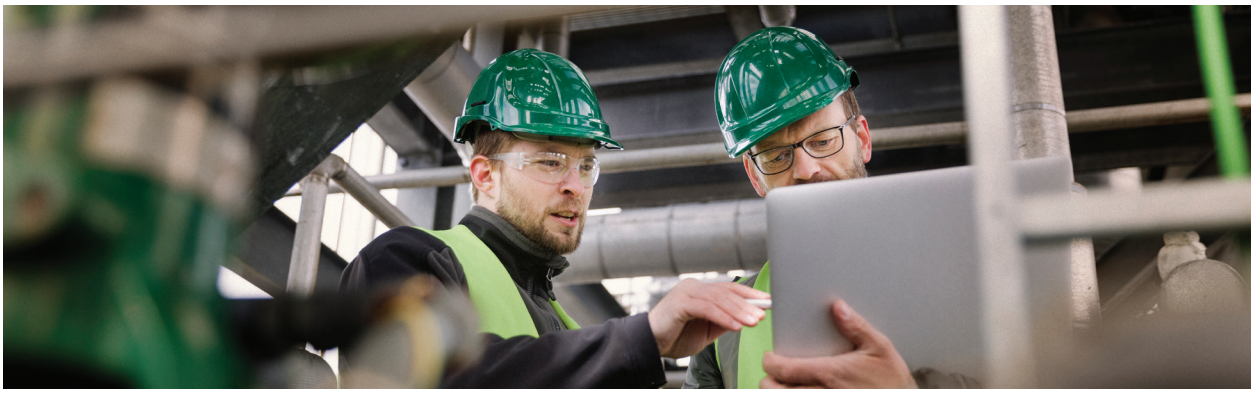
Cambium Networks™

THE WIRELESS NICHE

In Your Network



Larger Internet service providers are realizing that wireless is a valid solution for last mile broadband. Business customers demand higher throughputs for video conferencing, fast data transfer and Industrial IoT pilots. Residential customers ask for higher throughput to connect the increasing number of devices in the home and to support streaming video for entertainment.

Though inherent benefits of wireless last mile installation such as rapid deployment and lower labor costs are attractive, larger service providers have learned from observations of early wireless deployments and work to carefully evaluate and select from an increasingly diverse range of technology and architecture options that best meets their business needs. Recent developments include hybrid fiber/wireless solutions that implement LTE, proprietary, or Wi-Fi technologies using a mix of licensed and unlicensed frequency bands. Driving this analysis are the issues of spectrum, coverage, and capacity.

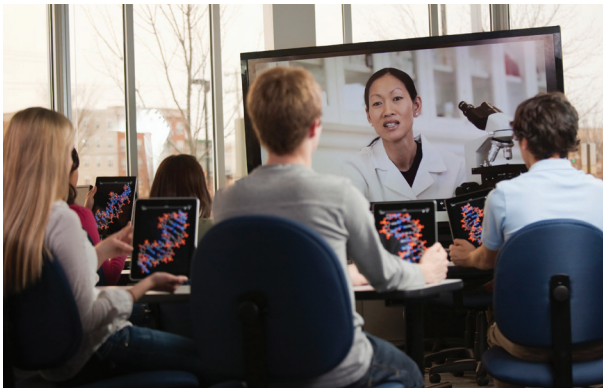
SPECTRUM AVAILABILITY

Exclusivity is the appeal of licensed bands in the 3 GHz spectrum. 5 GHz unlicensed bands, while not exclusive, can provide high throughput reliably to business and residential customers when deployed effectively.

The availability and cost of licensed spectrum must be weighed against the total opportunity available given the customer base. Possible solutions include:

- Licensed point-to-point backhaul and unlicensed last mile distribution
- Fiber to the neighborhood and unlicensed last mile distribution
- Unlicensed point-to-point backhaul and unlicensed last mile distribution

Regardless of the technology selected, service providers should consider the spectral efficiency of the wireless solution. While a high data rate may seem attractive, the spectrum some systems require to deliver top-level throughput may rarely be available.



WHAT TO LOOK FOR IN SPECTRAL AVAILABILITY

Does the solution provide options to use the licensed and unlicensed spectrum

Does the wireless system offer acceptable spectral efficiency – getting the highest amount of data transfer in the smallest amount of spectrum

COVERAGE AND COST

While fiber provides excellent throughput capacity, suburban and rural markets create a challenge for service providers due to the prohibitive cost in labor and time of reaching fiber into each home. One strategy is to deliver rural connectivity by fixed wireless, at a cost of hundreds of dollars per home passed instead of thousands. By evaluating the number of available subscribers in a given coverage area, and the range to each customer from the network, the service provider can model the cost and time of deploying a fiber or hybrid network.

Another strategy is to use fixed wireless as a method to quickly enter these less densely populated areas and offer service. If the subscriber take rates are high enough, they may go back and add fiber to the home (business case dependent) for higher capacity. Service providers around the world are using wireless to make rapid initial connections for targeted business and government customers, which provides a relatively low risk, low investment cost entry point. As needs evolve for satisfied existing customers, the service provider can revise their business decisions.

WHAT TO LOOK FOR IN COVERAGE AND COST

What is the total number of subscribers projected in a given area

What is the relative cost of connecting the projected customers (equipment and labor) with fiber vs. wireless last mile connections

CAPACITY

Network capacity is important in the near term for customer satisfaction, and over the long term for subscriber growth.

The system should meet the needs of the current and projected subscriber base at peak periods. While designed for an initial subscriber level, what specific changes will the network require should the throughput demand of the initial subscriber base, number of subscribers, or both, double?

The goal is to have a solution that can add capacity and subscribers without requiring the cost and time of overhauling the entire network.

WHAT TO LOOK FOR IN CAPACITY

Does the solution have the capacity to meet peak demand periods for the current subscriber base

As the network grows, how does the solution add new users while maintaining steady state and peak performance that satisfies all customers

TAKING THE FIRST STEPS

Service providers are wise to be cautious. However, they should recognize that wireless broadband is a proven solution. Where wireless broadband can be used to penetrate new geography and satisfy the needs of business and residential customers, it can be deployed to expand the network. Service providers should carefully evaluate the solution options and business case to make an informed decision regarding the capabilities of the technology.

Planning a first office application or test bed is straightforward. Consider the target application services to be offered, then plan the backhaul from the core network, design the distribution network, and identify the final access layer. This can be an all wireless application with licensed microwave or Sub-6 GHz unlicensed backhaul, a licensed or unlicensed last mile distribution multipoint

network, and an indoor and/or outdoor Wi-Fi access network. Cambium Networks' free LINKPlanner software is a design tool that can provide a detailed solution to connect a specific geographic area.

Installing the wireless first office will provide exact details of the equipment costs, and related labor cost and timescale. These facts from the field can be weighed against the take rate and annual revenue per user (ARPU), and customer satisfaction levels from the connectivity provided. The first office application will also provide exact detail on equipment performance, failure rate and associated trouble tickets and maintenance costs.

With field-proven, fact-based information on network performance, service providers can balance the cost side of the equation against customer demand and revenue, deriving the core set of details required to make a solid, objective business decision.

INTEGRATING WIRELESS TECHNOLOGY INTO STRATEGY

Because service providers are discovering that no one technology fits across the entire network, the goal is to understand the business opportunity in a given area and select the right technology to meet the business case. By analyzing the aggregate needs of targeted business and residential customers in a given geographical area, service providers can model alternative connectivity solutions. By selecting the best technology and growth strategy, network operators can develop and maintain a satisfied and loyal customer base as needs and the network evolve.

Cambium Networks™

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