Satellite Backhaul In Emerging Countries

By Louis Dubin, Vice President Product Management, Comtech EF Data

The rural cellular market in emerging countries has changed significantly in the past couple of years. Newer usages and technologies have helped reshape the landscape. Social networking, smart and feature phones, sophisticated voice and data plans have all fueled the uptake of mobile communications and further reinforced the need for high data traffic.

These changes have implications on satellite backhaul. High throughput requirements with excellent quality of service (low jitter, low latency) have become crucial. Quality of service has to be guaranteed. Any limitation can immediately lead to dropped calls, degraded user experience, revenue loss and customer churn. All of this must fit within the mobile operator's stringent OPEX and CAPEX objectives.

In order to address the challenges, the available solutions have followed two general trends:

- TDMA VSAT with the concept of shared bandwidth
- SCPC with dedicated bandwidth, efficiency and performance

The TDMA VSAT operates under the assumption that not all remote sites of a mobile network will require high traffic capability at the same time. This allows overbooking of the capacity, but containment of CAPEX and OPEX.

However, this is often an inaccurate and generally costly misconception. CAPEX and OPEX end up increasing quickly as the bandwidth and capital equipment has to be provisioned for a larger shared carrier. Ultimately, even though individual sites need much less bandwidth than the total shared capacity they are burdened with the larger aggregate TDMA carrier.

Secondly, when traffic picks up and most remotes reach higher levels of traffic at the same time (which is often the case in mobile networks), the classic issues with an oversubscription model become apparent. Suddenly there is not sufficient bandwidth to support the user base. Calls are dropped and data is lost, all during the most profitable peak hours. Add to this the latency and jitter induced by TDMA, due to the need to frequently re-allocate the bandwidth with the shared technology and the lesser ability to convey real-time voice and data traffic, the impacts on quality of service are significant enough that they require measures to be taken to review the satellite backhaul technology strategy.

SCPC technology has a different concept. Here, the system dimensioning is made such that quality of service is always guaranteed particularly at peak traffic. Low jitter and latency, and low packet losses ensure that the mobile operator can provide a performing and efficient service. The latter is a determining factor today in deploying a successful satellite backhaul solution.

While not all SCPC solutions are alike, the latest ones have focused on key efficiency areas: modulation, FEC, frame encapsulation and protocol optimization. Advanced modulation capacity combined with better FEC helps increase spectral performance and maximize throughput or power. Optimized frame encapsulation eliminates overhead, which can hamper throughput, jitter and latency. Header compression addresses IP protocol overhead; payload compression also reduces the bandwidth required for user traffic.

In the end, there can be as much as 100 percent overall capacity improvements over TDMA which bring direct benefits to quality of service, OPEX (less cost for the satellite bandwidth) and CAPEX (lower requirements on BUC and antenna).

The choice of the technology is at a turning point in emerging markets today. From the remote village, which only needs voice capacity, to the affluent tourist resort where customers use their smartphones to upload their vacation videos, the requirement gaps are wide.

Subscribers expect to be able to initiate a voice call and to seamlessly watch streaming content at any moment. Quality of service has therefore, become a key component. Hence the technology choice relies upon a single option: SCPC. It is the only one that guarantees QoS, and best optimizes CAPEX as well as OPEX. More info at http://www.comtechefdata.com/

About the author

Louis Dubin is Vice President of Product Management at Comtech EF Data. In this role, he is responsible for business development and product management of the high-speed modems, TDMA modems, and broadcast products. Dubin joined Comtech EF Data in 2008, through the acquisition of Radyne Corporation. During his tenure at Radyne Corporation, he held the positions of President of Radyne's Phoenix, Arizona division and Vice President of Sales. Dubin has over 18 years of experience in the telecommunications and transmission industry. He holds a degree in Electrical Engineering from the Florida Institute of Technology, and completed the Stanford Executive program in Technology Management.