# HetNet Performance Analysis with Asynchronous ABSF Configuration employing Horizontal Sector Offset Scheme

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Co-channel deployment in Heterogeneous Networks (HetNets) has been an efficient approach for spectrum reuse in order to achieve high network capacity and coverage. But as the users demand increases so does the dense and random deployment of small cells which results in an increase in cross-tier interference.

A time domain enhanced inter-cell interference coordination (eICIC) scheme is used for mitigation of such interference. This scheme uses the concept of blanking specific sub-frames known as almost blank subframes (ABSF). The paper (H.Wang and et. al, Proc. Int. Symposium WPMC, 2014) introduces the use of asynchronous ABSF, where the ABSF muting patterns are adjusted accordingly. This reduces the excessive need of blanking the subframes. In (D. Lopez-Perez and et al, IEEE PIMRC Symposium, London, pp.2159 – 2164, 2013 and IEEE ICC, Sydney, pp. 2338 – 2343, 2014) the authors used a scheme known as horizontal sector offset configuration in which a single spectrum fragment is divided into two. Each eNodeB is equipped with two spectrum fragments which are offset with respect to each other. The horizontal half-power beamwidth used was substantially wide and this creates excess interference. The authors (J.He and et al, 5th Nordic Workshop, SNOW, 2014) improved this shortcoming by using a better horizontal half-power beamwidth setting. This further decreases the cross-tier interference and thus increases the UE throughput.

In our paper we successfully combined both asynchronous ABSF configuration and a hexagonal grid layout of 6 sectors with horizontal sector offset scheme using stochastic geometric approach and achieved a significant improvement in the performance of coverage probability and 65% UE increase in throughput at 0dB SINR threshold as can be seen in Figure 1 and Figure 2 below.
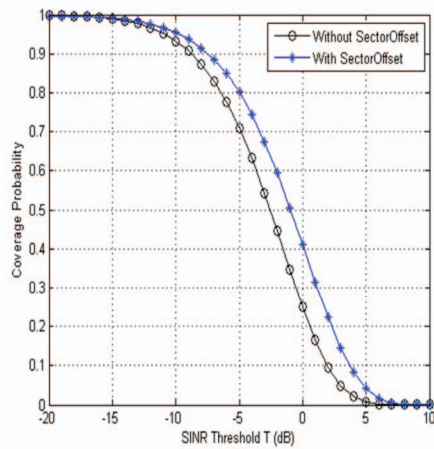

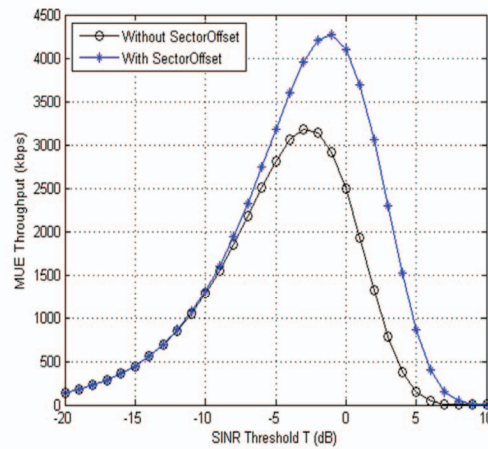
Figure 1: MUE Coverage Probability



Figure 2: MUE Throughput