

## Abstract:

The fifth Generation (5G) network will provide services with extreme data rate and latency demands compared to current cellular networks, and provide massive capacity and connectivity to multitude of devices with diverse requirements and applications. In this paper, dense deployment of small cells in high carrier frequency is considered as the theme of future 5G network. Network densification depicted in this work includes densification over the frequency by the adoption of wider bandwidth in the millimetre wave band, and densification over the space through higher number of antennas, higher sectorisation order, and dense deployment of small cells. The reference signal received power (RSRP) and quality (RSRQ), and signal to interference plus noise ratio (SINR) have been considered as the metrics for the design evaluation. Our results show that network densification has significant importance in improving data rate to meet 5G vision. And that dense deployment of small cells has better performance over higher sectorisation order, due to the higher line of site coverage and lower interference in the former case. In addition, the results show that densification in term of increasing the antennas is also vital to enable spatial multiplexing through multiinput-multi-output and enable beamforming to improve SINR, which eventually improve the data rate. Foliage loss and rain at millimetre wave bands are significant, and therefore, their impact has been evaluated as well.