American National Standard for Financial Services

X9.100-181-2007

Specification for TIFF Image Format for Image Exchange

Accredited Standards Committee X9, Incorporated
Financial Industry Standards

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American National Standards Institute

Contents

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Introduction

The purpose of this standard is to provide the financial industry with a defined specific implementation of a TIFF (Tagged Image File Format) structure necessary to support proper electronic check exchange (ECE) without the need of special agreements. This standard was determined to be necessary when an issue arose in the development of ANS X9.100-180-2006 (Specification for Electronic Exchange of Check and Image Data) which was proposing a normative Annex that contained minimum TIFF tags. As a result, the working group's decision was to move the TIFF tag Annex N in ANS X9.100-180-2006 from a normative to an informative Annex and create a separate standard ANS X9.100-181 that would define the minimum TIFF fields and their allowed values for image exchange. The new standard will allow development of accepted methods and procedures to accommodate any identified key non-conformances. JPEG (grayscale) compressions will be addressed in a separate standard to be developed in the future.

The standard will focus on seven (7) key issues regarding TIFF tags these are: Multistrip, Byte-order, Photometric Interpretation, Fill Order, Orientation, Resolutions and Private Tags.

Suggestions for the improvement or revision of this standard are welcome. They should be sent to the X9 Committee Secretariat, Accredited Standards Committee X9, Inc., Financial Industry Standards, 1212 West Street, Annapolis, MD 21401

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Financial Services, X9. Committee approval of the standard does not necessarily imply that all the committee members voted for its approval.

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American National Standard for Financial Services— TIFF Image Format for Financial Image Exchange

1 Purpose

The ANS X9.100-180-2006 standard, as well as other standards, defines TIFF 6.0 as an image format scheme that can be used between exchange partners without the need of special agreement. Although TIFF is a defined specification, it is very flexible and is designed to accommodate a variety of uses. In addition, some TIFF field values can have different interpretations. Therefore, this flexibility can cause some TIFF readers, internal TIFF editors and image applications to experience problems when they encounter a variant which they are not designed to handle. Currently, many TIFF readers, editors and image applications in use in the financial industry do not support all variations and interpretations of TIFF generated by the diverse range of check image scanners and transports in use today.

In addition, as automated recognition and quality analysis becomes more common throughout the industry, some variations such as upside down or reversed image video can cause failures within these processes as well as printing and viewing concerns. As many new scanning devices and applications are being developed for check imaging, a central purpose of this standard is to provide guidance to the financial industry by defining the most commonly supported and least problematic uses of TIFF fields and their values for the exchange of images within the financial industry.

2 Scope

The scope of this standard is to define specific TIFF fields that can be used and the allowable values for those fields that will support interoperability for check image exchange processing between financial institutions. This standard will only address the use of G4 bilevel image (black/white) compressions within the TIFF 6.0 structure.

A “least common denominator” approach was used to identify the fields that everyone should read and the required or allowable values for these fields that everyone will be expected to support. To accomplish interoperability, some of the fields and values are more restrictive compared to what is being generated in today’s environment. In addition, this standard clarified areas that have been interpreted in different ways.

This standard developed a methodology that promotes an expedited migration to these restrictive specifications as well as accepted procedures and techniques for dealing with variants or non-conformances. Initially, there are fields that will need to be allowed to vary in order to have an orderly migration to full compliance. The hope is that these variances would be minimal and would be phased out over time.

This standard will not address changing the industry TIFF (Tagged Image File Format) revision 6.0 (final June 3, 1992) standard owned by Adobe Systems Inc. as it is used for a wider variety of industry uses. Also, JPEG (grayscale) compressions will be addressed in a separate standard to be developed in the future.

This standard supersedes Annex N in ANS X9.100-180-2006. (Annex N Informative, TIFF 6.0 Recommendations for Exchange)

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.

ANS X9.100-180-2006, *Specifications for Electronic Exchange of Check and Image Data*

CCITT Recommendation T.6 (CCITT, Geneva: 1988), *Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus.*

DSTU X9.37-2003 (Retired) , *Specifications for Electronic Exchange of Check and Image Data*

ITU-T Recommendation T.6, *Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus*

Regulation CC (12 CFR part 229), *Availability of Funds and Collection of Checks*

TIFF 6.0 Specification (June 3, 1992) http://partners.adobe.com/public/developer/en/tiff/TIFF6.pdf

4 Terms and Definitions

The defining standard is listed in parentheses after each term. The first listing is the current defining standard and the second listing, if present, is the past or future defining standard.

4.1
bilevel (ANS X9.100-181)
A bilevel image contains two colors – black and white. Also known and referenced as a bitonal image.

4.2
CCITT Group 4 (G4) (ANS X9.100-181)
CCITT T.6 bilevel encoding as specified in section 2 of CCITT Recommendation T.6: “Facsimile coding schemes and coding control functions for Group 4 facsimile apparatus.” International Telephone and Telegraph Consultative Committee (CCITT, Geneva: 1988). ITU-T supersedes CCITT.

4.3
exchange file (ANS X9.100-181)
A file containing items and associated data and images organized in a structure suitable for exchange of value between Depository Financial Institutions. (Examples are DSTU X9.37-2003 (Retired) and ANS X9.100-180-2006 exchange file standards).

4.4
image file (ANS X9.100-181)
The data set representing a single image view formatted in accordance with the TIFF 6.0 standard. The image file may be a stand-alone file (.TIF extension) or embedded within an exchange file (e.g. within the Image Data Field in the Type 52 Record in an DSTU X9.37-2003 (Retired) or ANS X9.100-180-2006 exchange file)..

