SAMSUNG ELECTRONICS

EMC TEST REPORT

Project No. : LBE040511

Product : PDP TV Monitor

Model No. : NP50P4

Date of test : Februsry 25 ~March 10, 2004

Issued Date : March.16 , 2004

Tested by:

Tae Young,JANG / Test Engineer

Reviewed by:

No Cheon, PARK / Manager of EMC Lab.

Authorized by:

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1. Introduction & Summary

1.1 Description of the EUT

Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Project Number	LBE040511
Equipment Under Test	PDP TV Monitor
Trade Name	SAMSUNG
Model Number	NP50P4
Variant Model	-
FCC ID Number	A3LHPP5071
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, 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.

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
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	1024x768	Horizontal F.:63.667kHz	32bits
		Vertical F. : 84.997Hz	

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

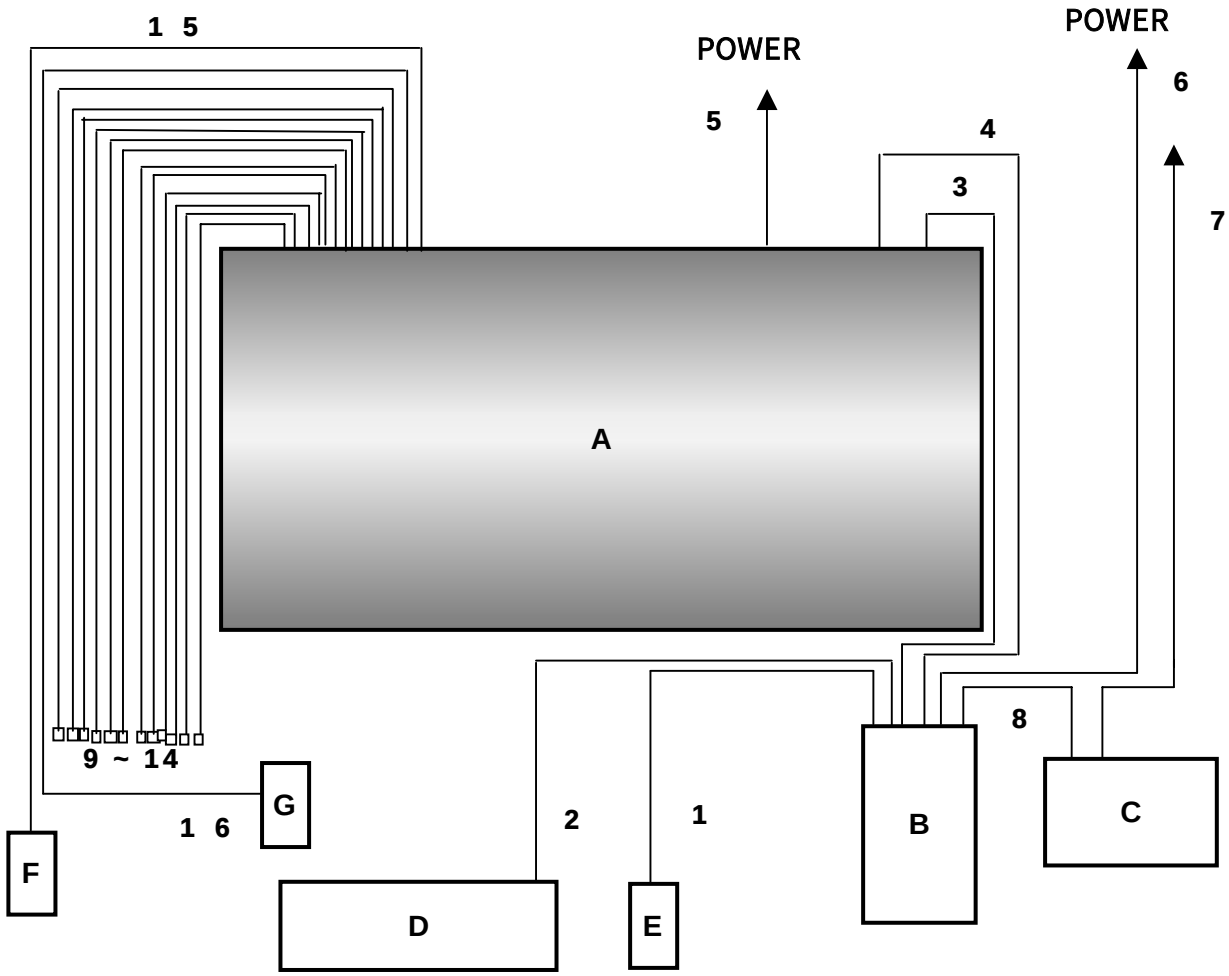
1) Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	PDP TV Monitor	NP50P4	-	Samsung	EUT
B	Personal Computer	GX270	6Q4W81S	DELL	-
C	Printer	LQ-580H	CG2Y014537	EPSON	-
D	PS/2 Keyboard	SK-8110	LR86682	DELL	-
E	PS/2 Mouse	M-S69	LZB33503033	DELL	-
F	Speaker	-	-	Samsung	-
G	Speaker	-	-	Samsung	-

2) Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark	
1	PS/2 Mouse Cable	1.8	N		
2	PS/2 Keyboard	1.6	N		
3	Video Cable(Analog)	1.5	Y		
4	Video Cable(Digital)	1.5	Y		
5	Power Cable(Monitor)	1.8	N		
6	PC Power Cable	1.8	N		
7	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	AV Out Cable2	1.2	N		
12	AV Out Cable1	1.2	N		
13	Component In	1.2	N		
14	S-video In	1	N		
15	Speaker	1	Y		
16	Speaker	1	Y		

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

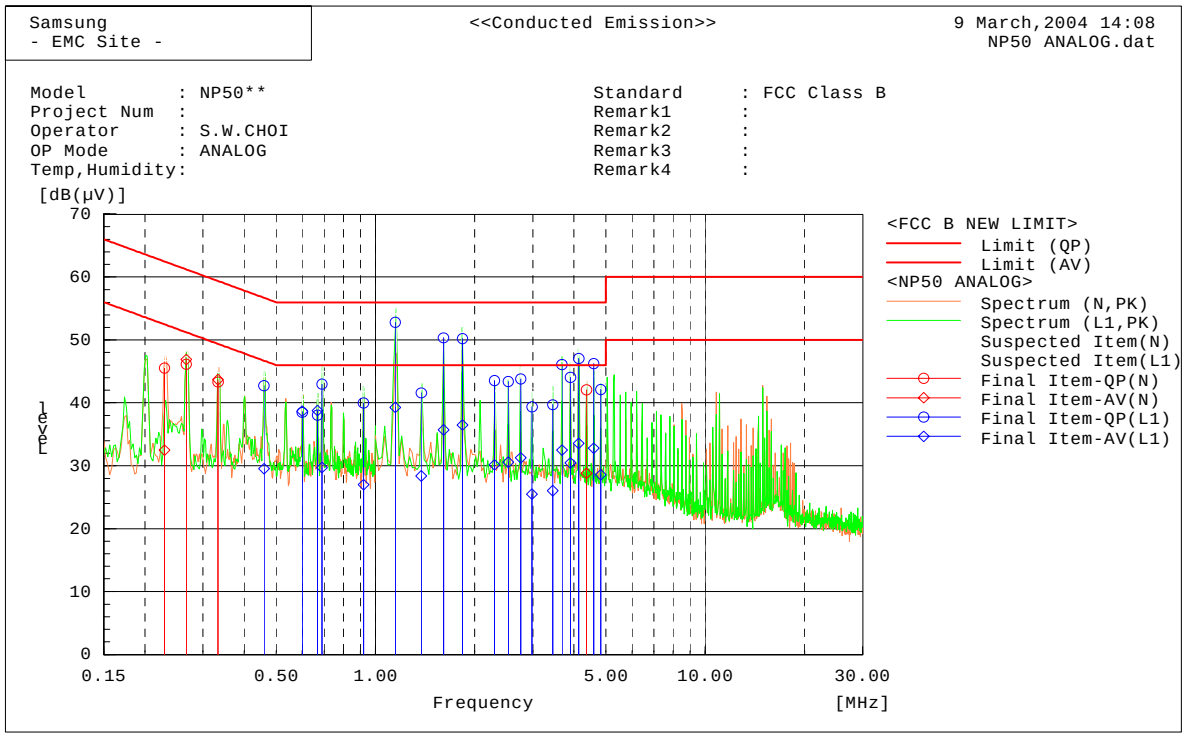
3.1.1 Test Procedure

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.

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	0.22924	45.4	32.4	0.1	45.5	32.5	62.5	52.5	17.0	20.0
2	0.26685	46.1	46.8	0.1	46.2	46.9	61.2	51.2	15.0	4.3
3	0.33318	43.2	43.6	0.1	43.3	43.7	59.4	49.4	16.1	5.7
4	4.3667	42.0	28.7	0.1	42.1	28.8	56.0	46.0	13.9	17.2

--- 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	0.45951	42.6	29.4	0.1	42.7	29.5	56.7	46.7	14.0	17.2
2	0.60029	38.4	38.6	0.1	38.5	38.7	56.0	46.0	17.5	7.3
3	0.66686	38.0	38.7	0.1	38.1	38.8	56.0	46.0	18.0	7.2
4	0.68875	42.9	29.6	0.1	43.0	29.7	56.0	46.0	13.0	16.3
5	0.91989	39.9	26.9	0.1	40.0	27.0	56.0	46.0	16.0	19.0
6	1.149	52.7	39.2	0.1	52.8	39.3	56.0	46.0	3.2	6.7
7	1.3776	41.5	28.3	0.1	41.6	28.4	56.0	46.0	14.4	17.6
8	1.6086	50.2	35.6	0.1	50.3	35.7	56.0	46.0	5.7	10.3
9	1.8381	50.1	36.4	0.1	50.2	36.5	56.0	46.0	5.8	9.5
10	2.2974	43.5	30.1	0.1	43.6	30.2	56.0	46.0	12.5	15.8
11	2.5264	43.3	30.5	0.1	43.4	30.6	56.0	46.0	12.6	15.4
12	2.7566	43.7	31.1	0.1	43.8	31.2	56.0	46.0	12.2	14.8
13	2.9868	39.3	25.4	0.1	39.4	25.5	56.0	46.0	16.6	20.5
14	3.4471	39.6	25.9	0.1	39.7	26.0	56.0	46.0	16.3	20.0
15	3.6768	46.0	32.4	0.1	46.1	32.5	56.0	46.0	9.9	13.5
16	3.9052	44.0	30.4	0.1	44.1	30.5	56.0	46.0	11.9	15.5
17	4.1358	46.9	33.5	0.1	47.0	33.6	56.0	46.0	9.0	12.5
18	4.5944	46.2	32.8	0.0	46.2	32.8	56.0	46.0	9.8	13.2
19	4.8248	42.1	28.6	0.0	42.1	28.6	56.0	46.0	13.9	17.4

