



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

INT'L STANDARD CERTIFICATION TEAM  
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNKI-DO, 467-701, KOREA  
TEL : +82 31 639 8518 FAX : +82 31 639 8525

# CERTIFICATION

**Manufacture;**

**HYUNDAI IMAGE QUEST CO., LTD.**  
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI,  
KYOUNKI-DO, 467-701, KOREA

**Date of Issue: APRIL 30, 2001**

**Test Report No.: HCT-F01-0403**

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

**FCC ID :**

**PJIC17F06091**

**MODEL / TYPE :**

**F791 / C17F06091**

**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:**

**17" CRT Monitor**

**Max Resolution:**

**1600X1200 Non-interlaced (@93.8KHz/ 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).

*Ki Soo Kim*

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



## TABLE OF CONTENTS

	PAGE
<b>1. GENERAL INFORMATION.....</b>	<b>3</b>
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
<b>2. SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
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
<b>3. PRELIMINARY TESTS.....</b>	<b>9</b>
3.1 Power line Conducted Emissions Tests.....	9
3.2 Radiated Emissions Tests.....	9
<b>4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY.....</b>	<b>9</b>
4.1 Conducted Emission Tests.....	10
4.2 Radiated Emission Tests.....	10
<b>5. FIELD STRENGTH CALCULATION.....</b>	<b>11</b>
<b>6. LIST OF TEST EQUIPMENT .....</b>	<b>12</b>

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

## 1. GENERAL INFORMATION

### 1.1 Product Description

The Hyundai Image Quest CO., LTD. Model F791 (referred to as the EUT in this report) is a 17" CRT Monitor HOR. Freq. 93.8KHz w/max. Resolution of 1600X1200 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)	12MHz
POWER REQUIREMENT	100 - 240 VAC 2.5A 60/50 Hz
NUMBER OF LAYERS	MAIN BOARD 1 LAYER CRT BOARD 1 LAYER
MAX. RESOLUTION	1600X1200 NON-INTERLACED(@93.8KHz/ 75 Hz)
H-SYNC FREQUENCY RANGE	30KHz 97KHz
V-SYNC FREQUENCY RANGE	50Hz 150Hz
CRT TYPE	17" ( CRT Type :M41QCJ761X172)

### 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)	HYUNDAI IMAGE QUEST CO., LTD.	F791	PJIC17F06091	HOST
PC(HOST)	H/P	DTPC-17	DoC	N/A
KEY BOARD	H/P	SK-2501-2D-K	GYUR385K	HOST
PRINTER	H/P	HP895C	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	Daeduck CO., Ltd.	3040100879
CRT BOARD	Daeduck CO., Ltd.	3040100880

### 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>MONITOR(EUT)</b>	N	Y	<b>1.8(P), 1.5(D)</b>
<b>PC(HOST)</b>	N	N/A	<b>1.8(P)</b>
<b>PRINTER</b>	N	Y	<b>2.0(P),1.8(D)</b>
<b>KEY BOARD</b>	N/A	Y	<b>2.0(D)</b>
<b>MODEM</b>	N	Y	<b>2.0(P),0.8(D)</b>
<b>MOUSE</b>	N/A	Y	<b>1.8(D)</b>

