WERBEL MICROWAVE LLC
628 State Route 10, Unit 14
Whippany, New Jersey 07981
Sales@WerbelMicrowave.com - www.WerbelMicrowave.com

Directional Coupler, 500-8000MHz, N Female

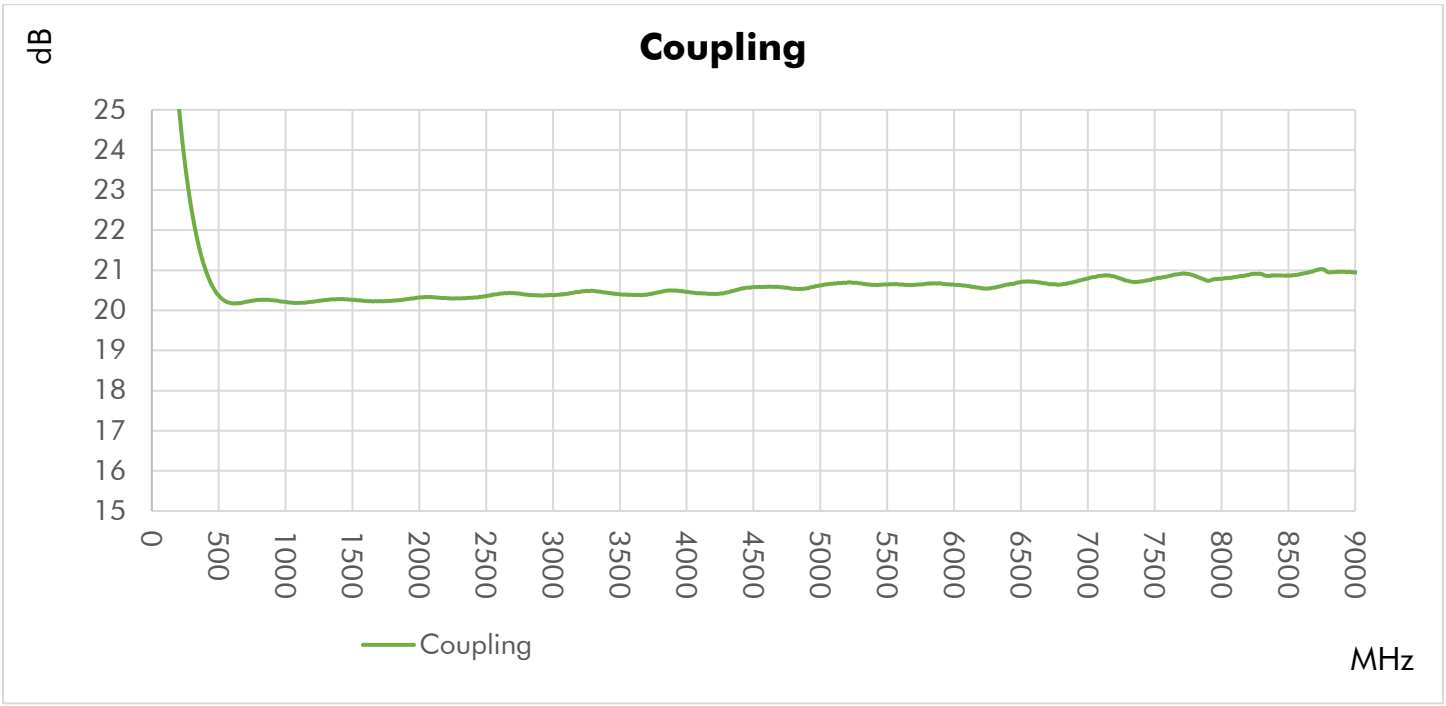
WMC-0.5-8-20dB-N

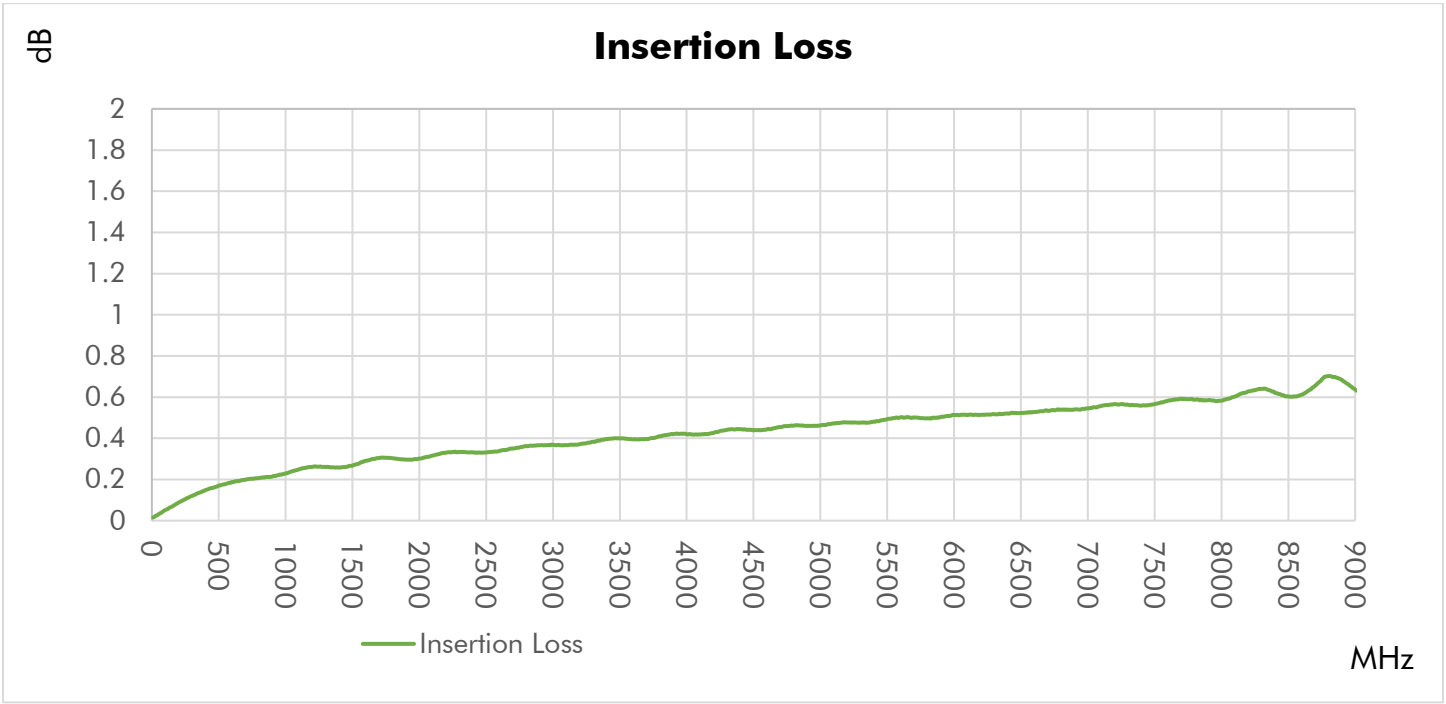
Parameter	Low Band	Mid Band	High Band	Unit
Frequency Range	500-3000	3000-6000	6000-8000	MHz
Impedance		50		Ω
Coupling	20 ± 1.0	20 ± 1.5	20 ± 2.0	dB
Frequency Sensitivity (Flatness)	± 0.20	±0.25	± 0.30	dB, typ.
Mainline Loss[1]	0.5	0.7	0.8	dB, max.
Directivity	20	18	16	dB, min.
Mainline Return Loss	20	20	20	dB, min.
Secondary Line Return Loss	20	18	16	dB, min.
Isolation	40	38	36	dB, typ.
Forward Power (CW)[2]	150	100	90	W, max.
Reverse Power (CW)[2]		50		W, max.
Termination Power		1		W, max.
DC Current (Input-Output)		1		A, max.

