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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test report file number : E011R-023

Applicant : Hyundai MultiCAV Computer Co., Ltd.
Address : 333-1, Sangdaewon-1 Dong, Jungwon-Ku, Sungnam-Si, Kyunggi-Do, Korea

Manufacturer : Hyundai MultiCAV Computer Co., Ltd.
Address : 333-1, Sangdaewon-1 Dong, Jungwon-Ku, Sungnam-Si, Kyunggi-Do, Korea

Type of Equipment : 15" TFT LCD Monitor

FCC ID : PGGHMM-L1500-M

Model / Type No. : HMM-L1500-M

Serial number : N/A

Total page of Report : 16 pages (including this page)

Date of Incoming : December 21, 2000

Date of issuing : January 16, 2001

SUMMARY

The equipment complies with the regulation; FCC PART 15 CFR 47 SUBPART B Section 15.101.

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:

Y. K. Nam / Asst. Chief Engineer

Reviewed by:

S. S. Hong / Managing Director

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FCC-004 (Rev.0)

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EMC Testing Dept : 426-1 Daesangyong-Ri, Chongwon-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



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Testing & Evaluation Lab.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : Hyundai MultiCAV Computer Co., Ltd.
 ADDRESS : 333-1, Sangdaewon-1 Dong, Jungwon-Ku, Sunnam-Si, Kyunggi-Do, Korea
 CONTACT PERSON : Young-Woo, Lee / General Manager
 TELEPHONE NO : 82-31-735-8080
 FCC ID : PGGHMM-L1500-M
 MODEL NO/NAME : HMM-L1500-M
 SERIAL NUMBER : N/A
 DATE : January 16, 2001

DEVICE TYPE	Peripheral Device for Class B Computing Device -Unintentional Radiator
E.U.T. DESCRIPTION	15" TFT LCD Monitor
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



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2. GENERAL INFORMATION

2.1 Product Description

The Hyundai MultiCAV Computer Co., Ltd., Model HMM-L1500-M (refer to the EUT in this report) is a 15" TFT LCD Monitor for PC. Also, the EUT has speakers for hi-quality sound function and USB Hub terminal ports on the bottom side of the EUT. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE		Plastic – Non coated
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)		14.318 MHz on the Main Board 12.0 MHz on the USB HUB Board
NUMBER OF LAYERS		4 Layers : Main Board, 2 Layers : USB HUB, Inverter, Button, AMP B/D
LCD PANEL	TYPE	15" TFT (Thin Film Transistor)
	PIXEL PITCH	0.297 x 0.297 (H x V)mm
	VIEWING ANGLE	60 degree (L/R), 35/55 degree (U/D)
	NUMBER OF COLORS	16M color (Dithering)
	NUMBER OF PIXELS	1024 x 768 (H x V) @ 60Hz
INPUT CONNECTOR		15 pin D-sub
POWER INPUT VOLTAGE & CONSUMPTION		DC 12V, 3.0A, 36W
VIDEO SIGNAL		Horizontal : 30 ~ 61KHz, Vertical : 56 ~ 75Hz
SOUND SIGNAL, IMPEDANCE		Sound output : 6W(L/R), 8 ohm
DIMENSION(HMM-L1500-M, HMM-L1500)		384(W) x 216(D) x 390(H), 384(W) x 216(D) x 390(H)
WEIGHT(HMM-L1500-M, HMM-L1500)		7.11 Kg, 5.38 Kg

Model Differences: -. The following list consists of added model name and their difference. The basic and added models are identical except for following difference.

	Model	Model Differences
Basic Model	HMM-L1500-M	-
Added Model	HMM-L1500	Except pivot function and USB HUB Terminal ports

2.2 Related Submittal(s) / Grant(s)

Original submittal only.

