

Coverage and Capacity Improvement of Millimetre Wave 5G Networks Using Remote Radio Heads

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Abstract:

In this work, the Distributed Base Station (DBS) with Remote Radio Head (RRH) is considered as the envisioned architecture of the 5th Generation (5G) network. DBS network architecture supports easier scalability for network expansions using remote antennas in the form of RRHs. RRHs have been used in this work in order to compensate for the high path loss and penetration loss that characterise millimetre wave (mmWave) communications. The band of interest is the pioneer band at 26GHz, which has been recently released for 5G services focused on areas of high traffic demand in the UK. DBS architecture can minimise the number of base stations required for the same Quality of Service (QoS). An algorithm has been developed for DBS scheduling. In addition to that, the gain of using DBS has been demonstrated in terms of: increasing the user data throughput, decreasing the unnecessary handovers as a result of dense network deployment, increasing the coverage probability in terms of Line-of-Sight (LoS) coverage, and minimising the impact of shadow fading. The results have shown significant improvement in terms of peak, average, and cell-edge data throughput, and the LoS coverage probability has been improved due to the spatial distribution of RRHs.