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EMC TEST REPORT For FCC

Test Report No. : CTK02-F065

Date of Issue : June 12, 2002

Model/Type No: : B15BF

Kind of Product : LCD MONITOR

Applicant : Hansol Electronics Inc.

Applicant Address : 27-29, Hanchon-Ri, Ducksan-Myun, Jinchon-Gun, Chungbuk, 365-840, Korea

Manufacturer : Hansol Electronics Inc.

Manufacturer Address : 27-29, Hanchon-Ri, Ducksan-Myun, Jinchon-Gun, Chungbuk, 365-840, Korea

Contact Person : Sun-Pil Yang

Telephone : +82-43-530-8503

Received Date : May 24, 2002

Test period : Start: May 25, 2002 End: June 3, 2002

Test Results : ☒ In Compliance ☐ Not in Compliance

Permissive change II

The test results presented in this report relate only to the object tested.

CERTITEK Standards Laboratory 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).

Tested by

Michael Jang
EMC Test Engineer
Date: June 12, 2002

Reviewed by

James Hong
EMC Technical Manager
Date: June 12, 2002

REPORT REVISION HISTORY

Date	Revision		Page No
July 6, 2001	(CTK01-F097) Issued		All
May 8, 2002	(CTK02-F048) Changed as below;		All
		OLD NEW	
	Adaptor	Accessory Internal type (See 1.1)	
	Main B'd	Changed to another main board (See 1.1)	
	Invertor	This equipment will use three invertors (See 1.1)	
June 12, 2002	(CTK02-F065) Changed as below;		All
	Adaptor	1. Before SMPS's PCB patterns were some changed (APPRO-Systems Co., Ltd.) : See 1.1 2. New SMPS manufacturer was added (L S Power Co., Ltd.)	
	Main B'd	Some components were moved to the other side : See 1.1	

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1.0 General Product Description

1.0.1 Tested Equipment

- ☒ Unless otherwise indicated, all tests were conducted on Model B15BF.
- ☐ Tests performed on Model _____ were considered to be representative of Model(s) _____.

1.0.2 Equipment Size, Mobility and Identification

Dimensions: 358 by 214 by 353.5 ☒ mm ☐ in
Mobility: ☐ Hand-Held ☒ Table-top ☐ Floor-standing
Serial No.: Not Applicable

1.0.3 Electrical Ratings

Input: 100-240 V ac, 50/60 Hz
Output: Not applicable

1.0.4 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage: 120V
Frequency: 60Hz

1.0.5 Clock & Other Frequencies Utilized

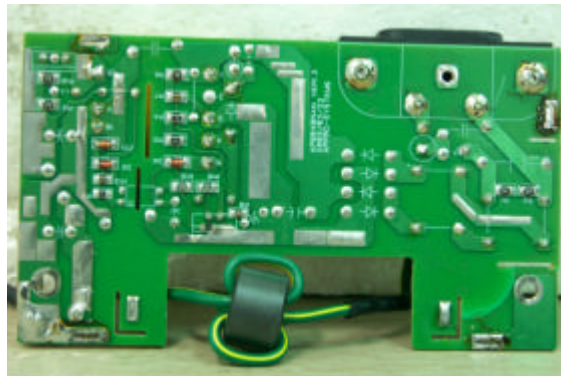
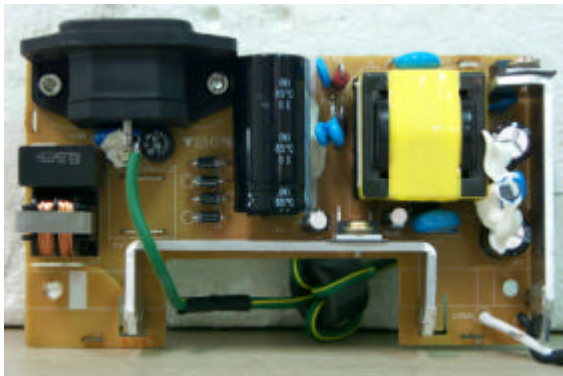
78MHz