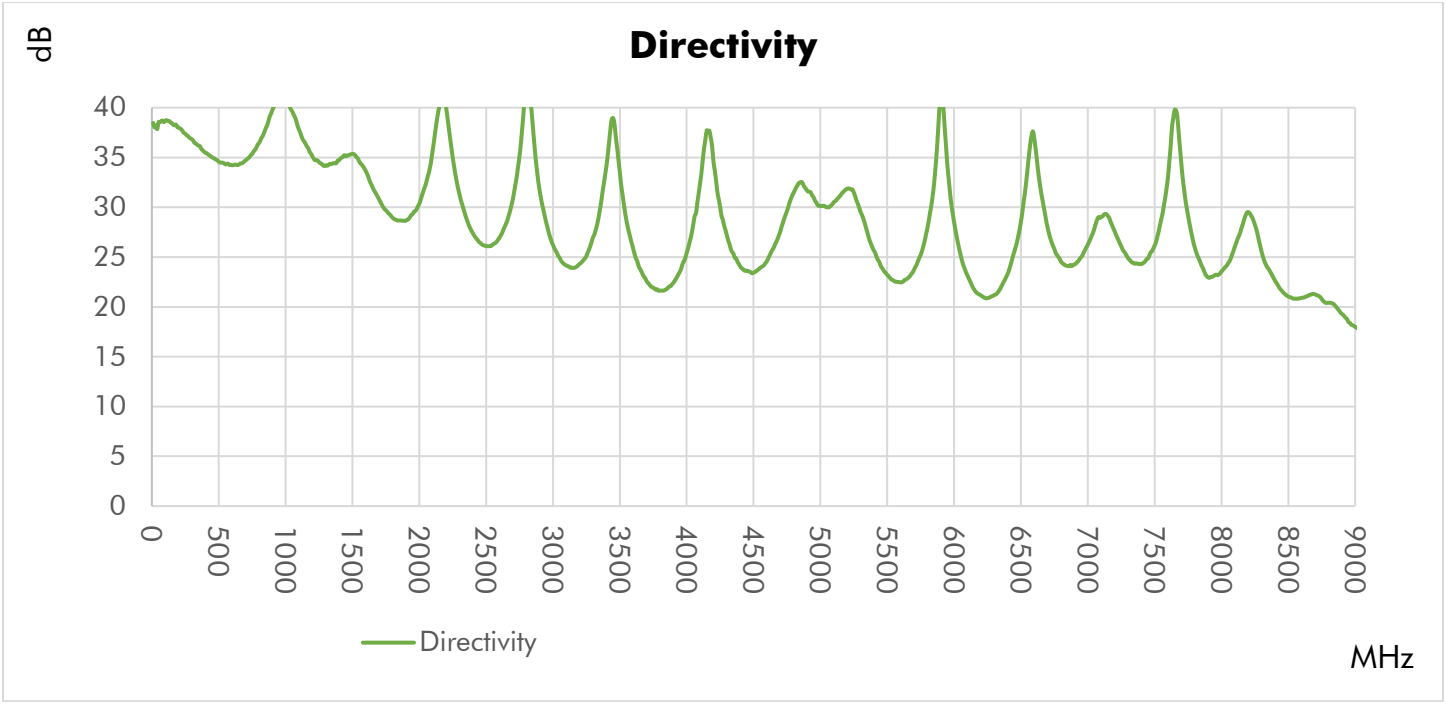
Connector Interface	N Female	RoHS Status[4]	RoHS3 Compliant
Operating Temperature[3]	-55 to +85 °C	REACH Status[4]	REACH Unaffected
Storage Temperature	-55 to +100 °C	Enclosure Material	Aluminum
Nominal Weight	404 g (14.2 oz)	Connectors Material	Brass, Tri-Alloy Plate
Operating Humidity	10-90% (non-condensing)	Contacts Material	Beryllium Copper, Gold Plated
Operating Environment	Indoor Use Only	Insulators Material	Virgin PTFE
HTSUS Code	8525.50.3035	Finish	Green Paint
ECCN	EAR99		

