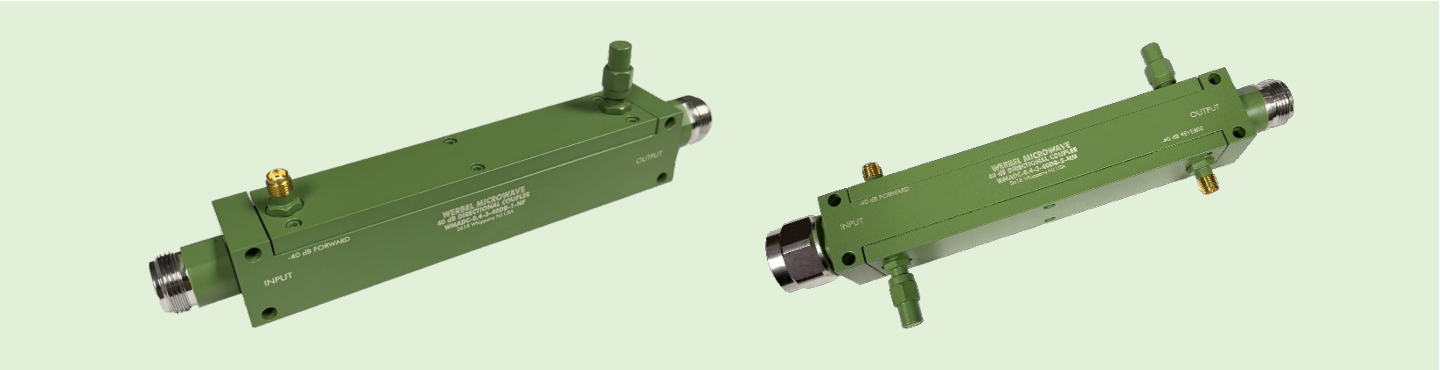
WERBEL MICROWAVE LLC
628 State Route 10, Unit 14
Whippany, New Jersey 07981
Sales@WerbelMicrowave.com - www.WerbelMicrowave.com

High Power Directional Coupler, 380-3000MHz, 40dB, N-Male or Female Input, 50Ω

HIGH DIRECTIVITY… 30dB TYPICAL PERFORMANCE!

WMADC-0.4-3-40DB-SERIES



The WMADC-0.38-3-40DB-SERIES is a high-power 40 dB directional coupler covering 380 to 3000 MHz, supporting a wide range of VHF, UHF, cellular, LTE, and wireless infrastructure bands. Built on an air dielectric coaxial structure, this design delivers low insertion loss, excellent power handling, and exceptional directivity for accurate forward and reverse power discrimination.

Unlike many broadband couplers that prioritize ultra-flat coupling, this model is engineered to maximize directivity across the band, ensuring cleaner separation between forward and reflected signals. In most real-world systems, coupling variation is easily calibrated out, while poor directivity cannot be corrected—making this approach better aligned with high-power measurement accuracy and system protection.

Typical applications include RF power monitoring, transmitter protection, VSWR measurement, distributed antenna systems (DAS), base station infrastructure, and general-purpose RF test setups requiring reliable sampling of high-power signals.

The series is configurable in single or dual configurations. The input connector is offered with a standard N-Female, or optionally an N-Male for direct amplifier connection—eliminating unnecessary adapters, reducing mismatch, and preserving system integrity at high power.

Electrical Specifications at +25°C, Sea Level

Parameter		Low Band	Mid Band	High Band	Unit
Frequency Range		0.38 – 1	1 – 2	2 – 3	GHz
Impedance			50		Ω
Coupling Nominal Value		41.0	39.5	38.5	dB
Coupling Accuracy (±) deviation from nominal		3.0	3.0	2.5	dB, typ.
Coupling Flatness (±)		1.5	2.5	1.5	dB, typ.
Directivity		25	25	25	dB, min.
Mainline Loss[1]	+25°C +85°C	0.10 0.15	0.15 0.22	0.20 0.30	dB, max.
Return Loss (Input, Output)		25	25	24	dB, min.
Return Loss (Coupled)		20	20	20	dB, min.
Forward or Reverse Power, at +25°C, Sea Level (CW)[2]		500	375	300	W, max.
Forward or Reverse Power, at +85°C, Sea Level (CW)[2]		400	300	240	W, max.
Termination Power (Coupled Port max power)			1		W, max.
DC Current (Input-Output)			5		A max.

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Mechanical and Environmental Specifications

Connector Interface	N Male or Female, SMA 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	272 g (single) 276 g (dual)	Connectors Material	N: Brass, Tri-Alloy Plated
Operating Humidity	10-90% (non-condensing)		SMA: Brass, Gold Plated
Operating Environment	Indoor Use Only	Contacts Material	Beryllium Copper, Gold Plated
HTSUS Code	8548.00.0000	Insulators Material	Virgin PTFE
ECCN	EAR99	Finish	Green Paint

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

Explanation of Part Numbers

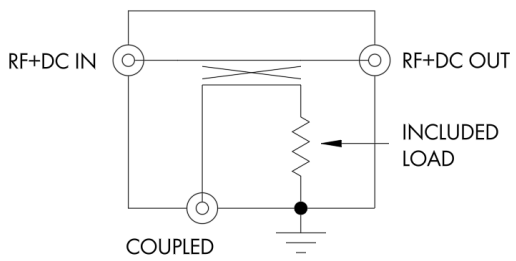
WMADC-	0.4-3-	40DB-	1-	NF
Product Series	Frequency (GHz)	Nominal dB Value	Configuration: 1 = Single Coupler 2 = Dual Coupler	Input Connector: NF = N Female NM = N Male

Currently available as standard models:

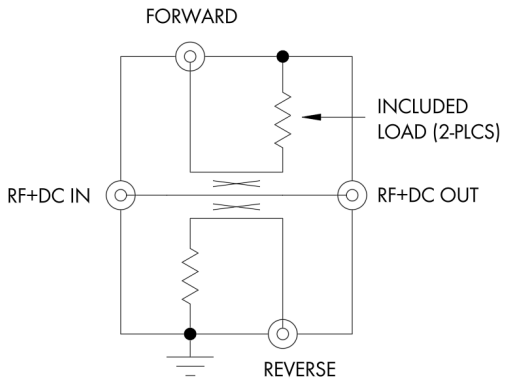
WMADC-0.4-3-40DB-1-NF	380-3000MHz, 40dB, Single Coupler,	N-Female Input,	N-Female Output, SMA-F Coupled
WMADC-0.4-3-40DB-1-NM	380-3000MHz, 40dB, Single Coupler,	N-Male Input,	N-Female Output, SMA-F Coupled
WMADC-0.4-3-40DB-2-NF	380-3000MHz, 40dB, Dual Coupler,	N-Female Input,	N-Female Output, SMA-F Coupled
WMADC-0.4-3-40DB-2-NM	380-3000MHz, 40dB, Dual Coupler,	N-Male Input,	N-Female Output, SMA-F Coupled

