BS ISO/IEC 29109-7:2011

BSI Standards Publication

Information technology — Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794

Part 7: Signature/sign time series data

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National foreword

This British Standard is the UK implementation of ISO/IEC 29109-7:2011.

The UK participation in its preparation was entrusted to Technical Committee IST/44, Biometrics.

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

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

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Information technology — Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794 —

Part 7:
Signature/sign time series data

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 29109-7 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

ISO/IEC 29109 consists of the following parts, under the general title *Information technology — Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794*:

— *Part 1: Generalized conformance testing methodology*

— *Part 2: Finger minutiae data*

— *Part 3: Finger pattern spectral data*

— *Part 4: Finger image data*

— *Part 5: Face image data*

— *Part 6: Iris image data*

— *Part 7: Signature/sign time series data*

— *Part 8: Finger pattern skeletal data*

— *Part 9: Vascular image data*

— *Part 10: Hand geometry silhouette data*

— *Part 11: Signature/sign processed dynamic data*

— *Part 13: Voice data*

— *Part 14: DNA data*

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Introduction

ISO/IEC 19794-7 specifies two data interchange formats for storing, recording, and transmitting signature/sign time series data records. This part of ISO/IEC 29109 establishes tests for checking the correctness of the binary records.

Without standardized methods for conducting conformance tests of commercial products that claim to support ISO/IEC 19794-7, application developers and implementers of Biometric Service Providers can interpret the ISO/IEC 19794-7 specification differently and this can compromise interoperability. This possibility rests on the assertion that conformance to ISO/IEC 19794-7 is a necessary prerequisite for achieving interoperability among implementations. This is the motivation for development of this conformance testing methodology.

This part of ISO/IEC 29109 supports those applications that require use of signature/sign time series data according to ISO/IEC 19794-7. It defines a testing methodology to assure conformance of a vendor's application or service to the base ISO/IEC 19794-7 specification. Thus this document is intended to

— establish elements of the conformance testing methodology framework that are specific to the signature/sign time series-based data record requirements of ISO/IEC 19794-7,

— define requirements and guidelines for specifying conformance test suites and related test methods for measuring conformity of products and services to the signature/sign time series-based data record requirements of ISO/IEC 19794-7, and

— define test procedures to be followed before, during, and after conformance testing.

This part of ISO/IEC 29109 is applicable to the development and use of conformity test method specifications, conformity test suites for ISO/IEC 19794-7 records, and conformance testing programs for ISO/IEC 19794-7 conformant products. It is intended primarily for use by testing organizations, but can be applied by developers and users of test method specifications and test method implementations.

The tables of test assertions in Clause 6 specify levels of testing for the conformance requirements of ISO/IEC 19794-7.

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INTERNATIONAL STANDARD **ISO/IEC 29109-7:2011(E)**

Information technology — Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794 —

Part 7: Signature/sign time series data

1 Scope

This part of ISO/IEC 29109 specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-7. ISO/IEC 19794-7 defines two data interchange formats for signature/sign time series data, one for general use and one compact format for use with smart cards and other tokens.

This part of ISO/IEC 29109 establishes

— test assertions of the structure of both signature/sign time series data formats as specified in ISO/IEC 19794-7 (Type A Level 1 as defined in ISO/IEC 29109-1),

— test assertions of internal consistency by checking the types of values that may be contained within each field (Type A Level 2 as defined in ISO/IEC 29109-1), and

— test assertions on the contents of data records in the signature/sign time series data formats as specified in ISO/IEC 19794-7 (Type A Level 3 as defined in ISO/IEC 29109-1).

This part of ISO/IEC 29109 does not establish

— tests of other characteristics of biometric products or other types of testing of biometric products (e.g. acceptance, performance, robustness, security), and

— tests of conformance of systems that do not produce ISO/IEC 19794-7 records.

2 Conformance

Biometric data interchange format conformance tests conform to this part of ISO/IEC 29109 if they satisfy all of the normative requirements related to Clause 6. Specifically, they shall use the test methodology specified in Clauses 6, 7 and 8 of ISO/IEC 29109-1:2009, and all tests shall use the assertions defined in Table 2 to Table 4.

Implementations of ISO/IEC 19794-7 tested according to the methodology specified shall be able to claim conformance only to those requirements specified in ISO/IEC 19794-7 that are tested by the test methods established by this methodology.

Implementations of ISO/IEC 19794-7 do not necessarily need to conform to all possible aspects of ISO/IEC 19794-7, but only to those ISO/IEC 19794-7 requirements that are claimed to be supported by the implementation in an Implementation Conformance Statement, filled out in accordance with Clause 8 of ISO/IEC 29109-1:2009 and Table 1 of this part of ISO/IEC 29109.