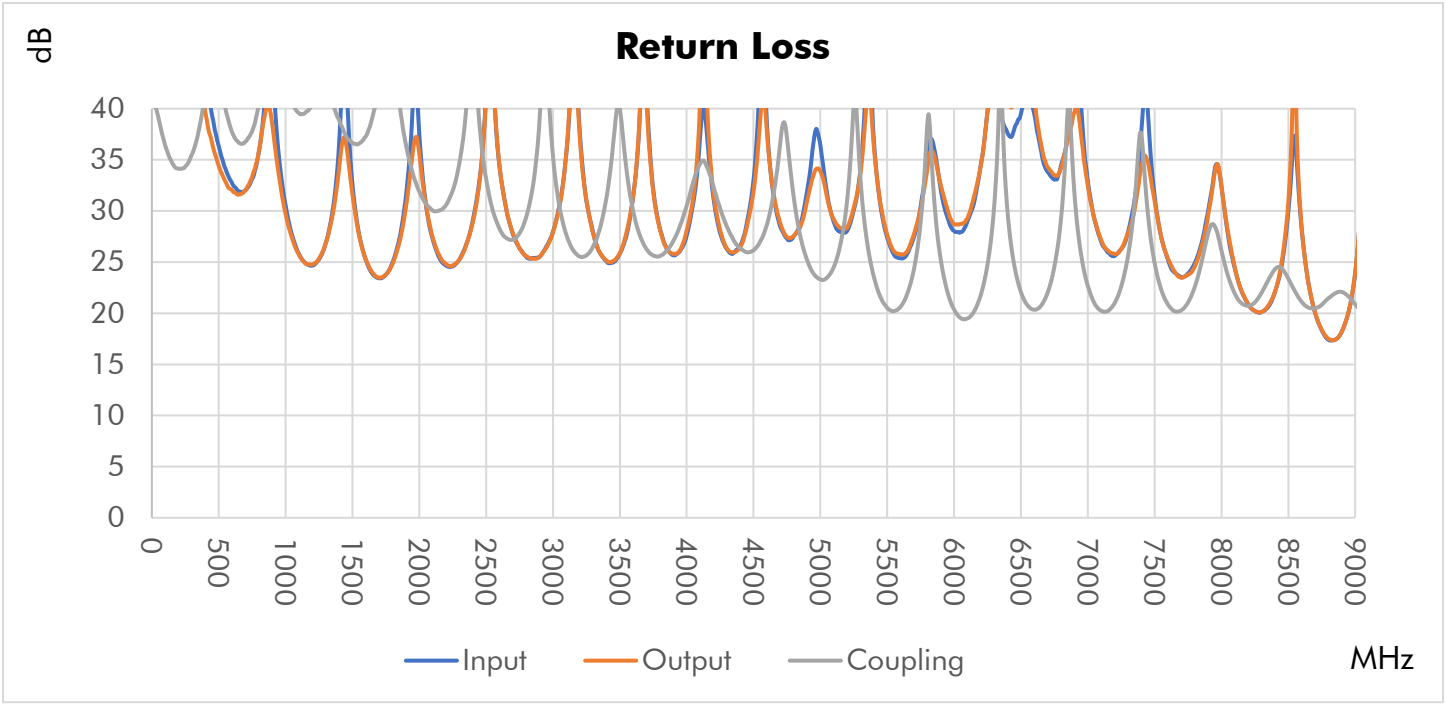
1. Mainline loss includes coupling loss.
2. All output ports should be terminated in a 50-ohm load with 1.2:1 max VSWR.
3. Electrical specifications are tested at +25 °C.
4. To the best of our knowledge at the time of publication.

