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Cards and security devices for personal identification — Building blocks for identity management via mobile devices

Part 6: Mechanism for use of certification on trustworthiness of secure area

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Cards and security devices for personal identification — Building blocks for identity management via mobile devices —

Part 6: Mechanism for use of certification on trustworthiness of secure area

Cartes et dispositifs de sécurité pour l'identification des personnes — Blocs fonctionnels pour la gestion des identités via les dispositifs mobiles —

Partie 6: Mécanisme pour l'utilisation de la certification concernant la fiabilité de la zone protégée

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Abbreviated terms ... **3**
5 Mechanism for use of certification on trustworthiness of secure area ... **3**
6 List of elements describing capabilities of a secure area ... **6**
6.1 General ... 6
6.2 Elements of trustworthiness characteristics for secure area ... 7
6.2.1 General ... 7
6.2.2 Secure Environment Vendor Name ... 7
6.2.3 Secure Environment Certification Information ... 7
6.2.4 Secure environment operating system and version ... 8
6.2.5 Secure environment operating system vendor ... 8
6.2.6 SA-Application Provider name ... 9
6.2.7 SA-Application Version ... 9
6.2.8 SA-Application Certification Information ... 9
6.2.9 Cryptographic key generation ... 10
6.2.10 Cryptographic key destruction ... 11
6.2.11 Cryptographic key derivation ... 11
6.2.12 Cryptographic operation ... 12
6.2.13 Random number generation ... 13
6.2.14 Information flow control functions (Simple security attributes) ... 14
6.2.15 Stored data integrity monitoring ... 15
6.2.16 Access control policy (Subset access control) ... 15
6.2.17 Access control functions ... 16
6.2.18 Timing of authentication ... 17
6.2.19 User authentication before any action ... 17
6.2.20 Re-authenticating ... 17
6.2.21 Security management of functions ... 18
6.2.22 Security roles ... 19
6.2.23 Management of security functionality data ... 19
6.2.24 Management of security attributes ... 20
6.2.25 Specification of management functions ... 21
6.2.26 Anonymity ... 21
6.2.27 Emanation ... 22
6.2.28 Resistance to physical attack ... 23
6.2.29 Testing ... 24
6.2.30 Failure with preservation of secure state ... 25
6.2.31 Trusted path/channels ... 25
7 Encoding Trustworthiness Characteristic information ... **26**
7.1 General ... 26
7.2 Encoding trustworthiness certificate ... 27
Annex A (informative) **Example of trustworthiness information of secure area** ... **29**
Annex B (informative) **Certificate profile** ... **33**
Bibliography ... **35**

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

A list of all parts in the ISO/IEC 23220 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

Electronic ID-Applications (eID-Apps) are commonly used in badges and ID cards with integrated circuits and allow users to complete electronic identification, authentication, or optionally, to create digital signatures. Many different application areas have an essential need for these mechanisms and use different means to provide these features (e.g. health system with health assurance cards or health professional cards, financial sector with payment cards, governmental ID with national ID cards, electronic passports or driver's licenses, educational systems with student cards or library cards, in the company sector with employee cards and in the private sector with any kind of member cards).

Mobile devices (e.g. mobile phones or smart phones, wearable devices) are a central part of the daily life for many individuals. They are not only used for communication, but also for emailing, access to social media, gaming, shopping, banking, and storing of private content such as photos, videos and music. They are used today as a personal device for business and private applications. With the ubiquity of mobile devices in day-to-day activities there is a strong demand from users to have eID-Apps or services with identification/ authentication mechanisms on their mobile equipment, i.e. an mdoc app.

An mdoc app can be deployed to provide a number of different digital ID-documents. Additionally, it can reside among other eID-Apps on a mobile device. Moreover, users can possess more than one mobile device holding an mdoc app, which leads to enhanced mechanisms for the management of credentials and attributes.

The technical preconditions for the deployment of mdoc apps exist and they are partly standardized to support security and privacy on a mobile device. Examples for containers of eID-App solutions are the software-based trusted execution environment (TEE), hardware-based secure elements such as universal integrated circuit card (UICC), embedded or integrated UICC (eUICC or iUICC), embedded secure elements, secure memory cards with cryptographic module or other dedicated internal security devices residing on the mobile device, as well as solutions with server-based security means.

