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Information technology — Machine readable test data for biometric testing and reporting

Part 1: Test reports

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Information technology — Machine readable test data for biometric testing and reporting —

Part 1: Test reports

Technologies de l'information — Données d'essai lisibles par machine pour les rapports et les essais biométriques —

Partie 1: Rapports d'essai

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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Conformance **1**
3 Normative references **1**
4 Terms and definitions **2**
5 Symbols and abbreviated terms **2**
6 ASN.1 format **2**
6.1 Encoding rules 2
6.2 ASN.1 object identifier for test report 2
6.3 `BiometricTestReport` type 2
6.4 Data types for technology tests 3
6.4.1 Overview 3
6.4.2 Product information 3
6.4.3 Information about test report 5
6.4.4 Test report under a specific condition 7
6.5 Data types for scenario tests 12
6.5.1 Overview 12
6.5.2 Test report under a specific condition 12
6.6 Data types for signed test reports 13
Annex A (normative) **ASN.1 module for machine readable biometric test reports** **15**
Annex B (informative) **Common elements** **22**
Annex C (informative) **Test reports** **29**
Bibliography **37**

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 37, *Biometrics*.

ISO/IEC 29120 consists of the following parts, under the general title *Information technology — Machine readable test data for biometric testing and reporting*:

— *Part 1: Test reports*

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Introduction

This International Standard will enhance the usability of biometric test data by providing them in a common and machine readable form. This International Standard is intended to provide

— documentary evidence that a product has been tested,

— a statement of authenticity of the test report,

— an ability to maintain of registry of products,

— a clear mechanism for maintaining product availability and certification status, and

— an ability for a relying system to depend on a biometric product used in a remote authentication context.

This International Standard is not intended to replace traditional biometric test reports. Indeed, because such texts are essential to the complete documentation of a test, they are viewed as parents of the machine readable content defined in ISO/IEC 29120 and are explicitly referenced in these reports.

Accordingly, the parts of this International Standard establish requirements for, and define formats for, signed test reports and biometric datasets as follows.

This part of ISO/IEC 29120 establishes machine readable records for documenting the output of a biometric test. This supports the documentary reporting requirements of some parts of ISO/IEC 19795. This part of ISO/IEC 29120 is primarily intended to support scenario and technology tests. Additionally, interoperability tests can be documented by a collection of ISO/IEC 29120-1 test reports (one for each tested combination of components). The International Standard also includes mechanism to protect the integrity of the test report. This assures a receiving system that the test information (date, laboratory, accreditation body, manner of testing, conformance, test size, accuracy) can be relied upon and used appropriately.

As the parts of ISO/IEC 19795 have been developed and testing standards have been published, there is an increasing reliance on the correct conduct of tests and their documented outputs. Although the ISO/IEC 19795 standards include extensive disclosure and reporting requirements, they do not establish definitive data formats for those pieces of information. Other data concerning the commissioning, accreditation, and conduct of the test can also be valuable to consumers of the test reports. In addition, this International Standard will benefit users of biometric tests via improved

— conformance to testing standards,

— reliability (via automation of relevant activities), and

— comparability of test results.

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INTERNATIONAL STANDARD ISO/IEC 29120-1:2015(E)

Information technology — Machine readable test data for biometric testing and reporting —

Part 1:
Test reports

1 Scope

This part of ISO/IEC 29120 establishes

— machine readable records for documenting the output of a biometric test,

— formats for data that ISO/IEC 19795 tests are required to report, and

— an ASN.1 syntax for test reports.

This standard specifically does not

— require, prohibit, or otherwise specify, the format of biometric samples or templates used in a test,

— require, prohibit or otherwise specify, the encapsulation of biometric samples or templates used in a test, or

— regulate metrics for tests.

NOTE ISO/IEC 19795-1 establishes the reportable metrics.

2 Conformance

A test report shall be conformant to this part of ISO/IEC 29120 if it meets all normative requirements of this part of ISO/IEC 29120.

3 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 8601:2004, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8825-1:2008, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) — Part 1*

ISO/IEC 8825-4:2008, *Information technology — ASN.1 encoding rules: XML Encoding Rules (XER) — Part 4*

ISO/IEC 9594-2, *Information technology — Open Systems Interconnection — The Directory — Part 2: Models*

ISO/IEC 19785-3:2007, *Information technology — Common Biometric Exchange Formats Framework — Part 3: Patron format specifications*

ISO/IEC 19795-1, *Information technology — Biometric performance testing and reporting — Part 1: Principles and framework*

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RFC 3852, *Cryptographic Message Syntax (CMS)*

RFC 5911, *New ASN.1 Modules for Cryptographic Message Syntax (CMS) and S/MIME*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19795-1 apply.

5 Symbols and abbreviated terms

For the purposes of this part of ISO/IEC 29120, the following abbreviations apply.

