EMC TEST REPORT

Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do, 443-742 Korea (Tel: 031 277 7752, Fax: 031 277 7753)	Project No. : LBE060220 Page (1)/(21)	KOREA LABORATORY ACCREDITATION SCHEME KOLAS TESTING NO. 124

1. Applicant

◦ Name of organization : **Samsung Electronics Co., Ltd.**

◦ Address : 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea

◦ Date of application : 2006.01.12

2. Purpose for the report : Approval for EMC

3. Kind of product : LASER PRINTER (Model name : CLP-650N)

4. Date of test : 2006.01.23

5. Applied standard : FCC Part 15 B

6. Test result : **PASS**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Tested by	Reviewed by
Name : Young Hun Cheong J.Y.H	Name : No Cheon Park N. C. Park

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.

2006. 01. 23

Samsung Electornics Co., Ltd.
Chief of CS Management Center

TEST RESULT

Test Report No.	:	LBE060220
Applicant / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Manufacture / Address	:	Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea
EUT	:	1. Product name : Laser Printer 2. Model name : CLP-650N 3. Brand name : Samsung 4. Variant model : CLP-650
Basic Standards	:	ANSI C63.4:2003
Test Result	:	**PASS** The equipment under test has found to be compliant with the applied standards
Test Lab.	:	CS Management Center, Samsung Electronics Co., Ltd.
Tested by	:	Young Hun Cheong
Reviewed by	:	No Cheon Park
Date of Issue	:	2006. 01. 23

Table of contents

1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	CLP-650N
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Contact person	Young Hun, Cheong
Kind of product	LASER PRINTER
Variant model	CLP-650
Manufacturer	Samsung Electronics Co., Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea
Rated power	AC 120 V, 60 Hz
New / Alternative / Permissive change information	New

1.2 Detail Information related product

1.2.1 Specification

Item	Specification	Remark
Print Speed	Black and White/Color : Up to 20 PPM in A4(21 PPM in Letter)	-
Resolution	Optical: 600 x 600 dpi Support: Up to 2400 x 600 dpi effective output	-
First print out time	From Ready Black and White : Less than 20 seconds Color : Less than 20 seconds From ColdBoot(Without ACR) Black and White : Less than 50 seconds Color : Less than 50 seconds	-
Warm-up time	Less than 30 seconds(Without ACR)	-
Power Rating	110 ~ 127 V AC, 9 A, 50/60 Hz	-
Power Consumption	Average : 450 W Power Save mode : Less than 35 W	-
Noise Level	Printing mode : Less than 51 dBA Standby mode	-

	: Less than 35 dBA	
Consumable life	Y/M/C/K Toner Cartridge : Approx. 4,000 A4/Letter pages at 5% Coverage	-
Duty cycle	Monthly : Up to 45,000 images	-
Weight	29.1 kg (including consumables)	-
Package weight	Paper : 2 kg, Plastic : 900 g	-
External dimensions (W x D x H)	464 x 464 x 445 mm	-
Operating Environment	Temperature :15 ~ 30 ℃) Humidity : 20 ~ 80 % RH	-
Printer Language	SPL-Color , PS3, PCL6	-
Memory	256 MB DDR1 SDRAM	-
Interface	USB 2.0, IEEE1284, Ethernet 10/100 Base TX	-
OS compatibility	Windows 98/Me/NT/2000/XP/2003 Various Linux OS Mac OS 10.3 ~ 10.4	-

Operating Frequency

Video(31.005 MHz), CPU(600 MHz), Main clock(14.318 MHz),
USB clock(12 MHz), N/W clock(25 MHz) SDRAM(133 MHz)

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 the USB, IEEE1284 and Network(LAN) 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(duplex mode) was reported.

- Operating Mode

- USB Printing Mode (worst emission)
- IEEE1284 Printing Mode
- LAN Printing Mode
- Standby Mode

- Test Voltage : AC 120 V, 60 Hz

1.4 Equipment modifications

No equipment modifications were required.

