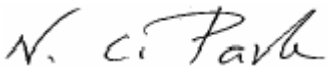
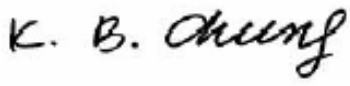
EMC Test Report

According to FCC Part 15 Subpart B

Project No.	LBE041998
Equipment under Test	
Applicant	Samsung Electronics Co., Ltd.
	416 Maetan-3Dong, Yeong tong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
FCC ID	**A3LSECSMOA**
Product Name	USB Flash Drive
Model Name	SECSMOA_2G
Manufacturer	Samsung Electronics Co., Ltd.
Date of Test	October 21, 2004 ~ October 21, 2004
Issued Date	October 26, 2004

	Name/Position	Signature
Tested by	Hak Seong, Kang Test Engineer	
Reviewed by	No Cheon, Park Manager of EMC Lab.	
Authorized by	Kyu Baek, Chung 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

Table of Contents

1. General Information

1.1 Basic Information related Product

Applicant	Samsung Electronics Co., Ltd.
Model name	SECSMOA_2G
Applicant Address	416 Maetan3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Contact Person	Hak Seong, Kang
Kind of product	USB Flash Drive
Valiant list	1GB : SECSMOA_1G, 512MB : SECSMOA_512, 256MB :SECSMOA_256, 128MB : SECSMOA_128 64MB : SECSMOA_64, 32MB : SECSMOA_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.) - Software support : – Password lock – Secure zoning - Auto Sleep Mode - USB Bus Powered (4.75 volt – 5.25 volt) - Suspend ≤ 500uA	

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.

1.6 Test Procedure

1.6.1 Disturbance Voltage at Mains

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 groud 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 conducing 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.

1.6.2 Radiated disturbance

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

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.

1.7 Test Configuration

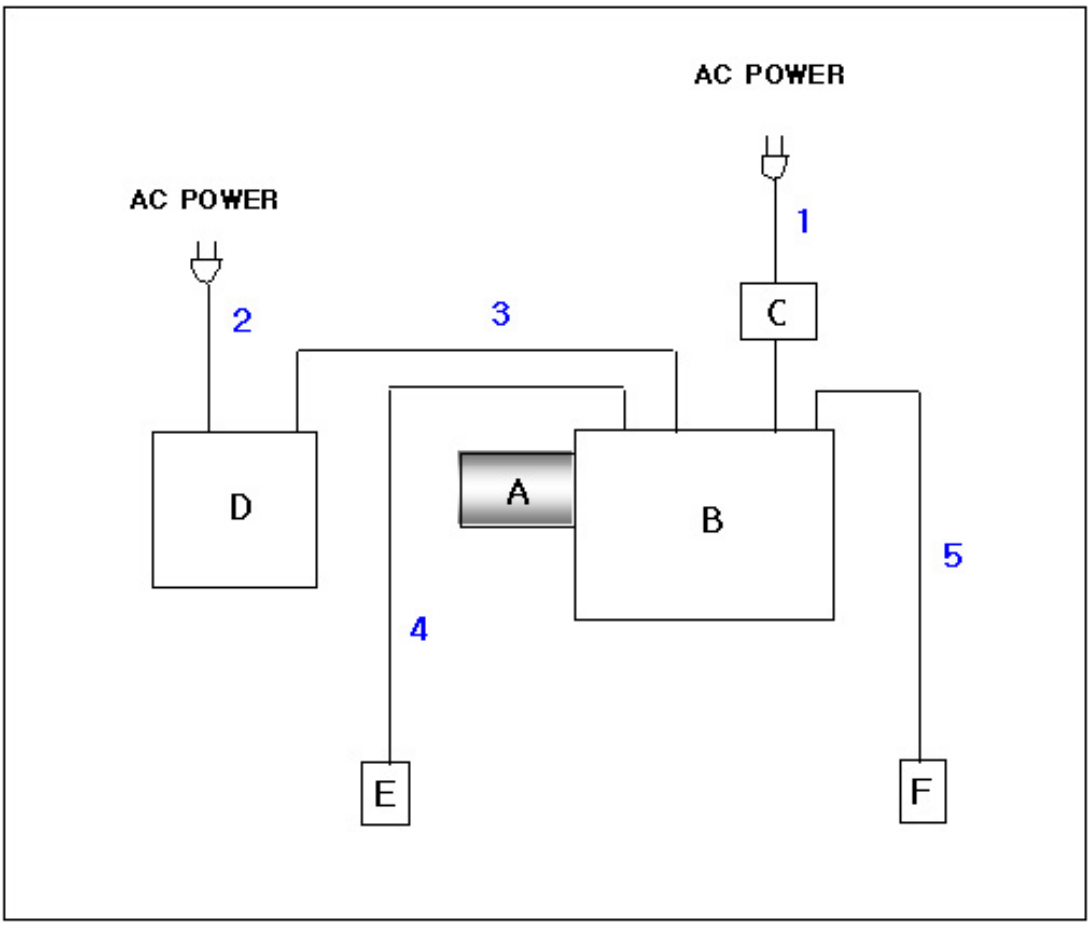
Used EUT and Peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	USB Flash Drive	SECSMOA_2G	-	Samsung	EUT
B	Notebook PC	Blade	-	Dell	
C	AC Adapter	PA-1500-05D	CN-00R334- 48010-286-00E0	Dell	For Notebook PC
D	Printer	DeskJet932C	-	HP	
E	USB Mouse	M-UV89a	HCA40801448	Logitech	
F	Serial Mouse	C3KMS1	0988578	Microsoft	

