

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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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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LAB CODE : 200447

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Distribution

This test report has been made available as follows:

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

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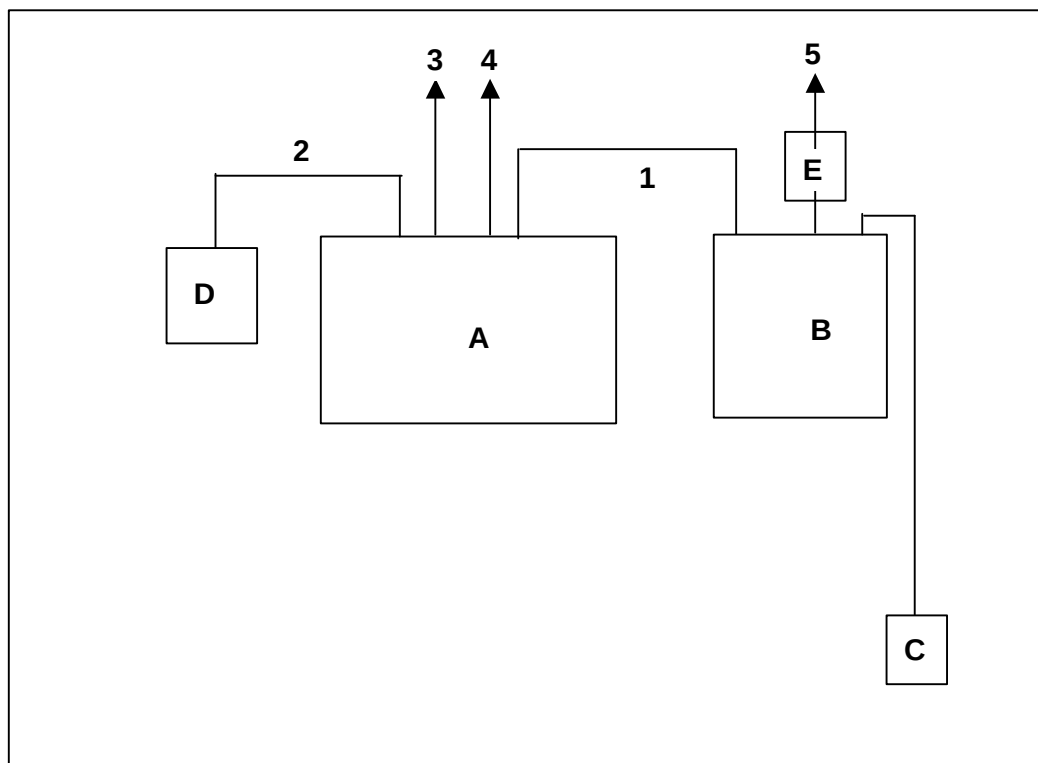
2.5.2 Configuration of EUT and peripherals

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

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.

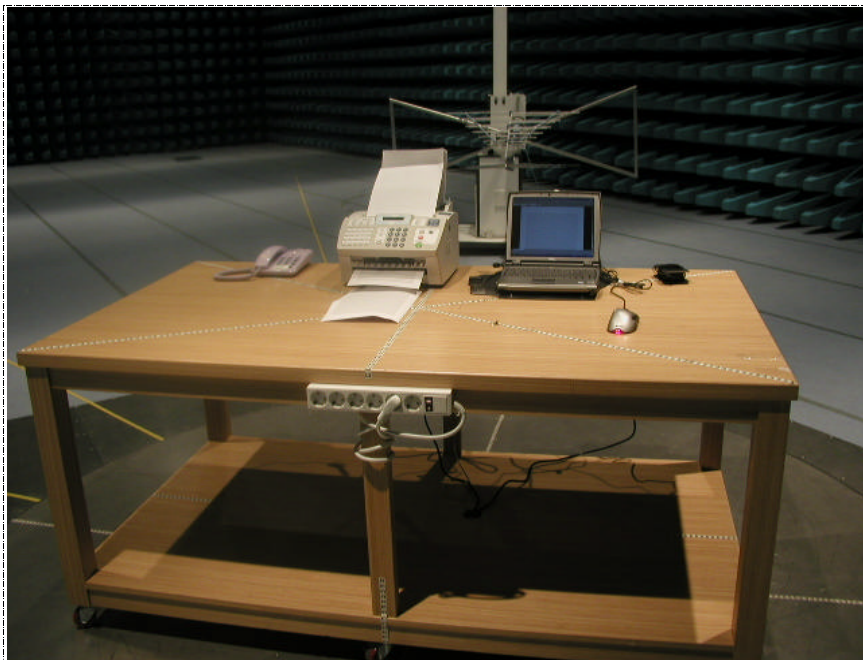
1)Conduction(Front View)



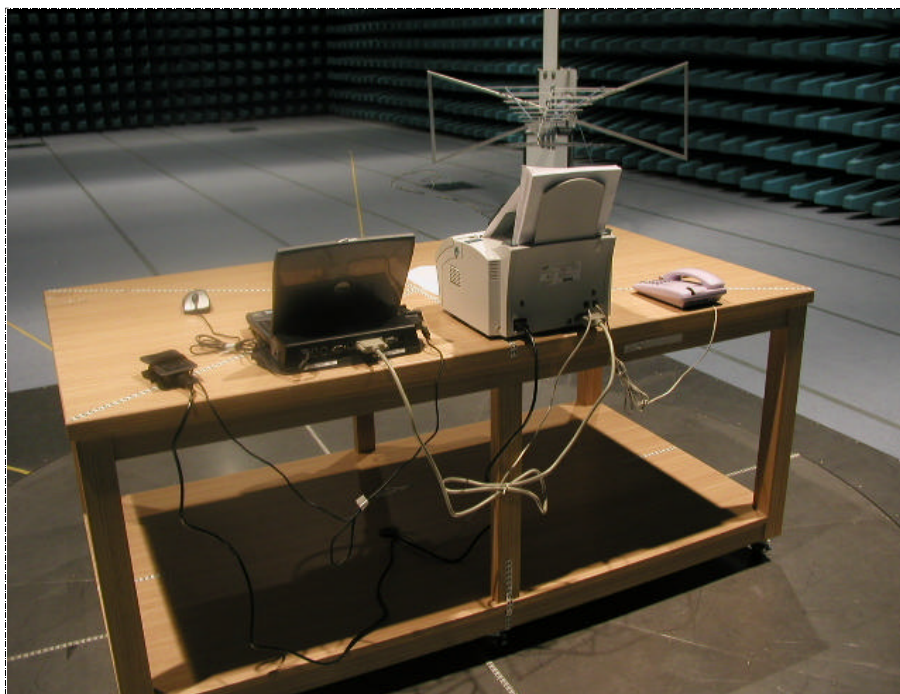
2)Conduction(Rear View)



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

4. Radiated Emission Test Data

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

* "<" 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

3710/F102/LF115m AG/1160L	
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: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
 51Y7 E149091 US I.T.E. LISTED "SYP-01"	FCC ID:
SERIAL NO. _____	RICOH COMPANY, LTD. 3-6, Naka-magome 1-Chome Ohta-ku, Tokyo 143-8555 Japan
MANUFACTURED:	
Complies With Part 68, FCC Rules FCC Registration No. <u>ASLKOR-36333-FA-E</u> Ringer Equivalence <u>0.5B</u> Jack Type: (USOC) RJ11C	CANADA IC: 649 11746 MADE IN KOREA JC68-00950A (2)

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
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
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