



## **Frugal 5G: Towards Affordable Rural Wireless Broadband**

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In the recent years, there has been a significant growth of cellular wireless communications. Despite this growth, a large part of the world is still deprived of broadband connectivity. Using existing cellular wireless systems including Third Generation (3G) and Fourth Generation (4G) technology, there are significant challenges in providing broadband access. These include- High capital and operations expenditure with low Average Revenue Per User (ARPU), lack of affordable backhaul, energy cost which is worsened by lack of reliable power supply and geographic accessibility including issues such as right of way. These challenges require a re- thinking on developing next generation wireless system for connecting the unconnected world. Mobility is not a major driver for designing such systems, rather fixed primary broadband access is the most important requirement. A simplified IP based network architecture with dynamic spectrum sharing and a low cost wireless backhaul can set the vision of what we call "Frugal 5G" for connecting the unconnected.

This paradigm opens up several directions for technology solutions. These include dynamic spectrum sharing for multi-operator co-existence, scalable control and management of such access and middle mile network through software defined network (SDN) controller among others. In this talk, we will outline these solutions and a vision for setting up universal broadband access.