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Abstract:

Millimeter Wave (mm-Wave) provides high bandwidth and is expected to increase the capacity of the network thousand-fold in the future generations of mobile communications. However, since mm-Wave is sensitive to blockage and incurs in a high penetration loss, it has increased complexity and bottleneck in the realization of substantial gain. Network densification, as a solution for sensitivity and blockage, increases handover (HO) rate, unnecessary and ping-pong HO's, which in turn reduces the throughput of the network. On the other hand, to minimize the effect of increased HO rate, Time to Trigger (TTT) and Hysteresis factor (H) have been used in Long Term Evolution (LTE). In this paper, we primarily present two different networks based on Evolved NodeB (eNB) density: sparse and dense. As their name also suggests, the eNB density in the dense network is higher than the sparse network. Hence, we proposed an optimal eNB selection mechanism for 5G intra-mobility HO based on spatial information of the sparse eNB network. In this approach, User Equipment (UE) in the dense network is connected only to a few selected eNBs, which are delivered from the sparse network, in the first place. HO event occurs only when the serving eNB can no longer satisfy the minimum Signal-to-Noise Ratio (SNR) threshold. For the eNBs, which are deployed in the dense network, follow the conventional HO procedure. Results reveal that the HO rate is decreased significantly with the proposed approach for the TTT values between 0 ms to 256 ms while keeping the radio link failure (RLF) at an acceptable level; less than 2% for the TTT values between 0 ms to 160 ms. This study paves a way for HO management in the future 5G network.