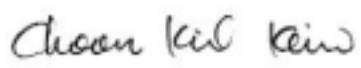
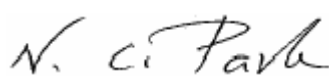
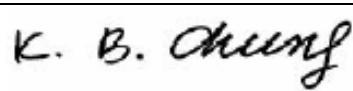


# EMC Test Report

## According to FCC Part 15 Subpart B

|                             |                                                                                                          |
|-----------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Project No.</b>          | LBE040869                                                                                                |
| <b>Equipment under Test</b> | Laser Beam Printer                                                                                       |
| Applicant                   | Samsung Electronics Co. Ltd;<br>416 Maetan-3 Dong, YeoungTong-Ku, Suwon City, Kyungki-Do, Korea, 442-742 |
| FCC ID                      | <b>A3LML1520</b>                                                                                         |
| Product Name                | LBP                                                                                                      |
| Model Name                  | ML-1520                                                                                                  |
| Manufacturer                | Samsung Electronics Co. Ltd<br>259, Gongdan-Dong, Gumi-City, Kyung-Buk, 730-030, Korea                   |
| <b>Date of Test</b>         | April 29, 2004                                                                                           |
| <b>Issued Date</b>          | May 3, 2004                                                                                              |

|                      | <b>Name/Position</b>                  | <b>Signature</b>                                                                     |
|----------------------|---------------------------------------|--------------------------------------------------------------------------------------|
| <b>Tested by</b>     | CK KIM<br>Test Engineer               |  |
| <b>Reviewed by</b>   | No Cheon, Park<br>Manager of EMC Lab. |  |
| <b>Authorized by</b> | Kyu Baek, Chung<br>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

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# 1. General Information

## 1.1 Basic Information related Product

|                                                      |                                                                                                            |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Applicant                                            | Samsung Electronics Co. Ltd;                                                                               |
| Model name                                           | ML-1520                                                                                                    |
| Applicant Address                                    | Samsung Electronics Co. Ltd; 416 Maetan3- Dong, Yeoung tong-Ku,<br>Suwon City, Gyeonggi-Do, Korea, 443-742 |
| Contact Person                                       | CK KIM                                                                                                     |
| Kind of product                                      | LBP                                                                                                        |
| Valiant list                                         |                                                                                                            |
| Manufacturer                                         | Samsung Electronics Co. Ltd<br>259, Gongdan-Dong, Gumi-City, Kyung-Buk, 730-030,<br>Korea                  |
| New / Alternative /<br>Permissive change Information | This report is original report #                                                                           |

## 1.2 Detail Information related Product

### Specification

| Item                 | Specification                                             | Remark |
|----------------------|-----------------------------------------------------------|--------|
| Print speed          | Up to 14 ppm in A4 (15 ppm in Letter)                     |        |
| Resolution           | Up to 600 x 600 dpi effective output                      |        |
| First Printing Time  | Less than 12 seconds                                      |        |
| Warm-up Time         | Less than 30 seconds                                      |        |
| Power Rating         | AC 110~127V 50/60Hz                                       |        |
| Toner Cartridge Life | 3000 pages (for starter, 1000 pages)<br>@ IDC 5% coverage |        |
| Weight               | 7 Kg                                                      |        |
| External Dimensions  | 352 x 372 x 196 mm (13.8" x 14.6" x 7.7")                 |        |
| Emulation            | SPL                                                       |        |
| Random               | 2 MB (Nonexpendable)                                      |        |

|                  |                                                                   |  |
|------------------|-------------------------------------------------------------------|--|
| Access<br>Memory |                                                                   |  |
| Interface        | USB Interface Standard<br>- USB 1.1 compliant<br>- 12 Mbps 1 port |  |

Operating Frequency

- CPU Clock : 12 MHz
- SD-Ram Clock : 75 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 have Wireless Printing server function so Host PC link to EUT and transfer print file formation "H" character document continuously.