1.1 Model Differences

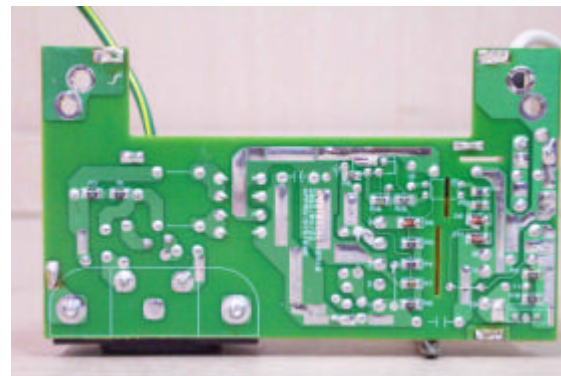
This equipment changed from previous equipment as below;

- 1) SMPS's PCB patterns were some changed. (APPRO-Systems Co., Ltd.)

OLD

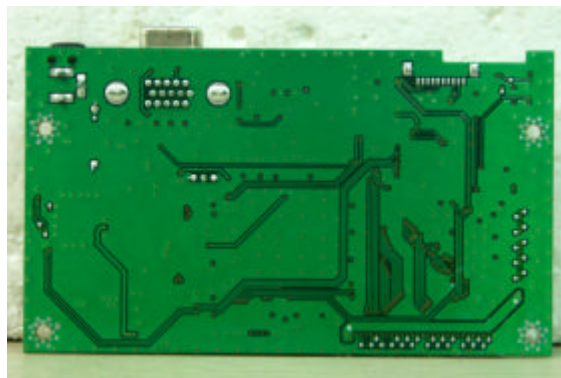
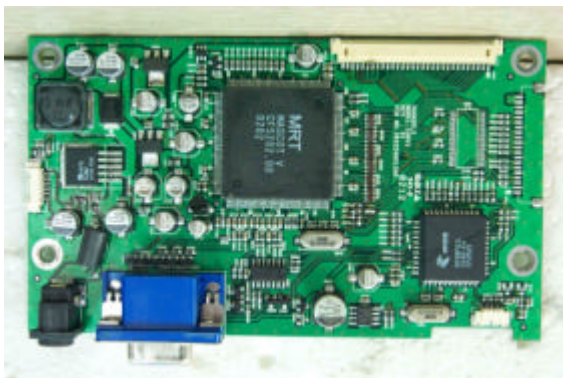


NEW

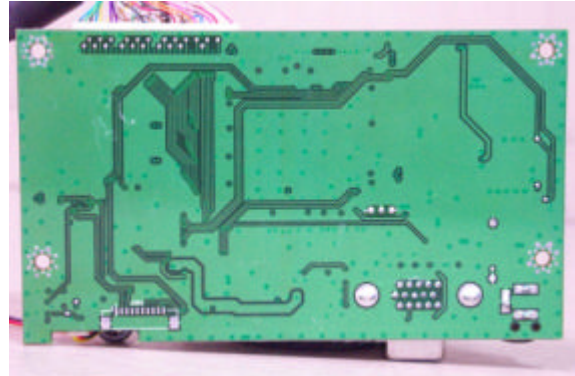
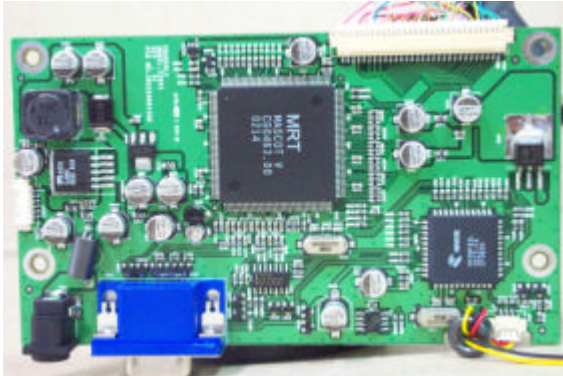


- 2) New SMPS manufacturer was added (L S Power Co., Ltd.)
See the "PCB" part of Appendix C – EUT photographs
- 3) Main board some components were moved to the other side as below;

