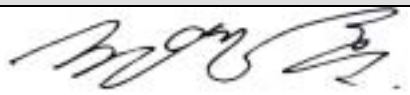
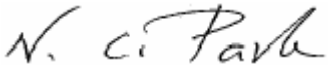
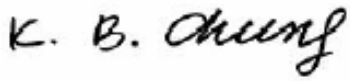
# EMC Test Report

## According to FCC Part 15 Subpart B

| | |
|---|---|
| **Project No.** | **LBE041294** |
| **Equipment under Test** | |
| Applicant | Samsung Electronics Co. Ltd |
| | 416 Maetan-3 Dong, Yeoung tong-Ku, Suwon City, Gyeonggi-Do, Korea, 442-742 |
| FCC ID | **A3LSECSMOM** |
| Product Name | USB Flash Drive |
| Model Name | SECSMOM_1G |
| Manufacturer | Samsung Electronics Co. Ltd |
| **Date of Test** | June 30, 2004 ~ July 03, 2004 |
| **Issued Date** | July 10, 2004 |

| | Name/Position | Signature |
|---|---|---|
| **Tested by** | Young Hun, Cheong<br>Test Engineer |  |
| **Reviewed by** | No Cheon, Park<br>Manager of EMC Lab. |  |
| **Authorized by** | 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

## Table of Contents

# 1. General Information

## 1.1 Basic Information related Product

| | |
|---|---|
| Applicant | Samsung Electronics Co. Ltd. |
| Model name | SECSMOM_1G |
| Applicant Address | Samsung Electronics Co. Ltd; 416 Maetan3- Dong, Yeoung tong-Ku, Suwon City, Gyeonggi-Do, Korea, 443-742 |
| Contact Person | Young Hun, Cheong |
| Kind of product | USB Flash Drive |
| Valiant list | 512MB : SECSMOM_512<br>256MB : SECSMOM_256<br>128MB : SECSMOM_128<br>64MB : SECSMOM_64<br>32MB : SECSMOM_32<br>16MB : SECSMOM_16 |
| Manufacturer | Samsung Electronics Co.Ltd. |
| New / Alternative / Permissive change Information | New |

## 1.2 Detail Information related Product

**Specification**

| Item | Specification | Remark |
|---|---|---|
| **USB Flash Drive** | - Fully compatible with the USB 2.0 High speed Specification , USB-IF certified<br>- USB Specification V1.1 Mass Storage Compliance<br>- USB Bulk Only Mass Storage Support<br>- USB Class Definition for Bootability Support<br>- Interface Speed : up to<br>  - High Speed : 480M bps<br>  - Full Speed : 12M bps<br>- High Performance : Sequential Read/Write : 15MB/s (Max.)<br>- Storage Capacities : Up to 1GB<br>- Software support :<br>  - Password lock<br>  - Secure zoning<br>- Auto Sleep Mode<br>- USB Bus Powered (4.75 volt – 5.25 volt)<br>- Suspend ≤ 500uA | |

**Operating Frequency**

Crystal : 12MHz(Ceramic SMD-type)

## 1.3 Operating Mode and Condition

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.
So we used windows media player program, It operated read continuously on EUT.

The system was tested with the configuration of clause 1.4.

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 was reported.

Further details of cabling and configuration are shown in the test system configuration.

## 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 Disturbance Voltage at Mains

EUT was placed on a platform nominal size, 1m by 1.5m, raised 80cm above the conducti ng ground plane. The rear of tabletop was located 40cm to the vertical conducting groud 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 conducing 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 biconiLog antenna.

