

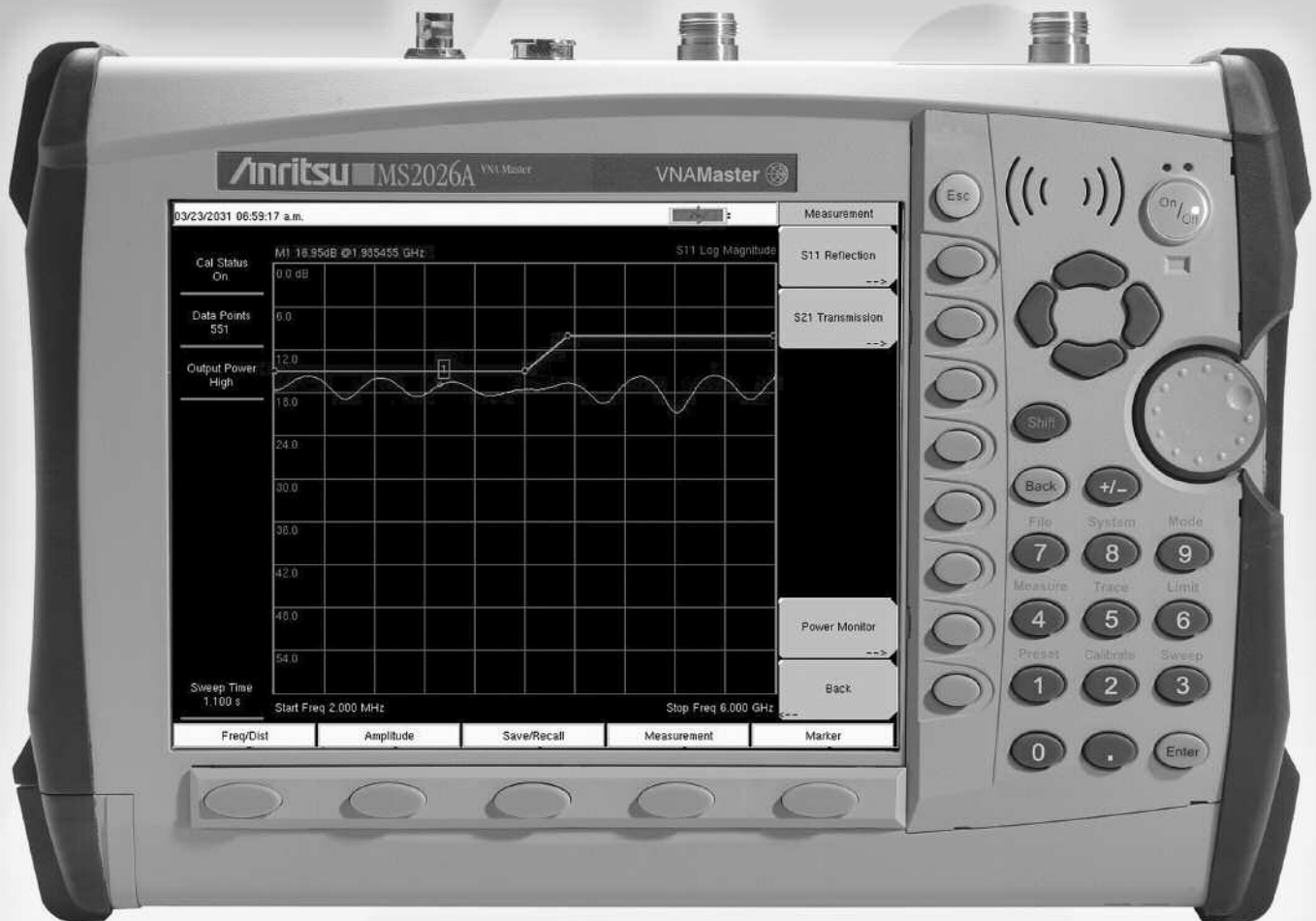


Advanced Test Equipment Rentals
www.atecorp.com 800-404-ATEC (2832)

MS2024A/MS2026A

VNA Master™

2 MHz to 6 GHz



Handheld Vector Network Analyzer from 2 MHz to 6 GHz

VNAMaster

Introduction

VNA Master MS2024A/MS2026A are the most ultra-portable VNAs on the market. They are designed to make accurate vector corrected 1-Port and 1-path 2-Port magnitude and phase measurements from 2 MHz to 4 GHz (MS2024A) and 2 MHz to 6 GHz (MS2026A). VNA Master's light weight (6.4 lbs) and three hour battery life time provide you with the flexibility needed to make VNA measurements anywhere.