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2.3 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
HMM-L1500-M	Hyundai MultiCAV Computer Co., Ltd.	PGGHMM-L1500-M	15" TFT LCD Monitor (EUT)	PC
TC-PA1000	TAEIL	LIZ-TCPA1000	PC	-
SKR-1032	SEJIN Elec	GJJSKR-1032B	KEYBOARD	PC
3500U	BTC	DOC	KEYBOARD	EUT
9532	ARTEC.	ITEUECMN9532	MOUSE	PC
PC EYE	MAIN TECH	DOC	CAMERA	EUT
2225C	HP	DSI6XU2225	PRINTER	PC
020-0470	CARDINAL	GDE0196	MODEM	PC
PW160	AULT KOREA CORP	N/A	AD/DC ADAPTER	EUT

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 12, 1999. (Registration Number: 92819)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main B/D	Hyundai MultiCAV Computer Co., Ltd.	HM15X11-200	N/A
Inverter B/D	AMBIT	K041002.00	N/A
Button B/D	Hyundai MultiCAV Computer Co., Ltd.	N/A	N/A
AMP B/D	N/A	L1500	N/A
HUB B/D	ROISTECH	S2-20001217	N/A

3.2 EUT exercise Software

The windows program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. This program was included into HOST. The series of H characters are displayed on the LCD monitor (EUT) until the screen is completely full and displayed image captured by camera and played music file using media program. For the USB HUB terminal ports, additional USB Keyboard and a camera were connected.

The investigated resolution mode of the EUT was at 1024 x 768, 60Hz.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
15" TFT LCD Monitor (EUT)	N	Y	1.5(P), 1.0(D)
PC	N	Y	1.5(P), 1.0(D)
KEYBOARD	N/A	Y	1.2(D)
KEYBOARD	N/A	Y	1.2(D)
MOUSE	N/A	Y	1.5(D)
MODEM	N	Y	1.5(P), 1.5(D)
CAMERA	N/A	Y	1.8(D)
PRINTER	N	Y	1.5(P), 1.2 (D)

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* The marked “(P)” means the Power Cable and “(D)” means the Data Cable.

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3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
15" TFT LCD Monitor (EUT)	Y	EUT END*	Y	BOTH END
PC	-	-	-	-
KEYBOARD	N	N/A	Y	EUT END
KEYBOARD	N	N/A	Y	PC END
MOUSE	N	N/A	Y	PC END
MODEM	N	N/A	Y	BOTH END
CAMERA	N	N/A	Y	EUT END
PRINTER	N	N/A	Y	BOTH END

Remark: "*" means that the AC/DC Adapter for the EUT has 2 output cables. One is for LCD Monitor and the other one has ferrite core on the cable is for USB HUB Terminal ports.

3.5 Equipment Modifications: None

3.6 Configuration of Test System

Line Conducted Test: The AC/DC Adapter power cable for the EUT was connected to LISN, all supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

document property name.

4. PRELIMINARY TEST

4.1 Conducted Emission Test

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Display “H” character and captured image by camera and play music files	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Display “H” character and captured image by camera and play music files	X



document property name.

5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 43 % Temperature : 20 °
 Limits apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Test : CLASS B
 Result : PASSED BY -3.69 dB at 17.74 MHz

EUT : 15" TFT LCD Monitor Date: January 15, 2001
 Operating Condition : Continuously displayed "H" character and captured image by camera and play music files.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)
 Remark : Model name is HMM-L1500-M (with USB HUB Terminal ports)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.53	30.84	NEUTRAL	48.00	-17.16
0.65	32.35	NEUTRAL	48.00	-15.65
1.71	29.38	NEUTRAL	48.00	-18.62
3.42	29.85	NEUTRAL	48.00	-18.15
5.38	33.69	NEUTRAL	48.00	-14.31
13.12	31.82	NEUTRAL	48.00	-16.18
17.74	44.31	NEUTRAL	48.00	-3.69
23.37	33.40	NEUTRAL	48.00	-14.60

Line Conducted Emission Tabulated Data

document property name.

Measuring by: Young Min, Choi / Project Engineer



document property name.

EUT : 15" TFT LCD Monitor Date: January 15, 2001

Operating Condition : Continuously displayed "H" character and captured image by camera and play music files.