4.5
image file directory (IFD) (ANS X9.100-181)
An image file directory contains information about the image, as well as pointers to the actual image data. There must be at least 1 IFD in a TIFF file and each IFD must have at least one entry.

4.6
lossless algorithm (ANS X9.100-181)
A lossless encoding algorithm is one which has the following properties:
Let I_o be the original image, C be the compression algorithm, I_c be the compressed image, D be the decompression algorithm and I_d be the decoded image. In other words, $I_c = C(I_o)$, $I_d = D(I_c)$, and $I_d = D(C(I_o))$. The algorithm is lossless if $I_d = I_o$.

4.7
optional fields (ANS X9.100-181)
These are fields that are not required to be present in order to process the image. The default value shall be assumed.

4.8

photometric interpretation (ANS X9.100-181)
A bilevel image contains two colors – black and white. TIFF allows an application to write out bilevel data in either a white-is-zero or black-is-zero format. The field that records this information is called photometric interpretation. Also known as the color space of the image data.

4.9

TIFF (Tagged Image File Format) (ANS X9.100-181)
A tag-based file format for storing and interchanging raster images.

4.10
TIFF field (ANS X9.100-181)

A TIFF field is a logical entity consisting of TIFF tag and its value. This logical concept is implemented as an IFD Entry, plus the actual value if it doesn't fit into the value/offset part, the last 4 bytes of the IFD Entry. The terms TIFF field and IFD entry are interchangeable in most contexts.

4.11
variance (ANS X9.100-181)
These are TIFF field contents which, while defined under the TIFF 6.0 specification, do not fall within the subset that is promoted by this standard. The variance values are specified with the intent that if a Financial Institution is delivering an image that does not meet the proposed standard, they can flag the image as a variant and continue to send forward the item

5 Overview

In order to promote efficient interoperable check image exchange among institutions, restrictions and additional requirements and definitions are needed to specify TIFF fields that shall be used or may be used, and the allowable type, counts and values for those fields. In addition, values that can be generated with different techniques or conventions need to be clearly and unambiguously specified. A "least common denominator" approach is used to identify the fields that everyone should be able to read and the required or allowable type, counts and values for these fields that everyone is expected to support.

To accomplish the desired level of interoperability, these fields and values will necessarily have to be more restrictive compared to what is being generated in today's environment. This will promote a more efficient

exchange and as more players get involved and volumes increase, the industry will be moved to an environment where there will be less variation. Less variation will protect exchange partners that have always expected certain TIFF format conventions from being surprised when a new player comes on board and starts using an unconventional field, or field value, that is allowed within the overall TIFF specifications.

TIFF wrapped G4 is an "encoding" of the actual image. Since G4 is a lossless encoding algorithm, when performed properly the encoding of an image can be altered without changing the information content of the underlying image. Converting the encoding of an image is a normal occurrence in the processing of an image and does not alter the information content of the image. This standard recognizes these changes of encoding as normal in the industry and as such, they do not alter any information content of the underlying image:

- Change of Orientation
- Change of Fill Order
- Change of number of strips per image
- Change of Photometric Interpretation

6 TIFF Wrapped (G4) Bilevel Images

This standard is specifically addressing G4 bilevel Images and defines a subset of the TIFF 6.0 specifications and, when followed, will produce TIFF image files compliant with those specifications. The following general TIFF 6.0 specifications are retained without restrictions and are listed here to emphasize their importance in creating standard compliant TIFF files. The following TIFF 6.0 requirements shall be met:

- TIFF files begin with an 8-byte image file header that points to an image file directory (IFD). An image file directory contains information about the image, as well as pointers to the actual image data.

- All entries in an IFD (also called TIFF fields) shall be sorted in ascending order by Tag.

- Each TIFF field has an associated field type, e.g., SHORT, LONG. The TIFF standard allows for more than one type for some fields. The TIFF specifications explicitly state which field types are valid for each TIFF field. Only the specified field types shall be used. All valid field types are supported by this standard.

- Each TIFF field has an associated count and a value/offset. The actual syntax of the value is determined by the field type and the count. The proper, defined syntax shall be used. In accordance with the TIFF 6.0 specification, the Value Offset shall contain the Value instead of pointing to the Value if and only if the Value fits into 4-bytes. If the Value is shorter than 4 bytes, it is left justified within the 4 bytes Value Offset, i.e., stored in the lower numbered bytes. Whether the Value fits within 4 bytes is determined by the Type and Count of the field.

- Some TIFF fields are mandatory, while others are optional. Optional TIFF fields have a default value specified by the TIFF standard. TIFF file readers are instructed to use the default value whenever the optional TIFF field is absent.

- TIFF image files shall be syntactically correct and properly formed in accordance with the TIFF 6.0 Specification unless otherwise specified within this standard.

- Each G4 compressed image strip shall be terminated by a 24-bit End-of-Facsimile-Block (EOFB) code. The EOFB code is defined in the iTU-T Recommendation T.6 Specification.

TIFF writers shall always encode the full, prescribed number of rows, with a proper EOFB immediately following in the encoding. Padding shall be by the least number of 0-bits needed for the T.6 –encoding to exactly occupy a multiple of 8 bits. Only 0-bits shall be used for padding, and StripByteCount shall not extend to any bytes not containing properly formed T.6 encoding.

It is highly recommended that new financial image capture hardware devices that create TIFF G4 images be designed to comply with tables 1 and 2.

7 Requirements for Image Exchange

The following general restrictions to the TIFF 6.0 standard are introduced by this standard in defining the **Requirements** for check image exchange.

