WERLATONE®

SINCE 1965

Mismatch Tolerant®

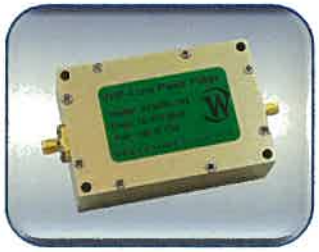
High Power, Multi-Octave Performance

Directional Couplers

0° Combiners / Dividers

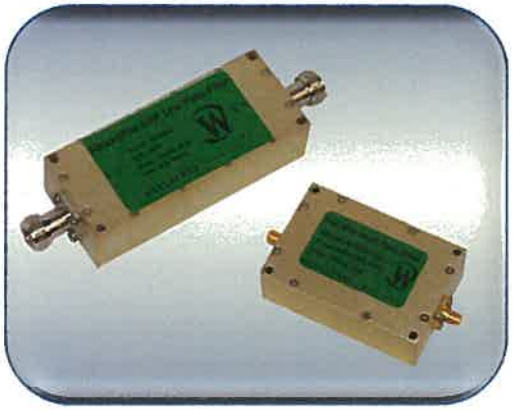
90° Hybrid Couplers

180° Hybrid Couplers



Absorptive Filters

High Power Absorptive Filters

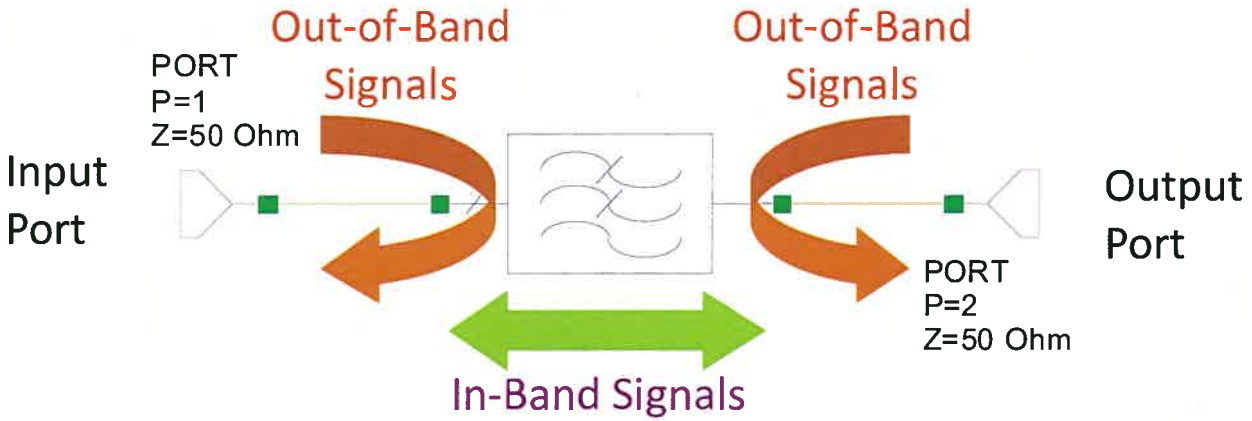


Absorptive Filters

- Low Pass
- High Pass
- Band Pass
- Notch
- Cross Band

Model	Type	Frequency (MHz)	Power (Watts CW)
AF9438	Low Pass	1-30	5,000
AF9349	Low Pass	10-150	500
AF9255	Low Pass	10-170	100
AF9350	Low Pass	10-500	400
AF9560	Notch	10-3000	400
AF9456	Low Pass	30-400	400
AF9187	Low Pass	450-490	100
DP9222	Cross Band	450-890	100
AF9256	High Pass	806-2000	100

