

MPD

MICROWAVE PRODUCT DIGEST

Editorial Statement of Purpose

Microwave Product Digest serves RF and microwave design engineers, research and development engineers, applications engineers and engineering managers. These professionals, working in facilities that serve both the commercial and government markets, are involved with the design, development, application, and use of systems and subsystems, devices, and techniques involving frequencies from RF to light.

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FROM THE EDITOR



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Headline

Cavity Filters and 4G: Something Old for Something New

The coming year will be a big one for the wireless industry, as wireless carriers battle it out for market share in what has become known as the fourth generation of wireless networks. Verizon and AT&T will blast into 2011 with LTE and Sprint and Clear will continue to roll out WiMAX throughout the US. Not to be left without a 4G offering, T-Mobile has its own spin -- HSPA+, which is actually a 3G standard and even older than LTE. However, this is marketing and LTE isn't really a 4G standard either. It's something like "3.xG" if you adhere to the release structure of the Third Generation Partnership Project (currently due for a name change, I'd suspect). Standards under 3GPP's auspices won't arrive until LTE-Advanced appears in Release 10. Nevertheless, one of things all carriers share is the need to deal effectively with interference, which is now of greater concern than ever.

To combat the inevitable need for interference reduction, carriers will rely heavily on that Swiss Army Knife of RF and microwave components – the cavity filter. Cavity filters have been used in communications systems for a very long time and for very good reasons: They offer the best way to reduce interference at a specific frequency, and are the only filter type that combines the ability to handle high power with extremely high rejection (sharp skirts) and low insertion loss. They are also very rugged and can withstand hostile environmental conditions.

Reducing or eliminating interference in wireless systems today is important even in the 700 MHz bands, where LTE will mostly be deployed in the U.S. This presumably "blank canvas", where previous inhabitants have been moved elsewhere in the spectrum, is no less an

interference concern than in current wireless bands. Think of the 700 MHz bands as a vast farm, whose previous inhabitants have long since cashed in and moved to the Big City. What's left is a flat expanse of land with nothing growing on it.

However, close inspection reveals that there are indeed some things growing there that unless dealt with will interfere with whatever the new farmer chooses to grow. This analogy applies to wireless carriers, who after conducting interference hunting and spectrum clearing to find interferers, have unearthed unexpected "electromagnetic vegetation" growing in their space. It can come from an almost limitless number of sources, including spurious and harmonic signals generated by other services to unintended emissions produced by faulty systems of various kinds.

Cavity filters are generally deployed in every new base station to remove known interferers and to fend off the problems posed by operation at co-located sites occupied by several carriers and perhaps public safety networks as well. However, they can also be installed at any time if new problems occur. Consequently, they will continue to play a vital role in wireless systems today and tomorrow. So while 4G is something entirely new, it will rely on these "old" filter types to keep interference in check.

IN MY OPINION



Sam Benzacar
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