EOS

EOS imaging system

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DICOM Conformance Statement

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1 Conformance Statement Overview

EOS is a digital radiography system which is intended for use in general radiographic examinations and applications excluding fluoroscopy, angiography and mammography. EOS allows radiographic acquisition of either one or two orthogonal X-Ray images for diagnostic purposes, in one single scan, of the whole body or a reduced area of investigation of a patient in upright or seated position.

EOS Acquisition Workstation (AWS) is a software application that is dedicated to drive EOS system. AWS provides a user interface for the operator to manage patient information, control the image acquisition function, display the images for quality check and manage data output.

EOS produces its DX images using the DICOM Basic Modality Worklist Management services, exports them using DICOM Storage services, asks for Storage Commitment (if configured), and retrieves images from an Archive using DICOM Query and Retrieve services.

If configured EOS also exports:
- MPPS messages (containing exam progress & dose information),
- X-Ray Radiation Dose Structured Reports.

AWS acts as an SCU for the following SOP Classes:

- Verification
- Storage
- Query and Retrieve
- Basic Modality Worklist Management
- Print
- Storage Commitment Push Model
- Modality Performed Procedure Step

AWS companion application (WinSCP32) acts as an SCU for the following SOP Class:

- Storage Commitment Push Model

AWS companion application (WinSCP32) acts as an SCP for the following SOP Classes:

- Verification
- Storage

This document is intended to describe AWS conformance to DICOM.

Table 1.1 Network services

SOP Class Name	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage For Presentation	Yes	Yes
Digital X-Ray Image Storage For Processing	Yes	Yes
Digital Mammography X-Ray Image Storage For Presentation	Yes	Yes
Digital Mammography X-Ray Image Storage For Processing	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Presentation	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Processing	Yes	Yes
CT Image Storage	Yes	Yes
Enhanced CT Image Storage	Yes	Yes

US Multi-frame Image Storage (RET)	Yes	Yes
US Multi-frame Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
MR Spectroscopy Storage	Yes	Yes
NM Image Storage (RET)	Yes	Yes
US Image Storage (RET)	Yes	Yes
US Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Multi-frame Secondary Capture Single Bit Image Storage	Yes	Yes
Multi-frame Secondary Capture Byte Image Storage	Yes	Yes
Multi-frame Secondary Capture Word Image Storage	Yes	Yes
Multi-frame Secondary Capture True Color Image Storage	Yes	Yes
Twelve Lead ECG Waveform Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes
Ambulatory ECG Waveform Storage	Yes	Yes
Hemodynamic Waveform Storage	Yes	Yes
Cardiac Electrophysiology Audio Waveform Storage	Yes	Yes
Basic Voice Audio Waveform Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Fluoroscopy Image Storage	Yes	Yes
X-Ray Angiographic Bi-Plane Image Storage (RET)	Yes	Yes
NM Image Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Beams Treatment Record Storage	Yes	Yes
RT Plan Storage	Yes	Yes
RT Brachy Treatment Record Storage	Yes	Yes
RT Treatment Summary Record Storage	Yes	Yes
PET Image Storage	Yes	Yes
PET Curve Storage	Yes	Yes
Stored Print Storage	Yes	Yes
Hardcopy Grayscale Image Storage	Yes	Yes
Hardcopy Color Image Storage	Yes	Yes
Raw Data Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Spatial Fiducial Storage	Yes	Yes
VL Endoscopic Image Storage	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes
VL Microscopic Image Storage	Yes	Yes
Video Microscopic Image Storage	Yes	Yes
VL Slide Coordinates Microscopic Image Storage	Yes	Yes
VL Photographic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
Ophthalmic Photography 8Bit Image Storage	Yes	Yes
Ophthalmic Photography 16Bit Image Storage	Yes	Yes
Stereometric Relationship Storage	Yes	Yes
Basic Text SR Storage	Yes	Yes
Enhanced SR Storage	Yes	Yes
Comprehensive SR Storage	Yes	Yes
Procedure Log Storage	Yes	Yes
Mammography CAD SR Storage	Yes	Yes

Key Object Selection Document Storage	Yes	Yes
Chest CAD SR Storage	Yes	Yes
X-Ray Radiation Dose SR Storage	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Worklist		
Modality Worklist Information Model – FIND	Yes	No
Query /Retrieve		
Patient Root Query/Retrieve Information Model – FIND	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	Yes	No
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No
Print Management		
Basic Grayscale Print Management	Yes	No
Basic Color Print Management	Yes	No
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No
Printer SOP Class	Yes	No
Storage Commitment		
Storage Commitment Push Model SOP Class	Yes	No
MPPS		
Modality Performed Procedure Step SOP Class	Yes	No

2 Introduction

2.1 Scope and field of application

This document describes EOS Acquisition Workstation (AWS) conformance to the DICOM 3.0 standard.

It contains a short description of application involved and provides technical information about data exchange capabilities of the equipment. The main elements describing these capabilities are the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

It applies to version 3.7.1 of EOS Acquisition Workstation and should be read in conjunction with the DICOM standard and its addenda.

2.2 Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document

- ACR American college of Radiology
- AE Application entity
- ANSI American National Standards Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- SR Structured Report
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

2.3 References

The DICOM Standard:

NEMA *Digital Imaging and Communications in Medicine, Part 1-20*
(NEMA Standards Publication PS3.X, 2013)

National Electrical Manufacturers Association (NEMA) - Publication Sales
1300 N. 17th Street, Suite 1847 - Rosslyn, Virginia 22209 United States of America

2.4 Intended audience

This Conformance Statement is intended for:

- Potential users;
- System integrators of medical equipment;
- Software designers implementing DICOM interfaces.

It is assumed that the reader is familiar with the DICOM standard.

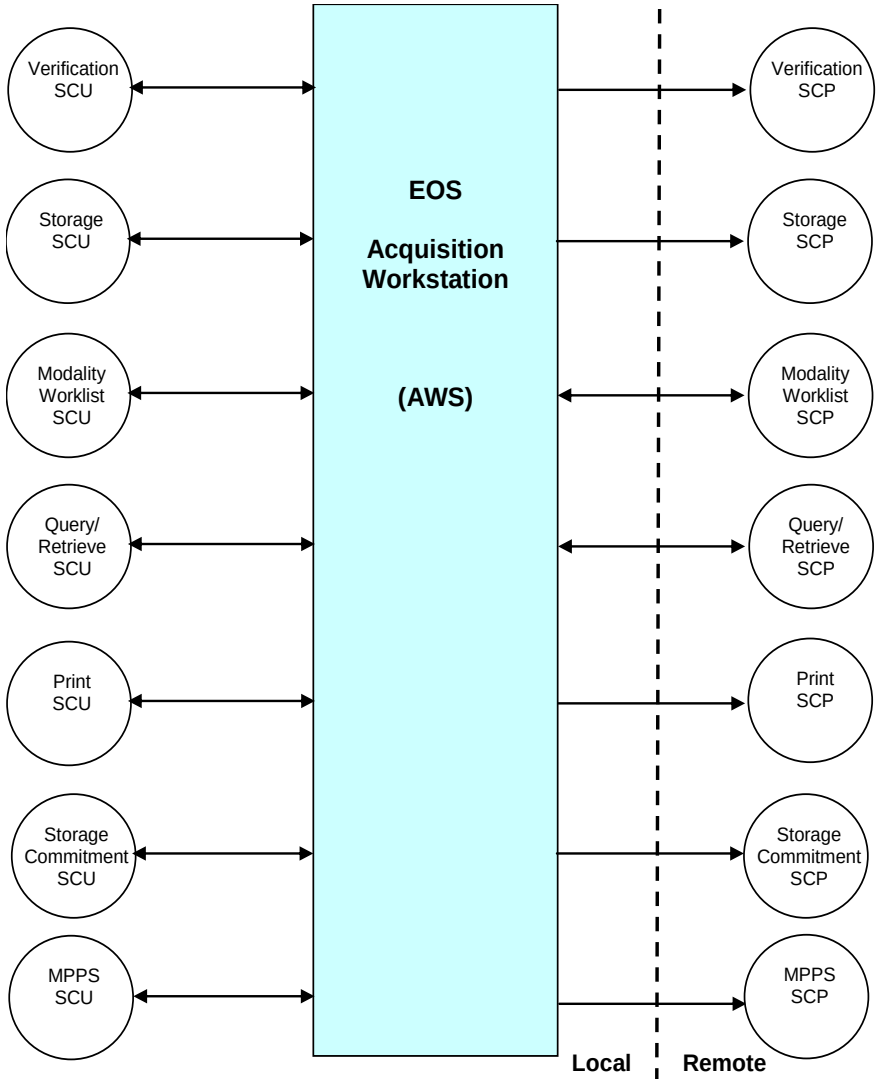
2.5 Warning to the Reader

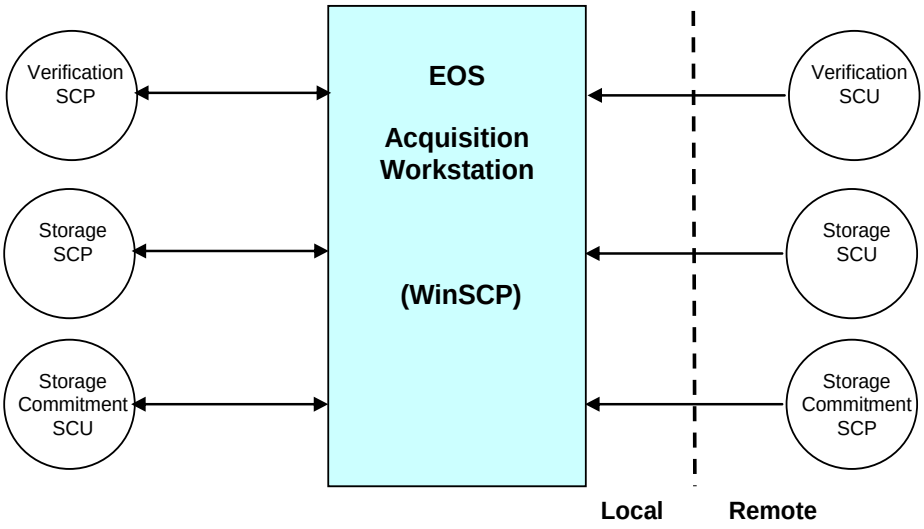
If another device matches this Conformance Statement based on the comparison with its own Conformance Statement, there is a chance, but no guarantee that they interoperate. DICOM only deals with communication; it is not a standard which specifies what is needed for certain applications to run on a device.

3 Networking

3.1 Implementation Model

3.1.1 Application Data Flow





3.1.2 Functional Definitions of Application Entities

AWS functions may be seen as only 2 configurable Application Entities, acting as SCU (AWS software itself) or SCP (WinSCP32, companion software provided with AWS).

3.1.2.1 Functional definitions of AWS (SCU services)

3.1.2.1.1 Verification service as SCU

AWS supports the Echo / Verification service as SCU.

Verification service is part of the configuration tool. When declaring a remote AE Title, the configuration panel lets the user issue a verification request to check some AE title parameters.

Also, a Verification request is issued automatically by AWS before any Storage operation to check the remote AE Title.

