

EMC TEST REPORT

Project No. : LBE040130

Product : **DLP Projection TV**

Model No. : **AT50L3**

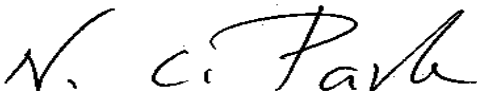
Date of test : January. 25 ~ March 02, 2004

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Table of Contents

1. Introduction & Summary

- 1.1 Description of the EUT
- 1.2 Test facility
- 1.3 Test equipment

2. Test Set-up

- 2.1 Test mode
- 2.2 Justification
- 2.3 Test equipment setup
- 2.4 Tested System Details
- 2.5 System Block Diagram of Test Configuration
- 2.6 Test rule and Procedure
- 2.7 Test Summary

3. Test Results

- 3.1 AC Powerline Conducted Emission Measurement
- 3.2 Radiated Emission Measurement

1. Introduction & Summary

1.1 Description of the EUT

Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Project Number	LBE040130
Equipment Under Test	DLP Projection TV
Trade Name	SAMSUNG
Model Number	AT50L3
Variant Model	-
FCC ID Number	A3LHLP5063W
Mains input	120V, 60Hz
Using Clock	See the attached Block Diagram

1.2 Test facility

The EMI/EMS measurement facilities used to collect the tested data are located at 416 Maetan 3 Dong, Yeongtong-Gu, Suwon-Si, 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.

1.3 Test equipment

Description	Model	Manufacturer	Serial No.	Applied
TEST RECEIVER	ESCS30	R & S	839809/002	o
RF RELAIS MATRIX	PSU	R & S	861206/024	o
10dB ATTENUATOR	8491B	Agilent	58226	o
LISN	ESH3-Z5	R & S	100261	o
TEST SOFTWARE	EP5CE	TOYO	-	o
TEST RECEIVER	ESCS30	R & S	100104	o
SPECTRUM ANALYZER	E7405A	Agilent	US41110272	o
BI-LOG ANTENNA	CBL6112B	SCHAFFNER	2766	o
RF SELECTOR	NS4900	TOYO	0303-015	o
SPECTRUM ANALYZER	E7405A	R & S	MY42000109	o
TEST SOFTWARE	EP5RE	TOYO	-	o
Turn Table	DS412	HD	-	N/A
Antenna Mast	MA240	HD	240/620	N/A
amplifier	8447D	Agilent	2944A10430	o

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	1280x720	Horizontal F.:60kHz Vertical F. : 75Hz	32bits

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

2.4 Tested System Details

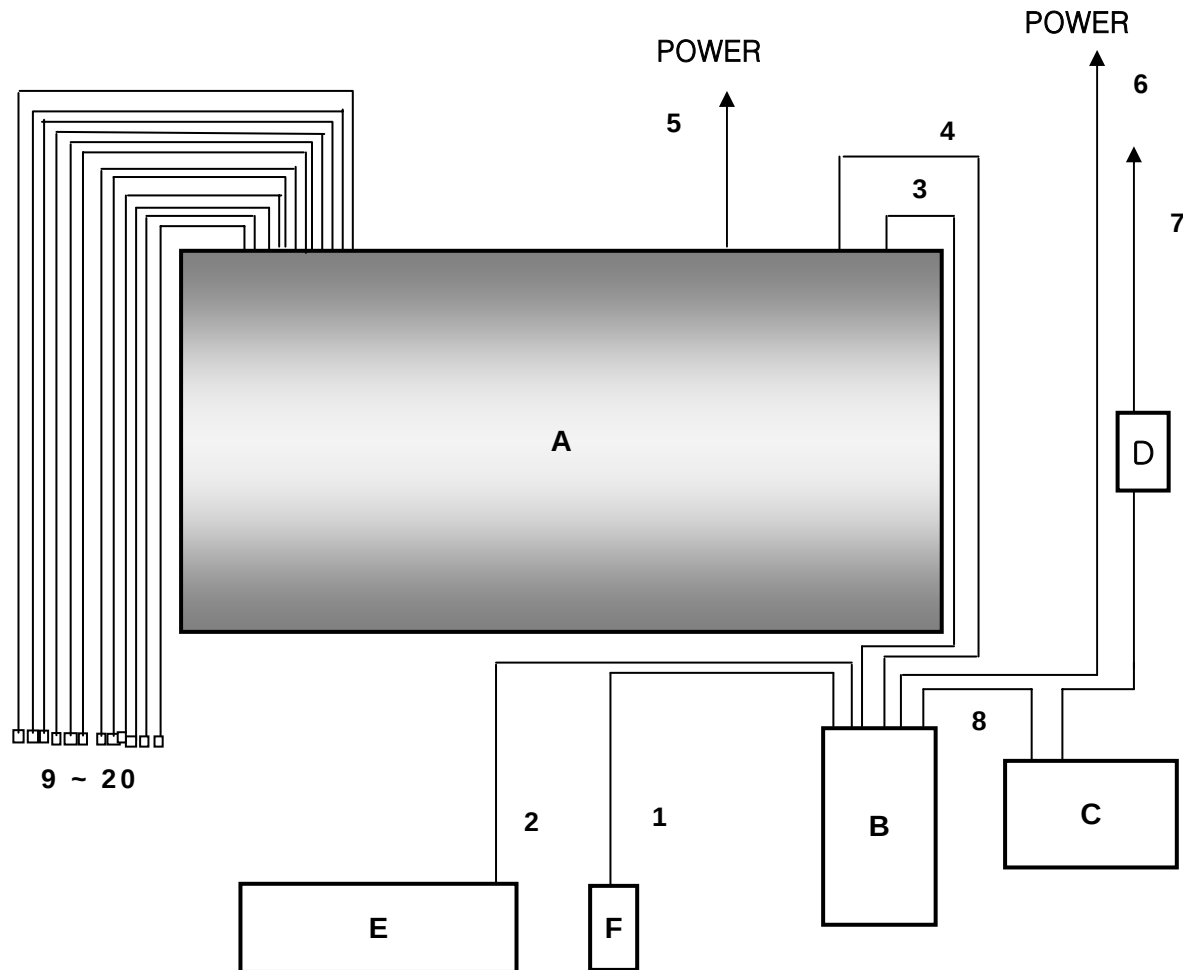
1) Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	DLP Projection TV	AT50L3	-	Samsung	EUT
B	Personal Computer	M6320	625792GR301193	SAMSUNG	-
C	Printer	K10158	CLG001000275	Canon	-
D	Printer Adapter	K30088	CLG001000275	Canon	-
E	PS/2 Keyboard	SEM-A17K	04MW-0010432	SAMSUNG	-
F	PS/2 Mouse	M-S35	LZE22400409	HP	-

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	Antenna Cable	1.5	Y		
10	AV1 In Cable	1.2	N		
11	AV2 In Cable	1.2	N		
12	AV Out Cable	1.2	N		
13	Component In 1	1.2	N		
14	Component In 2	1.2	N		
15	DVI Audio In	1.2	N		
16	PC Audio In	1.2	N		
17	S-video In 1	1	N		
18	S-Video In 2	1	N		
19	AV3 In Cable	1.5	N		
20	S-Video In 3	1	N		

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

3. Test Results

3.1 AC POWERLINE CONDUCTED EMISSION MEASUREMENT

3.1.1 Test Procedure

Configure 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.

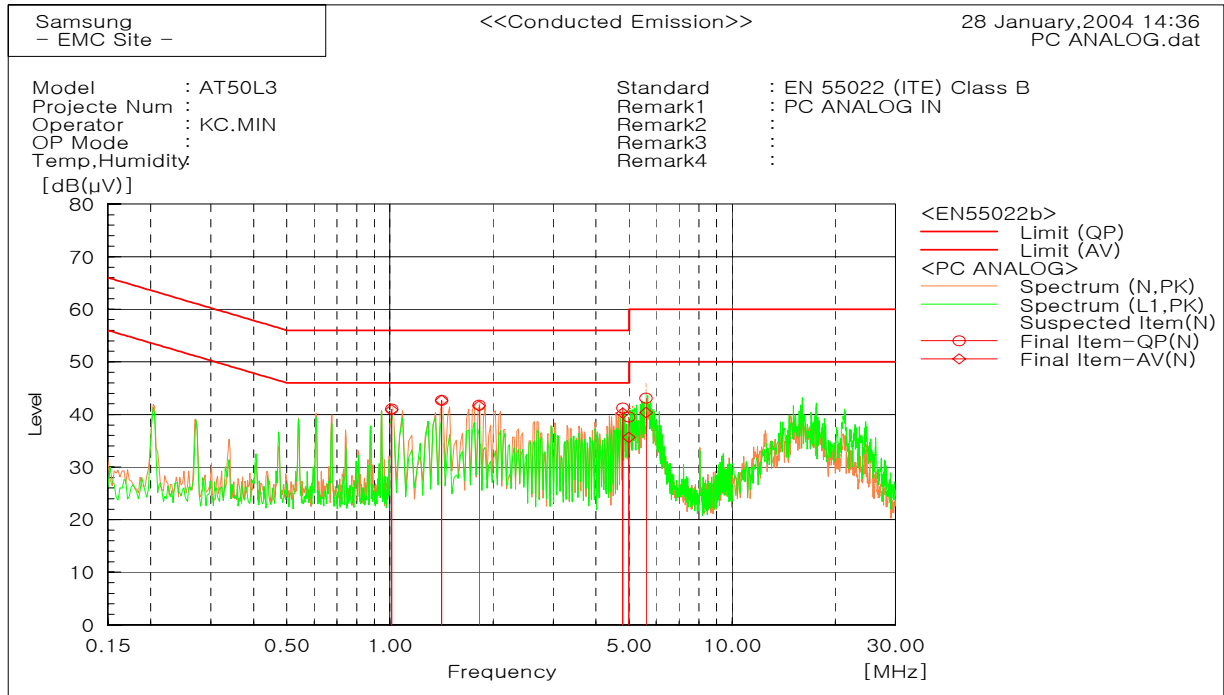
Using a calibrated coaxial cable, the TEST RECEIVER is connected to the measuring port of the LISN for EUT. To find out an EUT condition procedures the maximum emission, the position of cables, EUT operations mode are the position of cables, EUT operations mode are checked under normal usage of EUT.

