SAMSUNG ELECTRONICS

EMC TEST REPORT

Project No. : LBE041161

Product : LCD TV MONITOR

Model No. : GA46UO

Date of test : May. 24 ~ 25, 2004

Issued Date : May. 27, 2004

Tested by:
Tae Young,JANG / Test Engineer

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

Authorized by:
Kyu Baek, CHUNG / Chief of EMC Lab.

SAMSUNG ELECTRONICS Co., Ltd.
EMC Test Laboratory
416 Maetan-3 Dong, Yeongtong-Ku, Suwon City, Kyungki-Do,Korea, 442-742
Tel. : 81-31-200-2185 Fax. : 81-31-200-2189

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

Table of Contents

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

1. Introduction & Summary

1.1 Description of the EUT

Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Project Number	LBE041161
Equipment Under Test	LCD TV MONITOR
Trade Name	SAMSUNG
Model Number	GA46UO
Variant Model	-
Operating Frequency	60Hz
FCC ID Number	A3LGA46UO
Mains input	120V

1.2 Test facility

The EMI/EMS measurement facilities used to collect the tested data are located at 416 Maetan 3 Dong, Youngtong-Ku, Suwon City, Kyungki Do, Korea.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1 & 16-2.
SAMSUNG Electronics Co.,Ltd 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).

Measured in Semi-anechoic chamber #1 that is FCC Registration Number 98856.

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

1.3 Test equipment

Description	Model	Manufacturer	Serial No.	Applied
TEST RECEIVER	ESS	R & S	844861/005	o
Spectrum Analyzer	E7405A	Agilent	MY42000109	o
RF Relais Matrix	PSU	R & S	861206/024	o
LISN	ESH3-Z5	R & S	100261	o
Test Software	EP5/CE	TOYO	Version : 2.0.860	o
Test Receiver	ESCS30	R & S	100104	o
Secetrum Analyzer	E7405A	AGILENT	US41110272	o
RF Selector	NS4900	TOYO	0303-015	o
Mast Controller	HD2000	HD	HD20000902027	o
Bi-Log Antenna	CBL6112B	SCHAFFNER	2766	o
Preamp	8447D	Agilent	2944A10430	o
Test Software	EP5/RE	TOYO	Version : 2.0.860	o
Antenna Mast	MA240	HD	240/620	o
Turn Table	DS412	HD	-	o
Test Receiver	ESI26	R & S	100067	o
TV Pattern Gen.	PM5418	Philips	L0612437	o
Matching Pad	RAM	R & S	860708/043	o
Matching Pad	RAM	R & S	860175/025	o
Power Divider	11636A	HP	2512	o

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

2. Test Set-up

2.1 Test mode

The EUT was tested in the following operating modes for the tests mention in this report:

Description of Testing operating mode & Tested Resolution

Operating Mode	Resolutions	Refresh rates	Colors
"H" Pattern display	1920x1080	Horizontal F.: 80kHz	32bits
		Vertical F. : 75Hz	

Measured each about 2 input(PC VIDEO INPUT mode & Digital Video Interface)of EUT.
Further details of cabling and configuration are shown in the test system configuration.
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.

2.2 Justification

The system was configured for testing in typical fashion use. Cable were attached to each of the available I/O Ports.
The mode of operation utilized for testing was selected to best simulate typical EUT use.

2.3 Test equipment setup

The explanation of measuring equipment setup when respective function is used in any frequency band is as following:

Frequency Band [MHz]	Equipment	Detector function	Resolution Bandwidth	Video Bandwidth
0.15 to 30	EMI Test receiver	Quasi-Peak	9kHz	-
30 to 1000	Spectrum analyzer	Peak	100kHz	1MHz
	EMI Test receiver	Quasi-Peak	120kHz	-
Above 1000	EMI Test receiver	Peak	1MHz	1MHz

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

2.4 Tested System Details

1) Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	LCD TV MONITOR	GA46UO	-	Samsung	EUT
B	Personal Computer	M6050	-	Samsung	DoC
C	Printer	ML-1750	PR1750-120V-018	Epson	A3LML-1750
D	PS/2 Keyboard	7800	K80100020	Gateway	DoC
E	PS/2 Mouse	SWB-400	4BDF030605	Samsung	GJJSP65C0
F	Earphone	-	-	-	-
G	Earphone	-	-	-	-