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

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

## **2.5 Equipment Modifications**

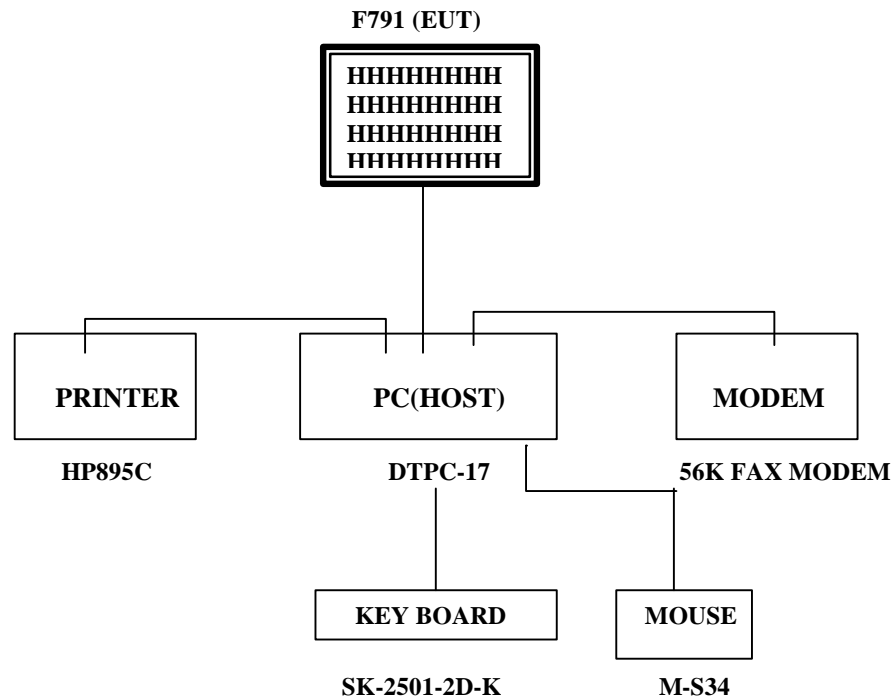
N/A

## 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	1600X1200 Non-Interlaced (93.8KHz/75Hz)	X
	1280X1024 Non-Interlaced (80KHz/75Hz)	
	1280X1024 Non-Interlaced (63.9KHz/60Hz)	
	1024X768 Non-Interlaced (68.7KHz/85Hz)	
	800 x 600 Non-Interlaced (53.7 KHz/85Hz)	
	640 x 480 Non-Interlaced (31.5KHz/60Hz)	

#### 4.2 Radiated Emission Tests

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1600X1200 Non-Interlaced (93.8KHz/75Hz)	X
	1280X1024 Non-Interlaced (80KHz/75Hz)	
	1280X1024 Non-Interlaced (63.9KHz/60Hz)	
	1024X768 Non-Interlaced (68.7KHz/85Hz)	
	800 x 600 Non-Interlaced (53.7 KHz/85Hz)	
	640 x 480 Non-Interlaced (31.5KHz/60Hz)	

During Preliminary Tests, the following operating mode were investigated

Tested by Keun- Ho Park / Engineer

Date : APRIL 16, 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 : 32%                      Temperature : 25  
 Limit apply to : CISPR 22  
 Type of Tests : CLASS B  
 Date : APRIL 18, 2001  
 Result : PASSED BY -3.0 dB

EUT : 17" CRT MONITOR  
 Operating Condition : 1600X1200 Non-Interlaced (Hf : 93.8KHz, 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
0.186	53.8	HOT	64.3	-10.5	Quasi-Peak
9.645	45.5	HOT	60.0	-14.5	Quasi-Peak
0.186	51.2	HOT	54.2	-3.0	Average
9.270	41.2	HOT	50.0	-8.8	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 : Keun-Ho Park / Engineer