Typical Performance at +25 °C

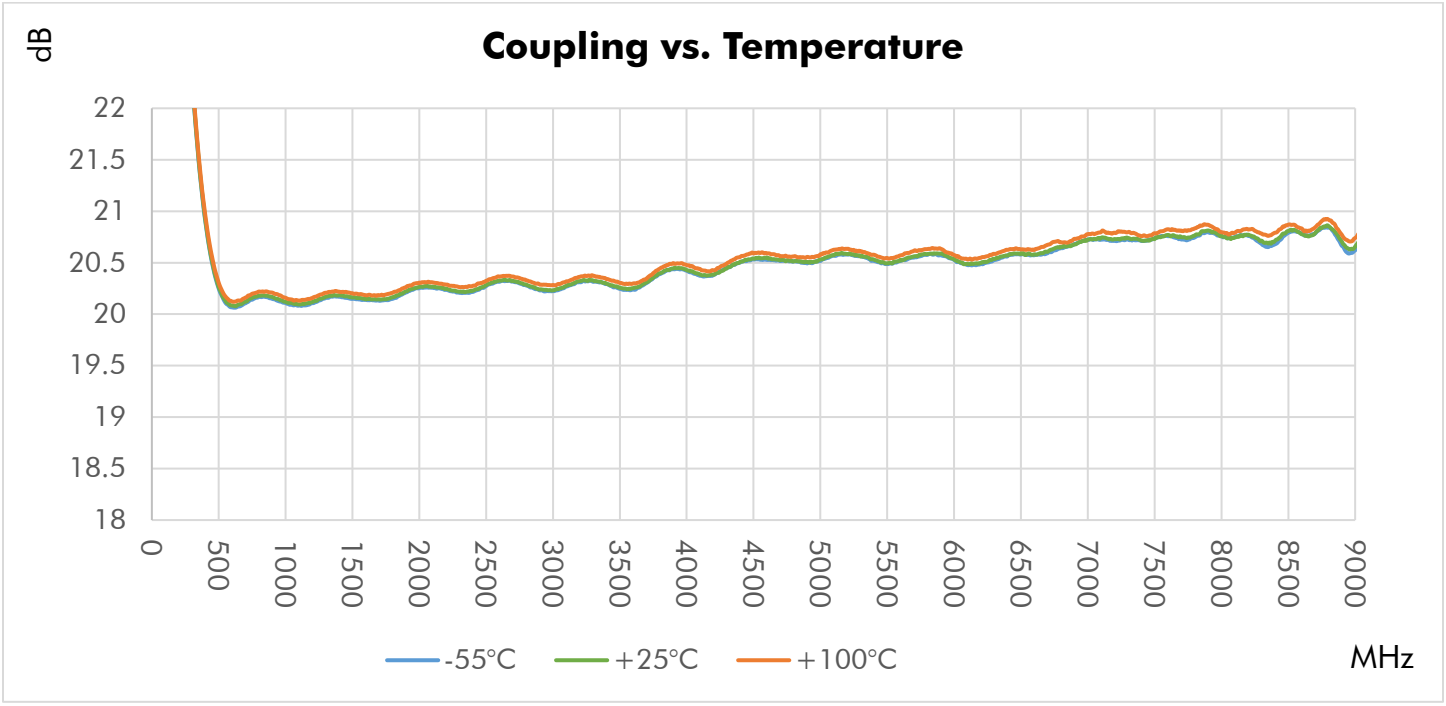


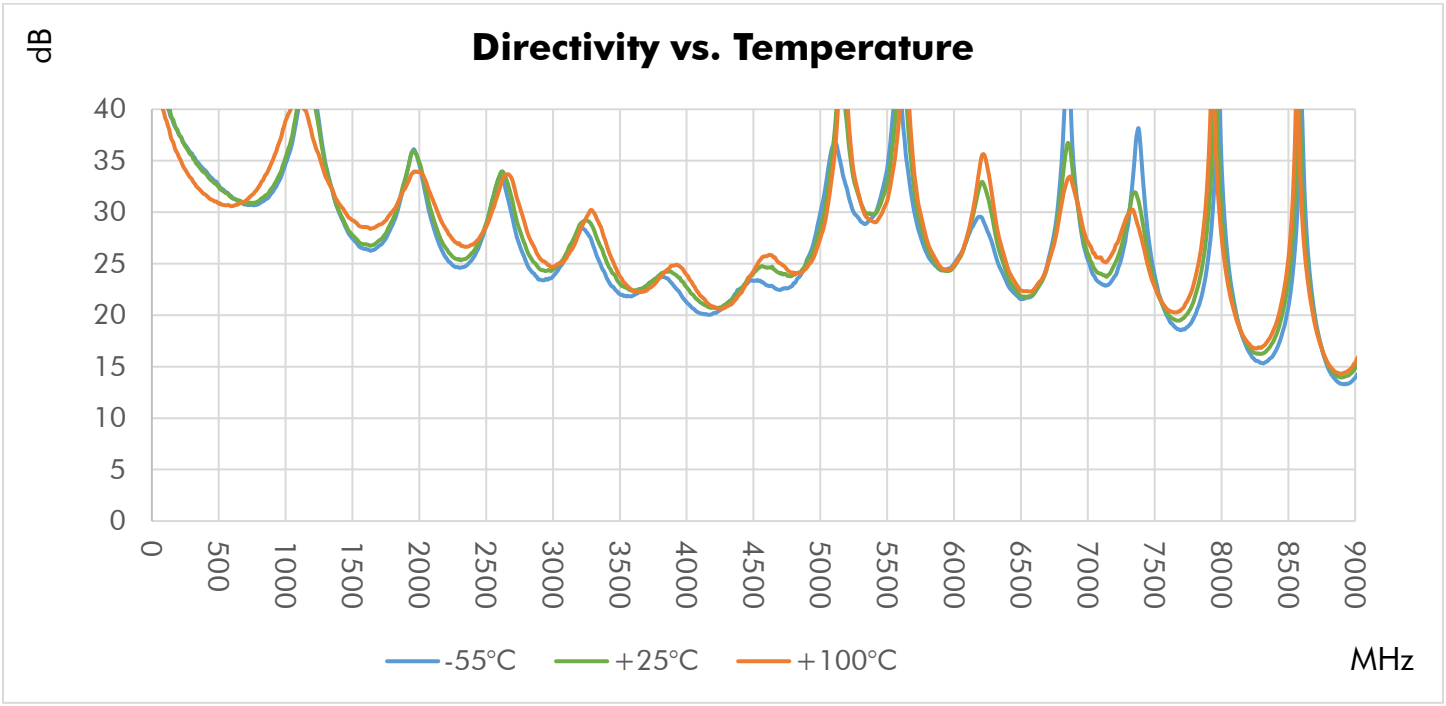


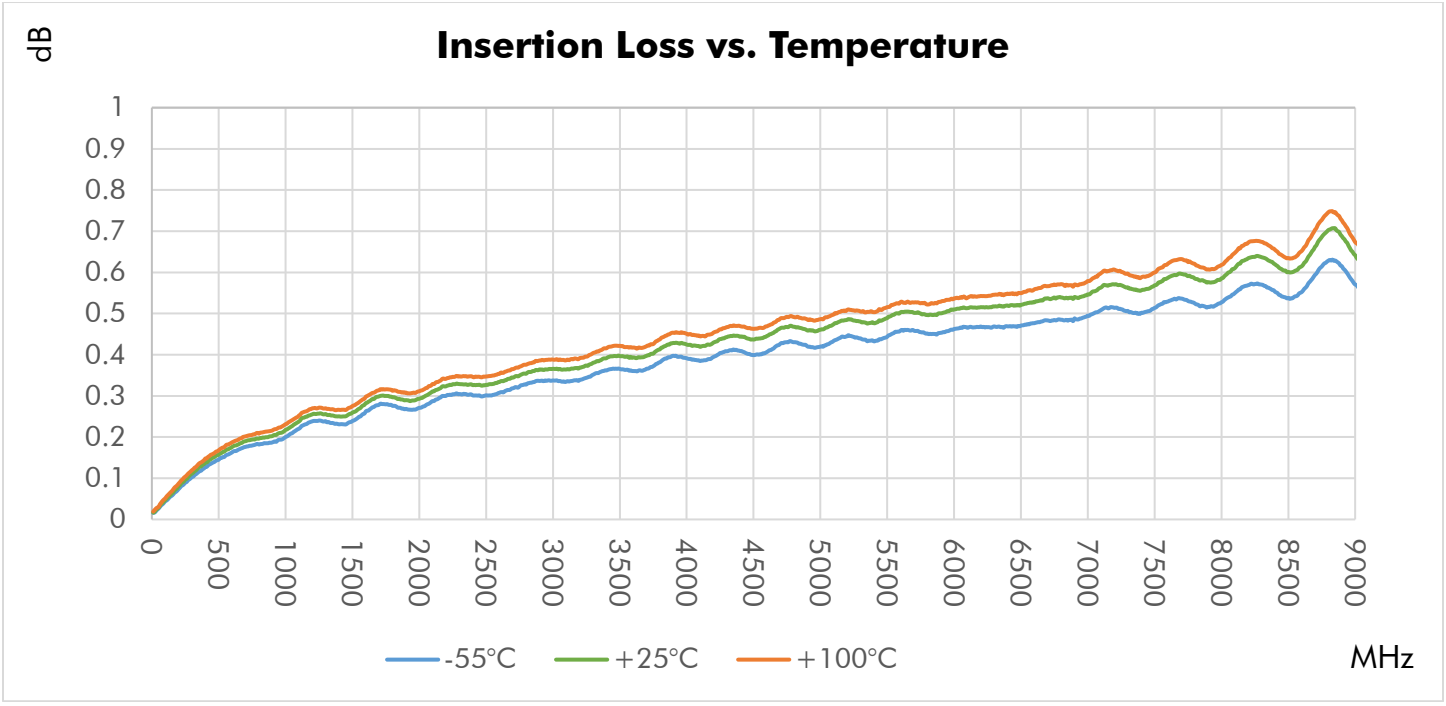

Directivity
dB
40
35
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
Directivity
MHz

