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AMENDMENT 1
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Information technology — Biometric data interchange formats —

Part 7: Signature/sign time series data

AMENDMENT 1: XML encoding

Technologies de l'information — Formats d'échange de données biométriques —

Partie 7: Données de série chronologique de signature/signe

AMENDEMENT 1: Codage XML

Reference number
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Foreword

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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).

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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

Amendment 1 to ISO/IEC 19794-7:2014 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

The corrected version of ISO/IEC 19794-7:2014/Amd 1:2015 incorporates the following corrections.

"Table A.2.2" in AMD 1-8 has been corrected to read "Table A.3".

"Table A.2.3" in AMD 1-9 has been corrected to read "Table A.4".

The sentence in AMD1-9 has been replaced with: "Rename clause "A.2.3 Conformance test assertions for compression format (binary format)" and ”Table A.2.3 – Conformance test assertions for compression format (binary format)” in “Annex A”.

"Table A.2.4" in AMD 1-10 has been corrected to read "Table A.5".

Information technology — Biometric data interchange formats — Part 7: Signature/sign time series data

AMENDMENT 1: XML encoding

AMD1-1: Insert the following text as introduction to AMENDMENT 1: XML encoding

Additionally, this part of the ISO/IEC standard supports both binary and XML encoding, to support a spectrum of user requirement. With XML, this part will meet the requirements modern IT architectures. With binary encoding this part will also be able to be used in bandwidth or storage constrained environments. Annex E specifies the schema that XML encoded signature/sign time series data record must conform to, and Annex F provides an example of a valid XML encoded signature/sign time series data record.

AMD1-2: Replace in clause "1 Scope" "three data formats" with "three binary data formats"

Replace in the first listing the second bullet point "three data formats" with "three binary data formats".

AMD1-3: Add in clause "1 Scope" in the first listing a fourth bullet point"

Add in clause "1 Scope" as fourth bullet point of the first listing following:

- *an XML schema definition*

AMD1-4: Insert the following text into clause "2 Conformance" as second paragraph

An XML document conforms to this part of ISO/IEC 19794 if it satisfies the format requirements with respect to its structure, relations among its fields, and relations between its fields and the underlying input that are specified within Annex E of this part of ISO/IEC 19794.

AMD1-5: Insert the following text in the appropriate alphabetical order of Clause , Normative reference:

- http://www.w3.org/XML/Schema

AMD1-6: Replace "Table A.1 – Table of requirements" in "Annex A"

