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Information technology — Biometric data interchange formats —

Part 7: Signature/sign time series data

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

Partie 7: Données de série chronologique de signature/signe

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

This second edition revises the first edition (ISO/IEC 19794-7:2007). Clauses 7 and 8 have been technically revised and it has been amended by Clause 10 and Annex A. It also incorporates the Technical Corrigendum ISO/IEC 19794-7:2007/Cor.1:2009.

ISO/IEC 19794 consists of the following parts, under the general title *Information technology — Biometric data interchange formats*:

— *Part 1: Framework*

— *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 14: DNA data*

The following part is under preparation:

— *Part 13:Voice data*

Information technology — Biometric data interchange formats —

Part 7: Signature/sign time series data

1 Scope

This part of ISO/IEC 19794 specifies data interchange formats for signature/sign behavioural data captured in the form of a multi-dimensional time series using devices such as digitizing tablets or advanced pen systems. The data interchange formats are generic, in that they may be applied and used in a wide range of application areas where handwritten signs or signatures are involved. No application-specific requirements or features are addressed in this part of ISO/IEC 19794.

This part of ISO/IEC 19794 contains

— a description of what data may be captured,

— three data formats for containing the data: a full format for general use, a compression format capable of holding the same amount of information as the full format but in compressed form, and a compact format for use with smart cards and other tokens that does not require compression/decompression but conveys less information than the full format, and

— examples of data record contents and best practices in capture.

Specifying which of the format types and which options defined in this part of ISO/IEC 19794 are to be applied in a particular application is out of scope; this needs to be defined in application-specific requirements specifications or application profiles.

It is advisable that cryptographic techniques be used to protect the authenticity, integrity, and confidentiality of stored and transmitted biometric data; yet such provisions are beyond the scope of this part of ISO/IEC 19794.

This part of ISO/IEC 19794 also specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to this part of ISO/IEC 19794. It establishes test assertions on the structure and internal consistency of the signature/sign time series data formats defined in this part of ISO/IEC 19794 (type A level 1 and 2 as defined in ISO/IEC 19794-1:2011/Amd.1), and semantic test assertions (type A level 3 as defined in ISO/IEC 19794-1:2011/Amd.1).

The conformance testing methodology specified in this part of ISO/IEC 19794 does not establish:

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

— tests of conformance of systems that do not produce data records claimed to conform to the requirements of this part of ISO/IEC 19794.

2 Conformance

A biometric data record conforms to this part of ISO/IEC 19794 if it satisfies the format requirements with respect to its structure, with respect to relations among its fields, and with respect to relations between its fields and the underlying input that are specified within clauses 6–10 of this part of ISO/IEC 19794.

Biometric data interchange format conformance tests conform to this part of ISO/IEC 19794 if they satisfy all of the normative requirements set forth in Annex A. Specifically, all level-1, level-2, and level-3 tests shall use the test assertions defined in Table A.2, Table A.3, and Table A.4 of clause A.2 in conformity with the concept and rules set in ISO/IEC 19794-1:2011/Amd.1.

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

Implementations of this part of ISO/IEC 19794 do not necessarily need to conform to all possible aspects of this part of ISO/IEC 19794, but only to those requirements that are claimed to be supported by the implementation in an implementation conformance statement (ICS), filled out in accordance with ISO/IEC 19794-1:2011/Amd.1 and Table A.1 of clause A.1 of this part of ISO/IEC 19794.

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 8825-1, *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 19785-1, *Information technology — Common Biometric Exchange Formats Framework — Part 1: Data element specification*

ISO/IEC 19785-2, *Information technology — Common Biometric Exchange Formats Framework — Part 2: Procedures for the operation of the Biometric Registration Authority*

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

ISO/IEC 19794-1:2011, *Information technology — Biometric data interchange formats — Part 1: Framework*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19794-1:2011 and the following apply.

4.1
channel
data item (captured, intermediate, or processed) recorded in form of a time series

EXAMPLE pen tip position x and y coordinates, pen tip force, pen tilt along the x and y axes, pen azimuth, pen elevation, pen rotation

4.2
compression
process that reduces the size of a digital file with or without loss of information

Note 1 to entry: The compression format defined in clause 10 includes data compressed by lossless compression schemes.

4.3
pen azimuth
angle measured clockwise from the positive y axis to the perpendicular projection of the pen onto the writing plane

Note 1 to entry: The pen azimuth may range from 0° to 360°.

4.4
pen-down event
event from which on the pen tip is touching the writing plane

4.5
pen elevation
angle between the perpendicular projection of the pen onto the writing plane and the pen

Note 1 to entry: The pen elevation may range from 0° to 90°.

4.6
pen rotation
angle of the rotation of the pen about its longitudinal axis measured counter-clockwise from a device-specific rotational reference position

Note 1 to entry: The pen rotation may range from 0° to 360°.

4.7
pen tilt along the x axis
angle measured clockwise from the positive z axis to the perpendicular projection of the pen onto the x,z plane

Note 1 to entry: The pen tilt along the x axis may range from –90° to +90°.

4.8
pen tilt along the y axis
angle measured clockwise from the positive z axis to the perpendicular projection of the pen onto the y,z plane

Note 1 to entry: The pen tilt along the y axis may range from –90° to +90°.

4.9
pen-up event
event from which on the pen tip is not touching the writing plane, after a pen-down event

4.10
sampling rate
number of samples per second (or per other unit) taken from a continuous signal to make a discrete signal

4.11
signature/sign representation
data recorded from a single signature/sign

4.12
X jitter
sample standard deviation of at least 100 x coordinate samples from a stationary pen

4.13
Y jitter
sample standard deviation of at least 100 y coordinate samples from a stationary pen

4.14
X pixel density
number of dots per millimetre that the capture device resolves in the x (horizontal) direction

4.15
Y pixel density
number of dots per millimetre that the capture device resolves in the y (vertical) direction

5 Abbreviated terms

lsb least significant bit

msb most significant bit

6 Conventions

6.1 Coordinate system

The coordinate system used to express the pen position shall be a three-dimensional Cartesian coordinate system. The x axis shall be the horizontal axis of the writing plane, with x coordinates increasing to the right. The y axis shall be the vertical axis of the writing plane, with y coordinates increasing upwards. 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. For an illustration see Figure 1.

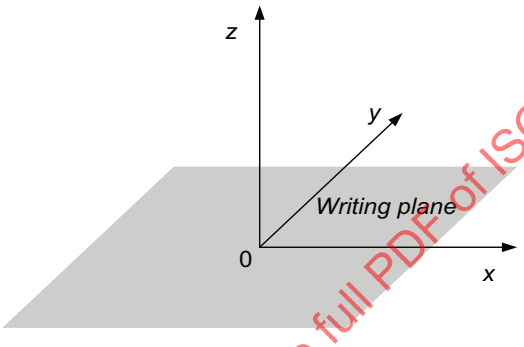

Figure 1 — Coordinate system

NOTE The origin of x and y coordinates is not specified here. Depending on the used technology, it may be, for instance, in the centre of the writing pad, at its lower left corner, or at the pen position at the first pen-down event.

6.2 Octet and bit order

The more significant bytes of any multi-byte quantity are stored at lower addresses in memory than (and are transmitted before) less significant bytes.

Within a byte, the bits are numbered from 8 to 1, where bit 8 is the 'most significant bit' (msb) and bit 1 the 'least significant bit' (lsb).

6.3 Registered format type identifiers

The data records specified in this part of ISO/IEC 19794 may be embedded in a CBEFF- (ISO/IEC 19785-1) compliant biometric information record (BIR). This clause lists the BDB (biometric data block) format owner identifier and the BDB format type identifiers that shall be used if embedded in a CBEFF BIR. These identifiers are registered with IBIA, the CBEFF Registration Authority (see ISO/IEC 19785-2).

The format owner of the formats defined in ISO/IEC 19794 is ISO/IEC JTC 1/SC 37. The format owner identifier is 257 (0101_{Hex}). Table 1 lists the format type identifiers for the formats defined in this part of ISO/IEC 19794.

Table 1 — Format type identifiers

CBEFF BDB format type identifier	Short name	Full object identifier
14 ($000e_{Hex}$)	signature-sign-time-series-full	{iso(1) registration-authority(1) cbeff(19785) biometric-organization(0) jtc1-sc37(257) bdbs(0) signature-sign-time-series-full(14)}
15 ($000f_{Hex}$)	signature-sign-time-series-compact	{iso(1) registration-authority(1) cbeff(19785) biometric-organization(0) jtc1-sc37(257) bdbs(0) signature-sign-time-series-compact(15)}
30 ($001e_{Hex}$)	signature-sign-time-series-compression	{iso(1) registration-authority(1) cbeff(19785) biometric-organization(0) jtc1-sc37(257) bdbs(0) signature-sign-time-series-compression(30)}

NOTE 1 The format type identifier for the full format defined in this edition of ISO/IEC 19794-7 is the same as the one for the full format defined in ISO/IEC 19794-7:2007. An indication of which version of the full format applies can be determined from the version number included in the general header.

NOTE 2 The compact format defined in this edition of ISO/IEC 19794-7 is the same as the one defined in ISO/IEC 19794-7:2007. Hence, the format type identifier for the compact format defined in this edition of ISO/IEC 19794-7 is also the same as the one for the compact format defined in ISO/IEC 19794-7:2007.

7 Channels

7.1 General

Table 2 lists the channel names and their meanings. Signature/sign time series data captured with different capture devices or used in different applications may contain data from different channels. Either the T channel or the DT channel shall be present, or uniform sampling (constant time difference between adjacent sample points) shall be indicated (see clause 7.6). Inclusion of at least one other channel is mandatory.

