



ELECTRONICS

# EMI TEST REPORT

## FCC Part 15 Subpart B, Class B


**Product** : External Hard Disk Drive  
**Model No.** : SEV08UP

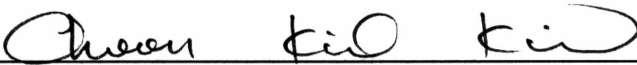
**JOB NO. : LEB020119**

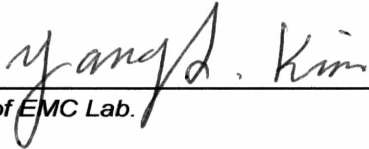
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2. This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.
3. This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.  
All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

**Date of test** : May 30 , 2002

**Issued Date** : June 04, 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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The test reported herein have been performed in accordance with its terms of registration.



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### Distribution

This test report has been made available as follows:

<b>CS Management Center, EMC Laboratory</b>	1 original
Storage 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**: **External Hard Disk Drive**

**FCC ID** : **A3LSEZ00UP**

**Project Name** : **Handy-Q**

**Basic Model** : **SEV08UP** (Brand Name: SAMSUNG)

**Variant Model** : **SEV04UP** (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, Reading and Writing Via USB, Reading and Writing Via 1394 the test results of Reading and Writing Via 1394 mode was the worst case emissions.

Further details of cabling and configuration are shown in the test system configuration.

**2) Operating Frequency :**

24,576MHz(IEEE1394 Clock), 30MHz(USB2.0 Clock)

**3) Description of Testing operating mode**

Operating Mode	Operating section of EUT	
READ	IEEE1394	USB
WRITE	IEEE1394	USB
STAND BY	-	

**4) Tested Resolution :**

Tested Video mode	Resolutions	Refresh rates	Colors

### 5) Assemble Parts

Item	Specification	Remark
Main Controller	Oxford semi. , OXFW911 Cypress, ISD300A1	
SMPS	SAMSUNG, AC100-240, 1.0-0.5A, 50/60Hz	
HVPS	SAMSUNG, DC12V, 3.0A	HIGH VOLAGE POWER SUPPLY
Ports	1 USB, 2 IEEE1394I Port	

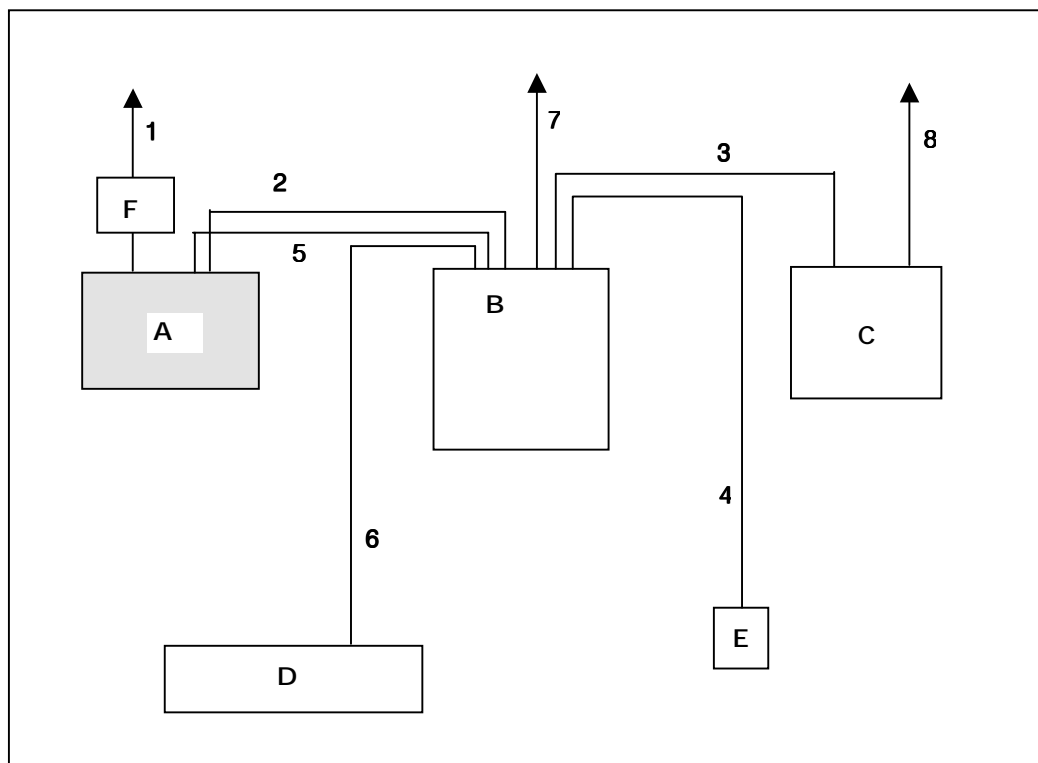
2.5.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	External Hard Disk Drive	SEV08UP	-	Samsung	EUT
B	Computer	Pavilion 7845	KR11401739	HP	
C	Monitor	55E Plus	DP15H8PK803078	Samsung	
D	Keyboard	SKR-2283S	7CAE021898	Sejin Electronics	
E	Mouse	SMB-602	9EAE22731	Sejin Electronics	
F	Adapter	PSCV360104A	C020382036B	DongGwon Samsung	

