

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : External Network Print Server

Model No. : ML-00LA

FCC ID : A3LML-00LA

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All tests necessary to show compliance to the requirements were and these results met the specifications requirement.
4. That data in this report are traceable to National or International Standards.

Date of test : Nov 25, 2003

Issued Date : Nove 28, 2003

Tested by:

Min Gon, KIM / Test Engineer

Reviewed by:

Choon Kil, KIM / Manager of EMC Lab.

Authorised by:

Kyu Baek, CHUNG / Chief of EMC Lab.

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



NVLAP Code: 200447

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Distribution

This test report has been made available as follows:

CS Management Center, EMC Laboratory	1 original
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1. General Information

Applicant : Samsung Electronics Co., Ltd.

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

Kind of Product : External Network Print Server

FCC ID : A3LML-00LA

Project Name : WiFi EX

Model & Variant Names : ML-00LA Brand : Samsung

Test Report Produced by : Min Gon, KIM / Test Engineer

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.

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.

2) Operating Frequency :

ML-00LA model have

CPU input(25MHz), Machine clock(48MHz), SDRAM(48MHz), Wire LAN(25MHz),
USB host controller input(6MHz) & Operating(48MHz), Wireless module input(44MHz,
48MHz)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
Wireless LAN Printing (USB Printing)	Continously "H" pattern Receving and Transmitting
Wireless LAN Printing (IEEE1284 Printing)	Continously "H" pattern Receving and Transmitting
LAN Printing	Continously "H" pattern Receving and Transmitting

The mode of operation utilized for testing was selected to best simulate typical EUT use.
The EUT was tested continuously "H" pattern Receving and Transmitting
connected Wire & Wireless LAN

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors

5) Manufacturer : SAMSUNG Electronics Co., Ltd.

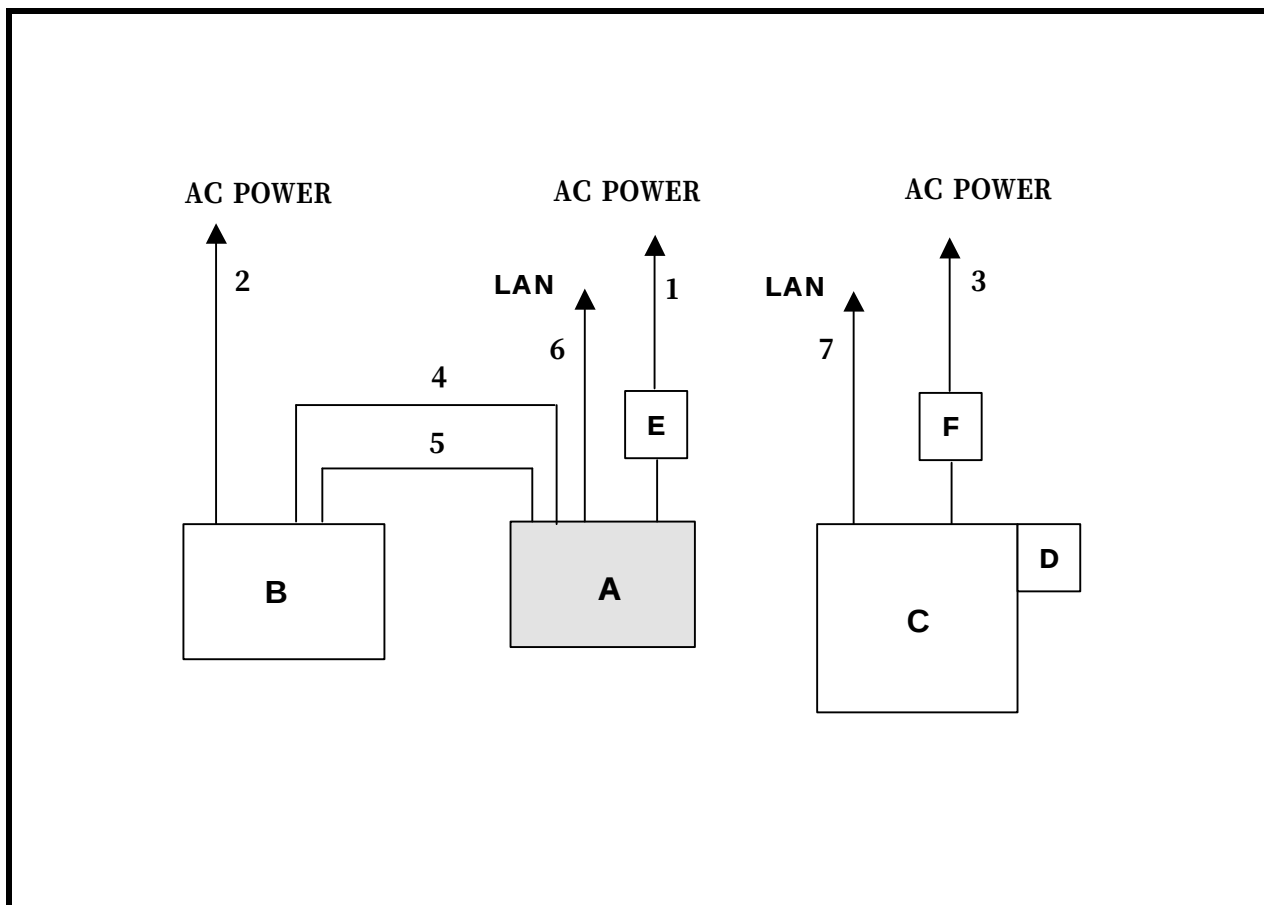
1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	External Network Print Server	ML-00LA	None	Samsung	EUT
B	Printer	ML-1750	LE11B1AW400766	Samsung	-
C	Note-PC	SENS 950	824891CRB00001	Samsung	-
D	Wireless Lan Card	SWL-2000N	LNUSBAA02B4355	Samsung	PCMCIA
E	Adapter	TAD037EBE	DK2W322KS/7	Samsung	For EUT
F	Adapter	AD-6019	BA44-00046A	Samsung	For PC