Performance Specification

Frequency

Frequency Range:	2 to 4000 MHz (MS2024A) 2 to 6000 MHz (MS2026A)
Frequency Accuracy:	25 ppm
Frequency Resolution ^① :	10 kHz
Data Points:	Low, Medium, High (137/275/551)
Interference Immunity ^② :	
On-Channel:	+17 dBm
On-Frequency:	+10 dBm (RF Out), +30 dBc RF In
1-Port Power:	
High:	0 dBm (typical)
2-Port Power:	
High:	0 dBm (typical)
Low:	-35 dBm (typical)
Corrected Directivity ^③ :	42 dB (2 MHz to 6 GHz)
1-Port Accuracy ^④ :	= $<0.8 + 20 \log(1 \pm 10^{-E\Delta/20}) $ dB, typical E Δ = Directivity - Measured Return Loss
System Dynamic Range:	
	80 dB, 2 MHz to 3 GHz
	70 dB, >3 GHz to 5.5 GHz
	65 dB, >5.5 GHz to 6 GHz

Return Loss

Range:	0 to 60 dB
Resolution:	0.01 dB

VSWR

Range:	1 to 65
Resolution:	0.01

Cable Loss

Range:	0 to 30 dB
Resolution:	0.01 dB

1-Port Phase

Range:	-180° to +180°
Resolution:	0.01°

Smith Chart

Resolution:	0.01
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2-Port Gain

Range:	-120 to 100 dB
Resolution:	0.01 dB

2-Port Phase

Range:	-180° to +180°
Resolution:	0.01°

Distance-to-Fault (DTF)

Fault Resolution (meters):	$(1.5 \times 10^8 \times vp) / \Delta F$ vp is the propagation constant and ΔF is F2-F1 in Hz
Horizontal Range (meters):	0 to (data points-1) x Fault Resolution to a maximum of 1500m (4921 ft) where datapoints = 137/275/551
Vertical Range (Return Loss):	0 to 60 dB
Vertical Range (VSWR):	1 to 65

RF Power Monitor (Option 5):

Display Range:	-80 to +80 dBm (10 pW to 100 kW)
Detector Range:	-40 to +20 dBm (100 nW to 100 mW)
Offset Range:	0 to +60 dB
Resolution:	0.1 dB or 0.1 W
Accuracy:	± 1 dB maximum for >-40 dBm using 560-7N50B

Bias T (Option 10):

Voltage/Current:	+12 V, 250 or 500 mA steady state
	+15 V, 250 or 500 mA steady state
	+18 V, 350 mA steady state
	+21 V, 300 mA steady state
	+24 V, 250 mA steady state

GPS Receiver (Option 31)

GPS Location Indicator
Latitude, Longitude, Altitude and UTC on Display

General Specifications

Languages

Built-in English, Spanish, Italian, French, German, Japanese, Korean, and Chinese. Can also customize two additional languages using Master Software Tools.

Memory

Internal memory provides for the storage and recall of more than 1000 traces and setups. The contents of the internal memory can be copied to and from a removable Compact Flash Card.

Markers

6 markers (Delta marker, peak search, valley search) and Marker Table.

Traces

View Trace, Memory, Trace-Memory, Trace + Memory, Trace and Memory

Limit Lines

Upper and Lower Limit. Each upper and lower limit can consist of between one and forty segments.

Display

Bright daylight viewable color TFT LCD, Full SVGA, 8.4 in.