## 1.7 Test Configuration

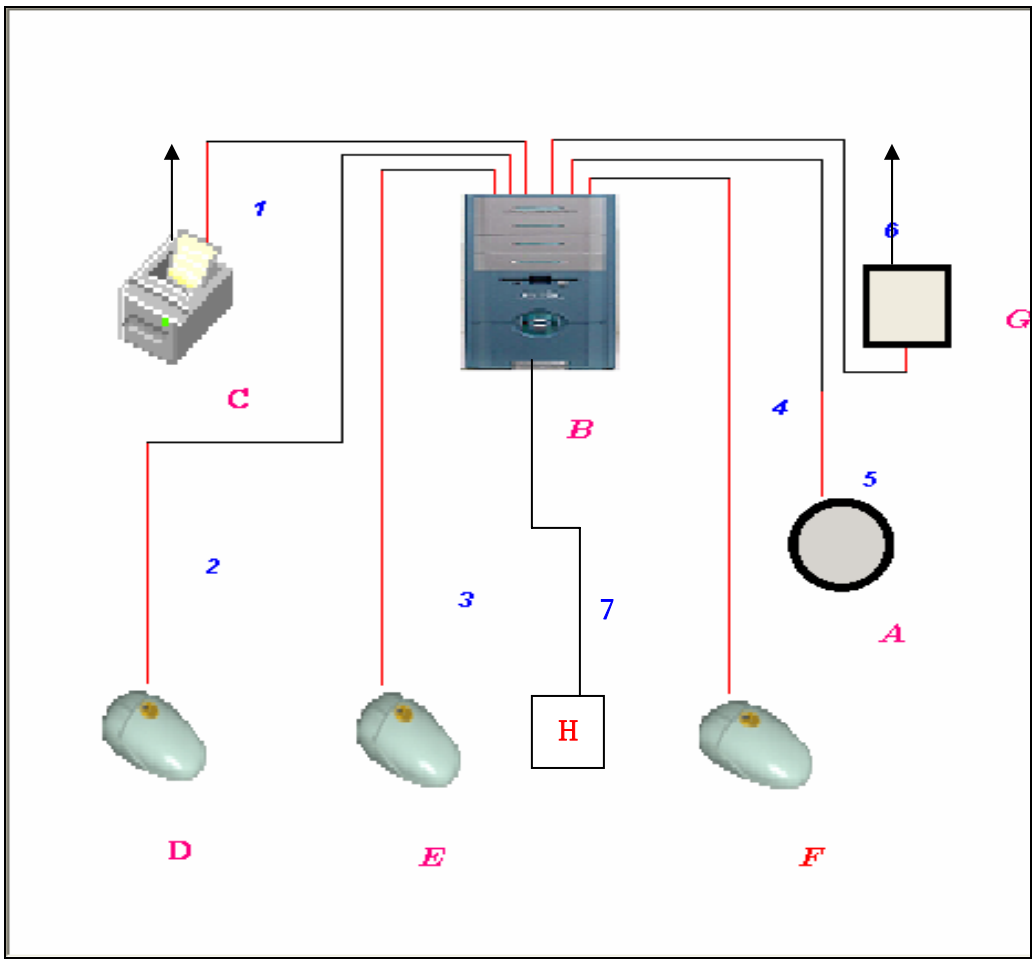
Used EUT and Peripherals

| Seq | Device | Model Name | Serial # | Maker | Note |
|---|---|---|---|---|---|
| A | USB Flash Drive | SECSMOM_1G | - | SAMSUNG | EUT |
| B | NOTE PC | BLADE | - | DELL | DOC |
| C | DESKJET PRINTER | LQ-580H | CG2Y014508 | EPSON | DOC |
| D | USB MOUSE | M-UV69a | HCA40801485 | LOGITECH | DOC |
| E | SERIAL MOUSE | C3KMS1 | 1020764 | MICRO SOFT | C3KMS1 |
| F | PS/2 MOUSE | SCROLL MOUSE P801 | 02161489 | LOGITECH | DOC |
| G | AC ADAPTOR | PA-1500-05D | DDR334-48010-286-00E0 | DELL | - |

Used Cable Description

| | Connect Cable | Length [m] | Shielded [Y/N] | Remark |
|---|---|---|---|---|
| 1 | Parallel Cable | 1.8 | Yes | For Printer |
| 2 | USB Cable | 1.6 | Yes | For Mouse |
| 3 | Serial Cable | 1.6 | Yes | For Mouse |
| 4 | PS/2 Cable | 1.8 | No | For Mouse |
| 5 | Card Reader Cable | 1.6 | Yes | For Card Reader |
| 6 | AC Power Cable | 1.7 | No | For AC Adaptor |
| 7 | Earphone Cable | 1.5 | No | For Earphone |

Block Diagram



## 1.8 Applied Standards

**List**

| Product or Generic Standards | Basic Standards |
|---|---|
| FCC Part15 Sub Part B | ANSI C63.4 : 2001 |