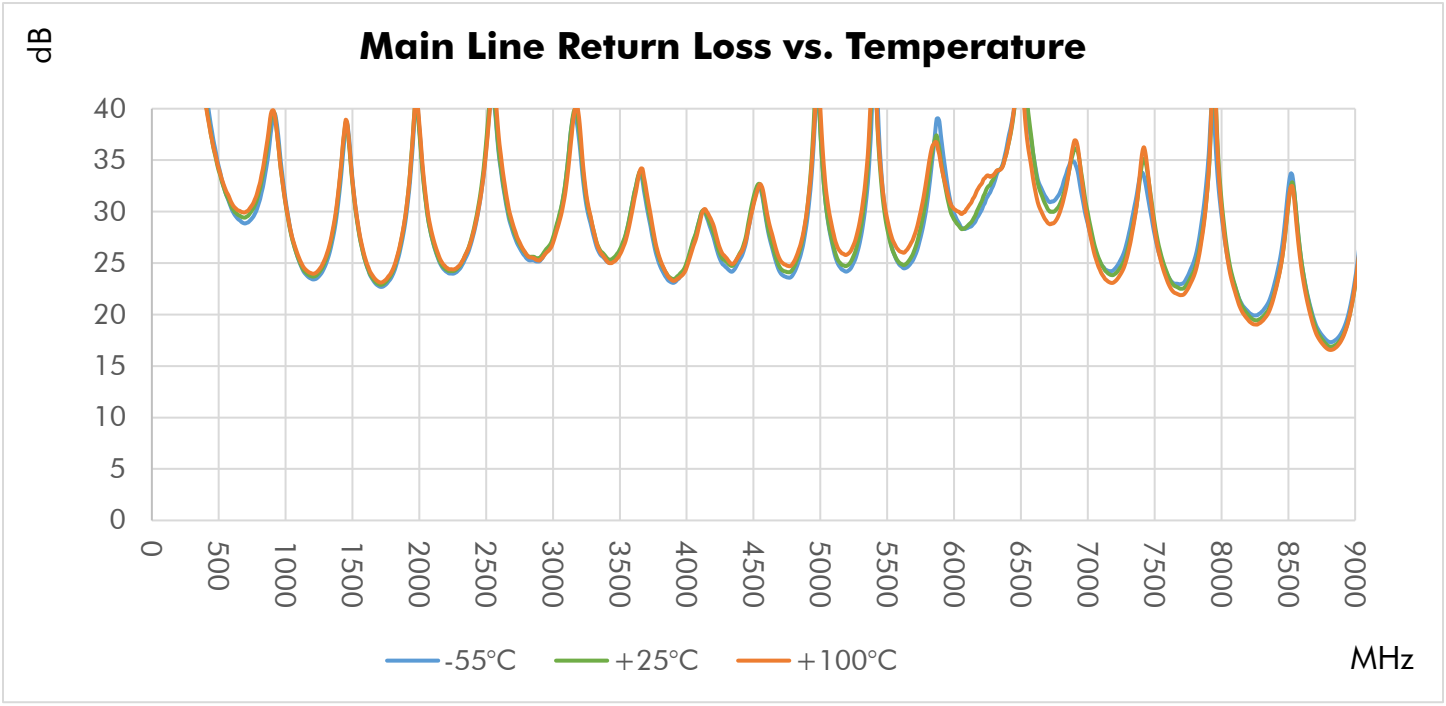

Return Loss
dB
40
35
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
Input
Output
Coupling
MHz

Typical Performance Over Temperature






Insertion Loss vs. Temperature
dB
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
-55°C
+25°C
+100°C
MHz


Main Line Return Loss vs. Temperature
dB
40
35
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
-55°C
+25°C
+100°C
MHz