### **1.4 Test System Details**

### **1.5 Equipment Modifications**

No equipment modifications were required.

## **1.6 Test Procedure**

### **1.6.1 Disturbance Voltage at Mains**

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 grounding 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.

### **1.6.2 Radiated disturbance**

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.

## 1.7 Test Configuration

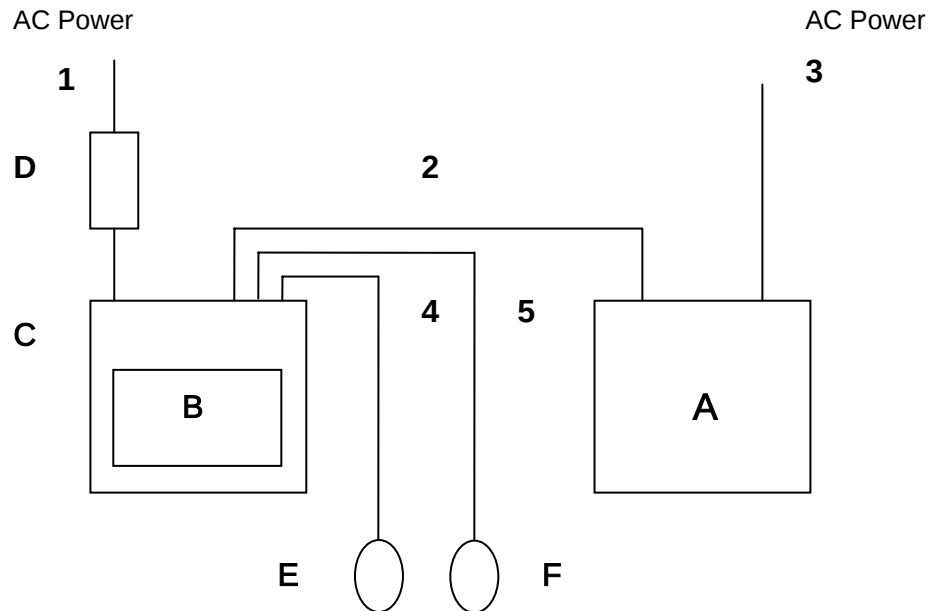
### Used EUT and Peripherals

| Seq | Device                  | Model Name | Serial #                     | Maker      | Note |
|-----|-------------------------|------------|------------------------------|------------|------|
| A   | Laser Beam -<br>Printer | ML-1520    | -                            | Samsung    |      |
| B   | PC                      | PP03L      | TW-04P102-<br>7016-23K-J0V7  | DELL       | Doc  |
| C   | DOCKING                 | PRX        | 00065BEA0748                 | DELL       |      |
| D   | AC ADAPTOR              | V85        | TH-06G356-<br>17971-23M-6VX6 | DELL       |      |
| E   | USB Mouse               | M-UR69     | LNA22400020                  | Logitech   | Doc  |
| F   | PS2 Mouse               | MSW-5      | None                         | Mass Corp. | Doc  |

### Used Cable Description

| No | Connect Cable | Length [m] | Shielded [Y/N] | Remark |
|----|---------------|------------|----------------|--------|
| 1  | Power         | 1.7        | No             |        |
| 2  | USB Cable     | 1.8        | Yes            |        |
| 3  | Power         | 1.7        | No             |        |
| 4  | USB Mouse     | 1.8        | No             |        |
| 5  | PS-2 Mouse    | 1.8        | No             |        |

Block Diagram



## 1.8 Applied Standards

List

| Product or Generic Standards | Basic Standards   |
|------------------------------|-------------------|
| FCC Part15                   | ANSI C63.4 : 1995 |

Performance Criteria

- A. normal performance within the specification limits
- B. temporary degradation or less of function or performance which is self-recoverable
- C. temporary degradation or less of function or performance which require operator intervention or system reset

## 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, 11.

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 NAMAS Pub.NIS81)