3.1.2.1.2 Storage Services as SCU

To store local objects (DX images, Secondary Capture Images, Dose SR), AWS establishes an association with a remote Storage SCP, negotiates its presentation contexts according to object SOP Classes and their native transfer syntax, and sends all data.

Then AWS closes the association.

3.1.2.1.3 Color / Grayscale Printing Service as SCU

AWS may use the Print services as SCU to print films to DICOM printers.

Print requests are enqueued by AWS and processed in background in sequential order. For each print request, AWS establishes one association with the remote Print SCP, performs its print request and closes the association when printing is done, successfully or not.

3.1.2.1.4 Basic Modality Worklist Management Service as SCU

AWS makes use of the Basic Modality Worklist Management service to initialize the examination data.

For each query operation, it establishes one association with the remote Modality Worklist SCP, performs one C-FIND request, waits for responses and releases the association.

3.1.2.1.5 Query and Retrieve Service as SCU

AWS may use the Query and Retrieve service to Retrieve images from a PACS and store them locally.

For each query operation, it establishes one association with the remote Query and Retrieve SCP, performs one C-FIND request, waits for responses and releases the association.

For each retrieve operation, it establishes one association with the remote Query and Retrieve SCP, performs one C-MOVE request, waits for responses and releases the association.

3.1.2.1.6 Storage Commitment as SCU

To request an acknowledgment for the storage of images, the AWS may send a Storage Commitment message: it establishes one association with the remote Storage Commitment SCP, sends a N-ACTION request and releases the association.

Duration of applicability of the Transaction UID: infinite.

The AWS does not support the optional Storage Media File-Set ID & UID Attributes in the N-ACTION request.

3.1.2.1.7 Modality Performed Procedure Step as SCU

AWS may use the MPPS service to inform another actor of the DICOM network of the progress of an exam (in progress, completed, discontinued).
When an exam is started in the AWS, it establishes one association with the remote MPPS SCP, sends a N-CREATE request and releases the association. The data contained in the MPPS dataset come from either by the worklist entry selected, or by patient information manually entered.
When the exam is closed, the operator chooses in the GUI if the procedure is "completed" or "discontinued". Then the AWS establishes one association with the remote MPPS SCP, sends a N-SET request and releases the association.

3.1.2.2 Functional definitions of WinSCP32 (SCP services)

3.1.2.2.1 Verification Service as SCP

AWS, through WinSCP32, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, WinSCP32 expects it to be a DICOM application. WinSCP32 will accept associations with Presentation Contexts for SOP Class of the Verification Service Class.

3.1.2.2.2 Storage Services as SCP

AWS, through WinSCP32, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, WinSCP32 expects it to be a DICOM application. WinSCP32 will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class. It will receive images on these Presentation Contexts and write them to files in the format compliant to Part 10 of the DICOM standard.

3.1.2.2.3 Storage Commitment as SCU

Note: unlike other services provided here, WinSCP32 really acts as SCU and not SCP because in a Storage Commitment transaction, the SCU is the unique AE that requests storage acknowledgements and also receives these acknowledgements.

AWS, through WinSCP32, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, WinSCP32 expects it to be a DICOM application. WinSCP32 will accept associations with Presentation Contexts for SOP Classes of the Storage Commitment Service Class. It will receive N-EVENT-REPORT messages, which contain the list of instances stored by the other application (ex.: a PACS).

The local instances which have been "committed" are deleted on demand by the operator.

3.1.3 Sequencing of Real-World Activities

See the previous section.

3.2 Application Entity Specifications

3.2.1 AWS / SCU

3.2.1.1 SOP Classes

AWS provides Standard Conformance to the following DICOM V3.0 SOP Classes

Table 3.2.1-1 Supported SOP Classes for Verification SCU

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 3.2.1-2 Supported SOP Classes for Storage SCU

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
US Multi-frame Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3
US Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Secondary Capture Single Bit Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-frame Secondary Capture Byte Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Secondary Capture Word Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame Secondary Capture True Color Image Storage	1.2.840.10008.5.1.4.1.1.7.4

Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-Plane Image Storage (RET)	1.2.840.10008.5.1.4.1.1.12.3
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Stored Print Storage	1.2.840.10008.5.1.1.27
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Raw Data Storage	1.2.840.10008.5.1.1.66
Spatial Registration Storage	1.2.840.10008.5.1.1.66.1
Spatial Fiducial Storage	1.2.840.10008.5.1.1.66.2
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
Ophthalmic Photography 8Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

Table 3.2.1-3 Supported SOP Classes for Modality Worklist SCU

SOP Class Name	SOP Class UID
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31

Table 3.2.1-4 Supported SOP Classes for Query/Retrieve SCU

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2

Table 3.2.1-5 Supported Meta SOP Classes for Basic Print SCU

Meta SOP Class Name	Meta SOP Class UID
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9
Basic Color Print Management	1.2.840.10008.5.1.1.18

Table 3.2.1-6 Supported SOP Classes for Basic Grayscale Print SCU

SOP Class Name	SOP Class UID
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

Table 3.2.1-7 Supported SOP Classes for Basic Color Printing SCU

SOP Class Name	SOP Class UID
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

Table 3.2.1-8 Supported SOP Classes for Storage Commitment SCU

SOP Class Name	SOP Class UID
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1

Table 3.2.1-9 Supported SOP Classes for MPPS SCU

SOP Class Name	SOP Class UID
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3

3.2.1.2 Association policies

3.2.1.2.1 General

The following DICOM standard application context shall be used.

Table 3.2.1-10 Application context

Application Context Name	1.2.840.10008.3.1.1.1

AWS contains the following limitations for PDU size:

Table 3.2.1-11 PDU sizes

Minimum PDU size	8 192 bytes
Maximum PDU size	16 384 bytes

3.2.1.2.2 Number of Associations

All DICOM services are performed synchronously on user request, except Print operations that are performed in background. They are however spooled so that only one Print operation may be performed at the same time.

Thus, the maximum number of simultaneous DICOM SCU operations and associations established is 2.

Table 3.2.1-12 Number of associations as an association initiator AWS / SCU

Maximum number of simultaneous associations	2

3.2.1.2.3 Asynchronous Nature

AWS does not support asynchronous communication.

Table 3.2.1-13 Asynchronous nature as an association initiator AWS / SCU

Maximum number of outstanding asynchronous transactions	o

3.2.1.2.4 Implementation Identifying Information

AWS has the following implementation identifying parameters:

Table 3.2.1-14 Application Identifying Information for DX images and Secondary Captures

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.453.284
Implementation Version Name	ACC-ETIAM-284

Table 3.2.1-15 Application Identifying Information for X-Ray Radiation Dose SR

Name	SOP Class UID
Implementation Class UID	1.2.250.1.118.0.1.0.0
Implementation Version Name	EOS_DCM_100

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Activity: Verification SCU

3.2.1.3.1.1 Description and sequencing of activity

All verification SCU operations are performed synchronously, on user request.

AWS may initiate an association with a Verification SCP within its configuration panel to check remote SCP availability. A verification request is also initiated automatically by AWS before each storage SCU request.

3.2.1.3.1.2 Proposed presentation contexts

Table 3.2.1-16 Proposed presentation contexts for Verification SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.2.1.3.1.3 SOP Specific conformance

None

3.2.1.3.2 Activity: Storage SCU

3.2.1.3.2.1 Description and sequencing of activity

All storage SCU operations are performed synchronously, on user request.

AWS will initiate an association with a Storage SCP to store local data to a remote application entity. All data then are stored on the same association and then the association is released.

3.2.1.3.2.2 Proposed presentation contexts

Table 3.2.1-17 Proposed presentation contexts for Storage SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See note	*See note*	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	1.2.840.10008.1.2.4.51	SCU	None
		JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
		MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCU	None
		RLE Lossless	1.2.840.10008.1.2.5	SCU	None

3.2.1.3.2.3 SOP Specific conformance

DX Images / Secondary Captures

Images sent by AWS using Storage SCU operation contain their native information. AWS never attempts to modify local stored datasets.

AWS applies the following rules for the presentation contexts proposed:

- Uncompressed transfer syntaxes are proposed for all storage operations with a few exceptions mentioned below.
- If an image is encoded, its corresponding native transfer syntax is proposed also in a separate Presentation Context, and will be preferred by SCU if both compressed and uncompressed transfer syntaxes are accepted by SCP.
- If SCP does not accept encoded transfer syntaxes, AWS will try to uncompress the related images on the fly.
- Exceptions
    - MPEG2 encoded data will never be proposed uncompressed.

Dose SR (cf DICOM PS 3.4, Annex O.4.1)

- DX images instances are referenced by instances of X-Ray Radiation Dose SR Storage SOP Class.
- Range of Value Types and Relationship Types that are supported by the SCU (cf DICOM PS 3.3, A.35.8.3.1):
    - Values Types supported: TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, IMAGE, COMPOSITE, and CONTAINER
    - Relationships supported:

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type

CONTAINER	CONTAINS	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, IMAGE,COMPOSITE, CONTAINER
CONTAINER	HAS OBS CONTEXT	DATETIME, CODE, TEXT, UIDREF, PNAME
TEXT, CODE, NUM	HAS OBS CONTEXT	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME,COMPOSITE
CONTAINER, IMAGE,COMPOSITE	HAS ACQ CONTEXT	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, CONTAINER.
any type	HAS CONCEPT MOD	TEXT, CODE
TEXT, CODE, NUM	HAS PROPERTIES	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, IMAGE, COMPOSITE, CONTAINER.
PNAME	HAS PROPERTIES	TEXT, CODE, DATETIME, DATE, TIME, UIDREF, PNAME
TEXT, CODE, NUM	INFERRED FROM	TEXT, CODE, NUM, DATETIME, UIDREF, IMAGE, COMPOSITE, CONTAINER.

3.2.1.3.3 Activity: Modality Worklist SCU

3.2.1.3.3.1 Description and sequencing of activity

All modality worklist operations are performed synchronously, on user request, when filling examination data.

For each basic query of a remote application entity for a modality worklist list of items, AWS will initiate an association, send a C-FIND request command, wait in blocking mode for all C-FIND responses, and then release the association.

3.2.1.3.3.2 Proposed presentation contexts

AWS will propose the following Presentation Context:

Table 3.2.1-18 Modality Worklist Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Worklist Find	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.3.3 SOP Specific conformance

AWS provides standard conformance to the DICOM Modality Worklist Service Class. AWS requests the following matching key types:

Key type matching	
SV	Single value Matching
WC	Wild card Matching
RM	Range Matching

AWS will query for the following attributes:

Table 3.2.1-19 Modality Worklist Query attributes

Module	Attribute Name	Tag	Match
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	
	› Scheduled Station AETitle	(0040,0001)	SV / WC
	› Scheduled Procedure Step Start Date	(0040,0002)	SV / WC
	› Scheduled Procedure Step Start Time	(0040,0003)	
	› Modality	(0008,0060)	SV / WC
	› Scheduled Performing Physician's Name	(0040,0006)	
	› Scheduled Station Name	(0040,0010)	
	› Scheduled Procedure Step Location	(0040,0011)	
	› Pre Medication	(0040,0012)	
	› Scheduled Procedure Step ID	(0040,0009)	
	› Requested Contrast Agent	(0032,1070)	
Requested Procedure	Requested Procedure ID	(0040,1001)	SV / WC
	Study Instance UID	(0020,000D)	
	Requested Procedure Priority	(0040,1003)	
	Patient Transport Arrangements	(0040,1004)	
Imaging Service Request	Accession Number	(0008,0050)	SV / WC
	Requesting Physician	(0032,1032)	
	Referring Physician's Name	(0008,0090)	
Visit Identification	Admission ID	(0038,0010)	
Visit Status	Current Patient Location	(0038,0300)	
Patient Identification	Patient's Name	(0010,0010)	SV / WC
	Patient ID	(0010,0020)	SV / WC
Patient Demographic	Patient's Birth Date	(0010,0030)	SV / WC
	Patient's Sex	(0010,0040)	SV / WC
	Patient's Weight	(0010,1030)	
Patient Medical	Patient State	(0038,0500)	
	Medical Alerts	(0010,2000)	
	Contrast Allergies	(0010,2110)	
	Special Needs	(0038,0050)	

3.2.1.3.4 Activity: Query/Retrieve SCU

3.2.1.3.4.1 Description and sequencing of activity

All query and retrieve operations are performed synchronously, on user request.