Date : APRIL 18, 2001

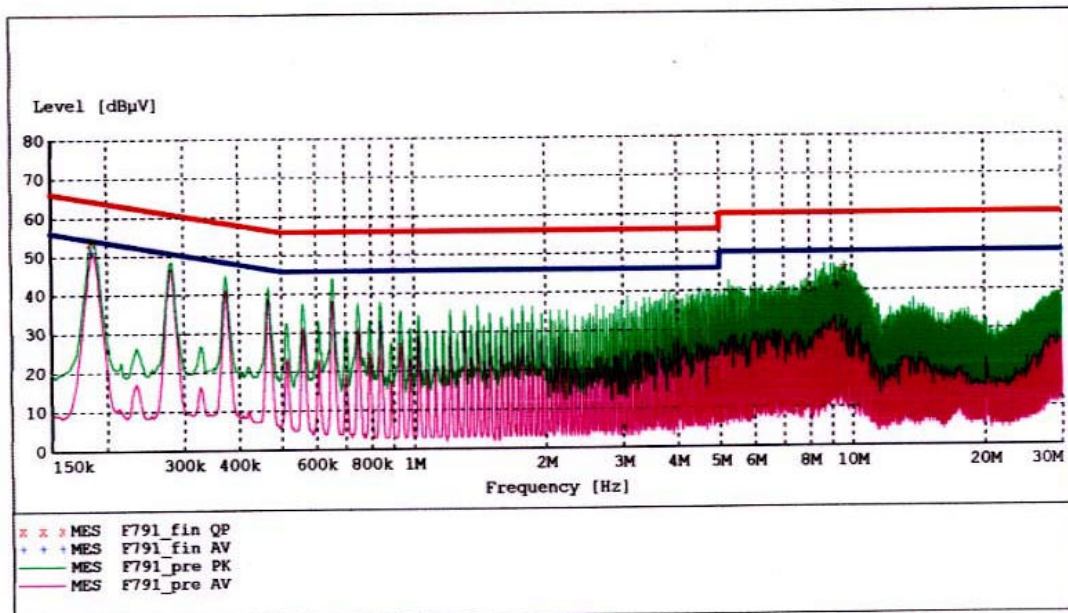
**HYUNDAI C-TECH. CO., LTD. EMC LAB**  
**San 136-1, Ami-Ri-Bubal-Eub, Ichon-Si, Kyongki-Do**

EUT: F791  
Manufacturer: HIQ  
Operating Condition: 1600X1200 VF:75Hz  
Test Site: Shield Room

Test Specification: CISPR 22 CLASS B  
Comment: H

**SCAN TABLE: "EN 55022 V (PKH)"**

Short Description:			CISPR 22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	2.0 MHz	3.0 kHz	MaxPeak	100.0 ms	9 kHz	C/E FACTOR
			Average			
2.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	C/E FACTOR
			Average			

**MEASUREMENT RESULT: "F791\_fin QP"**

4/3/01 4:22PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.186000	53.80	0.5	64	10.5	1	---
9.645000	45.50	1.2	60	14.5	1	---

**MEASUREMENT RESULT: "F791\_fin AV"**

4/3/01 4:22PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.186000	51.20	0.5	54	3.0	1	---
9.270000	41.20	1.2	50	8.8	1	---

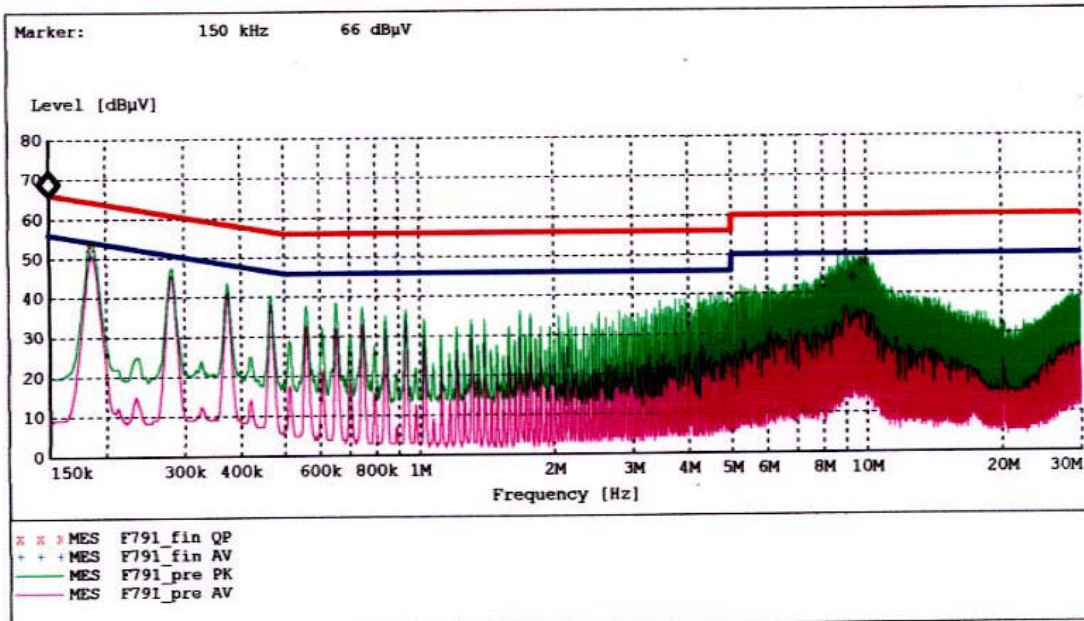
**HYUNDAI C-TECH. CO., LTD. EMC LAB**  
**San 136-1, Ami-Ri-Bubal-Eub, Ichon-Si, Kyongki-Do**

