EMI Test Report

According to FCC Part 15 Subpart B

Project No.	**LBE050199**
Equipment under Test	
Applicant	Samsung Electronics Co., Ltd. 416 Maetan 3-Dong, Yeong tong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
FCC ID	**A3LSECFRPC**
Product Name	USB Flash Drive
Model Name	SECFRPC_2G
Manufacturer	Samsung Electronics Co., Ltd.
Date of Test	January 28, 2005 ~ February 07, 2005
Issued Date	February 17, 2005

	Name/Position	Signature
Tested by	Young Hun, Cheong Test Engineer	
Reviewed by	No Cheon, Park Manager of EMC Lab.	
Authorized by	Seung Kyu, Cha Chief of EMC Lab.	

1. This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.
2. 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.

This laboratory is registered by the NIST/NVLAP, U.S.A.
The test reported herein have been performed in accordance
with its terms of registration.

NVLAP LAB CODE 200623-0

3. Fcc filing Registration Number : 873282

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1. General Information

1.1 Basic Information related Product

Applicant	Samsung Electronics Co., Ltd.
Model name	SECFRPC_2G
Applicant Address	416 Maetan 3-Dong, Yeong tong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Contact Person	Young Hun, Cheong
Kind of product	USB Flash Drive
Variant list	1GB : SECFRPC_1G 512MB : SECFRPC_512 256MB : SECFRPC_256 128MB : SECFRPC_128 64MB : SECFRPC_64 32MB : SECFRPC_32
Manufacturer	Samsung Electronics Co., Ltd.
New / Alternative / Permissive change Information	New

1.2 Detail Information related Product

Specification

Item	Specification	Remark
USB Flash Drive	- 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 Support - Interface Speed : up to – High Speed : 480M bps – Full Speed : 12M bps - High Performance : Sequential Read/Write : 15MB/s (Max.) - Storage Capacities : Up to 2GB - Software support : – Password lock – Secure zoning - Auto Sleep Mode - USB Bus Powered (4.75 volt – 5.25 volt) - Suspend ≤ 500uA	

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Operating Frequency

Crystal : 12MHz(Ceramic SMD-type)

1.3 Operating Mode and Condition

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.
So we used windows media player program, It operated read continuously on EUT.

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

1.4 Test System Details

Refer to 1.2

1.5 Equipment Modifications

No equipment modifications were required.

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1.6 Test Procedure

1.6.1 Conducted Emission

EUT was placed on a platform nominal size, 1m by 1.5m, raised 80cm above the conducti ng 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 bindle 30cm to 40cm long and were handed 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.

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
0.15 to 30	EMI Receiver	Quasi-Peak	9kHz	-
		Average	9kHz	-

1.6.2 Radiated Emission

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.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane and the run table azimuth was varied to obtain the maximum signal strength

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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.

Also, the EMI RECEIVER was scanned from 1000 to 1800MHz using linearly polarization Double ridge horn antennas were used. The explanation of measuring instrument setup when Respective function is used in any frequency band is as following;

Frequency Band [MHz]	Instrument	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1000	EMI Receiver	Quasi-Peak	120kHz	-
Above 1000	EMI Receiver	Peak	1MHz	1MHz

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1.7 Test Configuration

Used EUT and Peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	USB Flash Drive	SECFRPC_2G	-	SAMSUNG	EUT
B	NOTE PC	BLADE	-	DELL	-
C	PRINTER	DESTJET932C	MY02Q1F0JN	H/P	-
D	PS/2 MOUSE	MOUSE P801	01063726	SAMSUNG	-
E	SERIAL MOUSE	C3KMS1	1022949	Microsoft	-
F	AC ADAPTOR	PA-1500-05D	DDR334-48010-286-00E0	DELL	-
G	Headset	Stereo LS1	-	Microsoft	-
H	USB MOUSE	M-UR69	HCA40801479	Logitech	-

Used Cable Description

	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	AC Power Cable	1.7	No	-
2	AC Power Cable	1.7	No	-
3	PS/2 Cable	1.6	Yes	-
4	Serial Cable	1.6	No	-
5	Parallel Cable	1.8	Yes	-
6	Audio In/ Out	1.7	No	-
7	USB Cable	1.8	Yes	-