Table A.1– Table of requirements

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-1	6.1	The coordinate system used to express the pen position shall be a three-dimensional Cartesian coordinate system.	3B	M	Y	Y	Y	Y		N/A	
R-2	6.1	The x axis shall be the horizontal axis of the writing plane, with x coordinates increasing to the right.	3B	M	Y	Y	Y	Y		N/A	
R-3	6.1	The y axis shall be the vertical axis of the writing plane, with y coordinates increasing upwards.	3B	M	Y	Y	Y	Y		N/A	
R-4	8.2.2	The format ID shall be recorded in four bytes. The format ID shall consist of three characters "SDI" followed by Null (00_{Hex}) as a string terminator.	1	M	Y	N	N	N			
R-5	10.2	The format ID shall be recorded in four bytes. The format ID shall consist of three characters "SCD" followed by Null (00_{Hex}) as a string terminator.	1	M	N	N	Y	N			
R-6	8.2.3, 10.2	The number for the version of this part of ISO/IEC 19794 shall be placed in four bytes. The version number shall consist of the three characters "020" followed by Null as a string terminator ($3032\ 3000_{Hex}$).	1	M	Y	N	Y	N			
R-7	8.2.4, 10.2	The length (in bytes) of the entire BDIR shall be recorded in four bytes. This count shall be the total length of the BDIR including the general record header and one or more representation records.	2	M	Y	N	Y	N			
R-8	8.2.5, 10.2	The total number of representation records contained in the BDIR shall be recorded in two bytes. A minimum of one representation is required.	2	M	Y	N	Y	N			
R-9	8.2.6, 10.2	The one-byte certification flag shall indicate whether each Representation Header includes a certification record. A value of 00_{Hex} shall indicate that no representation contains a certification record. A value of 01_{Hex} shall indicate that all representations contain a certification record.	2	M	Y	N	Y	N			
R-10	8.3.1, 10.3.1	A Representation Header shall precede each representation providing information for that representation. There shall be one header for each representation contained in the BDIR.	1	M	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-11	8.3.2.2, 10.3.2.1	The total number of bytes in the entire representation, including the Representation Header, shall be recorded in four bytes.	2	M	Y	N	Y	N			
R-12	8.3.2.3, 10.3.2.1	The Gregorian calendar year of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-13	8.3.2.3, 10.3.2.1	The month of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-14	8.3.2.3, 10.3.2.1	The day of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-15	8.3.2.3, 10.3.2.1	The hour of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-16	8.3.2.3, 10.3.2.1	The minute of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-17	8.3.2.3, 10.3.2.1	The second of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-18	8.3.2.3, 10.3.2.1	The millisecond of the capture date and time field shall be encoded in the form given in ISO/IEC 19794-1:2011.	1	M	Y	N	Y	N			
R-19	8.3.2.3, 10.3.2.1	The capture date and time field shall indicate when the capture of this representation started in Coordinated Universal Time (UTC).	3C	M	Y	N	Y	N			
R-20	8.3.2.4, 10.3.2.1	The capture device technology ID shall be encoded in one byte. A value of 00_{Hex} indicates unknown or unspecified technology. See Table 3 for the list of possible values.	1	M	Y	N	Y	N			
R-21	8.3.2.4, 10.3.2.1	The capture device technology ID shall indicate the class of capture device technology used to acquire the captured biometric sample.	3C	M	Y	N	Y	N			
R-22	8.3.2.5, 10.3.2.1	The capture device vendor ID shall be encoded in two bytes. A value of all zeros shall indicate that the capture device vendor is unreported.	1	M	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-23	8.3.2.5, 10.3.2.1	The capture device vendor ID shall be registered by IBIA or other approved registration authority.	3C	M	Y	N	Y	N			
R-24	8.3.2.6, 10.3.2.1	The capture device type ID shall be encoded in two bytes. A value of all zeros shall indicate that the capture device type is unreported.	1	M	Y	N	Y	N			
R-25	8.3.2.6, 10.3.2.1	The capture device type ID shall be assigned by the registered product owner or other approved registration authority.	3C	M	Y	N	Y	N			
R-26	8.3.2.7, 10.3.2.1	A quality record shall begin with a length field. The length field shall consist of one byte. It shall represent the number of quality blocks as an unsigned integer.	2	M	Y	N	Y	N			
R-27	8.3.2.7, 10.3.2.1	A quality score shall be encoded in one byte as an unsigned integer. Allowed values are – 0 to 100 with higher values indicating better quality, – 255, i.e. ff_{Hex}, for indicating that an attempt to calculate a quality score failed.	1	M	Y	N	Y	N			
R-28	8.3.2.7, 10.3.2.1	The quality algorithm vendor ID shall be encoded in two bytes. A value of all zeros shall indicate that the quality algorithm vendor is unreported.	1	M	Y	N	Y	N			
R-29	8.3.2.7, 10.3.2.1	The quality algorithm vendor ID shall be registered by IBIA or other approved registration authority.	3C	M	Y	N	Y	N			
R-30	8.3.2.7, 10.3.2.1	The quality algorithm ID shall be encoded in two bytes. A value of all zeros shall indicate that the quality algorithm is unreported.	1	M	Y	N	Y	N			
R-31	8.3.2.7, 10.3.2.1	The quality algorithm ID shall be registered by IBIA or other approved registration authority.	3C	M	Y	N	Y	N			
R-32	8.3.2.8, 10.3.2.1	The channel inclusion field shall consist of two bytes.	1	M	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-33	8.3.2.8.1, 10.3.2.1	A bit value of 1 in the channel inclusion field shall encode the presence of the corresponding channel; a bit value of 0 shall encode the absence of the corresponding channel. 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 starting with the X channel. The channel descriptions are mandatory for all channels present in the signature/sign time series data record.	2	M	Y	N	Y	N			
R-34	8.3.2.8.1, 10.3.2.1	Each bit of the channel inclusion field shall correspond to a channel as shown in Table 4.	3A	M	Y	N	Y	N			
R-35	8.3.2.8.2, 10.3.2.1	Each channel description shall begin with a preamble. Each channel description preamble shall consist of one byte. The unused trailing bit of the preamble shall have value 0 and is reserved by ISO/IEC JTC 1/SC 37 for future use.	1	M	Y	N	Y	N			
R-36	8.3.2.8.2, 10.3.2.1	Each of the bits 4 through 8 of a channel description preamble shall correspond to a channel attribute as shown in Table 5. 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. If any of the bits 4 through 8 of a channel description preamble 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	Y	N			
R-37	8.3.2.8.2, 10.3.2.1	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 representation body even though the representation header indicates the presence of the channel.	2	M	Y	N	Y	N			
R-38	8.3.2.8.2, 10.3.2.1	If the channel description of a channel whose value is constant contains a scaling value, then the constant value of this channel shall be 1 divided by the scaling value.	3A	M	Y	N	Y	N			
R-39	8.3.2.8.2, 10.3.2.1	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.	2	M	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-40	8.3.2.8.3, 10.3.2.1	If present, scaling values shall consist of two bytes. The five most significant bits of the first byte shall constitute the exponent field *E*, and the remaining 11 bits shall constitute the fraction field *F*. The scaling value *s* is calculated by $s = \left(1 + \frac{F}{2^{11}}\right) \cdot 2^{E-16}$.	1	O	Y	N	Y	N			
R-41	8.3.2.8.4, 10.3.2.1	If present, the minimum and maximum possible channel values shall be encoded in two bytes.	1	O	Y	N	Y	N			
R-42	8.3.2.8.4, 10.3.2.1	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. For the minimum and maximum possible channel values of the Z, T, DT, F, A, E, and R channels, integer values in the range from 0 to 65 535 are allowed. These values shall be encoded in two bytes as unsigned integers. 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 –32 768 to 32 767 are allowed. These values shall be encoded in two bytes as unsigned integers after adding 32 768 to each value. Hence, for non-negative numbers, bit 8 of the most significant byte has the value 1; for negative numbers, bit 8 of the most significant byte has the value 0. For decoding these values, 32 768 is to be subtracted from each recorded value.	3A	O	Y	N	Y	N			
