Designated by Ministry of international Trade and industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
6-8-7 NISHITENMA
KITA-KU OSAKA 530-0047 JAPAN

KEC

IKOMA TESTING LABORATORY
12128 TAKAYAMA-CHO
IKOMA-CITY NARA 630-0101 JAPAN

Corporate Juridical Person

TEST REPORT

Report No. A-015-02-C Date: 8 July 2002

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 22 Subpart H ; a Public Mobile Service.

The tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant

Company Name : Matsushita Electric Works, Ltd.

Mailing Address : 1048, Kadoma, Osaka 571-8686, Japan

2. Identification of Tested Device

FCC ID : HHV20020606
Device Name : Emergency Communication Device
Trade Name : NAIS
Model Number : TG100
Serial Number : 17407802146
Date of Manufacture : June 2002

3. Test Items and Procedure

(1) MEASUREMENT OF RADIATED SPURIOUS EMISSIONS
(2) MEASUREMENT OF RF POWER OUTPUT(SUBSTITUTION METHOD)

Above all tests were performed under : FCC Part 2 Section 2.1046 and Section 2.1053

4. Date of Test

Receipt of Test Sample : 1 July 2002
Test Completed on : 3 July 2002

CERTIFIED BY : S. Izumi

Seiichi Izumi
General Manager of Ikoma Testing Laboratory

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

The NAIS Model No. TG100 (referred to as EUT in this report) is an ANALOG AMPS Emergency Communication Device.

(1) Transmitting Frequency Range	:	824.04 - 848.97 MHz
(2) Receiving Frequency Range	:	869.04 - 893.97 MHz
(3) Emission Designator	:	F3E
(4) Type of Circuit	:	Superheterodyne 1st IF : 83.16 MHz 2nd IF : 60 kHz
(5) Type of Antenna	:	Internal Antenna (50Ω, unbalanced)
(6) Rated Power Supply	:	DC 6.0 V
(7) Contained Oscillator		
1) SYSTEM CLOCK	:	14.4 MHz
2) 2nd LOCAL OSC	:	83.1 MHz
3) RX VCO	:	952.2 - 977.13 MHz
4) TX VCO	:	824.04 - 848.97 MHz

1.2 Description for Equipment Authorization

(1) Rules Part(s) under which the equipment is operated

FCC Rule Part 22, Subpart H ; a Public Mobile Service

(2) Kind of Equipment Authorization

Certification

(3) Procedure of Application

☒ Original Equipment ☐ Modification

1.3 Test Facility

Name : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY
Anechoic Chamber No.3

Address : 12128, Takayama-cho Ikoma-city, Nara, 630-0101 Japan

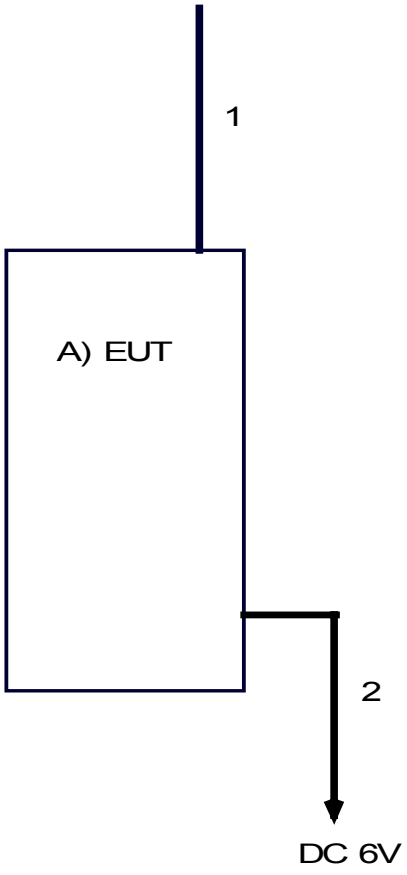
This test facility has been filed in FCC under the criteria in ANSI C63.4-1992.
The laboratory has been accredited by the NVLAP (Lab.Code:200207-0) based on ISO17025.

2. TESTED SYSTEM

2.1 Test Mode

The carrier wave is transmitted continuously with the maximum power level.

2.2 Block Diagram of EUT System



[Note]
See 2.3 List of EUT System and 2.4 List of Antenna and Cable.