Then, the emission are scanned from 0.15MHz to 30MHz relative to the limit are recorded.

3.1.2 Test Results

- Operating Mode : Analog Video Input

LISN Mode : Live & Neutral



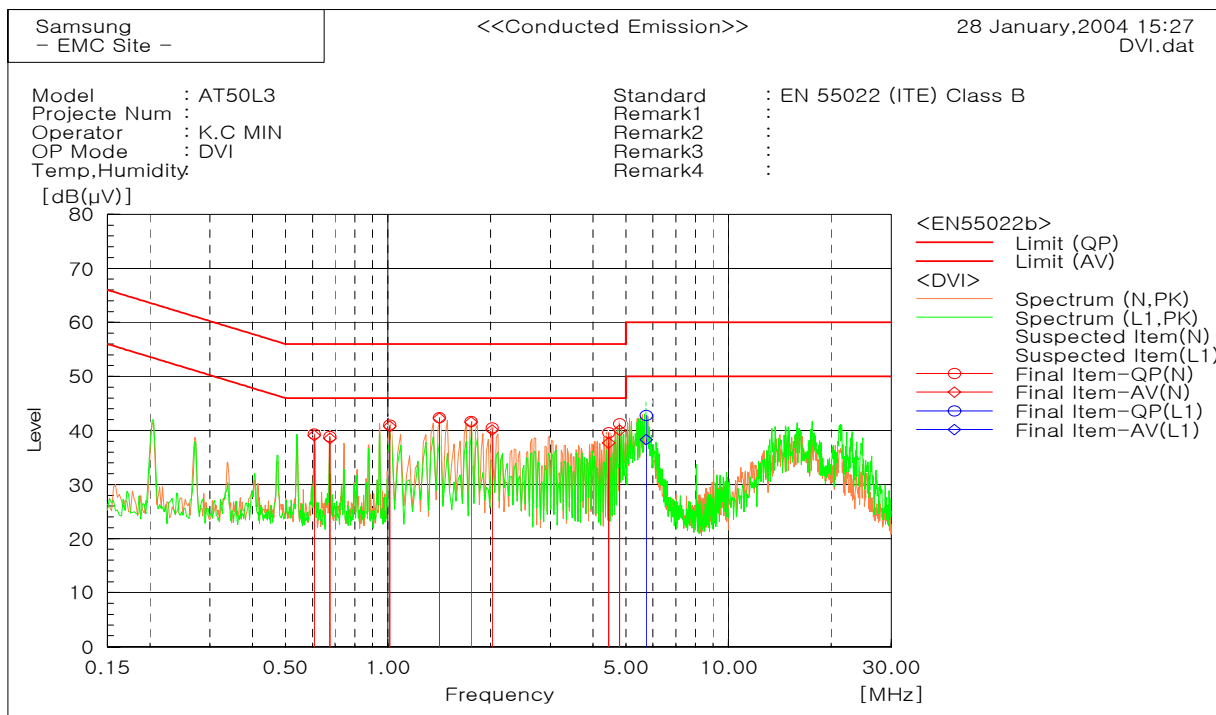
Final Result

--- N Phase ---

No.	Frequency	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	1.0113	40.9	40.7	0.2	41.1	40.9	56.0	46.0	15.0	5.1
2	1.4163	42.5	42.5	0.2	42.7	42.7	56.0	46.0	13.3	3.3
3	1.8213	41.6	41.4	0.2	41.8	41.6	56.0	46.0	14.2	4.4
4	4.7886	40.9	39.9	0.3	41.2	40.2	56.0	46.0	14.8	5.8
5	4.9922	39.2	35.3	0.3	39.5	35.6	56.0	46.0	16.5	10.4
6	5.5977	42.8	40.1	0.3	43.1	40.4	60.0	50.0	16.9	9.6

- Operating Mode : Digital Video Input

LISN Mode: Live & Neutral



Final Result

--- N 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]
1	0.60664	39.3	39.0	0.1	39.4	39.1	56.0	46.0	16.6	6.9
2	0.67481	38.8	38.4	0.1	38.9	38.5	56.0	46.0	17.1	7.5
3	1.0115	40.8	40.6	0.2	41.0	40.8	56.0	46.0	15.0	5.2
4	1.4163	42.1	42.1	0.2	42.3	42.3	56.0	46.0	13.7	3.8
5	1.7535	41.5	41.4	0.2	41.7	41.6	56.0	46.0	14.4	4.4
6	2.0231	40.3	39.9	0.2	40.5	40.1	56.0	46.0	15.5	5.9
7	4.4511	39.3	37.4	0.3	39.6	37.7	56.0	46.0	16.4	8.3
8	4.7888	40.9	39.7	0.3	41.2	40.0	56.0	46.0	14.8	6.0

--- 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]
1	5.7347	42.5	38.0	0.3	42.8	38.3	60.0	50.0	17.3	11.7

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 Test Procedure

Configure the EUT System in accordance with ANSI C63.4-1992 section 8 and 12.2.

Power cords for the EUT System are connected the receptacle on the ground plane.

The I/O 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 1,000MHz.

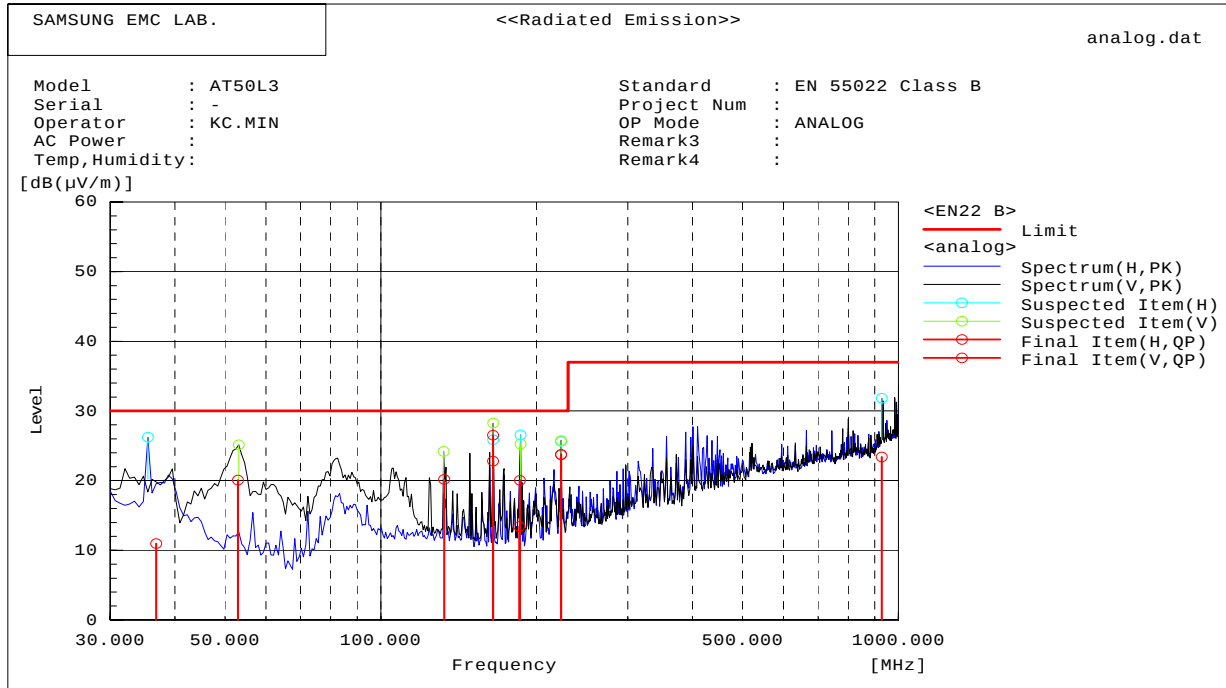
(If it is needed, the spectrum analyzer are scanned above 1GHz.)