Table 2 — Channels

Channel name	Description
X	x coordinate (horizontal pen position)
Y	y coordinate (vertical pen position)
Z	z coordinate (height of pen above the writing plane)
VX	velocity in x direction
VY	velocity in y direction
AX	acceleration in x direction
AY	acceleration in y direction
T	time
DT	time difference
F	pen tip force
S	pen tip switch state (touching/not touching the writing plane)
TX	pen tilt along the x axis
TY	pen tilt along the y axis
A	pen azimuth
E	pen elevation
R	pen rotation

7.2 Pen tip position channels: X, Y, Z

There are three channels defined for recording pen tip position data in the three-dimensional space. The X channel is for recording the x coordinate of the projection of the pen tip on the writing plane. The Y channel is for recording the y coordinate of the projection of the pen tip on the writing plane. The Z channel is for recording the height of the pen tip above the writing plane.

The unit of measurement is millimetres (mm). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

7.3 Pen tip velocity channels: VX, VY

The VX channel is for recording the pen tip velocity along the x axis. The VY channel is for recording the pen tip velocity along the y axis.

The unit of measurement is millimetres per second (mm/s). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

7.4 Pen tip acceleration channels: AX, AY

The AX channel is for recording the pen tip acceleration along the x axis. The AY channel is for recording the pen tip acceleration along the y axis.

The unit of measurement is millimetres per square second (mm/s^2). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

7.5 Time channel: T

The T channel is for recording the time elapsed since the first sample.

The unit of measurement is seconds (s). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

7.6 Time difference channel: DT

The DT channel is for recording the time elapsed since the previous sample point.

The unit of measurement is seconds (s). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

In case of uniform sampling, the channel inclusion field (see clause 8.3.2.8.1) in the representation header should indicate the DT channel as present, but the DT channel values should be absent in the representation body while the channel description preamble (see clause 8.3.2.8.2) for the DT channel indicates the time differences between adjacent sample points as constant.

7.7 Pen tip force channel: F

The F channel is for recording the magnitude of the pen tip force.

The unit of measurement is Newton (N). To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

NOTE The direction of the pen-tip force depends on the capture device technology, which is identified by the capture device technology identifier.

7.8 Pen tip switch state channel: S

The S channel is for recording whether the pen tip touches the writing plane or not. The value shall be 0 in case that the pen tip does not touch the writing plane. In case of pen-down events, the value shall also be 0. The value shall be 1 in case that the pen tip touches the writing plane. In case of pen-up events, the value shall also be 1.

NOTE Temporarily maintaining a value of 0 when the pen tip starts touching the writing plane allows a recognition of pen-down events even if the capture device provides no sample points for pen-up strokes.

7.9 Pen orientation channels: TX, TY, A, E, R

There are five channels defined for recording pen orientation data. The A channel is for recording the pen azimuth. The E channel is for recording the pen elevation. The TX channel is for recording the pen tilt along the x axis. The TY channel is for recording the pen tilt along the y axis. The R channel is for recording the rotation of the pen about its longitudinal axis. It may be chosen to use

— pen azimuth and pen elevation or

— pen tilt along the x and y axes

with or without the pen rotation. For illustrations see Figure 2 and Figure 3.

The unit of measurement for the pen orientation angles is degree (°).To restore the actual values, the integer values given in the record body are to be divided by a scaling value given in the channel description. By choosing appropriate scaling values, different degrees of accuracy can be expressed.

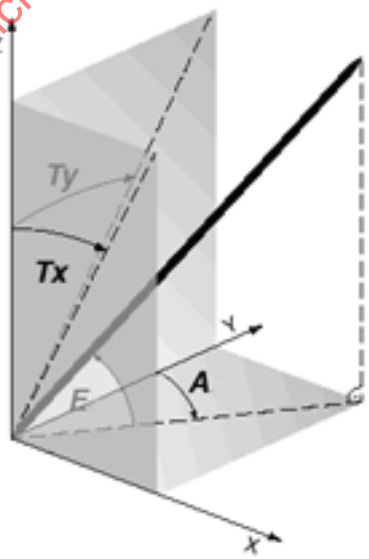

Figure 2 — Pen orientation angles

Figure 3 — Pen rotation

8 Full format

8.1 Record organisation

A signature/sign time series data record in the full format shall consist of the following data elements in the given order:

— a general header, containing descriptive information about the structure and contents of the data record, and

— a record body, containing at least one signature/sign representation.

Figure 4 depicts a signature/sign time series data record in full format. The solid boxes indicate fields that shall be present. The dashed boxes indicate optional fields. The length of each field in bytes is indicated in parentheses at the bottom of the corresponding box. The ellipses indicate that more fields of the same format may follow.

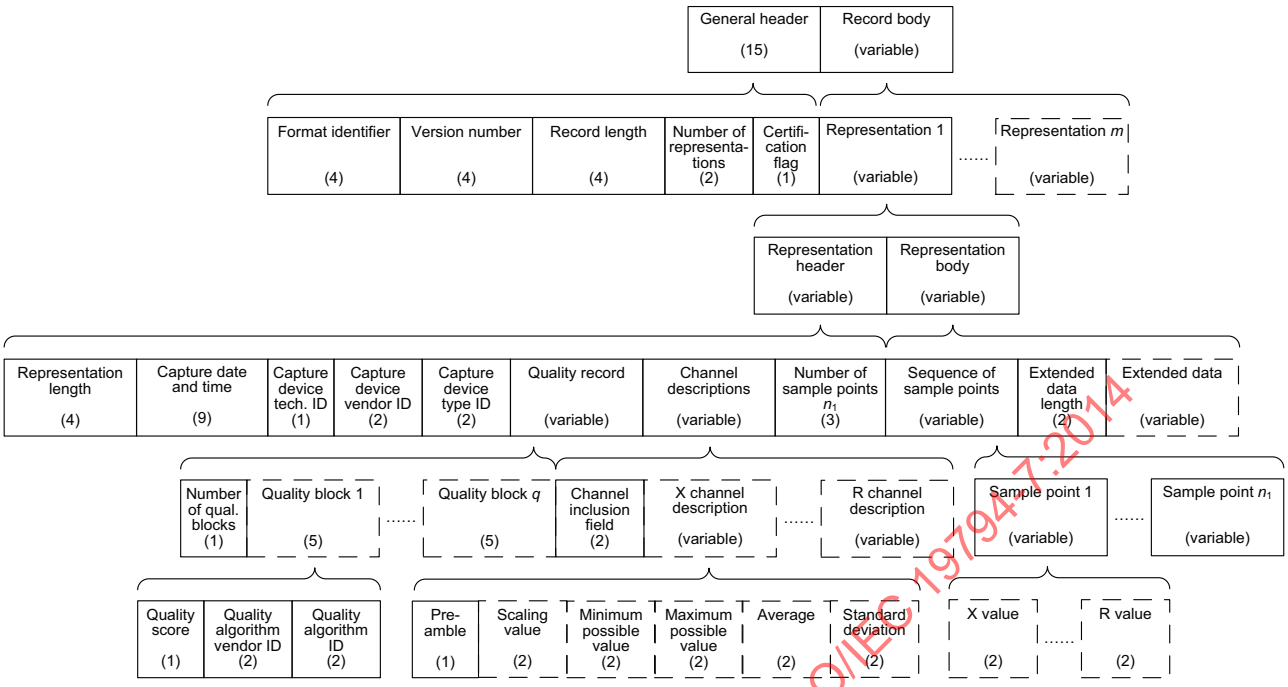

Figure 4 — Full format

8.2 General header

8.2.1 Structure

The general header shall contain information applicable to all signature/sign representations. The general header shall consist of the following data elements in the given order:

— a format identifier,

— a version number,

— the length of the data record,

— a field indicating the number of subsequent signature/sign representations, and

— a certification flag.

8.2.2 Format identifier

The format identifier shall be recorded in four bytes. The format identifier shall consist of the three ASCII characters "SDI" (534449_{Hex}) followed by Null (00_{Hex}) as a string terminator.

8.2.3 Version number

The number of the version of this part of ISO/IEC 19794 shall be placed in four bytes. This version number shall consist of three ASCII characters followed by Null (00_{Hex}) as a string terminator. The first and second characters represent the major revision number and the third character represents the minor revision number.

In a signature/sign time series data record following this second edition of this part of ISO/IEC 19794, the version number shall be $3032\ 3000_{Hex}$, i.e. "020" (an ASCII '0' followed by an ASCII '2' and an ASCII '0') followed by Null (00_{Hex}) as a string terminator.

8.2.4 Length of the data record

The length in bytes of the entire BDIR (biometric data interchange record) shall be recorded in four bytes. This count shall be the total length of the BDIR including the general header and one or more representation records.

8.2.5 Number of representations

The total number of representation records contained in the BDIR shall be recorded in two bytes. A minimum of one representation is required.

8.2.6 Certification flag

The one-byte certification flag indicates whether each representation header includes a certification record. Its value shall be 00_{Hex} to indicate that no representation contains a certification record.

NOTE The certification flag has been added for upward compatibility with later versions of the full format in which representation headers may contain certification records.

8.3 Record body

8.3.1 Structure

The record body shall consist of a sequence of at least one signature/sign representation. Each signature/sign representation shall consist of the following data elements in the given order:

— a representation header and

— a representation body.

8.3.2 Representation header

8.3.2.1 Structure

A signature/sign representation header shall contain representation-specific descriptive information. A representation header shall consist of the following data elements in the given order:

— a representation-length field,

— the capture date and time,

— a capture device technology identifier,

— a capture device vendor identifier,

— a capture device type identifier,

— a quality record,

— a sequence of channel descriptions, and

— a field indicating the number of sample points.

8.3.2.2 Length of the signature/sign representation

The four-byte representation-length field denotes the length in bytes of the representation including the representation header.

8.3.2.3 Capture date and time

The capture date and time field shall indicate when the capture of this representation started in Coordinated Universal Time (UTC). The capture date and time field shall consist of 9 bytes. Its value shall be encoded in the form given in ISO/IEC 19794-1:2011.

