

# Optical wireless broadband: a strategic component to next generation enterprise networks

by David Achim, President and CEO, SkyFiber

Better access to faster wireless broadband networks is absolutely critical for today's enterprises. Optical wireless broadband technology offers an exceptionally low cost-per-gigabit, unmatched by any other wireless technology. Enterprises that look to innovative solutions like optical wireless broadband will gain an edge on their competitors when implementing wireless communications solutions.



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By 2014 there will be 722 million mobile business connections worldwide, according to Juniper Research's Future Mobile Enterprise Report, representing an increase in connectivity levels of almost 60 per cent over just five years. Mobile handsets and other wireless devices will shift from playing a supplemental role in business communications to being the dominant end-user devices in business connections, accounting for more than 70 per cent of enterprise devices.

For today's enterprise to succeed, and to truly receive the benefit that the strategic advantages of an everything-wireless office can provide, better access to faster wireless broadband networks is absolutely critical. A vital step is ensuring high-capacity broadband connectivity flowing into the businesses campus. The T1s and E1s of our legacy voice networks simply cannot handle the bandwidth demands that the data and video-intensive businesses of today require. Fast Ethernet speeds have become a minimum requirement for an enterprise to truly operate competitively.

There are many considerations when a business is deploying broadband connectivity. Consider the following real-life scenarios:

The need - rapidly deployable bandwidth that is secure: An enterprise specializing in security-sensitive government contracts is adding a second building to the existing campus. The CIO knows they need a high-capacity broadband feed over to the new building, their budget is limited and their execution timeline is short. Currently there is no fiber available at the new site, and with the move-in date one month away, waiting for new fiber to be installed is not an option. Using Microwave RF is also not an option, due to data security requirements. The CIO knows that they need a wireless solution that is economical, secure, and can be rapidly deployed.

The need - cost relief from leased lines: For years, a municipality has been paying ever-increasing fees to the local telecommunications service provider for leased T1 lines. Over the last few years the network has become increasingly bogged down as powerful mobile devices contribute to the rapidly growing quantity of data transferred daily through the network. As budgets are squeezed ever tighter, the city's Director of Telecommunications has no choice but to find a less costly alternative to the current leased line solution.

The need - secure wireless data transmission: The CTO of a major shipping port looks out their window at shipping crates filled with US\$30 million worth of high-resolution cameras that have been sitting unused for three months. After making a significant investment in the cameras with the intent of using them for port surveillance, they have reached an impasse on implementing the technology. If installed, the cameras would capture vast amounts of data that would need to be transmitted back to the central office. Laying fiber across the port is a physical and financial impossibility. So many barges already use unlicensed frequencies that the interference makes an RF solution unworkable. The port desperately needs to find a unique solution that will allow them to wirelessly but securely transmit the data from these cameras, or the investment will be lost.

Each of these scenarios has its own unique challenges, but the needs of today's wirelessly connected enterprise typically come down to four critical needs:

**High capacity**

Today's business networks demand fast Ethernet speeds. The T1/E1 connections of yesterday's voice-based networks are not capable of providing the bandwidth that today's enterprises need to be successful. Finding the solution that provides the lowest cost-per-bit is paramount.

**Cost efficiency**

It's never hard to make a case for the value of employing cost-effective solutions, but the current projected increase in bandwidth demand is just the beginning. Forward-looking enterprises need to choose solutions that are not only cost effective now, but that can scale up rapidly and economically as capacity needs continue to grow.

**Rapidly deployable**

Speed of deployment is critical. In many enterprises, broadband capacity is directly tied to time-to-revenue, for others broadband capability means at minimum ensuring that the business can operate effectively. Either way, the difference between having a connectivity solution in place in a matter of days, versus weeks or months, can translate directly to the company's bottom line.

**Data security**

As global businesses continue to move towards an all-wireless, all-digital model, the security of data is absolutely crucial. Data security will always be an inherent challenge for RF wireless solutions; by its very nature the content is broadcast in multiple directions, making it accessible to anyone with the right snooping equipment. RF is also plagued by interference and data-bleed, which can irreparably compromise data, leading to information theft as well as network attack.