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

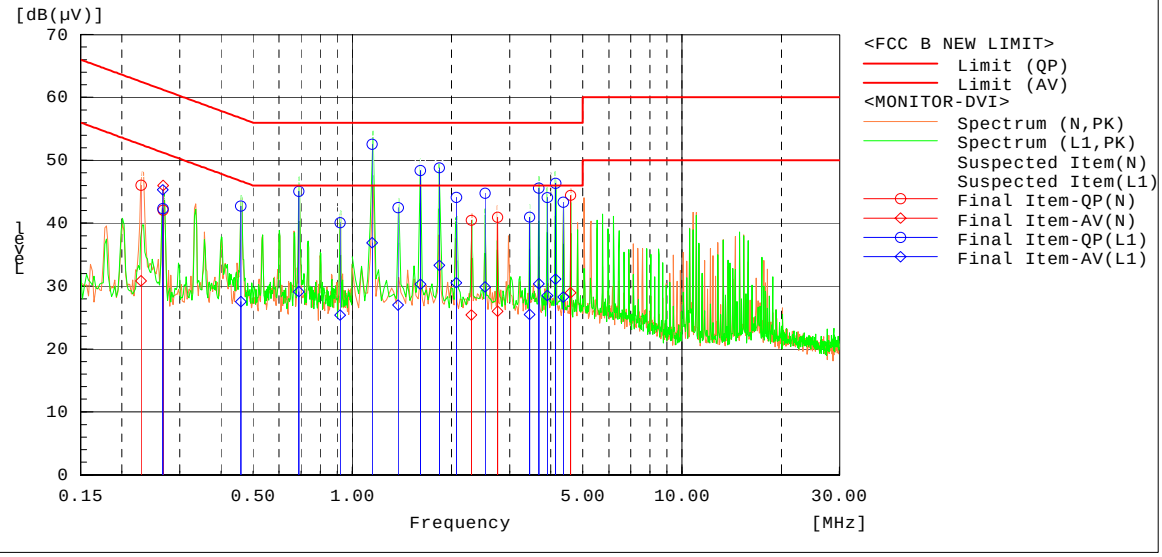
Samsung
- EMC Site -

<<Conducted Emission>>

9 March,2004 13:26
MONITOR-DVI.dat

Model : NP50**
Project Num :
Operator : S.W.CHOI
OP Mode : DVI
Temp,Humidity:

Standard : FCC Class B
Remark1 :
Remark2 :
Remark3 :
Remark4 :



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	0.26668	42.0	45.9	0.1	42.1	46.0	61.2	51.2	19.1	5.2
2	4.5957	44.4	29.0	0.0	44.4	29.0	56.0	46.0	11.6	17.1
3	2.7568	40.9	25.9	0.1	41.0	26.0	56.0	46.0	15.1	20.0
4	0.22905	46.0	30.7	0.1	46.1	30.8	62.5	52.5	16.5	21.7
5	2.298	40.4	25.3	0.1	40.5	25.4	56.0	46.0	15.5	20.6

--- 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	0.26624	42.2	45.2	0.1	42.3	45.3	61.2	51.2	18.9	5.9
2	1.1494	52.5	36.8	0.1	52.6	36.9	56.0	46.0	3.4	9.1
3	1.608	48.3	30.2	0.1	48.4	30.3	56.0	46.0	7.6	15.7
4	1.8372	48.7	33.2	0.1	48.8	33.3	56.0	46.0	7.2	12.7
5	4.1363	46.2	31.0	0.1	46.3	31.1	56.0	46.0	9.7	14.9
6	3.6775	45.5	30.3	0.1	45.6	30.4	56.0	46.0	10.4	15.6
7	0.6882	45.0	29.0	0.1	45.1	29.1	56.0	46.0	10.9	16.9
8	3.9052	44.0	28.4	0.1	44.1	28.5	56.0	46.0	11.9	17.5
9	1.3776	42.4	26.9	0.1	42.5	27.0	56.0	46.0	13.6	19.0
10	4.3656	43.4	28.3	0.0	43.4	28.3	56.0	46.0	12.7	17.8
11	0.45963	42.6	27.4	0.1	42.7	27.5	56.7	46.7	14.0	19.2
12	3.4473	40.9	25.4	0.1	41.0	25.5	56.0	46.0	15.0	20.5
13	2.526	44.7	29.8	0.1	44.8	29.9	56.0	46.0	11.2	16.1
14	0.91885	40.0	25.3	0.1	40.1	25.4	56.0	46.0	15.9	20.6
15	2.0683	44.0	30.4	0.1	44.1	30.5	56.0	46.0	11.9	15.5

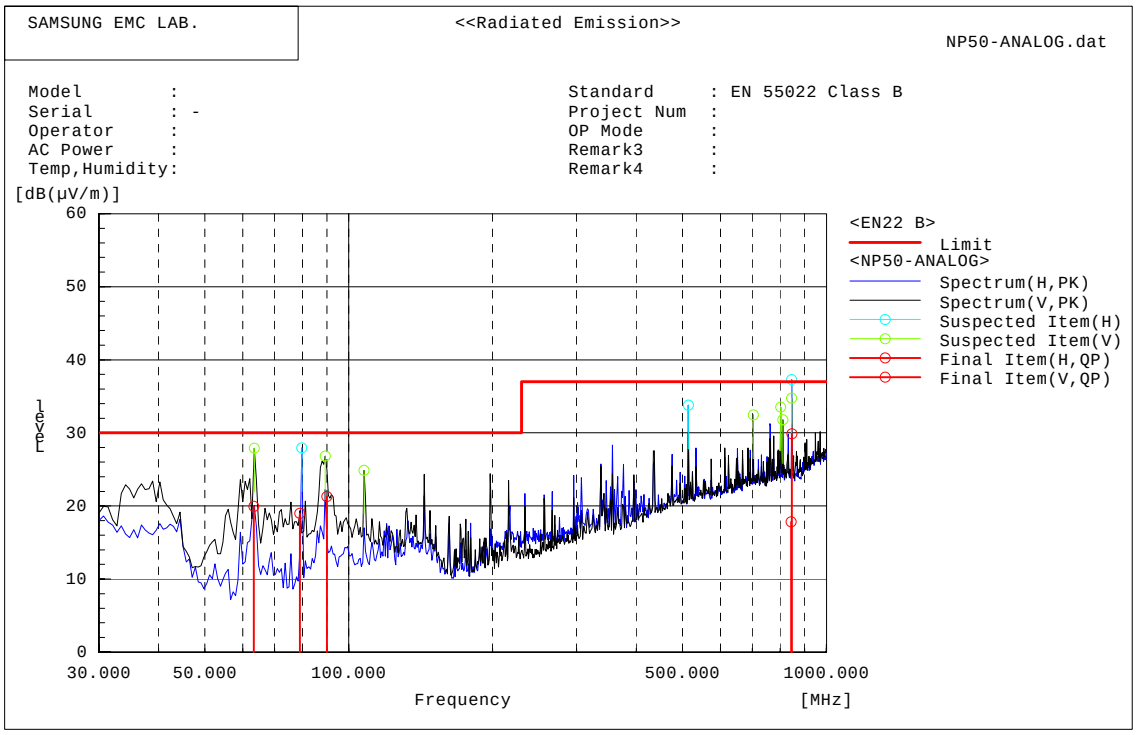
3.2 RADIATED EMISSION MEASUREMENT

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 1,000MHz.
And, detecting waves mode is peak mode, Graph's result in worst arrangement state of EUT. Spectrum analyzer result did horizontal and vertical polarization.

3.2.2 Test Results

- Operating Mode : PC Video Input



Final Result

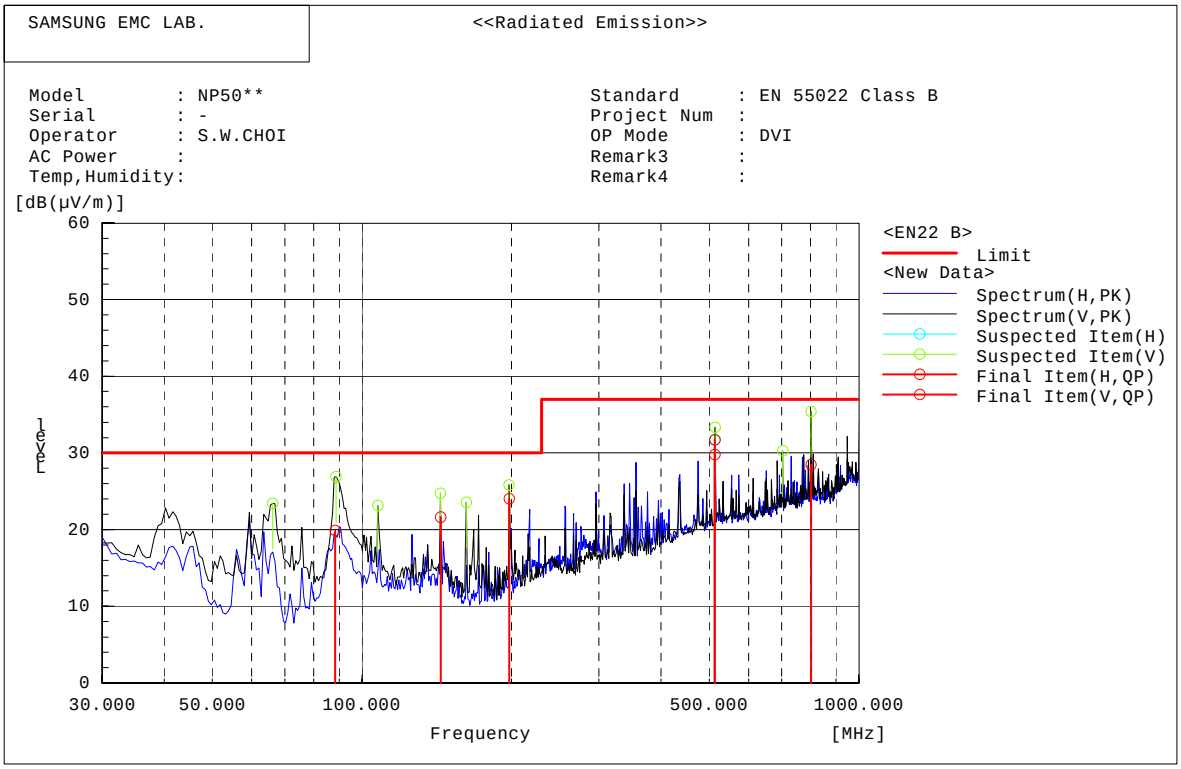
--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	844.080	21.0	-3.2	17.8	37.0	19.2	
2	78.971	39.0	-20.0	19.0	30.0	11.0	