OLD



NEW



1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
PC	Hewlett Packard	DTPC-17	SG01703009
Printer	SEIKO EPSON CORP	EPSON STYLUS COLOR 460	BWCE143331
USB Mouse	PANWEST CHINA LIMITED	Cyber Beetle	PM1F144009941
USB Mouse	PANWEST CHINA LIMITED	Cyber Beetle	PM1F144009915
Serial Mouse	Microsoft	BASM1	4476266-20000
PS/2 Mouse	PANWEST CHINA LIMITED	Cyber Beetle	PM1F184045737
Keyboard	SAN HAWK TECIING CO., LTD	KB120	-
Game Pad	Microsoft	SideWinder™ game pad	03426853
Headset	CAMAC	CMK-C3	-

☒ Cable Description

#	Description	Ferrited	Length (m)	Other Details
1	EUT Power Cable, Unshielded	No	1.8	Connect to AC Power
2	PC Power Cable, Unshielded	No	1.8	Connect to AC Power
3	Printer Power Cable, Unshielded	No	1.8	Connect to AC Power
4	Monitor Cable, Shielded	Yes	1.5	Between EUT and PC
5	Printer Cable, Shielded	Yes	1.5	Between Monitor and PC
6	USB Mouse Cable, Shielded	No	1.8	Between USB Mouse and PC
7	USB Mouse Cable, Shielded	No	1.8	Between USB Mouse and PC
8	Serial Mouse Cable, Shielded	No	1.8	Between Serial Mouse and PC
9	PS/2 Mouse Cable, Shielded	No	1.8	Between PS/2 Mouse and PC
10	Keyboard Cable, Shielded	No	1.5	Between Keyboard and PC
11	Game Pad Cable, Shielded	No	1.8	Between Game Pad and PC
12	Headset Cable, Unshielded	No	3.0	Between Headset and PC
13	Line In Cable, Unshielded	No	1.5	Connect to PC

n/a = not available

1.4 Test Software

- ☐ Pinging
☒ Name / Manufacturer / Version / Type of Pattern
 - EMC Test / Compaq Computer / 1.0 / Scrolling 'H'

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

- ☒ Test program (H-Pattern) ☐ Test program (color bar)
☐ Standby ☐ Test program (customer specific)
☐ Practice operation
☒ Resolution / Refresh Rate - 1024 x 768 / 75Hz

1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7 Test Facility

The measurement facility is located at 386-1, Ho-Dong, Yongin-City, Kyungki-Do, Korea 449-100. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.8 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested. Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)





Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Open Area Test Site. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-1992 7.2.3, 7.2.4, 8.3.1.1, 8.3.1.2

1.9 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 and 10 meter Open Area Test Sites to perform FCC Part 15/18 measurements.	 93250
JAPAN	VCCI	10 meter Open Area Test Site and one conducted site.	 R-948, C-986
KOREA	MIC	EMI (CE, RE) EMS (ESD, BURST, RS, Surge, CS, Power-frequency Susceptibility, Voltage Dips and Short Interruptions)	 No. 51, KR0025
International	KOLAS	EMC	 NO. 119