And, detecting waves mode is peak mode, Graph's result in worst arrangement state of EUT. Spectrum analyzer result did horizontal and vertical polarization.

3.2.2 Test Results

- Operating Mode : Analog Video Input

Frequency Range : 30MHz ~ 1GHz

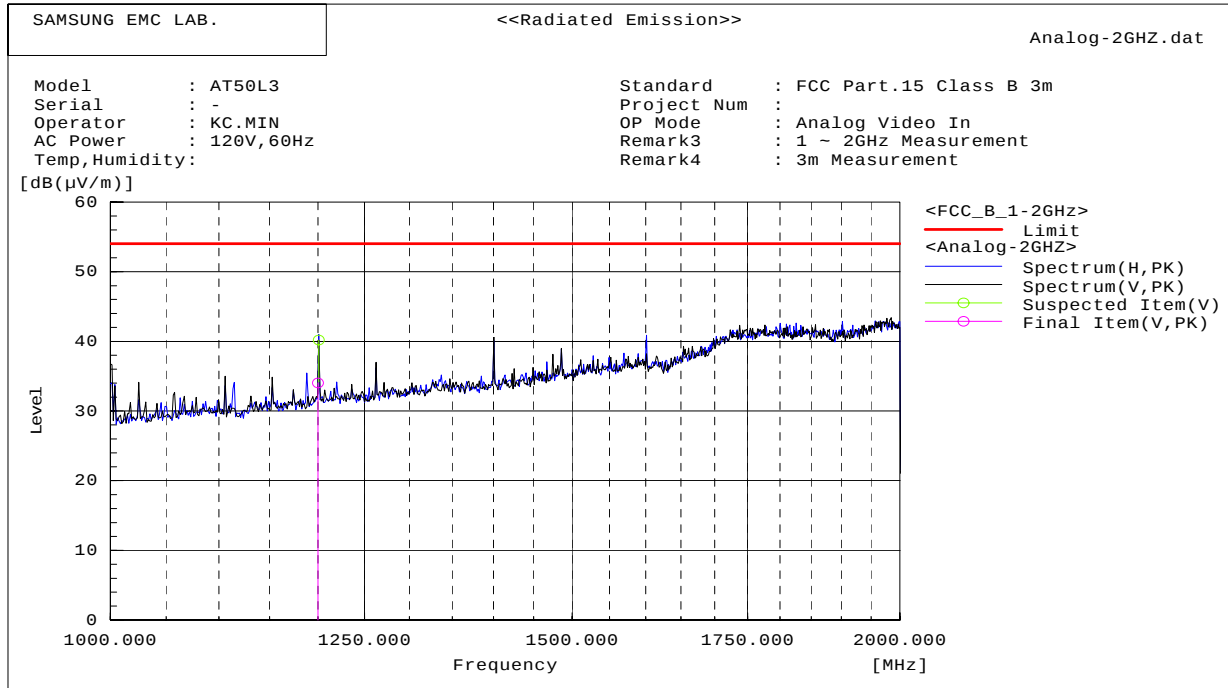


Final Result

No.	Frequency [MHz]	(P)	S.C	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Remark
1	36.791	H	S	24.1	-13.1	11.0	30.0	19.1	
2	52.957	V	S	40.5	-20.4	20.1	30.0	9.9	
3	132.539	V	S	35.8	-15.6	20.2	30.0	9.8	
4	164.798	V	S	43.6	-17.1	26.5	30.0	3.5	
5	164.798	H	S	39.9	-17.1	22.8	30.0	7.2	
6	185.075	H	S	30.5	-17.1	13.4	30.0	16.6	
7	185.831	V	S	37.2	-17.1	20.1	30.0	10.0	
8	223.003	V	S	39.7	-16.0	23.7	30.0	6.3	
9	223.003	H	S	39.7	-16.0	23.7	30.0	6.3	
10	929.230	H	S	24.7	-1.3	23.4	37.0	13.6	

- Operating Mode : Analog Video Input

Frequency Range : 1GHz ~ 2GHz

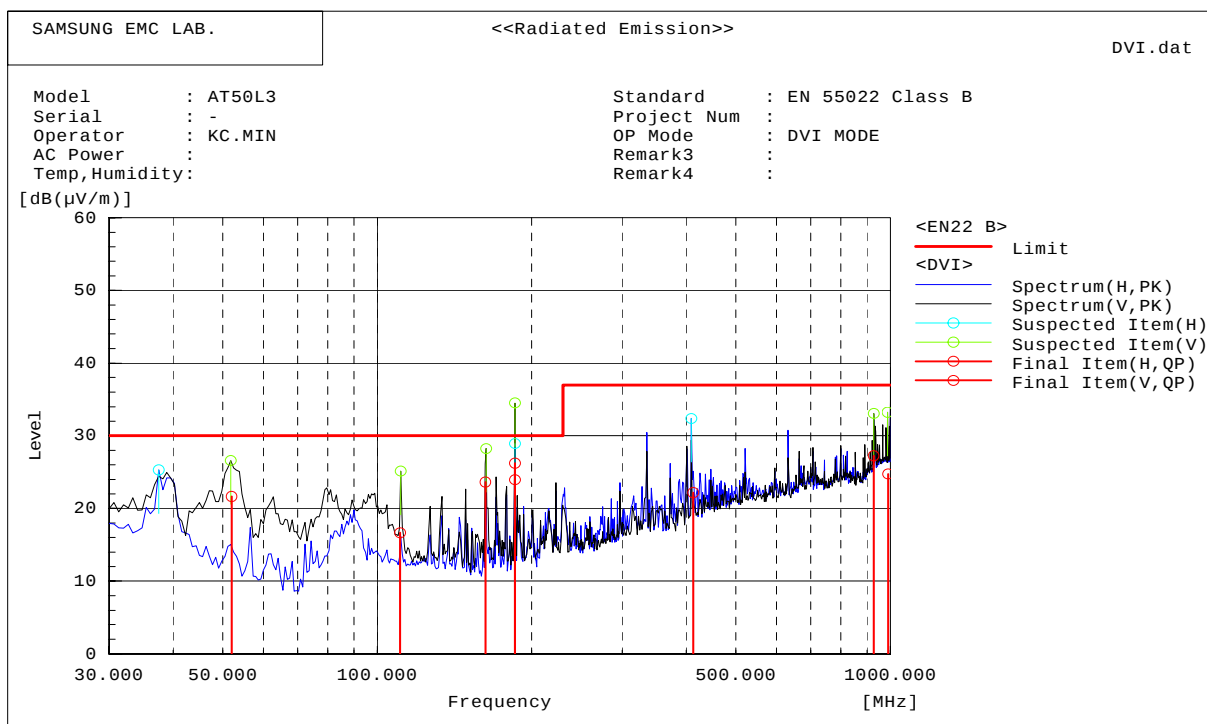


Final Result

No.	Frequency [MHz]	(P)	S.C	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin PK [dB]	Remark
1	1200.000	V	S	28.0	6.0	34.0	54.0	20.0	

