

EMI TEST REPORT

FCC Part 15 Subpart B, Class B

Product : Laser Printer

Model No. : ML-1430

JOB NO. : E2-02-0009

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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 : March 09 , 2002

Issued Date : March 16, 2002

Tested by:

Tae Young, Jang/ Engineer of EMC Lab.

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 : **Leaser Beam Printer**

FCC ID : **A3LML1430**

Project Name : -

Model & Variant Names : **ML-1430** (Brand Name: SAMSUNG)

Test Report Produced by : Tae Young, Jang/ 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 :

66MHz(CPU Speed), 51.040MHz(Video Clock),10.000 MHz(Main Clock)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
PRINTING	LPT1
	USB
STAND BY	-

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors

5) Assemble Parts

Item	Specification	Remark
CPU	SAMSUNG,IC ASIC-JUPITER3,	S3C46M0X01 66MHz RISC Processor Including USB
Main Controller	SAMSUNG,8MB	
LSU	SAMSUNG,600DPI,14PPM KIHWA PRECISION,600DPI,14PPM	LASER SCAN UNIT
SMPS	SUN KOREA, 3.5A , AC100~127,50/60Hz DONGYANG, 3.5A , AC100~127,50/60Hz	
HVPS	SUN KOREA, DC24V+15%/-10%, 1A DOGYANG, DC24V+15%/-10%, 1A	HIGH VOLTAGE POWER SUPPLY
Ports	1 USB, 1 Parallel Port	

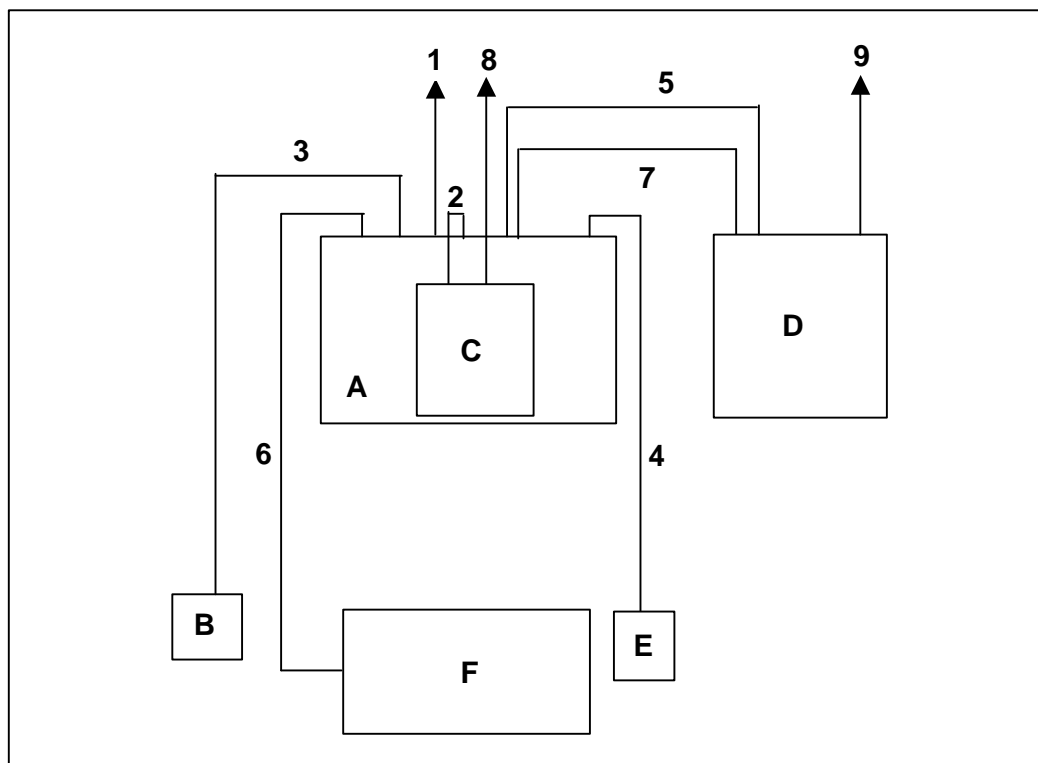
2.5.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	Desktop computer	TD260-DT	C92DK409981	SAMSUNG	
B	Serial Mouse	M-CU15	LTC45000091	-	
C	Monitor	CPG17NF	P106H2JN401141	SAMSUNG	
D	Laser Printer	ML-1430	-	SAMSUNG	EUT
E	PS/2 Mouse	P801	1028781	KYE SYSTEMS	
F	Keyboard	SEM-DT35	3V088510	SAMSUNG	

2.5.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power cable	1.7	N	
2	Video cable	1.5	Y	
3	Serial cable	1.5	Y	
4	Mouse cable	2.0	Y	
5	Printer cable	1.8	Y	
6	Keyboard Cable	1.7	Y	
7	USB	1.8	Y	
8	AC Power cable	1.7	N	
9	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
Semi Anechoic Chamber #1(Registration Number:98856) and Shielded Room.