**Broadband options for enterprise**

Fiber is an option when a fixed line solution is acceptable, but it is extremely costly and securing right-of-way and trenching means a long deployment timeline. In the wireless arena, traditional options include microwave and WiMAX. Both require frequency licences, or taking your chances in an unlicensed band, and also incur a significant amount of lead-time. While all of these technologies have their place, a lesser-known technology is starting to come into its own as the need for low-cost high-capacity bandwidth rises rapidly. Currently there are less than a dozen companies developing OWB (*Optical Wireless Broadband*) technology, but a handful of these have started to gain significant traction over the last few

years, both in enterprise broadband and the mobility backhaul space.

**Optical wireless broadband: an attractive alternative broadband technology**

Optical wireless broadband technology, formerly known as free space optics, uses infrared light to transmit a broadband data stream between two points, using air as the transmission medium. It is a line-of-sight technology, deployed in a point-to-point link, where multiple links can be meshed together to cover campuses or cities. The unique qualities of this technology allow it to address the four critical communications needs of enterprises discussed earlier in very powerful ways: cost, capacity, speed of deployment, and security.

**Capacity:** The average bandwidth of an OWB link ranges from 10Mbps to 2.5Gbps, with each link typically spanning one to two miles. Some experimental short-range ten Gbps units exist today, and OWB developers expect to have commercially viable 10Gbps units within the next 18 months.

**Cost:** OWB offers an exceptionally low cost-per-gigabit, unmatched by any other wireless technology. Industry analyst Chetan Sharma indicated: "The CAPEX and OPEX of OWB networks is quite attractive compared to other technologies. The cost per site can be significantly lower than that of others, especially with the new generation of OWB with smaller form factors and increased reliability." This difference can be seen in the figure.

The table shows the differences in operational and performance parameters between three key broadband technologies - fiber, microwave, and OWB.

**Rapid deployment**

The optical wireless broadband technology has a significant advantage over traditional solutions when it comes to speed of deployment. OWB

is not slowed down by the need for frequency licensing, RF studies, or the building permits that are needed when installing microwave or WiMAX, or the construction time and right-of-way needed for terrestrial fiber. When the lead-time of deploying microwave (2-4 months) or fiber (6-12 months) means a two to 12 month delay until the business's revenue stream can be fully realized, critical revenue-generation time that cannot be recovered. Deploying an alternative technology like OWB avoids that delay, and some OWB vendors have deployment methodologies that allow them to deploy a link in a matter of hours.

**Security**

Unlike RF, optical wireless broadband is a point-to-point technology, where the data is transmitted on an invisible beam of light. The OWB beam is virtually impossible to intercept, ensuring the security of an enterprise's data. Also, multiple OWB beams can be used in the same space with no concern of interference or data-bleed. Optical wireless broadband is by far the most secure wireless transmission technology available today, and it has been deployed by some of the most security-conscious enterprises and government agencies in the world, including surveillance system operators, financial and banking businesses, and the US Department of Defense.

**The need for wireless low-cost high-capacity enterprise data solutions**

Optical wireless broadband is a valuable option for enterprises that need high capacity at very low cost. Today the capacity of the wireless broadband needed even for small businesses is fuelling a migration to alternative solutions that can provide economical high-capacity broadband. Enterprises that look to innovative solutions like OWB will gain an edge on their competitors by saving both time and money when implementing wireless communications solutions. ●

	Fiber	Microwave	OWB
Capacity	GB	MB	GB
OPEX	High	Low	Low
CAPEX	High	Moderate	Low
Average 3 year cost/ connection	\$90K	\$57K	\$16K
TDM support	Yes	Yes	Yes
Time to market issues	Permit and right-of-way	Licence, permits and interference studies	No licence or right of way required
Power Consumption	12W	50W	15W
Time to deployment	9-12 months	3-6 months	1-30 days