--- 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	63.271	41.9	-22.0	19.9	30.0	10.1	
2	847.070	33.0	-3.1	29.9	37.0	7.1	
3	90.001	39.2	-17.9	21.3	30.0	8.7	

- Operating Mode : Digital Video Interface



Final Result

--- Horizontal Polarization (QP)---

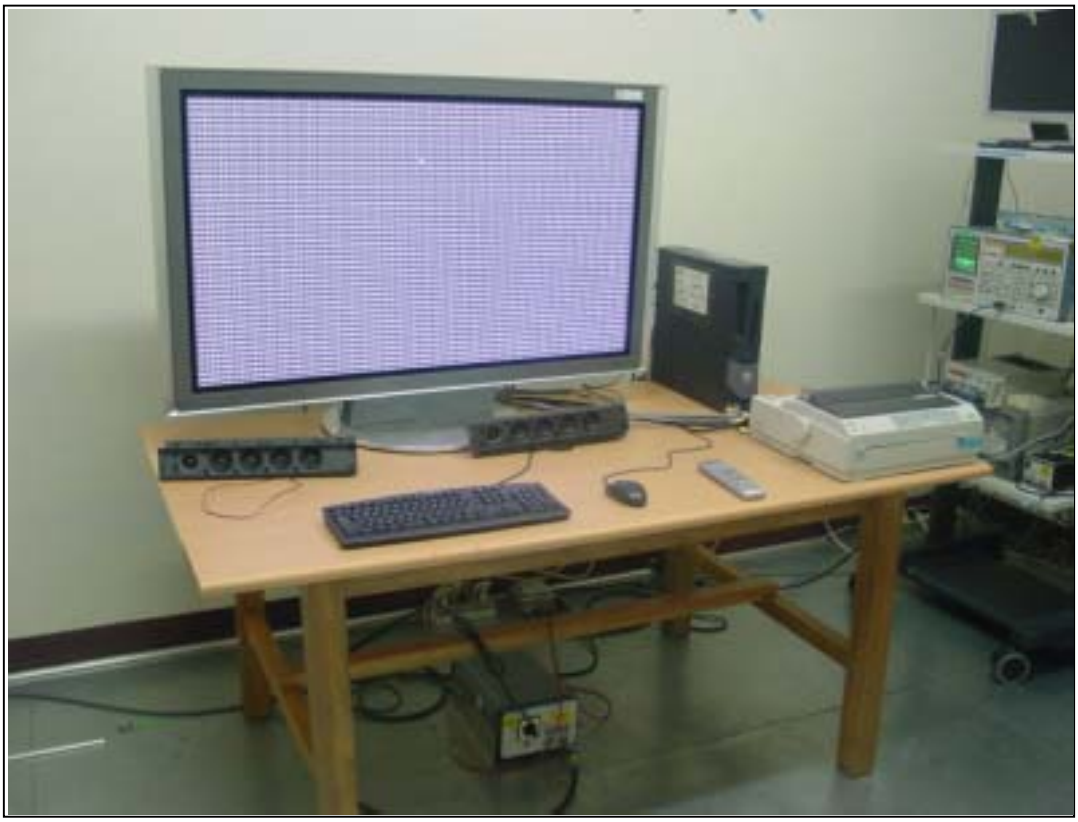
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	513.310	36.5	-6.7	29.8	37.0	7.2	

--- 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	801.830	32.1	-3.6	28.5	37.0	8.5	
2	88.367	38.2	-18.3	19.9	30.0	10.1	
3	513.310	38.4	-6.7	31.7	37.0	5.3	
4	198.001	40.9	-16.9	24.0	30.0	6.0	
5	144.001	37.6	-16.0	21.6	30.0	8.4	

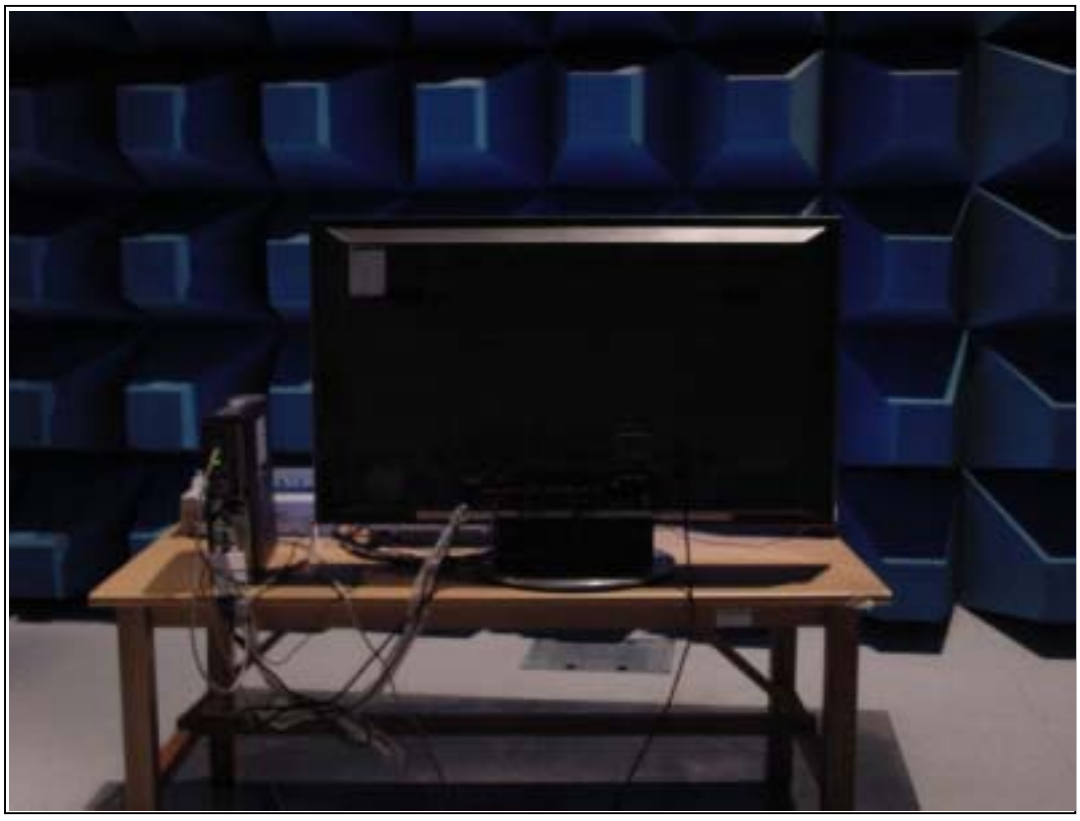
Test Set up Photographs

[AC POWERLINE CONDUCTED EMISSION MEASUREMENT]



Test Set up Photographs

[RADIATED EMISSION MEASUREMENT]