2.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

- | | | |
|---|---|---|
| <input type="checkbox"/> EN 50081-1 /1992 | | |
| <input type="checkbox"/> EN 55011 /1998 | <input type="checkbox"/> Group 1 | <input type="checkbox"/> Group 2 |
| | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55013 /A12:1994 | | |
| <input type="checkbox"/> EN 55014 /1987 | <input type="checkbox"/> Household appliances and similar | |
| | <input type="checkbox"/> Portable tools | |
| | <input type="checkbox"/> Semiconductor devices | |
| <input type="checkbox"/> EN 55014 /A2:1990 | | |
| <input type="checkbox"/> EN 55014 /1993 | <input type="checkbox"/> Household appliances and similar | |
| | <input type="checkbox"/> Portable tools | |
| | <input type="checkbox"/> Semiconductor devices | |
| <input type="checkbox"/> EN 55015 /1987 | | |
| <input type="checkbox"/> EN 55015 /A1:1990 | | |
| <input type="checkbox"/> EN 55015 /1993 | | |
| <input type="checkbox"/> EN 55022 /A1:1995 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022 /1998 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 61000-3-2 /1995 (EN 60555 Part 2 /4.87) | | |
| <input type="checkbox"/> EN 61000-3-3 /1995 (EN 60555 Part 3 /4.87) | | |
| <input type="checkbox"/> BS | | |
| <input type="checkbox"/> VCCI V-3/99.05 : 1999 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> FCC Part 15 SUBPART B | <input type="checkbox"/> Class A | <input checked="" type="checkbox"/> Class B |
| <input type="checkbox"/> AS 3548 (1992) | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> CISPR 11 (1990) | <input type="checkbox"/> Group 1 | <input type="checkbox"/> Group 2 |
| | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> CISPR 22 (1993) | <input type="checkbox"/> Class A | <input checked="" type="checkbox"/> Class B |

The unit was tested to CISPR 22 and complies with the alternate methods allowed by FCC under paragraphs 15.107 and 15.109.

2.1 Conducted Voltage Emissions

Test Date

May 31, 2002

Test Location

EMI-CE: Shielded Room

Test Instruments

<input checked="" type="checkbox"/> Field Strength Meter	Rohde Schwarz	ESHS30	828144/002
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Test Accessories

<input type="checkbox"/> LISN	EMCO	3825/2	9206-1971
<input checked="" type="checkbox"/> LISN	EMCO	3825/2	9409-2246
<input checked="" type="checkbox"/> LISN	EMCO	3825/2	9607-2574
<input checked="" type="checkbox"/> Control PC	HP	Vectra 500	SG72000192

Frequency Range of Measurement

☒ 150 kHz to 30 MHz
☐ 450 kHz to 30 MHz
☐ _____

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

<input checked="" type="checkbox"/> MET	minimum margin is 8.4dB μ V at 17.90MHz (APPRO Sys. SMPS)
	minimum margin is 5.1dB μ V at 4.00MHz (L S Power SMPS)
<input type="checkbox"/> NOT MET	limit exceeded by maximum of ____ dB μ V at ____ MHz
<input type="checkbox"/> NOT APPLICABLE	

Remarks

See Appendix A for test data.

2.2 Radiated Electric Field Emissions

Test Date

May 29, 2002

Test Location

- ☒ EMI-OATS: Testing was performed at a test distance of 10 m
☐ EMI-OATS: Testing was performed at a test distance of 3 m

Test Instruments

☒ Field Strength Meter Rohde Schwarz ESVS30 826638/008

Test Accessories

<input checked="" type="checkbox"/> ULTRA Broadband Antenna	R & S	HL562	361324/014
<input type="checkbox"/> Biconical Antenna	Schwarzbeck	BBA9106	41-00201
<input type="checkbox"/> Biconical Antenna	EMCO	3110B	9607-2564
<input type="checkbox"/> Log-periodic Antenna	EMCO	3146	9607-4567