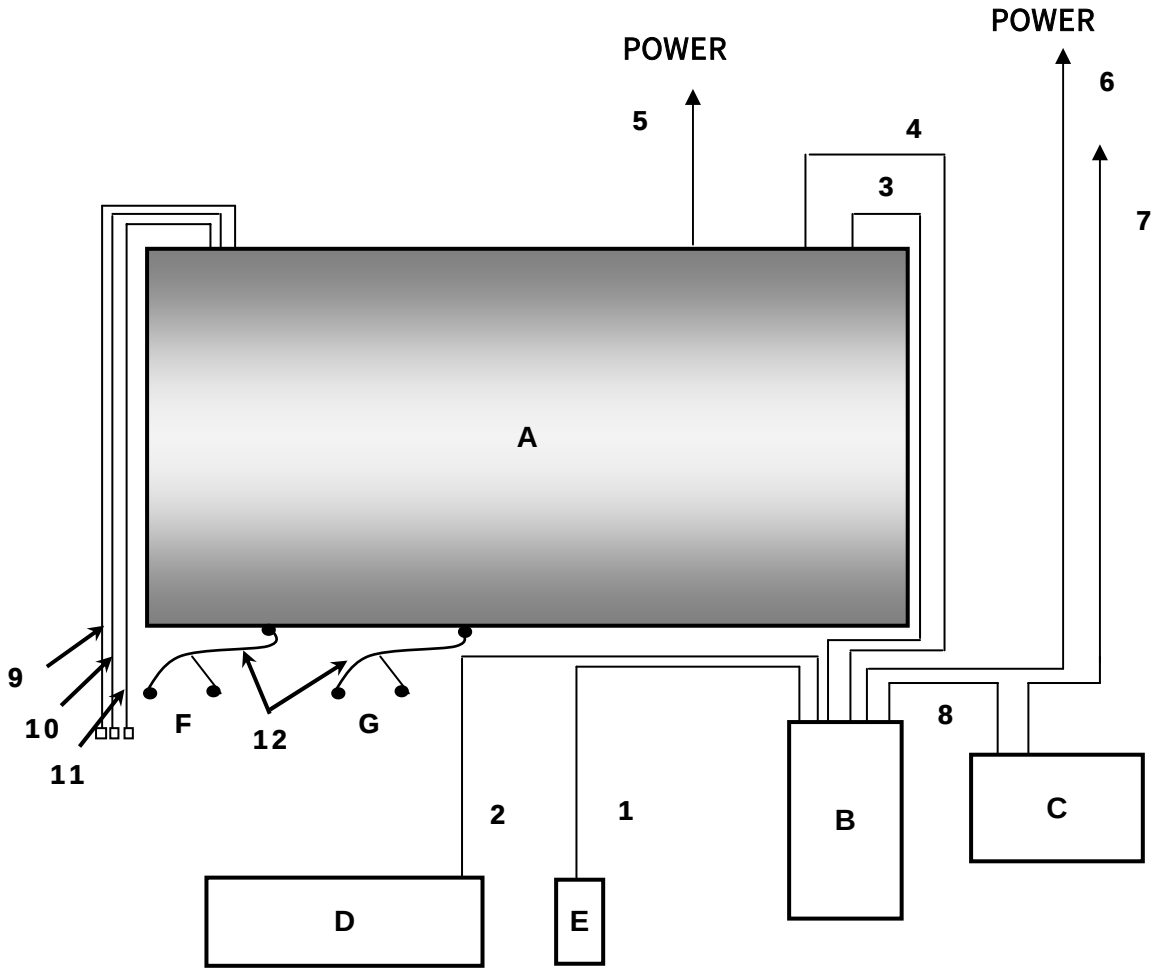
* DOC : FCC Declaration of Conformity

2) Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	PS/2 Mouse Cable	1.8	N	
2	USB Keyboard Cable	1.6	N	
3	Video Cable(Analog)	1.5	Y	
4	Video Cable(Digital)	1.5	Y	
5	AC Power Cable(Monitor)	1.8	N	
6	AC Power Cable(PC)	1.8	N	
7	AC Power Cable(Printer)	1.8	N	
8	Printer Cable	1.5	Y	
9	ANT Cable	1.2	N	
10	S-Video In Cable	1.2	N	
11	RCA Cable	1.2	N	
12	Earphone Cable	1.2	N	

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

2.5 System Block Diagram of Test Configuration



2.6 Test rule and Procedure

FCC Rule Part 15, Subpart B : Unintentional Radiators
Test Procedure : ANSI C63.4-1992

2.7 Test Summary

Test item	Test Procedure	Result
AC POWERLINE CONDUCTED EMISSION	ANSI C63.4-1992	Pass
RADIATED EMISSION	ANSI C63.4-1992	Pass

* N/A : Test not applicable

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3. Test Results

3.1 AC POWERLINE CONDUCTED EMISSION MEASUREMENT

3.1.1 Test Procedure

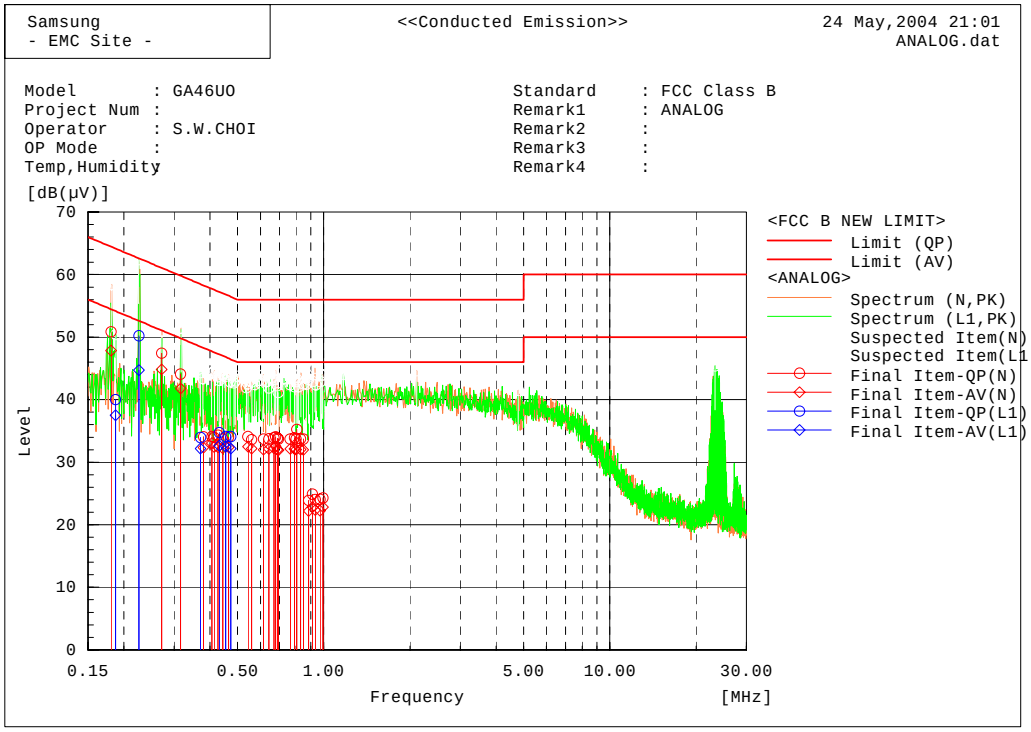
Configurate the EUT System in accordance with ANSI C63.4-1992 section 7 and 12.2.
Connect the EUT's AC line cord to the EUT port of LISN.
All input terminals are terminated in the proper impedance.
The output ports are connected to the cable provided with the device and the ending port are terminated in the proper impedance.

Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT. To the find out an EUT condition procedures the maximum emission, the position of cables, EUT operations mode are the position of cables, EUT operations mode are checked under normal usage of EUT.
Then, the emission are scanned from 0.15MHz to 30MHz relative to the limit are recorded.

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.1.2 Test Results

- Operating Mode : PC Video Input **LISN Mode : Live & Neutral**



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.18055	50.8	47.8	0.1	50.9	47.9	64.5	54.5	13.6	6.7
2	0.2712	47.4	44.7	0.1	47.5	44.8	61.1	51.1	13.7	6.3
3	0.31586	44.0	41.7	0.1	44.1	41.8	59.8	49.8	15.7	8.0
4	0.37929	34.0	32.2	0.1	34.1	32.3	58.3	48.3	24.3	16.0
5	0.40657	34.0	32.9	0.1	34.1	33.0	57.7	47.7	23.6	14.7
6	0.41404	33.9	32.4	0.1	34.0	32.5	57.6	47.6	23.6	15.2
7	0.4269	34.2	32.3	0.1	34.3	32.4	57.3	47.3	23.0	14.9
8	0.44274	33.7	32.1	0.1	33.8	32.2	57.0	47.0	23.3	14.8
9	0.46412	33.9	32.3	0.1	34.0	32.4	56.6	46.6	22.6	14.2
10	0.5434	34.0	32.4	0.1	34.1	32.5	56.0	46.0	21.9	13.5
11	0.55984	33.5	32.1	0.1	33.6	32.2	56.0	46.0	22.4	13.8
12	0.61525	33.6	31.9	0.1	33.7	32.0	56.0	46.0	22.3	14.0
13	0.64296	33.6	32.0	0.1	33.7	32.1	56.0	46.0	22.3	13.9
14	0.66929	33.8	32.1	0.1	33.9	32.2	56.0	46.0	22.1	13.8
15	0.67875	34.0	32.5	0.1	34.1	32.6	56.0	46.0	22.0	13.4
16	0.68795	33.8	31.9	0.1	33.9	32.0	56.0	46.0	22.2	14.0
17	0.6946	33.6	31.8	0.1	33.7	31.9	56.0	46.0	22.3	14.1
18	0.7627	33.6	32.0	0.1	33.7	32.1	56.0	46.0	22.3	13.9
19	0.78995	33.8	32.0	0.1	33.9	32.1	56.0	46.0	22.1	13.9
20	0.80031	33.6	31.9	0.1	33.7	32.0	56.0	46.0	22.3	14.0
21	0.80533	35.2	33.0	0.1	35.3	33.1	56.0	46.0	20.7	12.9
22	0.8302	33.6	31.9	0.1	33.7	32.0	56.0	46.0	22.3	14.0
23	0.84795	33.6	31.9	0.1	33.7	32.0	56.0	46.0	22.3	14.0
24	0.88538	23.8	22.1	0.1	23.9	22.2	56.0	46.0	32.1	23.8
25	0.9138	24.8	22.7	0.1	24.9	22.8	56.0	46.0	31.1	23.2
26	0.93276	23.9	22.2	0.1	24.0	22.3	56.0	46.0	32.0	23.7
27	0.97079	24.0	22.2	0.1	24.1	22.3	56.0	46.0	31.9	23.7
28	0.9932	24.2	22.7	0.1	24.3	22.8	56.0	46.0	31.7	23.2

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.18727	39.9	37.4	0.1	40.0	37.5	64.2	54.2	24.2	16.7
2	0.22557	50.1	44.6	0.1	50.2	44.7	62.6	52.6	12.4	7.9
3	0.37093	33.9	32.1	0.1	34.0	32.2	58.5	48.5	24.6	16.3
4	0.43105	34.7	32.6	0.1	34.8	32.7	57.2	47.2	22.4	14.5