1.5 Test procedure

1.5.1 Conducted emission

EUT was placed on a platform nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of tabletop was located 40 cm 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 80 cm 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 30 cm to 40 cm long and were handed at a 40 cm 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	9 kHz	-
		Average	9 kHz	-

1.5.2 Radiated emission

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The rear of EUT, including peripherals was aligned and flush with rear of tabletop. The I/O cables that were connected to the peripherals were bundle in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged 40 cm 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 trun 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 1 000 MHz using biconiLog antenna.

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1 000	EMI Receiver	Quasi-Peak	120 kHz	-

1.6 Test configuration

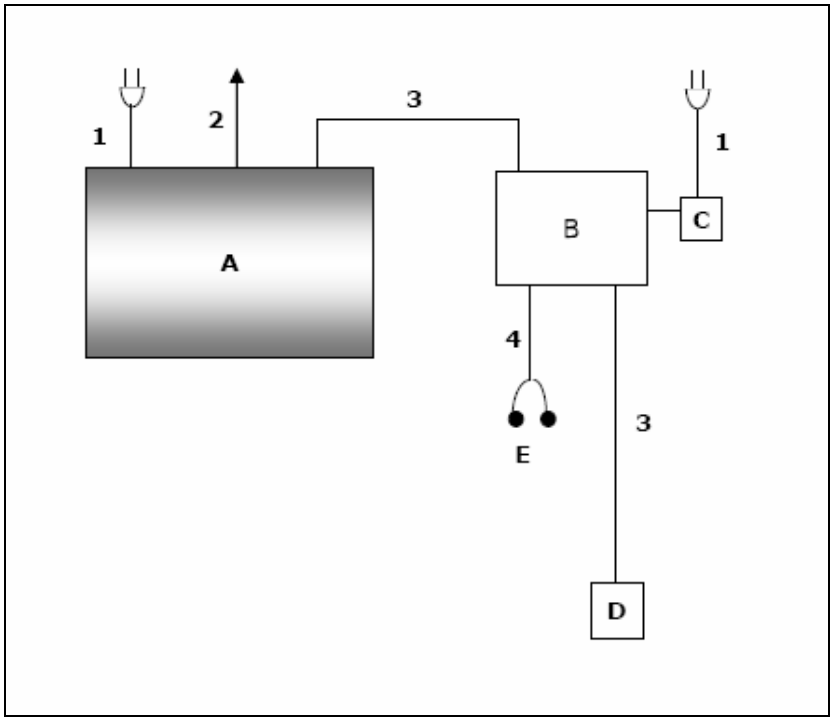
1.6.1 Used EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	Laser Printer	CLP-650N	-	Samsung	A3LDC65CPP
B	Notebook PC	SQ20	L30991CX300026B	Samsung	Doc
C	AC Adapter	AD-4212A	CNBA4400148ASE383B S0345	Samsung	-
D	Joystick	-	3760200731855	Microsoft	Doc
E	Headset	Axis-202	-	Labtec	-
F	Serial Mouse	-	0988577	Microsoft	Doc

1.6.2 Used cable description

Mark	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.8	No	EUT
2	LAN(RJ45)	3.5	No	-
3	USB	1.8	Yes	-
4	Headset	1.8	Yes	-
5	Serial Mouse	1.8	Yes	-

1.6.3 Block Diagram



1.7 Applied Standards

Test standard	Basic standard
FCC Part 15 B	ANSI C63.4:2003

1.8 Test Facility

1.8.1 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.

