More than Residential: Femtocell Deployment Beyond the Home

There is great potential for ‘greater femtocells' to improve mobile coverage and capacity outside the home environment.

By Rupert Baines, picoChip, Inc.

Femtocells are now a commercial reality. Launches by AT&T and Vodafone, amongst others, have brought femtocells into the consumer sphere. This first wave of femtocells is targeted at residential users, solving coverage and data coverage issues in the home, and femtocells are an ideal solution to the problem.

But operators are also focused on improving data coverage and capacity issues outside the home, and the technology is starting to be used there too. The challenge for operators is to provide reliable and secure high bandwidth data and services to consumers in other indoor locations, such as shopping malls, consumers in isolated or rural locations, and also to enterprise customers.

Unfortunately, much like in the residential sphere, simply erecting more macrocells is an inefficient and expensive way for operators to boost coverage. In fact, as warned by Julius Genachowski, FCC Chairman, at his speech at CTIA last year, with operators limited by spectrum availability and air interfaces nearing maximum efficiency, small cells are one of the few options available for providing more network capacity to lots of users, particularly as the demand for data services explodes.

While picocells have been proposed to solve this need, the economics have not worked out. However, femtocells deliver significant advantages to operators by providing a cost effective and, through self-configuration, simple means to boost coverage and capacity for enterprise and other non-residential sectors. This addresses the OpEx aspects of cost, while leveraging the economies of scale from residential volumes means that the CapEx of dense deployment becomes attractive.

Femtocells Narrow the Gap

The issues of capacity and coverage are pressing. In an update to ABI Research's Business Mobility Market Data, it is expected that through 2014 mobile data services revenues will grow at a CAGR of 12%. The problem is that data traffic is growing at 134% a year, every year that creates a huge and growing gap. New network capacity needs to be found, and found cost-effectively, to support these increases - femtocells present a perfect opportunity to achieve this.

Femtocell technology is now out in the ‘real world', in residential environments, and proven to work. There are already several hundred thousand femtocells deployed,

with ten carriers offering services. By the end of this year there will be millions of residential femtocells in service.

By taking the concept further it seems that, after the first flush of residential femtocell uptake, that metrozone and enterprise services will be the ‘next big thing' for operators. For many of the femtocell technology suppliers, including picoChip, these so-called ‘greater femtocells' have been the next logical step for some time. As a result we have seen more emphasis placed on solutions catering for higher numbers of users and extended range.

Femto Forum Defines the Requirements

Indeed, last year the Femto Forum defined the requirements for ‘Class2' and ‘Class 3' femtocells covering a broad range of non-residential applications: from 8 channel devices for small enterprises up to 32 channel femtocells for rural or other large area applications.

Class 2 are primarily for enterprise use: perhaps 16 users per node, with several nodes in a company, integrated with a corporate PBX and managed by the CIO. Of course, the femtocell is still using standard handsets and still on carrier spectrum with carrier control. In this case, they can replace landlines or officer cordless phones, giving the best of both worlds of cellular and corporate communications.

Class 3 femtocells are more powerful, with longer range and offer a wide range of possibilities in terms of deployments. Whether that is with ‘metro' femtocells in dense urban areas, or specific locations like shopping malls, university campuses or airports, or by installing femtocells in specific rural locations, such as railway stations, where coverage is needed (rather than using a macrocell to boost coverage in the middle of fields). This could be an extremely important way to extend 3G service to areas that are currently unserved, whether remote areas in developed countries (small islands, mines or ski lodges for example) or extending networks into developing countries. In some of these cases there will be no broadband so satellite backhaul could be used.

New Opportunities Abound

For network operators, these extended femtocells offer a range of new opportunities. Primarily, of course, it greatly expands the addressable market for femtocell services and opens up the potential for a range of new revenue streams. However, perhaps the most significant of these opportunities, at least while the overall femtocell market is still in its relatively nascent stage, is the chance for operators create a virtuous circle of demand.

As more residential and enterprise users experience the benefits of femtocells, either at home or at work, so they will be more inclined to want the same service wherever they are - at home, at work or in the town center - fueling and broadening demand for femtocells.

In 2010 we will see femtocells take off as a consumer service, with the vast majority of operators launching their own services this year, and in the short term this will understandably be the main focus of the industry.

Conclusion

However, no one in the industry is standing still. The residential environment is just one aspect of the mobile market and there remain challenges in improving mobile coverage and capacity for a range of other scenarios.

With the technology development progressing quickly, the first operators are already trialing ‘greater femtocells' as user interest in, and demand for, femtocells grows. Looking further forward, it seems that femtocell technology will continue to have a crucial role to play in meeting the challenges of advanced networks and rapidly increasing smart phone use, not just in people's homes but across the full range of usage scenarios.

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