

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : CD-R/RW DRIVE

Model No. : SW-252(Ver.B)

FCC ID : A3LSW252

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All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

Date of test : December 05, 2002 ~ December 09, 2002

Issued Date : December 10, 2002

Tested by:

Jin Hwan, Jung/ Test Engineer

Reviewed by:

Yang Soo, 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

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:

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

Applicant : **Samsung Electronics Co., Ltd.**
Digital Media Network, OMS Division

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

Kind of Product : **CD-R/RW DRIVE**

FCC ID : **A3LSW252**

Project Name : **-**

Model & Variant Names : **SW-252(Ver.B)**
(Brand Name: Samsung)

Test Report Produced by : Jin Hwan, Jung/ 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.

The system was pre-tested using the below additional components, and we found worst emission level for the components, were selected as the final components for the test.

Component	Brand and Model Name	Remark
Computer	53B320A4DLM0EN	Compaq
LCD Monitor	CX151S-AZ	Samsung
Mouse	M-U48a	Logitech
Key-Board	SDM454DUL	Compaq
Ear-Phone	-	Sony
CD-R/RW Drive	SW-252(Ver.B)	EUT/Samsung

And then the system was tested with the configuration of clause 1.4

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 :

1. Resonator : 33.86Mhz
2. HFM : 280±20 Mhz

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
CD-ROM MODE CD-R MODE CD-RW MODE	CD-ROM MODE
	Continously Audio CD playing by EUT

4) Manufacturer : SAMSUNG Electronics Co., Ltd.

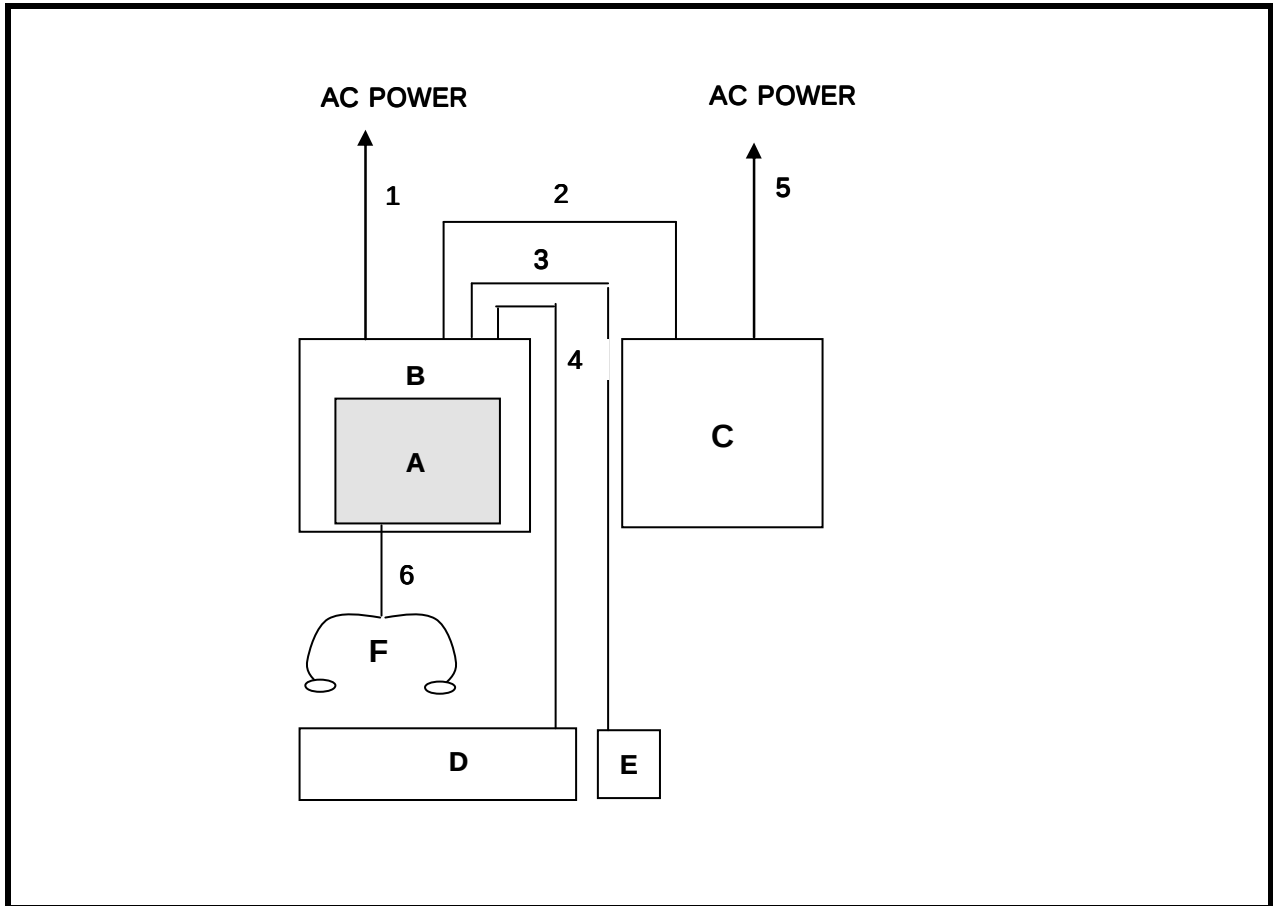
1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	CD-R/RW Drive	SW-252(Ver.B)	None	Samsung	EUT
B	D/T PC	53B320A4DLM0EN	3D13JCD2208M	Compaq	-
C	LCD Monitor	CX151S-AZ	N192H4NT319256	Samsung	-
D	USB Mouse	M-U48a	LZE95183958	Logitech	-
E	USB Key-Board	SDM454DUL	B354ALP0BL1VKW	Compaq	-
F	Ear-Phone	None	None	Sony	-

