

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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TEST REPORT

Manufacture;
HARSPER CO.,LTD.

546-4. Ami-Ri Bubai-Eub, Ichon-City, Kyoungki-Do
Korea

HARSPER FRN : 00007-9131-06

Date of Issue : June 27,2006

Test Report No.: HCT-F06-0603

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

HCT FRN : 0005-8664-21

FCC ID :

MODEL :

O5XHP-420VPM**HP-4200VPM**

Rule Part(s): Part 15
Equipment Class: FCC Class B Peripheral Device (JBP)
Standard(s): FCC Class B
EUT Type: PDP Monitor
Max. Resolution(s): 1280×1024(@60Hz)
Model(s): HP-4200VPM
Port/Connector(s): Composite Input/output, Component1,2input, S-VIDEO Input, PC input,
DVI Input, Audio Input/Output, Speaker Output, External Control Port,
HDMI Port
PDPD Panel : Samsung(S42SD – YD0N)

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.

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.



Report prepared by
: Kun-Hyoung Kim
Test engineer of EMC Tech.Part



Approved by
: Sang Jun LEE
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ATTACHMENT A:	FCC ID LABEL & LOCATION
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MEASUREMENT REPORT

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

Applicant Name:	HARSPER CO., LTD.
Address:	546-4. Ami-Ri, Bubai-Eub, Ichon-City, Kyoungki-Do Korea

- **FCC ID : O5XHP-420V**
- **Equipment Class: FCC Class B Peripheral Device (JBP)**
- **EUT Type: PDP MONITOR**
- **Model(s): HP-4200VPM**
- **Max. Resolution: 1280×1024(@60Hz)**
- **Power Cord: Unshielded**
- **Rule Part(s): FCC Part 15 Subpart B**
- **Test Procedure(s): ANSI C63.4 (2003)**
- **Dates of Tests: June 23.2006**
- **Place of Tests: 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO,467-701,KOREA**

2.1 INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2001) was used in determining radiated and conducted emissions emanating from **HARSPER CO., LTD. PDP MONITOR FCC ID: O5XHP-420VPM**

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 23, 2003 (Confirmation Number: EA90661)

3.1 PRODUCT INFORMATION

3.2 Equipment Description

Equipment Under Test (EUT) is the **HARSPER CO., LTD. PDP MONITOR(HP-4200VPM)**

FCC ID: **O5XHP-420V**

Maximum Resolution(s): **1280×1024(@60Hz)**

Dimensions: **1220mm(W) x 645mm(H) x 122mm(D)**

Power Supply: **AC 100-240V, 50/ 60Hz 220W**

Connectivity: **TV 1,2Input: RF / CATV (ATSC)**

Composite Input/Output: RCA ×4 Port (AV INPUT 1,2,3 / AV OUTPUT 1)

Component 1, 2 Input: RCA×2 Port (Y, Pb/Cb, Pr/Cr: 480i, 480p, 576i, 576p, 720p, 1080i)

S-video Input: Mini Din 4Pin × 1 Port

PC Input :Mini D-Sub 15pin × 1Port /HDTV

Input(480p,576p,720p(50/60Hz),1080i(50/60Hz)

DVI Input: Mini D-sub 29Pin ×1Port /HDTV

Input(480p,576p,720p(50/60Hz),1080i(50/60Hz)/HDCP(Factory Option)