For each basic query of a remote application entity for a patient, a study, a series or an instance list, AWS will initiate an association, send a C-FIND request command, wait in blocking mode for all C-FIND responses, and then release the association.

For each basic retrieval of a patient, a study, a series or an instance list, AWS will initiate an association, send a C-MOVE request command, wait in blocking mode for all C-MOVE responses, and then release the association.

3.2.1.3.4.2 Proposed presentation contexts

AWS will propose the following Presentation Context:

Table 3.2.1-20 Query and Retrieve Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	Transfer Syntax	Role	Extended

Name	UID	Name	UID		Negotiation
Patient Root Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Patient Root Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.4.3 SOP Specific conformance

AWS provides standard conformance to the DICOM Query and Retrieve Service Class. AWS requests the following matching key types:

Key type matching	
SV	Single value Matching
WC	Wild card Matching
RM	Range Matching

Table 3.2.1-21 Query and Retrieve matching key types

Attribute Name	Tag	Match
Patient's Name	(0010,0010)	SV / WC
Patient ID	(0010,0020)	SV / WC
Study Date	(0008,0020)	RM
Modality	(0008,0060)	SV

AWS will query for the following attributes:

Table 3.2.1-22 Query Attributes

Attribute Name	Tag
Patient Level	
PatientName	(0010,0010)
PatientID	(0010,0020)
PatientBirthDate	(0010,0030)
PatientSex	(0010,0040)
Study Level	
StudyInstanceUID	(0020,000D)

Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
ReferringPhysiciansName	(0008,0090)
NameOfPhysiciansReadingStudy	(00081060)
StudyDescription	(0008,1030)
StudyID	(0020,0010)
Series Level	
SeriesInstanceUID	(0020,000E)
Modality	(0008,0060)
SeriesDescription	(0008,103E)
SeriesNumber	(0020,0011)
Instance Level	
SOPInstanceUID	(0008,0018)
InstanceNumber	(0020,0013)

3.2.1.3.5 Activity: Print SCU

3.2.1.3.5.1 Description and sequencing of activity

Each user Print request made through the Film Composer is spooled and processed sequentially in a background task. Only one Print request is processed at the same time.

For each print request, AWS will initiate an association with a Print SCP, process the request on this association and then release the association.

3.2.1.3.5.2 Proposed presentation contexts

AWS will propose the following different Presentation Contexts:

Table 3.2.1-23 Basic Print Management Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.5.3 SOP Specific conformance

If the DICOM Print software is unable to open an association with the selected destination AE, an error message displays in AWS. No message is displayed when successful printing operation responses are received.

After an association has been accepted and is established, AWS will send a print job to the Print Server.

Each print job includes the following steps:

- AWS first performs a N-GET request to get Printer information.
- AWS requests the server to a N-CREATE a film session SOP instance.

For each film to be printed:

- a N-CREATE request is performed to get a Film Box SOP instance
- N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data.
- If no print collation is needed, an N-ACTION is requested for the Film Box instance. This causes the film to be printed.
- If print collation is requested, an N-ACTION is performed on the film session.

3.2.1.3.5.3.1 Basic Printer SOP Class

AWS can send the following DIMSE commands to a Film Box: N-GET.

◊ N-GET is issued by AWS to get Print information. However, this information is not used.

3.2.1.3.5.3.2 Basic Film Session SOP Class

AWS can send the following DIMSE commands to a Film Session: N-CREATE, N-SET, N-ACTION, N-DELETE.

◊ N-CREATE is issued by AWS to create a Film Session where film boxes will be created.

Attribute Name	Tag ID	Value / Comment
Number of Copies	(2000,0010)	Default is 1

◊ N-SET is issued by AWS to change Film Session attributes.

Attribute Name	Tag ID	Value / Comment
Number of Copies	(2000,0010)	Default is 1
Print Priority	(2000,0020)	HIGH, MED, LOW. Default is MED
Medium Type	(2000,0030)	PAPER, BLUE FILM, CLEAR FILM empty string
Film Destination	(2000,0040)	PROCESSOR or MAGAZINE. Not set if default.
Film Session Label	(2000,0050)	Fixed value

◊ N-ACTION is issued by AWS to request printing of all Film Boxes in the Film Session.

◊ N-DELETE is issued by AWS to request a Film Session deletion.

3.2.1.3.5.3.3 Basic Film Box SOP Class

AWS can send the following DIMSE commands to a Film Box: N-CREATE, N-SET, N-ACTION, N-DELETE.

◊ N-CREATE is issued by AWS to create a Film Box in a Film Session, where image boxes will be created.

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010,0010)	STANDARD
Film Orientation	(2010,0030)	PORTRAIT or LANDSCAPE. Not set if default.

◊ N-SET is issued by AWS to create change Film Box attributes.

Attribute Name	Tag ID	Value / Comment

Image Display Format	(2010,0010)	STANDARD
Film Orientation	(2010,0030)	PORTRAIT or LANDSCAPE. Not set if default.
Film Size ID	(2010,0050)	8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 14INX36IN, 14INX51IN, 24CMX24CM, 24CMX30CM, A4 or A3. Not set if default.
Magnification Type	(2010,0060)	NONE, REPLICATE, BILINEAR or CUBIC Not set if default.
Smoothing Type	(2010,0080)	Not set if default.
Border Density	(2010,0100)	BLACK, WHITE Not set if default
Empty Image Density	(2010,0110)	BLACK, WHITE Not set if default
Min Density	(2010,0120)	BLACK, WHITE Not set if default
Max Density	(2010,0130)	BLACK, WHITE Not set if default
Trim	(2010,0140)	YES, NO Not set if default
Referenced Film Session Sequence	(2010,0500)	
Requested Image Size	(2020,0030)	Width (x-dimension) in mm of the image to be printed. Only if print true size activated.
›Referenced SOP Class UID	(0008,1150)	
›Referenced SOP Instance UID	(0008,1155)	

◊ N-ACTION is issued by AWS to request printing of a Film Boxes.

◊ N-DELETE is issued by AWS to request a Film Box deletion.

3.2.1.3.5.3.4 Basic Grayscale Image Box SOP Class

Basic Grayscale Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that applie to a single image of a film sheet.

AWS can send the following DIMSE commands to an Image Box: N-SET.

◊ N-SET is issued by AWS to set change Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020,0010)	1 to ‹number of images in film box›
Polarity	(2020,0020)	NORMAL or REVERSE. Not set if default.
Basic Grayscale Image Sequence	(2020,0110)	
›Samples Per Pixel	(0028,0002)	1
›Photometric Interpretation	(0028,0004)	MONOCHROME2
›Rows	(0028,0010)	
›Columns	(0028,0011)	
›Pixel Aspect Ratio	(0028,0034)	1\1
›Bits Allocated	(0028,0100)	8 or 16
›Bits Stored	(0028,0101)	8 or 12
›High Bit	(0028,0102)	7 or 11
›Pixel Representation	(0028,0103)	0
›Pixel Data	(7FE0,0010)	

3.2.1.3.5.3.5 Basic Color Image Box SOP Class

Basic Color Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet.

AWS can send the following DIMSE commands to an Image Box: N-SET.

◊ N-SET is issued by AWS to set change Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020,0010)	1 to ‹number of images in film box›
Polarity	(2020,0020)	NORMAL or REVERSE. Not set if default.
Basic Color Image Sequence	(2020,0110)	
›Samples Per Pixel	(0028,0002)	3
›Photometric Interpretation	(0028,0004)	RGB
›Planar Configuration	(0028,0006)	0
›Rows	(0028,0010)	
›Columns	(0028,0011)	
›Pixel Aspect Ratio	(0028,0034)	1\1
›Bits Allocated	(0028,0100)	8
›Bits Stored	(0028,0101)	8
›High Bit	(0028,0102)	7
›Pixel Representation	(0028,0103)	0
›Pixel Data	(7FE0,0010)	

3.2.1.3.6 Activity: Storage Commitment SCU

3.2.1.3.6.1 Description and sequencing of activity

All Storage Commitment operations are performed synchronously, after a successful archiving (if Storage Commitment request is configured for this AE).

AWS will initiate an association, send a N-ACTION request command containing the list of SOP Instance UID just archived by DICOM Store, wait in blocking mode for all N-ACTION responses, and then release the association.

3.2.1.3.6.2 Proposed presentation contexts

AWS will propose the following Presentation Context:

Table 3.2.1-24 Storage Commitment Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

3.2.1.3.6.3 SOP Specific conformance

- Storage Commitment is supported for all the SOP Class UIDs as mentioned in table "3.2.1-2 Supported SOP Classes for Storage SCU"

- The optional Storage Media File-Set ID & UID Attributes in the N-ACTION are not supported.

- The Storage Commitment transaction does not have any temporal limit of applicability.

3.2.1.3.7 Activity: MPPS SCU

3.2.1.3.7.1 Description and sequencing of activity

All MPPS operations are performed synchronously, after the creation of an exam (N-CREATE request) and after the termination of an exam (N-SET request).

When creating an exam, the AWS will initiate an association, send a N-CREATE request command containing information coming from the worklist or from manually entered data, wait in blocking mode for all N-CREATE responses, and then release the association.

When terminating a procedure, the AWS will initiate an association, send a N-SET request command containing the list of instances created during the exam, total dose for the exam, and a COMPLETED/DISCONTINUED status, wait in blocking mode for all N-SET responses, and then release the association.