Functional Schematic

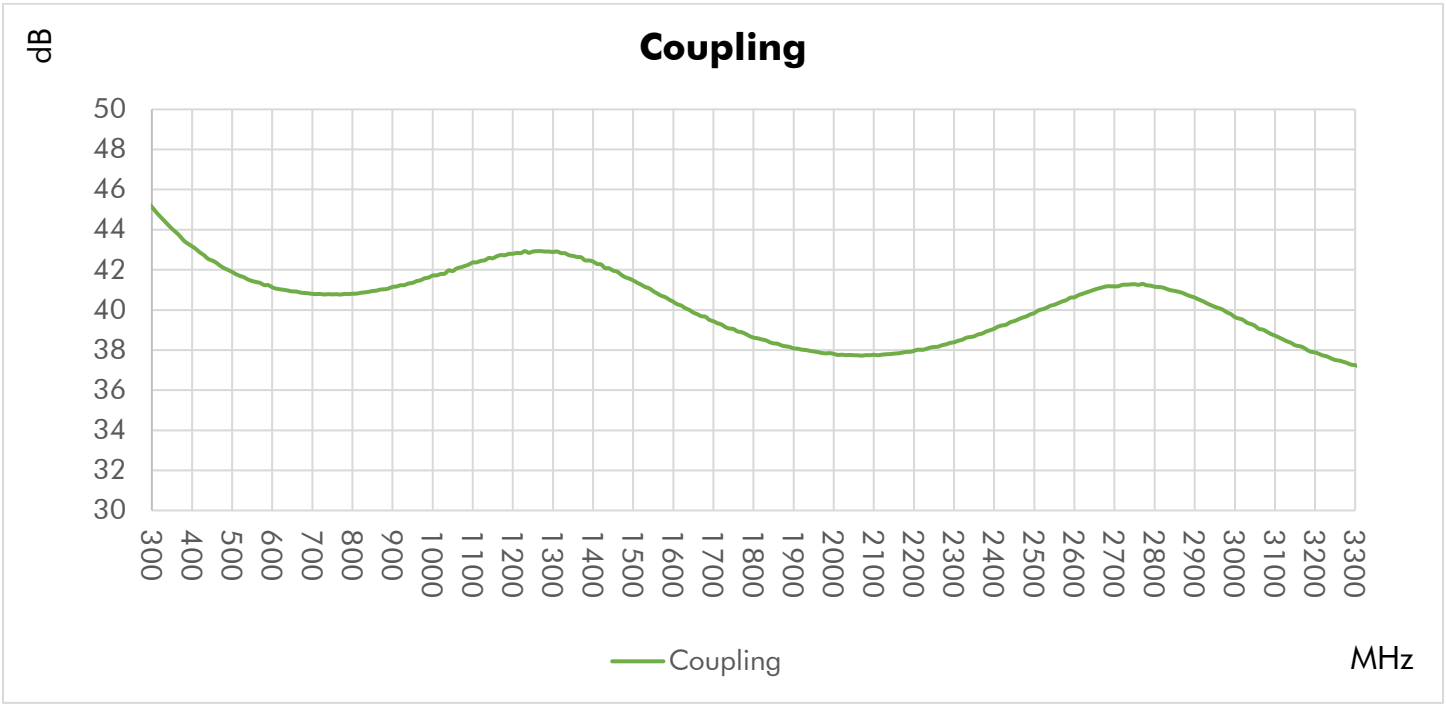
Single Coupler

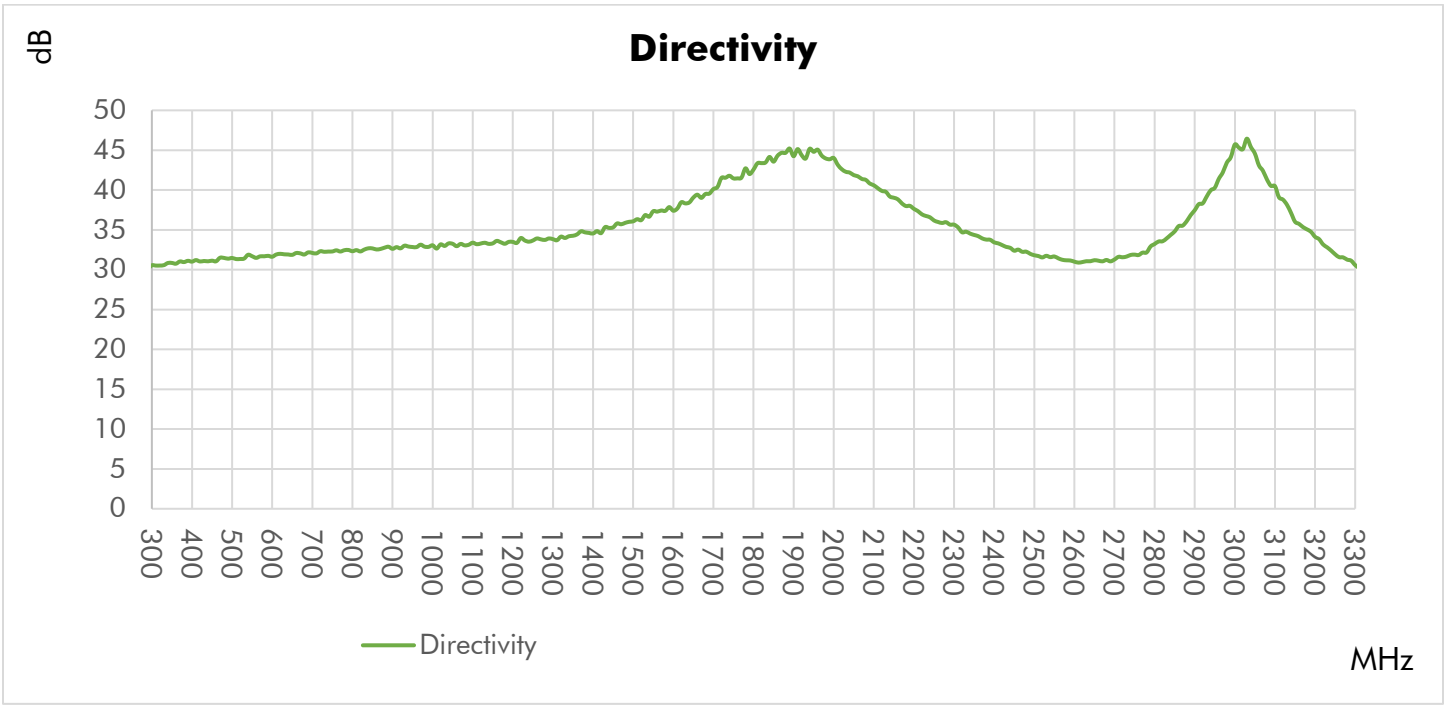


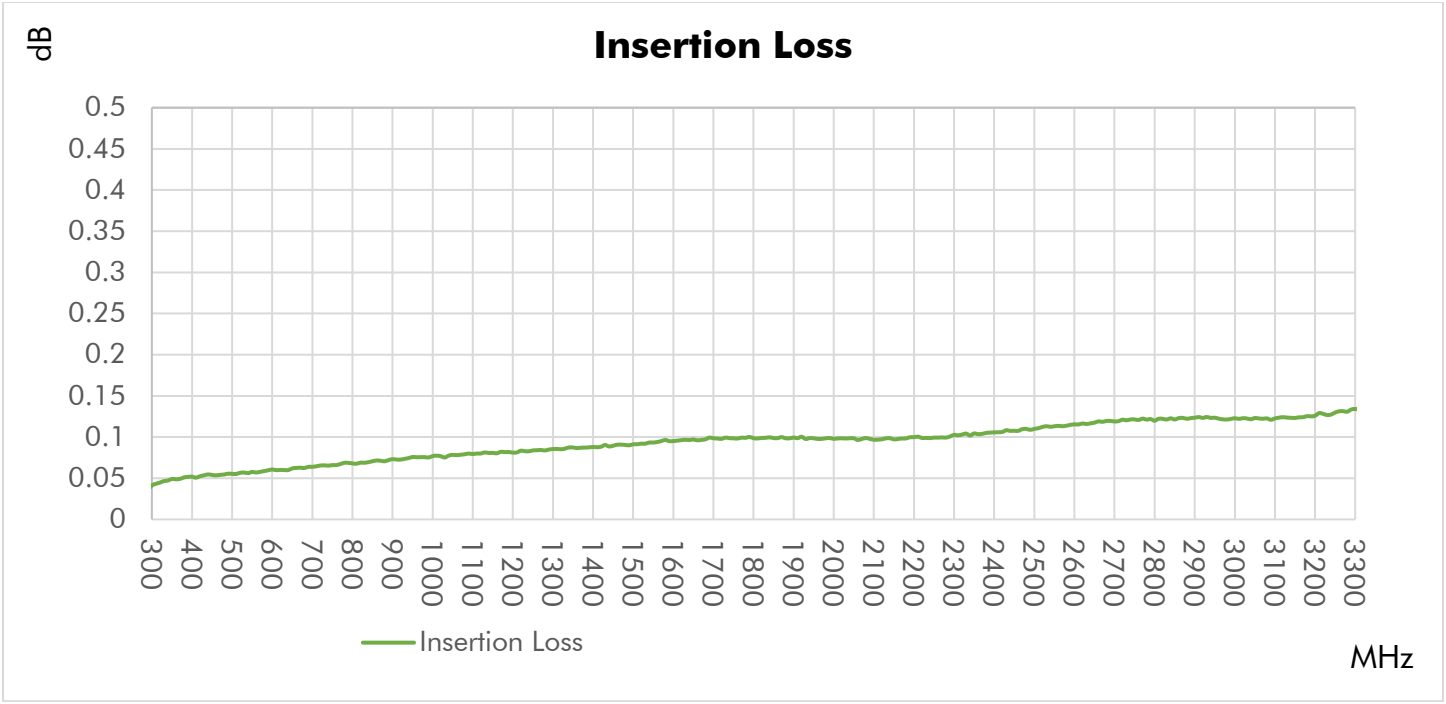
