Practical Realities

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Operators need good coverage, and antennas and cell sites fulfill that need. However, the current trend points to less being more.

Maximizing the burgeoning stacks of technologies and equipment being layered onto existing cell site towers is now a top-of-mind issue for wireless operators. And shrinking the number of antennas is a growing go-to strategy.

Delivering a wealth of services – from VoIP to video – to a content-hungry marketplace, while reducing operating and maintenance expenses are pushing the wireless industry to create, innovate and deploy more efficient technologies on their towers.

"We're seeing lots of significant innovations and combining more technologies on the same antennas. There's lots of technology going back into the antennas, so operators can deliver their services more economically. But there's also lots of talk about reducing cell site density, with little earth-shaking progress yet," says Philip Marshall, vice president of enabling technologies for The Yankee Group.

Progress may be on the way, however. Several service providers such as Alltel are exploring creative new ways of optimizing the precious real estate on existing towers, including antennas.

"Tower space itself is really becoming a premium, so the vertical real estate and stress loads become an issue. Maximizing the technology and space on towers is now mandatory," says Patrick Adair, staff manager of project engineering for Alltel.

Adair: Vertical real estate and stress loads are issues

Alltel is using equipment such as duplexers to maximize an antenna's performance, and to reduce maintenance costs, Adair notes. The operator also is looking at remote, tiltable antennas and dual-band antennas. "There are a lot more options now with technologies that are translating to fewer antennas on towers, with the bonus being fewer loads on the towers."

ANTENNA REDUCTION

Innovative new technologies are emerging, designed to optimize the existing equipment and technologies on towers, particularly with antennas.

Laird Technologies, for example, has developed a 4-sector, adjustable beamwidth antenna which the company says will replace four antennas with one, and will be easier to maintain.

"There's lots of convergence going on, and all in one antenna. Not just on towers, but in mobile devices. So the challenge is combining technology, engineering and the business model. Now, smaller is better," says Craig Somach, director of sales for Laird Technologies.

And for the expanding community of companies in the antenna optimization business such as the Andrew Corporation, smaller and efficient are the two operative words. "Being able to utilize existing technology and equipment on towers is crucial, and is a bigger issue now. Service providers want to maximize revenue from each site. So if you want to add more technology and equipment, it's going to cost you. One major carrier has already designated a person in each market to reduce the cost of service and improve profitability at each cell site, and others will follow," says Jeff Vann, senior systems engineer for Andrew Corporation.

REMOTE CONTROL

Andrew is rolling out its Multiple Carrier Power Amplifier (MCPA) to eliminate certain antennas. "MCPA brings multiple signals on one feed line. You can add any technology without touching anything on the tower and eliminate the need for cable or antenna adds," Vann says.

The company also is thinking remote. "We're trying to provide diagnostics and remote control at sites from the desktop, and looking at similar features via MCPA with couplers in buildings," Vann says.

Quintel, which designs and builds patented RF access products, is also a player via its remote electronic tilt technology, which it says can upgrade existing sites without site redevelopment, planning or zoning delays, while reducing the number of antennas.

"The longer term rental opex costs are driving the need to seek site solutions which can use fewer antennas. It's conceivable that in the future a typical cellular tower site could deliver cdma2000, EV-DO, GSM, UMTS, HSDPA, Mobile TV, SMR and WiMAX, and all requiring independent optimization and a massive number of large antennas. So, we are being asked to provide innovative solutions for multi-antenna performance on a single antenna," says Steve Obsitnik, executive chairman of Quintel.

Yet most operators, according to Ken Hyers of the research group TBR, want to not only reduce their number of antennas, but the towers themselves. "The cost structure is 15% for base stations and 85% towers. So, operators would like to reduce the number of antennas and the number of towers. That's why they want to maximize the use of existing towers, which can only hold so much equipment. The trend is to reduce costs of equipment and cell sites/towers," he maintains.

SMART TECHNOLOGIES

Smart antennas, most industry experts agree, haven't solved the less-antennas-is-better issue. "Smart antenna technology has never really been realized. And carriers don't want to add more antennas. The mindset is the more bang from the same set of antennas, the

better, says Mike Hennigan, executive vice president of KGI Wireless. “It results in less lease expense and less equipment and capital expense and cuts down on long-term maintenance. So the more technology that allows you to maximize antennas, the better,”

And better for upstart companies such as Ubidyne, a German-based manufacturer of digital radio systems which is developing its uB 900 technology to address the antenna maximization issue.

“It’s an antenna-embedded radio with the receiver embedded in the antenna. It will reduce the capex because it uses less power and is smaller, while increasing the coverage of each site,” says Volker Ricker, senior marketing manager for Ubidyne.

And for operators such as Alltel, coverage counts. “Operators are being pressured by cities to balance the technology deployments on the towers, while pushing new services to customers, says Adair. “We must be able to upgrade the real estate because new towers are being built in cities and companies are being asked to be more creative with their vertical real estate. We’re constantly balancing our network investments with meeting customer needs and services. It’s an on-going balancing act.”

And an act that is likely to get more complicated as more services are rolled out.

“With UMTS rolling out, GPS and other services in one antenna,” says Marshall, “operators are looking for ways to deliver them more economically, and to reduce their operating expense, lease costs, and amount of activity of field engineers. But the reality is: There’s a huge difference between theory and reality.”