



NSAI
Standards

Irish Standard
I.S. EN 419212-2:2017

Application Interface for Secure Elements for Electronic Identification, Authentication and Trusted Services - Part 2: Signature and Seal Services

I.S. EN 419212-2:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 419212-2:2017

Published:

2017-12-13

This document was published under the authority of the NSAI and comes into effect on:

2017-12-31

ICS number:

35.240.15

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 419212-2:2017 is the adopted Irish version of the European Document EN 419212-2:2017, Application Interface for Secure Elements for Electronic Identification, Authentication and Trusted Services - Part 2: Signature and Seal Services

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN 419212-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2017

ICS 35.240.15

Supersedes EN 419212-1:2014, EN 419212-2:2014

English Version

Application Interface for Secure Elements for Electronic Identification, Authentication and Trusted Services - Part 2: Signature and Seal Services

Interface applicative des éléments sécurisés utilisés
comme dispositifs de création de signature
électronique qualifiée (cachet) - Partie 2 : Services de
signatures et de cachets

Anwendungsschnittstelle für sichere Elemente, die als
qualifizierte elektronische Signatur-
/Siegelerstellungseinheiten verwendet werden - Teil 2:
Zusätzliche Dienste

This European Standard was approved by CEN on 6 February 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword	6
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Symbols and abbreviations	9
5 Signature application	9
5.1 Application Flow	9
5.2 Trusted environment versus untrusted environment.....	11
5.3 Selection of ESIGN application	12
5.3.1 General	12
5.3.2 Exceptions for Secure Messaging	13
5.4 Selection of cryptographic information application.....	13
5.5 Concurrent usage of signature applications	13
5.5.1 General	13
5.5.2 Methods of channel selection	14
5.5.3 Security issues on multiple channels	14
5.6 Security environment selection	14
5.7 Key selection	14
5.8 Security Services	15
6 User verification.....	15
6.1 General	15
6.2 Knowledge based user verification.....	16
6.2.1 General	16
6.2.2 Explicit user verification.....	16
6.2.3 Password-based mechanisms	18
6.2.4 Presentation formats	18
6.2.5 Retry and Usage counters	18
6.2.6 Password Change.....	19
6.2.7 Reset of RC and setting a new password	19
6.3 Biometric user verification	20
6.3.1 General	20
6.3.2 Retrieval of the Biometric Information Template	21
6.3.3 Performing the biometric user verification.....	22
6.3.4 Reset of RC.....	24
7 Digital Signature Service.....	24
7.1 General	24
7.2 Signature generation algorithms.....	25
7.3 Activation of digital signature service	25
7.4 General aspects	25
7.5 Signature Generation	27
7.5.1 General	27
7.5.2 No hashing in Card.....	27
7.5.3 Partial hashing.....	27
7.5.4 All hashing in ICC	29
7.6 Selection of different keys, algorithms and input formats	30
7.6.1 General	30
7.6.2 Restore an existing SE	31

EN 419212-2:2017 (E)

7.6.3	Setting the Hash Template (HT) of a current Security Environment (SE)	31
7.6.4	Modify the Digital Signature Template (DST) of a current Security Environment (SE)	32
7.7	Read certificates and certificate related information	32
7.7.1	General	32
7.7.2	Read certificate related CIOs	33
7.7.3	Read signer's certificate from ICC	33
7.7.4	Retrieval of the signer's certificate from a directory service	34
8	Password-based authentication protocols	35
8.1	General	35
8.2	Notation	35
8.3	Authentication steps	36
8.3.1	General	36
8.3.2	Step 1 — Reading the protocol relevant public parameters	37
8.3.3	Step 2 — Set PBM parameters and generate blinding point	38
8.3.4	Step 3 — Get encrypted nonce	39
8.3.5	Step 4.1 — Map nonce and compute generator point for generic mapping	40
8.3.6	Step 4.2 — Map nonce and compute generator point for integrated mapping	41
8.3.7	Step 5 — Generate session keys	43
8.3.8	Step 6 — Explicit key authentication	43
9	Secure Messaging	44
9.1	General	44
9.2	CLA byte	45
9.3	TLV coding of command and response message	45
9.4	Treatment of SM-Errors	45
9.5	Padding for checksum calculation	46
9.6	Send sequence counter (SSC)	46
9.7	Message structure of Secure Messaging APDUs	46
9.7.1	Cryptograms	46
9.7.2	Cryptographic Checksums	48
9.7.3	Final command APDU construction	51
9.8	Response APDU protection	52
9.9	Use of TDES and AES	56
9.9.1	TDES/AES encryption/decryption	56
9.9.2	CBC mode	57
9.9.3	Retail MAC with TDES	57
9.9.4	EMAC with AES	58
9.9.5	CMAC with AES	59
10	Key Generation	59
10.1	General	59
10.2	Signature key and certificate generation	60
11	Key identifiers and parameters	61
11.1	General	61
11.2	Key identifiers (KID)	62
11.2.1	General	62
11.2.2	Secret and private keys	62
11.3	Public Key parameters	62
11.3.1	General	62
11.3.2	RSA public key parameters	62
11.4	Diffie-Hellman key exchange parameters	63
11.5	Authentication tokens in the protocols mEACv2 and PCA	63
11.5.1	General	63

