

**HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.**

Product Compliance Division, Product Compliance Team  
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNGI-DO, 467-701, KOREA  
TEL : +82 31 639 8518 FAX : +82 31 639 8525

## CERTIFICATION

Manufacture;  
**HARSPER CO., LTD.**  
546-4, Ami-Ri Bubai-Eub, Ichon-City, Kyoungki-Do  
Korea  
FRN : 0007-9131-06

Dates of Tests: NOV. 06, 2002  
Test Report No.: HCT-F02-1103  
Test Site: HYUNDAI CALIBRATION & CERTIFICATION  
TECHNOLOGIES CO., LTD.  
FRN : 0005-8664-21

FCC ID :  
MODEL/TYPE :

**O5XHP-400**  
**HP-4200**

FCC Rule Part(s): Part 15 & 2; ET Docket 95-19  
Classification: FCC Class B Computing Device Peripheral (JBP)  
Standard(s): FCC Class B: 2001(CISPR 22)  
Equipment(EUT) Type: PDP MONITOR / HP-4200  
Brand Name: HARSPER CO.,LTD.  
Port/ Connector(s) Audio input( Pin jack), Video input(BNC), S-video(S terminal)  
Component Video input(BNC), RGB input(15pin mD-sub),  
RS-232C(9pin D-sub), Speaker output

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 Product Compliance Team



## 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.....	10
4.1 Conducted Emission Tests.....	10
4.2 Radiated Emission Tests.....	11
5. FIELD STRENGTH CALCULATION.....	12
6. LIST OF TEST EQUIPMENT .....	13
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.
ATTACHMENT G.....	Circuit Diagram

## 1. GENERAL INFORMATION

### 1.1 Product Description

Plasma Monitor is the most advanced display solution for digital A/V integration used for information Displays, Conference System as well as Home Theater. In the plasma Image producing system, gas is confined in a 0.1mm-width space between two glass substrates with transparent electrodes. When voltage is applied between the electrode pairs, it causes an emission of ultraviolet light. This light reacts with RGB phosphors to produce multiple colors that are displayed as the final image. Plasma is an array of cells, know as pixels, which are composed of there sub-pixels, corresponding to the colors red, green and bleu.(red, green or blue). Each sub –pixel is individually controlled by advanced electronics to produce over 16 million different colors. This means that you get perfect, easily viewable images in a display that is 3.3 inches thin.

CHASSIS TYPE	METAL
LIST OF EACH OSC. OR XTAL. FREQ. (FREQ.≥ 1MHz)	20, 22, 24.57, 26, 27.4, 78.75 MHz
MAX.RESOLUTION	PC Monitor support up to 1280 x 1024 60 Hz
H-SYNC FREQUENCY RANGE	31 KHz ~ 64 KHz
V-SYNC FREQUENCY RANGE	60 Hz ~ 120 Hz
POWER REQUIREMENT	AC 100~240V 50/60Hz 380Watts

### 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
PDP MONITOR (EUT)	HARSPER CO., LTD.	HP-4200	O5XHP400	HOST
PC(HOST)	H/P	HP PAVILION700	DOC	N/A
KEY BOARD	H/P	5181	DOC	HOST
MOUSE	H/P	Intellimouse optical USB and PS/2 compatible	DOC	HOST
DVD PLAYER	ELLION DIGITAL	DVD-360A	DOC	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
SCAN DRIVE BOARD	SAMSUNG SDI	Y-BUFFER(I) / LJ-92-00570A
SCAN DRIVE BOARD	SAMSUNG SDI	Y-BUFFER(J) / LJ-92-00571A
Y-DRIVE BOARD	SANSUNG SDI	Y-MAIN / LJ-92-00569B
LOGIC BOARD	SAMSUNG SDI	LOGIC-MAIN / LJ-92-00573A
SMPS	DANAM	SMPS / LJ-44-00025A
X-DRIVE BOARD	SAMSUNG SDI	X-MAIN / LJ-92-00568B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER(E) / LJ-92-00600A
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER(F) / LJ-92-00601A
VSC BOARD	HARSPER	ZINNIA MAIN/20TP008
A/V BOARD	HARSPER	ZINNA RCA / 20TP009