#### Samsung IT EMC Test Lab.

**Disturbance voltage at Mains** :  $\pm 1.9\text{dB}$

**Radiated disturbance**    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 | FCC Part15<br>Subpart B |
| Electromagnetic Emission Test   |                    |                  |                         |
| 3.1                             | Conducted Emission | ANSI C63.4       |                         |
| 3.2                             | Radiated Emission  | ANSI C63.4       |                         |

## 3. Description of Individual Tests

### 3.1 Conducted Emission

| Test Information  |                                                         |
|-------------------|---------------------------------------------------------|
| Test Engineer     | CK KIM                                                  |
| Test Date         | May 03, 2004                                            |
| Climate Condition | Ambient Temperature : 24.5      Relative Humidity : 46% |
|                   | Atmospheric Pressure 1001mbar                           |
| Test Place        | Shield Room                                             |

#### Test Equipments

| Equipment            | Model Name | Manufacturer | Serial No. | Calibration |            |
|----------------------|------------|--------------|------------|-------------|------------|
|                      |            |              |            | Next Date   | Next Date  |
| LISN                 | ESH3-Z5    | R&S          | 100263     | 2004-07-16  | 2004-07-16 |
| EMI TEST<br>RECEIVER | ESCS30     | R&S          | 830986/004 | 2005-02-12  | 2005-02-12 |
| LISN                 | ESH3-Z5    | R&S          | 831887/004 | 2004-10-01  | 2004-10-01 |

|                            |                                                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------|
| <b>Measurement Results</b> | <b>Passed</b><br>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. Printing Operation - TEST DATA & GRAPH

