



MILLIMETER WAVE SCALAR ANALYZER BROCHURE



“Innovation in Millimeter Wave Measurements”

General Information

The RxxRFT & RxxDET Series are elements that extend the frequency range of scalar network analyzers to millimeter wave. These complete scalar systems contain filtered multipliers with -50 dBc spurious and harmonics. Included are a dual directional coupler and detectors for reference, reflection and transmission measurements.

HIGHLIGHTS	APPLICATIONS
<ul style="list-style-type: none"> • Full waveguide band coverage • Scalar reflection and transmission measurements 	<ul style="list-style-type: none"> • Versatility to satisfy multiple applications • Economic alternative to vector network analyzers

System Overview

As shown in the following setup, the system consists of a microwave scalar network analyzer, which utilizes an external microwave synthesizer. The RxxRFT & RxxDET Series are external modules that extend the measurements to millimeter wave for reflection and transmission measurements of your DUT.



ELECTRICAL AND PERFORMANCE SPECIFICATIONS (+25°C)

After a one hour warm-up period, the RxxRFT Series satisfy the following specifications.

SPECIFICATIONS ¹	REFLECTOMETER		
MODEL	R15RFT	R12RFT	R10RFT
System Operating Freq. (GHz)	50 to 75	60 to 90	75 to 110
RF Input Freq. (GHz)	12.5 to 18.8	10.0 to 15.0	12.5 to 18.4
RF Input Power (dBm)	+7 min, +10 max.		
RF Input Damage Level (dBm)	+20		
RF Multiplication Factor	4	6	6
RF Input Return Loss	14 dB typ.		
Spurs & Harmonics	-20 dBc typ. with FL1 thru section installed -50 dBc max. with Filters FL2, FL3, or FL4 installed		
Reflectometer Coupler Directivity	35 dB typ.		
Test Port Output Power Minimum (dBm) Typical (dBm)	-2 +2 typ. w/ FL1 thru section installed	0 +4 w/ FL1 thru section installed	-5 0 w/ FL1 thru section installed
Test Port Match (dB) typ.	> 17	> 17	> 17
System Input Interface RF (Test Port) Output Flange	MIL-DTL-3922/67D-008 (UG 387/U)	MIL-DTL-3922/67D -009 (UG 387/U)	MIL-DTL-3922/67D -010 (UG 387/U)
RF Input Detector Output DC Input	SMA (f) BNC (f) 7 Pin Bayonet Circular Receptacle		
System Output Interface	WR-15	WR-12	WR-10
DC Power	+12VDC @ 1.5A typ.		
Operating Temperature	+20 to +30°C		
Weight	≤ 5 lbs		
Size (L x W x H) ²	9.0" x 4.8" x 1.5"		8.0" x 4.8" x 1.5"

¹ Specifications are typical and subject to change without notice

² Excluding Detector, DC and RF input connector

ELECTRICAL AND PERFORMANCE SPECIFICATIONS (+25°C)

After a one hour warm-up period, the RxxDET Series satisfy the following specifications.

SPECIFICATIONS ¹	TRANSMISSION DETECTOR		
MODEL	R15DET	R12DET	R10DET
Frequency Range (GHz)	50 to 75	60 to 90	75 to 110
Detector Return Loss (dB)	15 typ.		
Detector Flatness (dB)	± 3 typ.		
Detector Output (mV/mW) typ.	250	200	150
CW Input Power (dBm)	+ 20 max.		
Interface RF Input Flange Detector Output	MIL-F-3922/67B-008 (UG 387/U)	MIL-F-3922/67B-009 (UG 387/U)	MIL-F-3922/67B-010 (UG 387/U)
Operating Temperature	+20 to +30°C		
Weight	≤ 10 oz		
Size (L x W x H) ²	3.8" x 1.1" x 0.8"		3.7" x 1.1" x 0.8"

¹Specifications are typical and subject to change without notice

²Excluding BNC (f) connector

Ordering Information

Order Information	
R15RFT	WR-15 Reflectometer Module w/ Detector & 3 Filters
R12RFT	WR-12 Reflectometer Module w/ Detector & 4 Filters
R10RFT	WR-10 Reflectometer Module w/ Detector & 4 Filters
Standard Accessories	
R15DET R15RFT-FL1 R15RFT-FL2 R15RFT-FL3 WGS01 V00DCBC1	Transmission Detector, WR-15, 50 to 75 GHz WR-15 BPF, 50 to 75 GHz WR-15 BPF, 50 to 58 GHz WR-15 BPF, 57 to 75 GHz Waveguide Short 1 m DC power cable, Banana Plug to 7-Pin Circular Jack Connector
R12DET R12RFT-FL1 R12RFT-FL2 R12RFT-FL3 R12RFT-FL4 WGS01 V00DCBC1	Transmission Detector, WR-12, 60 to 90 GHz WR-12 BPF, 60 to 90 GHz WR-12 BPF, 60 to 66 GHz WR-12 BPF, 65 to 80 GHz WR-12 BPF, 71 to 90 GHz Waveguide Short 1 m DC power cable, Banana Plug to 7-Pin Circular Jack Connector
R10DET R10RFT-FL1 R10RFT-FL2 R10RFT-FL3 R10RFT-FL4 WGS01 V00DCBC1	Transmission Detector, WR-10, 75 to 110 GHz WR-10 BPF, 75 to 110 GHz WR-10 BPF, 75 to 92 GHz WR-10 BPF, 89 to 110 GHz WR-10 BPF, xx to xx GHz Waveguide Short 1 m DC power cable, Banana Plug to 7-Pin Circular Jack Connector