11.5.2	TDES.....	63
11.5.3	AES.....	63
11.5.4	Ephemeral Public Key Data Object.....	63
11.6	The compression function Comp().....	63
11.7	DSA with ELC public key parameters	64
11.7.1	General	64
11.7.2	The plain format of a digital signature	65
11.7.3	The uncompressed encoding.....	65
11.8	ELC key exchange public parameters.....	65
12	AlgIDs, Hash- and DSI Formats	66
12.1	General	66
12.2	Algorithm Identifiers and OIDs	66
12.3	Hash Input-Formats.....	66
12.3.1	General	66
12.3.2	PSO:HASH without command chaining.....	67
12.3.3	PSO:HASH with command Chaining.....	67
12.4	Formats of the Digital Signature Input (DSI).....	68
12.4.1	General	68
12.4.2	DSI according to ISO/IEC 14888-2 (scheme 2).....	69
12.4.3	DSI according to PKCS #1 V 1.5.....	69
12.4.4	Digest Info for SHA-X Hash:Digest Info SHA:Digest Info	71
12.4.5	DSI according to PKCS #1 V 2.x MGF function.....	73
12.4.6	DSA with DH key parameters	74
12.4.7	Elliptic Curve Digital Signature Algorithm - ECDSA.....	74
13	Files.....	74
13.1	General	74
13.2	File structure.....	74
13.3	File IDs	75
13.4	EF.DIR.....	75
13.5	EF.SN.ICC	76
13.6	EF.DH	76
13.7	EF.ELC.....	77
13.8	EF.C.ICC.AUT.....	77
13.9	EF.C.CA _{ICC} .CS-AUT	78
13.10	EF.C_X509.CH.DS.....	78
13.11	EF.C_X509.CA.CS (DF.ESIGN)	79
13.12	EF.DM	79
14	Cryptographic Information Application.....	79
14.1	General	79
14.2	ESIGN cryptographic information layout example.....	81
14.2.1	General	81
14.2.2	EF.CIAInfo	82
14.2.3	EF.AOD	84
14.2.4	EF.PrKD	88
14.2.5	EF.PuKD.....	92
14.2.6	EF.CD.....	93
14.2.7	EF.DCOD.....	95
Annex A (normative)	Security environments.....	100
Annex B (informative)	Seals and Signatures.....	108
Annex C (informative)	Remote Signatures	111

EN 419212-2:2017 (E)**European foreword**

This document (EN 419212-2:2017) has been prepared by Technical Committee CEN/TC 224 “Furniture”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2018, and conflicting national standards shall be withdrawn at the latest by June 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 419212-1:2014 and EN 419212-2:2014.

This standard supports services in the context of **electronic IDentification, Authentication and Trust Services (eIDAS)** including signatures.

In EN 419212 Part 2, the standard allows support of implementations of the European legal framework for electronic signatures, defining the functional and security features for a Secure Elements (SE) (e.g. smart cards) intended to be used as a Qualified electronic Signature Creation Device (QSCD) according to the Terms of the “European Regulation on Electronic Identification and Trust Services for electronic transactions in the internal market” [2].

A Secure Element (SE) compliant to the standard will be able to produce a “qualified electronic signature” that fulfils the requirements of Article of the Electronic Signature Regulation ” [2] and therefore can be considered equivalent to a hand-written signature.

This standard consists of five parts:

Part 1: “Introduction and common definitions” describes the history, application context, market perspective and a tutorial about the basic understanding of electronic signatures. It also provides common terms and references valid for the entire 419212 series.

Part 2: “Signature and Seal Services” describes the specifications for signature generation according to the eIDAS regulation.

Part 3: “Device Authentication” describes the device authentication protocols and the related key management services to establish a secure channel.

Part 4: “Privacy specific Protocols” describes functions and services to provide privacy to identification services.

Part 5: “Trusted eServices” describes services that may be used in conjunction with signature services described in Part 2.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning the mapping function given in Part 2, clause 8.3.6.

The patent relates to “Sagem, MorphoMapping Patents FR09-54043 and FR09-54053, 2009”.

CEN takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has ensured CEN that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN. Information may be obtained from:

Morpho

11, boulevard Galliéni

92445 Issy-les-Moulineaux Cedex

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. CEN shall not be held responsible for identifying any or all such patent rights.

EN 419212-2:2017 (E)

1 Scope

This part specifies mechanisms for SEs to be used as qualified signature creation devices covering

- Signature creation and mobile signature creation
- User verification
- Password based authentication

The specified mechanisms are suitable for other purposes like services in the context of [2].

The particular case of seal is also covered by the specification. The differences between seal and signature is exposed in Annex B. Annex B also explains how the mechanisms for SEs as qualified signature creation devices can be used for SEs as qualified seal creation devices.

Mobile signature is an alternative to the classical signature case which is performed by a secure element. Mobile signature is encouraged by the large widespread of mobile devices and the qualification authorized by the eIDAS Regulation [2]. The particular case of remote signature (or server signing) is covered by this specification in Annex C.

In the rest of this document, except Annex B, there will be no particular notion of a seal since it technically compares to the signature.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7816-4:2013, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-8:2004, *Identification cards – Integrated circuit cards – Part 8: Commands for security operations*

ISO/IEC 7816-11:2004, *Identification cards — Integrated circuit cards — Part 11: Personal verification through biometric methods*

ISO/IEC 7816-15, *Identification cards — Integrated circuit cards — Part 15: Cryptographic information application*

ISO/IEC 9797-1:2011, *Information technology — Security techniques — Message Authentication Codes (MACs) — Part 1: Mechanisms using a block cipher*

ISO 11568-2:2012, *Financial services — Key management (retail) — Part 2: Symmetric ciphers, their key management and life cycle*

ISO/IEC 14888-2:2008, *Information technology — Security techniques — Digital signatures with appendix — Part 2: Integer factorization based mechanisms*

ISO/IEC 19794-2:2005, *Information technology — Biometric data interchange formats — Part 2: Finger minutiae data*

ISO/IEC 15946-5, *Information technology — Security techniques — Cryptographic techniques based on elliptic curves — Part 5: Elliptic curve generation, 2009-12-15*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-