



V10VNA2 IMD (Intermodulation) Series
WR10 Frequency Extension Module
75-110 GHz

WR15 WR12 WR10 WR08 WR06 WR05 WR03 WR02.2

DESCRIPTION

The V10VNA2 IMD Series will expand your existing Vector Network Analyzer (VNA) capabilities so you can conduct industry-leading millimeter wave S-parameters in WR10 (75-110 GHz). These frequency extension modules connect to your existing test port(s) and leverage the inherent microwave network analyzer's performance and features to display gain compression, intermodulation distortion and two-port S-parameters: S_{11} , S_{21} , S_{12} , and S_{22} . Four architectures are available: 1-port, scalar 2-port, 1-path/2-port, and fully-reversing 2-port. Waveguide calibration kits are available as separate accessories.



HIGHLIGHTS

- Dynamic Range of 105 dB
- Output Power of +5 dBm
- Optional Manual Attenuation of 0 to 25 dB
- Raw Directivity of 37 dB
- Raw Test Port Match of 17 dB
- Stability of ± 0.2 dB & ± 2 deg

APPLICATIONS

- S-parameters for millimeter wave devices
- Truly broadband on-wafer device characterization
- Pulse setups to mitigate power handling considerations
- Filter passband and rejection verification
- Antenna characterization for lobes and polarization
- True differential measurements

ELECTRICAL AND PERFORMANCE SPECIFICATIONS (+25°C)



After a one hour warm-up period, the V10VNA2 module will satisfy the following specifications.

Electrical Characteristics ¹	MIN	TYP	MAX
System Operating Frequency	75 GHz	--	110 GHz
Test Port Output Power 1 ²	+2 dBm	+5 dBm	
Test Port Output Power 2 ²	-17 dBm	-13 dBm	
System Dynamic Range ³	92 dB	105 dB	--
Reflection & Transmission Tracking, Magnitude ⁴	--	± 0.2 dB	--
Reflection & Transmission Tracking, Phase ⁴	--	± 2 deg	--
Raw Coupler Directivity (T/R module only) ⁵	35 dB	> 37 dB	--
Residual Directivity (with system error correction)	--	>40 dB	--
Raw Test Port Match ⁵	--	> 17 dB	--
Residual Source & Load Match (with system error correction)	--	>35 dB	--
Test Port Input Power @ 0.1 dB compress (T/R & T modules) ⁵	--	+8 dBm	--
Test Port Input Damage Level	+20 dBm	--	--
Optional Manually Adjustable Attenuator (T/R & S modules) ⁶	0 dB	--	25 dB
Operating Temperature Range	+20 °C	+25 °C	+30 °C

¹Specifications are typical and subject to change without notice

²As there are no internationally recognized power standards above 110 GHz, any power data supplied above 110 GHz is traceable only to OML's Calorimeter³ Measured with Agilent PNA-X (N524xA) at 10 Hz IF bandwidth

⁴At +25°C, measured for 1 hr after 1 hr warm-up. Based on "perfect" RF & LO test cables not moved after warm-up and calibration. Not tested.

⁵Not tested

⁶Available as an option (Option A)

Module Characteristics ¹	Description
Test Port, System Output Interface ⁷	WR-10
RF System Input Interface, SMA(f), T/R & S modules	
RF Input Frequency	12.5 to 18.4 GHz
RF Input Power	+10 dBm \pm 1.5 dB
RF Input Damage Level	+20 dBm
RF Multiply Factor	x6
LO System Input Interface, SMA(f), All modules	
LO Input Frequency	9.3 to 13.8 GHz
LO Input Power	+10 dBm \pm 1.5 dB
LO Input Damage Level	+20 dBm
LO Multiply Factor	x8
IF Output Frequency, SMA(f), All modules	5 to 300 MHz
DC (+12 VDC) Power Requirements: T/R & S versus T	1.5A / 0.5A, typ
Size (L x W x H, excludes rubber feet & output WG length)	13.0" x 4.3" x 2.7" (T module: L = 4.7")
Weight: T/R & S versus T	≤ 6.0 lbs. / ≤ 3.0 lbs.