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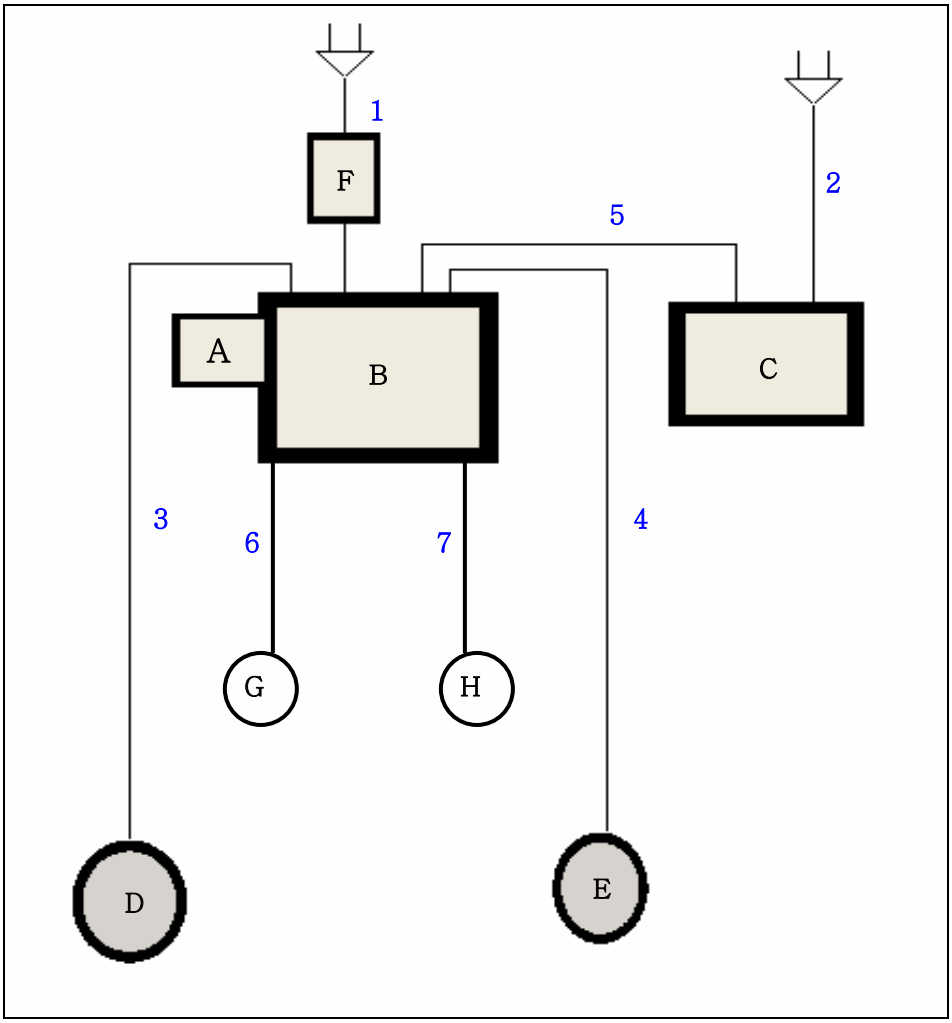
Block Diagram



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1.8 Applied Standards

List

Product or Generic Standards	Basic Standards
FCC Part15	ANSI C63.4 : 2003

1.9 Test Facility

General Information

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 22, 16-1, 16-2.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme (KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) for the above test item(s) and test method(s).

This Lab. is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:1998.

Accreditation and Listing

Uncertainty (According to NAMAS Pub.NIS81)

Conducted Emission : ±1.9dB

Radiated Emission Bi-Log Antenna : ±5.1dB

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2. Summary of Test Results

Result : PASS

The equipment under test(EUT) has been found to comply with the applied standards.

Section of the Product Standard		Applied Standard	Result
Electromagnetic Emission Test			
3.1	Conducted Emission	Fcc Part 15 Sub. B	Complied
3.2	Radiated Emission	Fcc Part 15 Sub. B	Complied

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3.1 Conducted Emission

Test Information	
Test Engineer	Young Hun, Cheong
Test Date	February 07, 2005
Climate Condition	Ambient Temperature : 25.0 ℃ Relative Humidity : 39%
	Atmospheric Pressure 1019mbar
Test Place	Shield Room

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
EMI TEST RECEIVER	ESCS30	R&S	830986/004	2005-02-12	12
LISN	ESH3-Z5	R&S	100263	2005-05-25	12
LISN	ESH3-Z5	R&S	831887/004	2005-08-31	12

Measurement Results	**Passed** The Measured emissions of the EUT have found to be below the specified limits.

