Explosion of wireless devices causing data traffic jam

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With the exploding popularity of smartphones, wireless laptops and, if Steve Jobs has his way, tablet computers, it's fast becoming a wireless world. But the breakneck growth of all things wireless is threatening to cause a traffic jam -- of the airwaves that deliver calls, Web searches and video to those data-hungry devices.

Left unchecked, that could eventually mean more dropped calls, slower service and a lot of frustrated customers. Recent complaints of dropped calls and slow connections by iPhone users on AT&T's networks in San Francisco and New York foreshadow a potentially widespread problem.

Now federal regulators are working to head off what they call a "looming spectrum crisis" -- a severe shortage of the wireless frequencies that deliver data and allow smartphones to perform all the tasks people expect. A proposal from the Federal Communications Commission is expected next month.

The electromagnetic spectrum that carries these transmissions is highly valuable and allocated by the government to businesses that often pay for their slice. That complicates any effort to shift it from one use -- such as over-the-air TV broadcasts or satellite TV -- to wireless providers.

The problem is one of basic supply and demand. More and more Americans are buying smartphones and using them not only to make calls but also to watch YouTube videos, share pictures, surf the Web and download books, among a litany of other applications on the horizon.

But the bandwidth to deliver data for all those functions is limited.

At the end of 2008, 34 million mobile subscribers in the United States accessed the Internet using their cell phone, according to Forrester Research, a technology market research firm. That number is projected to grow to 106 million by 2014. And Web-enabled smartphones, which are expected to account for the majority of cell phone purchases within a few years, consume 30 times the data of regular cell phones, according to Cisco Systems of San Jose, Calif.

Currently, wireless companies have 534 megahertz of spectrum allotted to them, with an additional 50 megahertz in the pipeline. The industry says it needs at least 800 megahertz more within six years to accommodate demand.

"Spectrum for us is our highway," said Christopher Guttman-McCabe, vice president of regulatory affairs for CTIA-The Wireless Association, a trade group. "But the volume of traffic is picking up. Without more lanes, we'll have more traffic and more congestion," which will result in slower service.

When the shortage will become acute varies from market to market and carrier to carrier, he said, but it's generally in the range of two to five years.

Limited spectrum is only part of the problem, experts say, though an important part. Often, slow cell service is caused by a handful of bandwidth hogs -- watching videos on their iPhones, for example -- in a small area between cell phone towers.

"You have a few users clogging up capacity -- that is not something which can be solved just by providing more spectrum," said Aditya Kaul, director of mobile networks for ABI Research, a technology research

firm.

Another solution, he said, might be to be add a series of smaller cell towers -- serving a few streets in a neighborhood, or even an individual's home -- to ease demand on wider wireless networks. There are also ways, Kaul added, for wireless carriers to use their existing spectrum more efficiently.

Still another idea gaining currency is for wireless providers to charge customers based on how much data they use, instead of relying on all-you-can-use plans.

Even if such short-term solutions are adopted, Kaul and other experts agree that a spectrum crunch is inevitable -- and the government, which has broad authority to allocate the public airwaves, will need to do something.

FCC Chairman Julius Genachowski has deemed the shortage a looming crisis, and his staff is hatching plans to address it as part of a sweeping proposal to expand broadband due out next month.

"Our mobile use will soon outpace our mobile capacity," Genachowski said in a statement, adding that the commission is considering "win-win solutions that free up more airwaves and make better use of what we have."

One option the FCC is weighing is shifting spectrum controlled by TV broadcasters to wireless providers. With only about 10 percent of homes now relying on over-the-air signals for TV reception -- as opposed to cable or satellite subscriptions -- officials say at least some of the 294 megahertz of broadcast spectrum could be put to better use serving wireless customers.

But broadcasters say they have their own plans for that frequency -- such as more high-def programming and mobile digital TV. And just a few years ago, they note, broadcasters relinquished more than a quarter of their spectrum allotment as part of the switch from analog to digital TV -- airspace that was auctioned off to wireless companies.

There are still millions of households that "rely on free, over-the-air TV -- particularly in Hispanic and rural communities," said Dennis Wharton, executive vice president of the National Broadcasters Association.

There is also talk of reallocating spectrum from satellite TV firms or federal agencies to wireless providers. The FCC is likely to tread lightly at first, seeking voluntary measures to free up more airwaves to accommodate the boom in wireless devices.

But the issue clearly isn't going away. Aside from smartphones, netbooks and tablet computers, Kaul said, the emergence of "smart grid" energy delivery and home appliances controlled via the Internet will only accelerate demand for wireless spectrum.

"This is a story," he said, "we'll be hearing again and again."