EUT Photographs

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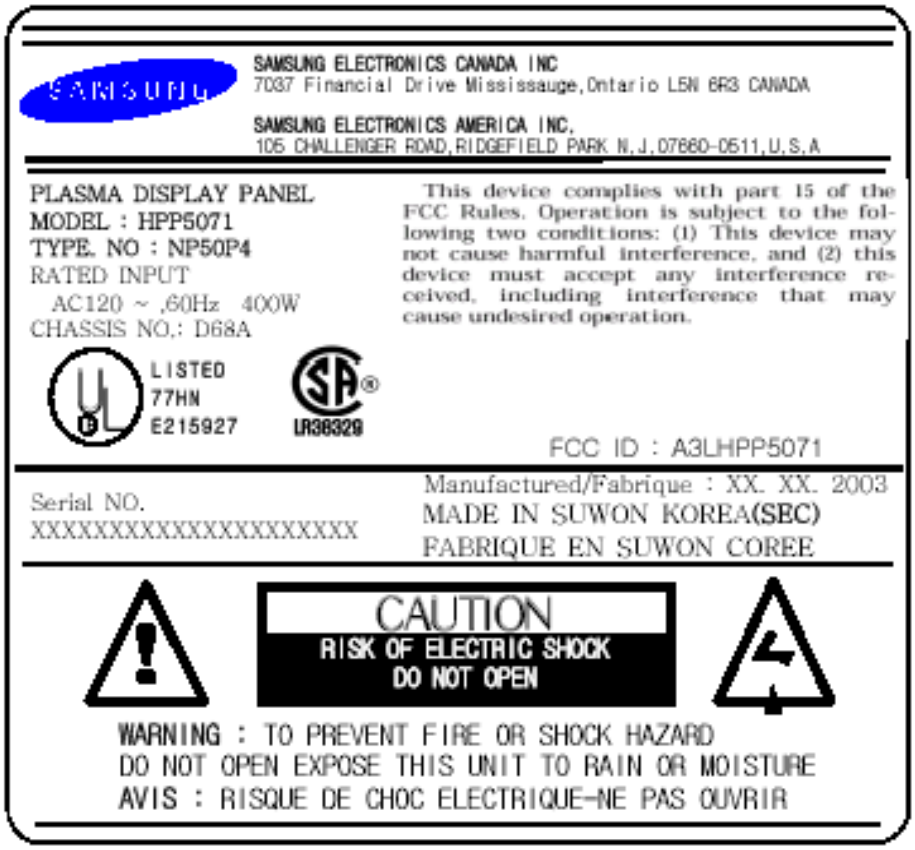
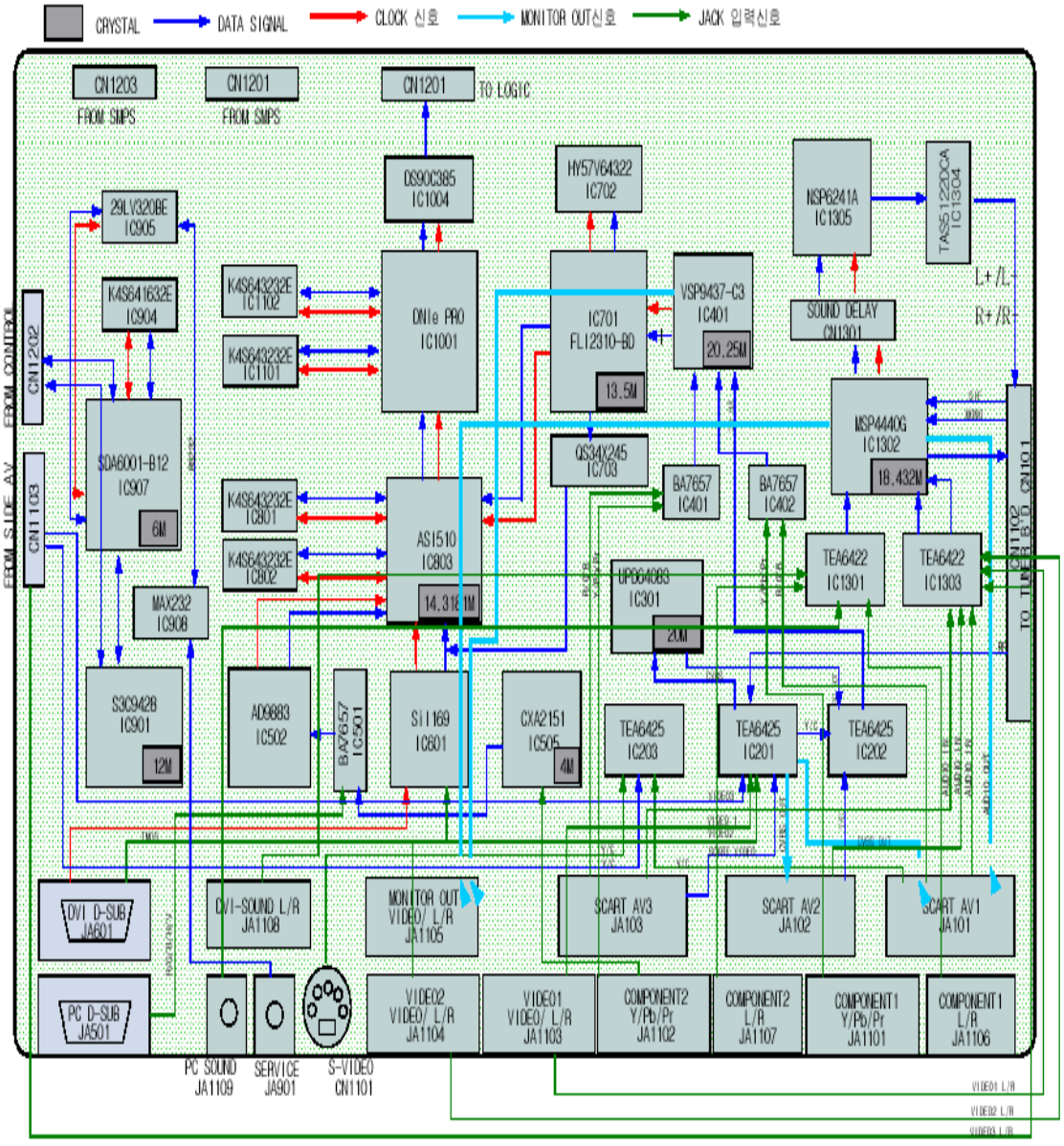
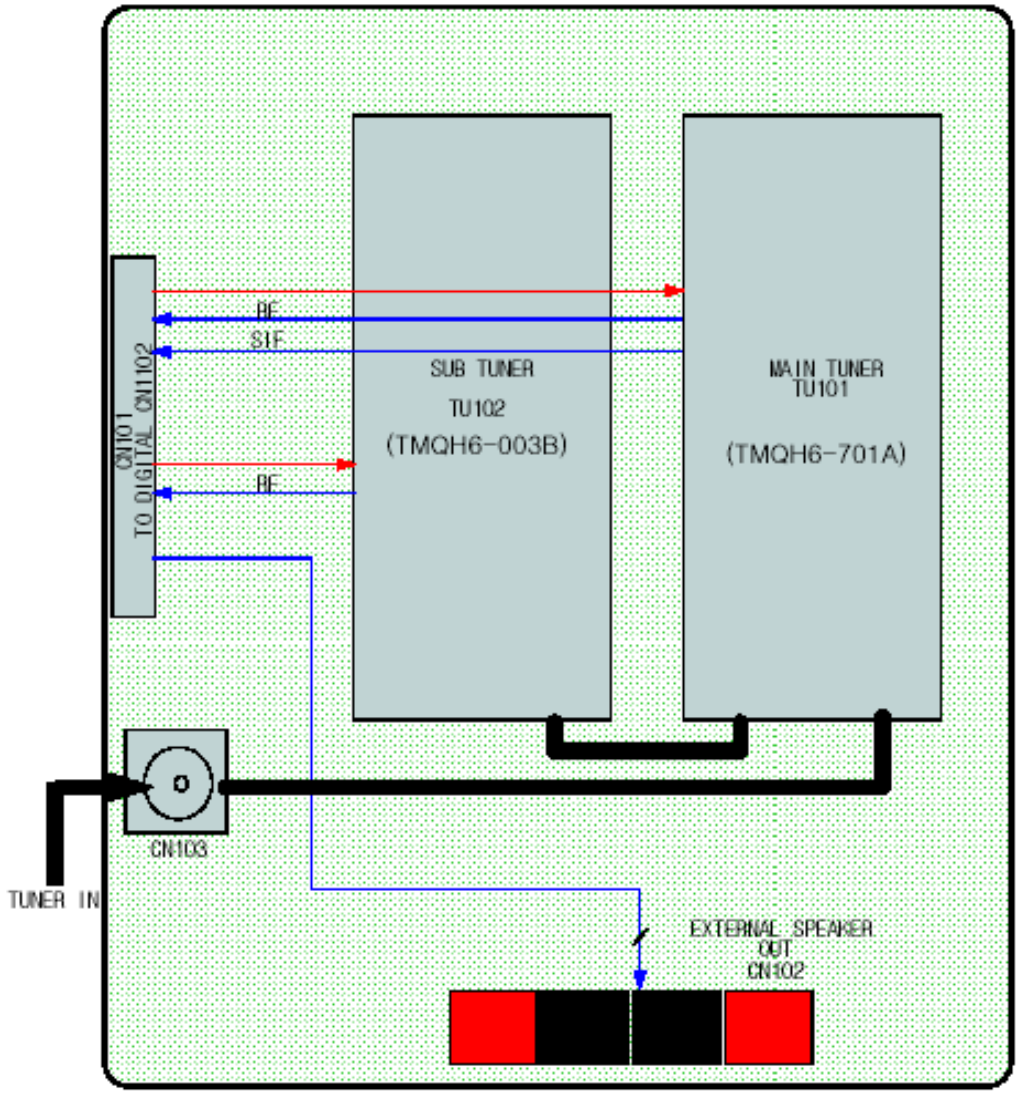