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Test Data & Graph

The Initial step in collecting conducted data was to perform a peak and average scan over the measurement range using a receiver

The find data represents worst-case emissions.

* QP : Quasi-peak, AV: Average

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

* Margin = Limit – Result

1. TEST DATA

1-1. Quasi Peak Table

MEASUREMENT RESULT: "SECFRPC_2G_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.195000	47.50	0.6	64	16.5	L1	GND
0.260000	45.20	0.5	61	15.8	L1	GND
0.520000	43.70	0.6	56	12.3	N	GND
0.585000	46.00	0.6	56	10.0	L1	GND
0.655000	39.60	0.5	56	16.4	L1	GND
0.720000	41.80	0.5	56	14.2	L1	GND
0.785000	40.40	0.5	56	15.6	L1	GND
1.110000	41.70	0.6	56	14.3	L1	GND
1.175000	41.80	0.6	56	14.2	L1	GND
1.630000	40.10	0.6	56	15.9	L1	GND

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1-2. Average Table

MEASUREMENT RESULT: "SECFRPC_2G_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.460000	34.40	0.5	47	12.6	N	GND
0.520000	40.40	0.6	46	5.6	N	GND
0.585000	40.00	0.6	46	6.0	L1	GND
0.650000	37.70	0.5	46	8.3	L1	GND
0.715000	39.40	0.5	46	6.6	L1	GND
1.045000	35.30	0.6	46	10.7	L1	GND
1.110000	38.10	0.6	46	7.9	L1	GND
1.175000	39.00	0.6	46	7.0	N	GND
1.240000	39.40	0.6	46	6.6	L1	GND
1.630000	36.40	0.6	46	9.6	N	GND

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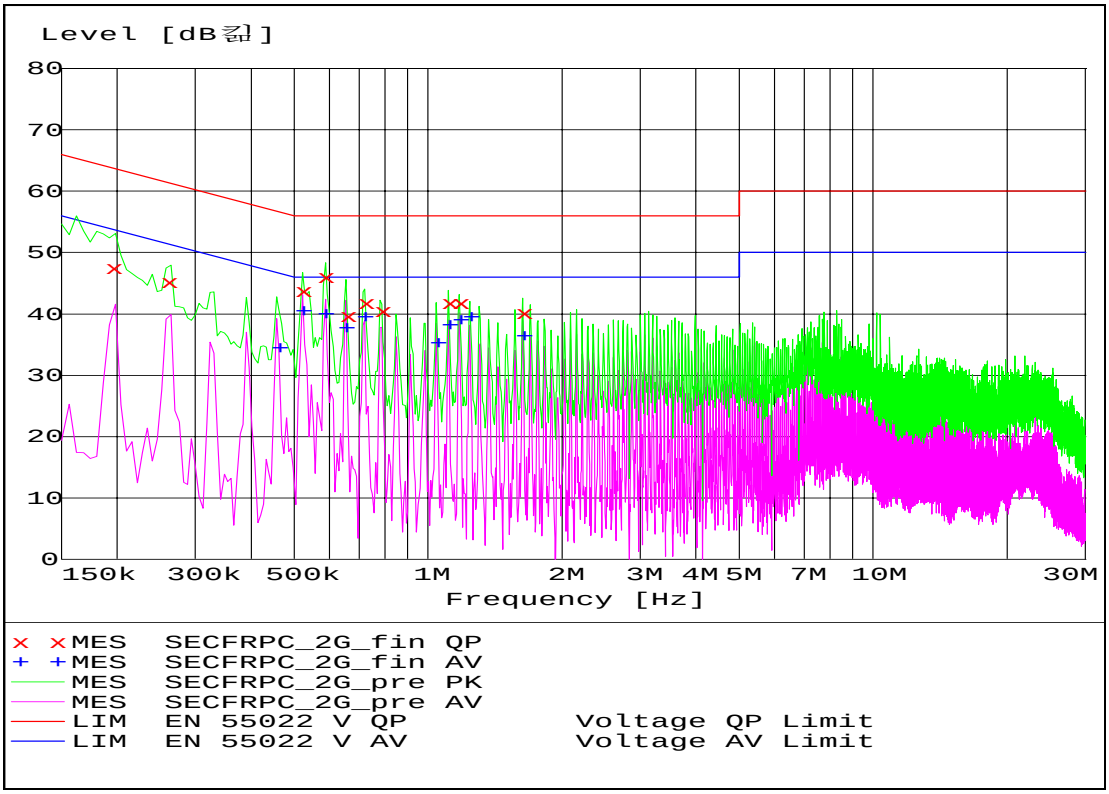
2. Graph