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] :	23C	23C
Humidity [%] :	63C	63C
Power supply :	AC120V/60Hz	AC120V/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	1MHz	1MHz
	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]
0.45	31.7	N	0.145	31.845	48	16.155
0.576	31.2	N	0.158	31.358	48	16.642
0.636	29.5	N	0.164	29.664	48	18.336
0.768	31.7	N	0.163	31.863	48	16.137
0.96	34.3	N	0.16	34.46	48	13.54
1.086	31.8	N	0.143	31.943	48	16.057
1.278	31.9	N	0.16	32.06	48	15.94
1.596	31.7	N	0.33	32.03	48	15.97
1.788	32.3	N	0.241	32.541	48	15.459
2.364	31.6	N	0.156	31.756	48	16.244
3.192	32.8	N	0.146	32.946	48	15.054
3.51	32.4	N	0.14	32.54	48	15.46
4.344	31.9	N	0.109	32.009	48	15.991
5.172	32.4	N	0.065	32.465	48	15.535
5.874	32.2	N	0.044	32.244	48	15.756
6.96	31.8	N	0.01	31.81	48	16.19
7.854	31.2	N	0.057	31.257	48	16.743
9.258	29.9	N	0.139	30.039	48	17.961
12.09	30.1	N	0.506	30.606	48	17.394

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 Deegree [Deg]	Results [A+B] [dBuV/m]	Limits at 3m [dBuV/m]	Margin (Limit-Result) [dB]
30 - 88	42.70	H	17.2	12.8	150	216	30.0	40.0	10.0
30 - 216	131.50	H	18.3	13.4	204	37	31.7	43.5	11.8
	198.00	H	23.7	11.7	240	93	35.4	43.5	8.1
216 - 960	328.00	H	18.6	17.5	100	130	36.1	46.0	9.9
	367.50	H	19.0	18.9	100	148	37.9	46.0	8.1
	461.90	H	12.0	21.4	164	176	33.4	46.0	12.6
	594.50	V	10.9	23.9	164	167	34.8	46.0	11.2
	724.00	V	9.6	25.2	110	36	34.8	46.0	11.2
	830.50	V	15.7	26.7	125	30	42.4	46.0	3.6
960 - 1000	867.22	V	10.0	26.9	125	30	36.9	46.0	9.1

* "<" Means equal or less then 5dB

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

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

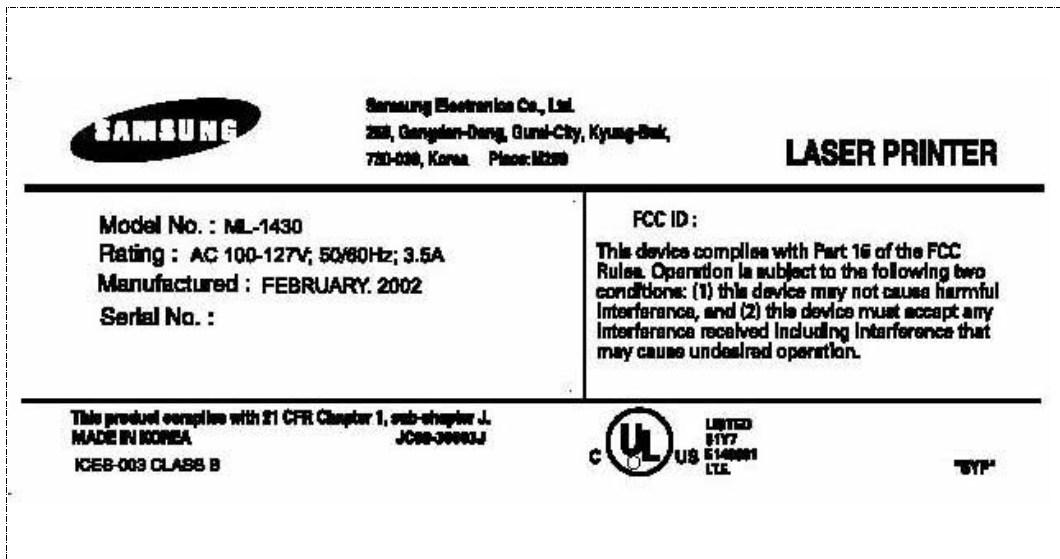
* Measurement detector function and bandwidth

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

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

5. FCC Label Configuration and Location

5.1 Label Configuration



5.2 Location of Label



6. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Field strength meter	ESCS30	839809/002	R & S	01/06/18, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESVP	860688/015	R & S	01/03/20, 12Months
L.I.S.N	3825-2R	9208-1981	EMCO	01/03/21, 12Months
Spectrum analyzer	8566B	3340A21744	H.P	01/03/20, 12Months
Quasi-peak adapter	85650A	3303A01748	H.P	01/01/27, 12Months
RF Preselector	85685A	3506A01500	H.P	01/01/29, 12Months
Biconilog Antenna	CBL6112B	2766	SCHAFFNER	01/05/23, 12Months