WERBEL MICROWAVE LLC
628 State Route 10, Unit 14
Whippany, N.J. 07981
www.WerbelMicrowave.com

Directional Coupler, 0.5-2GHz, 10dB, SMA Female — WMC-0.5-2-10dB-S

Description

Model WMC-0.5-2-10dB-S from Werbel Microwave is a directional coupler that covers 500 MHz to 2 GHz with broadband flat coupling response, high directivity, and excellent return loss performance. Stripline design handles much higher power than equivalent core-and-wire models, while the enclosure remains minimally sized at 3.600 x 0.600 x 0.38 inches with SMA-Female connectors. The device is RoHS compliant, and Sn/Pb solder is available on special order. The device has coverage of the upper band of UHF as well as L-band. The mainline and coupled arm VSWR is 1.15:1 typical, minimizing reflections and leading to highly accurate measurements. Designed, assembled, and tested in the USA.

Photo is representative.

Specifications	Min.	Typ.	Max.	Units
Frequency	500	--	2000	MHz
Impedance	--	50	--	Ohm
Coupling	--	10 ± 1.0	--	dB
Frequency Sensitivity (Flatness)	--	± 0.75	± 1.00	dB
Mainline Loss[1]	--	0.6	0.9	dB
Directivity	23	25	--	dB
Main Line Return Loss	20	24	--	dB
Secondary Line Return Loss	20	23	--	dB
Isolation	--	35	--	dB
Forward Power (CW)[2]	--	--	50	Watt
Reverse Power (CW)[2]	--	--	5	Watt
Termination Power	--	--	1	Watt

Mechanical

Connector Interface	SMA-Female
Operating Temperature[3]	-55 to +85 °C
Storage Temperature	-55 to +100 °C
Weight	1.5 oz (42 g)
Humidity	10-90% non-condensing
Environment	Indoor Use Only

