EMC TEST REPORT

Project No. : LBE031380

Product : PROJECTOR

Model No. : SP-H700AE

Date of test : June. 25 ~ 27, 2003

Issued Date : July. 3, 2003

Tested by:
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1. Introduction & Summary

1.1 Description of the EUT

Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Project Number	LBE031380
Equipment Under Test	PROJECTOR
Trade Name	SAMSUNG
Model Number	SP-H700AE
Variant Model	-
FCC ID Number	A3LSPH700

1.2 Test facility

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

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1.3 Test equipment

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Spectrum analyzer	E7405A	MY42000109	Agilent	03/04/18, 12Months
	Firmware versions : Rev.29.9.86			
Quasi-peak adapter	85650A	2521A00687	H.P	02/10/09, 12Months
10dB Attenuator	8491B	58226	Agilent	37537
RF Relais Matrix	PSU	861206/024	R & S	N/A
Measurement Software	EP5CE	-	TOYO	N/A
RF Selector	NS4900	0303-015	TOYO	N/A
Measurement Software	EP5RE	-	TOYO	N/A
Field strength meter	ESCS30	839809/022	R & S	02/06/27, 12Months
	Firmware versions : Main 1.08, OTP 02.01, GRA 02.03			
Field strength meter	ESCS30	100104	R & S	03/01/17, 12Months
L.I.S.N	ESH3-Z5	847265/028	R & S	02/10/09, 12Months
Bi-Log Antenna	CBL6112B	2766	SCHAFFNER	03/06/20, 12Months
EMC Analyzer	E7405A	US41110272	Agilent	03-06-14

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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
-	1280x720	Horizontal F.: 70kHz	-
		Vertical F. : 85Hz	

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

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2.4 Tested System Details

1) Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	PROJECTOR	SP-H700AE	-	Samsung	A3LSPH700
B	Personal Computer	M6200	450092DN101415	Samsung	
C	PS/2 Keyboard	SEM-A17R	04MB-0000229	Samsung	
D	PS/2 Mouse	M-U48a	LZE12153242	Logitech	

* 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	PS/2 Keyboard Cable	1.6	N	
3	Video Cable	1.5	Y	
4	AC Power Cable(Projector)	1.2	N	
5	AC Power Cable(PC)	1.8	N	

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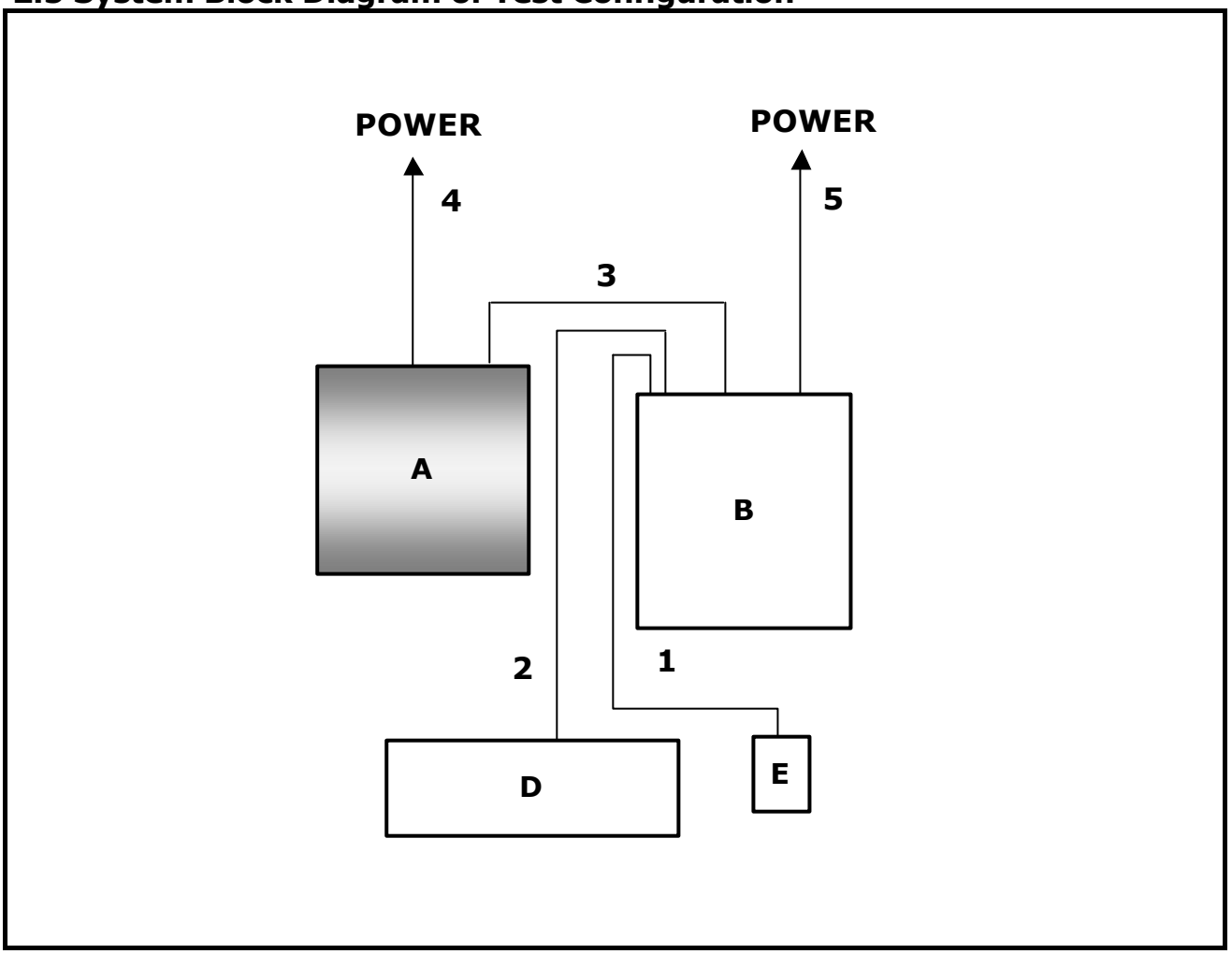
2.5 System Block Diagram of Test Configuration



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

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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.