R-43	8.3.2.8.3, 10.3.2.1	If a scaling value is present, the minimum and maximum possible channel values are to be divided by the corresponding scaling value to obtain their actual values.	3A	O	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-44	8.3.2.8.5, 10.3.2.1	If present, the average of the channel values shall be the arithmetic mean $\bar{c}$, rounded to the nearest integer, of all values c_i ($1 \le i \le N$ where N is the number of sample points) for the corresponding channel within a signature/sign time series data record: $\bar{c} = \frac{1}{N} \sum_{i=1}^{N} c_i$. For the averages of the Z, T, DT, F, A, E, and R channels, integer values in the range from 0 to 65 535 are allowed. These values shall be encoded in two bytes as unsigned integers. For the averages of the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from -32 768 to 32 767 are allowed. These values shall be encoded in two bytes as unsigned integers after adding 32 768 to each value. Hence, for non-negative numbers, bit 8 of the most significant byte has the value 1; for negative numbers, bit 8 of the most significant byte has the value 0. For decoding these values, 32 768 is to be subtracted from each recorded value.	2	O	Y	N	Y	N			
R-45	8.3.2.8.3, 10.3.2.1	If a scaling value is present, the average channel values are to be divided by the corresponding scaling value to obtain their actual values.	3A	O	Y	N	Y	N			
R-46	8.3.2.8.5, 10.3.2.1	If present, the standard deviation of the channel values shall be the empirical standard deviation σ_c, rounded to the nearest integer, of all values c_i ($1 \le i \le N$) for the corresponding channel within a signature/sign time series data record: $\sigma_c = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (c_i - \bar{c})^2}$. For the standard deviations of all channels, integer values in the range from 0 to 65 535 are allowed. These values shall be encoded in two bytes as unsigned integers.	2	O	Y	N	Y	N			
R-47	8.3.2.8.3, 10.3.2.1	If a scaling value is present, the standard deviation values are to be divided by the corresponding scaling value to obtain their actual values.	3A	O	Y	N	Y	N			
R-48	8.3.2.9, 10.3.2.1	The length field shall consist of three bytes.	1	M	Y	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-49	8.3.2.9, 10.3.2.1	The length field shall indicate the number of sample points as an unsigned integer.	2	M	Y	N	Y	N			
R-50	10.3.2.2	The compression algorithm ID shall be encoded in one byte. See Table 9 for the list of possible values.	1	M	N	N	Y	N			
R-51	10.3.2.3	The compressed-data length field shall consist of four bytes.	1	M	N	N	Y	N			
R-52	10.3.2.3	The compressed-data length field shall denote the total number of bytes in the compressed data.	2	M	N	N	Y	N			
R-53	8.3.3.2	Each sample point field shall consist of a sequence of selected channel values as indicated by the channel inclusion field. The order of the channel values is determined by the order of indicated inclusion within the channel inclusion field.	2	M	Y	N	N	N			
R-54	8.3.3.2	For the Z, T, DT, F, Az, El, and R channels, integer values in the range from 0 to 65 535 are allowed. These values shall be encoded in two bytes as unsigned integers.	2	M	Y	N	N	N			
R-55	8.3.3.2	For the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from –32 768 to 32 767 are allowed. These values shall be encoded in two bytes as unsigned integers, after adding 32 768 to each value. Hence, for non-negative numbers, bit 8 of the most significant byte has the value 1; for negative numbers, bit 8 of the most significant byte has the value 0. For decoding these values, 32 768 is to be subtracted from each recorded value.	2	M	Y	N	N	N			
R-56	8.3.3.2	For the S channel, the values 0 and 1 are allowed. These values shall be encoded in one byte as unsigned integers.	2	M	Y	N	N	N			
R-57	8.3.2.8.3, 10.3.2.1	If a scaling value is present, the channel values in the representation body are to be divided by the corresponding scaling value to obtain their actual values.	3A	O	Y	N	Y	N			
R-58	10.3.3.1	The data to be compressed shall consist of a sequence of difference channels, one for each channel that is indicated as present by the channel inclusion field in the representation header. The sequence of difference channels shall be compressed using the compression algorithm indicated by the compression algorithm ID field in the representation header.	2	M	N	N	Y	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-59	10.3.3.2	Every difference channel shall start with the initial value c_1 of the channel, encoded as defined in clause 8.3.3.2. This is followed by a sequence of differences between values at consecutive sample points $d_i = c_{i+1} - c_i$ $(1 \le i \le N-1)$. Each d_i shall be encoded in two bytes as an unsigned integer after adding 32768.	3A	M	N	N	Y	N			
R-60	8.3.3.3, 10.3.3.3	The extended data length field shall consist of two bytes.	1	M	Y	N	Y	N			
R-61	8.3.3.3, 10.3.3.3	The extended data length field shall represent the number of bytes in the extended data as an unsigned integer.	2	M	Y	N	Y	N			
R-62	8.3.3.4, 10.3.3.4	The structure of the extended data field is not prescribed by this part of ISO/IEC 19794.	1	O	Y	N	Y	N			
R-63	9.2.1	If present, the comparison algorithm parameters data object tag is $B1_{Hex}$. Its length shall be encoded following the Distinguished Encoding Rules of ASN.1 defined in ISO/IEC 8825-1.	1	M	N	Y	N	N			
R-64	9.2.3.1	If present, the sequence of channel descriptions shall begin with a channel inclusion field as defined in clause 8.3.2.8.1.	1	M	N	Y	N	N			
R-65	9.2.3.2	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) starting with the X channel. The channel descriptions are mandatory for all channels present in the signature/sign time series data block.	1	M	N	Y	N	N			
R-66	9.2.3.2	Each channel description shall begin with a preamble as defined in clause 8.3.2.8.2.	1	M	N	Y	N	N			
R-67	9.2.3.2	If any of the bits 4 through 8 of a channel description preamble 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.	1	M	N	Y	N	N			
R-68	9.2.3.3	If present, the meaning and encoding of the scaling values shall be as defined in clause 8.3.2.8.3.	2	M	N	Y	N	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-69	9.2.3.4	If present, the meaning of the minimum and maximum possible channel values shall be as defined in clause 8.3.2.8.4.	2	M	N	Y	N	N			
R-70	9.2.3.4	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 255 are allowed. These values shall be encoded in one byte as unsigned integers.	2	M	N	Y	N	N			
R-71	9.2.3.4	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 –128 to 127 are allowed. These values shall be encoded in one byte as unsigned integers after adding 128 to each value. Hence, for non-negative numbers, bit 8 of the most significant byte has the value 1; for negative numbers, bit 8 of the most significant byte has the value 0. For decoding these values, 128 is to be subtracted from each recorded value.	2	M	N	Y	N	N			
R-72	9.2.3.5	If present, the meaning of the average value and of the standard deviation of the channel values shall be as defined in clause 8.3.2.8.5.	2	M	N	Y	N	N			
R-73	9.2.3.5	For the average 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 255 are allowed. These values shall be encoded in one byte as unsigned integers.	2	M	N	Y	N	N			
R-74	9.2.3.5	For the mean values of the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from -128 to 127 are allowed. These values shall be encoded in one byte as unsigned integers after adding 128 to each value. Hence, for non-negative numbers, bit 8 of the most significant byte has the value 1; for negative numbers, bit 8 of the most significant byte has the value 0. For decoding these values, 128 is to be subtracted from each recorded value.	2	M	N	Y	N	N			
R-75	9.2.2	If there is an upper limit to the number of sample points, the maximum number of sample points that the comparison algorithm is able to process may be indicated in the comparison algorithm parameters data object. If present, the maximum number of sample points shall be encoded as an unsigned integer.	2	M	N	Y	N	N			