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

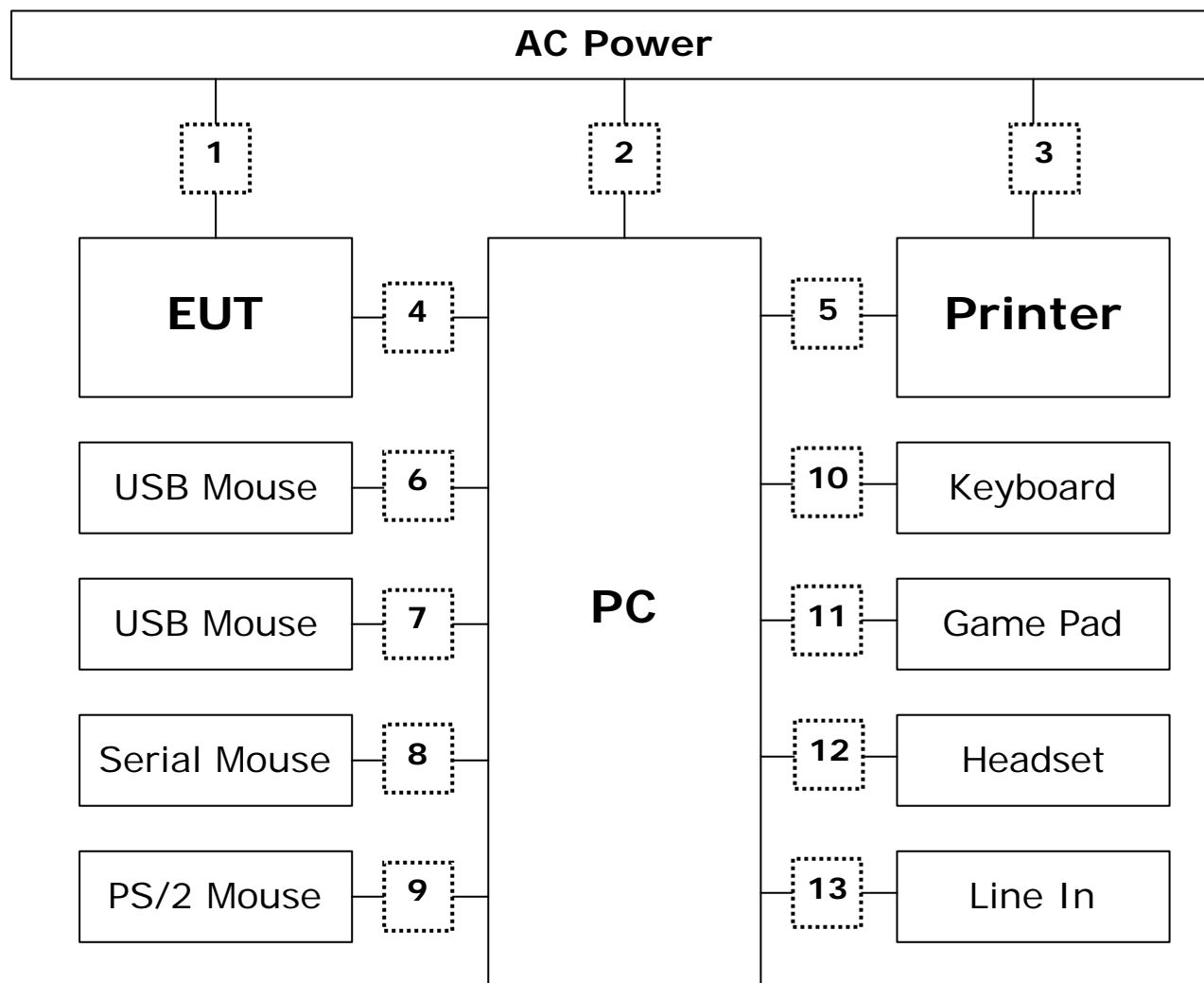
The requirements are:

- ☒ MET minimum margin is 3.00dB (μ V/m) at 436.50MHz (APPRO Sys. SMPS)
 minimum margin is 3.00dB (μ V/m) at 933.50MHz (L S Power SMPS)
☐ NOT MET limit exceeded by maximum of ____ dB(μ V/m) at ____ MHz
☐ NOT APPLICABLE

Remarks

See Appendix A for test data

Configuration



APPENDIX A – TEST DATA

Conducted Voltage Emissions (Quasi-Peak reading)

