EMC TEST REPORT

Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do, 443-742 Korea (Tel: 82 31 277 7752, Fax: 82 31 277 7753)	Project No. : LBE071509 Page (1)/(27)	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 : 2007. 04. 27

2. Purpose for the report : Approval for EMC

3. Kind of product : Printer (Model name :ML-1630)

4. Date of test : 2007. 05. 02 ~ 2007. 05. 11

5. Applied standard : FCC Part 15, Subpart B

6. Test result : **Complied**

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 : Sang Kyu, seo	Name : No Cheon Park

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

2007. 05. 18

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

TEST RESULT

Test Report No.	:	LBE071509
Applicant / Address	:	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Manufacture / Address	:	1) Samsung Electronics Co.,Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea 2) Samsung Electronics(Shandong) Digital Printing Co., Ltd. 264209, Samsung Road, Weihai Hi-Tech IDZ, Shandong Province, China 3) Weihai Shin Heung Digital Electronics Co., Ltd. 98, Samsung Road, Weihai H-Tech. IDZ, Shandong Province, P.R.China
EUT	:	1. Product name : Printer 2. Model name : ML-1630 3. Brand name : SAMSUNG 4. Variant model : ML-1630S 5. FCC ID : A3LML1630
Test Method	:	**ANSI C 63.4:2003**
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	:	Sang Kyu, Seo
Reviewed by	:	No Cheon Park
Date of Issue	:	2007. 05. 18

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1. General information

1.1 Basic information related product

Applicant	Samsung Electronics Co., Ltd.
Model name	ML-1630
Applicant address	416 Maetan 3-Dong, Yeongtong-Gu,Suwon-Si,Gyeonggi-Do 443-742 Korea
Contact person	Sangsu ROH
Kind of product	Printer
Valiant model	ML-1630S
FCC ID	A3LML1630
Manufacturer	1) Samsung Electronics Co.,Ltd. 259, Gongdan-Dong, Gumi-City, Gyeongsangbuk-Do, 730-030 Korea 2) Samsung Electronics(Shandong) Digital Printing Co., Ltd. 264209, Samsung Road, Weihai Hi-Tech IDZ, Shandong Province, China 3) Weihai Shin Heung Digital Electronics Co., Ltd. 98, Samsung Road, Weihai H-Tech. IDZ, Shandong Province, P.R.China
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 and Description
Processor	Jupiter4e(ARM940T, 150MHz)
Standard System memory	8MB SDRAM
Resolution	600x600dpi(1200 dpi Class)
Copy Quality mode	NA
Paper Handling	Paper Tray(standard) 100 Sheets 2nd Tray(optional) : NA Bypass Tray : NA
Power Rating	110~127 VAC, 4.0A, 50/60 Hz
Power Consumption	Power save mode : 8.12Watts Stand by mode : 8.12Watts Printing simplex : 300Watts
Printer Language	GDI
Interfaces	USB2.0
OS compatibility	Windows 2000 / XP / 2003 / Vista Linux Mac OS 10.3
Modes of Operation	USB Printing
Intended Class for Emissions	Class B

Operating Frequency

Main Source Clock : 12MHz, Video Clock : 19.75MHz, CPU Internal Clock : 150MHz
SDRAM Clock : 75MHz, USB Device Clock : 12MHz, OPE : 115.2KHz

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 printind mode.
So, all the data of EUT operation were reported.

- Operating Mode

- USB Printing Mode
- Standby Mode

- Test Voltage : 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.

Also, the EMI Receiver was scanned from 1 000 to 2 000 MHz 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 1 000	EMI Receiver	Quasi-Peak	120 kHz	-
Above 1 000	EMI Receiver	Peak	1 MHz	1 MHz