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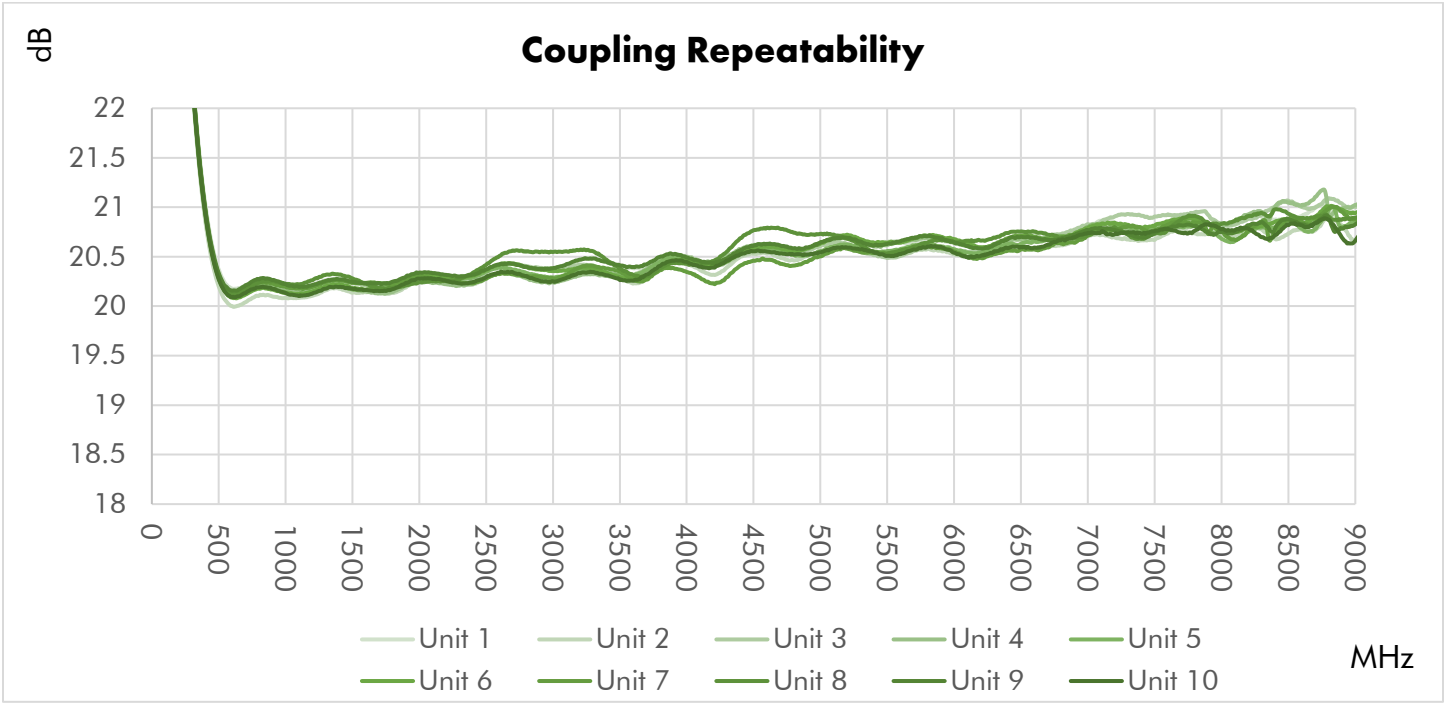
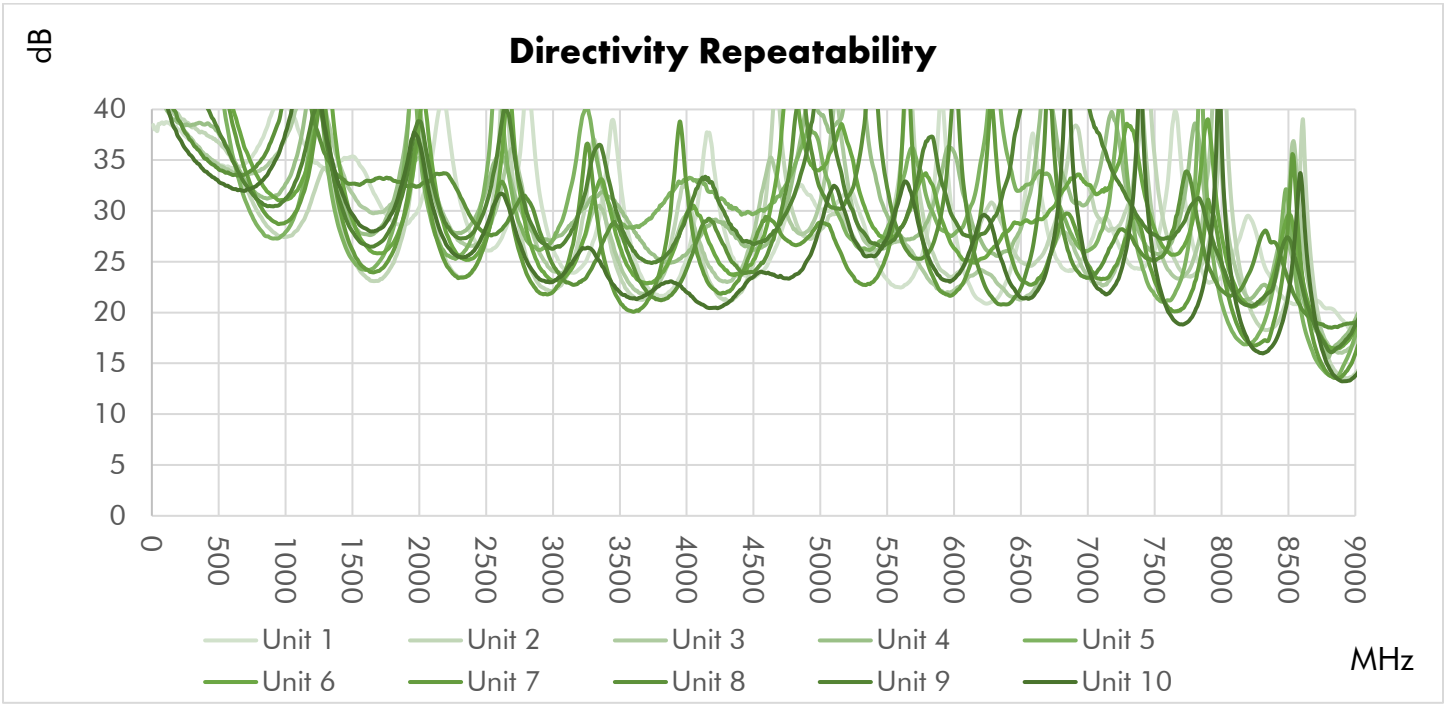
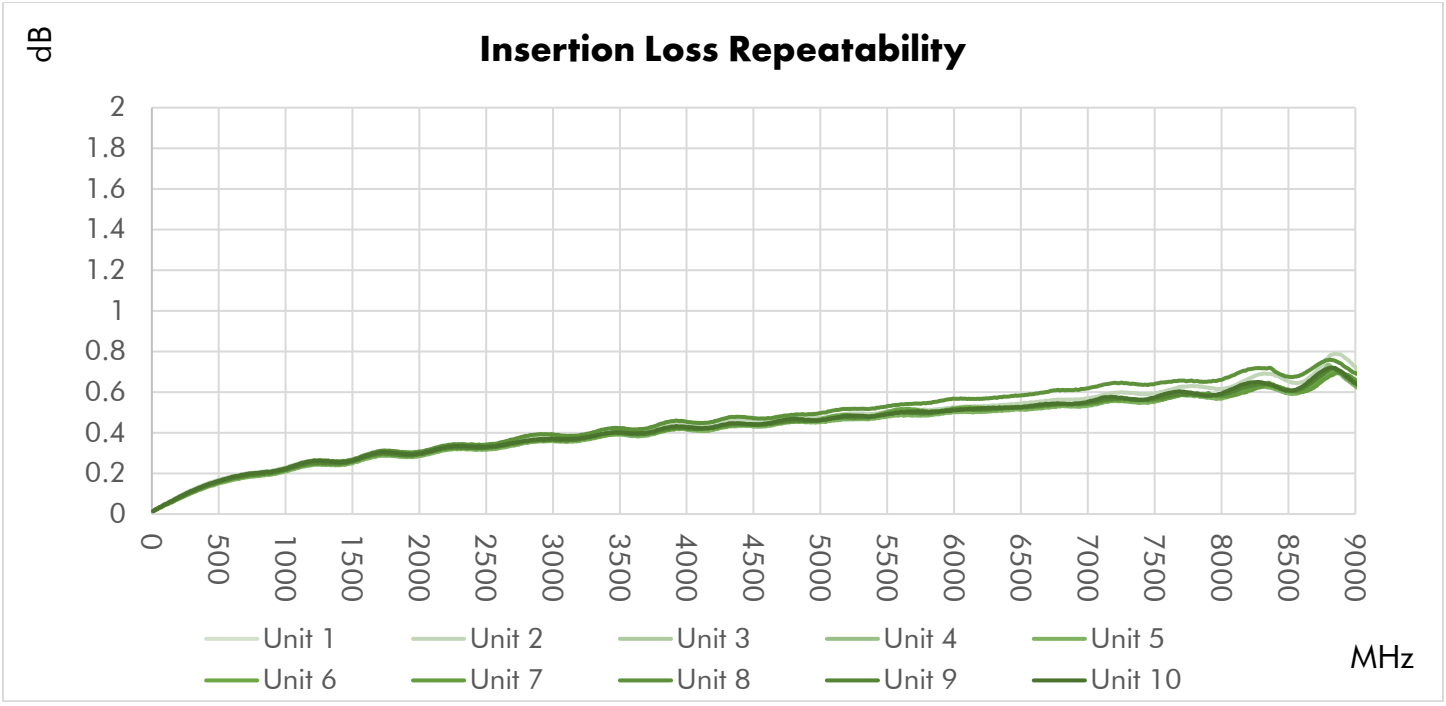
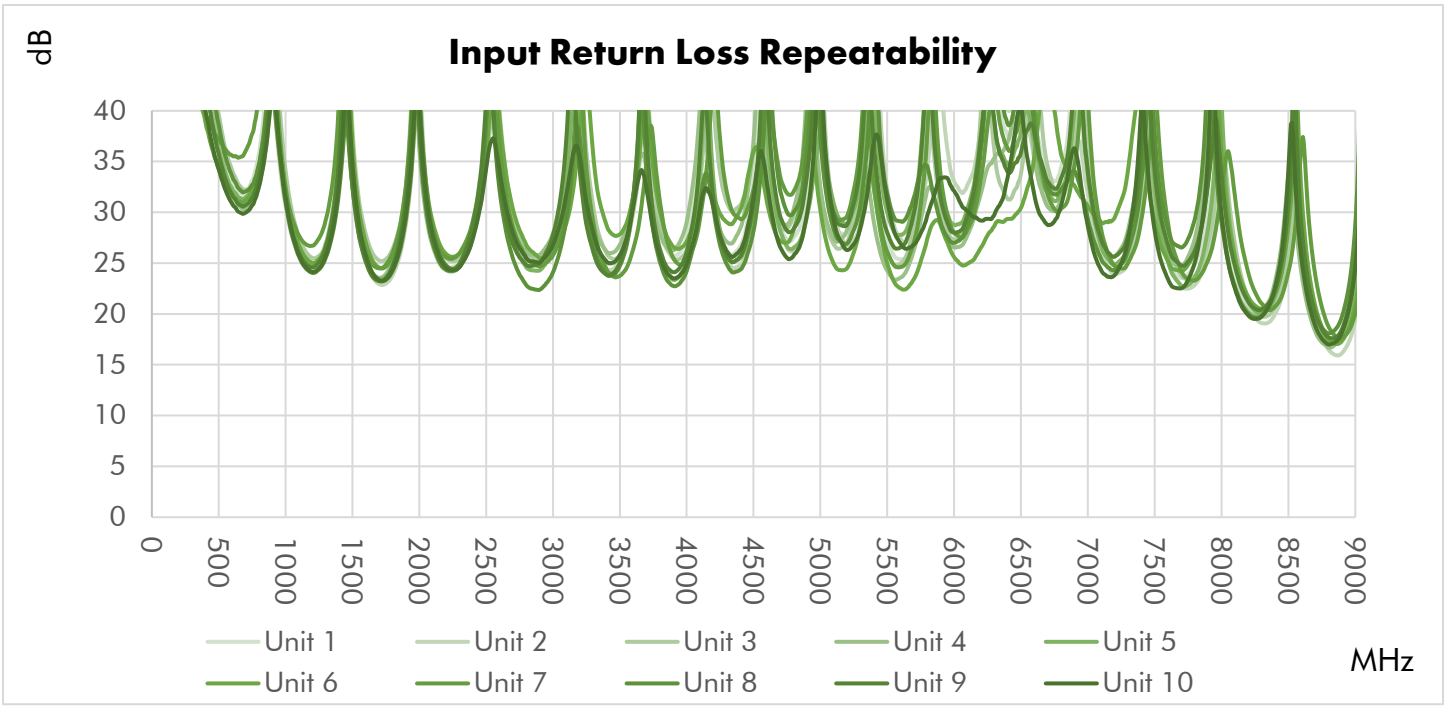
Repeatability in Production