### 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)
<b>PDP MONITOR (EUT)</b>	<b>Power</b>	N	N/A	1.5(P)
	<b>S-Video</b>	N/A	Y	1.5(D)
	<b>RGB(Dsub)</b>	N/A	Y	1.5(D)
	<b>Video</b>	N/A	N	1.5(D)
	<b>Audio</b>	N/A	N	1.5(D)
	<b>Console</b>	N/A	Y	1.2(D)
	<b>Component</b>	N/A	N	1.6(D)
	<b>TV ANT</b>	N/A	Y	3.0(D)
	<b>Speaker</b>	N/A	N	5.0(D)
<b>PC(HOST)</b>		N	N/A	1.8(P)
<b>MOUSE</b>		N/A	Y	1.8(D)
<b>PRINTER</b>		N	Y	2.0(P), 1.8(D)
<b>DVD PLAYER</b>	<b>Power</b>	N	N	1.5(P)
	<b>S-video</b>	N/A	Y	1.5(D)
	<b>Video</b>	N/A	N	1.5(D)
	<b>Audio</b>	N/A	N	1.5(D)
	<b>Component</b>	N/A	N	1.2(D)

## 2.4 Noise Suppression Parts on Cable.

		Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
<b>PDP MONITOR (EUT)</b>	<b>S-Video</b>	N	N/A	Y	N/A
	<b>Video</b>	N	N/A	Y	<b>BOTH END</b>
	<b>RGB(Dsub)</b>	Y	<b>BOTH END</b>	Y	<b>BOTH END</b>
	<b>Audio</b>	N	N/A	Y	<b>BOTH END</b>
	<b>Console</b>	N	N/A	Y	<b>BOTH END</b>
	<b>Component</b>	N	N/A	Y	<b>BOTH END</b>
	<b>TV ANT</b>	N	N/A	Y	<b>BOTH END</b>
	<b>Speaker</b>	Y	<b>EUT END</b>	N	N/A
<b>KEY BOARD</b>		N	N/A	Y	<b>PC END</b>
<b>MOUSE</b>		Y	<b>PC END</b>	Y	<b>PC END</b>