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MILLIMETER WAVE RECTANGULAR TE₁₀ WAVEGUIDE INFORMATION

WG Band	Waveguide Frequency Range (GHz)	Wavelength Range λ_0 (mil)	Wavelength Range λ_0 (mm)	Guide Wavelength Range (λ_g/λ_0)	Waveguide Impedance Range (Ω)	TE ₁₀ Cutoff Freq (GHz)	TE ₁₀ Cutoff λ_c (mil)	TE ₁₀ Cutoff λ_c (mm)	Internal Dimensions (mils)	Internal Dimensions (mm)
WR-28	26.5 - 40.0	445.4 - 295.1	11.313 - 7.495	1.650 - 1.177	621.9 - 443.6	21.1	560.0	14.22	280.0 x 140.0	7.112 x 3.556
WR-22	33.0 - 50.0	357.7 - 236.1	9.085 - 5.996	1.661 - 1.177	626.0 - 443.6	26.3	448.0	11.38	224.0 x 112.0	5.690 x 2.845
WR-19	40.0 - 60.0	295.1 - 196.7	7.495 - 4.997	1.613 - 1.173	608.3 - 442.4	31.4	376.0	9.55	188.0 x 94.0	4.775 x 2.388
WR-15	50.0 - 75.0	236.1 - 157.4	5.996 - 3.997	1.657 - 1.181	624.8 - 445.1	39.9	296.0	7.52	148.0 x 74.0	3.759 x 1.880
WR-12	60.0 - 90.0	196.7 - 131.1	4.997 - 3.331	1.690 - 1.186	637.2 - 447.1	48.4	244.0	6.20	122.0 x 61.0	3.099 x 1.549
WR-10	75.0 - 110.0	157.4 - 107.3	3.997 - 2.725	1.620 - 1.185	610.9 - 446.7	59.0	200.0	5.08	100.0 x 50.0	2.50 x 1.270
WR-08	90.0 - 140.0	131.1 - 84.3	3.331 - 2.141	1.746 - 1.177	658.1 - 443.6	73.8	160.0	4.06	80.0 x 40.0	2.032 x 1.016
WR-06	110.0 - 170.0	107.3 - 69.4	2.725 - 1.763	1.771 - 1.183	667.7 - 445.9	90.8	130.0	3.30	65.0 x 32.5	1.651 x 0.826
WR-05	140.0 - 220.0	84.3 - 53.6	2.141 - 1.363	1.777 - 1.176	669.7 - 443.3	115.7	102.0	2.59	51.0 x 25.5	1.295 x 0.648
WR-04	170.0 - 260.0	69.4 - 45.4	1.763 - 1.153	1.695 - 1.177	638.8 - 443.9	137.2	86.0	2.18	43.0 x 21.5	1.092 x 0.546
WR-03	220.0 - 325.0	53.6 - 36.3	1.363 - 0.922	1.627 - 1.183	613.5 - 445.9	173.6	68.0	1.73	34.0 x 17.0	0.864 x 0.432
WR-02.8	260.0 - 400.0	45.4 - 29.5	1.153 - 0.749	1.708 - 1.177	643.8 - 443.6	210.8	56.0	1.42	28.0 x 14.0	0.711 x 0.356
WR-02.2	325.0 - 500.0	36.3 - 23.6	0.922 - 0.600	1.771 - 1.185	667.7 - 446.7	268.2	44.0	1.12	22.0 x 11.0	0.559 x 0.279
WR-01.9	400.0 - 600.0	29.5 - 19.7	0.749 - 0.500	1.587 - 1.169	598.3 - 440.6	310.6	38.0	0.97	19.0 x 9.5	0.483 x 0.241
WR-01.5	500.0 - 750.0	23.6 - 15.7	0.600 - 0.400	1.620 - 1.175	610.9 - 442.8	393.4	30.0	0.76	15.0 x 7.5	0.381 x 0.191
WR-01.2	600.0 - 900.0	19.7 - 13.1	0.500 - 0.333	1.746 - 1.194	658.1 - 450.1	491.8	24.0	0.61	12.0 x 6.0	0.305 x 0.152
WR-01.0	750.0 - 1100.0	15.7 - 10.7	0.400 - 0.273	1.620 - 1.185	610.9 - 446.7	590.1	20.0	0.51	10.0 x 5.0	0.254 x 0.127

Scalar Brochure: Rev. B
 Release Date: 06-2013