1.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power Cable	1.5	N	EUT
2	AC Power Cable	1.7	N	Printer
3	AC Power Cable	1.7	N	Note-PC
4	USB Cable	1.5	Y	-
5	IEEE1284 Cable	1.7	Y	-
6	LAN Cable	2.0	N	-
7	LAN Cable	2.0	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, Yeongtong-Ku, Suwon City, Kyungki Do, Korea, 442-742
Semi Anechoic Chamber #2(Registration Number:873282) and Shielded Room.

This test facility has been filed in FCC under the criteria in ANSI C63.4-1995.

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.

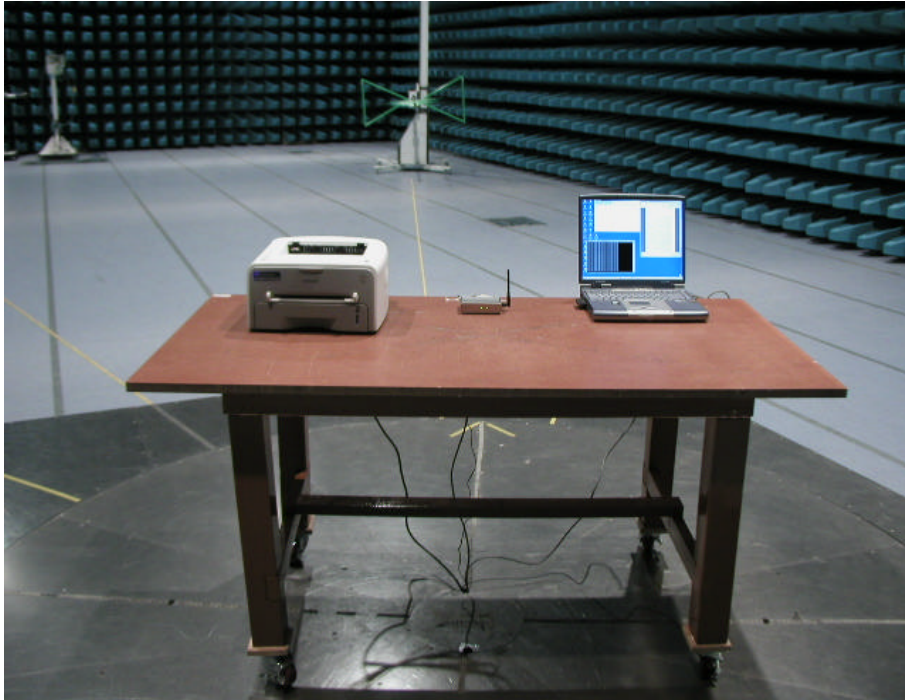
1)Conduction(Front View)