As mdoc apps can be located on different forms of mobile devices featuring different security means, being as generic as possible helps them to be adoptable to different variants of trusted eID-Management. This diversity leads also to different levels of security, trust and assurance. Trusted eID-Management thereby implies the (remote) administration and use of one or several security elements (e.g. in form of an intelligent network), credentials and user attributes with different levels of security suitable to their capability and power.

Access to the mdoc app by the external world is performed by the available transmission channels. Typical local communication channels are Bluetooth Low Energy (BLE), Near Field Communication (NFC) and Wi-Fi aware, whereas remote communication is typically an internet connection over mobile networks and Wi-Fi networks. The way of identification and choice of the transmission interface and protocols is an essential part for a trusted eID-Management.

Those mdoc apps are used in different areas of daily life and are the focus of different standardization activities. This document aims at delivering mechanisms and protocols usable by other standards to provide interoperability and interchangeability. With these basics in mind, future mdoc apps can be derived and extend the ISO/IEC 23220 series.

The ISO/IEC 23220 series builds upon existing international standards comprising four main subjects:

a) secure channel establishment;

b) API call serialization method;

c) data element naming convention; and

d) payload transport over communication channel protocols, which are constitutive of the interoperability pillars.

In addition, it adds means to establish Trust on First Use (TOFU).

Annex A provides an example of trustworthiness information.

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Annex B provides an example of a certificate profile.

NOTE The ISO/IEC 23220 series inherits and enhances the functionality that was adopted by mobile driving licence (mDL) applications whereby ensuring backward compatibility with ISO/IEC 18013-5.

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Cards and security devices for personal identification — Building blocks for identity management via mobile devices —

Part 6: Mechanism for use of certification on trustworthiness of secure area

1 Scope

This document specifies mechanism for use of certification on trustworthiness of secure area that is defined in ISO/IEC 23220-1.

This document aims at enabling secure area providers to describe capabilities and confidence level of secure area for verification by eID issuers or mobile eID Attestation service providers, or both.

This document specifies:

— list of elements describing capabilities and confidence level of a secure area;

— structure and management for use of a certificate, affixed or not to the secure area, containing that list of elements.

This document refers to existing standards and applicable industry specifications which partly address the trustworthiness related issue (e.g. DLOA specified in GlobalPlatform specification GPC_SPE_095[1], MDS specified in FIDO Alliance specification[2], and SAAO specified in ISO/IEC TS 23220-3), and aims to minimize the differences between them.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 23220 (all parts), *Cards and security devices for personal identification — Building blocks for identity management via mobile devices*

ISO/IEC 15408-2, *Information security, cybersecurity and privacy protection — Evaluation criteria for IT security — Part 2: Security functional components*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23220 (all parts) and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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3.1
authenticity
property that an entity is what it claims to be

[SOURCE: ISO/IEC 27000:2018, 3.6]

3.2
availability
property of being accessible and usable upon demand by an authorized entity

[SOURCE: ISO/IEC 27000:2018, 3.7]

3.3
integrity
property of accuracy and completeness

[SOURCE: ISO/IEC 27000:2018, 3.36]

3.4
privacy
freedom from intrusion into the private life or affairs of an individual when that intrusion results from undue or illegal gathering and use of data about that individual

[SOURCE: ISO/IEC 2382:2015, 2126263]

3.5
resilience
capability of a system to maintain its functions and structure in the face of internal and external change, and to degrade gracefully when this is necessary

Note 1 to entry: This definition is drawn from ISO 37101:2016, 3.33, Note 3 to entry.

3.6
secure area evaluating entity
entity that evaluates trustworthiness of secure area

3.7
secure area provider
entity that provides secure area

3.8
trustworthiness certificate authority
secure area trustworthiness certificate authority
entity who evaluates and certify the trustworthiness of a secure area

Note 1 to entry: This authority can also support infrastructure, system and repository making secure area trustworthiness certificate publicly available.

3.9
secure environment
common functions of secure area independent from SA-Applications

3.10
trustworthiness
ability to meet stakeholders' expectations in a demonstrable, verifiable and measurable way

Note 1 to entry: Depending on the context or sector, and also on the specific product or service, data, and technology used, different characteristics apply and need verification to ensure stakeholders expectations are met.

Note 2 to entry: Characteristics of trustworthiness include, for instance, reliability, availability, resilience, security, privacy, safety, accountability, transparency, integrity, authenticity, quality, usability and accuracy.

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Note 3 to entry: Trustworthiness is an attribute that can be applied to services, products, technology, data and information as well as, in the context of governance, to organizations.

