Macro cell assisted cell discovery method for 5G mobile networks

The use of millimeter wave (mmWave) frequencies in next generation mobile networks - 5G networks - is now a fact. mmWave allow to overcome the spectrum scarcity in microwave frequencies and supply the demanded capacity. Nevertheless, the use of these frequencies comes with challenges to the network, and requires a new system design. The aspects concerning the impact of using mmWave frequencies on the medium access (MAC) layer are one of the topics that need to be further analyzed. In this article we focus on the cell discovery process of the MAC layer for mmWave communications. A new approach assuming a joint search of the user equipment (UE) between the mmWave small cell (SC) and the macro cell (MC) is proposed. The performance of this method is analyzed and compared with existing methods. The results show that using the MC as aid during the search process can allow for up to 99% improvement in terms of attempts needed to find the UE.