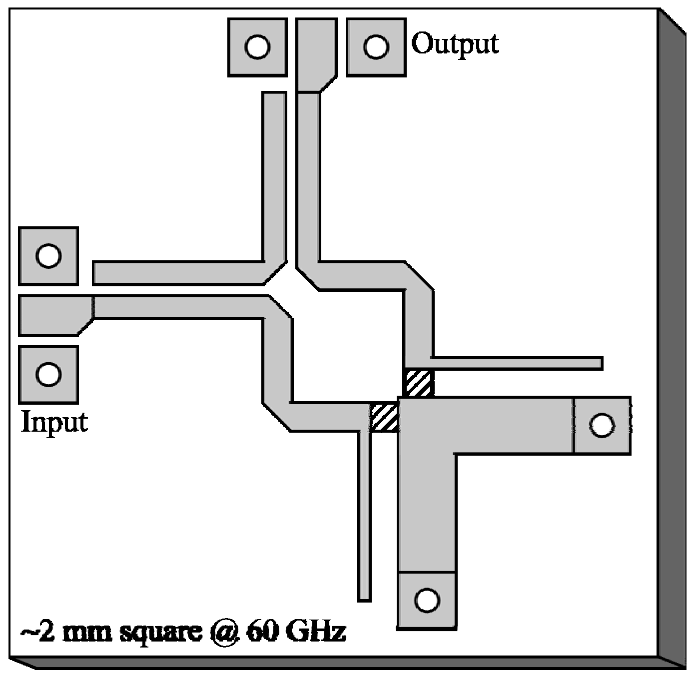
High Frequency Absorptive RF Filters

From 20GHz—100GHz

Why Use Transmission Line Absorptive Filters (US Patent Pending)?

- Similar to Chebyshev Type II response with excellent impedance match in passband, stop-band and transition band
- Improves out-of-band termination in mixers and amplifiers for better linearity an stability.
- Ideal for RF systems operating from 20 GHz to 100 GHz.
- Absorbs spurious signals and reduces cross-channel coupling in integrated multi-chip modules.
- Greater amplitude, phase stability and linearity.
- Cascadable with other components.



Conceptual layout of a Transmission Line RF Absorptive Filter for IEEE 802.11ad frequencies

- Directly stackable for larger stop-band rejection.
- Distributable throughout the signal path for optimum linearity/dynamic range.
- Order of magnitude greater amplitude and phase stability than conventional filter types.
- Complete filter requires no tuning and reduces cost.
- **NRAO has successfully commercialized & transferred to industry technology similar to this before.**

What conventional RF Filters Provide

Conventional reflective filters do not dissipate spurious signals or added noise. Instead they build up as standing waves between the filter and the source and/or are radiated into the electronics housing, impacting the linearity, stability, and electromagnetic compatibility of the system. These effects often go unnoticed, but they can be important in some high-performance applications.

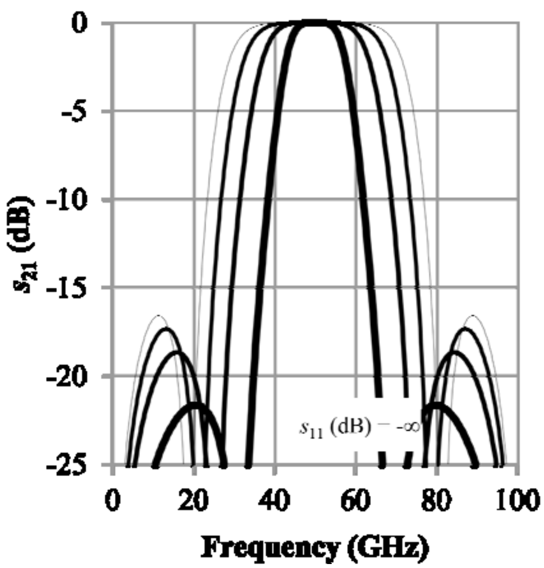
Background

High-frequency radio system engineers have numerous options for filtering requirements including topologies, synthesis equations and proven methods of implementation. Conventional RF filters focus almost exclusively on techniques that presume all circuit elements will be nominally-lossless, with a few exceptions. This presumption leads engineers to use filters with the following three properties:

1. that minimize the passband insertion loss,

2. show the sharpest possible transition between passband and stopband, and,

3. reflect back to the source any out-of-band power rejections.



Graph showing out-of-band signal absorption

This causes the impedance mismatch to become maximized, but is accepted only because it occurs out of the operating band, since traditional thinking is that in-band performance is all that matters. However, this is not always true. If out-of-band signal power did not matter, why filter it in the first place?

Transmission Line Absorptive Filters solve this and other types of problems that are caused by traditional filters.

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