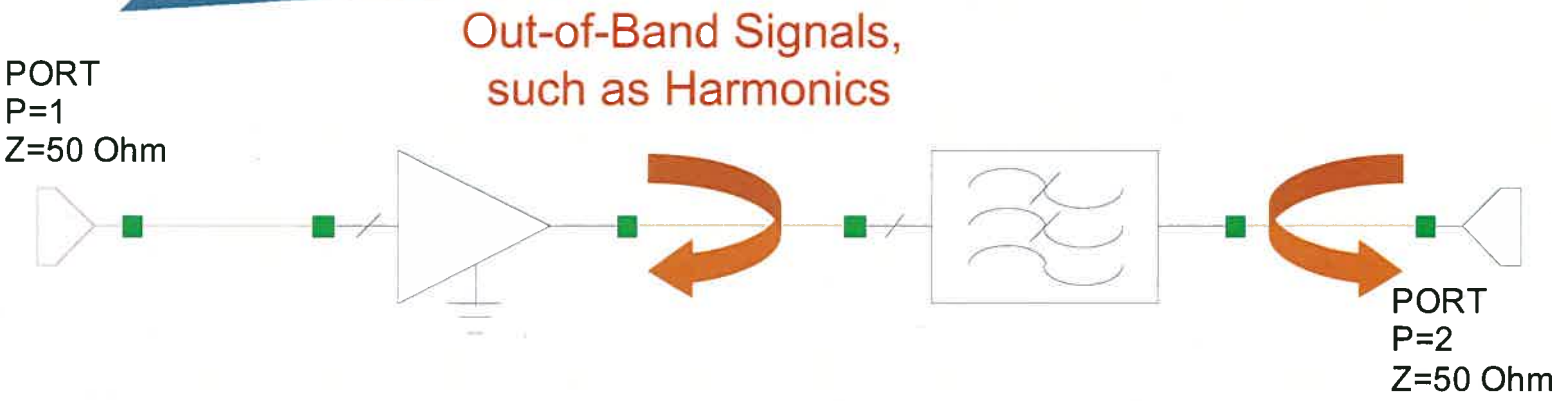
Traditional Filter: Reflective Type



Characteristics of a Reflective Filter

- *In-Band Signals are transmitted through the filter to the output port. The shape (magnitude & phase) of the transmission is that of S21.*
- *Out-of-Band Signals are reflected back to the source. The shape (magnitude & phase) of the reflection is that of S11 & S22.*

Shortcomings of Reflective Filter Approach

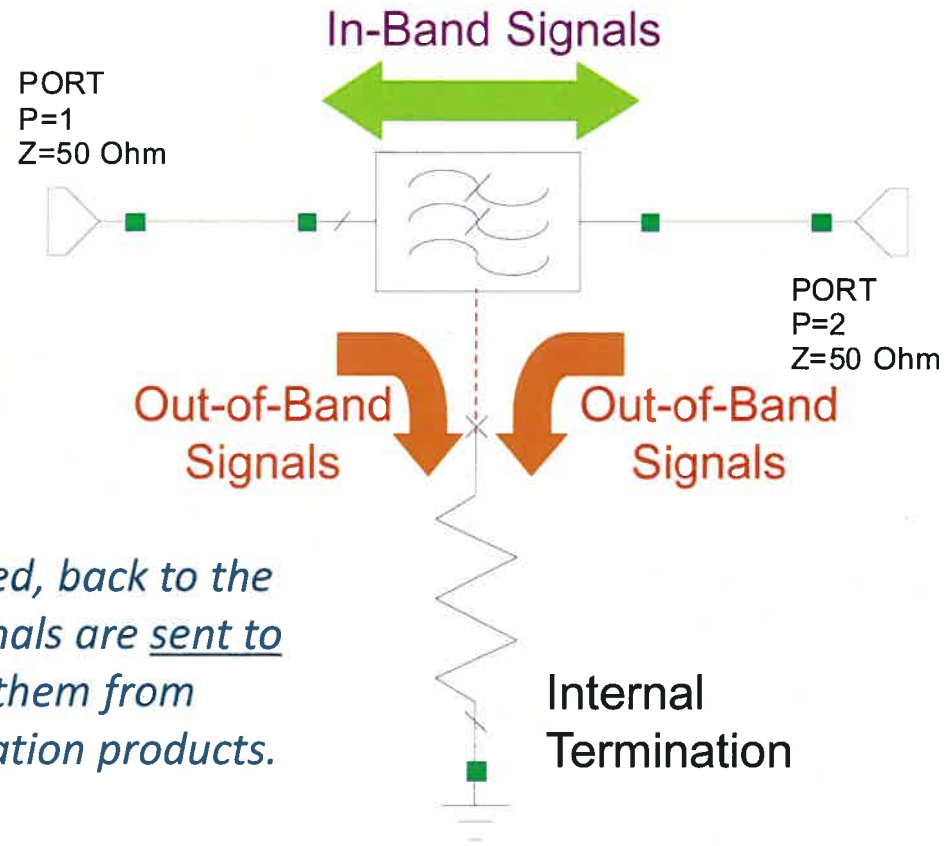


- *Usually, a Reflective Low Pass Filter is placed at the output of a PA to remove harmonics and out-of-band intermodulation. All out-of-band signals are reflected back to the source, or the load.*
- *These reflected signals excite the non-linear behaviors of the PA, especially when the frequencies of these signals are near or are harmonically related to the frequencies of interest. This causes the PA to generate more inter-modulation products.*
- *These reflections also cause instability effects.*
- *High susceptibility to temperature change.*
- *Performance degradation at other than 50 Ohms.*

