



ELECTRONICS

# EMI TEST REPORT

## FCC Part 15 Subpart B, Class B

**Product** : Laser Printer  
**Model No.** : ML-1450

**JOB NO. : KE-01-0565**

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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** : November 19 ~ 20, 2001

**Issued Date** : November 20, 2001

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## 1. General Information

**APPLICANT** : SAMSUNG ELECTRONICS CO., LTD.

**ADDRESS** : 416, Maetan-3Dong, Paldal-Gu  
Suwon-City, Kyungki-Do, Korea 442-742

**CONTACT PERSON** : Kyoung Mook, Kang  
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**CONTACT ADDRESS** : 416, Maetan-3Dong, Paldal-Gu  
Suwon-City, Kyungki-Do, Korea 442-742

**REGULATION(S)** : FCC Part 15 Subpart B, Class B

**MODEL NUMBER** : ML-1450

**SERIAL NUMBER** : -

**VARIANT NAME(S)** : ML-1451N

**KIND OF PRODUCT** : Laser Printer

**TESTED DATE** : November 19 ~ 20, 2001

**TEST SITE** : 3meter semi-anechoic chamber

**TEST SITE ADDRESS** : San 14, Nongseo-Ri, Kihung-Eup,  
Yongin-City, Kyungki-Do, Korea, 449-900

### 1.1 Product Description

The Samsung ML-1450 print at 1200dots per inch class,14 pages-per-minute.  
Standard 550 sheet input tray(Tray1) and optional 550 sheet iput tray(Tray2) support various sizes,types.  
Main System clock is 66MHz, Video clock 53.01MHz, USB clock 48MHz and Network Card clock 33MHz.  
Power rating is AC100~127V and 350W Power consumption during operation and less than 12W in sleep mode. See the attached ML-1450 User's Guide for more information.

### 1.2 Tested System Details

The FCC IDs for all equipment, plus descriptions of all products used in the tested system are:

Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
(1) Laser printer (EUT)	SAMSUNG	ML-1450	N/A	A3LML1450
(2) PC	SAMSUNG	TD260-DT	C92DK409981	FCC DoC
(3) Monitor	SAMSUNG	CPG17NF	P106H2JN401141	FCC DoC
(4) Keyboard	SAMSUNG	5900	K09141644	FCC DoC
(5) Mouse	Logitech	M-SAS51	LZB00478743	JNZ211167
(6) External Modem	US Robotics	SPORTSTER	33083962	CJE-0149-217
(7) AC/DC Adaptor	US Robotics	AW-1220A		

### 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4(1992).

Radiated testing was performed at a distance of 3 meters from the antenna to EUT.

### 1.4 Test Facility

All test described in this report were performed by :

Open area test site : 781-14, Chung-Ri, Dongtan-Myun, Hwasung-Kun, Kyungki-Do, Korea  
Conducted measurement facility and 3meter Semi-anechoic chamber :  
San 14, Nongseo-Ri, Kihung-Eup, Yongin-City, Kyungki-Do, Korea, 449-900

## 2. System Test Configuration

### 2.1 Operation Environment

	<b>Conduction</b>	<b>Radiation</b>
<b>Temperature [ ] :</b>	24	25
<b>Humidity [%] :</b>	30	31
<b>Power supply :</b>	AC115V/60Hz	AC115V/60Hz

### 2.2 Justification

The system was configured in typical fashion(as a customer would normally use it) for testing.

### 2.3 EUT Exercise Soft ware

The EUT exercise program used during radiated and conducted testing is word editor(Hun2000).Type H character on document 10 page and then execute print to EUT continuously.

