White Paper

The Big Skinny: How to get more bits through the same pipe at a lower cost

DragonWave

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NOTICE

TABLE OF CONTENTS

1. Overview

Network operators are caught between the demand for higher capacity on one hand, and the need to reduce their cost per bit on the other. This paper identifies the market reasons for this squeeze, and explains how DragonWave offers a compelling solution to this daunting challenge.

With the proliferation of Long Term Evolution (LTE) Radio Access technologies and LTE-Advanced has resulted in an explosion in bandwidth requirements on the backhaul links from base stations to the core of the network. Bandwidth consuming applications on smartphones and tablets are growing at significant rates and continue to drive new demand; meanwhile the price per user remains relatively flat.

2. Leap to Quantum

Horizon Quantum has been designed to maximize the capacity per link to address the capacity issues, as well as provide the enhanced functionality required for 4G networks, with nodal intelligence and network synchronization. Horizon Quantum delivers an industry leading capacity of 1.6 Gbps per link, add to this, DragonWave's Bandwidth Accelerator feature, the Horizon Quantum can deliver up to 4 Gbps per link rivaling the capacity of a fiber-based solution without the huge construction costs for building out fiber laterals.

Horizon Quantum delivers several other technical and operational advantages. The use of DragonWave's innovative multi-carrier XPIC minimizes spectrum utilization while maximizing throughput on a single antenna using 4 carriers across two channels. Combining higher order Modulations (up to 2048QAM) and Hitless Automatic Adaptive Modulation (AAM) delivers high capacity on longer links without the need for larger antennas, thus reducing antenna lease costs. All of this is done without using any more spectrum than the previous generation product, resulting in spectral efficiency that is up to 2.5X better than any other single carrier solutions available on the market. Not only does this capability match the needs of the evolving 4G network deployments (both in terms of capacity and cost per bit), it does so without increasing the OPEX from antenna and spectrum lease.

In addition to the capacity increase, Horizon Quantum has been designed with the needs of next generation IP networks in mind. With support for network synchronization through Synchronous Ethernet and timing over packet (1588 v2), Quantum meets the requirements of existing 4G base stations, resulting in a seamless evolution to new services. Horizon Quantum also integrates Ethernet switching and nodal intelligence, so that packet-based traffic can be interconnected and routed without the need for additional third-party equipment. Eliminating boxes from the network reduces equipment cost and simplifies management and operations.

From an operations perspective, Horizon Quantum has a number of features to simplify the installation and maintenance of the product. Increased loss compensation in IF cable allows the use of smaller, cheaper and lighter cables in most installations. The ODU is equipped with an orientation sensor to allow the operator to immediately determine which polarization alignment has been installed; something that requires an expensive tower climb to verify with conventional radio equipment. Maintenance is also simplified by the support for advanced Ethernet OA&M features such as 802.1 ag and 802.3 ah for fault isolation and neighbor discovery.

All of this functionality is delivered in a form factor that allows two indoor units (IDUs) to fit in 1 rack unit (1RU) of cabinet space. The small form factor, coupled with the low power dissipation and the elimination of 3rd party equipment, alleviates the pressing problems of power and space in the cabinet: something almost every operator is facing. The reduction in equipment, interconnect cables and small radio head result in a significantly simpler installation, further reducing costs and mistakes. The reduced power requirement also means on-going cost savings both in powering the equipment itself, and in the amount of air conditioning and battery back-up required.

Horizon Quantum works seamlessly with the Horizon Compact+ (DragonWave's all outdoor packet microwave radio optimized for connecting the individual base stations to the aggregation network) and the Harmony IDU family which provides Ethernet aggregation and T1 interfaces for converged network operation.

Horizon Quantum takes packet microwave backhaul to new levels of service, efficiency, and economic performance. With unmatched scalability, the highest density and best spectral efficiency on the market, and LTE optimized network intelligence, the Horizon Quantum expands the realm of possibilities for the network designer. The transformation of today's network is underway.