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type				IUT support	Supported range	Test result
					Full	Compact	Compression	XML			
R-76	9.4	The body of a signature/sign time series data block consists of a sequence of fields, each of which consists of a sequence of channel values at a particular sample point, 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 comparison algorithm parameters data object.	1	M	N	Y	N	N			
R-77	9.4	For the Z, T, F, Az, El, and R channels, integer values in the range from 0 to 255 are allowed. These values shall be encoded in one byte as unsigned integers. In the compact format, the T channel shall contain time data relative to the preceding sample.	2	M	N	Y	N	N			
R-78	9.4	For the X, Y, VX, VY, AX, AY, TX, and TY channels, integer values in the range from –128 to 127 are allowed. These values shall be encoded in one byte as unsigned integers after adding 128 to each value. Hence, for non-negative numbers, bit 8 has the value 1; for negative numbers, bit 8 has the value 0. For decoding these values, 128 is to be subtracted from each recorded value.	2	M	N	Y	N	N			
R-79	9.4	For the S channel, integer values in the range from 0 to 1 are allowed. These values shall be encoded in one byte as unsigned integers.	2	M	N	Y	N	N			
R-80	9.3	The tag of a signature/sign time series data block shall be $5f2e_{Hex}$ if there is no extended data and $7f2e_{Hex}$ if there is also extended data.	2	M	N	Y	N	N			
R-81	9.3	The length of a signature/ sign time series data block shall be encoded following the Distinguished Encoding Rules of ASN.1 defined in ISO/IEC 8825-1.	2	M	N	Y	N	N			
R-82	9.3	If there is extended data, the body of a signature/sign time series data block shall be preceded by the tag 81_{Hex} and a length field.	1	M	N	Y	N	N			
R-83	9.3	If there is extended data, it shall follow the body of a signature/sign time series data block and shall be preceded by the tag 82_{Hex} or $A2_{Hex}$ and a length field.	1	M	N	Y	N	N			

