

Advances on 5G, research directions and role of optical technologies - An industry view

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Summary: *One important aspect of 5G, compared to previous generations, is the prominent role of a diverse set of usage scenarios with applications above and beyond the traditional high-speed connection. Even though enhanced mobile broadband (eMBB) is still an important use case for mobile operators around the world, emergence of other usage scenarios such as those classified under massive machine type communications (mMTC) and ultra-reliable/low-latency communications*

Introduction

In this context 5G is targeting unprecedented improvements over the previous generations of mobile networks such as a 1000-times increase in system capacity, 100-times improvement in energy efficiency, down to milliseconds end-to-end network latency and massive machine type connectivity for numerous devices.

Notwithstanding 5G is in its initial deployment phase industry is already researching what is coming beyond 5G with a further new set of challenges to satisfy the envisaged applications that are going to require even more bandwidth, extremely precise positioning, real-time and up-link centric broadband.

In order to implement this vision millimeter-wave spectrum, new solutions and new network topology will be necessary posing challenges to the research not only in the wireless domain with optical technologies playing a key role for innovative base stations architectures and above all in the backhaul to transport and route the enormous quantity of data.

Envisioned 5G and “beyond 5G” communication architecture scenario 5G and “beyond 5G” key requirements driving evolution of mobile access and wireless x-haul to millimeter-wave and sub-millimeter ranges

Analysis of the most important requirements of 5G to drive the trends and technology research backhaul / front-haul network

- Application scenarios and potential bands for 5G at millimeter-wave
- Massive MIMO architectures
- how backhaul can meet the demand of capacity and network densification
- technology challenges and research

Research directions for optical technologies in the backhaul and innovative base station