

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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CERTIFICATION

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

Dates of Tests: NOV. 29, 2002
Test Report No.: HCT-F02-1108
Test Site: HYUNDAI CALIBRATION & CERTIFICATION
TECHNOLOGIES CO., LTD.
FRN : 0005-8664-21

FCC ID :

MODEL/TYPE :

O5XHP-500

HP-5000

FCC Rule Part(s):

Part 15 & 2

Classification:

FCC Class B Computing Device Peripheral (JBP)

Standard(s):

FCC Class B: 2001(CISPR 22)

Equipment(EUT) Type:

PDP MONITOR / HP-5000

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 D-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).

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Report prepared by : Ki-Soo Kim
Manager of Product Compliance Team



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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 110~240V 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-5000	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-92-00561A
SCAN DRIVE BOARD	SAMSUNG SDI	Y-BUFFER(J) / LJ-92-00562A
Y-DRIVE BOARD	SANSUNG SDI	Y-MAIN / LJ-92-00560A
LOGIC BOARD	SAMSUNG SDI	LOGIC-MAIN / LJ-92-00598A
SMPS	SANSUNG ELECTRO MECHANICS	SMPS / LJ-44-00024A
X-DRIVE BOARD	SAMSUNG SDI	X-MAIN / LJ-92-00559A
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER/ LJ-92-00527B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER/LJ-92-00528B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER/ LJ-92-00529B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER/ LJ-92-00524B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER/ LJ-92-00525B
COLUMN DRIVE BOARD	SAMSUNG SDI	LOGIC-BUFFER(F)/ LJ-92-00526B
VSC BOARD	HARSPER	ZINNIA MAIN/20TP008-01
A/V BOARD	HARSPER	ZINNA RCA / 20TP009
POWER FILTER	SANSUNG ELECTRO MECHANICS	PP50HW001A/LJ92-00424A

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

2.4 Noise Suppression Parts on Cable.

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

2.5 Equipment Modifications

N/A

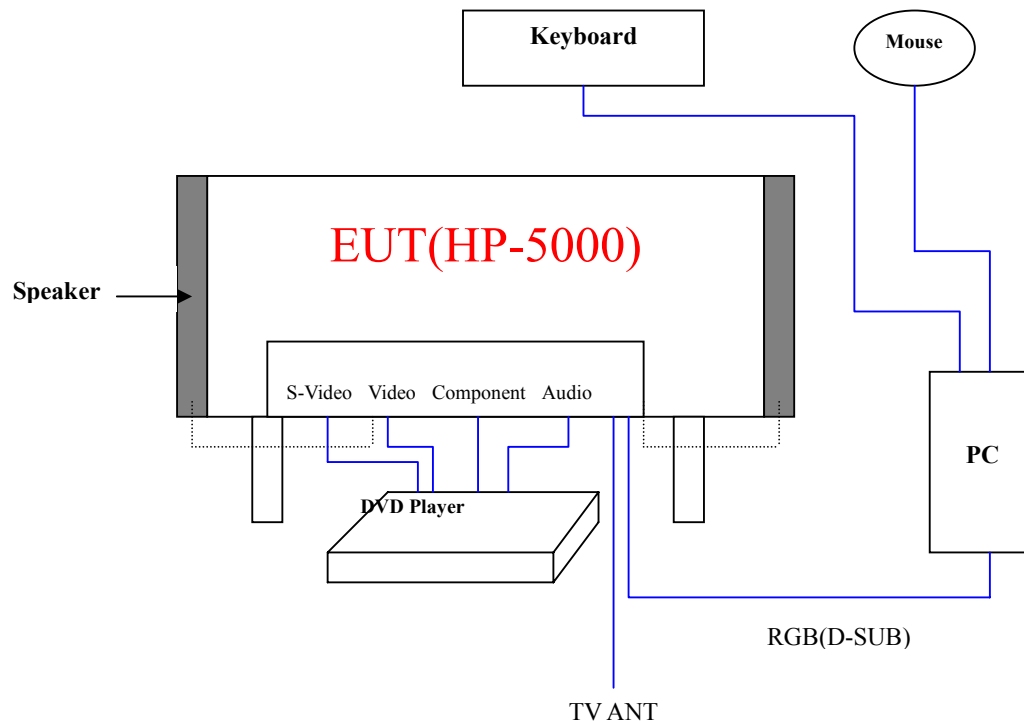
2.6 Configuration of Test system

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

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 HongDate : NOV. 20, 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 : NOV. 22. 2002
Result : PASSED BY -5.4 dB Margin