2.3 List of EUT System

No	Device Name	Model Number (Serial Number)	FCC ID (Trade Name)	Note
A	Emergency Communication Device	TG100 (17407802146)	HHV20020606 (NAIS)	EUT

2.4 List of Antenna and Cable

No	Type	Length (m)	Note
1	Built-in Antenna (50Ω)	0.1	
2	DC Cable	1.8	

3.RF OUTPUT POWER AND RADIATED EMISSIONS

3.1 Reference Rule and Specification

FCC Rule Part 22 Subpart H [§22.917] and Part 2 Subpart J [§2.1053]

3.2 Test Procedure

(1) Place the transmitter to be tested (EUT) on the turntable.

(2) Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier.

(3) For each spurious frequency, raise and lower the test antenna from 1m to 4m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

(4) Repeat step (3) for each spurious frequency with the test antenna polarized vertically.

(5) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3m above the ground.

(6) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

(7) Repeat step (6) with both antennas vertically polarized for each spurious frequency.

(8) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps (6) and (7) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

(9) The levels record in step (8) are the absolute levels of radiated spurious emissions in dBm.

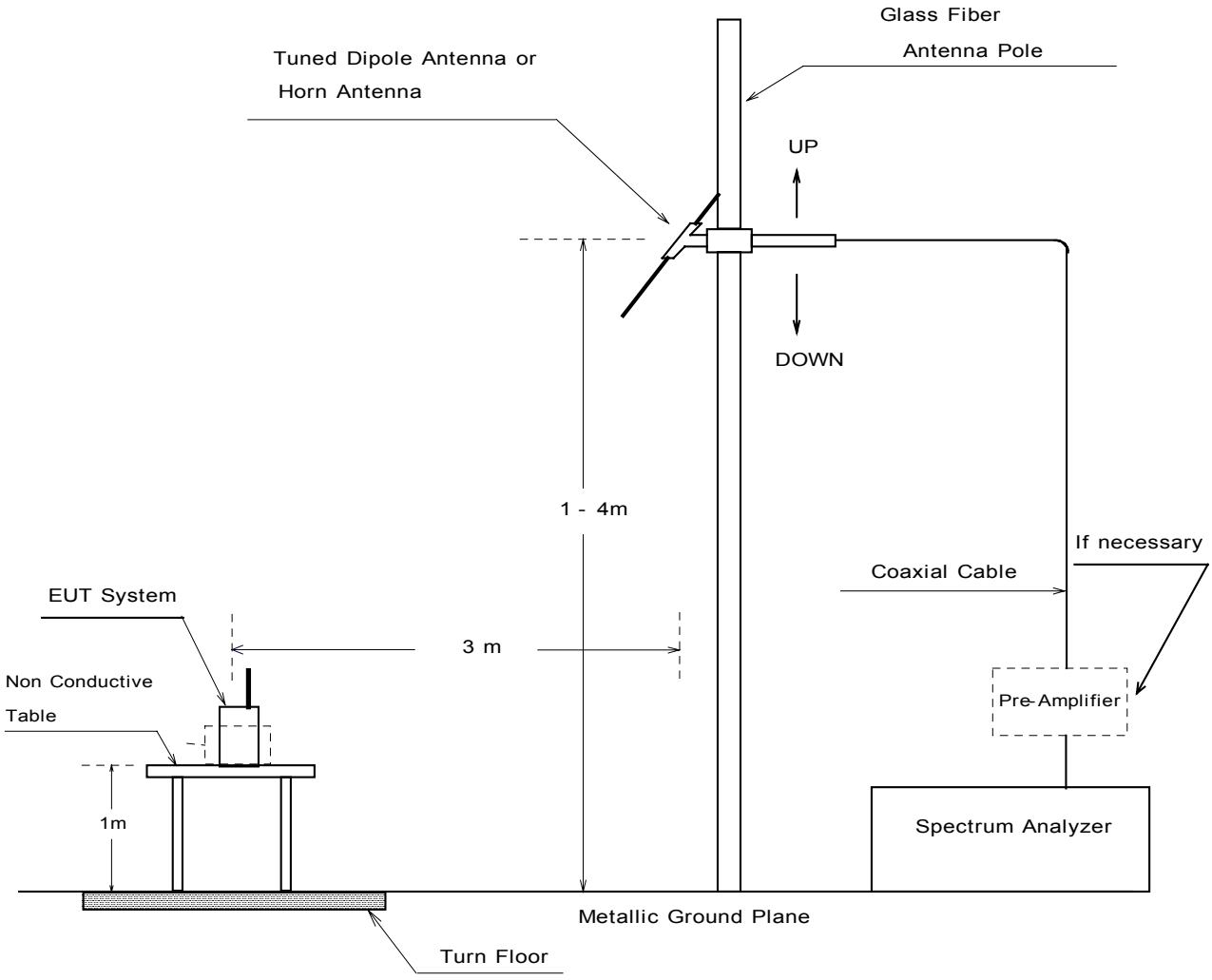
The radiated spurious emissions in dB can be calculated by the following:

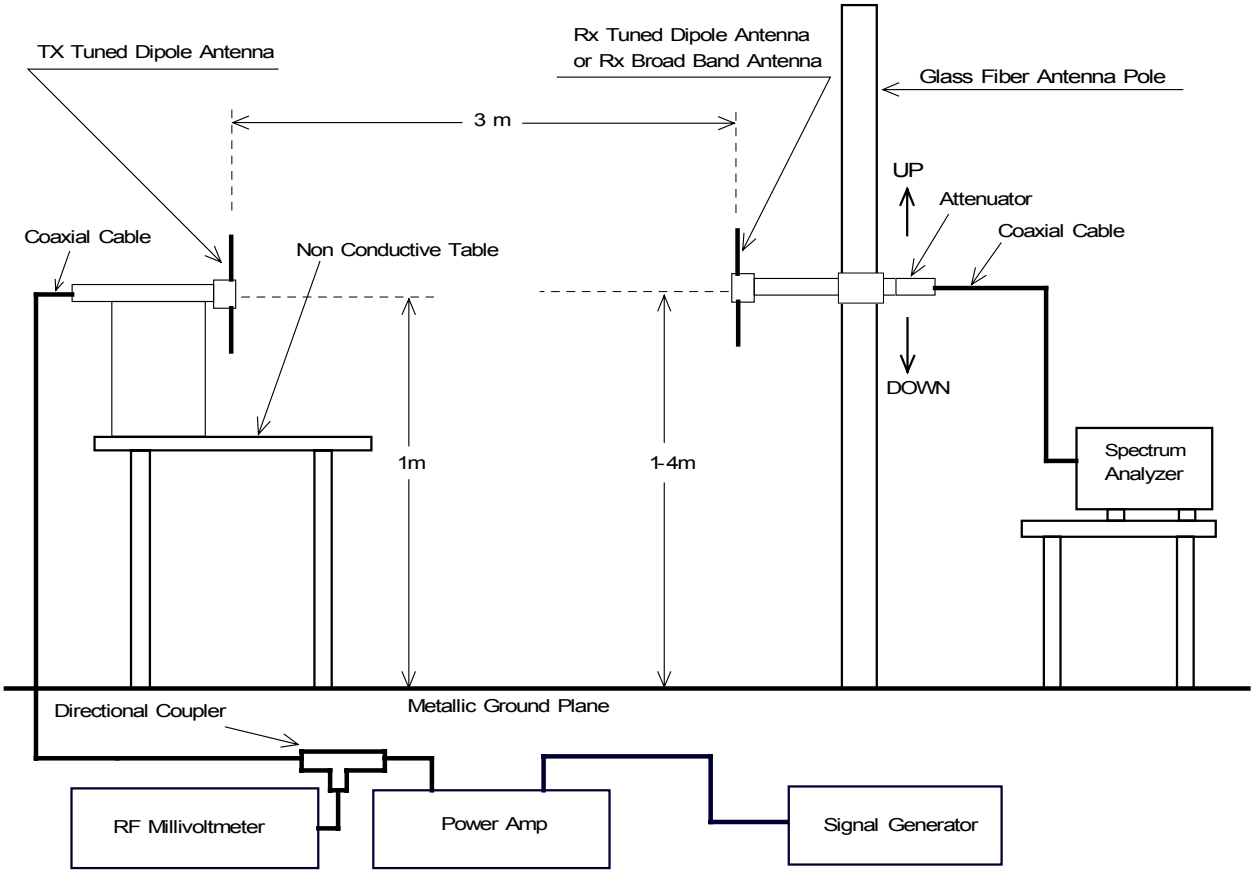
Radiated spurious emissions (dB) =

$$10\log_{10}\left[\frac{\text{TX power in watts}}{0.001}\right] - \text{the levels in step (8)}$$

Note : It is permissible to use other antennas provided they can be referenced to a dipole.

3.3 Test Configuration




TX Tuned Dipole Antenna
Rx Tuned Dipole Antenna
or Rx Broad Band Antenna
Glass Fiber Antenna Pole
3 m
UP
Attenuator
Coaxial Cable
Coaxial Cable
Non Conductive Table
DOWN
1m
1-4m
Spectrum
Analyzer
Directional Coupler
Metallic Ground Plane
RF Millivoltmeter
Power Amp
Signal Generator

3.4 Photographs of EUT System Configuration

3.5 Test Results

(1) (991 ch.)

