

# EMI TEST REPORT

FCC Part 15 Subpart B, Class B

**Product** : Multi Function Product  
**Model No.** : 3710/F102/LF115m AG/1160L

**JOB NO. : LBE020048**

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2. This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.
3. 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.

**Date of test** : May 14 , 2002

**Issued Date** : May 15, 2002

**Tested by:**

JongHo, Lee / Test Engineer.

**Tested and Reviewed by:**

Choon Kil, KIM / Manager of EMC Lab.

**Authorised by:**

Yang Soo, KIM / Chief of EMC Lab.

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The test reported herein have been performed in accordance with its terms of registration.

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LAB CODE : 200447

## Table of Contents

### 1. General Information

- 1.1 Product Description
- 1.2 Configuration of EUT and peripherals
- 1.3 Used Cable Description
- 1.4 System Block Diagram of Test Configuration
- 1.5 Test Facility

### 2. System Test Configuration

- 2.1 Configuration of Radiated and Conducted Interference Measurement
- 2.2 Operation Environment
- 2.3 Test Procedure

### 3. Conducted Emission Test Data

### 4. Radiated Emission Test Data

### 5. Label Configuration and Location

### 6. Test Equipment Used

### Distribution

This test report has been made available as follows:

|                                             |            |
|---------------------------------------------|------------|
| <b>CS Management Center, EMC Laboratory</b> | 1 original |
| Printer Division                            | 1 copy     |

## 1. General Information

**Applicant** : Samsung Electronics Co., Ltd.  
CS Management Center EMC Test Laboratory  
Tel.: +81-(0)31-200-2135 Fax.: +81-(0)31-200-2189

**Full Address** : 416 Maetan 3 Dong, Paldal-Ku,  
Suwon City, Kyungki Do, Korea, 442-742

**Kind of Product** : **Multi Function Product**

**FCC ID** : **A3L1160L**

**Project Name** : -

**Model & Variant Names** : **3710/F102/LF115m AG/1160L**(Brand Name: Ricoh)

**Test Report Produced by** : Jong Ho, Lee/ Test Eng.

### 1.1 Product Description

#### 1) Justification

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use.

The Test mode is standby, USB printing, and Parallel Printing.  
the test results of standby mode was the worst case emissions.

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

## 2) Operating Frequency :

CPU(Main) Clock      9.5MHz  
Video Clock            28.74448MHz  
Modem Clock          28.224MHz

## 3) Description of Testing operating mode

| Operating Mode | Operating section of EUT |
|----------------|--------------------------|
| PRINTING       | LPT1                     |
| Scan           | LPT1                     |
| Fax            | Tx,Rx                    |
| Copy           | -                        |
| STAND BY       | -                        |

## 4) Tested Resolution :

| Tested Video mode | Resolutions | Refresh rates | Colors |
|-------------------|-------------|---------------|--------|
|                   |             |               |        |
|                   |             |               |        |
|                   |             |               |        |
|                   |             |               |        |
|                   |             |               |        |

## 5) Assemble Parts

| Item                                                           | Specification                                                                                                                                                      | Remark |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Size<br>Weight<br>Power Consumption<br><br>Interface(MFP only) | 313x356x195mm<br>7.7kg<br>Energy save mode:9.5W<br>Standby mode:50W<br>Printing mode:170W<br>Scanning mode:25W<br>Max power consumption:700W<br>Parallel: IEEE1284 |        |
| Printer Technology<br>Printer Speed<br>Print Resolution        | Laser Beam<br>8ppm mono<br>600 x 600 dpi                                                                                                                           |        |
| Copy Resolution                                                | 1120L/F101/LF110: 200 x 200 dpi<br>1160L/3710/F102/LF115m: 300 x 300 dpi                                                                                           |        |
| Scan Method<br>Scan Speed                                      | Contact Image Sensor(CIS)<br>1120L/F101/LF110: 9 sec/page<br>1160L/3710/F102/LF115m: 6 sec/page                                                                    |        |
| Fax Modem speed<br>Compatibility                               | 33.6 kbps<br>ITU-T Group 3                                                                                                                                         |        |