- **Images shall be single page.** Each TIFF image file shall contain a single image view. Thus each TIFF image file shall contain only one IFD (Image File Directory).
- **Images shall be single strip.** ImageLength (257) and RowsPerStrip (278) fields shall have the same value and both shall be present.
- **Compression shall be Group 4 Fax.**
- **Photometric Interpretation shall be 0.**
- **XResolution and YResolution shall be the same and resolve to a value of 200 or 240.** If the denominator is greater than 1, the ratio shall resolve to a value of 200 or 240, e.g., 800/4=200).
- **All TIFF 6.0 mandatory fields shall be present (see Table 1).**
- **All TIFF 6.0 optional TIFF fields, if present, shall have the specified default value (see Table 2).**

Tables 1 and 2 specify the subset of TIFF 6.0 fields that have restrictions specified on values that are required by this standard. These specified values shall be used for creating black/white (Group 4) TIFF image files for check image exchange.

Allowed variances when images do not meet Table 1 or Table 2 standards are defined in Table 3.

In order to create maximum compatibility with TIFF readers commonly used in the financial industry, financial industry TIFF writers shall only use these fields and their defined values and conditions when creating image views for exchange in ANS X9.100-180-2006, DSTU X9.37-2003 (Retired) files or other similar exchange files. Conversely, financial industry TIFF readers shall support as a minimum the fields and values specified by these Requirements in order to achieve maximum interoperability across diverse platforms. All tag numbers and related values are expressed in decimal notation.

Table 1 - Required TIFF Fields

Tag Name	Tag Number	Approved Defined Value(s)	Comment
ImageWidth	256	This shall be some value other than zero	Note 1
ImageLength	257	This shall be some value other than zero.	Note 1, Note 2
Compression	259	4 (Group 4 Fax – T.6)	
Photometric Interpretation	262	0	An image bit of 0 is imaged as white and an image bit 1 is imaged as black.
StripOffsets	273	This array shall have only one entry	Note 1, Note 2
RowsPerStrip	278	This field shall have only one value which shall be equal to the value of the "ImageLength" field.	This field shall be present. Note 1, Note 2
StripByteCounts	279	This field shall have only one value.	The value for this field shall be stored in the Value Offset. Note 1, Note 2
XResolution	282	This shall be 200/1 or 240/1	Note 3
YResolution	283	This shall be 200/1 or 240/1	Note 3

Note 1. This value shall be a valid value as defined in TIFF 6.0 for this field. It shall also comply with any restriction specified by this Standard.

Note 2. All image views shall be represented as a single strip.

Note 3. XResolution and YResolution fields shall have identical values with unique offsets. If the denominator is greater than 1, ratio shall resolve to a value of 200 or 240, e.g., 800/4 = 200.

Table 2 - Optional TIFF Fields

Tag Name	Tag Number	Approved Defined Value(s)	Comments
NewSubfileType	254	0 (single image per TIFF file)	0 is TIFF 6.0 default.
BitsPerSample	258	1 (bilevel image)	1 is TIFF 6.0 default
Thresholding	263	1 (no dithering or half toning has been applied to image data)	1 is TIFF 6.0 default.
FillOrder	266	1	1 is TIFF 6.0 default. Note 1
Orientation	274	1	1 is TIFF 6.0 default Note 2
SamplesPerPixel	277	1	1 is TIFF 6.0 default.
T6Options	293	0	0 is TIFF 6.0 default. Note 3
ResolutionUnit	296	2 (inch)	2 is the TIFF 6.0 default.

Note 1. This indicates that the first sequential bit of the binary string of encoded data is found in the high-order bit of the first octet of the stored byte sequence. The high-order bit of the first compression code is stored in the high-order bit of the first byte, the next-highest bit of the first compression code is stored in the next-highest bit of the first byte, and so on

Note 2. The 0th row represents the visual top of the image, and the 0th column represents the visual left-hand side.

Note 3. Values for T6Options other than zero (0) are not allowed since not all G4 decompressors would be able to handle T.6-Encoding options (specifically uncompressed mode).

8 Variances

The following TIFF 6.0 fields referenced in Clause 6 may be 'relaxed' in the form of an Allowed **Variance.** Only the following defined variances are allowed by this Standard. These variances shall only be used where there are no reasonable alternatives to ensure compliance with the requirements of this standard. When an allowed variance is used, the presence of that variance, for each image, shall be flagged in the appropriate exchange file per the implementation definition as defined in Annex A for the utilized file format. This will permit the receiving party to decide whether to accept them as is or to perform the necessary exception processing within their bank to process the transaction.

In addition under banking agreement, a Financial Institution has the option to convert images containing variances to images without variance to avoid the necessity of setting the variance flag in the exchange file.

Table 3 - Allowable Variance

Tag Name	Tag Number	Allowed Variance Value(s)	Comments
Photometric Interpretation	262	1	1 is the allowed variance An image bit of 0 is imaged as black and an image bit of 1 is imaged as white.
FillOrder	266	2	Note 2
StripOffsets	273	For each strip, the byte offset of that strip. The TIFF field count shall be equal to the number of strips. This array shall have as many entries as specified by the TIFF field count.	Multistrip is allowed. Note 1
Orientation	274	3 or 4	
RowsPerStrip	278	The number of rows in each strip (except possibly the last strip.) For example, if ImageLength is 24, and RowsPerStrip is 10, then there are 3 strips, with 10 rows in the first strip, 10 rows in the second strip, and 4 rows in the third strip.	Multistrip is allowed. Note 1
StripByteCounts	279	For each strip, the number of bytes in that strip after any compression. The TIFF field count shall be equal to the number of strips. This array shall have as many entries as specified by the TIFF field count.	Multistrip is allowed. Note 1

Note 1. For definition of multistrip refer to TIFF 6.0 page 19.