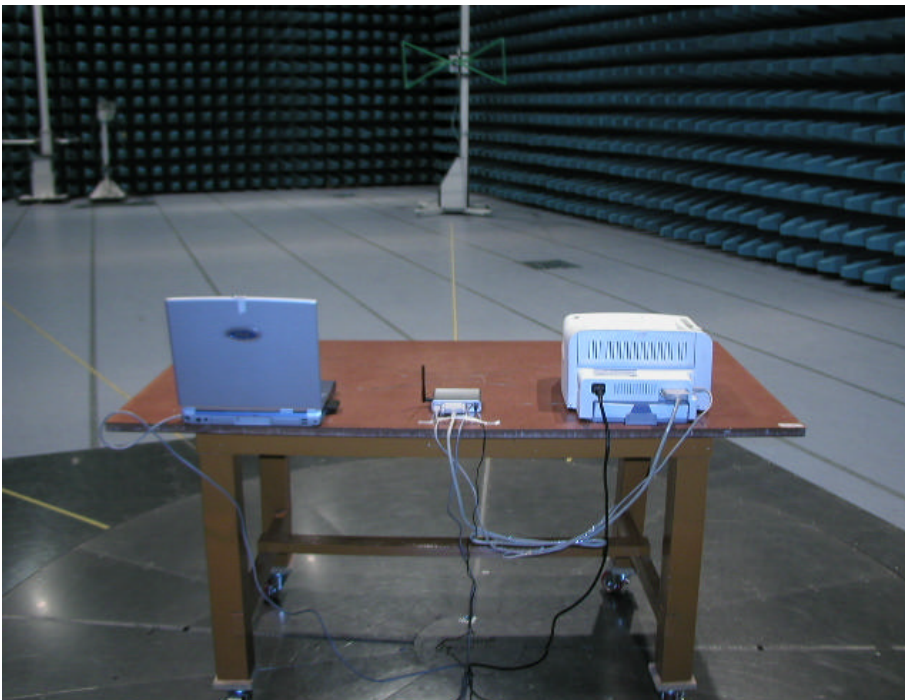
2)Conduction(Rear View)



3) Radiation(Front View)



4) Radiation(Rear View)



2.2 Operation Environment

	Conduction	Radiation
Temperature [C] :	25.2	23
Humidity [%] :	25	33
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 150kHz 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 1000 MHz using biconiLog antenna.

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.

3. Conducted Emission Test Data

O Test Data Sheet

■ Quasi-Peak Data

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	
0.780000	48.90	0.5	56	7.1	L1	GND
1.600000	47.70	0.6	56	8.3	L1	GND
2.240000	48.10	0.5	56	7.9	L1	GND
2.330000	48.40	0.5	56	7.6	L1	GND
2.470000	47.50	0.5	56	8.5	L1	GND
2.880000	47.30	0.6	56	8.7	L1	GND
2.970000	46.60	0.6	56	9.4	L1	GND
3.020000	48.30	0.6	56	7.7	L1	GND