1.6 Test configuration

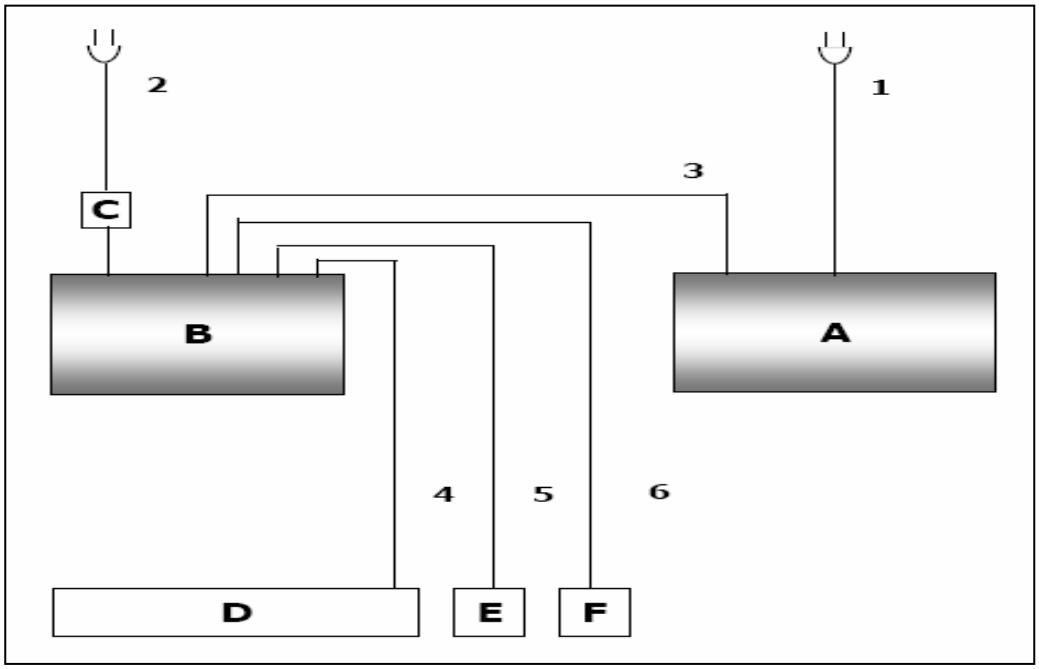
1.6.1 Used EUT and peripherals

Seq	Device	Model Name	Serial #	Maker	FCC ID
A	Printer	ML-1630	-	Samsung	-
B	Notebook PC	SQ20	L30991CX300026B	Samsung	DoC
C	AC Adaptor	AD-4212A	CNBA44XXXXXXSE3831L0241	Dong Guan SEM	-
D	USB Keyboard	SDM4600UH	4S000220	Samsung Electro Mechanics., Co. Ltd	DoC
E	SP/2 Mouse	SMOP5000WX-UAG	06060 002825	Chic Corp	DoC
F	Serial Mouse	37964	1020764	Micro Soft	FCC ID C3KMS1

1.6.2 Used cable description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.8	No	For EUT
2	Power	1.8	No	For PC
3	USB	1.8	Yes	From eut to pc
4	USB	1.8	Yes	From pc to keyboard
5	PS/2	1.8	Yes	From pc to mouse
6	Serial	1.8	Yes	From pc to mouse

1.6.3 Block diagram



1.7 Applied Standards

Test standard	Test method
FCC Part 15 Subpart 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		± 2.8 dB
Radiated emission	Horizontal	± 5.1 dB
	Vertical	± 5.09 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	Test result
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	Sang Kyu, Seo
Test date	May 11, 2007
Climate condition	Ambient temperature : 23.7 ℃, Relative humidity : 32 % Atmospheric pressure : 101.0 kPa
Test place	Shielded room # 1

3.1.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval (Month)
EMI TEST RECEIVER	ESCI	100086	R&S	2007-03-21	12
LISN (For EUT)	ENV216	R&S	100116	2006-09-01	12
LISN (For Peripheral)	ESH3-Z5	R&S	100261	2006-07-21	12
Test Software	EMC 32	R&S	Ver 4.40.0	N/A	N/A

EUT Test Setup

The EUT was set up as per normal use on a wooden table, 0.4 m from a vertical ground reference plane, At least 0.8 m from other conduction surfaces and 0.8 m from the LISN.
See photo.

Test Result

Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.

3.1.3 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.

3.1.3.1 Test graph

Test Information

Test Description: ML-1630
Operating Conditions:
Operator Name:
Comment: USB Printing

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

Frequency Range: 150kHz - 30MHz

Receiver: ESCI 3 [ESCI 3]
@ GPIB0 (ADR 20), SN 100369/003, FW 3.82

Signal Path: Receiver-2-Line-LISN ENV216
FW 1.0
Correction Table: Receiver-2-LISN ENV216

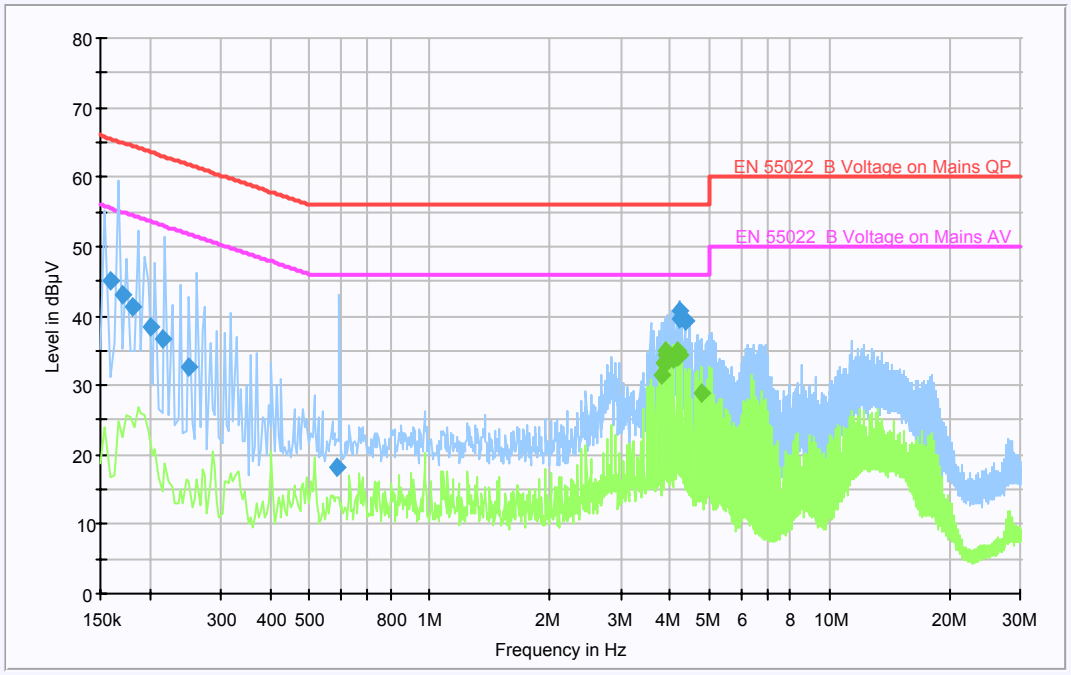
LISN: ENV216
Correction Table (Line 0): ENV216_100116_N
Correction Table (Line 1): ENV216_100116_L

