

# WIPI Mobile Platform with Secure Service for Mobile RFID Network Environment

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**Abstract.** Recently, RFID (Radio Frequency Identification) technology is practically applied to a number of logistics processes as well as asset management, and RFID is also expected to be permeated in our daily life with the name of 'Ubiquitous Computing' or 'Ubiquitous Network' within the near future. The R&D groups in global now have paid attention to integrate RFID with mobile devices as well as to associate with the existing mobile telecommunication network. Such a converged technology and services would lead to make new markets and research challenges. However, the privacy violation on tagged products has become stumbling block. We propose light-weight security mechanism which is constructed by mobile RFID security mechanism based on WIPI (Wireless Internet Platform for Interoperability). WIPI-based light-weight mobile RFID security platform can be applicable to various mobile RFID services that required secure business applications in mobile environment.

## 1 Introduction

Due to rapid development of information technology, handheld terminal is evolving into a low-power, ultra-light, integrated, and intellectual terminal to support various information service and ubiquitous environment, and it will develop to a more advanced form current services. The wireless internet infrastructure integrated with the mobile communication system and RFID gave birth to mobile RFID to provide new services to users, and the standardization of mobile RFID information protection technology such as the protection and verification of personal information, authorization, and key management and its technological development are being progressed along the way.

RFID reader has been mainly used as RFID tag recognizable unattended information production terminal, and now it is expanding into the mobile RFID service providing useful information to users by reading various RFID tag information through RFID tag

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chip and RFID reader chip installed to cellular phone. Mobile RFID service is defined as to provide personalized secure services such as searching the product information, purchasing, verifying and paying for the product while on the move through the wireless internet network by building the RFID reader chip into the mobile terminal[4]. The service infrastructure required for providing such RFID based mobile service is composed of RFID reader, handset, communication network and protocol, information protection, application server, RFID code interpretation, and contents development.

In this paper, the light-weight mobile RFID middleware of WIPI-based environment is presented. The proposed platform, the ETRI (Electronics and Telecommunications Research Institute) mobile RFID security middleware platform, is composed of AAL (Application Adaptation Layer) and RFID-WIPI HAL (Handset Adaptation Layer). The proposed AAL is the core component of the security middleware platform.) Security platform is a building block for the extended security API (Application Programming Interface) for secure mobile RFID and it has to be integrated with WIPI and mobile RFID security mechanism for phone-based RFID service to provide more secure mobile business. It enables business to provide new services to mobile customers by securing services and transactions from the end-user to a company's existing e-commerce and IT systems.

## 2 Overview of Mobile RFID

### 2.1 Mobile RFID Technology

RFID is expected to be the base technology for ubiquitous network or computing, and to be associated with other technology such as telemetric, and sensors. Meanwhile Korea is widely known that it has established one of the most robust mobile telecommunication networks. In particular, about 78% of the population uses mobile phones and more than 95% among their phones have Internet-enabled function. Currently, Korea has recognized the potential of RFID technology and has tried to converge with mobile phone. Mobile phone integrated with RFID can activate new markets and end-user services, and can be considered as an exemplary technology fusion. Furthermore, it may evolve its functions as end-user terminal device, or 'u-device (ubiquitous device)', in the world of ubiquitous information technology[11].

Actually, mobile RFID phone may represent two types of mobile phone devices; one is RFID reader equipped mobile phone, and the other is RFID tag attached mobile phone. Each type of mobile phone has different application domains, for example, the RFID tag attached one can be used as a device for payment, entry control, and identity authentication, and the feature of this application is that RFID readers exist in the fixed positions and they recognize each phone to give user specific services like door opening. In the other hand, the RFID reader equipped mobile phone, which Korea is paying much attention now, can be utilized for providing end-users detailed information about the tagged object through accessing mobile network.

Korea's mobile RFID technology is focusing on the UHF range (860~960MHz), since UHF range may enable longer reading range and moderate data rates as well as relatively small tag size and cost. Then, as a kind of handheld RFID reader, in the selected service domain the UHF RFID phone device can be used for providing object