

## Rapid tag collision resolution using enhanced continuous wave absence detection

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**Abstract:** In RFID tag identification, tag-to-tag collisions pose a challenging problem to protocol designers. Currently the modulation silencing mechanism (MSM) has been proposed to overcome the time and power wasted on collision slots during tag identification. In MSM, the time of collision slots is reduced by the assistance of the continuous wave absence detection (CWAD) circuit. CWAD allows the tags to sense the reader's RF signal cutoff and terminate data modulation. In this paper, we propose an enhanced CWAD (ECWAD) design to reduce the time required for RF cutoff detection. The ECWAD circuit mitigates the tag-to-tag collision effects on both identification efficiency and throughput. ECWAD is a fast and low power sensing circuit that allows having shorter collision slots, faster tag identification, and limited voltage drop at the tag. When compared to the existing CWAD design, the proposed design detects the RF signal cutoff by the reader in less than 20% of that in CWAD and reduces the collision slot time by more than 32%.