1.8.2 Accreditation and listing

1.8.3 Measurement uncertainty

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

Test item	Measurement uncertainty
Conducted emission	± 3.3 dB
Radiated emission (Bi-Log Antenna)	± 4.3 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	ANSI C63.4 : 2003	Complied
3.2	Radiated Emission	ANSI C63.4 : 2003	Complied

3. Description of individual tests

3.1 Conducted emission

3.1.1 Test information

Test engineer	Young Hun, Cheong
Test date	Jan. 23, 2006
Climate condition	Ambient temperature : 21.7 ℃, Relative humidity : 35 % Atmospheric pressure : 101.9 kPa
Test place	Shielded room #1

3.1.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Next date	Interval
Field strength meter	ESCI	R&S	100136	2006-04-17	12
LISN	ENV216	R&S	100116	2006-09-08	12
LISN	ENV216	R&S	100107	2006-08-18	12
Test Software	EMC 32	R&S	Ver 4.40.0	N/A	N/A

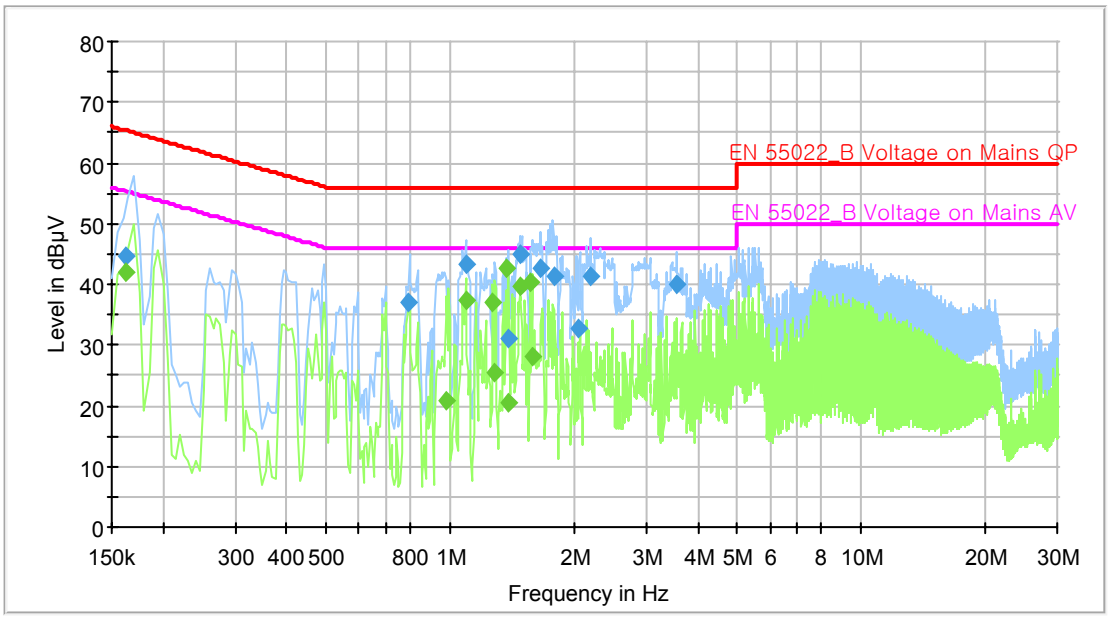
3.1.3 Test result : **Passed**

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

3.1.4 Test data and 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.

3.1.4.1 Test graph



3.1.4.2 Quasi-peak results

Frequency (MHz)	Quasi Peak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162 500	44.5	N	9.6	20.8	65.3
0.787 500	37.0	L1	9.6	19.0	56.0
1.090 500	43.2	N	9.6	12.8	56.0
1.381 500	30.9	L1	9.6	25.1	56.0
1.476 500	45.0	N	9.6	11.0	56.0
1.660 500	42.7	N	9.6	13.3	56.0
1.787 500	41.3	N	9.6	14.7	56.0
2.057 500	32.7	L1	9.6	23.3	56.0
2.195 500	41.5	L1	9.6	14.5	56.0
3.560 500	39.9	L1	9.6	16.1	56.0