Scan Setup: EN55022_B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup: Voltage with ENV 2-Line-LISN
Level Unit: dB µV

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_B with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.158000	45.2	N	9.6	20.4	65.6
0.169700	43.1	N	9.6	21.9	65.0
0.180700	41.3	N	9.6	23.2	64.5
0.199700	38.5	N	9.6	25.1	63.6
0.215100	36.5	N	9.6	26.5	63.0
0.248900	32.5	N	9.6	29.3	61.8
0.584300	18.2	N	9.6	37.8	56.0
4.211200	40.8	L1	9.7	15.2	56.0
4.213400	39.6	L1	9.7	16.4	56.0
4.340400	39.2	L1	9.7	16.8	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
3.820800	31.5	L1	9.7	14.5	46.0
3.823000	33.2	N	9.7	12.8	46.0
3.886400	33.1	L1	9.7	12.9	46.0
3.887800	34.3	L1	9.7	11.7	46.0
3.888000	34.9	N	9.7	11.1	46.0
4.081400	33.7	L1	9.7	12.3	46.0
4.145400	34.1	L1	9.7	11.9	46.0
4.146000	34.9	N	9.7	11.1	46.0
4.212600	34.2	L1	9.7	11.8	46.0
4.794400	28.9	N	9.7	17.2	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

Test Information

Test Description:	ML-1630
Operating Conditions:	
Operator Name:	
Comment:	Standby

Hardware Setup: Voltage with ENV 2-Line-LISN - [EMI conducted]

Subrange 1

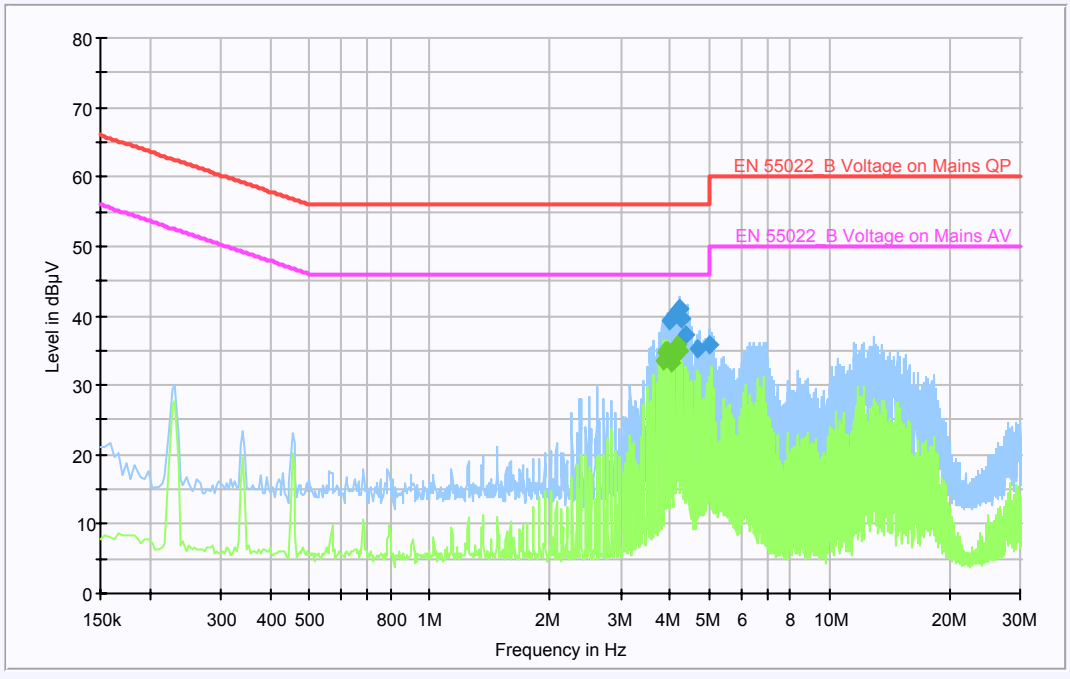
Frequency Range:	150kHz - 30MHz
Receiver:	ESCI 3 [ESCI 3] @ GPIB0 (ADR 20), SN 100369/003, FW 3.82
Signal Path:	Receiver-2-Line-LISN ENV216 FW 1.0 Correction Table: Receiver-2-LISN ENV216
LISN:	ENV216 Correction Table (Line 0): ENV216_100116_N Correction Table (Line 1): ENV216_100116_L