3.2.1.3.7.2 Proposed presentation contexts

AWS will propose the following Presentation Context:

Table 3.2.1-25 MPPS Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.2.1.3.7.3 SOP Specific conformance

Attribute name	Tag	N-CREATE dataset	N-SET dataset
SOP Common Module			
Specific Character Set	(0008,0005)	Generated by the system: "ISO_IR 100".	Not included.
Instance Creation Date	(0008,0012)	Generated by the system.	Not included.
Instance Creation Time	(0008,0013)	Generated by the system.	Not included.
Performed Procedure Step Relationship Module			
Patient's Name	(0010,0010)	Acquired from the Worklist or user input.	Not included.
Patient ID	(0010,0020)	Acquired from the Worklist or user input.	Not included.
Patient's Birth Date	(0010,0030)	Acquired from the Worklist or	Not included.

		user input.	
Patient's Sex	(0010,0040)	Acquired from the Worklist or user input.	Not included.
Referenced Patient Sequence	(0008,1120)	Empty.	Not included.
Scheduled Step Attributes Sequence	(0040,0270)	See below	Not included.
›Study Instance UID	(0020,000D)	Acquired from the Worklist or generated by the system.	Not included.
›Referenced Study Sequence	(0008,1110)	See below	Not included.
›› Referenced SOP Class UID	(0008,1150)	Generated by the system: 1.2.840.10008.3.1.2.3.1 (i.e. Detached Study Management SOP Class (Retired)).	Not included.
›› Referenced SOP Instance UID	(0008,1155)	Acquired from the Worklist or generated by the system. Same as Study Instance UID.	Not included.
› Accession Number	(0008,0050)	Acquired from the Worklist or user input.	Not included.
›Requested Procedure ID	(0040,1001)	Acquired from the Worklist.	Not included.
›Requested Procedure Description	(0032,1060)	Acquired from the Worklist.	Not included.
›Scheduled Procedure Step ID	(0040,0009)	Acquired from the Worklist.	Not included.
›Scheduled Procedure Step Description	(0040,0007)	Acquired from the Worklist.	Not included.
›Scheduled Protocol Code Sequence	(0040,0008)	See below	Not included.
›› Code Value	(0008,0100)	Acquired from the Worklist.	Not included.
›› Coding Scheme Designator	(0008,0102)	Acquired from the Worklist.	Not included.
›› Code Meaning	(0008,0104)	Acquired from the Worklist.	Not included.
Performed Procedure Step Information Module			
Performed Station AE Title	(0040,0241)	From system configuration.	Not included.
Performed Station Name	(0040,0242)	From system configuration.	Not included.
Performed Location	(0040,0243)	Empty	Not included.
Performed Procedure Step Start Date	(0040,0244)	Generated by the system.	Not included.
Performed Procedure Step Start Time	(0040,0245)	Generated by the system.	Not included.
Performed Procedure	(0040,0253)	Generated by the system.	Not included.

Step ID			
Performed Procedure Step End Date	(0040,0250)	Empty	Generated by the system.
Performed Procedure Step End Time	(0040,0251)	Empty	Generated by the system.
Performed Procedure Step Status	(0040,0252)	Generated by the system: "IN PROGRESS"	Generated by the system: "COMPLETED" or "DISCONTINUED"
Performed Procedure Step Description	(0040,0254)	Acquired from the Worklist. Same as Requested Procedure Description.	Not included.
Performed Procedure Type Description	(0040,0255)	Empty.	Not included.
Procedure Code Sequence	(0008,1032)	See below	Not included.
› Code Value	(0008,0100)	Acquired from the Worklist.	Not included.
› Coding Scheme Designator	(0008,0102)	Acquired from the Worklist.	Not included.
› Code Meaning	(0008,0104)	Acquired from the Worklist.	Not included.
Image Acquisition Results Module			
Modality	(0008,0060)	Generated by the system: "DX"	Not included.
Study ID	(0020,0010)	Acquired from the Worklist (Requested Procedure ID) or generated by the system.	Not included.
Performed Protocol Code Sequence	(0040,0260)	Empty.	Not included.
Performed Series Sequence	(0040,0340)	Empty.	See below
›Performing Physician's Name	(0008,1050)	Not included.	Acquired from the Worklist.
›Operators' Name	(0008,1070)	Not included.	Selected user account.
›Protocol Name	(0018,1030)	Not included.	Generated by the system.
›Series Instance UID	(0020,000E)	Not included.	Generated by the system.
›Series Description	(0008,103E)	Not included.	Generated by the system.
›Retrieve AE Title	(0008,0054)	Not included.	Empty.
›Referenced Image Sequence	(0008,1140)	Not included.	See below
››Referenced SOP Class UID	(0008, 1150)	Not included.	Generated by the system.
››Referenced SOP Instance UID	(0008, 1155)	Not included.	Generated by the system.
›Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	Not included.	See below
››Referenced SOP Class	(0008, 1150)	Not included.	Generated by the system.

UID			
››Referenced SOP Instance UID	(0008, 1155)	Not included.	Generated by the system.
Radiation Dose Module			
Total Number of Exposures	(0040,0301)	Not included.	Generated by the system.
Image and Fluoroscopy Area Dose Product	(0018,115E)	Not included.	Generated by the system.
Exposure Dose Sequence	(0040,030E)	Not included.	Generated by the system.
›Radiation Mode	(0018,115A)	Not included.	Generated by the system.
›KVp	(0018,0060)	Not included.	Generated by the system.
›X-Ray Tube Current in µA	(0018,8151)	Not included.	Generated by the system.
›Exposure Time	(0018,1150)	Not included.	Generated by the system.
›Filter Material	(0018,7050)	Not included.	Generated by the system.

3.2.1.4 Association Acceptance Policy

Non applicable

3.2.2 WinSCP32 (SCP)

3.2.2.1 SOP Classes

WinSCP32 provides Standard Conformance to the following SOP Classes:

Table 3.2.2-1 Supported SOP Classes for Verification SCP

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 3.2.2-2 Supported SOP Classes for Storage SCP

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
US Multi-frame Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3
US Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5

US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Secondary Capture Single Bit Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi-frame Secondary Capture Byte Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Secondary Capture Word Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame Secondary Capture True Color Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-Plane Image Storage (RET)	1.2.840.10008.5.1.4.1.1.12.3
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Stored Print Storage	1.2.840.10008.5.1.1.27
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Raw Data Storage	1.2.840.10008.5.1.1.66
Spatial Registration Storage	1.2.840.10008.5.1.1.66.1
Spatial Fiducial Storage	1.2.840.10008.5.1.1.66.2
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
Ophthalmic Photography 8Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

Table 3.2.2-3 Supported SOP Classes for Storage Commitment SCU

SOP Class Name	SOP Class UID
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1

3.2.2.2 Association policy

3.2.2.2.1 General

The following DICOM standard application context shall be used.

Table 3.2.2-4 Application context

Application Context Name	1.2.840.10008.3.1.1.1

WinSCP32 contains the following limitations for PDU size:

Table 3.2.2-5 PDU Sizes

Minimum PDU size	8 192 bytes
Maximum PDU size	16 384 bytes

3.2.2.2.2 Number of Associations

WinSCP32 maximum number of association is 5. However this default value may be changed using WinSCP32 configuration panel.

Table 3.2.2-6 Number of associations as an association acceptor WinSCP32

Maximum number of simultaneous associations	5

3.2.2.2.3 Asynchronous Nature

WinSCP32 does not support asynchronous communication.

Table 3.2.2-7 Asynchronous nature as an association acceptor WinSCP32

Maximum number of outstanding asynchronous transactions	0

3.2.2.2.4 Implementation Identifying Information

WinSCP32 will have the following implementation identifying parameters:

Table 3.2.2-8 Application Identifying Information

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

3.2.2.3 Association Initiation Policy

Non applicable

3.2.2.4 Association Acceptance Policy

3.2.2.4.1 Activity: Verification SCP

3.2.2.4.1.1 Description and sequencing of activity

WinSCP32 will respond to Verification requests.

3.2.2.4.1.2 Accepted presentation contexts

Table 3.2.2-9 Acceptable presentation contexts for Verification SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

3.2.2.4.1.3 SOP Specific conformance

None

3.2.2.4.2 Activity: Storage SCP

3.2.2.4.2.1 Description and sequencing of activity

When receiving DICOM objects, WinSCP32 will store them in AWS local data repository.

3.2.2.4.2.2 Accepted presentation contexts

Table 3.2.2-10 Storage Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See note	*See note*	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	1.2.840.10008.1.2.4.51	SCP	None
		JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
		MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCP	None
		RLE Lossless	1.2.840.10008.1.2.5	SCP	None

3.2.2.4.2.3 SOP Specific conformance

WinSCP32 provides standard conformance to the DICOM Storage Service Class.

3.2.2.4.2.3.1 Presentation Context Acceptance Criterion

No control is made concerning the Abstract/Transfer syntax consistency.

3.2.2.4.2.3.2 Transfer Syntax Acceptance Selection Policies

WinSCP32 will prefer, for storage operations, in decreasing order:

- Encoded transfer syntax
- Explicit VR Little Endian transfer syntax
- Implicit VR Little Endian transfer syntax
- Explicit VR Big Endian transfer syntax

3.2.2.4.3 Activity: Storage Commitment SCU

3.2.2.4.3.1 Description and sequencing of activity

Upon reception of a N-EVENT-REPORT message, WinSCP32 stores the datasets in AWS local data repository. Then the AWS parses these files and updates a flag "committed/not committed" associated to each DICOM object.

No automatic deletion of local SOP instances is done.

3.2.2.4.3.2 Proposed presentation contexts

AWS will propose the following Presentation Context:

Table 3.2.2-11 Storage Commitment Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.2.4.3.3 SOP Specific conformance

None.

3.3 Network interface

3.3.1 Physical network interface

AWS is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

AWS provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard. It inherits its TCP/IP stack from the Windows system upon which it executes. Default Windows TCP/IP stack is supported.

3.3.2 Additional protocols

None

3.4 Configuration

AWS configuration is detailed in AWS User's Guide.

The following parameters may be configured:

- AWS AE Title: Default value is SCP
- WinSCP32 TCP/IP port. Default value is 104

4 Media Interchange

Not applicable.

5 Support of Character Sets

AWS supports ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set).

6 Annexes

6.1 Digital X-Ray Image IOD Contents

6.1.1 Created SOP Instances

Table 6.1-1 specifies the attributes of a Digital X-Ray Image transmitted by the AWS Acquisition storage application.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Value” column are:

- VNAP Value Not Always Present (attribute sent zero length if no value is present)
- ANAP Attribute Not Always Present
- ALWAYS Always Present
- EMPTY Attribute is sent without a value

The abbreviations used in the “Source” column:

- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- MWL the attribute value source Modality Worklist
- CONFIG the attribute value source is a configurable parameter

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

6.1.1.1.1 Digital X-Ray Image Storage – For Presentation

Table 6.1-1 IOD of created DX SOP Instances

IE	Module	Reference	Presence of module
Patient	Patient	Table 6.1-2	ALWAYS
Study	General Study	Table 6.1-3	ALWAYS
	Patient Study	Table 6.1-4	ALWAYS
	Patient Medical Module	*Table 6.1-4b*	*ALWAYS*
Series	General Series	Table 6.1-5	ALWAYS
	DX Series	Table 6.1-6	ALWAYS
Equipment	General Equipment	Table 6.1-7	ALWAYS
Image	General Image	Table 6.1-8	ALWAYS
	Image Pixel	Table 6.1-9	ALWAYS
	Contrast/Bolus	Table 6.1-10	ALWAYS
	DX Anatomy Imaged	Table 6.1-11	ALWAYS
	DX Image	Table 6.1-12	ALWAYS
	DX Detector	Table 6.1-13	ALWAYS
	X-Ray Collimator	Table 6.1-14	ALWAYS
	DX Positioning	Table 6.1-15	ALWAYS
	X-Ray Acquisition Dose	Table 6.1-16	ALWAYS
	X-Ray Generation	Table 6.1-17	ALWAYS
	X-Ray Filtration	Table 6.1-18	ALWAYS
	VOI LUT	Table 6.1-19	ALWAYS
	Acquisition Context	Table 6.1-20	ALWAYS
	SOP Common	Table 6.1-21	ALWAYS
	Private Application	Table 6.1-22	ALWAYS