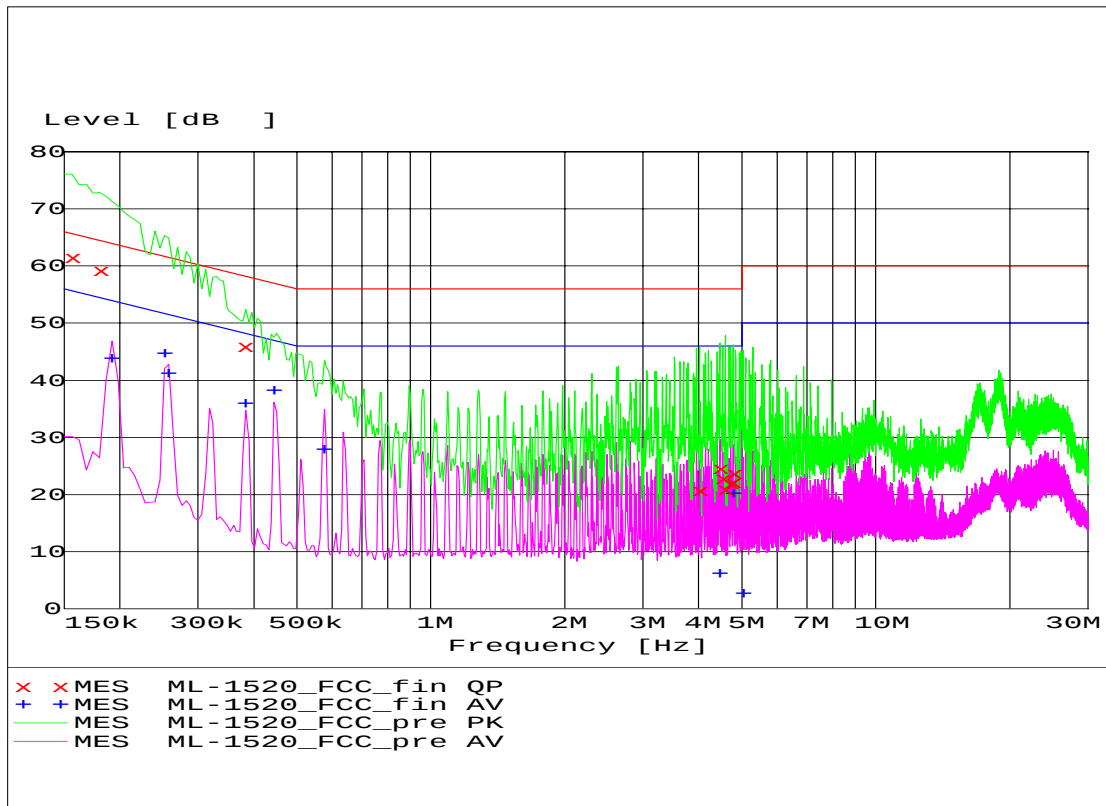
### 1. Average Table

| Frequency | Meter Reading | Total Loss | Phase | Result | Limit  | Margin |
|-----------|---------------|------------|-------|--------|--------|--------|
| [MHz]     | [dBuV]        | [dB]       |       | [dBuV] | [dBuV] | [dB]   |
| 0.190     | 43.2          | 0.6        | N     | 43.8   | 54     | 10.2   |
| 0.250     | 44.1          | 0.5        | L1    | 44.6   | 52     | 7.2    |
| 0.255     | 40.7          | 0.5        | L1    | 41.2   | 52     | 10.4   |
| 0.380     | 35.4          | 0.5        | N     | 35.9   | 48     | 12.4   |
| 0.440     | 37.7          | 0.5        | N     | 38.2   | 47     | 8.9    |
| 0.570     | 27.3          | 0.6        | N     | 27.9   | 46     | 18.1   |
| 4.420     | 5.3           | 0.8        | N     | 6.10   | 46     | 39.9   |
| 4.735     | 19.4          | 0.8        | N     | 20.2   | 46     | 25.8   |
| 4.990     | 1.7           | 0.8        | N     | 2.6    | 46     | 43.4   |

**2. Quasi Peak Table**

| Frequency | Meter Reading | Total Loss | Phase | Result | Limit  | Margin |
|-----------|---------------|------------|-------|--------|--------|--------|
| [MHz]     | [dBuV]        | [dB]       |       | [dBuV] | [dBuV] | [dB]   |
| 0.155     | 60.8          | 0.6        | L1    | 61.40  | 66     | 4.0    |
| 0.180     | 57.6          | 1.6        | N     | 59.20  | 65     | 5.3    |
| 0.380     | 44.2          | 1.7        | L1    | 45.90  | 58     | 12.4   |
| 3.995     | 19.0          | 1.7        | L1    | 20.70  | 56     | 35.3   |
| 4.435     | 22.9          | 1.7        | N     | 24.60  | 56     | 31.4   |
| 4.500     | 21.1          | 1.7        | N     | 22.80  | 56     | 33.2   |
| 4.560     | 19.0          | 1.8        | N     | 20.80  | 56     | 35.2   |
| 4.685     | 20.1          | 1.8        | N     | 21.90  | 56     | 34.1   |
| 4.740     | 20.0          | 2.0        | N     | 22.10  | 56     | 33.9   |
| 4.765     | 21.7          | 2.0        | L1    | 23.70  | 56     | 32.3   |

- Graph -



### 3.2 Radiated Emission

| Test Information  |                                                       |
|-------------------|-------------------------------------------------------|
| Test Engineer     | CK KIM                                                |
| Test Date         | April 29, 2004                                        |
| Climate Condition | Ambient Temperature : 21.5    Relative Humidity : 50% |
|                   | Atmospheric Pressure 1014mbar                         |
| Test Place        | 10m RF Semi Anechoic Chamber                          |

|                        |
|------------------------|
| <b>Test Equipments</b> |
|------------------------|

| Equipment     | Model Name | Manufacturer | Serial No.    | Calibration |            |
|---------------|------------|--------------|---------------|-------------|------------|
|               |            |              |               | Next Date   | Next Date  |
| Test Receiver | ESI26      | R&S          | 100010        | 2004-05-04  | 2004-05-04 |
| Turn Table    | DT430      | HD           | 430/691/01    | N/A         | N/A        |
| Antenna Mast  | MA240      | HD           | 240/678 BJ:01 | N/A         | N/A        |
| BILOG Antenna | CBL6112B   | Schaffner    | 2804          | 2004-06-26  | 2004-06-26 |
| Controller    | HD100      | HD           | 100/723       | N/A         | N/A        |

|                            |                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------|
| <b>Measurement Results</b> | <b>Passed</b><br>No Operation errors were detected during or after the applied test. |
|----------------------------|--------------------------------------------------------------------------------------|

