

AUTO-TUNE FILTER (AtF)

A superior alternative to limiters and filters, Metamagnetics' Auto-tune Filter provides a broadband, fast-response, simple solution that protects receivers from electromagnetic interference (EMI) and ensures that signals-of-interest are detected. These devices work by setting a power threshold level which no one signal can exceed. If one or more signals exceeds the threshold, the AtF automatically limits it by notching and attenuating the dangerous signal. In the meantime, desired radio frequency (RF) signals operating below the power threshold pass through the system unaltered. Applications include military EW, radar, and comms along with commercial applications such as wireless communications and satellite broadcasting.

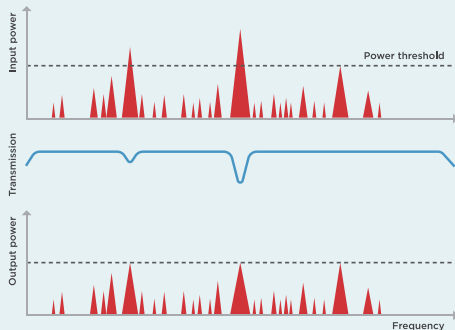
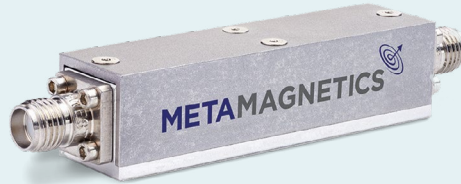


Fig. 1. The AtF provides automatic selective attenuation (aka signal limiting) of above-threshold power signals while all other signals propagate unaltered. This capability allows for the mitigation of EMS threats and interference with improved performance at a fraction of the cost.

Features

PROBLEM

Time Lag: Traditional tunable RF filters have a search-and-respond approach, making the process time consuming. Sophisticated software is required to reduce the power of the detected offending signal. This causes a lag from when the signal hits to when the system reacts, and in that window the system can be compromised.

Protection: Catch-all protection measures shut off the input to the receiver until the threat is gone, preventing harmful signals from damaging your system at the cost of hindering desired signals necessary to communication efforts.

Limited Tones Per Device: Typical RF notch filters are only able to mitigate one tone per device, thereby limiting the user to determine how many, which frequency, and what direction the interference is coming from. This rigidity leaves systems designers to attempt to predict the number of signals their devices will encounter in the field.

SOLUTION

Unlike traditional RF filters, Metamagnetics' Auto-tune Filter does not rely on digital components to slow it down. It has a fast response time and excellent selectivity taking less than 50 nanoseconds to remove the interference.

Metamagnetics' Auto-tune Filter automatically adapts to filter interference above a preset power level without attenuating desired below threshold signals.

Adaptable across multiple platforms for land, sea, and air solutions, Metamagnetics' Auto-tune Filters have no limitations on number of signals that can be attenuated in band, including intermods.

Specifications

Reflective	FREQUENCY	POWER THRESHOLD (dBm)	MAX ATTENUATION (dB)	INSERTION LOSS (dB)	RESPONSE TIME (ns)	3dB SELECTIVITY (MHz)	SIZE
	800-1,000 MHz	-40	30	3.0	100	5	10mm x 10mm QFN
	1,000-1,200 MHz	-40	30	3.0	100	5	10mm x 10mm QFN
	1,200-1,400 MHz	-40	30	2.0	100	5	10mm x 10mm QFN
	1,400-1,600 MHz	-40	30	2.0	100	5	10mm x 10mm QFN
	1,600-1,800 MHz	-40	30	1.5	100	5	10mm x 10mm QFN
	1,800-2,000 MHz	-40	30	1.5	100	5	10mm x 10mm QFN
	2,000-2,200 MHz	-40	30	1.5	100	5	10mm x 10mm QFN
Absorptive	FREQUENCY	POWER THRESHOLD (dBm)	MAX ATTENUATION (dB)	INSERTION LOSS (dB)	RESPONSE TIME (ns)	3dB SELECTIVITY (MHz)	SIZE
	2-4 GHz	0 to +6	20	1.5	50	50	0.5" x 0.5" x 1.6"
	4-8 GHz	+3 to +9	30	1.5	50	50	0.5" x 0.5" x 1.6"
	8-12 GHz	+6 to +12	30	2.0	50	50	0.5" x 0.5" x 1.6"
	12-18 GHz	+9 to +15	30	3.0	50	50	0.5" x 0.5" x 1.6"
	2-12 GHz	0 to +15	30	4.0	50	50	0.5" x 0.5" x 1.6"

Disclaimer: The information outlined above are not final specifications. The information outlined above is provided as example specifications and are not the full extent of our capabilities, nor does Metamagnetics believe that the specifications list above will work with every application. Metamagnetics takes pride in working with each customer's exact specifications and meeting those needs to benefit your project.

Mounting

These Auto-tune Filters can be mounted to a housing or printed circuit board using conductive epoxy or solder. Electrical interconnects can be implemented using wire bonds or ribbons. Metamagnetics offers fully packaged devices covering the entire band for L, S, C, and X-bands.

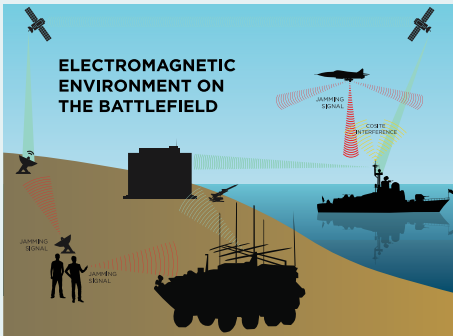


Fig. 2. To the left are some examples of the electromagnetic environment on the battlefield. Secure communications are crucial to maintain communications from land, to sea, to air, to even space. At any moment these systems could be under attack including small handheld systems by insurgents, advanced widespread systems like jet carried jamming systems, and even interference from one's own electronic systems.

Receiver Block Diagram Using Notch Filter Bank

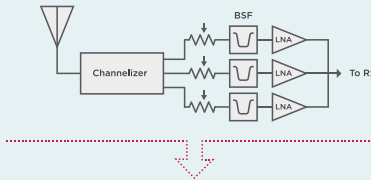


Fig. 3. A single Auto-tune Filter replaces an entire tunable notch filter bank. Since the AtF tunes automatically to any number of notches, this eliminates the need for sensing and control circuitry greatly reducing system complexity.

Receiver Block Diagram Simplified and Enhanced Using the Auto-tune Filter



Contact us today to learn how Metamagnetics' Auto-tune Filters can improve your application.

ABOUT METAMAGNETICS

U.S. based and veteran owned, Metamagnetics develops and markets advanced RF and microwave solutions to enhance the performance and effectiveness of mission-critical security, surveillance and communication systems. Our unparalleled knowledge of electromagnetism and materials science empowers break-through technologies that can bring significant value to defense and commercial projects. Efficient and agile, our team can help you rapidly design and deploy innovative solutions for current and next-generation radar, sensing and related systems.

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