8.3.2.4 Capture device technology identifier

The capture device technology ID shall be encoded in one byte. This field shall indicate the class of capture device technology used to acquire the captured biometric sample. A value of 00_{Hex} indicates unknown or unspecified technology. See Table 3 for the list of possible values.

Table 3 — Signature/sign capture device technology identifiers

Identifier	Capture device technology
00_{Hex}	Unknown or unspecified
01_{Hex}	Electromagnetic
02_{Hex}	Semiconductor
04_{Hex}	Special pen with acceleration sensors
08_{Hex}	Special pen with optical sensors
all others	Reserved by ISO/IEC JTC 1/SC 37 for future use

8.3.2.5 Capture device vendor identifier

The capture device vendor identifier shall identify the biometric organisation that owns the product that created the BDIR. The capture device vendor identifier shall be encoded in two bytes carrying a CBEFF biometric organization identifier (registered by IBIA or other approved registration authority). A value of all zeros shall indicate that the capture device vendor is unreported.

8.3.2.6 Capture device type identifier

The capture device type identifier shall identify the product type that created the BDIR. It shall be assigned by the registered product owner or other approved registration authority. Registered product types shall include all valid combinations of writing tablet and pen as a single product where applicable. A value of all zeros shall indicate that the capture device type is unreported. If the capture device vendor identifier is 0000_{Hex}, then also the capture device type identifier shall be 0000_{Hex}.

8.3.2.7 Quality record

The quality record shall consist of a length field followed by zero or more quality blocks. The length field shall consist of one byte. It shall represent the number of quality blocks as an unsigned integer.

Each quality block shall consist of

— a quality score,

— a quality algorithm vendor identifier, and

— a quality algorithm identifier.

A quality score should express the predicted comparison performance of a representation. 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.

The quality algorithm vendor identifier shall identify the provider of the quality algorithm. The quality algorithm vendor identifier shall be encoded in two bytes carrying a CBEFF biometric organization identifier (registered by IBIA or other approved registration authority). A value of all zeros shall indicate that the quality algorithm vendor is unreported.

The quality algorithm identifier shall identify the vendor's quality algorithm that created the quality score. It shall be assigned by the provider of the quality algorithm or an approved registration authority. The quality algorithm identifier shall be encoded in two bytes. A value of all zeros shall indicate that the quality algorithm is unreported.

8.3.2.8 Channel descriptions

8.3.2.8.1 Channel inclusion field

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 two bytes. Each bit shall correspond to a channel as shown in Table 4. 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.

Table 4 — Format of the channel inclusion field

Channel name	Octet	Bit position
X	1	8 (msb)
Y		7
Z		6
VX		5
VY		4
AX		3
AY		2
T		1 (lsb)
DT	2	8 (msb)
F		7
S		6
TX		5
TY		4
A		3
E		2
R		1 (lsb)

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.

EXAMPLE Figure 5 shows the channel inclusion field for signature/sign time series data including the channels X, Y, T, F, S, A, E and R.

Octet 1								Octet 2							
1	1	0	0	0	0	0	1	0	1	1	0	0	1	1	1

Figure 5 — Example of a channel inclusion field

8.3.2.8.2 Channel description preamble

Each channel description shall begin with a preamble. Each channel description preamble shall consist of one byte.

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.

Table 5 — Format of a channel description preamble

Channel attribute	Bit position
Scaling value	8 (msb)
Minimum possible channel value	7
Maximum possible channel value	6
Average of the channel values	5
Standard deviation of the channel values	4
Constant value	3
Removal of the linear component with respect to time	2
Reserved by ISO/IEC JTC 1/SC 37 for future use	1 (lsb)

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. If the channel description contains a scaling value, then the constant value of this channel shall be 1 divided by the scaling value.

EXAMPLE 1 Bit 3 of the DT channel description preamble can be used to indicate a uniform sampling rate.

NOTE 1 For all other channels except the DT channel, bit 3 of the channel description preamble should be 0.

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.

EXAMPLE 2 Bit 2 of the X channel description preamble can be used to indicate that the linear component of the X-on-T regression line (which may be present due to writing along a horizontal line) has been removed from the X channel in order to map the X values to a smaller range.

NOTE 2 Since the removal of a linear trend with respect to time is not practically relevant for the time channel, the value of 1 should not be used for bit 2 of the channel description preamble of the T channel.

The unused trailing bit of the preamble shall have value 0 and is reserved by ISO/IEC JTC 1/SC 37 for future use.

8.3.2.8.3 Scaling value

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 eleven bits shall constitute the fraction field *F*.

The exponent field *E* contains an unsigned integer representing the base 2 exponent of the scaling value biased by 16. For the exponent, signed integer values in the range from –16 to 15 are possible. For encoding the exponent value, 16 is to be added in order to get an unsigned value. For decoding the exponent value, 16 is to be subtracted from the contents of *E*.

The fraction field *F* contains the bit field that lies, in binary notation, to the right of the leading bit and the binary point of the scaling value's coefficient lying in the range 1 ≤ coefficient < 2.

The scaling value *s* is calculated by

$$s = \left(1 + \frac{F}{2^{11}}\right) \cdot 2^{E-16} .$$

EXAMPLE s = 1 is represented by a value of 00_{Hex} in the fraction field F and a value of 10_{Hex} in the exponent field E.

The scaling value has a range from 2^{-16} to $(1 + 2047/2048) \cdot 2^{15}$, i.e. from 0,000 015 258 789 062 5 to 65 520.

The channel values in the representation body as well as the minimum, maximum, and average channel values and the standard deviation in the representation header are to be divided by the corresponding scaling value to obtain their actual values.

If the scaling value is absent, the calibration of the corresponding channel is unknown.

8.3.2.8.4 Minimum and maximum possible channel values

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 –32768 to 32767 are allowed. These values shall be encoded in two bytes as unsigned integers after adding 32768 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, 32768 is to be subtracted from each recorded value.

8.3.2.8.5 Average and standard deviation of the channel values

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:

$$\bar{c} = \frac{1}{N}\sum_{i=1}^{N} c_i \ .$$

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 averages of the Z, T, DT, F, A, E, and R channels as well as 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.

For the averages 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 two bytes as unsigned integers after adding 32768 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, 32768 is to be subtracted from each recorded value.

NOTE The average and the standard deviation values provide information as to whether and to which range the signature/sign data has been transformed for facilitating comparison.

EXAMPLE The averages of the X and Y channels provide information as to whether the signature/sign data has been translated and rotated for facilitating comparison. If present, the standard deviation values of the X and Y channels provide information about the range to which the signature/sign data has been normalized and scaled for facilitating comparison.

8.3.2.9 Number of sample points

The length field shall indicate the number of sample points. The length field shall consist of three bytes, representing the number of sample points as an unsigned integer.

8.3.3 Representation body

8.3.3.1 Structure

A signature/sign representation body shall consist of

— a sequence of sample point fields, each consisting of a sequence of channel values, and

— an extended data length field followed by optional extended data.

8.3.3.2 Sequence of sample points

Each sample point field shall consist of a sequence of selected channel values as indicated by the channel inclusion field in the representation header. The order of the channel values is determined by the order of indicated inclusion within the channel inclusion field (Table 4).

For 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 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 32768 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, 32768 is to be subtracted from each recorded value.

For the S channel, the integer values 0 and 1 are allowed. These values shall be encoded in one byte as unsigned integers.

8.3.3.3 Extended data length

The extended data length field shall indicate the number of bytes in the extended data field. The length field shall consist of two bytes, representing the number of subsequent bytes as an unsigned integer. Values in the range from 0 to 65 535 are allowed.

8.3.3.4 Extended data

The optional extended data field allows for inclusion of additional data that may be used by comparison algorithms. The structure of the extended data field is not prescribed by this part of ISO/IEC 19794. If extended data is present and the comparison algorithm does not recognise its format, the algorithm shall ignore it.

NOTE Comparison algorithms claiming to use data records conforming to the full format defined in this part of ISO/IEC 19794 should be capable of achieving equivalent biometric performance in terms of error rates when processing data records without extended data and when processing data records with extended data.

9 Compact format

9.1 Record organisation

The compact format of signature/sign time series data is for use with smart cards and other tokens. Its areas of application include both off-card and on-card comparison.

The compact format of signature/sign time series data is more compact than the full format defined in clause 8. A signature/sign time series data record in compact format contains a single signature/sign representation; it does not contain a header and encodes each channel value within one byte only. Information about the structure and contents of the data record that otherwise would be given in the channel descriptions within the header is contained in a separate comparison algorithm parameters data object as defined in clause 9.2.

Figure 6 depicts the body of a signature/sign time series data record in compact format. The solid boxes indicate fields that shall be present. The dashed boxes indicate optional fields. The length of each field in bytes is indicated in parentheses at the bottom of the corresponding box. The ellipses indicate that more fields of the same format may follow.

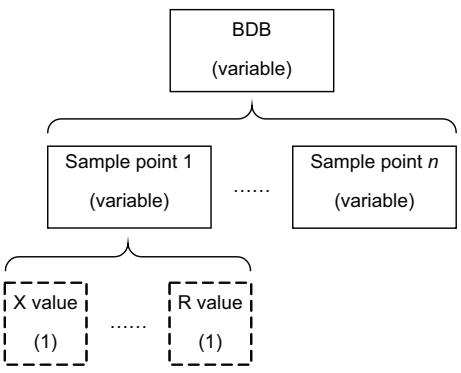

Figure 6 — Compact format

9.2 Comparison algorithm parameters template

9.2.1 Structure

The comparison algorithm parameters data object may be embedded in a Biometric Header Template (BHT), which is again embedded in a Biometric Information Template (BIT) as defined in the TLV-encoded CBEFF patron format for use with smart cards or other tokens defined in ISO/IEC 19785-3.