Scan Setup: EN55022_B_ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:	Voltage with ENV 2-Line-LISN
Level Unit:	dB µ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

EN55022_B with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
3.956800	39.3	L1	9.7	16.7	56.0
4.146200	40.9	N	9.7	15.2	56.0
4.147000	40.9	L1	9.7	15.1	56.0
4.211600	41.0	N	9.7	15.0	56.0
4.211800	41.0	N	9.7	15.0	56.0
4.213400	39.9	N	9.7	16.1	56.0
4.276600	39.5	N	9.7	16.5	56.0
4.341400	37.3	N	9.7	18.7	56.0
4.671400	35.2	L1	9.8	20.8	56.0
4.990600	35.8	N	9.7	20.2	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
3.823000	33.5	L1	9.7	12.5	46.0
3.888200	34.7	L1	9.7	11.3	46.0
3.888800	34.9	N	9.7	11.1	46.0
3.954200	35.0	N	9.7	11.0	46.0
4.020600	34.6	N	9.7	11.4	46.0
4.021600	33.3	N	9.7	12.7	46.0
4.085400	34.9	N	9.7	11.1	46.0
4.086000	34.1	N	9.7	11.9	46.0
4.147800	35.9	L1	9.7	10.1	46.0
4.210800	35.0	N	9.7	11.0	46.0

3.2 Radiated emission

3.2.1 Test information

Test engineer	Sang Kyu, Seo
Test date	May 02, 2007
Climate condition	Ambient temperature : 24.1 ℃, Relative humidity : 33 % Atmospheric pressure : 100.7 kPa
Test place	10 m Semi-anechoic Chamber

3.2.2 Test equipment

Equipment	Model name	Manufacturer	Serial no.	Calibration	
				Date	Interval (Month)
Bi-con Antenna	CBL6112D	SCHAFFNER	22602	2006-06-26	12
Bi-con Antenna	CBL6112D	SCHAFFNER	22601	2007-04-02	12
EMI Receiver	ESIB-26	R&S	100289	2007-03-22	12
EMI Receiver	ESIB-26	R&S	100287	2007-04-10	12
AMPLIFIER	310N	SONOMA	186467	2007-03-17	12
AMPLIFIER	310N	SONOMA	251673	2007-03-17	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
RF Selector	NS4900	TOYO	-	N/A	N/A
HORN ANTENNA	BBHA9120B	SCHWARZBECK	335	2007-01-08	12

EUT Test Setup

EUT set up in semi-anechoic chamber. EUT positioned at 10 m from antenna in center of table.

All ports terminated into characteristic loads.

Test Result

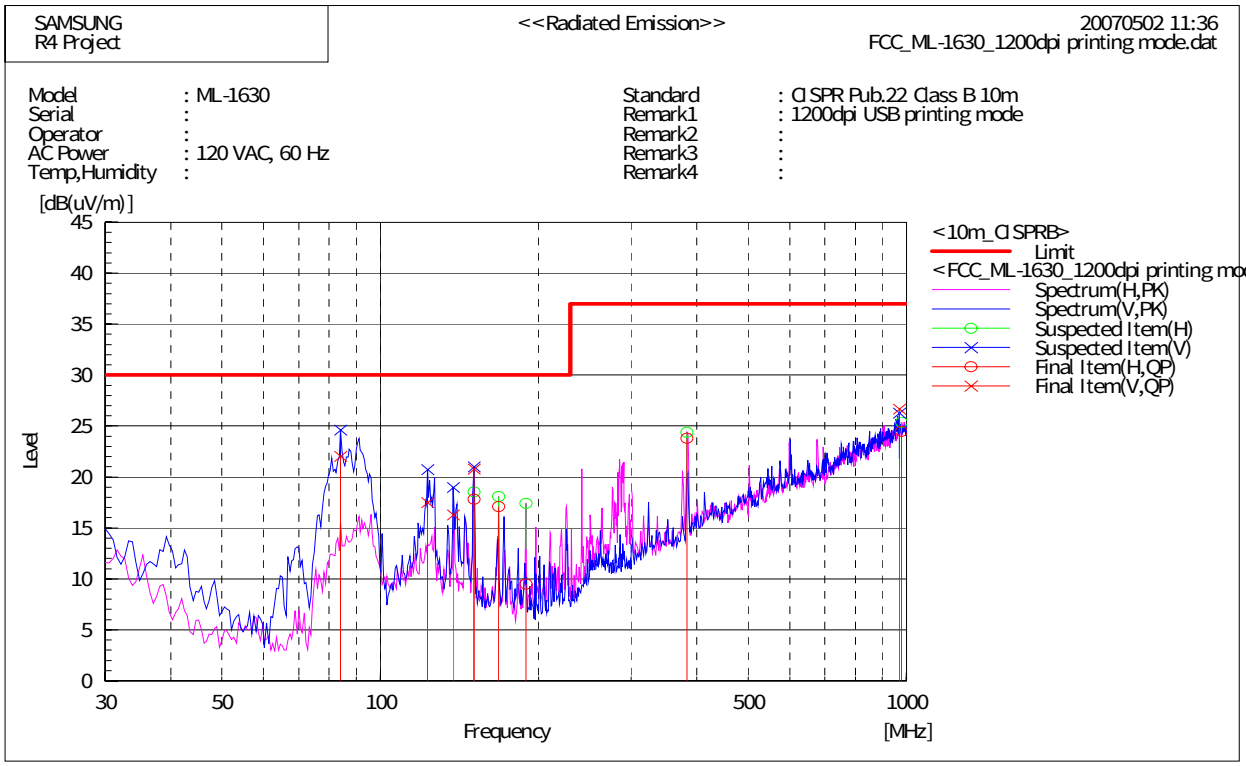
Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.