Dual Coupler

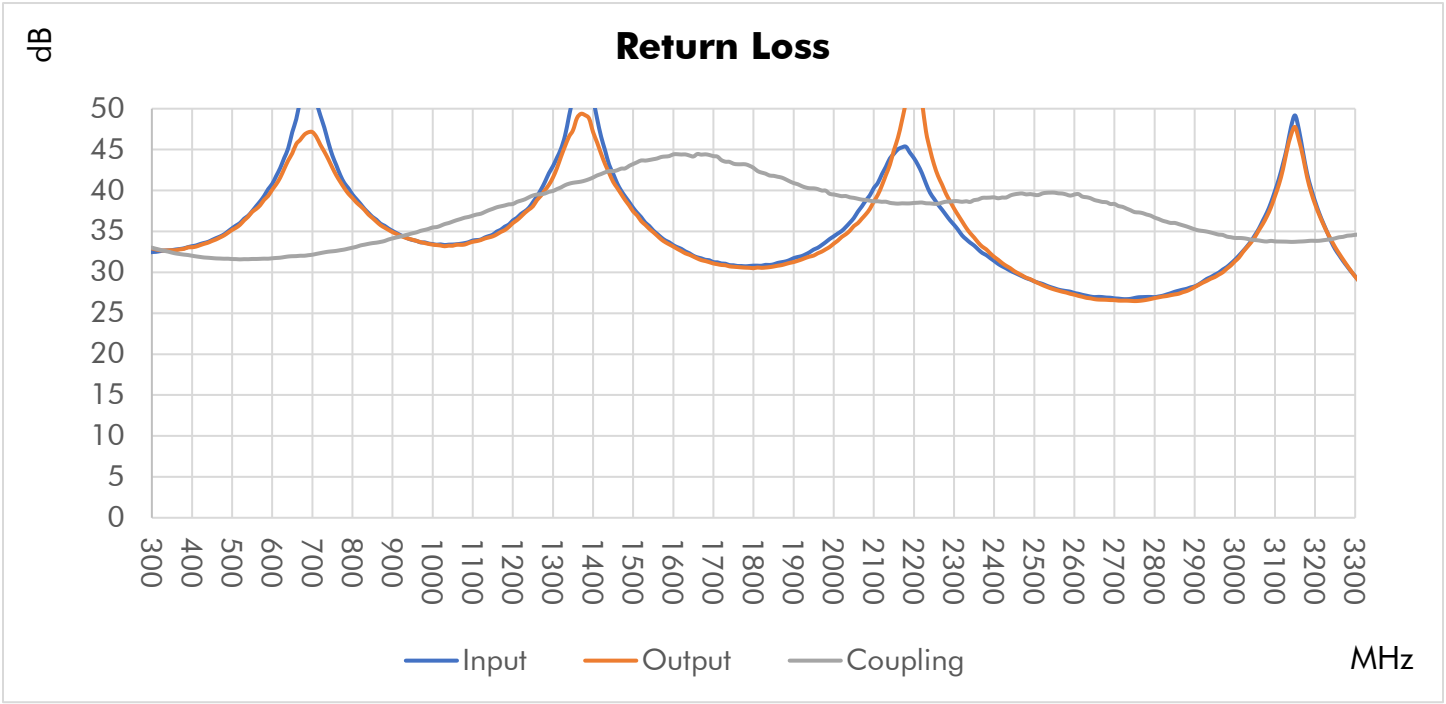


Typical Performance at +25 °C

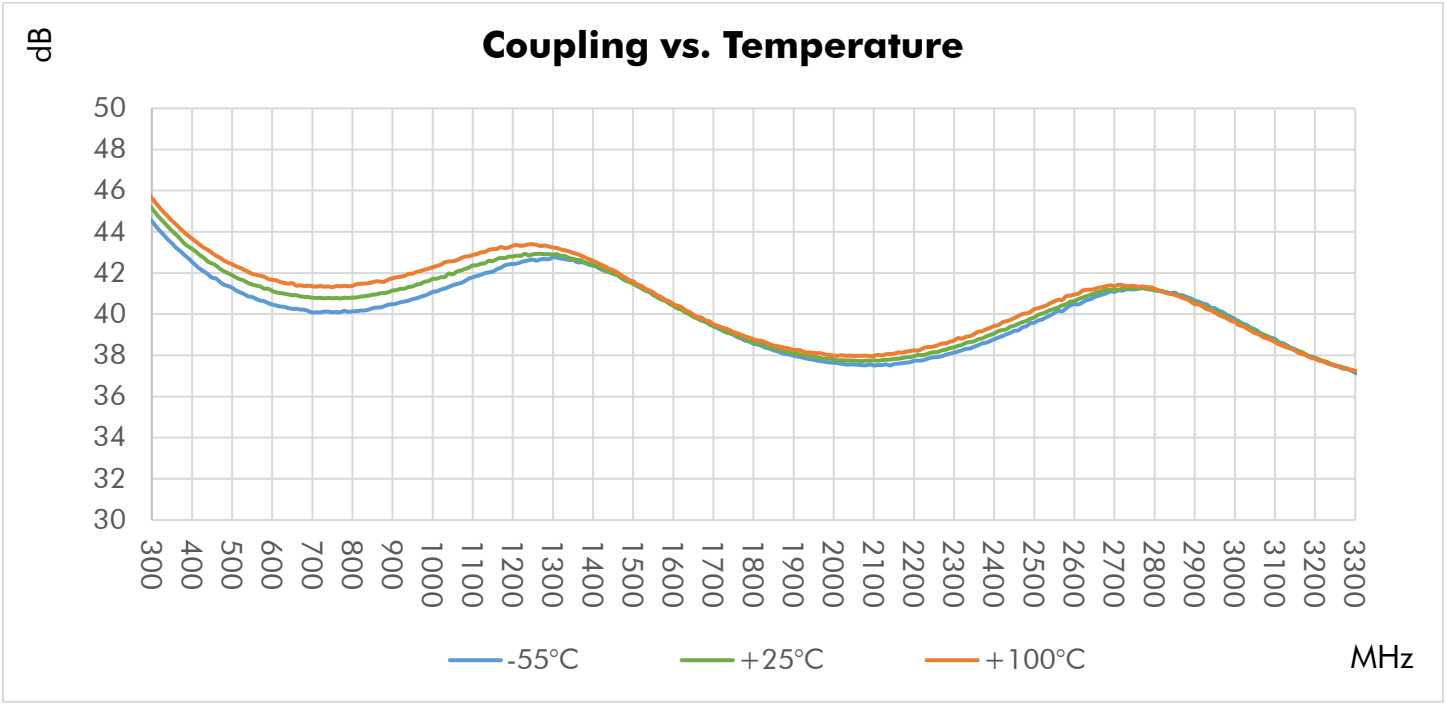