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3 Normative references

The following referenced documents are indispensable for the application 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 19794-7:2007, *Information technology — Biometric data interchange formats — Part 7: Signature/sign time series data*

ISO/IEC 29109-1:2009, *Information technology — Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794 — Part 1: Generalized conformance testing methodology*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19794-7 and ISO/IEC 29109-1 apply.

5 Symbols and abbreviated terms

For the purposes of this document, the symbols and abbreviated terms given in ISO/IEC 19794-7 and ISO/IEC 29109-1 apply.

6 Conformance testing methodology

6.1 General

The testing methodology specified in Clauses 6, 7 and 8 of ISO/IEC 29109-1:2009 shall apply. The content of the tables below is based on the conformance testing methodology outlined in ISO/IEC 29109-1 and shall only be used in the context of that testing methodology.

6.2 Table of requirements in the base standard

The normative requirements of ISO/IEC 19794-7:2007 signature/sign time series data formats are listed in Table 1. Under subformat applicability the columns labelled F and C indicate the Full and Compact Formats. The supplier of the IUT can explain which optional components of the standard are supported and the testing laboratory can note the results of the test.

Table 1 — Requirements of the base standard, ISO/IEC 19794-7:2007

Require-ment ID	Reference in Base Standard	Requirement Summary	Level	Status	Subformat Applicability		IUT Support	Supported Range	Test Result
					F	C			
R-1	5.1	The coordinate system used to express the pen position shall be a three-dimensional Cartesian coordinate system.	3B	M	Y	Y			
R-2	5.1	The x-axis shall be the horizontal axis of the writing plane, with x coordinates increasing to the right.	3B	M	Y	Y			
R-3	5.1	The y-axis shall be the vertical axis of the writing plane, with y coordinates increasing upwards.	3B	M	Y	Y			

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Table 1 (*continued*)

Requirement ID	Reference in Base Standard	Requirement Summary	Level	Status	Subformat Applicability		IUT Support	Supported Range	Test Result
					F	C			
R-4	5.1	The z-axis shall be the axis perpendicular to the writing plane, with z coordinates increasing upwards out of the writing plane starting from 0.	3C	O	Y	Y			
R-5	5.2	The more significant octets of any multioctet quantity are stored at lower addresses in memory than (and are transmitted before) less significant octets.	1	M	Y	Y			
R-6	7.2	The organisation of the BDB shall be as follows:	2	M	Y	N			
R-7		1. mandatory variable-length BDB header containing information about the overall BDB,	2	M	Y	N			
R-8		2. mandatory variable-length BDB body.	2	M	Y	N			
R-9	7.3.1	The BDB header shall contain information about the overall signature/ sign time series data block.	2	M	Y	N			
R-10	7.3.2	The signature/sign time series data block shall begin with the three ASCII characters “SDI” to identify the data block as following the full format defined in ISO/IEC 19794-7:2007, followed by a zero octet as a string terminator (5344 4900_{Hex}).	1	M	Y	N			
R-11	7.3.3	The version number for the version of ISO/IEC 19794-7:2007 used in constructing the signature/sign time series data block shall be placed in four octets. This version number shall consist of three ASCII characters followed by a zero octet as a string terminator. The first and second character shall represent the major revision number and the third character will represent the minor revision number. The version number shall be “10” (203130_{Hex}, an ASCII space followed by an ASCII ‘1’ and an ASCII ‘0’).	1	M	Y	N			
R-12	7.3.4.1	The channel descriptions field shall begin with a channel inclusion field indicating the presence or absence of channels. The channel inclusion field shall consist of 2 octets. Each bit shall correspond to a channel as shown in Table 4 of ISO/IEC 19794-7:2007. A bit value of 1 shall encode the presence of the corresponding channel; a bit value of 0 shall encode the absence of the corresponding channel.	1	M	Y	N			

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Table 1 (*continued*)

Require-ment ID	Reference in Base Standard	Requirement Summary	Level	Status	Subformat Applicability		IUT Support	Supported Range	Test Result
					F	C			
R-13	7.3.4.2	The channel inclusion field shall be followed by a sequence of channel descriptions for the channels indicated as present in the channel inclusion field. The order of the channel descriptions is determined by the order of indicated inclusion within the channel inclusion field (Table 4 of ISO/IEC 19794-7:2007) starting with the X channel. The channel descriptions are mandatory for all channels present in the signature/sign time series data block.	2	M	Y	N			
R-14	7.3.4.2	Each channel description shall begin with a preamble. Each channel description preamble shall consist of 1 octet. Each of the bits 4 through 8 of a channel description preamble shall correspond to a channel attribute as shown in Table 5 of ISO/IEC 19794-7:2007. A bit value of 1 shall encode the presence of the corresponding channel attribute; a bit value of 0 shall encode the absence of the corresponding channel attribute. A value of 1 for bit 3 of a channel description preamble shall indicate that the value of this channel is constant. If bit 3 of a channel description preamble is set to 1, then this channel shall be absent in the BDB body even though the BDB header indicates the presence of the channel. If the channel description contains a scaling value, then the constant value of this channel shall be 1 divided by the scaling value. A value of 1 for bit 2 of a channel description preamble shall indicate that the linear component of the regression line for this channel has been removed from this channel. If any of the bits 4 through 8 of a channel description pre-amble are set to 1, the preamble shall be followed by a sequence of channel attributes in the same order as indicated in the preamble starting with the scaling value.	2	M	Y	N			
R-15	7.3.4.3	If present, scaling values shall consist of 2 octets. The 5 most significant bits of the first octet shall constitute the exponent field and the remaining 11 bits shall constitute the fraction field. These values should be encoded in 5 bits as an unsigned integer after adding a value of 16.	2	M	Y	N			