Carrier Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dB)	(dBm)	(mW)	(W)
824.04	92.0	96.2	24.2	29.1	2.0	27.1	512.86	7.0

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Antenna Gain	Cable Loss	ERP	ERP	Limit of ERP	Margin
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dBi)	(dB)	(dBm)	(dBc)	(dBc)	(dB)
1648.08	48.9	41.3	-32.7	-39.8	13.7	2.9	-24.1	-51.2	-40.1	11.1
2472.12	60.1	63.3	-54.9	-54.6	16.8	3.5	-43.5	-70.6	-40.1	30.5
3296.16	58.5	51.0	-49.3	-62.4	18.6	4.1	-41.9	-69.0	-40.1	28.9
4120.20	53.6	52.7	-50.5	-57.1	19.4	4.7	-43.7	-70.8	-40.1	30.7
4944.24	45.6	49.1	-57.2	-59.6	19.5	5.3	-47.6	-74.7	-40.1	34.6
5768.28	38.6	47.1	-60.4	-58.1	19.4	5.7	-46.6	-73.7	-40.1	33.6
6592.32	35.0	36.8	-63.6	-71.0	22.3	6.2	-57.1	-84.2	-40.1	44.1
7416.36	41.0	50.6	-56.0	-55.9	22.7	6.6	-42.0	-69.1	-40.1	29.0
8240.40	43.3	48.6	-52.8	-56.1	22.3	7.1	-43.1	-70.2	-40.1	30.1

[Note]
Limit of ERP in dBc:
-43 - 10Log (Power) = -43 - 10Log (0.51286) = -40.1dB

[Environment]
Temperature : 25℃ Humidity : 57%

[Summary of Test Results]
Minimum Margin was 11.1 dB at 1648.08 MHz, horizontal polarization.

Tested Date : 1 July 2002 Tester Signature _____

Yasunari Kawai

- Continued -

(2) (383 ch.)

Carrier Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dB)	(dBm)	(mW)	(W)
836.49	94.7	96.6	27.0	29.5	2.0	27.5	562.34	7.0

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Antenna Gain	Cable Loss	ERP	ERP	Limit of ERP	Margin
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dBi)	(dB)	(dBm)	(dBc)	(dBc)	(dB)
1672.98	49.0	41.3	-32.3	-39.6	13.7	2.9	-23.7	-51.2	-40.5	10.7
2509.47	57.8	63.4	-56.4	-53.9	16.9	3.5	-42.7	-70.2	-40.5	29.7
3345.96	60.9	59.3	-46.6	-53.9	18.7	4.1	-39.2	-66.7	-40.5	26.2
4182.45	54.4	54.9	-50.5	-55.6	19.4	4.8	-43.2	-70.7	-40.5	30.2
5018.94	47.9	50.3	-52.8	-56.7	19.3	5.3	-44.9	-72.4	-40.5	31.9
5855.43	37.4	43.1	-65.0	-65.3	19.5	5.8	-53.8	-81.3	-40.5	40.8
6691.92	35.0	36.0	-62.8	-71.1	22.4	6.3	-57.2	-84.7	-40.5	44.2
7528.41	35.0	38.1	-62.2	-68.6	22.7	6.7	-54.8	-82.3	-40.5	41.8
8364.90	40.8	48.0	-55.2	-55.9	21.5	7.1	-43.7	-71.2	-40.5	30.7

[Note]
Limit of ERP in dBc:
-43 - 10Log (Power) = -43 - 10Log (0.56234) = -40.5dB

[Environment]
Temperature : 25℃ Humidity : 57%

[Summary of Test Results]
Minimum Margin was 10.7 dB at 1672.98 MHz, horizontal polarization.

Tested Date : 1 July 2002 Tester Signature

Yasunari Kawai

- Continued -

(3) (799 ch.)