Interface Connectors

Type N female RF Out Port and RF In Port (50 Ω)
5-pin Mini-B USB 2.0 for data transfer to a PC
RJ45 Connector for Ethernet 10/100 Base-T
2.5 mm 3-wire headset connector

Remote Programmability Commands

Not available

Power Supply

External DC Input, +12 V, 5A max

ESD Damage Level

10 kV

Maximum Input (Damage Level)

Test Port, Type N:	+22 dBm
RF Detector:	+20 dBm

Impedance

50 Ω

Dimensions

12 x 8 x 3 in. (305 x 203 x 76 mm)

Weight

<6.4 lbs (2.9 kg)

Environment

MIL-PRF-2800F Class 2	
Operating:	-10°C to 55°C, humidity 85% or less
Storage:	-51°C to 71°C
Altitude:	4600 meters, operating and non-operating

Safety

Conforms to EN 61010-1 for Class 1 portable equipment

Electromagnetic Compatibility

Meets European Community requirements for CE marking

^① If display resolution (Span / (DataPoints-1)) is less than 150 kHz, then frequency resolution only applies to measurements with RF Immunity set to Normal.

^② On Channel Interference Immunity is specified at >1.0 MHz of the carrier frequency.

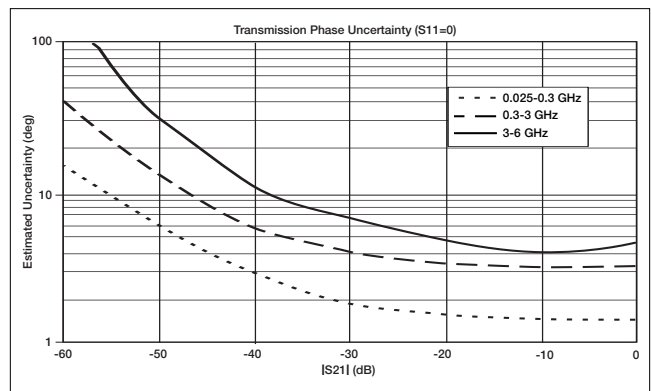
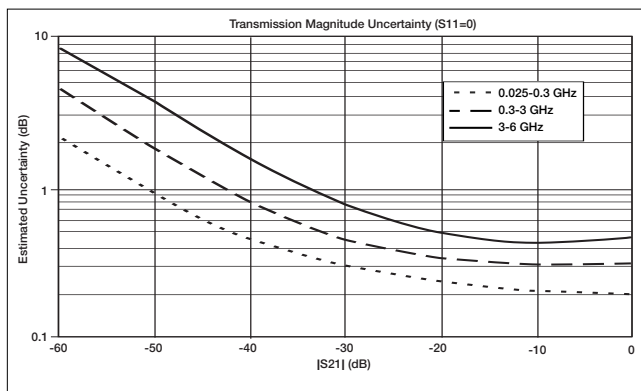
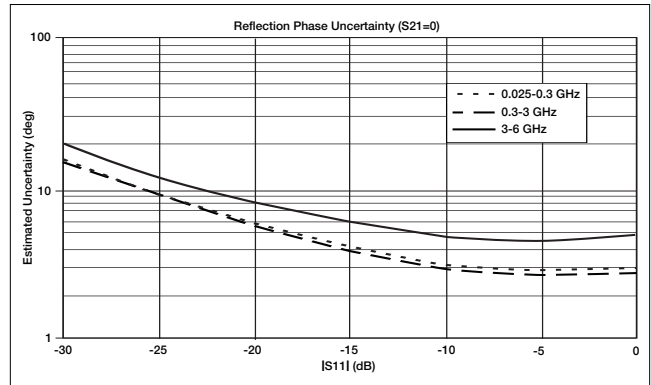
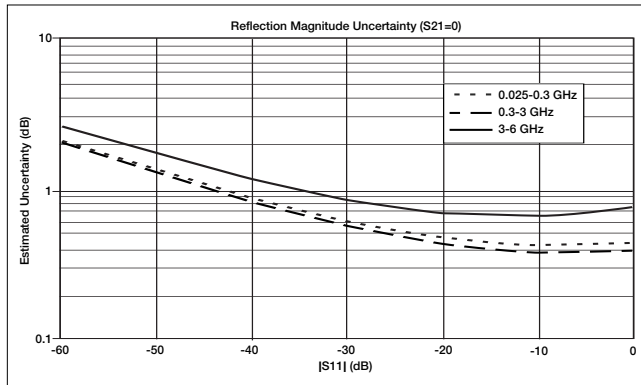
On-Frequency Interference Immunity is specified to within ± 10 kHz of the carrier frequency.