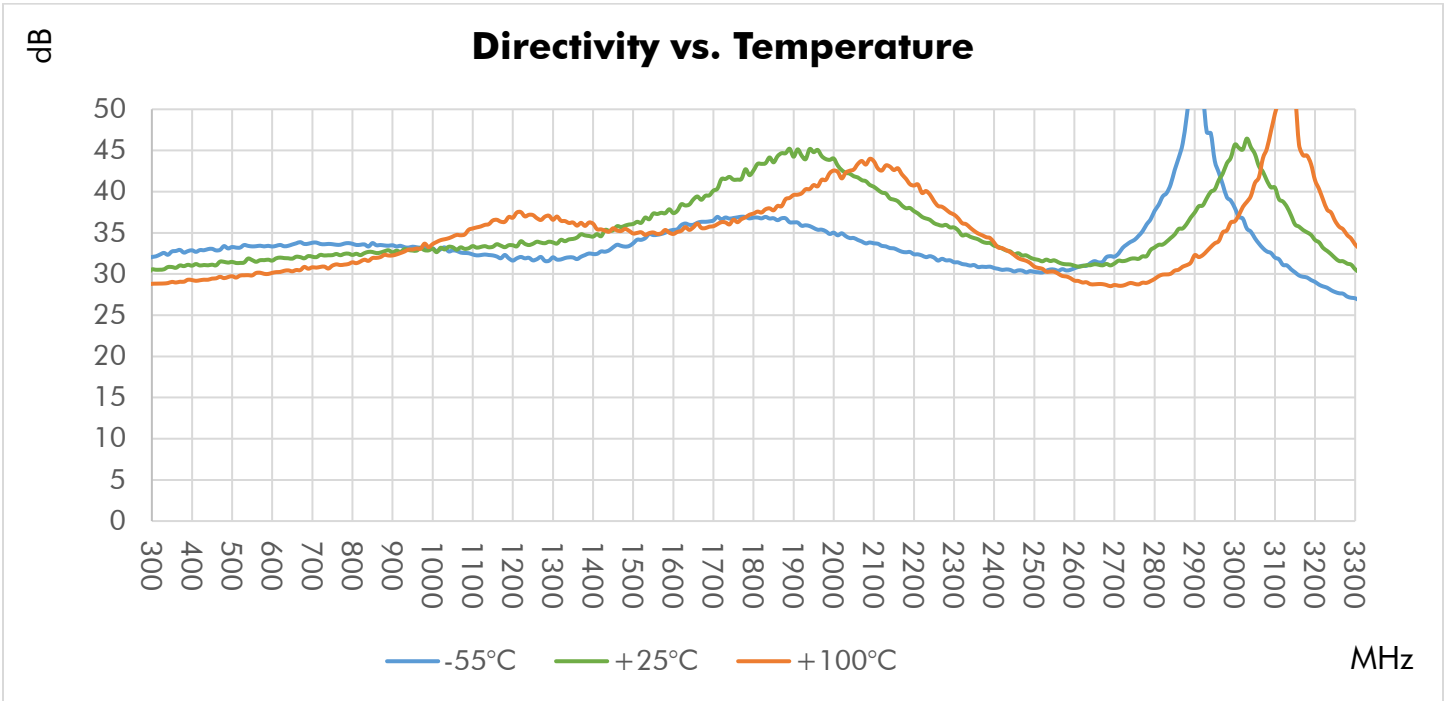


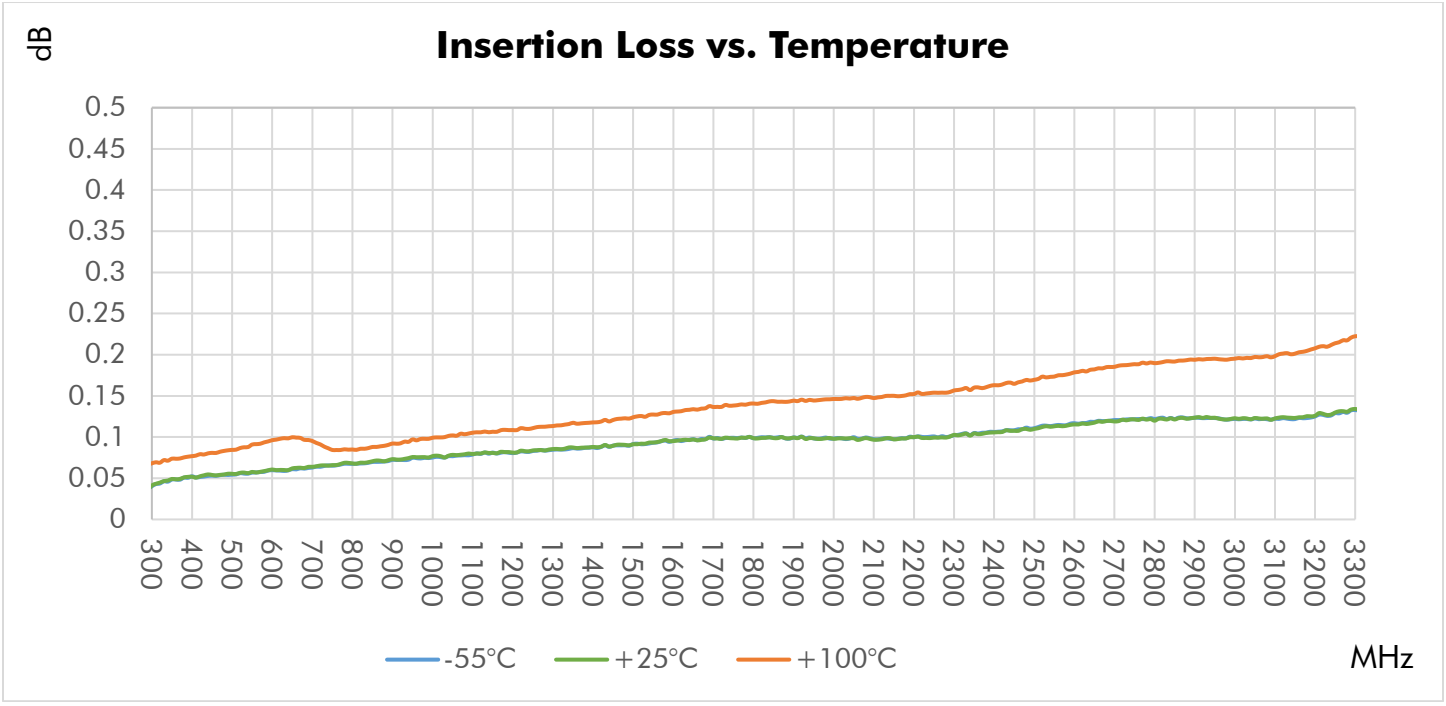

Insertion Loss
dB
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
Insertion Loss
MHz