Used Cable Description

No	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.7	No	For Note PC
2	Power	1.7	No	For Printer
3	Parallel (Printer)	1.8	Yes	For Printer
4	USB	1.7	Yes	For USB Mouse
5	Serial	1.7	Yes	For Serial Mouse

Block Diagram



1.8 Applied Standards

List

Product or Generic Standards	Basic Standards
FCC Part15	ANSI C63.4 : 2001

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, 11.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (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)

Samsung IT EMC Test Lab.

Disturbance voltage at Mains : ±1.9dB

Radiated disturbance Bi-Log Antenna : ±5.1dB

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	3.1
3.2	Radiated Emission	Fcc Part 15 Sub. B	3.2

3.1 Conducted Emission

Test Information	
Test Engineer	Hak Seong, Kang
Test Date	October 21, 2004
Climate Condition	Ambient Temperature :23 ℃ Relative Humidity : 55%
	Atmospheric Pressure 1013mbar
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	3810/2NM	EMCO	2251	2005-02-07	12
Double 2-Wire ISN	ENY22	R&S	836727/016	2005-02-23	12

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

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 & GRAPH

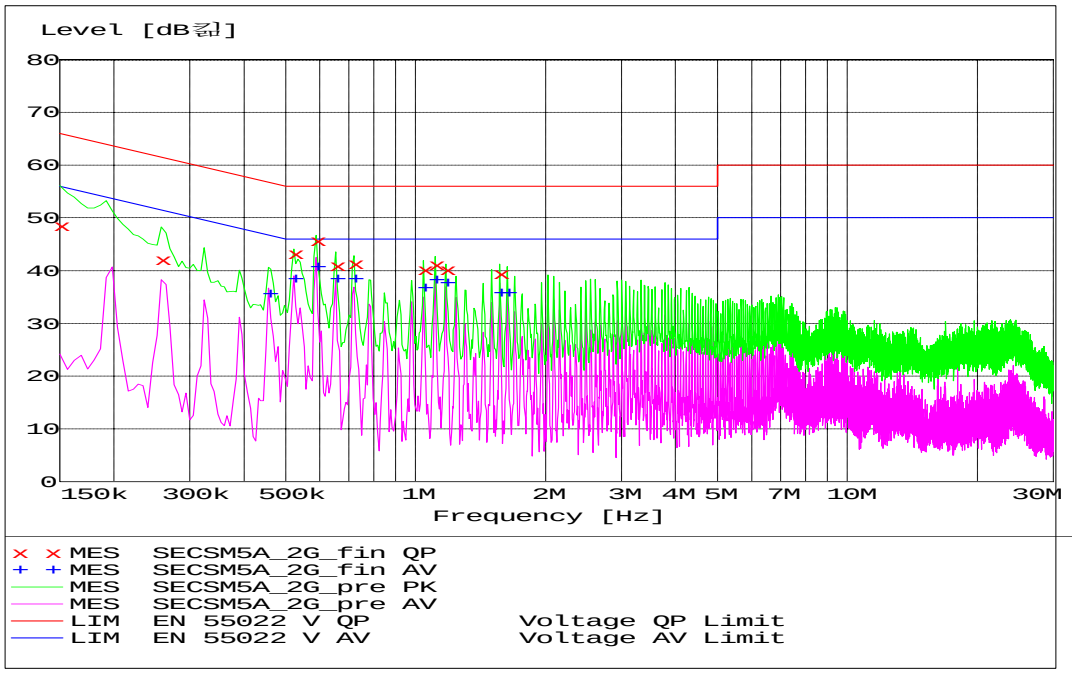
1. Quasi Peak Table

Frequency	Meter Reading	Total Loss	Phase	Result	Limit	Margin
[MHz]	[dBuV]	[dB]		[dBuV]	[dBuV]	[dB]