Note 2. This indicates that the first sequential bit of the binary string of encoded data is found in the low-order bit of the first octet of the stored byte sequence. The high-order bit of the first compression code is stored in the low-order bit of the first byte, the next-highest bit of the first compression code is stored in the next-lowest bit of the first byte, and so on.

9 Details and Suggestion

9.1 Additional Fields (not listed in tables 1 or 2)

TIFF readers shall ignore extra fields that are present in TIFF files and not understood. There is no requirement to validate extra fields.

9.2 Private Tags

The TIFF 6.0 specification supports the use of private tags. Private tags are tags numbered 32768 or higher that are assigned to organizations that might wish to store information meaningful only to that organization. The use of TIFF fields with private tags in financial image exchange environments is discouraged, but not prohibited, in order to avoid potential situations where TIFF readers may not handle fields with private tags properly.

Financial TIFF readers shall ignore fields with private tags that are present in TIFF files and not understood. There is no requirement to validate fields with private tags.

It must be noted that any fields with private tags shall follow the fields with non-private tags in the IFD since it is a requirement of the TIFF 6.0 Specification that the entries in an IFD are sorted in ascending order by Tag. This should allow any reader to successfully process the image view by ignoring fields with private tags

9.3 Byte Order

Byte Order shall be little-endian. The little-endian byte order is specified by the first two bytes in a TIFF 6.0 image file header as: “II” (4949.H).

In the “II” format, byte order is always from the least significant byte to the most significant byte. This is called *little-endian* byte order.

Annex A
(Normative)
TIFF Variance Usage

A.1 General Comments

When an allowed variance is used, the presence of that variance, for each image, shall be flagged in the appropriate exchange file per the implementation definition for the utilized file format as defined below. The following clauses contain the definition and allowable values when using the DSTU X9.37-2003 (Retired) and ANS X9.100-180-2006 specifications. When an image view contains a variance, that variance shall be flagged at the image view level.

A.2 TIFF Variance Usage when using DSTU X9.37-2003 (Retired)

The following table shows the current defined Image View Detail Record (Type 50) in the DSTU X9.37-2003 (Retired) specification. The reserved field as defined in that specification is 15 bytes. For purpose of communicating the variance this field will be redefined as shown in clause A.2.2.

A.2.1. Image View Detail Record (Type 50) Existing Specification

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record Type	M	01 – 02	2	N
2	Image Indicator	M	03 – 03	1	N
3	Image Creator Routing Number	M	04 – 12	9	N
4	Image Creator Date	M	13 – 20	8	N
5	Image View Format Indicator	M	21 – 22	2	NB
6	Image View Compression Algorithm Identifier	M	23 – 24	2	NB
7	Image View Data Size	C	25 – 31	7	N
8	View Side Indicator	M	32 – 32	1	N
9	View Descriptor	M	33 – 34	2	N
10	Digital Signature Indicator	M	35 – 35	1	NB
11	Digital Signature Method	C	36 – 37	2	N
12	Security Key Size	C	38 – 42	5	N
13	Start of Protected Data	C	43 – 49	7	N
14	Length of Protected Data	C	50 – 56	7	N
15	Image Recreate Indicator	C	57 – 57	1	N
16	User Field	C	58 – 65	8	ANS
17	Reserved	M	66 – 80	15	B

A.2.2 Image View Detail Record (Type 50) Redefined

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record Type	M	01 – 02	2	N
2	Image Indicator	M	03 – 03	1	N
3	Image Creator Routing Number	M	04 – 12	9	N
4	Image Creator Date	M	13 – 20	8	N
5	Image View Format Indicator	M	21 – 22	2	NB
6	Image View Compression Algorithm Identifier	M	23 – 24	2	NB
7	Image View Data Size	C	25 – 31	7	N
8	View Side Indicator	M	32 – 32	1	N
9	View Descriptor	M	33 – 34	2	N
10	Digital Signature Indicator	M	35 – 35	1	NB
11	Digital Signature Method	C	36 – 37	2	N
12	Security Key Size	C	38 – 42	5	N
13	Start of Protected Data	C	43 – 49	7	N
14	Length of Protected Data	C	50 – 56	7	N
15	Image Recreate Indicator	C	57 – 57	1	N
16	User Field	C	58 – 65	8	ANS
17	**Image TIFF Variance Indicator**	**M**	**66 – 66**	**1**	**ANS**
18	**Reserved**	**M**	**67 – 80**	**14**	**B**

Note: If a TIFF G4 image is conveyed with a defined Image TIFF Variance Indicator field containing a value of "blank" and upon inspection the Receiver determines that the image does not comply with ANS X9.100-181-2007 (including containing variances that are not supported by ANS X9.100-181-2007), then the Receiver shall be permitted to refuse the image and associated item by using the appropriate method.

A.2.3 Image TIFF Variance Indicator using DSTU X9.37-2003 (Retired)

A code that indicates the presence of a TIFF Variance in the related Image View Data Record (Type 52) as allowed in clause 7 of this standard.