[SOURCE: ISO/IEC TS 5723:2022, 3.1.1, modified — "Demonstrable" and "measurable" added to definition, Notes 2 and 3 to entry adjusted, Note 4 to entry deleted.]

3.11
trustworthiness certificate
proof of the test results and relating entities information

4 Abbreviated terms

CA	certificate authority
DLOA	digital letter of approval
FIDO	fast identity online
MDS	metadata service
OID	object identifier
PP	protection profile
RA	registration authority
SAAO	secure area attestation object
TCA	trustworthiness certificate authority
TOE	target of evaluation
TSF	TOE security function

5 Mechanism for use of certification on trustworthiness of secure area

eID documents are implemented to IC cards (ICCs) in order to prevent either unauthorized modification or access to credentials and privacy information, or a combination thereof. The trustworthiness of ICCs is evaluated in advance of the issuing process. When eID documents are implemented to mobile devices, such credentials and privacy information should be stored in the secure area of mobile devices as described in ISO/IEC 23220-1. In this case, eID issuers and mobile eID Attestation service providers are not easy to evaluate for the trustworthiness of a secure area in advance of the issuing process because it they are not under the management of issuers.

In the issuing process, SAAO is used to obtain the capability information of a secure area as specified in ISO/IEC TS 23220-3. The capability information is available for an issuer, however, the issuer is not able to validate the trustworthiness of such capability information. The capability of secure area is also affected to confidence level of eID in accordance with the protection level of the identity information.

This document aims to provide the means for the issuer to validate the trustworthiness of a secure area, using trustworthiness certificate which includes the trustable information for the capability and confidence level of a secure area.

Figure 1 describes the mechanism for the use of trustworthiness certificate of secure area.

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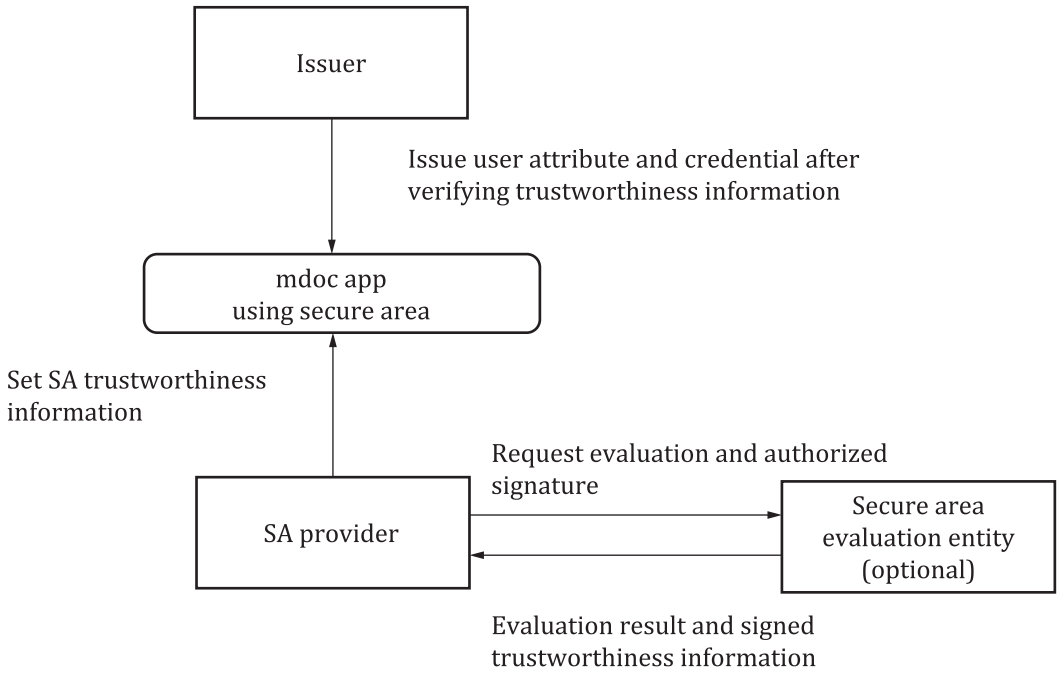

Figure 1 — Mechanism for the use of trustworthiness certificate of secure area

The issuer at first gets the mdoc app capability descriptor (MCD) which includes Secure Area Attestation Object (SAAO) as specified in ISO/IEC TS 23220-3. The MCD includes capability information of the secure area.