0.150000	47.9	0.60	L1	48.5	66.00	17.50
0.258000	41.6	0.50	L1	42.1	61.50	19.40
0.522000	42.5	0.60	N	43.1	56.00	12.90
0.588000	44.9	0.60	N	45.5	56.00	10.50
0.654000	40.5	0.50	L1	41	56.00	15.00
0.720000	40.8	0.50	L1	41.3	56.00	14.70
1.044000	39.5	0.60	L1	40.1	56.00	15.90
1.110000	40.5	0.60	L1	41.1	56.00	14.90
1.176000	39.5	0.60	N	40.1	56.00	15.90
1.566000	38.8	0.60	L1	39.4	56.00	16.60

2. Average Table

Frequency	Meter Reading	Total Loss	Phase	Result	Limit	Margin
[MHz]	[dBuV]	[dB]		[dBuV]	[dBuV]	[dB]
0.456000	35.1	0.50	L1	35.6	46.80	11.20
0.522000	37.8	0.60	N	38.4	46.00	7.60
0.588000	40.1	0.60	N	40.7	46.00	5.30
0.654000	38	0.50	L1	38.5	46.00	7.50
0.720000	37.9	0.50	N	38.4	46.00	7.60
1.044000	36.2	0.60	L1	36.8	46.00	9.20
1.110000	37.7	0.60	L1	38.3	46.00	7.70
1.176000	37	0.60	N	37.6	46.00	8.40
1.566000	35.2	0.60	L1	35.8	46.00	10.20
1.632000	35.2	0.60	L1	35.8	46.00	10.20

- Graph -



3.2 Radiated Emission

Test Information	
Test Engineer	Hak Seong, Kang
Test Date	October 21, 2004
Climate Condition	Ambient Temperature : 20℃ Relative Humidity : 54% Atmospheric Pressure 1013mbar
Test Place	10m RF Semi Anechoic Chamber

Test Equipments

Equipment	Model Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
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	1054	2005-02-12	12
BILOG Antenna	CBL6112B	Schaffner	2805	2005-02-23	12
Test Receiver	ESI26	R&S	100010	2005-03-16	12