Table 6.1-2 Patient module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received. Values supplied via user input will contain all 5 components (some possibly empty). Maximum 64 characters per component group.	ALWAYS	MWL/ USER
Patient ID	(0010,0020)	LO	From Modality Worklist or user input.	VNAP	MWL/ USER
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input.	ALWAYS	MWL/ USER
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input.	ALWAYS	MWL/ USER

Table 6.1-3 General Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or generated by device with timestamp.	ALWAYS	MWL/ AUTO
Study Date	(0008,0020)	DA	‹yyyymmdd›	ALWAYS	AUTO
Study Time	(0008,0030)	TM	‹hhmmss›	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist.	VNAP	MWL
Study ID	(0020,0010)	SH	From Modality Worklist (Requested Procedure ID) or generated by device.	ALWAYS	MWL/ AUTO
Accession Number	(0008,0050)	SH	From Modality Worklist or user input.	VNAP	MWL/ USER
Study Description	(0008,1030)	LO	From Modality Worklist, or empty.	VNAP	MWL
Referenced Study Sequence	(0008,1110)	SQ	From Modality Worklist.	VNAP	AUTO
› Referenced SOP Class UID	(0008,1150)	UI	"1.2.840.10008.3.1.2.3.1" (i.e. Detached Study Management SOP Class (Retired))	ALWAYS	AUTO
› Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist.	ALWAYS	MWL
Procedure Code Sequence	(0008,1032)	SQ	From Modality Worklist. Absent if "Requested Procedure Code Sequence" is empty in worklist.	ANAP	AUTO
› Code Value	(0008,0100)	SH	From Modality Worklist.	ALWAYS	AUTO
› Coding Scheme Designator	(0008,0102)	SH	From Modality Worklist.	ALWAYS	AUTO
› Code Meaning	(0008,0104)	LO	From Modality Worklist.	ALWAYS	AUTO

Table 6.1-4 Patient Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Admitting Diagnoses Description	(0008,1080)	LO	User input. Maximum 64 characters.	VNAP	USER
Patient's Age	(0010,1010)	AS	Calculated from DoB input on base of actual Date.	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	From Modality Worklist or user input.	VNAP	MWL/ USER
Patient's Weight	(0010,1030)	DS	From Modality Worklist or user input.	VNAP	MWL/ USER
Occupation	(0010,2180)	SH	User input.	VNAP	USER
Additional Patient's History	(0010,21B0)	LT	From Modality Worklist (Medical Alerts (0010,2000)) or user input. Maximum 10240 characters.	VNAP	MWL/ USER

Table 6.1-5 General Series module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Series Instance UID	(0020,000E)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device.	ALWAYS	AUTO
Series Date	(0008,0021)	DA	‹yyyymmdd›	ALWAYS	AUTO
Series Time	(0008,0031)	TM	‹hhmmdd›	ALWAYS	AUTO
Performing Physicians' Name	(0008,1050)	PN	From Modality Worklist.	VNAP	MWL
Protocol Name	(0018,1030)	LO	Zero length.	EMPTY	AUTO
Series Description	(0008,103E)	LO	Examination Area	ALWAYS	AUTO
Operators' Name	(0008,1070)	PN	Selected user account. Maximum 64 characters.	ALWAYS	USER
Body Part Examined	(0018,0015)	CS	Mapped from Anatomical Region Codes using the table Annex L-1 provided in DICOM PS 3.16.	VNAP	AUTO
Request Attributes Sequence	(0040,0275)	SQ	From Modality Worklist.	ANAP	MWL
› Requested Procedure ID	(0040,1001)	SH	From Modality Worklist.	ALWAYS	MWL
› Requested Procedure Description	(0032,1060)	LO	From Modality Worklist.	VNAP	MWL
› Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist.	ALWAYS	MWL
› Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist.	VNAP	MWL
› Scheduled Protocol Code Sequence	(0040,0008)	SQ	From Modality Worklist. Absent if empty in worklist.	ANAP	MWL
›› Code Value	(0008,0100)	SH	From Modality Worklist.	ALWAYS	MWL
›› Coding Scheme Designator	(0008,0102)	SH	From Modality Worklist.	ALWAYS	MWL
›› Code Meaning	(0008,0104)	LO	From Modality Worklist.	ALWAYS	MWL
Performed Procedure Step ID	(0040,0253)	SH	Generated by device.	ALWAYS	AUTO
Performed Procedure Step Start Date	(0040,0244)	DA	Generated by device.	ALWAYS	AUTO
Performed Procedure Step Start Time	(0040,0245)	TM	Generated by device.	ALWAYS	AUTO
Performed Procedure Step Description	(0040,0254)	LO	From Modality Worklist, or empty.	VNAP	AUTO

Table 6.1-6 DX Series module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Modality	(0008,0060)	CS	DX	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Generated by device.	ANAP	AUTO
› Referenced SOP Class UID	(0008,1150)	UI	"1.2.840.10008.3.1.2.3.3" (i.e. MPPS SOP Class UID)	ALWAYS	AUTO
› Referenced SOP Instance UID	(0008,1155)	UI	Generated by device.	ALWAYS	AUTO
Presentation Intent Type	(0008,0068)	CS	FOR PRESENTATION	ALWAYS	AUTO

Table 6.1-7 General Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Manufacturer	(0008,0070)	LO	EOS imaging	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	From configuration.	ALWAYS	CONFIG
Station Name	(0008,1010)	SH	From configuration	ALWAYS	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	From configuration	ALWAYS	CONFIG
Device Serial Number	(0018,1000)	LO	From configuration.	ALWAYS	CONFIG
Software Versions	(0018,1020)	LO	Software version (3.x.x.xxxx)	ALWAYS	AUTO
Date of Last Calibration	(0018,1200)	DA	‹yyyymmdd›	ALWAYS	AUTO
Time of Last Calibration	(0018,1201)	TM	‹hhmmss›	ALWAYS	AUTO

Table 6.1-8 General Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by device.	ALWAYS	AUTO
Content Date	(0008,0023)	DA	‹yyyymmdd›	ALWAYS	AUTO
Content Time	(0008,0033)	TM	‹hhmmss›	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	‹yyyymmdd›	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	‹hhmmss›	ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ	present if (0008,0008) = ORIGINAL\PRIMARY\\BIPLANE A or ORIGINAL\PRIMARY\\BIPLANE B	ANAP	AUTO
›Referenced SOP Class UID	(0008,1150)	UI	From referenced image.	ANAP	AUTO
›Referenced SOP Instance UID	(0008,1155)	UI	From referenced image.	ANAP	AUTO
›Purpose of Reference Code Sequence	(0040,A170)	SQ	One item	ANAP	AUTO
››Code Value	(0008,0100)	SH	121314	ANAP	AUTO
››Coding Scheme Designator	(0008,0102)	SH	DCM	ANAP	AUTO
››Code Meaning	(0008,0104)	LO	Other image of biplane pair	ANAP	AUTO
Images in Acquisition	(0020,1002)	IS	Generated by device.	ALWAYS	AUTO

Image Comments	(0020,4000)	LT	EOS Frontal = for frontal images EOS Lateral = for lateral images	ALWAYS	AUTO
Irradiation Event UID	(0008,3010)	UI	Generated by device.	ALWAYS	AUTO

Table 6.1-9 Image Pixel module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Rows	(0028,0010)	US	Generated by device.	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by device.	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	The Pixel Data itself does not contain any burned-in annotation.	ALWAYS	AUTO

Table 6.1-10 Contrast/Bolus module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO	From Modality Worklist.	VNAP	MWL

Table 6.1-11 DX Anatomy Imaged module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Image Laterality	(0020,0062)	CS	U	ALWAYS	AUTO
Anatomic Region Sequence	(0008,2218)	SQ	From Acquisition parameters.	ALWAYS	USER
>Code Value	(0008,0100)	SH	Anatomic code selected from a catalog (see CID 4009 in DICOM PS3.16).	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	SRT	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	Anatomic code selected from a catalog (see see CID 4009 in DICOM PS3.16).	ALWAYS	AUTO

Table 6.1-12 DX Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Image Type	(0008,0008)	CS	ORIGINAL\PRIMARY\\BIPLANE A = acquired frontal images of biplane pair ORIGINAL\PRIMARY\\BIPLANE B = acquired lateral images of biplane pair ORIGINAL\PRIMARY\\SINGLE PLANE A = acquired frontal images ORIGINAL\PRIMARY\\SINGLE PLANE B = acquired lateral images	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	From Acquisition parameters.	ALWAYS	USER

Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0000H	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	NO	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	CS	LOG	ALWAYS	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	SS	-1	ALWAYS	AUTO
Rescale Intercept	(0028,1052)	DS	0	ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	LO	US	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	00	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	NO	ALWAYS	AUTO
Window Center	(0028,1050)	DS	Generated by device	ALWAYS	AUTO
Window Width	(0028,1051)	DS	Generated by device	ALWAYS	AUTO
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO

Table 6.1-13 DX Detector module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Detector Type	(0018,7004)	CS	DIRECT	ALWAYS	AUTO
Detector Configuration	(0018,7005)	CS	SLOT	ALWAYS	AUTO
Detector Description	(0018,7006)	LT	Vertical Scanning Pressured Xenon Gazeous Linear Detector	ALWAYS	AUTO
Field of View Shape	(0018,1147)	CS	RECTANGLE	ALWAYS	AUTO
Field of View Origin	(0018,7030)	DS	0\0	ALWAYS	AUTO
Field of View Rotation	(0018,7032)	DS	0	ALWAYS	AUTO
Field of View Horizontal Flip	(0018,7034)	CS	Generated by device	ALWAYS	AUTO
Detector Active Dimension(s)	(0018,7026)	DS	From Acquisition parameters.	ALWAYS	AUTO
Field of View Dimension(s)	(0018,1149)	IS	From Acquisition parameters.	ALWAYS	USER
Imager Pixel Spacing	(0018,1164)	DS	0.254000\0.254000	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Generated by device.	ALWAYS	AUTO
Pixel Spacing Calibration Type	(0028,0A02)	CS	GEOMETRY	ALWAYS	AUTO
Pixel Spacing Calibration Description	(0028,0A04)	LO	BICUBIC	ALWAYS	AUTO

Table 6.1-14 X-Ray Collimator module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Collimator Shape	(0018,1700)	CS	RECTANGULAR	ALWAYS	AUTO
Collimator Left Vertical Edge	(0018,1702)	IS	From Acquisition parameters.	ALWAYS	USER
Collimator Right Vertical Edge	(0018,1704)	IS	From Acquisition parameters.	ALWAYS	USER
Collimator Upper Horizontal Edge	(0018,1706)	IS	0	ALWAYS	AUTO
Collimator Lower Horizontal Edge	(0018,1708)	IS	From Acquisition parameters.	ALWAYS	USER