## 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 NAMAS Pub.NIS81)

**Samsung IT EMC Test Lab.**

**Disturbance voltage at Mains** **:** ±1.9dB

**Radiated disturbance** Bi-Log Antenna : ±5.1dB

# 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 | Young Hun, Cheong |
| Test Date | July 02, 2004 |
| Climate Condition | Ambient Temperature :25 ℃ Relative Humidity : 58% |
| | Atmospheric Pressure 1004mbar |
| Test Place | Shield Room |

**Test Equipments**

| Equipment | Model Name | Manufacturer | Serial No. | Calibration | |
|---|---|---|---|---|---|
| | | | | Next Date | Interval |
| LISN | 3810/2NM | R&S | 2251 | 2005-02-12 | 12 |
| EMI TEST RECEIVER | ESCS30 | R&S | 830986/004 | 2005-02-12 | 12 |
| LISN | ESH3-Z5 | R&S | 831887/004 | 2004-10-01 | 12 |

| Measurement Results | Passed<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. - TEST DATA & GRAPH

#### 1) Average Table

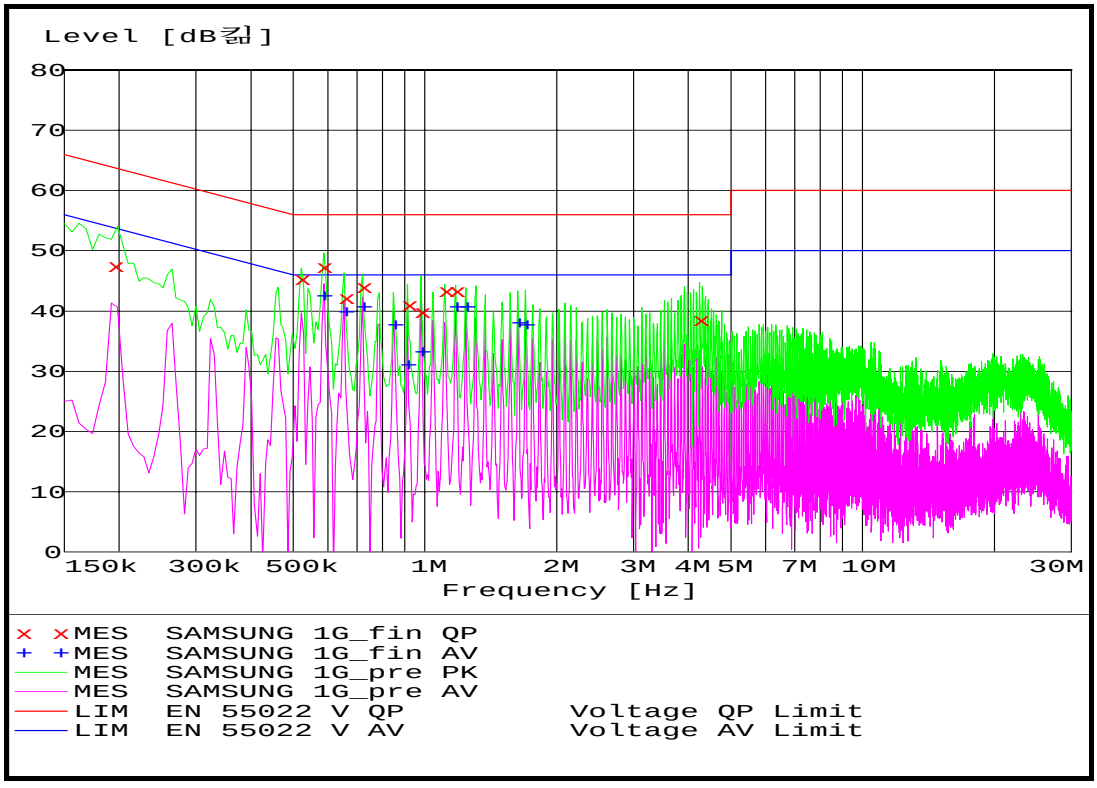
| Frequency | Result | Total Loss | Phase | Limit | Margin |
|---|---|---|---|---|---|
| [MHz] | [dBuV] | [dB] | | [dBuV] | [dB] |
| 0.585 | 42.40 | 0.60 | L1 | 46.00 | 3.6 |
| 0.655 | 39.70 | 0.50 | L1 | 46.00 | 6.3 |
| 0.720 | 40.60 | 0.50 | L1 | 46.00 | 5.4 |
| 0.850 | 37.70 | 0.50 | N | 46.00 | 8.3 |
| 0.910 | 30.90 | 0.50 | L1 | 46.00 | 15.1 |
| 0.980 | 33.10 | 0.60 | L1 | 46.00 | 12.9 |
| 1.175 | 40.70 | 0.60 | L1 | 46.00 | 5.3 |
| 1.240 | 40.60 | 0.60 | L1 | 46.00 | 5.4 |
| 1.630 | 37.90 | 0.60 | L1 | 46.00 | 8.1 |
| 1.695 | 37.70 | 0.60 | L1 | 46.00 | 8.3 |

