Technical Data Sheet

Anritsu envision : ensure

Power Master™

Frequency Selectable mmWave Power Analyzer

MA24507A
9 kHz to 70 GHz

MA24510A
9 kHz to 110 GHz

Introduction

Power Master is the world's first frequency selectable mmWave power analyzer. It is an ultraportable USB-powered instrument that measures the RF power of signals up to 110 GHz and as low as –90 dBm. Unlike spectrum analyzers that are bulky, expensive, and complex or power meters that are not frequency dependent and have limited dynamic range, Power Master enables simple, numeric, frequency-based amplitude measurements of up to six signals from 9 kHz to 110 GHz in a package slightly larger than a cell phone and at an extremely affordable price.

Features and Benefits

- Able to measure very low power signals as low as –90 dBm
- Excellent for over-the-air testing, especially with mmWave signals that have high propagation loss
- User settings to control measurement speeds and noise floor
- New Channel Monitor mode in PowerXpert for monitoring up to six frequency channels at once
- New Power Hunter mode in PowerXpert for searching up to six signals within a frequency range
- Mounting holes for direct mounting to probes for on-wafer testing

MA24507A mmWave Power Analyzer

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Definitions

All specifications and characteristics apply under the following conditions, unless otherwise stated:

Warm-Up Time	30 minutes
Operating Temperature Range	0 °C to 50 °C
Typical Performance	Typical performance indicates the measured performance of an average unit. Typical performance does not include guard-bands and is not covered by the product warranty. Typical specifications are shown in parenthesis, such as (-102 dB), or noted as Typical. All performance above 70 GHz is Typical.
Characteristic Performance	Characteristic performance indicates a performance designed-in and verified during the design phase. Characteristic performance is not covered by the product warranty.
ISO GUM Measurement Uncertainty	Uncertainty expressed with coverage factor of k=2.
Calibration Cycle	Anritsu recommended calibration interval is 12 months.

All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

Frequency

Range	MA24507A: 9 kHz to 70 GHz, V(m) Connector (1.85 mm) MA24510A: 9 kHz to 110 GHz, W1(m) Connector (1.0 mm)
Internal Reference	Accuracy: ±0.2 ppm (0 °C to 50 °C) Aging: ±1.0 ppm/year aging
Continuous Mode Span	30 kHz to 2 GHz max in Channel Power Measurement 10 kHz to Full Span in CW Max Measurement
Channel Monitor Mode Span	1 kHz to 20 MHz

Power Measurement

Maximum Amplitude

Frequency	Max Power[a]
≤ 6.15 GHz	+15 dBm
> 6.15 GHz	+10 dBm

a. Characteristic

Average Noise Floor

Channel Power Measurement

Channel Span	Noise Floor[a]
30 kHz	–88 dBm
10 MHz	–64 dBm
1 GHz	–40 dBm

CW Max Measurement

Resolution	Noise Floor[b]
High	–100 dBm
Medium	–90 dBm
Low	–80 dBm

a. Measured at 1 GHz center frequency
b. Measured at 1 GHz center frequency; 3 MHz span

Damage Level

Continuous: +30 dBm CW, +/- 10 VDC max

Ranges[1]

Lower: ≤ –10 dBm
Upper: > –10 dBm

Input Match (typical)

		V Connector		W1 Connector	
Frequency	Frequency	VSWR	Return Loss	VSWR	Return Loss
9 kHz to 12.4 GHz	9 kHz to 12.4 GHz	1.29:1	18 dB	1.29:1	18 dB
> 12.4 GHz to 26.5 GHz	> 12.4 GHz to 26.5 GHz	1.43:1	15 dB	1.67:1	12 dB
> 26.5 GHz to 40 GHz	> 26.5 GHz to 40 GHz	1.58:1	13 dB	1.67:1	12 dB
> 40 GHz to 50 GHz	> 40 GHz to 50 GHz	1.67:1	12 dB	1.67:1	12 dB
> 50 GHz to 70 GHz	> 50 GHz to 70 GHz	2.10:1	9 dB	2.10:1	9 dB
> 70 GHz to 110 GHz	> 70 GHz to 110 GHz	–	–	2.10:1	9 dB

Measurement Speed (readings/s, characteristic)

	Span (measured at 1 GHz center frequency; no averages)		
	300 kHz	20 MHz	1 GHz
Channel Power Measurement	7	20	10
CW Max Measurement (High)	0.8	15	6
(Medium)	4	25	10
(Low)	20	25	10

Trigger Source

Bus
Continuous

1. Power Master allows the user to define the operating range. To avoid clipping or saturating signals, the upper range is recommended for signals above –10 dBm. Signals at or below –10 dBm will typically be able to use the lower range.