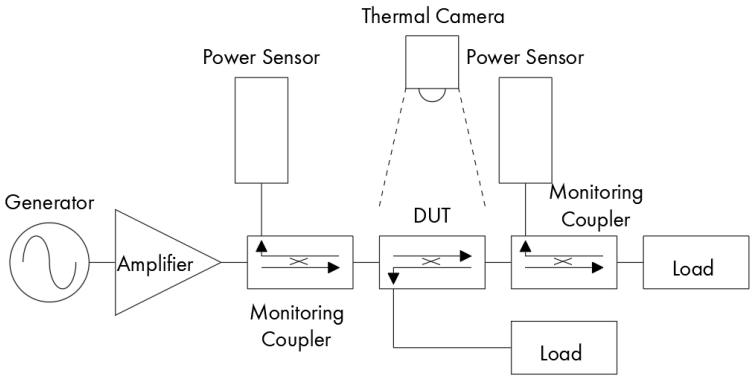



Insertion Loss Repeatability
dB
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
Unit 1
Unit 2
Unit 3
Unit 4
Unit 5
Unit 6
Unit 7
Unit 8
Unit 9
Unit 10
MHz

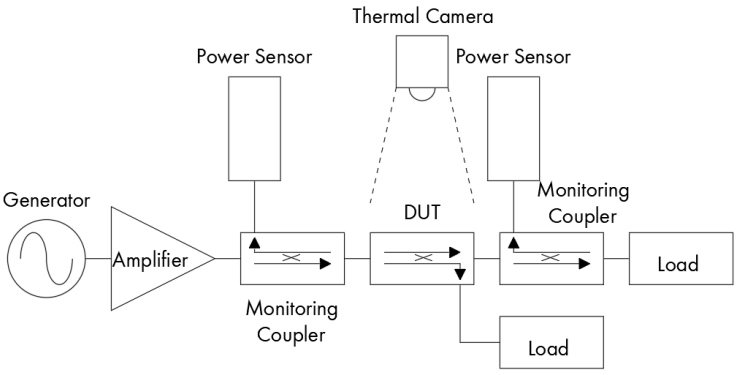
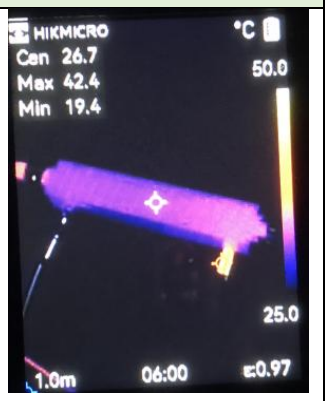

Input Return Loss Repeatability
dB
40
35
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
Unit 1
Unit 2
Unit 3
Unit 4
Unit 5
Unit 6
Unit 7
Unit 8
Unit 9
Unit 10
MHz

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)

- 300 watts CW at 500MHz was applied to the DUT input for a duration of 10 minutes.
- The cable temperature increased more than the DUT. The DUT temperature increased less than 10°C.

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

- 90 watts CW at 500MHz was applied to the DUT output for a duration of 10 minutes.
- The DUT temperature increased from 25.3°C (initial, center marker) to 42.4°C (final, max marker), resulting in a 17.1°C rise.
- The DUT termination was receiving an estimated power of 0.9W, based on a 20dB coupling factor.

