



HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
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CERTIFICATION (Permissive change class)

Manufacture;
CORNEA TECHNOLOGY CO., Ltd.

Rm#201, Na Dong, Shilla-Technoville, 39-3 Dong-Dong,
Kunpo-Shi, Kyunggi-Do, Korea

CORNEA : 0006-5809-55

Date of Issue: DECEMBER 27, 2001
Test Report No.: HCT-F02-0301

Test Site: HYUNDAI CALIBRATION & CERTIFICATION
TECHNOLOGIES CO., LTD.

HCT FRN : 0005-8664-21

FCC ID :

PL4CT1501

MODEL / TYPE :

CT1501

FCC Rule Part(s):	Part 15 & 2; ET Docket 95-19
Classification:	FCC Class B Peripheral Device (JBP)
Standard(s):	FCC Class B: 1998 (CISPR 22)
Equipment(EUT) Type:	15" LCD Monitor
Max Resolution:	1024 X 768 Non-interlaced (@60KHz/ 75Hz)
Port/ Connector(s)	15-pin D-sub VGA connector

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-1992. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HYUNDAI C-Tech. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse of 1988, 21 U.S.C. 853(a).

Report prepared by : Ki-Soo Kim
Manager of EMC Tech. Part



TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION.....	3
1.1 Product Description.....	3
1.2 Related submittal(s)/Grant(s).....	3
1.3 Tested System Details.....	4
1.4 Test Methodology.....	4
1.5 Test Facility.....	4
2. SYSTEM TEST CONFIGURATION.....	5
2.1 Justification.....	5
2.2 EUT Exercise Software.....	5
2.3 Cable Description.....	6
2.4 Noise Suppression Parts on Cable.....	6
2.5 Equipment Modifications.....	7
2.6 Configuration of Tested System.....	8
3. PRELIMINARY TESTS.....	9
3.1 Power line Conducted Emissions Tests.....	9
3.2 Radiated Emissions Tests.....	9
4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY.....	9
4.1 Conducted Emission Tests.....	10
4.2 Conducted Emission Tests.....	11
4.3 Radiated Emission Tests.....	12
5. FIELD STRENGTH CALCULATION.....	13
6. LIST OF TEST EQUIPMENT	14

ATTACHMENT A	ID Label / Location Info.
ATTACHMENT B.....	External Photos.
ATTACHMENT C	Block Diagram..
ATTACHMENT D	Test Setup Photos.
ATTACHMENT E	User's Manual.
ATTACHMENT F	Internal Photos.

1. GENERAL INFORMATION

1.1 Product Description

The CORNEA TECHNOLOGY CO., LTD. Model CT1501 (referred to as the EUT in this report) is a 15"LCD Monitor with HOR. Freq. 60KHz (Max) and Resolution of 1024X768 (Non-Interlaced). Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	PLASTIC
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	12.46MHz , 32.0MHz
POWER REQUIREMENT	100 - 240 V~ 1.5A 60/50Hz
NUMBER OF LAYERS	MAIN BOARD 4 LAYER OSD BOARD 1 LAYER POWER BOARD 1 LAYER INVERTER BOARD 2 LAYER
MAX. RESOLUTION	1024 X 768 NON-INTERLACED(@60KHz/ 75Hz)
H-SYNC FREQUENCY RANGE	30KHz 60KHz
V-SYNC FREQUENCY RANGE	50Hz 75Hz
CRT TYPE	15" (LCD Type :HM15X11-200, HYUNDAI)

1.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

1.3 Tested System Details

The Model names for all equipment, plus descriptions used in the tested system (including inserted cards) are:

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
MONITOR (EUT)	CORNEA TECHNOLOGY CO., LTD.	CT1501	PL4CT1501	HOST
PC(HOST)	H/P	DTPC-17	DoC	N/A
KEY BOARD	H/P	SK-2501-2D-K	GYUR385K	HOST
PRINTER	H/P	HP 895C	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
VIDEO CARD	DIAMOND	3D3000	DoC	HOST
MOUSE	H/P	M-S34	DZL211029	HOST

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at an antenna to EUT distance of 10 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO, 467-701,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 24,2000(Confirmation Number: EA90661)

2.SYSTEM TEST CONFIGURATION

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components and I/O cards inside the E.U.T were used.

DEVICE TYPE	MANUFACTURE	MODEL/PART NUMBER
MAIN BOARD	HYUNDAI	HM15X-11
POWER BOARD	FSP GROUP INC.	FSP040-1AD101
OSD BOARD	CORNEA TECHNOLOGY CO., LTD.	150000018
INVERTOR BOARD	CORNEA TECHNOLOGY CO., LTD.	K04C0200
LCD BOARD	CORNEA TECHNOLOGY CO., LTD.	5IT017003N102819

2.2 EUT exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing.

2.3 Cable Description

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
MONITOR(EUT)	N	Y	1.8(P), 1.5(D)
PC(HOST)	N	N/A	1.8(P)
PRINTER	N	Y	2.0(P),1.8(D)
KEY BOARD	N/A	Y	2.0(D)
MODEM	N	Y	2.0(P),0.8(D)
MOUSE	N/A	Y	1.8(D)

2.4 Noise Suppression Parts on Cable. (I/O CABLE)

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
MONITOR(EUT)	Y	PC END	Y	PC END
PRINTER	N	N/A	Y	BOTH END
KEY BOARD	Y	PC END	Y	PC END
MODEM	N	N/A	Y	BOTH END
MOUSE	N	N/A	Y	PC END

2.5 Equipment Modifications

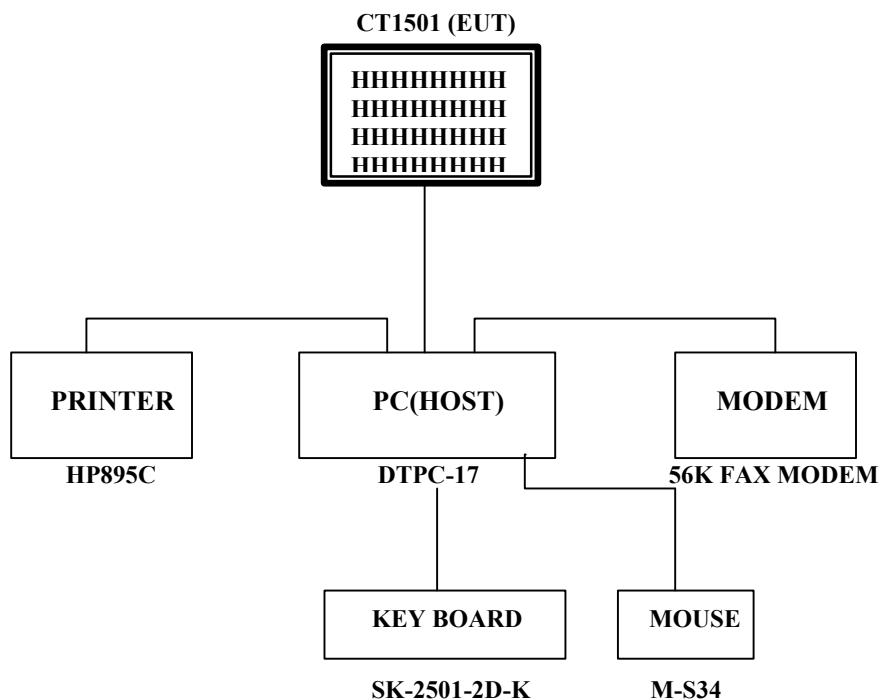
N/A

2.6 Configuration of Test system

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN.
Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary Radiated Emissions tests were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating condition. Final Radiated Emission tests were conducted at 10 meter open area test site.

[Configuration of Tested System]



3. PRELIMINARY TESTS

3.1 AC Power line Conducted Emission Tests

During Preliminary Tests, the following operating mode were investigated

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1024 x 768 Non-Interlaced (60KHz/75Hz)	X
	1024 x 768 Non-Interlaced (56.6KHz/70Hz)	
	800 x 600 Non-Interlaced (46.9KHz/75Hz)	
	800 x 600 Non-Interlaced (37.9KHz/60Hz)	
	640 x 480 Non-Interlaced (31.5KHz/60Hz)	

4.2 Radiated Emission Tests

During Preliminary Tests, the following operating mode were investigated

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1024 x 768 Non-Interlaced (60KHz/75Hz)	X
	1024 x 768 Non-Interlaced (56.6KHz/70Hz)	
	800 x 600 Non-Interlaced (46.9KHz/75Hz)	
	800 x 600 Non-Interlaced (37.9KHz/60Hz)	
	640 x 480 Non-Interlaced (31.5KHz/60Hz)	

Measured by : Kyoung-Hee Yoon / Engineer

Date : DECEMBER 10, 2001

4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level : 43% Temperature : 21
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : DECEMBER 26, 2001
 Result : PASSED BY -9.2 dB