EUT : HP-5000
Operating Condition : 'H' Scrolling((1280 x 1024 (64KHz/60Hz))
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
0.19	58.4	HOT	63.8	-5.4	Quasi-Peak
0.20	58.2	NEUTRAL	63.6	-5.4	Quasi-Peak
0.20	46.1	NEUTRAL	53.6	-7.5	Average-Peak



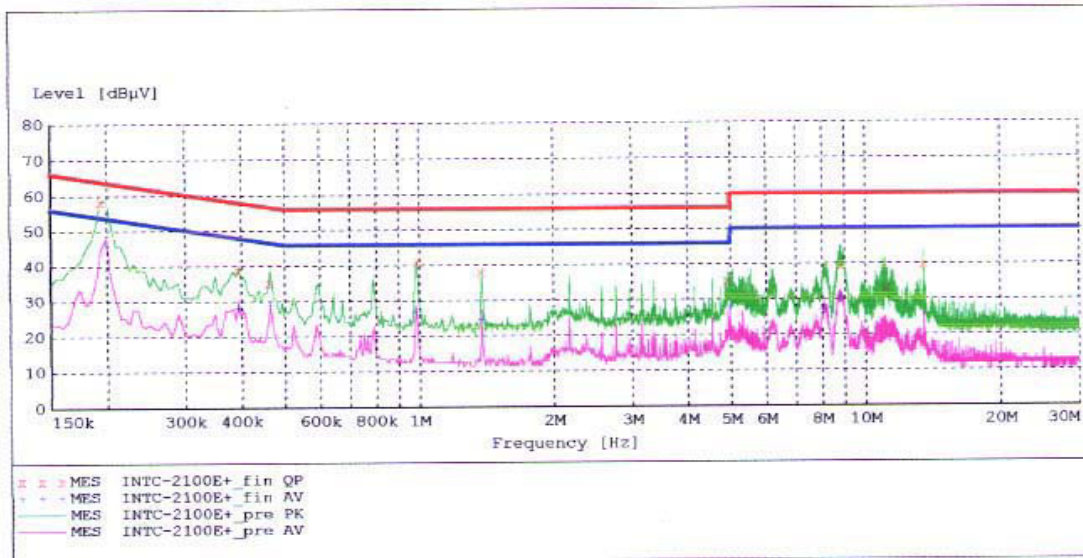
Measured by : Jin Pyo Hong / Engineer

HYUNDAI C TECH
EMC Testing Laboratory

EUT: HP-5000
Manufacturer: HARSPER
Operating Condition: NORMAL
Test Site: SHIELD ROOM
Operator: JP-HONG
Test Specification: EN55022 CLASS B
Comment: H
Start of Test: 11/22/02 / 9:42:44AM

SCAN TABLE: "EN 55022 Voltage"

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5
500.0 kHz	5.0 MHz	5.0 kHz	Average	10.0 ms	9 kHz	ESH3-Z5



MEASUREMENT RESULT: "HP-5000_fin QP"

11/22/02 9:45AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.195000	58.40	10.1	64	5.4	1	---
0.395000	38.60	10.1	58	19.4	1	---
0.465000	35.20	10.1	57	21.4	1	---
0.990000	41.20	10.1	56	14.8	1	---
1.385000	37.90	10.2	56	18.1	1	---
4.940000	35.20	10.3	56	20.8	1	---
8.825000	39.50	10.4	60	20.5	1	---
11.125000	32.90	10.4	60	27.1	1	---
13.555000	39.70	10.5	60	20.3	1	---

MEASUREMENT RESULT: "HP-5000_fin_QP"

