Fixed Wireless – Broadband Over the Air

The simple, quick and cost-effective solution to serving customers not easily accessed by traditional networks.

by Bryan K. Blunt, Director of Sales - Western Region - Amphenol Antenna Solutions

Fixed Wireless is a technology coming into its own as a broadband access network. The equipment required to deploy fixed wireless is readily available, and in a growing number of business models, may be installed by the subscriber themself.

Most broadband subscribers are served using a physical connection consisting of copper or fiber cable. However, there are many who have some form of physical barrier that will not allow a cable run to their premises. In these cases, a fixed wireless (FW) network may allow them to enjoy broadband speeds without the expense of placing cable.

FW broadband is high speed access in which the "last mile" connection to a service provider uses radio signals rather than a cable. It connects the internet backbone and consumer by broadcasting radio waves from an access point, typically at the top of a tower, to reception antennas, at a building. Wireless Internet Service Providers (WISPs) provide services over these networks.

FW is different than other wireless services. The technology provides better performance on latency when compared to services such as satellite broadband, a fact sure to please online gamers. FW is also not the same as cellular systems which connect any device within range of an antenna to receive service. FW is point-to-point, directing coverage in a straight line to a single receiving device. FW cannot pass through or around barriers.

Some of the advantages of FW are:

- The ability to greatly increase a broadband service area at low cost by eliminating the need to place fiber or coax to serve a single or just a few customers.

- FW handles latency much better than other solutions. Typical rural technologies have very high latency, making it hard to effectively "stream" data. FW offers much lower latency connections making online gaming and streaming more feasible.

- FW solutions can be deployed to a new customer quickly. Simply placing equipment at the customer's location and pointing it towards an already-deployed access antenna will provide the broadband connection without the need for cables, trenches, right-of-way, etc.

Of course, no technology is without its limitations. These include:

- Unobstructed "line of sight" between the donor antenna and the reception dish is required. Geography, vegetation, and even buildings can determine the possibility of using this solution.

- System cost. While every FW deployment is unique, the cost of a tower, radio equipment, power, etc. can challenge even the best business case. On average fixed wireless is slightly more expensive per Mbs (the speed the subscriber actually receives) than wired solutions.

- FW uses air as its medium which means it may suffer a slight reduction in download and upload speeds during rainstorms. "Rain fade," essentially the absorption of microwave radio frequency (RF) signals by rain, may contribute to spotty performance.

Types of Fixed Wireless Networks

There are two types of fixed wireless networks; point-to-point and point-to-multipoint.

Point-to-Point

Point-to-Multipoint
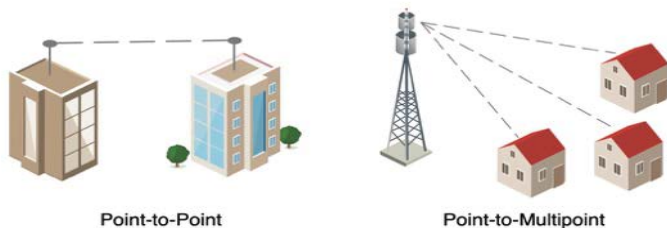
A point-to-point connects two locations such as a tower network on the internet backbone and a business or residential building. While point-to-multipoint FW networks use a single donor antenna to connect to multiple locations, each with its own reception dish. Campus environments are a great example of an area that may be effectively served using multi-point FW.

The main elements of a FW network are the access point and the reception antenna located at the customers' premises. The access point is where broadband access transitions from a hardwired internet connection to a wireless one. Required here are the "donor" antenna along with the equipment that places it in a convenient line of sight, such as a tower, as well as cabling that connects the antenna to the internet infrastructure.

The access point consists of much more than simply an antenna. As mentioned earlier, an advantage of FW is its ability to be deployed quickly. Time saving innovations such as Amphenol's hybrid cable can accelerate deployment and reduce costs. Running a single cable that can provide both backhaul connectivity as well as power is a proven time- and cost-saving deployment approach.
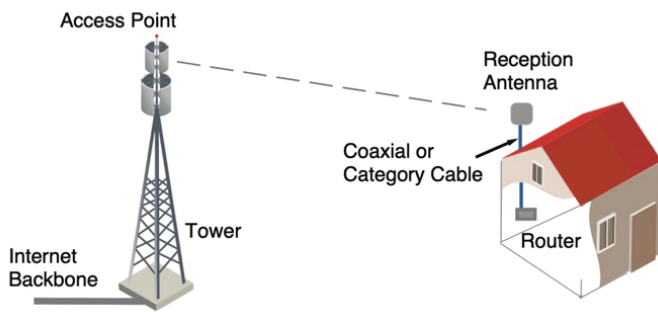
At the subscriber's location, a reception antenna brings the broadband signal into the premises over coaxial or category cable connected to a router. The trend for customer premises deployments is the use of self-installation kits. Category cables (Cat5e, Cat6, etc.) are the most common method of connecting the reception antenna to a router. A quick entry into the premises can be made using a clever flat window/door jumper from Amphenol Broadband Solutions. These simple to use cables, which are equipped with protective rails to shield the twisted pair or coax inside, can be molded by hand to enter the building through an existing door or window opening, eliminating the need to drill through a new wall.

FW is a technology coming into its own as a broadband access network. It provides a simple, quick and cost-effective solution to serving customers not easily accessed by traditional networks. The equipment required to deploy FW is readily available and, in a growing number of business models may be installed by the subscriber themself. Network providers should include this solution as part of their service offering.

Bryan K. Blunt has been working in the telecommunications industry for more than a decade. He has spent the last three years specializing in wireless services. Bryan manages product lines for the wireless industry which include passives, antennas, cabling and connector solutions, as well as fixed wireless transport solutions. His education in business management, as well as years of operational and management experience, have given him a broad skillset which he draws upon daily in this rapidly changing marketplace. His wireless product portfolio forms part of the network solutions that can be viewed in detail at amphenolbroadband.com. Bryan also enjoys coaching baseball for his three boys and playing golf now and again.

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