Label

System Block Diagram

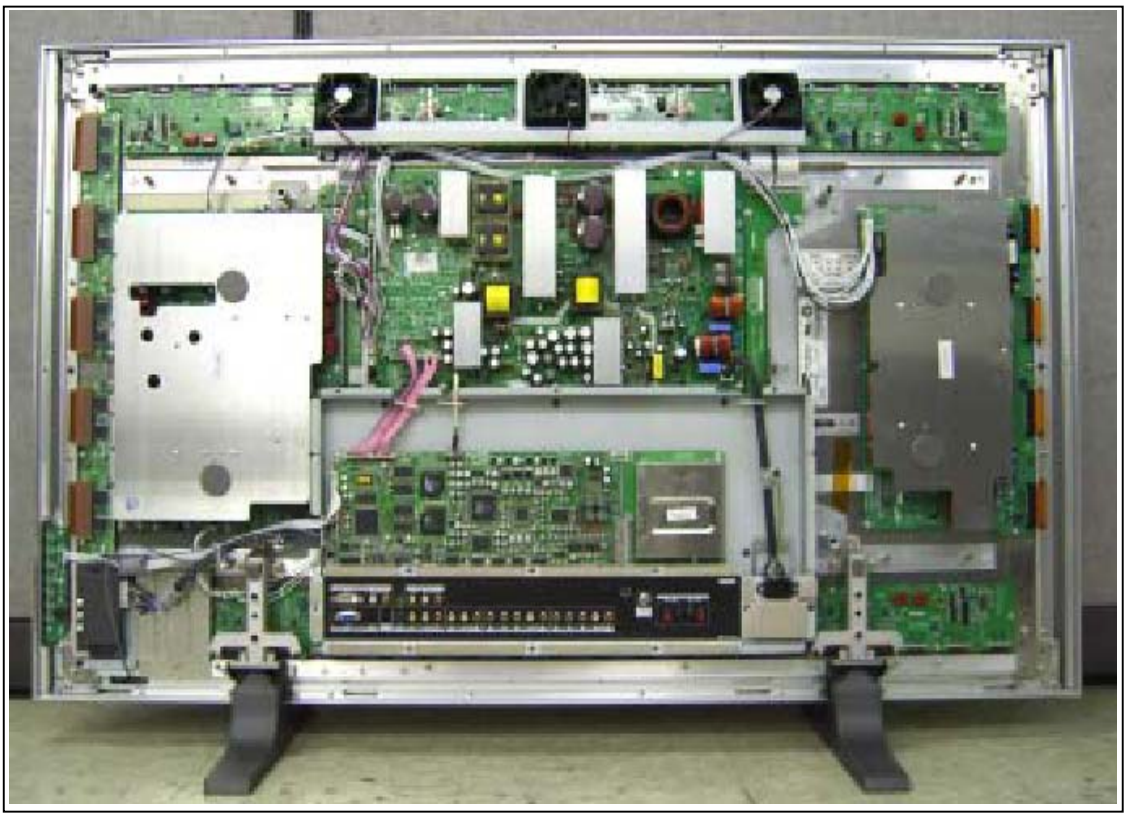


System Block Diagram



EUT Photographs

EUT Photographs



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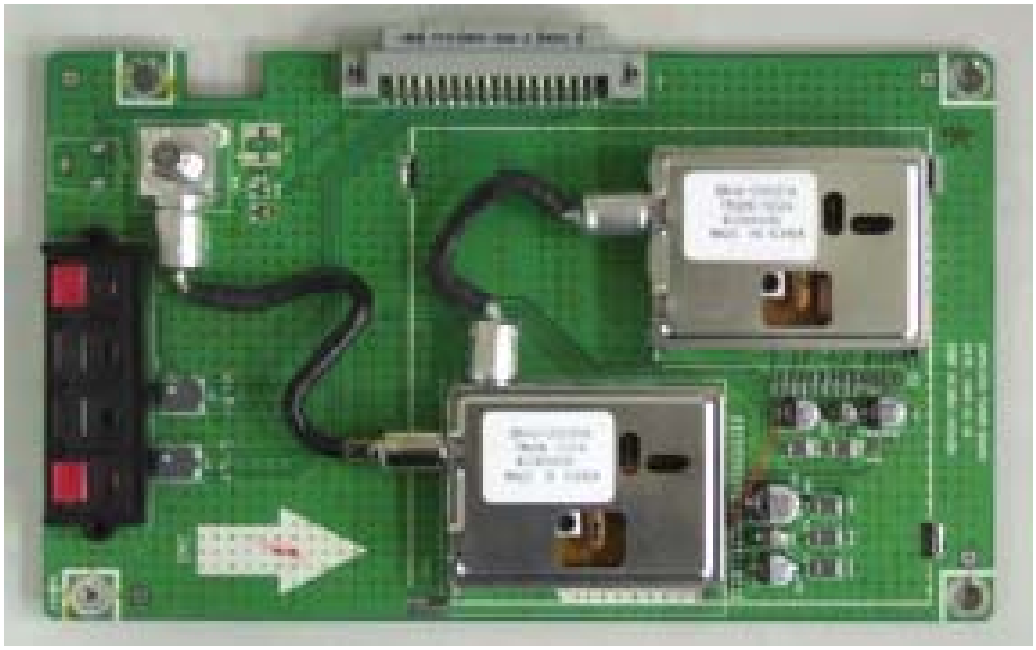
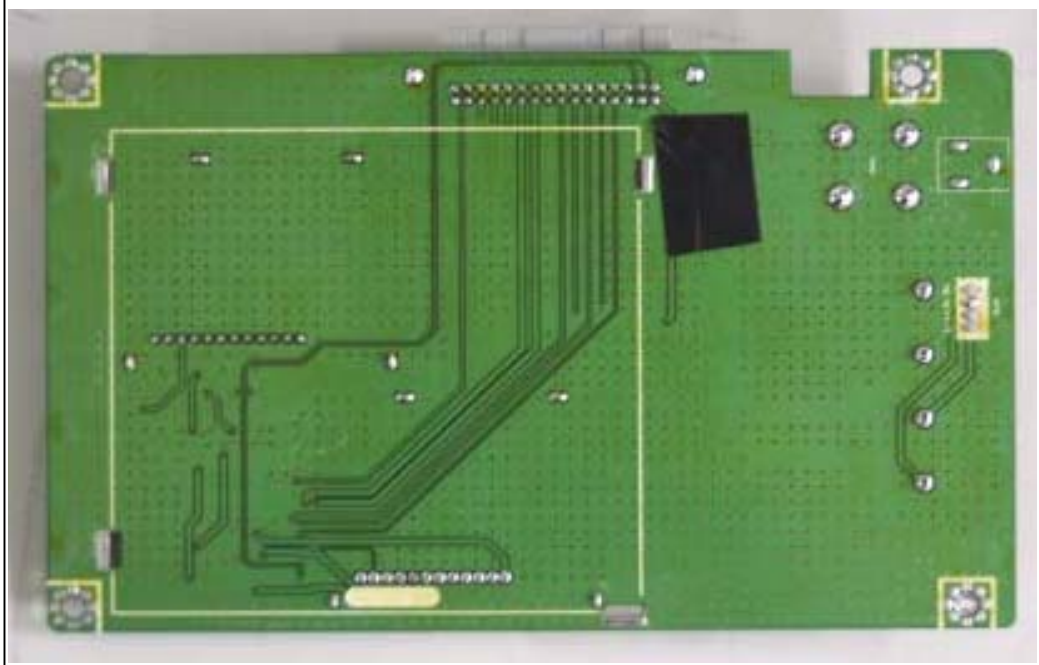
