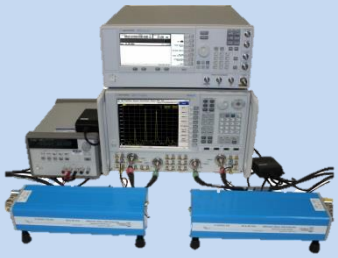
V12VNA2 IMD (Intermodulation) Series
WR12 Frequency Extension Module
60-90 GHz

DESCRIPTION

The V12VNA2-T/R-IMD Series will expand your existing Vector Network Analyzer (VNA) capabilities so you can conduct industry-leading millimeter wave S-parameters in WR12 (60-90 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 V12VNA2 module will satisfy the following specifications.

Electrical Characteristics[1]	MIN	TYP	MAX
System Operating Frequency	60 GHz	--	90 GHz
Test Port Output Power 1[2]	+2 dBm	+5 dBm	
Test Port Output Power 2[2]	-8 dBm	-5 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 ºC	+25 ºC	+30 ºC

[1]Specifications are typical and subject to change without notice
[2]As there are no internationally recognized power standards above 110 GHz, any power data supplied above 110 GHz is traceable only to OML's Calorimeter [3]Measured with Agilent PNA-X (N524xA) at 10 Hz IF bandwidth
[4]At +25°C. measured for 1 hr after 1 hr warn-up. Based on "perfect" RF & LO test cables not moved after warm-up and calibration. Not tested.
[5]Not tested
[6]Available as an option (Option A)

Module Characteristics[1]	Description
Test Port, System Output Interface[7]	WR-12
RF System Input Interface, SMA(f), T/R & S modules	
RF Input Frequency	10.0 to 15.0 GHz
RF Input Power	+10 dBm ± 1.5 dB
RF Input Damage Level	+20 dBm
RF Multiply Factor	x6
LO System Input Interface, SMA(f), All modules	
LO Input Frequency	12.0 to 18.0 GHz
LO Input Power	+10 dBm ± 1.5 dB
LO Input Damage Level	+20 dBm
LO Multiply Factor	x5
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.

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

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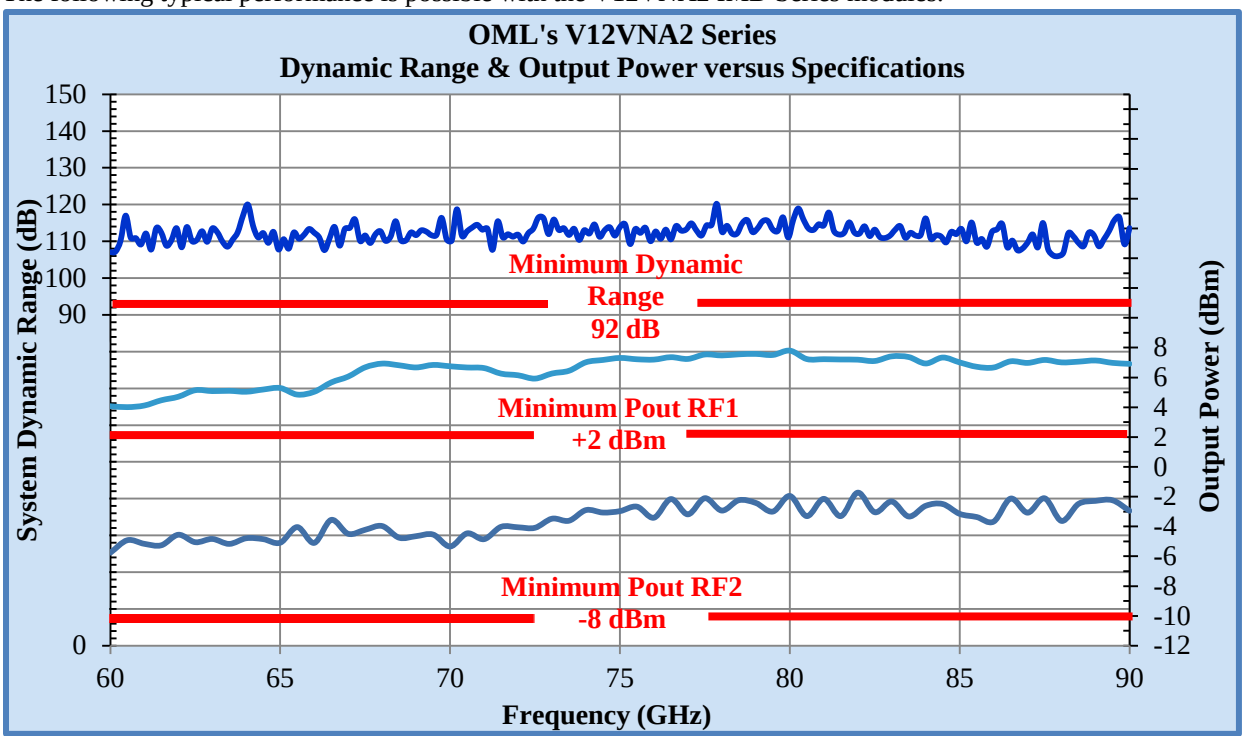
TYPICAL PERFORMANCE