- Operating Mode : Digital Video Interface

Frequency Range : 30MHz ~ 1GHz

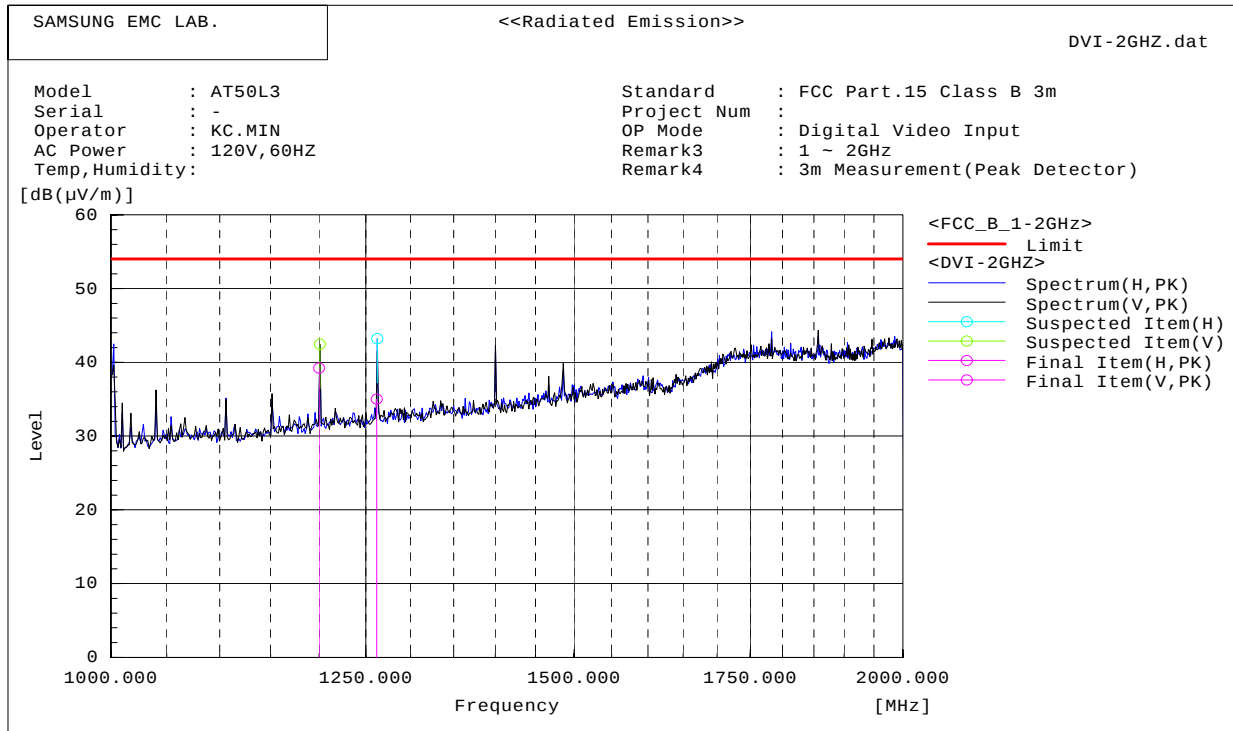


Final Result

No.	Frequency [MHz]	(P)	S.C	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Remark
1	51.985	V	S	41.8	-20.1	21.7	30.0	8.4	
2	110.872	V	S	32.0	-15.3	16.7	30.0	13.3	
3	162.496	V	S	40.6	-17.0	23.6	30.0	6.4	
4	185.608	H	S	41.1	-17.1	24.0	30.0	6.1	
5	185.621	V	S	43.3	-17.1	26.2	30.0	3.8	
6	412.510	H	S	31.0	-8.8	22.2	37.0	14.8	
7	928.090	V	S	28.7	-1.4	27.3	37.0	9.7	
8	990.010	V	S	24.4	0.3	24.7	37.0	12.3	

- Operating Mode : Digital Video Interface

Frequency Range : 1GHz ~ 2GHz



Final Result

No.	Frequency [MHz]	(P)	S.C	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin PK [dB]	Remark
1	1200.000	V	S	33.2	6.0	39.2	54.0	14.8	
2	1262.160	H	S	27.9	7.1	35.0	54.0	19.0	

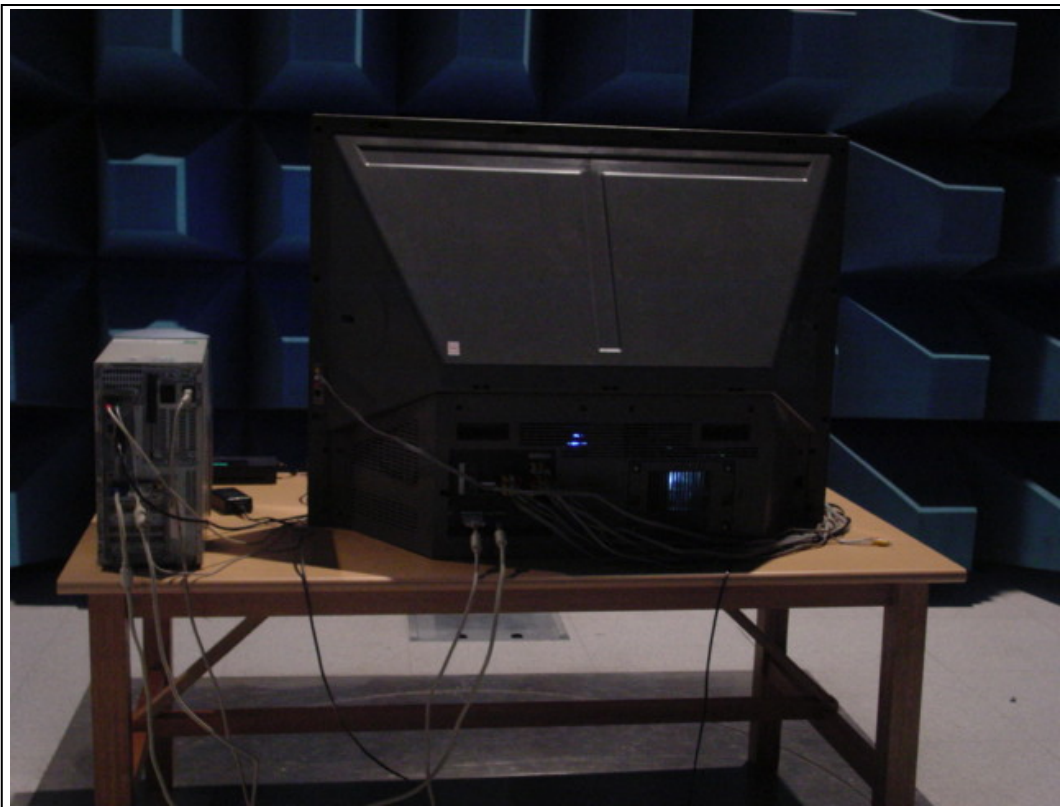
Test Set up Photographs

[AC POWERLINE CONDUCTED EMISSION MEASUREMENT]



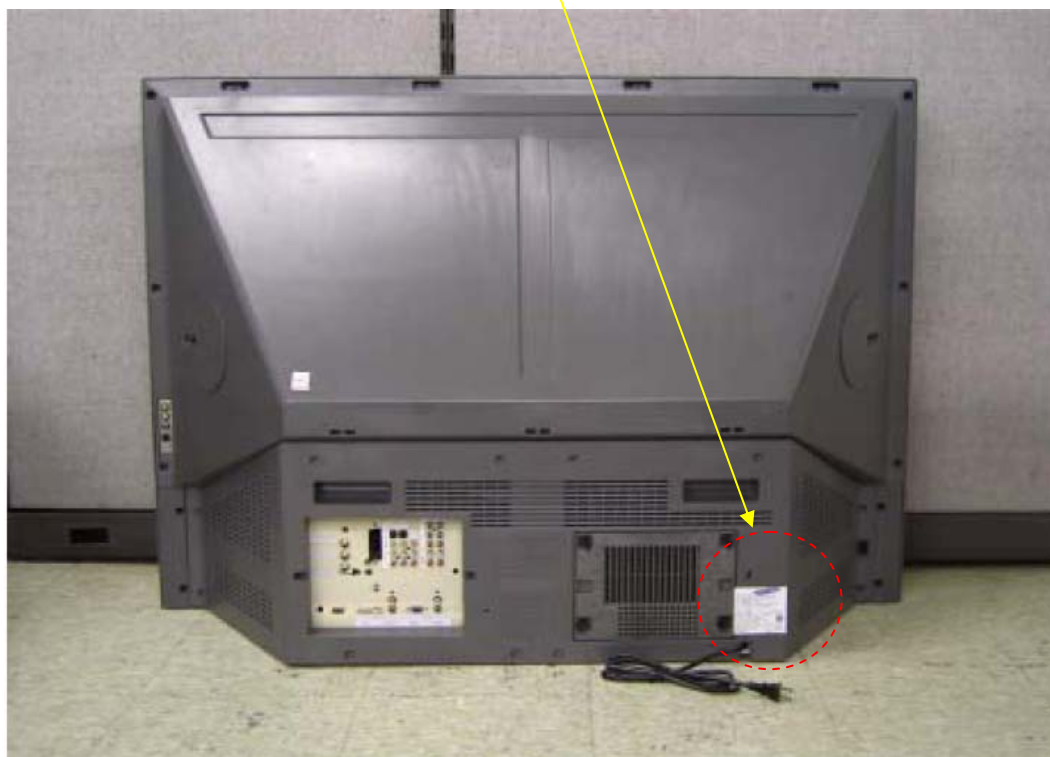
Test Set up Photographs

[RADIATED EMISSION MEASUREMENT]