*This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.*

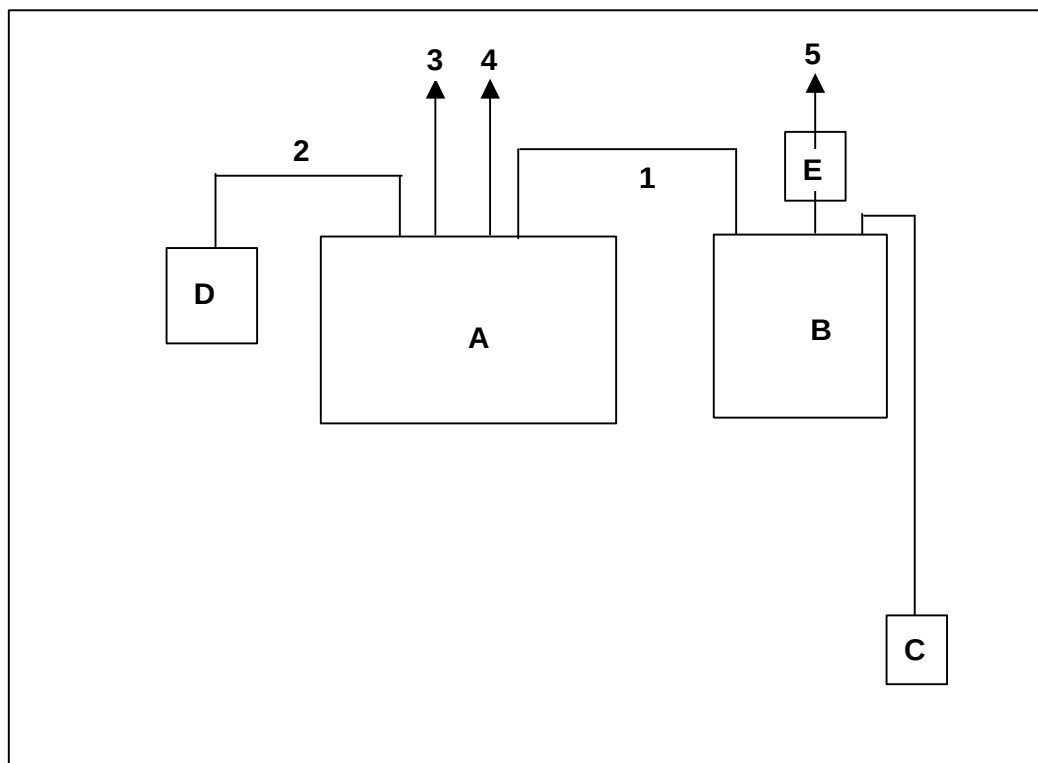
### 2.5.2 Configuration of EUT and peripherals

| Mark | Item      | Model No. | Serial No.           | Manufacturer | Remark   |
|------|-----------|-----------|----------------------|--------------|----------|
| A    | MFP       | 1160L     | -                    | SAMSUNG      | A3L1160L |
| B    | Computer  | C400      | TW04D1027016123KJ0V7 | Dell         | DOC      |
| C    | Mouse     | USB-PS/2  | 602                  | SAMSUNG      | DOC      |
| D    | Telephone | SP-F106   | B23D727355           | SAMSUNG      | DOC      |
| E    | Adaptor   | PA-8      | TH08H0511797123B1Q1K | Dell         | DOC      |
|      |           |           |                      |              |          |
|      |           |           |                      |              |          |
|      |           |           |                      |              |          |
|      |           |           |                      |              |          |
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|      |           |           |                      |              |          |
|      |           |           |                      |              |          |
|      |           |           |                      |              |          |

### 2.5.3 Used Cable Description

| No. | Item           | Length[m] | Shielded(Y/N) | Remark |
|-----|----------------|-----------|---------------|--------|
| 1   | IEEE1284 cable | 1.7       | Y             |        |
| 2   | Tel. Cable     | 1.5       | N             |        |
| 3   | Tel. Cable     | 1.5       | N             |        |
| 4   | AC Power cable | 1.7       | N             |        |
| 5   | AC Power cable | 1.7       | N             |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |
|     |                |           |               |        |

## 1.4 System Block Diagram of Test Configuration



## 1.5 Test Facility

All test described in this report were performed by :  
SAMSUNG ELECTRONICS CO., LTD.  
EMC TESTING LABORATORY  
416 Maetan 3 Dong, Paldal-Ku, Suwon City, Kyungki Do, Korea, 442-742

This test facility has been filed in FCC under the criteria in ANSI C63.4-1992.

## 2. System Test Configuration

### 2.1 Configuration of Radiated and Conducted Interference Measurement

\* Cabling was taken into consideration and test data was taken under worse case conditions.