1.3 Used Cable Description

No.	Item	Length[m]	Shielded (Y/N)	Remark
1	AC Power Cable	1.7	N	-
2	Monitor Cable	1.2	Y	-
3	Mouse Cable	1.2	N	-
4	Key-Board Cable	1.2	N	-
5	AC Power Cable	1.7	N	-
6	Ear-Phone Cabe	0.7	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 #2(Registration Number:873282) 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 Environment

	Conduction	Radiation
Temperature [C] :	23	24
Humidity [%]	38	42
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 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.

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	-

3. Conducted Emission Test Data

O Test Data Sheet

Frequency [MHz]	Meter reading (a)		Total Loss (b) [dB]	Results (a) + (b)		Limits		Margin (Limits-Result)	
	QP	AV		QP	AV	QP	AV	QP	AV
	[dBuV]			[dBuV]		[dBuV]		[dB]	
0.170	32.2	-	0.6	32.8	-	65.0	55.0	32.2	-
0.220	50.7	-	0.6	51.4	-	62.8	52.8	11.5	-
0.330	38.9	-	0.5	39.5	-	59.5	49.5	20.0	-
0.439	32.5	-	0.5	33.0	-	57.1	47.1	24.1	-
0.662	33.3	-	0.5	33.8		56.0	46.0	22.2	-
0.775	33.3	-	0.5	33.8		56.0	46.0	22.2	-
1.107	33.8	-	0.7	34.5	-	56.0	46.0	21.5	-
1.220	33.0	-	0.7	33.6	-	56.0	46.0	22.4	-
1.552	33.4	-	0.6	34.0		56.0	46.0	22.0	-
25.627	36.2	-	2.3	38.6	-	60.0	50.0	21.5	-
25.830	38.6	-	2.3	41.0	-	60.0	50.0	19.0	-
25.841	36.4	-	2.3	38.7	-	60.0	50.0	21.3	-
25.943	38.1	-	2.3	40.5	-	60.0	50.0	19.5	-