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

- Operating Mode : PC Video Input **LISN Mode : Live & Neutral**

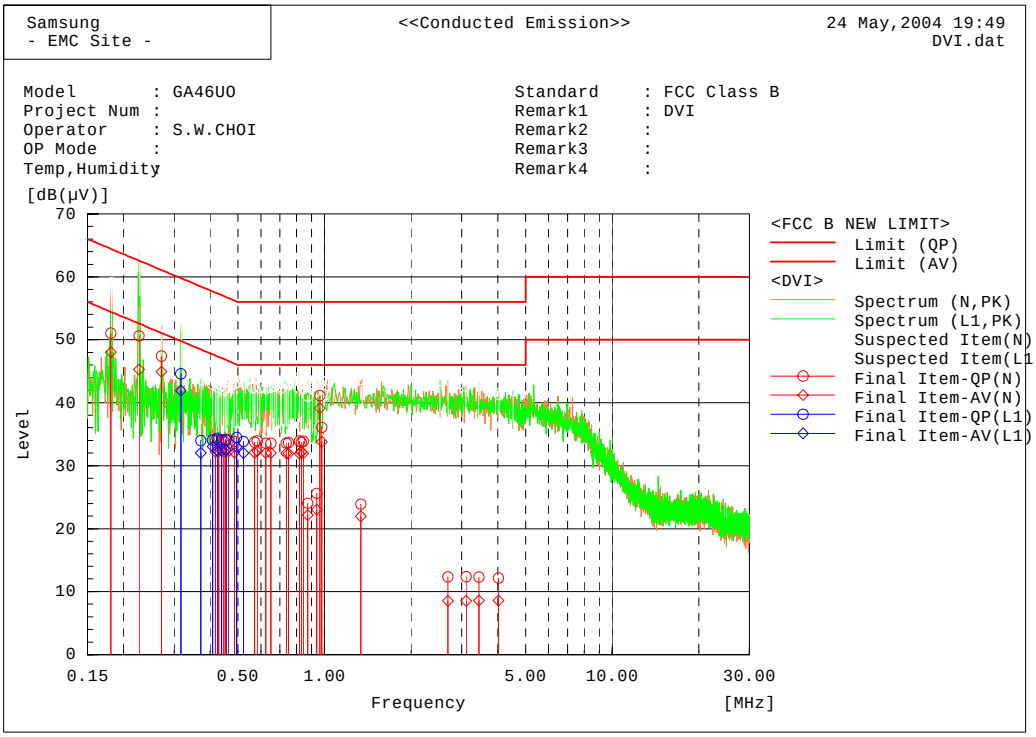
Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
5	0.45444	34.0	32.4	0.1	34.1	32.5	56.8	46.8	22.7	14.3
6	0.47251	34.0	32.1	0.1	34.1	32.2	56.5	46.5	22.4	14.3

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

- Operating Mode : Digital Video Interface , LISN Mode: Live & Neutral



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.97695	36.0	33.7	0.1	36.1	33.8	56.0	46.0	19.9	12.2
2	0.22668	50.5	45.2	0.1	50.6	45.3	62.6	52.6	12.0	7.3
3	0.18077	51.0	47.9	0.1	51.1	48.0	64.5	54.5	13.4	6.5
4	0.2712	47.3	44.8	0.1	47.4	44.9	61.1	51.1	13.7	6.2
5	0.96466	41.0	39.0	0.1	41.1	39.1	56.0	46.0	14.9	6.9
6	0.58329	33.8	32.2	0.1	33.9	32.3	56.0	46.0	22.1	13.7
7	0.81891	33.8	31.8	0.1	33.9	31.9	56.0	46.0	22.1	14.1
8	0.84319	33.8	31.9	0.1	33.9	32.0	56.0	46.0	22.1	14.0
9	0.57129	33.6	32.0	0.1	33.7	32.1	56.0	46.0	22.3	13.9
10	0.82975	33.6	32.1	0.1	33.7	32.2	56.0	46.0	22.3	13.8
11	0.74903	33.6	31.8	0.1	33.7	31.9	56.0	46.0	22.3	14.1
12	0.48618	33.8	32.0	0.1	33.9	32.1	56.2	46.2	22.3	14.1
13	0.73521	33.5	31.9	0.1	33.6	32.0	56.0	46.0	22.4	14.0
14	0.6244	33.5	31.9	0.1	33.6	32.0	56.0	46.0	22.4	14.0
15	0.65058	33.5	31.9	0.1	33.6	32.0	56.0	46.0	22.4	14.0
16	0.46254	34.0	32.1	0.1	34.1	32.2	56.6	46.6	22.5	14.4
17	0.45237	34.1	32.5	0.1	34.2	32.6	56.8	46.8	22.6	14.2
18	0.44592	33.8	32.1	0.1	33.9	32.2	57.0	47.0	23.1	14.8
19	0.42843	34.1	32.2	0.1	34.2	32.3	57.3	47.3	23.2	15.1
20	0.41764	33.9	32.1	0.1	34.0	32.2	57.5	47.5	23.5	15.3
21	0.93906	25.5	22.9	0.1	25.6	23.0	56.0	46.0	30.4	23.0
22	0.87334	23.9	22.1	0.1	24.0	22.2	56.0	46.0	32.0	23.8
23	1.3364	23.8	21.9	0.1	23.9	22.0	56.0	46.0	32.1	24.0
24	3.1049	12.3	8.4	0.1	12.4	8.5	56.0	46.0	43.6	37.5
25	2.6807	12.2	8.4	0.1	12.3	8.5	56.0	46.0	43.7	37.5
26	3.4377	12.2	8.5	0.1	12.3	8.6	56.0	46.0	43.7	37.4
27	4.0247	12.1	8.5	0.1	12.2	8.6	56.0	46.0	43.8	37.4

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.31631	44.5	41.8	0.1	44.6	41.9	59.8	49.8	15.2	7.9
2	0.49454	34.4	32.9	0.1	34.5	33.0	56.1	46.1	21.6	13.1
3	0.52145	33.8	31.9	0.1	33.9	32.0	56.0	46.0	22.1	14.0
4	0.45428	34.0	32.3	0.1	34.1	32.4	56.8	46.8	22.7	14.4
5	0.43879	34.0	32.3	0.1	34.1	32.4	57.1	47.1	23.0	14.8