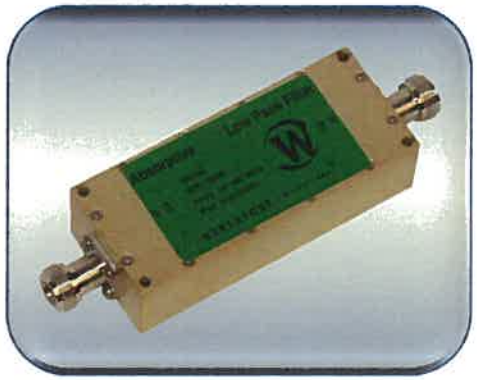
Absorptive Filter Approach

How Does it Work?

- *In-Band signals pass through the filter and the shape (magnitude & phase) of the transmission is that of S21.*
- *Out-of-Band signals are NOT reflected, back to the source. Instead, the out-of-band signals are sent to an internal termination, preventing them from generating undesirable inter-modulation products.*
- *There is little penalty in terms of insertion loss due to the presence of the internal termination and excellent return loss, both in and out-of-band.*



Key Benefits of Absorptive Filters

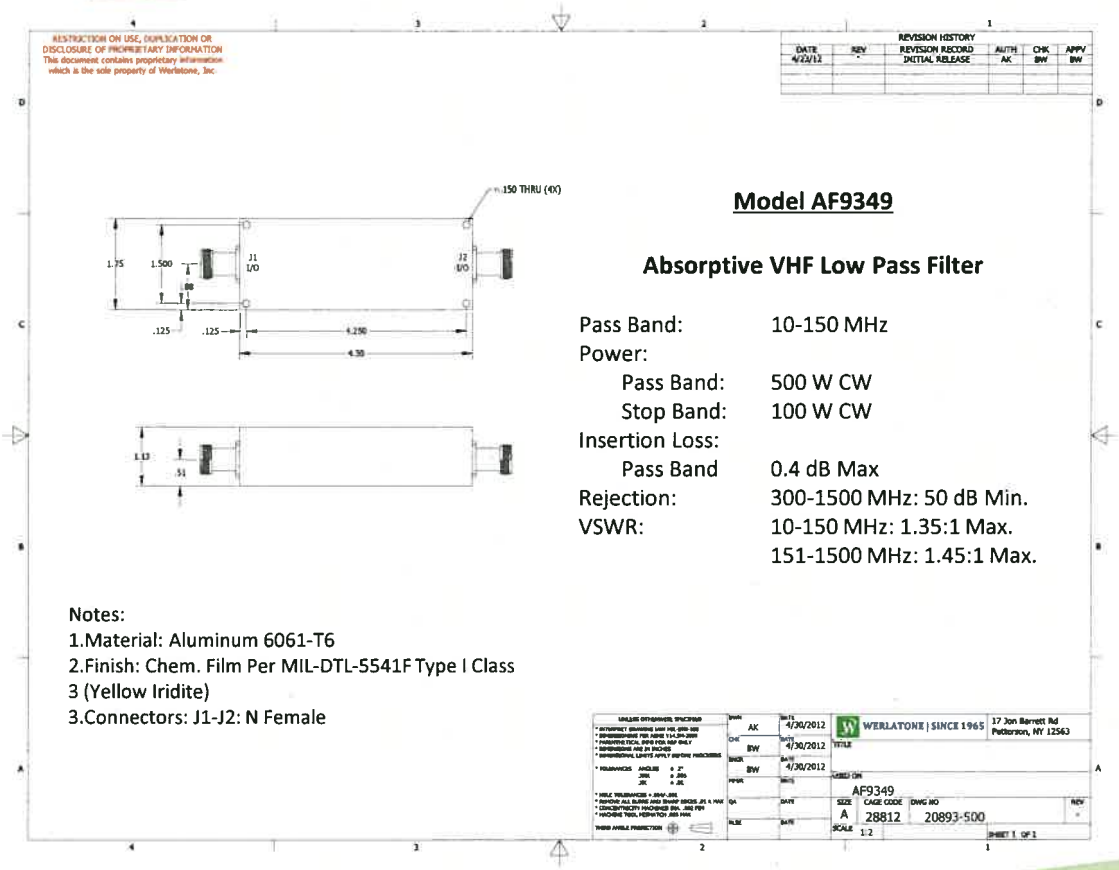


- ***Mismatch Tolerant*** ® *Design eliminates the dependency of system on the length of interconnect cables. Between two non-perfect components (between power amplifier and antenna or between LNA and a mixer.)*
- *Use of low Q resonators = less susceptibility to temperature change.*

- ***Eliminates:***
  - *Instability of power amplifiers at out-of-band frequencies.*