### 2) Quasi Peak Table

| Frequency | Result | Total Loss | Phase | Limit | Margin |
|---|---|---|---|---|---|
| [MHz] | [dBuV] | [dB] | | [dBuV] | [dB] |
| 0.195 | 47.50 | 0.60 | N | 64.00 | 16.3 |
| 0.520 | 45.20 | 0.60 | N | 56.00 | 10.8 |
| 0.585 | 47.20 | 0.60 | L1 | 56.00 | 8.8 |
| 0.655 | 42.10 | 0.50 | L1 | 56.00 | 13.9 |
| 0.720 | 43.90 | 0.50 | L1 | 56.00 | 12.1 |
| 0.915 | 40.90 | 0.50 | L1 | 56.00 | 15.1 |
| 0.980 | 39.80 | 0.60 | N | 56.00 | 16.2 |
| 1.110 | 43.20 | 0.60 | L1 | 56.00 | 12.8 |
| 1.175 | 43.20 | 0.60 | L1 | 56.00 | 12.8 |
| 4.245 | 38.50 | 0.80 | L1 | 56.00 | 17.5 |

### 3) Graph

**Level [dBuV]**



## 3.2 Radiated Emission

| Test Information | |
|---|---|
| Test Engineer | Young Hun, Cheong |
| Test Date | June 30, 2004 |
| Climate Condition | Ambient Temperature : 20℃ Relative Humidity : 42%<br>Atmospheric Pressure 999 mbar |
| Test Place | 10m RF Semi Anechoic Chamber |

**Test Equipments**

| Equipment | Model Name | Manufacturer | Serial No. | Calibration | |
|---|---|---|---|---|---|
| | | | | Next Date | Interval |
| 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 |
| BILOG Antenna | CBL6112B | Schaffner | 2805 | 2005-03-12 | 12 |
| Test Receiver | ESI26 | R&S | 100010 | 2005-03-16 | 12 |

| Measurement Results | Pass<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.

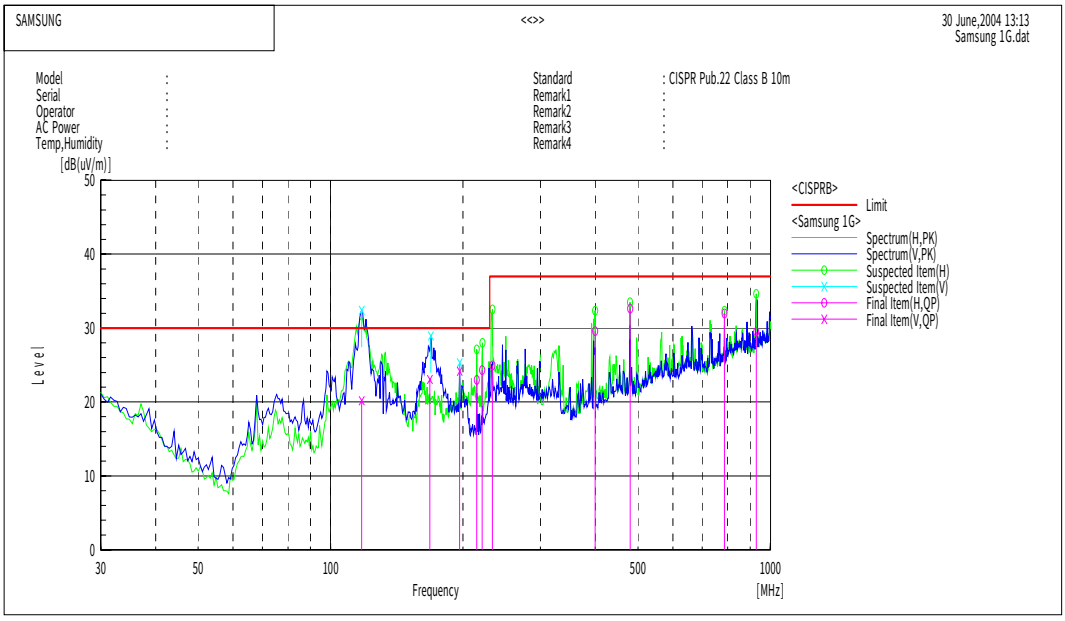
* Receiving Antenna Mode : Horizontal, Vertical

