

3G Phones Exposing Networks' Last-Gen Technology

By [MATT RICHEL](#)

Published: March 13, 2009

SAN FRANCISCO — Oh, the things modern mobile phones can do. They are music-playing, video-taking, direction-providing multimedia powerhouses. But many people have trouble getting them to perform their most basic functions, like making phone calls.

Apple's iPhone 3Gs on display last July in Salt Lake City. "The iPhone and the carriers are shoving 3G down our throats," said one analyst. "But the actual experience has been abysmal."

Disguised or not, cellphone towers often carry a patchwork of network upgrades.

The underlying problem, industry analysts say, is the complex quilt of the nation's wireless networks. The major mobile carriers have spent tens of billions of dollars on new voice and data networks that they advertise as superfast wireless express lanes. But analysts say these upgrades present major engineering challenges, and the networks often underperform.

The resulting technological glitches have given many owners of fancy new phones the urge to throw them out the window and onto the highway.

For many, the [iPhone](#) has become a symbol of the gap between the promise of a powerful device and the reality of inconsistent service. Its owners complain of continual hiccups, particularly in certain cities.

[AT&T](#), which is the exclusive carrier for the iPhone in the United States, says it has done a lot to improve its network, and is doing more. Last Tuesday, the company announced plans to invest around \$11 billion this year to expand and improve its wireless and broadband networks.

"I'm not minimizing the frustration somebody may feel, but I think the improvements in wireless in this country have been extraordinary," said Mark Siegel, a spokesman for AT&T. "It's come a long, long way."

For some AT&T customers, more improvements to the company's so-called 3G, or third-generation, high-speed network can't happen soon enough. And industry analysts say the problems at all carriers are becoming more glaring as the growing popularity of so-called smartphones puts pressure on their networks.

“The iPhone and the carriers are shoving 3G down our throats,” said Edward Snyder, an industry analyst with Charter Equity Research. “But the actual experience has been abysmal.”

Overall customer satisfaction with cellphone service has been rising, but it varies among cities and carriers. [Verizon](#) customers tend to be happiest with their service, while AT&T and [Sprint](#) customers were less satisfied, according to a survey published in Consumer Reports magazine in January. Bob Goodson, 28, the chief executive of a start-up in San Francisco, upgraded in January from a 2G iPhone to a 3G version. On the whole he is very pleased, he said, but his experience varies widely based on what part of the country he is in.

During a recent two-week trip to New York, he said, the coverage was far inferior to what he experiences in California, and made it tough for him to use the map function to get directions.

“I found myself walking around Manhattan frustrated,” Mr. Goodson said. “It couldn’t hang on to the network.”

Even when the network is within reach, its speeds are often not what they should be. A Gartner research report released in January found that data speeds for mobile phone users are often half of what is advertised by the carriers. The most glaring problem, Gartner found, is at AT&T.

“AT&T is constantly falling below the threshold,” said Ken Dulaney, a mobile computing analyst for Gartner, who said he had heard from three of Gartner’s major corporate clients in the last three months that their employees were frustrated with AT&T’s service. “I can’t say that Verizon is trouble-free, but we’ve heard fewer complaints.”

The reasons for the trouble are complicated. Part of the problem is that the companies are constantly upgrading their networks — creating a patchwork of technology on cell towers, and integrating slices of radio spectrum that carry voice and data transmissions.

Analysts said the problem was not unique to AT&T, but was especially pronounced on its network in some cities because of the way its infrastructure was built.

AT&T began introducing its 3G network in 2005, upgrading the equipment and antennas at many of its 40,000 cell towers nationwide. It built the network to complement and take advantage of the technology servicing its older 2G or second-generation network. Many phones still use the 2G network, so it must be kept running.

But there are important differences between the 2G and 3G networks, and getting them to work together presents problems, according to engineers who work on the infrastructure.

Take, for instance, the difference in the way voice and data traffic is carried on the two networks. On AT&T's 2G network, cellphone towers — even ones in close proximity to one another — use different chunks of the radio spectrum to carry information. As phone users move around on foot or in a car, their phones switch from one frequency to another.

On the 3G network, all of the cell towers use the same frequency to transmit information. On its face, this would seem to make things simpler. But this technology also adds a wrinkle: when phones get too close to too many 3G towers using the same frequency, they can become overwhelmed with radio noise.

“When you have more than three cell sites overlapping, you get interference,” said one infrastructure engineer who works for AT&T, who asked not to be named so as not to upset the company. “You get bad quality, funky sounds. If you're doing data, the rates get slower and slower until you lose it.”

Kristin S. Rinne, senior vice president of architecture and planning for AT&T, said the company had done a good job of diminishing the prospect of such interference by limiting the strength of signals from overlapping towers. Moreover, she said, the phones themselves have a role to play; some handsets, she said, do a good job of managing the interference internally, while others do not.

“The chipset inside the handset impacts how adaptable it is,” Ms. Rinne said. She declined to discuss the iPhone's performance.

The iPhone, of course, is not perfect. Mr. Dulaney of Gartner said the phone did not communicate with the data network as efficiently as it could — which is a problem for a phone whose owners are among the heaviest users of mobile data.

Greg Joswiak, vice president of iPod and iPhone product marketing at [Apple](#), said the phone was plenty fast. “We've shown it's faster than any competitive phone doing Internet browsing,” he said.

There are other, broader technical challenges that affect all carriers as they move to the faster networks — both 3G and, coming soon, 4G.

The newer networks are designed to carry bigger chunks of data so that, for example, people can use their phones to send and receive videos and not just e-mail or [text messages](#). These larger chunks are not able to travel as far before degrading, however. That presents a serious problem, because carriers cannot easily erect hundreds of new towers to be closer to users.

Today's cellphone users often just learn to live with the glitches. Rebecca Hwang, 29, a San Franciscan who has had a 2G iPhone since December 2007, said her calls were cut off periodically and she did not receive 30 percent of her text messages. But she is still a fan of the phone.

“I love the camera, the music is great, I use the GPS and map all the time,” Ms. Hwang said. “If I could have a reliable phone, it would be just perfect.”