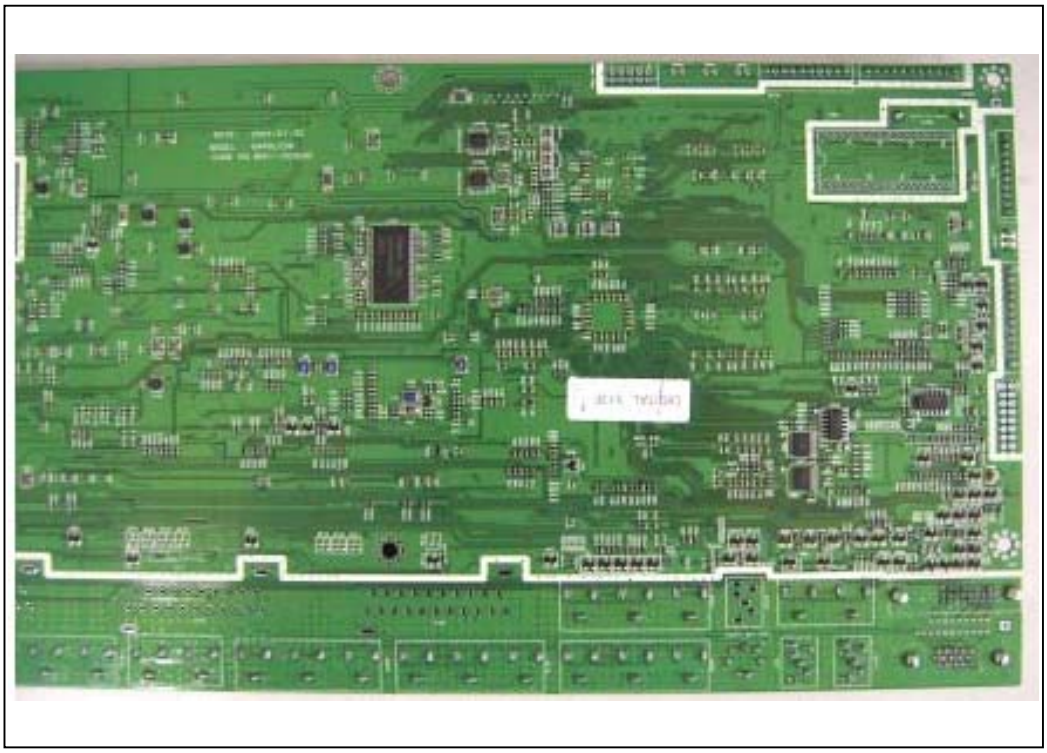




EUT Photographs



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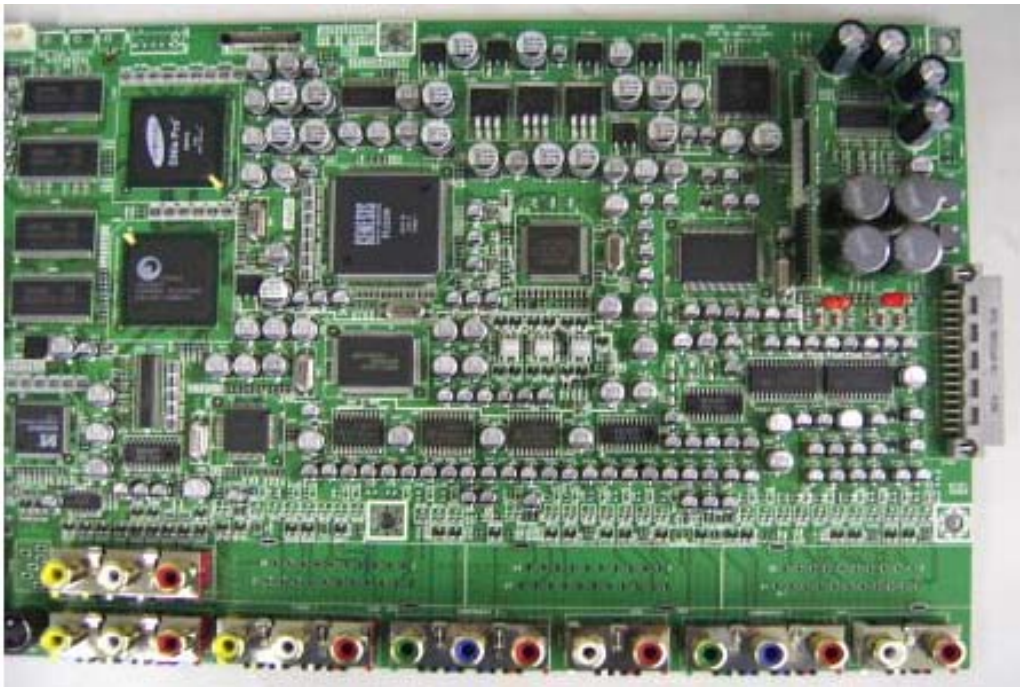
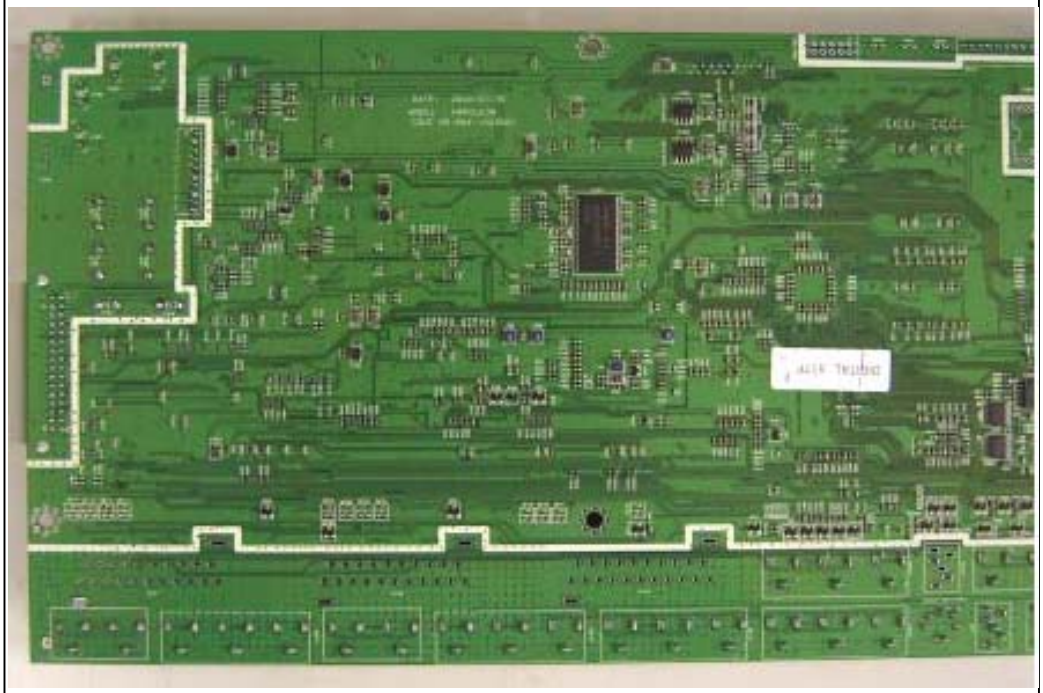
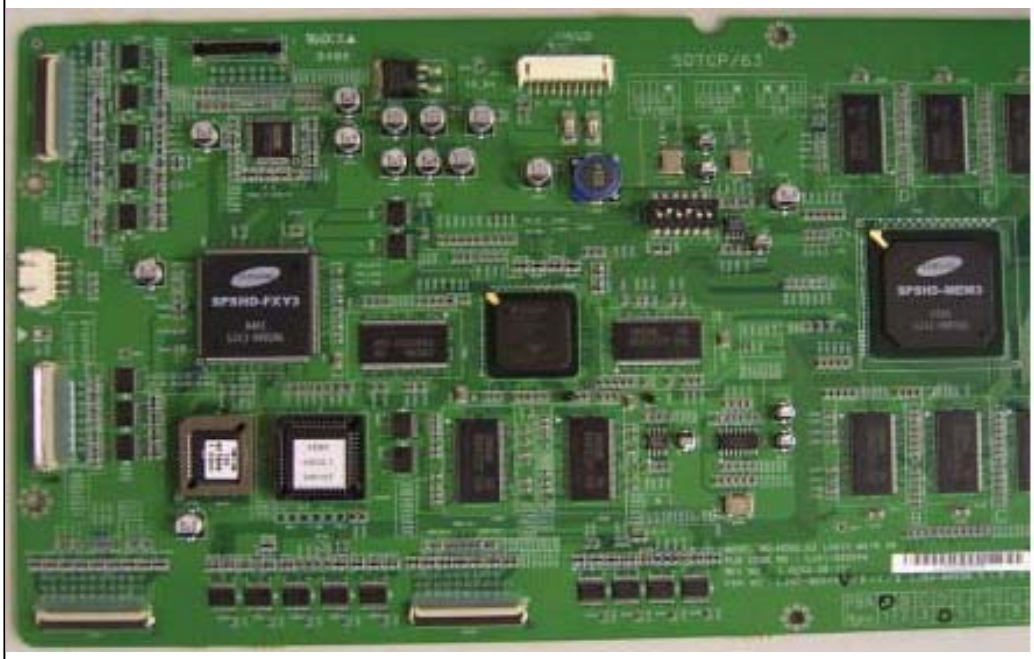
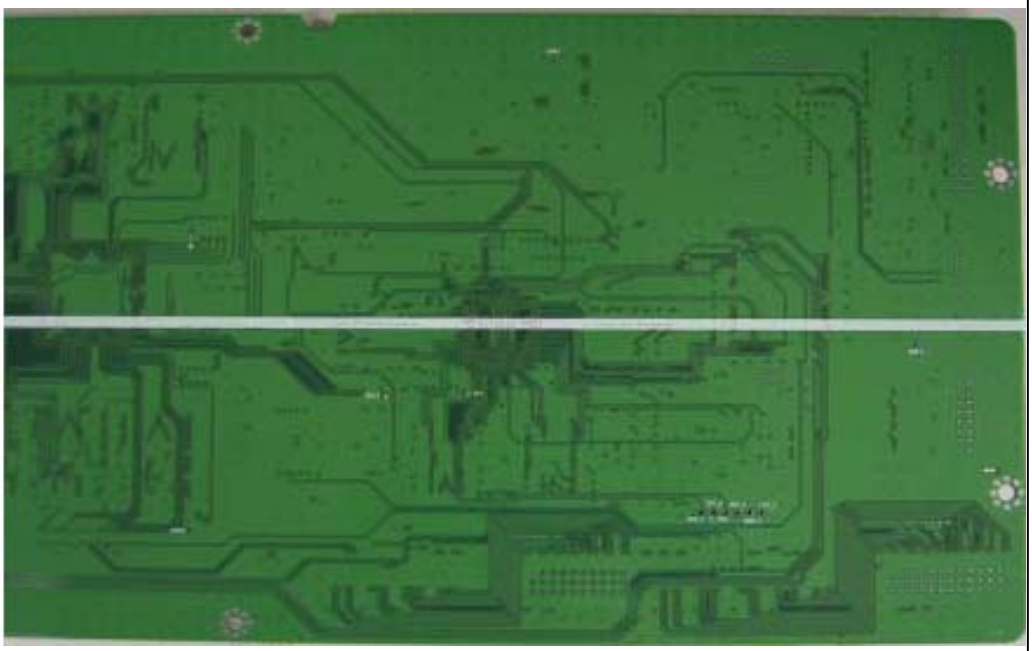