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

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

* Margin = Limit – Result

### 1) TEST DATA & GRAPH




Final Result

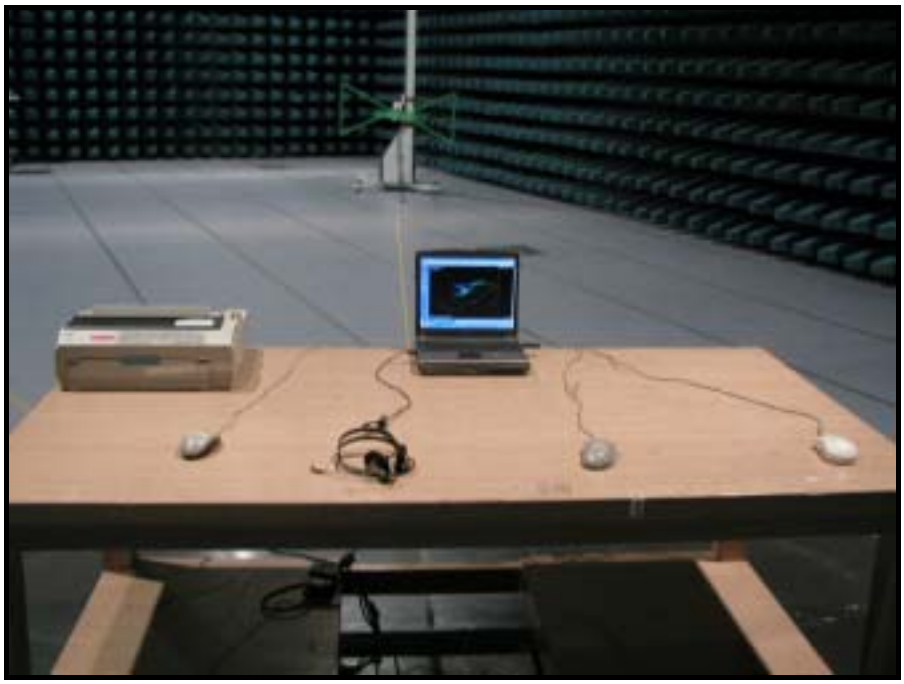
| No. | Frequency [MHz] | (P) | S.C | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 117.663 | V | S | 27.2 | -7.0 | 20.2 | 30.0 | 9.8 | 138.0 | 286.0 | 헤드셋 |
| 2 | 168.190 | V | S | 32.9 | -9.8 | 23.1 | 30.0 | 6.9 | 115.0 | 195.0 | |
| 3 | 196.607 | V | S | 34.4 | -10.2 | 24.2 | 30.0 | 5.8 | 106.0 | 202.0 | |
| 4 | 215.026 | H | S | 32.5 | -9.5 | 23.0 | 30.0 | 7.0 | 378.0 | 138.0 | 헤드셋 |
| 5 | 221.167 | H | S | 33.4 | -9.1 | 24.3 | 30.0 | 5.7 | 386.0 | 310.0 | 헤드셋 |
| 6 | 233.482 | H | S | 33.1 | -8.1 | 25.0 | 37.0 | 12.0 | 379.0 | 74.0 | |
| 7 | 399.550 | H | S | 31.9 | -2.3 | 29.6 | 37.0 | 7.4 | 223.0 | 67.0 | |
| 8 | 480.085 | H | S | 33.2 | -0.5 | 32.7 | 37.0 | 4.3 | 207.0 | 5.0 | |
| 9 | 786.444 | H | S | 27.7 | 4.3 | 32.0 | 37.0 | 5.0 | 113.0 | 267.0 | |
| 10 | 929.165 | H | S | 23.5 | 6.0 | 29.5 | 37.0 | 7.5 | 108.0 | 286.0 | |