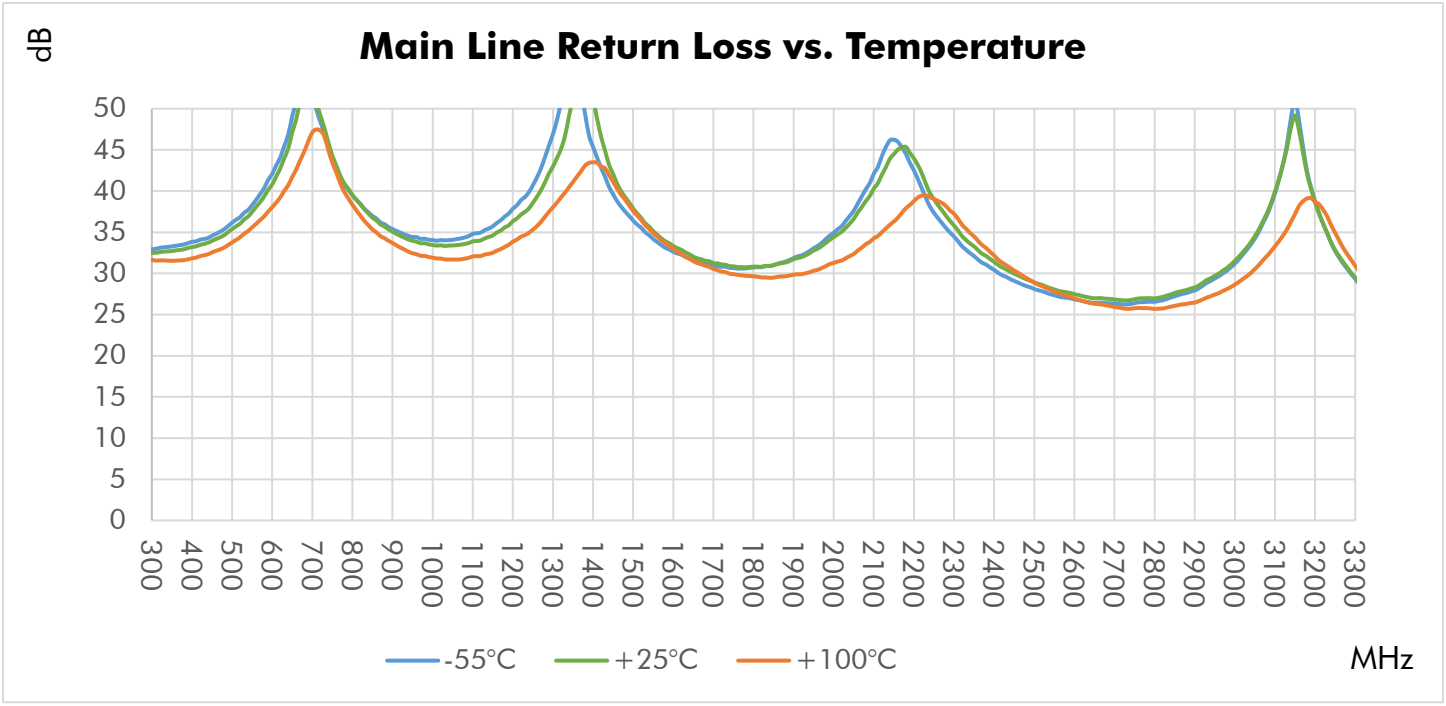

Return Loss
dB
50
45
40
35
30
25
20
15
10
5
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
Input
Output
Coupling
MHz