AMD1-7: Rename clause "A.2.1 Conformance test assertions for full format (binary format)" and "Table A.2 – Conformance test assertions for full format (binary format)" in "Annex A"

AMD1-8: Rename clause A.2.2 – Conformance test assertions for compact format (binary format) and "Table A.3 – Conformance test assertions for compact format (binary format)" in "Annex A"

AMD1-9: Rename clause "A.2.3 Conformance test assertions for compression format (binary format) " and "Table A.4 – Conformance test assertions for compression format (binary format)" in "Annex A"

AMD1-10: Add clause "A.2.4 – Conformance test assertions for XML encoding" in "Annex A" and insert following text below

The specific test assertions required for conformance testing to the XML format of this part of ISO/IEC 19794 are listed in Table A.5. The normative requirements of this part of ISO/IEC 19794 listed in Table A.1 and not handled by schema are referenced in Table A.5.

AMD1-11: Add "Table A.5 – Conformance test assertions for XML encoding" in clause A.2.4 in "Annex A"

Table A.5 – Conformance test assertions for XML encoding

Test	Section	Requirement-ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test results
T-601	General *Header*	R-6	1	SignatureSignTimeSeries.Version.Major	EQ	2		M			
T-602	General *Header*	R-6	1	SignatureSignTimeSeries.Version.Minor	EQ	0		M			

AMD1-12: Insert the following as a new normative Annex E to ISO/IEC 19794-7:2014:

Annex E
(normative)
XML schema definition

This annex defines the schema that shall be used to validate xml signature signtime series records encoded in an xml format.