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

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

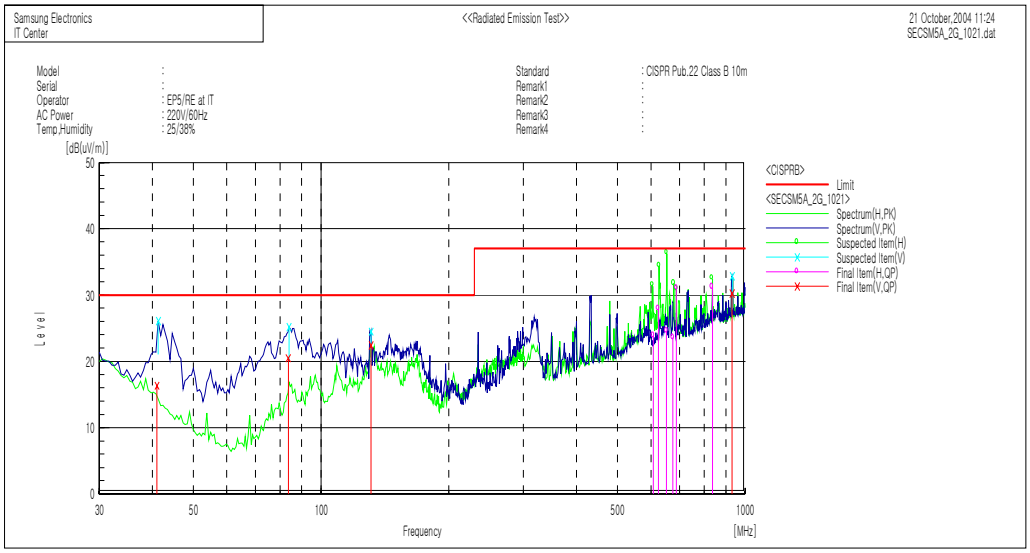
* Test distance : 10m (Semi-Anechoic Chamber)

* Result = Meter Reading + Total Loss(Antenna factor + Cable loss)

* Margin = Limit – Result

1. - Graph -

Samsung Electronics Co., Ltd
IT Center



Final Result

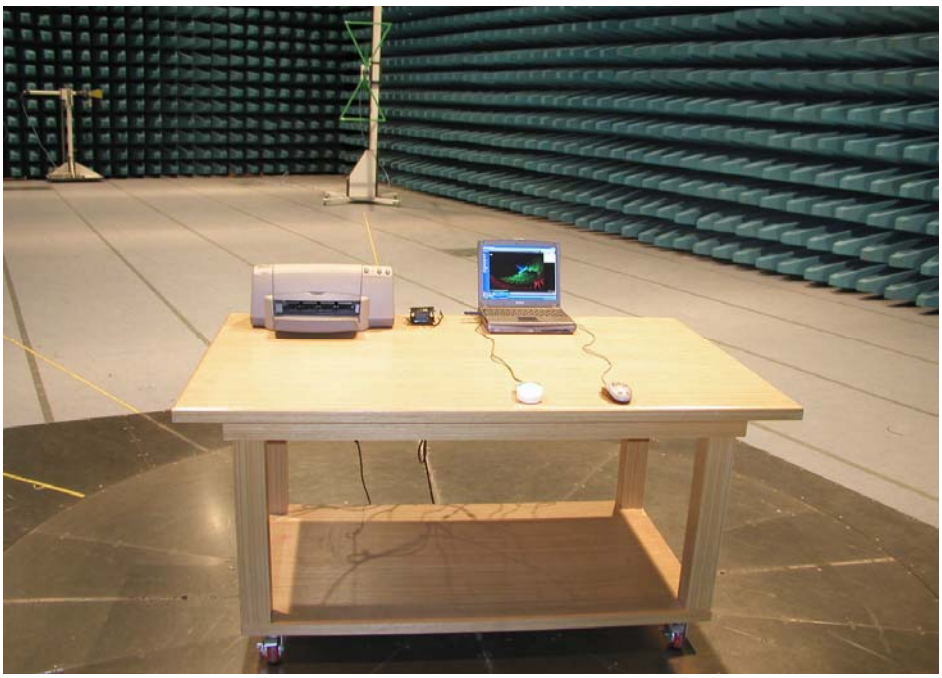
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	41.035	V	23.8	-7.5	16.3	30.0	13.7	111.0	286.0	
2	83.683	V	32.8	-12.3	20.5	30.0	9.5	167.0	288.0	
3	131.191	V	29.6	-7.2	22.4	30.0	7.6	115.0	299.0	
4	606.562	H	21.6	2.2	23.8	37.0	13.2	143.0	28.0	
5	624.069	H	25.3	2.6	27.9	37.0	9.1	167.0	223.0	
6	652.322	H	21.4	3.2	24.6	37.0	12.4	145.0	219.0	
7	675.678	H	20.2	3.3	23.5	37.0	13.5	151.0	311.0	
8	688.135	H	27.8	3.2	31.0	37.0	6.0	142.0	235.0	
9	835.542	H	25.1	6.0	31.1	37.0	5.9	109.0	313.0	
10	931.494	V	24.1	6.1	30.2	37.0	6.8	204.0	47.0	

