Project NO. : LBE041291

SAMSUNG ELECTRONICS

EMI TEST REPORT

According to FCC Part 15 Subpart B/Class B

Product : USB Flash Drive
Model No. : SECSMPA_1G

FCC ID : A3LSECSMPA

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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 : July 7. 2004

Issued Date : July 10, 2004

Tested by: Choon Kil Kim
Choon Kil, KIM / Test Engineer

Reviewed by: N. C. Park
No Cheon, PARK / Manager of EMC Lab.

Authorised by: K. B. Chung
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.

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NVLAP Code: 200623-

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Distribution

This test report has been made available as follows:

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

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1. General Information

Applicant : **Samsung Electronics Co., Ltd.**
Device Solution Network, Memory Division

Full Address : **San #16 Banwol-Ri, Taean-Eup, Hwasung-City**
Kyungki-Do, Korea, 442-742

Kind of Product : **USB Flash Drive**

FCC ID : **A3LSECSMPA**

Project Name : **-**

Model & Variant Names : **SECSMPA_1G**
(Brand Name: Samsung)
SECSMPA_512, SECSMPA_256, SECSMPA_128
SECSMPA_64, SECSMPA_32, SECSMPA_16

Product Description :

- Fully compatible with the USB 2.0 High speed Specification, USB-IF certified
  - USB Specification V1.1 Mass Storage Compliance
  - USB Bulk Only Mass Storage Support
  - USB Class Definition for Bootability Suppor
  - Interface Speed : up to
    - High Speed : 480M bps
    - Full Speed : 12M bps
  - High Performance : Sequential Read/Write : 15MB/s(Max.)
  - Storage Capacities : Up to 1GB
  - Low Vcc Program Inhibit Function
  - Software support
    - Password lock
    - Secure zoning
    - Auto Sleep Mode
    - USB Bus Powered (4.75 volt - 5.25 volt)
    - Suspend : <= 500uA

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 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 :

Crystal : 12MHz(Ceramic SMD-type)

3) Description of Testing operating mode

Operating Mode	Operating section of EUT
Read MODE Write MODE Execute MODE	Read and Execute MODE
	Read and Execute continuously data on EUT

4) Manufacturer : SAMSUNG Electronics Co., Ltd.

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1.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	USB Flash Drive	SECSMPA_1G	-	Samsung	EUT
B	Notebook PC	PP03S	9X9X9XA00	Samsung	-
C	AC Adapter	PA-1500-05D	CN00R3344801028600E0	LITE-ON Electronics	For PC
D	H/Phone	Stereo LSI	-	Microsoft	-
E	USB Mouse	M-UR69	LNA22400077	Logitech	-
F	PS2 Mouse	M-S69	HCA22300038	Logitech	-
G	Serial Mouse	C3KMS1	1020764	Microsoft	-

1.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power cable	1.7	N	For Notebook PC
2	H/Phone	1.5	N	-
3	USB Mouse	1.6	N	-
4	PS2 Mouse	1.6	N	-
5	Serial Mouse	1.6	N	-