* QP : Quasi-peak, AV: Average

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

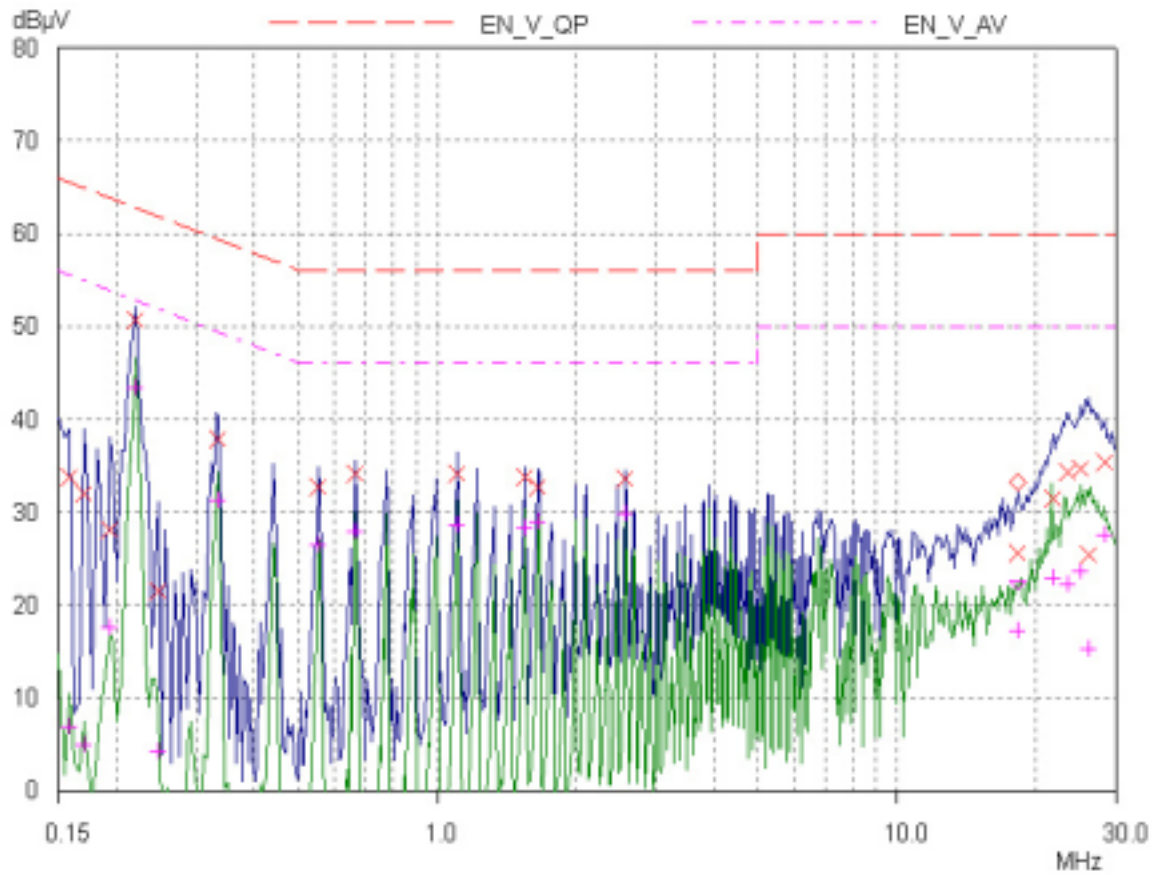
*"-":The Quasi-peak reading value also meets average limit so it is not necessary to measure
with Average detector

* Measurement detector function and bandwidth

Detector function : CISPR quasi-peak

Bandwidth : 9kHz

3-1. Conducted Emission Test Graph



4. Radiated Emission Test Data

Frequency Range	Tested Frequency	ANT Pol.	Meter Reading [A]	Total Loss [B]	Antenna Height [Cm]	Turn table Degree [Deg]	Results [A+B]	Limits at 10m [dBuV/m]	Margin (Limit-Result) [dB]
[MHz]	[MHz]		[dBuV/m]	[dB]	[Cm]	[Deg]	[dBuV/m]	[dBuV/m]	[dB]
30 - 230	48	V	7.5	9.7	244	29	17.2	30.0	12.8
	102.2	H	5.9	12.3	317	300	18.2		11.8
	144	H	12.0	12.2	400	300	24.2		5.8
	156.7	H	12.5	11.8	400	300	24.3		5.7
	162.7	H	6.8	11.5	400	300	18.3		11.7
	168.8	H	8.8	11.1	395	300	19.9		10.1
230 - 1000	400	H	4.6	19	137	300	23.6	37.0	13.4
	502.4	H	2.9	21.1	129	300	24		13.0
	624.1	H	8.0	23.1	123	300	31.1		5.9
	678.6	V	9.5	23.3	170	29	32.8		4.2

* "<" 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: Peak)