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Result : PASSED BY -13.46 dB at 14.32 MHz

Remark : Model name is HMM-L1500 (without USB HUB Terminal ports)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.47	31.34	NEUTRAL	48.00	-16.66
0.65	31.56	NEUTRAL	48.00	-16.44
0.76	30.88	HOT	48.00	-17.12
4.31	25.36	NEUTRAL	48.00	-22.64
14.32	34.54	HOT	48.00	-13.46
17.84	33.95	NEUTRAL	48.00	-14.05
24.00	31.82	HOT	48.00	-16.18
28.64	30.18	HOT	48.00	-17.82

Line Conducted Emission Tabulated Data

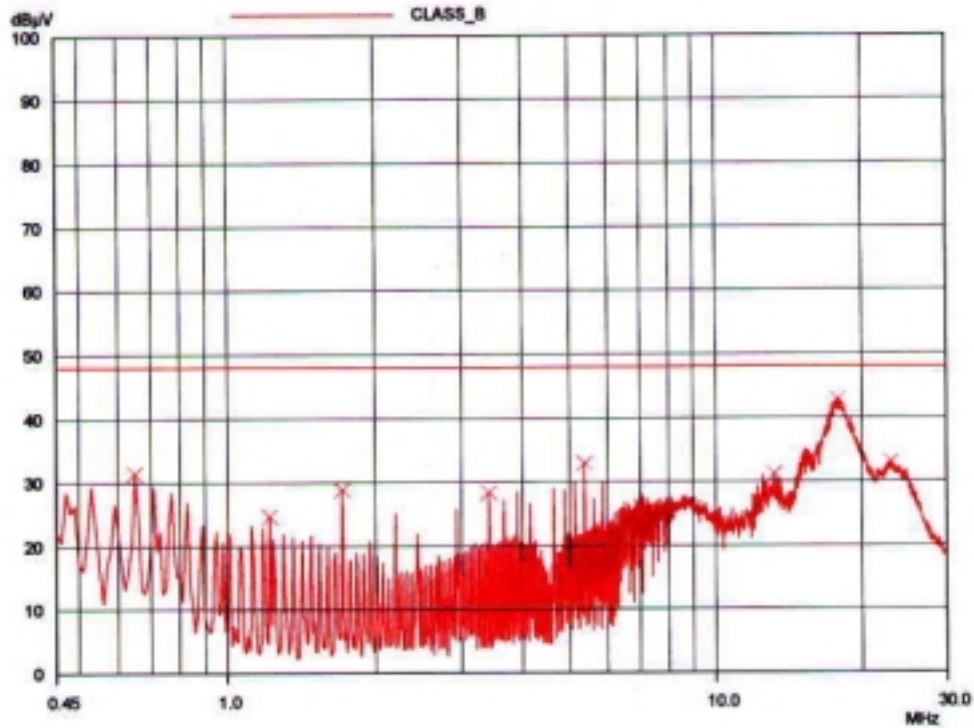
document property name.

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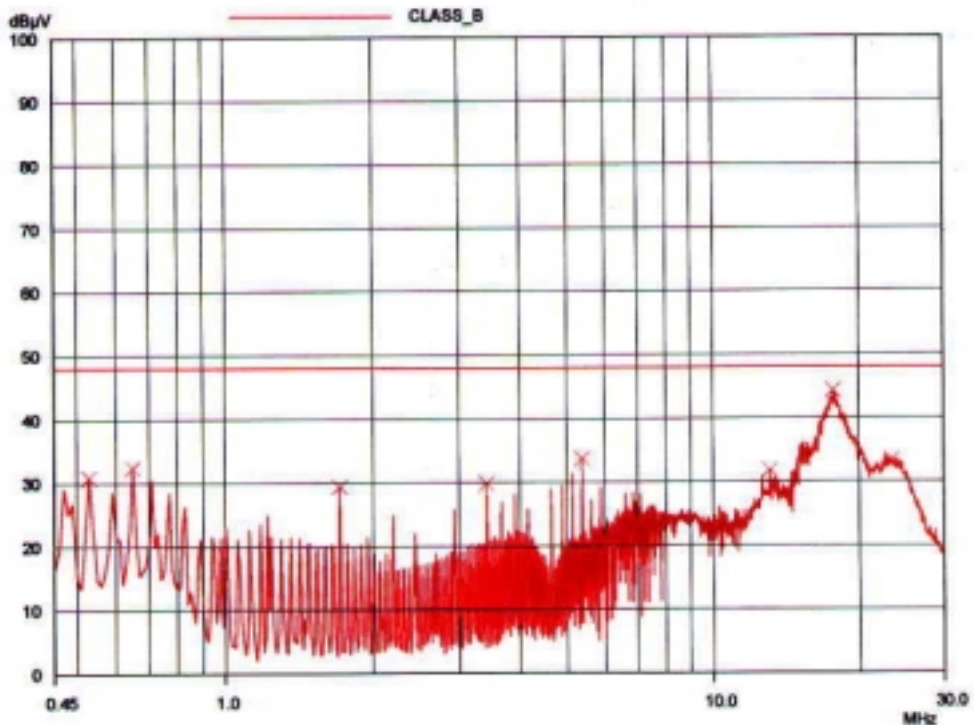