3.1.4.3 Average results

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162 500	41.8	N	9.6	13.5	55.3
0.982 500	20.7	L1	9.6	25.3	46.0
1.090 500	37.4	N	9.6	8.6	46.0
1.270 500	37.0	N	9.6	9.0	46.0
1.285 500	25.6	N	9.6	20.4	46.0
1.366 500	42.7	L1	9.6	3.3	46.0
1.377 500	20.5	L1	9.6	25.5	46.0
1.475 500	39.7	N	9.6	6.3	46.0
1.561 500	40.3	L1	9.6	5.7	46.0
1.577 500	28.0	N	9.6	18.0	46.0

* QP : Quasi-peak, AV: Average

* Level (QuasiPeak or Average) = Meter Reading(QP or AV) + Corr. (LISN Insertion loss + Cable loss)

* Margin = Limit – Result

3.2 Radiated Emission

3.2.1 Test information

Test engineer	Young Hun, Cheong
Test date	Jan. 23, 2006
Climate condition	Ambient temperature : 24.9 ℃, Relative humidity : 32 % Atmospheric pressure : 101.4 kPa
Test place	10m Semi Anechoic Chamber

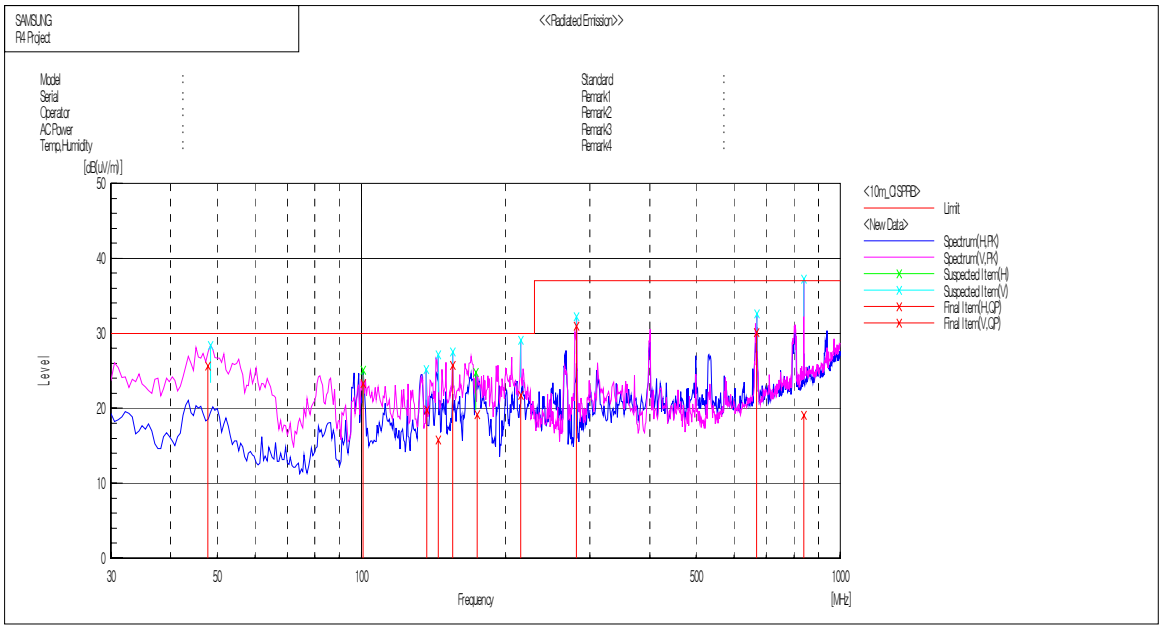
3.2.2 Test equipment

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
RF Selector	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