2.5.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	EUT AC Power cable	1.7	N	
2	1394 cable	1.7	Y	
3	Viedo cable	1.5	Y	
4	Mouse cable	2.0	N	
5	USB	1.8	Y	
6	Keyboard Cable	1.7	N	
7	Computer AC Power cable	1.7	N	
8	Monitor 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.

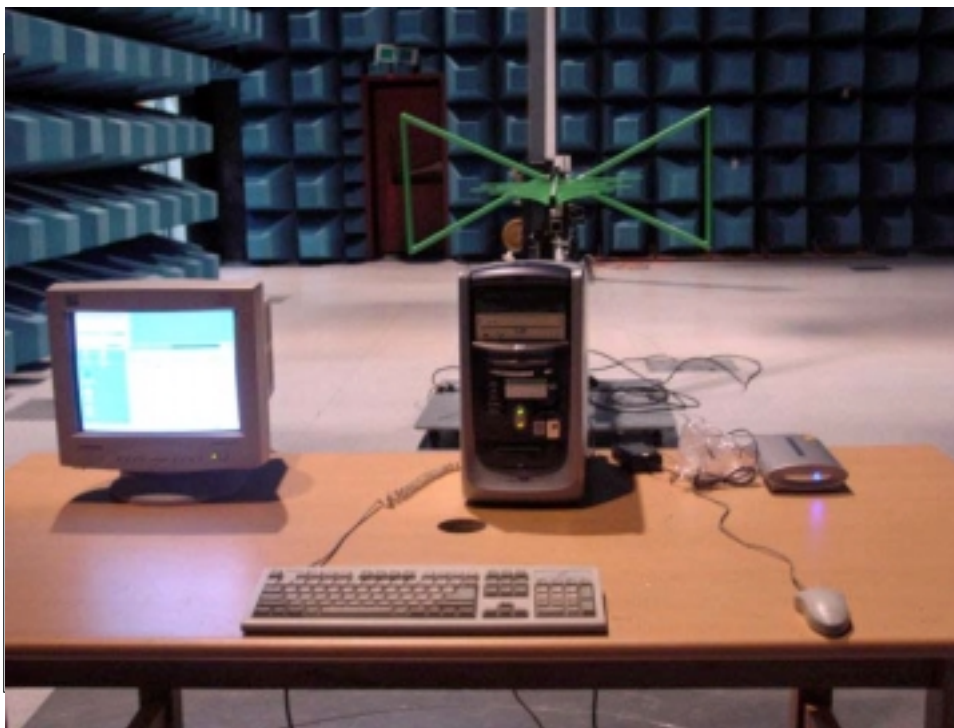
#### 1)Conduction(Front View)