EUT: F791  
 Manufacturer: HIQ  
 Operating Condition: 1600X1200 VF:75Hz  
 Test Site: Shield Room

Test Specification: CISPR 22 CLASS B  
 Comment: N

**SCAN TABLE: "EN 55022 V (PKH)"**

Short Description:			CISPR 22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	2.0 MHz	3.0 kHz	MaxPeak	100.0 ms	9 kHz	C/E FACTOR
			Average			
2.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	C/E FACTOR
			Average			



**MEASUREMENT RESULT: "F791\_fin QP"**

4/3/01 4:27PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.186000	53.10	0.5	64	11.1	1	---
9.925000	48.10	1.2	60	11.9	1	---

**MEASUREMENT RESULT: "F791\_fin AV"**

4/3/01 4:27PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.186000	50.70	0.5	54	3.5	1	---
9.365000	44.00	1.2	50	6.0	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 : 30 %                      Temperature : 24  
 Limit apply to : CISPR 22  
 Type of Tests : CLASS B  
 Date : APRIL 18, 2001  
 Result : PASSED BY - 3.6dB

EUT : 17" CRT MONITOR  
 Operating Condition : 1600X1200 Non-Interlaced (Hf :93.8 kHz, Vf : 75 Hz)  
 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 dB	Margin dB
40.4	8.24	15.26	1.30	V	24.8	30.0	-5.2
41.8	9.33	14.77	1.30	V	25.4	30.0	-4.6
60.6	15.02	7.18	1.70	V	23.9	30.0	-6.1
149.9	7.81	14.69	2.50	V	25.0	30.0	-5.0
202.3	7.53	15.87	3.00	V	26.4	30.0	-3.6
202.3	7.13	15.87	3.00	H	26.0	30.0	-4.0
343.9	9.61	16.19	4.00	V	29.8	37.0	-7.2
362.2	11.33	16.57	4.10	V	32.0	37.0	-5.0
505.8	6.14	18.66	4.90	V	29.7	37.0	-7.3

### 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.
3. The EUT was test up to 2GHz and no significant emission was found.

Measured by : Keun-Ho Park / Engineer

Date : APRIL 18, 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

<b>TYPE</b>	<b>MANUFACTURE</b>	<b>MODEL</b>	<b>CAL. DATE</b>
EMI Test Receiver	Rohde & Schwarz	ESH3	2000.6.29
EMI Test Receiver	Rohde & Schwarz	ESVP	2001.2.14
EMI Test Receiver	Rohde & Schwarz	ESI40	2001.1.18
EMI Test Receiver	Rohde & Schwarz	ESVS30	2000.6.29
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	2000.7.11
LISN	EMCO	3825/2	2000.10.13
LISN	Rohde & Schwarz	ESH2-Z5	2000.7.14
Amplifier	Hewlett-Packard	8447E	2001.3.2
Dipole Antennas	Rohde & Schwarz	VHAP	2000.6.29
Dipole Antennas	Rohde & Schwarz	UHAP	2000.6.29
Biconical Antenna	Rohde & Schwarz	BBA-9106	2000.6.29
Log-Periodic Antenna	Rohde & Schwarz	UHALP-9107	2000.6.29
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	2000.12.20
Reference Network Impedance	Voltech	IEC 555	N.A
AC Power Source	PACIFIC	Magnetic Module	N.A
AC Power Source	PACIFIC	360AMX	N.A