Audio In/Output: RCA × 6Port

Speaker output : Cinch Type × 4Port(Stereo L/R),Head Phone Jack × 1Port

External Control ports : Mini D-Sub 9Pin × 1Port

HDMI Port : HDMI × 1Port

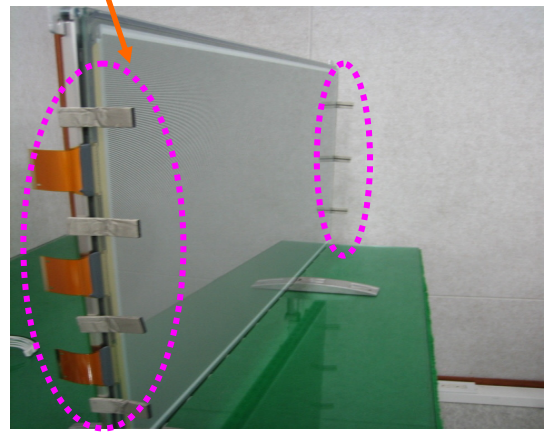
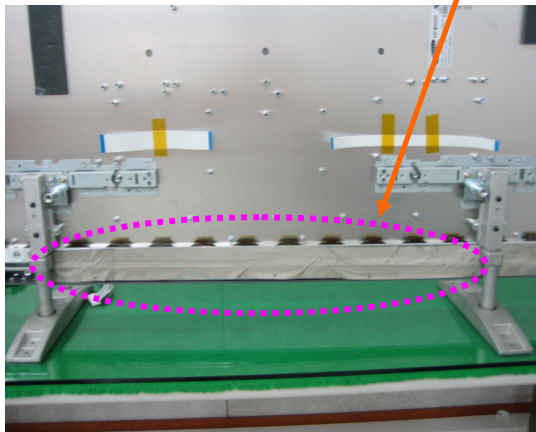
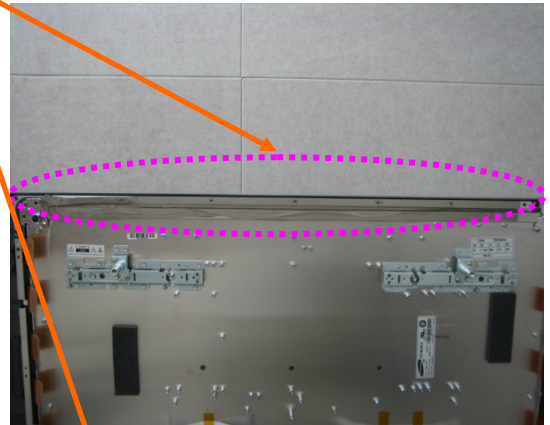
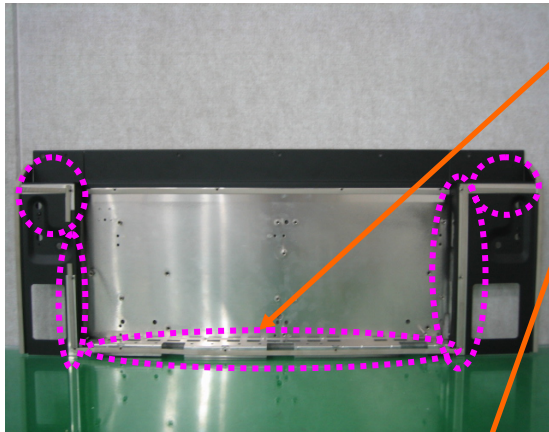
Power Consumption : **350Watts**

Weight (Net): **38.5Kg**

EMI Suppression Devices:

Modifications were made to the device. Please refer to the next page.

1. Attach a gasket



2. Apply a ferrite Core to the speaker cable



4.1 Description of Tests(Conducted & Radiated)

4.2 Powerline Conducted Emission (150kHz- 30MHz)

The power line conducted RFI measurements were performed according to CISPR 22.

The EUT was placed on a non-conducting 1.0 by 1.5 meter table which is 0.8 meters in height and 0.40 meters away from the vertical wall of the shielded enclosure. Power to the EUT is provided through a Rohde & Schwarz 50 Ω / 50 uH Line Impedance Stabilization Network (LISN) and the support equipment through a separate Solar 50 Ω / 50 uH Line- Conducted Test Facility LISN. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME. The spectrum was scanned from 150kHz to 30 MHz. Each maximum EME was measured using an EMI receiver. The detector function of the receiver was set to CISPR quasi- peak and average mode with the bandwidth set to 9 kHz. Each emission was maximized consistent with the typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum Diagram emission. Excess cable lengths were bundled at the centre with 30- 40cm. in length. The worst-case configuration is noted in the test report and the photographs are attached. Each EME reported was calibrated using the Rohde & Schwarz SMX signal generator and are listed on Table 1. RFI Conducted FCC Class B

RFI CONDUCTED	FCC CLASS B	
	Limits dB(uV/m)	
Freq. Range	CISPR 22 Quasi-Peak	CISPR 22 Average
150kHz - 0.5MHz	66-56*	56-46*
0.5MHz - 5MHz	56	46
5MHz - 30MHz	60	50
*Limits decreases linearly with the logarithm of frequency		

Table 1. FCC CLASS B Conducted Emission Limits

4.3 Description of Tests(Radiated)

Radiated Emissions

Preliminary measurements were made indoors at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The spectrum was scanned from 30 to 1000 MHz using Tri-log antenna, and above 1 GHz using linearly polarized horn antennas. Final measurements were made outdoors at 10-meter test range using Dipole antennas and EMI receiver. For frequencies above 1 GHz, horn antennas were used. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The EMI receiver detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz. The EUT, support equipment, and interconnecting cables were arranged to the configuration that produces the maximum EME emission found during preliminary scan. 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. Horizontal and vertical antenna polarizations were checked. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/ or support equipment, and powering the monitor the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