^③ All accuracy and directivity specifications apply only when using Anritsu's precision components.

^④ For data transfer only, remote programmability commands not available.

Performance Specifications

The following graphs provide measurement uncertainty at 23°C after vector correction for the standard N connector type. The errors are worst-case contributions of residual directivity, source match, frequency response, network analyzer dynamic range, and connector repeatability. For the 1-path 2-port measurements, transmission tracking, crosstalk and physical load match terms were added. Calibration components OSLN50-1 were used.



Power Monitor - Detectors

Model	Frequency Range	Impedance	Return Loss	Input Connector	Frequency Response
5400-71N50	0.001 to 3 GHz	50Ω	26 dB	N(m)	±0.2 dB, <1 GHz ±0.3 dB, <3 GHz
5400-71N75	0.001 to 3 GHz	75Ω	26 dB, <2 GHz 20 dB, <3 GHz	N(m)	±0.2 dB, <1 GHz ±0.5 dB, <3 GHz
560-7A50	0.01 to 18 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz	GPC-7	±0.5 dB, <18 GHz
560-7N50B	0.01 to 20 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <20 GHz	N(m)	±0.5 dB, <18 GHz ±1.25 dB, <20 GHz
560-7S50B	0.01 to 20 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <20 GHz	WSMA(m)	±0.5 dB, <18 GHz ±1.25 dB, <20 GHz
560-7S50-2	0.01 to 26.5 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <26.5 GHz	WSMA(m)	±0.5 dB, <18 GHz ±1.25 dB, <26.5 GHz
560-7K50	0.01 to 40 GHz	50Ω	12 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 15 dB, <26.5 GHz 14 dB, <32 GHz 13 dB, <40 GHz	K(m)	±0.5 dB, <18 GHz ±1.25 dB, <26.5 GHz ±2.2 dB, <32 GHz ±2.5 dB, <40 GHz
560-7VA50	0.01 to 50 GHz	50Ω	12 dB, <0.04 GHz 19 dB, <20 GHz 15 dB, <40 GHz 10 dB, <50 GHz	V(m)	±0.8 dB, <20 GHz ±2.5 dB, <40 GHz ±3.0 dB, <50 GHz

Ordering Information

Models

MS2024A	VNA Master, 2 MHz to 4 GHz
MS2026A	VNA Master, 2 MHz to 6 GHz

Options

MS2020/5	Power Monitor (requires external detector)
MS2020/10	Built-in Variable Bias-Tee
MS2020/31	GPS Receiver (including GPS antenna)

Standard Accessories Include:

10580-00122	MS2024A/MS2026A User's Guide
61382	Soft Carrying Case
64343	Tilt Bail
2300-498	Master Software Tools CD ROM
633-44	Rechargeable battery, Li-Ion
40-168	AC – DC adapter
806-141	Automotive cigarette lighter/12 Volt DC adapter
2000-1360	USB A-mini B cable, 6 ft (1.83 m)
2000-1371	Ethernet cable, 7 ft (2.13 m)
2000-1358	Compact Flash Card (64 MB)
	One Year Warranty

Optional Accessories:

OSLN50-1	Precision N(m) Open/Short/Load, 42 dB, 6 GHz
OSLNF50-1	Precision N(f) Open/Short/Load, 42 dB, 6 GHz
22N50	Precision N(m) Short/Open, 18 GHz
22NF50	Precision N(f) Short/Open, 18 GHz
SM/PL-1	Precision N(m) Load, 42 dB, 6.0 GHz
SM/PLNF-1	Precision N(f) Load, 42 dB, 6.0 GHz
2000-767	Precision Open/Short/Load, 7/16(m), 4.0 GHz
2000-768	Precision Open/Short/Load, 7/16(f), 4.0 GHz
1N50C	Limiters, N(m) to N(f), 50Ω, 0.01 to 50 GHz
42N50-20	Attenuator, 20 dB, 5W, DC to 18 GHz, N(m)-N(f)
42N50A-30	Attenuator, 30 dB, 50W, DC to 18 GHz, N(m)-N(f)
2000-1410	Magnet Mount GPS Antenna with 15 ft (4.6 m) cable