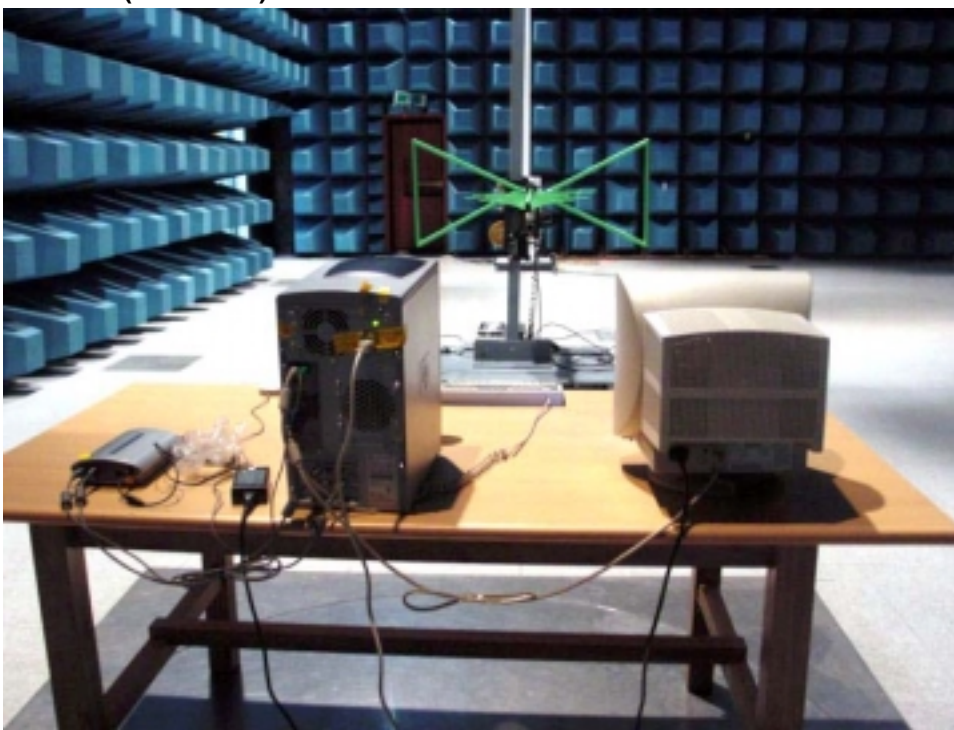
#### 2)Conduction(Rear View)



**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; running program "CP Device" 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

+ 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]
0.450	33.49	H	0.56	34.05	<b>47.96</b>	13.91
0.513	32.25	N	0.63	32.88	<b>47.96</b>	15.08
2.177	26.47	N	0.58	27.05	<b>47.96</b>	20.91
12.673	32.90	N	1.23	34.13	<b>47.96</b>	13.83
12.856	32.67	N	1.24	33.91	<b>47.96</b>	14.05
13.020	32.52	N	1.26	33.78	<b>47.96</b>	14.18
15.997	33.02	N	1.56	34.58	<b>47.96</b>	13.38
20.008	33.82	N	1.83	35.65	<b>47.96</b>	12.31
23.993	32.75	H	2.1	34.85	<b>47.96</b>	13.11

#### 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]
<b>30 - 88</b>	31.98	V	10.5	19.2	100	8	29.7	<b>40.0</b>	10.3
	38.10	V	11.2	16.0	100	100	27.2	<b>40.0</b>	12.8
	45.54	V	15.5	11.6	105	116	27.1	<b>40.0</b>	12.9
	48.78	V	14.9	9.5	100	80	24.4	<b>40.0</b>	15.6
<b>88 - 216</b>	99.90	H	16.0	10.3	265	120	26.3	<b>43.5</b>	17.2
<b>216 - 960</b>	245.82	H	22.3	11.3	111	163	33.6	<b>46.0</b>	12.4
	298.20	H	17.9	13.2	100	121	31.1	<b>46.0</b>	14.9
	344.16	H	18.2	14.7	100	990	32.9	<b>46.0</b>	13.1
	393.30	H	17.7	16.0	100	113	33.7	<b>46.0</b>	12.3
	624.00	H	14.5	20.6	100	240	35.1	<b>46.0</b>	10.9
	639.12	H	14.4	20.8	117	120	35.2	<b>46.0</b>	10.8
	737.46	H	12.6	22.4	100	178	35.0	<b>46.0</b>	11.0
	786.42	H	13.2	23.0	104	237	36.2	<b>46.0</b>	9.8
934.08	H	12.6	24.9	100	114	37.5	<b>46.0</b>	8.5	
<b>960 - 1000</b>									

\* "<" 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
	<b>Firmware versions : Main 1.08, OTP 02.01, GRA 02.03</b>			
Field strength meter	ESVP	860688/015	R & S	02/02/28, 12Months
L.I.S.N	3825-2R	9208-1981	EMCO	01/10/09, 12Months
Spectrum analyzer	8566B	3340A21744	H.P	02/04/18, 12Months
Quasi-peak adapter	85650A	2521A00687	H.P	01/10/09, 12Months
RF Preselector	85685A	2602A00224	H.P	01/10/09, 12Months
Biconilog Antenna	CBL6112B	2766	SCHAFFNER	02/ 04/26, 12Months