3.2.3 Test data and 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 emissions were reported. All other emissions are non-significant

3.2.4 30 MHz ~ 1 000 MHz

■ Operating Mode: USB Printing

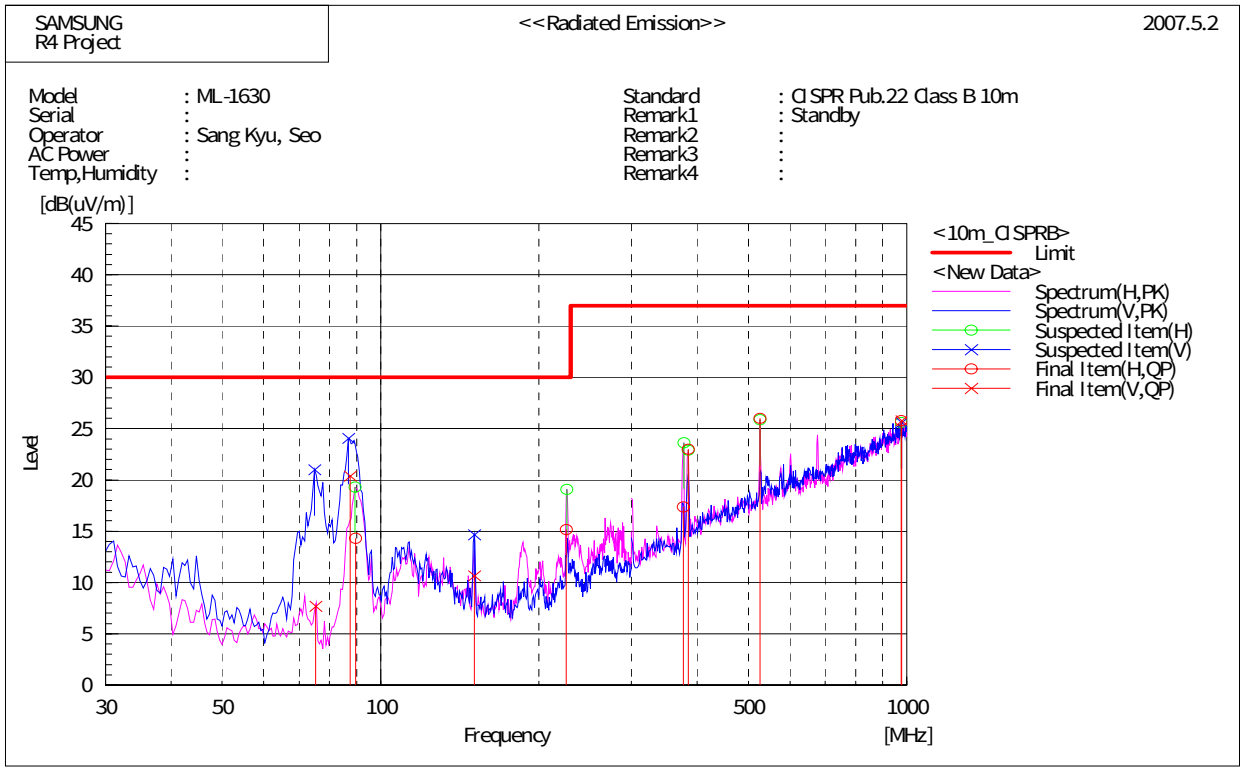


Final Result

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	83.981	V	44.3	-22.2	22.1	30.0	7.9	169.0	197.6	2
2	123.066	V	35.4	-17.9	17.5	30.0	12.5	125.0	2.7	2
3	137.675	V	34.5	-18.2	16.3	30.0	13.7	156.0	251.5	2
4	150.661	H	36.6	-18.8	17.8	30.0	12.2	265.0	153.6	1
5	150.661	V	40.0	-19.2	20.8	30.0	9.2	112.0	51.3	2
6	167.976	H	36.4	-19.3	17.1	30.0	12.9	389.0	349.7	1
7	189.078	H	29.6	-20.1	9.5	30.0	20.5	278.0	15.4	1
8	382.766	H	35.6	-11.8	23.8	37.0	13.2	198.0	99.6	1
9	969.138	V	28.1	-1.4	26.7	37.0	10.3	357.0	37.7	2
10	978.958	H	26.0	-1.5	24.5	37.0	12.5	201.0	198.8	1

