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## Efficient and anonymous RFID tag counting and estimation using Modulation Silencing

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**Abstract:** In RFID based inventory systems, counting and estimating the number of the surrounding tags without reading each tag individually is a challenge. In this paper we propose an estimation function that considers the variance of collision and empty slots during the estimation frame. In addition, two schemes, Variance and Modulation Silencing based Estimation (VMSE) and Modulation silencing count (MSC), are proposed to utilize the accuracy of the estimation function and modulation silencing mechanism [1] in counting and estimating the number of RFID tags. In the proposed schemes, tags participating in collision and success slots are silenced to accelerate the counting process. Requiring only minimal modification to the reader-to-tag communication procedure, the proposed schemes achieve a significant performance gain when compared to existing counting protocols in the literature.