## 2.5 Equipment Modifications

N/A

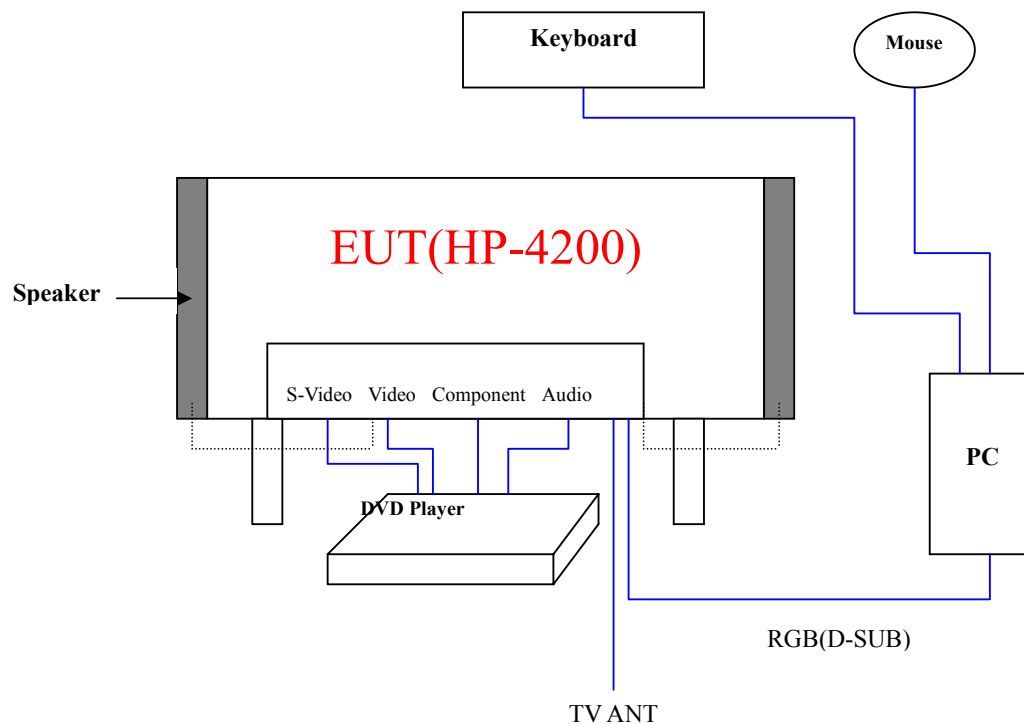
## 2.6 Configuration of Test system

**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

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 1GHz	1280 x 1024 (64KHz/60Hz)	X
	1024 x 768 (60KHz/75Hz)	
	852 x 480 (32KHz/60Hz)	
	832 x 624 (50KHz/75Hz)	
	800 x 600 (64KHz/100Hz)	
	640 x 480 (64 KHz/120Hz)	
	640 x 350 (31.5KHz/70Hz)	
	S-Video Mode	
	Video Mode	
	Component Mode	
	TV ANT Mode	

### 3.2 Radiated Emission Tests

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 1GHz	1280 x 1024 (64KHz/60Hz)	X
	1024 x 768 (60KHz/75Hz)	
	852 x 480 (32KHz/60Hz)	
	832 x 624 (50KHz/75Hz)	
	800 x 600 (64KHz/100Hz)	
	640 x 480 (64 KHz/120Hz)	
	640 x 350 (31.5KHz/70Hz)	
	S-Video Mode	
	Video Mode	
	Component Mode	
	TV ANT Mode	

 Tested by Jin Pyo Hong

 Date : OCT 18, 2002

## 4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

### 4.1 Conducted Emissions Tests

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

Humidity Level : 37%                      Temperature : 24℃  
Limit apply to : CISPR 22  
Type of Tests : CLASS B  
Date : OCT 24, 2002  
Result : PASSED BY -8.1 dB Margin

EUT : HP-4200  
Operating Condition : NORMAL CONDITION  
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)  
CISPR Average(6 dB Bandwidth : 9KHz)

#### Line Conducted Emissions Tabulated Data

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)	Detector Mode
12.80	49.7	NEUTRAL	60	-10.3	Quasi-Peak
13.20	49.1	NEUTRAL	60	-10.9	Quasi-Peak
13.56	51.9	NEUTRAL	60	-8.1	Quasi-Peak