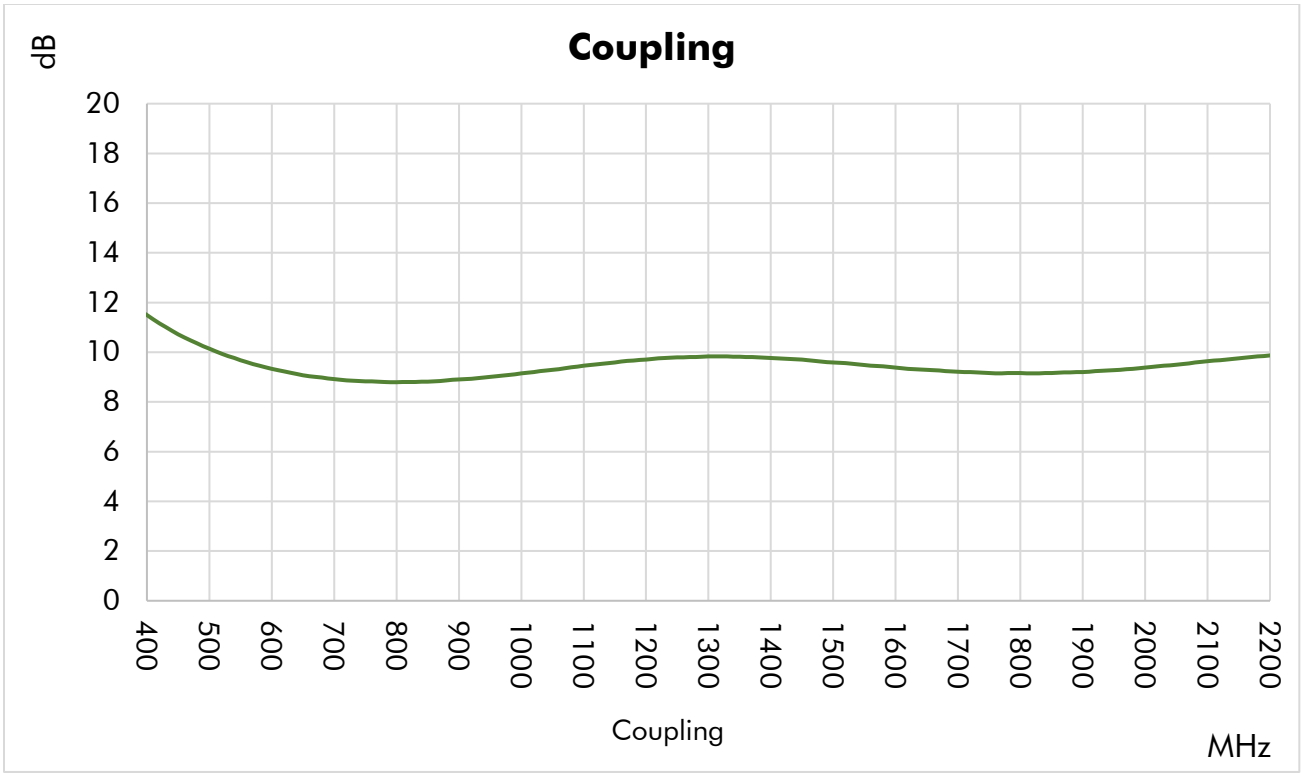
Materials

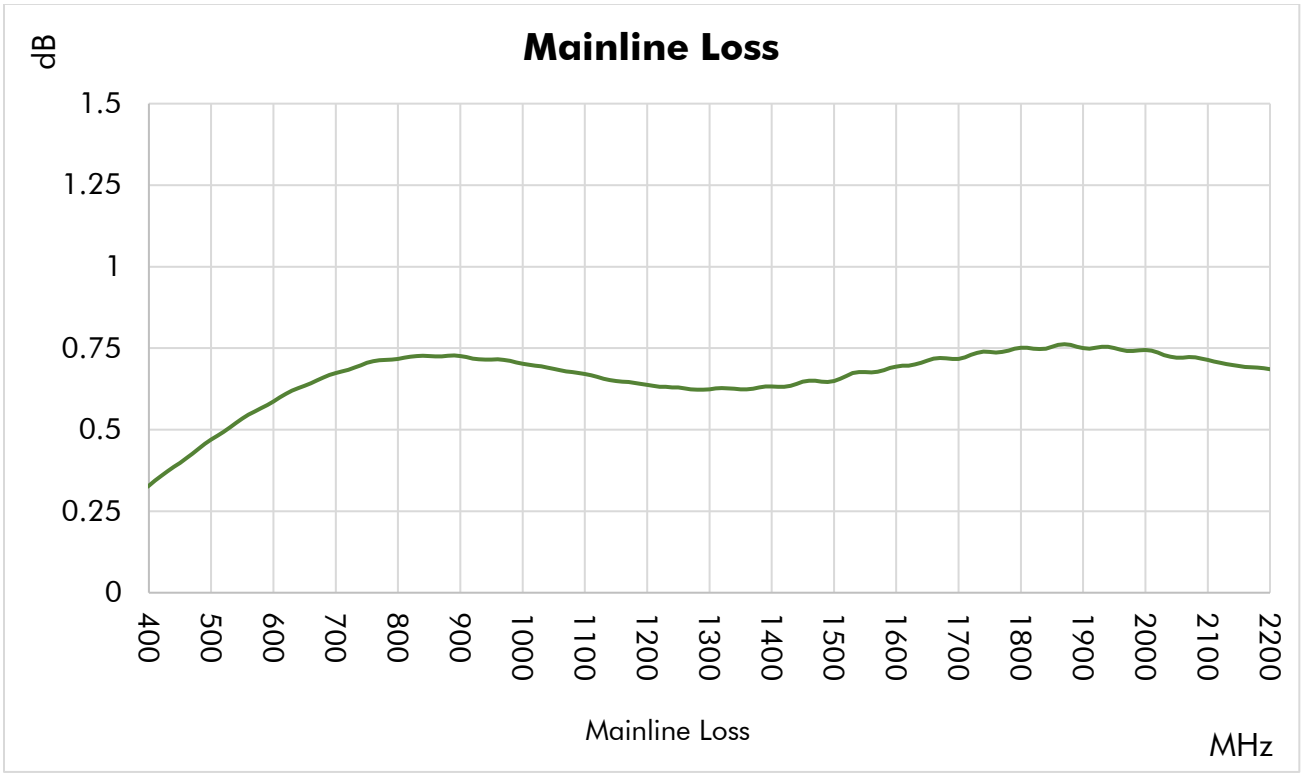
RoHS and REACH Compliant[4]

