

E-Band More Than Just an Ultra-High Capacity Solution

Greg Friesen

Article

September 23, 2015

When the 70/80 GHz (E-Band) spectrum started to open up about five years ago, it was heralded as a wireless fiber alternative, delivering unprecedented wireless gigabit capacities. As the market has developed over the past few years, and regulators in the majority of regions globally have adopted the spectrum, the actual applications have broadened quite widely.

E-Band is still used in this ultra-high capacity band, offering an alternative to fiber, but it is an application that has largely been for enterprise and private network extensions, and primarily limited to North America. Much of the growth for the market is focused on three applications for mobile operators: Small cell backhaul, Spectrum relief and Spectrum cost reduction. The potential for each of these applications varies by country and is dependent upon the local regulations pertaining to E-Band and the traditional microwave spectrum.

E-Band is becoming more relevant for small cells due to a broad amount of typically low cost spectrum available, which allows the mobile operator to densely deploy links without worrying about self interference. What's more, in most countries, other than the United States, small antennas (less than 15cm high) are permitted, allowing solutions to be tailored for urban, street level deployments. With the wide channels available in E-band, links of 500M to 1 Gbps can be deployed, delivering more than sufficient capacity and providing an ideal solution to aggregate multiple small cells. Additionally,

the short distances of small cell, typically ranging from 100-500M, make it ideally suited for the E-Band spectrum, which typically supports link ranges up to 1 Km with small antenna sizes.

In many regions, such as India, the Middle East, and Eastern Europe, mobile operators are only granted a limited amount of traditional microwave space in the 6-38 GHz bands. This poses a problem for operators looking to grow their cell site capacity, as in many cases the only way they can deploy their entire network without self interference is by using very small channel size on each link, thereby limiting their capacity potential. These channel sizes will often be 14MHz or less and will limit the macrocell backhaul link capacity to about 100Mbps. Most operators in these counties are deploying LTE networks, and 100Mbps is not sufficient capacity for the macro network. The use of E-Band spectrum can enable links with higher capacities by using wider channel sizes such as 500 MHz, and delivering 1Gbps capacity or more. In these cases, the reach of the E-Band system is critical in order to address a meaningful part of the network. Link lengths of 3 Km and above are needed for macro cell backhaul applications, and are now being enabled with next generation E-Band systems utilizing 30-60 cm antennas. The use of Eband also helps reduce and optimize the use of the 6-38GHz frequencies by utilizing less of the limited 6-38GHz spectrum so that it can be used for longer links.

In other regions, such as Western Europe and Asia, traditional microwave spectrum in the 6-38GHz band is more readily available, but extremely expensive and becoming even more cost prohibitive. This has been exasperated with LTE networks, which require more backhaul spectrum to deliver the required capacities, and as a result drive higher spectrum lease costs. These costs are charged monthly or annually and, at high capacities, can represent over 50 percent of the total cost of ownership. Conversely, E-Band spectrum is typically 1/10th of the cost of traditional spectrum, and it is often only a one-time cost. Leveraging the E-Band spectrum can be ideally suited as an alternative to traditional spectrum, delivering 500 Mbps to 1 Gbps of capacity at a fraction of the spectrum cost. This application also requires longer range out of E-Band systems, needing 3Km and above to be broadly applicable as an alternative to the 23 to 38GHz bands.

In addition to these three emerging mobile backhaul applications that require lower- to middle-range capacities, there is also an emerging, but originally unanticipated, application requiring 2.5 Gbps to

10Gbps capacity. This emerging application is for wireless Fronthaul of CPRI and OBSAI links for cloud RAN. E-Band, with its wide spectrum of 500MHz to 1Ghz channels, can deliver these extremely high capacities, while meeting the very low delay requirements of the cloud ran technologies. This can deliver a very cost effective alternative to fiber for locations where there is not currently any fiber available.

The E-Band market has emerged more slowly than originally anticipated, with no significant growth and momentum. That said, as the application range has now more widely broadened, and has become very applicable to mobile networks, it now appears that there will be growth that will continue over time. While the applicability and usage of the E-Band spectrum varies by country, and is dependent on their regulations, the wide range of E-Band applications makes it an applicable solution in some form globally.

View this Article Online

<http://www.mobilitytechzone.com/topics/4g-wirelessevolution/articles/2015/09/23/410319-e-band-more-than-just-an-ultra-high.htm>