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3.2 Radiated Emission

Test Information	
Test Engineer	Young Hun, Cheong
Test Date	January 28, 2005
Climate Condition	Ambient Temperature : 20.0℃ Relative Humidity : 54%
	Atmospheric Pressure 1015mbar
Test Place	10m Semi Anechoic Chamber

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Test Receiver	ESI26	R&S	100019	2005-02-16	12
Turn Table	DT430	HD	430/691/01	N/A	N/A
Antenna Mast	MA240	HD	240/678 BJ:01	N/A	N/A
Controller	HD100	HD	100/723	N/A	N/A
Preamplifier	CPA9232	Schaffner	1053	2005-08-14	12
BILOG Antenna	CBL6112B	Schaffner	2805	2005-02-23	12

Measurement Results	**Passed** The measured emissions of the EUT have found to be below the specified limits.

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Test Data & Graph

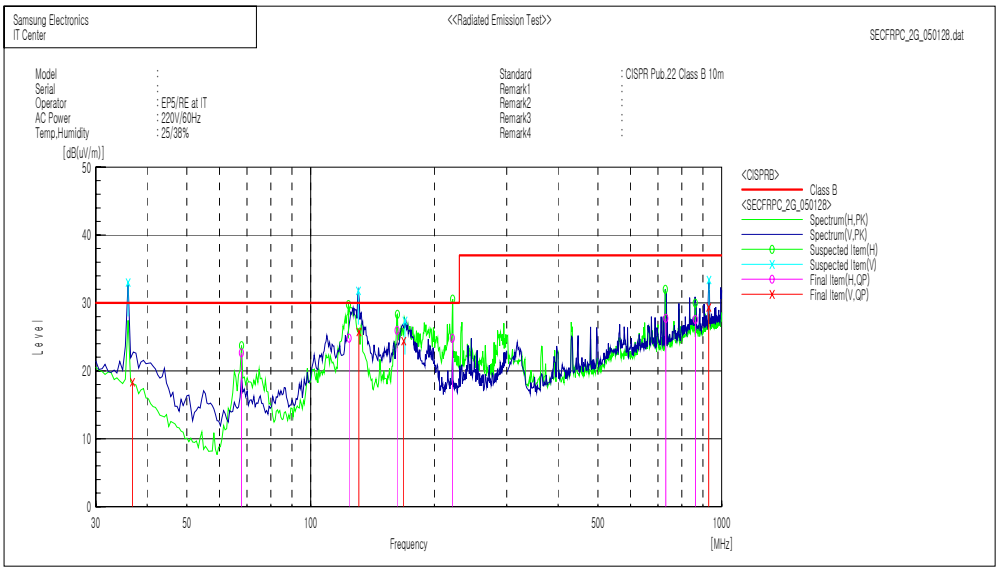
The initial step in collecting radiated data was to perform a peak scan over the measurement range using a receiver. All modes of operation were investigated and the worst-case emission are reported. The minimum margin to the limit is as follows:

All other emission are non-significant.

* Receiving Antenna Mode : Horizontal, Vertical
* Test distance : 10m (Semi-Anechoic Chamber)
* Result = Meter Reading + Total Loss(Antenna factor + Cable loss - Amp. Gain)
* CF = Antenna Factor + Cable Loss - Amp. Gain
* Margin = Limit – Result

1. Data & Graph

Samsung Electronics Co., Ltd
IT Center



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	36.837	V	S	23.7	-5.3	18.4	30.0	11.6	111.0	359.0	
2	67.851	H	S	37.3	-14.7	22.6	30.0	7.4	400.0	167.0	
3	123.972	H	S	31.8	-7.0	24.8	30.0	5.2	359.0	255.0	
4	131.028	V	S	32.9	-7.2	25.7	30.0	4.3	139.0	318.0	
5	162.259	H	S	35.4	-9.4	26.0	30.0	4.0	400.0	263.0	
6	168.309	V	S	34.2	-9.8	24.4	30.0	5.6	100.0	151.0	
7	221.189	H	S	33.9	-9.1	24.8	30.0	5.2	400.0	199.0	
8	731.468	H	S	24.0	3.7	27.7	37.0	9.3	380.0	356.0	
9	863.346	H	S	21.4	6.2	27.6	37.0	9.4	348.0	311.0	
10	929.684	V	S	23.4	6.0	29.4	37.0	7.6	179.0	223.0	