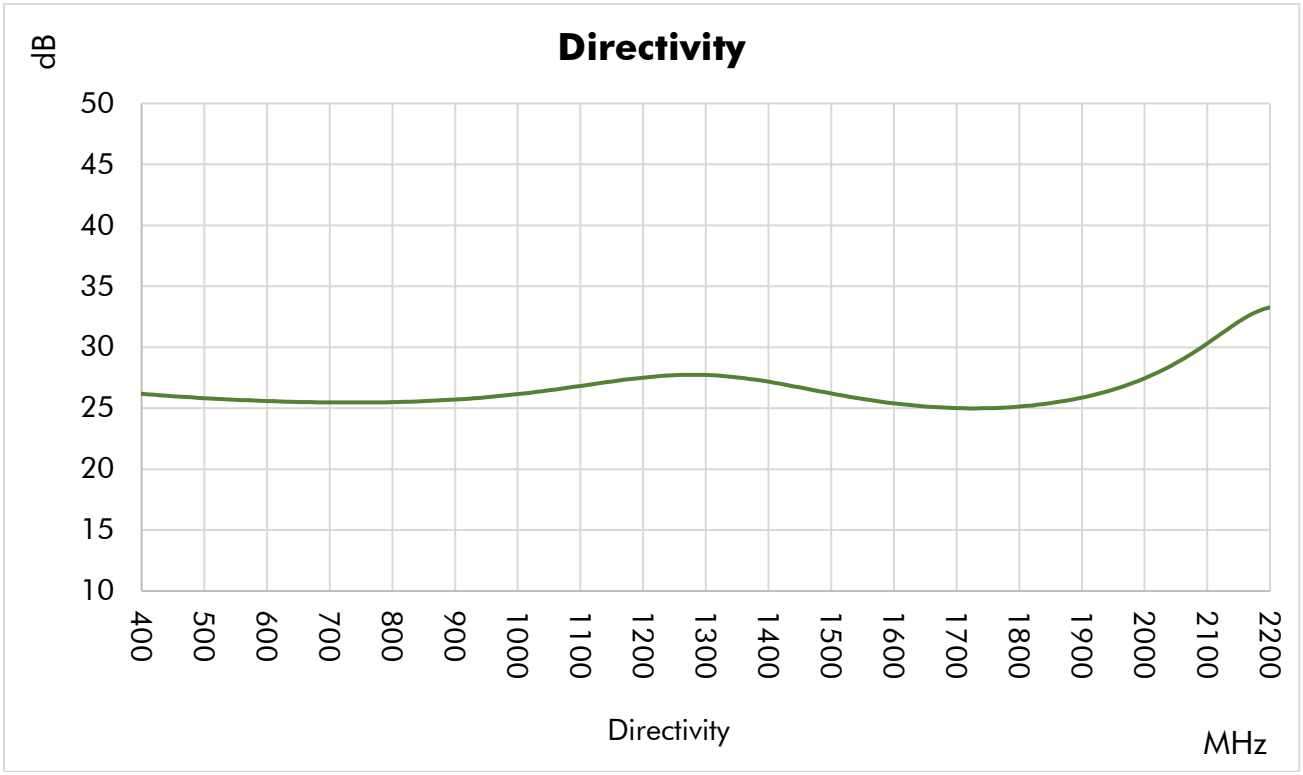
Enclosure	Aluminum
Connectors	Stainless Steel
Contacts	Be Cu, Gold Plated
Insulators	PTFE
Finish	Green Paint

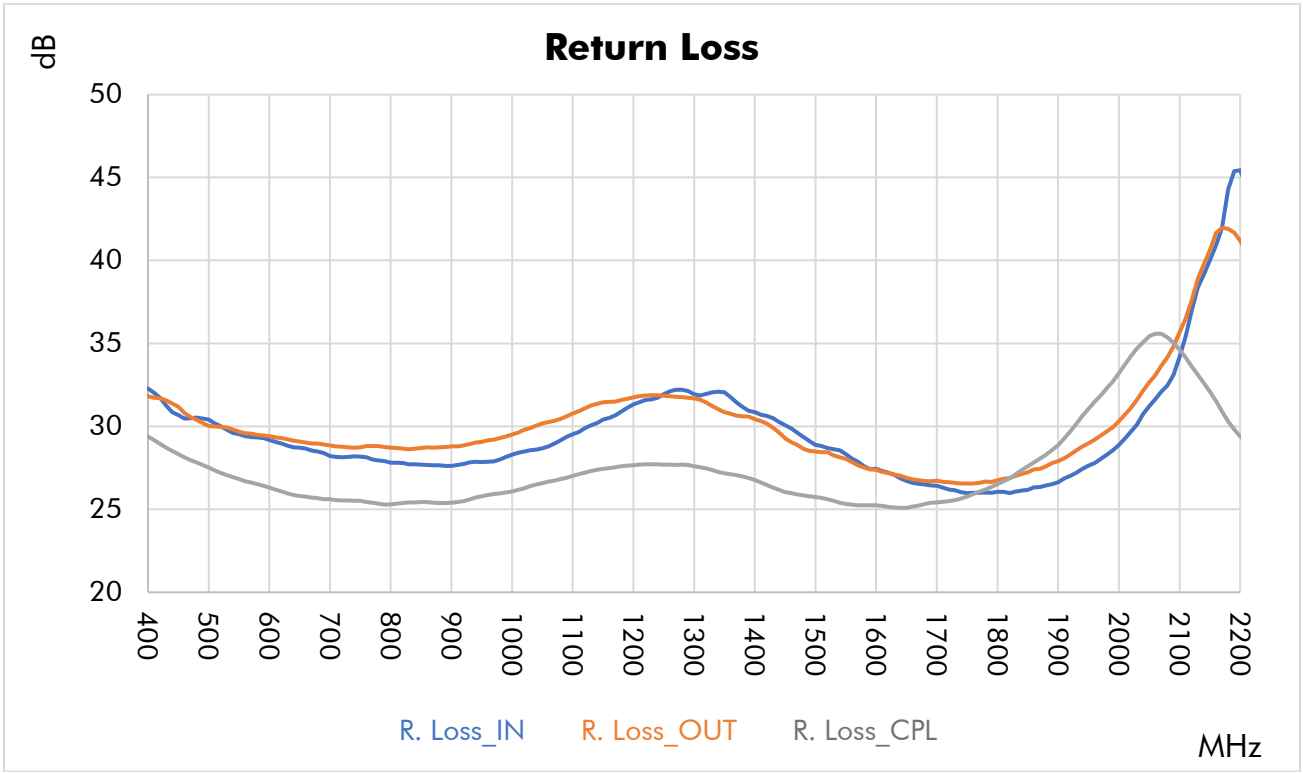
1. Mainline loss includes coupling loss.
2. All output ports should be terminated in a 50-ohm load with 1.2:1 max VSWR.
3. Electrical specifications at +25 °C only.
4. To the best of our knowledge at the time of publication.