### 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)

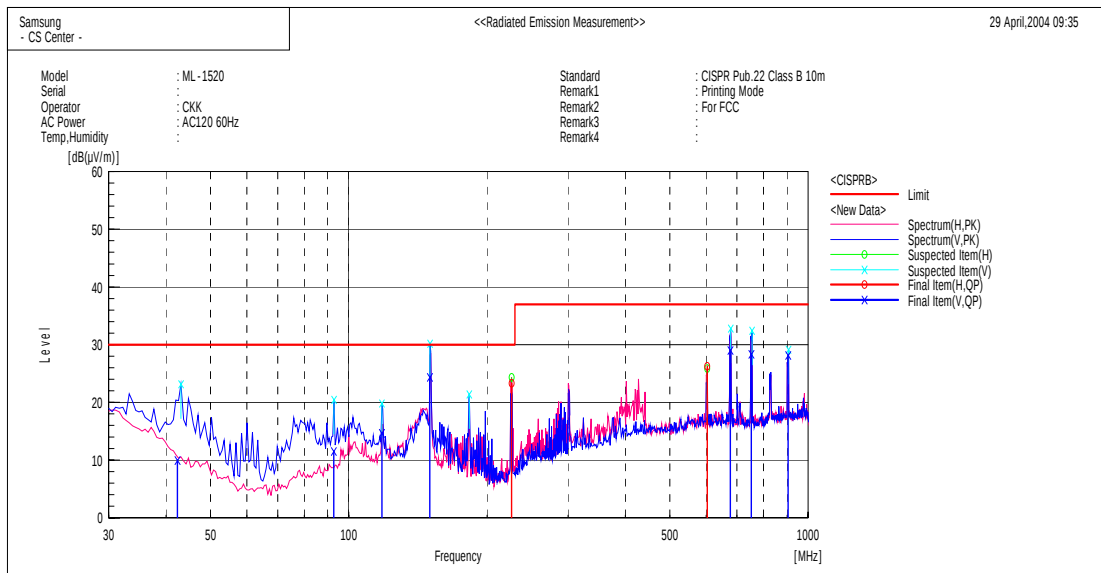
\* Result = Meter Reading + Total Loss(Antenna factor + Cable loss)

\* Margin = Limit – Result

#### 1. Printing Operation - TEST DATA & GRAPH

| Freq.   | Level  | Transd. | Limits | Marjin | Height | Azimuth | Pol.  |
|---------|--------|---------|--------|--------|--------|---------|-------|
| MHz     | dBuV/m | dB      | dBuV/m | dB     | cm     | deg     |       |
| 42.329  | 20.1   | -10.2   | 30     | 20.1   | 114    | 351     | VERTI |
| 92.752  | 23.7   | -12.2   | 30     | 18.5   | 118    | 334     | VERTI |
| 118.021 | 24.4   | -9.8    | 30     | 15.4   | 115    | 92      | VERTI |
| 150.150 | 35.5   | -11.2   | 30     | 5.7    | 121    | 155     | VERTI |
| 226.248 | 35.6   | -12.3   | 30     | 6.7    | 377    | 63      | HORI  |
| 603.448 | 28.5   | -2.2    | 37     | 10.7   | 131    | 71      | HORI  |
| 677.123 | 30.6   | -1.6    | 37     | 8.0    | 253    | 9       | VERTI |
| 752.286 | 29.7   | -1.4    | 37     | 8.7    | 202    | 327     | VERTI |
| 905.177 | 27.8   | 0.3     | 37     | 8.9    | 163    | 5       | VERTI |