Typical Performance Over Temperature

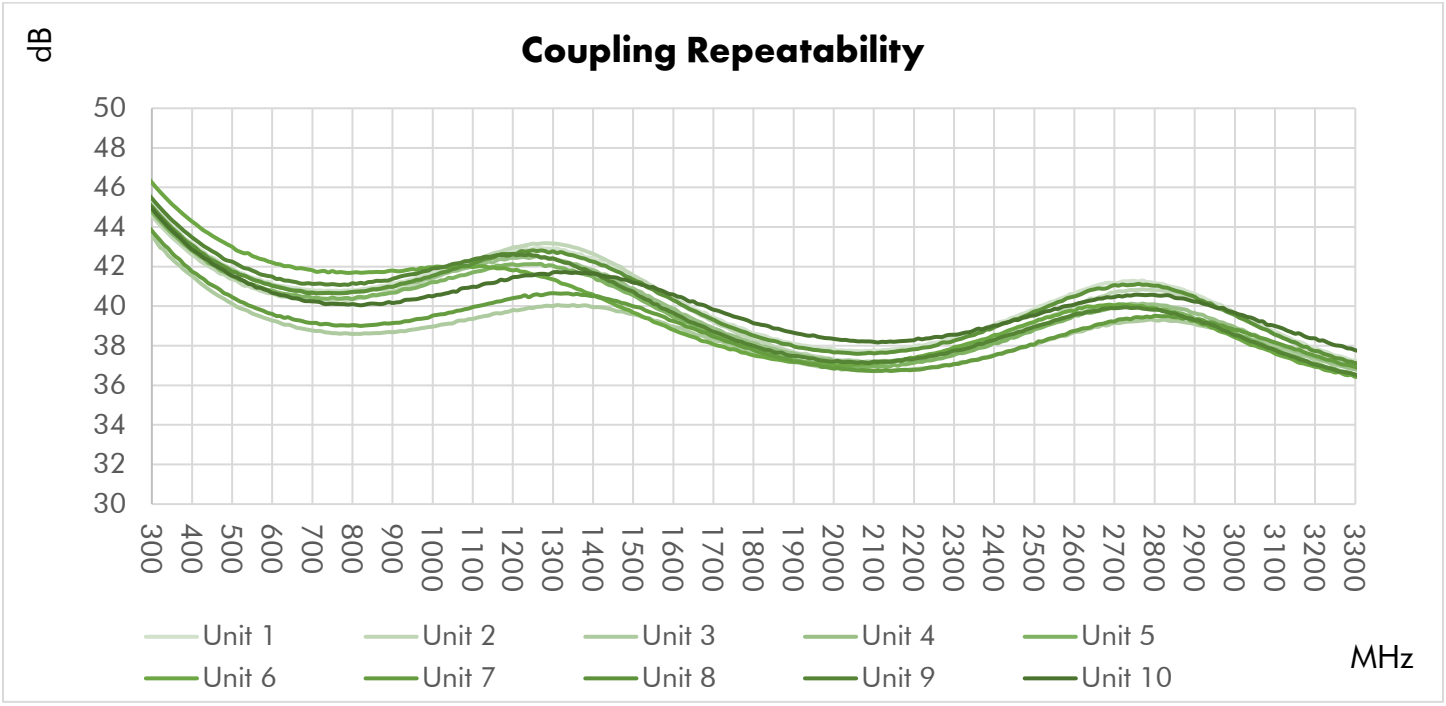


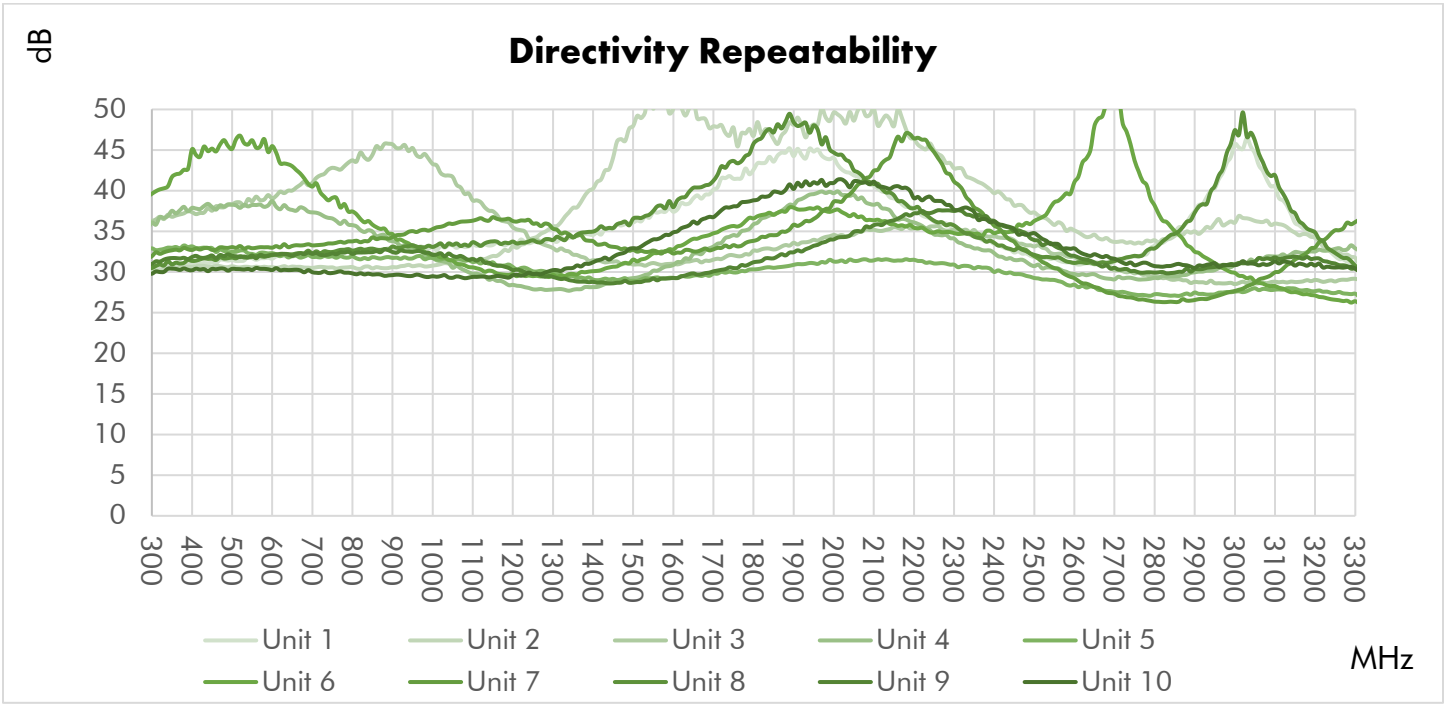


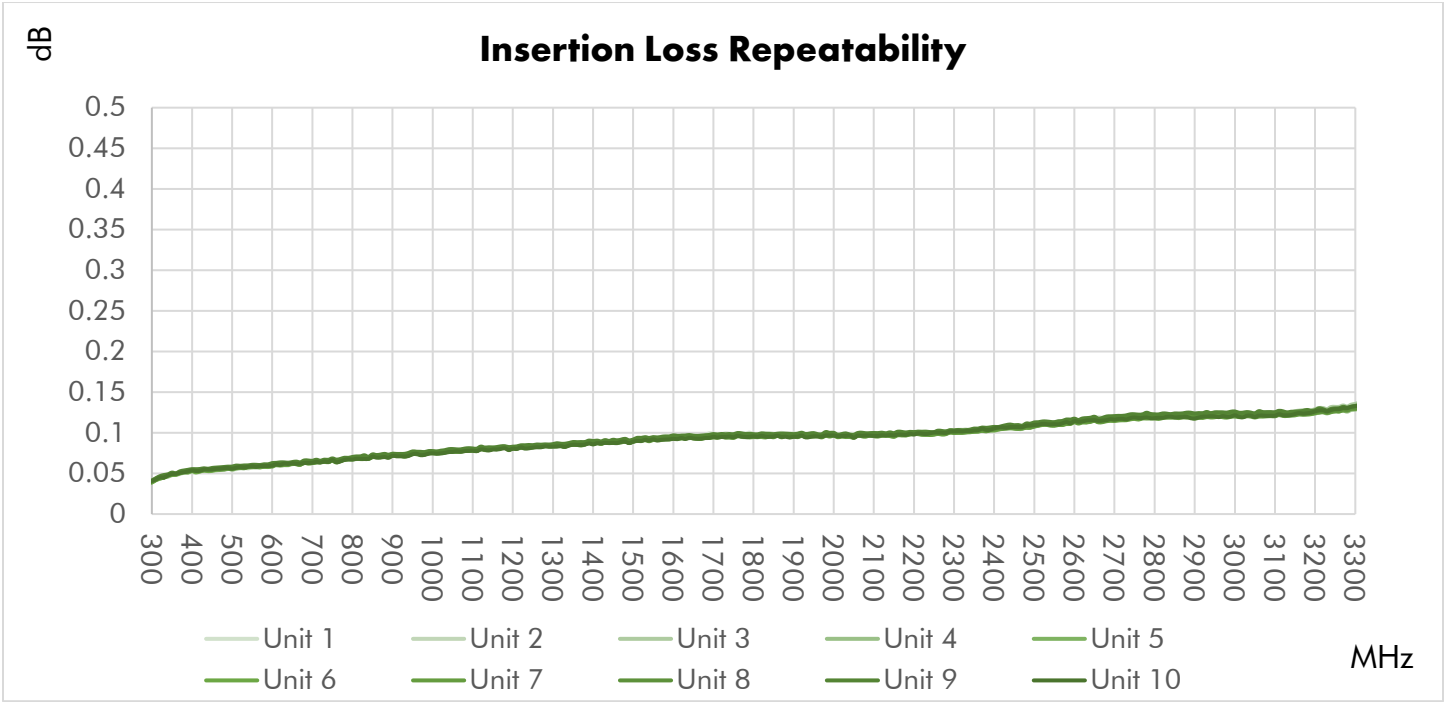

Insertion Loss vs. Temperature
dB
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
-55°C
+25°C
+100°C
MHz