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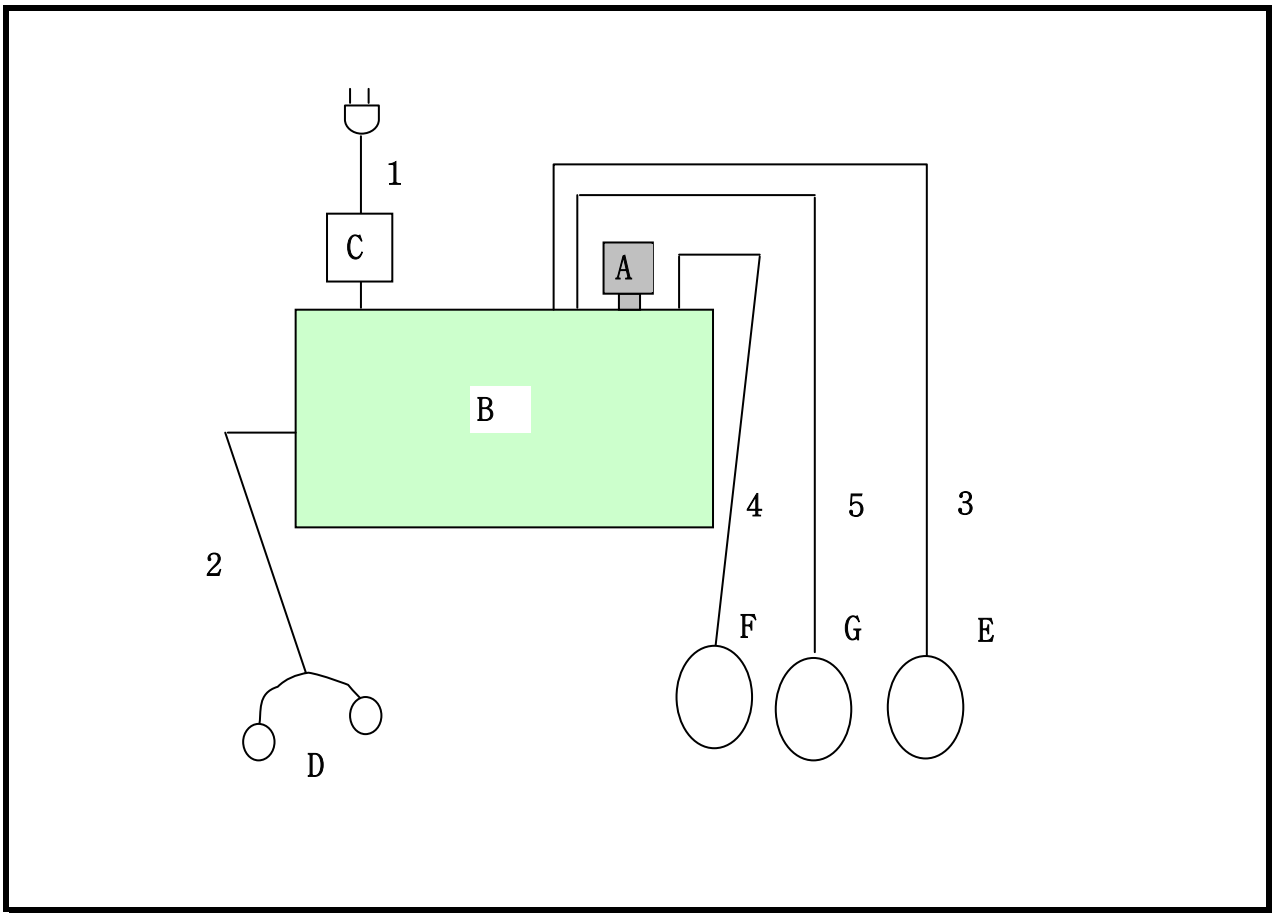
1.4 System Block Diagram of Test Configuration



1.5 Test Facility

All test described in this report were performed by :

SAMSUNG ELECTRONICS CO., LTD.
EMC TESTING LABORATORY
416 Maetan 3-Dong, Yeoungtong-Ku, Suwon City, Gyeongki-Do, Korea, 443-742
Semi Anechoic Chamber and Shielded Room.

This test facility has been filed in FCC under the criteria in ANSI C63.4-1992.

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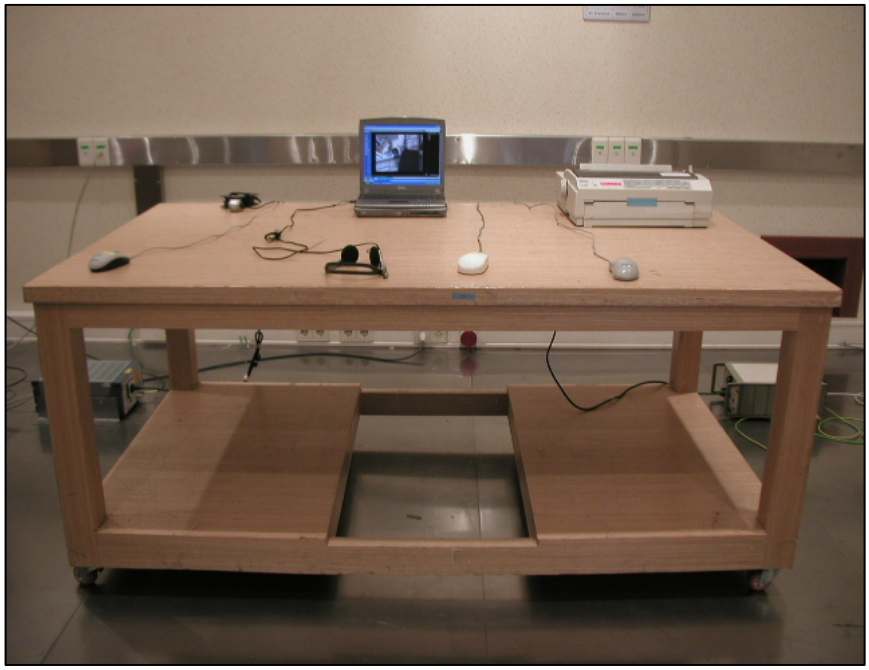
2. System Test Configuration