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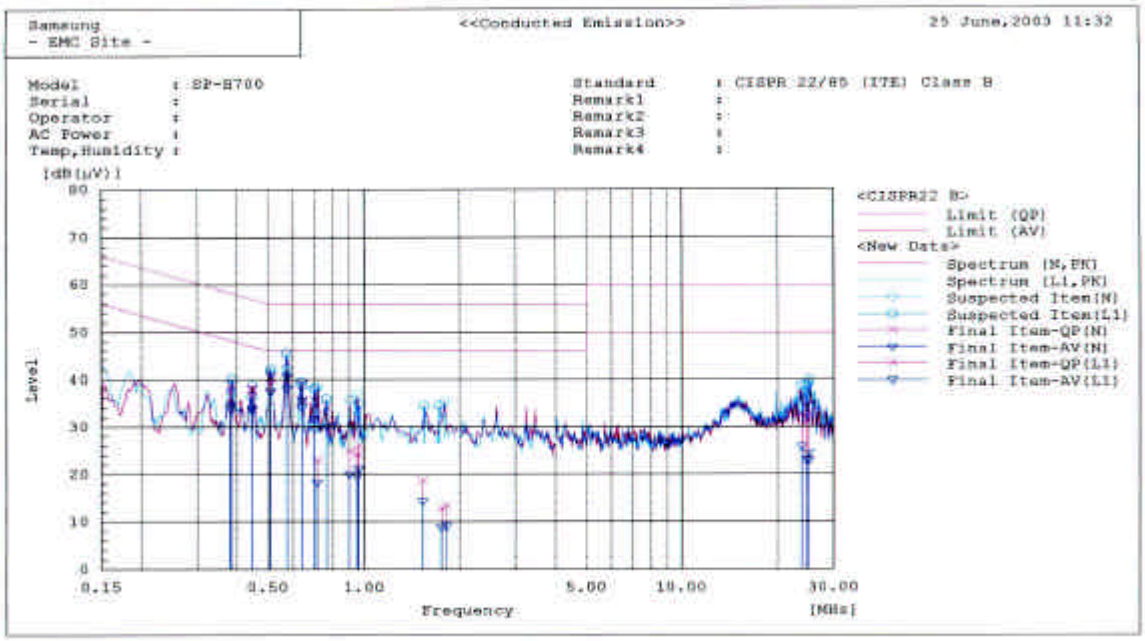
3.1.2 Test Results

O Test Data (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	0.38182	27.5	23.4	10.5	38.0	33.9	58.2	48.2	20.2	14.3
2	0.44844	27.2	23.4	10.6	37.8	34.0	56.9	46.9	19.1	12.9
3	0.50891	29.6	27.0	10.6	40.2	37.6	56.0	46.0	15.8	8.4
4	0.57362	29.5	27.5	10.6	40.1	38.1	56.0	46.0	15.9	7.9
5	0.63833	25.3	23.8	10.5	35.8	34.3	56.0	46.0	20.2	11.8
6	0.70169	21.5	19.2	10.5	32.0	29.7	56.0	46.0	24.0	16.3
7	0.71245	12.6	7.8	10.5	23.1	18.3	56.0	46.0	32.9	27.7
8	0.89987	14.6	9.6	10.4	25.0	20.0	56.0	46.0	31.0	26.0
9	0.95306	14.1	9.2	10.3	24.4	19.6	56.0	46.0	31.6	26.4
10	1.8228	3.3	-1.1	10.2	13.5	9.1	56.0	46.0	42.5	36.9
11	24.6445	21.0	12.6	10.5	31.5	23.1	60.0	50.0	28.5	26.9
12	25.0945	21.4	12.6	10.4	31.8	23.0	60.0	50.0	28.2	27.0

--- 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	0.38356	28.4	24.5	10.5	38.9	35.0	58.2	48.2	19.3	13.2
2	0.44654	27.6	23.1	10.6	38.2	33.7	56.9	46.9	18.7	13.3
3	0.50898	30.1	26.9	10.6	40.7	37.5	56.0	46.0	15.4	8.5
4	0.57419	33.2	30.2	10.6	43.8	40.8	56.0	46.0	12.2	5.2
5	0.63952	28.6	25.1	10.5	39.1	35.6	56.0	46.0	16.9	10.4
6	0.70016	25.2	21.1	10.5	35.7	31.6	56.0	46.0	20.3	14.4
7	0.76517	23.8	19.7	10.4	34.2	30.1	56.0	46.0	21.8	15.9
8	0.96275	15.8	10.9	10.3	26.1	21.2	56.0	46.0	29.9	24.8
9	1.5292	8.5	4.1	10.3	18.8	14.4	56.0	46.0	37.2	31.6
10	1.752	2.7	-1.4	10.3	13.0	8.9	56.0	46.0	43.0	37.1
11	23.816	21.9	15.0	10.9	32.8	25.9	60.0	50.0	27.3	24.1
12	25.1045	22.5	13.8	10.7	33.2	24.5	60.0	50.0	26.8	25.5

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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 maxhold.

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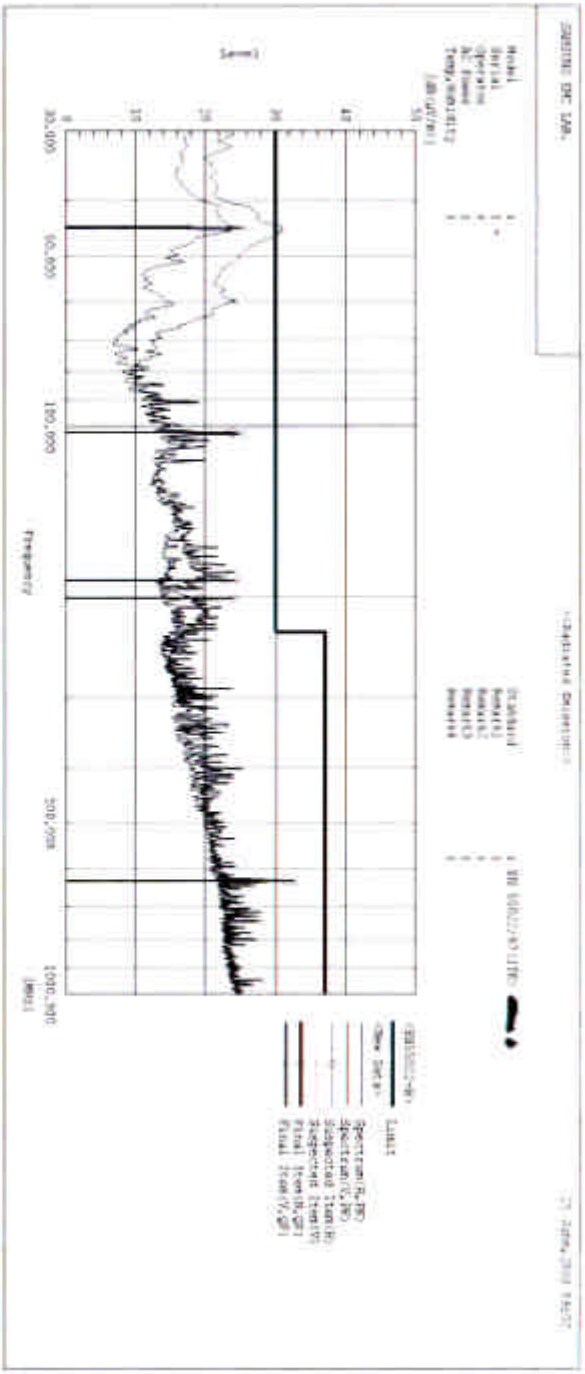
3.2.2 Radiated Emission Test Data

