700 MHz Spectrum Boosts Mobile Coverage

BY MICHAEL HARRIS

Valuing wireless spectrum is like keeping score in golf: the lower the number, the better. During the FCC's 2008 auction of 700 MHz spectrum, AT&T and Verizon paid the highest price in history – some $16 billion between them – for the lowest frequencies ever made available for wireless services.

Why? In a nutshell, radio waves in lower frequencies propagate further. That means mobile handsets operating in lower frequencies can receive stronger signals over a greater distance from a cell tower than devices using higher frequencies. Additionally, signals in the 700 MHz band are better able to penetrate buildings and withstand inclement weather.

By operating in the 700 MHz range, wireless carriers expect to use fewer cell towers and antennas to cover a service area, offering the potential for significant capital and operating cost savings.

The Benefits of 700 MHz

Figure 1 presents the results of a technical analysis prepared by the investment bank Morgan Stanley. It demonstrates how wireless signal strength improves as frequency ranges decrease. In higher frequencies, such as 2500 MHz, signal strength seemingly falls off a cliff, dropping rapidly within one mile of a cell tower. By comparison, with lower frequencies, such as those in the 700 MHz range, signal strength degrades gradually over a much greater distance. The result is the ability to cover much larger cell areas with fewer towers.[1]

As shown in Figure 2, with 700 MHz spectrum, a wireless carrier in an urban area may need 50% fewer cell towers to cover the same wireless service area.

700 MHz at a Glance

700 MHz spectrum was made available for wireless services following the nation's transition to digital TV.

Radio waves in the 700 MHz band propagate further than waves in higher frequencies. That means mobile devices can receive stronger signals over a greater distance, and wireless carriers need fewer cell towers to cover a service area.

700 MHz spectrum will serve as the foundation for the 4G services for the nation's largest wireless carriers, Verizon and AT&T.

Verizon antenna for 700 Mhz/LTE site

Fewer towers mean lower capital and recurring expenditures for wireless carriers.[2]

Carrier Plans

For the nation's two largest wireless carriers, AT&T and Verizon, 700 MHz spectrum will serve as the foundation for fourth-generation (4G) wireless services using a technology called LTE. Data, not voice services, account for the majority of traffic on wireless carrier networks today. Their goal with 4G is to dramatically boost data capacity and speeds for users as efficiently and cost-effectively as possible.

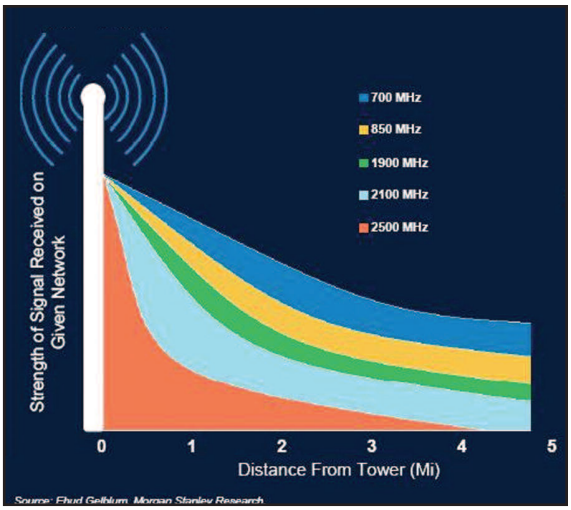

FIGURE 1: Cell Tower Signal Strength

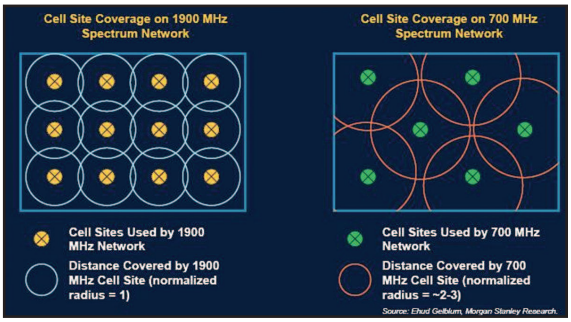

FIGURE 2: Cell Site Coverage by Frequency

In the coming years, AT&T and Verizon are expected to overlay their entire nationwide networks with LTE infrastructure operating in 700 MHz spectrum. In October 2010, Verizon announced plans to launch LTE service in 38 major metropolitan areas by year's end, including New York City, Los Angeles, Chicago, Boston, Seattle, San Francisco and Washington, DC. Verizon says it will offer 700 MHz LTE coverage to more than 110 million Americans by the end of 2010, and full nationwide coverage in 2013.

"The big thing for us is that 100% of the 700 MHz spectrum we won in the FCC auction a couple years back will be used for 4G services. The 700 MHz spectrum gives us tremendous propagation advantages versus the people who are deploying LTE in the higher spectrum ranges. 700 MHz spectrum means that there will be fewer sites required and we'll have better building penetration."

Tony Melone, Executive Vice President and Chief Technology Officer, Verizon Wireless

AT&T plans to begin 700 MHz LTE network tests in 2010 and limited deployments starting in 2011 in anticipation of a wider rollout.

The rollout of 4G networks using LTE and 700 MHz will take time, but that's par for the course in the wireless world. In the meantime, carriers will continue to operate their 2G (second-generation) and 3G (third-generation) networks for voice and legacy data service delivery, while migrating customers to LTE as they upgrade to 4G devices.

Notes

[1,2] "The Mobile Internet Report," *Morgan Stanley Research*, December 2009

[3] Interview with *Network World*, February 2010
(www.networkworld.com/news/2010/022510-verizon-lte-melone.html)

About the Author

Michael Harris is principal consultant at Phoenix, Ariz.-based Kinetic Strategies, Inc. Applying more than 15 years of experience as a strategist, research analyst, journalist, public speaker and entrepreneur, Michael consults with select clients in the networking, Internet and telecommunications industries.

About Unison Site Management

Unison Site Management is the largest independently owned cell site management company in the United States, managing thousands of wireless leases. As wireless lease consultants, Unison helps cell site owners protect against uncertainty, maximize return and provide peace of mind.

340 Madison Avenue,
New York, NY 10173
Phone: 1-866-434-8495
educate@so.unisonsite.com