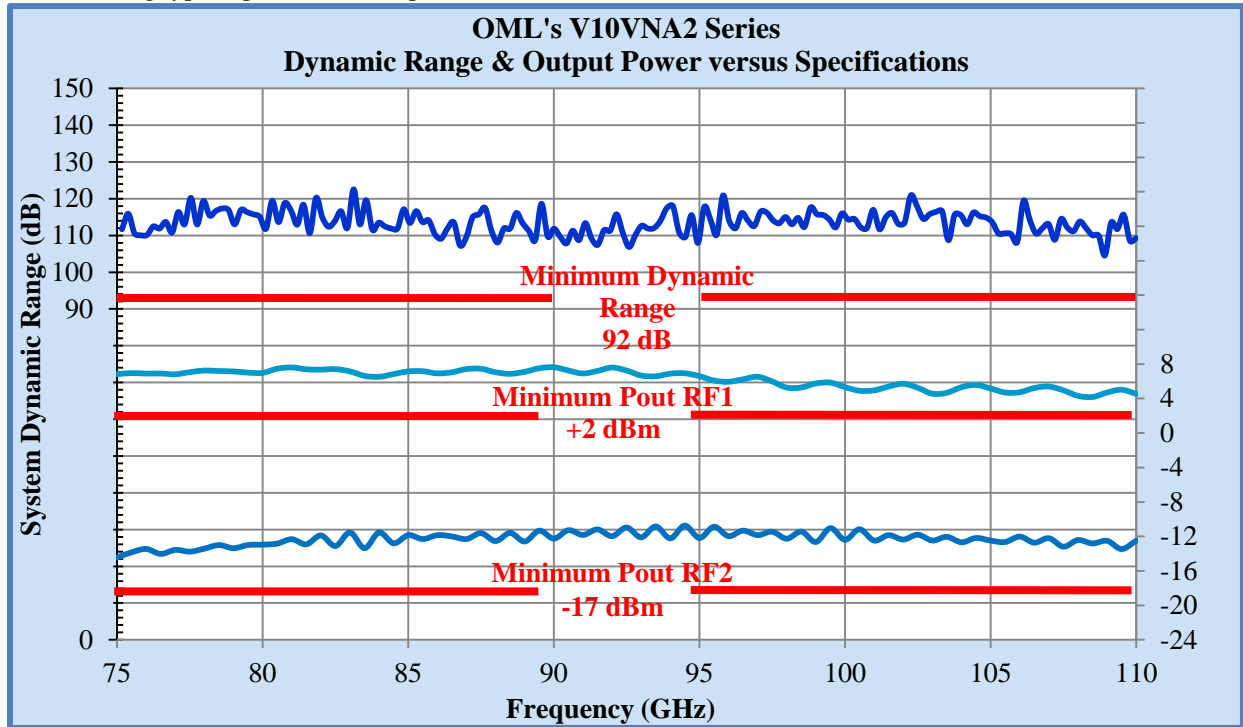
⁷Test Port Flange Configuration is compatible with MIL-DTL-3922/67D (UG387/U-M)





TYPICAL PERFORMANCE

The following typical performance is possible with the V10VNA2 Series modules.



ORDER INFORMATION

S-parameters {Architecture}	S ₁₁ , S ₂₁ , S ₁₂ , S ₂₂ {Full 2-port}	(S ₁₁ , S ₂₁) or (S ₁₂ , S ₂₂) {1-path / 2-port}	S ₂₁ or S ₁₂ only {Scalar 2-port}	S ₁₁ or S ₂₂ only {Vector 1-port}
Test Port Module(s)	V10VNA2-T/R-IMD V10VNA2-T/R	V10VNA2-T/R-IMD V10VNA2-T	V10VNA2-S V10VNA2-T	V10VNA2-T/R-IMD
Option A	In T/R or S module, adds Manually Adjustable Attenuator (0-25 dB) to RF path			
Option RLA	In T/R or S module, adds amplifier (15 dB gain) in RF&LO paths for drive input of -5 dBm			
Option LOA	In T module, adds amplifier (15 dB gain) in LO path for drive input of -5 dBm			

Standard accessories for each module includes: DC Power Cable (V00DCBC1), Waveguide Section (V10WG2), and 20 dB Attenuator (V10AT20).

MECHANICAL DIMENSIONS (If necessary, contact OML for more detailed drawings)