3.2.3 Test result : **Passed**

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

3.2.4 Test data



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	Remark
1	47.804	V	41.0	-15.4	25.6	30.0	4.4	206.0	332.1	2	
2	100.771	H	43.1	-19.8	23.3	30.0	6.7	381.0	186.8	1	
3	137.045	V	37.2	-17.4	19.8	30.0	10.2	101.0	15.3	2	
4	144.745	V	33.2	-17.4	15.8	30.0	14.2	125.0	359.1	2	
5	155.020	V	43.5	-17.7	25.8	30.0	4.2	105.0	27.4	1	
6	174.515	H	38.4	-19.3	19.1	30.0	10.9	349.0	357.8	1	
7	215.318	V	38.8	-17.1	21.7	30.0	8.3	101.0	248.2	2	
8	280.995	V	47.5	-16.5	31.0	37.0	6.0	100.0	187.9	1	
9	668.580	V	36.1	-5.9	30.2	37.0	6.8	188.0	89.6	2	
10	838.236	V	23.2	-4.1	19.1	37.0	17.9	400.0	29.3	1	

* QP : Quasi-peak, AV: Average

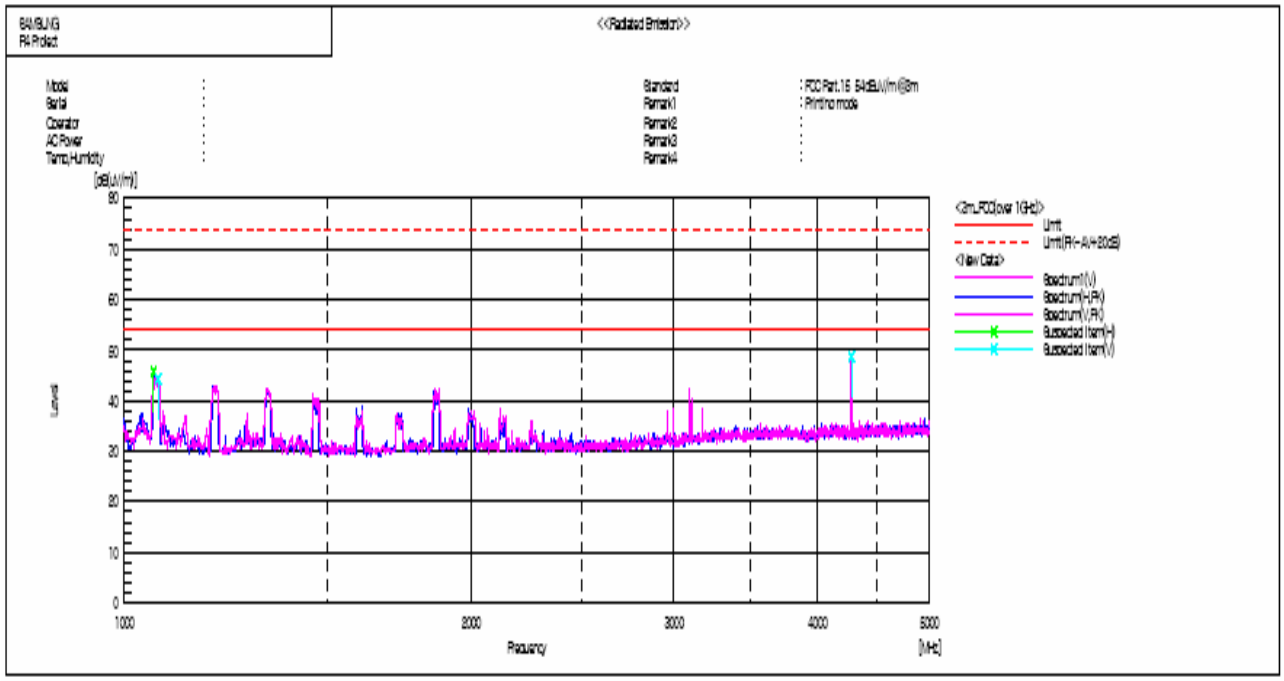
* Level (QuasiPeak or Average)

= Meter Reading(QP or AV) + Corr. (Antenna facor + Cable loss – Amp.gain)