The structure of a comparison algorithm parameters data object is shown in Table 6. Its tag is defined in ISO/IEC 19785-3 as $B1_{Hex}$. The length fields shall be encoded following the Distinguished Encoding Rules of ASN.1 defined in ISO/IEC 8825-1. Its contents may be a sequence of channel descriptions as defined in clause 9.2.3 and the maximum number of sample points that the comparison algorithm is able to process as defined in clause 9.2.2.

Table 6 — Structure of a comparison algorithm parameters data object for signature/sign time series data

Tag	Length	Value			Presence
$B1_{Hex}$	variable				
		Tag	**Length**	**Value**	
		81_{Hex}	variable	Minimum and maximum number of sample points as defined in clause 9.2.2	optional
		86_{Hex}	variable	Sequence of channel descriptions as defined in clause 9.2.3	optional

9.2.2 Minimum and maximum number of sample points

If there is a lower and an upper limit to the number of sample points, the minimum and maximum number of sample points that the comparison algorithm is able to process may be indicated in the comparison algorithm parameters data object. The minimum number of sample points shall be encoded in one byte as an unsigned integer, directly followed by the maximum number of sample points encoded as an unsigned integer, in as few bytes as possible (without leading zeros).

NOTE ISO/IEC 24787[1] recommends 81_{Hex} as tag for this data object.

9.2.3 Channel descriptions

9.2.3.1 Channel inclusion field

If present, the sequence of channel descriptions shall begin with a channel inclusion field as defined in clause 8.3.2.8.1.

9.2.3.2 Channel description preamble

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 if present. The channel descriptions are mandatory for all channels present in the signature/sign time series data record.

Each channel description shall begin with a preamble as defined in clause 8.3.2.8.2.

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.

9.2.3.3 Scaling value

If present, the meaning and encoding of the scaling values shall be as defined in clause 8.3.2.8.3.

9.2.3.4 Minimum and maximum possible channel values

If present, the meaning of the minimum and maximum possible channel values shall be as defined in clause 8.3.2.8.4.

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 255 are allowed. These values shall be encoded in one byte 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 –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.

9.2.3.5 Average and standard deviation of the channel values

If present, the meaning of the average and of the standard deviation of the channel values shall be as defined in clause 8.3.2.8.5.

For the averages of the Z, T, DT, F, A, E, 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.

For the averages 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.

9.3 Embedment in a CBEFF data structure

According to the TLV-encoded patron format for use with smartcards or other tokens defined in ISO/IEC 19785-3, a signature/sign time series data record shall be encoded as shown in Table 7 or Table 8, depending on whether the signature/sign time series data record contains extended data or not. Its tag shall be $5f2e_{Hex}$ if there is no extended data, and $7f2e_{Hex}$ if there is also extended data. Its length shall be encoded following the Distinguished Encoding Rules of ASN.1 defined in ISO/IEC 8825-1. Its contents shall be the body of a signature/sign time series data record as defined in clause 9.4.

Table 7 — Signature/sign time series data record without extended data

Tag	Length	Value
$5f2e_{Hex}$	variable	Body of a signature/sign time series data record as defined in clause 9.4

Table 8 — Signature/sign time series data record alongside extended data

Tag	Length	Value		
$7f2e_{Hex}$	variable			
		Tag	**Length**	**Value**
		81_{Hex}	variable	Body of a signature/sign time series data record as defined in clause 9.4
		82_{Hex} or $A2_{Hex}$	variable	Extended data in proprietary format (of primitive or constructed type)

9.4 Record body

The record body 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 consist of a sequence of selected channel values as indicated by the channel inclusion field in the comparison algorithm parameters data object. The order of the channel values is determined by the order of indicated inclusion within the channel inclusion field (Table 4).

For the Z, T, DT, F, A, E, 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.

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.

For the S channel, the integer values 0 and 1 are allowed. These values shall be encoded in one byte as unsigned integers.

10 Compression format

10.1 Record organisation

The compression format of signature/sign time series data is for use within applications where both, data record size and algorithm performance in terms of error rates, are important factors (for example, smart cards and other tokens) and also within applications where the data transmission speed might be slow.

The compression format has the advantage of smaller data size due to lossless data compression. As an inconvenience, it requires uncompressing the data in order to use them.

A signature/sign time series data record in the compression format shall consist of the following data elements in the given order:

— a general header, containing descriptive information about the structure and contents of the data record,

— and a record body, containing at least one signature/sign representation.

Figure 7 depicts a signature/sign time series data record in compression format. The solid boxes indicate fields that shall be present. The dashed boxes indicate optional fields. The length of each field in bytes is indicated in parentheses at the bottom of the corresponding box. The ellipses indicate that more fields of the same format may follow.

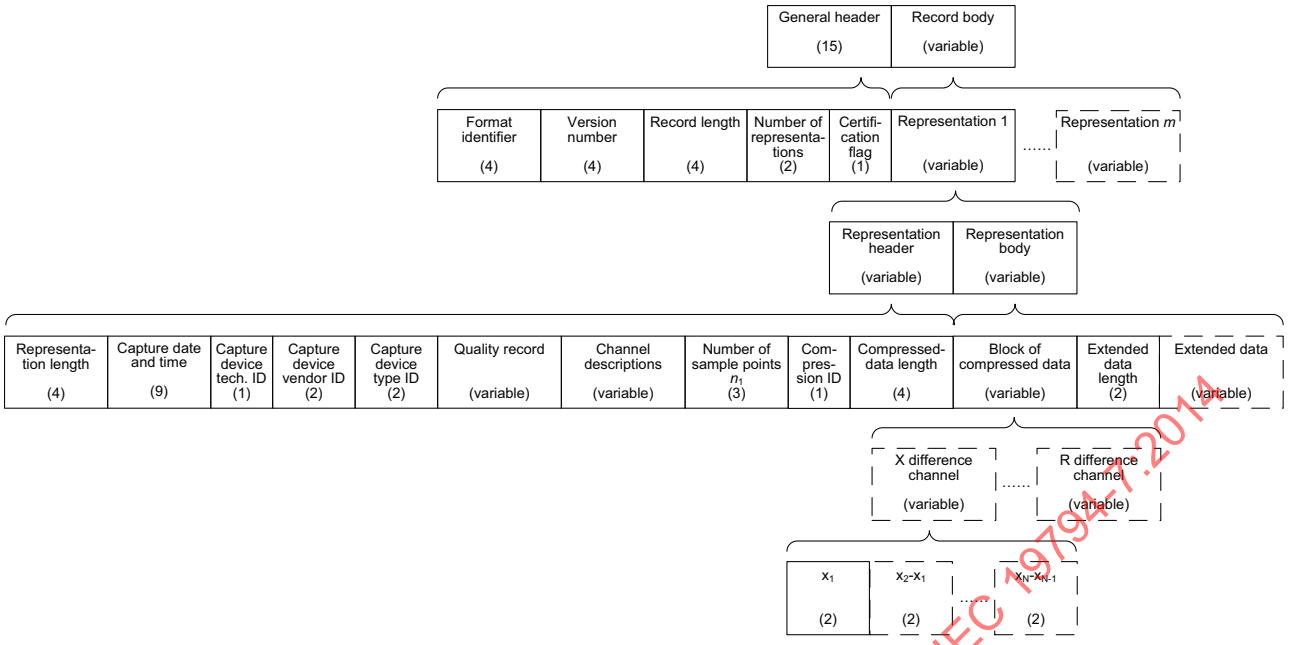

Figure 7 — Compression format

10.2 General header

The general header shall be as defined in clause 8.2 with the exception of the format identifier. The format identifier shall consist of the three ASCII characters "SCD" (534344_{Hex}) followed by Null (00_{Hex}) as a string terminator.

10.3 Record body

10.3.1 Structure

The record body shall consist of a sequence of at least one signature/sign representation. Each signature/sign representation shall consist of the following data elements in the given order:

— a representation header and

— a representation body.

10.3.2 Representation header

10.3.2.1 Structure

A representation header shall contain representation-specific descriptive information. A representation header shall consist of the following data elements in the given order:

— a representation-length field,

— the capture date and time,

— a capture device technology identifier,

— a capture device vendor identifier,

— a capture device type identifier,

— a quality record,

— a sequence of channel descriptions,

— a field indicating the number of sample points,

— a compression algorithm identifier field, and

— a field indicating the length of the compressed data.

The meaning and encoding of the representation-length field, the capture date and time field, the capture device technology identifier, the capture device vendor identifier, the capture device type identifier, the quality record, the channel descriptions, and of the number-of-sample-points field shall be as defined in clause 8.3.2. The scaling values given in the channel descriptions shall be set in such a way that the differences are mapped to an as small as possible range of values without loss of information.

10.3.2.2 Compression algorithm identifier

The compression algorithm identifier shall identify the compression algorithm used. The compression algorithm identifier shall be encoded in one byte. See Table 9 for the list of possible values.

Table 9 — Compression algorithm identifiers

Identifier	Compression Algorithm
00_{Hex}	Bzip2[2]
01_{Hex}	LZW[3]
02_{Hex}	GZip[4]
03_{Hex}	Deflate[5]
05_{Hex}	PPMd[6]
06_{Hex}	LZMA[7]
08_{Hex}	Zip[8]
all others	Reserved by ISO/IEC JTC 1/SC 37 for future use

10.3.2.3 Length of the compressed data

The compressed-data length field shall denote the total number of bytes in the compressed data. The compressed-data length field shall consist of four bytes.

10.3.3 Representation body

10.3.3.1 Structure

A signature/sign representation body in compression format shall consist of:

— a block of compressed data, and

— an extended data length field followed by optional extended data.