Test Port Cables Armored

15NN50-1.5C	1.5 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-3.0C	3.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-5.0C	5.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NNF50-1.5C	1.5 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-3.0C	3.0 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-5.0C	5.0 meters, N(m)-N(f), 6 GHz, 50Ω
15ND50-1.5C	5.0 meters, N(m)-7/16 DIN(m), 6 GHz, 50Ω
15NDF50-1.5C	5.0 meters, N(m)-7/16 DIN(f), 6 GHz, 50Ω

Precision Adapters

34NN50A	N(m)-N(m), DC to 18 GHz, 50Ω
34NPNF50	N(f)-N(f), DC to 18 GHz, 50Ω

Adapters

1091-26	N(m)-SMA(m), DC to 18 GHz, 50Ω
1091-27	N(m)-SMA(f), DC to 18 GHz, 50Ω
1091-80	N(f)-SMA(m), DC to 18 GHz, 50Ω
1091-81	N(f)-SMA(f), DC to 18 GHz, 50Ω
1091-172	N(m)-BNC(f), DC to 1.3 GHz, 50Ω
510-90	7/16 DIN(f)-N(m), DC to 7.5 GHz, 50Ω
510-91	7/16 DIN(f)-N(f), DC to 7.5 GHz, 50Ω
510-92	7/16 DIN(m)-N(m), DC to 7.5 GHz, 50Ω
510-93	7/16 DIN(m)-N(f), DC to 7.5 GHz, 50Ω
510-96	7/16 DIN(m)-7/16 DIN(m), DC to 7.5 GHz, 50Ω
510-97	7/16 DIN(f)-7/16 DIN(f), DC to 7.5 GHz, 50Ω
510-102	N(m)-N(m) 90° right angle, DC to 11 GHz, 50Ω

SALES CENTERS:

United States (800) ANRITSU	Europe 44 (0) 1582-433433	Microwave Measurement Division
Canada (800) ANRITSU	Japan 81 (46) 223-1111	490 Jarvis Drive, Morgan Hill, CA 95037-2809
South America 55 (21) 2527-6922	Asia-Pacific (852) 2301-4980	http://www.us.anritsu.com



Band Pass Filters

1030-109	836.5 MHz Ctr Freq, 25.8 MHz BW, N(m)-SMA(f), 50Ω
1030-110	897.5 MHz Ctr Freq, 35 MHz BW, N(m)-SMA(f), 50Ω
1030-111	1.88 GHz Ctr Freq, 63.1 MHz BW, N(m)-SMA(f), 50Ω
1030-112	2.442 GHz Ctr Freq, 85.1 MHz BW, N(m)-SMA(f), 50Ω

Detector Extender Cables

800-109	7.6 m (25 ft)
800-110	15.2 m (50 ft)
800-111	30.5 m (100 ft)
800-112	61.0 m (200 ft)

760-235	Hard Transit Case
10580-00122	MS2024A/MS2026A User's Guide
61382	Soft Carrying Case
64343	Tilt Bail
2300-498	Master Software Tools CD ROM
633-44	Rechargeable battery, Li-Ion
40-168	AC – DC adapter
806-141	Automotive cigarette lighter/12 Volt DC adapter
2000-1358	Compact Flash Card (64 MB)
2000-1360	USB A-mini B cable, 6 ft (1.83 m)
2000-1371	Ethernet cable, 7 ft (2.13 m)
2000-1374	Dual Battery Charger

Literature:

10580-00122	MS2024A/MS2026A User's Guide
10580-00123	MS2024A/MS2026A Programmng Manual
11410-00369	MS2024A/MS2026A Brochure
11410-00274	Tower Mounted Amplifiers Application Note
11410-00214	Reflection Measurement Application Note



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