Usage: Mandatory. Shall be present when a variant exists.
Position: 66 - 66
Size: 1
Type: ANS Alphameric/Special
Defined Values:
' ' Blank, Image variance unknown
'0' No known variance
' 1' Photometric Interpretation (Tag 262)
'2' Multistrip Item (Tag 273, Tag 278, Tag 279)

‘3’ Fill Order (Tag 266)
‘4’ Orientation (Tag 274)
‘5’ Photometric Interpretation & Multistrip Item (Tag 262, Tag 273, Tag 278, Tag 279)
‘6’ Photometric Interpretation & Fill Order (Tag 262, Tag 266)
‘7’ Photometric Interpretation & Orientation (Tag 262, Tag 274)
‘8’ Multistrip Item & Fill Order (Tag 266, Tag 273, Tag 278, Tag 279)
‘9’ Multistrip Item & Orientation (Tag 273, Tag 274, Tag 278, Tag 279)
‘A’ Fill Order & Orientation (Tag 266, Tag 274)
‘B’ Photometric Interpretation, Multistrip Item & Fill Order (Tag 262, Tag 266, Tag 273, Tag 278, Tag 279)
‘C’ Photometric Interpretation, Multistrip Item & Orientation (Tag 262, Tag 273, Tag 274, Tag 278, Tag 279)
‘D’ Photometric Interpretation, Fill Order & Orientation (Tag 262, Tag 266, Tag 274)
‘E’ Multistrip Item, Fill Order & Orientation (Tag 266, Tag 273, Tag 274, Tag 278, Tag 279)
‘F’ Photometric Interpretation, Multistrip Item, Fill Order & Orientation (Tag 262, Tag 266, Tag 273, Tag 274, Tag 278, Tag 279)

A.3 Suggested TIFF Variance Usage when using ANS X9.100-180-2006

The following table shows the current defined Image View Detail Record (Type 50) in the ANS X9.100-180-2006 specification. The reserved field as defined in that specification is 4 bytes. For purpose of communicating the variance this field will be redefined as shown in clause A.3.2.

A.3.1. Image View Detail Record (Type 50) Existing Specification

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record Type	M	01 – 02	2	N
2	Image Indicator	M	03 – 03	1	AN
3	Image Creator Routing Number	M	04 – 12	9	NBD
4	Image Creator Date	M	13 – 20	8	N
5	Image View Format Indicator	M	21 – 22	2	AN
6	Image View Compression Algorithm Identifier	M	23 – 24	2	AN
7	Image View Type	M	25 – 25	1	AN
8	View Side Indicator	M	26 – 26	1	AN
9	View Descriptor	M	27 – 28	2	AN
10	Digital Signature Indicator	M	29 – 29	1	AN
11	Digital Signature Hash Function Method	C	30 – 31	2	AN
12	Digital Signature Cryptographic Algorithm Method	C	32 – 33	2	AN
13	DSA/RSA Key Size or ECC Curve Number	C	34 – 43	10	ANS
14	Digital Certificate Indicator	M	44 – 44	1	AN
15	Digital Certificate Format	C	45 – 46	2	AN
16	Digital Certificate Conveyance Method	C	47 – 48	2	AN
17	Start of Protected Data	M	49 – 55	7	N
18	Length of Protected Data	M	56 – 62	7	N
19	Image Recreate Indicator	C	63 – 63	1	AN
20	Image Test Override Indicator	C	64 – 64	1	AN
21	Image Capture Time	C	65 – 70	6	NB
22	User Field	C	71 – 76	6	ANS
23	Reserved	M	77 – 80	4	AB

A.3.2 Image View Detail Record (Type 50) Redefined

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record Type	M	01 – 02	2	N
2	Image Indicator	M	03 – 03	1	AN
3	Image Creator Routing Number	M	04 – 12	9	NBD
4	Image Creator Date	M	13 – 20	8	N
5	Image View Format Indicator	M	21 – 22	2	AN
6	Image View Compression Algorithm Identifier	M	23 – 24	2	AN
7	Image View Type	M	25 – 25	1	AN
8	View Side Indicator	M	26 – 26	1	AN
9	View Descriptor	M	27 – 28	2	AN
10	Digital Signature Indicator	M	29 – 29	1	AN
11	Digital Signature Hash Function Method	C	30 – 31	2	AN
12	Digital Signature Cryptographic Algorithm Method	C	32 – 33	2	AN
13	DSA/RSA Key Size or ECC Curve Number	C	34 – 43	10	ANS
14	Digital Certificate Indicator	M	44 – 44	1	AN
15	Digital Certificate Format	C	45 – 46	2	AN
16	Digital Certificate Conveyance Method	C	47 – 48	2	AN
17	Start of Protected Data	M	49 – 55	7	N
18	Length of Protected Data	M	56 – 62	7	N
19	Image Recreate Indicator	C	63 – 63	1	AN
20	Image Test Override Indicator	C	64 – 64	1	AN
21	Image Capture Time	C	65 – 70	6	NB
22	User Field	C	71 – 76	6	ANS
23	**Image TIFF Variance Indicator**	**M**	**77 – 77**	**1**	**ANS**
24	**Reserved**	**M**	**78 – 80**	**3**	**AB**

Note: If a TIFF G4 image is conveyed with a defined Image TIFF Variance Indicator field containing a value of "blank" and upon inspection the Receiver determines that the image does not comply with ANS X9.100-181-2007 (including containing variances that are not supported by ANS X9.100-181-2007), then the Receiver shall be permitted to refuse the image and associated item by using the appropriate method.

A.3.3 Image TIFF Variance Indicator using ANS X9.100-180-2006

A code that indicates the presence of a TIFF Variance in the related Image View Data Record (Type 52) as allowed clause 7 of this standard.