Typical Performance at +25 °C

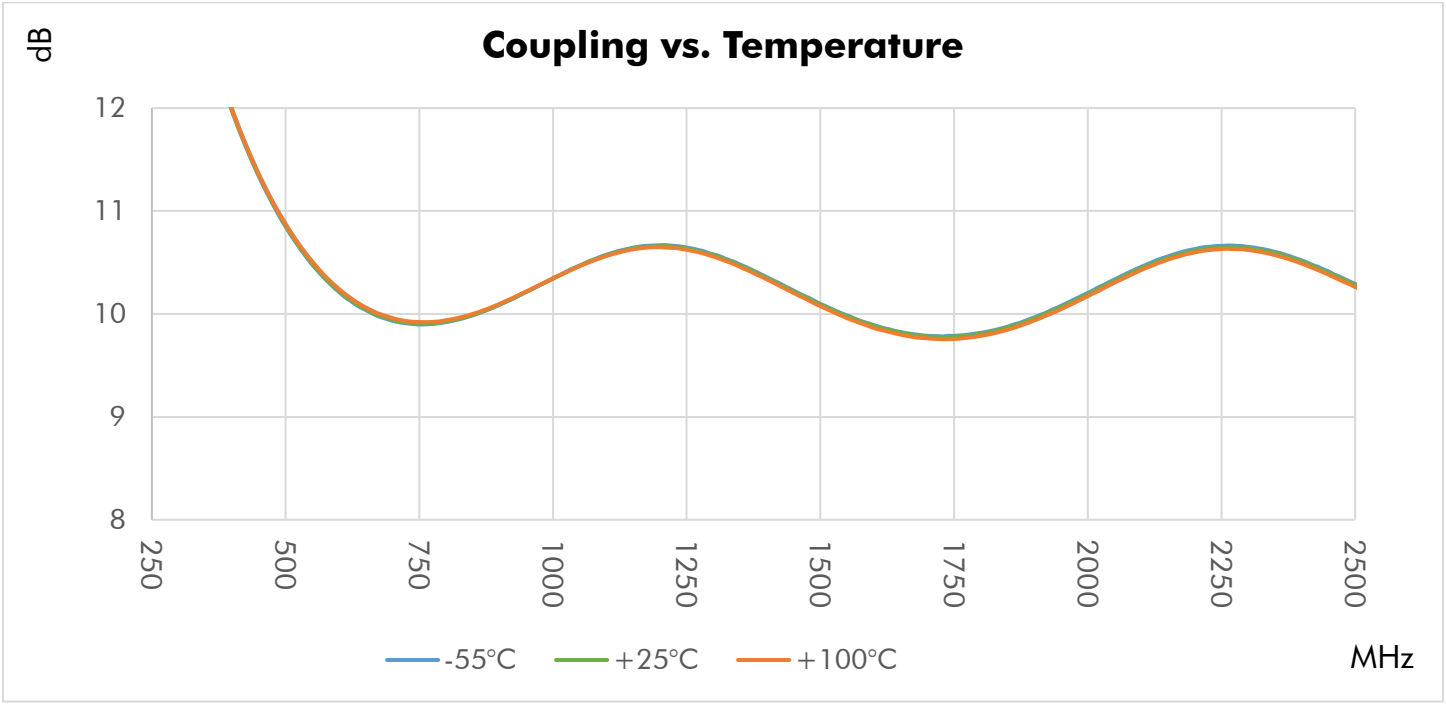


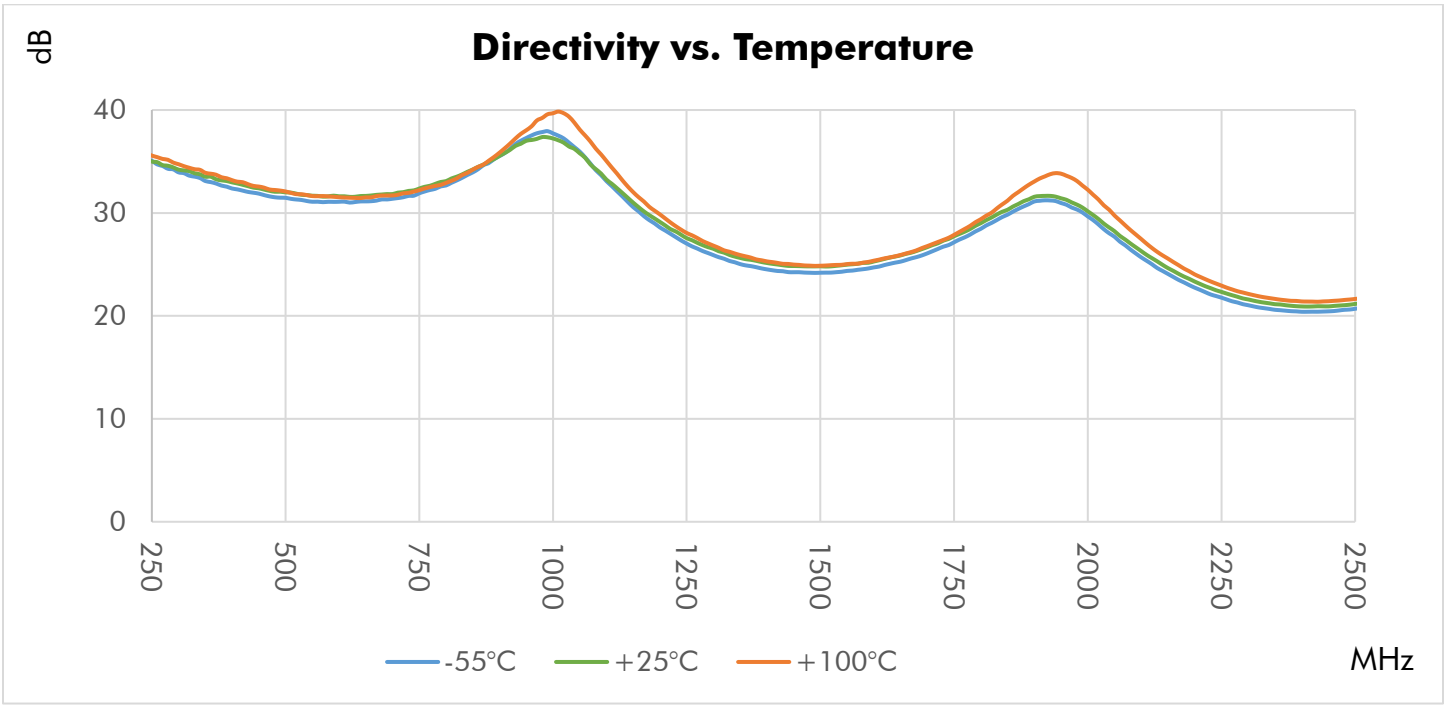