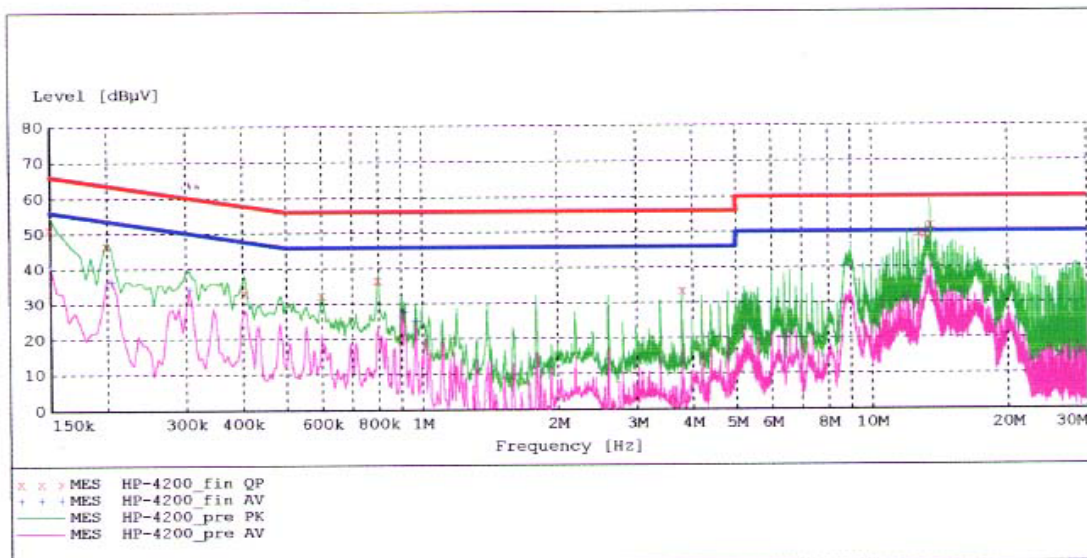
Measured by : Jin Pyo Hong / Engineer

**HYUNDAI C TECH**  
**EMC Testing Laboratory**

EUT: HP-4200  
Manufacturer: HARSPER  
Operating Condition: NORMAL  
Test Site: SHIELD ROOM  
Operator: JP-HONG  
Test Specification: CISPR 22 CLASS B  
Comment: N  
Start of Test: 10/24/02 / 3:36:24PM

**SCAN TABLE: "EN 55022 Voltage"**

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



**MEASUREMENT RESULT: "HP-4200\_fin QP"**

10/24/02 3:39PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	51.10	10.5	66	14.9	1	---
0.200000	46.60	10.5	64	17.0	1	---
0.405000	33.10	10.5	58	24.6	1	---
0.600000	32.50	10.5	56	23.5	1	---
0.800000	36.60	10.5	56	19.4	1	---
3.800000	33.40	10.7	56	22.6	1	---
12.800000	49.70	11.4	60	10.3	1	---
13.200000	49.10	11.4	60	10.9	1	---
13.565000	51.90	11.4	60	8.1	1	---

**MEASUREMENT RESULT: "HP-4200\_fin AV"**

10/24/02 3:39PM

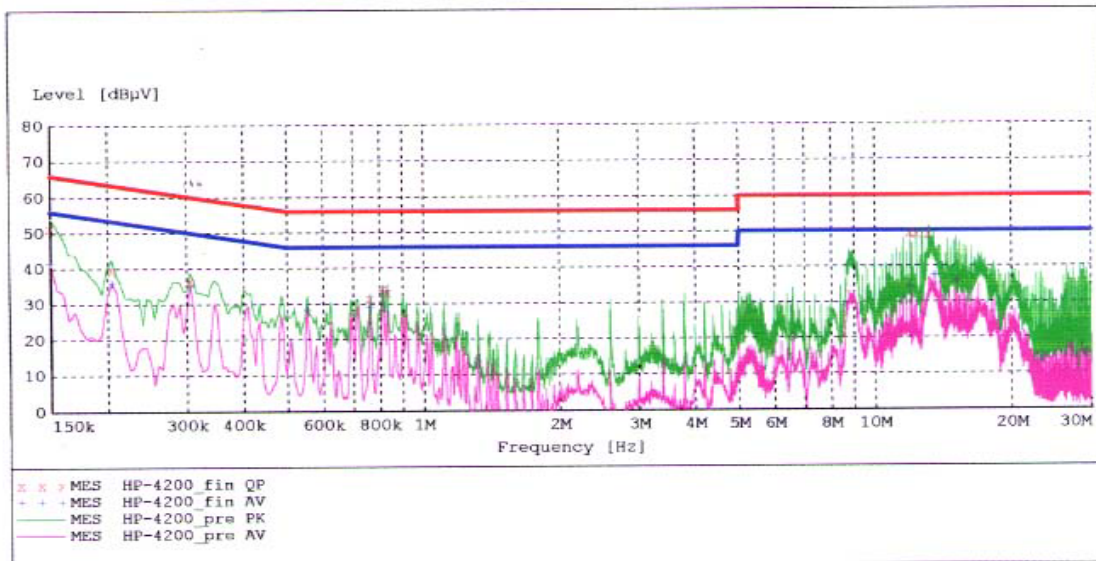
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	41.10	10.5	56	14.9	1	---
0.205000	36.30	10.5	53	17.1	1	---
0.305000	34.40	10.5	50	15.7	1	---
0.900000	26.60	10.5	46	19.4	1	---
0.915000	27.90	10.5	46	18.1	1	---
0.970000	25.30	10.5	46	20.7	1	---
12.800000	36.10	11.4	50	13.9	1	---
13.200000	38.60	11.4	50	11.4	1	---
13.565000	34.80	11.4	50	15.2	1	---