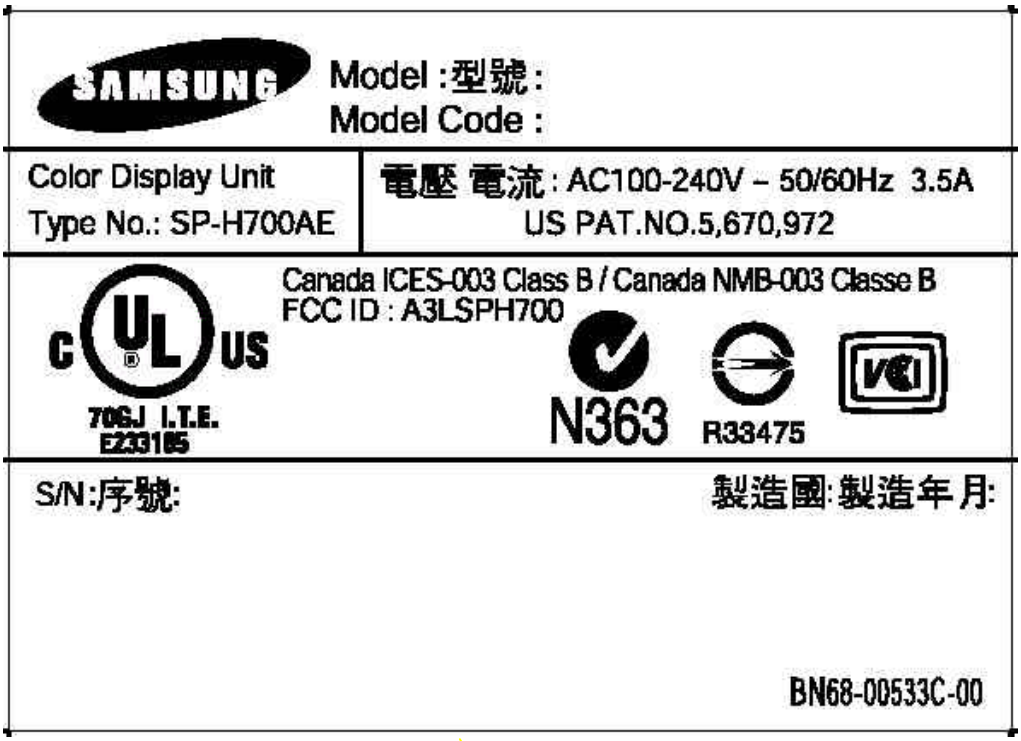


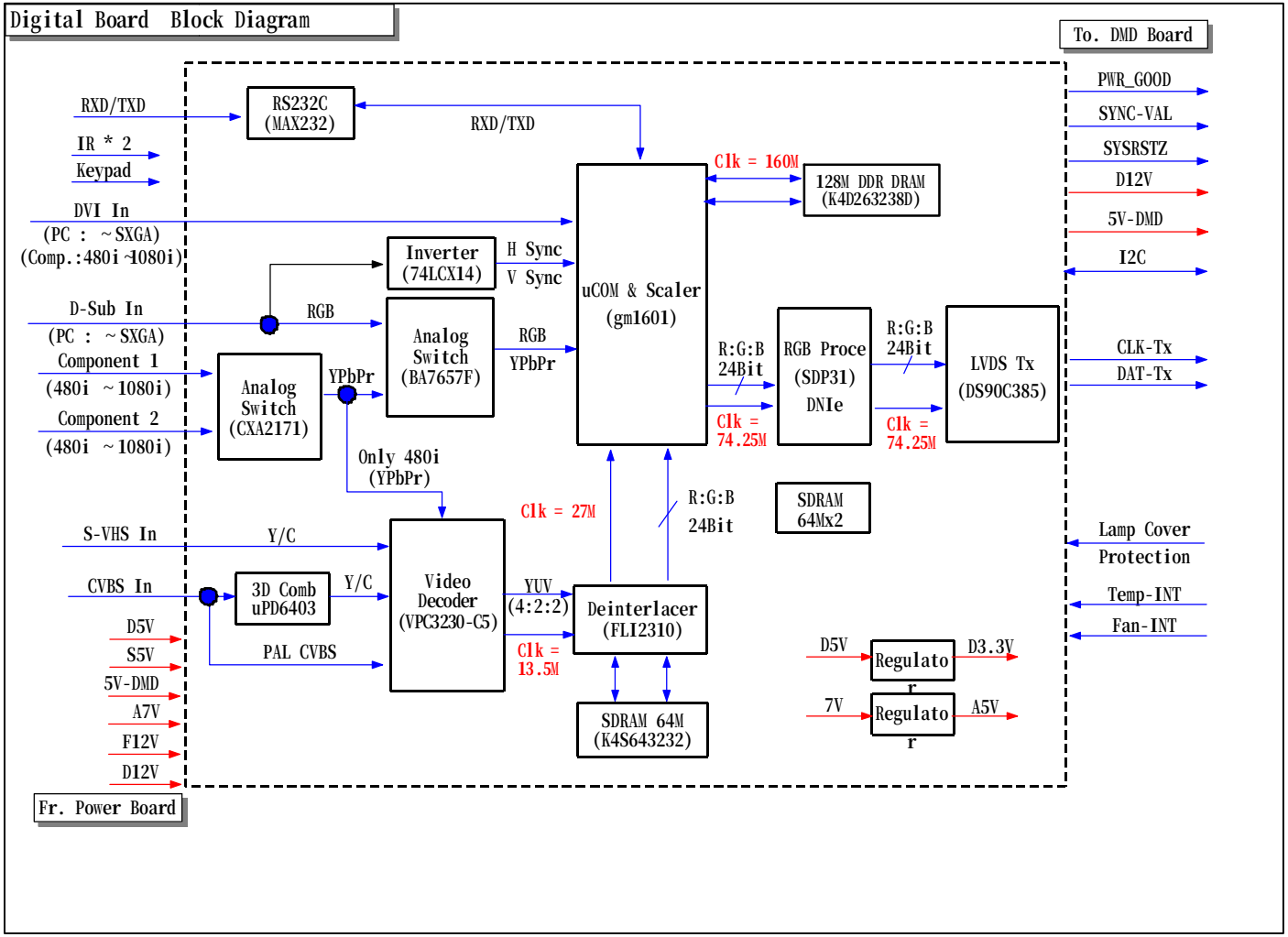
Final Result

No.	Frequency (MHz)	(P)	L.C.	S.C	Reading QP (dBμV)	e.f (dB(1/m))	Result QP (dBμV/m)	Limit (dBμV/m)	Margin QP (dB)	Height (cm)	Angle (°)	Remark
1	44.526	V	OK	S	42.6	-16.9	25.5	30.0	4.5	106.0	222.0	
2	49.399	H	OK	S	34.5	-16.8	17.7	30.0	12.3	399.0	312.0	
3	102.349	H	OK	S	39.5	-15.6	23.9	30.0	6.2	316.0	230.0	
4	102.347	V	OK	S	36.8	-15.6	21.2	30.0	8.8	326.0	128.0	
5	114.382	V	MG	S	--------	-14.4	--------	30.0	--------	149.0	54.0	
6	186.573	H	OK	S	39.8	-16.9	22.9	30.0	7.2	399.0	18.0	
7	200.471	H	OK	S	35.8	-16.7	19.1	30.0	10.9	304.0	304.0	
8	630.000	H	OK	S	37.0	-5.4	31.6	37.0	5.4	149.0	221.0	
9	629.980	V	OK	S	35.4	-5.4	30.0	37.0	7.0	279.0	319.0	
10	945.020	V	MG	S	--------	-1.1	--------	37.0	--------	152.0	222.0	

EUT Photographs

[Label and Label position]