ASN Abstract Syntax Notation

BDB Biometric Data Block

CDF Cumulative Distribution Function

CMC Cumulative match characteristic

DET Detection error tradeoff

FAR False accept rate

FTA Failure to acquire rate

FTE Failure to enrol rate

FMR False match rate

FNIR False-negative identification error rate

FNMR False non-match rate

FPIR False-positive identification error rate

FRR False reject rate

ROC Receiver operating characteristic

IUT Implementation under test

6 ASN.1 format

6.1 Encoding rules

The test reports specified in this part of the International Standard shall be encoded using the XML Encoding Rules (XER) [ISO/IEC 8825-4:2008] or the Basic Encoding Rules (BER) [ISO/IEC 8825-1:2008] of ASN.1.

6.2 ASN.1 object identifier for test report

```
MachineReadableBiometricTestingAndReportingTestReport {
       iso(1) standard(0) MRTDBTR(29120) testReport(1) module(1) rev(0)
}
```

6.3 `BiometricTestReport` type

```
BiometricTestReport ::= SEQUENCE {
       contentType         CONTENT-TYPE.&id({ContentTypeBiometricTestReport }),
       content             [0] EXPLICIT CONTENT-TYPE.&Type
```


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```
            ({ContentTypeBiometricTestReport}{@contentType})
}
```

Type BiometricTestReport is composed of two components, contentType and content. The first component contentType is an object identifier, which indicates the type of content in the second component content. The value of contentType takes one of the following three values; id-estReportTechnology, id-testReportScenario, and id-signedTestReport. This is done by the following definition of ContentTypeBiometricTestReport and those of testReportTechnology, testReportScenario, and signedDataBTR.

```
ContentTypeBiometricTestReport CONTENT-TYPE ::= { testReportTechnology |
testReportScenario |
                                                signedTestReport }
testReportTechnology CONTENT-TYPE ::= {
       TestReportTechnology
       IDENTIFIED BY id-testReportTechnology
}
testReportScenario CONTENT-TYPE ::= {
       TestReportScenario
       IDENTIFIED BY id-testReportScenario
}
signedTestReport CONTENT-TYPE ::= {
       SignedTestReport
       IDENTIFIED BY id-signedTestReport
}
```

Each of these content types corresponds to report of technology test, scenario test, and signed test report.

The object identifiers are defined as follows:

```
id-testReportTechnology OBJECT IDENTIFIER ::= {
       iso(1) standard(0) MRTDBTR(29120) testReport(1) contentType(2)
testReportTechnology(1)
}
id-testReportScenario OBJECT IDENTIFIER ::= {
       iso(1) standard(0) MRTDBTR(29120) testReport(1) contentType(2)
testReportScenario(2)
}
id-signedTestReport OBJECT IDENTIFIER ::= {
       iso(1) standard(0) MRTDBTR(29120) testReport(1) contentType(2) signedTestReport(3)
}
```

6.4 Data types for technology tests

6.4.1 Overview

Type TestReportTechnology is a type to express results of technology test. The first field version is the version of this test report format of type MRTDBTRVersion. The second field targetInfo is of type ProductInformation and gives information of the evaluated product. The third field testReportInfo gives the information about the test report of type TestReportInformation. The fourth part is a sequence testReports of type TestReportTechnologyForOneCondition. Each element of this sequence corresponds to a test result under a specific condition.

```
TestReportTechnology ::= SEQUENCE {
       version                    MRTDBTRVersion      DEFAULT v0,
       targetInfo                 ProductInformation,
       testReportInfo             TestReportInformation,
       testReports                SEQUENCE OF TestReportTechnologyForOneCondition
}
MRTDBTRVersion ::= INTEGER { v0(0) } ( v0, ... )
```

6.4.2 Product information

Type ProductInformation has six fields and gives information about the tested product.

```
ProductInformation ::= SEQUENCE {
       provider            Provider,
```

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```
        nameProduct          NameProduct,
        description          VisibleString OPTIONAL,
        functionProduct      SEQUENCE OF Function,
        outputProduct        DataType OPTIONAL,
        modalityProduct      Modality
}
```

6.4.2.1 Provider information

The first field `provider` is of type `Provider` and gives information about the provider of the tested biometric product.

```
Provider ::= SEQUENCE {
        nameProvider                Name,
        typeProvider                TypeProvider,
        roleProvider                RoleProvider,
        contactInformation          VisibleString OPTIONAL
}
```

The first field `nameProvider` identifies the name of the provider. The type `Name` for this field is specified in ISO/IEC 9592-2:2005.