E.1 Signature/sign Series Time Data Schema

```
<?xml version="1.0" encoding="utf-8" ?>

<!--
Permission is hereby granted, free of charge in perpetuity, to any person obtaining a
copy of the Schema, to use, copy, modify, merge
and distribute free of charge, copies of the Schema for the purposes of developing,
implementing, installing and using software based on
the Schema, and to permit persons to whom the Schema is furnished to do so, subject to
the following conditions:
THE SCHEMA IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED,
INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR
COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR
OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT
OF OR IN CONNECTION WITH THE SCHEMA OR THE USE OR OTHER
DEALINGS IN THE SCHEMA.
In addition, any modified copy of the Schema shall include the following notice:
THIS SCHEMA HAS BEEN MODIFIED FROM THE SCHEMA DEFINED IN ISO/IEC 19794-7, AND SHOULD NOT
BE INTERPRETED AS COMPLYING WITH THAT STANDARD
-->

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns:cmn="http://standards.iso.org/iso-iec/19794/-1/ed-2/amd/2"
           xmlns="http://standards.iso.org/iso-iec/19794/-7/ed-1/amd/1"
           targetNamespace="http://standards.iso.org/iso-iec/19794/-7/ed-1/amd/1"
           elementFormDefault="qualified"
           attributeFormDefault="unqualified">

  <!-- import the schema for the framework (part 1)-->
  <xs:import schemaLocation="19794-1_ed2_amd2.xsd"
namespace="http://standards.iso.org/iso-iec/19794/-1/ed-2/amd/2" />

   <xs:complexType name="SignatureChannelDescriptionType">
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="ScalingValue" type="xs:int" />
      <xs:element minOccurs="0" maxOccurs="1" name="MinChannelValue"
type="xs:unsignedShort" />
      <xs:element minOccurs="0" maxOccurs="1" name="MaxChannelValue"
type="xs:unsignedShort" />
      <xs:element minOccurs="0" maxOccurs="1" name="AverageChannelValue"
type="xs:unsignedShort" />
```

```
      <xs:element minOccurs="0" maxOccurs="1" name="StandardDeviationValue"
type="xs:unsignedShort" />
      <xs:element minOccurs="0" maxOccurs="1" name="ConstantValue" type="xs:boolean" />
      <xs:element minOccurs="0" maxOccurs="1" name="RemovedLinearComponent"
type="xs:boolean" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="SignatureDataTSType">
    <xs:sequence>
       <xs:element minOccurs="0" name="PenTipCoord"
type="cmn:CoordinateCartesian3DShortType" >
       </xs:element>
       <xs:element minOccurs="0" name="PenTipVelocity" type="PenTipVelocityChannelType"
/>
       <xs:element minOccurs="0" name="PenTipAcceleration"
type="PenTipAccelerationChannelType" />
       <xs:element minOccurs="0" name="PenOrient" type="PenOrientationChannelType" />
       <xs:element minOccurs="0" name="TimeChannel" type="xs:unsignedShort">
      </xs:element>
     <xs:element minOccurs="0" name="DTChannel" type="xs:unsignedShort">
    </xs:element>
    <xs:element minOccurs="0" name="FChannel" type="xs:unsignedShort">
    </xs:element>
    <xs:element minOccurs="0" name="SChannel" type="xs:boolean">
      </xs:element>
   </xs:sequence>
   </xs:complexType>
  <xs:complexType name="PenTipVelocityChannelType">
    <xs:sequence>
      <xs:element minOccurs="0" name="VelocityX" type="xs:short" />
      <xs:element minOccurs="0" name="VelocityY" type="xs:short" />
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="PenTipAccelerationChannelType">
    <xs:sequence>
      <xs:element minOccurs="0" name="AccelerationX" type="xs:short" />
      <xs:element minOccurs="0" name="AccelerationY" type="xs:short" />
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="PenOrientationChannelType">
    <xs:sequence>
      <xs:element minOccurs="0" name="TiltAlongX" type="xs:short" />
      <xs:element minOccurs="0" name="TiltAlongY" type="xs:short" />
      <xs:element minOccurs="0" name="PenAzimuth" type="xs:int" />
      <xs:element minOccurs="0" name="PenElevation" type="xs:int" />
      <xs:element minOccurs="0" name="PenRotation" type="xs:int" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="SignatureSignTimeSeriesRepresentationType">
    <xs:sequence>
      <xs:element name="CaptureDateAndTime" type="xs:dateTime" />
      <xs:element name="CaptureDevice" type="SignatureCaptureDeviceType" />
      <xs:element minOccurs="0" name="QualityList" type="cmn:QualityListType"/>
      <xs:element name="InclusionField" type="xs:hexBinary"/>
      <xs:element name="ChannelDescriptionList">
       <xs:complexType>
```

```
        <xs:sequence>
            <xs:element minOccurs="0" maxOccurs="1"
name="PenTipOrientationChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
            <xs:element minOccurs="0" maxOccurs="1"
name="PenTipAccelerationChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
            <xs:element minOccurs="0" maxOccurs="1"
name="PenTipVelocityChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
            <xs:element minOccurs="0" maxOccurs="1"  name="DTChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
            <xs:element minOccurs="0" maxOccurs="1"  name="FChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
            <xs:element minOccurs="0" maxOccurs="1"  name="SChannelDescription"
type="SignatureChannelDescriptionType"></xs:element>
        </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="SamplePointList">
        <xs:complexType>
          <xs:sequence>
            <xs:element maxOccurs="unbounded" name="SamplePoint"
type="SignatureDataTSType" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="CaptureDeviceType">
    <xs:sequence>
      <xs:element name="DeviceID" type="cmn:RegistryIDType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="SignatureCaptureDeviceType">
    <xs:complexContent mixed="false">
      <xs:extension base="CaptureDeviceType">
        <xs:sequence>
          <xs:element name="DeviceTechnology"
type="SignatureCaptureDeviceTechnologyType" />
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <xs:simpleType name="SignatureCaptureDeviceTechnologyType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="Unknown" />
      <xs:enumeration value="Electromagnetic" />
      <xs:enumeration value="Semiconductor" />
      <xs:enumeration value="Special pen with acceleration sensors" />
      <xs:enumeration value="Special pen with optical sensors" />
    </xs:restriction>
  </xs:simpleType>
  <xs:element name="SignatureSignTimeSeries">
    <xs:complexType>
      <xs:sequence>
        <xs:element minOccurs="1" name="Version" type="cmn:VersionType" />
        <xs:element minOccurs="1" name="RepresentationList">
```

```
          <xs:complexType>
            <xs:sequence>
              <xs:element maxOccurs="unbounded" name="Representation"
type="SignatureSignTimeSeriesRepresentationType" />
            </xs:sequence>
          </xs:complexType>
        </xs:element>
        <xs:element name="VendorSpecificData" type="cmn:VendorSpecificDataType"/>
      </xs:sequence>
      <xs:attribute name="SchemaVersion" type="xs:decimal" use="required" />
    </xs:complexType>
  </xs:element>
</xs:schema>
```

