

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : USB Flash Drive

Model No. : SECUSB

FCC ID : A3LSECUSB

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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 : September 4, 2002 ~ September 5, 2002

Issued Date : September 6, 2002

Tested by:

Choon Kil, Kim / 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

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Distribution

This test report has been made available as follows:

CS Management Center, EMC Laboratory	1 original
Computer Division	1 copy

1. General Information

Applicant : Samsung Electronics Co., Ltd.

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

Kind of Product : USB Flash Drive

FCC ID : A3LSECUSB

Project Name : -

Model & Variant Names : SECUSB (Brand Name: Samsung)

Test Report Produced by : Choon Kil, 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.

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
Note PC	S820	Samsung
Monitor	M17D-AN	Samsung
Mouse	SMB-600	Samsung
AC/DC Adaptor	BA44-00014A	Samsung
AC/DC Adaptor	C011108523	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 :

4MHz (Metal-SMD Clock)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
Read & Write & Delete (Using 'CP Device' Program)	USB Flash Drive

4) Tested Resolution :

Tested Video mode	Resolutions	Refresh rates	Colors
LCD(17")	1600 X 1200	60Hz	32bits

5) Manufacturer : SAMSUNG Electronics Co., Ltd.

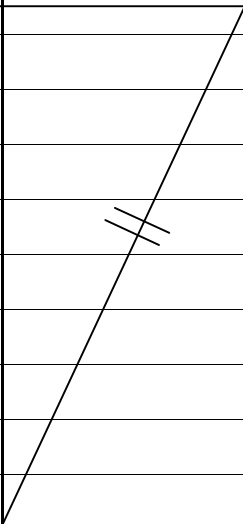
6) Assemble Parts

Item	Specification	Remark
Flash Memory	256MB	
Controller	100TQFP	Lexar
X-tal	Metal-SMD,4MHz	
LED	1608,green	
Switch	Slide-switch	
Interface	USB	

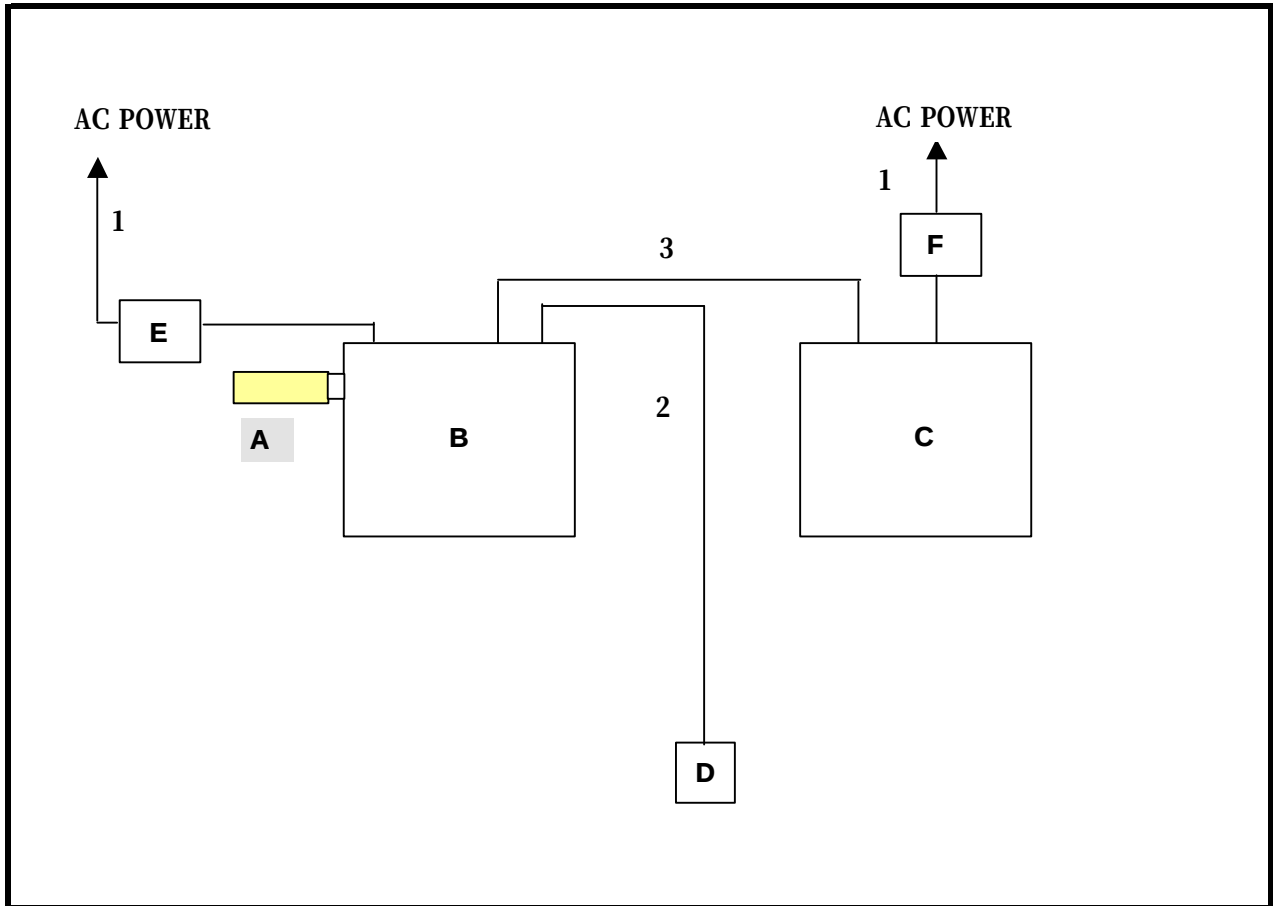
1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	USB Flash Drive	SECUSB	-	Samsung	EUT
B	Note PC	S820	463691EN400009	Samsung	-
C	Monitor	M17D-AN	N106H4JT100839	Samsung	-
D	Mouse	SMB-600	8BCE018009	Samsung	-
E	AC/DC Adaptor	AD-6019	BA44-00014A	Samsung	PC
F	AC/DC Adaptor	AD-4214N	C011108523	Samsung	Monitor