ITE Radiated Limits			
Frequency (MHz)	FCC Limit @ 3m. Quasi-Peak dB[μV/m]	FCC Limit @ 10m.* Quasi – Peak dB [μV/m]	CISPR Limit @ 10m. Quasi-Peak dB [μV/m]
30-88	40.0	29.5	30.0
88-216	43.5	33.0	30.0
216-230	46.0	35.6	30.0
230-960	46.0	35.6	37.0
960-1000	54.0	43.5	37.0
> 1000	54.0	43.5	
* Limit extrapolated 20 dB/decade			

Table 2. Radiated Class B limits @ 10-meters

5.1 Support Equipment Used

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
PDP MONITOR	HARSPER	HP-4200VPM	O5XHP-420VPM	EUT
P.C	DELL	OPTIPLEXGX620	DoC	EUT END
USB Mouse	DELL	MO56U0	-	P.C END
Serial Mouse	LOGITECH	M-M28	DoC	P.C END
USB Key Board	DELL	SK-8115	DoC	P.C END
Printer	H.P	C4569A	DoC	P.C END
Head-Set	HYUNDAI	JPC-914MV	DoC	EUT END

5.2 Cable Description

		Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
PDP Monitor	AC IN	N	N/A	1.8(P)
	DVI	N/A	Y	1.8(D)
	D-SUB	N/A	Y	1.6(D)
	AUDIO IN	N/A	Y	1.6(D)
	HDMI	N/A	Y	1.8(D)
	RS-232C	N/A	Y	1.8(D)
	Component 1	N/A	Y	1.6(D)
	Component Audio 1	N/A	Y	1.6(D)
	Component 2	N/A	Y	1.6(D)
	Component Audio 2	N/A	Y	1.6(D)
	Video1 IN	N/A	Y	1.6(D)
	Audio1 IN	N/A	Y	1.6(D)
	Video2 IN	N/A	Y	1.6(D)
	Audio2 IN	N/A	Y	1.6(D)
	Line Out	N/A	Y	1.6(D)
	S-Video3 IN	N/A	Y	1.6(D)
	Video3 IN	N/A	Y	1.6(D)
	Audio3 IN	N/A	Y	1.6(D)
P.C	AC IN	N	N/A	1.8(P)
	USB(Mouse)	N/A	Y	1.8(D)
	USB(Key Board)	N/A	Y	1.8(D)
	Parallel(Printer)	N/A	Y	1.8(D)
	Serial(Mouse)	N/A	Y	1.6(D)
Printer	AC IN	N	N/A	1.8(P)

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

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

		Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PDP MONITOR	AUDIO IN	Y	EUT END	Y	BOTH END
	DVI	Y	BOTH END	Y	BOTH END
	D-SUB	Y	BOTH END	Y	BOTH END
	HDMI	N	N/A	Y	BOTH END
	RS-232S	N	N/A	Y	BOTH END
	Component 1	N	N/A	Y	BOTH END
	Component1 Audio	N	N/A	Y	BOTH END
	Component 2	N	N/A	Y	BOTH END
	Component2 Audio	N	N/A	Y	BOTH END
	Video1 IN	N	N/A	Y	BOTH END
	Audio1 IN	N	N/A	Y	BOTH END
	Video2 IN	N	N/A	Y	BOTH END
	Audio2 IN	N	N/A	Y	BOTH END
	Line Out	N	N/A	Y	EUT END
	S-Video3 IN	N	N/A	Y	BOTH END
	Video3 IN	N	N/A	Y	BOTH END
	Audio3 IN	N	N/A	Y	BOTH END
P.C	USB(Mouse)	N	N/A	Y	P.C END
	USB(Key Board)	N	N/A	Y	P.C END
	Serial(Mouse)	N	N/A	Y	P.C END
	Parallel(Printer)	N	N/A	Y	BOTH END