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)

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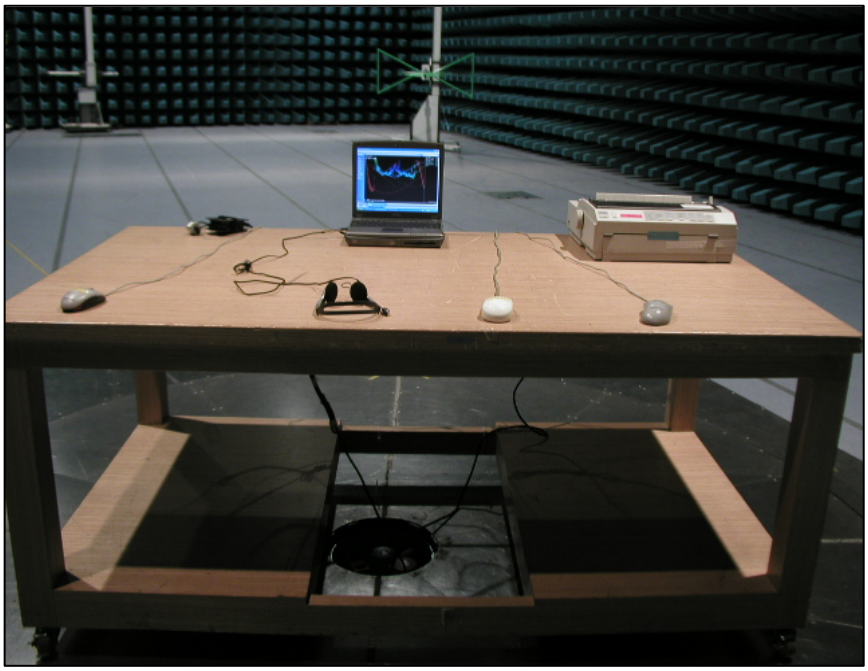
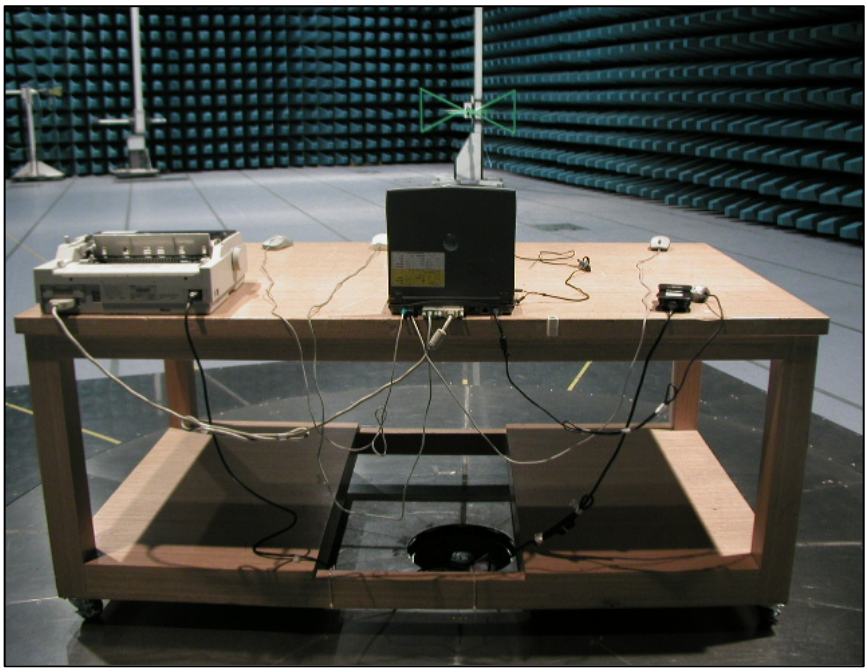
3) Radiation(Front View)



4) Radiation(Rear View)



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2.2 Operation Environment

	Conduction	Radiation
Temperature [C] :	25	18.5
Humidity [%]	58	67
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.

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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	-

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3. Conducted Emission Test Data

The initial step in collecting conducted data was to perform a quasi-peak and average scan over the measurement range using a receiver.
The final data represents worst-case emissions.

