

Case study

Bridging the digital divide

Extended-range millimeter-wave
5G Fixed Wireless Access



ERICSSON

In
partnership
with



UScellular and Ericsson lead the way

Case study:
UScellular

Industry:
Telecommunications

Executive summary

Working in partnership with Ericsson, UScellular was the first communications service provider to offer consumers and enterprise Fixed Wireless Access (FWA) services, using extended-range millimeter-wave (mmWave) 5G which is key to targeting digital divide areas in rural America. In the first commercial step, Ericsson's innovative solution enables mmWave coverage to extend from typically 600–900 m, to over 5 km. This increased the area in which households may be served by mmWave by 40 times, greatly expanding the number of households able to benefit from these new high-speed, low-latency connections.

UScellular has been working together with Ericsson for over a decade. The companies have previously collaborated on 5G low-band deployment and deployed both LTE and voice over LTE together, so when UScellular was looking for a solution to better serve their customers in suburban and rural areas with high-speed FWA, Ericsson was the natural choice. As Jossie Prochilo, Vice President, UScellular and TDS accounts at Ericsson North America, explains: "...we have such a great relationship, and we work together by combining their knowledge and our expertise to find the best solutions."

About UScellular

Operating for nearly 40 years, UScellular is the fourth-largest full-service wireless carrier in the US, providing national coverage. They offer a wide range of communications services, connecting 5 million consumers, businesses and government entities with their award-winning network.





The challenge of the digital divide

The “digital divide” refers to the gap between demographics and regions that have access to modern information and communication technology, and those that have restricted access, or no access at all. In 2022 it was estimated that between 23–25 million Americans are either unserved or underserved with broadband internet,¹ illustrating that there is still some way to go to ensure as much of the population as possible can fully access the internet and associated services.

“Closing the digital divide in America is a top priority for us...we think it’s the right thing to do to make sure everyone in the country has access to high-speed internet services.”

Mike Irizarry
Executive Vice President and Chief
Technology Officer, UScellular

In addition to addressing US residents’ right to access high-speed internet, these innovative FWA services address a previously underserved gap in the market left by the lack of options for consumers living outside the main urban areas. UScellular is working together with Ericsson to close the digital divide, connecting people and communities to high-speed broadband by providing a world-first commercial offering of 5G mmWave extended-range 5G FWA services.

One of the defining capabilities of 5G is that it was initially designed to be a future-proof technology to deliver broadband services in a cost-efficient way, and it has now reached the point where it is allowing mobile technology to fully intersect with the demands – and price points – of fixed-line services. The cost, time and complexity of delivering fixed broadband has historically been one of the main challenges to the roll-out of high-speed data services.

Previous initiatives have often been unsuccessful, mainly due to the outlay cost involved with new infrastructure and equipment.

In contrast, the extended-range 5G FWA solution proposed by Ericsson leveraged existing assets such as macro sites and radio towers, using common components to deliver high-speed broadband services to UScellular’s previously underserved consumer and enterprise markets. With a massive capacity and quick deployment time when compared to other wireline options, 5G FWA is an affordable, accessible and future-proof solution to expanding broadband services and helping to bridge the digital divide.

“UScellular was putting their mmWave radios on macro sites, and that’s something that very few service providers were doing. It was worth exploring because it’s a way to bridge that digital divide by connecting the last mile over the airwaves rather than deploying very expensive fiber.”

Jossie Prochilo
Vice President, UScellular and TDS
accounts, Ericsson North America

¹ www.costquest.com/resources/articles/broadband-world-news-interviews-cqa-about-the-new-national-broadband-map/

“Ericsson played a pivotal role in the innovation for mmWave... the thing that really impressed me was they put their best and brightest on the ground with us in those cities where our customers are.”

Mike Irizarry
Executive Vice President and Chief
Technology Officer, UScellular

Pushing the boundaries

FWA enables service providers to deliver high-speed, low-latency broadband services to suburban and rural consumers in areas where the cost of installing and maintaining fiber connections has previously been prohibitive. Using New Radio (NR) in mmWave, 5G FWA provides a scalable,

competitive alternative, providing the bandwidth to support high-speed internet access for a wide range of use cases, such as high-definition streaming, gaming, and augmented and virtual reality (AR and VR).

With the innovative mmWave extended range functionality, coverage is significantly extended – pushing the effective range out from typically around 600–900 m to over 5 km.

As previously mentioned, this extended range increases the area in which households can benefit from mmWave services by around 40 times. It is now being commercially rolled out across a number of cities and is a significant milestone that redefines the value of the mmWave spectrum, enabling UScellular’s mmWave Home Internet solution to deliver speeds of +300 Mbps, an increase of 10–15 times compared to its 4G LTE home internet offering.

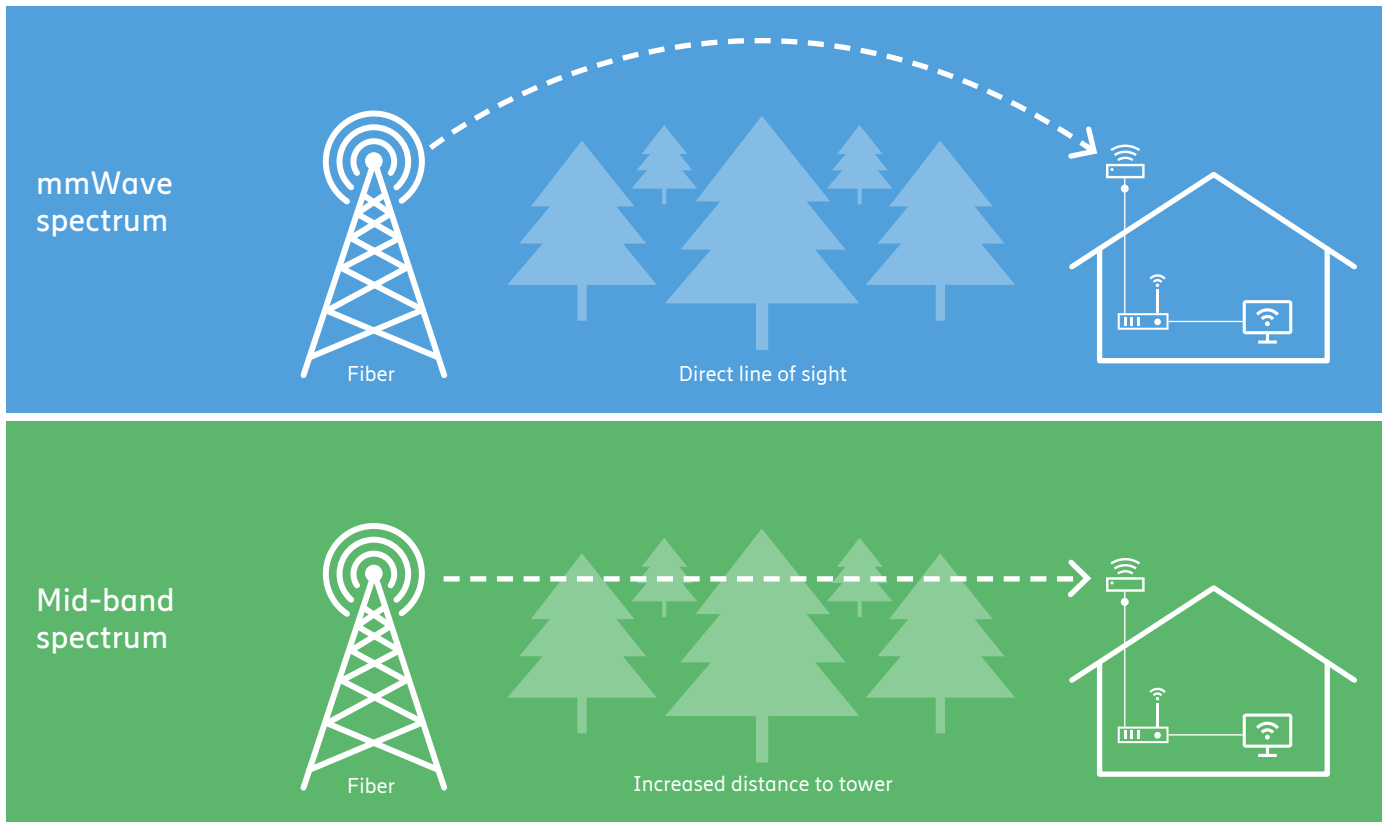
“It was important for us to overcome this challenge with mmWave because we knew it would lower the economics to deploy the technology in these rural markets where the population density is very low, which makes it difficult to provide high-speed connectivity.”

Mike Irizarry
Executive Vice President and Chief
Technology Officer, UScellular

Because of the flexibility of the hardware architecture and software innovations planned for 2023, Ericsson will continue to expand the limits of mmWave, further supporting UScellular’s commercial network and their unique usage of the technology.



Figure 1. Broadband connections via mmWave and mid-band spectrums



Mid-band expanding choice and access for consumers

From a technical perspective, mmWave extended-range benefits from line of sight in order to reach its full performance. Those households who are unable to establish line of sight between the tower and their property are able to be served by mid-band spectrum, ensuring a solution benefitting all types of consumers (Figure 1). This shows how mid-band and mmWave spectrums complement each other. As you move further away from the city centers to suburban or rural areas, the broadband options consumers have become more limited; there may be less choice of providers, or perhaps no opportunity to receive high-speed broadband services. Another important factor to consider as you move away from the cities is that the distances between households becomes greater, and therefore the costs of installing wired technologies to those households also become greater. The distances are a physical issue that wireless technologies can play an important part in overcoming and, by utilizing existing assets, costs can be kept manageable, benefitting both provider and end users. Previously, installing mmWave technology in cities – where range is not such an issue – would have utilized existing street furniture or

micro towers, where a range of 500 m would be able to serve a large number of users within that area. This innovative solution extends the range of the mmWave band, which in turn increases the number of previously underserved households that can benefit from it.

Another benefit of this extended-range mmWave solution is the time taken to deploy. With the existing macro towers already serving mobile broadband customers, and the infrastructure already in place, upgrading the tower and installing the customer premises equipment (CPE) to receive the mmWave signal can be achieved in a far quicker timeframe – and for far less initial cost – than could be expected for an alternative solution, such as fiber. Additionally, the development of applications and tools to assist the installers when setting up the CPE helped to minimize the number of visits required to consumers' premises to adjust the equipment, resulting in further cost savings as well as reducing potential further disruption to the consumers.

With UScellular now deploying extended-range mmWave across a number of cities – with over 125,000 households now having access to high-speed internet – and plans to expand the service further,

“There are many benefits (from FWA) from UScellular. They’re serving underserved areas, which means if you’re a student and you can’t get a broadband connection, you may not be able to learn, or submit assignments. You’ve got hospitals who now have remote access to their patients and can service them in critical situations when they couldn’t come to the hospital. It’s a huge benefit for those areas.”

Jossie Prochilo
Vice President, UScellular and TDS accounts, Ericsson North America

the partnership between Ericsson and UScellular continues, working together to bridge the digital divide and by using innovative technology to connect people and communities across America.

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

www.ericsson.com