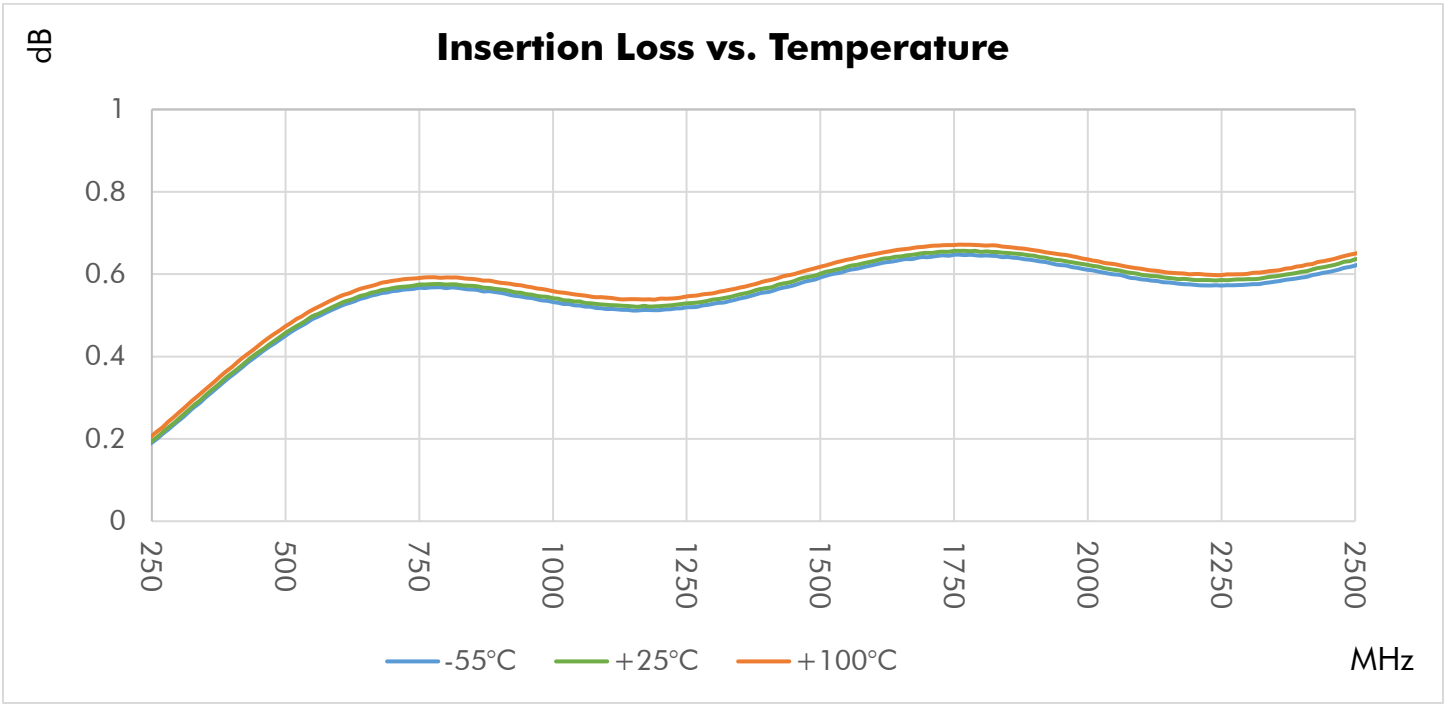

Directivity
dB
50
45
40
35
30
25
20
15
10
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
Directivity
MHz

