23.0	30.0	7.0	140.0	5.0	
5	171.636	V	27.3	-10.1	17.2	30.0	12.8	163.0	155.0	
6	192.430	H	27.4	-10.2	17.2	30.0	12.8	342.0	216.0	
7	224.630	H	29.8	-8.9	20.9	30.0	9.1	361.0	18.0	
8	523.783	H	25.3	1.3	26.6	37.0	10.4	135.0	109.0	
9	673.560	H	23.8	3.3	27.1	37.0	9.9	116.0	164.0	
10	823.773	V	20.9	5.5	26.4	37.0	10.6	398.0	240.0	

4. Appendix

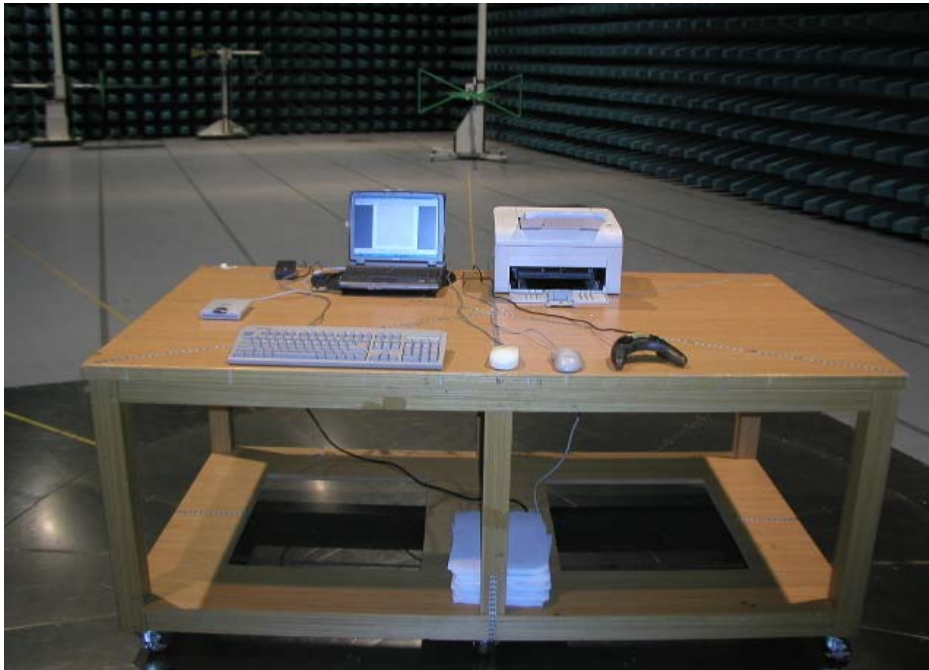
4.1 Test Photography



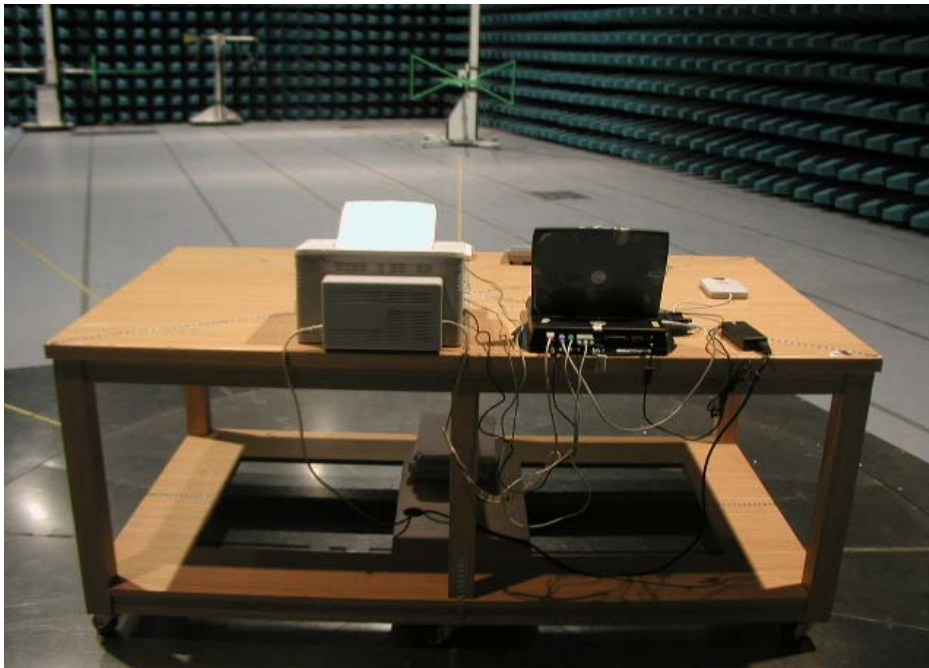
Pic. 1 Conducted Emission (Front)