* Receiving antenna mode : Horizontal, Vertical
* Test distance : 10m (RF Semi Anechoic Chamber)
* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)
* Margin = Limit – Result

■ Operating Mode: **Standby**

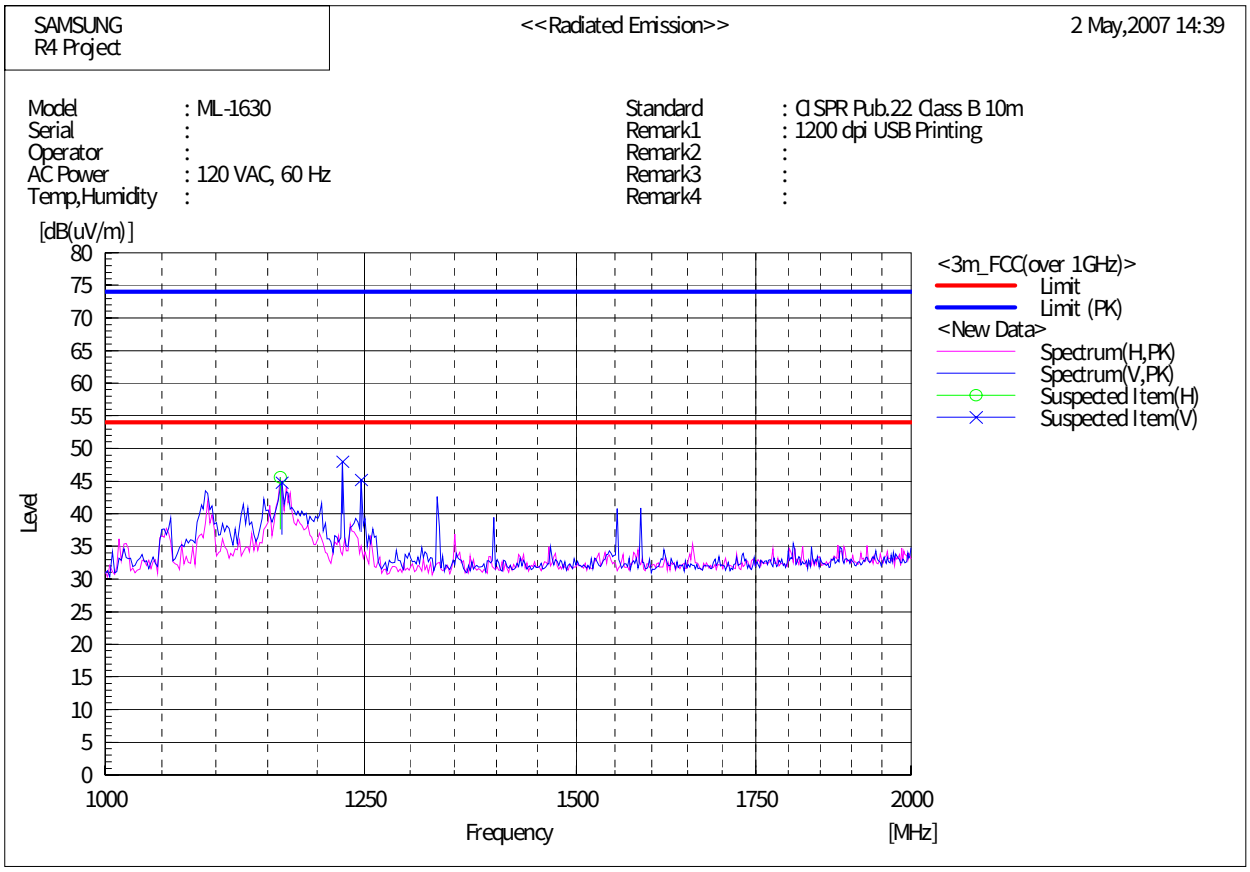


Final Result

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	75.280	V	32.0	-24.3	7.7	30.0	22.3	188.0	351.3	2
2	87.574	V	41.8	-21.4	20.4	30.0	9.6	170.0	0.8	2
3	89.565	H	35.4	-21.1	14.3	30.0	15.7	380.0	359.5	1
4	150.734	V	29.9	-19.2	10.7	30.0	19.3	104.0	330.6	2
5	225.561	H	34.4	-19.2	15.2	30.0	14.8	393.0	57.2	1
6	376.067	H	29.4	-12.0	17.4	37.0	19.6	238.0	330.6	1
7	384.168	H	34.7	-11.7	23.0	37.0	14.0	200.0	184.1	1
8	525.852	H	34.6	-8.6	26.0	37.0	11.0	200.0	167.4	1
9	976.152	H	27.4	-1.6	25.8	37.0	11.2	100.0	234.4	1
10	977.555	V	27.1	-1.3	25.8	37.0	11.2	400.0	242.5	2