EUT : 15" LCD MONITOR(CT1501 with D-Tech Adapter)
 Operating Condition : 1024 X 768 Non-Interlaced (Hf : 60.0KHz, Vf : 75Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)
 CISPR Average(6 dB Bandwidth : 9 KHz)

Line Conducted Emission Tabulated Data

Power Line Conducted Emissions			CISPR 22		
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)	Detector Mode
2.455	36.8	NEUTRAL	46.0	-9.2	AVERAGE
0.485	37.0	HOT	46.0	-9.3	AVERAGE
2.210	36.6	NEUTRAL	46.0	-9.4	AVERAGE
2.395	36.4	NEUTRAL	46.0	-9.6	AVERAGE

NOET:

- All video modes and resolutions were investigated and the worst-case emissions are reported
 Other video modes & resolution were tested and found to be in compliance.

Measured by : Kyoung-Hee Yoon / Engineer

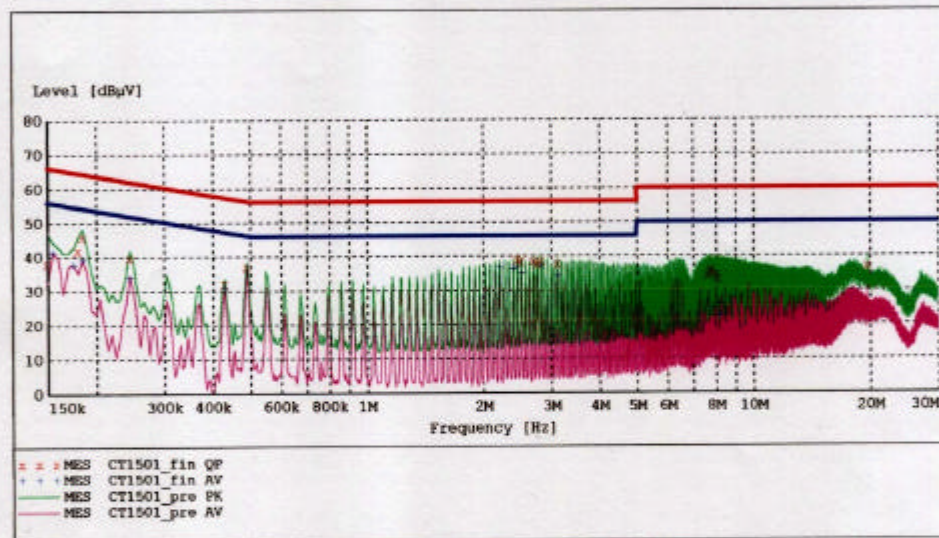
Date : DECEMBER 26, 2001

HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.

EUT: CT1501
Manufacturer: CORNEA
Operating Condition: 1024 X 768 60K 75Hz
Test Site: Shield Room
Operator: Kyoung-Hee Yoon
Test Specification: MIC CLASS B
Comment: N
Start of Test: 12/26/01 / 9:04:49PM

SCAN TABLE: "EN 55022 V (PKH)"

Short Description:			EN 55022 Voltage	Detector	Meas. Time	IF Bandw.	Transducer
Start Frequency	Stop Frequency	Step Width					
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	100.0 ms	9 kHz	CABLE LOSS (NEW)	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	CABLE LOSS (NEW)	
			Average				

**MEASUREMENT RESULT: "CT1501_fin QP"**

12/26/01 9:08PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	37.90	0.5	66	28.1	1	---
0.180000	41.80	0.5	65	22.7	1	---
0.185000	45.90	0.5	64	18.3	1	---
0.245000	39.70	0.5	62	22.2	1	---
0.430000	32.10	0.5	57	25.1	1	---
0.490000	36.90	0.5	56	19.3	1	---
2.455000	38.90	0.6	56	17.1	1	---
2.515000	38.20	0.6	56	17.8	1	---
2.700000	38.40	0.6	56	17.6	1	---
2.760000	37.60	0.6	56	18.4	1	---
2.825000	38.70	0.6	56	17.3	1	---
3.130000	37.80	0.6	56	18.2	1	---
7.615000	34.40	1.1	60	25.6	1	---
7.740000	36.00	1.1	60	24.0	1	---

MEASUREMENT RESULT: "CT1501_fin QP"
(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
7.800000	35.10	1.1	60	24.9	1	---
8.045000	34.50	1.2	60	25.5	1	---
8.105000	33.20	1.2	60	26.8	1	---
19.690000	36.90	1.8	60	23.1	1	---