Usage: Mandatory. Shall be present when a variance exists.
Position : 77 - 77
Size: 1

Type: ANS Alphanumeric/Special

Defined Values:

- ' ' Blank, Image variance unknown
- '0' No known variance
- '1' Photometric Interpretation (Tag 262)
- '2' Multistrip Item (Tag 273, Tag 278, Tag 279)
- '3' Fill Order (Tag 266)
- '4' Orientation (Tag 274)
- '5' Photometric Interpretation & Multistrip Item (Tag 262, Tag 273, Tag 278, Tag 279)
- '6' Photometric Interpretation & Fill Order (Tag 262, Tag 266)
- '7' Photometric Interpretation & Orientation (Tag 262, Tag 274)
- '8' Multistrip Item & Fill Order (Tag 266, Tag 273, Tag 278, Tag 279)
- '9' Multistrip Item & Orientation (Tag 273, Tag 274, Tag 278, Tag 279)
- 'A' Fill Order & Orientation (Tag 266, Tag 274)
- 'B' Photometric Interpretation, Multistrip Item & Fill Order (Tag 262, Tag 266, Tag 273, Tag 278, Tag 279)
- 'C' Photometric Interpretation, Multistrip Item & Orientation (Tag 262, Tag 273, Tag 274, Tag 278, Tag 279)
- 'D' Photometric Interpretation, Fill Order & Orientation (Tag 262, Tag 266, Tag 274)
- 'E' Multistrip Item, Fill Order & Orientation (Tag 266, Tag 273, Tag 274, Tag 278, Tag 279)
- 'F' Photometric Interpretation, Multistrip Item, Fill Order & Orientation (Tag 262, Tag 266, Tag 273, Tag 274, Tag 278, Tag 279)

A.4 Return Reasons Codes when using DSTU X9.37-2003 (Retired)

Clause A.4.1 shows the current defined Return Reason field in DSTU X9.37-2003(Retired) Check Detail Addendum C Record (Type 28) Field 9, Return Record (Type 31) Field 6, and Return Addendum D Record (Type 35) Field 9.

For purposes of supporting this standard, the Return Reason field will be redefined as shown in clause A.4.2.

A.4.1 Return Reason Field in existing specification

A code that indicates the reason for non-payment.

Usage: Refer to DSTU X9.37-2003 (Retired).
Position: 40 – 40
Size: 1
Type: AN Alphameric

Defined Values:

- 'A' NSF - Not Sufficient Funds
- 'B' UCF - Uncollected Funds Hold
- 'C' Stop Payment
- 'D' Closed Account
- 'E' UTLA - Unable to Locate Account
- 'F' Frozen/Blocked Account
- 'G' Stale Dated
- 'H' Post Dated
- 'I' Endorsement Missing
- 'J' Endorsement Irregular

‘K’ Signature(s) Missing
‘L’ Signature(s) Irregular
‘M’ Non-Cash Item (Non-Negotiable)
‘N’ Altered/Fictitious Item
‘O’ Unable to Process (e.g. Mutilated Item)
‘P’ Items Exceeds Dollar Limit
‘Q’ Not Authorized
‘R’ Branch/Account Sold (Wrong Bank)
‘S’ Refer to Maker
‘T’ Stop Payment Suspect
‘U’ Unusable Image (Image could not be used for required business purpose)
‘V’ Image fails security check
‘W’ Cannot Determine Amount

A.4.2 Return Reason Field redefined

A code that indicates the reason for non-payment.

Usage: Refer to DSTU X9.37-2003 (Retired).
Position: 40 – 40
Size: 1
Type: AN Alphameric
Defined Values:
‘A’ NSF - Not Sufficient Funds
‘B’ UCF - Uncollected Funds Hold
‘C’ Stop Payment
‘D’ Closed Account
‘E’ UTLA - Unable to Locate Account
‘F’ Frozen/Blocked Account
‘G’ Stale Dated
‘H’ Post Dated
‘I’ Endorsement Missing
‘J’ Endorsement Irregular
‘K’ Signature(s) Missing
‘L’ Signature(s) Irregular
‘M’ Non-Cash Item (Non-Negotiable)
‘N’ Altered/Fictitious Item
‘O’ Unable to Process (e.g. Mutilated Item)
‘P’ Items Exceeds Dollar Limit
‘Q’ Not Authorized
‘R’ Branch/Account Sold (Wrong Bank)
‘S’ Refer to Maker
‘T’ Stop Payment Suspect
‘U’ Unusable Image (Image could not be used for required business purpose)
‘V’ Image fails security check
‘W’ Cannot Determine Amount
‘1’ Image not compliant with ANS X9.100-181-2007

A.5 Return Reasons Codes when using ANS X9.100-180-2006

Clause A.5.1 shows the current defined Annex G Return Reasons Codes in ANS X9.100-180-2006.

For purposes of supporting this standard, this Annex will be redefined as shown in clause A.5.2.

A.5.1 Annex G Return Reasons Codes in existing specification

Return Reason Codes
The table below identifies all return Reason Codes used in this standard. It identifies the code as used in this standard, the meaning of the code and the short text to be used in the ANS X9.100-140-2004 Standard (Specifications for an Image Replacement Document – IRD) in Region 7F of that standard.

Code	Description	ANS X9.100-140-2004 Usage
A	NSF – Not Sufficient Funds	NOT SUFFICIENT FUNDS
B	UCF – Uncollected Funds Hold	UNCOLLECTED FUNDS HOLD
C	Stop Payment	STOP PAYMENT
D	Closed Account	CLOSED ACCOUNT
E	UTLA – Unable to Locate Account	UNABLE TO LOCATE ACCT
F	Frozen/Blocked Account	FROZEN/BLOCKED ACCOUNT
G	Stale Dated	STALE DATED
H	Post Dated	POST DATED
I	Endorsement Missing	ENDORSEMENT MISSING
J	Endorsement Irregular	ENDORSEMENT IRREGULAR
K	Signature(s) Missing	SIGNATURE(S) MISSING
L	Signature(s) Irregular	SIGNATURE(S) IRREGULAR
M	Non-Cash Item (Non Negotiable)	NON-CASH ITEM
N	Altered/Fictitious Item	ALTERED/FICTITIOUS
O	Unable to process (e.g., Mutilated Item)	UNABLE TO PROCESS
P	Item Exceeds Dollar Limit	EXCEEDS DOLLAR LIMIT
Q	Not Authorized	NOT AUTHORIZED
R	Branch/Account Sold	BRANCH/ACCOUNT SOLD

