

USING SMART CARD IN RFID INFRASTRUCTURE TO PROTECT CONSUMER PRIVACY*

MI-CHENG LU¹, CHENG-YUAN KU¹, LAIN-CHYR HWANG² AND HUI-MING CHAO¹

¹Department of Information Management
National Chung Cheng University
No. 168, University Road, Min-Hsiung, Chia-Yi County, Taiwan
{ cooperku; mimilu }@mis.ccu.edu.tw

²Department of Electrical Engineering
I-Shou University
No. 1, Section 1, Hsueh Cheng Road, Da-Hsu, Kaohsiung County, Taiwan
lain@isu.edu.tw

Received December 2009; revised April 2010

ABSTRACT. As the application of Radio Frequency Identification (RFID) technology in supply chain is getting mature, most of the products we purchase from the retailers will carry RFID tags in the near future. By exploiting RFID tags on garments, packs of food, home appliances and so on, the logistic and sales processes could operate more effectively [1]. However, with the efforts to adopt the RFID technology, considerable disputes about consumer privacy have occurred that lead to market boycotts promoted by some privacy advocates. In order to prevent the possible threat of spying the information stored in the low-cost RFID tags after purchase, but still allow the customers to enjoy the convenient function provided by tags, a simple and feasible mechanism based on symmetrical encryption and smart card system is proposed. The traceable Electronic Product Code (EPC) inside RFID tag should be encrypted by the key stored in the membership card at the supermarkets, and decrypted by the same key at home for smart use.

Keywords: EPC, Consumer privacy, RFID, Smart card, Smart home

1. Introduction. RFID is the emerging technology used for automatic identification of objects or people [1]. Within this system, three most important components are RFID tag, RFID reader and the corresponding applications. A RFID tag, composed of tiny integrated circuit and embedded with radio antennas, can communicate with the RFID reader through radio wave. After the reader receives the EPC which is stored in tag, this EPC could be used to retrieve the related information for objects attached with this tag. Due to its remote ability to identify and track objects through application system, RFID technology has attracted tremendous attention in the past few years. In fact, people have already been using RFID tags in everyday life, such as proximity cards or payment tokens. A research report also declares that the RFID market, which stands at approximately 3 billions in 2008, will grow roughly 800% by 2016 and 2800% by 2022 as shown in Figure 1 [2].

As the famous cases of Wal-Mart and the Department of Defense indicate, U.S. have laid down requirements which mandate their suppliers to add RFID tags on all shipments in order to improve the effectiveness and efficiency of supply chain system [3]. Because of their dominating role in the world, this policy has affected thousands of companies

*The preliminary result was submitted to the International Conference on TELECOMMUNICATIONS and INFORMATICS (TELE-INFO'06), Turkey.