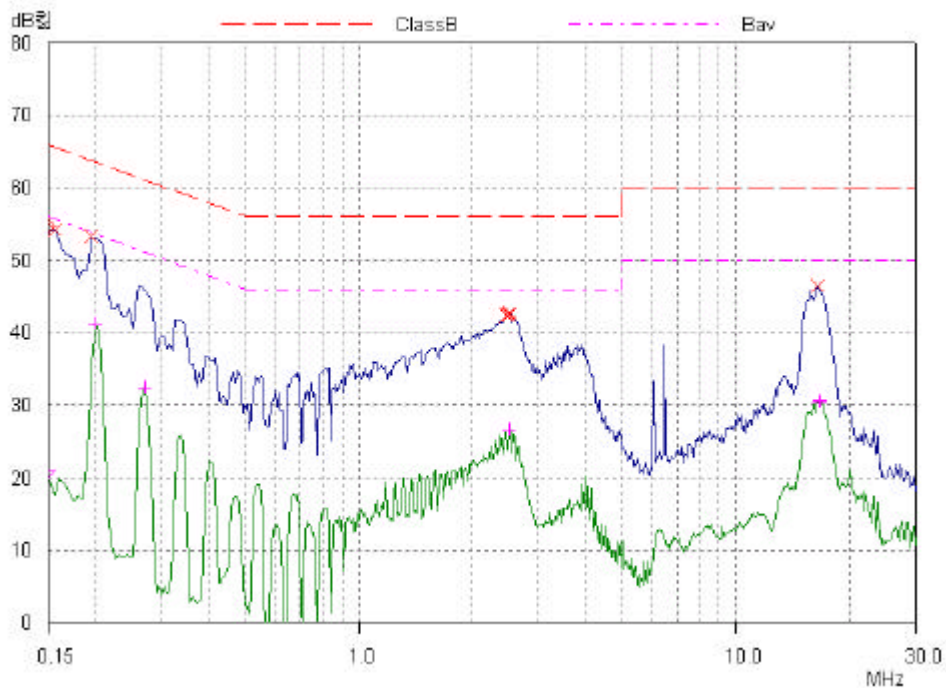
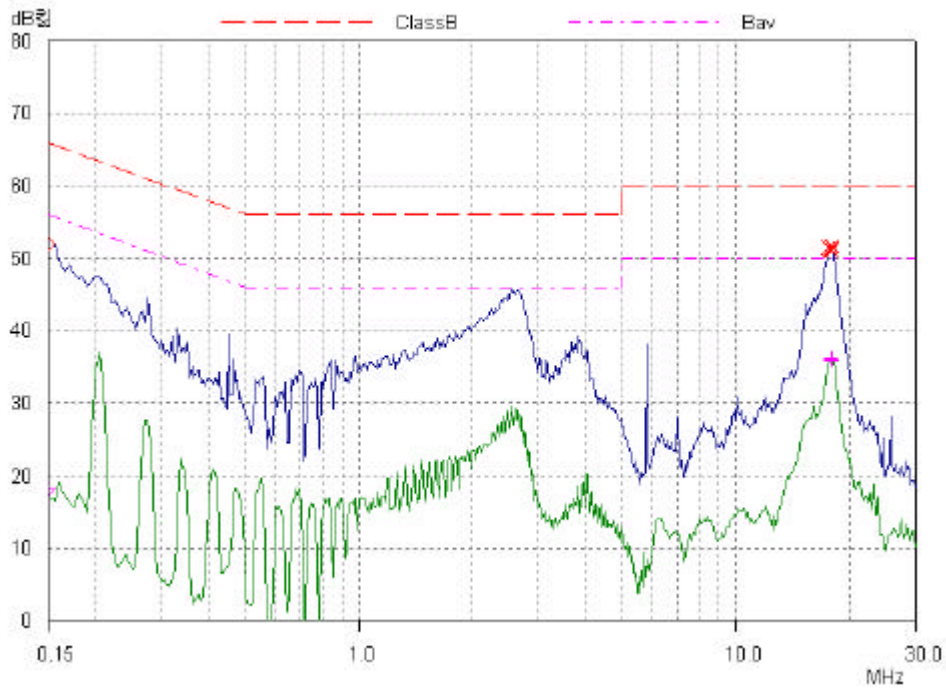
- With APPRO Sys. SMPS

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dB]
0.16	3.0	0.1	N	65.7	51.1	54.2	11.5	53.8	38.8	41.2	12.6
0.20	2.3	0.1	N	63.8	51.0	53.4	10.5				
17.54	0.5	0.2	L	60.0	50.8	51.5	8.5				
17.65	0.5	0.2	L	60.0	50.6	51.3	8.7				
17.74	0.5	0.2	L	60.0	50.6	51.3	8.7	50.0	35.4	36.1	13.9
17.87	0.5	0.2	L	60.0	50.8	51.5	8.5				
17.90	0.5	0.2	L	60.0	50.9	51.6	8.4				