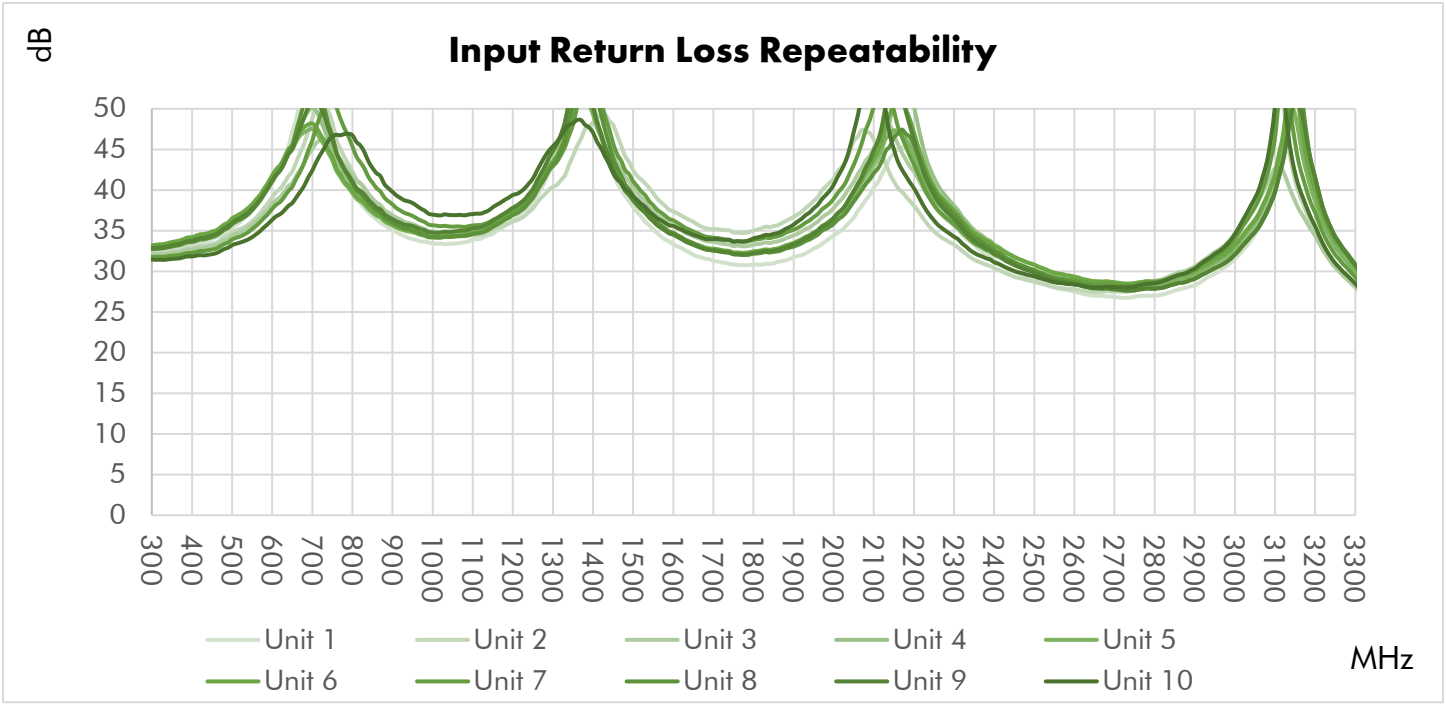

Main Line Return Loss vs. Temperature
dB
50
45
40
35
30
25
20
15
10
5
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
-55°C
+25°C
+100°C
MHz

Repeatability in Production






Insertion Loss Repeatability
dB
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
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
50
45
40
35
30
25
20
15
10
5
0
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300
Unit 1
Unit 2
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Unit 10
MHz

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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.	
100	38.85	38.63	39.03	0.02	54.05	28.00
200	34.03	35.39	34.89	0.02	48.27	28.75
300	32.47	32.93	33.01	0.04	45.14	30.55
400	33.19	33.06	32.03	0.05	43.17	31.01
500	35.38	35.18	31.62	0.06	41.89	31.47
600	40.80	40.10	31.72	0.06	41.13	31.63
700	52.70	47.14	32.15	0.06	40.80	32.10
800	39.52	39.10	33.01	0.07	40.81	32.32
900	35.06	34.91	34.14	0.07	41.15	32.62
1000	33.46	33.39	35.48	0.08	41.71	33.07
1100	33.88	33.73	36.93	0.08	42.37	33.39
1200	36.34	36.02	38.35	0.08	42.80	33.49
1300	42.97	41.59	39.94	0.09	42.89	33.83
1400	51.30	47.14	41.59	0.09	42.42	34.54
1500	37.87	37.44	43.24	0.09	41.47	36.07
1600	33.32	33.15	44.42	0.10	40.41	37.40
1700	31.24	31.08	44.20	0.10	39.44	40.13
1800	30.81	30.51	42.77	0.10	38.62	42.57
1900	31.73	31.26	40.91	0.10	38.08	44.24
2000	34.40	33.51	39.52	0.10	37.81	44.02
2100	40.30	38.66	38.68	0.10	37.76	40.59
2200	43.96	58.72	38.48	0.10	37.96	37.63
2300	35.80	37.79	38.70	0.10	38.39	35.65
2400	31.39	31.89	39.17	0.11	39.06	33.43
2500	28.90	28.90	39.48	0.11	39.84	31.81
2600	27.47	27.27	39.51	0.12	40.63	31.01
2700	26.82	26.60	38.36	0.12	41.17	31.28
2800	26.97	26.85	36.69	0.12	41.16	33.23
2900	28.28	28.20	35.25	0.12	40.62	37.46
3000	31.52	31.34	34.20	0.12	39.64	45.71
3100	39.93	39.31	33.78	0.12	38.72	40.49
3200	38.68	38.34	33.85	0.13	37.88	34.13
3300	29.51	29.48	34.58	0.13	37.25	30.58

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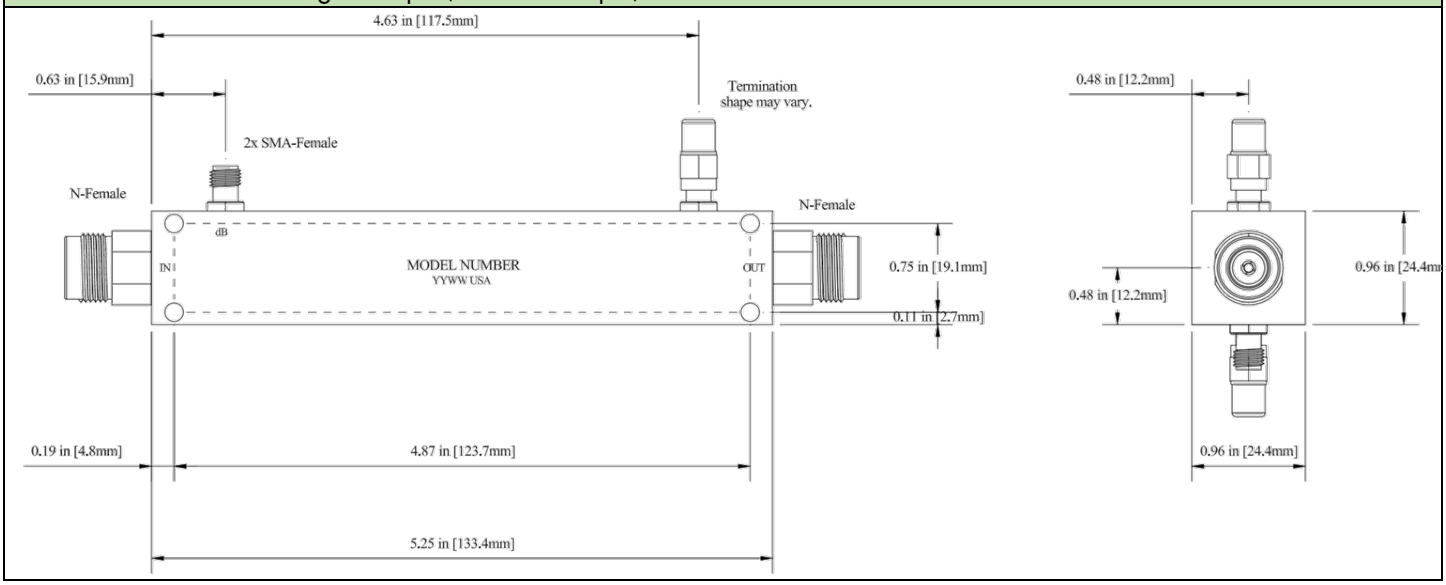
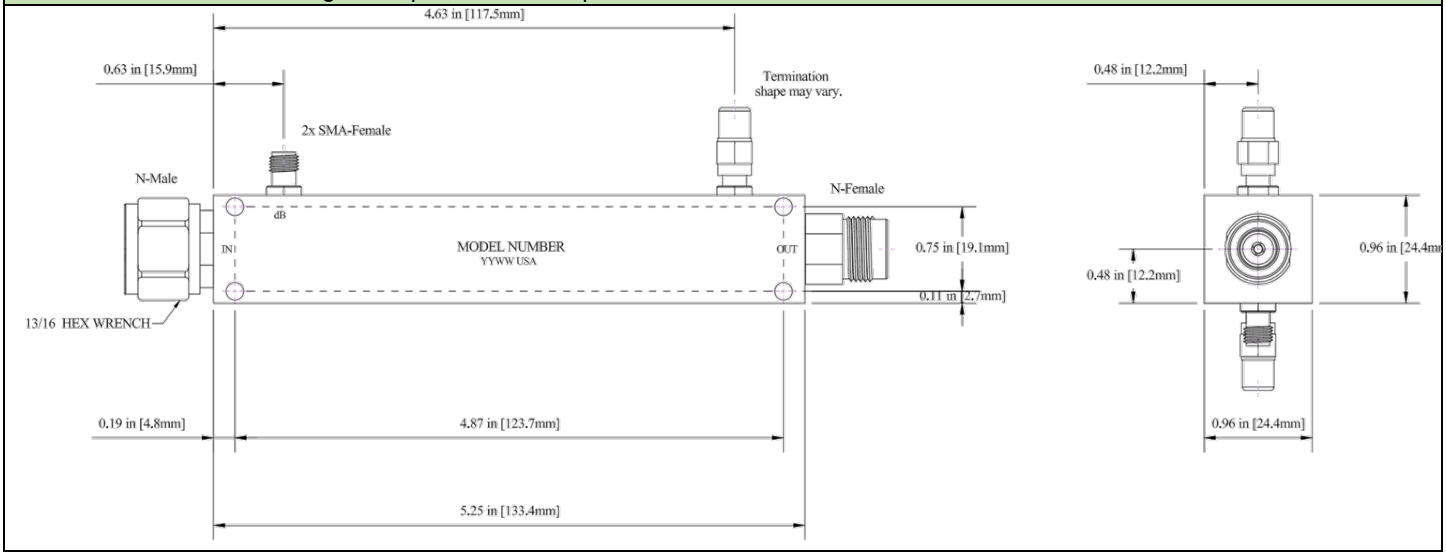
Outline Drawings