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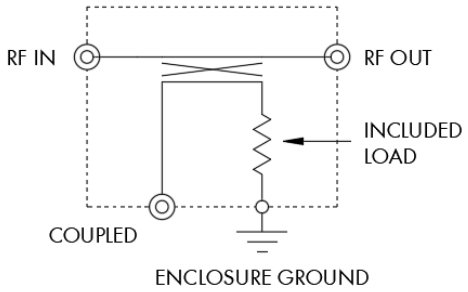
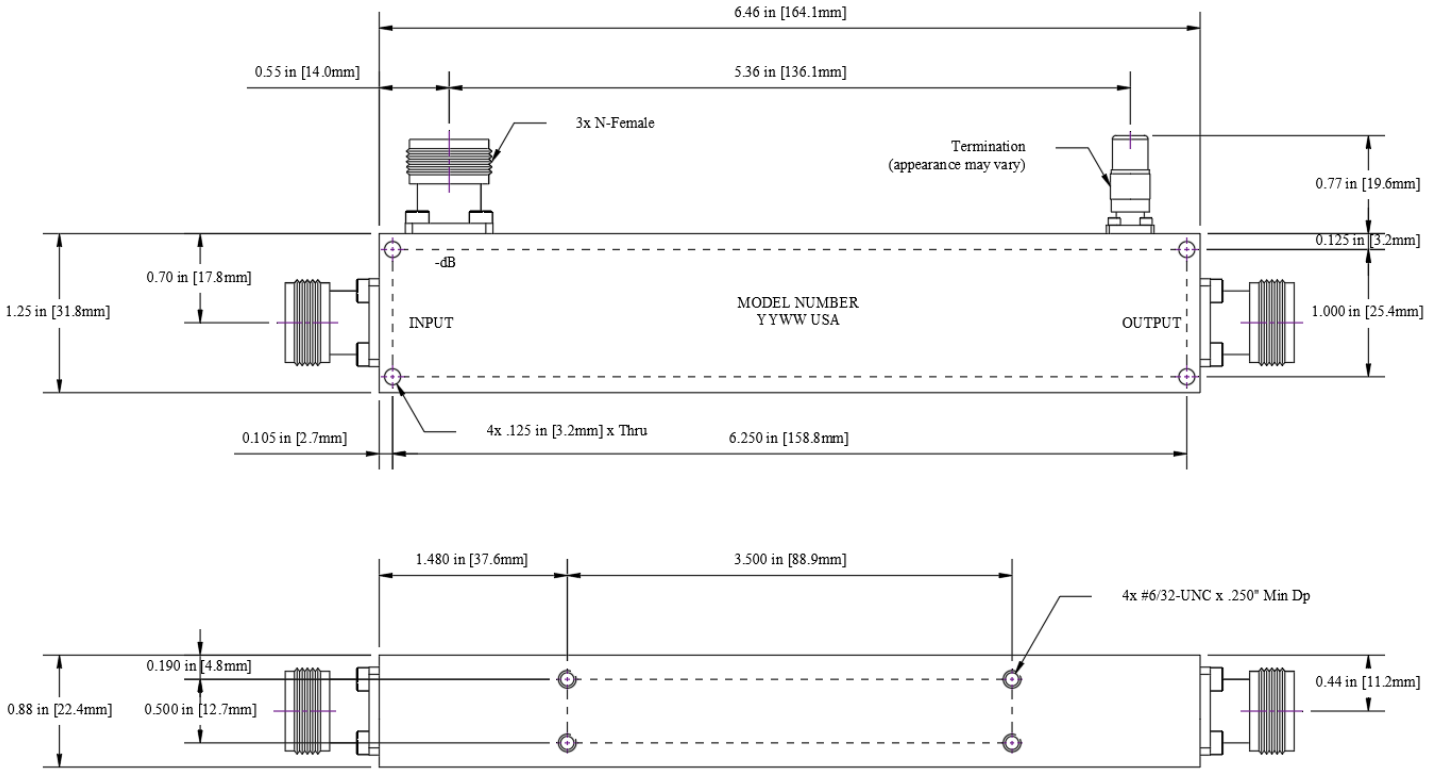
Typical Performance Data

Frequency (MHz)	Return Loss (dB)			Mainline Loss (dB)	Coupling (dB)	Directivity (dB)
	In	Out	Cpl.	In-Out	In-Cpl.	
250	48.94	61.16	34.35	0.10	23.60	37.38
500	36.36	34.43	44.45	0.17	20.37	34.58
750	33.13	33.31	37.79	0.20	20.24	35.35
1000	30.57	29.71	43.37	0.23	20.21	41.34
1250	25.27	25.33	41.71	0.26	20.24	34.54
1500	32.66	31.61	36.67	0.27	20.26	35.36
1750	23.77	23.76	50.83	0.30	20.23	29.70
2000	37.56	35.66	31.90	0.30	20.33	30.34
2250	24.59	24.67	31.98	0.33	20.30	35.01
2500	41.68	41.26	33.13	0.33	20.36	26.11
2750	26.33	26.36	27.83	0.36	20.42	35.17
3000	27.98	27.91	35.40	0.37	20.38	26.22
3250	30.97	31.11	25.65	0.38	20.48	25.11
3500	25.82	25.88	39.99	0.40	20.40	33.54
3750	32.13	31.90	25.66	0.40	20.42	21.92
4000	27.59	28.09	30.50	0.42	20.46	25.40
4250	27.84	28.16	30.28	0.44	20.42	30.06
4500	33.02	31.87	26.14	0.44	20.58	23.43
4750	27.29	27.46	37.17	0.46	20.57	29.62
5000	36.43	33.88	23.31	0.46	20.62	30.14
5250	30.10	30.32	40.58	0.48	20.69	31.49
5500	27.39	27.67	20.53	0.49	20.64	23.22
5750	30.47	30.28	28.92	0.50	20.65	25.22
6000	28.05	28.69	20.37	0.51	20.64	28.52
6250	39.68	39.84	24.75	0.52	20.55	20.88
6500	39.52	48.02	22.07	0.52	20.71	28.56
6750	33.07	33.50	24.55	0.54	20.65	25.82
7000	32.98	32.50	22.70	0.55	20.80	26.25
7250	26.28	26.28	22.61	0.57	20.79	26.10
7500	31.50	30.97	24.91	0.57	20.79	26.15
7750	23.90	23.75	21.05	0.59	20.91	29.16
8000	32.32	32.51	26.12	0.58	20.79	23.56
8250	20.22	20.22	21.06	0.63	20.91	28.25
8500	29.96	30.90	23.38	0.60	20.87	21.04
8750	18.34	18.37	20.83	0.69	21.03	20.79
9000	23.89	23.97	20.87	0.64	20.95	18.00

Simplified Electrical Schematic



Outline Dimensions



Outline drawing: OL-1760
Dimensions are in inches, [mm] shown for convenience.
Tolerances on 2-pl decimals: ±.03. 3-pl decimals: ± .015.