Pic. 2 Conducted Emission (Rear)



Pic. 3 Radiated Emission (Front)



Pic. 4 Radiated Emission (Rear)

4.2 EUT Photography



Pic. 5 EUT (Front)



Pic. 6 EUT (Rear) & Label Location



Pic. 7 EUT (Inside)

	Model No.:	ML-1610	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: i) This device may not cause harmful interference, and ii) This device must accept any interference received, including interference that may cause undesired operation. FCC ID: A3LML-1610 This product complies with 21 CFR Chapter 1, subchapter J. COMPANY NAME: Samsung Electronics Co., Ltd. ADDRESS: 259, Gongdan-Dong, Gumi-City, Kyung-Buk, 730-030, Korea Place: M259 This Class B digital apparatus complies with Canadian ICES-003 Cet appareil numérique de la classe "B" est conforme à la norme NMB-003 du Canada. MADE IN KOREA REV.00
	Voltz:	AC 110-127V	
Hertz:	50/60Hz		
Amps:	4.0A		
Manufactured:			
		LISTED 51Y7 E149091 I.T.E.	
Serial No.			

- #1. Model Name : ML-1610 (Brand : Samsung)
- Factory #1 : Samsung Electronics Co., Ltd (Korea)

	Model No.:	ML-1610	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: i) This device may not cause harmful interference, and ii) This device must accept any interference received, including interference that may cause undesired operation. FCC ID: A3LML-1610 This product complies with 21 CFR Chapter 1, subchapter J. COMPANY NAME: Shandong Samsung Telecommunications Co., Ltd. ADDRESS: Sanxing Road, Weihai Hi-Tech. IDZ Shandong Province, 264209, China Place:M264 This Class B digital apparatus complies with Canadian ICES-003 Cet appareil numérique de la classe "B" est conforme à la norme NMB-003 du Canada. MADE IN CHINA REV.00
	Voltz:	AC 110-127V	
Hertz:	50/60Hz		
Amps:	4.0A		
Manufactured:			
		LISTED 51Y7 E149091 I.T.E.	
Serial No.			

- #2. Model Name : ML-1610 (Brand : Samsung)
- Factory #2 : Shandong Samsung Telecommunications Co., Ltd (China)

 Manufactured for Dell Austin, Texas, USA Made in Korea	Model No.: Dell Laser Printer 1100 Volts: AC 110-127V Hertz: 50/60Hz Amps: 4.0A Manufactured:	FCC ID: A3LML-1610 This product complies with 21 CFR Chapter 1, subchapter J. PLACE: M259
	 LISTED 51Y7 E149091 I.T.E.	This Class B digital apparatus complies with Canadian ICES-003 Cet appareil numérique de la classe "B" est conforme à la norme NMB-003 du Canada.
 	REV.00 (2)	

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

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

 Xerox Corporation El Segundo, CA 90245 Made in Korea	Phaser™ 3117 Volts : 110-127V~ Hertz: 50/60Hz Amps: 4.0A Manufactured:	FCC ID: A3LML-1610 This product complies with FDA performance standards for laser products except for Deviations pursuant to laser notice No.50, Dated 26 July, 2001 PLACE:M259 This Class B digital apparatus complies with Canadian ICES-003 Cet appareil numérique de la classe "B" est conforme à la norme NMB-003 du Canada.
	 LISTED 51Y7 E149091 I.T.E.	Serial Number:
		REV.00 (2)

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

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

Pic. 8 EUT (Label)