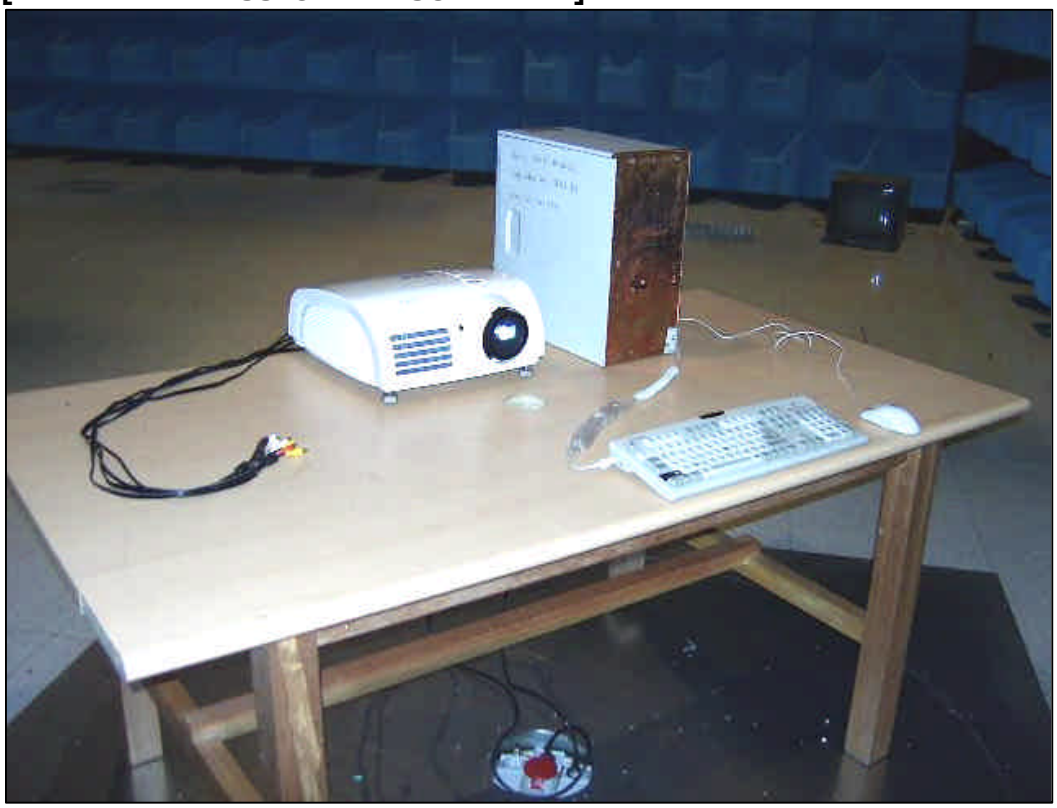



Digital Board Block Diagram
To. DMD Board
RXD/TXD
IR * 2
Keypad
DVI In
(PC : ~SXGA)
(Comp.:480i~1080i)
D-Sub In
(PC : ~SXGA)
Component 1
(480i ~1080i)
Component 2
(480i ~1080i)
S-VHS In
CVBS In
D5V
S5V
5V-DMD
A7V
F12V
D12V
Fr. Power Board
RS232C
(MAX232)
RXD/TXD
Inverter
(74LCX14)
H Sync
V Sync
RGB
Analog
Switch
(BA7657F)
RGB
YPbPr
Analog
Switch
(CXA2171)
YPbPr
Only 480i
(YPbPr)
Y/C
3D Comb
uPD6403
Y/C
PAL CVBS
Video
Decoder
(VPC3230-C5)
YUV
(4:2:2)
Clk =
13.5M
Clk = 27M
uCOM & Scaler
(gm1601)
Clk = 160M
128M DDR DRAM
(K4D263238D)
R:G:B
24Bit
Clk =
74.25M
RGB Proce
(SDP31)
DNIe
R:G:B
24Bit
Clk =
74.25M
LVDS Tx
(DS90C385)
R:G:B
24Bit
SDRAM
64Mx2
Deinterlacer
(FLI2310)
SDRAM 64M
(K4S643232)
D5V
Regulato
r
D3.3V
7V
Regulato
r
A5V
PWR_GOOD
SYNC-VAL
SYSRSTZ
D12V
5V-DMD
I2C
CLK-Tx
DAT-Tx
Lamp Cover
Protection
Temp-INT
Fan-INT