S	Refer to Maker	REFER TO MAKER
T	Stop Payment Suspect	STOP PAYMENT SUSPECT
U	Unusable Image (Image could not be used for required business purpose)	UNUSABLE IMAGE
V	Image Fails Security Check	IMAGE FAILS SECURITY
W	Cannot Determine Amount	CANNOT DETERMINE AMT
Y	Duplicate Presentment	DUPLICATE PRESENTMENT
Z	Forgery	FORGERY
'9x'	IRD User Defined-See Return Text Overlay - x can be blank or any alphanumeric value at the discretion of the User. Can be used in this file for exchange, however when used on an IRD an overlay would explain the user reason.	USER DEF-SEE OVERLAY
'01'-'09'	Not Used	
'2'	Unavailable Funds	UNAVAILABLE FUNDS
'3'	Ineligible	INELIGIBLE
'4'	Not Our Item (Wrong Bank)	NOT OUR ITEM
'5'	Retired ABA	RETIRED ABA
'6'	Suspected Counterfeit	SUSPECTED COUNTERFEIT
'7'	Counterfeit	COUNTERFEIT
'8'	Warranty Breach	WARRANTY BREACH
'9'	Amounts Differ	AMOUNTS DIFFER
'10'	Double Post	DOUBLE POST
'11'	Amount Not Authorized	AMOUNT NOT AUTHORIZED
'12'	Payee Deceased	PAYEE DECEASED
'13'	Personal Endorsement Missing	PERS ENDORSEMENT MISS
'14'	Check Fraud – Breach of Warranty	CK FRAUD – BREACH
'15'	Non Conforming Image	NON CONFORMING IMAGE

‘16’	Non Conforming IRD	NON CONFORMING IRD
‘19’	Do Not Represent – Exceeds Presentment Limits	DO NOT REPRESENT
‘20’	Suspected Altered	SUSPECTED ALTERED
‘21’	Altered/Fictitious Amount	ALT/FICT AMOUNT
‘22’	Altered/Fictitious Date	ALT/FICT DATE
‘23’	Altered/Fictitious Payee Signature	ALT/FICT PAYEE SIGN
‘24’	Altered/Fictitious Payee Name	ALT/FICT PAYEE NAME
‘25’	Altered/Fictitious Maker	ALT/FICT MAKER
‘26’	Unable to Process/Mutilated Item – Missing Payee	UTP/MI–MISSING PAYEE
‘27’	Unable to Process/Mutilated Item – Missing Amount	UTP/MI–MISSING AMT
‘28’	Unable to Process/Mutilated Item – Missing Maker’s Signature	UTP/MI–MISS MAKER SIGN
‘31’	Signature Irregular – Not on File	SIGN IRREG–NOT ON FILE
‘32’	Signature Irregular – Two Signatures Required	SIGN IRREG–2 SIGN REQ
‘33’	Signature Irregular – Unauthorized Signature	SIGN IRREG–UNAUTH
‘34’	Signature Irregular – Questionable	SIGN IRREG–QUESTION
‘35’	Unable to Locate Account – Invalid Account	UTLA–INVALID ACCOUNT
‘36’	Unable to Locate Account – Divested Account	UTLA–DIVESTED ACCOUNT
‘41’	Missing Image (Front and Back)	MISSING IMAGE (F&B)
‘42’	Missing Image Front	MISSING IMAGE FRONT
‘43’	Missing Image Back	MISSING IMAGE BACK
‘50’	Fails Image Quality Analysis – Unusable	FAILS IQA – UNUSABLE
‘70’	Invalid Data for Field Data Type Usage within ANS X9.100-180-2006	INVALID DATA FOR TYPE
‘71’	Missing Mandatory Data within ANS X9.100-180-2006	MISS MAND DATA
‘72’	Not Acceptable Image Compression Type and/or Image Format Type	NA COMP/FORMAT

'74'	Data Mismatch Between Pair Type 50 and Type 52 within ANS X9.100-180-2006	MISMATCH TYPE 50/52
'75'	Image Decompression Error	IMAGE DECOMP ERROR
'76'	Invalid Image Structure (i.e., missing tags, invalid values, etc.)	INVAL IMAGE STRUCTURE
'77'	Sum of Variable Length Data Does Not Match Variable Length Data Elements within ANS X9.100-180-2006	VARIABLE DATA MISMATCH
'78'	Forward Item in Return Bundle or Return item in a Forward Bundle within ANS X9.100-180-2006	INVALID ITEM IN BUNDLE
'79'	Clipping Coordinates Inconsistent with Image Size within ANS X9.100-180-2006	CLIP COORD INVALID
'80'	MICR Code Line on Check Image does not Match Type 25,or Type 31/33, or Type 27, or Type 34 Record Contents within ANS X9.100-180-2006	MISMATCHED MICR

A.5.2 Annex G Return Reasons Codes redefined

Return Reason Codes

The table below identifies all return Reason Codes used in this standard. It identifies the code as used in this standard, the meaning of the code and the short text to be used in the ANS X9.100-140-2004 Standard (Specifications for an Image Replacement Document – IRD) in Region 7F of that standard.