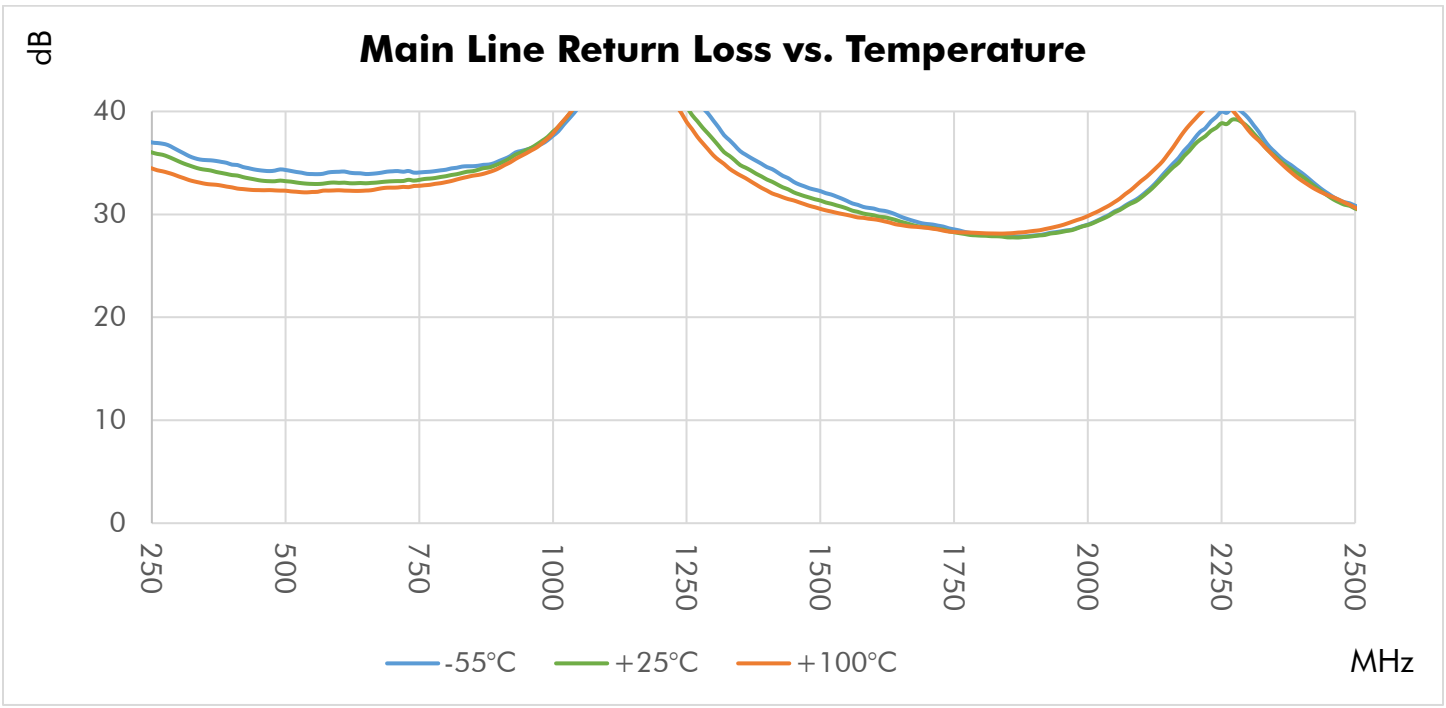

Return Loss
dB
50
45
40
35
30
25
20
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
R. Loss_IN
R. Loss_OUT
R. Loss_CPL
MHz

Typical Performance Over Temperature



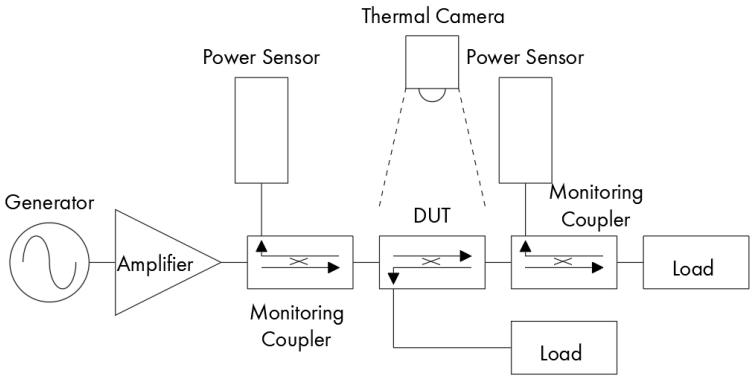
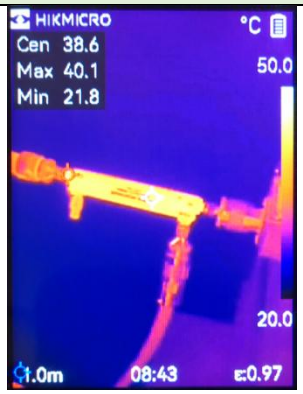



Insertion Loss vs. Temperature
dB
1
0.8
0.6
0.4
0.2
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
-55°C
+25°C
+100°C
MHz

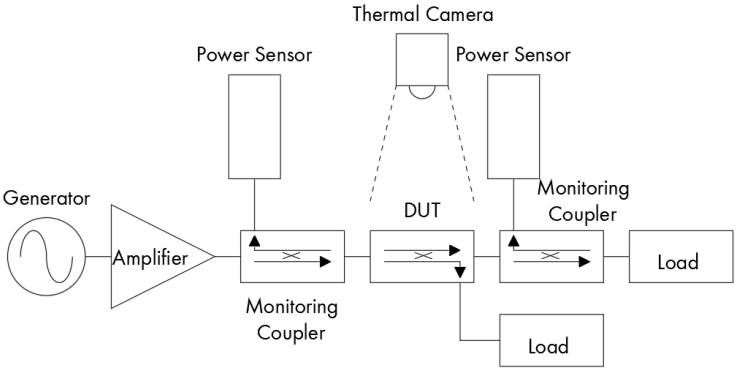

Main Line Return Loss vs. Temperature
dB
40
30
20
10
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
-55°C
+25°C
+100°C
MHz

Reliability Testing

The RF power test was performed in both forward and reverse direction.

Forward Direction RF Power Test Setup Diagram	Initial Temperature	Final Temperature
	 (RF power applied from the right)	 (RF power applied from the right)

- 100 watts CW at 500MHz was applied to the DUT input for a duration of 10 minutes.
- The DUT temperature increased from 26.8°C (initial, center marker) to 40.1°C (final, max marker), resulting in a 13.3°C rise.

