

Certification of Compliance

CFR 47 Part 15 Subpart B

Test Report File No. : 04-IST-0238 Date of Issue : September 23, 2004

Model(s) : COP-170HB

Kind of Product : LCD Monitor for Gaming

Applicant : CHAAM TECH CO., LTD.

Address : 555-52, Baekseok-Dong, Cheonan-City, Chungcheongnam-Do,
Korea 330-220

Manufacturer : CHAAM TECH CO., LTD.

Address : 555-52, Baekseok-Dong, Cheonan-City, Chungcheongnam-Do,
Korea 330-220

Test Result

☒ Positive

☐ Negative

Reviewed By

Approved By



J. H. Lee / EMC Group Manager



G. Chung / Chief

Comment(s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart B - Unintentional Radiators, Class B.
- The test report with appendix consists of 22 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 2001.



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■ **Test Conditions and Data - Emissions**

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Note:

INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. (*FCC Filing Lab.*)
San 21-8, Goan-Ri, Baekam-Myun, Yongin-City
Kyonggi-Do, 449-860, Korea
TEL : +82 31 333 4093 FAX : +82 31 333 4094

ENVIRONMENTAL CONDITIONS

Temperature	26.5
Humidity	56 %
Atmospheric pressure	1012 mbar

POWER SUPPLY SYSTEM USED

Power supply system	AC 120Vac, 60Hz (Refer to the product information)
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PRODUCT INFORMATION

LCD Panel :	Panel Model - OP170BK (Chaam Tech) 17-inch diagonal Pixel pitch - 0.264(H) x 0.264(V) mm Contrast ratio - 500:1 (Typical) Average Brightness - Typ.170BK 750cd/m ² (Typical) 170WH 1,000cd/m ²
Resolution :	1280 x 1024, 75Hz (max.)
Synchronization :	Horizontal - 15~80 KHz, Vertical - 50~77 KHz
PC Input Signal :	Analog RGB DVI-D Composite Video & S-Video
Power Source :	100~240Vac, 50/60Hz(Free Voltage) AC/DC Adapter : HE (Type Name:SAD7015SE)
Power Consumption :	60 W (max)
Panel Dimensions(WxHxD) :	358.5 x 296.5 x 24.8 mm
- EMC suppression device is not used during the test.	
- Please refer to user's manual.	

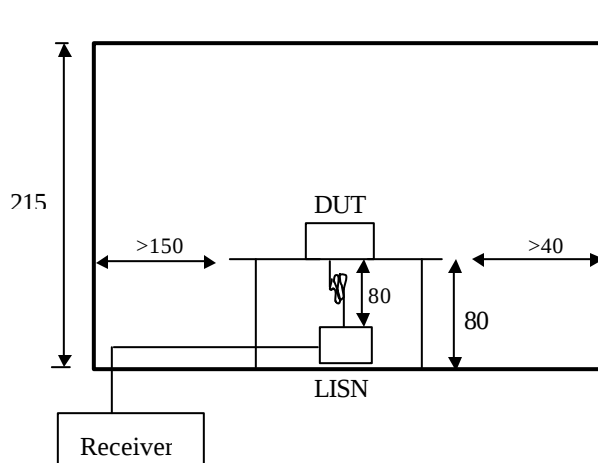
DESCRIPTIONS OF TEST

Conducted Emissions:

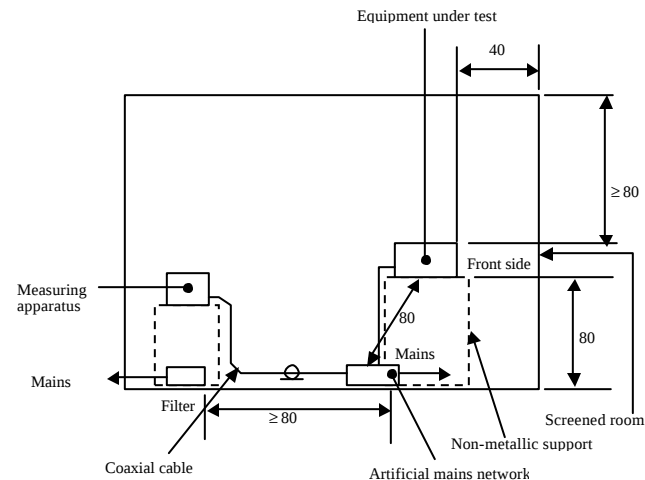
The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50 Ω /50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" & "Average" within a bandwidth of 9KHz.

-Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1m X 1.5m wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The R/S ESH3-Z5 and EMC0 3825/2 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the EMC0 LISN. The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMC0 LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



< Side View >



< Concept Drawing >

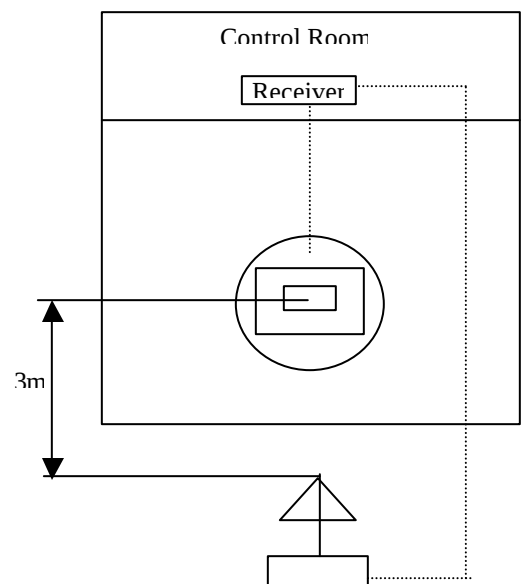
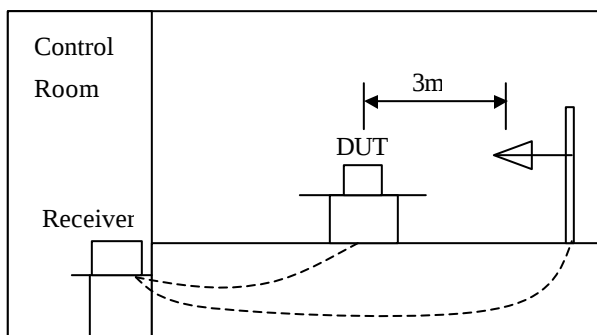
DESCRIPTION OF TEST

Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120KHz.

-Procedure of Test

Preliminary measurements were made at 3 meter using bi-conical and log-periodic antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 300MHz using S/B bi-conical antenna and 300 to 1000MHz using S/B log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.



Equipment Under Test

EUT Type :

- ☒ Table-Top. ☐ Floor-Standing.
☐ Table-Top and Floor-Standing(Combination).

Operation - mode of the E.U.T. :

The equipment under test was operated during the measurement under following conditions :

- ☐ Standby Mode
- ☒ Operational Condition : ☒ D-sub (Analog RGB) ☒ S-Video
(Input Signal) ☒ DVI-D ☒ Composite Video
- ☒ Test Resolution : ☒ 640 x 480, 75Hz ☒ 1280 x 1024, 75Hz
☒ 800 x 600, 75Hz ☒ Color Bar (composite)

The test results of followings are the representative of worst case emissions for the available resolution can be adjusted.

Configuration of the equipment under test :

Following peripheral devices and interface cables were connected during the measurement :

Equipment	Type	Brand	Serial No.
PC	Pavilion t328k	HP	KRJ33800KY
Keyboard	5219	HP	BN32402948
PS/2 Mouse	M042K0	HP	030330777
Color TV Pattern Generator	PM5418	Fluke	L0796009
Printer	A0302384	Northern Telecom	26633S60168
Serial Mouse	M-M28	Logitech	LCA53305547

Connecting Interface Cables :

- Unshielded AC power cable : 1.8 m
- Shielded D-sub signal cable (with two ferrite core) : 1.6 m
- Shielded DVI signal cable (with two ferrite core) : 1.5 m
- Unshielded Composite signal cable : 1.4 m
- Unshielded S-Video signal cable : 1.2 m
- Shielded Printer's signal cable (with two ferrite core) : 1.8 m

Note :

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

Test Equipment Used

Model Name	Description	Manufacture	Calibration Date	Serial Number
ESH 3	Test Receiver	Rohde & Schwarz	Dec. 12, 2003	861742/015
3725/2	LISN	EMCO	Jul. 15, 2004	9101-2068
KNW-407	LISN	Hyup-Rip	Jul. 15, 2004	8-883-10
ESH 3-Z2	Pulse Limiter	Rohde & Schwarz	Dec. 12, 2003	357.8810.52

Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

Test Program Scrolling "H" Characters Mode (D-Sub, DVI-I, S-Video)
 Color Bar (Composite Video)

Test Date September 19, 2004

Test Area Shielded room No.1

Note : The equipment used is calibrated in regular for every year.

Conducted Emissions

Input Signal: D-Sub / Phase: L1

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μ V]	Q-peak	Average	Q-peak	Average
0.150	45.6	23.9	66.0	56.0	0.1	0.5	46.2	24.5	19.8	31.5
7.068	38.8	37.0	60.0	50.0	0.0	0.6	39.4	37.6	20.6	12.4
16.533	44.4	42.5	60.0	50.0	0.1	0.7	45.2	43.3	14.8	6.7

Input Signal: D-Sub / Phase: N

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μ V]	Q-peak	Average	Q-peak	Average
0.150	46.4	25.3	66.0	56.0	0.1	0.5	47.0	25.9	19.0	30.1
0.215	35.9	29.5	63.0	53.0	0.1	0.4	36.4	30.0	26.6	23.0
3.714	36.4	35.1	56.0	46.0	0.0	0.5	36.9	35.6	19.1	10.4
7.068	38.8	37.1	60.0	50.0	0.0	0.6	39.4	37.7	20.6	12.3
16.495	45.1	43.2	60.0	50.0	0.2	0.7	46.0	44.1	14.0	5.9
16.638	44.8	43.0	60.0	50.0	0.2	0.7	45.7	43.9	14.3	6.1

Input Signal: DVI-I / Phase: L1

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μ V]	Q-peak	Average	Q-peak	Average
0.150	45.0	22.6	66.0	56.0	0.1	0.5	45.6	23.2	20.4	32.8
16.667	44.8	43.2	60.0	50.0	0.1	0.7	45.6	44.0	14.4	6.0

Input Signal: DVI-I / Phase: N

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μ V]	Q-peak	Average	Q-peak	Average
0.150	45.0	21.3	66.0	56.0	0.1	0.5	45.6	21.9	20.4	34.1
16.667	44.9	42.0	60.0	50.0	0.1	0.7	45.7	42.8	14.3	7.2

Note : The scan graph means peak value, the upper limit does quasi-peak, and the lower average.