Test Set up Photographs

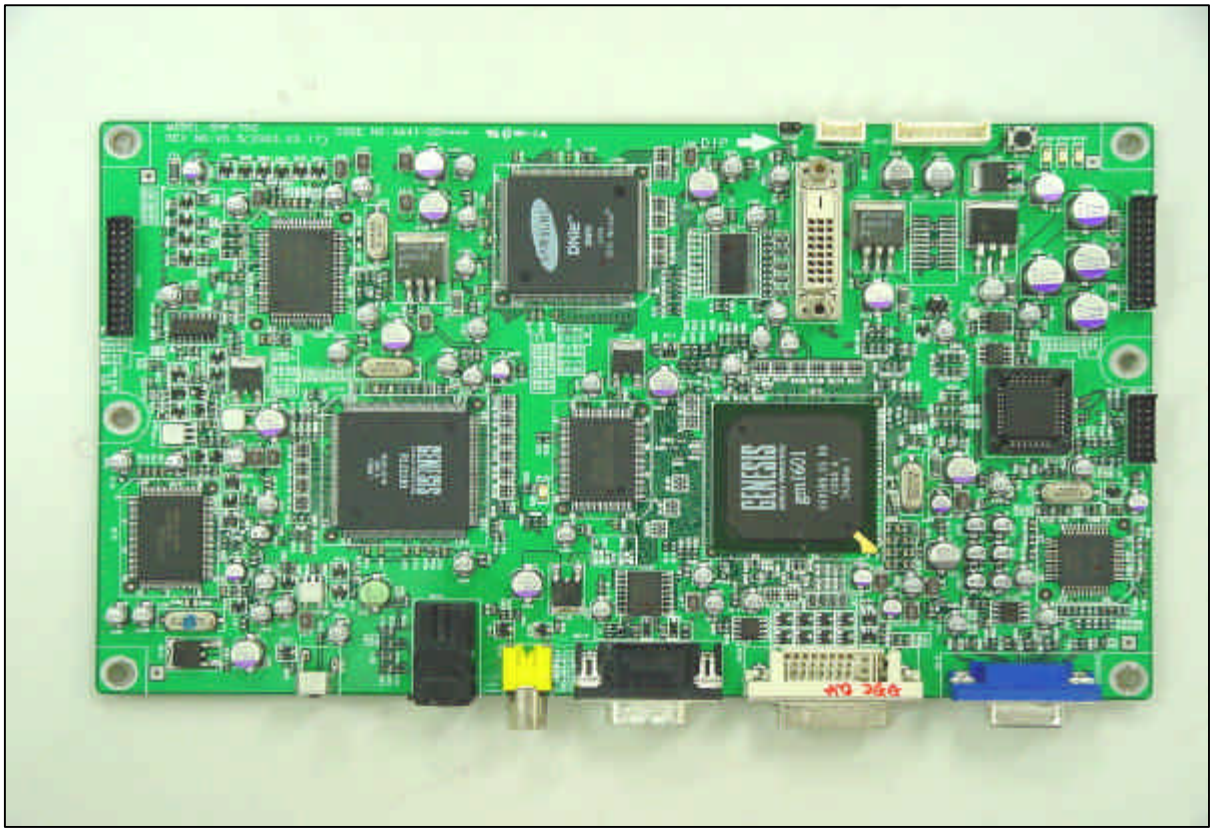
[AC POWERLINE CONDUCTED EMISSION MEASUREMENT]

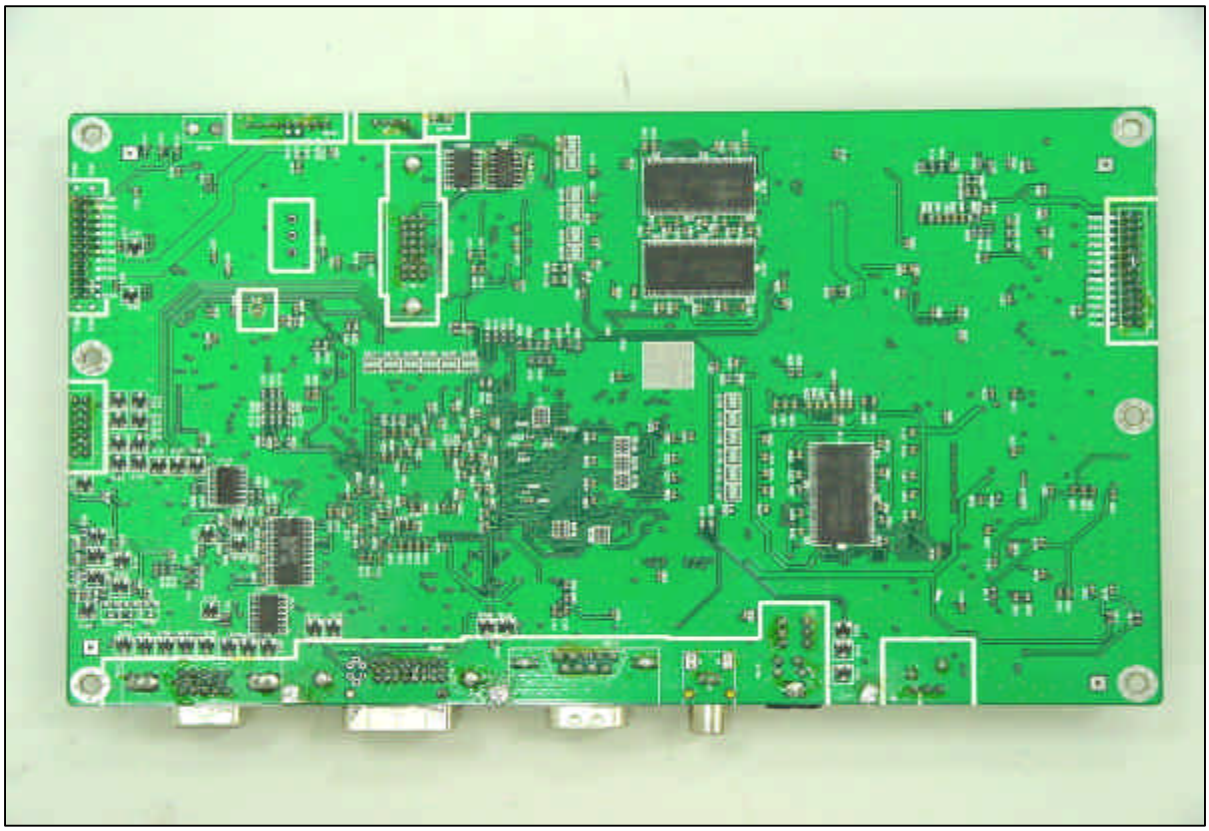
[RADIATED EMISSION MEASUREMENT]