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

- Operating Mode : Digital Video Interface , LISN Mode: Live & Neutral

Final Result

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]
6	0.42256	34.3	32.3	0.1	34.4	32.4	57.4	47.4	23.1	15.0
7	0.40756	34.0	32.9	0.1	34.1	33.0	57.7	47.7	23.7	14.7
8	0.37162	33.9	32.0	0.1	34.0	32.1	58.5	48.5	24.5	16.5

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2 RADIATED EMISSION MEASUREMENT

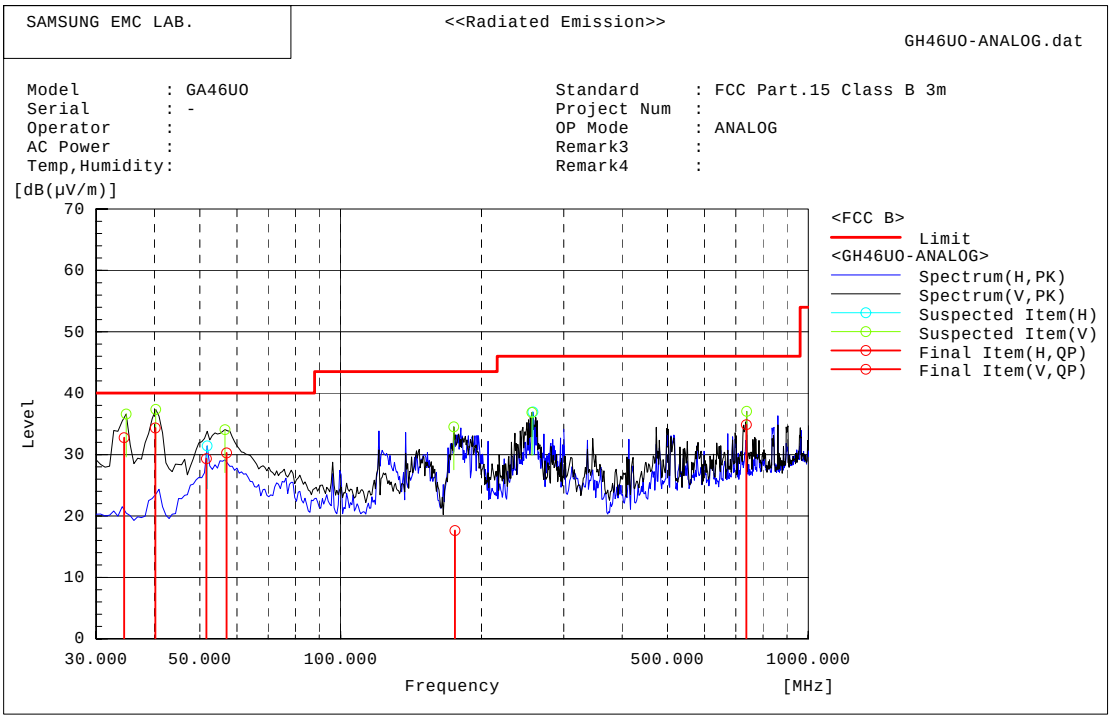
3.2.1 Test Procedure

Configurate the EUT System in accordance with ANSI C63.4-1992section 8 and 12.2.
Power cords for the EUT System are connected the receptacle on the ground plane.
The output ports are connected to the cable provided with the device and the ending port of the cable are terminated in the proper impedance.
To find out the maximum emission, change the position of the cable, and the EUT operation mode under normal usage of the EUT.
The spectrum analyzer are scanned from 30MHz to 2,000MHz.
And, detecting waves mode is peak mode, Graph's result in worst arrangement state of EUT. Spectrum analyzer result did horizontal and vertical polarization maxhold.

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2.2 Test Results

- Operating Mode : PC Video Input



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	51.654	48.5	-19.2	29.3	40.0	10.7	

