An Efficient Collision Recovery Based on Modified Tag/Reader for EPCglobal Class 1 Gen 2 Standard

**Abstract:**

Dense Radio Frequency Identification (RFID) systems face simultaneously multiple tags replies per slot. This phenomenon called collision problem. At the state-of-the-art, there are two possible solutions for the collision problem: 1) Scheduling of the collided tags using Dynamic Framed Slotted ALOHA (DFSA). 2) Resolving the collided slots into successful slots using the Physical layer parameters. Modern RFID readers have a powerful collision resolving capability. However, according to the EPCglobal Class 1 Gen 2 standards, only single tag acknowledgment is allowed. Therefore the reading efficiency is limited by this feature. In this work, we propose a new RFID system (Reader-Tag). The proposed system has the capability to recover up to 8 collided tags per slot. Afterward, the collided tags are acknowledged successively in a novel pseudo parallel successful slot. The proposed system is compatible with EPCglobal class 1 gen 2 standards. i.e. The proposed tags could be inserted with the conventional tags and identified by the conventional reader without affecting the performance, and the conventional tags can also be inserted with the proposed tags and identified by the proposed reader. The maximum reading efficiency of the proposed system has increased up 5 times compared to the conventional system, which affect directly the mean reading time to be reduced 50% compared to the conventional case.