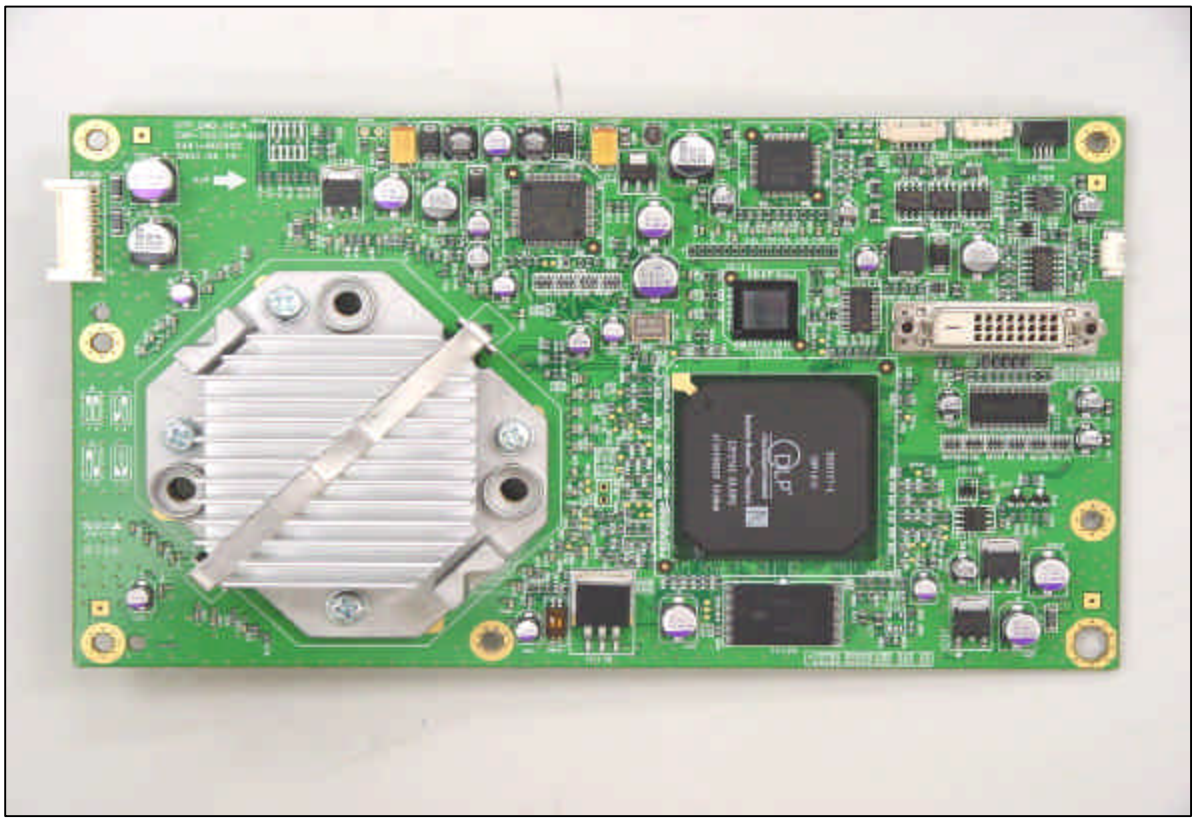
EUT Photographs

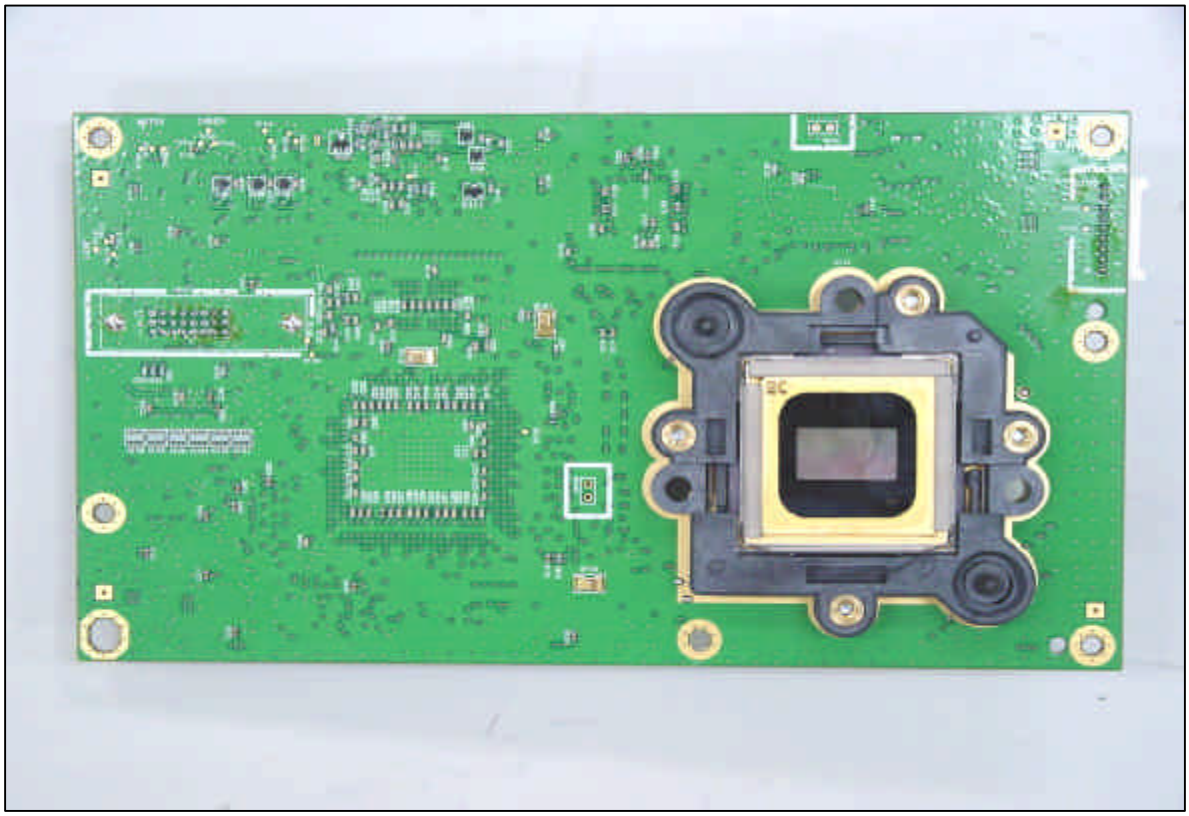
EUT Photographs



