

PowerMatch, The RF Filter for Real World Applications

Conventional RF Filters can lose up to 30% of their interference rejection when terminated in real world impedances, but PowerMatch achieves 100% interference rejection under all load conditions.

Figure 1: Communications Map for a 3G radio that is experiencing interference from a UHF satellite radio's third harmonic

When tested with laboratory test equipment, Conventional RF Filters are capable of achieving good interference rejection. But what happens when these filters are installed into real-world systems? We have empirical data demonstrating that Conventional Filters can lose up to 30% of their interference rejection with impedance terminations common in the real world.

There are a number of wireless applications requiring RF Filters to enable operation in the presence of interference including:

1. Military Radio CoSite Interference. A transmitter can interfere with a receiver if operated in close proximity, a problem known as CoSite Interference. Operating 4 VHF SINGARS radios in close proximity reduces the communications range from 30km to less than 3km.¹
2. First Responders and Public Safety Radio Interoperability. In the United States, many regions where Public Safety radios are installed are subjected to interference by other wireless sources, creating potential communication "dead zones" as large as 0.5 miles in diameter.^{2, 3}
3. Commercial Wireless Quality of Service. There is a significant amount of unmanaged wireless "noise" radiated into open air despite emissions regulations established by the Federal Communications Commission (FCC). A survey performed by Cisco indicates that 54% of companies surveyed cite interference as the main cause of their wireless system failures, even more significant considering 78% of them consider their wireless systems to be mission-critical.⁴

Based on these examples, it is clear that current techniques for eliminating interference are insufficient. In a time of rapid growth in wireless systems and spectrum scarcity at an all-time high, technology to eliminate interference must be capable of maximum performance under real-world conditions. Figure 1 demonstrates the communications range of a radio operating in the presence of an interferer. Figure 1a shows a communication range of 1 mile if a filter achieves only 70% of its interference rejection. Figure 1b shows a range of 7 miles when the filter achieves 100% of its interference rejection. PowerMatch is the filter that achieves 100% interference rejection.

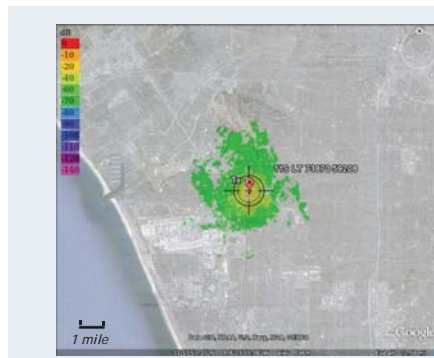


Figure 1a: Radio range with 70% interference rejection

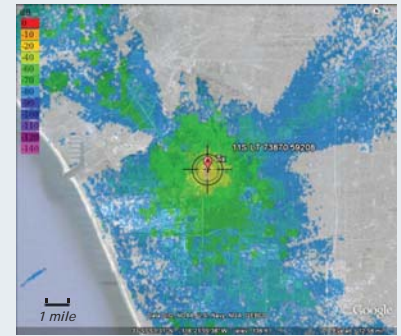


Figure 1b: Radio range with 100% interference rejection

Figure 2: Comparing the interference rejection performance for a Conventional Filter & PowerMatch

Figure 2 shows the difference between a Conventional Filter and PowerMatch when measured under impedance terminations encountered in the real world. Notice the Conventional Filter has regions where it is only capable of achieving 70% of its interference rejection potential, whereas the PowerMatch Filter achieves 100% of its full interference rejection everywhere.

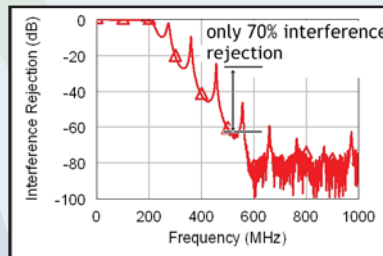


Figure 2a: Conventional Filter Interference Rejection Under Real World Impedances

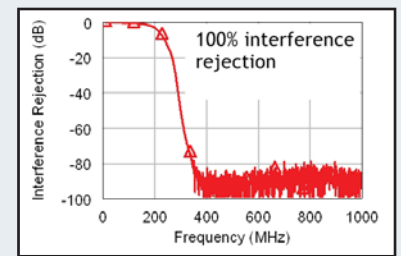


Figure 2b: PowerMatch Filter Interference Rejection Under Real World Impedances

Choose PowerMatch for your filtering needs so you can sleep soundly knowing your filter is providing maximum interference rejection for your real-world applications. If you want to know more about the technology behind PowerMatch and what it can do for you, please contact us at sales@terasystechnologies.com to request a copy of our PowerMatch Technical White Paper.

References:

1. "SINGARS frequency hopping multiplexer", Tactical Communication Conference, 1992, Vol. 1, Fort Wayne IN, pp. 125-131.
2. Association of Public Safety Communication Officials (APCO) Project 39.
3. Schoenberger, David. www.davidschoenberger.net
4. "Wireless RF Interference Customer Survey Results," Cisco White Paper, 2010.

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