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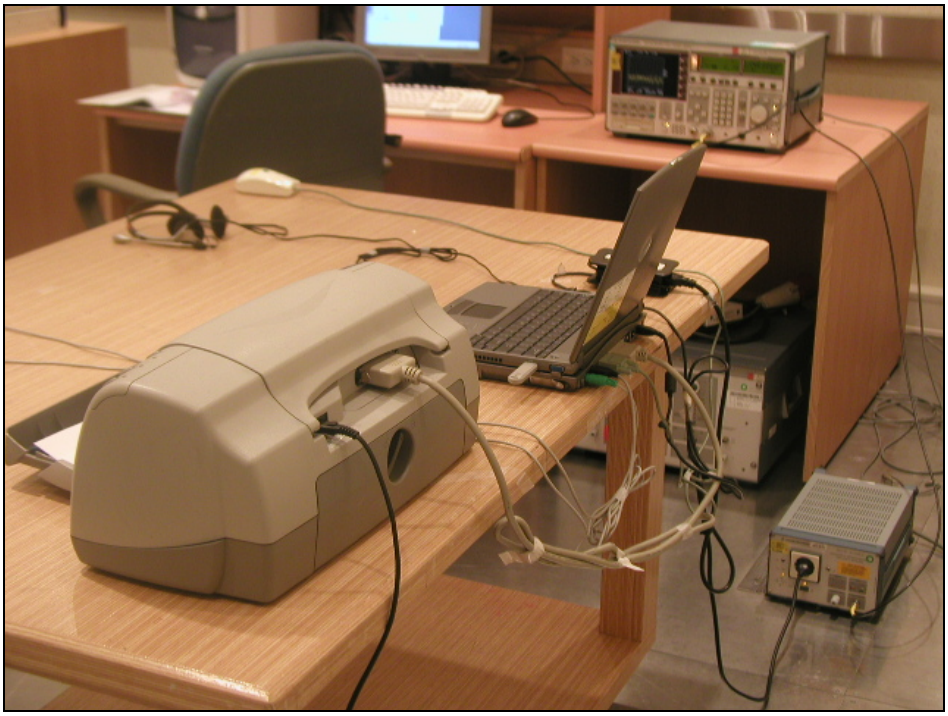
4. Appendix

4.1 Test Photography

Picture 1. Conducted Emission (Front)



Picture 2. Conducted Emission (Rear)