E.1 .1 Signature/sign Series Time Data Mappings

There are some encoding differences between the binary encoded format and the XML format. This section provides a set of tables to make the encodings clear.

Table E.1 – Binary channel name vs. XML channel name

Channel Description	Base standard (Binary) Channel Name	XML Amendment Channel Name	XML Amendment Channel Type
x coordinate (horizontal pen position)	X	X	PenTipCoord
y coordinate (vertical pen position)	Y	Y	PenTipCoord
z coordinate (height of pen above the writing plane)	Z	Z	PenTipCoord
velocity in x direction	VX	VelocityX	PenTipVelocity
velocity in y direction	VY	VelocityY	PenTipVelocity
acceleration in x direction	AX	AccelerationX	PenTipAcceleration
acceleration in y direction	AY	AccelerationY	PenTipAcceleration
Time	T	TimeChannel	TimeChannel
time difference	DT	DTChannel	DTChannel
pen tip force	F	FChannel	FChannel
pen tip switch state (touching/not touching the writing plane)	S	SChannel	SChannel
pen tilt along the x axis	TX	TiltAlongX	PenOrient
pen tilt along the y axis	TY	TiltAlongY	PenOrient
pen azimuth	A	PenAzimuth	PenOrient
pen elevation	E	PenElevation	PenOrient
pen rotation	R	PenRotation	PenOrient