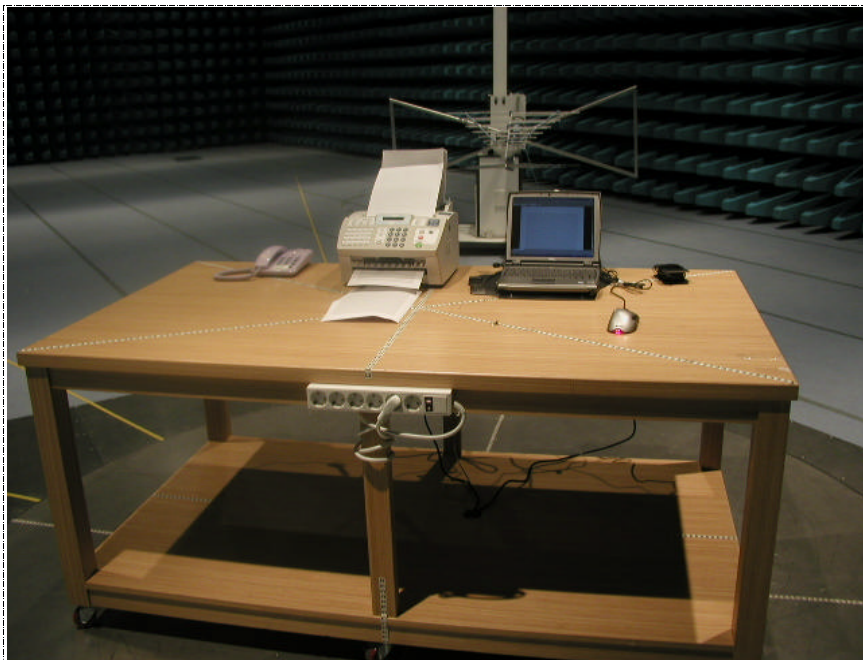
#### 1)Conduction(Front View)



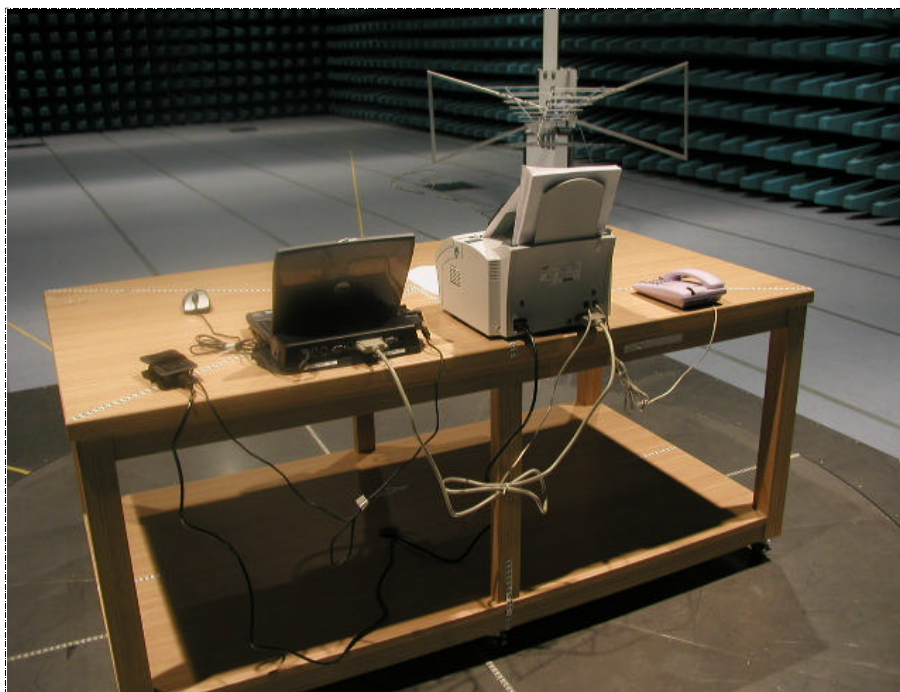
#### 2)Conduction(Rear View)



### 3) Radiation(Front View)



### 4) Radiation(Rear View)



## 2.2 Operation Enviroment

|                     | Conduction    | Radiation   |
|---------------------|---------------|-------------|
| Temperature [ C ] : | 23            | 23          |
| Humidity [ % ] :    | 41            | 41          |
| Power supply        | : AC110V/60Hz | AC110V/60Hz |

## 2.3 Test Procedure

### 2.3.1 Conducted Emissions

Eut was placed on a platform of 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 bundle 30cm to 40cm long and were hanged 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.