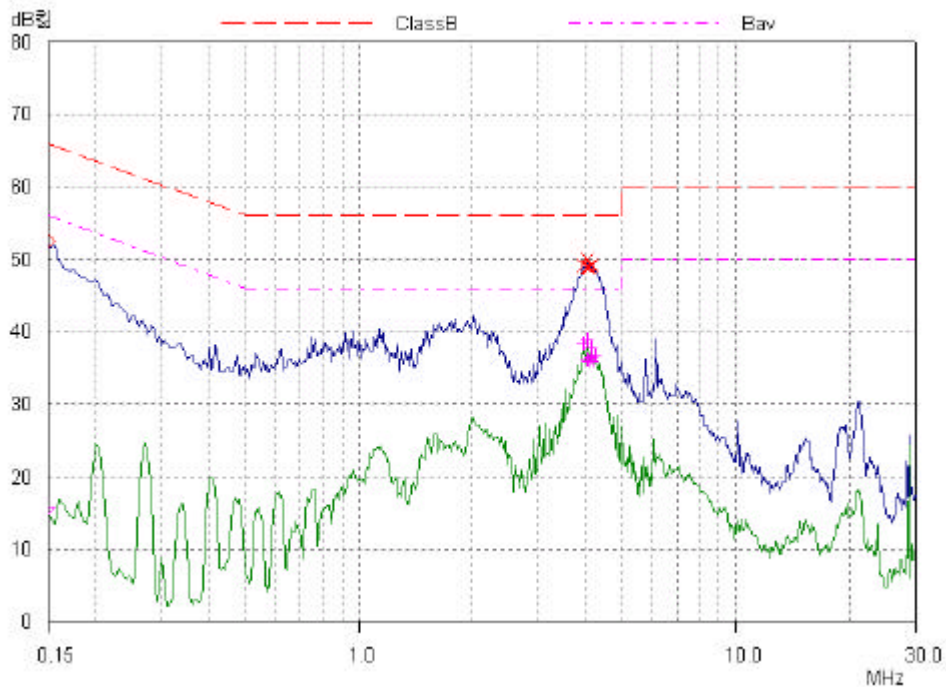
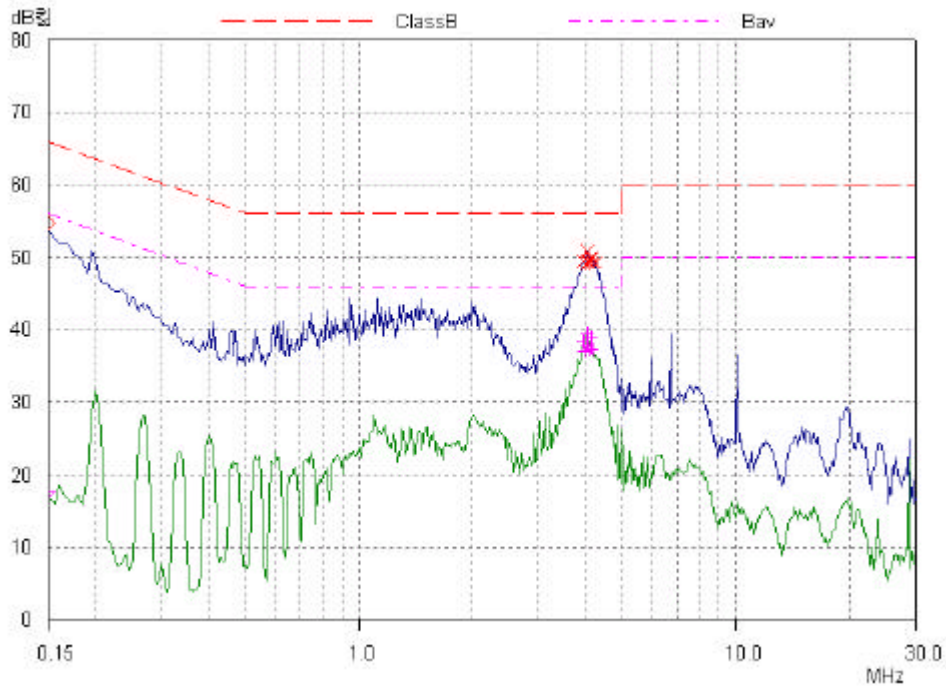
- With L S Power SMPS