1.3 Used Cable Description

No.	Item	Length[m]	Shielded (Y/N)	Remark
1	AC Power Cable	1.7	N	-
2	Mouse Cable	1.2	N	-
3	Monitor Cable	1.2	Y	-
				

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)



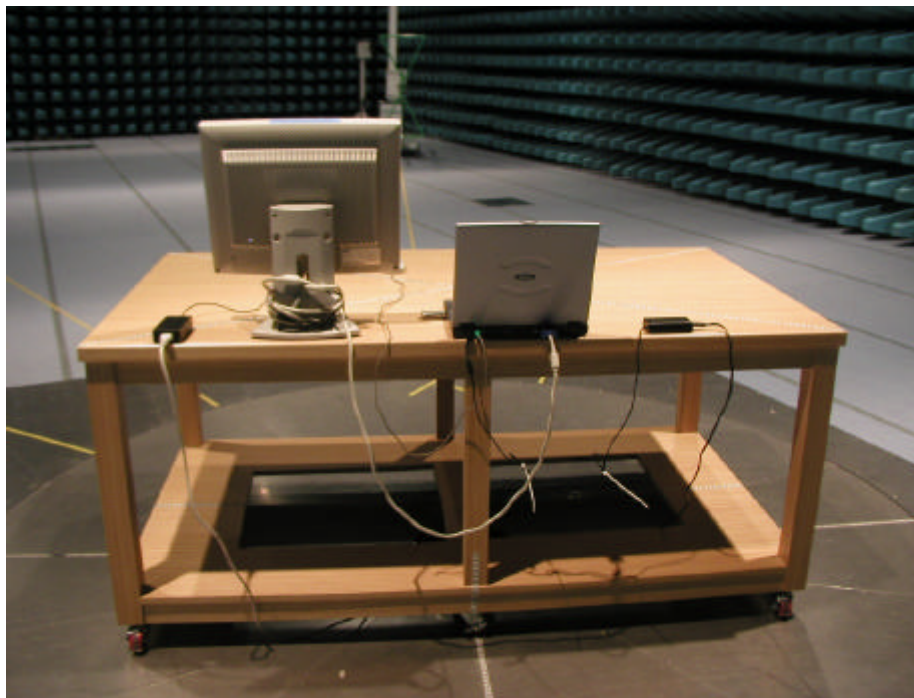
2)Conduction(Rear View)



