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## **RKF Travel Card Technical Requirement Specification**

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# 1 INTRODUCTION

## 1.1 Scope

This document specifies requirements for selected IC-card technologies for the RKF travel card, thereby supplementing the card technology independent part of the RKF Requirement Specification [RKF-0020]

Together with the general requirements in [RKF-0020], this document outlines the requirements for each defined card technology. For each relevant technology a description of how a possible implementation should be handled is given in three separate documents, namely the Implementation Specification ([RKF-0022] for type 1), the Implementation Specification Details ([RKF-0023] for type 1) and the Implementation Guide ([RKF-0024] for type 1).

Both the Requirement Specification and this document refer to the three above mentioned type specific documents for detailed information beyond the overall requirements common for all types.

This specification defines 3 types of card technologies:

RKF type 1: Contactless IC-cards according to [ISO 14443], type A, 1 kB (e.g. Mifare® Standard).

The implementation of the RKF travel card specification using the type 1 card technology is described in [RKF-0022], [RKF-0023], and [RKF-0024].

RKF type 2: Contact IC-cards according to [ISO 7816].

Currently, the implementation of the RKF travel card specification using the type 2 card technology is not described.

RKF type 3: Dual interface IC-cards fulfilling the requirements of both RKF type 1 and 2 cards.

Currently, the implementation of the RKF travel card specification using the type 3 card technology is not described.

## 1.2 Reader's Guide

Chapter 2 gives an overview of the RKF travel card.

Chapter 3 defines technical requirements on the technical layers.

The requirements that are defined in this document are divided in two categories. *Shall* requirements are mandatory requirements. These requirements are necessary for the travel card to be compatible between implementations. *Should* requirements are not mandatory but are still very desirable since they support the interoperability of the travel card between PTAs.

## 2 OVERVIEW OF THE RKF TRAVEL CARD

### 2.1 General

The purpose of the RKF travel card is to facilitate one travel card within the public transport in the Nordic countries. The co-operation concerns the card techniques (e.g. technologies with or without contacts) and the RKF travel card application objects (e.g. purse, ticket, and contract).

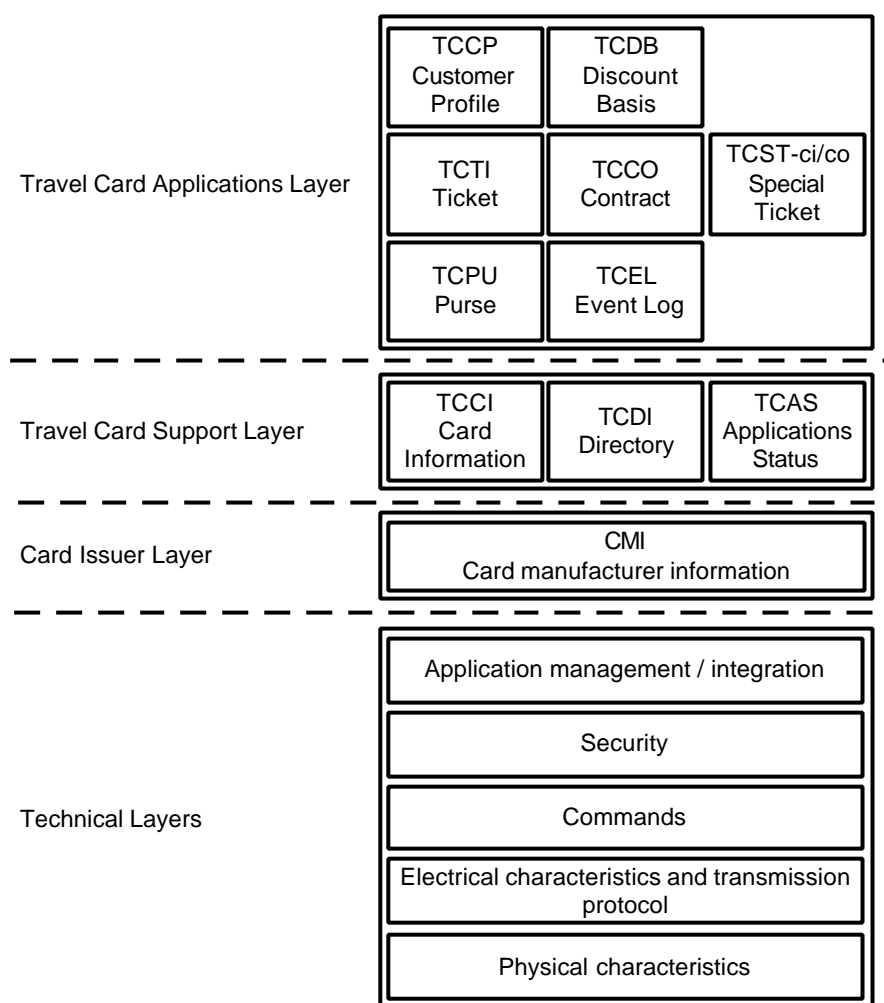
A contactless card does not have to have the shape of traditional IC-cards as long as the transmission protocol is correct. A contactless card might for instance have the shape of a watch or a key ring.