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Model name is HMM-L1500-M (with USB HUB Terminal port)



HOT LINE



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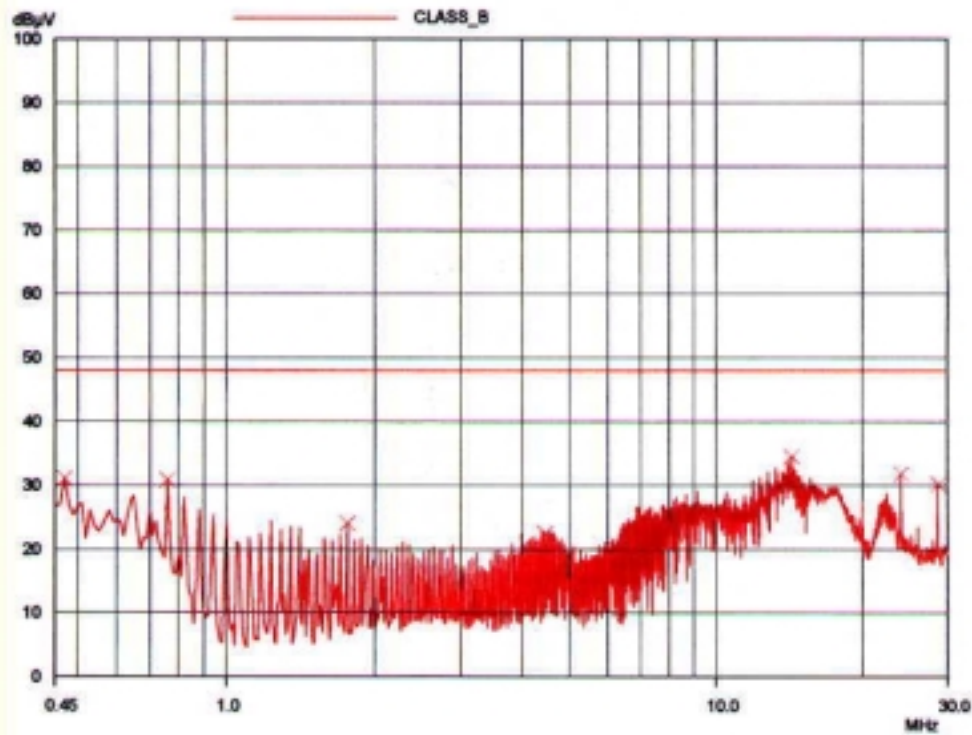
document property name.