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. A difference channel shall be encoded as described in clause 10.3.3.2. The sequence of difference channels shall be compressed using the compression algorithm indicated by the compression algorithm identifier field in the representation header.

10.3.3.2 Sequence of channels

The compression format for signature/sign time series data shall store the data acquired from the input device as a sequence of difference channels instead of as a sequence of sample points as defined in full format.

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 $d_i = c_{i+1} - c_i$ $(1 \leq i \leq N - 1)$. Each d_i shall be encoded in two bytes as an unsigned integer after adding 32768.

10.3.3.3 Extended data length

The extended data length field shall be as defined in clause 8.3.3.3.

10.3.3.4 Extended data

The extended data field shall be as defined in clause 8.3.3.4.

Annex A
(normative)

Conformance testing methodology

A.1 Table of requirements

The normative requirements of the main body of this part of ISO/IEC 19794 are listed in Table A.1. The supplier of the IUT should use Table A.1 to explain which optional components of this part of ISO/IEC 19794 are supported and the testing laboratory should use Table A.1 to note the results of the test.

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			
R1	6.1	The coordinate system used to express the pen position shall be a three-dimensional Cartesian coordinate system.	3B	M	Y	Y	Y		N/A	
R2	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		N/A	
R3	6.1	The y axis shall be the vertical axis of the writing plane, with y coordinates increasing upwards.	3B	M	Y	Y	Y		N/A	
R4	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			
R5	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			
R6	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			
R7	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			
R8	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			
R9	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			
R10	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			
R11	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			
R12	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			
R13	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			
R14	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R15	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			
R16	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			
R17	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			
R18	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			
R19	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			
R20	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			
R21	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			
R22	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			
R23	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			
R24	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			
R25	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			
R26	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			
R27	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R28	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			
R29	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			
R30	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			
R31	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			
R32	8.3.2.8.1, 10.3.2.1	The channel inclusion field shall consist of two bytes.	1	M	Y	N	Y			
R33	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			
R34	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			
R35	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			
R36	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R37	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			
R38	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			
R39	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			
R40	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			
R41	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			
R42	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R43	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			
R44	8.3.2.8.5, 10.3.2.1	If present, the average of the channel values shall be the arithmetic mean $\overline{c}$, 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: $\overline{c} = \frac{1}{N}\sum_{i=1}^{N} c_i$ 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			
R45	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			
R46	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: $\sigma_c = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(c_i - \overline{c})^2}$. 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			
R47	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R48	8.3.2.9, 10.3.2.1	The length field shall consist of three bytes.	1	M	Y	N	Y			
R49	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			
R50	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			
R51	10.3.2.3	The compressed-data length field shall consist of four bytes.	1	M	N	N	Y			
R52	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			
R53	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			
R54	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			
R55	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			
R56	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			
R57	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			
R58	y	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R59	y	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			
R60	8.3.3.3, 10.3.3.3	The extended data length field shall consist of two bytes.	1	M	Y	N	Y			
R61	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			
R62	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			
R63	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			
R64	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			
R65	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			
R66	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			
R67	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			
R68	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			
R69	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R70	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			
R71	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			
R72	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			
R73	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			
R74	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			
R75	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			
R76	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			

Table A.1 *(continued)*

Requirement ID	Reference in main body	Requirement summary	Level	Status	Applicable to format type			IUT support	Supported range	Test result
					Full	Compact	Compression			
R77	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			
R78	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			
R79	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			
R80	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			
R81	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			
R82	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			
R83	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			

A.2 Tables of test assertions

A.2.1 Conformance test assertions for full format

The specific test assertions required for conformance testing to the full format of this part of ISO/IEC 19794 are listed in Table A.2. The normative requirements of this part of ISO/IEC 19794 listed in Table A.1 are referenced in Table A.2.

The conformance test assertions are listed in the order in which the corresponding fields, if present, are required to appear in a conforming data record.