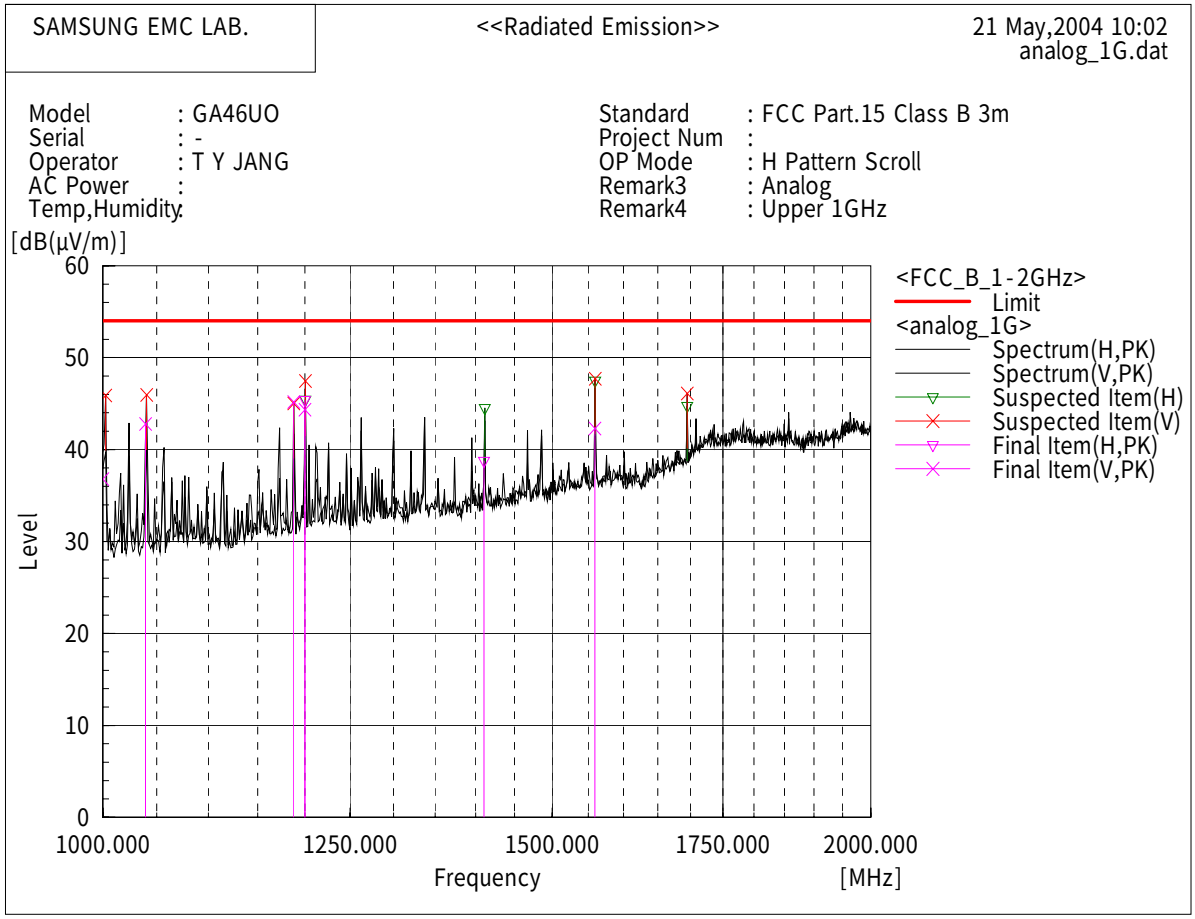
--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	40.139	48.4	-14.1	34.3	40.0	5.7	
2	34.415	43.9	-11.1	32.8	40.0	7.3	
3	57.041	50.9	-20.6	30.3	40.0	9.8	
4	737.030	36.2	-1.3	34.9	46.0	11.1	
5	175.476	33.4	-15.8	17.6	43.5	25.9	

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

3.2.2 Test Results

- Operating Mode : PC Video Input upto 2GHz



Final Result

--- Horizontal Polarization (PK)---

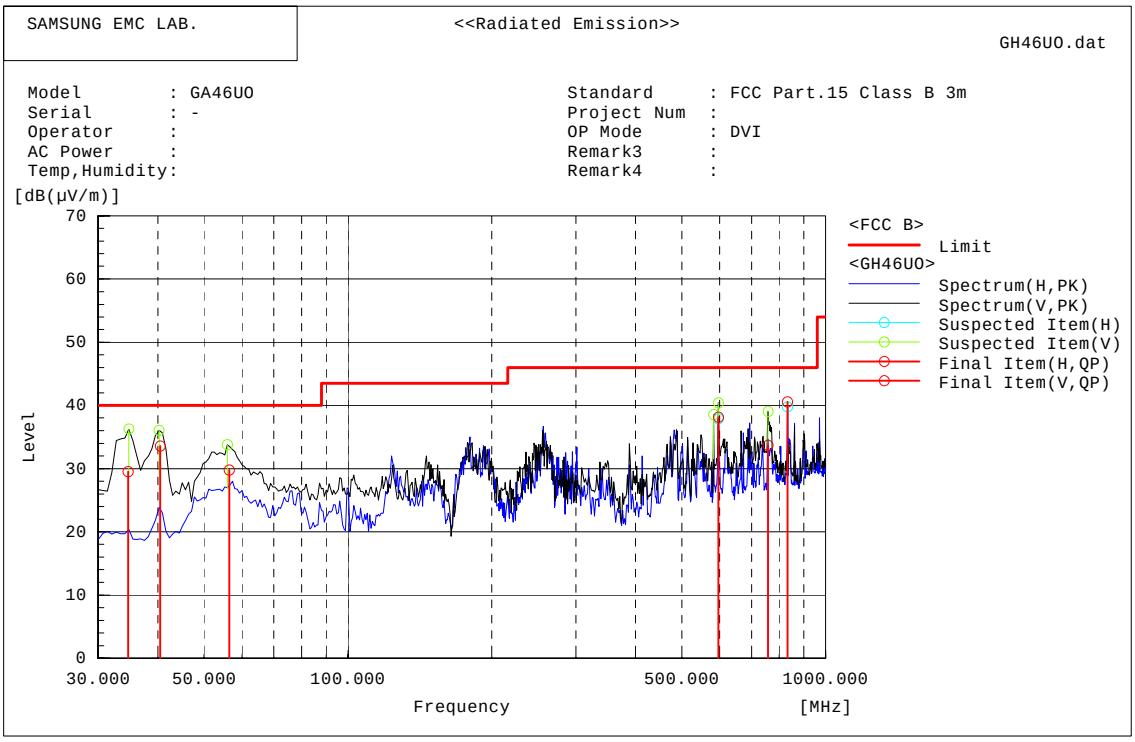
No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	1200.000	39.4	6.0	45.4	54.0	8.6	
2	1410.650	29.6	9.2	38.8	54.0	15.2	

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	1000.000	33.4	3.4	36.8	54.0	17.2	
2	1039.430	39.5	3.3	42.8	54.0	11.2	
3	1187.910	39.5	5.7	45.2	54.0	8.8	
4	1200.000	38.3	6.0	44.3	54.0	9.7	
5	1559.140	30.1	12.2	42.3	54.0	11.7	