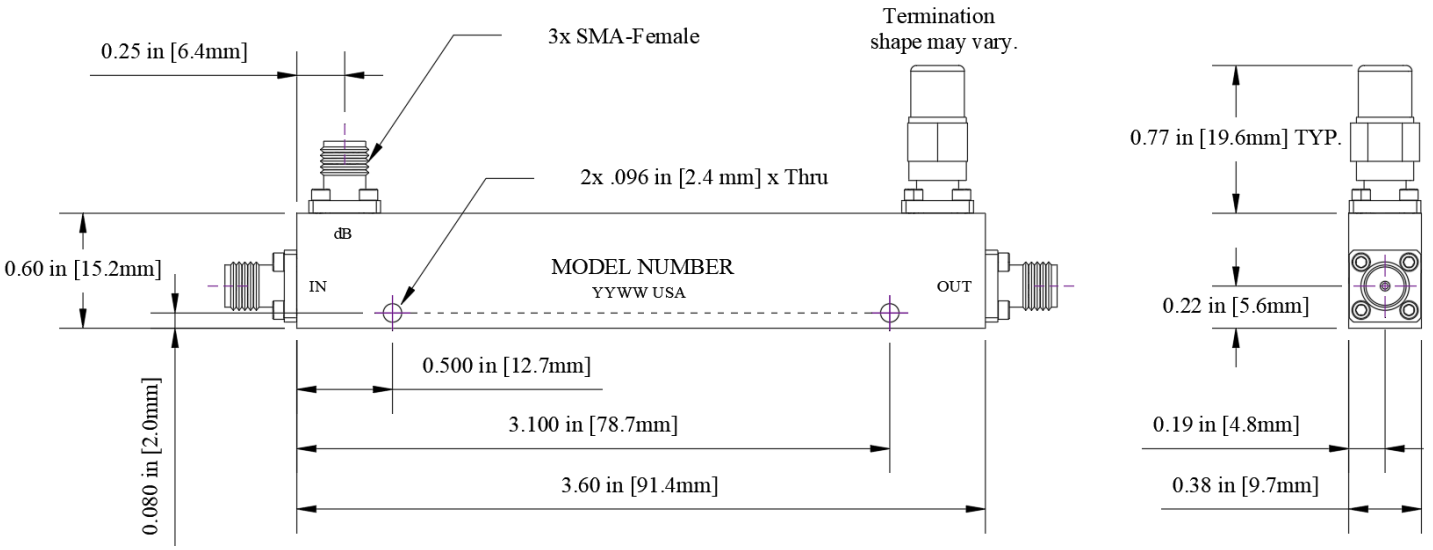
Reverse Direction RF Power Test Setup Diagram	Initial Temperature	Final Temperature
	 (RF power applied from the right)	 (RF power applied from the right)

- 8 watts CW at 500MHz was applied to the DUT output for a duration of 10 minutes.
- The DUT temperature increased from 26.4°C (initial, center marker) to 44.8°C (final, max marker), resulting in an 18.4°C rise.
- The DUT termination was receiving an estimated power of 0.8W, based on a 10dB coupling factor.

Typical Performance Data

Frequency (MHz)	Return Loss (dB)			Mainline Loss (dB)	Coupling (dB)	Directivity (dB)
	In	Out	Cpl.	In-Out	In-Cpl.	
400	31.9	31.9	28.9	0.5	10.9	25.9
500	30.1	29.4	27.1	0.6	9.8	25.6
600	28.9	29.1	26.0	0.7	9.1	25.5
700	27.9	28.4	25.7	0.7	8.8	25.5
800	27.8	28.6	25.5	0.7	8.8	25.6
900	27.7	29.0	25.5	0.7	9.0	26.0
1000	28.5	30.0	26.3	0.7	9.2	26.7
1100	29.7	31.4	27.3	0.7	9.6	27.5
1200	31.6	32.2	27.7	0.6	9.8	27.9
1300	31.7	31.4	27.4	0.7	9.9	27.4
1400	30.8	29.7	26.3	0.6	9.7	26.3
1500	28.8	28.7	25.6	0.7	9.5	25.4
1600	27.4	27.2	25.1	0.7	9.3	25.0
1700	26.5	26.7	25.4	0.8	9.2	25.0
1800	26.2	27.2	27.0	0.8	9.2	25.6
1900	26.7	28.4	29.9	0.7	9.2	27.0
2000	29.3	31.6	34.7	0.7	9.5	29.6
2100	36.3	39.2	33.3	0.7	9.7	33.7
2200	43.4	39.5	28.7	0.7	9.9	33.0

Outline Dimensions



Outline # OL-1002
Dimensions are in inches, [mm] shown for convenience.
Tolerances on 2-pl decimals: ±.03. 3-pl decimals: ± .015.