The objectives are that the RKF travel card shall offer a useful platform for PTAs implementing IC-card travel cards in either of 2 situations:

- The travel card is used locally by one PTA
- The travel card is used by a group of co-operating PTAs

The travel card is defined by a number of layers. A layer has its own defined functionality and defined interfaces to superior and subordinate layers.

Figure 1 'RKF travel card system overview' (see below) shows the layers and their relations.



*Figure 1: RKF travel card system overview*

This requirement specification defines relevant requirements on the layers:

- Card issuer layer
- Travel card support layer
- Travel card applications layer

The document [RKF-0020] treats the application layers.

The layers specified in this specification are the technical layers.

- Application management/integration
- Security
- Commands
- Electronic signals and transmission protocols
- Physical characteristics

## **2.2 Application Management/Integration**

The layer application management/integration is the technical layer that does the real implementation of a specific physical card (or a card based on a specific chip).

Any divergence from the application specification [RKF-0020], caused by an implementation of the RKF travel card on a specific card technology is specified by the layer application management/integration.

## **2.3 Security**

The security layer specifies the distinguished demands for security expected on cards such as access rights, authentication, encryption, cryptography etc.

## **2.4 Commands**

The command layer specifies the command structure that should be implemented on a card.

## **2.5 Electronic Signals and Transmission Protocols**

The layer electronic signals and transmission protocol specifies which transmission protocols and electronic signals that should be implemented on a card.

## **2.6 Physical Characteristics**

The layer physical characteristic specifies the cards physical size and environmental requirement on card, reference to both manufacture materials and operation environment.

### **3 REQUIREMENTS OF THE TECHNICAL LAYERS**

The technical layers define the technical demands on the RKF travel card. The definition concerns contactless cards, contact cards, and dual interface cards.

Any direct implementation of a physical card is made in the layer application management/integration.

#### **3.1 Application Management/Integration**

The layer application management/integration is the layer that defines the implementation of the RKF travel card on a specific physical card or on a card equipped with a specific physical chip. When implementations are made the following standards shall be used to define data elements: [CEN 1545-1], [CEN 1545-2], [ISO 7816-4], [ISO 7816-5], [ISO 7816-6].

These implementations are defined in separate documents.

Currently, only the RKF type 1 card technology is described in [RKF-0022], [RKF-0023], and [RKF-0024].

#### **3.2 Security**

Access rights shall be possible to set at least on file level.

Access rights shall be possible to put on/off to write, read and possible functions done by the card.

It shall be possible to demand authorisation to defined specific files on the card.

The card shall have support for authentication by challenge and response.

The communication between card and card-reader should have possibilities to be encrypted.

The card should have functions to maintain data integrity.

The card should have functions to maintain transaction integrity.

#### **3.3 Commands**

The RKF travel card is designed to be implemented on cards which accommodate the file structure, security and commands as specified in the [ISO 7816-4].

An implementation of travel card on a contactless card must be done so that the structure on the card as long as possible follow the [ISO 7816-4].

### 3.4 Electronic Signals and Transmission Protocols

The RKF travel card is based on IC-cards. These cards can be of three types:

1. Contactless cards as specified in the [ISO 14443-2] (type A, 1 kB), draft
2. Contact cards following the specifications in the [ISO 7816-3]
3. Dual Interface cards, i.e. cards with both a contactless and a contact interface to one common memory and one shared microprocessor

#### 3.4.1 Common Requirement

The following rules define requirements for implementation of the travel card.

- The card must have an addressable memory.
- It must be possible to address the memory on at least file level.
- The card should have functionality to manage a counter.
- The card must have an addressable memory of at least 1024 bytes.
- There must be possibilities to write and read from different files on the card.
- The card CAD will have to follow the EMC-directive [EMC].

#### 3.4.2 Requirements for RKF Type 1 Contactless Cards

Contactless cards shall be in accordance with [ISO 14443], type A, 1 kB (e.g. Mifare® Standard) regarding to transmission, anticollision etc.

Contactless cards shall have full functionality up to a range of 10 cm from the reader.

#### 3.4.3 Requirements for RKF Type 2 Contact Cards

Contact cards shall follow the [ISO 7816-3] with amendments.

### 3.5 Physical Characteristics

The physical card on which the RKF travel card is implement should follow the [ISO 7816-1]. Contactless cards do not have to have the shape of traditional IC-cards.

Contactless cards must also follow the [ISO 14443-1].

Because of environmental influence, the card should be manufactured in other materials than PVC, preferably ABS, polycarbonate or any other materiel with little environmental influence.

It shall be possible to store information on the card for at least 10 years.

It shall be possible to do at least 100000 operations to the card during its life-cycle.

No technical maintenance on the card is allowed.



The card should be easy for the user to clean externally.