Frequency [MHz]	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dB]
3.90	0.3	0.1	L	56.0	49.1	49.5	6.5	46.0	37.9	38.3	7.7
4.00	0.3	0.1	L	56.0	50.5	50.9	5.1	46.0	39.1	39.5	6.5
4.03	0.3	0.1	L	56.0	49.1	49.5	6.5				
4.09	0.3	0.1	L	56.0	49.4	49.8	6.2	46.0	38.5	38.9	7.2
4.11	0.3	0.1	N	56.0	48.9	49.3	6.7	46.0	36.1	36.5	9.5
4.12	0.3	0.1	L	56.0	49.5	49.9	6.1	46.0	36.9	37.3	8.7
4.13	0.3	0.1	L	56.0	48.9	49.3	6.7				

With APPRO Sys. SMPS



With L S Power SMPS



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Tel: +82-31-339-9970 Fax: +82-31-339-9855

<http://www.certitek.com/>**CERTITEK****Radiated Electric Field Emissions (Quasi-Peak reading)****- With APPRO Sys. SMPS**

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
55.00	16.2	V	1.0	4.70	1.40	30.0	22.32	7.68
94.80	13.9	V	1.0	8.90	1.80	30.0	24.62	5.38
109.00	12.4	H	3.8	9.60	2.00	30.0	23.95	6.05
131.30	11.8	H	4.0	8.60	2.30	30.0	22.72	7.28
218.30	12.2	H	3.8	7.95	2.90	30.0	23.04	6.96
269.00	10.1	H	4.0	10.10	3.30	37.0	23.46	13.54
276.40	6.9	V	1.2	10.30	3.40	37.0	20.59	16.41
290.60	16.1	H	4.0	10.70	3.60	37.0	30.37	6.63
364.80	13.9	V	1.1	12.60	3.90	37.0	30.36	6.64
401.50	11.2	H	3.5	13.50	4.10	37.0	28.81	8.19
436.50	15.4	V	1.0	14.40	4.20	37.0	34.00	3.00
510.00	8.1	H	4.0	15.70	4.80	37.0	28.61	8.39
709.50	5.2	H	4.0	18.50	5.70	37.0	29.36	7.64
935.30	6.2	V	1.2	21.00	6.80	37.0	33.99	3.01

- With L S Power SMPS

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
87.40	12.6	V	1.0	8.80	1.80	30.0	23.22	6.78
94.80	14.2	V	1.1	8.90	1.80	30.0	24.86	5.14
109.00	12.3	V	1.0	9.60	2.00	30.0	23.88	6.12
145.40	11.8	H	3.5	7.80	2.40	30.0	22.00	8.00
157.60	13.1	H	3.8	7.40	2.50	30.0	22.98	7.02
171.80	16.4	V	1.0	7.05	2.60	30.0	26.03	3.97
218.30	12.4	V	1.0	7.95	2.90	30.0	23.26	6.74
254.80	9.7	H	4.0	9.60	3.30	37.0	22.64	14.36
276.40	7.8	H	4.0	10.30	3.40	37.0	21.53	15.47
290.60	16.1	H	3.8	10.70	3.60	37.0	30.36	6.64
401.50	14.0	V	1.2	13.50	4.10	37.0	31.60	5.40
436.50	11.5	V	1.1	14.40	4.20	37.0	30.09	6.91
709.50	5.8	H	4.0	18.50	5.70	37.0	30.02	6.98
933.50	6.3	V	1.0	21.00	6.70	37.0	34.00	3.00