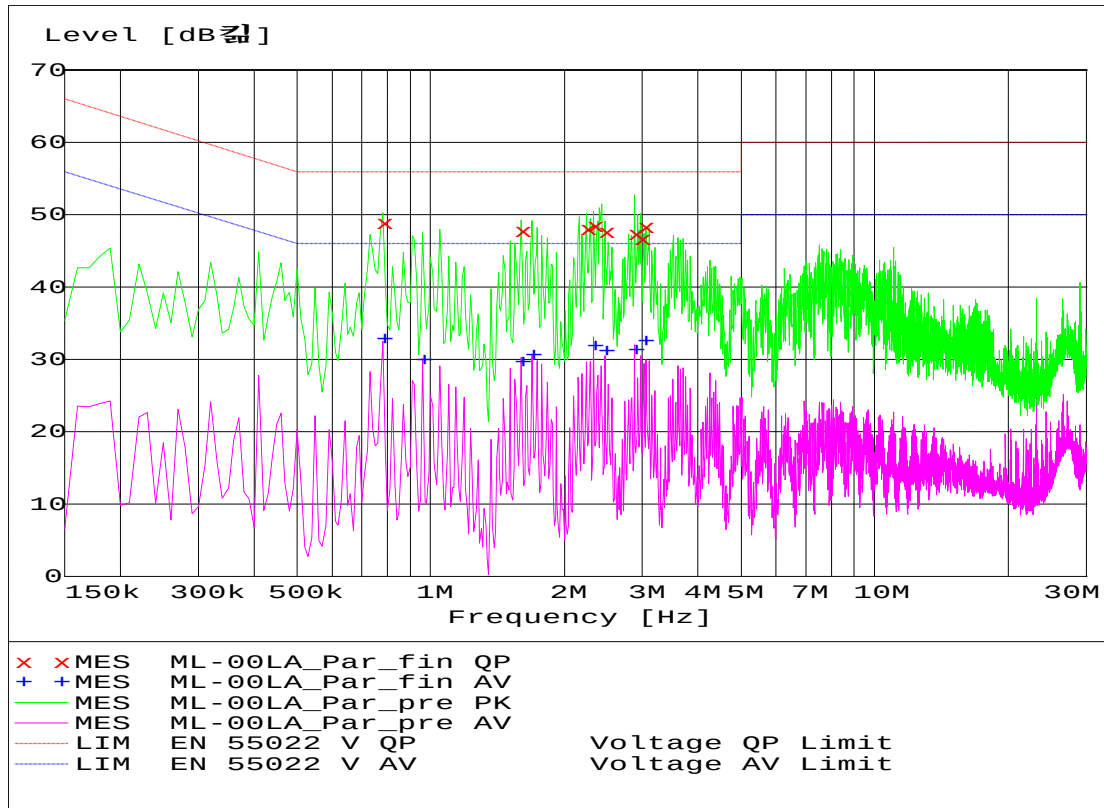
■ Average Data

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.780000	32.80	0.5	46	13.2	L1	GND
0.960000	29.80	0.6	46	16.2	L1	GND
1.600000	29.70	0.6	46	16.3	L1	GND
1.690000	30.50	0.6	46	15.5	L1	GND
2.330000	31.80	0.5	46	14.2	L1	GND
2.470000	31.10	0.5	46	14.9	L1	GND
2.880000	31.30	0.6	46	14.7	L1	GND
3.020000	32.50	0.6	46	13.5	L1	GND

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

3-1. Conducted Emission Test Graph



4. Radiated Emission Test Data

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
69.120000	20.60	6.5	30.0	9.4	218.0	60.00	VERTICAL
73.920000	22.90	7.1	30.0	7.1	399.0	120.00	VERTICAL
90.400000	23.60	10.3	30.0	6.4	150.0	300.00	VERTICAL
94.400000	17.90	11.1	30.0	12.1	150.0	49.00	VERTICAL
143.280000	25.20	12.1	30.0	4.8	100.0	224.00	VERTICAL
145.280000	24.30	12.1	30.0	5.7	106.0	240.00	VERTICAL
147.520000	23.90	11.9	30.0	6.1	125.0	199.00	VERTICAL
148.080000	26.50	11.9	30.0	3.5	113.0	205.00	VERTICAL
708.000000	26.80	23.5	37.0	10.2	400.0	180.00	HORIZONTAL
720.000000	32.00	24.1	37.0	5.0	394.0	153.00	HORIZONTAL
997.680000	25.90	26.1	37.0	11.1	134.0	240.00	VERTICAL

Frequency MHz	Level dBµV/m	Height cm	Azimuth deg	Polarisation
2471.000000	25.35	100.0	150.00	VERTICAL
7368.000000	32.76	100.0	270.00	VERTICAL
7372.500000	36.50	100.0	330.00	VERTICAL
7377.000000	34.60	100.0	150.00	VERTICAL
9829.000000	26.70	100.0	210.00	VERTICAL

* 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: Peak)

