

Test More. Test Faster. Test for Less.

AEM

Mixed Mode Multi-Port Vector Network Analyzer (MMVNA-200)



**Optimized for
Manufacturing
Testing**

A Multi-Port Vector
Network Analyzer Capable of
Simultaneously Measuring All
Ports and Their Interdependency.

**OPEN
ALLIANCE**

**C A B L I N G
INNOVATORS
A W A R D S**
SILVER HONOREE

IEEE
Advancing Technology
For Humanity

Multi-Port Component Testing



The MMVNA-200 is a multi-port vector network analyzer capable of simultaneously measuring all ports and their interdependency.

The small, portable 8-port form-factor makes MMVNA-200 easy to integrate in the manufacturing environment. Measuring all possible combinations of RF S-parameters on all ports within a sweep lasting less than 10 seconds, MMVNA-200 greatly reduces test time over other RF test systems. Additionally, multiple test ports eliminate the need of connecting and disconnecting different test fixtures repeatedly. No external RF switch matrix is required, further simplifying the test setup.

MMVNA-200 is uniquely capable of performing dual-ended testing using two independent MMVNA-200 instruments synchronized over the communication-channel under test. This feature makes it ideal for far-field measurements and cable measurements.

In addition to RF measurements, MMVNA-200 also performs DC measurements, ensuring proper end-to-end connectivity of the DUT and measuring DC resistance when required. This is an important feature for DUTs where many failures happen due to improper connectivity rather than RF performance.

VNA Manager is a required companion software utility that facilitates control of the analyzer including customization of the Autotest through S-parameter based settings.

The system is IP addressable enabling remote view of test data across geographical locations.

While MMVNA-200 measures hundreds of different S-parameters in every sweep within seconds, yet it enables focusing on critical parameters by allowing flexible configuration, and easy-to-understand PASS/FAIL results. Results for mixed-mode and single-ended results are displayed and tools for zooming and filtering of results are available for in-depth analysis.

These features make MMVNA-200 one of the most versatile RF analyzer for the engineers interested in deep-dive, and at the same time fast and easy for the operators.

A large number of test applications can be supported by user configurable parameters and test limits. These are several built-in configurations for widely used test applications such as automotive single-pair Ethernet test.





KEY CAPABILITIES

- Measurements of multi-port devices under test (up to 8 ports)
- End-to-end synchronized testing with two independent analyzers
- DC measurements and RF measurements in the same instrument
- All S-parameter combinations automatically measured during every autotest within seconds, with ability to choose parameters of interest
- Adheres to Open Alliance, BroadR-Reach, 802.3bw, 802.3bp and 802.3ch (draft) for the following s-parameter tests:
 - Link segments and components; cables, connectors, and wire harnesses
- Open Alliance VNA Reference Measurements
- Equipment connector interfaces (ECU, MDI)
- Transmitter's and Receiver's



SPECIFICATIONS

Parameter	Specification
Frequency Range	▪ 0.1 – 3,000 MHz
Frequency Resolution	▪ 0.1 MHz
Frequency Accuracy	▪ ± 2 ppm
Test Ports (single ended)	▪ 4 (differential)/ 4 (single ended)
Test Ports (dual ended)	▪ 8 (differential)
IF bandwidth	▪ 100 Hz (range setting = 7)
Test Interface	▪ SMA (female)
Impedance of Test Port	▪ 50 Ω (single ended) ▪ 100 Ω (differential)
Test Port power output	▪ -1.0 dBm
Max DC voltage at Test Port (damage level)	▪ 60 V
Sweep Speed	▪ -1.0 dBm
Max DC voltage at Test Port (damage level)	▪ 0.3 msec/step (80 db noise floor) ▪ 3.4 msec/step (110 db noise floor)
RF Measurement Parameters	▪ Differential-to-single ended return loss (SSD,x+/-,x) ▪ Differential-to-single ended cross-talk (SSD,y+/-,x) ▪ Differential-to-differential return loss (SDD,xx) ▪ Differential-to-differential cross-talk (SDD,yx). ▪ Differential to common mode return loss (TCL) (SCD,xx) ▪ Differential to common mode transmission (TCTL) (SCD,xx) ▪ Differential to common mode cross-talk (SCD,yx)
RF Measurement Parameters - Double Ended	▪ Differential-to-single ended return loss and cross-talk. Differential-to-differential return loss and cross-talk. (near-end and far-end). Differential Insertion loss, differential to common-mode insertion loss