When such information is not evaluated yet, then it should be evaluated with appropriate test methods by Secure Area Evaluating Entity. Information approved by content of trustworthiness certificate (e.g., DLOA specified by GlobalPlatform, MDS specified by FIDO Alliance) may be required for issuers for SA attestation as specified in ISO/IEC 23220-1. Each element shall be trustable by either evaluation or approval. The list of elements is specified in Clause 6. The relation of listed elements and confidence level is described in ISO/IEC TS 23220-5.

When all elements are evaluated or with approval, they are either made available within to Trustworthiness Certificate Authority or directly input in SAAO by the secure area vendor or the SA provder.

In the actual SA evaluation of a mobile device, multiple entities are involved in Figure 1. Figure 2 shows an example where the SA is subject to Common Criteria evaluation. The results of the SA evaluation are opened by the registration authority based on the evaluation results of the evaluating entity. The issuer can evaluate the safety of the SA by referring to the obtained certification information.

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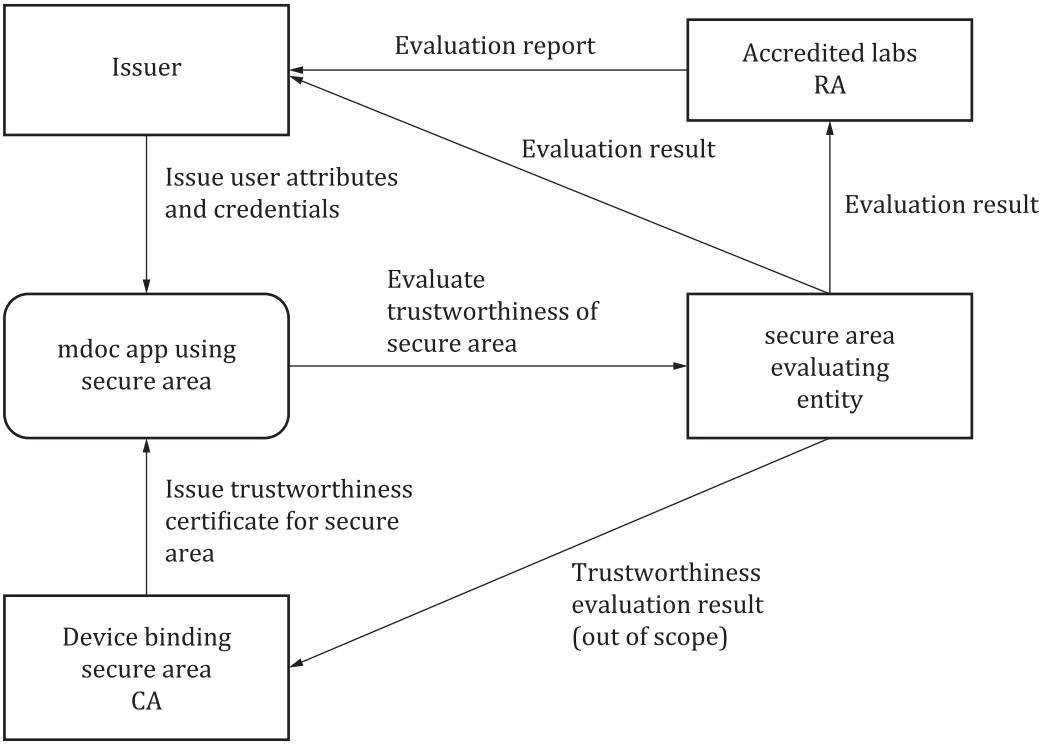

Figure 2 — Example mechanism for using existing certification report

Figure 3 shows an example where an SA evaluation organization provides the results directly through the SA provider, where evaluation criteria are determined for each application, such as the use of national IDs, and the issuer can obtain the evaluation results.