EUT Photographs

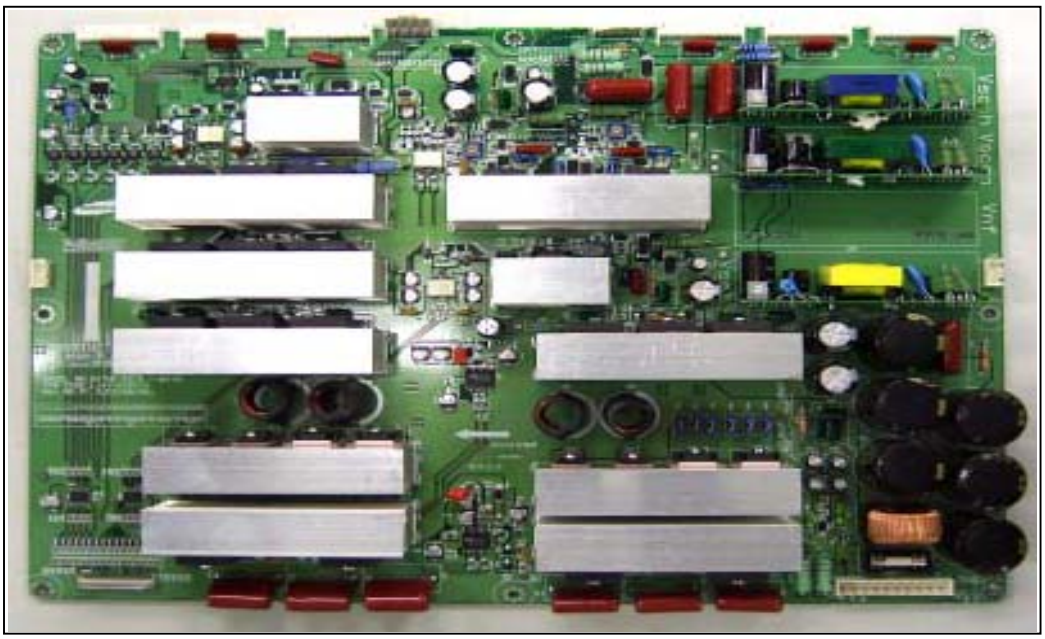
EUT Photographs

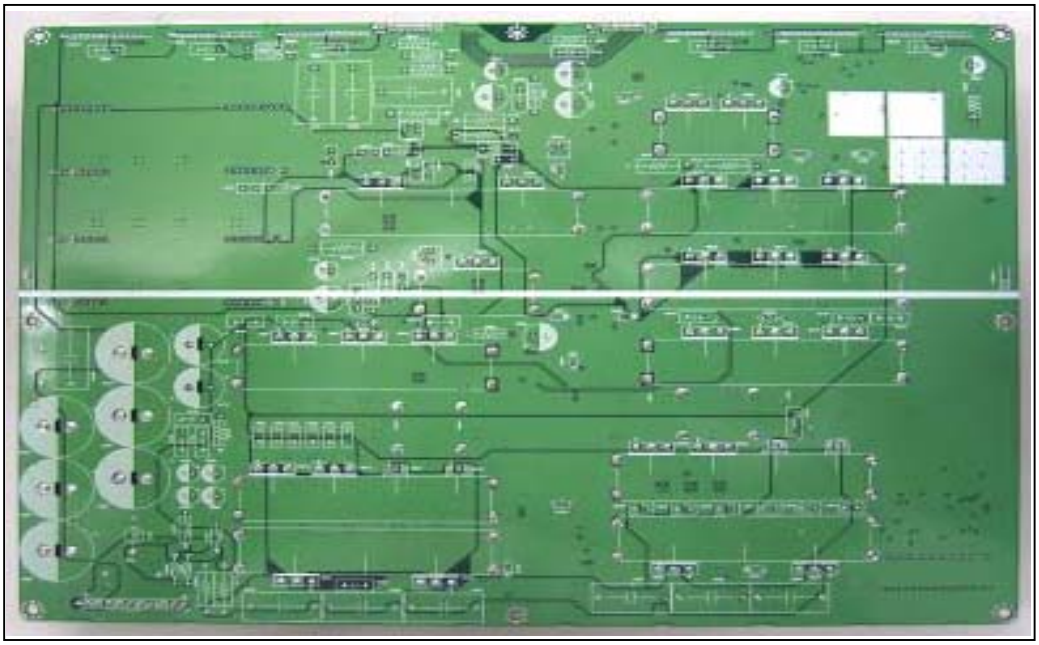




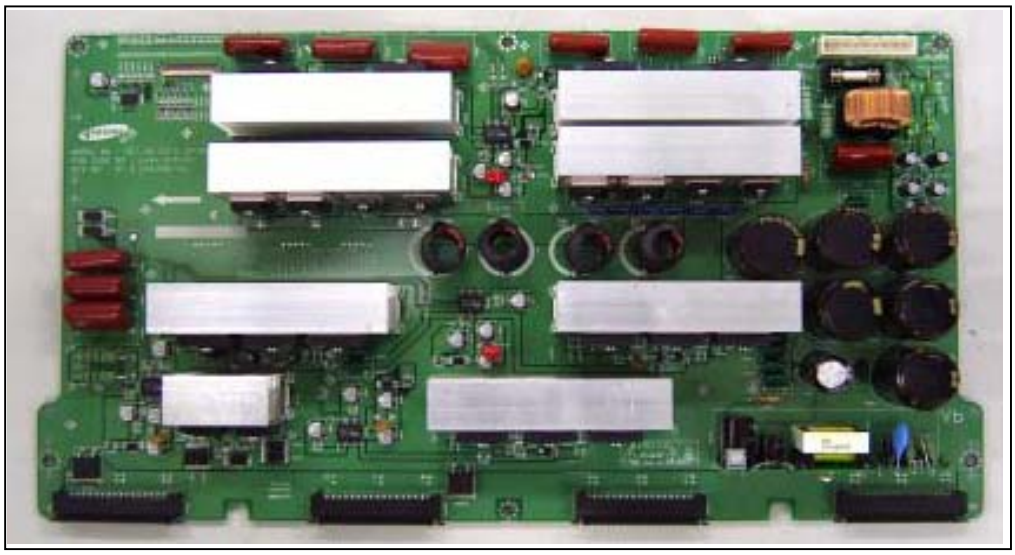
EUT Photographs

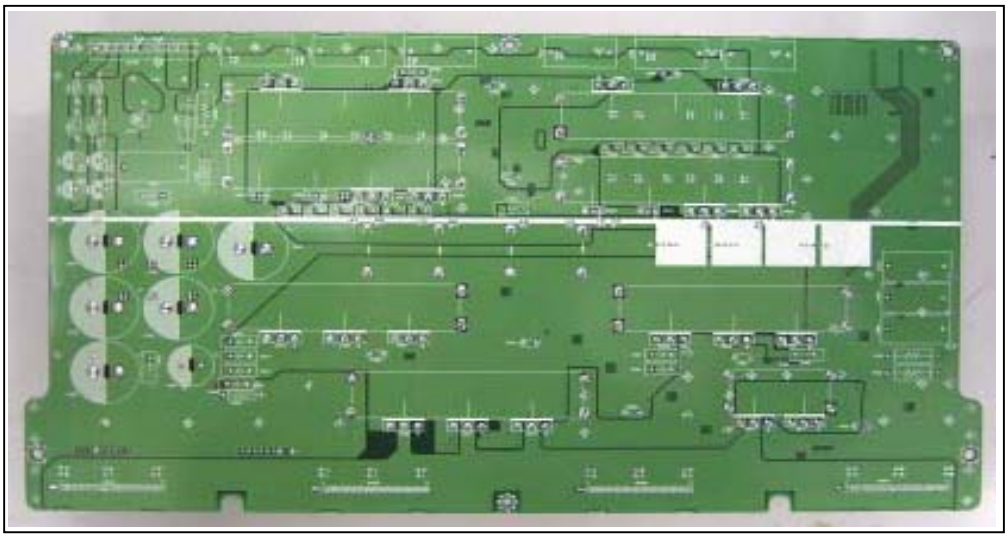
EUT Photographs

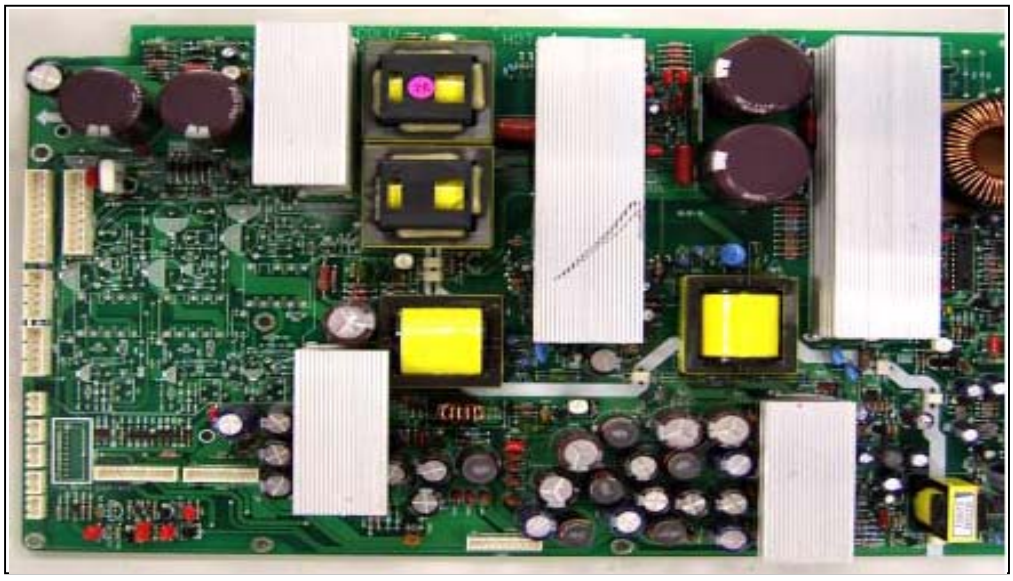




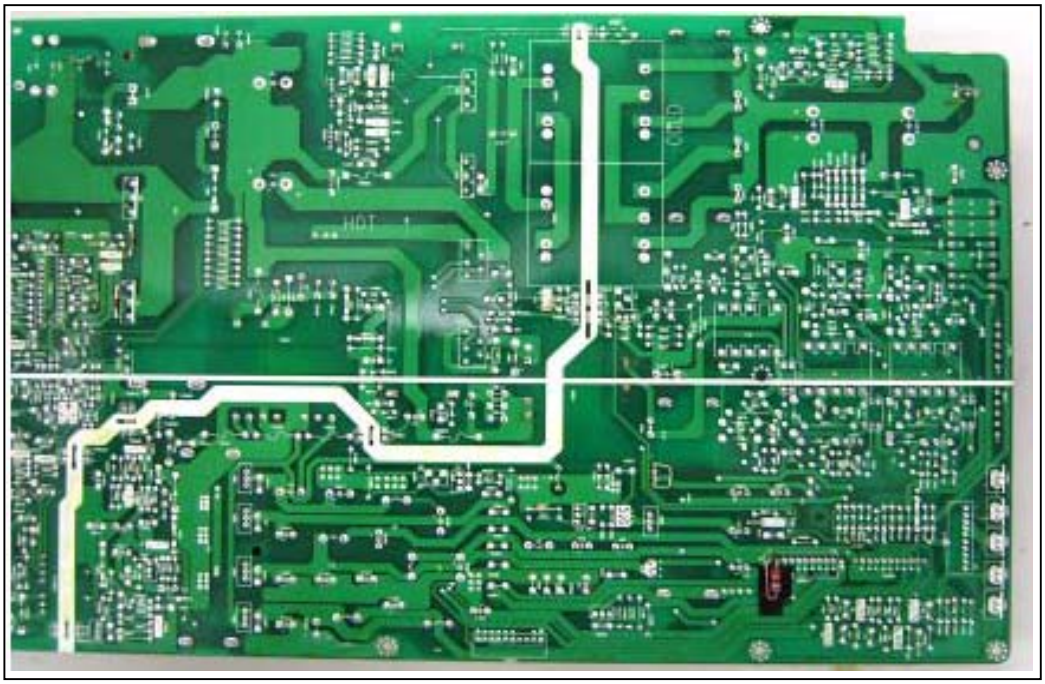
EUT Photographs

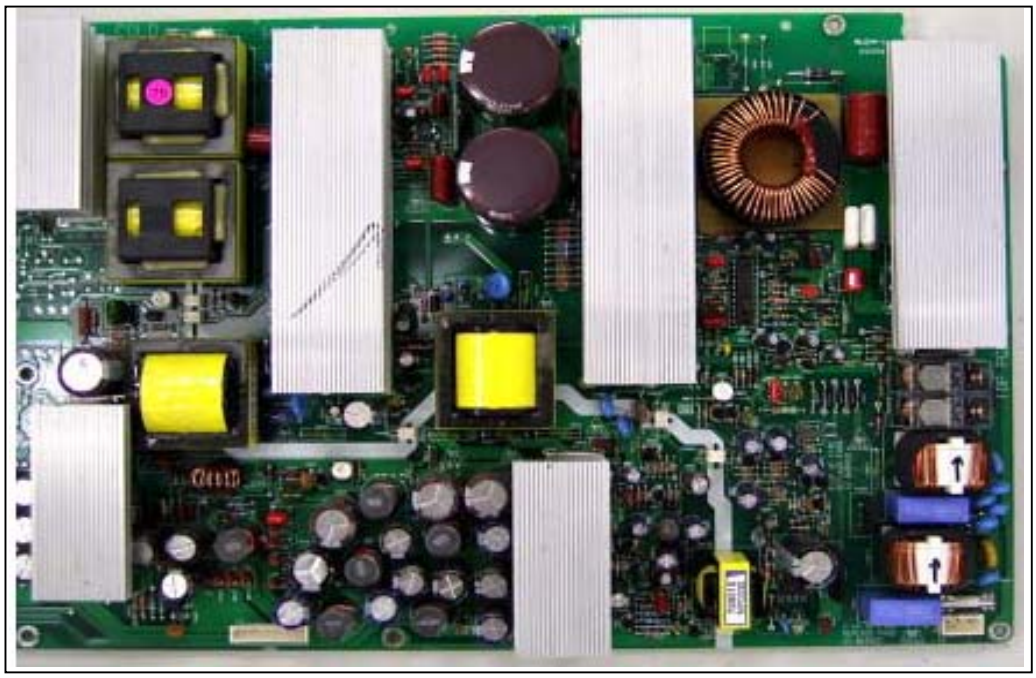






EUT Photographs





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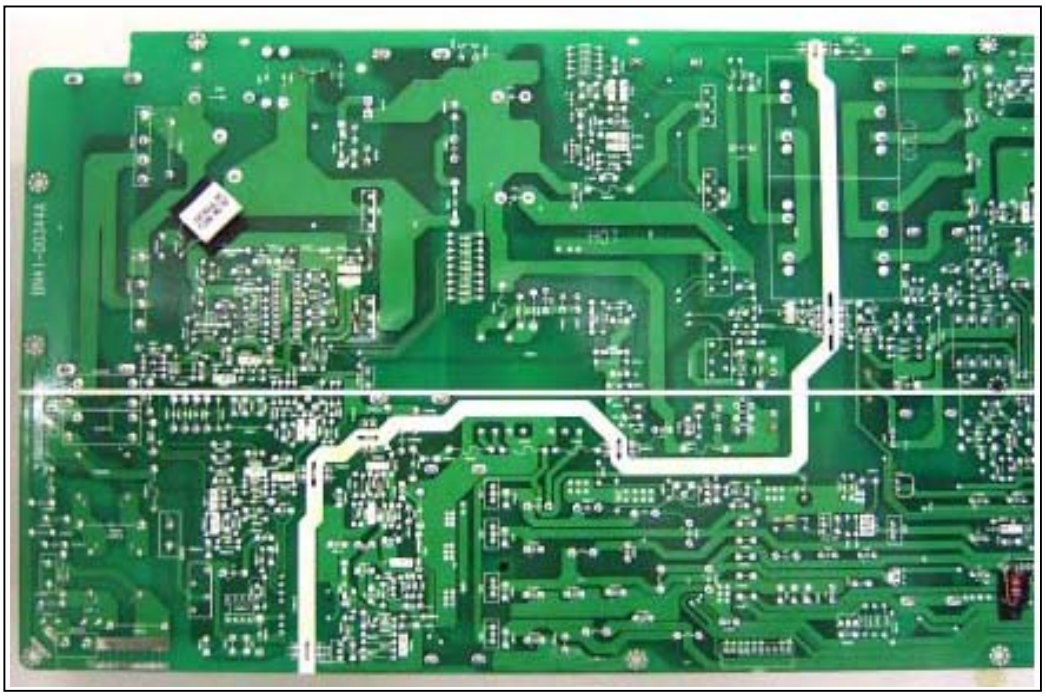