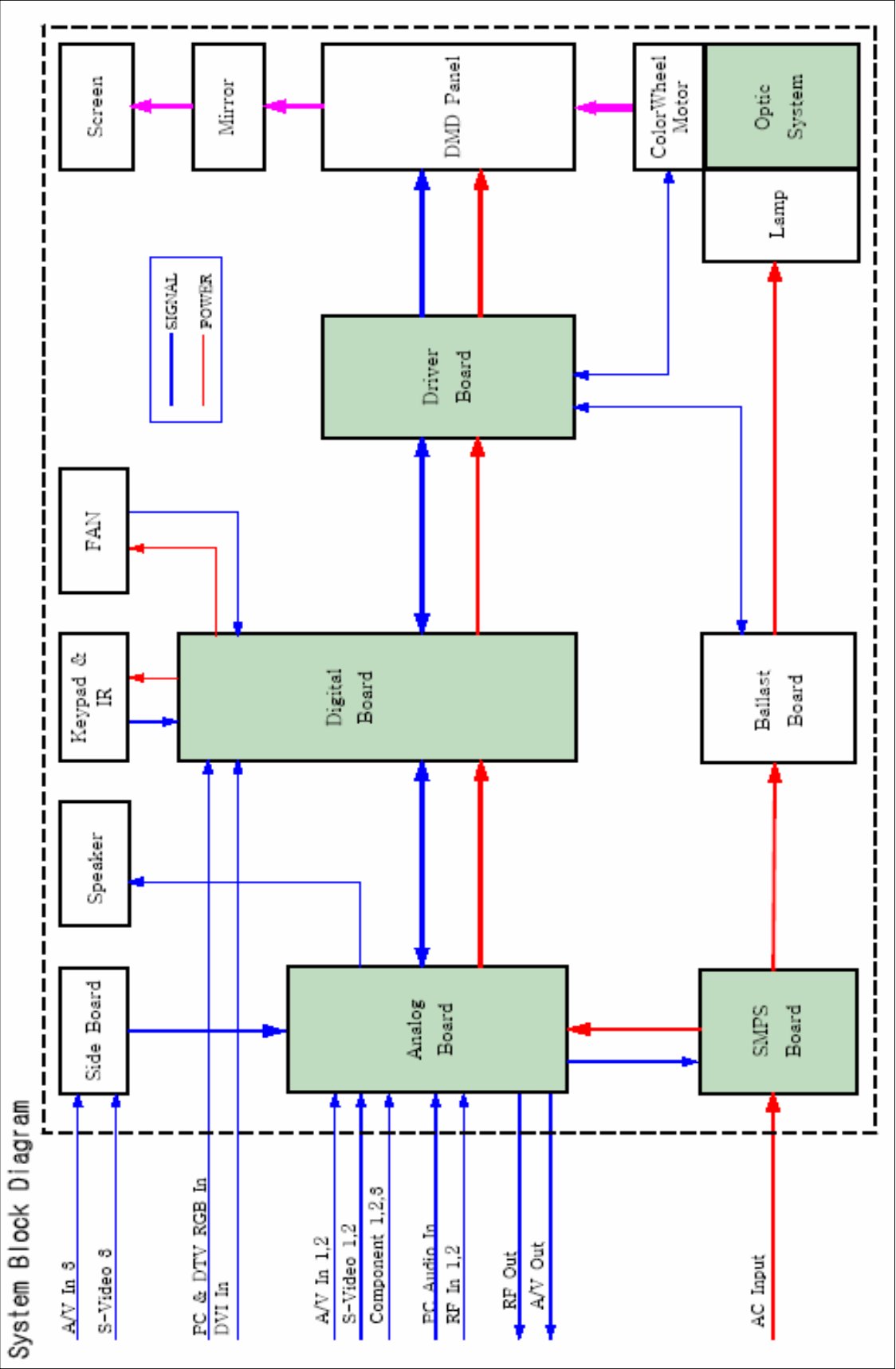


EUT Photographs

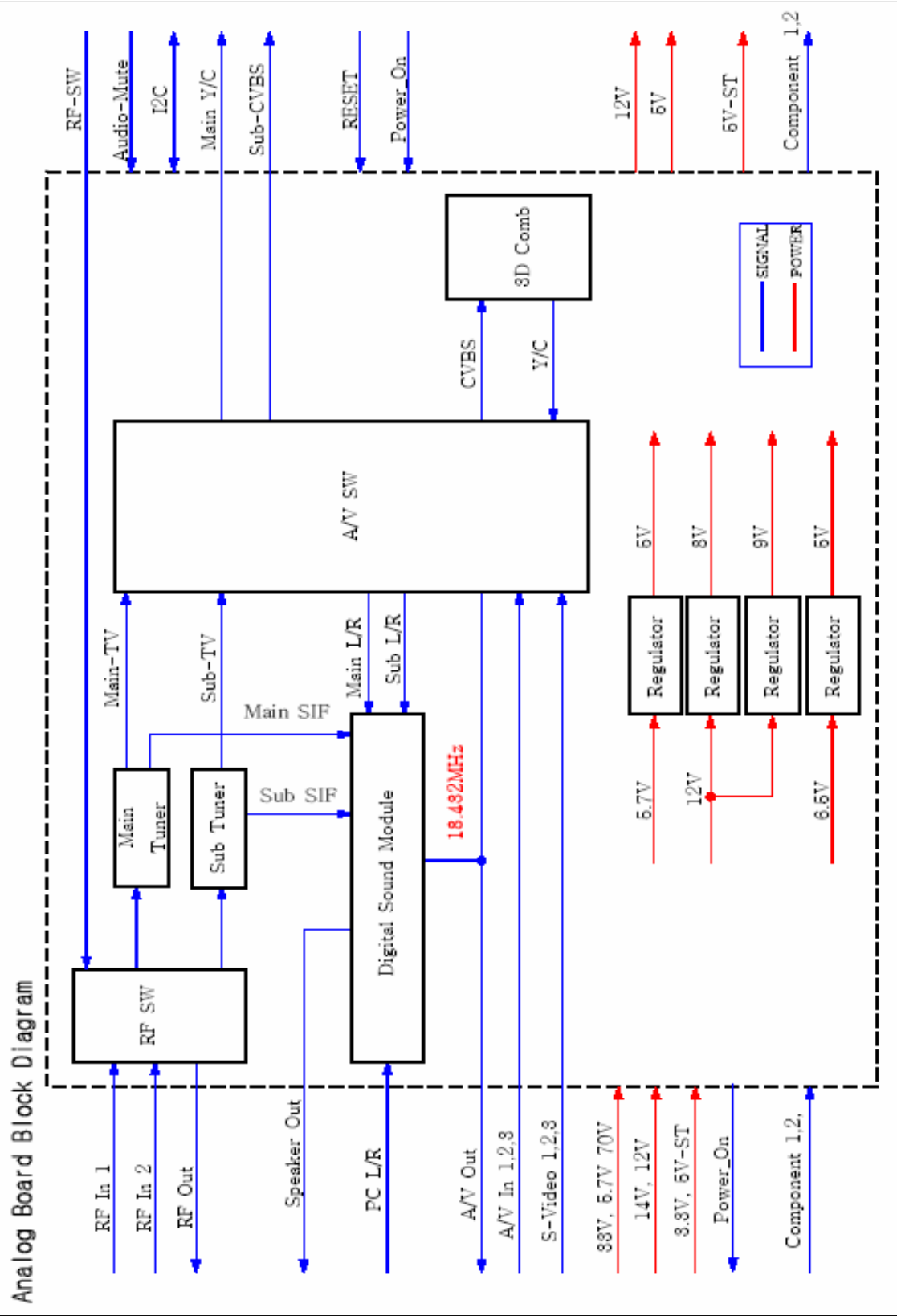
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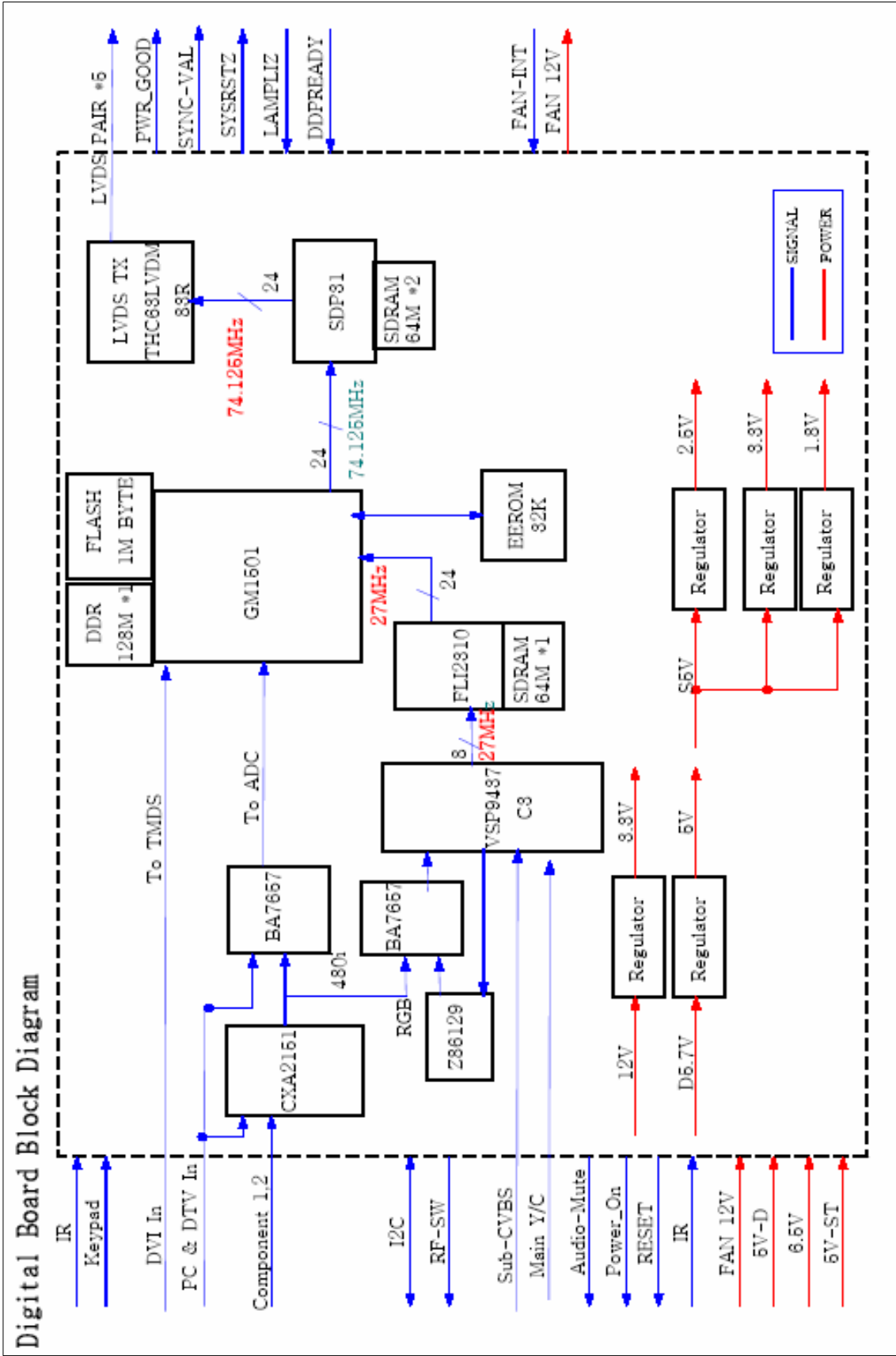
System Block Diagram