The scan data shows that full-peak value are under the limit of average through all frequencies.

Conducted Emissions

Input Signal: S-Video / Phase: L1

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.150	44.9	23.9	66.0	56.0	0.1	0.5	45.5	24.5	20.5	31.5
16.665	44.2	42.8	60.0	50.0	0.1	0.7	45.0	15.0	43.6	6.4

Input Signal: S-Video / Phase: N

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.150	44.7	23.5	66.0	56.0	0.1	0.5	45.3	24.1	20.7	31.9
16.664	42.8	42.9	60.0	50.0	0.1	0.7	43.6	43.7	16.4	6.3

Input Signal: Composite / Phase: L1

Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.150	43.8	22.4	66.0	56.0	0.1	0.5	44.4	23.0	21.6	33.0
16.655	43.8	40.5	60.0	50.0	0.1	0.7	44.6	15.4	41.3	8.7

Input Signal: Composite / Phase: N

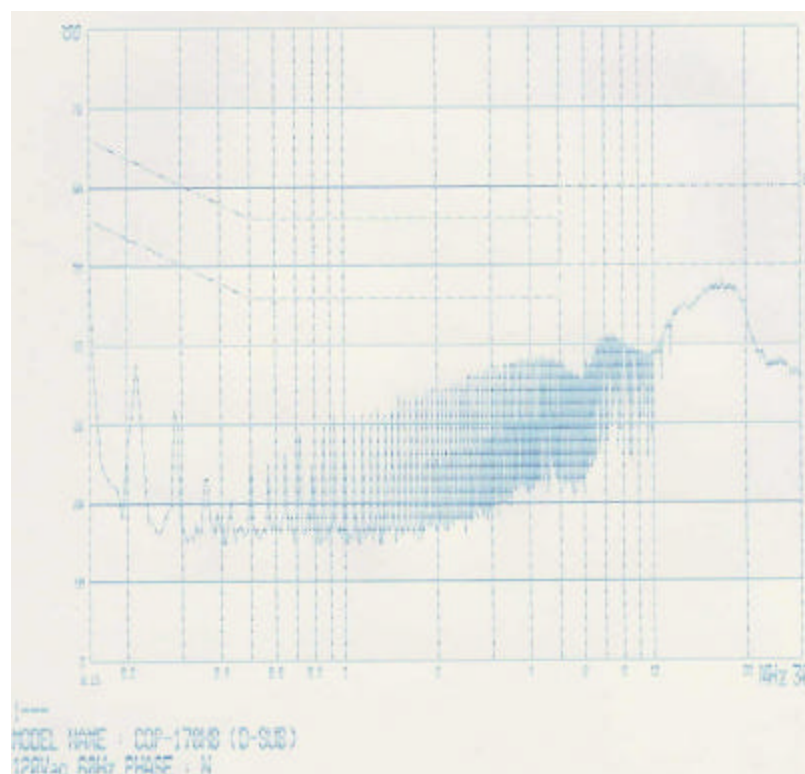
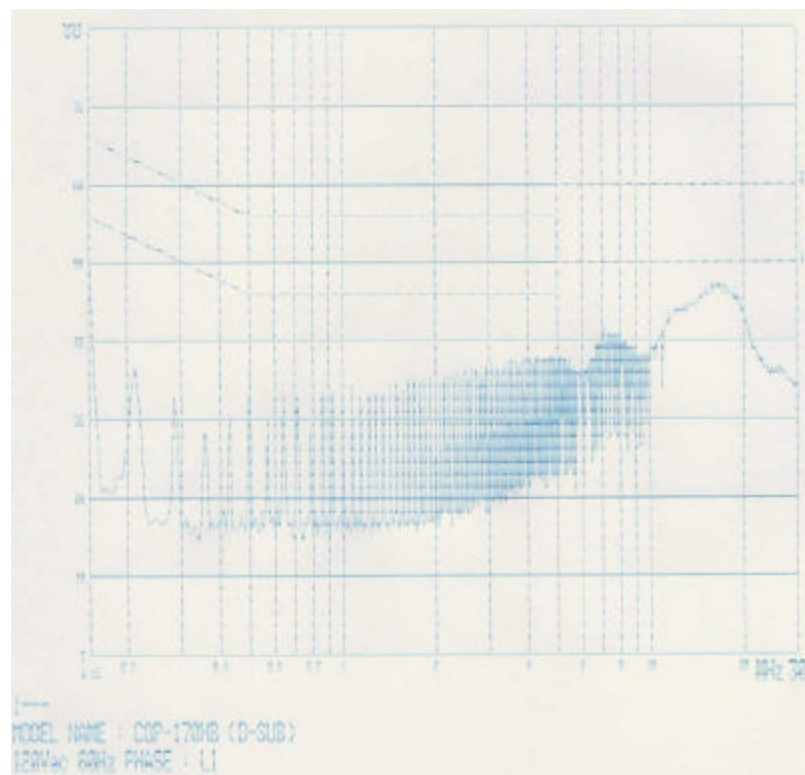
Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss	Cable Loss	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.150	43.6	23.5	66.0	56.0	0.1	0.5	44.2	21.8	24.1	31.9
16.651	43.2	41.1	60.0	50.0	0.1	0.7	44.0	16.0	41.9	8.1

Note : The scan graph means peak value, the upper limit does quasi-peak, and the lower average.