Table 6.1-15 DX Positioning module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
View Code Sequence	(0054,0220)	SQ	N.A.	ALWAYS	AUTO
› Code Value	(0008,0100)	SH	From Context ID 4010 (cf PS 3.16)	ALWAYS	AUTO
› Coding Scheme Designator	(0008,0102)	SH	From Context ID 4010 (cf PS 3.16)	ALWAYS	AUTO
› Code Meaning	(0008,0104)	LO	From Context ID 4010 (cf PS 3.16)	ALWAYS	AUTO
Positioner Type	(0018,1508)	CS	Zero length (No value available)	EMPTY	AUTO

Table 6.1-16 X-Ray Acquisition Dose module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	1300	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	From Acquisition parameters: reference plane can be adjusted	ALWAYS	USER
Image and Fluoroscopy Area Dose Product	(0018,115E)	DS	From Acquisition parameters.	ALWAYS	USER
Exposed Area	(0040,0303)	US	From Acquisition parameters.	ALWAYS	USER

Table 6.1-17 X-Ray Generation module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
KVP	(0018,0060)	DS	From Acquisition parameters.	ALWAYS	USER
X-Ray Tube Current	(0018,1151)	IS	From Acquisition parameters.	ALWAYS	USER
Exposure Time	(0018,1150)	IS	From Acquisition parameters.	ALWAYS	USER
Focal Spot	(0018,1190)	DS	From Acquisition parameters.	ALWAYS	AUTO

Table 6.1-18 X-Ray Filtration module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Filter Material	(0018,7050)	CS	ALUMINUM or COPPER	ALWAYS	AUTO
Filter Thickness Minimum	(0018,7052)	DS	From configuration	ALWAYS	AUTO
Filter Thickness Maximum	(0018,7054)	DS	From configuration	ALWAYS	AUTO

Table 6.1-19 VOI LUT module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Window Center	(0028,1050)	DS	Generated by device	ALWAYS	AUTO
Window Width	(0028,1051)	DS	Generated by device	ALWAYS	AUTO

Table 6.1-20 Acquisition Context module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)	SQ	Zero length.	EMPTY	AUTO

Table 6.1-21 SOP Common module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.1.1	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	‹yyyymmdd›	ALWAYS	AUTO

Table 6.1-22 Private Application module attributes of created SOP Instances

Attribute Name	Tag	VR	Presence of Value	Source
Internal data	(0863,0010)	LO	ALWAYS	AUTO
Internal data	(0863,1010)	SL	ALWAYS	AUTO
Internal data	(0863,1023)	SL	ALWAYS	AUTO
Internal data	(0863,1026)	UL	ALWAYS	AUTO
Internal data	(0863,1027)	SL	ALWAYS	AUTO
Internal data	(0863,1028)	SL	ALWAYS	AUTO
Internal data	(0863,1032)	SL	ALWAYS	AUTO
Internal data	(0863,1033)	SL	ALWAYS	AUTO
Internal data	(0863,1034)	FL	ANAP	AUTO
Internal data	(0863,1035)	SL	ALWAYS	AUTO
Internal data	(0863,1036)	SL	ALWAYS	AUTO
Internal data	(0863,1037)	SL	ALWAYS	AUTO
Internal data	(0863,1038)	SL	ALWAYS	AUTO
Internal data	(0863,1039)	SL	ALWAYS	AUTO
Internal data	(0863,1040)	FL	ALWAYS	AUTO
Internal data	(0863,1041)	FL	ALWAYS	AUTO
Internal data	(0863,1042)	FL	ALWAYS	CONFIG
Internal data	(0863,1043)	FL	ALWAYS	CONFIG
Internal data	(0863,1044)	FL	ALWAYS	CONFIG
Internal data	(0863,1045)	FL	ALWAYS	CONFIG
Internal data	(0863,1046)	DS	ALWAYS	CONFIG
Internal data	(0863,1047)	SL	ALWAYS	AUTO
Internal data	(0863,1048)	UL	ALWAYS	AUTO
Internal data	(0863,1049)	FL	ALWAYS	AUTO
Internal data	(0863,1057)	CS	ALWAYS	AUTO

NOTE: EOS imaging private fields are specifically managed. However, this management is not described in this document.

The following attributes are not required in the Digital X-Ray Image IOD Module but the AWS Acquisition storage application adds them.

Table 6.1-23 Additional attribute of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Allergies	(0010,2110)	LO	From Modality Worklist or user input.	VNAP	MWL/ USER
Distance Source to Isocenter	(0018,9402)	FL	Generated by device.	ALWAYS	AUTO
Requesting Physician	(0032,1032)	PN	From Modality Worklist.	VNAP	MWL

6.2 Digital X-Ray Image: data dictionary of private attributes

The Private Attributes added to create SOP Instances are listed in the Table below. AWS reserves blocks of private attributes in group 0863.

Table 6.2-1 Data Dictionary of private attributes

Tag	Attribute Name	VR	VM
(0863,0010)	*Internal data*	LO	1
(0863,1010)	*Internal data*	SL	1
(0863,1023)	*Internal data*	SL	1
(0863,1026)	*Internal data*	UL	1
(0863,1027)	*Internal data*	SL	1
(0863,1028)	*Internal data*	SL	1
(0863,1032)	*Internal data*	SL	1
(0863,1033)	*Internal data*	SL	1
(0863,1034)	*Internal data*	FL	1
(0863,1035)	*Internal data*	SL	1
(0863,1036)	*Internal data*	SL	1
(0863,1037)	*Internal data*	SL	1
(0863,1038)	*Internal data*	SL	1
(0863,1039)	*Internal data*	SL	1
(0863,1040)	*Internal data*	FL	1
(0863,1041)	*Internal data*	FL	1
(0863,1042)	*Internal data*	FL	1
(0863,1043)	*Internal data*	FL	1
(0863,1044)	*Internal data*	FL	1
(0863,1045)	*Internal data*	FL	1
(0863,1046)	*Internal data*	DS	11
(0863,1047)	*Internal data*	SL	1
(0863,1048)	*Internal data*	UL	1
(0863,1049)	*Internal data*	FL	1
(0863,1057)	*Internal data*	CS	1

6.3 Secondary Capture Image IOD Contents

6.3.1 Created SOP Instances

Table 6.3-1 specifies the attributes of a Secondary Capture Image transmitted by the 2D Viewer module of AWS.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Value” column are:

- VNAP Value Not Always Present (attribute sent zero length if no value is present)
- ANAP Attribute Not Always Present
- ALWAYS Always Present
- EMPTY Attribute is sent without a value

The abbreviations used in the “Source” column:

- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- CONFIG the attribute value source is a configurable parameter
- COPY the attribute value source is another SOP instance

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

6.3.1.1.1 Secondary Capture Image Storage SOP Class

Table 6.3-1 IOD of created Secondary Capture SOP Instances

IE	Module	Reference	Presence of module
Patient	Patient	Table 6.3-2	ALWAYS
Study	General Study	Table 6.3-3	ALWAYS
	Patient Study	Table 6.3-4	ALWAYS
Series	General Series	Table 6.3-5	ALWAYS
Equipment	General Equipment	Table 6.3-6	ALWAYS
	SC Equipment	Table 6.3-7	ALWAYS
Image	General Image	Table 6.3-8	ALWAYS
	Image Pixel	Table 6.3-9	ALWAYS
	SC Image	Table 6.3-10	ALWAYS
	VOI LUT	Table 6.3-11	ALWAYS
	SOP Common	Table 6.3-12	ALWAYS
	Private Application	Table 6.3-13	ALWAYS

Table 6.3-2 Patient module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Same as original image.	ALWAYS	COPY
Patient ID	(0010,0020)	LO	Same as original image.	VNAP	COPY
Patient's Birth Date	(0010,0030)	DA	Same as original image.	ALWAYS	COPY
Patient's Sex	(0010,0040)	CS	Same as original image.	ALWAYS	COPY

Table 6.3-3 General Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Same as original image.	ALWAYS	COPY
Study Date	(0008,0020)	DA	Same as original image.	ALWAYS	COPY
Study Time	(0008,0030)	TM	Same as original image.	ALWAYS	COPY
Referring Physician's Name	(0008,0090)	PN	Same as original image.	VNAP	COPY
Study ID	(0020,0010)	SH	Same as original image.	ALWAYS	COPY
Accession Number	(0008,0050)	SH	Same as original image.	VNAP	COPY
Study Description	(0008,1030)	LO	Same as original image.	VNAP	COPY

Table 6.3-4 Patient Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Admitting Diagnoses Description	(0008,1080)	LO	Same as original image.	ANAP	COPY
Patient's Age	(0010,1010)	AS	Same as original image.	ANAP	COPY
Patient's Size	(0010,1020)	DS	Same as original image.	ANAP	COPY
Patient's Weight	(0010,1030)	DS	Same as original image.	ANAP	COPY
Occupation	(0010,2180)	SH	Same as original image.	ANAP	COPY
Additional Patient's History	(0010,21B0)	LT	Same as original image.	ANAP	COPY

Table 6.3-5 General Series module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Modality	(0008,0060)	CS	Same as original image.	ALWAYS	COPY
Series Instance UID	(0020,000E)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device.	ALWAYS	AUTO
Series Date	(0008,0021)	DA	‹yyyymmdd›	ALWAYS	AUTO
Series Time	(0008,0031)	TM	‹hhmmdd›	ALWAYS	AUTO
Performing Physicians' Name	(0008,1050)	PN	Same as original image.	ANAP	COPY
Protocol Name	(0018,1030)	LO	Same as original image.	ANAP	COPY
Series Description	(0008,103E)	LO	2D ‹Frontal/Lateral› secondary ‹mm/dd/yyyy› ‹hh:mm:ss›	ALWAYS	AUTO
Operators' Name	(0008,1070)	PN	Same as original image.	ANAP	COPY
Body Part Examined	(0018,0015)	CS	Same as original image. Absent if not present in original images.	VNAP	COPY

Table 6.3-6 General Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Manufacturer	(0008,0070)	LO	Same as original image.	ALWAYS	COPY
Institution Name	(0008,0080)	LO	Same as original image.	ANAP	COPY
Station Name	(0008,1010)	SH	From configuration	ALWAYS	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	Same as original image.	ANAP	COPY
Device Serial Number	(0018,1000)	LO	Same as original image.	ANAP	COPY
Software Versions	(0018,1020)	LO	Same as original image.	ANAP	COPY
Date of Last Calibration	(0018,1200)	DA	Same as original image.	ANAP	COPY
Time of Last Calibration	(0018,1201)	TM	Same as original image.	ANAP	COPY

Table 6.3-7 SC Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source

Conversion Type	(0008,0064)	CS	WSD	ALWAYS	AUTO
Modality	(0008,0060)	CS	Same as original image.	ALWAYS	COPY
Secondary Capture Device Manufacturer	(0018,1016)	LO	EOS imaging	ALWAYS	AUTO
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	LO	EOS Software Applications	ALWAYS	AUTO
Secondary Capture Device Software Version	(0018,1019)	LO	Software version (3.x.x.xxxx)	ALWAYS	AUTO