Single Coupler, N-Female Input, Model Shown: **WMADC-0.4-3-40DB-1-NF**



Single Coupler, N-Male Input, Model Shown: **WMADC-0.4-3-40DB-1-NM**



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

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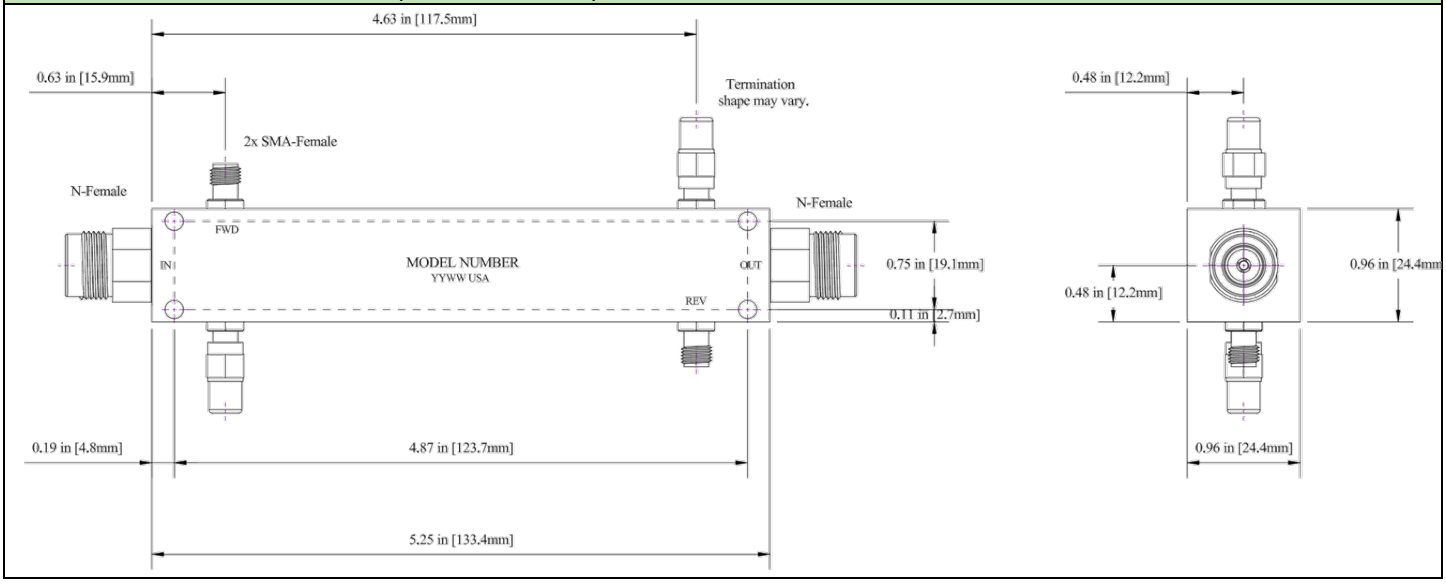
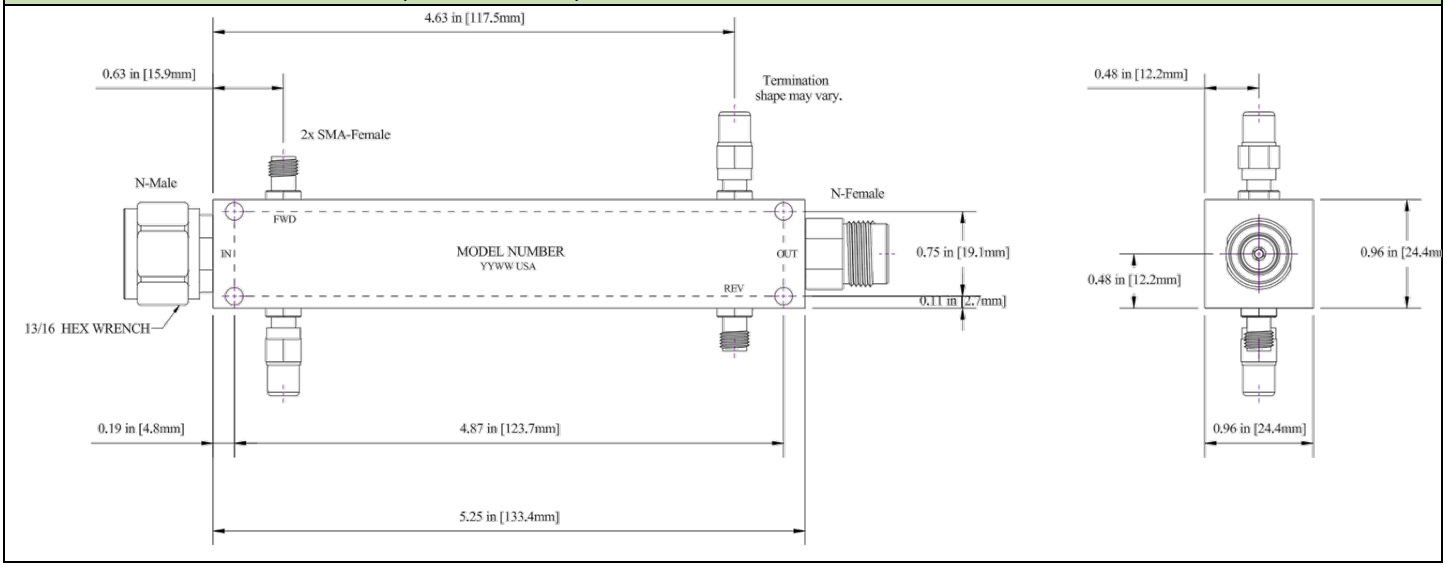
Dual Coupler, N-Female Input, Model Shown: **WMADC-0.4-3-40DB-2-NF**



Dual Coupler, N-Male Input, Model Shown: **WMADC-0.4-3-40DB-2-NM**



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