O Test Data Sheet (AC Power Line)

Quasi Peak

MEASUREMENT RESULT: "SECSMPA_1G_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.195000	46.50	0.6	64	17.3	N	GND
0.455000	40.70	0.5	57	16.1	L1	GND
0.520000	45.10	0.6	56	10.9	N	GND
0.585000	47.40	0.6	56	8.6	L1	GND
0.650000	40.00	0.5	56	16.0	L1	GND
0.715000	42.20	0.5	56	13.8	L1	GND
1.110000	42.50	0.6	56	13.5	N	GND
1.175000	42.40	0.6	56	13.6	L1	GND
1.565000	40.20	0.6	56	15.8	L1	GND
1.630000	41.10	0.6	56	14.9	L1	GND

Average

MEASUREMENT RESULT: "SECSMPA_1G_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.455000	35.30	0.5	47	11.5	N	GND
0.520000	38.20	0.6	46	7.8	L1	GND
0.585000	42.00	0.6	46	4.0	N	GND
0.650000	38.00	0.5	46	8.0	N	GND
0.715000	38.00	0.5	46	8.0	L1	GND
1.045000	37.30	0.6	46	8.7	N	GND
1.110000	39.50	0.6	46	6.5	N	GND
1.175000	39.80	0.6	46	6.2	N	GND
1.565000	37.60	0.6	46	8.4	N	GND
1.630000	37.90	0.6	46	8.1	N	GND

*Transd(dB) : Cable Loss + LISN Loss

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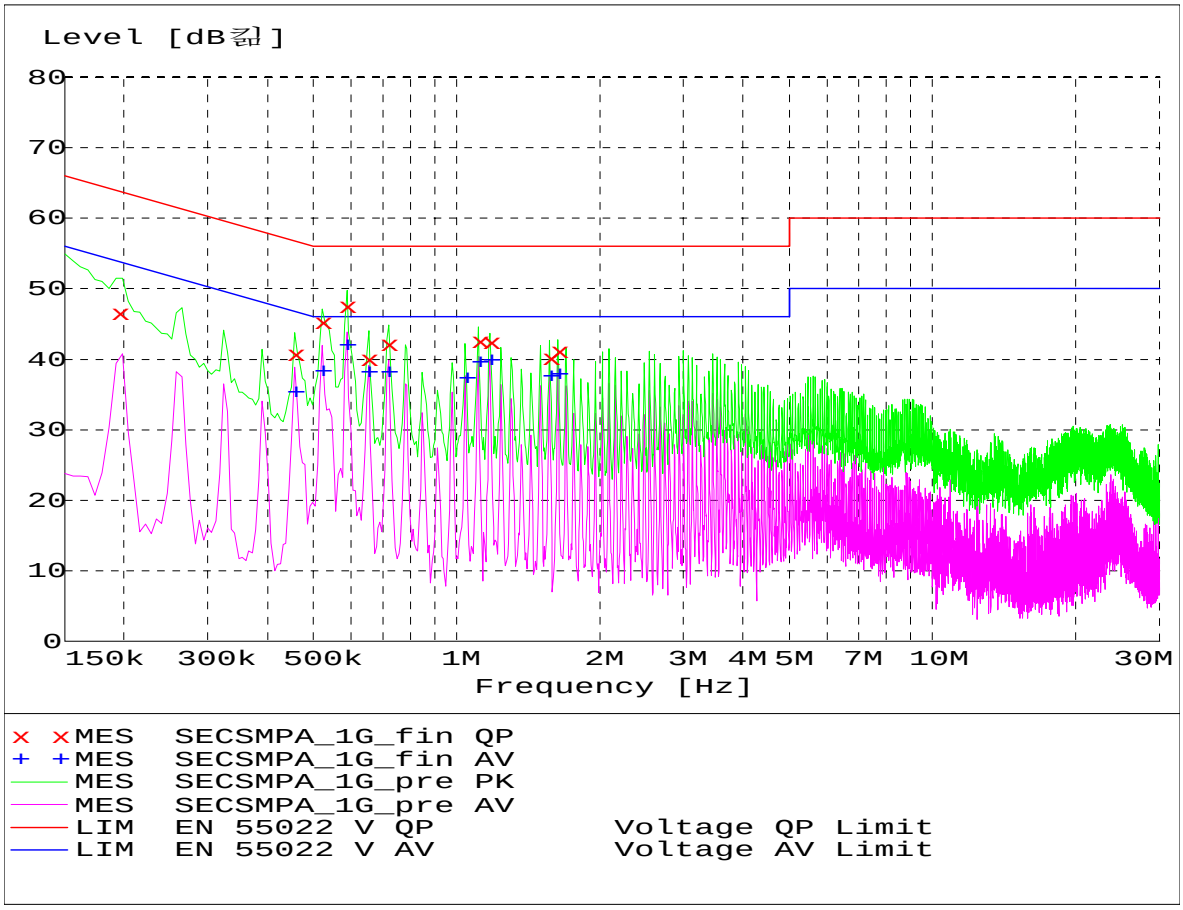
O Test Data Graph