- Graph -



Final Result

| No. | Frequency [MHz] | (P) | S.C | Reading QP [dB(μV)] | c.f [dB(1/m)] | Result QP [dB(μV/m)] | Limit [dB(μV/m)] | Margin QP [dB] | Height [cm] | Angle [°] | Remark |
|-----|-----------------|-----|-----|---------------------|---------------|----------------------|------------------|----------------|-------------|-----------|--------|
| 1   | 42.329          | V   | S   | 20.1                | -10.2         | 9.9                  | 30.0             | 20.1           | 114.0       | 351.0     |        |
| 2   | 92.752          | V   | S   | 23.7                | -12.2         | 11.5                 | 30.0             | 18.5           | 118.0       | 334.0     |        |
| 3   | 118.021         | V   | S   | 24.4                | -9.8          | 14.6                 | 30.0             | 15.4           | 115.0       | 92.0      |        |
| 4   | 150.150         | V   | S   | 35.5                | -11.2         | 24.3                 | 30.0             | 5.7            | 121.0       | 155.0     |        |
| 5   | 182.977         | V   | I   | -----               | -13.0         | -----                | 30.0             | -----          | 113.0       | 160.0     |        |
| 6   | 226.248         | H   | S   | 35.6                | -12.3         | 23.3                 | 30.0             | 6.7            | 377.0       | 63.0      |        |
| 7   | 603.448         | H   | S   | 28.5                | -2.2          | 26.3                 | 37.0             | 10.7           | 131.0       | 71.0      |        |
| 8   | 677.123         | V   | S   | 30.6                | -1.6          | 29.0                 | 37.0             | 8.0            | 253.0       | 9.0       |        |
| 9   | 752.286         | V   | S   | 29.7                | -1.4          | 28.3                 | 37.0             | 8.7            | 202.0       | 327.0     |        |
| 10  | 905.177         | V   | S   | 27.8                | 0.3           | 28.1                 | 37.0             | 8.9            | 163.0       | 5.0       |        |

## 4. Appendix

### 4.1 Test Photography



Pic. 1 Conducted Emission (Front)



Pic. 2 Conducted Emission (Rear)



Pic. 3 Radiated Emission (Front)



Pic. 4 Conducted Emission(Rear)

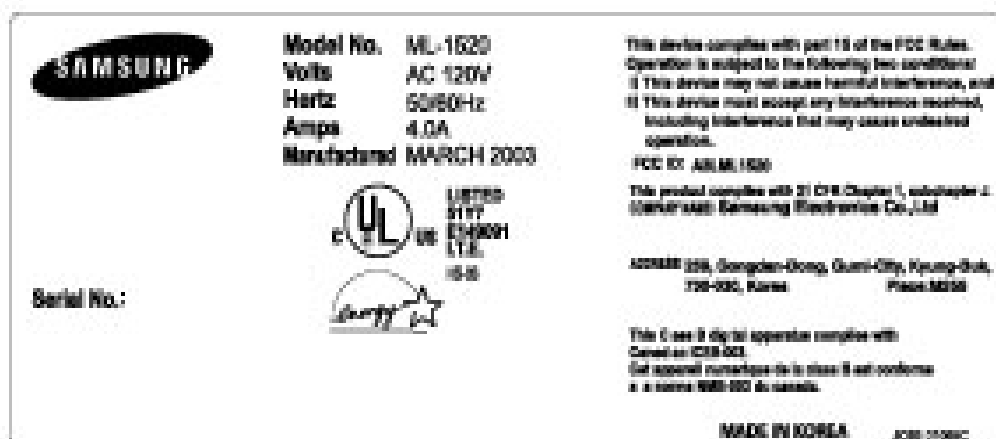
## 4.2 EUT Photography



Pic. 5 EUT (Front)



Pic. 6 EUT (Rear)



Pic. 7 EUT (Label)



Pic. 8 EUT (Inside)