Table A.2 — Conformance test assertions for the full format

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-1	General header	R4	1	Format ID	EQ	53444900_{Hex}		M			
T-2	General header	R6	1	Version number	EQ	30323000_{Hex}		M			
T-3	General header	R7	1	Record length	EQ	00000032_{Hex} to $ffffffff_{Hex}$		M			
T-4	General header	R7	2	Record length	EQ	Total number of bytes in the record		M			
T-5	General header	R8	1	Number of representations	EQ	0001_{Hex} to $ffff_{Hex}$		M			
T-6	General header	R8	2	Number of representations	EQ	Total number of representations		M			
T-7	General header	R9	2	Certification flag	EQ	00_{Hex}		M			
T-8	Representation header	R11	1	Representation length	EQ	$0000001d_{Hex}$ to $ffffffff_{Hex}$		M			
T-9	Representation header	R11	2	Representation length	EQ	Total number of bytes in the representation		M			
T-10	Representation header	R12	1	Gregorian calendar year of the capture date	EQ	0001_{Hex} to $ffff_{Hex}$		M			
T-11	Representation header	R13	1	Month of the capture date	EQ	01_{Hex} to $0c_{Hex}$ or ff_{Hex}		M			
T-12	Representation header	R14	1	Day of the capture date	EQ	01_{Hex} to $1f_{Hex}$ or ff_{Hex}		M			
T-13	Representation header	R15	1	Hour of the capture time	EQ	00_{Hex} to 17_{Hex} or ff_{Hex}		M			
T-14	Representation header	R16	1	Minute of the capture time	EQ	00_{Hex} to $3b_{Hex}$ or ff_{Hex}		M			
T-15	Representation header	R17	1	Second of the capture time	EQ	00_{Hex} to $3b_{Hex}$ or ff_{Hex}		M			
T-16	Representation header	R18	1	Millisecond of the capture time	EQ	0000_{Hex} to $03e7_{Hex}$ or $ffff_{Hex}$		M			
T-17	Representation header	R20	1	Capture device technology ID	EQ	00_{Hex} to 02_{Hex} or 04_{Hex} or 08_{Hex}		M			
T-18	Representation header	R22	1	Capture device vendor ID	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-19	Representation header	R24	1	Capture device type ID	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-20	Representation header/ quality record	R26	1	Number of quality blocks	EQ	00_{Hex} to ff_{Hex}		M			
T-21	Representation header/ quality block	R27	1	Quality score	EQ	00_{Hex} to 64_{Hex} or ff_{Hex} if present		M			
T-22	Representation header/ quality block	R28	1	Quality algorithm vendor ID	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-23	Representation header/ quality block	R30	1	Quality algorithm ID	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-24	Representation header/ channel inclusion field	R33	1	xIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-25	Representation header/ channel inclusion field	R33	1	yIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-26	Representation header/ channel inclusion field	R33	1	zIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-27	Representation header/ channel inclusion field	R33	1	vXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-28	Representation header/ channel inclusion field	R33	1	vYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-29	Representation header/ channel inclusion field	R33	1	aXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-30	Representation header/ channel inclusion field	R33	1	aYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-31	Representation header/ channel inclusion field	R33	1	tIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-32	Representation header/ channel inclusion field	R33	1	dtIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-33	Representation header/ channel inclusion field	R33	1	fIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-34	Representation header/ channel inclusion field	R33	1	sIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-35	Representation header/ channel inclusion field	R33	1	tXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-36	Representation header/ channel inclusion field	R33	1	tYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-37	Representation header/ channel inclusion field	R33	1	azIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-38	Representation header/ channel inclusion field	R33	1	elIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-39	Representation header/ channel inclusion field	R33	1	rIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-40	Representation header/ X channel description	R36	2	xScalingValueIncluded	EQ	0_{Bin} or 1_{Bin}		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-41	Representation header/ X channel description	R36	2	xMinIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-42	Representation header/ X channel description	R36	2	xMaxIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-43	Representation header/ X channel description	R36	2	xMeanIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-44	Representation header/ X channel description	R36	2	xStdIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-45	Representation header/ X channel description	R37	2	xIsConstant	EQ	0_{Bin} or 1_{Bin}		M			
T-46	Representation header/ X channel description	R39	2	xLinearCompRemoved	EQ	0_{Bin} or 1_{Bin}		M			
T-47	Representation header/ X channel description	R35	1	reserved	EQ	0_{Bin}		M			
T-48	Representation header/ X channel description	R40	2	xScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-49	Representation header/ X channel description	R40	2	xScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-50	Representation header/ X channel description	R41	2	xMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-51	Representation header/ X channel description	R41	2	xMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-52	Representation header/ X channel description	R44	2	xMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-53	Representation header/ X channel description	R46	2	xStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-54	Representation header/ Y channel description	R36	2	yScalingValueIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-55	Representation header/ Y channel description	R36	2	yMinIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-56	Representation header/ Y channel description	R36	2	yMaxIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-57	Representation header/ Y channel description	R36	2	yMeanIncluded	EQ	0_{Bin} or 1_{Bin}		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-58	Representation header/ Y channel description	R36	2	yStdIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-59	Representation header/ Y channel description	R37	2	yIsConstant	EQ	0_{Bin} or 1_{Bin}		M			
T-60	Representation header/ Y channel description	R39	2	yLinearCompRemoved	EQ	0_{Bin} or 1_{Bin}		M			
T-61	Representation header/ Y channel description	R35	1	reserved	EQ	0_{Bin}		M			
T-62	Representation header/ Y channel description	R40	2	yScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-63	Representation header/ Y channel description	R40	2	yScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-64	Representation header/ Y channel description	R41	2	yMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-65	Representation header/ Y channel description	R41	2	yMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-66	Representation header/ Y channel description	R44	2	yMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-67	Representation header/ Y channel description	R46	2	yStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-68	Representation header/ Z channel description	R36	2	zScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-69	Representation header/ Z channel description	R36	2	zMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-70	Representation header/ Z channel description	R36	2	zMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-71	Representation header/ Z channel description	R36	2	zMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-72	Representation header/ Z channel description	R36	2	zStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-73	Representation header/ Z channel description	R37	2	zIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-74	Representation header/ Z channel description	R39	2	zLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-75	Representation header/ Z channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-76	Representation header/ Z channel description	R40	2	zScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-77	Representation header/ Z channel description	R40	2	zScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-78	Representation header/ Z channel description	R41	2	zMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-79	Representation header/ Z channel description	R41	2	zMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-80	Representation header/ Z channel description	R44	2	zMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-81	Representation header/ Z channel description	R46	2	zStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-82	Representation header/ VX channel description	R36	2	vXScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-83	Representation header/ VX channel description	R36	2	vXMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-84	Representation header/ VX channel description	R36	2	vXMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-85	Representation header/ VX channel description	R36	2	vXMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-86	Representation header/ VX channel description	R36	2	vXStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-87	Representation header/ VX channel description	R37	2	vXIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-88	Representation header/ VX channel description	R39	2	vXLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-89	Representation header/ VX channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-90	Representation header/ VX channel description	R40	2	vXScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-91	Representation header/ VX channel description	R40	2	vXScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-92	Representation header/ VX channel description	R41	2	vXMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-93	Representation header/ VX channel description	R41	2	vXMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-94	Representation header/ VX channel description	R44	2	vXMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-95	Representation header/ VX channel description	R46	2	vXStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-96	Representation header/ VY channel description	R36	2	vYScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-97	Representation header/ VY channel description	R36	2	vYMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-98	Representation header/ VY channel description	R36	2	vYMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-99	Representation header/ VY channel description	R36	2	vYMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-100	Representation header/ VY channel description	R36	2	vYStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-101	Representation header/ VY channel description	R37	2	vYIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-102	Representation header/ VY channel description	R39	2	vYLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-103	Representation header/ VY channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-104	Representation header/ VY channel description	R40	2	vYScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-105	Representation header/ VY channel description	R40	2	vYScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-106	Representation header/ VY channel description	R41	2	vYMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-107	Representation header/ VY channel description	R41	2	vYMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-108	Representation header/ VY channel description	R44	2	vYMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-109	Representation header/ VY channel description	R46	2	vYStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-110	Representation header/ AX channel description	R36	2	aXScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-111	Representation header/ AX channel description	R36	2	aXMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-112	Representation header/ AX channel description	R36	2	aXMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-113	Representation header/ AX channel description	R36	2	aXMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-114	Representation header/ AX channel description	R36	2	aXStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-115	Representation header/ AX channel description	R37	2	aXIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-116	Representation header/ AX channel description	R39	2	aXLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-117	Representation header/ AX channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-118	Representation header/ AX channel description	R40	2	aXScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-119	Representation header/ AX channel description	R40	2	aXScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-120	Representation header/ AX channel description	R41	2	aXMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-121	Representation header/ AX channel description	R41	2	aXMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-122	Representation header/ AX channel description	R44	2	aXMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-123	Representation header/ AX channel description	R46	2	aXStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-124	Representation header/ AY channel description	R36	2	aYScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-125	Representation header/ AY channel description	R36	2	aYMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-126	Representation header/ AY channel description	R36	2	aYMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-127	Representation header/ AY channel description	R36	2	aYMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-128	Representation header/ AY channel description	R36	2	aYStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-129	Representation header/ AY channel description	R37	2	aYIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-130	Representation header/ AY channel description	R39	2	aYLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-131	Representation header/ AY channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-132	Representation header/ AY channel description	R40	2	aYScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-133	Representation header/ AY channel description	R40	2	aYScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-134	Representation header/ AY channel description	R41	2	aYMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-135	Representation header/ AY channel description	R41	2	aYMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-136	Representation header/ AY channel description	R44	2	aYMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-137	Representation header/ AY channel description	R46	2	aYStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-138	Representation header/ T channel description	R36	2	tScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-139	Representation header/ T channel description	R36	2	tMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-140	Representation header/ T channel description	R36	2	tMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-141	Representation header/ T channel description	R36	2	tMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-142	Representation header/ T channel description	R36	2	tStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-143	Representation header/ T channel description	R37	2	tIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-144	Representation header/ T channel description	R39	2	tLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-145	Representation header/ T channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-146	Representation header/ T channel description	R40	2	tScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-147	Representation header/ T channel description	R40	2	tScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-148	Representation header/ T channel description	R41	2	tMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-149	Representation header/ T channel description	R41	2	tMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-150	Representation header/ T channel description	R44	2	tMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-151	Representation header/ T channel description	R46	2	tStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-152	Representation header/ DT channel description	R36	2	dTScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-153	Representation header/ DT channel description	R36	2	dTMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-154	Representation header/ DT channel description	R36	2	dTMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-155	Representation header/ DT channel description	R36	2	dTMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-156	Representation header/ DT channel description	R36	2	dTStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-157	Representation header/ DT channel description	R37	2	dTIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-158	Representation header/ DT channel description	R39	2	dTLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-159	Representation header/ DT channel description	R35	1	reserved	EQ	0_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-160	Representation header/ DT channel description	R40	2	dTScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-161	Representation header/ DT channel description	R40	2	dTScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-162	Representation header/ DT channel description	R41	2	dTMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-163	Representation header/ DT channel description	R41	2	dTMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-164	Representation header/ DT channel description	R44	2	dTMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-165	Representation header/ DT channel description	R46	2	dTStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-166	Representation header/ F channel description	R36	2	fScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-167	Representation header/ F channel description	R36	2	fMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-168	Representation header/ F channel description	R36	2	fMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-169	Representation header/ F channel description	R36	2	fMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-170	Representation header/ F channel description	R36	2	fStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-171	Representation header/ F channel description	R37	2	fIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-172	Representation header/ F channel description	R39	2	fLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-173	Representation header/ F channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-174	Representation header/ F channel description	R40	2	fScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-175	Representation header/ F channel description	R40	2	fScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-176	Representation header/ F channel description	R41	2	fMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-177	Representation header/ F channel description	R41	2	fMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-178	Representation header/ F channel description	R44	2	fMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-179	Representation header/ F channel description	R46	2	fStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-180	Representation header/ S channel description	R36	2	sScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-181	Representation header/ S channel description	R36	2	sMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-182	Representation header/ S channel description	R36	2	sMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-183	Representation header/ S channel description	R36	2	sMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-184	Representation header/ S channel description	R36	2	sStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-185	Representation header/ S channel description	R37	2	sIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-186	Representation header/ S channel description	R39	2	sLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-187	Representation header/ S channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-188	Representation header/ S channel description	R40	2	sScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-189	Representation header/ S channel description	R40	2	sScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-190	Representation header/ S channel description	R41	2	sMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-191	Representation header/ S channel description	R41	2	sMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-192	Representation header/ S channel description	R44	2	sMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-193	Representation header/ S channel description	R46	2	sStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-194	Representation header/ TX channel description	R36	2	tXScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-195	Representation header/ TX channel description	R36	2	tXMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-196	Representation header/ TX channel description	R36	2	tXMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-197	Representation header/ TX channel description	R36	2	tXMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-198	Representation header/ TX channel description	R36	2	tXStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-199	Representation header/ TX channel description	R37	2	tXIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-200	Representation header/ TX channel description	R39	2	tXLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-201	Representation header/ TX channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-202	Representation header/ TX channel description	R40	2	tXScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-203	Representation header/ TX channel description	R40	2	tXScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-204	Representation header/ TX channel description	R41	2	tXMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-205	Representation header/ TX channel description	R41	2	tXMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-206	Representation header/ TX channel description	R44	2	tXMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-207	Representation header/ TX channel description	R46	2	tXStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-208	Representation header/ TY channel description	R36	2	tYScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-209	Representation header/ TY channel description	R36	2	tYMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-210	Representation header/ TY channel description	R36	2	tYMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-211	Representation header/ TY channel description	R36	2	tYMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-212	Representation header/ TY channel description	R36	2	tYStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-213	Representation header/ TY channel description	R37	2	tYIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-214	Representation header/ TY channel description	R39	2	tYLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-215	Representation header/ TY channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-216	Representation header/ TY channel description	R40	2	tYScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-217	Representation header/ TY channel description	R40	2	tYScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-218	Representation header/ TY channel description	R41	2	tYMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-219	Representation header/ TY channel description	R41	2	tYMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-220	Representation header/ TY channel description	R44	2	tYMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-221	Representation header/ TY channel description	R46	2	tYStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-222	Representation header/ Az channel description	R36	2	azScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-223	Representation header/ Az channel description	R36	2	azMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-224	Representation header/ Az channel description	R36	2	azMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-225	Representation header/ Az channel description	R36	2	azMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-226	Representation header/ Az channel description	R36	2	azStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-227	Representation header/ Az channel description	R37	2	azIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-228	Representation header/ Az channel description	R39	2	azLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-229	Representation header/ Az channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-230	Representation header/ Az channel description	R40	2	azScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-231	Representation header/ Az channel description	R40	2	azScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-232	Representation header/ Az channel description	R41	2	azMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-233	Representation header/ Az channel description	R41	2	azMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-234	Representation header/ Az channel description	R44	2	azMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-235	Representation header/ Az channel description	R46	2	azStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-236	Representation header/ El channel description	R36	2	elScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-237	Representation header/ El channel description	R36	2	elMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-238	Representation header/ El channel description	R36	2	elMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-239	Representation header/ El channel description	R36	2	elMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-240	Representation header/ El channel description	R36	2	elStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-241	Representation header/ El channel description	R37	2	elIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-242	Representation header/ El channel description	R39	2	elLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-243	Representation header/ El channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-244	Representation header/ El channel description	R40	2	elScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-245	Representation header/ El channel description	R40	2	elScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-246	Representation header/ El channel description	R41	2	elMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-247	Representation header/ El channel description	R41	2	elMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-248	Representation header/ El channel description	R44	2	elMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-249	Representation header/ El channel description	R46	2	elStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-250	Representation header/ R channel description	R36	2	rScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-251	Representation header/ R channel description	R36	2	rMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-252	Representation header/ R channel description	R36	2	rMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-253	Representation header/ R channel description	R36	2	rMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-254	Representation header/ R channel description	R36	2	rStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-255	Representation header/ R channel description	R37	2	rIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-256	Representation header/ R channel description	R39	2	rLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-257	Representation header/ R channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-258	Representation header/ R channel description	R40	2	rScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-259	Representation header/ R channel description	R40	2	rScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-260	Representation header/ R channel description	R41	2	rMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-261	Representation header/ R channel description	R41	2	rMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-262	Representation header/ R channel description	R44	2	rMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-263	Representation header/ R channel description	R46	2	rStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-264	Representation header	R48	1	Number of sample points	EQ	000000_{Hex} to $ffffff_{Hex}$		M			
T-265	Representation header	R49	2	Number of sample points	EQ	Total number of sample points		M			
T-266	Representation body	R53, R55	2	x	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-267	Representation body	R53, R55	2	y	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-268	Representation body	R53, R54	2	z	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-269	Representation body	R53, R55	2	vX	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-270	Representation body	R53, R55	2	vY	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-271	Representation body	R53, R55	2	aX	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-272	Representation body	R53, R55	2	aY	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-273	Representation body	R53, R54	2	t	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-274	Representation body	R53, R54	2	dt	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-275	Representation body	R53, R54	2	f	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-276	Representation body	R53, R56	2	s	EQ	00_{Hex} or 01_{Hex} if present		M			
T-277	Representation body	R53, R55	2	tX	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-278	Representation body	R53, R55	2	tY	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-279	Representation body	R53, R54	2	az	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-280	Representation body	R53, R54	2	el	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-281	Representation body	R53, R54	2	r	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-282	Representation body	R1, R2, R3, R57	3B	x, y, s	N/A	N/A	1	M		N/A	
T-283	Representation body	R1, R2, R3, R57	3B	x, y, s	N/A	N/A	2	M		N/A	
T-284	Representation body	R60	1	Extended-data length	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-285	Representation body	R61	2	Extended-data length	EQ	Total number of bytes in {Extended data}		M			