MEASUREMENT RESULT: "CT1501_fin AV"
12/26/01 9:08PM

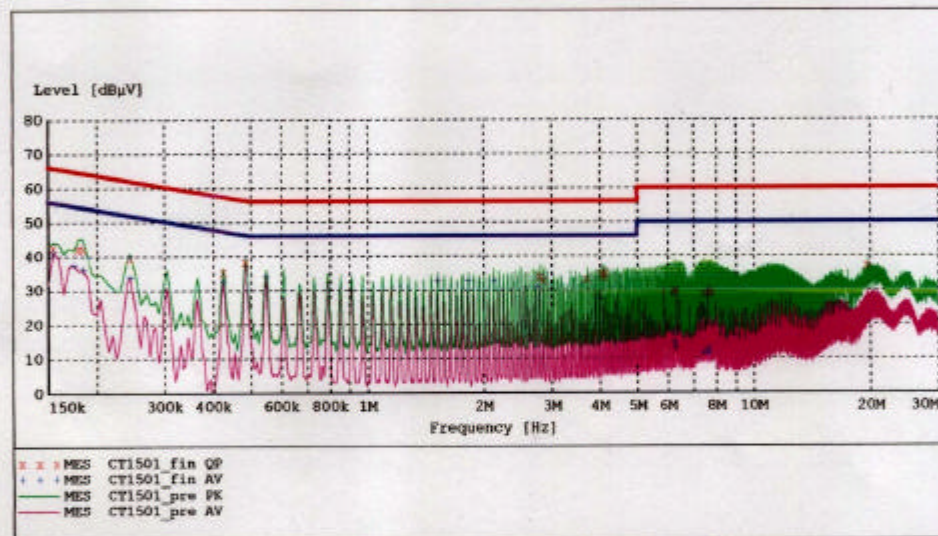
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.155000	41.40	0.5	56	14.4	1	---
0.175000	37.70	0.5	55	17.0	1	---
0.185000	39.20	0.5	54	15.0	1	---
0.245000	34.00	0.5	52	18.0	1	---
0.430000	30.70	0.5	47	16.6	1	---
0.490000	35.80	0.5	46	10.3	1	---
2.210000	36.60	0.6	46	9.4	1	---
2.395000	36.40	0.6	46	9.6	1	---
2.455000	36.80	0.6	46	9.2	1	---
2.515000	35.00	0.6	46	11.0	1	---
2.825000	37.10	0.6	46	8.9	1	---
3.130000	34.60	0.6	46	11.4	1	---
7.615000	26.30	1.1	50	23.7	1	---
7.860000	24.80	1.1	50	25.2	1	---
8.045000	25.60	1.2	50	24.4	1	---
8.105000	22.50	1.2	50	27.5	1	---
8.230000	25.90	1.2	50	24.1	1	---
8.290000	22.90	1.2	50	27.1	1	---

HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.

EUT: CT1501
Manufacturer: CORNEA
Operating Condition: 1024 X 768 60K 75Hz
Test Site: Shield Room
Operator: Kyoung-Hee Yoon
Test Specification: MIC CLASS B
Comment: H
Start of Test: 12/26/01 / 8:56:11PM

SCAN TABLE: "EN 55022 V (PKH)"

Short Description:			EN 55022 Voltage				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
Frequency	Frequency	Width					
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	100.0 ms	9 kHz	CABLE LOSS (NEW)	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	CABLE LOSS (NEW)	
			Average				

**MEASUREMENT RESULT: "CT1501_fin QP"**

12/26/01 9:03PM

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
0.155000	42.70	0.5	66	23.0	1	---
0.180000	42.20	0.5	65	22.3	1	---
0.185000	42.40	0.5	64	21.9	1	---
0.245000	39.50	0.5	62	22.5	1	---
0.425000	35.30	0.5	57	22.0	1	---
0.485000	38.30	0.5	56	18.0	1	---
2.805000	33.90	0.6	56	22.1	1	---
2.870000	32.80	0.6	56	23.2	1	---
3.720000	33.50	0.7	56	22.5	1	---
4.025000	34.90	0.8	56	21.1	1	---
4.085000	34.00	0.8	56	22.0	1	---
4.150000	35.20	0.8	56	20.8	1	---
6.230000	30.20	1.0	60	29.8	1	---
6.290000	29.40	1.0	60	30.6	1	---

MEASUREMENT RESULT: "CT1501_fin QP"
(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
7.450000	28.90	1.1	60	31.1	1	---
7.695000	28.90	1.1	60	31.1	1	---
7.820000	29.50	1.1	60	30.5	1	---
19.690000	37.10	1.8	60	22.9	1	---