  - *Excessive In-Band ripples due of out-of-band reflected energies.*
  - *Potential damage to power amplifier due to reflection of high power out-of-band energies.*
  - *The false trigger of power-detector circuitry due to reflected harmonics.*

Absorptive VHF Low Pass Filter

Model AF9349



VHF: AF9349

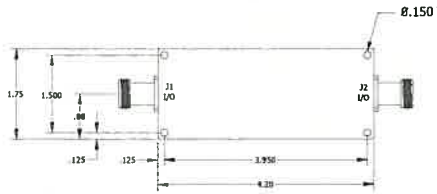

1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Transmission
Tr1 S21 Log Mag 10.00dB/ Ref 0.000dB [F2]
Tr2 S12 Log Mag 10.00dB/ Ref 0.000dB [F2]
1 150.00000 MHz -0.2902 dB
2 270.00000 MHz -63.128 dB
3 1.0000000 GHz -83.358 dB
>4 1.5000000 GHz -65.414 dB
10.00
0.000
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
1 Start 10 MHz
IFBW 70 kHz
Stop 1.5 GHz
Cor
Return Loss
Tr1 S11 Log Mag 10.00dB/ Ref -16.00dB [F2]
Tr2 S22 Log Mag 10.00dB/ Ref -16.00dB [F2]
1 80.000000 MHz -18.945 dB
2 150.00000 MHz -19.014 dB
>3 248.00875 MHz -14.419 dB
34.00
24.00
14.00
4.000
-6.000
-16.00
-26.00
-36.00
-46.00
2 Start 10 MHz
IFBW 70 kHz
Stop 1.5 GHz
Cor
Meas
Ready
2012-06-14 09:14