* Receiving antenna mode : Horizontal, Vertical
* Test distance : 10m (RF Semi Anechoic Chamber)
* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)
* Margin = Limit – Result

3.2.5 GHz ~ 2 GHz



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]
1	1162.325	H	57.4	-11.8	45.6	54.0	8.4	200.0	233.5
2	1164.329	V	56.6	-11.8	44.8	54.0	9.2	100.0	17.4
3	1226.453	V	59.5	-11.5	48.0	54.0	6.0	100.0	82.0
4	1246.493	V	56.6	-11.4	45.2	54.0	8.8	200.0	132.3

* Receiving antenna mode : Horizontal, Vertical
* Test distance : 3 m (Semi Anechoic Chamber)
* Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain)
* Margin = Limit – Reading

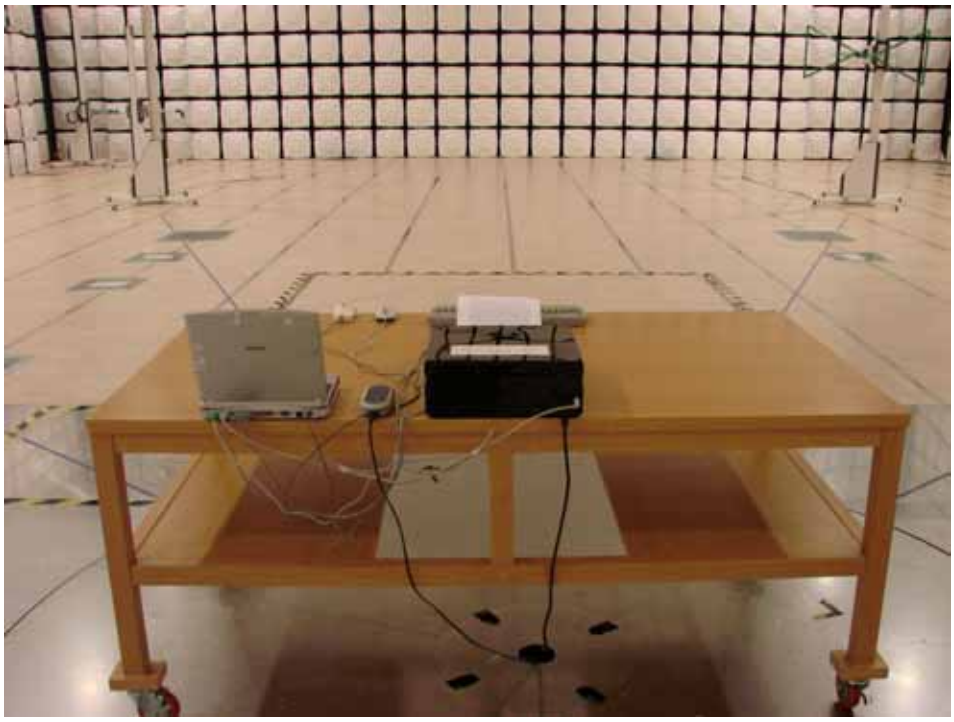
4. Appendix

4.1 Test photography

Picture 1. Conducted Emission (Front)

Picture 2. Conducted Emission (Rear)

Picture 3. Radiated emission (Front)



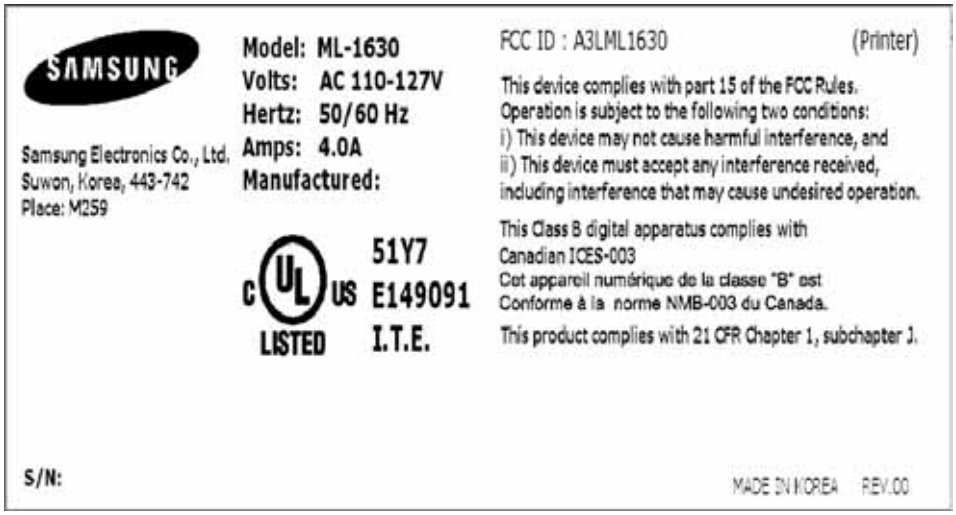
Picture 4. Radiated emission (Rear)