Measurement Uncertainty

Amplitude Accuracy[1]

	20 °C to 30 °C (after 30 minute warm-up)		0 °C to 50 °C (after 60 minute warm-up)	
Frequency	Maximum (dB)	Typical (dB)	Maximum (dB)	Typical (dB)
9 kHz to 644 MHz	±1.3	±0.5	±2.0	±0.5
> 644 MHz to 40 GHz	±1.8	±0.5	±3.0	±1.0
> 40 GHz to 70 GHz	±2.0	±0.5	±3.0	±1.0
> 70 GHz to 90 GHz	±2.2	±0.5	±3.0	±1.0
> 90 GHz to 110 GHz	±2.5	±0.5	±3.0	±1.0

Relative Power Accuracy

Frequency	Accuracy
9 kHz to < 6.15 GHz	±0.3 dB
6.15 GHz to < 40 GHz	±0.3 dB
40 GHz to ≤ 110 GHz	±0.3 dB (typical with W1 connector)

PowerXpert™

PC Requirements (version 4.0 or greater)

Processor and RAM	Equivalent to Quad Core i5 fourth generation or higher CPU, 8 GB RAM
Operating System	Microsoft® Windows® 10, 8.1, or 7; 64-bit
Hard-Disk Free Space	100 MB minimum
Display Resolution	1024 × 768 minimum
Interface	USB 3.0

System

Measurand	Channel power, CW peak power
Measurement Resolution	0.01 dB max via PowerXpert, 0.01 dB max via remote command
Offset Correction[2]	–100 dB to +150 dB
Units	dBm, nW, µW, mW, W
Averaging	Manual
Averaging Type	Moving
Number of Averages	1 to 1,000

Continuous Mode

Measurements	Channel power, CW max
Center Frequency	9.5 kHz to (Max Freq – 500 Hz)
Span	30 kHz to 2 GHz (Channel power), 1 kHz to Full span (CW max)
Resolution	High, medium, low

Power Hunter Mode

Measurement	CW max only
Start Frequency	9 kHz to (Max Freq – 1 kHz)
Stop Frequency	10 kHz to Max Freq
Set Minimum Power Range	–130 to 0 dBm

Channel Monitor Mode

Measurements	Channel power, CW max
Channel Frequencies	(9 kHz + Span/2) to (Max Freq – Span/2)
Span	1 kHz to 20 MHz
Number of Channels	Up to 6

1. Accuracy excludes effects of Noise and Mismatch uncertainty. Characteristic values between 67 and 70 GHz for MA24507A.
2. Offset correction feature is available only through the PowerXpert application. There is no remote command for it in the analyzer firmware.

General

RF Connector	MA24507A: V male (1.85 mm) MA24510A: W1 male (1.0 mm)
Interface to Host	USB 3.0
Current Consumption	900 mA max
Size	155 mm x 84 mm x 27 mm (6.1 in x 3.3 in x 1.1 in)
Weight	282 g (0.62 lb)
Warranty	1 year

Operational Requirements Tests were performed per MIL-PRF-28800F (Class 3).

Operating Temperature Range	0 °C to 50 °C
Storage Temperature Range	–40 °C to +71 °C
Relative Humidity (non-condensing)	45 % at 50 °C 75 % at 40 °C 95 % at 30 °C
Altitude	4600 m operational max
Shock	30 g half-sine, 11 ms duration
Vibration	Sinusoidal: 5 Hz to 55 Hz, 3 g max Random: 10 Hz to 500 Hz, 2.34 g rms Power Spectral Density: 0.01 g^2/Hz

