

Chapter 3.21

The Smart Card in Mobile Communications: Enabler of Next-Generation (NG) Services

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ABSTRACT

This chapter gives an introduction into the smart card technology and its history by outlining the role of the smart card in mobile communications systems. The role of the smart card as a key enabler for services requiring or utilizing unambiguous user-identification is outlined. These services include multimedia and high-security services such as mobile commerce or mobile banking. Smart cards containing the described mechanisms provide the user with privacy and the capabilities to use information, personalized according to his needs, in a wide-spread system with a virtually unlimited number of services. Furthermore, the capabilities of the smart card to enhance services, to secure the issuers' revenues and to increase the usage of the services by providing a trustful platform for the user are described. Future evolutions and further developments of the smart card

are illustrated, including how they pave towards new types of applications and services.

INTRODUCTION

The smart card in mobile communications is used both as a service platform and as a marketing instrument for the network operator. The (Universal) Subscriber Identity Module-(U)SIM—is the network operator's "business card" that is handed out to the end-user. The design of the artwork printed on the smart card, the packaging, and the functionality directly influence the positioning of the operator's brand in the market. The smart card as used in mobile communications enjoys a high reputation and is very important for the network operators. It does not only provide security and trust thus securing the revenues of the network operator, but is also a platform for value added services. Its importance for the network operator is

impressively expressed by one of the world-leading network operators: they included the shape of the SIM into their corporate identity and use it within their logo and advertisement. Why this is absolutely justifiable will be outlined in the following chapter.

This chapter is divided into the following seven sections:

- The first section gives a brief introduction into the structure of the chapter and subject;
- The following section derives a dedicated definition for the term “smart card in mobile communications” to create a common understanding for the remainder of the chapter;
- The next section briefly lists and describes the main different specifications for smart cards used in today’s mobile communications systems;
- The next section describes the technological and commercial evolution of the early SIM towards the next generation smart card (UICC, USIM, ISIM) used for 3G and further generations. Issues such as the technological constraints as well as the enhancements of the smart card are described and their impact on the market is highlighted;
- We then illustrate the role of standardizing organizations and explain the importance of standards for the success of a mobile communications system and the smart card in particular;
- The following section details the key capabilities of current and future smart cards and describes their importance for the creation of successful mobile services;
- And finally, we give an outlook on future evolutions of the smart card in mobile communications.

DEFINING THE “SMART CARD IN MOBILE COMMUNICATIONS”

When searching the internet or other technical literature for definitions and explanations of the term “smart card”, the following can be found: “The smart card is a credit-card size plastic card containing a micro-processor”. Please also refer to the Smart Card Handbook for further information on smart card technology in general. For the context of this chapter and for the usage of the smart card in mobile communications, this definition is only to some extent true and need to be modified. A more appropriate definition of what the smart card in mobile communications actually is, is developed below by examining the features and applications implemented on and executed by it. The first indication on the purpose of a particular product may in many cases be derived from its name. This also holds for a smart card in mobile communications. As, of course, everybody using a Global System for Mobile communications (GSM™) phone knows, it has been called the Subscriber Identity Module or simply the “SIM”. In fact, the capability to uniquely and securely identify one single user within the network has been one of the key features for the SIM since the beginning. How this feature was extended during the evolution of the SIM will be outlined later in this chapter.

Coming back to the above cited definition of the “smart card”, the following precision are made below that focus on the use of the smart card in the area of mobile communications. The first precision concerns the first part of the definition, that is, “The smart card is a credit-card size...”.

Simply looking at a SIM reveals that the actual size is much smaller than the size of a regular credit card. This reduction in size was felt necessary already at a very early stage in order to allow the smart card to be inserted in smaller and smaller devices, i.e. mobile terminals. In the respective specifications and standards this small size SIM is called Plug-in or ID-000. A further reduction

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