4. Appendix

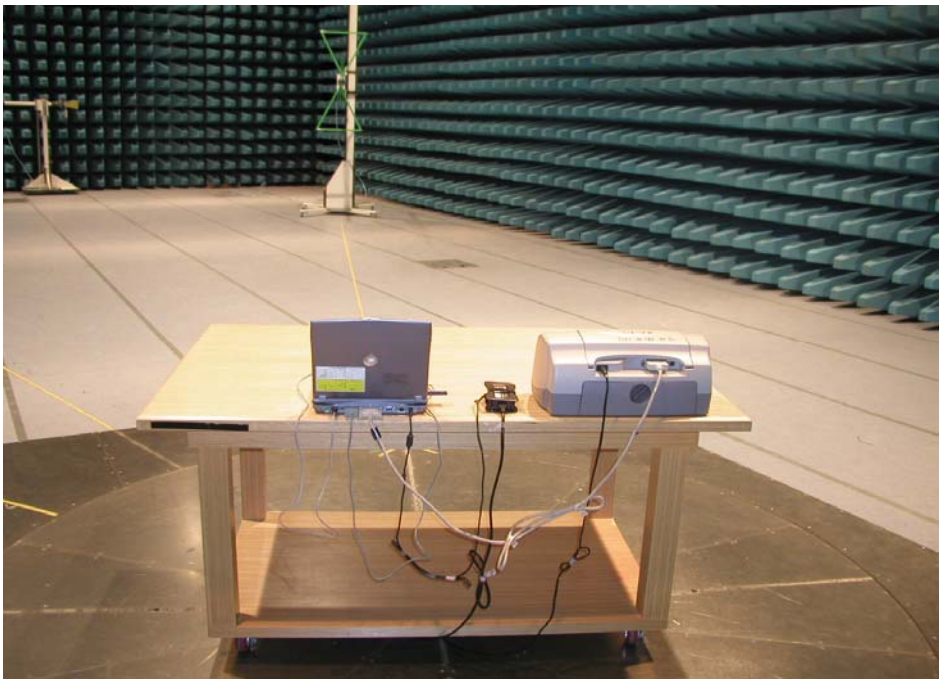
4.1 Test Photography

Pic. 1 Conducted Emission (Front)

Pic. 2 Conducted Emission (Rear)



Pic. 3 Radiated Emission (Front)

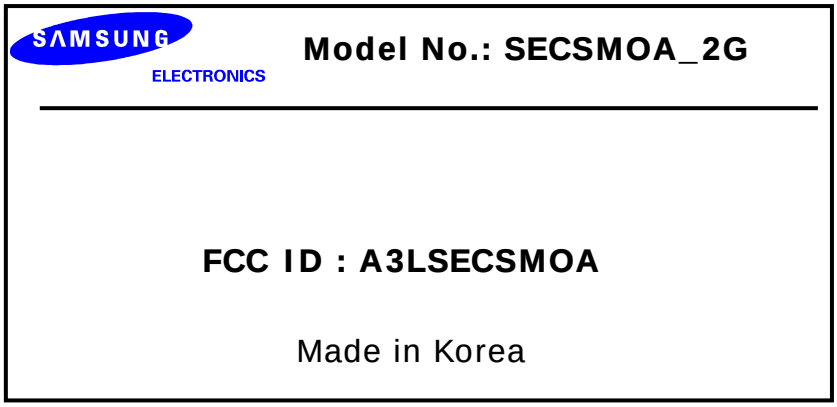


Pic. 4 Radiated Emission (Rear)

4.2 EUT Photography

Pic. 5 EUT (Front)

Pic. 6 EUT (Rear)



Pic. 7 Label