Table A.2 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-286	Representation body	R62	1	Extended data	EQ	any value if present		O			
Test Notes 1 Enter strokes of defined direction and length to a signature/sign time series data capture subsystem and check whether the direction and length of the strokes are correctly reflected in the output signature/sign time series data records. Test stimulus: A 2 cm horizontal line followed by a 2 cm vertical line drawn on the capture surface will enable an assessment of the accuracy of the X, Y and S channels (with reference to the scaling values). Expected outcome: No Y channel deviation should be detected in the horizontal line drawing data and no X channel deviation should be detected in the vertical line drawing data. A single 'pen-up' change (S channel: 1 → 0) followed by a single 'pen-down' change (S channel: 0 → 1) between line drawing data. 2 Enter strokes of defined direction and length to a signature/sign time series data capture subsystem and check whether the direction and length of the strokes are correctly reflected in the output signature/sign time series data records. Test stimulus: A circle of 2 cm in diameter drawn using a template overlaid on capture surface will enable an assessment of the accuracy of the X and Y channels (with reference to the scaling values). Expected outcome: Both X and Y channel data should constantly change as the pen moves during the drawing process.											

A.2.2 Conformance test assertions for compact format

The specific test assertions required for conformance testing to the compact format of this part of ISO/IEC 19794 are listed in Table A.3. The normative requirements of this part of ISO/IEC 19794 listed in Table A.1 are referenced in Table A.3.

The conformance test assertions are listed in the order in which the corresponding fields, if present, are required to appear in a conforming data record.

Table A.3 — Conformance test assertions for the compact format

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-1	CBEFF wrapper	R80	1	BDB tag	EQ	$5f2e_{Hex}$ or $7f2e_{Hex}$	1	M			
T-288	CBEFF wrapper	R81	1	BDB length	EQ	00_{Hex} to $7f_{Hex}$, 8180_{Hex} to $81ff_{Hex}$, 820100_{Hex} to $82ffff_{Hex}$	2	M			
T-289	CBEFF wrapper	R81	2	{BDB length}	EQ	number of contents bytes		M			
T-290	CBEFF wrapper	R82	1	Standard BDB tag	EQ	81_{Hex}		O-1			
T-291	CBEFF wrapper	R82	1	Standard BDB length	EQ	00_{Hex} to $7f_{Hex}$, 8180_{Hex} to $81ff_{Hex}$, 820100_{Hex} to $82ffff_{Hex}$	2	O-1			
T-292	CBEFF wrapper	R82	2	{Standard BDB length}	EQ	number of contents bytes		O-1			
T-293	BDB	R76, R78	2	x	EQ	00_{Hex} to ff_{Hex}		M			
T-294	BDB	R76, R78	2	y	EQ	00_{Hex} to ff_{Hex}		M			
T-295	BDB	R76, R77	2	z	EQ	00_{Hex} to ff_{Hex} if present		M			
T-296	BDB	R76, R78	2	vX	EQ	00_{Hex} to ff_{Hex} if present		M			
T-297	BDB	R76, R78	2	vY	EQ	00_{Hex} to ff_{Hex} if present		M			
T-298	BDB	R76, R78	2	aX	EQ	00_{Hex} to ff_{Hex} if present		M			
T-299	BDB	R76, R78	2	aY	EQ	00_{Hex} to ff_{Hex} if present		M			
T-300	BDB	R76, R77	2	t	EQ	00_{Hex} to ff_{Hex} if present		M			
T-301	BDB	R76, R77	2	dt	EQ	00_{Hex} to ff_{Hex} if present		M			
T-302	BDB	R76, R77	2	f	EQ	00_{Hex} to ff_{Hex} if present		M			
T-303	BDB	R76, R79	2	s	EQ	00_{Hex} or 01_{Hex} if present		M			
T-304	BDB	R76, R78	2	tX	EQ	00_{Hex} to ff_{Hex} if present		M			
T-305	BDB	R76, R78	2	tY	EQ	00_{Hex} to ff_{Hex} if present		M			
T-306	BDB	R76, R77	2	az	EQ	00_{Hex} to ff_{Hex} if present		M			
T-307	BDB	R76, R77	2	el	EQ	00_{Hex} to ff_{Hex} if present		M			
T-308	BDB	R76, R77	2	r	EQ	00_{Hex} to ff_{Hex} if present		M			
T-309	BDB	R1, R2, R3, R57	3B	x, y, s	N/A	N/A	3	M		N/A	
T-310	BDB	R1, R2, R3, R57	3B	x, y, s	N/A	N/A	4	M		N/A	
T-311	CBEFF wrapper	R83	1	Extended BDB tag	EQ	82_{Hex} or $A2_{Hex}$		O-1			

Table A.3 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-312	CBEFF wrapper	R83	1	Extended BDB length	EQ	00_{Hex} to $7f_{Hex}$, 8180_{Hex} to $81ff_{Hex}$, 820100_{Hex} to $82ffff_{Hex}$	2	O-1			
T-313	CBEFF wrapper	R83	2	{Extended BDB length}	EQ	number of contents bytes		O-1			
T-314	Extended data	R83	2	Extended data	EQ	any value		O-1			

Test Notes

1 The tag shall be 5f2eHex if there is no extended data and 7f2eHex if there is also extended data.

2 The length shall be encoded following the Distinguished Encoding Rules of ASN.1 defined in ISO/IEC 8825 1.

3 Enter strokes of defined direction and length to a signature/sign time series data capture subsystem and check whether the direction and length of the strokes are correctly reflected in the output signature/sign time series data records.

Test stimulus: A 2 cm horizontal line followed by a 2 cm vertical line drawn on the capture surface will enable an assessment of the accuracy of the X, Y and S channels (with reference to the scaling values).

Expected outcome: No Y channel deviation should be detected in the horizontal line drawing data and no X channel deviation should be detected in the vertical line drawing data. A single 'pen-up' change (S channel: 1 → 0) followed by a single 'pen-down' change (S channel: 0 → 1) between line drawing data.

4 Enter strokes of defined direction and length to a signature/sign time series data capture subsystem and check whether the direction and length of the strokes are correctly reflected in the output signature/sign time series data records.

Test stimulus: A circle of 2 cm in diameter drawn using a template overlaid on capture surface will enable an assessment of the accuracy of the X and Y channels (with reference to the scaling values).

Expected outcome: Both X and Y channel data should constantly change as the pen moves during the drawing process.

Status Notes

O-1 These tests apply only if there is extended data.

A.2.3 Conformance test assertions for compression format

The specific test assertions required for conformance testing to the compression format of this part of ISO/IEC 19794 are listed in Table A.4. The normative requirements of this part of ISO/IEC 19794 listed in Table A.1 are referenced in Table A.4.

The conformance test assertions are listed in the order in which the corresponding fields, if present, are required to appear in a conforming data record.