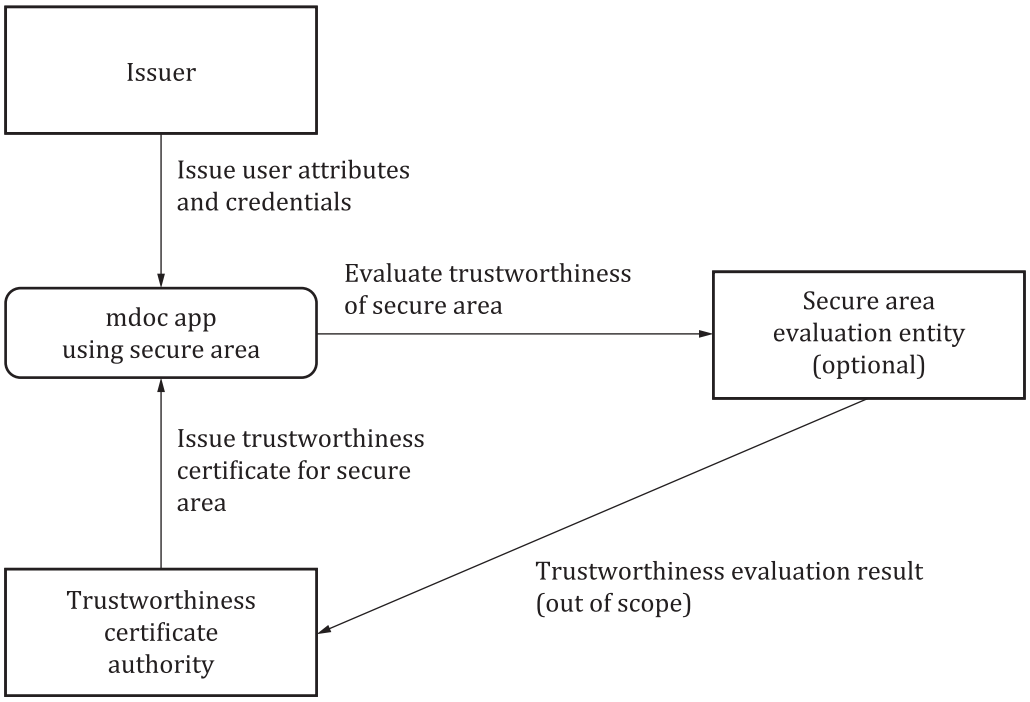

Figure 3 — Example mechanism for using application specific evaluation entity

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6 List of elements describing capabilities of a secure area

6.1 General

This clause provides lists of elements that are used for issuers to trust secure areas. The term "trust" has several meanings depending on the context. Therefore, this clause clarifies what the issuer trusts in the secure area, i.e. trustworthiness characteristics, and then provides the elements that should be used to validate the trustworthiness of the secure area.

For this goal, at first, this clause provides the trustworthiness characteristics and their aspects on secure area that is used on mobile eID systems. Next, it provides functional and attributional elements about trustworthiness characteristics for secure area shown in Table 1. Finally, it provides the lists of elements for evaluating trustworthiness of secure area based on its operational conditions including relations of entities involved. Elements are endorsed with a digital signature signed by TCA. This document refers to the terms and data object names that are defined by ISO/IEC 23220 series for harmonization if it is applicable.

Table 1 shows the trustworthiness characteristics and description on mobile eID aspects of secure area.

NOTE Group of elements are endorsed with a digital signature signed by TCA (see 7.2).

Table 1 — Trustworthiness characteristics and description in mobile eID aspects of secure area

Elements	Trustworthiness characteristics	Verification method	Proof of validation
Secure environment vendor name	Integrity/Authenticity	Digital Signature	N/A
Secure environment certification info	Integrity/Authenticity	Digital Signature	List of certified products (URL)
Secure environment operating system and version	Integrity/Authenticity	Digital Signature	N/A
Secure environment operating system vendor	Integrity/Authenticity	Digital Signature	N/A
SA-Application provider name	Integrity/Authenticity	Digital Signature	N/A
SA-Application version	Integrity/Authenticity	Digital Signature	N/A
SA-Application certification info	Integrity/Authenticity	Digital Signature	List of certified products (URL)
Cryptographic key generation	Security	Digital Signature	N/A
Cryptographic key destruction	Security	Digital Signature	N/A
Cryptographic key derivation	Security	Digital Signature	N/A
Cryptographic operation	Security	Digital Signature	N/A
Random number generation	Security	Digital Signature	N/A
Cryptographic key derivation	Security	Digital Signature	N/A
Simple security attributes	Security	Digital Signature	N/A
Stored data integrity monitoring	Security	Digital Signature	N/A
Subset access control	Security	Digital Signature	N/A
Access control functions	Security	Digital Signature	N/A
Timing of authentication	Security	Digital Signature	N/A
User authentication before any action	Security	Digital Signature	N/A
Re-authenticating	Security	Digital Signature	N/A
Security management functions	Security	Digital Signature	N/A

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