Table 6.3-8 General Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Instance Number	(0020,0013)	IS	Same as original image.	ALWAYS	COPY
Patient Orientation	(0020,0020)	CS	From current display setting.	ALWAYS	USER
Image Type	(0008,0008)	CS	DERIVED\SECONDARY	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	Same as original image.	ANAP	COPY
Acquisition Time	(0008,0032)	TM	Same as original image.	ANAP	COPY
Referenced Image Sequence	(0008,1140)	SQ	present if (0008,0008) = DERIVED\SECONDARY\\BIPLANE A or DERIVED\SECONDARY\\BIPLANE B	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	From referenced image.	ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image.	ANAP	AUTO
>Purpose of Reference Code Sequence	(0040,A170)	SQ	One item	ANAP	AUTO
>>Code Value	(0008,0100)	SH	121314	ANAP	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ANAP	AUTO
>>Code Meaning	(0008,0104)	LO	Other image of biplane pair	ANAP	AUTO
Source Image Sequence	(0008,2112)	SQ	From original image.	ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of the original image.	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of the original image.	ALWAYS	AUTO
>Purpose of Reference Code Sequence	(0040,A170)	SQ	One item.	ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121322	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Source image for image processing operation	ALWAYS	AUTO
Images in Acquisition	(0020,1002)	IS	Same as original image.	ANAP	COPY
Image Comments	(0020,4000)	LT	Same as original image.	ANAP	COPY
Lossy Image Compression	(0028,2110)	CS	Same as original image.	ANAP	COPY
Lossy Image Compression Ratio	(0028,2112)	DS	Same as original image.	ANAP	COPY
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ANAP	AUTO

Table 6.3-9 Image Pixel module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Generated by device.	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by device.	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Same as original image.	ALWAYS	COPY
Bits Stored	(0028,0101)	US	Same as original image.	ALWAYS	COPY
High Bit	(0028,0102)	US	Same as original image.	ALWAYS	COPY
Pixel Representation	(0028,0103)	US	Same as original image.	ALWAYS	COPY
Pixel Data	(7FE0,0010)	OW	The Pixel Data itself does not contain any burned-in annotation.	ALWAYS	AUTO

Table 6.3-10 SC Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Date of Secondary Capture	(0018,1012)	DA	‹yyyymmdd›	ALWAYS	AUTO
Time of Secondary Capture	(0018,1014)	TM	‹hhmmdd›	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Generated by device.	ALWAYS	AUTO
Pixel Spacing Calibration Type	(0028,0A02)	CS	Same as original image.	ANAP	COPY
Pixel Spacing Calibration Description	(0028,0A04)	LO	Same as original image.	ANAP	COPY

Table 6.3-11 VOI LUT module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Window Center	(0028,1050)	DS	From current display setting: 0...65536	ALWAYS	USER
Window Width	(0028,1051)	DS	From current display setting: 0...65536	ALWAYS	USER

Table 6.3-12 SOP Common module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	‹yyyymmdd›	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	Generated by device.	ALWAYS	AUTO

Table 6.3-13 Private Application module attributes of created SOP Instances

Attribute Name	Tag	VR	Presence of Value	Source
Internal data	(0863,0010)	LO	ALWAYS	AUTO
Internal data	(0863,1010)	SL	ALWAYS	COPY
Internal data	(0863,1023)	SL	ANAP	COPY
Internal data	(0863,1026)	UL	ALWAYS	AUTO
Internal data	(0863,1027)	SL	ANAP	COPY
Internal data	(0863,1028)	SL	ANAP	COPY
Internal data	(0863,1032)	SL	ANAP	AUTO
Internal data	(0863,1033)	SL	ANAP	AUTO
Internal data	(0863,1034)	FL	ANAP	COPY
Internal data	(0863,1035)	SL	ANAP	COPY
Internal data	(0863,1036)	SL	ANAP	COPY
Internal data	(0863,1037)	SL	ANAP	COPY
Internal data	(0863,1040)	FL	ANAP	AUTO
Internal data	(0863,1041)	FL	ANAP	AUTO
Internal data	(0863,1047)	SL	ANAP	COPY
Internal data	(0863,1050)	FL	ALWAYS	AUTO
Internal data	(0863,1055)	FL	ANAP	AUTO
Internal data	(0863,1056)	FL	ANAP	AUTO
Internal data	(0863,1057)	CS	ANAP	AUTO
Internal data	(0863,1058)	SL	ANAP	AUTO

NOTE: EOS imaging private fields are specifically managed. However, this management is not described in this document.

The following attributes are not required in the Secondary Capture Image IOD Module but the AWS Acquisition storage application adds them.

Table 6.3-14 Additional attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Imager Pixel Spacing	(0018,1164)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Detector Active Dimension(s)	(0018,7026)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Distance Source to Isocenter	(0018,9402)	FL	Present if biplane images. Same as original image.	ANAP	COPY
Requesting Physician	(0032,1032)	PN	Same as original image. Absent if not present in original images.	ANAP	COPY

6.4 Secondary Capture Image: data dictionary of private attributes

The Private Attributes added to create SOP Instances are listed in the Table below. AWS Acquisition reserves blocks of private attributes in group 0863.

Table 6.4-1 Data Dictionary of private attributes

Tag	Attribute Name	VR	VM
(0863,0010)	*Internal data*	LO	1
(0863,1010)	*Internal data*	SL	1
(0863,1023)	*Internal data*	SL	1
(0863,1026)	*Internal data*	UL	1
(0863,1027)	*Internal data*	SL	1
(0863,1028)	*Internal data*	SL	1
(0863,1032)	*Internal data*	SL	1
(0863,1033)	*Internal data*	SL	1
(0863,1034)	*Internal data*	FL	1
(0863,1035)	*Internal data*	SL	1
(0863,1036)	*Internal data*	SL	1
(0863,1037)	*Internal data*	SL	1
(0863,1040)	*Internal data*	FL	1
(0863,1041)	*Internal data*	FL	1
(0863,1047)	*Internal data*	SL	1
(0863,1050)	*Internal data*	FL	1
(0863,1055)	*Internal data*	FL	1
(0863,1056)	*Internal data*	FL	1
(0863,1057)	*Internal data*	CS	1
(0863,1058)	*Internal data*	SL	1

6.5 X-Ray Radiation Dose SR IOD Contents

6.5.1 Created SOP Instances

Table 6.5-1 specifies the attributes of an X-Ray Radiation Dose SR transmitted by the AWS Acquisition storage application.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Value” column are:

- VNAP Value Not Always Present (attribute sent zero length if no value is present)
- ANAP Attribute Not Always Present
- ALWAYS Always Present
- EMPTY Attribute is sent without a value

The abbreviations used in the “Source” column:

- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- MWL the attribute value source Modality Worklist
- CONFIG the attribute value source is a configurable parameter

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

6.5.1.1 X-Ray Radiation Dose SR Storage

Table 6.5-1 IOD of created X-RAY RADIATION DOSE SR SOP Instances

IE	Module	Reference	Presence of module
Patient	Patient	Table 6.5-2	ALWAYS
Study	General Study	Table 6.5-3	ALWAYS
	Patient Study	Table 6.5-4	ALWAYS
Series	SR Document Series	Table 6.5-5	ALWAYS
Equipment	General Equipment	Table 6.5-6	ALWAYS
	Enhanced General Equipment	Table 6.5-7	ALWAYS
Document	SR Document General	Table 6.5-8	ALWAYS
	SR Document Content	§6.5.1.1.1	ALWAYS
	SOP Common	Table 6.5-9	ALWAYS

The template used in the SR Document is TID 10001 "Projection X-Ray Radiation Dose Report".

Table 6.5-2 Patient module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input.	ALWAYS	MWL/ USER
Patient ID	(0010,0020)	LO	From Modality Worklist or user input. May be empty.	VNAP	MWL/ USER
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input.	ALWAYS	MWL/ USER
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input.	ALWAYS	MWL/ USER

Table 6.5-3 General study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or generated by device with timestamp.	ALWAYS	MWL/ AUTO
Study Date	(0008,0020)	DA	‹yyyymmdd›	ALWAYS	AUTO
Study Time	(0008,0030)	TM	‹hhmmss›	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist.	VNAP	MWL
Study ID	(0020,0010)	SH	From Modality Worklist (Requested Procedure ID) or generated by device.	ALWAYS	MWL/ AUTO
Accession Number	(0008,0050)	SH	From Modality Worklist or user input.	VNAP	MWL/ USER
Study Description	(0008,1030)	LO	From Modality Worklist, or empty.	VNAP	MWL
Physician(s) of Record	(0008,1048)	PN	From Modality Worklist (Scheduled Performing Physician's Name (0040,0006)).	ANAP	MWL
Procedure Code Sequence	(0008,1032)	SQ	From Modality Worklist. Absent if "Requested Procedure Code Sequence" is empty in worklist.	ANAP	AUTO
› Code Value	(0008,0100)	SH	From Modality Worklist.	ALWAYS	AUTO
› Coding Scheme Designator	(0008,0102)	SH	From Modality Worklist.	ALWAYS	AUTO
› Code Meaning	(0008,0104)	LO	From Modality Worklist.	ALWAYS	AUTO

Table 6.5-4 Patient Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Calculated from DoB input on base of actual Date.	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	From Modality Worklist or user input.	ANAP	MWL/ USER
Patient's Weight	(0010,1030)	DS	From Modality Worklist or user input.	ANAP	MWL/ USER
Occupation	(0010,2180)	SH	User input.	ANAP	USER
Additional Patient's History	(0010,21B0)	LT	From Modality Worklist (Medical Alerts (0010,2000)) or user input. Maximum 10240 characters.	ANAP	MWL/ USER

Table 6.5-5 SR Document Series module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Modality	(0008,0060)	CS	"SR"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	"1"	ALWAYS	AUTO
Series Date	(0008,0021)	DA	‹yyyymmdd›	ALWAYS	AUTO
Series Time	(0008,0031)	TM	‹hhmmss›	ALWAYS	AUTO
Series Description	(0008,103E)	LO	"Radiation Dose Information"	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Present only if MPPS is configured in EOS Acquisition to send N-CREATE/N-SET messages.	ANAP	AUTO
› Referenced SOP	(0008,1150)	UI	1.2.840.10008.3.1.2.3.3	VNAP	AUTO

Class UID					
› Referenced SOP Instance UID	(0008,1155)	UI	MPPS SOP Instance UID.	VNAP	AUTO

Table 6.5-6 General Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Institution Name	(0008,0080)	LO	From configuration.	ALWAYS	CONFIG
Station Name	(0008,1010)	SH	From configuration.	ALWAYS	CONFIG
Date of Last Calibration	(0018,1200)	DA	‹yyyymmdd›	ALWAYS	AUTO
Time of Last Calibration	(0018,1201)	TM	‹hhmmss›	ALWAYS	AUTO

Table 6.5-7 Enhanced General Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Manufacturer	(0008,0070)	LO	"EOS imaging"	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	From configuration.	ALWAYS	CONFIG
Device Serial Number	(0018,1000)	LO	From configuration.	ALWAYS	CONFIG
Software Versions	(0018,1020)	LO	Software version (3.7.1.xxxx).	ALWAYS	AUTO