The EUT was switched on and allowed to warm up to its normal operating condition.

A quick scan, from 450kHz to 30MHz, was made on the L1 & L2 line by LISN.

High peaks, relative to the limit line, over the frequency range were then selected.

The EMI TEST RECEIVER was then tuned to the selected frequencies.

CISPR quasi-peak measurements with a receiver bandwidth setting of 10kHz, were taken.

### 2.3.2 Radiated Emissions

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.

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 2000 MHz using biconiLog antenna.

Also, the EMI TEST RECEIVER was scanned from 1000 to 18000MHz using linearly polarized double ridge horn antennas were used.

Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment; powering the monitor from the floor mounted outlet box and the computer aux AC outlet if applicable, and changing the polarity of the antenna; whichever determined the worst-case emission.

The explanation of measuring instrument setup when respective function is used in any frequency band is as following:

| Frequency Band<br>[MHz] | Instrument        | Detector<br>fuction | resolution<br>Bandwidth | Video<br>Bandwidth |
|-------------------------|-------------------|---------------------|-------------------------|--------------------|
| 30 to 1000              | Spectrum analyzer | Peak                | 100kHz                  | 100kHz             |
|                         | EMI Test receiver | Quasi-Peak          | 120kHz                  | -                  |
| Above 1000              | EMI Test receiver | Average             | 1MHz                    | -                  |

### 3. Conducted Emission Test Data

#### + Test Data Sheet

| Frequency | Meter Reading<br>[a] | LISN Pol. | Total Loss<br>[b] | Results<br>[a+b] | Limits    | Margin<br>(Limit - Result) |
|-----------|----------------------|-----------|-------------------|------------------|-----------|----------------------------|
| [MHz]     | [dBuV]               | [L,N]     | [dB]              | [dBuV]           | [dBuV]    | [dB]                       |
| 3.1414    | 20.63                | L1        | 0.145             | 20.775           | <b>48</b> | 27.225                     |
| 3.66093   | 14.41                | N         | 0.158             | 14.568           | <b>48</b> | 33.432                     |
| 3.87968   | 13.85                | N         | 0.164             | 14.014           | <b>48</b> | 33.986                     |
| 16.30937  | 14.28                | N         | 0.163             | 14.443           | <b>48</b> | 33.557                     |
| 16.37577  | 14.99                | L1        | 0.16              | 15.15            | <b>48</b> | 32.85                      |
| 16.57109  | 15                   | N         | 0.143             | 15.143           | <b>48</b> | 32.857                     |
| 17.28203  | 13.26                | L1        | 0.16              | 13.42            | <b>48</b> | 34.58                      |
| 18.90312  | 13.38                | L1        | 0.33              | 13.71            | <b>48</b> | 34.29                      |

#### 4. Radiated Emission Test Data

| Frequency Range<br>[MHz] | Tested Frequency<br>[MHz] | ANT Pol. | Meter Reading<br>[A]<br>[dBuV/m] | Total Loss<br>[B]<br>[dB] | Antenna Height<br>[Cm] | Turn table Degree<br>[Deg] | Results<br>[A+B]<br>[dBuV/m] | Limits<br>at 3m<br>[dBuV/m] | Margin<br>(Limit-Result)<br>[dB] |
|--------------------------|---------------------------|----------|----------------------------------|---------------------------|------------------------|----------------------------|------------------------------|-----------------------------|----------------------------------|
| <b>30 - 88</b>           | 37.74                     | V        | 11.8                             | 16.3                      | 100                    | 308                        | 28.1                         | <b>40.0</b>                 | 11.9                             |
|                          | 40.92                     | V        | 14.1                             | 14.4                      | 100                    | 238                        | 28.5                         | <b>40.0</b>                 | 11.5                             |
|                          | 75.42                     | V        | 24.3                             | 8.8                       | 111                    | 98                         | 33.1                         | <b>40.0</b>                 | 6.9                              |
|                          | 78.54                     | V        | 21.8                             | 9.2                       | 125                    | 199                        | 31.0                         | <b>40.0</b>                 | 9.0                              |
| <b>88 - 216</b>          | 91.08                     | H        | 23.3                             | 9.9                       | 391                    | 330                        | 33.2                         | <b>43.5</b>                 | 10.3                             |
|                          | 92.70                     | H        | 22.8                             | 10.0                      | 242                    | 304                        | 32.8                         | <b>43.5</b>                 | 10.7                             |
|                          | 97.38                     | H        | 24.3                             | 10.1                      | 316                    | 130                        | 34.4                         | <b>43.5</b>                 | 9.1                              |
|                          | 143.70                    | H        | 25.1                             | 9.4                       | 227                    | 318                        | 34.5                         | <b>43.5</b>                 | 9.0                              |
|                          | 172.44                    | H        | 25.0                             | 9.0                       | 157                    | 5                          | 34.0                         | <b>43.5</b>                 | 9.5                              |
| <b>216 - 960</b>         | 288.00                    | H        | 25.7                             | 12.8                      | 100                    | 63                         | 38.5                         | <b>46.0</b>                 | 7.5                              |
|                          | 301.62                    | H        | 26.5                             | 13.3                      | 110                    | 185                        | 39.8                         | <b>46.0</b>                 | 6.2                              |
|                          | 377.04                    | H        | 23.0                             | 15.6                      | 100                    | 106                        | 38.6                         | <b>46.0</b>                 | 7.4                              |
| <b>960 - 1000</b>        |                           |          |                                  |                           |                        |                            |                              |                             |                                  |