The second field `typeProvider` shows the type of the provider, and shall take a value chosen from the values of type `TypeProvider: non-profit, university, corporation, individual, government`.

```
TypeProvider ::= ENUMERATED {
        non-profit(1),
        university(2),
        corporation(3),
        individual(4),
        government(5)
}
```

The third field `roleProvider` shows the role of the provider, and shall take a value chosen from the values of type `RoleProvider: manufacturer, reseller, integrator, other.` `manufacturer` is for the role of the entity responsible for the design or creation of the component. `reseller` is for the role of the entity which packages or resells the component. `integrator` is for the role of the entity which may combine components into a single atomic component.

```
RoleProvider ::= ENUMERATED {
        manufacturer(1),
        reseller(2),
        integrator(3),
        other(4)
}
```

The fourth field `contactInformation`, which is optional, shows the contact informationof the provider, such as the mail address of the provider, in `VisibleString`.

6.4.2.2 Other information in product information

The second field `nameProduct` in type `ProductInformation` is of `NameProduct` and gives basic information about the product.

```
NameProduct ::= SEQUENCE {
        modelName            Name,
        productCBEFF         Product OPTIONAL,
        version              VersionProduct,
        softwareVersion      VersionProduct,
        firmwareVersion      VersionProduct
}
VersionProduct ::= INTEGER { v0(0) } ( v0, ... )
```

The first field `modelName` in `NameProduct` is of type `Name` and identifies the product. The second field `productCBEFF` is an optional field of type `Product` imported from 19785-3 CBEFF Part 3. If the product is registered to a certain biometric organization, this field may be used to identify the product. The third, fourth, and fifth field `version, softwareVersion`, and `firmwareVersion` are all of type

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`VersionProduct` and indicate the version of the product, the version of the software of the product, the version of the firmware of the product respectively.

The third field `description` in type `ProductInformation` gives a complete unique description of the component under the test in `VisibleString`. This field should be used to describe prototypes, experimental models, use of biometric modalities not listed in ISO/IEC 19785-3, or to give additional information about the biometric modality (e.g. for iris recognition in the visible spectrum).

The fourth field `functionProduct` in type `ProductInformation` expresses the function of the tested product with type `Function`.Type `Function` is specified as follows:

```
Function ::= ENUMERATED {
       acquisition(1),
       enrolment(2),
       verification(3),
       identification(4),
       ...
}
```

The fifth field `outputProduct` in type `ProductInformation` expresses the data type of the output of the tested product with type `DataType`. Type `DataType` consists of two fields, `processedLevel` and `purpose`. The former takes a value which corresponds to raw data, intermediate data, processed data, comparison score, or comparison decision. The latter takes a value which corresponds to biometric reference or biometric sample.

```
DataType ::= SEQUENCE {
       processedLevel              ProcessedLevel,
       purpose                     Purpose OPTIONAL
}
ProcessedLevel ::= ENUMERATED {
       raw-data(1),
       intermediate-data(2),
       processed-data(3),
       comparison-score(4),
       comparison-result(5),
       ...
}
Purpose ::= ENUMERATED {
       reference(1),
       sample(2)
}
```

The sixth field `modalityProduct` in type `ProductInformation` indicate the modality of biometric data which the tested product processes, with type `Modality`. Type `modality` consists of a pair of fields `type` and `subtype`. `type` is mandatory if `processedLevel` in `outputProduct` takes neither `comparison-score` nor `comparison-result`. The types `BiometricType` and `BiometricSubtype` are defined in ISO/IEC 19785-3:2007, Clause 6.2.

```
Modality ::= SEQUENCE {
       type          BiometricType,
       subtype       BiometricSubtype OPTIONAL
}
```

6.4.3 Information about test report

Type `TestReportInformation` has four fields and gives information about the test report.

```
TestReportInformation ::= SEQUENCE {
       testLabInformation                      TestLabInformation,
       compliantStandard                       StandardDescription,
       testReportIssuaranceDate                Date,
       parentTestReport                        ExternalDocument
}
```

The first field `testLabInformation` in type `TestReportInformation` identifies the test laboratory conducting the test, with type `TestLabInformation`. Type `TestLabInformation` consists of two fields: `identificationTestLab` of type `IdentificationTestLab` and `accreditationStatus` of type `AccreditationStatus`.

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```
TestLabInformation ::= SEQUENCE {
       identificationTestLab       IdentificationTestLab,
       accreditationStatus         AccreditationStatus
}
```

Type `IdentificationTestLab` has five fields of type `VisibleString` : `nameLab` to show the name of the responsible laboratory, `location` to show location of the laboratory, optional `testImplementor` to show the employee or representative who executed the test, `testReportSignatory` to show the employee or representative assuring the integrity, correctness and completeness of the test, and `contactInformation` to show the contact information for enquiries concerning the test report.