Carrier Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Cable Loss	ERP	RF Output Power	Limit
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dB)	(dBm)	(mW)	(W)
848.97	94.7	96.6	27.0	29.4	2.1	27.3	537.03	7.0

Spurious Emission Frequency (MHz)	Spectrum Analyzer Reading		RF Meter Reading		Antenna Gain	Cable Loss	ERP	ERP	Limit of ERP	Margin
	Horizontal (dBuV)	Vertical (dBuV)	Horizontal (dBm)	Vertical (dBm)	(dBi)	(dB)	(dBm)	(dBc)	(dBc)	(dB)
1697.94	46.5	42.0	-35.1	-39.1	13.7	2.9	-26.5	-53.8	-40.3	13.5
2546.91	53.6	58.6	-60.4	-59.1	17.1	3.5	-47.7	-75.0	-40.3	34.7
3395.88	57.0	58.0	-50.8	-55.4	18.7	4.2	-43.1	-70.4	-40.3	30.1
4244.85	51.9	52.1	-53.4	-58.7	19.4	4.8	-46.3	-73.6	-40.3	33.3
5093.82	49.3	52.3	-52.0	-54.7	18.7	5.3	-43.5	-70.8	-40.3	30.5
5942.79	35.0	39.4	-65.4	-69.4	21.8	5.8	-55.6	-82.9	-40.3	42.6
6791.76	35.0	35.4	-62.8	-71.2	22.4	6.3	-57.3	-84.6	-40.3	44.3
7640.73	35.0	37.3	-61.1	-68.5	22.8	6.8	-54.7	-82.0	-40.3	41.7
8489.70	35.0	43.4	-61.0	-60.6	21.6	7.2	-48.4	-75.7	-40.3	35.4

[Note]

Limit of ERP in dBc:

-43 - 10Log (Power) = -43 - 10Log (0.53703) = -40.3dB

[Environment]

Temperature : 25℃ Humidity : 57%

[Summary of Test Results]

Minimum Margin was 13.5 dB at 1697.94 MHz, horizontal polarization.

Tested Date : 1 July 2002 Tester Signature

Yasunari Kawai

5. LIST OF TEST INSTRUMENTS

Instrument	Manufacturer	Model No	Specifications	KEC Control No.	If used, checked By "×".	Last Cal.	Next Cal.
Spectrum Analyzer	Hewlett Packard	HP8564E	Frequency Range 9 kHz to 40 GHz	SA-39	☒	2002/2	2003/2
Tuned Dipole Antenna	Kyoritsu	KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-136	☒	2002/2	2003/2
Tuned Dipole Antenna	Kyoritsu	KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-115	☒	2002/2	2003/2
Signal Generator	Wiltron	6769B	Frequency Range 10 MHz - 40 GHz	SG-42	☒	2001/10	2002/10
Power Amp.	Amplifier Research	100W1000M1	Frequency Range 70 MHz – 1 GHz	AM-55	☒	2001/6	2002/6
RF Millivolt-Meter	Rohde & Schwarz	URV5	Frequency Range 9 kHz – 2 GHz	VV-29	☒	2002/3	2003/3
Coaxial Cable	Suhner	SUCOFLEX 104	Length : 1m [SMA(p)-SMA(p)]	CL-42	☒	2002/2	2003/2
			Length : 10m [SMA(p)-SMA(p)]	CL-45	☒	2002/2	2003/2
				CL-46	☒	2002/2	2003/2
Horn Antenna	Raven	91888-2	Frequency Range 1 GHz - 2 GHz	AN-116	☒	2001/9	2002/9
		91888-2	Frequency Range 1 GHz - 2 GHz	AN-211	☒	2001/8	2002/8
		91889-2	Frequency Range 2 GHz - 5 GHz	AN-117	☒	2001/6	2002/6
		91889-2	Frequency Range 2 GHz - 5 GHz	AN-212	☒	2001/11	2002/11
	Scientific Atlanta	12-3.9	Frequency Range 3.95GHz - 5.85 GHz	AN-103	☒	2001/8	2003/8
		12-3.9	Frequency Range 3.95GHz - 5.85 GHz	AN-142	☒	2000/6	2002/6
		12-5.8	Frequency Range 5.85 GHz - 8.2 GHz	AN-62	☒	2001/8	2003/8
		12-5.8	Frequency Range 5.85 GHz - 8.2 GHz	AN-104	☒	2001/8	2003/8
		12-8.2	Frequency Range 8.2 GHz - 12.4 GHz	AN-63	☒	2001/8	2003/8
		12-8.2	Frequency Range 8.2 GHz - 12.4 GHz	AN-210	☒	2001/8	2002/8
Terminator	Anritsu	MP752A	50 Ω	AX-503	☒	2002/2	2003/2
100V Insertion Unit	Rohde & Schwarz	URV5-Z4	Frequency Range 100 kHz - 2 GHz	VV-24-2	☒	2002/3	2003/3
Directional Bridge	Hewlett Packard	86205A	Frequency Range 300 kHz - 6 GHz	AX-55	☒	2001/8	2002/8