The scan data shows that full-peak value are under the limit of average through all frequencies.

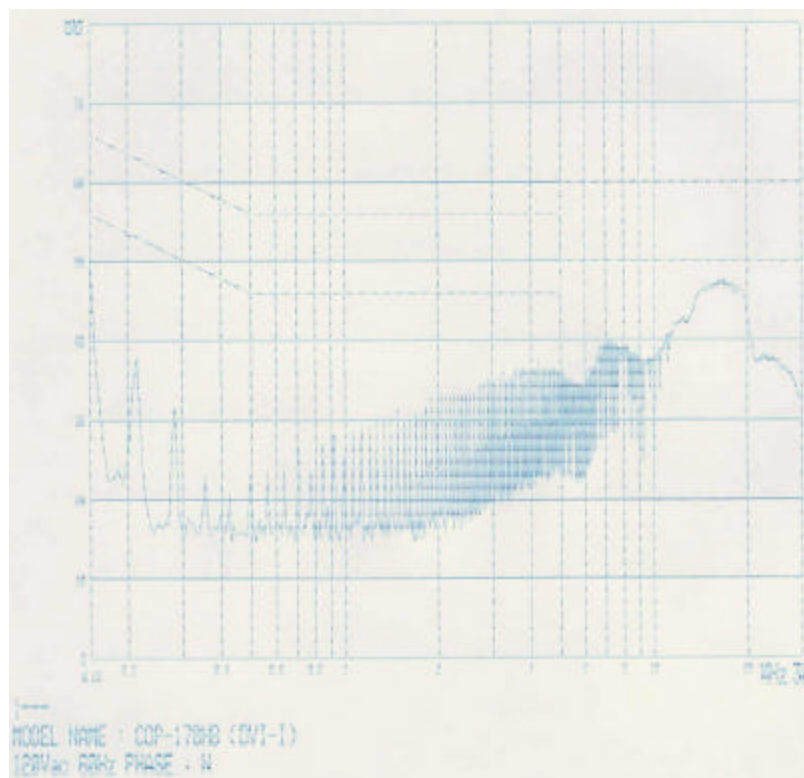
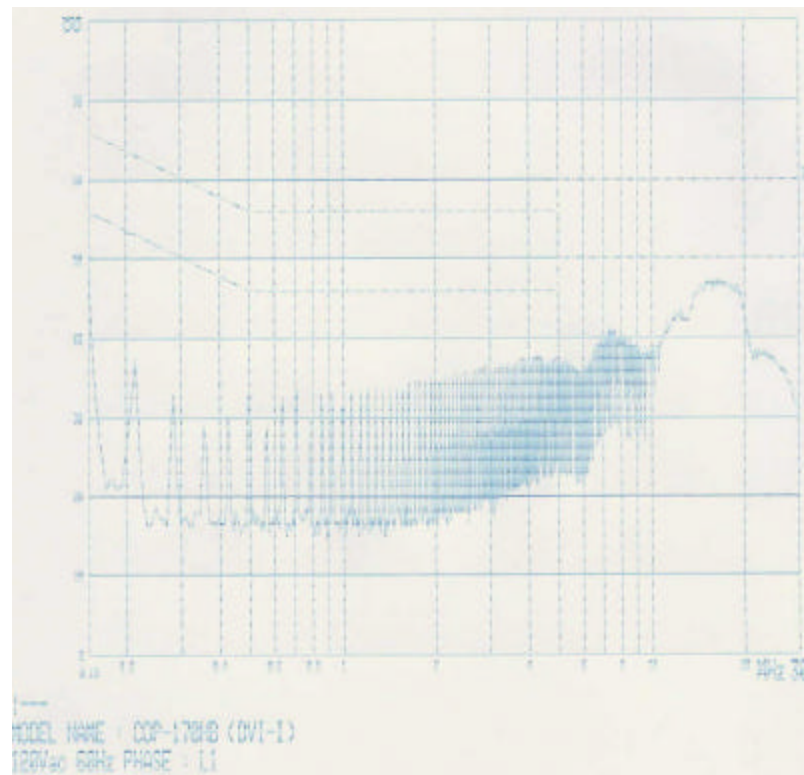
Conducted Emissions