NEUTRAL LINE

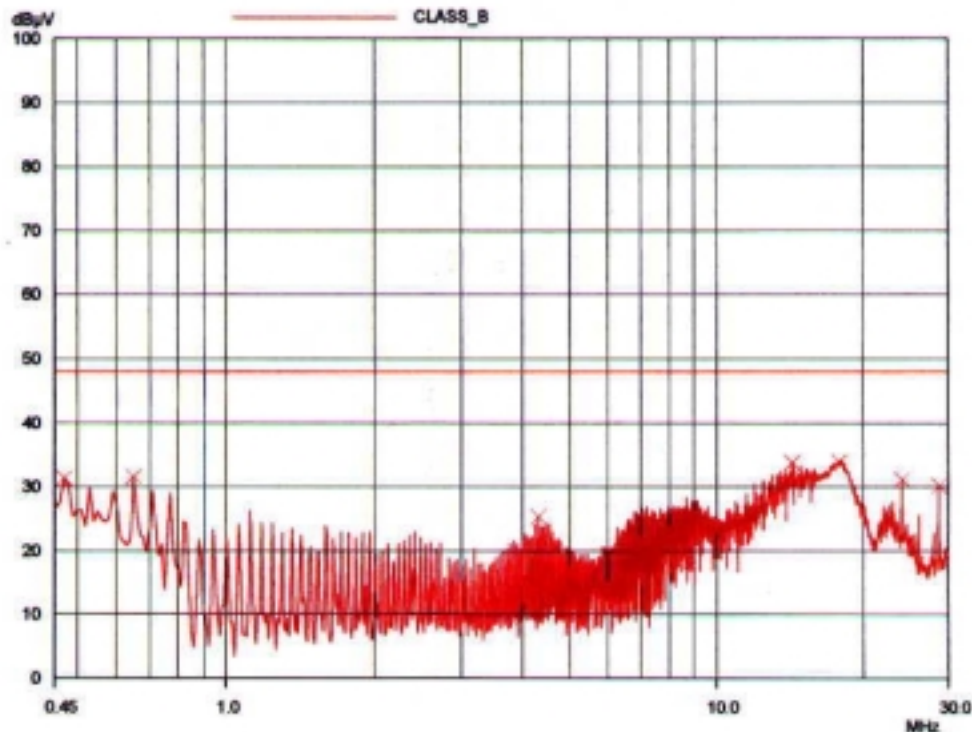


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Model name is HMM-L1500 (without USB HUB Terminal port)



HOT LINE



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NEUTRAL LINE



document property name.

5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 43 % Temperature : 17.0
Limits apply to : FCC CFR 47, PART 15, SUBPART B
Type of Test : CLASS B
Result : PASSED BY -5.20 dB at 39.22 MHz

EUT : 15" TFT LCD Monitor Date: January 15, 2001
Operating Condition : Continuously displayed "H" character and captured image by camera and play music files.
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter
Remark : Model name is HMM-L1500-M (with USB HUB Terminal ports)

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
39.22	22.20	H	11.78	0.82	34.80	40.00	-5.20
48.10	19.70	V	11.24	0.91	31.85	40.00	-8.15
108.53	17.10	H	12.49	1.19	30.78	43.50	-12.72
120.62	14.70	V	13.32	1.23	29.25	43.50	-14.25
215.60	15.70	H	11.79	1.65	29.14	43.50	-14.36
239.60	17.90	H	12.20	1.78	31.88	46.00	-14.12
288.00	14.20	H	14.70	1.95	30.85	46.00	-15.15
336.20	15.40	H	15.20	2.21	32.81	46.00	-13.19
360.20	18.10	H	15.32	2.32	35.74	46.00	-10.26
384.40	11.90	H	15.63	2.41	29.94	46.00	-16.06
407.60	11.70	H	15.99	2.45	30.14	46.00	-15.86
431.80	12.10	H	16.53	2.50	31.13	46.00	-14.87
455.80	12.50	H	17.09	2.56	32.15	46.00	-13.85

Radiated Emission Tabulated Data

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Measuring by: Young Min, Choi / Project Engineer



document property name.

EUT : 15" TFT LCD Monitor Date: January 15, 2001

Operating Condition : Continuously displayed "H" character and captured image by camera and play music files.

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Result : PASSED BY -5.21 dB at 39.32 MHz

Remark : Model name is HMM-L1500 (without USB HUB Terminal ports)

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
39.32	22.20	V	11.77	0.82	34.79	40.00	-5.21
48.19	18.00	V	11.23	0.91	30.14	40.00	-9.86
51.00	17.60	V	11.03	0.94	29.57	40.00	-10.43
74.47	25.00	V	6.41	1.00	32.41	40.00	-7.59
85.88	24.00	V	7.50	1.10	32.60	40.00	-7.40
114.40	12.30	V	12.93	1.22	26.45	43.50	-17.05
119.36	11.20	V	13.29	1.23	25.72	43.50	-17.78
126.60	8.80	V	13.12	1.25	23.17	43.50	-20.33
151.22	12.80	V	13.49	1.35	27.64	43.50	-15.86

Radiated Emission Tabulated Data

document property name.

Measuring by: Young Min, Choi / Project Engineer

document property name.

6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

document property name.



document property name.

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	SEP/00	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/00	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/00	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/00	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/00	12MONTH	■
10.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
11.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
12.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■