MEASUREMENT RESULT: "CT1501_fin AV"
12/26/01 9:03PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.155000	41.10	0.5	56	14.6	1	---
0.175000	37.40	0.5	55	17.3	1	---
0.185000	36.10	0.5	54	18.1	1	---
0.245000	33.90	0.5	52	18.0	1	---
0.425000	32.80	0.5	47	14.6	1	---
0.485000	37.00	0.5	46	9.3	1	---
0.550000	34.00	0.5	46	12.0	1	---
1.525000	33.00	0.5	46	13.0	1	---
1.830000	32.90	0.6	46	13.1	1	---
2.135000	32.80	0.6	46	13.2	1	---
2.745000	31.20	0.6	46	14.8	1	---
4.025000	27.60	0.8	46	18.4	1	---
6.230000	14.80	1.0	50	35.2	1	---
6.290000	13.20	1.0	50	36.8	1	---
6.355000	17.90	1.0	50	32.1	1	---
7.450000	11.60	1.1	50	38.4	1	---
7.635000	12.60	1.1	50	37.4	1	---
7.695000	11.50	1.1	50	38.5	1	---

4.3 Radiated Emissions Tests

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 41 % Temperature : 23
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : DECEMBER 20, 2001
 Result : PASSED BY -3.3 dB

EUT : 15" LCD MONITOR(CT1501 with D-Tech Adapter)
 Operating Condition : 1024 X 768 Non-Interlaced (Hf :60.0 kHz, Vf : 75 Hz)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Frequency MHz	Reading dBuV/m	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
59	14.44	8.46	1.60	V	24.5	30.0	-5.5
100.9	12.59	10.61	2.10	V	25.3	30.0	-4.7
123.8	8.08	13.62	2.40	V	24.1	30.0	-5.9
138.6	9.41	14.39	2.50	H	26.3	30.0	-3.7
158.9	9.33	14.77	2.60	V	26.7	30.0	-3.3
186.1	5.65	15.25	2.80	V	23.7	30.0	-6.3
257.4	11.17	17.73	3.60	H	32.5	37.0	-4.5
315.8	11.73	15.87	3.80	H	31.4	37.0	-5.6
468	9.85	17.95	4.80	V	32.6	37.0	-4.4
494.3	10.10	18.20	4.90	V	33.2	37.0	-3.8
553.8	8.79	19.61	5.30	V	33.7	37.0	-3.3
748	3.66	22.54	6.40	V	32.6	37.0	-4.4

NOTE:

- 1.All video modes and resolutions were investigated and the worst-case emissions are reported.
- 2.Other video modes & resolution were tested and found to be in compliance.

Measured by : Kyoung-Hee Yoon / Engineer

Date : DECEMBER 20, 2001

5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The 30 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm } [(30 \text{ dBuV/m})/20] = 31.6 \text{ uV/m}$$

6. LIST OF TEST EQUIPMENT

<u>DATE</u>	<u>TYPE</u>	<u>MANUFACTURE</u>	<u>MODEL</u>	<u>CAL .</u>
	EMI Test Receiver	Rohde & Schwarz	ESH3	2001.6.29
	EMI Test Receiver	Rohde & Schwarz	ESVP	2002.2.14
	EMI Test Receiver	Rohde & Schwarz	ESI40	2001.11.5
	EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.3.6
	Spectrum Monitor	Rohde & Schwarz	EZM	N.A
	Graphic Plotter	Rohde & Schwarz	DOP2	N.A
	Printer	Rohde & Schwarz	PDN	N.A
	Spectrum Analyzer	H.P	8591EM	2001.7.11
	LISN	EMCO	3825/2	2002.2.7
	LISN	Rohde & Schwarz	ESH2-Z5	2001.8.12
	Amplifier	Hewlett-Packard	8447E	2002.3.2
	Dipole Antennas	Rohde & Schwarz	VHAP	2001.6.28
	Dipole Antennas	Rohde & Schwarz	UHAP	2001.6.28
	Biconical Antenna	Rohde & Schwarz	BBA-9106	2001.6.28
	Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2001.6.26
	Antenna Position Tower	EMCO	1051-12	N.A
	Turn Table	EMCO	1060-06	N.A
	Line Filter	KEENE	ULW 2X30-60	N.A
	Power Analyzer	Voltech	PM 3300	2002.2.20
	Reference Network Impedance	Voltech	IEC 555	N.A
	AC Power Source	PACIFIC	Magnetic Module	N.A
	AC Power Source	PACIFIC	360AMX	N.A