6.1 CONDUCTED TEST DATA

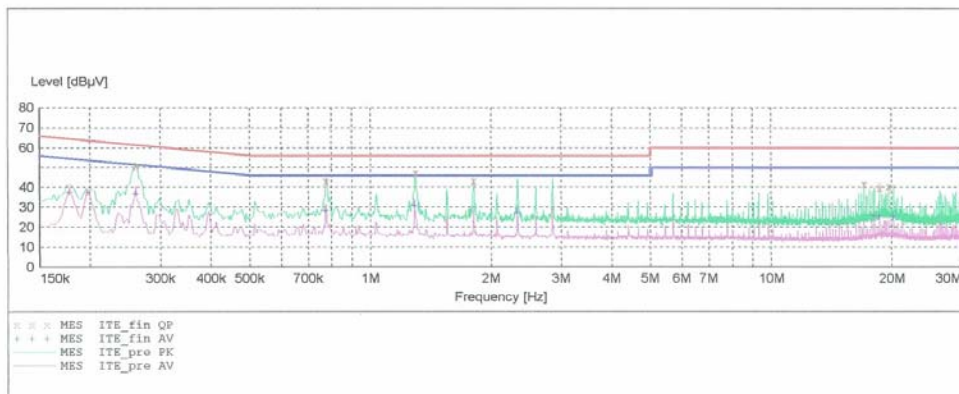
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EMC TEST LAB

EUT: HP-4200VPM
 Manufacturer: HARSPER
 Operating Condition: 1280 X 1024 60Hz (DSUB)
 Test Site: SHIELD ROOM
 Operator: KH-KIM
 Test Specification: CISPR 22 CLASS B
 Comment: H

SCAN TABLE: "CISPR 22 Voltage"

Short Description:		CISPR 22 Voltage					
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
Frequency	Frequency	Width					
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "ITE_fin QP"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.177600	39.60	10.1	65	25.0	---	---
0.197600	38.00	10.1	64	25.8	---	---
0.260100	50.80	10.1	61	10.6	---	---
0.775000	43.00	10.2	56	13.0	---	---
1.295000	47.40	10.2	56	8.6	---	---
1.810000	43.30	10.3	56	12.7	---	---
17.070000	41.70	10.5	60	18.3	---	---
18.620000	39.80	10.5	60	20.2	---	---
19.655000	40.60	10.5	60	19.4	---	---

MEASUREMENT RESULT: "ITE_fin AV"

6/23/2006 5:32PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.177600	37.20	10.1	55	17.4	---	---
0.197600	37.50	10.1	54	16.2	---	---
0.260100	37.00	10.1	51	14.4	---	---
0.775000	28.30	10.2	46	17.7	---	---
1.290000	31.00	10.2	46	15.0	---	---
2.330000	27.40	10.3	46	18.6	---	---
18.100000	25.50	10.5	50	24.5	---	---
18.620000	25.10	10.5	50	24.9	---	---
20.170000	25.20	10.5	50	24.8	---	---

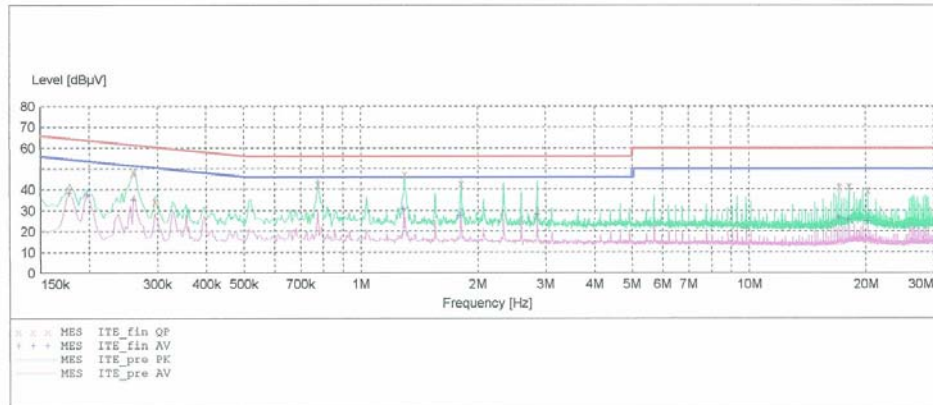
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EMC TEST LAB

EUT: HP-4200VPM
 Manufacturer: HARSPER
 Operating Condition: 1280 X 1024 60Hz (DSUB)
 Test Site: SHIELD ROOM
 Operator: KH-KIM
 Test Specification: CISPR 22 CLASS B
 Comment: N

SCAN TABLE: "CISPR 22 Voltage"

Short Description:			CISPR 22 Voltage				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
Frequency	Frequency	Width					
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "ITE_fin QP"