11/22/02 9:54AM

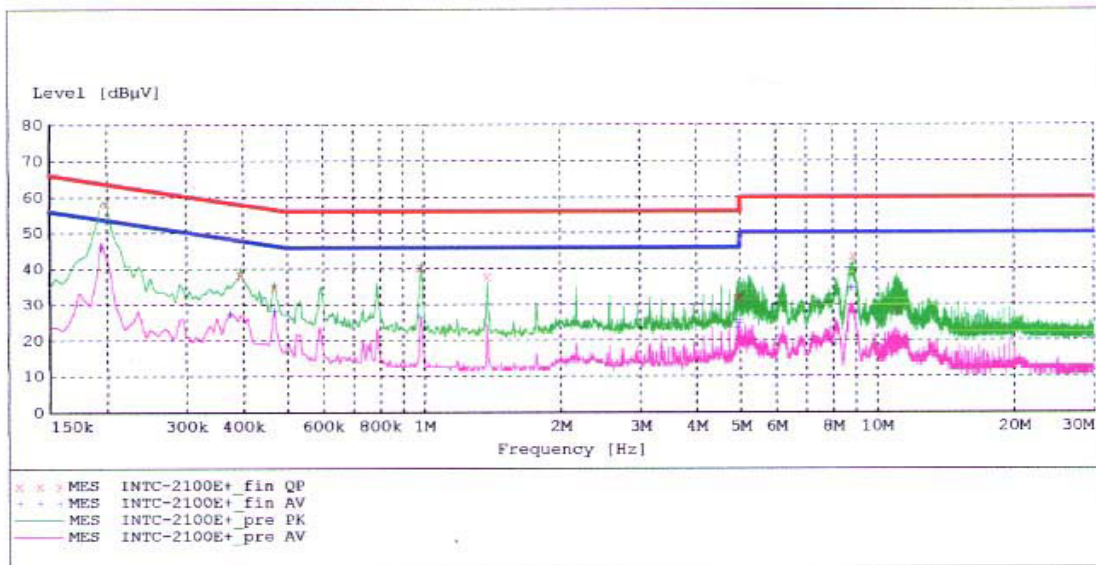
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.195000	45.90	10.1	54	7.9	1	---
0.375000	27.50	10.1	48	20.9	1	---
0.470000	28.30	10.1	47	18.2	1	---
0.985000	26.70	10.1	46	19.3	1	---
4.945000	23.70	10.3	46	22.3	1	---
5.000000	24.90	10.3	46	21.1	1	---
5.000000	25.70	10.3	46	20.3	1	---
8.105000	19.00	10.4	50	31.0	1	---
8.795000	34.70	10.4	50	15.3	1	---

HYUNDAI C TECH
EMC Testing Laboratory

EUT: HP-5000
Manufacturer: HARSPER
Operating Condition: NORMAL
Test Site: SHIELD ROOM
Operator: JP-HONG
Test Specification: EN55022 CLASS B
Comment: N
Start of Test: 11/22/02 / 9:51:45AM

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	ESH3-Z5
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5
			Average			



MEASUREMENT RESULT: "HP-5000_fin QP"

11/22/02 9:54AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.200000	58.20	10.1	64	5.4	1	---
0.395000	38.40	10.1	58	19.5	1	---
0.470000	34.80	10.1	57	21.7	1	---
0.990000	40.40	10.1	56	15.6	1	---
1.385000	37.60	10.2	56	18.4	1	---
4.945000	32.10	10.3	56	23.9	1	---
5.000000	32.20	10.3	56	23.8	1	---
8.915000	43.60	10.4	60	16.4	1	---
11.100000	28.30	10.4	60	31.7	1	---

MEASUREMENT RESULT: "HP-5000_fin QP"

11/22/02 9:45AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.200000	46.10	10.1	54	7.5	1	---
0.395000	28.30	10.1	48	19.6	1	---
0.465000	28.80	10.1	47	17.8	1	---
0.985000	27.10	10.1	46	18.9	1	---
1.385000	24.70	10.2	46	21.3	1	---
5.000000	28.20	10.3	46	17.8	1	---
5.000000	27.40	10.3	46	18.6	1	---
8.110000	27.10	10.4	50	22.9	1	---
8.800000	30.80	10.4	50	19.2	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 : 35 % Temperature : 22℃
Limit apply to : CISPR 22
Type of Tests : CLASS B
Date : NOV 26, 2002
Result : PASSED BY -4.6 dB Margin

EUT : HP-5000
Operating Condition : 'H' Scrolling((1280 x 1024 (64KHz/60Hz))
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
108.2	10.4	11.5	2.2	V	24.1	30	-5.3
200.0	6.5	15.8	3.0	H	25.3	30	-4.7
323.0	9.8	16.0	3.9	H	29.7	37	-7.3
425.0	11.0	17.0	4.4	H	32.4	37	-4.6
513.0	7.9	18.8	5.0	V	31.7	37	-5.3
578.7	5.1	20.0	5.4	H	30.5	37	-6.5
676.1	3.9	22.3	6.0	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

TYPE	MANUFACTURE	MODEL	CAL. DATE
EMI Test Receiver	Rohde & Schwarz	ESH3	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESVP	2002.7.16
EMI Test Receiver	Rohde & Schwarz	ESI40	2002.11.16
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