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

- Operating Mode : Digital Video Interface



Final Result

--- Horizontal Polarization (QP)---

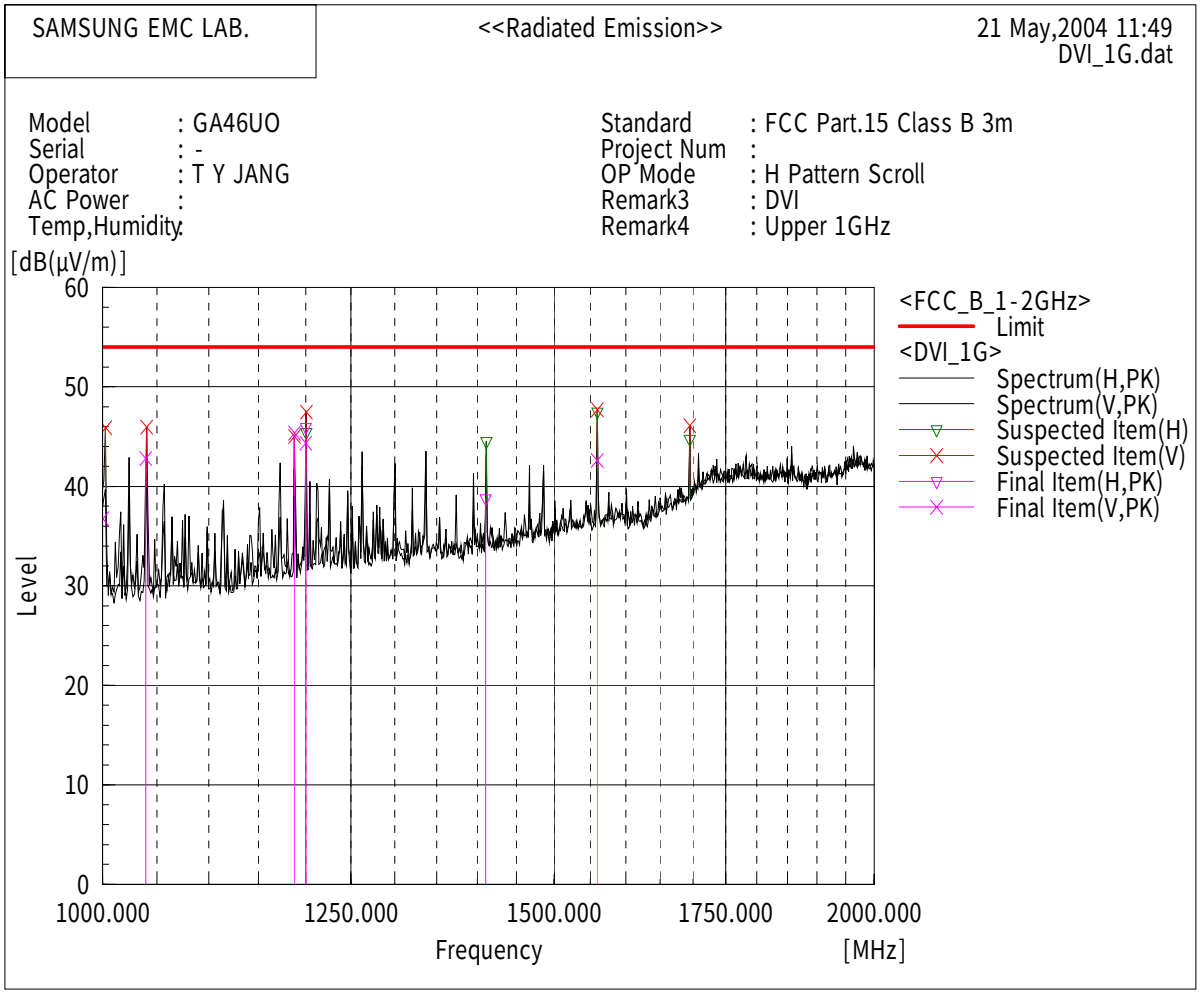
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	832.110	41.3	-0.7	40.6	46.0	5.4	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	34.658	40.8	-11.3	29.5	40.0	10.5	
2	40.449	47.9	-14.3	33.6	40.0	6.4	
3	596.350	41.8	-3.7	38.1	46.0	7.9	
4	56.460	50.2	-20.4	29.8	40.0	10.2	
5	758.100	34.9	-1.2	33.7	46.0	12.3	

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

- Operating Mode : Digital Video Interface upto 2GHz



Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	1200.000	40.0	6.0	46.0	54.0	8.0	
2	1410.650	29.6	9.2	38.8	54.0	15.2	

