

# Sub-Carrier-Multiplexed Duplex 64-QAM Radio-Over-Fiber Transmission for Distributed Antennas

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The past years have witnessed a huge increase in the number of wireless subscribers accessing the Internet from mobile devices. The proportion of high-bandwidth services, such as video-on-demand, video conferencing, voice-over-IP and internet gaming is on the rise. A major contributor to the increase in the demand for these high-bandwidth services is the development of high bitrate portable devices, such as smart-phones and tablet PCs. These mobile devices use WiFi, 3G HSPA and imminently LTE technology for communication with wireless base stations or routers.

In line with the number of wireless subscribers, the number of base stations has to be increased in order to cope with the increased traffic and to provide improved coverage. As a result, the reduced distances between base stations have facilitated the employment of base station cooperation techniques that further improve received signal quality. However, this flawless tele-presence quality is achieved at the cost of having to exchange substantially more information amongst cooperating base stations. Radio-over-Fiber communication provides one of the most reliable, high-bandwidth and low-latency solutions for connecting base stations.

In this letter the authors demonstrate the feasibility of a cost-efficient optical link design for such a base station cooperation that relies on a minimum number of components whose parameters are close to those of commercially available components. With only a single laser source, and avoiding the use of high-frequency local oscillators at the base stations, full-duplex data transmission (240 Mbit/s in each direction) is accomplished to a pair of base stations located 5km and 10km from the central network unit, respectively.

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