

# Stochastic Ordering Based Carrier-to-Interference Ratio Analysis for the Shotgun Cellular Systems

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*Abstract* A stochastic ordering based analysis is presented for the carrier-to-interference ratio (CIR) in shotgun cellular systems. The CIR is modeled as a random variable and its distribution is analyzed using stochastic ordering techniques. The analysis shows that the CIR distribution is stochastically ordered by the number of active users in the system. This result is used to derive the CIR distribution for a given system configuration. The analysis is validated using Monte Carlo simulations. The results show that the CIR distribution is indeed stochastically ordered by the number of active users. The analysis is also used to derive the CIR distribution for a given system configuration. The analysis is validated using Monte Carlo simulations. The results show that the CIR distribution is indeed stochastically ordered by the number of active users.

and i.i.d. transmission powers can be captured by modifying the BS density as shown in Section IV-D, they are assumed to be 1 for all BSs. The generalization to arbitrary path loss model is given in [2, Section VI], which is also equivalent to modifying the BS density  $\lambda(\cdot)$ . As a result, <sup>c</sup>