Input signal : D-sub / Resolution : 1280 x 1024, 75Hz



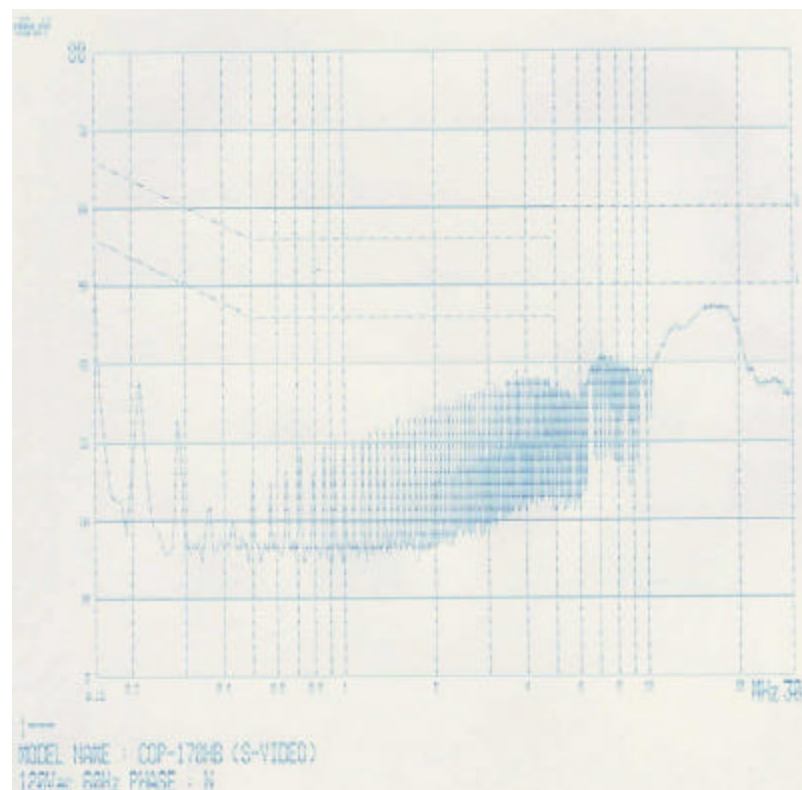
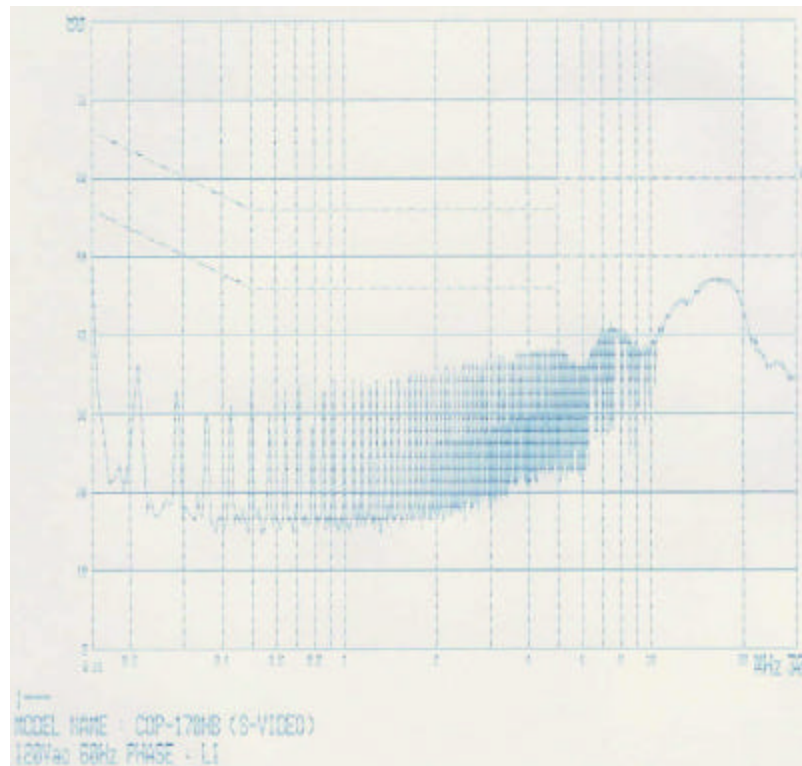
Conducted Emissions