### 2.4 Test Procedure

#### 2.4.1 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.

### 2.4.2 Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

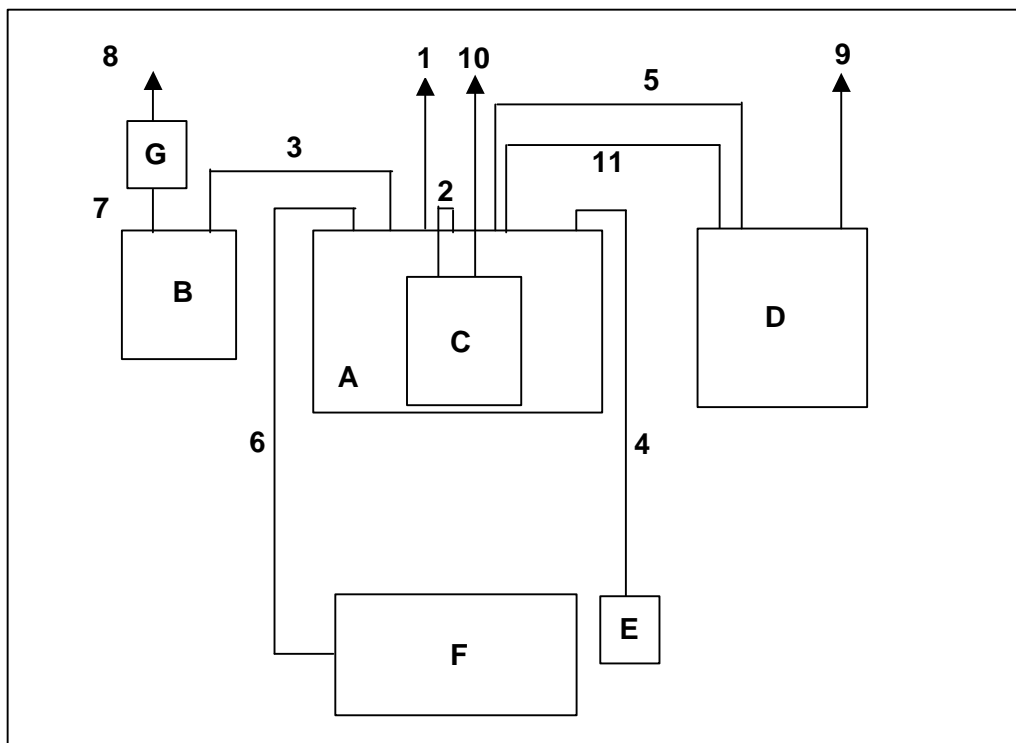
The rear of EUT, including peripherals was aligned and flush with rear of tabletop. I/O cables that were connected to the peripherals were bundle in center.

They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane.

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 to obtain the maximum signal strength.

## 2.5 Test System configuration

### 2.5.1 System Block Diagram of Test Configuration



### 2.5.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	Desktop computer	TD260-DT	C92DK409981	SAMSUNG	
B	External Modem	SPORTSTER	33083962	US ROBOTICS	
C	Monitor	CPG17NF	P106H2JN401141	SAMSUNG	
D	Laser Printer	ML-1450	-	SAMSUNG	EUT
E	PS/2 Mouse	M-SAS51	LZB00478743	Logitech	
F	Keyboard	5900	K09141644	SAMSUNG	
G	AC/DC Adaptor	AW-1220A	-	US ROBOTICS	

### 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	DC Power cable	1.7	N	
8	AC Power cable	1.7	N	
9	AC Power cable	1.7	N	
10	AC Power cable	1.7	N	
11	USB	1.8	Y	

## 4. Measurement Uncertainty

All data in report are to be traceability to the national or international standards.

### 4.1 Conducted Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was  $\pm 2.08\text{dB}$ .

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

*The data listed in this test report has enough margin, more than 2.08dB.*

### 4.2 Radiated Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was as follow  
30MHz~200MHz :  $\pm 4.50$                       200MHz~1000MHz :  $\pm 5.23$

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

*The data listed in this test report has enough margin, more than 3.4dB.*

## 5. Conducted Emission Test Data

The initial step in collecting conducted data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer.

All modes of operation(parallel, USB and Network Printing modes) were investigated and the worst case emission(printing on USB connection) was reported.

All other emission are non-significant.