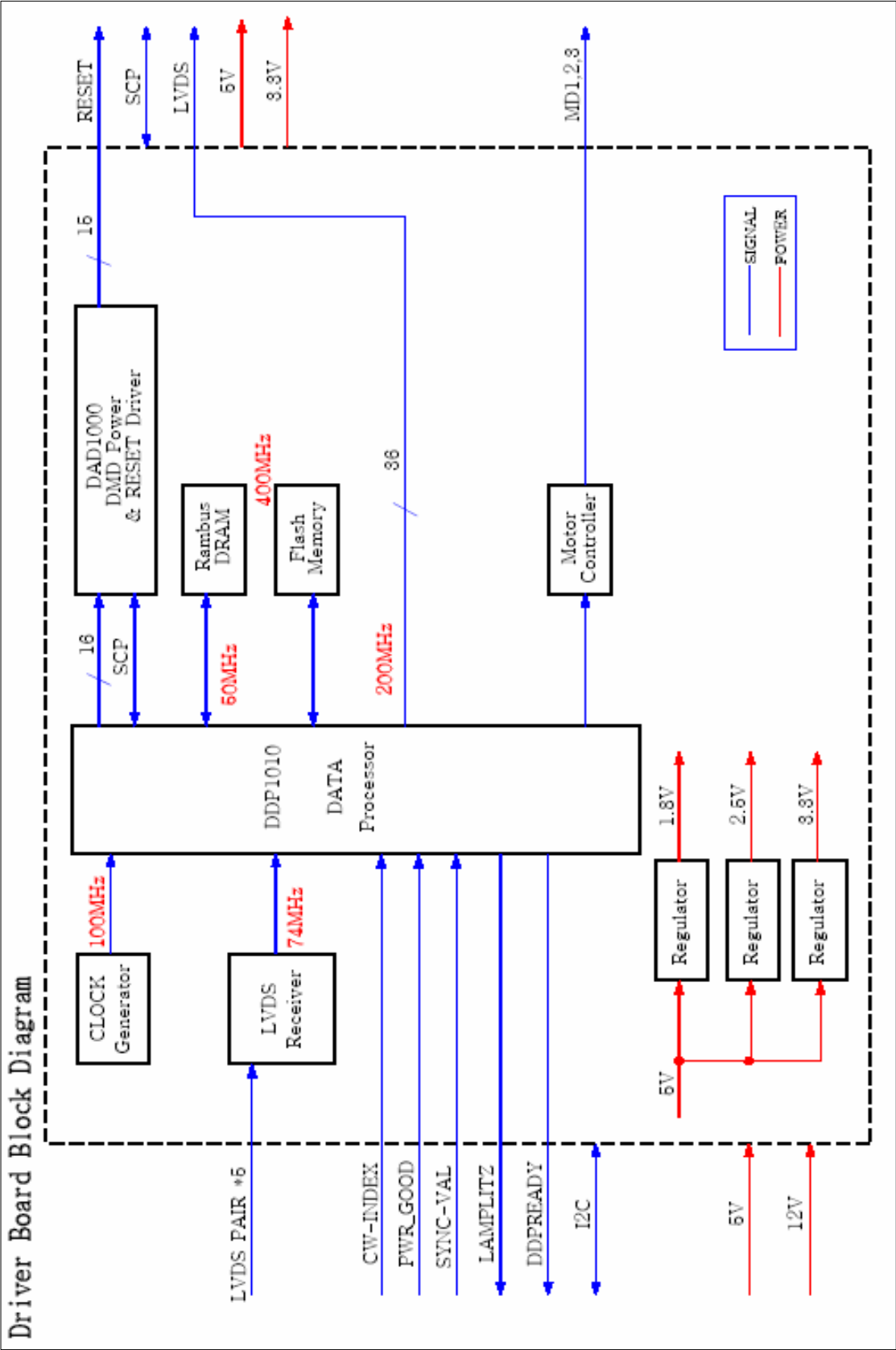
Analog Board Block Diagram



Digital Board Block Diagram



Driver Board Block Diagram



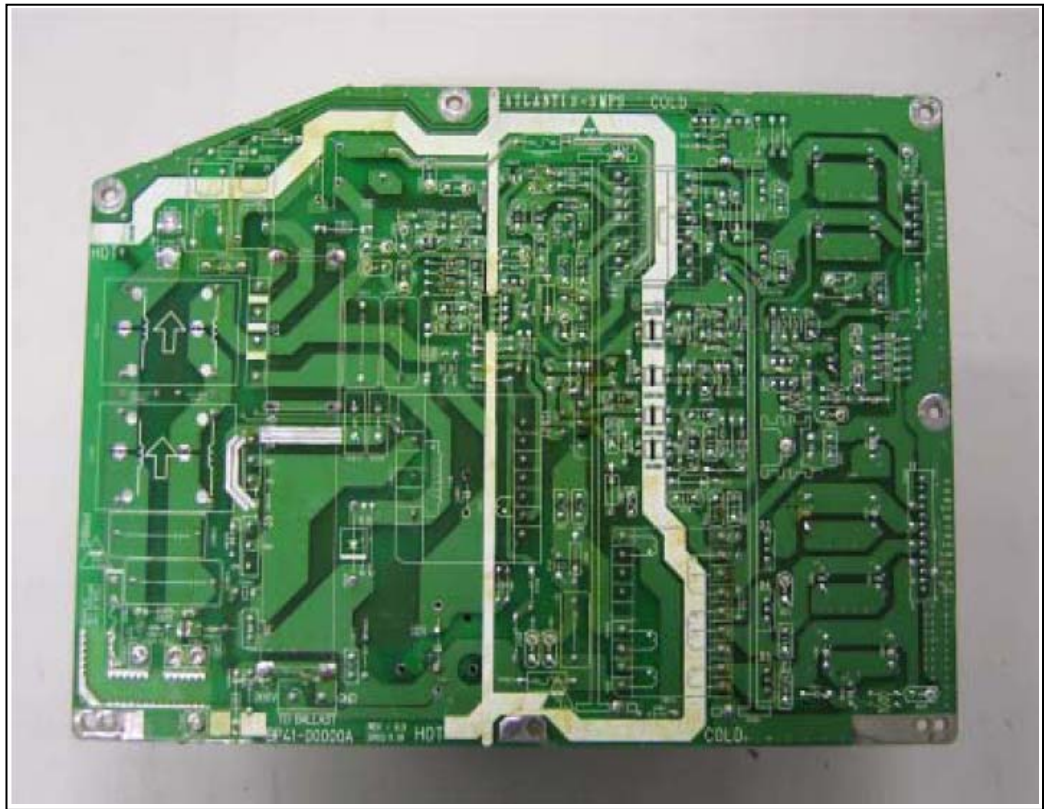
