

## 3GPP SIM-BASED AUTHENTICATION SCHEMES FOR WIRELESS LOCAL AREA NETWORKS

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**ABSTRACT.** *User authentication is a critical issue on mobile cellular networks and Wireless Local Area Networks (WLANs). In 2006, Tsai and Chang proposed an authentication mechanism that integrated authentication of GSM/GPRS mobile cellular networks with WLANs access control. However, their scheme neither resists denial of service attack nor anonymity. In addition, the mobile cellular systems gradually evolve into 3G. Therefore, in this paper, we elaborate a denial of service attack for Tsai and Chang's scheme, and then propose two versions of 3GPP SIM-based schemes to overcome these drawbacks according to the status of registration. Meanwhile, since our schemes are based on 3GPP, they can successfully integrate 3G authentication into WLANs access control with security and efficiency.*

**Keywords:** 3G, Authentication, Mobile cellular network, Subscriber identity module, WLAN

**1. Introduction.** With the rapid popularization and extensive radio coverage of base stations, mobile cellular phones substantially improve people's mobile communication ability. However, besides the demand of cell phones for voice communication, they are increasingly being used to transmit data.

The Third Generation Partnership Project (3GPP) is a joint initiative, comprising European, U.S., Japanese, and Korean telecommunications standardization organizations. They negotiate and produce global specifications for the Universal Mobile Telecommunication System (UMTS). So far, 3G data communication offers at most a transmission rate of 1920Kbps [28], which can be realized only if the mobile device is stationary and indoors. If the mobile device moved less than five km/h, then the transmission rate would decrease to 384Kbps. If the mobile device moved faster than 60km/h, the transmission rate would be 64Kbps. The transmission rates of 3G mobile phones are unable to satisfy the multimedia and Web-browsing demands of mobile users, but 3G systems provide well-defined subscriber roaming management [7-9,11], good service entries [12] (such as billing systems), and a considerable number of subscribers.