* Margin = Limit – Result

2. Test Data (1GHz ~ 5GHz)

* Measurement detector function and bandwidth
  - Detector function : peak
  - Bandwidth : 1MHz
* Receiving Antenna Mode : Horizontal, Vertical
* Test distance : 3m (Semi-Anechoic Chamber)
* Result = Meter Reading + c.f(Antenna factor + Cable loss-Amp. Gain)
* Margin = Limit – Result



Spectrum Selection

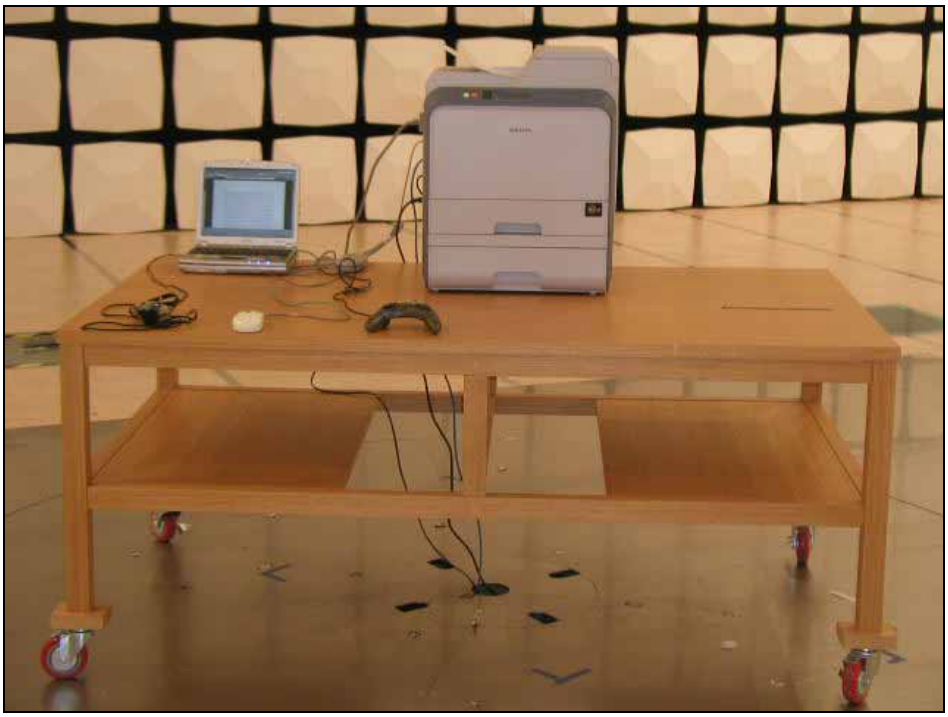
No.	Frequency [MHz]	(P)	Reading [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]	Remark
1	1060.120	H	58.5	-12.6	45.9	54.0	8.1	100.0	265.9	
2	1070.140	V	57.0	-12.6	44.4	54.0	9.6	100.0	241.9	
3	4280.561	V	51.1	-2.3	48.8	54.0	5.2	100.0	157.0	