Input signal : DVI-I / Resolution : 1280 x 1024, 75Hz



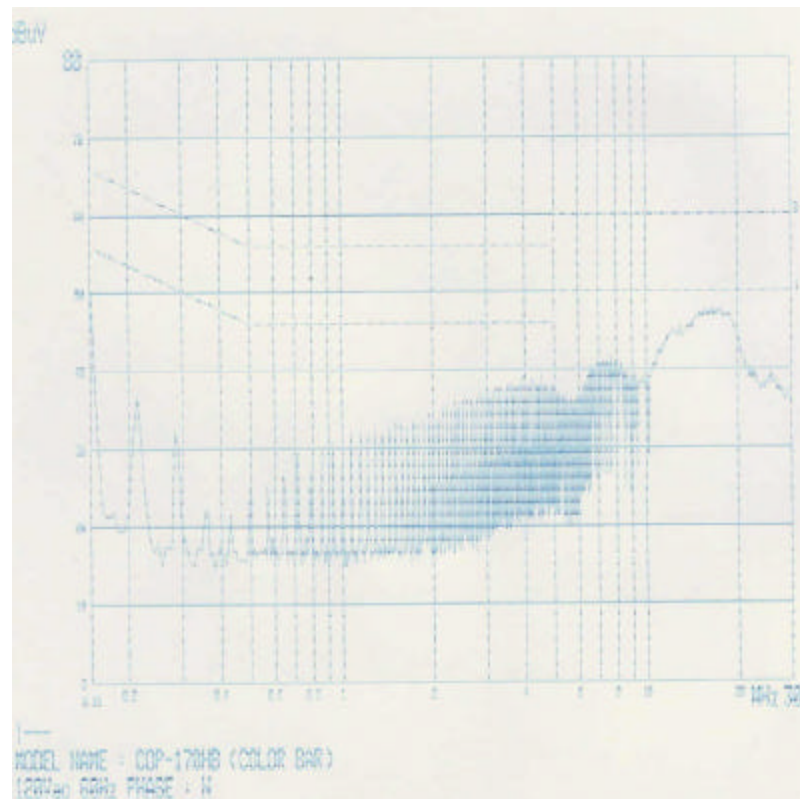
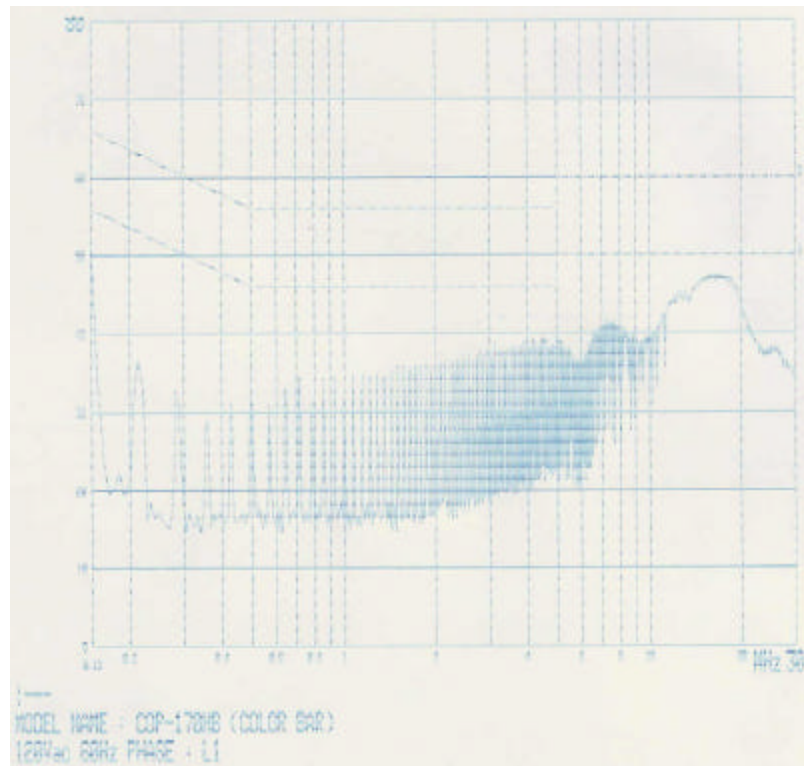
Conducted Emissions

Input signal : S-Video / Resolution : 1280 x 1024, 75Hz



Conducted Emissions

Input signal : Composite Video / Phase : Live



TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

Test Equipment Used

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESVP	Test Receiver	Rohde & Schwarz	Jul. 15, 2004	861744/004
VULB 9160	Antenna	Schwarzbeck	Jul. 19, 2004	3048

Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

Test Program Scrolling "H" Characters Mode (D-Sub, DVI-I, S-Video)
 Color Bar (Composite Video)

Test Date September 21, 2004

Test Area Open site No.2

Note : The equipment used is calibrated in regular for every year.

Radiated Emissions

Input signal : D-Sub

Mode	Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
640x480, 75Hz	129.0	21.5	12.0	2.7	V	36.2	43.5	7.3
	133.0	22.5	12.2	2.7	V	37.4	43.5	6.1
	193.4	26.2	9.9	3.3	H	39.4	43.5	4.1
	215.0	25.0	9.3	3.5	V	37.8	43.5	5.7
	321.5	22.3	13.0	4.5	V	39.8	46.0	6.2
	431.7	20.7	15.5	5.4	V	41.6	46.0	4.4
	539.5	20.0	16.1	6.2	V	42.3	46.0	3.7
	751.3	12.5	21.9	7.8	H	42.2	46.0	3.8
800x600, 75Hz	129.0	23.5	12.0	2.7	V	38.2	43.5	5.3
	133.0	24.4	12.2	2.7	V	39.3	43.5	4.2
	193.4	26.5	9.9	3.3	H	39.7	43.5	3.8
	215.0	25.0	9.3	3.5	V	37.8	43.5	5.7
	321.6	23.5	13.0	4.5	V	41.0	46.0	5.0
	431.7	21.2	15.5	5.4	V	42.1	46.0	3.9
	539.5	19.2	16.1	6.2	V	41.5	46.0	4.5
	751.3	12.8	21.9	7.8	H	42.5	46.0	3.5
1280x1024, 75Hz	75.2	15.8	8.8	1.9	V	26.5	40.0	13.5
	118.4	22.3	11.1	2.5	V	35.9	43.5	7.6
	129.0	24.7	12.0	2.7	V	39.4	43.5	4.1
	133.0	24.9	12.2	2.7	V	39.8	43.5	3.7
	139.8	21.0	12.7	2.8	V	36.5	43.5	7.0
	161.4	15.7	13.0	2.9	H	31.6	43.5	11.9
	182.8	25.9	10.8	3.2	H	39.9	43.5	3.6
	193.4	26.8	9.9	3.3	H	40.0	43.5	3.5
	215.0	25.2	9.3	3.5	V	38.0	43.5	5.5
	321.6	23.5	13.0	4.5	V	41.0	46.0	5.0
	431.7	21.0	15.5	5.4	V	41.9	46.0	4.1
	539.5	19.9	16.1	6.2	V	42.2	46.0	3.8
	751.3	12.9	21.9	7.8	H	42.6	46.0	3.4