# 4. Appendix

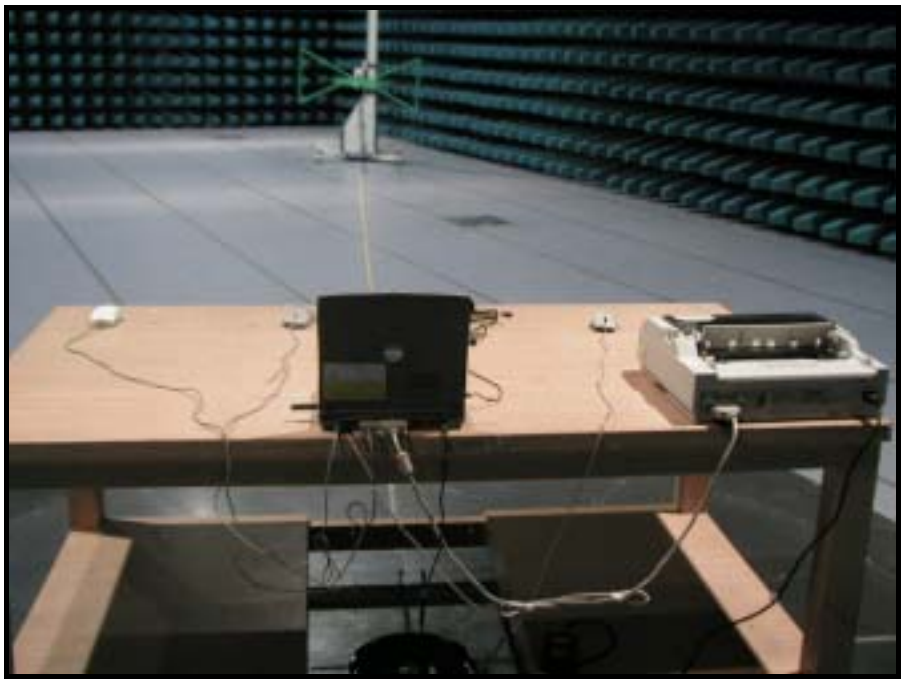
## 4.1 Test Photography

Pic. 1 Conducted Emission (Front)

Pic. 2 Conducted Emission (Rear)



Pic. 3 Radiated Emission (Front)

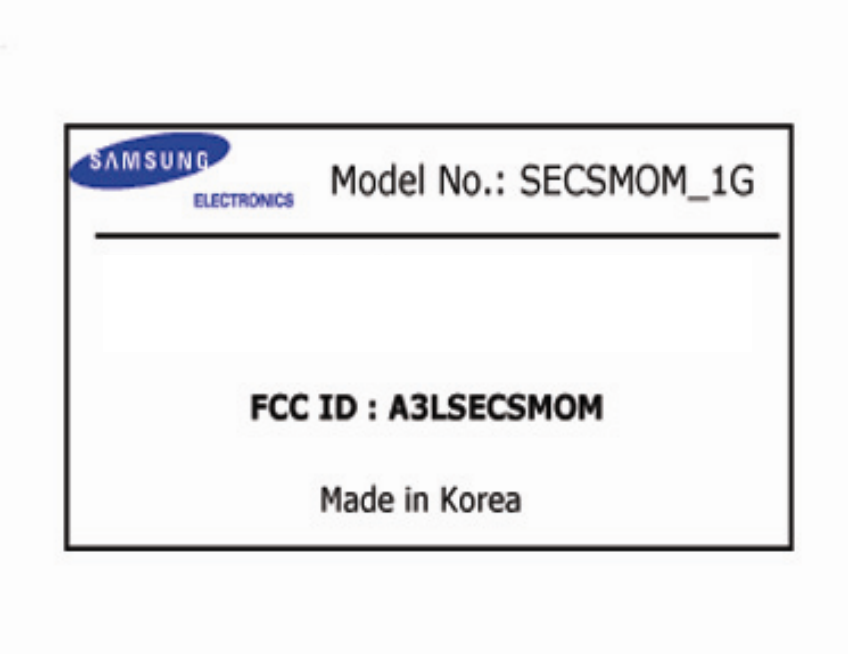


Pic. 4 Radiated Emission (Rear)

## 4.2 EUT Photography

Pic. 5 EUT (Front)

Pic. 6 EUT (Rear)




Pic. 7 Label