EUT Photographs



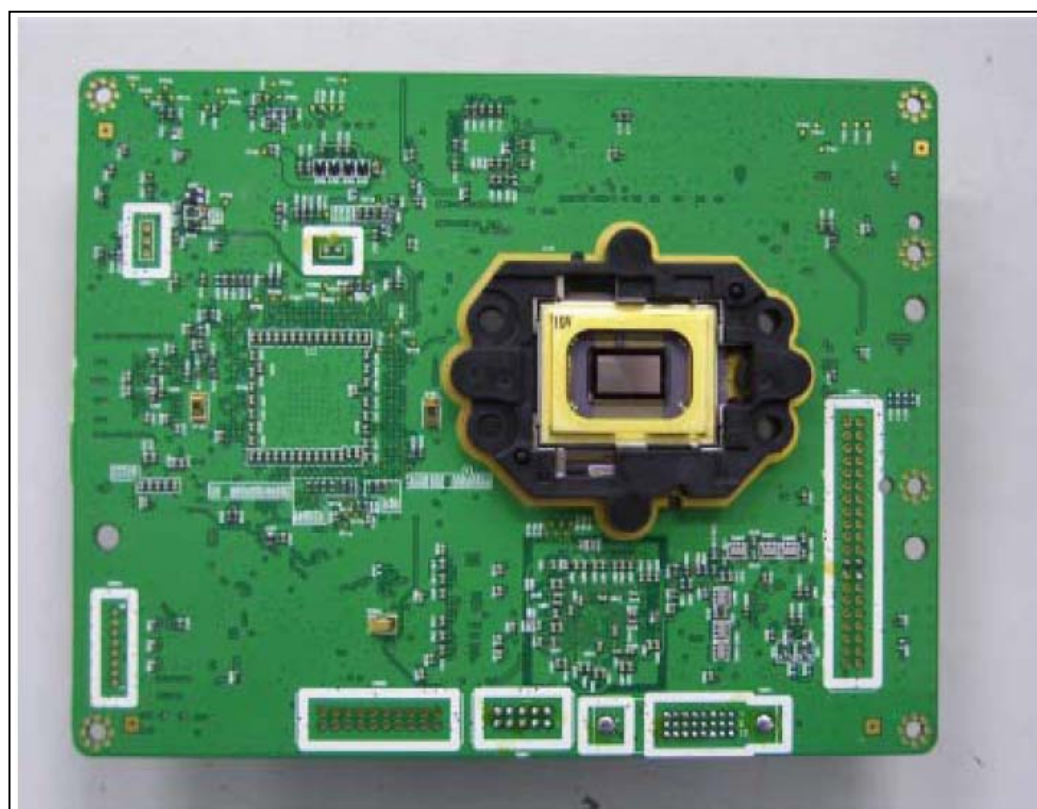
EUT Photographs



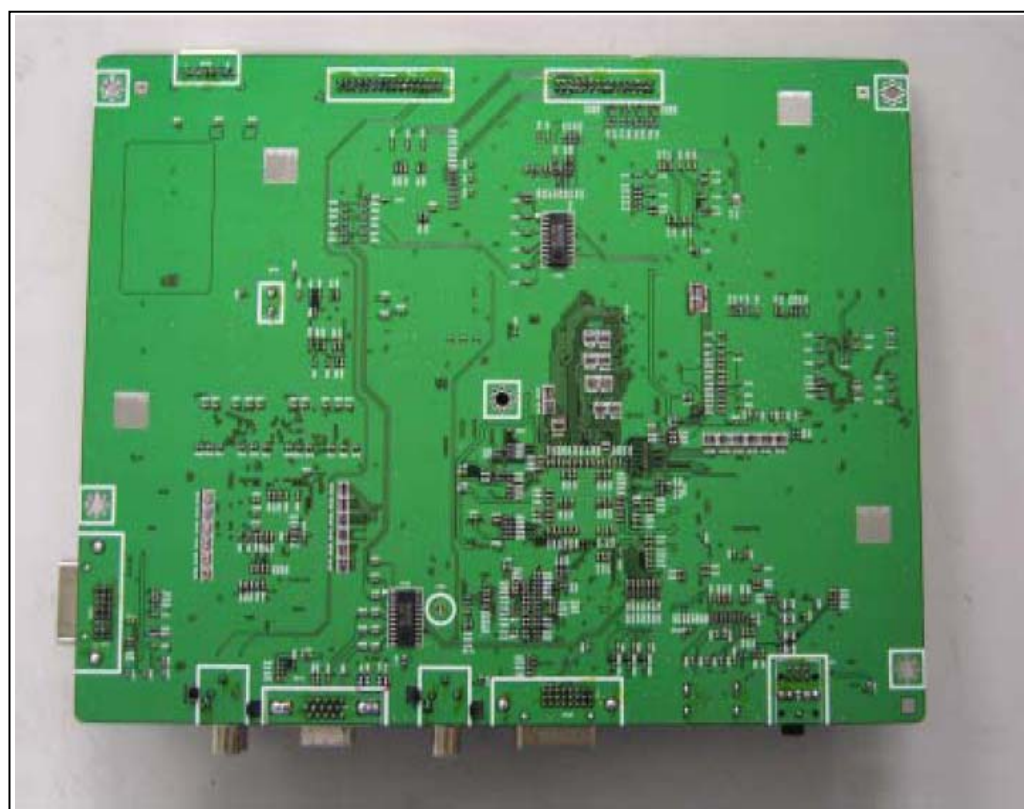
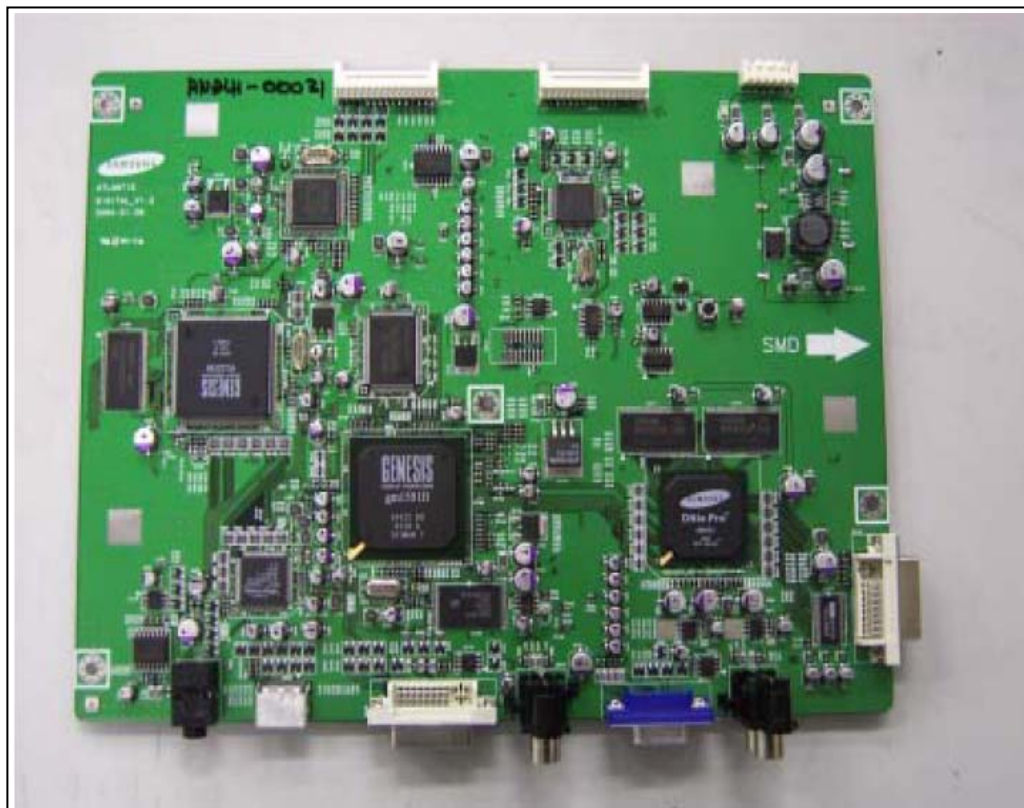
EUT Photographs