The following typical performance is possible with the V12VNA2 IMD Series modules.

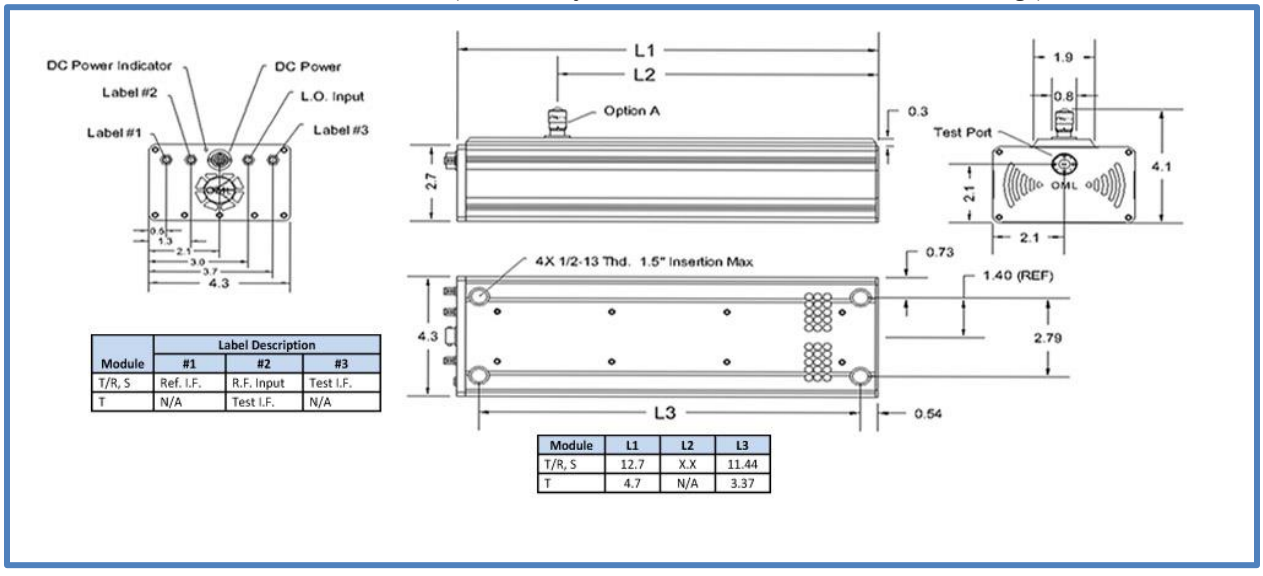


ORDER INFORMATION

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)	V12VNA2-T/R-IMD V12VNA2-T/R	V12VNA2-T/R-IMD V12VNA2-T	V12VNA2-S V12VNA2-T	V12VNA2-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 (V12WG2), and 20 dB Attenuator (V12AT20).

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



Module	Label Description		
	#1	#2	#3
T/R, S	Ref. I.F.	R.F. Input	Test I.F.
T	N/A	Test I.F.	N/A

Module	L1	L2	L3
T/R, S	12.7	X.X	11.44
T	4.7	N/A	3.37