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Modulation silencing: Novel RFID anti-collision resolution for passive tags

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Abstract: RFID technology has been gaining popularity in several automated inventory management applications. In such applications, thousands of RFID tags are attached to different products and the reader(s) will be collecting tags IDs using an arbitration protocols. In the existing tag arbitration protocols, significant time and power are consumed on inevitable tag collisions. In this paper, collision time reduction mechanism, called Modulation Silencing Mechanism (MSM) is proposed. MSM accelerates ending of collision slots by allowing the collided tags to interpret the silencing feedback from the reader and stop their backscattering. The proposed mechanism achieves a considerable reduction in collision time; hence, we proposed a new generalized performance metric to consider the shorter duration of collision slots by MSM. In addition, we evaluate the main RFID arbitration protocols after applying MSM and the time efficiency of these protocols was significantly increased.