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Fixed wireless access has emerged as a promising technology that can help bridge the digital divide and change how users connect to the internet. Because FWA can deliver high-speed broadband in underserved and remote areas, it has gained significant traction over traditional wired network connectivity.

FWA is still relatively new and in the early stages of its growth curve. But, as traditional wireless slows down due to the ubiquity of mobile devices, service providers need to find new areas of growth, such as FWA. FWA can serve both individuals and enterprise consumers, said Atlanta-based wireless analyst Jeff Kagan.

"FWA lets customers choose wireless connections for broadband to replace their current wireline connection," he said. "Growth in FWA will only continue moving forward."

FWA provides an alternative to traditional wireless

5G technology now provides a viable and competitive alternative to wired broadband, according to Peter Rysavy, president of Rysavy Research. As a result, mobile network operators (MNOs) in the U.S. offer FWA services to millions of consumers, both businesses and individual users.

"Midband spectrum and millimeter wave spectrum are both being used, with mmWave providing faster speeds and greater capacity and midband providing longer range," Rysavy said.

The U.S. broadband market has historically been defined as the following services:

- Voice.
- Internet.
- Cable TV, also known as *triple play*.
- Cable TV with mobile, also known as *quad play*.

The top MNOs -- AT&T, T-Mobile and Verizon -- are able to address all four of these considerations, said Earl J. Lum, president of EJL Wireless Research LLC.

"The convergence of fixed and mobile has been happening slowly, but FWA has turbocharged mobile operators to take advantage of something cable companies don't have, which is spectrum," Lum said.

MNOs are currently developing FWA in rural and underserved areas before they begin to deploy in urban markets, he added.

Benefits and challenges of FWA strategies

FWA can provide several benefits, but one of its top advantages is it serves as a competitive alternative to wired connectivity options. FWA costs less when combined with mobile services, Rysavy said.

FWA also has some challenges to deployment, however. One drawback is that some locations don't have strong signals. MNOs might also limit the number of FWA users to avoid exhausting capacity, especially if they use midband spectrum, Rysavy said. But, over time, operators will augment capacity to support more connections.

While FWA gives more control to users, some FWA connections are faster and more consistent than others, depending on the location. Some users said they have sufficient service, while others said their service speed and connection varies, Kagan said.

"Consistency is key, and FWA is not consistent yet," he said.

He added that FWA is a great service for consumers and businesses, but it will take time before it's ready for everyone. In the meantime, he said, each carrier needs to prepare its network and geography to provide high-quality and consistent service.

Factors that affect the 5G FWA market

Service prices and overall costs for rural areas are factors that positively affect the 5G FWA market, Lum said.

"Case studies show that some people in rural and underserved areas don't want to pay for the service," Lum said.

Some subscribers might be convinced to sign up for FWA only if they receive state-level subsidies, he added. Additionally, factors like coverage, availability and performance affect their decision, especially if the radio frequency (RF) link uses mmWave spectrum.

Unlike fiber, coaxial or sub-6 GHz frequencies, mmWave frequencies in the 24 GHz to 47 GHz range are susceptible to rain and weather obstructions that can affect connectivity and overall speeds, Lum said. Bad weather could potentially cut off radio signals and sever broadband connections.

Constrained capacity, especially with midband spectrum, is another challenge to 5G FWA market growth. However, small cells and mmWave technology will increasingly be able to augment capacity in many deployment scenarios, Rysavy said.

According to Lum, other challenges MNOs need to address for market growth include the following:

- How many points of presence are in rural and underserved areas? What is the likely penetration rate into this market?
- How quickly can MNOs address the coverage issue and improve the take-up rate?
- How quickly can MNOs deploy FWA in urban areas?
- How can MNOs use spectrum efficiently between FWA and mobile services?

"It will take time for each carrier to build its networks in its areas of operation and footprint," Kagan said. "At the same time, prices must be competitive, and innovation must be high. The task is delivering something customers don't already have."

A large potential customer base at stake

Every MNO has a different approach to 5G FWA, Rysavy said. For example, T-Mobile has focused on midband spectrum, while Verizon works on mmWave. Over time, each method of FWA will garner millions of users.

Enterprises and consumers can both take advantage of FWA, but currently, most of the interest in FWA deployment focuses on how it can provide connectivity to

individual users. A strong FWA connection can enable individuals to connect to enterprise networks, especially in remote areas with limited connectivity options.

According to Lum, approximately 60 million residents in the U.S. live in rural areas. An August 2021 report from Pew Research Center found that 72% of these residents already have some type of broadband internet service.

"That leaves 16.8 million who are not connected for whatever reason, which may include costs or pricing," Lum said. The 20% to 50% of nonconnected customers might sign up if subsidies are available, he added. The other 50% -- customers who are already connected -- might turn to FWA.

Potential for market growth

The potential for growth in the 5G FWA market is impressive, especially as the technology continues to improve. Potential features include the ability to harness higher RF, deploy radio repeaters and develop new technologies, Rysavy said.

According to Kagan, the success of FWA will boil down to the quality, connectivity, reliability, speed and latency of the services.

In this handbook:

David Weldon is a business and technology writer in the Boston area who covers topics related to data management, information security, healthcare technology, educational technology and workforce management.