3) Radiation(Front View)



4) Radiation(Rear View)



2.2 Operation Environment

	Conduction	Radiation
Temperature [C] :	21.5	22
Humidity [%] :	59	51
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]	
0.150	49.5	-	0.6	50.1	-	66.0	56.0	15.9	-
0.165	38.4	-	0.6	39.0	-	65.2	55.2	26.2	-
0.212	50.4	-	0.6	51.0	-	63.6	53.6	12.6	-
0.282	42.4	-	0.6	43.0	-	60.8	50.8	17.8	-
0.350	41.3	-	0.5	41.8	-	58.7	48.7	16.9	-
0.419	34.4	-	0.5	34.9	-	57.8	47.8	22.9	-
0.997	39.5	-	0.5	39.9	-	56.0	46.0	16.1	-
1.282	39.5	-	0.6	40.1	-	56.0	50.0	15.9	-
1.780	38.3	-	0.5	38.8	-	60.0	50.0	21.2	-
2.208	37.0	-	0.5	37.5	-	60.0	50.0	22.5	-
6.622	31.9	-	0.8	32.7	-	60.0	50.0	27.3	-
21.782	32.8	-	1.7	34.5	-	60.0	50.0	25.5	-

* 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 : 10kHz

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	55.76	V	14.6	7.3	296	48	21.9	30.0	8.1
	75.40	V	14.0	7.4	190	294	21.4		8.6
	100.31	V	8.0	12.0	146	301	20.0		10.0
	122.85	V	12.4	13.3	100	274	25.7		4.3
	165.20	V	10.1	11.3	103	236	21.4		8.6
	195.42	V	15.7	10.8	104	240	26.5		3.5
	227.97	H	10.8	11.6	340	319	22.4		7.6
230 - 1000	364.70	H	8.5	17.9	238	216	26.4	37.0	10.6
	366.24	H	8.4	17.9	180	222	26.3		10.7
	368.43	H	5.2	17.9	202	357	23.1		13.9
	390.86	V	14.5	18.6	400	199	33.1		3.9
	649.99	V	4.8	23.3	218	25	28.1		8.9
	997.73	V	0.4	25.9	152	0	26.3		10.7

* "<" 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)

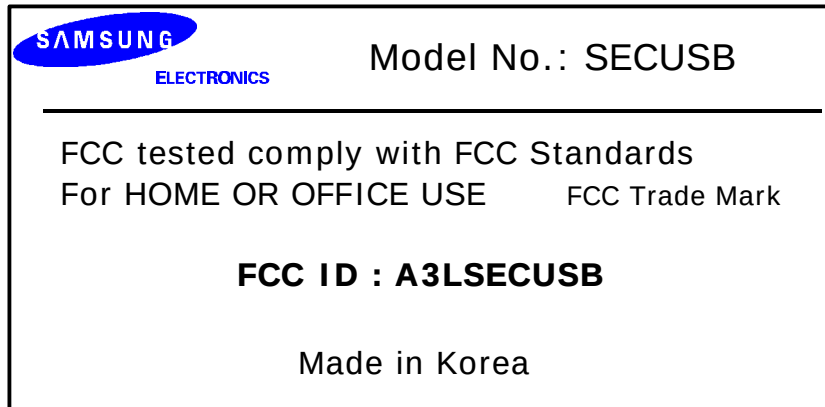
* Test distance

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

- Above 1000MHz: 3m(Peak)

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	Calibration Last calibration and Interval
Field strength meter	ESCS30	830986/004	R & S	2003-02-15
	Firmware versions : Main 2.22, OTP 02.01, GRA 02.36			
Test Receiver	ESI26	100010	R&S	2003-05-04
L.I.S.N	ESH2-Z5	831886/006	R & S	2002-11-20
Biconilog Antenna	CBL6112B	2806	SCHAFFNER	2003-04-23