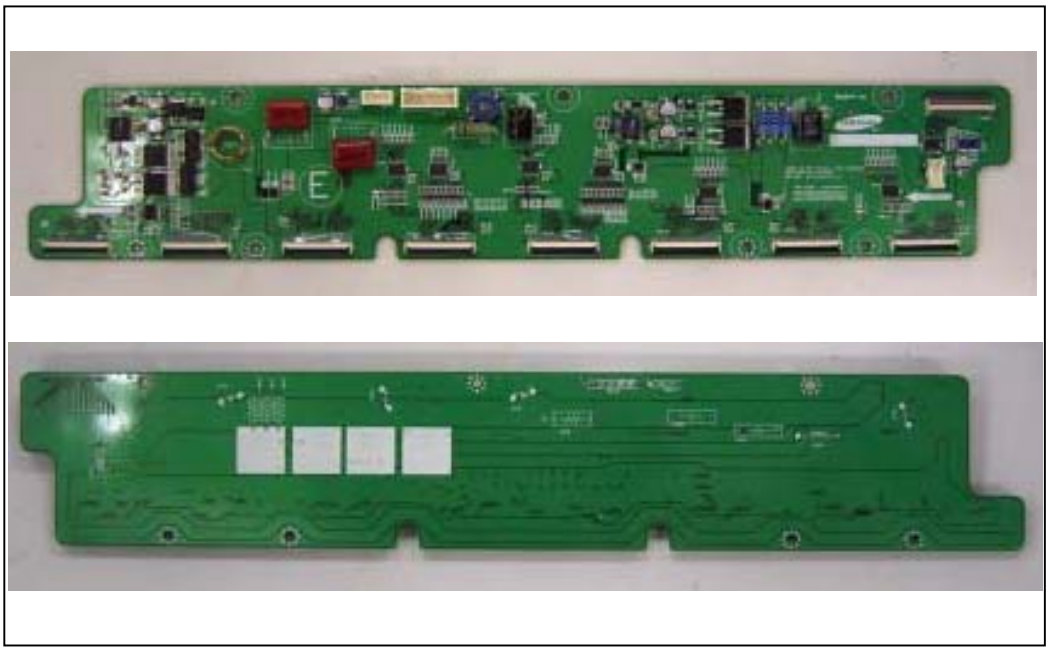

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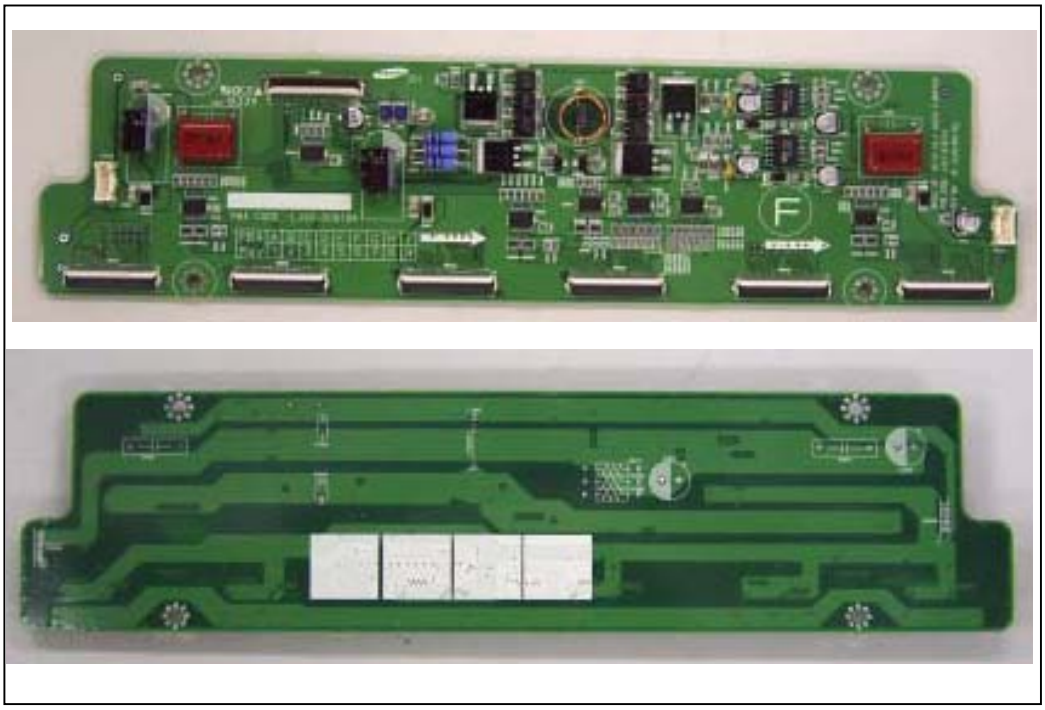

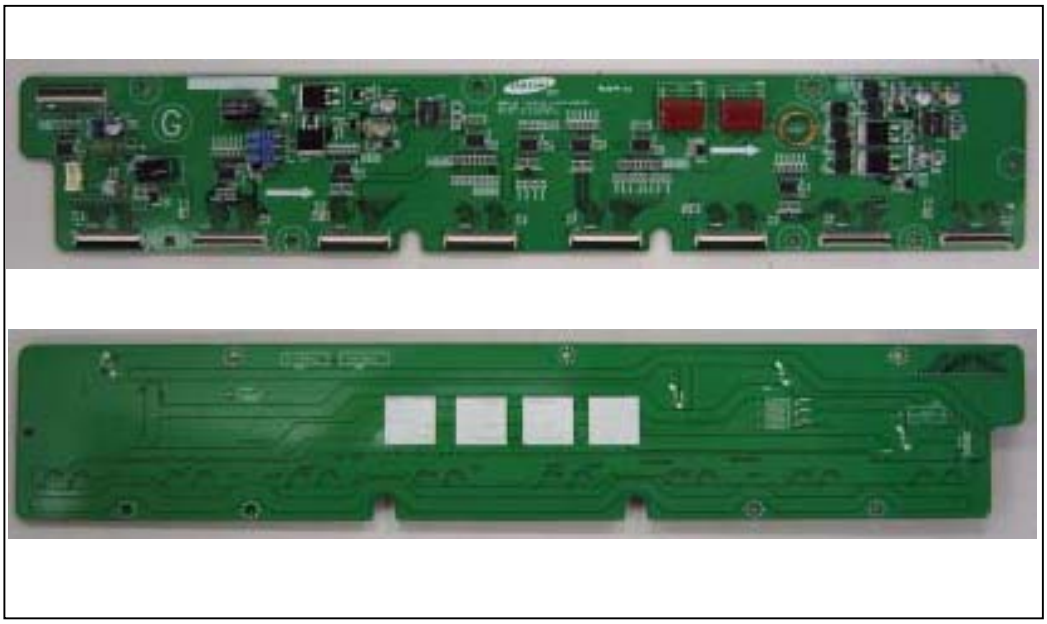

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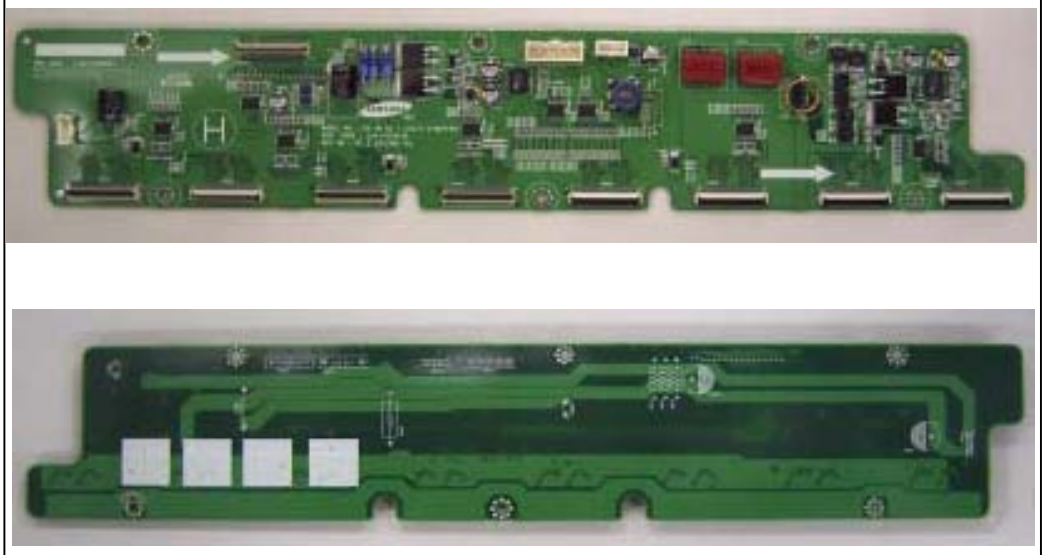

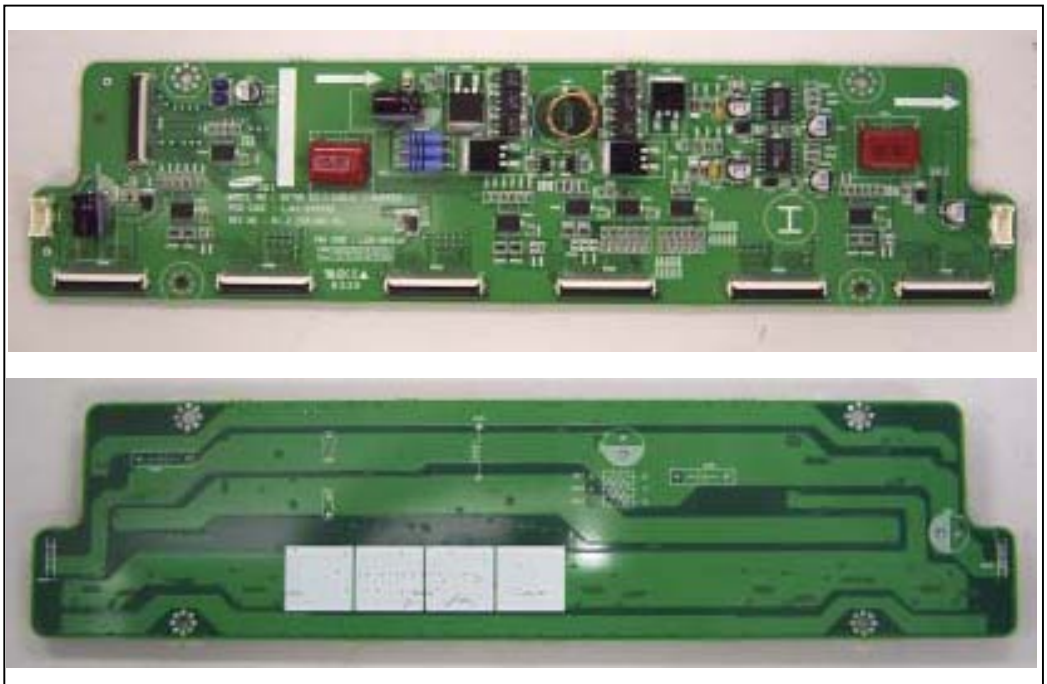

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