**HYUNDAI C TECH**  
**EMC Testing Laboratory**

EUT: HP-4200  
Manufacturer: HARSPER  
Operating Condition: NORMAL  
Test Site: SHIELD ROOM  
Operator: JP-HONG  
Test Specification: CISPR 22 CLASS B  
Comment: H  
Start of Test: 10/24/02 / 3:40:58PM

**SCAN TABLE: "EN 55022 Voltage"**

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 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: "HP-4200\_fin QP"**

10/24/02 3:44PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150000	51.40	10.5	66	14.6	1	---
0.205000	39.50	10.5	63	23.9	1	---
0.305000	36.70	10.5	60	23.4	1	---
0.765000	31.60	10.5	56	24.4	1	---
0.815000	34.30	10.5	56	21.7	1	---
0.835000	33.10	10.5	56	22.9	1	---
12.000000	49.20	11.4	60	10.8	1	---
12.400000	49.00	11.4	60	11.0	1	---
13.200000	48.90	11.4	60	11.1	1	---

**MEASUREMENT RESULT: "HP-4200\_fin AV"**

10/24/02 3:44PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	41.60	10.5	56	14.4	1	---
0.205000	36.00	10.5	53	17.4	1	---
0.305000	35.30	10.5	50	14.8	1	---
0.555000	28.60	10.5	46	17.4	1	---
0.765000	29.30	10.5	46	16.7	1	---
0.815000	33.80	10.5	46	12.2	1	---
12.000000	34.40	11.4	50	15.6	1	---
13.600000	37.40	11.4	50	12.6	1	---
15.150000	35.60	11.5	50	14.4	1	---

## 4.2 Radiated Emissions Tests

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

Humidity Level : 38 %                      Temperature : 21 °C  
Limit apply to : CISPR 22  
Type of Tests : CLASS B  
Date : NOV 1, 2002  
Result : PASSED BY -3.6 dB Margin

EUT : HP-4200  
Operating Condition : NORMAL CONDITION  
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dBuV/m
84.0	13.9	7.2	1.9	H	23.0	30	-7.0
182.0	3.9	15.2	2.8	H	21.9	30	-8.1
200.0	6.2	15.6	3.0	H	24.8	30	-5.2
208.1	6.4	16.0	3.0	V	25.4	30	-4.6
240.0	9.8	17.4	3.4	H	30.6	37	-6.4
458.3	10.9	17.8	4.7	V	33.4	37	-3.6
520.0	8.3	18.9	5.0	V	32.2	37	-4.8



Measured by : Jin Pyo Hong / Engineer



## 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

<b>TYPE</b>	<b>MANUFACTURE</b>	<b>MODEL</b>	<b>CAL. DATE</b>
EMI Test Receiver	Rohde & Schwarz	ESH3	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESVP	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESI40	2001.11.5
EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.7.16
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	2002.9.1
LISN	EMCO	3825/2	2002.2.7
LISN	Rohde & Schwarz	ESH2-Z5	2002.8.12
Amplifier	Hewlett-Packard	8447E	2002.9.
Dipole Antennas	Rohde & Schwarz	VHAP	2002.7.16
Dipole Antennas	Rohde & Schwarz	UHAP	2002.7.16
Biconical Antenna	Rohde & Schwarz	BBA-9106	2002.7.12
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2002.7.12
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