SPECIFICATIONS CONTINUED

Parameter	Specification
Measurement Floor – Cross-Talk (regular sweep mode)	100 dB @ 0.1MHz 105 dB @ 1MHz 105 dB @ 100MHz 95 dB @ 600MHz 85 dB @ 1000MHz 50 dB @ 3000MHz
Measurement Floor– Return Loss (regular sweep mode)	60 dB @ 0.1MHz 60 dB @ 1MHz 60 dB @ 100MHz 50 dB @ 600MHz 40 dB @ 1000MHz 15 dB @ 3000MHz
Dynamic Range transmission measure- ments (regular sweep mode)	90 dB @ 0.1MHz 100 dB @ 1MHz 100 dB @ 100MHz 95 dB @ 600MHz 85 dB @ 1000MHz 50 dB @ 3000MHz
Accuracy – Transmission measurements (regular sweep mode) mid dynamic range measurements	± 0.2 dB @ 0.1MHz ± 0.1 dB @ 1MHz ± 0.1 dB @ 100MHz ± 0.1 dB @ 600MHz ± 0.3 dB @ 1000MHz ± 0.5 dB @ 3000MHz
Accuracy – Reflection measurements mid dynamic range measurements	± 0.4 dB
Directivity	40 dB @ 0.1MHz 60 dB @ 1MHz 60 dB @ 100MHz 45 dB @ 600MHz 30 dB @ 1000MHz 25 dB @ 3000MHz
Tracking Error	0.05 dB (0.1 to 1000MHz)
Source Return Loss	50 dB @ 1MHz 40 dB @ 100MHz 20 dB @ 1000 MHz
Insertion Loss Measurement range–dual ended	80 dB @ 0.1MHz 80 dB @ 1MHz 70 dB @ 100 MHz 65 dB @ 1000 MHz 40 dB @ 3000 MHz
DC Measurement Parameters – Double Ended	0 – 100 Ω ($\pm$ 0.5 Ω)
DC Resistance Measurement Range	0 – 100 Ω ($\pm$ 0.5 Ω)
DC Resistance Measurement Resolution	0.1 Ω
File Format for S-parameter Results	CSV and Touchstone (s8p, s16p)
Plots	- frequency domain S-parameter (magnitude) - time-domain impulse response (linear or dB) - time-domain step response (impedance or dB) - phase v/s frequency, real part v/s frequency, imaginary part v/s frequency - ACRF, PSACRF for dual ended tests - power sum measurements of selected combinations of S-parameters

SPECIFICATIONS CONTINUED

Parameter	Specification
Size	▪ 17.5cm (Depth) x 16.5cm (Width) x 5.5cm (Height)
File Format for S-parameter results	▪ CSV and Touchstone (s8p, s16p)
Weight	▪ 1.0 kg
Power Supply	▪ 5V DC adapter
Power Consumption	▪ 8 W
Battery Operation	▪ 8 hours with full charge and 1 test/min
Connectivity	▪ USB, 10/100/1000 Ethernet
Operating System	▪ Linux
Operating Temperature	▪ 0 °C to 45 °C
Storage Temperature	▪ -50 °C to +70 °C
Humidity	▪ 90 % at 25 °C
Atmospheric pressure	▪ 70.0 kPa to 106.7 kPa

Enquiries

CustomerCare@aem-test.com

Asia

AEM Singapore Pte. Ltd.
52 Serangoon North Ave
4 Singapore 555853

North America

AEM International (US)
5560 West Chandler Blvd. Suite 3
Chandler, Arizona 85226 USA