Table 6.5-8 SR Document General module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Instance Number	(0020,0013)	IS	Incremented number	ALWAYS	AUTO
Preliminary Flag	(0040,A496)	CS	"FINAL"	ALWAYS	AUTO
Completion Flag	(0040,A491)	CS	"COMPLETE" Note: the Dose SR contains all the irradiation events within the Scope of Accumulation (PPS)	ALWAYS	AUTO
Verification Flag	(0040,A493)	CS	"UNVERIFIED"	ALWAYS	AUTO
Content Date	(0008,0023)	DA	‹yyyymmdd›	ALWAYS	AUTO
Content Time	(0008,0033)	TM	‹hhmmss›	ALWAYS	AUTO
Referenced Request Sequence	(0040,A370)	SQ	From Modality Worklist, or absent.	ANAP	MWL
›Study Instance UID	(0020,000D)	UI	From Modality Worklist.	ALWAYS	MWL
›Referenced Study Sequence	(0008,1110)	SQ	N/A	EMPTY	AUTO
›Accession Number	(0008,0050)	SH	From Modality Worklist	VNAP	MWL
›Placer Order Number/Imaging Service Request	(0040,2016)	LO	N/A	EMPTY	AUTO
›Filler Order Number/Imaging Service Request	(0040,2017)	LO	N/A	EMPTY	AUTO
›Requested Procedure ID	(0040,1001)	SH	From Modality Worklist.	ALWAYS	MWL
›Requested Procedure Description	(0032,1060)	LO	From Modality Worklist.	VNAP	MWL
›Requested Procedure	(0032,1064)	SQ	From Modality Worklist, or empty.	VNAP	MWL

Code Sequence					
››Code Value	(0008,0100)	SH	From Modality Worklist.	ALWAYS	MWL
››Coding Scheme Designator	(0008,0102)	SH	From Modality Worklist.	ALWAYS	MWL
››Code Meaning	(0008,0104)	LO	From Modality Worklist.	ALWAYS	MWL
Performed Procedure Code Sequence	(0040,A372)	SQ	N/A	EMPTY	AUTO
Current Requested Procedure Evidence Sequence	(0040,A375)	SQ	Present if images were created during the exam.	VNAP	AUTO
› Study Instance UID	(0020,000D)	UI	Copied from original images	ALWAYS	AUTO
› Referenced Series Sequence	(0008,1115)	SQ	Present if images were created during the exam.	ALWAYS	AUTO
›› Series Instance UID	(0020,000E)	UI	Copied from original images	ALWAYS	AUTO
›› Referenced SOP Sequence	(0008,1199)	SQ	Present if images were created during the exam	ALWAYS	AUTO
››› Referenced SOP Class UID	(0008,1150)	UI	Copied from original images	ALWAYS	AUTO
››› Referenced SOP Instance UID	(0008,1155)	UI	Copied from original images	ALWAYS	AUTO

Table 6.5-9 SOP Common module

Attribute Name	Tag	VR	Values	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	"1.2.840.10008.5.1.4.1.1.88.67"	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	‹yyyymmdd›	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	‹hhmmss›	ALWAYS	AUTO
Instance Creator UID	(0008,0014)	UI	“1.2.250.1.118.0.1.0.0”	ALWAYS	AUTO

6.5.1.1.1 SR Document Content module (templates)

Table 6.5-10 TID 10001 PROJECTION X-RAY RADIATION DOSE

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			CONTAINER	EV (113701, DCM, “X-Ray Radiation Dose Report”)	ALWAYS	
2	›	HAS CONCEPT MOD	CODE	EV (121058, DCM, ”Procedure reported”)	ALWAYS	EV (113704, DCM, “Projection X-Ray”)
3	››	HAS CONCEPT MOD	CODE	EV (G-CoE8, SRT, “Has Intent”)	ALWAYS	EV (R-408C3, SRT, “Diagnostic Intent”)
5	›		INCLUDE	DTID 1002 "Observer Context"	ALWAYS	See table TID 1002.
6	›	HAS OBS CONTEXT	CODE	EV (113705, DCM, “Scope of	ALWAYS	EV (113016, DCM, "Performed Procedure Step")

				Accumulation")		
7	»»	HAS PROPERTIES	UIDREF	EV (121126, DCM, "Performed Procedure Step SOP Instance UID")	ALWAYS	MPPS SOP Instance UID automatically generated
8	›	CONTAINS	CODE	EV (113945, DCM, "X-Ray Detector Data Available")	ALWAYS	EV (R-0038D, SRT, "Yes")
9	›	CONTAINS	CODE	EV (113943, DCM, "X-Ray Source Data Available")	ALWAYS	EV (R-0038D, SRT, "Yes")
12	›	CONTAINS	INCLUDE	DTID 10002 "Accumulated X-Ray Dose"	ALWAYS	See table TID 10002.
13	›	CONTAINS	INCLUDE	DTID 10002 "Accumulated X-Ray Dose"	ALWAYS	See table TID 10002.
14	›	CONTAINS	INCLUDE	DTID 10003 "Irradiation Event X-Ray Data"	ALWAYS	See table TID 10003.
18	›	CONTAINS	CODE	EV (113854, DCM, "Source of Dose Information")	ALWAYS	EV (113856, DCM, "Automated Data Collection")

Table 6.5-11 TID 1002 OBSERVER CONTEXT

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1		HAS OBS CONTEXT	CODE	EV (121005,DCM, "Observer Type")	ALWAYS	EV (121007, DCM, "Device")
3		HAS OBS CONTEXT	INCLUDE	DTID 1004 "Device observer identifying attributes"	ALWAYS	See table TID 1004.

Table 6.5-12 TID 1004 DEVICE OBSERVER IDENTIFYING ATTRIBUTES

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			UIDREF	EV (121012,DCM, "Device Observer UID")	ALWAYS	AUTO (generated by device)
2			TEXT	EV (121013,DCM, "Device Observer Name")	ALWAYS	CONFIG
3			TEXT	EV (121014,DCM, "Device Observer Manufacturer")	ALWAYS	"EOS imaging"
4			TEXT	EV (121015,DCM, "Device Observer Model Name")	ALWAYS	CONFIG
5			TEXT	EV (121016,DCM, "Device Observer Serial Number")	ALWAYS	CONFIG
7			CODE	EV (113876, DCM, "Device Role in Procedure")	ALWAYS	EV (113859, DCM, "Irradiating Device")

Table 6.5-13 TID 10002 ACCUMULATED X-RAY DOSE

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			CONTAINER	EV (113702, DCM, "Accumulated X-Ray Dose Data")	ALWAYS	
2	›	HAS CONCEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	ALWAYS	EV (113620, DCM, "Plane A") or EV (113621, DCM, "Plane B")
12	›	CONTAINS	INCLUDE	DTID 10004 "Accumulated Projection X-RAY Dose"	ALWAYS	See table TID 10004.

Table 6.5-14 TID 10004 ACCUMULATED PROJECTION X-RAY DOSE

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			NUM	EV (113722, DCM, "Dose Area Product Total")	ALWAYS	AUTO
2			NUM	EV (113725, DCM, "Dose (RP) Total")	ALWAYS	AUTO
6			NUM	EV (113727, DCM, "Acquisition	ALWAYS	AUTO

				Dose Area Product Total")		
7			NUM	EV (113729, DCM, "Acquisition Dose (RP) Total")	ALWAYS	AUTO
8			NUM	EV (113855, DCM, "Total Acquisition Time")	ALWAYS	AUTO
12			TEXT	EV (113780, DCM, "Reference Point Definition")	ALWAYS	AUTO

Table 6.5-15 TID 10003 IRRADIATION EVENT X-RAY DATA

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			CONTAINER	EV (113706, DCM, ”Irradiation Event X-Ray Data”)	ALWAYS	
2	›	HAS CONCEPT MOD	CODE	EV (113764, DCM, “Acquisition Plane”	ALWAYS	EV (113620, DCM, ”Plane A”) or EV (113621, DCM, ”Plane B”)
3	›	CONTAINS	UIDREF	EV (113769, DCM, “Irradiation Event UID”)	ALWAYS	AUTO
6	›	CONTAINS	DATETIME	DT (111526, DCM, “DateTime Started”)	ALWAYS	AUTO
7	›	CONTAINS	CODE	EV (113721, DCM, “Irradiation Event Type”)	ALWAYS	EV (113611, DCM, “Stationary Acquisition”)
8	›	CONTAINS	TEXT	EV (125203, DCM, “Acquisition Protocol”)	ALWAYS	AUTO
17	›	CONTAINS	CODE	EV (123014, DCM, (“Target Region”)	ALWAYS	AUTO
18	›	CONTAINS	NUM	EV (122130, DCM, “Dose Area Product”)	ALWAYS	AUTO
25	›	CONTAINS	TEXT	EV (121106, DCM, “Comment”)	ALWAYS	AUTO
26	›	CONTAINS	INCLUDE	DTID 1020 "Person Participant"	ALWAYS	See table TID 1020.
27	›	CONTAINS	INCLUDE	DTID 10003A “Irradiation Event X-Ray Detector Data”	ALWAYS	See table TID 10003A.
28	›	CONTAINS	INCLUDE	DTID 10003B “Irradiation Event X-Ray Source Data”	ALWAYS	See table TID 10003B.

Table 6.5-16 TID 10003A IRRADIATION EVENT X-RAY DETECTOR DATA

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
5			IMAGE	EV (113795, DCM, “Acquired Image”)	ALWAYS	AUTO

Table 6.5-17 TID 10003B IRRADIATION EVENT X-RAY SOURCE DATA

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			NUM	EV (113738, DCM, “Dose (RP)”)	ALWAYS	AUTO
2			TEXT	EV (113780, DCM, “Reference Point Definition”)	ALWAYS	AUTO
7			NUM	EV (113768, DCM, “Number of Pulses”)	ALWAYS	AUTO
11			NUM	EV (113733, DCM, “KVP”)	ALWAYS	AUTO
12			NUM	EV (113734, DCM, “X-Ray Tube Current”)	ALWAYS	AUTO
14			NUM	EV (113824, DCM, “Exposure Time”)	ALWAYS	AUTO
16			NUM	EV (113766, DCM, “Focal Spot Size”)	ALWAYS	AUTO

18			CONTAINER	EV (113771, DCM, “X-Ray Filters”)	ALWAYS	
19	›	CONTAINS	CODE	EV (113772, DCM, “X-Ray Filter Type”)	ALWAYS	AUTO
20	›	CONTAINS	CODE	EV (113757, DCM, “X-Ray Filter Material”)	ALWAYS	AUTO
21	›	CONTAINS	NUM	EV (113758, DCM, “X-Ray Filter Thickness Minimum”)	ALWAYS	AUTO
22	›	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	ALWAYS	AUTO
23			NUM	EV (113790, DCM, “Collimated Field Area”)	ALWAYS	AUTO
24			NUM	EV (113788, DCM, “Collimated Field Height”)	ALWAYS	AUTO
25			NUM	EV (113789, DCM, “Collimated Field Width”)	ALWAYS	AUTO

Table 6.5-18 TID 1020 PERSON PARTICIPANT

	NL	Rel with Parent	VT	Concept Name	Presence of Value	Value
1			PNAME	EV (113870, DCM, "Person Name")	ALWAYS	AUTO
2	›	HAS PROPERTIES	CODE	EV (113875, DCM, "Person Role in Procedure")	ALWAYS	AUTO
ttr6	›	HAS PROPERTIES	CODE	EV (113874, DCM, "Person Role in Organization")	ALWAYS	AUTO

"Biospace med" has changed its name, and will henceforth be known as "EOS imaging".