Table A.4 — Conformance test assertions for the compression format

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-315	General header	R5	1	Format ID	EQ	53434400_{Hex}		M			
T-316	General header	R6	1	Version number	EQ	30323000_{Hex}		M			
T-1	General header	R7	2	Record length	EQ	00000032_{Hex} to $ffffffff_{Hex}$		M			
T-318	General header	R7	2	Record length	EQ	Total number of bytes in the record		M			
T-319	General header	R8	2	Number of representations	EQ	0001_{Hex} to $ffff_{Hex}$		M			
T-320	General header	R8	2	Number of representations	EQ	Total number of representations		M			
T-321	General header	R9	2	Certification flag	EQ	00_{Hex}		M			
T-322	Representation header	R11	2	Representation length	EQ	$0000001d_{Hex}$ to $ffffffff_{Hex}$		M			
T-323	Representation header	R11	2	Representation length	EQ	Total number of bytes in the representation		M			
T-324	Representation header	R12	1	Gregorian calendar year of the capture date	EQ	0001_{Hex} to $ffff_{Hex}$		M			
T-325	Representation header	R13	1	Month of the capture date	EQ	01_{Hex} to $0c_{Hex}$ or ff_{Hex}		M			
T-326	Representation header	R14	1	Day of the capture date	EQ	01_{Hex} to $1f_{Hex}$ or ff_{Hex}		M			
T-327	Representation header	R15	1	Hour of the capture time	EQ	00_{Hex} to 17_{Hex} or ff_{Hex}		M			
T-328	Representation header	R16	1	Minute of the capture time	EQ	00_{Hex} to $3b_{Hex}$ or ff_{Hex}		M			
T-329	Representation header	R17	1	Second of the capture time	EQ	00_{Hex} to $3b_{Hex}$ or ff_{Hex}		M			
T-330	Representation header	R18	1	Millisecond of the capture time	EQ	0000_{Hex} to $03e7_{Hex}$ or $ffff_{Hex}$		M			
T-331	Representation header	R20	1	Capture device technology ID	EQ	00_{Hex} to 02_{Hex} or 04_{Hex} or 08_{Hex}		M			
T-332	Representation header	R22	1	Capture device vendor ID	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-333	Representation header	R24	1	Capture device type ID	EQ	0000_{Hex} to $ffff_{Hex}$		M			
T-334	Representation header/ quality record	R26	2	Number of quality blocks	EQ	00_{Hex} to ff_{Hex}		M			
T-335	Representation header/quality block	R27	1	Quality score	EQ	00_{Hex} to 64_{Hex} or ff_{Hex} if present		M			
T-336	Representation header/quality block	R28	1	Quality algorithm vendor ID	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-337	Representation header/quality block	R30	1	Quality algorithm ID	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-338	Representation header/ channel inclusion field	R33	1	xIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-339	Representation header/ channel inclusion field	R33	1	yIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-340	Representation header/ channel inclusion field	R33	1	zIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-341	Representation header/ channel inclusion field	R33	1	vXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-342	Representation header/ channel inclusion field	R33	1	vYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-343	Representation header/ channel inclusion field	R33	1	aXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-344	Representation header/ channel inclusion field	R33	1	aYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-345	Representation header/ channel inclusion field	R33	1	tIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-346	Representation header/ channel inclusion field	R33	1	dtIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-347	Representation header/ channel inclusion field	R33	1	fIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-348	Representation header/ channel inclusion field	R33	1	sIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-349	Representation header/ channel inclusion field	R33	1	tXIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-350	Representation header/ channel inclusion field	R33	1	tYIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-351	Representation header/ channel inclusion field	R33	1	azIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-352	Representation header/ channel inclusion field	R33	1	elIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-353	Representation header/ channel inclusion field	R33	1	rIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-354	Representation header/ X channel description	R36	2	xScalingValueIncluded	EQ	0_{Bin} or 1_{Bin}		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-355	Representation header/ X channel description	R36	2	xMinIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-356	Representation header/ X channel description	R36	2	xMaxIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-357	Representation header/ X channel description	R36	2	xMeanIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-358	Representation header/ X channel description	R36	2	xStdIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-359	Representation header/ X channel description	R37	2	xIsConstant	EQ	0_{Bin} or 1_{Bin}		M			
T-360	Representation header/ X channel description	R39	2	xLinearCompRemoved	EQ	0_{Bin} or 1_{Bin}		M			
T-361	Representation header/ X channel description	R35	1	reserved	EQ	0_{Bin}		M			
T-362	Representation header/ X channel description	R40	2	xScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-363	Representation header/ X channel description	R40	2	xScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-364	Representation header/ X channel description	R41	2	xMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-365	Representation header/ X channel description	R41	2	xMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-366	Representation header/ X channel description	R44	2	xMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-367	Representation header/ X channel description	R46	2	xStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-368	Representation header/ Y channel description	R36	2	yScalingValueIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-369	Representation header/ Y channel description	R36	2	yMinIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-370	Representation header/ Y channel description	R36	2	yMaxIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-371	Representation header/ Y channel description	R36	2	yMeanIncluded	EQ	0_{Bin} or 1_{Bin}		M			
T-372	Representation header/ Y channel description	R36	2	yStdIncluded	EQ	0_{Bin} or 1_{Bin}		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-373	Representation header/ Y channel description	R37	2	yIsConstant	EQ	0_{Bin} or 1_{Bin}		M			
T-374	Representation header/ Y channel description	R39	2	yLinearCompRemoved	EQ	0_{Bin} or 1_{Bin}		M			
T-375	Representation header/ Y channel description	R35	1	reserved	EQ	0_{Bin}		M			
T-376	Representation header/ Y channel description	R40	2	yScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-377	Representation header/ Y channel description	R40	2	yScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-378	Representation header/ Y channel description	R41	2	yMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-379	Representation header/ Y channel description	R41	2	yMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-380	Representation header/ Y channel description	R44	2	yMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-381	Representation header/ Y channel description	R46	2	yStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-382	Representation header/ Z channel description	R36	2	zScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-383	Representation header/ Z channel description	R36	2	zMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-384	Representation header/ Z channel description	R36	2	zMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-385	Representation header/ Z channel description	R36	2	zMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-386	Representation header/ Z channel description	R36	2	zStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-387	Representation header/ Z channel description	R37	2	zIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-388	Representation header/ Z channel description	R39	2	zLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-389	Representation header/ Z channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-390	Representation header/ Z channel description	R40	2	zScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-391	Representation header/ Z channel description	R40	2	zScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-392	Representation header/ Z channel description	R41	2	zMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-393	Representation header/ Z channel description	R41	2	zMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-394	Representation header/ Z channel description	R44	2	zMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-395	Representation header/ Z channel description	R46	2	zStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-396	Representation header/ VX channel description	R36	2	vXScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-397	Representation header/ VX channel description	R36	2	vXMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-398	Representation header/ VX channel description	R36	2	vXMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-399	Representation header/ VX channel description	R36	2	vXMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-400	Representation header/ VX channel description	R36	2	vXStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-401	Representation header/ VX channel description	R37	2	vXIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-402	Representation header/ VX channel description	R39	2	vXLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-403	Representation header/ VX channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-404	Representation header/ VX channel description	R40	2	vXScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-405	Representation header/ VX channel description	R40	2	vXScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-406	Representation header/ VX channel description	R41	2	vXMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-407	Representation header/ VX channel description	R41	2	vXMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-408	Representation header/ VX channel description	R44	2	vXMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-409	Representation header/ VX channel description	R46	2	vXStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-410	Representation header/ VY channel description	R36	2	vYScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-411	Representation header/ VY channel description	R36	2	vYMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-412	Representation header/ VY channel description	R36	2	vYMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-413	Representation header/ VY channel description	R36	2	vYMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-414	Representation header/ VY channel description	R36	2	vYStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-415	Representation header/ VY channel description	R37	2	vYIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-416	Representation header/ VY channel description	R39	2	vYLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-417	Representation header/ VY channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-418	Representation header/ VY channel description	R40	2	vYScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-419	Representation header/ VY channel description	R40	2	vYScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-420	Representation header/ VY channel description	R41	2	vYMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-421	Representation header/ VY channel description	R41	2	vYMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-422	Representation header/ VY channel description	R44	2	vYMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-423	Representation header/ VY channel description	R46	2	vYStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-424	Representation header/ AX channel description	R36	2	aXScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-425	Representation header/ AX channel description	R36	2	aXMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-426	Representation header/ AX channel description	R36	2	aXMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			

Table A.4 *(continued)*

Test	Section	Requirement ID	Level	Field	Operator	Operands	Note	Status	Support	Supported values	Test result
T-427	Representation header/ AX channel description	R36	2	aXMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-428	Representation header/ AX channel description	R36	2	aXStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-429	Representation header/ AX channel description	R37	2	aXIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-430	Representation header/ AX channel description	R39	2	aXLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			
T-431	Representation header/ AX channel description	R35	1	reserved	EQ	0_{Bin} if present		M			
T-432	Representation header/ AX channel description	R40	2	aXScalingValueExponent	EQ	00_{Hex} to $1f_{Hex}$ if present		M			
T-433	Representation header/ AX channel description	R40	2	aXScalingValueFraction	EQ	000_{Hex} to $7ff_{Hex}$ if present		M			
T-434	Representation header/ AX channel description	R41	2	aXMin	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-435	Representation header/ AX channel description	R41	2	aXMax	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-436	Representation header/ AX channel description	R44	2	aXMean	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-437	Representation header/ AX channel description	R46	2	aXStd	EQ	0000_{Hex} to $ffff_{Hex}$ if present		M			
T-438	Representation header/ AY channel description	R36	2	aYScalingValueIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-439	Representation header/ AY channel description	R36	2	aYMinIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-440	Representation header/ AY channel description	R36	2	aYMaxIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-441	Representation header/ AY channel description	R36	2	aYMeanIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-442	Representation header/ AY channel description	R36	2	aYStdIncluded	EQ	0_{Bin} or 1_{Bin} if present		M			
T-443	Representation header/ AY channel description	R37	2	aYIsConstant	EQ	0_{Bin} or 1_{Bin} if present		M			
T-444	Representation header/ AY channel description	R39	2	aYLinearCompRemoved	EQ	0_{Bin} or 1_{Bin} if present		M			