A Novel Coding Scheme for Security in Communications in Passive RFID Systems

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ABSTRACT—Radio Frequency Identification (RFID) is an electronic tagging technology that allows objects to be automatically identified at a distance without a direct line-of-sight using an electromagnetic challenge-and-response exchange of data. Due to the computational power constraints of passive tags, non-encryption-based singulation protocols have been recently developed, in which wireless jamming is used. In this project, we are proposing a novel coding scheme, namely Random Flipping Random Jamming (RFRJ), to protect tags' content. Further, as an enhancement, we are implementing low power memory organization coding which provides more robust and reliable low power data as output.


I INTRODUCTION

In October 1999, the United States Federal Communications Commission (FCC) allocated 75 MHz of spectrum in the 5.9 GHz band to be used by intelligent transportation systems (ITS).[2] In August 2008, the European Telecommunications Standards Institute (ETSI) allocated 30 MHz of spectrum in the 5.9 GHz band for ITS By 2003, it was used in Europe and Japan in electronic toll collection DSRC systems in Europe, Japan and U.S. are not compatible and include some very significant variations (5.8 GHz, 5.9 GHz or even infrared, different baud rates, and different protocols). Singapore's Electronic Road Pricing scheme uses DSRC technology for road use measurement. [2] Other possible applications were:

- Emergency warning system for vehicles
- Cooperative Adaptive Cruise Control
- Cooperative Forward Collision Warning
- Intersection collision avoidance
- Approaching emergency vehicle warning (Blue Waves)
- Vehicle safety inspection
- Transit or emergency vehicle signal priority
- Electronic parking payments
- Commercial vehicle clearance and safety inspections
- In-vehicle signing
- Rollover warning
- Highway-rail intersection warning
- Electronic toll collection

II METHODOLOGY

RFID (Radio Frequency Identification) is an ADC (Automated Data Collection) technology that:

1. Uses radio-frequency waves to transfer data between a reader and a movable item to identify, categorize, track...
2. Is fast and does not require physical sight or contact between reader/scanner and the tagged item.
3. Performs the operation using low cost components.
4. Attempts to provide unique identification and backend integration that allows for wide range of applications.
The tag’s content is encoded generally and some of the bits of encoded data are randomly flipped and randomly jammed. The resultant data is transmitted by the TSD from tag to reader. After reception, the reader decodes the original data from a set of code rules. Next, the decoded data is stored in the memory.

III DETAILED DESIGN 1-To-4- RFRJ Coding Scheme:

For source bit 1"1010" (c1) is selected

For source bit 0"0101" (c0) is selected

In general, we call lb-to-lc, the RFRJ coding scheme. For instance, the coding with lb=1 and lc=4 is said to be the 1-to-4 RFRJ coding scheme. A source bit is encoded into a 4-bit codeword. The tag flips the third bit in the codeword, which is colored gray, and the TSD selects the first bit for jamming, which is crossed off. Assume the original codeword is 1010. Since the tag flips the third bit, it will send 1000 over the backward channel. Meanwhile, the TSD jams the first bit. Hence, the TSD and the eavesdropper will receive X000, where X could be decoded to either 0 or 1. For the eavesdropper, two out of the 4 bits may contain errors. Thus, the TSD and the eavesdropper have a different amount of information to decode the original codeword. [4]
After receiving the data, the receiver stores the information of tag in the memory which is present at the back-end infrastructure. In order to store a data in a memory, the buffers in the memory should be selected sequentially. Thus, we are presenting the circuit design of a low power delay buffer.

**V RING COUNTER WITH CLOCK GATED BY C ELEMENTS**

Logic of C-element = \( AC + AB + BC \)

**VI RESULTS**

**RTL schematic of existing technique:**

**Power results of existing technique:**

**Simulation output for input „1“:**
VII CONCLUSION

In this project, we presented a new architecture of RFID systems which provides security and a low power delay buffer architecture using a ring counter with clock gated by the C-elements to reduce power consumption.

REFERENCES:


