

# A Performance Model for the Effect of Interferences among the Collocated Heterogeneous Wireless Networks

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**Abstract**—As various wireless networks connecting mobile devices have been widely deployed, many researchers are interested in evaluating the effect of interferences among them. It is due to that these heterogeneous collocated wireless networks tend to be asymmetric in terms of transmission power and carrier sense threshold, resulting in unfair channel access and degraded performance of victim networks. This paper proposes an analytical model to evaluate the degree of interferences among collocated wireless networks sharing the same bandwidth and running BEB (Binary Exponential Backoff) algorithm. Furthermore, it introduces a mathematical model to measure the performance improvement by NACK (negative ACK) scheme, which lets senders distinguish inter-network interferences from intra-network ones named collisions. The model predicts that interferences from dominant networks can severely deteriorate the performance of weak networks. It also shows that the NACK technique alone is unable to alleviate the degradation of performance if superior networks continue to deliver data frames.

**Keywords**—coexistence; heterogeneous; CSMA; contention; interference



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