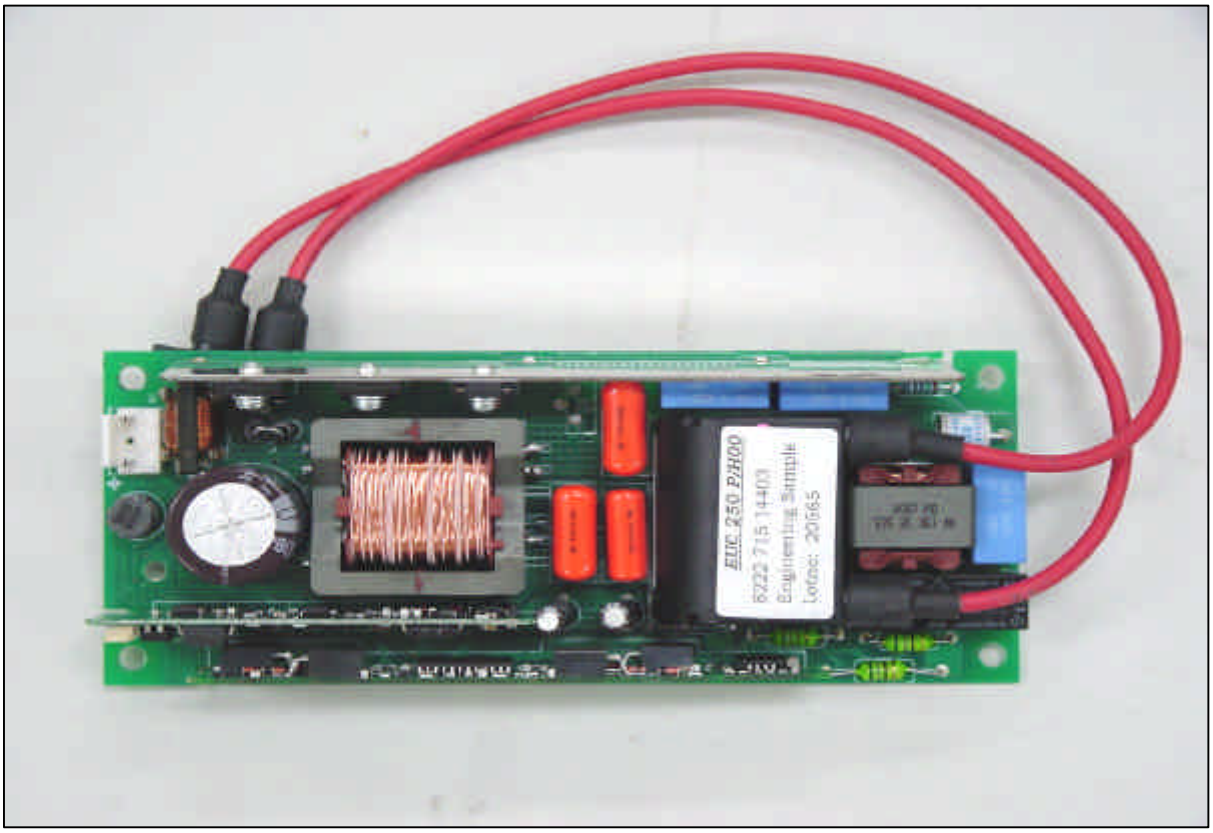


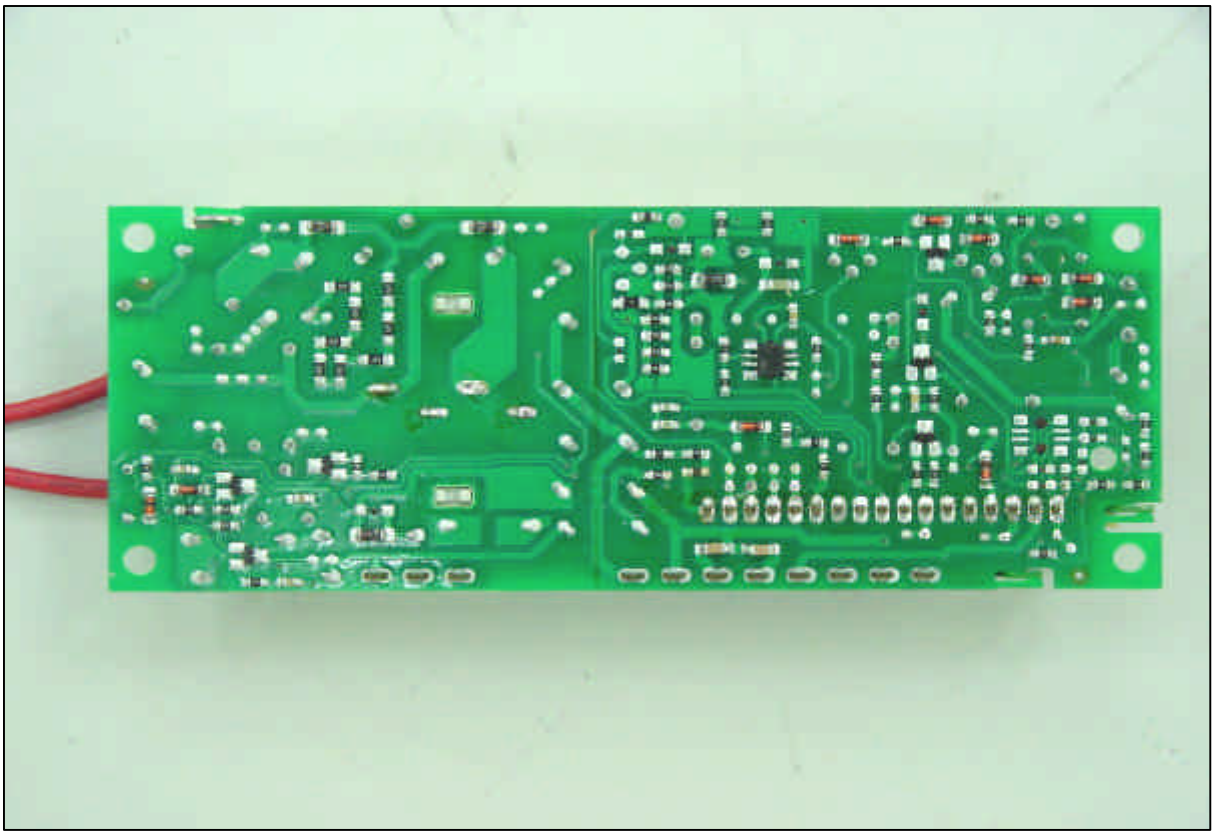
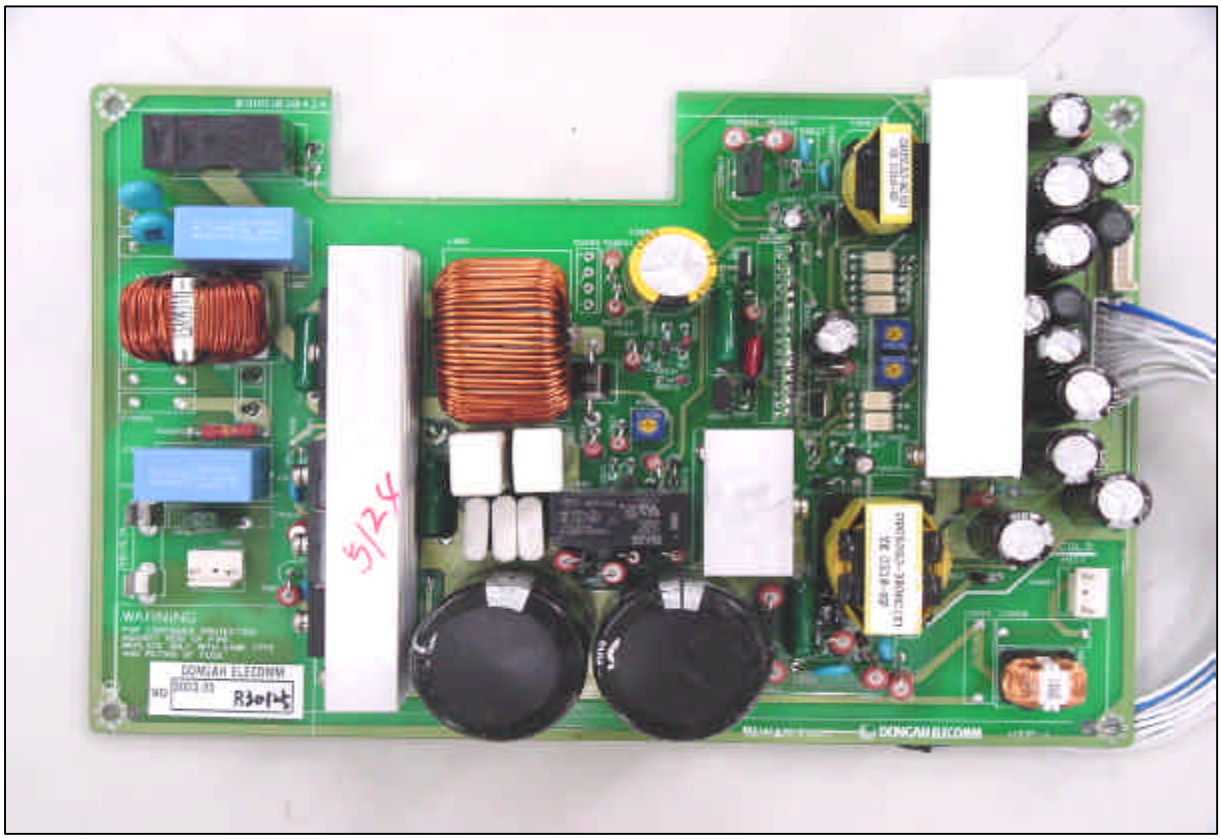