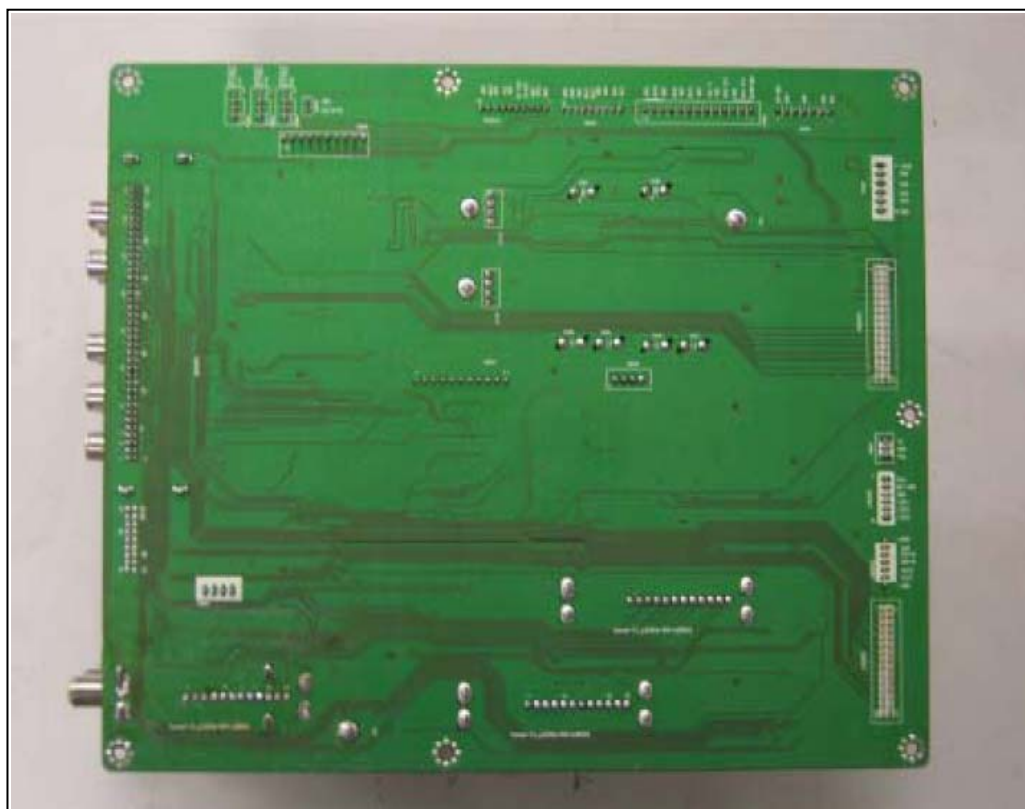
EUT Photographs



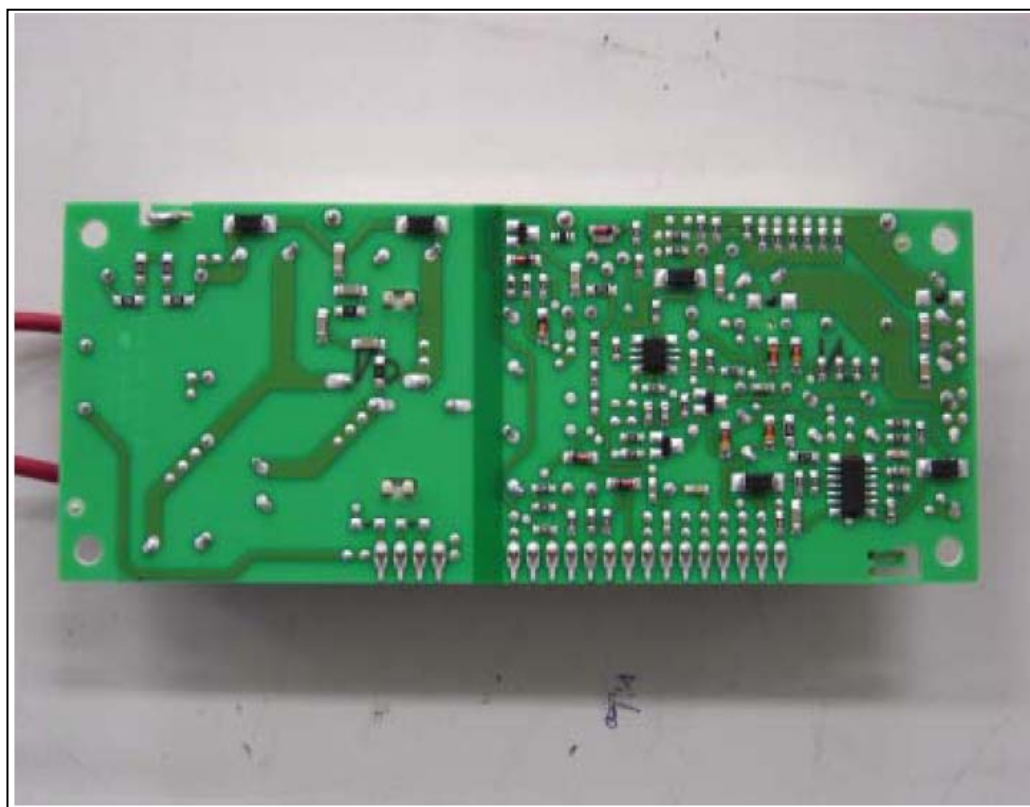
EUT Photographs



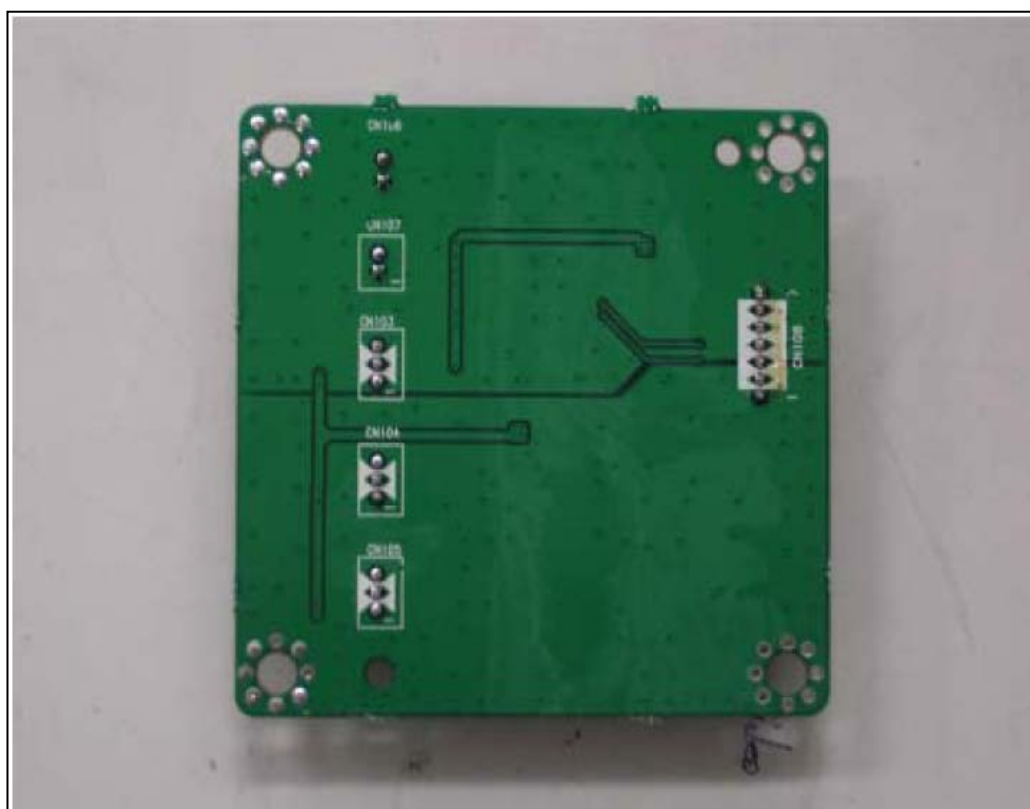
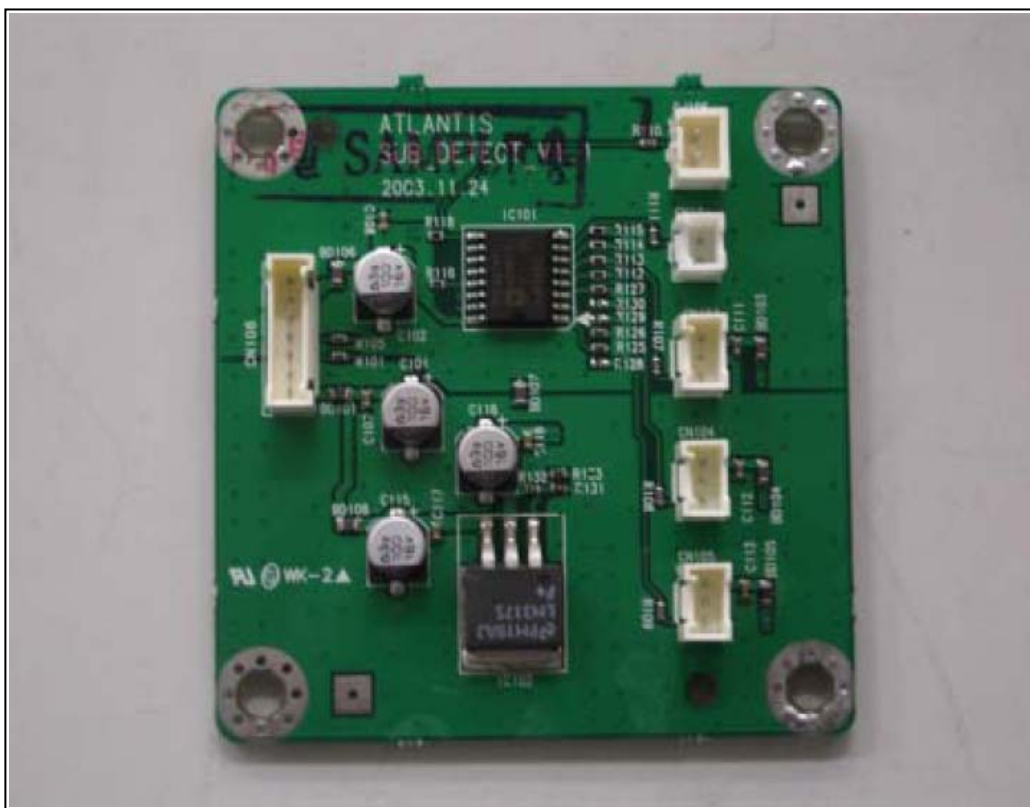
EUT Photographs



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