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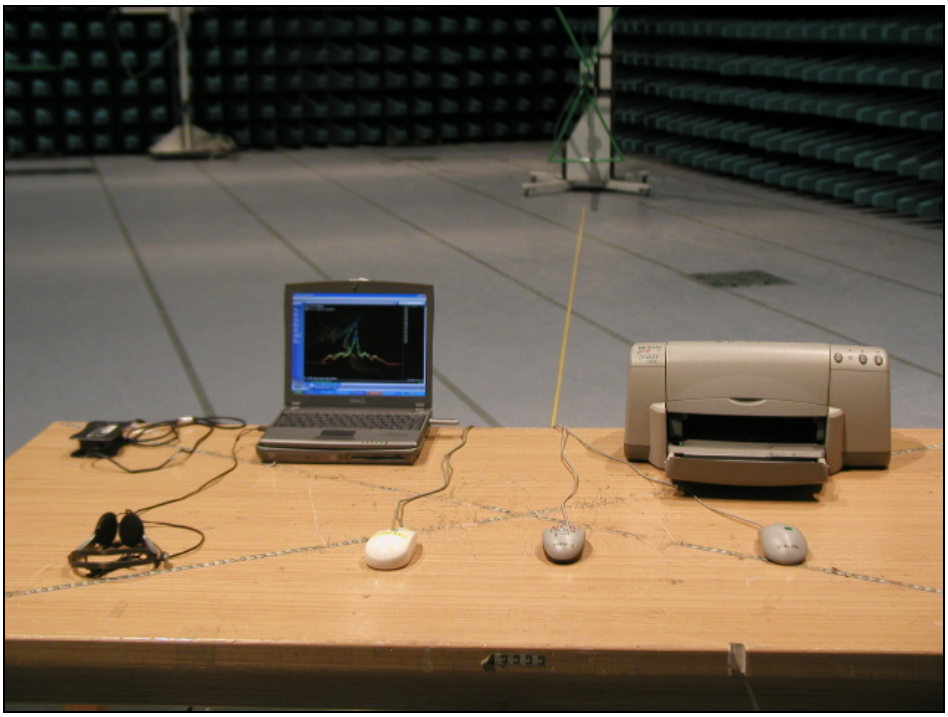
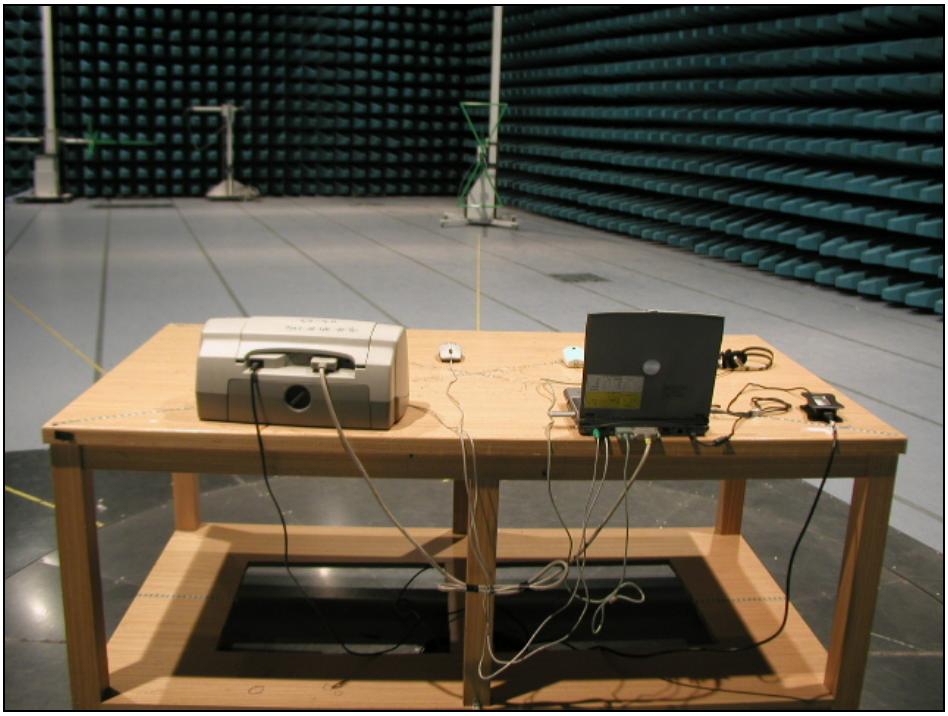


Picture 3. Radiated Emission (Front)



Picture 4. Radiated Emission (Rear)

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4.2 EUT Photography

Picture 5. EUT (Top)

Picture 6. EUT (Bottom)

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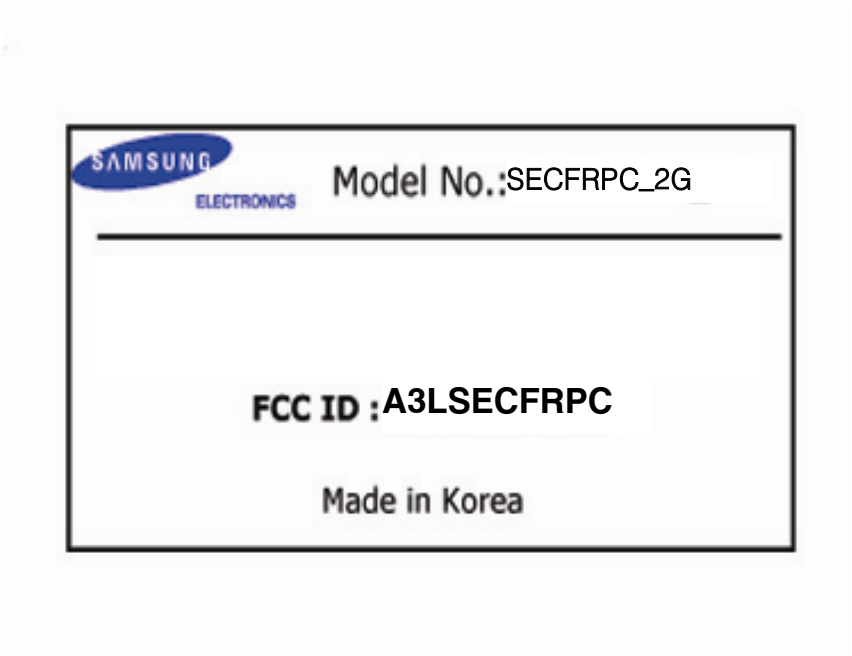

Picture 7. EUT (Label)

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