Regulatory Compliance

European Union	EMC 2014/30/EU, EN 61326:2013, CISPR 11/EN 55011, IEC/EN 61000-4-2/3/4/5/6/8/11 Low Voltage Directive 2014/35/EU Safety EN 61010-1:2010 RoHS Directive 2011/65/EU
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21-0004

Ordering Information

Available Models

MA24507A	9 kHz to 70 GHz mmWave Power Analyzer
MA24510A	9 kHz to 110 GHz mmWave Power Analyzer

Included Accessories

2000-1605-R	1.5 m BNC(m) to MCX(m) cable
2000-1859-R	USB 3.0 Type C to Type A Cable, 1 m

Available Options

MA24507A-098/MS24510A-098	Option 98: Standard calibration ISO/IEC 17025 and ANSI/NCSL Z540-1
MA24507A-099/MA24510A-099	Option 99: Premium calibration ISO/IEC 17025 and ANSI/NCSL Z540-1 (includes test report and uncertainty data)

Optional Accessories

Calibrated Torque Wrenches

01-201	Calibrated torque wrench for K and V connectors

Precision Fixed Attenuators

41V-3	DC to 60 GHz, 3 dB, V(m) to V(f), 50 Ω
41V-6	DC to 60 GHz, 6 dB, V(m) to V(f), 50 Ω
41V-10	DC to 60 GHz, 10 dB, V(m) to V(f), 50 Ω
41V-20	DC to 60 GHz, 20 dB, V(m) to V(f), 50 Ω

Precision Coaxial Adapters

33VFVF50C	DC to 70 GHz, V(f) to V(f), 50 Ω
33VVF50C	DC to 70 GHz, V(m) to V(f), 50 Ω
34WV50	DC to 65 GHz, W1(m) to V(m), 50 Ω
34WVF50	DC to 65 GHz, W1(m) to V(f), 50 Ω
34WFV50	DC to 65 GHz, W1(f) to V(m), 50 Ω
34WFVF50	DC to 65 GHz, W1(f) to V(f), 50 Ω
33WW50	DC to 110 GHz, W1(m) to W1(m), 50 Ω
33WWF50	DC to 110 GHz, W1(m) to W1(f), 50 Ω
33WFWF50	DC to 110 GHz, W1(f) to W1(f), 50 Ω

Waveguide to Coaxial Adapters (right angle)

35WR22VF	33 GHz to 50 GHz, WR22 to V(f)
35WR19VF	40 GHz to 60 GHz, WR19 to V(f)
35WR15VF	50 GHz to 65 GHz, WR15 to V(f)
35WR10WF	75 GHz to 110 GHz, WR10 to W1(f)
SC7442	60 GHz to 90 GHz, WR12 to W1(f)

Waveguide to Coaxial End Launch Adapters (straight through)

1091-460-R	17.6 GHz to 26.7 GHz, WR42 to V(f)
1091-459-R	26.4 GHz to 40.1 GHz, WR28 to V(f)
1091-458-R	33.0 GHz to 50.1 GHz, WR22 to V(f)
1091-457-R	39.3 GHz to 59.7 GHz, WR19 to V(f)
1091-456-R	49.9 GHz to 67.0 GHz, WR15 to V(f)
1091-402-R	49.9 GHz to 75.8 GHz, WR15 to W1(f)
1091-401-R	60.5 GHz to 92.0 GHz, WR12 to W1(f)
1091-400-R	73.8 GHz to 110 GHz, WR10 to W1(f)

Directional Horn Antennas

2000-1867-R	17.6 GHz to 26.7 GHz, WR42, 25 dBi gain
2000-1868-R	26.4 GHz to 40.1 GHz, WR28, 25 dBi gain
2000-1869-R	33.0 GHz to 50.1 GHz, WR22, 25 dB gain
2000-1870-R	39.3 GHz to 59.7 GHz, WR19, 25 dBi gain
2000-1871-R	49.9 GHz to 75.8 GHz, WR15, 25 dBi gain
2000-1872-R	60.0 GHz to 90.0 GHz, WR12, 25 dBi gain
2000-1873-R	75.0 GHz to 110.0 GHz, WR10, 25 dBi gain

USB Cable Extenders

2000-1888-R	USB 3.0 Powered Cable Extender, 10 m, (32 ft) (up to two can be used in series for a total length of 20 m)