Code	Description	ANS X9.100-140-2004 Usage
A	NSF – Not Sufficient Funds	NOT SUFFICIENT FUNDS
B	UCF – Uncollected Funds Hold	UNCOLLECTED FUNDS HOLD
C	Stop Payment	STOP PAYMENT
D	Closed Account	CLOSED ACCOUNT
E	UTLA – Unable to Locate Account	UNABLE TO LOCATE ACCT
F	Frozen/Blocked Account	FROZEN/BLOCKED ACCOUNT
G	Stale Dated	STALE DATED
H	Post Dated	POST DATED
I	Endorsement Missing	ENDORSEMENT MISSING
J	Endorsement Irregular	ENDORSEMENT IRREGULAR

K	Signature(s) Missing	SIGNATURE(S) MISSING
L	Signature(s) Irregular	SIGNATURE(S) IRREGULAR
M	Non-Cash Item (Non Negotiable)	NON-CASH ITEM
N	Altered/Fictitious Item	ALTERED/FICTITIOUS
O	Unable to process (e.g., Mutilated Item)	UNABLE TO PROCESS
P	Item Exceeds Dollar Limit	EXCEEDS DOLLAR LIMIT
Q	Not Authorized	NOT AUTHORIZED
R	Branch/Account Sold	BRANCH/ACCOUNT SOLD
S	Refer to Maker	REFER TO MAKER
T	Stop Payment Suspect	STOP PAYMENT SUSPECT
U	Unusable Image (Image could not be used for required business purpose)	UNUSABLE IMAGE
V	Image Fails Security Check	IMAGE FAILS SECURITY
W	Cannot Determine Amount	CANNOT DETERMINE AMT
Y	Duplicate Presentment	DUPLICATE PRESENTMENT
Z	Forgery	FORGERY
'9x'	IRD User Defined-See Return Text Overlay - x can be blank or any alphanumeric value at the discretion of the User. Can be used in this file for exchange, however when used on an IRD an overlay would explain the user reason.	USER DEF-SEE OVERLAY
'01'-'09'	Not Used	
'2'	Unavailable Funds	UNAVAILABLE FUNDS
'3'	Ineligible	INELIGIBLE
'4'	Not Our Item (Wrong Bank)	NOT OUR ITEM
'5'	Retired ABA	RETIRED ABA
'6'	Suspected Counterfeit	SUSPECTED COUNTERFEIT
'7'	Counterfeit	COUNTERFEIT

‘8’	Warranty Breach	WARRANTY BREACH
‘9’	Amounts Differ	AMOUNTS DIFFER
‘10’	Double Post	DOUBLE POST
‘11’	Amount Not Authorized	AMOUNT NOT AUTHORIZED
‘12’	Payee Deceased	PAYEE DECEASED
‘13’	Personal Endorsement Missing	PERS ENDORSEMENT MISS
‘14’	Check Fraud – Breach of Warranty	CK FRAUD – BREACH
‘15’	Non Conforming Image	NON CONFORMING IMAGE
‘16’	Non Conforming IRD	NON CONFORMING IRD
‘19’	Do Not Represent – Exceeds Presentment Limits	DO NOT REPRESENT
‘20’	Suspected Altered	SUSPECTED ALTERED
‘21’	Altered/Fictitious Amount	ALT/FICT AMOUNT
‘22’	Altered/Fictitious Date	ALT/FICT DATE
‘23’	Altered/Fictitious Payee Signature	ALT/FICT PAYEE SIGN
‘24’	Altered/Fictitious Payee Name	ALT/FICT PAYEE NAME
‘25’	Altered/Fictitious Maker	ALT/FICT MAKER
‘26’	Unable to Process/Mutilated Item – Missing Payee	UTP/MI–MISSING PAYEE
‘27’	Unable to Process/Mutilated Item – Missing Amount	UTP/MI–MISSING AMT
‘28’	Unable to Process/Mutilated Item – Missing Maker’s Signature	UTP/MI–MISS MAKER SIGN
‘31’	Signature Irregular – Not on File	SIGN IRREG–NOT ON FILE
‘32’	Signature Irregular – Two Signatures Required	SIGN IRREG–2 SIGN REQ
‘33’	Signature Irregular – Unauthorized Signature	SIGN IRREG–UNAUTH
‘34’	Signature Irregular – Questionable	SIGN IRREG–QUESTION
‘35’	Unable to Locate Account – Invalid Account	UTLA–INVALID ACCOUNT
‘36’	Unable to Locate Account – Divested Account	UTLA–DIVESTED ACCOUNT

'41'	Missing Image (Front and Back)	MISSING IMAGE (F&B)
'42'	Missing Image Front	MISSING IMAGE FRONT
'43'	Missing Image Back	MISSING IMAGE BACK
'50'	Fails Image Quality Analysis – Unusable	FAILS IQA – UNUSABLE
'70'	Invalid Data for Field Data Type Usage within ANS X9.100-180-2006	INVALID DATA FOR TYPE
'71'	Missing Mandatory Data within ANS X9.100-180-2006	MISS MAND DATA
'72'	Not Acceptable Image Compression Type and/or Image Format Type	NA COMP/FORMAT
'74'	Data Mismatch Between Pair Type 50 and Type 52 within ANS X9.100-180-2006	MISMATCH TYPE 50/52
'75'	Image Decompression Error	IMAGE DECOMP ERROR
'76'	Invalid Image Structure (i.e., missing tags, invalid values, etc.)	INVAL IMAGE STRUCTURE
'77'	Sum of Variable Length Data Does Not Match Variable Length Data Elements within ANS X9.100-180-2006	VARIABLE DATA MISMATCH
'78'	Forward Item in Return Bundle or Return item in a Forward Bundle within ANS X9.100-180-2006	INVALID ITEM IN BUNDLE
'79'	Clipping Coordinates Inconsistent with Image Size within ANS X9.100-180-2006	CLIP COORD INVALID
'80'	MICR Code Line on Check Image does not Match Type 25,or Type 31/33, or Type 27, or Type 34 Record Contents within ANS X9.100-180-2006	MISMATCHED MICR
'81'	**Image not compliant with ANS X9.100-181-2007**	**NON COMPLIANT TIFF**