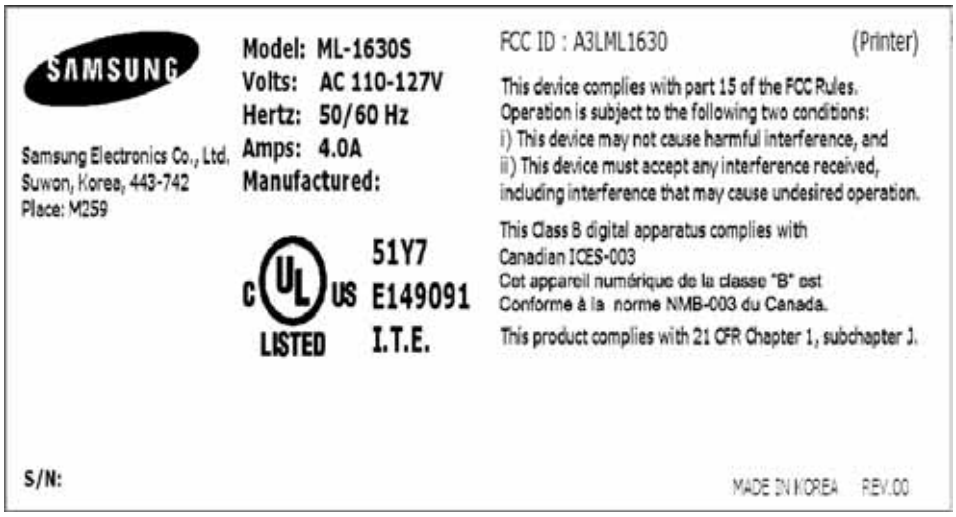
4.2 EUT photography

Picture 5. EUT (Front)

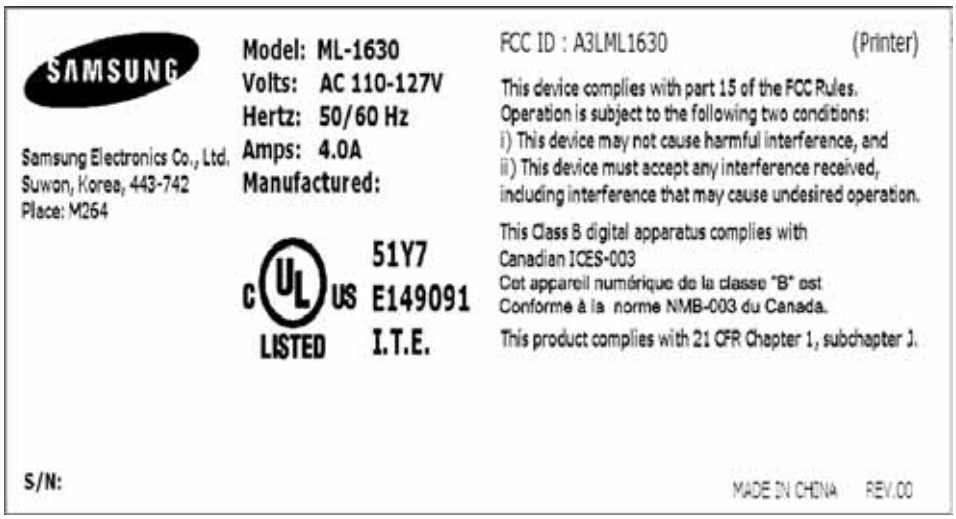
Picture 6. EUT (Rear)

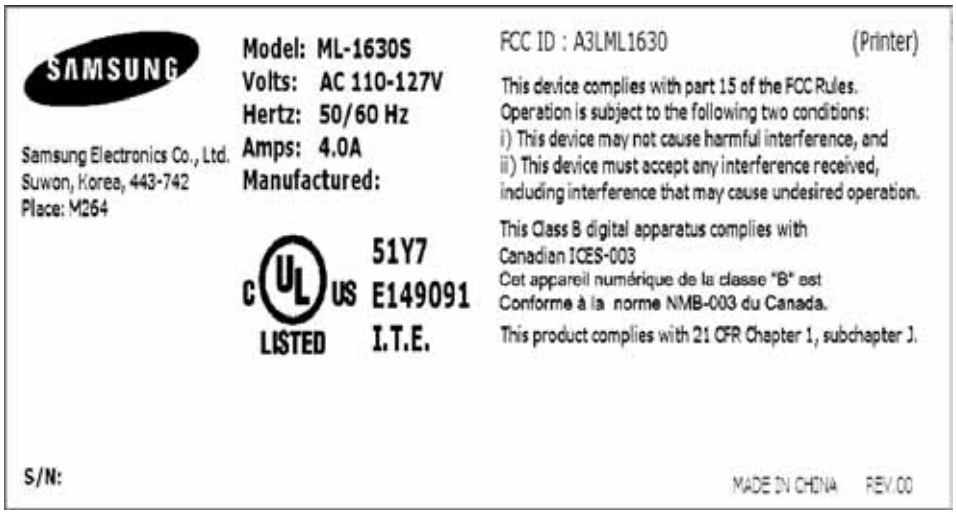
4.3 Label and Label Location





(Samsung Electronics Co., Ltd)





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Picture 7. Label

Picture 8. Label location