```
IdentificationTestLab ::= SEQUENCE {
       nameLab                     VisibleString,
       location                    VisibleString,
       testImplementor             VisibleString OPTIONAL,
       testReportSignatory         VisibleString,
       contactInformation          VisibleString
}
AccreditationStatus ::= SEQUENCE {
       accreditingBodies   SEQUENCE OF AccreditingBody,
       scopeAccreditation  ScopeAccreditation OPTIONAL
}
AccreditingBody ::= SEQUENCE {
       nameAccreditingBody         VisibleString,
       identifierCertificate       OBJECT IDENTIFIER,
       signatory                   OCTET STRING
}
```

The second field `compliantStandard` in type `TestReportInformation` indicates which testing standards were used for the test with type `StandardDescription`. Type `StandardDescription` has four fields: `standardName` in `VisibleString` to show the name of the standard such as Biometric Testing and Reporting – Principles and Framework, `standardNumber` in `VisibleString` to show the number of the standard such as 19795, `standardPart` in `VisibleString` to show the part number of the standard, and `standardPublicationDate` of type `Date` to show the publication date of the standard.

Type `Date` is expressed in `VisibleString` with fixed length of 8 of form YYYYMMDD, which comforms to ISO 8601.

```
StandardDescription ::= SEQUENCE {
       standardName                      VisibleString,
       standardNumber                    VisibleString,
       standardPart                      VisibleString,
       standardPublicationDate           Date
}
Date ::= VisibleString
       -- conforms to ISO 8601
       -- length = 8
       -- fixed
       -- YYYYMMDD
```

The third field `testReportIssuaranceDate` in type `TestReportInformation` encodes the date on which the test report was signed by the test laboratory official with type `Date`.

The fourth field `parentTestReport` in type `TestReportInformation` gives the information about the non-machine readable, traditional test report for complete human-readable documentation of the test with type `ExternalDocument`. Type `ExternalDocument` consists of three mandatory fields and five optional fields. The first field `link` of type `URI` expresses the URL where the document can be referenced. The second field `title` of type `VisibleString` shows the title of the document. The third and optional field `authors` of type `SEQUENCE OF VisibleString` shows the author or the group of authors of the document. The fourth and optional field `publisher` of type `VisibleString` shows the publisher of the document. The fifth and optional field `editior` of type `VisibleString` shows the editor of the document. The sixth and optional field `typeDocument` of type `TypeDocument` shows the type of the document: article, technical report, in proceedings, abstract, book, in book, or collection. The seventh and optional field `publicationDate` of type `Date` shows the publication date

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of the document. The eighth field `availability` of type `Availability` shows the availability of the document: public, restricted, unavailable, or superseded.

```
ExternalDocument ::= SEQUENCE {
       link                URI,
       title               VisibleString,
       authors             SEQUENCE OF VisibleString OPTIONAL,
       publisher           VisibleString OPTIONAL,
       editior             VisibleString OPTIONAL,
       typeDocument        TypeDocument OPTIONAL,
       publicationDate     Date OPTIONAL,
       availability        Availability
}
TypeDocument ::= ENUMERATED {
       article(1),
       technical-report(2),
       in-proceedings(3),
       abstract(4),
       book(5),
       in-book(6),
       collection(7)
}
Availability ::= ENUMERATED {
       public(1),
       restricted(2),
       unavailable(3),
       superseded(4)
}
```

6.4.4 Test report under a specific condition

6.4.4.1 Overview

Type `TestReportTechnologyForOneCondition` gives a set of information for a result of technology test under a given condition. `TestReportTechnologyForOneCondition` consists of four fields; `corpusInfo` of type `CorpusInformation`, `dateStarted` of type `Date`, `dateEnded` of type `Date`, and `testResult` of type `SEQUENCE OF TestResult`. The second and third are optional fields.

```
TestReportTechnologyForOneCondition ::= SEQUENCE {
       corpusInfo                CorpusInformation,
       dateStarted               Date OPTIONAL,
       dateEnded                 Date OPTIONAL,
       testResult                SEQUENCE OF TestResult
}
```

6.4.4.2 Corpus information

Type `CorpusInformation` represents the information of the corpus which was used in the evaluation with two fields; `composition` of type `CorpusComposition` and `environInfo` of type `EnvironmentalInformation`.

```
CorpusInformation ::= SEQUENCE {
       composition   CorpusComposition,
       environInfo   EnvironmentalInformation
}
```

In type `CorpusComposition`, the corpus is identified with the first field `identifier` of type `OBJECT IDENTIFIER`. The second field `nameCorpus` of type `VisibleString` gives the name of the corpus. The third field `corpusStatistics` of type `CorpusStatistics` gives statistical information of the corpus.

```
CorpusComposition  ::= SEQUENCE {
       identifier                OBJECT IDENTIFIER,
       nameCorpus                VisibleString,
       corpusStatistics          CorpusStatistics
}
```

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