4. Appendix

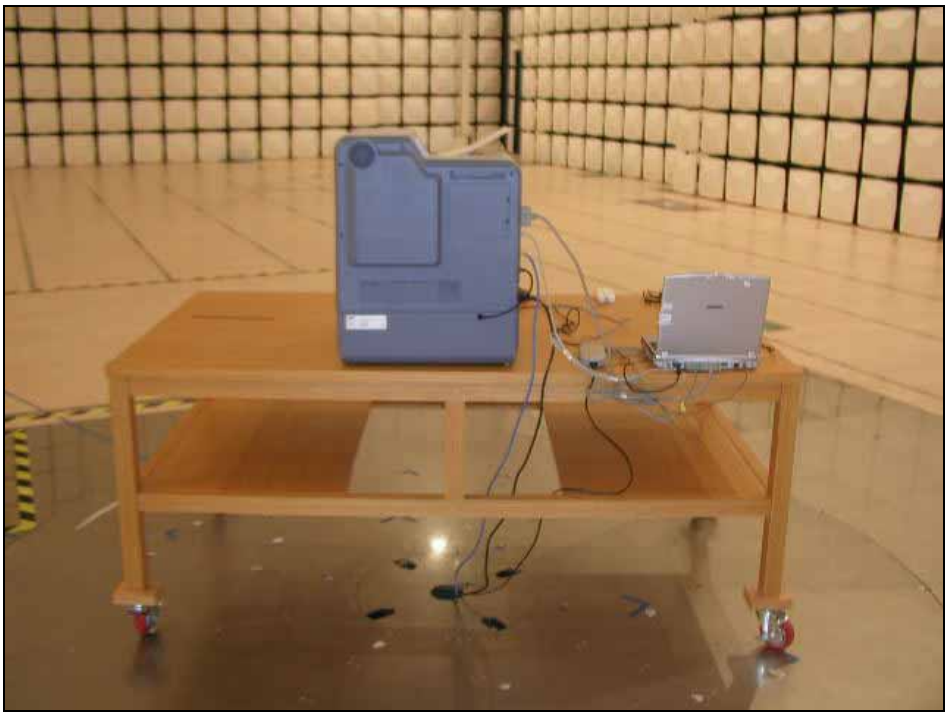
4.1 Test photography

Picture 1. Conducted emission (Front)

Picture 2. Conducted emission (Rear)



Picture 3. Radiated emission (Front)



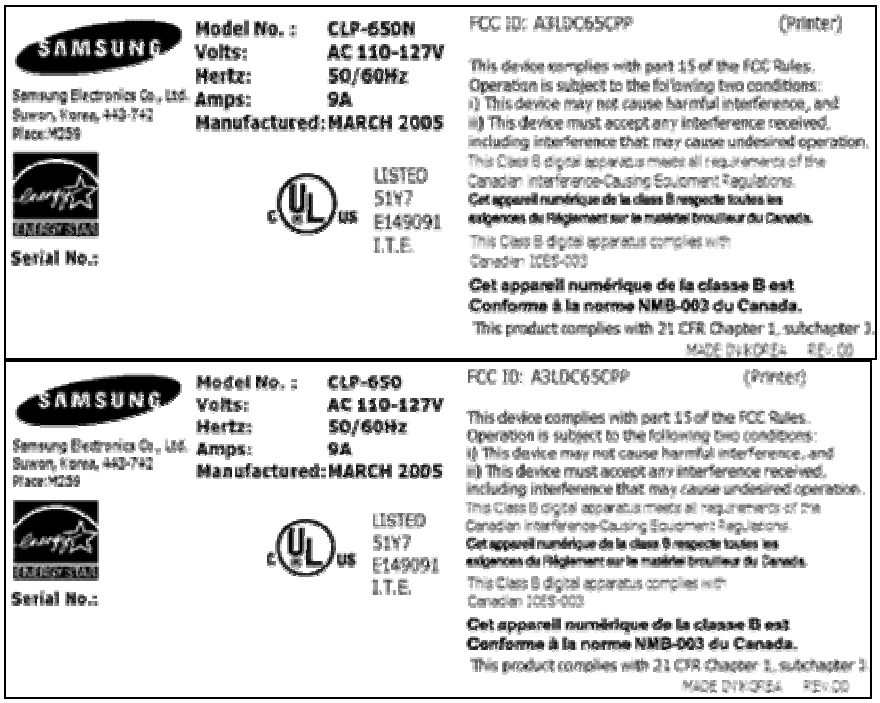
Picture 4. Radiated emission (Rear)

4.2 EUT photography

Picture 5. EUT (Top)

Picture 6. EUT (Bottom)

Picture 7. Label Location



Picture 8. Label