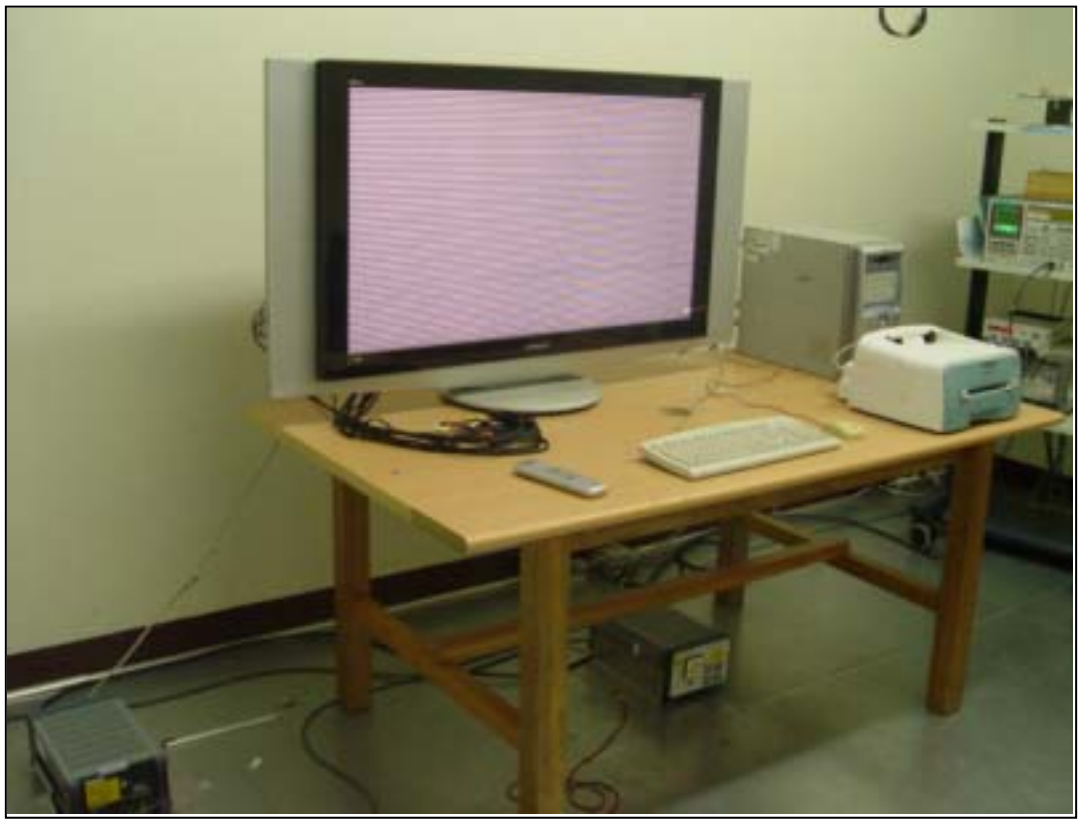
--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	1000.000	33.7	3.1	36.8	54.0	17.2	
2	1039.430	39.5	3.3	42.8	54.0	11.2	
3	1187.910	39.7	5.7	45.4	54.0	8.6	
4	1200.000	38.3	6.0	44.3	54.0	9.7	
5	1559.140	30.4	12.2	42.6	54.0	11.4	

This reports shall not be reproduced except in full, without the written approval of SEC EMC Testing laboratory.

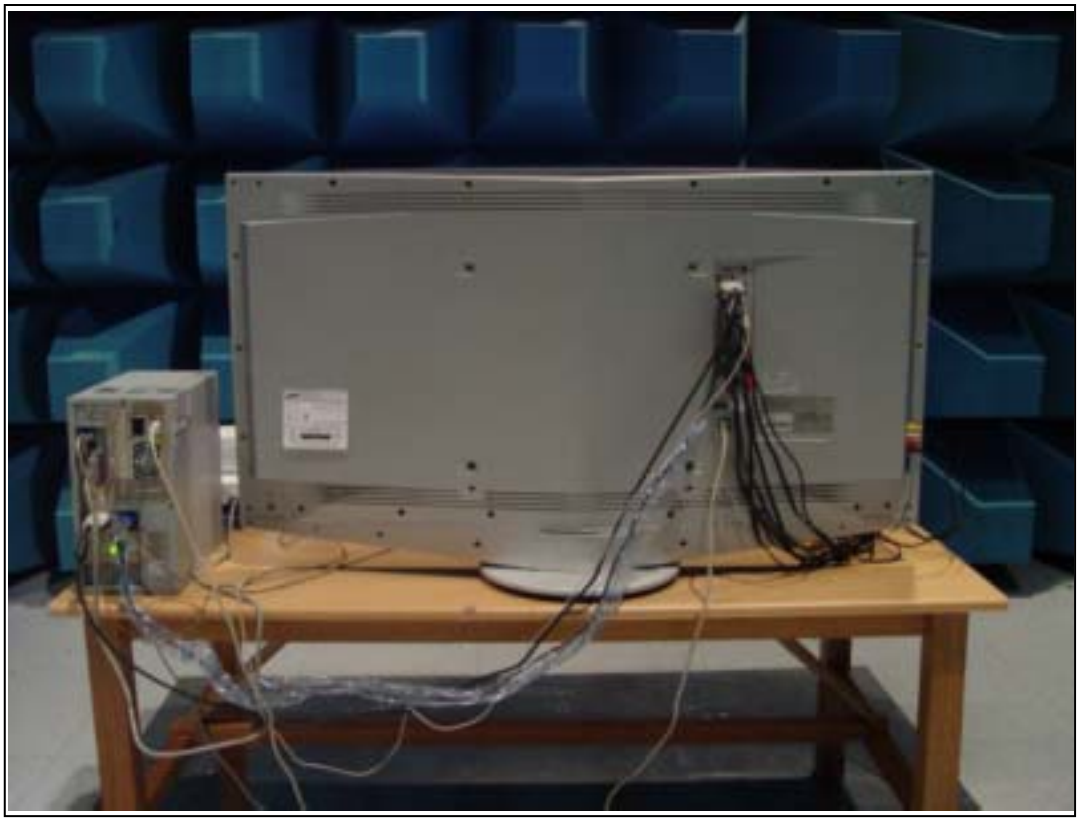
Test Set up Photographs

[AC POWERLINE CONDUCTED EMISSION MEASUREMENT]



Test Set up Photographs

[RADIATED EMISSION MEASUREMENT]



EUT Photographs

[Label and Label position]