Absorptive UHF Low Pass Filter

Model AF9350

REVISION HISTORY

DATE	REV	REVISION RECORD	AUTH	CHK	APPV
4/23/12	-	INITIAL RELEASE	AK	BW	BW
6/18/12	A	ECN 5685	AK	BW	BW



Model AF9350

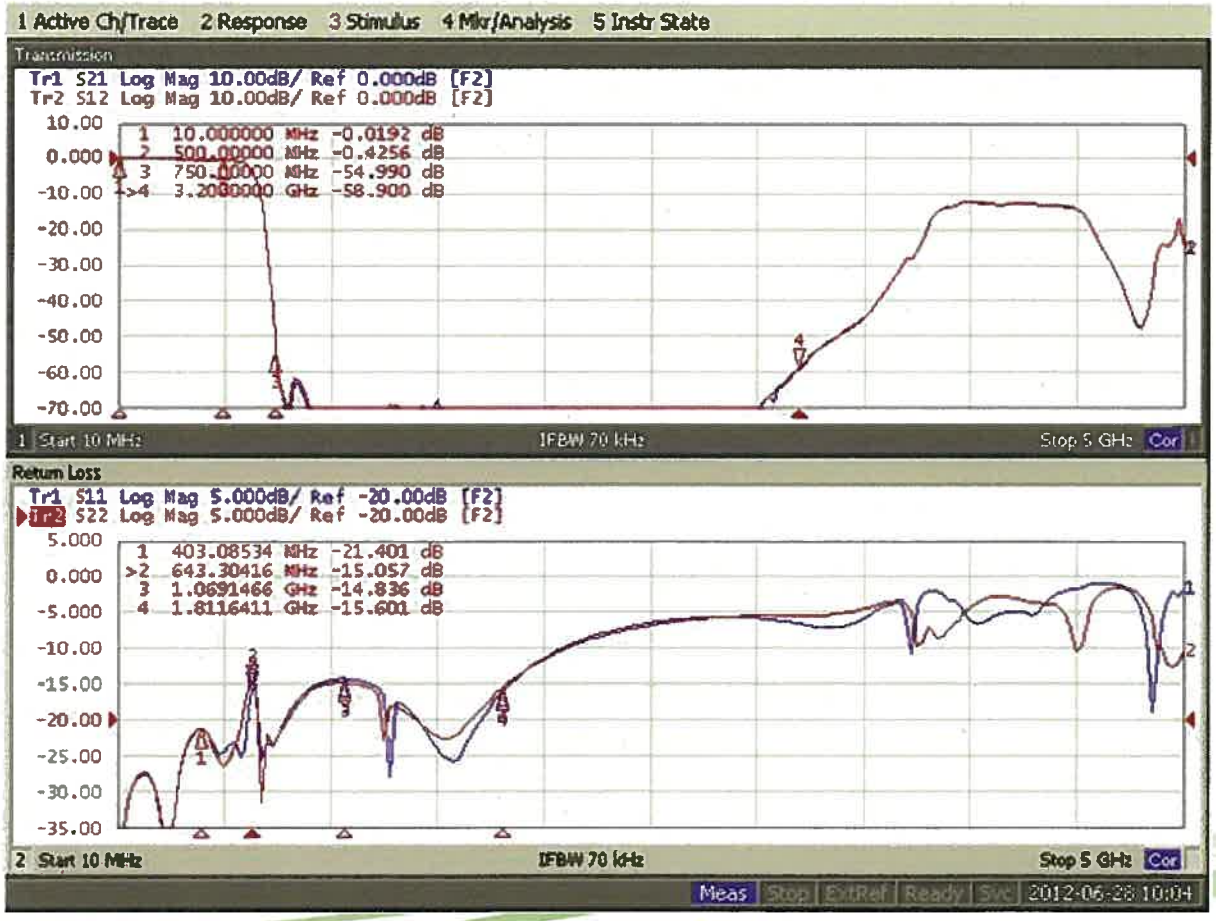
Absorptive UHF Low Pass Filter

Pass Band:	10-500 MHz
Power:	
Pass Band:	400 W CW
Stop Band:	100 W CW
Insertion Loss:	
Pass Band	0.5 dB Max
Rejection:	750-3000 MHz: 55 dB Min.
VSWR:	10-500 MHz: 1.25:1 Max.
	501-1500 MHz: 1.45:1 Max.

Notes:
1.Material: Aluminum 6061-T6
2.Finish: Chem. Film Per MIL-DTL-5541F Type I Class
3 (Yellow Iridite)
3.Connectors: J1-J2: N Female

AK	6/18/2012	WERLATONE | SINCE 1965	17 Jon Barrett Rd Patterson, NY 12563
CHK BW	6/18/2012	TITLE	
SHOP BW	6/18/2012	AF9350	
		SIZE A	CAGE CODE 28812
		DWG NO 20894-500	REV A
		SCALE 1:2	SHEET 1 OF 1

UHF: AF9350


1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Transmission
Tr1 S21 Log Mag 10.00dB/ Ref 0.000dB [F2]
Tr2 S12 Log Mag 10.00dB/ Ref 0.000dB [F2]
1 10.000000 MHz -0.0192 dB
2 500.00000 MHz -0.4256 dB
3 750.00000 MHz -54.990 dB
>4 3.2080000 GHz -58.900 dB
10.00
0.000
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
1 Start 10 MHz
IFBW 70 kHz
Stop 5 GHz
Cor
Return Loss
Tr1 S11 Log Mag 5.000dB/ Ref -20.00dB [F2]
Tr2 S22 Log Mag 5.000dB/ Ref -20.00dB [F2]
1 403.08534 MHz -21.401 dB
>2 643.30416 MHz -15.057 dB
3 1.0691466 GHz -14.836 dB
4 1.8116411 GHz -15.601 dB
5.000
0.000
-5.000
-10.00
-15.00
-20.00
-25.00
-30.00
-35.00
2 Start 10 MHz
IFBW 70 kHz
Stop 5 GHz
Cor
Meas
Stop
ExtRef
Ready
Svc
2012-06-28 10:04