



# RFID Tag Identification Using Bit Tracking Technology

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**Abstract:** Tag identification is an important tool in RFID systems with applications for monitoring and tracking. A RFID reader recognizes tags through communication over a shared wireless channel. When multiple tags transmit their IDs simultaneously, the tag to- reader signals collide and this collision disturbs a reader's identification process. Therefore, tag collision arbitration for passive tags is a significant issue for fast identification. This paper proposes an optimal query tracking tree protocol (OQTT) that tries to separate all of the tags into smaller sets to reduce collisions at the beginning of identification. Using bit tracking technology, OQTT mainly adopts three proposed approaches, bit estimation, optimal partition, and query tracking tree. Bit estimation first estimates the number of tags based on the locations of collided bits. Optimal partition then determines the optimal number of the initial sets based on this estimation. Query tracking tree splits a set of collided tags into two subsets using the first collided bit in the tag IDs. This paper analyzes the efficiency of OQTT, which represents how many tags can be identified in a slot.

**Keywords:** RFID, Tag identification, Anti-collision, Bit tracking, Manchester code