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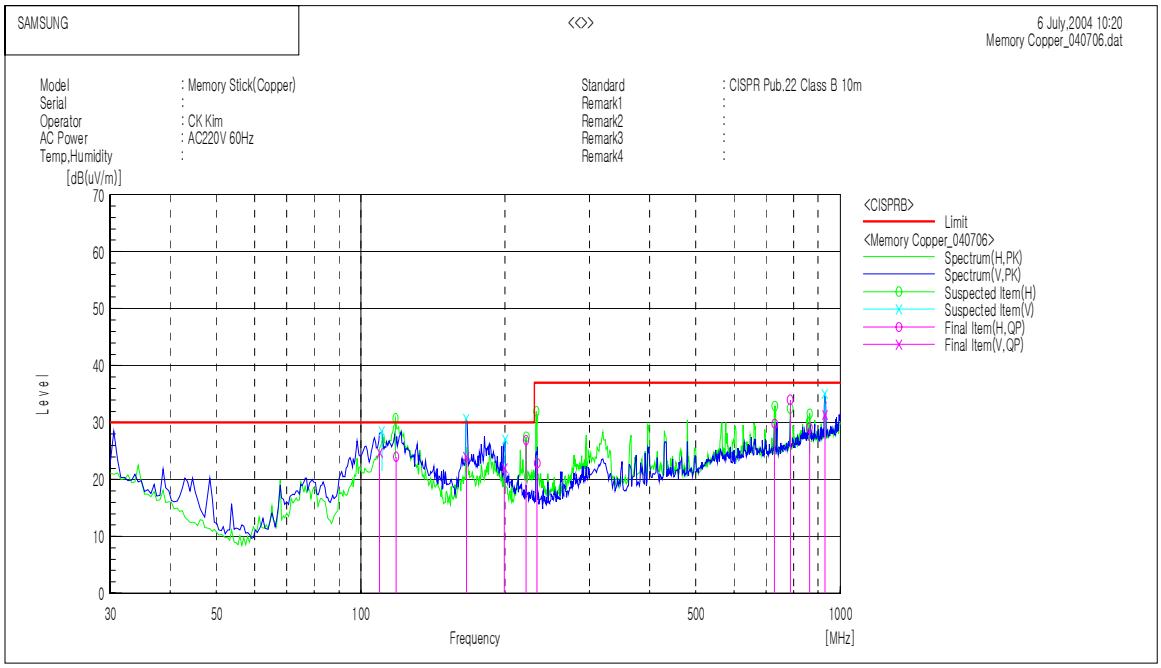
4. Radiated Emission Test Data



Final Result

No.	Frequency [MHz]	(P)	S.C	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	109.482	V	S	32.5	-7.8	24.7	30.0	5.3	106.0	61.0	
2	118.508	H	S	31.0	-7.0	24.0	30.0	6.0	341.0	251.0	
3	165.901	V	S	33.7	-9.7	24.0	30.0	6.0	133.0	28.0	
4	199.302	V	S	32.2	-10.2	22.0	30.0	8.0	104.0	4.0	
5	221.178	H	S	36.0	-9.1	26.9	30.0	3.1	397.0	214.0	
6	233.444	H	S	31.0	-8.1	22.9	37.0	14.1	388.0	208.0	
7	729.967	H	S	26.1	3.7	29.8	37.0	7.2	134.0	154.0	
8	786.430	H	S	29.7	4.3	34.0	37.0	3.0	123.0	143.0	
9	862.644	H	S	22.9	6.2	29.1	37.0	7.9	107.0	156.0	
10	929.726	V	S	25.3	6.0	31.3	37.0	5.7	193.0	205.0	

** "<" 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 Configulation

SAMSUNG ELECTRONICS

Model No.: SECSMPA_1G

FCC ID : A3LSECSMPA

Made in Korea

5.2 Location of FCC ID Label

6. Test Equipment Used

Equipment	Model No.	Serial No	Makers	Last Calibration and Interval
Field strength meter	ESCS30	830986/004	R & S	2004-02-11, 12Months
	Firmware versions : Main 2.22, OTP 02.01, GRA 02.36			
Test Receiver	ESI26	100019	R&S	2004-02-16, 12Months
L.I.S.N	ESH3-Z5	831887/0004	R & S	2003-10-01, 12Months
Biconilog Antenna	CBL6112B	2805	SCHAFFNER	2004-03-12, 12Months
L.I.S.N	ESH3-Z5	100263	R&S	2003-07-16, 12Months

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