Note:

Radiated Emissions

Input signal : DVI-I

Mode	Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
640x480, 75Hz	129.0	21.6	12.0	2.7	V	36.3	43.5	7.2
	133.0	22.5	12.2	2.7	V	37.4	43.5	6.1
	193.4	26.2	9.9	3.3	H	39.4	43.5	4.1
	215.0	25.1	9.3	3.5	V	37.9	43.5	5.6
	321.5	22.3	13.0	4.5	V	39.8	46.0	6.2
	431.7	20.7	15.5	5.4	V	41.6	46.0	4.4
	539.5	20.0	16.1	6.2	V	42.3	46.0	3.7
	751.3	12.5	21.9	7.8	H	42.2	46.0	3.8
800x600, 75Hz	129.0	23.6	12.0	2.7	V	38.3	43.5	5.2
	133.0	24.5	12.2	2.7	V	39.4	43.5	4.1
	193.4	26.5	9.9	3.3	H	39.7	43.5	3.8
	215.0	25.0	9.3	3.5	V	37.8	43.5	5.7
	321.6	23.4	13.0	4.5	V	40.9	46.0	5.1
	431.7	21.3	15.5	5.4	V	42.2	46.0	3.8
	539.5	19.3	16.1	6.2	V	41.6	46.0	4.4
	751.3	12.8	21.9	7.8	H	42.5	46.0	3.5
1280x1024, 75Hz	75.2	16.2	8.8	1.9	V	26.9	40.0	13.1
	118.4	22.4	11.1	2.5	V	36.0	43.5	7.5
	129.0	24.8	12.0	2.7	V	39.5	43.5	4.0
	133.0	24.5	12.2	2.7	V	39.4	43.5	4.1
	139.8	21.0	12.7	2.8	V	36.5	43.5	7.0
	161.4	15.7	13.0	2.9	H	31.6	43.5	11.9
	182.8	25.7	10.8	3.2	H	39.7	43.5	3.8
	193.4	26.5	9.9	3.3	H	39.7	43.5	3.8
	215.0	25.2	9.3	3.5	V	38.0	43.5	5.5
	321.6	23.4	13.0	4.5	V	40.9	46.0	5.1
	431.7	21.1	15.5	5.4	V	42.0	46.0	4.0
	539.5	19.5	16.1	6.2	V	41.8	46.0	4.2
	751.3	12.7	21.9	7.8	H	42.4	46.0	3.6

Note:

Radiated Emissions

Input signal : S-Video

Mode	Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
800x600, 75Hz	129.0	24.0	12.0	2.7	V	38.7	43.5	4.8
	133.0	24.1	12.2	2.7	V	39.0	43.5	4.5
	193.4	26.1	9.9	3.3	H	39.3	43.5	4.2
	215.0	24.8	9.3	3.5	V	37.6	43.5	5.9
	321.6	23.5	13.0	4.5	V	41.0	46.0	5.0
	431.7	20.0	15.5	5.4	V	40.9	46.0	5.1
1280x1024, 75Hz	118.4	22.9	11.1	2.5	V	36.5	43.5	7.0
	129.0	24.3	12.0	2.7	V	39.0	43.5	4.5
	182.8	25.2	10.8	3.2	H	39.2	43.5	4.3
	193.4	26.2	9.9	3.3	H	39.4	43.5	4.1
	215.0	24.9	9.3	3.5	V	37.7	43.5	5.8
	431.7	20.1	15.5	5.4	V	41.0	46.0	5.0
	539.5	19.0	16.1	6.2	V	41.3	46.0	4.7

Input signal : Composite Video

Mode	Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
	118.3	21.8	11.1	2.5	V	35.4	43.5	8.1
	129.1	23.6	12.0	2.7	V	38.3	43.5	5.2
	133.1	23.5	12.2	2.7	V	38.4	43.5	5.1
	139.8	19.8	12.7	2.8	V	35.3	43.5	8.2
	182.8	25.2	10.8	3.2	H	39.2	43.5	4.3
	193.4	24.9	9.9	3.3	H	38.1	43.5	5.4
	215.1	25.5	9.3	3.5	V	38.3	43.5	5.2
	321.6	22.4	13.0	4.5	V	39.9	46.0	6.1
	431.7	19.6	15.5	5.4	V	40.5	46.0	5.5
	539.5	18.5	16.1	6.2	V	40.8	46.0	5.2
	751.3	11.7	21.9	7.8	H	41.4	46.0	4.6

Note:

Appendix A. The Photos of Test Setup



Conducted Emissions - Front View

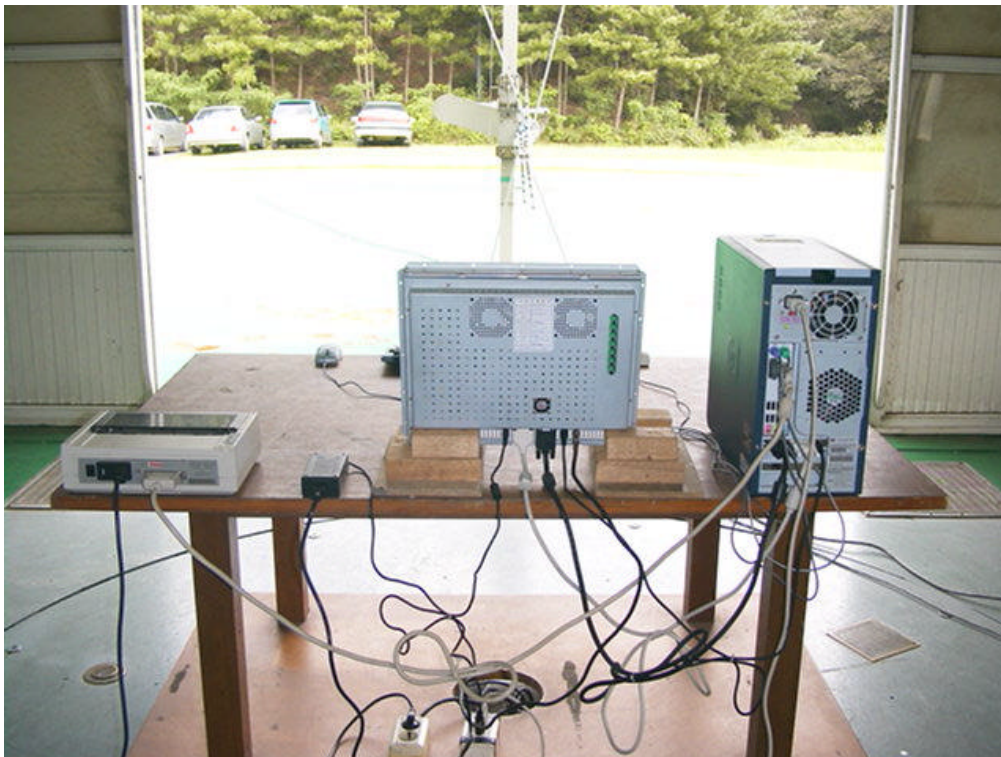


Conducted Emissions - Rear View

Appendix A. The Photos of Test Setup



Radiated Emissions - Front View

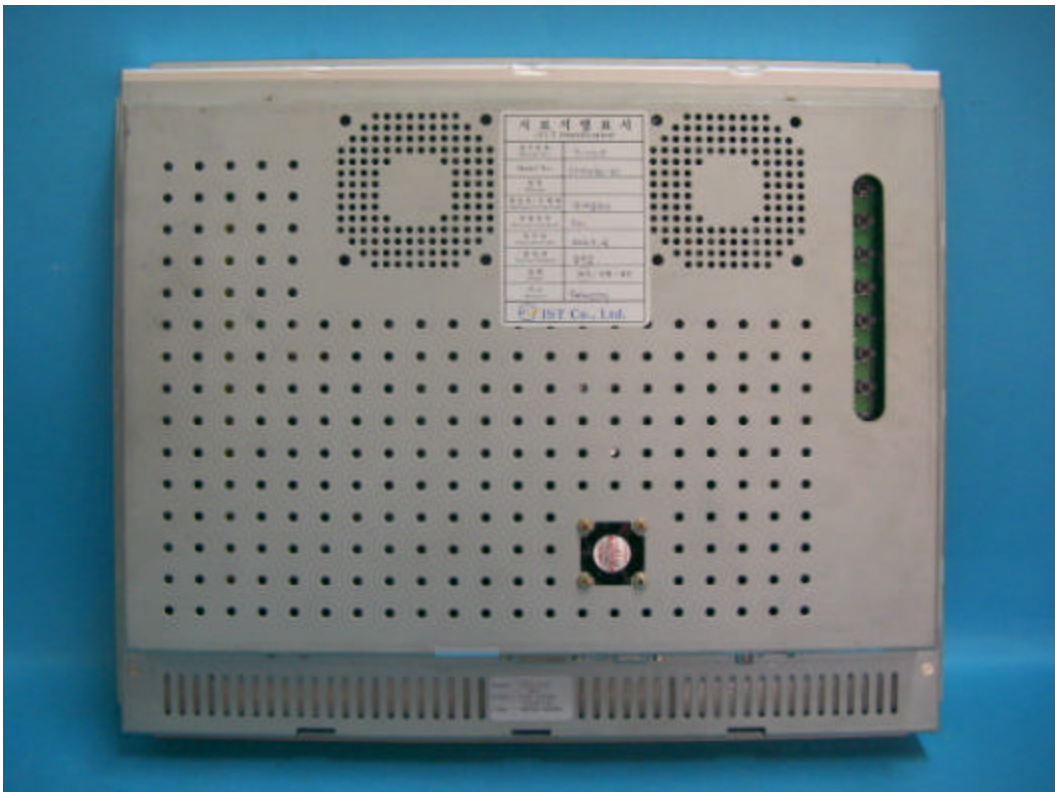


Radiated Emissions - Rear View

Appendix B. The Photos of Equipment Under Test



Front View



Rear View

Appendix B. The Photos of Equipment Under Test



Signal cable



AC/DC Adapter