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Table 1 (*continued*)

Require-ment ID	Reference in Base Standard	Requirement Summary	Level	Status	Subformat Applicability		IUT Support	Supported Range	Test Result
					F	C			
R-16	7.3.4.3, 8.2.2.3	The channel values in the BDB body as well as the minimum, maximum, and mean channel values and the standard deviation in the BDB header are to be divided by the corresponding scaling value to obtain their actual values.	3B	M	Y	Y		N/A	
R-17	7.3.4.4	If present, the minimum and maximum possible channel values shall indicate the scaled range of values that the deployed capture device may deliver for the corresponding channel.	2	M	Y	N			
R-18		For the minimum and maximum possible channel values of the Z, T, DT, F, Az, El, and R channels, integer values in the range from 0 to 65535 are allowed. These values shall be encoded in 2 octets as unsigned integers.	2	M	Y	N			
R-19		For the minimum and maximum possible channel values of the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from –32768 to 32767 are allowed. These values shall be encoded in 2 octets as unsigned integers after adding 32768 to each value.	2	M	Y	N			
R-20	7.3.4.5	If present, the mean value of the channel values shall be the arithmetic mean, rounded to the nearest integer, of all values for the corresponding channel within a signature/sign time series data block. If present, the standard deviation of the channel values shall be the standard deviation, rounded to the nearest integer, of all values for the corresponding channel within a signature/sign time series data block.	2	M	Y	N			
R-21	7.3.4.5	For the mean values of the Z, T, DT, F, Az, El, and R channels as well as for the standard deviations of all channels, integer values in the range from 0 to 65535 are allowed. These values shall be encoded in 2 octets as unsigned integers. For the mean values of the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from -32768 to 32767 are allowed. These values shall be encoded in 2 octets as unsigned integers after adding 32768 to each value.	2	M	Y	N			
R-22	7.3.5	A single octet shall be reserved for future revisions of this specification. For Version 1.0 of ISO/IEC 19794-7:2007 this octet shall be set to 00_{Hex}.	2	M	Y	N			

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Table 1 (*continued*)

Require-ment ID	Reference in Base Standard	Requirement Summary	Level	Status	Subformat Applicability		IUT Support	Supported Range	Test Result
					F	C			
R-23	7.4.1	The BDB body shall begin with a pre-amble indicating the presence or absence of the optional extended data. The preamble shall consist of 1 octet. A value of 1 in bit 8 (MSB) of the preamble shall encode the presence of the extended data; a value of 0 in bit 8 (MSB) of the preamble shall encode the absence of the extended data. The trailing bits of the preamble shall have the value 0.	1	M	Y	N			
R-24	7.4.2	The BDB body preamble shall be followed by a sequence of sample points (cf. clause 7.4.2) and, as indicated in the preamble, optional extended data (cf. clause 7.4.3).	1	M	Y	N			
R-25	7.4.2	The sequence of sample points shall begin with a length field. The length field indicates the number of sample points. The length field shall consist of 3 octets, representing the number of sample points as an unsigned integer.	2	M	Y	N			
R-26	7.4.2	The length field shall be followed by a sequence of fields for subsequent sample points. For each sample point, the field shall begin with a value for the mandatory X channel, followed by a value for the mandatory Y channel and a sequence of optional channel values as indicated by the channel inclusion field in the BDB header.	2	M	Y	N			
R-27	7.4.2	For the Z, T, DT, F, Az, El, and R channels, integer values in the range from 0 to 65535 are allowed. These values shall be encoded in 2 octets as unsigned integers.	2	M	Y	N			
R-28	7.4.2	For the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from –32768 to 32767 are allowed. These values shall be encoded in 2 octets as unsigned integers, after adding 32768 to each value. Hence, for non-negative num-bers, bit 8 of the most significant octet has the value 1; for negative numbers, bit 8 of the most significant octet has the value 0. For decoding these values, 32768 is to be subtracted from each recorded value.	2	M	Y	N			
R-29	7.4.2	For the S channel, integer values in the range from 0 to 1 are allowed. These values shall be encoded in one octet as unsigned integers.	2	M	Y	N			

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