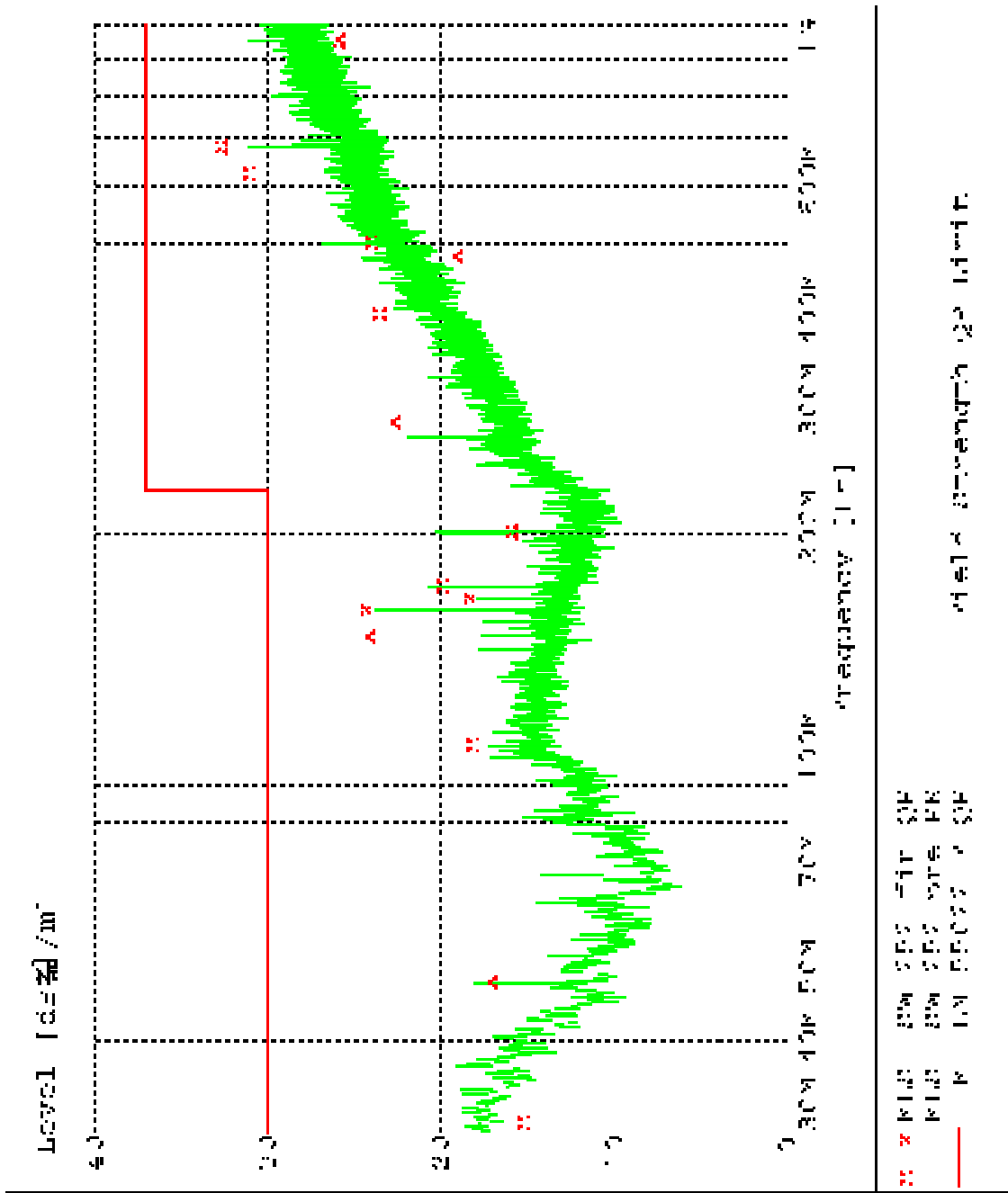
Resolution Bandwidth : 120kHz(Above 1000MHz: 1MHz)

* Test distance

- Below 1000MHz: 10m(Quasi-peak)

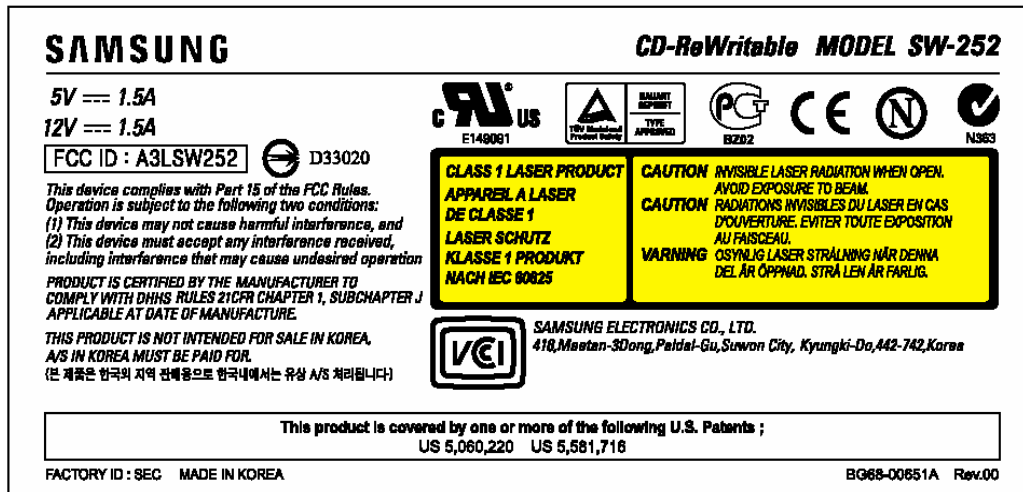
- Above 1000MHz: 3m(Peak)

4-1. 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.	Makers.	Serial No	Last Calibration and Interval
Field strength meter	ESCS30	830986/004	R & S	2002-02-15, 12Months
	Firmware versions : Main 2.22, OTP 02.01, GRA 02.36			
Test Receiver	ESI26	100010	R&S	2002-05-04, 12Months
L.I.S.N	ESH3-Z5	831887/0004	R & S	2002-08-06, 12Months
Biconilog Antenna	CBL6112B	2804	SCHAFFNER	2002-04-23, 12Months