**The minimum margin to the limit is as follows :**

Frequency : **6.653** [MHz]  
 Meter Reading : **43** [dBuV]  
 LISN Loss : **0.26** [dB]  
 Cable loss : **0.5** [dB]  
 Corrected Readings : **43.76** [dBuV/m]  
 Margin : **-4.2** [dB]

### Test Data Sheet

Tested Frequency [MHz]	Meter Reading [A] [dBuV]	LISN Pol. [L1/L2]	Factor[B]		Corrected Reading [A+B] [dBuV/m]	Limits [dBuV/m]	Margin [dB]
			LISN Loss [dB]	Cable Loss [dB]			
5.915	41.70	L1	0.25	0.60	42.55	47.96	-5.41
6.169	41.60	L2	0.25	0.60	42.45	47.96	-5.51
6.653	43.00	L1	0.26	0.50	43.76	47.96	-4.20
6.709	40.10	L2	0.26	0.50	40.86	47.96	-7.10
8.812	40.90	L2	0.27	0.80	41.97	47.96	-5.99
9.306	40.60	L2	0.27	0.80	41.67	47.96	-6.29
9.994	38.20	L2	0.27	0.50	38.97	47.96	-8.99
12.963	40.00	L2	0.30	0.70	41.00	47.96	-6.96

- \* All readings are quasi-peak mode.
- \* Set resolution bandwidth to 9kHz minimum.
- \* Results = Meter Reading + LISN Insertion loss + Cable loss
- \* Margin = Corrected Reading - Limits
- \* L1 = Hot, L2 = Neutral

## 6. Radiated Emission Test Data

The initial step in collecting conducted data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer.

All modes of operation(parallel, USB and Network Printing modes) were investigated and the worst case emission(printing on Network connection) was reported.

All other emission are non-significant.

### The minimum margin to the limit is as follows :

Frequency : **100.00** [MHz]  
 Meter Reading : **26.0** [dBuV]  
 Antenna Factor : **9.10** [dB]  
 Cable loss : **0.50** [dB]  
 Corrected Reading : **35.6** [dBuV/m]  
 Margin : **-7.90** [dB]

### Test Data Sheet

Frequency Range [MHz]	Tested Frequency [MHz]	Ant. Pol.	Meter Reading [A] [dBuV]	Factor[B]		Antenna Height [Cm]	Turn table Degree [Deg]	Corrected Reading [A+B] [dBuV/m]	Margin [dB]	Limits [3m] [dBuV/m]
				Ant. Factor	Cable Loss					
30 - 88	64.5	V	20.10	5.00	0.25	125	90	25.35	-14.65	40
	83.3	V	22.10	8.70	0.45	140	110	31.25	-8.75	
88 - 216	100.0	V	26.00	9.10	0.50	125	30	35.60	-7.90	43.5
	150.3	V	24.90	7.50	1.00	125	110	33.40	-10.10	
	175.1	V	21.40	7.00	0.95	130	15	29.35	-14.15	
	188.0	V	24.20	7.00	1.10	150	330	32.30	-11.20	
	195.0	V	23.70	7.00	1.10	150	345	31.80	-11.70	
216 - 960	292.7	H	22.90	10.80	1.58	100	90	35.28	-10.72	46
	528.4	V	19.10	15.90	2.62	130	135	37.62	-8.38	
	595.6	V	16.50	17.00	2.78	130	100	36.28	-9.72	
	628.6	V	15.30	17.40	2.56	125	150	35.26	-10.74	
	660.4	V	13.00	18.20	2.72	130	170	33.92	-12.08	
	733.6	H	15.20	18.80	3.06	110	90	37.06	-8.94	
960 -									54	

- \* "<" Means equal or less than      \* All readings are quasi-peak mode.
- \* The selected bandwidth in emission testing is 100kHz.
- \* Corrected Reading = Meter Reading + Antenna Factor + Cable loss
- \* Margin = Corrected Reading - Limits
- \* H = Horizontal Polarization/Antenna, V = Vertical Polarization/Antenna

## 8. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Spectrum analyzer	8568B	2928A04826	H.P	01/07/26, 12Months
		Firmware versions : REV 7.4.87		
Quasi-peak adapter	85650A	2811A01342	H.P	01/09/10, 12Months
RF Preselector	85685A	2926A01005	H.P	01/07/26, 12Months
EMI Test Receiver	ESCS30	8309861004	R & S	01/01/06, 12Months
		F/W ver. : Main 3.10, OTP 02.01, GRA 02.03		
L.I.S.N	ESH3-Z5	831887/0004	R & S	01/07/27, 12Months
	3825/2	8909-1548	EMCO	01/11/08, 12Months
Biconilog Antenna	HL 562	361324/003	R & S	01/01/22, 12Months
EMI Measurement Software	HP	Firmware versions : Rev. A.00.00		