\* "<" Means equal or less then 5dB

\* Receiving Antenna Mode : **Horizontal, Vertical**

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

\* Measurement detector function and bandwidth

Detector function : CISPR quasi-peak(Above 1000MHz: Average)

Resolution Bandwidth : 120kHz(Above 1000MHz: 1MHz)

## 5. FCC Label Configuration and Location

### 5.1 Label Configuration

|                                                                                                                                                |                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>3710/F102/LF115m AG/1160L</b>                                                                                                               |                                                                                                                                                                                                                                                                                           |
| 110-127 V $\sim$ 50/60 Hz 2.5 A                                                                                                                | This laser product complies with FDA radiation performance standards, 21 CFR Subchapter J. Place: M259                                                                                                                                                                                    |
| CODE H912-17                                                                                                                                   | This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:<br>(1) This device may not cause harmful interference, and<br>(2) This device must accept any interference received, including interference that may cause undesired operation. |
|  51Y7<br>E149091<br>US I.T.E.<br>LISTED "SYP-01"              | FCC ID:                                                                                                                                                                                                                                                                                   |
| SERIAL NO. _____                                                                                                                               | RICOH COMPANY, LTD.<br>3-6, Naka-magome 1-Chome<br>Ohta-ku, Tokyo 143-8555<br>Japan                                                                                                                                                                                                       |
| MANUFACTURED:                                                                                                                                  |                                                                                                                                                                                                                                                                                           |
| Complies With Part 68, FCC Rules<br>FCC Registration No. <u>ASLKOR-36333-FA-E</u><br>Ringer Equivalence <u>0.5B</u><br>Jack Type: (USOC) RJ11C | <b>CANADA</b><br><br><b>IC: 649 11746</b><br><br><b>MADE IN KOREA</b><br><b>JC68-00950A (2)</b>                                                                                                                                                                                           |

### 5.2 Location of Label



## 6. Test Equipment Used

| Equipment            | Model No.                                                  | Serial No.  | Makers | Calibration Last calibration and Interval |
|----------------------|------------------------------------------------------------|-------------|--------|-------------------------------------------|
| Field strength meter | ESCS30                                                     | 830986/004  | R & S  | 02/ 02/15, 12Months                       |
|                      | <b>Firmware versions : Main 1.08, OTP 02.01, GRA 02.03</b> |             |        |                                           |
| Field strength meter | ESI                                                        | 100010      | R & S  | 01/ 04/28, 12Months                       |
| Field strength meter | ESI                                                        | 100019      | R & S  | 01/ 05/19, 12Months                       |
| L.I.S.N              | ESH2-Z5                                                    | 831886/006  | R & S  | 01/ 11/20, 12Months                       |
| L.I.S.N              | ESH3-Z5                                                    | 831887/0004 | R & S  | 01/ 07/27, 12Months                       |
| Bi-Log Antenna       | HL562                                                      | 100005      | R & S  | 01/08/02, 12Months                        |
| Bi-Log Antenna       | HL562                                                      | 36132403    | R & S  | 01/05/23, 12Months                        |