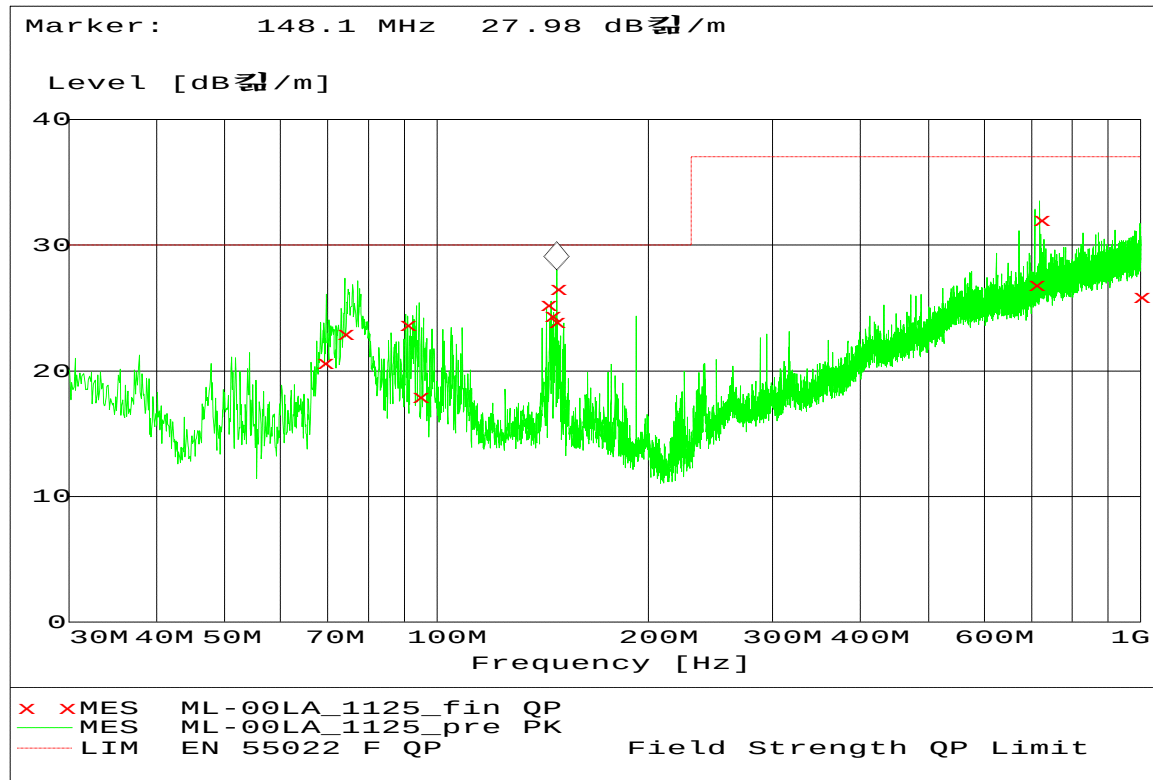
Resolution Bandwidth : 120kHz(Above 1000MHz: 1MHz)

* Test distance

- Below 1000MHz: 3m(Quasi-peak)

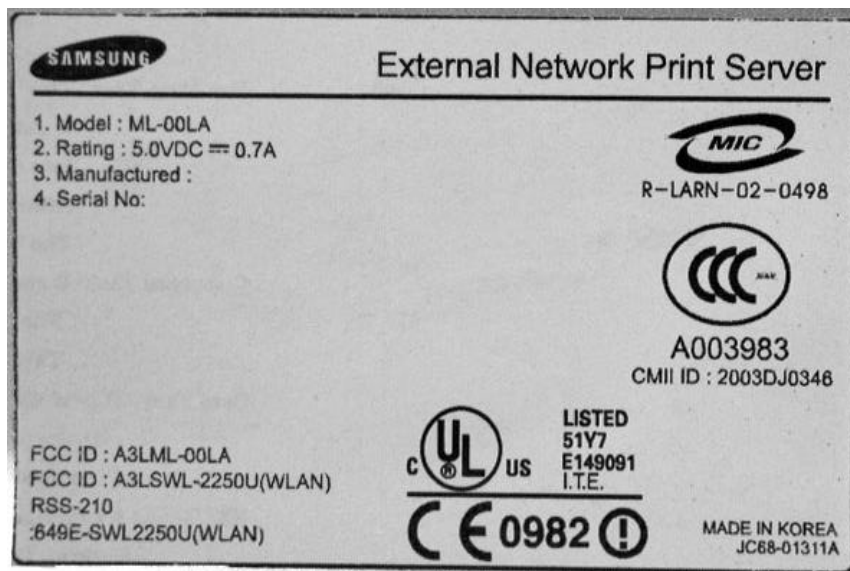
- Above 1000MHz: 3m(Average)

4-2. Radiated Emission Test Graph



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	Calibration Last calibration and Interval
Field strength meter	ESCS30	830986/004	R & S	03/ 04/03, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESI	100010	R & S	03/05/04, 12Months
L.I.S.N	3810/2NM	EMCO	2251	03/08/18, 12Months
L.I.S.N	ESH3-Z5	831887/0004	R & S	03/10/01, 12Months
Double Ridged Guide Antenna	RGA-60	6195	Electro-Metrics	03/05/21, 12Months
Bi-Log Antenna	CBL6112B	2805	Schaffner	03/04/02, 12Months