6/23/2006 5:35PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.177600	40.30	10.1	65	24.3	---	---
0.260100	48.20	10.1	61	13.3	---	---
0.295100	34.50	10.1	60	25.9	---	---
0.775000	42.80	10.2	56	13.2	---	---
1.295000	47.20	10.2	56	8.8	---	---
1.810000	42.90	10.3	56	13.1	---	---
17.070000	41.60	10.5	60	18.4	---	---
18.105000	41.70	10.5	60	18.3	---	---
20.170000	39.90	10.5	60	20.1	---	---

MEASUREMENT RESULT: "ITE_fin AV"

6/23/2006 5:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.177600	38.30	10.1	55	16.3	---	---
0.197600	37.70	10.1	54	16.0	---	---
0.260100	35.20	10.1	51	16.2	---	---
1.290000	30.80	10.2	46	15.2	---	---
1.810000	27.80	10.3	46	18.2	---	---
2.845000	28.30	10.2	46	17.7	---	---
17.070000	26.80	10.5	50	23.2	---	---
18.100000	25.60	10.5	50	24.4	---	---
20.175000	24.90	10.5	50	25.1	---	---

NOTES:

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. The conducted limits are listed on Table 1 (Page 7).
3. Line H = Hot Line N = Neutral

** Measurements using CISPR quasi-peak mode.

7.1 RADIATED TEST DATA

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
75.5	15.7	8.8	1.9	V	26.4	30.0	3.6
98.1	12.5	9.0	2.3	V	23.8	30.0	6.2
180.0	11.5	11.3	3.0	H	25.8	30.0	4.2
210.0	13.7	9.8	3.3	V	26.8	30.0	3.2
330.0	11.4	13.8	4.2	H	29.4	37.0	7.6
360.0	12.7	14.4	4.4	H	31.5	37.0	5.5
529.2	9.6	18.0	5.2	V	32.8	37.0	4.2
648.0	4.0	20.3	5.8	H	30.1	37.0	6.9

**Radiated Measurements at 10-meters.
1280 X 1024 (@60Hz)**

NOTES:

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. The radiated limits are listed on Table 2 (Page 8).

*** Measurements using CISPR quasi-peak mode. Above 1GHz, peak detector function mode is used using a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

8.1 Sample Calculations

$$\text{dB } \mu V = 20 \log_{10} (\mu V)$$

$$\text{dB } \mu V = \text{dBm} + 107$$

8.2 Example 1:

@1.295 KHz

Class B limit	= 56.0 dB μV
Reading	= 47.40 dB μV (calibrated level)

Margin	= 56.0 - 47.40 = 8.6 dB μV
	= 8.6 dB below limit

8.3 Example 2:

@ 210.0 MHz

Class B limit	= 30 dB $\mu V/m$
Reading	= 13.70 dB $\mu V/m$ (calibrated level)
Antenna Factor + Cable Loss	= 13.1 dB
Total	= 26.8 dB $\mu V/m$

Margin	= 26.8 - 30 = -3.2 dB $\mu V/m$
	= 3.2 dB below limit

9.1 Test Equipment

<u>Type</u>	<u>Manufacture</u>	<u>Model Number</u>	<u>CAL Due Date</u>
EMI Test Receiver	Rohde & Schwarz	ESCI40	2006.11.16
EMI Test Receiver	Rohde & Schwarz	ESCI	2006.09.13
LISN	Rohde & Schwarz	ESH2-Z5	2007.04.26
Attenuator	Rohde & Schwarz	ESH3-Z6	2007.04.11
TRILOG Antenna	Schwarzbeck	9160	2007.04.17
Antenna Position Tower	HD	MA240	N/A
Turn Table	EMCO	1050	N/A
Power Analyzer	Voltech	PM 3300	2007.03.22
Reference Network Impedance	Voltech	IEC 555	N/A
AC Power Source	PACIFIC	Magnetic Module	N/A
AC Power Source	PACIFIC	360-AMX	2007.01.05
Controller	HD GmbH	HD 100	N/A
SlideBar	HD GmbH	KMS 560	N/A
PULSE LIMITER	Rohde & Schwarz	ESH3-Z2	2006.11.16

10.1 Test Software Used

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.

NOTE: This is a sample of the basic program used during the test. However, during testing, a different software program may be used; whichever determines the worst-case condition. In addition, the program used also depends on the number and type of devices being tested.

11.1 Conclusion

The data collected shows that the **HARSPER CO., LTD. PDP MONITOR**
FCC ID: O5XHP-420VPM complies with §15.107 and §15.109 of the FCC Rules.