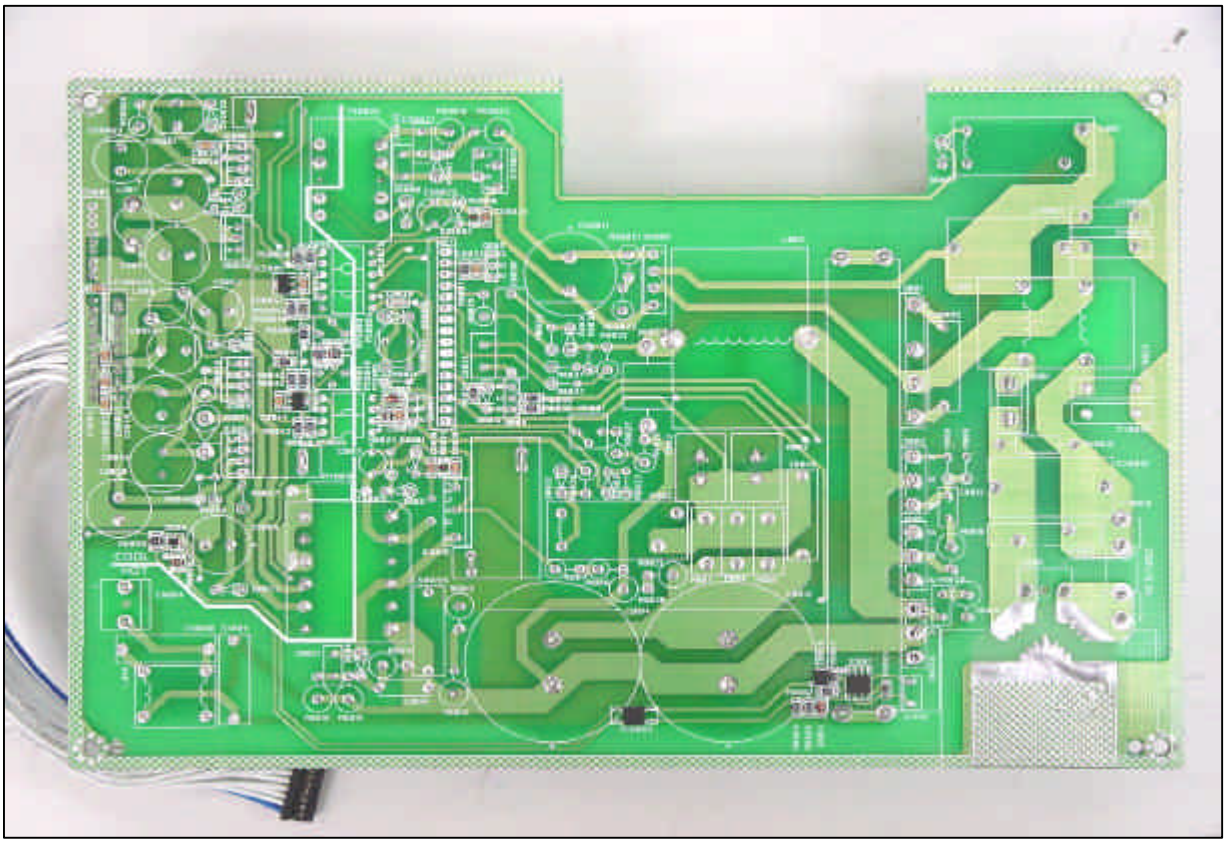
EUT Photographs





EUT Photographs





EUT Photographs